Final Remedial Investigation Report

Court Street Site
Binghamton, New York

New York State Electric & Gas Corporation
Binghamton, New York

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Errata

Following publication of this Final Remedial Investigation Report the following error was identified: the elevation of the till surface reported for well TW97-1D on Figure 9 was incorrectly reported as 776.36 feet above Mean Sea Level whereas the correct value is 796.36 feet above Mean Sea Level.

The following corrections have been made to this report to address this error:

1. Figure 9 (Till Surface Elevation Contour Map) was revised using the correct till surface elevation at well TW97-1D.
2. The till surface shown on Figure 7 (Geologic Cross Section B-B') was revised to reflect the correction made to Figure 9 (described above).
3. The text describing the till surface on page 7-5 was revised to reflect the correction made to Figure 9.

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Executive Summary

This Remedial Investigation (RI) Report presents the findings of environmental investigations conducted at NYSEG's (New York State Electric and Gas Corporation's) Court Street Manufactured Gas Plant (MGP) site (the "site") located in Binghamton, New York (Figure 1). NYSEG became owner of a portion of the MGP in 1991, upon purchasing Columbia Gas of New York.

Blasland, Bouck, and Lee, Inc. (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 November 8, 1996. In May 1998, NYSEG voluntarily undertook a subsurface investigation of two adjacent properties located at 293 and 295 Court Street. Based on the findings of that investigation, the NYSDEC requested that the definition of the Court Street Site contained in the Order on Consent be amended to include the 293 Court Street parcel. This amendment to the Order on Consent was made on January 21, 1999. NYSEG has since purchased the 293 Court Street parcel, which was part of the original MGP property.

The MGP operated for approximately 50 years (ca. 1888 to 1939), using coal and oil to produce gas. No information exists regarding how byproducts generated at the plant were handled and disposed. Byproducts from the MGP process, principally coal tar, are present in soils and groundwater beneath the site and in isolated, shoreline reaches of the Susquehanna River's bed.

The site has been the subject of five major investigations, starting in 1991 and culminating with this report. These investigations involved drilling approximately 40 soil borings, installing approximately 40 monitoring wells and piezometers, and analyzing several hundred samples of environmental media. The primary objectives of this work were to adequately 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, to enable conduct of a Feasibility Study, which will evaluate remedial alternatives. The Order on Consent also contains several related, specific objectives which are discussed in Section 3 of this report. All of these objectives have been satisfied by the work performed during these five investigations.

The byproduct responsible for most of the impacts is primarily coal-tar, which is a dense non-aqueous phase liquid (DNAPL). 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 (or "BTEX") and a more-general class of organic compounds called polycyclic aromatic hydrocarbons (PAHs). These two groups of compounds, along with NAPLs themselves, proved most-useful in characterizing the nature and extent of site-related impacts.

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

- ***Subsurface Investigation.*** This investigation characterized the hydrogeology of the site, and the nature and extent of site-related impacts.

- ***Susquehanna River Evaluation.*** This evaluation assessed the extent of site-related impacts to the river.

- ***Risk Evaluation.*** This evaluation assessed the potential risks posed to human health and the environment by site-related constituents.

Subsurface Investigation

The following present the salient findings of the subsurface investigation:

- Five geologic units beneath the site were investigated. These are (in descending order): fill, silt, sand and gravel, till, and bedrock. The thicknesses of the fill, silt, and sand and gravel units are approximately 10 feet, 10 feet, 30 feet, and 45 feet, respectively.

- NAPLs are present in the fill, silt, and sand and gravel beneath most of the site, predominantly below the water table. Soils that contain NAPLs will likely exceed NYSDEC guidance values for establishing 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 or centuries.

- The till and bedrock units appear unaffected by the site. The till appears to be an effective barrier to NAPL, and groundwater moves upward from the till and bedrock to the sand and gravel. For these reasons, it is unlikely that either the till or bedrock will become impacted in the future.

- Due to the physical properties of the NAPLs, and the complex nature of the fill, silt, and sand and gravel units beneath the site, the distribution of the NAPLs in these units is highly irregular and difficult to predict.

- Above the water table, the regions of soils that exceed NYSDEC guidance values are relatively small and reasonably well defined. The depth to the water table across most of the site averages less than 10 feet.

- NAPL has migrated off the site, principally at the top of the sand and gravel, in two areas: near the southwest and southeast corners of the site. At the extreme southwest corner, the NAPL has migrated southward predominantly beneath a 66-inch storm sewer that passes through the site and discharges to the Susquehanna River. While the NAPL appears to have exploited a preferential migration pathway, it does not appear that the pathway is related to the materials surrounding the sewer itself. This is because several features have existed in this area, including a canal and a creek, which could also be wholly or partly

responsible for influencing the direction of NAPL movement. Furthermore, the materials surrounding the sewer pipe are predominantly fine-grained and show no evidence of comprising a preferential pathway for fluid flow.

At the southeast corner of the site, two factors appear responsible for the NAPL: historical pumping at the Ranney well, and a gap in the Court Street flood wall. The Ranney well, a former water-supply well for the City of Binghamton, was located east of the site. While operating, it appears to have drawn NAPL eastward from the site, toward, but not all the way to the well. When pumping was discontinued at the well, groundwater and NAPL moved southward, apparently reaching the riverbed through an opening in the steel sheeting of the flood wall. The opening allows a former water intake for the MGP (identified as the "BB pipe") to pass through the wall. Two other pipes, which appear to be unused, also pass through the flood wall in this area, but are less likely to be sources of the impacted riverbed materials.

Susquehanna River Evaluation

The Susquehanna River evaluation entailed characterizing the quality of the river water, the nature of the riverbed, the extent of site-related impacts to the riverbed, and the potential for site-related constituents to be transported across the river to the intake of the City's water filtration plant.

Three areas of the riverbed have been affected by site-derived NAPL or components of the NAPL, particularly BTEX and PAHs. The areas where the riverbed, which is composed chiefly of sand, gravel, and cobbles, has been impacted are well constrained and relatively limited in extent. Two of the three areas are associated with the areas where NAPL has migrated off site; one is located near where the BB pipe (and other pipes) passes through the flood wall, the other where the 66-inch storm sewer discharges to the river. The third area is an isolated deposit of sediment located a few hundred feet downstream of, and probably derived from, the area around the 66-inch storm sewer. In these areas, impacted riverbed materials will often generate sheens when disturbed. The RI has shown that, except for these momentary sheens, the site does not adversely affect the quality of river water.

The causes of the affected sediments near the BB pipe and the 66-inch storm sewer are likely a combination of discharge of NAPL through the subsurface and discharge of site-related and/or non-site-related PAHs from the pipes that empty (or emptied) to these areas of the river. There is evidence that a portion of the PAHs detected in riverbed materials in all three affected areas are not site related. At all three areas of affected sediments, the areas where oil sheens were detected during probing and sampling correlated well with elevated PAHs; therefore, sheens may be a useful, easy means of identifying the limits of affected sediment.

Given the physical properties of the NAPL and the complex subsurface geology, it is not practicable to determine with certainty whether NAPL is continuing to migrate and discharge to the riverbed near the BB pipe and 66-inch storm sewer.

Transport modeling performed to evaluate the potential for site-related constituents to be transported across the river to the City's water filtration plant intake showed that such transport is not plausible under any current or foreseeable future scenarios.

Risk Evaluation

The human heath evaluation found that: (1) the site does not pose a significant threat to human health because, based on an evaluation of the current and foreseeable use of the site and the nature and location of chemicals of potential interest (COPI) in environmental media associated with the site, human exposure to COPI is unlikely to occur; and (2) exposure to sediments and Susquehanna-River water near the site is possible, though seasonal in nature.

The ecological assessment found that, for localized areas of sediments near the discharge point for the 66-inch-diameter storm sewer, and to a lesser extent the area around the BB pipe, the potential exists for localized adverse impacts to benthic-invertebrate species living in the river.

Conclusion

With the findings presented in this report, NYSEG has characterized the nature and extent of the former MGP's impacts on the environment and fulfilled the requirements of the Order on Consent. Following approval of this report by the NYSDEC, NYSEG will prepare a Feasibility Study to identify Remedial Action Objectives and select appropriate remedial measures for the site.

1. Introduction

1.1 Overview

This document reports the work and findings of a series of environmental investigations conducted between 1997 and 2002 that form the Remedial Investigation (RI), for the Court Street Former Manufactured Gas Plant (MGP) in Binghamton, New York. The RI consisted of three episodes of investigation, listed below, completed by the New York State Electric & Gas Corporation (NYSEG) with technical consulting services provided by Blasland, Bouck & Lee, Inc. (BBL).

- The Phase I Supplemental Remedial Investigation (SRI), conducted in 1997;
- Offsite Properties Investigations, conducted in 1998; and
- The Phase II Supplemental Remedial Investigation, conducted in 2001 and 2002.

To provide appropriate context, this report includes a limited review of the work and findings of two preliminary site investigations completed before 1997, and portions of two Interim Remedial Measures (IRMs) undertaken simultaneously with the RI. This report is comprehensive of all portions of the site investigations that have helped achieve the objectives of the RI. These objectives are discussed in detail in Section 3 of this report. Through each portion of the RI, NYSEG's overall objective has been to characterize the nature and extent of the former MGP's impacts on the environment so that a Feasibility Study may be conducted to identify a final remedy.



Figure 1.1 1994 Air Photo showing the Former MGP and surrounding features.

1.2 Site Setting

The Court Street Former MGP Site (the "site") is located in an industrial section of Binghamton, in Broome County, New York. This setting is illustrated on Figure 1 and in the adjacent air photo, Figure 1.1. The site occupies property identified as 271-291, and 293 Court Street, all now owned by NYSEG. The 293 Parcel is used as a natural gas service center by Columbia Gas Transmission Corporation. The remaining portion of the site is now a gravel lot, and is used only as an equipment storage and parking area for NYSEG's Court Street Service Center.

The service center is located immediately west of the site, across Brandywine Avenue. To the south, the site borders Court Street, which runs beside the Susquehanna River. East of the site is the 295 Court Street Property, containing a warehouse owned by the 295 Court Street Associates, L.L.C. (referred to hereafter as the Binghamton Materials Handling warehouse, or simply the "BMH warehouse"). Immediately north of the site is a major Norfolk and Southern Railroad line (formerly CSX), an asphalt works plant and a scrap yard.

1.3 History of Investigations

In 1991, the year NYSEG took possession of the property through its acquisition of Columbia Gas of New York, they began formal investigations into the Court Street Site due to its history as an MGP. NYSEG conducted two studies prior to the RI, which laid the groundwork for the later work. The early investigations were identified as follows:

- *Prioritization of Former MGP Site*, prepared by Engineering Science, Inc. in 1992, based on a limited field investigation conducted in 1991.

- *Task II Remedial Investigation* (Task II RI), prepared by BBL in 1996, based on a more extensive field program conducted between April 1993 and January 1994.

Based on the findings of the *Task II RI*, the New York State Department of Environmental Conservation (NYSDEC) and NYSEG entered into an Order on Consent, effective November 8, 1996, which shaped the scope of the first phase of the RI, at the time referred to as the SRI (now called the Phase I SRI).

After performing the work, BBL submitted its findings in a Draft Phase I SRI Report, dated June 1998. The NYSDEC provided comments on the report in correspondence dated October 1, 1998, and January 14, 1999. BBL then revised and resubmitted the Draft SRI Report in March 1999.

While the Phase I SRI Report was under state review, NYSEG voluntarily undertook the 293 and 295 Court Street Investigations, to assess the subsurface conditions of the properties immediately east of the site, then owned by third parties. BBL submitted the results of the 293 and 295 Court Street Investigations as draft letter-reports to NYSEG in August and October, 1998, respectively.

Based on the findings of the 293 Court Street Investigation, the NYSDEC requested that the definition of the Court Street Site contained in the Order on Consent be amended to include the 293 Court Street property. This amendment to the Order on Consent was made on January 21, 1999. Shortly thereafter, on September 10, 1999, NYSEG purchased the 293 Court Street property.

NYSEG finalized an Interim Remedial Measures (IRM) work plan for a limited source removal program in November 2000. The work, which included excavating impacted soil and several underground remnants of the MGP, began that same month and was completed August 2001. NYSEG submitted the Draft IRM Final Engineering Report to the NYSDEC in January 2002.

In the late summer of 2000, the NYSDEC changed project managers for the site and in correspondence dated September 18, 2000, notified NYSEG that the remedial investigation for the site was not complete. In an October 10, 2000 letter to NYSEG, the NYSDEC outlined their perceived data gaps. In response to these letters, NYSEG submitted, and the NYSDEC approved, the July 2001 Work Plan for the Phase II SRI. This Work Plan outlined the agreed scope of work required to complete the RI, and the general requirements of this report.

In correspondence dated October 10, 2000, the NYSDEC requested NYSEG complete a second IRM to mitigate the suspected transport of site-related constituents to the Susquehanna River along the former 66-inch storm sewer (shown on Figure 2). In January 2002, BBL submitted a plan to the NYSDEC for evaluating the feasibility of such an IRM and completed the initial phase of the evaluation in conjunction with the Phase II SRI. NYSEG plans to submit the results of the evaluation to the NYSDEC by the end of May 2002.

1.4 Report Scope and Organization

This document incorporates elements from each of NYSEG's site investigations since it took ownership in 1991, including the seven projects mentioned in the above section. This report focuses, however, on the three investigations constituting the RI, which have not (or will not) be reported elsewhere: the Phase I SRI of 1997, the offsite properties investigations of 1998, and the Phase II SRI of 2001. This document encompasses and supercedes prior draft submittals for the Phase I SRI and for the offsite properties investigations.

As a note of clarification, NYSEG initially used the title "*Supplemental* Remedial Investigation" in 1997 to indicate that the work was a continuation of the Task II RI. The SRI nomenclature persisted though the planning and completion of the Phase II SRI in 2002. For the final version of this report, the NYSDEC has asked that NYSEG adopt the more standard title "Remedial Investigation" to refer to the body of work completed. Though the term "supplemental" may be misleading with regard to the new RI nomenclature, to be consistent with the project history this RI Report refers to the Phase I SRI and Phase II SRI as distinct portions of the overall project.

As mentioned above, the Prioritization Investigation and the Task II RI are completed projects with submitted reports. The relevant data and other findings of those investigations are included in this report. For the reader's convenience a scanned copy of the Task II RI Report is included on the Electronic Attachments CD.

This report also presents key activities and findings of IRMs completed, or in progress, at the site. The work of the IRMs is tangential to the objectives of the RI, and is discussed only as far as the data provide support for the site investigations. Section 6 discusses the IRMs in more detail, though thorough coverage of their activities and findings has been left for the engineering documents submitted, or planned for submittal, pertaining specifically to that work (see Section 6 for details).

2. Site History and Prior Work

2.1 Site History

BBL developed this discussion of site history based on historical maps and other information from multiple sources and dating back to 1836. Relevant maps are provided in the Electronic Attachments CD included with this report.

In 1836, the current site limits lay along Court Street on the eastern outskirts of what was then the village of Binghamton. At that time, the site appeared undeveloped and contained a canal identified as "Side Cut to Chenango Canal", referred to hereafter as the "Brandywine Canal". The Brandywine Canal was aligned roughly north-south and passed through the western portion of the site before passing beneath Court Street and joining the Susquehanna River (Tower, 1836). More recent information suggests that the path of a tributary to the Susquehanna, Brandywine Creek, followed the approximate route of the Brandywine Canal. A less detailed map drawn four years later (Wentz, 1840) does not call out the canal or the creek specifically, but shows that the current site limits were located between the Susquehanna River and a lowland area that drained to the river through the western portion of the site. The map notes that this lowland area was "affected by waters of the Chenango Canal".

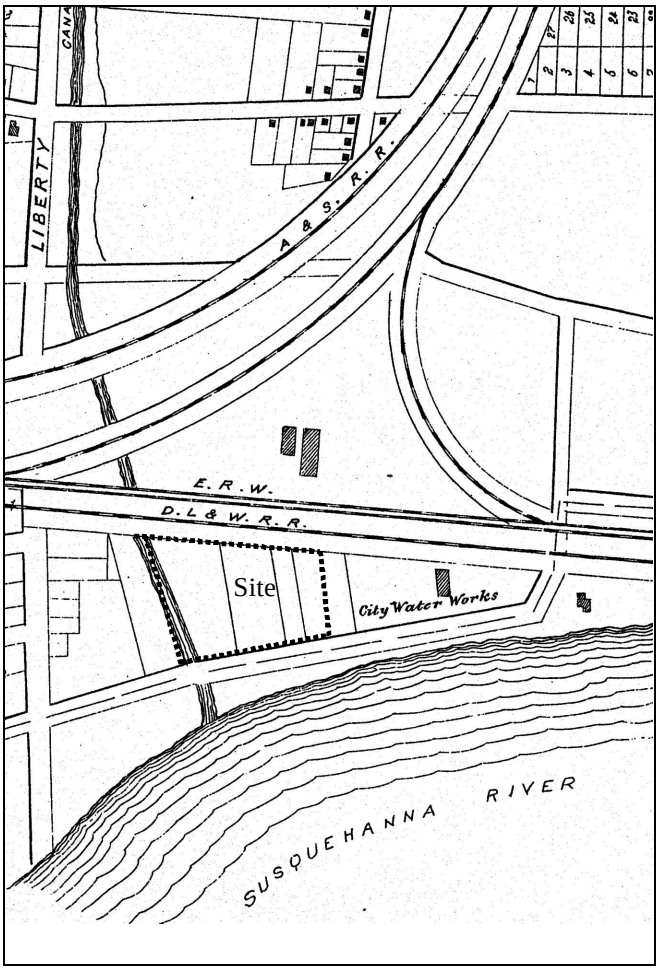


Figure 2.1 1876 map showing approximate site limits.

The Brandywine Canal appears to have been abandoned between 1876 and 1885, as shown on the two adjacent Figures 2.1 and 2.2. The 1876 map (Figure 2.1) shows the canal and a feature that may be Brandywine Creek, shown north of the site running parallel to the canal. The 1885 map shows what appears to be Brandywine Creek and a dashed line labeled "Line of Canal Extension" that reasonably matches the location of the Brandywine Canal. Based on this information it appears that, at least for a time, the creek and canal followed parallel but separate courses through the western portion of the site. The approximate location of these features in relation to current site features is shown on Figure 2.

Figure 2.2 also shows the location of a former oil refinery, situated north of the current 293 and 295 Court Street properties. This refinery was incorporated in 1872 and by 1898 was producing 100 barrels per day of petroleum product (American Journal of Progress, 1898). Sanborn maps from 1887 and 1918 show that the refinery had as many as 18 storage tanks of various sizes, some described as "sunk in the ground", with contents identified as "kerosene", "gasoline", and simply "oil". Sometime between 1918 and 1949, the refinery was replaced by the Municipal Construction Company Asphalt Works (Sanborn, 1918 and 1949), and appears to have been operated as such, under various owners, until the present. In summary, either an oil refinery or an asphalt plant occupied this parcel for a period of at least 97 years.

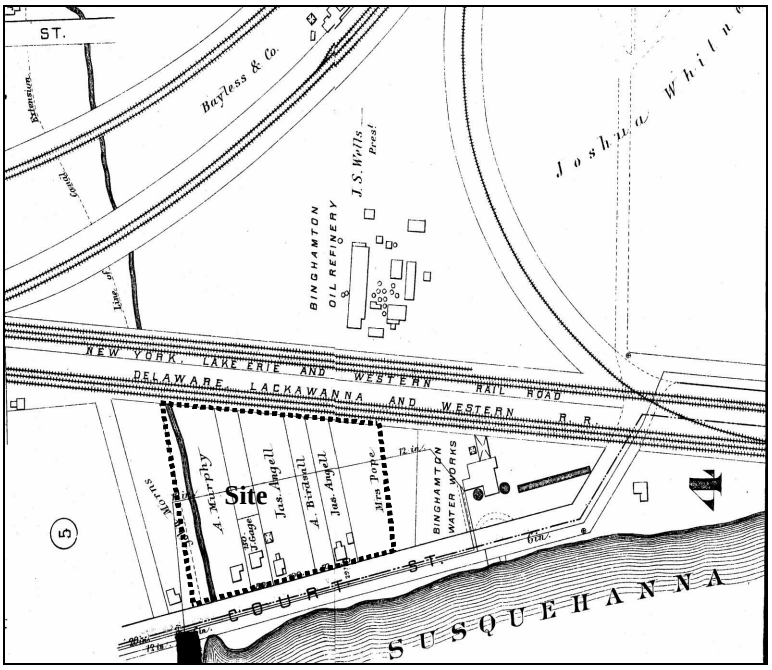


Figure 2.2 1885 map showing approximate site limits and oil refinery.

In about 1888, the Binghamton Gas & Electric Company began MGP operations on land that is now in the eastern portion of the site (293 Court Street). Plant ownership passed to the Binghamton Gas Works by 1898, and operations continued to expand westward across the site.

At some point between 1885 and 1924, Brandywine Creek was diverted into a culvert that still crosses the site, identified as the 66-inch storm sewer. The earliest mention of the 66-inch sewer was found in a City of Binghamton record of a flood in 1924.

Sanborn Maps show various structures within the plant, including four gas holders, seven oil tanks, a tar-separating well[1], machine shop, and a governor house. The footprints of the former plant features are shown on Figure 2. By the time the plant stopped gas production in about 1939 (Eng, 1985), its structures covered the entire site, between Brandywine Ave. and the western boundary of the 295 Court Street Property. Gas production records from 1940 to 1950 list the source of gas at the site as "natural gas". By about 1969 all aboveground structures at the plant had been dismantled. The Electronic Attachments CD contains an album

[1] This structure is identified differently on historical maps. It has been labeled an "ammonia well", "settling tank", and a "tar-separating well".

retrieved from the former MGP records, which included photos of site structures and limited information on their construction.

The scrap yard that currently occupies the property northwest of the site (see Figure 1.1) dates back to at least 1949, where it is labeled as such on a Sanborn map covering that period.

Columbia Gas of New York and its predecessors owned the property until 1991, though in 1961 they sold the 293 Court Street parcel to a private party. When NYSEG purchased Columbia Gas of New York in 1991, it assumed ownership of the Court Street Property and responsibility for management of issues related to the former MGP. On September 10, 1999, NYSEG purchased the 293 Court Street property back from the private party.

2.2 Previous Environmental Investigations and General Findings

This section summarizes the scope and general findings of the two environmental investigations that preceded the RI, the Site Prioritization Investigation (ES, 1992) and the Task II RI (BBL, 1996). The findings of those investigations are incorporated in the later sections of this report.

2.2.1 Site Prioritization Investigation

In 1991, NYSEG commissioned Engineering Science, Inc. to complete a Site Prioritization Investigation to determine whether the site posed an imminent threat to human health and/or the environment. Twelve environmental samples were collected:

- Seven surface-soil samples (six from the site and one "background" sample from an off-site location); and
- Three surface-water and three sediment samples from the Susquehanna River.

The surface-water and sediment samples were collected from locations upstream, adjacent to, and downstream of the site. Each of the samples was analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and inorganics including cyanide.

The general findings of the investigation were the following:

- Surface soil samples were found to contain polycyclic aromatic hydrocarbons (PAHs), a subset of SVOCs often associated with MGP sites, at concentrations as high as approximately 40.2 ppm.

- River surface water was found to contain no site-related constituents above applicable criteria.

- River sediment was found to contain significant concentrations of both VOCs and SVOCs that were potentially derived from the site.

Based on the findings presented in the report *Prioritization of Former MGP Site* (ES, 1992), NYSEG determined that additional work was warranted. These findings shaped the scope and objectives of the Task II RI, discussed below.

2.2.2 Task II Remedial Investigation

On NYSEG's behalf, BBL completed the field work for the Task II RI between April 1993 and January 1994. The objectives of the Task II RI were to:

- Locate and assess potential site-related source areas and impacted areas;
- Define the extent of constituents in soils, groundwater, surface water, and sediments; and
- Determine whether the constituents presented a potential significant threat to human health and/or the environment.

The investigation included the following activities:

- Excavating 21 test pits/trenches (TP-1 through TP-21);
- Drilling 11 soil borings (TB-1 through TB-11);
- Installing four shallow monitoring wells (MW93-1S, MW93-2S, MW93-3S, and MW93-6S);
- Installing five deep monitoring wells (MW93-1D through MW93-3D, MW-93-5D, and MW93-6D);
- Installing one piezometer (PZ93-1); and
- Collecting and analyzing samples of soil, groundwater, and Susquehanna-river water and sediment.

The locations of the test pits, borings and wells are shown on Figure 3. The boring logs and test pit logs were presented in the Task II RI Report, but are also included in Appendix A of this report. The Task II RI achieved the following:

- Determined that non-aqueous phase liquid (NAPL)-affected soil pervades the former MGP operations area of the site at depths from several feet below grade to the top of a geologic deposit called till, approximately 50 feet below grade.

- Developed a preliminary assessment of groundwater flow.

- Determined that groundwater below the site, from the water table to the top of the till, contains site-related constituents in concentrations exceeding NYSDEC Ambient Water Quality Standards. The investigation

also found chlorinated aliphatic hydrocarbons in all deep monitoring wells. Concentrations of these chemicals often exceeded the Ambient Water Quality Standards. As discussed later, the RI would subsequently demonstrate that the chlorinated hydrocarbons were from an upgradient source, not associated with the former MGP.

- Identified two areas of the river where sediment contained site-related materials: near the 66-inch sewer and 24-inch pipe outfalls. (Both locations are shown on Figure 2)

- Confirmed that the Susquehanna River water quality was not adversely impacted by site-related constituents.

The *Task II RI Report* (BBL, 1996) was submitted to the NYSDEC, with recommendations for additional work that would form, in part, the scope of subsequent RI (the subject of this report). The objectives and scope of the RI are discussed in detailed in the following section.

3. Objectives

3.1 Objectives of the Order on Consent

After completion of the *Task II RI*, the NYSDEC and NYSEG entered into an Order on Consent (Index #D7-001-96-03), effective November 8, 1996, which outlined objectives to be met to satisfactorily complete the RI. These objectives were based on the *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (USEPA 1988), so that, when completed, the RI and the preceding work would meet the regulatory definition of a Remedial Investigation.

The adjacent table lists the nine objectives contained in the Order on Consent. The two objectives regarding the City's Ranney Well (objectives 8 and 9) were quickly eliminated. The NYSDEC indicated that testing of the Ranney Well would be unnecessary if NYSEG and the appropriate government agencies could agree on a feasible alternative to using the Ranney Well as a backup water supply (NYSDEC, 1997). The Order on Consent was thus modified effective January 21, 1999 (Index #A7-0379-9811). Such an agreement was reached on February 1, 1999. NYSEG, the City of Binghamton and the Village of Johnson City developed a plan to close the Ranney Well and replace its capacity as a backup water supply by connecting the municipal water systems of Binghamton and Johnson City. That work was completed in July 2000 and the Ranney Well has since been decommissioned.

Table 3.1
Order on Consent Objectives
November 8, 1996

1) Source area delineation and characterization to allow planning for remediation on property [NYSEG] controls.
2) Install wells upgradient of the site in order to determine the impact the Site's contamination may have on groundwater quality, to the extent access can be obtained.
3) Determine the existence and extent of NAPLs on the Site and between the Site and Susquehanna River
4) Determine the existence and extent of hazardous substance and petroleum contamination originating from the Site along the banks and in the sediment of that portion of the Susquehanna River located across from the and downgradient from the Site.
5) Search for preferential pathways impacting sediments through the study of, inter alia, temperature gradients indicating seeps, nearby storm sewers, and the former creek bed.
6) Analyze municipal water at the Susquehanna River intake for the presence of MGP constituents.
7) Evaluate whether contaminated sediments could be drawn to such intake.
8) Perform, in coordination with the City of Binghamton, a pump test to determine if the cone of depression from the City's Ranney well extends to the groundwater underlying the site.
9) Perform a water quality analysis during such pump test to determine if coal tar constituents are impacting the Ranney Well.

The work of the RI was formulated to generate focused data to meet the remaining objectives contained in the Order on Consent. To this end, the objectives were subdivided into the three general tracks which the investigation would follow:

- ***Subsurface Investigation.*** Characterize the hydrogeology of the site, and the nature and extent of site-related impacts so that an FS may be undertaken. (Objectives 1,2, 3, and 5)

- ***Susquehanna River Evaluation.*** Assess the extent of site-related impacts to the River, so that an FS may be undertaken. (Objectives 4, 6, 7)

- ***Risk Evaluation.*** Characterize the potential risks to human health and the environment posed by site-related constituents.

Each track of the investigation was undertaken to characterize different elements of the site's environmental condition. The elements of these tracks are summarized below.

3.2 Elements of the Subsurface Investigation

The Subsurface Investigation needed to accomplish two interrelated tasks in sufficient detail that an FS could be prepared:

- Characterize the site hydrogeology sufficiently to develop a viable conceptual model; and
- Characterize the nature and extent of MGP-impacted media.

3.2.1 Hydrogeology Evaluation

To sufficiently characterize site hydrogeology, BBL collected data to complete the following:

- Identify the physical properties of significant hydrostratigraphic units below the site;

- Identify significant man-made features (i.e., the flood wall, utilities, and former canal) and evaluate their effect on groundwater or NAPL migration; and

- Characterize groundwater flow patterns, including expected locations of discharge to the River.

BBL characterized the site hydrogeology by drilling soil borings, excavating test pits, installing and gauging monitoring wells and piezometers, testing hydraulic conductivity, measuring soil grain size and physical properties, performing computerized groundwater modeling, researching the site and area history, and performing geophysical surveys. The data generated were used to build a conceptual model of the site that integrates all of the information gathered and facilitates remedial decision-making. The details of the tasks performed are discussed in Section 4.

3.2.2 Nature and Extent Evaluation

To characterize the nature and extent of MGP-impacted media, BBL collected data to complete the following:

- Identify potential or ongoing sources of site-related constituents in soil that may adversely affect groundwater quality.
- Characterize upgradient groundwater quality and identify potential offsite contaminant sources.
- Delineate the approximate bounds of site-related impacts to soil and groundwater quality.
- Evaluate the potential fate and transport of site-related constituents in soil and groundwater.

BBL characterized the nature and extent of MGP-impacted materials through observations of site media in borings, test pits and wells, and through laboratory analyses of soil and groundwater samples from various depths and locations. BBL used computer models to help assess groundwater movement. The details of the tasks performed are discussed in Section 4.

3.3 Elements of the Susquehanna River Evaluation

For the Susquehanna River Evaluation, BBL collected data to complete the following tasks:

- Identify site impacts to river water and sediments.
- Evaluate potential fate and transport of site-related constituents in river water and sediments.

BBL completed the Susquehanna River evaluation with a variety of tasks. Data were collected by sediment probing, sediment and surface-water sampling, temperature and conductivity surveying (to identify groundwater seeps), and drilling deep riverbed borings. Data were used to model river transport of site-related constituents. The model demonstrated that impacted media could not be drawn to the Binghamton water filtration plant intake. The details of the tasks performed are discussed in Section 5.

3.4 Elements of the Risk Evaluation

The Risk Evaluation was completed to achieve the following:

- Characterize human health risks associated with environmental media impacted by site-related constituents.
- Characterize ecological risks associated with environmental media impacted by site-related constituents.

This track of the investigation was not clearly defined by the Order on Consent, but was deemed necessary by NYSEG to prepare for the FS. BBL completed the Risk Evaluation largely through analysis of data collected for the other phases of work. The details of the tasks performed for the Risk Evaluation are discussed in Section 9.

3.5 Subsequent Objectives and Data Gaps

After completing the Phase I SRI, it was apparent that additional data were necessary to prepare for an FS. To address one such data gap, NYSEG voluntarily undertook offsite investigations of the 293 and 295 Court Street Properties. In October 2000, the NYSDEC identified several additional data gaps that required another phase of fieldwork (the Phase II SRI). The specific objectives of these subsequent investigations are discussed below.

3.5.1 Offsite Properties Investigations Objectives

The 293 and 295 Court Street Investigations were extensions of the Subsurface Investigation, necessary in order to more fully characterize the local hydrogeology and the nature and extent of site-related impacts. As such, the objectives of these investigations were not new; they were to collect additional data to help complete the original tasks of the RI, and satisfy the objectives in the Order on Consent.

To collect the additional data needed, BBL completed the following:

- Drilled and collected soil samples from five soil borings on the 293 Court Street Property; and
- Installed and tested three new monitoring wells on the 295 Court Street Property.

The details of the tasks performed for the Offsite Properties Investigations are discussed in Section 5.

3.5.2 Phase II SRI Objectives

NYSEG undertook the Phase II SRI in response to NYSDEC concerns that the completed work to date had left certain data gaps. These concerns were initially stated in an October 19, 2000 letter to NYSEG, then refined in a series of correspondence, meetings and conference calls, summarized in the Phase II SRI Work Plan (BBL, 2001c). The overall objective of the Phase II SRI was the same as that of prior work, to collect the data necessary to proceed to an FS. To do this required filling the data gaps identified by the NYSDEC, specifically the following:

- To refine the eastern extent of NAPL associated with the MGP;
- To determine if NAPL had pooled behind the Susquehanna River flood wall;
- To investigate the extent of NAPL west of the site near the corner of Henry Street and Brandywine Avenue;
- To determine the vertical extent of NAPL (i.e. determine if NAPL were present in the till or bedrock);
- To further delineate the extent of site impacts in and below the Susquehanna River; and
- To better characterize potential migration pathways of site-related constituents from land into the river.

The NYSDEC also requested that NYSEG investigate the potential for construction-worker exposure in Brandywine Avenue, and confirm prior groundwater sampling results from several upgradient monitoring wells. The work performed for the Phase II SRI fell into the three general tracks of the Phase I: Subsurface Investigation, Susquehanna River Evaluation, and Risk Assessment. The elements of the work performed were included in the lists given above for each track of the Phase I SRI. The details of the tasks performed for the Phase II SRI are included, as appropriate, in Sections 4, 5, and 9 (respectively, Subsurface Investigation Activities, Susquehanna River Evaluation Activities, and Risk Assessment).

4. Subsurface Investigation Activities

4.1 Overview

This section discusses the various field tasks completed on land through the full investigatory history of the Court Street Site, organized by type of work and the intended objectives. (Tasks completed to evaluate the Susquehanna River are described in Section 5.) The work completed as part of the RI was outlined in the following NYSDEC approved work plans:

- *Work Plan for Conducting a Supplemental Remedial Investigation Feasibility Study at the Court Street Site, Binghamton, New York*. "SRI Work Plan" (BBL, 1997a);

- Letter work plan for the Offsite Properties Investigations. "Offsite Work Plan" (Letter from F. Kirschenheiter (BBL) to Thomas Suozzo (NYSDEC) dated November 11, 1997); and

- *Work Plan Binghamton Court Street Site Phase II Supplemental Remedial Investigation.* "Phase II Work Plan" (BBL, 2001c).

This section provides a general overview of the field methods used, but does not reiterate the full detail of field procedures presented in the work plans. For a more detailed reference, the scanned copied of the work plans listed above can be found on the Electronic Attachments CD, included with this document.

Only the salient activities of the Prioritization Investigation and the Task II RI are covered in this section. Thorough discussions of the activities of these early investigations were presented in their respective reports:

- *Prioritization of Former Manufactured Gas Plant Site, Binghamton Court Street Site (NYSEG Code CG BS)*. (Engineering - Science, Inc. 1992); and

- *Task II Remedial Investigation Report. Former Manufactured Gas Plant Site. Court Street. Binghamton, New York*. (BBL, 1996).

For ease of reference, the Task II RI Report has been scanned and can be found on the Electronic Attachments CD, included with this document.

The key activities of IRMs completed, or in progress at the site, are also presented. The work of the IRMs is tangential to the objectives of the RI, and is discussed only as far as the data provide support for the site investigations. Section 6 discusses the IRMs in more detail, though thorough coverage of their activities and

findings has been left for the engineering documents submitted, or planned for submittal, pertaining specifically to that work (see Section 6 for details).

4.2 Soil Boring Programs

Drilling soil borings was the primary method used to investigate the site geology and the nature and extent of site impacts. BBL completed the first borings at the site as part of the Task II RI in 1992. To date, borings have been drilled at 38 distinct locations with monitoring wells or piezometers being installed at 25 locations.

Every boring was drilled to gather specific information needed to complete the RI – to provide physical or chemical data about the subsurface, or install a monitoring well. Regardless of purpose, all borings contributed data toward characterization of the site hydrogeology, the extent of buried utilities and structures, and the nature and extent of site-related impacts.

With some minor deviations, described in the subsections below, the boring programs have followed a consistent methodology:

- Drilling was completed using hollow-stem augers, spun by a truck-mounted rig;
- Soil samples were retrieved by driving continuous split-spoons, consistent with American Standards for Testing Materials (ASTM) Method D-1586 (1994);
- Soil samples were observed and described by a supervising geologist, and screened for VOCs using a photo-ionization detector (PID);
- Selected samples were submitted for various laboratory analyses, as described below;
- Upon completion, borings were tremie-grouted to grade; and
- Boring locations were later surveyed for position and surface elevation. The elevations shown in this report are given relative to the 1929 National Geodetic Vertical Datum (NGVD). Surface coordinates are given relative to the North American Datum (NAD) of 1983 – State Plane New York Central (3102).

The subsections below outline the scope and intent of the work completed in each phase of the site investigations. Additional detail on the soil boring programs can be found in the following places:

- Soil boring locations are shown on Figure 3;
- Subsurface boring logs are included in Appendix A;
- Depths and details of the analytical methods for samples submitted for analysis are summarized on Table 3;
- Analytical results are summarized on Table 5, and discussed later in Section 7 (Subsurface Investigation Findings);
- Chain-of-Custody forms are included on the Electronic Attachments CD; and
- Laboratory reports on the physical characteristics analyses are included on the Electronic Attachments CD.

Also, as mentioned above, several reference documents have been scanned and included in the Electronic Attachments CD, including the Task II RI Report and selected work plans.

4.2.1 Task II RI

A total of 11 soil borings were drilled in May and June of 1992 for the Task II RI. The work was completed as part of a Source Investigation, designed to verify the locations of potential MGP related source areas and to confirm the presence and extent of the site-related impacts. The depths of the borings ranged between 14 and 59 feet bgs, with the majority advanced to the top of till. The borings locations (shown on Figure 3) were chosen to fall within or near potential MGP source areas, or in areas hydraulically downgradient of the suspected source areas.

Borings were also drilled for one piezometer and eight monitoring wells. As noted in the adjacent table, continuous split spoon samples were collected at all boring locations except the shallow members of well pairs, where the deeper borings had been sampled.

Selected soil samples were submitted for various suites of analysis, as indicated in Table 4.1:

Table 4.1 Task II RI Boring Locations

Boring ID	Boring Depth (ft.)	Split Spooned	Soil Sample Analyzed	Location/ Area Investigated
TB-1	59.0	ü	ü	Oil tanks 1-3
TB-2	48.4	ü	ü	Oil tanks 5-7
TB-3	56.0	ü		No. 2 gas holder
TB-4	54.0	ü		No. 3 gas holder
TB-5	56.0	ü	ü	
TB-6	8.5	ü	ü	
TB-7	24.0	ü		South-center onsite
TB-8	52.8	ü		
TB-9	58.5	ü		No. 4 gas holder
TB-10	57.2	ü	ü	No. 3 gas holder
TB-11	14.3	ü	ü	No. 1 gas holder
MW93-1D	51.2	ü		Southern property boundary
MW93-1S	20.7			
MW93-2D	56.2	ü		
MW93-2S	14.8			
MW93-3D	48.0	ü		
MW93-3S	22.0	ü		
MW93-5D	62.0	ü		Northern property boundary
MW93-6D	60.8	ü		
MW93-6S	24.0	ü		
PZ93-01	12.0	ü		

- Six samples for laboratory analysis of VOCs, SVOCs, metals, and total and amendable cyanide (five from impacted intervals, one at depth for vertical delineation);

- Four samples for waste disposal characterization for reactivity, BTU content, and total petroleum hydrocarbons (TPH) selected from among the impacted intervals identified above; and

- Physical analysis of grain size, selected from various hydrostratigraphic units.

Sample analyses followed the NYSDEC ASP-12/91 analytical protocol, and included QA/QC samples at a frequency indicated in the RI Work Plan's QAPP. Additional details and results may be found in the locations noted in Subsection 4.2. These activities and findings were all previously reported in the Task II RI Report (BBL, 1996), which is included on the Electronic Attachments CD.

4.2.2 Phase I SRI

The Phase I SRI included a total of 18 locations for drilling of soil borings and monitoring wells. All borings were completed according to the SRI Work Plan, with several minor exceptions which are noted below. The work also followed the DNAPL Contingency Plan, which provided a set of procedures to be followed if DNAPL was observed or suspected while drilling. BBL transmitted the DNAPL Contingency Plan to the NYSDEC as an attachment to a letter dated September 12, 1997 (BBL, 1997b).

Laboratory sample packages were submitted with the full suite of Analytical Services Protocol (ASP) quality assurance/quality control (QA/QC) samples, including blind duplicates, matrix spikes (MS), matrix spike duplicates (MSD), equipment rinse blanks, and trip blanks. The frequency of QA/QC samples, and other sampling requirements were outlined in the Quality Assurance Project Plan (QAPP) included in the SRI Work Plan.

As noted in Table 4.2, continuous split spoon samples were collected at all boring locations except at the shallow members of well pairs, where the deeper borings had been sampled.

Table 4.2 Phase I SRI Boring Locations

Boring	Boring Depth (feet)	Split Spooned	Soil Sample(s) Analyzed	Location/ Area Investigated
SB-1	10.0	ü	ü	Northern property line
SB-2	8.0	ü	ü	
SB-3	6.0	ü	ü	
SB-4	20.0	ü	ü	West-center onsite
SB-5	14.0	ü	ü	
SB-6	6.0	ü	ü	No. 1 gas holder
SB-7	8.0	ü	ü	East-center onsite
SB-8 / MW-10S	12.0	ü	ü	
TB-12	50.0	ü	ü	Downgradient
TB-13 / MW97-8S	24.0	ü	ü	Downgradient by 66-inch sewer
MW97-7S	30.0		ü	Downgradient/ adjacent to TB-12
MW97-9D	48.0	ü		West of site along Brandywine Ave.
MW97-9S	23.2			
MW97-10D	54.0	ü		East-center of site
MW97-11S	20.0	ü		Downgradient within Court Street
MW97-12S	18.0	ü		
MW97-13S	14.0	ü		Tar-Separating well
MW97-14D	40.0	ü		East of site, behind the BMH warehouse
MW97-14S	20.0			
TW97-1D	64.0	ü		Upgradient wells within Norfolk Southern Railroad
TW97-1S	28.0			
TW97-2D	69.1	ü		
TW97-2S	24.5			
TW97-3S	24.1	ü		

The specifics of each portion of the Phase I SRI soil boring program are summarized below.

4.2.2.1 Shallow Soil Borings (SB-1 to SB-8)

The Phase I SRI included eight shallow soil borings to delineate the extent of MGP-impacts above the water table. The boring locations (shown on Figure 3) were chosen based on a review of previous investigations, to provide data in areas not thoroughly investigated during the Task II RI.

The borings included three along the northern property boundary (SB-1, 2, and 3), four in a west to east line approximately midway between the north and south property lines (SB-4, 5, 7 and 8), and one just east of the former No. 4 Gas Holder (SB-6). Soil boring SB-8 was converted to a monitoring well, as discussed in Subsection 4.3.

The soil borings were continuously sampled to the water table. From each boring, a sample from the interval with the highest PID reading and a sample from the interval with the lowest PID reading were submitted for laboratory analysis. The samples were submitted for analysis of PAHs, total benzene, and Toxicity Characteristic Leaching Procedure (TCLP) benzene. Samples collected from soil borings SB-4, SB-5, and SB-6 were also analyzed for reactivity.

The results of the reactivity analyses were rejected during BBL's data validation process because the laboratory failed to perform the analyses within the required holding time. Because at least two reactivity samples were required in the SRI Work Plan, BBL drilled two new soil-borings in 1998 slightly offset from SB-4 and SB-6. Soil samples for reactivity analysis were taken from those new borings at the same depth intervals as the original soil samples.

Additional details and results may be found at the locations noted in Subsection 4.2.

4.2.2.2 Downgradient Test Borings (TB-12 and TB-13)

The Phase I SRI included two test borings (TB-12 and TB-13) installed between the site and the river. As a continuation of the TB-series borings of the Task II RI, these borings were planned to delineate the horizontal and vertical extent of NAPL by drilling to the top of till at locations downgradient of the known extent of NAPL. Data collected at these borings would also be used to aid in the characterization of potential preferential pathways.

Test boring TB-12 was completed as described in the SRI Work Plan. Boring TB-13 was not advanced to the top of the till unit as planned, because potentially mobile NAPL was identified in the 20- to 22-foot sample. As required by the DNAPL Contingency Plan, drilling was discontinued to minimize the probability of

remobilizing DNAPL. The boring was converted into a DNAPL collection monitoring well (MW97-8S). Details of its construction and installation are covered in Subsection 4.4.

Through field screening, based on PID readings and visual evidence of impacts, the sample from each boring judged to contain the greatest concentration of constituents was submitted for laboratory analysis of TCL VOCs, TCL SVOCs, TAL inorganics, total cyanide, and amenable cyanide if total cyanide was detected. Note that the analytical sample from TB-12 was actually collected from the boring for the adjacent monitoring well MW97-07.

The SRI Work Plan also specified that three soil samples be collected from each boring, one from the silt unit, one from the sand and gravel unit, and one from the till. These samples were analyzed for a suite of physical parameters (shown in Table 4.3).

Table 4.3
Physical Parameters Evaluated in Soil: Phase I SRI

Analysis
Total organic carbon (TOC)
Moisture content
Grain size distribution analysis (GSDA)
Atterberg limits (silt and till samples only)
Permeability (silt and till only)
Porosity (silt and till only)
Bulk density (silt and till only)

Samples were collected using Shelby Tubes, where feasible. Because total organic carbon (TOC) samples were analyzed separately from the physical tests, those samples may have been collected from slightly different depth intervals. Due to subsurface conditions, some of the analyses were performed on samples collected from borings other than TB-12 and TB-13. These conditions included the following:

- The silt unit targeted for sampling was absent at the TB-12 location, and affected by site-related constituents at the TB-13 location. Instead, silt samples were collected during the installation of monitoring wells MW97-11S and TW97-1S.

- Shelby-tube samples could not be successfully collected from the till at TB-12 and (as previously mentioned) the till unit was not reached at TB-13. For these reasons, permeability, porosity, and bulk density analyses were not performed on the till. TOC, moisture content, GSDA, and Atterberg limits analyses were performed on one sample of till retrieved from a split-spoon sampler from soil boring TB-12.

Additional details and results may be found at the locations noted in Subsection 4.2.

4.2.3 Offsite Investigations

The Offsite Investigations conducted in 1998 focused on the two properties immediately east of the site: 293 and 295 Court Street. NYSEG purchased the 293 Court Street Property after the investigations, and additional work was later completed on both properties, during the Phase II SRI.

The 1998 field work followed the procedures outlined in the Offsite and the SRI Work Plans, as appropriate. Four soil borings, identified as SB-20 through SB-23, were advanced at the 293 Court Street Property. Three additional borings were completed on the 295 Court Street Property for the installation of one single shallow well (MW97-15) and one well pair (MW98-16S&D). These locations are shown on Figure 3. As noted in the adjacent table, continuous split spoon samples were collected from all borings locations except MW98-16S, which was installed immediately adjacent to MW98-16D.

Table 4.4
Offsite Properties Boring Locations

Boring	Depth (feet)	Split Spooned	Soil Sample(s) Analyzed	Location / Features Investigated
SB-20	11	ü	ü	Former tar well
SB-21	6	ü	ü	Former retorts
SB-22	16	ü	ü	Former purifier
SB-23	18	ü	ü	Former purifier
MW98-15S	17	ü	ü	East of purifiers
MW98-16S	17			Near Ranney Well
MW98-16D	46	ü		Near Ranney Well

The soil borings were completed as stated in the work plans, with the following exceptions:

- The Offsite Work Plan called for the boring near the former retorts (SB-21) to extend to the till. However, the initial drilling observations suggested some manner of an enclosed basin, with a base at 6 feet below grade. Rather than risk puncturing the basin, and allowing downward migration of the impacted water therein, the first boring was terminated and a second attempted three feet farther west. Similar conditions were found in the new boring, so it was terminated at 8.5 feet. No further attempts were made.

- Both SB-22 and SB-23 were moved slightly from their proposed locations because of subsurface obstructions near grade.

- Both SB-22 and SB-23 were planned to reach till, but were terminated after the supervising geologist observed potentially mobile NAPL in samples collected near the top of the sand and gravel unit.

At each boring location, one soil sample from the most heavily impacted interval was collected for analysis of TCL VOCs, TCL SVOCs, total and amenable cyanide, and TAL inorganics. In addition, the sample from SB-20 was submitted for analysis of TCLP Benzene, the sample from SB-22 for reactive cyanide and sulfide, and the samples from both SB-22 and SB-23 for TPH. Although not required by the work plan, a sample of black-stained silt from MW98-15S was submitted for analysis of TCL VOCs, TCL SVOCs, and TPH. The laboratory samples submitted included QA/QC samples as specified in the SRI Work Plan's QAPP.

Additional details and results may be found at the locations noted in Subsection 4.2.

4.2.4 Phase II SRI

The Phase II SRI included 17 drilling locations to characterize subsurface conditions and/or install monitoring wells and piezometers. BBL conducted the work following the procedures outlined in Phase II Work Plan. As noted in the adjacent table, split-spoon samples were collected from all borings locations except MW01-17S and PZ01-02, both of which were adjacent to deeper borings. The drilling procedures were consistent with prior methods, with several exceptions discussed later in this section.

Table 4.5
Phase II SRI Boring Locations

Boring	Boring Depth (feet)	Split Spooned	Soil Sample(s) Analyzed	Location / Features Investigated
SB-101	49.5	ü	ü	Eastern Extent Borings (295 Court Street)
SB-102	61.8	ü	ü	
SB-103	54	ü	ü	
SB-104	64	ü	ü	
SB-105	63.3	ü	ü	Floodwall Borings (in Court Street spaced along floodwall)
SB-106	55.2	ü	ü	
SB-107	53	ü	ü	
SB-108	51	ü	ü	
SB-109	55	ü	ü	
SB-110	10	ü	ü	Brandywine Ave. Construction Worker Risk Evaluation Borings
SB-111	10	ü	ü	
SB-112	10	ü	ü	
MW-01-03R	108.0	ü		Downgradient/ vertical extent/ bedrock wells
MW-01-07R	109.0	ü	ü	
MW-01-17D	59.2	ü		Western extent, near Brandywine Ave. and Henry St.
MW-01-17S	37.0			
PZ01-02	21.0			NAPL piezometer adjacent to SB-106

The borings drilled for the Phase II SRI were located around the perimeter of the former MGP to complete the delineation of NAPL and other site related constituents. The locations (shown on Figure 3) were chosen to fill specific data gaps noted in Subsection 3.5.2 of this report, in particular:

- To refine the eastern extent of NAPL associated with the MGP;
- To determine if NAPL had pooled behind the Susquehanna River flood wall;
- To investigate the extent of NAPL west of the site near the corner of Henry Street and Brandywine Avenue;
- To determine the vertical extent of NAPL (i.e. determine if NAPL were present in the till or bedrock); and
- Investigate the potential for construction-worker exposure to site-related constituents on Brandywine Avenue.

The drilling and soil sampling tasks completed to address each of these data gaps are discussed below.

Eastern Extent and Flood Wall Soil Borings

Eight soil borings were drilled to better delineate the extent of NAPL east of the MGP (borings SB-101 through SB-104), and along the Court Street flood wall (SB-105 though SB-109). Each was drilled to the till surface, following the procedures outlined in the Phase II Work Plan.

The locations of each of the eastern extent borings were chosen to form a line of delineation less than 200 feet beyond the easternmost observation of coal-tar DNAPL. Two borings (SB-103 and SB-104) were actually drilled inside the BMH warehouse located at 295 Court Street, using a skid-mounted rig. The locations of the flood wall borings were chosen for several reasons:

- To provide lateral coverage along the length of the Court Street flood wall between the site and the River. Full coverage took into account existing locations along the wall, including MW97-8, MW97-11S and MW97-12S.

- To coincide with areas of apparent site impacts to sediment found in the River. In particular, the location of SB-105 was selected in the field by the NYSDEC, to coincide with a particular area of impacted sediment identified on the river side of the flood wall[2]. Also, the location of SB-106 was chosen to fall near both the 24-inch pipe and the "BB pipe"[3], two utilities suspected to represent preferential pathways through the flood wall.

The Phase II Work Plan included a provision for installing NAPL piezometers if NAPL observed in any given boring appeared to be potentially mobile. One such piezometer was installed (PZ01-02) to provide a means to gauge the physical characteristics and mobility of the NAPL identified in boring SB-107. The piezometer was constructed of 2-inch diameter PVC, with a 10-foot screen, and a 2-foot sump grouted in place. A well construction log is included in Appendix A.

BBL collected two analytical samples from each of the eastern extent and flood wall soil borings, with the exception of SB-107 where significant quantities of NAPL were observed. Samples of soil, ranging from apparently clean to heavily impacted, were submitted following a rationale detailed in the Phase II Work Plan. Soils containing a significant quantity of NAPL were carefully documented, but were not submitted for laboratory analysis. Each soil sample was analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and PAHs. A sample from SB-101 was also submitted for analysis of TPH and the full suite of TCL VOCs to better characterize the soil quality of a sample initially judged not to be coal-tar related.

Vertical Extent of NAPL

To investigate the vertical extent of NAPL, BBL advanced two borings through the till and into the bedrock, and installed bedrock-monitoring wells MW01-3R and MW01-7R. Due to the depth and nature of these wells, the drilling procedures varied somewhat from other drilling locations. The drilling methodology was as follows:

[2] The sediment referred to was identified several days earlier during sediment probing. As discussed in Section 8, data gathered during the Phase II SRI suggest that the affected sediment is unrelated to the site.
[3] This pipe gets its name from as-built plans for the flood wall (contained on the Electronic Attachments CD). In those drawings, pipes passing through the wall are identified using letters of the alphabet.

- The driller augered to the top of the till collecting continuous split-spoon samples, in the manner of a conventional soil boring;

- In order to drill through the till, the borehole was overdrilled with large diameter augers so that a steel casing could be grouted into the top of the till.

- After the grout had hardened, the driller advanced through the till with spun-casing and a tri-cone roller bit, collecting split spoon samples, as above.

- Upon reaching the base of the till, approximately 15 feet of rock were cored through the drilling casing using a HQ core-barrel and bit.

The till proved to be extremely dense, and vertically extensive. With NYSDEC approval (Blazicek 7/31/01) BBL made two changes in drilling strategy to accommodate the conditions:

- Split spoon samples would be taken continuously over the first 10 feet of till, then at 5-foot intervals to the top of rock.

- Bentonite slurry would be used as drilling fluid while drilling through the till.

No analytical samples of soil or rock were planned nor collected from the bedrock well borings. A supervising geologist judged the presence or absence of NAPL by observing the samples of soil and rock, and by monitoring the returned drilling fluid.

To better characterize the nature of the till, two samples were submitted for sieve and hydrometer analysis. These samples were collected from MW01-03R and from soil boring SB-105, chosen to reflect apparent compositional differences noted in the till.

Additional details on well installation and testing are included in Subsection 4.4.

Western Extent of NAPL

To investigate the extent of NAPL west of the site, an overburden monitoring well pair (MW01-17S&D) was installed near the corner of Henry Street and Brandywine Avenue. Drilling was completed according to the procedure described in the Phase II Work Plan. The deep boring was drilled first, to the top of till with continuous split spoon sampling. After installation of the deep well, the shallow boring was advanced without sampling for the installation of the shallow well.

No analytical samples of soil were planned nor collected. A supervising geologist judged the presence or absence of NAPL by observing the soil samples collected at each interval. Additional details on well installation and testing are included in Subsection 4.4.

Brandywine Avenue Borings

To investigate the potential for construction-worker exposure to site-related constituents, the Phase II SRI included a series of three shallow soil borings along Brandywine Avenue (SB-110 through SB-112). This task was prompted by NYSEG's observation of NAPL from 4 to 8 feet below grade in a boring completed on-site, near the western property boundary, 70 feet south of well MW93-6S.

Each boring was planned to be drilled to 10 feet below grade, or five feet deeper than the last occurrence of NAPL, whichever was greater. As no NAPL was observed, each of the borings was drilled to 10 feet bgs. Each boring was continuously sampled. The most apparently impacted interval from of each boring was submitted for analysis of BTEX and PAHs.

Additional details and results may be found at the locations noted in Subsection 4.2.

4.2.5 IRMs

Soil borings were completed as part of two IRMs at the site. These borings were completed to meet objectives outside the scope of the RI. However, as the borings provide data on the site hydrogeology and the nature and extent of site-related impacts, they are mentioned here in brief. The adjacent table summarizes pertinent information regarding these borings. Further detail on the scope and status of the IRMs is provided in Section 6 of this report. The borings logs are provided in Appendix A.

Table 4.6 IRM Boring Locations

Boring	Boring Depth (feet)	Split Spooned	Soil Sample(s) Analyzed	Location / Features Investigated
SB-201	52.7	ü		Within and adjacent to Gas Holder 3
SB-202	14	ü		
PZ01-03	16.0	ü		Within Gas Holder 4
PZ01-04	14.6	ü		Beside 66-inch storm sewer
PZ01-05	15.5	ü		
PZ01-06	19.0	ü		

Source Removal IRM

Soil borings SB-201 and SB-202 were drilled to support a research and development (R&D) project intended to evaluate the feasibility/applicability of several promising new technologies for expedited characterization of contaminated sites. The R&D project was supported and co-funded by the USEPA Technology & Innovation Office (USEPA/TIO), Electric Power Research Institute (EPRI), and several EPRI member utilities. The borings were placed in the footprint of the No. 3 gas holder (SB-201), and just east of the holder (SB-202), to investigate anomalies noted in the remote-sensing data in that area. BBL completed the borings in September 2001, as an adjunct to the Phase II SRI field program, and therefore followed the drilling procedures of the

Phase II Work Plan, described above. The locations and sampling strategy were requested by META Environmental, Inc., a firm contracted to help develop and oversee the R&D project. At both borings, samples from each interval were archived for potential resistivity analysis, at META's discretion. No samples were collected for conventional laboratory analyses. The borings were completed as follows:

- Boring SB-201 was drilled to the top of the till unit. Split-spoon samples were collected continuously from 10 feet bgs to the total depth of 52.7 feet bgs.

- The target depth of boring SB-202 was the top of till; however, the soil conditions required discontinuing the boring due to measures in the DNAPL Contingency Plan. The supervising geologist noted potentially mobile DNAPL at 10 feet bgs, above a sequence of intact, clean silt. The boring was terminated at 14 feet bgs, to prevent possible induced downward migration of DNAPL during drilling.

66-inch Storm Sewer IRM

Borings were drilled for four new piezometers (PZ01-03 through PZ01-06) to investigate the fill and soil adjacent to the 66-inch storm sewer, and to provide gauging points to assess groundwater flow along the sewer. The borings were completed in conjunction with a test pitting program (described in Subsection 4.3), also assessing the storm sewer. The drilling was completed following the procedures of the Phase II Work Plan. Piezometer construction and installation are discussed in Subsection 4.4, below. No soil samples were submitted for laboratory analysis.

4.3 Test Pit Excavation

Test pits and test trenches were excavated for the Task II RI, the Phase II RI and as part of the site IRMs, as a tool to directly assess the nature and quality of shallow fill and soil, and to evaluate buried structures potentially acting as reservoirs or conduits for NAPL or impacted groundwater.

The subsections below outline the scope and intent of the work completed in each phase of the site investigations that included test pits. Additional detail on the test pit excavation programs can be found in the following places:

- Test pit locations are shown on Figure 3;

- Test pit logs are included in Appendix A;

- Depths and details of the analytical methods for samples submitted for analysis are summarized in Table 3;

- Analytical results are summarized in Table 5, and discussed later in Section 7 (Subsurface Investigation Findings);

- Chain-of-Custody forms are included on the Electronic Attachments CD; and

- Laboratory results for grain-size analyses and other soil-property analyses are included on the Electronic Attachments CD.

In addition, several reference documents have been scanned and included in the Electronic Attachments CD, including the Task II RI Report and selected work plans.

4.3.1 Task II RI

During the Task II RI, BBL excavated 21 test pits as part of a source investigation designed to identify the presence and extent of DNAPL beneath the former MGP. The test pits, excavated in May 1992, reached depths between 2.5 and 8.5 feet bgs, and were advanced to refusal, until significant DNAPL was found, or until groundwater entered the pit. As shown on Figure 3, the test pits (identified TP-1 through TP-21) were located in or near former MGP structures (e.g., gas holders, oil tanks, and the tar-separating well) and in other areas chosen to characterize general site fill materials. The excavation procedures followed the RI Work Plan.

Six soil and fill samples were selected from the test pits for laboratory analysis of VOCs, SVOCs, metals and cyanide. One of the samples (from TP-5) was also submitted for waste-disposal characterization analyses, including BTU content, reactivity (cyanide and sulfide), and TPH. Sample analyses followed the NYSDEC ASP-12/91 analytical protocol, and included QA/QC samples at a frequency indicated in the RI Work Plan's QAPP.

Additional details and results may be found at the locations noted in Subsection 4.3.

4.3.2 Phase II SRI

Two test pits were excavated during the Phase II SRI. TP-209 and TP-210, shown on Figure 3, were excavated on September 14, 2001 to evaluate the construction of a concrete wall that runs along the length of the western site boundary. These data were used to select the locations of the shallow soil borings in Brandywine Avenue (SB-110 through SB-112). The data also support the site-wide evaluation of buried man-man structures potentially impacting groundwater and DNAPL migration. Both test pits were excavated to approximately 15 feet bgs, following the test-pitting procedures of the IRM program, then in progress. No analytical samples were submitted from the test pits. Additional details and results may be found at the locations noted in Subsection 4.3.

4.3.3 IRMs

Source Removal IRM

The Source Removal IRM completed by NYSEG and reported in the Draft IRM Final Engineering Report (NYSEG, 2002) consisted of an extensive program of test-pits and test trenches, with excavation of materials considered potential reservoirs of DNAPL. This work was completed under the NYSEG's IRM Work Plan (November 2000). The project is discussed in more detail in Section 6.

In general, the work included the following test-pitting and excavation activities:

- Evaluate and remove the contents of the foundation of the former No. 3 gas holder;
- Evaluate and remove the foundation (and its contents) of the tar-separating well;
- Identify other buried structures potentially forming DNAPL reservoirs; and
- Identify and remove (where appropriate) inactive buried pipes potentially containing NAPL, or forming conduits for DNAPL or groundwater migration.

The source removal IRM test pit locations are not shown on the figures in this report. Their locations may be found in Draft Final Engineering Report (NYSEG, 2002).

66-inch Storm Sewer IRM

BBL is currently evaluating the feasibility of a second IRM, which would address NAPL migration along the 66-inch storm sewer. This work is addressed in more detail in Section 6. The work completed included eight test pits to investigate several man-made features including, and adjacent to, the 66-inch storm sewer. The test pits addressed the following:

- The construction and nature of bedding materials of the 66-inch storm sewer, with five new tests pits (TP-204, TP-205, TP-206, TP-207 and TP-208) at various locations along the length of the sewer as it crosses the site from north to south (see Figure 3).

- The foundation of the No. 4 gas holder where the 66-inch storm sewer passes underneath from the north and south, with two of the test pits mentioned above, TP-206 and TP-208.

- A buried concrete wall, potentially a relict feature of the Brandywine Canal, with three test pits, TP-201, TP-202, and TP-203.

No laboratory analytical samples were submitted from the IRM test pits. Several samples of the materials around and beneath the 66-inch storm sewer were submitted to Parratt Wolff, Inc. for grain-size analysis. The

subsurface logs for these test pits are included in Appendix A. The findings from data that relate to the SRI objectives are discussed in Section 7. The findings relevant to the IRM design will be reported to the NYSDEC in a separate deliverable in the future.

4.4 Monitoring Well Installation

Since 1993, 38 monitoring wells and piezometers have been installed to investigate groundwater beneath the Court Street Site. These wells have served as the primary tool to assess groundwater quality, to characterize groundwater flow and, to a lesser degree, judge the nature and mobility of NAPL.

All wells and piezometers were installed in borings drilled as described in Subsection 4.2 above. This section outlines the techniques and rationale behind the well-construction tasks of each phase of work. The details of the well installation methods used are outlined in the various work plans, in particular the SRI Work Plan, and the Phase II Work Plan.

With some minor deviations, described in the subsections below, well and piezometer installations have followed a consistent methodology:

- Borings were drilled to their target depths following the practices described in Subsection 4.2, generally with 4¼ -inch inner diameter hollow-stem augers.

- Wells completed for the Task II RI were constructed of 2-inch diameter stainless steel; for all later investigations, wells were constructed of schedule 40 PVC.

- 10-foot long, 0.010-inch slotted screens were generally used. For some deep monitoring wells installed to monitor just the very base of the sand and gravel unit, and for some shallow wells where unit thickness created vertical constraints, screens between 5 and 10 feet were installed.

- Appropriately sized silica sand packs were installed in the annular space around the screened interval and generally two feet above.

- Above the sand pack the well annulus was filled with two or more feet of bentonite to provide a seal, and then a cement/bentonite grout, tremied to near grade.

- Wells were completed with locked protective steel guard pipes or with flush-mount curb-boxes, as appropriate.

- Following completion, each well was developed to remove fine sediment from the well and improve the hydraulic connection to the surrounding formation.

- Completed wells and piezometers were surveyed for position, surface and measuring point elevation. The elevations shown in this report are given relative to the 1929 NGVD. Surface coordinates are given relative to the 1983 NAD – State Plane New York Central (3102).

The subsections below outline the scope and intent of the work completed in each phase of the site investigations. Additional detail on the well-installation programs can be found in the following places:

- Well and piezometer locations are shown on Figure 2;
- Subsurface boring and well construction logs are included in Appendix A;
- Well construction details, including survey data, are summarized on Table 1;
- Monitoring well gauging, testing and sampling tasks are covered in Subsection 4.5 below.

Also, as mentioned above, several reference documents have been scanned and included in the Electronic Attachments CD, including the Task II RI Report and selected work plans.

4.4.1 Task II RI

The Task II RI was the first site investigation to attempt to characterize groundwater quality and flow patterns. The adjacent table lists the wells installed: five deep monitoring wells, four shallow monitoring wells, and a single shallow piezometer (all shown on Figure 2).

The design and locations of the wells were selected to meet two general objectives for the two depths of interest (at or near the water table, and at the base of the sand and gravel):

- Characterize the quality of groundwater entering and exiting the site; and

- Generate potentiometric elevation data in order to determine groundwater flow patterns.

Table 4.7 Task II RI Monitoring Wells

	Depth to Screened interval (ft. bgs)		Water Table Well	Unit Screened	Location
	Top	Bottom			
MW93-1S (ab)	10.3	20.3	ü	fill/upper S&G	Southern property boundary
MW93-1D	40.9	50.9		lower S&G	
MW93-2D	43.6	53.6		lower S&G	
MW93-2S	4.2	14.2	ü	silt	
MW93-3D	37.0	46.6		lower S&G	
MW93-3S	12.0	22.0		silt/S&G	
MW93-5D	46.5	56.4		lower S&G	Northern property boundary
MW93-6D	49.8	59.8		lower S&G	
MW93-6S	13.0	23.0		silt/S&G	
PZ93-01	3.5	8.5	ü	coarse fill	

Note: S&G = sand and gravel unit; (ab) = well abandoned.

The monitoring wells were installed as specified in the RI Work Plan (BBL, 1993), including the use of stainless steel well screens. The shallow monitoring well MW93-1 was decommissioned shortly after installation, after DNAPL entered the well. A proposed upgradient well pair (what would have been MW93-4) was not installed due to access limitations.

Later interpretation of the site hydrogeology would show that MW93-3S and MW93-6S were not properly screened to provide water-table elevation data, though they were installed for that purpose. Both wells extend from the upper silt and clay unit into the sand and gravel unit, and therefore show head elevations more reflective of the sand and gravel (which is vastly more conductive).

Additional details may be found in the locations noted in Subsection 4.4 above. These activities and findings were all previously reported in the Task II RI Report (BBL, 1996), which is included on the Electronic Attachments CD.

4.4.2 Phase I SRI

During the Phase I SRI, 16 new monitoring wells were installed: three deep and eight shallow conventional monitoring wells, and two deep and three shallow upgradient temporary monitoring wells. The adjacent table lists the wells installed.

The well locations (shown on Figure 2) and their various constructions were selected to meet a variety of objectives:

- To further the hydrogeologic characterization of the site;
- To assess groundwater quality upgradient and cross-gradient of the site; and
- To assess shallow groundwater quality downgradient of the site.

Table 4.8 Phase I SRI Monitoring Wells

Well ID	Depth to Screened interval (ft. bgs)		Water Table Well	Unit Screened	Location
	Top	Bottom			
MW97-7S	16.0	26.0	ü	upper S&G	Downgradient
MW97-8S	12.0	22.0	ü	silt	Court St./66-in. Sewer
MW97-9D	33.8	43.8		lower S&G	West of site, near Brandywine Ave.
MW97-9S	13.0	23.0	ü	upper S&G	
MW97-10D	40.0	50.0		lower S&G	East-center of site
MW97-10S	4.0	12.0	ü	silty fill	
MW97-11S	7.6	17.6	ü	silty fill	Downgradient within Court Street
MW97-12S	7.3	17.3	ü	silty fill	
MW97-13S (ab)	5.0	10.0		coarse fill	Tar-separating well
MW97-14D	34.9	39.9		lower S&G	East of site, behind BMH warehouse
MW97-14S	9.9	19.9	ü	upper S&G	
TW97-1D	56.4	61.4		lower S&G	Upgradient within Norfolk Southern Railroad
TW97-1S	17.0	27.0	ü	silt	
TW97-2D	64.0	69.0		lower S&G	
TW97-2S	14.4	24.4	ü	coarse fill/silt	
TW97-3S	14.0	24.0	ü	upper S&G	

Note: S&G = sand and gravel unit; (ab) = well abandoned.

The wells were installed as described in the SRI Work Plan, with the following exceptions:

- Well casings and screens were composed of Schedule 40 PVC. BBL notified the NYSDEC of this modification in a letter dated September 12, 1997.

- Drilling followed the special procedures of the DNAPL Contingency Plan (an attachment to the above referenced letter) which provided for the installation of DNAPL collection wells where potentially mobile NAPL was observed.

- A shallow temporary monitoring well was not installed west of the site, at 267 Court Street, as planned. During a site reconnaissance, an existing shallow monitoring well (B-1) was discovered in this area. BBL obtained and reviewed the boring log for this well and deemed it a suitable substitute for the proposed shallow temporary well. The boring log for this well is included in Appendix A.

- Monitoring well pair MW97-14S and MW97-14D were proposed for the Offsite Investigations, discussed below in Section 4.4.3. For efficiency, the well pair was installed ahead of schedule during the Phase I SRI.

Field testing of recovered soil samples identified the potential for mobile DNAPL at two of the drilling locations proposed for shallow monitoring wells: MW97-8S and MW97-13S. As prescribed by the DNAPL Contingency Plan, both wells were completed as DNAPL-collection wells. This construction was identical to conventional monitoring wells, except that a 2-foot long sump was affixed below the screen, with a sloping collar attached at the screen bottom to direct downward-migrating DNAPL through the screen and into the sump. The annular space below the collar was sealed with bentonite.

Monitoring well MW97-13S was decommissioned as part of a source removal IRM (see Section 6). The excavation revealed that MW97-13S had been installed within and through the brick foundation of the former tar-separating well (see Figure 3). This revelation helps explain why DNAPL accumulated in this well. The details of this IRM are reported in the draft Final Engineering Report (NYSEG, 2002).

The temporary monitoring wells were installed no differently than the permanent wells, following the procedures noted above. Additional details may be found in the locations noted in Subsection 4.4 above.

4.4.3 Offsite Investigations

Three new monitoring wells were installed for the Offsite Investigations, all on the 295 Court Street property. The well locations (shown on Figure 2) were chosen to accomplish two tasks:

Table 4.9 Offsite Investigations Monitoring Wells

Well ID	Depth to Screened interval (ft. bgs)		Water Table Well	Unit Screened	Location
	Top	Bottom			
MW98-15S	5.0	15.0	ü	silt	East of purifiers
MW98-16D	38.5	43.5		lower S&G	Near Ranney Well
MW98-16S	7.0	17.0	ü	fill/upper S&G	

Note: S&G = sand and gravel unit.

- Assess groundwater quality immediately east of the former MGP (MW-15S).

- Determine if site-related constituents are present in groundwater adjacent to the former Ranney Well (the MW98-16 well pair).

The Offsite Work Plan (BBL, 1997) also included an additional well pair (MW97-14) to assess groundwater quality east of the former MGP. As discussed in Subsection 4.3.2, that well pair was completed ahead of schedule during the Phase I SRI.

Wells were constructed as specified in the Offsite and SRI Work Plans. At MW98-15S, the borehole penetrated the top of the sand and gravel unit, encountering a significant quantity of NAPL. The design objective of the well was to gauge the water table elevation and groundwater quality in the silt hydrostratigraphic unit. Therefore, the bottom of the borehole was filled with bentonite chips to seal off the sand and gravel unit below the well screen.

The borehole of MW98-16D was advanced west and slightly north of the Ranney Well. The Offsite Work Plan called for screen placement near the top of the till, or over a noticeably affected portion of the sand and gravel unit. Since no affected areas were identified, a five-foot long PVC screen was installed just above the top of the till. MW98-16S was installed to screen across the water table.

Additional details may be found in the locations noted in Subsection 4.4 above.

4.4.4 Phase II SRI

The Phase II SRI included four new monitoring wells and one new piezometer, listed in the adjacent table. The locations of the monitoring wells were chosen to better delineate the extent of site-related constituents vertically and to the west of the site. The piezometer was installed to gauge the nature and mobility of NAPL observed in the flood wall soil boring SB-107. The wells were drilled and installed following the Phase II Work Plan.

Table 4.10 Phase II SRI Monitoring Wells

Well ID	Depth to Screened interval (ft. bgs)		Water Table Well	Unit Screened	Location
	Top	Bottom			
MW01-03R	98.0	108.0		bedrock	South property line
MW01-07R	99.0	109.0		bedrock	Downgradient
MW01-17D	54.2	59.2		lower S&G	Offsite west
MW01-17S	27.0	37.0	ü	upper S&G	
PZ01-02	9.0	19.0	ü	silt/S&G	Court St. floodwall

Note: S&G = sand and gravel unit.

The MW01-17 monitoring well pair was installed near the corner of Henry Street and Brandywine Avenue, at the NYSEG service center at 267 Court Street. Because no hydraulic or groundwater quality monitoring points existed in that area, the extent of site impacts to the west was still considered

unbounded. The shallow well (MW01-17S) was installed with a 10-foot screen straddling the water table. The deep well (MW01-17D) was installed with a 5-foot screen set above the top of the till.

The NYSDEC requested that bedrock monitoring wells be installed downgradient of the former MGP, to confirm that site impacts had not penetrated the till to the bedrock. BBL selected the two locations shown on Figure 2 (MW01-3R and MW01-7R) for several reasons:

- Because the extent of NAPL in overburden at each location had already been assessed in completed borings, and found to be minor or non-existent (therefore posing a lesser risk of NAPL mobilization and downward migration);

- To fall near an existing sand and gravel overburden well, allowing an assessment of vertical gradient; and

- To avoid disruption of traffic in the Court Street, given the time required to drill each well.

The completed wells have been used to assess groundwater quality in bedrock, gauge the vertical gradient between the rock and the overburden, and characterize the hydraulic properties of the rock.

The piezometer PZ01-02 was installed as an adjunct to the flood-wall soil boring program, discussed in Subsection 4.2 above. The Phase II Work Plan included provisions that if the potentially mobile NAPL were observed, DNAPL piezometers may be installed. PZ01-02 was installed to gauge the nature and mobility of NAPL observed in the flood-wall soil boring SB-107. It was constructed of 2-inch diameter PVC, with a 10-foot screen, and a 2-foot sump grouted in place. Additional details may be found in the locations noted in Subsection 4.4 above.

4.4.5 IRMs

BBL installed four new temporary piezometers as part of the 66-inch storm sewer IRM. The piezometers (listed in the adjacent table) are spaced along the length of the sewer as it crosses the site from north to south. The piezometers provide gauging points to assess groundwater and NAPL migration along the sewer.

Table 4.11 IRM Piezometers

Well ID	Depth to Screened interval (ft. bgs)		Water Table Well	Unit Screened	Location
	Top	Bottom			
PZ01-03	6	16	ü	fill	Adjacent to the 66-inch storm sewer
PZ01-04	6	14.6	ü	fill	
PZ01-05	4.5	14.5	ü	fill	
PZ01-06	8	18	ü	fill	

Each piezometer was constructed to screen the water table, following the procedures of the Phase II Work Plan, with the following exceptions:

- Due to their temporary nature, and the vertical space constraints (i.e., the likelihood that the borings would penetrate to the sand and gravel unit) the piezometers were not installed with sumps.

- Piezometers PZ01-03, PZ01-05 and PZ01-06 were constructed with 0.020-inch slotted screens to improve the hydraulic connection to the fill (PZ01-04 screened across a silty fill unit, so a standard 0.010-inch slotted screen was used).

Further detail on the scope and status of the IRMs is provided in Section 6 of this report. The well construction logs are provided in Appendix A.

4.5 Groundwater Monitoring and Sampling

Starting with the Task II RI, each phase of the site investigation has included work to better characterize the quality and flow patterns of groundwater at and near the site. The field work discussed in this section falls into three general categories:

- Gauging water levels in wells, piezometers and at staff gauges;
- Performing hydraulic-conductivity tests; and
- Collecting groundwater and NAPL samples for laboratory analysis.

The data provided by these tasks form the basis for much of the discussion of the nature and extent of site impacts, discussed in Section 7. BBL also completed two computerized groundwater flow models based on these data and the geologic characterization developed through the soil boring program. The model findings are presented in Section 7, with additional detail on methods provided in Appendix B.

The subsections below outline the scope and intent of the work completed in each phase of the site investigations. Additional detail on the groundwater monitoring and sampling programs can be found in the following places:

- Well and piezometer and staff gauge locations are shown on Figure 2;

- Subsurface boring and well construction logs are included in Appendix A;

- Hydraulic conductivity test results are summarized on Table 1, and included on the Electronic Attachments CD;

- Well construction details, including survey data, are summarized on Table 1;

- The most recent and complete water-level data are summarized on Table 2;
- Select water-level data are plotted on two potentiometric surface maps, Figures 11 and 12;
- Sample analyses and laboratory methods are summarized on Table 3;
- The laboratory analytical data for groundwater are summarized on Table 4, with key data presented on Figure 13;
- The laboratory analytical data for NAPL samples submitted are included on Table 6; and
- Chains-of-custody and groundwater sampling logs are included on the Electronic Attachments CD.

Also, as mentioned above, several reference documents have been scanned and included on the Electronic Attachments CD, including the Task II RI Report and selected work plans.

4.5.1 Task II RI

Table 4.12 Task II RI Monitoring Well Testing

	Slug Test Performed	Sampled 7/20/93	Sampled 10/20/93	Sampled 1/24/94	Sampled 4/26/94
MW93-1D	ü	ü	ü	ü	ü
MW93-2D	ü	ü	ü	ü	ü
MW93-2S	ü	ü	ü	ü	ü
MW93-3D	ü	ü	ü	ü	ü
MW93-3S	ü	ü	ü	ü	ü
MW93-5D	ü	ü	ü	ü	ü
MW93-6D	ü	ü	ü	ü	ü
MW93-6S	ü	ü	ü	ü	ü

Hydraulic Conductivity Testing

During the Task II RI, BBL completed in-situ hydraulic conductivity tests at eight monitoring wells installed for that investigation (see adjacent table) to estimate the hydraulic conductivity of the geologic materials near the screened intervals of the wells. MW93-1S had been decommissioned, and therefore was not tested. The tests were performed as rising-head slug tests, using a pressure transducer to log water-level changes. The data were plotted and analyzed according to the methods of Bouwer and Rice (1976) and Bouwer (1989). Additional details and test results may be found in the locations noted in Subsection 4.5 above.

Sampling and Gauging Rounds

Eight wells listed in the adjacent table were sampled quarterly over a period of one year, on the dates shown. The sampling techniques, (generally, to purge three well volumes while monitoring indicator parameters for stability) were outlined in the RI Work Plan. The groundwater samples from each round were submitted to Galson Laboratories of East Syracuse for analysis of VOCs with tentatively identified compounds (TICs), SVOCs (with TICs), metals, total and amenable cyanide, and polychlorinated biphenyls (PCBs). Groundwater

samples were not analyzed for PCBs after the first round, in which none were detected. Sample analyses followed the NYSDEC ASP-12/91 analytical protocol, and included QA/QC samples at a frequency indicated in the RI Work Plan's QAPP.

In conjunction with each sampling round, BBL measured water-levels at PZ93-01, at the river staff gauges and in each of the monitoring wells. The two river staff gauges installed for the Task II RI were located on the south side of the Susquehanna River, near the Tompkins Street Bridge. Those gauges could not be located in subsequent investigations. The gauging points SG-1 and SG-2 (shown on Figure 2) were established later for the Phase I and Phase II investigations, respectively. Additional details and results may be found in the locations noted above in Subsection 4.4. These activities and findings were all previously reported in the Task II RI Report (BBL, 1996), which is included on the Electronic Attachments CD.

4.5.2 Phase I SRI

Hydraulic Conductivity Testing

In-situ hydraulic conductivity ("slug") tests were performed at each of the monitoring wells installed for the Phase I SRI, except MW97-14S and MW97-14D (which were installed in anticipation of the Offsite Investigations, and were therefore outside the scope of the Phase I SRI). The procedures used to conduct the tests are contained in the SRI Work Plan. Collected data were reduced according to the methods of Bouwer and Rice (1976) and Bouwer (1989). Additional details and results may be found in the locations noted above in Subsection 4.5.

Water-Level Measurements

BBL conducted comprehensive water-level rounds on December 23, 1997, and February 11, 1998. Both rounds included all new and existing site monitoring wells. River stage data were also obtained during the measurement rounds; however, the staff gauges that were installed during the Task II RI could not be located and were presumed to be destroyed. Stage data were obtained at a replacement staff gauge, SG-1, which was installed by BBL surveyors in the location shown on Figure 2.

Additional water-level data were collected from the following locations:

- Monitoring well B-1, located west of the site, at 267 Court Street (Figure 2). This monitoring well was installed as part of an unrelated subsurface investigation.

- Two monitoring wells located near the Ranney Well, identified as City Wells 1 and 2 on Figure 2 (second round only). Verbal permission to access these wells was obtained from the NYSDEC (Suozzo, Personal Communication with M.W. Erbe, 1998).

- A shallow and deep well pair (DGC-6S and DGC-6D) at the Almy Brothers Site, which is located southwest of the site, and across the Susquehanna River (Figure 1) (second round only). Verbal permission to access these wells was obtained from the NYSDEC (Cruden, Personal Communication with M.W. Erbe, 1998).

Groundwater Sampling

To further characterize the quality of groundwater entering, exiting, and directly beneath the site, BBL collected one round of groundwater samples from every new and existing monitoring well at the site, following the sampling procedures described in the SRI Work Plan. An additional sample was collected from existing monitoring well B-1 located crossgradient of the site at 267 Court Street. BBL's field staff collected the groundwater samples between December 17 and December 22, 1997, following the techniques outlined in the SRI Work Plan (generally, to purge three well volumes while monitoring indicator parameters for stability). Each sample collected was analyzed for TCL VOCs, TCL SVOCs, TAL inorganics (filtered and unfiltered), and total cyanide (with amenable cyanide if total cyanide was detected). Sample analyses followed the NYSDEC ASP-95 analytical protocol, and included QA/QC samples at a frequency indicated in the SRI Work Plan's QAPP. RCRA Labnet, Inc., located in Amherst, New York analyzed the samples.

Additional details and results may be found in the locations noted above in Subsection 4.5.

DNAPL Sampling

After installation, a measurable thickness of DNAPL accumulated in monitoring well MW97-13. As part of the Phase I SRI, and subsequent groundwater monitoring tasks, the DNAPL in the well was removed by bailing and contained in the drum staging area of the site. One sample of the DNAPL was submitted for analysis of TCL VOCS, TCL SVOCs, TAL inorganics, total and amenable cyanide, and the following physical characteristics: density, viscosity, interfacial tension by ASTM Methods D-1481, D-445, and D-971 (or equivalent), and wettability by soil imbibition.

Investigate Potential Upgradient Groundwater Contaminant Sources

Sampling of the upgradient monitoring wells (the TW-series wells) and cross-gradient wells (MW97-14S, MW97-14D, and B-1) was conducted in part to investigate potential upgradient groundwater contaminant sources. The Task II RI provided indirect evidence that groundwater entering the site had been contaminated by chlorinated aliphatic hydrocarbons, and identified several potential upgradient sources.

As an additional step in this investigation, BBL conducted a background review and literature search. This task consisted of the following:

- Obtaining and reviewing state and federal listings of RCRA hazardous waste generators (GNRTR), National Priority List (NPL), State Equivalent Priority List (SPL), sites under review by USEPA, leaking underground storage tank (LUST) sites, and solid waste landfill sites (SWLFs) hydraulically upgradient and crossgradient of the site. The search of these databases was performed by VISTA Environmental Information, Inc. (VISTA). Results of the VISTA search are contained on Electronic Attachments CD.

- Obtaining and reviewing Sanborn Fire Insurance Maps of the area upgradient of the site.

- Obtaining and reviewing aerial photographs from flights conducted during 1937, 1948, 1958, and 1967.

- Obtaining and reviewing information on specific potential source sites through Freedom of Information Act (FOIA) requests made to NYSDEC and the city of Binghamton.

- Performing a visual reconnaissance of the area.

The findings of these investigations are discussed in Subsection 7.4.1.

4.5.3 Offsite Investigations

The groundwater element of the Offsite Investigations consisted primarily of assessing water quality. On June 5, 1998, each of the three newly installed monitoring wells (MW98-15S, MW98-16S and MW98-16D) was sampled following the procedures outlined in the Offsite and SRI Work Plans. Each sample was submitted to Galson Laboratories to be analyzed for TCL VOCs and SVOCs, total and amenable cyanide, and for filtered and unfiltered TAL inorganics. The sample package included the full suite of QA/QC samples specified in the SRI Work Plan's QAPP.

No hydraulic conductivity tests were planned, nor performed on the new offsite monitoring well locations. Water-level measurements were collected from the new well as part of sampling. The next comprehensive round of water-levels, incorporating the onsite and offsite monitoring wells, was performed later, during the Phase II RFI (discussed below).

4.5.4 Phase II SRI

Groundwater Sampling

The Phase II SRI included a limited program of groundwater sampling, to meet several specific objectives:

- To assess groundwater quality west of the site near the corner of Henry Street and Brandywine Avenue (MW01-17S and MW01-17D);

- To assess groundwater quality in bedrock (MW01-03R and MW01-07R); and

- To confirm the Phase I SRI sampling results of upgradient monitoring wells TW97-2S and TW97-3S.

Of the six wells scheduled for sampling, all but TW97-2S were sampled on October 1 and 2, 2001. TW97-2S (a flush-mounted well) could not be found, despite and extensive search, due to apparent regrading within the Norfolk Southern rail yard.

BBL's field staff collected the groundwater samples by a low-flow procedure outlined in the Phase II Work Plan. Samples were analyzed for BTEX, PAHs, and total cyanide. To further assess the quality of bedrock groundwater, (and its potential usability as a drinking water source), samples from MW01-03R and MW01-07R were also submitted for analysis of chloride. With the exception of the chloride analyses, which were intended to provide screening-level data only, sample analyses followed the NYSDEC ASP-2000 analytical protocol, and included QA/QC samples at a frequency indicated in the Phase II Work Plan's QAPP. Additional details and results may be found in the locations noted above in Subsection 4.5.

Hydraulic Conductivity Testing

The Phase II Work Plan included provisions for hydraulic conductivity tests at each of the newly installed monitoring wells. The work plan outlined steps for specific capacity tests to be incorporated as part of the low-flow sampling protocol; however, due to field conditions, and to remain consistent with prior testing, the field staff performed rising head slug tests instead. These tests were performed following the procedures outlined in the SRI Work Plan.

Water-Level/NAPL-Level Measurement Round

In conjunction with groundwater sampling, BBL completed a site-wide water-level measurement round. As part of this activity, each well was checked for the presence of NAPL. All new and existing monitoring wells and piezometers were included in the round, with the exception of the TW97-02, which could not be found. Well B-1, was also not gauged due to equipment staged over the well head. Additional details and results may be found in the locations noted above in Subsection 4.5.

4.6 Utilities and Historical Structures Investigations

The site and the surrounding area are underlain by a multitude of buried utilities, foundations, walls and other man-made structures. Of these structures, some are in use, some are not, some are related to the former MGP

operations, and others serve (or served) functions unrelated to MGP operations. Such structures have the potential to affect the movement of groundwater and NAPL by forming reservoirs, obstructing flow, or creating preferential pathways. The site investigations included studies of subsurface structures to assess their effect on the migration of groundwater and NAPL.

The subsections below describe the work completed to assess subsurface structures. Additional details can be found in the following places:

- The approximate locations of key subsurface structures are shown on Figure 2.
- The findings of these studies are discussed in Section 7.

4.6.1 Task II RI

As part of a document review completed for the Task II RI, BBL searched for records identifying present and former subsurface structures that may influence the flow of groundwater and NAPL. BBL reviewed NYSEG's project files and information from other local and public sources such as the city of Binghamton and local utility companies. The findings of this file review preliminarily identified most of the man-made subsurface structures identified on Figure 2.

These findings, presented in the Task II RI, provided the basis for more the detailed investigations to follow in the Phase I and Phase II SRI.

4.6.2 Phase I SRI

Five of the man-made subsurface structures identified in the Task II RI were investigated during the Phase I SRI:

- The 66-inch diameter storm sewer that crosses the site from north to south;
- The former Brandywine Creek/Brandywine Canal;
- The former combined storm sewer and sanitary sewer lines that converge and extend beneath the flood wall south of the monitoring well MW93-2 cluster;
- The Court Street flood wall; and
- Municipal water lines running beneath and parallel to Court Street.

The approximate locations of these structures are shown on Figure 2. The work performed to characterize these potential preferential pathways is described in the following subsections.

66-Inch-Diameter Storm Sewer

The 66-inch-diameter storm sewer was characterized by:

- Evaluating subsurface, water-level, and water-quality data collected at test boring/monitoring well location TB-13/MW97-8S, which is located near the downgradient/down slope end of the sewer (Figure 2);

- Conducting a manned inspection of the storm sewer; and

- Collecting grab samples of surface water and sediment from three locations in the storm sewer.

BBL conducted the sewer inspection on October 13, 1997. Prior to the inspection, on-site sewer manholes (MH-1 and MH-2 – see Figure 2) were opened and the sewer allowed to vent. Air quality in the sewer was monitored continuously using an HMX 271 combination meter that monitored percent oxygen, percent of the lower explosive limit (LEL), carbon monoxide (CO) levels, and hydrogen sulfide (H_2S) levels. Oxygen concentrations remained steady throughout the inspection at 20.9 percent. Readings of LEL, CO, and H_2S were consistently zero.

The inspection was begun at manhole MH-1 at the south edge of the site, and continued upstream until a box culvert was reached, about 50 feet upstream of manhole MH-2. At this point too much water was flowing into the box culvert to permit further inspection. Observations made during the inspection are provided in the Storm Sewer Inspection Report (Appendix C) and are discussed in Section 7.

Surface-water and sediment samples were collected from manholes MH-1, MH-2, and the box culvert located upstream from the site (identified as MH-3 on Figure 2). Samples were analyzed for TCL VOCs, TCL SVOCs, and TAL inorganics, including cyanide. Results are summarized on Tables 7 and 16.

Former Brandywine Creek/Brandywine Canal

The file review conducted during the Task II RI identified two former drainage features crossing the western portion of the site. A City of Binghamton map (1876) shows the location of the Brandywine Canal of the former Utica-Binghamton Canal. The Brandywine Canal was constructed to connect with the Pennsylvania-Susquehanna Canal, but was never used (ES, 1992). The approximate location of the Brandywine Canal is shown on Figure 2. The second drainage feature shown near the site is Brandywine Creek. The creek appears on a Sanborn Fire Insurance Map dated 1885, and is located in the same general area as the former canal.

The area of the site crossed by the former canal and Brandywine Creek is coincident with the current 66-inch storm sewer, and has been rigorously investigated with soil borings, monitoring wells and test pits. BBL evaluated these data for the discussion of the potential influence of groundwater and NAPL migration played by former canal and creek bed (see Section 7).

Former Combined Storm/Sanitary Sewer

Historical data collected during this Phase I SRI identified one or possibly two sewers that cross under (or through) the flood wall south of the MW93-2 well cluster (Figure 2). As-built drawings for the flood wall (USACOE, 1948) show a 36-inch-diameter sewer passing beneath the flood wall and into a manhole/control structure, as shown on Figure 2. The second sewer appears on a storm-drainage map provided by the City of Binghamton (Shumaker, ca. 1974) and is identified as a "combined storm/sanitary facility".

The location of monitoring well MW97-11S was chosen in part to characterize these potential preferential pathways. The intended location, immediately behind the flood wall where the sewers cross the flood wall, was changed due to access restrictions. The New York State Department of Transportation (NYSDOT) required that the well be located approximately 30 feet north of the proposed location due to traffic and safety-related concerns. This location put the well approximately 5 feet from the 36-inch-diameter sewer. The installation of MW97-11S is discussed in Subsection 4.4.2.

Flood Wall

The Court Street flood wall (shown on Figure 2) extends up the north bank of the Susquehanna River from east of the 295 Court Street Property, below the southern boundary of the site, terminating at the 66-inch sewer. The presence and construction of the flood wall is considered to have a significant effect on the migration groundwater and NAPL. During the Phase I SRI, BBL completed several tasks to characterize the effects of the flood wall:

- Obtaining and reviewing as-built drawings for the flood wall;
- Evaluating the two rounds of water-level data collected during the Phase I SRI;
- Evaluating the geologic and groundwater-quality data obtained from monitoring wells located behind the flood wall (MW97-11S and MW97-12S); and
- Simulating the effect of the flood wall using a cross-sectional groundwater flow model.

The findings of these tasks are discussed in Section 7. The details of the groundwater flow model are included in Appendix B.

Municipal Water Lines Beneath Court Street

BBL characterized the municipal water lines beneath Court Street by:

- Obtaining information about the location, size, and depth of the lines from city of Binghamton Department of Engineering personnel; and

- Evaluating the information in relation to the hydrogeologic information obtained during the Phase I SRI and previous investigations conducted at the site.

4.6.3 Phase II SRI

BBL further investigated several subsurface structures during the Phase II SRI. The following identifies these structures and the work performed to investigate them:

- The 24-inch outfall, as well as two other pipes, identified as "BB" (10-inch diameter cast iron) and "E" (18" diameter cast iron) that pass through the flood wall in the vicinity. The locations of these pipes were traced using geophysical methods (described in detail below). BBL also attempted to video-inspect the 24-inch outfall.

- The concrete wall that follows the site's western boundary. The construction of this wall, which extends below grade, was evaluated by excavating two test pits (TP-209 and TP-210).

- The Court Street flood wall. The effects of the flood wall on groundwater and NAPL migration were further evaluated with five new soil borings and a new piezometer located in Court Street just behind the flood wall.

- The pump house sump. A sample of sediment accumulated in the sump of the City of Binghamton's pump house was collected and analyzed for BTEX, PAHs, and cyanide. The 66-inch storm sewer empties into and then discharges from this sump (see Figure 7). Analytical results for this sample are contained in Table 16.

The boring, piezometer and test pit tasks are described in more detail above in prior portions of Section 4. The findings of these tasks are discussed in Section 7.

BBL investigated the pipes passing through the flood wall near the 24-inch outfall using the following geophysical and pipe-locating equipment:

- Subsurface Interfacing Radar (SIR) System-2000 (referred-to hereafter as ground-penetrating radar [GPR]) with a 500 megahertz antenna;

- Radio Detection RD 400 Digital Pipe and Cable Locator (referred to hereafter as radio-frequency detection [RFD]); and

- Geonics EM-31 Frequency-Domain Electromagnetic Conductivity (EM) Meter.

BBL's geophysicist calibrated (when necessary) and operated the geophysical equipment following the manufacturer's instructions.

To trace the pipes, BBL used the GPR and RFD instruments to locate the pipes on the street side of the flood wall, and then used the RFD and EM instruments to trace the pipe routes north from the flood wall as far as possible.

During the tracing work, BBL identified and located several additional pipe outfalls along the river side of the flood wall. The adjacent table summarizes pertinent information about these pipes. Due to their distance upriver from the area of interest, and lack of apparent sediment impacts identified during sediment probing, BBL did not investigate these pipes further.

Table 4.13
Other Pipe Outfalls Located

Distance Upriver (ft.)[1]	Diameter (in.)	Material	Identified on Floodwall Drawings	Pipe I.D.[2]
130	12	Cast Iron	ü	Pipe "G"
156	6	Cast Iron	ü	Pipe "I"
271	12	Cast Iron	ü	Pipe "L"
354	12 - 18	Cast Iron		NA

[1] Measured from the 24-inch outfall.
[2] Refers to nomenclature used on the flood wall drawings (see Electronic Attachments CD).

The results of the geophysical investigation are described in Subsection 7.1.4.8.

To further investigate the 24-inch outfall, BBL subcontracted with Royal Environmental Services of Syracuse, N.Y to video-inspect the pipe. Royal performed the video logging on November 29, 2001 using a remote sewer inspection camera.

The end of the outfall contained sediment, which was removed prior to the video inspection. The remote camera was then lowered over a retaining wall on Court Street to the river and inserted into the pipe. Approximately six feet to the North, the pipe was found to make a 45-degree turn toward the east. The camera was able to maneuver beyond the turn but not beyond a deposit of sediment was located roughly 15 feet into the pipe. Royal then used a smaller push camera but was unable to advance it any further than the larger camera.

4.6.4 Interim Remedial Measures

The IRM completed by NYSEG and reported in the Draft IRM Final Engineering Report (NYSEG, 2002) consisted of an extensive program of test-pits and test trenches, with excavation of materials considered potential reservoirs of DNAPL. NYSEG's work is discussed in more detail in Section 6. The IRMs provided additional data on several man-made subsurface structures:

- The size and contents (now excavated) of the foundations for the former No. 3 gas holder and tar-separating well;

- The location of the foundation of the former No. 1 gas holder; and

- An extensive web of inactive buried pipes and buried slabs throughout the former MGP.

BBL is in the process of completing a second IRM, designed to address NAPL migration along the 66-inch storm sewer. This work is addressed in more detail in Section 6. The work completed so far has provided data on several man-made structures including, and adjacent to, the 66-inch storm sewer:

- The construction of the 66-inch storm sewer itself was investigated with five new test pits (TP-204, TP-205, TP-206, TP-207 and TP-208) at various locations along the length of the sewer as it crosses the site from north to south. Four new piezometers (PZ01-03, PZ01-04, PZ01-05 and PZ01-06) were installed to investigate the hydraulic effects of the sewer. These investigation locations are shown on Figure 3.

- The foundation of the No. 4 gas holder was evaluated in two of the test pits addressing the 66-inch storm sewer, TP-206 and TP-208.

- A buried concrete wall (potentially a relict portion of a retaining wall forming the east side of a containment area for the former oil tanks labeled 5 through 7, on Figure 2), was evaluated in three test pits, TP-201, TP-202, and TP-203.

4.7 Surface Soil Evaluation

The quality of surface soil was addressed in three phases of the site investigations. This work was conducted to assess the exposure risk posed by site-related constituents at grade, where direct contact with soils was possible, or where wind or water erosion could permit those constituents to migrate offsite. Table 4.14 summarizes the samples collected. Since the Prioritization Investigation, in 1991, the majority of the site has been covered with gravel or paved, so that the initial soil quality results are no longer valid for assessing exposure risk.

Additional details on the surface soil evaluation may be found at the following locations:

Table 4.14 Surface Soil Samples

ID	Phase of Work	Location	Current Status
SS-1	Prioritization	Northern Property Line	Covered by gravel
SS-2	Prioritization		
SS-3	Prioritization	Oil tanks	
SS-4	Prioritization	Gas Holder 3	Excavated
SS-5	Prioritization	Gas Holder 4	Paved-over
SS-6	Prioritization	West of Brandywine Ave.	Intact
SS-7	Prioritization	Oil tank 8	Covered by gravel
SF-01	Task II RI	Gas Holder 4	Paved-over
SF-02	Task II RI	Oil tank 8	Covered by gravel
SF-03	Task II RI	Oil tanks 1-3	
SF-04	Task II RI	Gas Holder 2	
SF-05	Task II RI	Near Gas Holder 1	intact
SS0-1	Phase I SRI	Lawn south of Gas Holder 1	intact
SS0-2	Phase I SRI		
SS0-3	Phase I SRI		
SB-123	Phase I SRI	Composite of SB-1, 2, 3	Covered by gravel or pavement
SB-456	Phase I SRI	Composite of SB-4, 5, 6	
SS-123	Phase I SRI	Composite of SS0-1, 2, 3	intact

- Surface soil analytical results are summarized on Table 8;
- The locations of the surface soil samples are shown on Figure 3.

Also, as mentioned above, several reference documents have been scanned and included on the Electronic Attachments CD, including the Task II RI Report and selected work plans.

4.7.1 Prioritization Investigation

For the Prioritization Investigation, ES collected seven surface-soil samples (six from the site and one background sample from an off-site location). Each of the samples was analyzed VOCs, SVOCs, and inorganics including cyanide.

The Prioritization Investigation surface-soil samples were designated SS-1 through SS-7. As noted in the adjacent table, all samples but the background sample (SS-6) are in locations that have been covered with pavement or clean fill or excavated.

4.7.2 Task II RI

For the Task II RI, BBL collected five surface-soil samples for analysis of VOCs, SVOCs, PCBs, metals, and total and amenable cyanide. Sample analyses followed the NYSDEC ASP-12/91 analytical protocol, and included QA/QC samples at a frequency indicated in the RI Work Plan's QAPP. As noted in the adjacent table, all of the surface-soil sample locations but SF-5 (in the lawn near the current gas control building) have been covered with gravel or pavement.

4.7.3 Phase I SRI

During the Phase I SRI, BBL collected four surface-soil samples in the only area of the site that was not paved or recently covered by clean fill. Three of the samples, SSO-1, SSO-2 and SSO-3 were collected on September 15, 1997, and one additional sample, also designated SSO-1, was collected on September 19, 1997. All of the samples were collected according to the procedure contained in the SRI Work Plan. The reason that there are two samples designated SSO-1 is that quality-control samples (matrix spike and matrix spike duplicate [MS/MSD]) were inadvertently not submitted with the samples collected on September 15; therefore, another sample, including the MS/MSD, was collected from the same location on September 18. The sampling interval comprised a two-inch thick interval located just below the sod. The four soil samples were analyzed for TCL VOCs, TCL SVOCs, TAL inorganics, total cyanide, and amenable cyanide if total cyanide was detected.

In addition to the grab samples, three composite surface-soil samples were collected and analyzed for polychlorinated biphenyls (PCBs) according to USEPA Method 8080. The first sample was a composite of selected intervals of samples obtained from soil borings SB-1, SB-2, and SB-3 (SB-123). The interval selected for compositing represented the uppermost 6 inches of the former land surface, prior to the recent addition of clean fill by NYSEG. The second sample was a composite of similar intervals from soil borings SB-4, SB-5, and SB-6 (SB-456). The third sample was a composite from the three surface-soil sampling locations described above (SSO-1 through SSO-3) and was designated SS-123.

All Phase I SRI surface-soil analyses followed the NYSDEC ASP-2000 analytical protocol, and included QA/QC samples at a frequency indicated in the Phase II Work Plan's QAPP. Additional details and results may be found in the locations noted above in Subsection 4.7.

5. Susquehanna River Evaluation Activities

5.1 Overview

This section discusses the various field tasks completed to evaluate the Susquehanna River. The work completed in Phase I and Phase II of the SRI was outlined in the following NYSDEC approved work plans:

- *Work Plan for Conducting a Supplemental Remedial Investigation Feasibility Study at the Court Street Site, Binghamton, New York.* "SRI Work Plan" (BBL, 1997a); and

- *Work Plan Binghamton Court Street Site Phase II Supplemental Remedial Investigation.* "Phase II Work Plan" (BBL, 2001c).

This section provides a general overview of the field methods used, but does not reiterate the full detail of field procedures presented in the work plans. For a more detailed reference, the scanned copies of the work plans listed above can be found on the Electronic Attachments CD, included with this document.

Only the salient activities of the Prioritization Investigation and the Task II RI are covered in this section. Thorough discussions of the activities of these early investigations were presented in their respective reports:

- *Prioritization of Former Manufactured Gas Plant Site, Binghamton Court Street Site (NYSEG Code CG BS)* (ES, 1992); and

- *Task II Remedial Investigation Report. Former Manufactured Gas Plant Site. Court Street. Binghamton, New York* (BBL, 1996).

For ease of reference, the Task II RI Report has been scanned and can be found on the Electronic Attachments CD, included with this document.

5.2 Surface-Water Sampling

Surface-water quality was addressed in the Prioritization Investigation and the Task II RI. The findings of this work demonstrated that the site did not have an adverse impact on surface-water quality except when impacted

riverbed materials were disturbed[4]; therefore, later investigations (i.e., the Phase I and Phase II SRIs) focused on the quality of riverbed materials.

The subsections below describe the scope of the surface-water sampling events and related tasks completed. Additional information on these programs can be found in the following places:

- Detailed discussion of the work and findings of Prioritization Investigation and the Task II RI can be found in their respective reports. The Task II RI, which summarizes the findings of the Prioritization Investigation, is included on the Electronic Attachments CD.

- Sample details and laboratory analytical methods are summarized on Table 3.

- Analytical results are summarized on Table 14, and discussed later in Section 8.

5.2.1 Prioritization Investigation

For the Prioritization Investigation, ES collected four surface-water samples from the Susquehanna River:

- SW91-1, upstream of the site, at the sediment sample location identified SED-1 (see Figure 3);
- SW91-2, near the outfall of the 66-inch storm sewer at the sample location identified SED-2; and
- SW91-3 and SW91-4, downstream of the site, at the sample location identified SED-3.

The samples were analyzed for VOCs, SVOCs, metals, and total and amenable cyanide. Additional details and results may be found in the locations noted in Subsection 5.2.

5.2.2 Task II RI

During the Task II RI, BBL reexamined the quality of the Susquehanna River by collecting five new surface-water samples:

- SW93-1, approximately 400 feet downstream of the site's western boundary;
- SW93-2, adjacent to the site, near the Phase I SRI probing point P-2 (see Figure 3);
- SW93-3, near the 24-inch pipe outfall; and
- SW93-4 and SW93-5, approximately 135 and 420 feet upstream of the 24-inch pipe outfall.

[4] When these materials were disturbed, they produce sheens, thus temporarily exceeding the water quality standard for oil and floating substances (6 NYCRR Part 703.2).

Each of these samples, collected June 17, 1993, was submitted for laboratory analysis of VOCs, SVOCs, metals and total cyanide. These sample locations were not surveyed or precisely measured; however, the approximate locations are shown on Figures 3 and 4 of the Task II RI Report (Attachment XIV of the Electronic Attachments CD). Additional details and results may be found in the locations noted in Subsection 5.2.

5.2.3 Phase I SRI

During the Phase I SRI, BBL interviewed City of Binghamton employees at the City's water filtration plant and obtained water-quality data for the filtration plant from the City to determine whether site-related constituents have been detected in water drawn from the Susquehanna River at the plant intake. The location of the intake is shown on Figure 2.

5.2.4 Phase II SRI

The riverbed borings of the Phase II SRI (identified SR-101 through SR-114) were drilled with a barge mounted rig using driven casing. To supply the water needed to drill by this method, the drilling subcontractors drew water directly from the river. Before proceeding with this technique, BBL confirmed that the river's water quality was not impacted by collecting a single sample and analyzing it for BTEX and PAHs. The sample was collected near the intake of the City of Binghamton's water filtration plant (see Figure 2). As this was a screening-level sample, no QA/QC samples were submitted, and the laboratory reported results only.

5.3 Temperature and Conductivity Survey

During the Phase I SRI, BBL conducted a temperature/conductivity survey of the Susquehanna River bottom to detect areas of preferential groundwater discharge to the river. The survey was completed by dragging a temperature/conductivity meter along the bottom of the Susquehanna River behind a boat, taking precautions to minimize disturbance of the river bottom, and recording readings at 10-foot intervals. The measurements were taken along three 1,000-foot-long transects aligned parallel to the north bank of the river. The first transect began upstream of the site, at the 24-inch outfall (Figure 2), 5 feet from the shoreline. The second and third transects also began at the outfall, and were spaced 25 and 50 feet from the shoreline, respectively. The collected data are contained on the Electronic Attachments CD.

Prior to starting the survey, the level of the groundwater was measured in monitoring wells MW97-11S and MW97-12S and compared to the river level to confirm that groundwater occurred at elevations above the river level, implying net groundwater flow into the river. Results of the survey are discussed in Section 8.

5.4 Surficial Riverbed Probing and Sampling

The Court Street site investigations included multiple episodes of riverbed probing and sampling in the Susquehanna River. These tasks were undertaken to characterize the nature and extent of site-related impacts to the riverbed materials. Probing tasks generally preceded sampling in order to more fully characterize the composition and extent of the probed riverbed material, generally assess the riverbed material for evidence of staining/sheens, and utilize this information to select sample locations.

The subsections below outline the scope and intent of the work completed in each phase of the site investigations. Additional detail on the riverbed probing and sampling programs can be found in the following places:

- Riverbed probing and sampling locations are shown on Figure 2;
- Sample analyses and laboratory methods are summarized on Table 3;
- The laboratory analytical data for riverbed materials are summarized on Table 9 with key data presented on Figure 15; and
- Chains-of-custody are included on the Electronic Attachments CD.

Also, as mentioned above, several reference documents have been scanned and included on the Electronic Attachments CD, including the Task II RI Report and selected work plans.

5.4.1 Prioritization Investigation

For the Prioritization Investigation, ES collected three riverbed samples from the Susquehanna River:

- Sed-1, upstream of the site, (see Figure 3);
- Sed-2, near the outfall of the 66-inch storm sewer; and
- Sed-3, downstream of the site, just west of the Tompkins Street Bridge.

Surface water samples SW-1, SW-2 and SW-3 were collected at these same locations (SW-4 was also collected near Sed-3). The samples were analyzed for VOCs, SVOCs, metals, and total and amenable cyanide. Additional details and results may be found in the locations noted in Subsection 5.4.

5.4.2 Task II RI

In June 1993, as part of the Task II RI, BBL conducted riverbed probing and sampling tasks in the Susquehanna River adjacent to the site. The scope of these activities is described below.

Probing

BBL completed three riverbed probing transects, amounting to 87 individual probing points. The three transects ran parallel to the river's north shore, immediately off the bank, 25 from the bank, and 50 feet from the bank.

The first transect began at the Tompkins Street Bridge and extended at 20 foot intervals upstream to the 24-inch outfall (see Figure 2). The probing points in the second and third transects were spaced approximately 20 and 50 feet apart, respectively, along parallel lines beginning approximately 250 feet downstream of the site (just beyond the Tompkins Street Bridge) and ending approximately 110 feet upstream of the site.

At each location, the field staff measured the water depth, then probed the riverbed by hand, driving a 5/8-inch metal rod to refusal, watching to see if any sheens were created. The depth of penetration was recorded as the sediment thickness. At each point, the field staff also drove a length of clear Lexan® tubing to retrieve a sample of the riverbed material for physical description.

The locations (identified P-1 through P-87) were not surveyed, and are not shown on the current figures due to more recent, overlapping data. Appendix A-4 of the Task II RI Report (provided on the Electronic Attachments CD) includes a more detailed discussion of the activities and findings of this task.

Riverbed Sampling

BBL collected fourteen riverbed samples at points chosen to cover the area of the river immediately upstream, adjacent to, and immediately downstream of the site, and to target areas that probing identified as potentially impacted. The sampling locations, identified SS-1 through SS-14, are shown on Figure 3. All 14 samples were collected from 0 to 1 foot or less of the riverbed materials, below water less than 1.5 feet deep.

Samples were collected by driving Lexan® core tubes. Each sample was submitted for laboratory analysis of VOCs, SVOCs, metals, cyanide, percent solids, and TOC. Sample analyses followed the NYSDEC ASP-12/91 analytical protocol, and included QA/QC samples at a frequency indicated in the RI Work Plan's QAPP. Additional details and results may be found in the locations noted above in Subsection 5.4. These activities and findings were all previously reported in the Task II RI Report (BBL, 1996), which is included on the Electronic Attachments CD.

5.4.3 Phase I SRI

During the Phase I SRI, BBL completed additional riverbed probing and sampling in the river adjacent to the site (see Figure 2). The scope of this work is summarized below.

Riverbed Sampling

BBL collected samples of the riverbed material in October 1997 at selected depths from the following areas:

- The area surrounding the 24-inch outfall located just upstream of the site (14 samples);
- The area near the abutment of the former Tompkins Street Bridge (31 samples);
- The 24-inch outfall pipe itself (one sample); and
- 100 and 200 feet downstream of former sediment sampling location SS-1 (BBL, 1996) (one sample at the 100-foot distance and two samples at the 200-foot distance).

Samples of the riverbed material were collected from two depth intervals at each location, 0 to 0.5 feet and 1 to 2 feet. During sampling, visual observations for the presence of an oil sheen on the water surface at each sampling location were made. When a sheen was noted, a third depth interval (2 to 3 feet) was also sampled.

Samples were collected using barge-mounted drill rig, steel casing, and 3-inch diameter split-spoon samplers. At each location, the sampler was driven to 2 feet below the river bottom. If a third sample was required, steel casing was driven to the base of the interval previously sampled, cleaned out, and then another split-spoon sampler driven to collect the third sample.

One objective of the sampling was to delineate areas of affected riverbed material. A location was deemed "affected" if an oil sheen was observed in the water during sampling. When affected material was identified at a given location, one additional sample was collected 50 feet out from the affected location. This process continued until the area of affected materials was delineated (i.e., until no sheens were observed).

Each riverbed-material core collected was observed, its location surveyed, and its PID reading recorded. Pertinent information (e.g., sediment depth, composition, water depth, visual observation) was recorded in a field log book.

Following collection, select samples were sent to the laboratory for analysis for TCL VOCs, TCL SVOCs, cyanide (total and amenable), and TPH. For locations where no oil sheen was observed, both discrete sample intervals collected (i.e., 0 to 0.5 feet and 1 to 2 feet) were analyzed. For locations where an oil sheen was

observed, the 0- to 0.5-foot interval was analyzed, and either the 1- to 2-foot or the 2- to 3-foot interval was also analyzed, whichever registered the greatest PID reading. Four of the surface samples (i.e., 0 to 0.5 feet) were analyzed for TOC and 20 percent of the samples collected underwent grain-size distribution analysis (GSDA). Analytical results are summarized on Tables 9 and 16. GSDA analytical results are included on the Electronic Attachments CD.

Six additional riverbed samples were collected by the NYSDEC in September, 1998. Four of the samples were collected adjacent to and immediately downstream of the 24-inch outfall. The other two samples were collected downstream of the Tompkins Street Bridge. Although the samples were not collected as part of the Phase I SRI, and the NYSDEC sampling procedures did not follow the Field Sampling Plan established for the site investigation (BBL, 1997a), analytical results for the NYSDEC riverbed samples are presented on the Electronic Attachments CD.

Probing

Riverbed probing was conducted along a single transect running between the 24-inch outfall and the former bridge abutment. The purpose of this exercise was to investigate whether affected riverbed materials existed between the areas specifically investigated through the Phase II riverbed sampling program, described above. The probing points (identified P-1 through P-10, and shown on Figure 2) fell in a line parallel to, and 10 feet out from, the riverbank. The probing interval along the transect was 25 feet.

5.4.4 Phase II SRI

The Susquehanna River evaluation program of the Phase II SRI, consisted of three tasks: riverbed probing, riverbed borings, and targeted sediment sampling. Each task is described in detail below.

Probing

At the start of the river evaluation, BBL conducted a riverbed probing survey adjacent to the site along the Court Street flood wall. As in prior probing exercises, this task was conducted to identify areas of sediment deposition and potential NAPL impacts, to identify locations to collect riverbed samples for laboratory analysis.

BBL completed the probing accompanied by Jeff Edwards of the NYSDEC, and a surveyor from Hawk Engineering. The probing points, shown on Figure 2, fell in three transects, each parallel to the north bank of the Susquehanna River and offset 2 feet, 10 feet and 20 feet from the bank. As shown on Figure 2, the probing transects began near the 66-inch storm sewer, extended upstream beyond the site and terminated near the location of the former Raney well.

At each location, the field staff measured the water depth, then probed the riverbed by hand, driving a metal rod to refusal, watching to see if any sheens were created. The depth of penetration was recorded as the sediment thickness.

Riverbed Borings

For the Phase II SRI, BBL completed 14 riverbed borings identified SR-1 through SR-14, in the locations shown on Figure 2. The borings were divided into two categories, deep (extending to the top of the till) and shallow (extending at least six feet or at least 4 feet beyond the lowest occurrence of NAPL). In combination, the riverbed boring program achieved the following objectives:

- To further delineate the lateral extent of NAPL impacts on riverbed materials adjacent to the site; and
- To determine the vertical extent of NAPL underlying the riverbed.

The depths and locations of the riverbed borings are summarized in Table 5.1. The locations of deep riverbed borings SR-102 and SR-103 were chosen to fall in the areas known from prior investigations to have impacts in riverbed materials. By drilling to the top of till in these locations, the borings investigated whether NAPL extended below the surficial materials and if, potentially, a migration pathway existed by which NAPL could migrate from the site at depth and then discharge upward into the River. As discussed in Section 9, the vertical extent of impacts was found to be minimal, and there was no evidence of NAPL migration at depth.

Table 5.1 Phase II SRI Riverbed Borings

Boring	Depth (feet)	Location / Features Investigated
SR-101	36	Downstream of 66-inch sewer.
SR-102	36	At outlet of 66-inch sewer.
SR-103	38	At outlet of 24-inch pipe.
SR-104	6	Spaced approximately 100' apart in area between 66-inch sewer and 24-inch pipe.
SR-105	8	
SR-106	6	
SR-107	6	
SR-108	6	Downstream of the Tompkins Street Bridge, investigating an isolated area where sheens were observed while collected sediment sample SS-1D.
SR-109	12	
SR-110	6	
SR-111	6	
SR-112	6	
SR-113	6	
SR-114	6	

The third deep riverbed boring (SR-101), and four of the shallow borings (SR-104 through SR-107) were located to provide even spatial coverage along the length of the flood wall from the Tompkins Street Bridge to the 24-inch pipe.

The final seven riverbed borings (SR-108 through SR-114) were not originally planned, but were drilled at the request of the NYSDEC to delineate potential impacts related to a sheen observed at sediment sample location SS-1D.

The sampling program for the riverbed borings differed for the deep and shallow locations. At the shallow borings, a sample of the riverbed materials in the top 1 to 2-foot of recoverable material was submitted for analysis of BTEX, PAHs, total organic carbon (TOC), and total cyanide. Deeper samples were collected in only one instance (at SR-109), to delineate the vertical extent of observed impacts.

At the deep riverbed borings, the sampling procedure called for submittal of a single sample from the most impacted interval in the boring. At SR-101 and SR-102, that interval corresponded to the 0 to 2 foot depth. No impacts were noted at SR-103, therefore no sample was submitted. As with the shallow riverbed borings, samples were submitted for BTEX, PAHs, TOC and total Cyanide.

Samples analyses followed the NYSDEC ASP-2000 analytical protocol, and included QA/QC samples at the frequency indicated in the Phase II SRI Work Plan.

The riverbed borings were drilled using a barge-mounted rig, using driven flush-joint casing and a rotary bit, as needed. Prior to the start of the program, a sample of river water was submitted for analysis of BTEX and PAHs to confirm the lack of MGP constituents. After laboratory results showed the river water to be unaffected, river water was used as a drilling fluid. All drilling wash water was contained and recirculated. During drilling, oil-absorbent booms were used, as needed, to contain sheens produced through agitation of the riverbed. Soil samples were collected with continuous split-spoons. Following completion, each boring was tremie-grouted to near the river bottom.

A temporary piezometer was installed for approximately one day, at the deep riverbed boring SR-102. This piezometer was installed so that field staff could gauge the vertical hydraulic gradient between the river and groundwater at the base of the sand and gravel. The piezometer was constructed of 2-inch diameter PVC with a 1-foot long slotted screen, a sand pack and bentonite seal. The piezometer was allowed to equilibrate over-night, after which time the water-level differential between the river the piezometer was gauged. Finally, the piezometer was removed and the borehole was grouted.

Targeted Riverbed Sampling

During the Phase II SRI, BBL collected samples of riverbed materials from a total of four locations, chosen to further investigate prior evidence of impacts. The NYSDEC selected each sampling location (shown on Figure 2). Table 5.2 lists the names and rationale for the collected samples.

Table 5.2 Phase II SRI Targeted Surficial Riverbed Samples

Boring	Depth (feet)	Location / Features Investigated
SS-15	0.8	Upstream of site at the location of a sheen generated during probing.
SS-1C	0.7	Downstream of site, near former sediment sample SS-1, to further investigate a cyanide detection reported at SS-1, dating to 1993.
SS-1D	0.7	
SS-1E	0.6	

Each sample was collected using hand-driven Lexan® tubes. Sample SS-15 was analyzed for BTEX, PAHs, total cyanide and TOC. The Phase II Work Plan required that the remaining samples (SS-1C, SS-1D, and SS-1E) be submitted for analysis of total cyanide and TOC. Since sheens were noted at SS-1D, that sample was also analyzed for BTEX and PAHs. Samples analyses followed the NYSDEC ASP-2000 analytical protocol, and include QA/QC samples at the frequency indicated in the Phase II Work Plan.

Additional details and results may be found in the locations noted in Subsection 5.4.

Background Sediment Sampling

By letter dated September 25, 2001, BBL informed the New York State Department of Environmental Conservation (NYSDEC) that further background sediment sampling was necessary to evaluate potential upstream and upland sources of PAHs to Susquehanna River sediments near the site. BBL's concern was that many potential sources of PAHs existed upstream from the site, and therefore PAHs would not be a good indicator of site-related impacts unless background concentrations were quantified. In the September 25, 2001 letter, BBL also outlined a series of steps to be taken to obtain the proposed background information. By letters dated November 14, 2001 and November 28, 2001 the NYSDEC and BBL exchanged comments related to the proposed work.

BBL proposed performing a reconnaissance of the Susquehanna River upstream of the site to identify storm water and other discharge locations and evaluate the nature of the riverbed and associated sediments upstream of the site. BBL performed this reconnaissance during the week of November 28, 2001. The reconnaissance identified soft sediment deposits in, and storm sewer lines that contributed flow to, an approximately one-mile reach of the river upstream of the site. During the reconnaissance, BBL systematically probed along, and in between, four transects to identify deposits of soft sediment. Based on this work, BBL identified four such deposits. One was located along the northern bank of the Susquehanna River and three were located along the southern bank of the River. The thickness of the deposits ranged up to three feet. At the remaining probing locations, the river bottom was comprised of mostly gravel, cobbles, and boulders.

In addition to the sediment deposits, BBL identified other potential sources of sediment to the river, specifically outfall pipes and storm-sewer manholes/catch basins located above the site. BBL identified seven storm-sewer lines or other pipes that discharged to the river upstream, and on the same side of the river as, the site. BBL also identified four catch basins/manholes that contained sediment.

Based upon this information, and consistent with BBL's September 25, 2001 letter to the NYSDEC, BBL selected fifteen locations, for sampling that included areas of soft sediment, storm sewers, and manholes.



Figure 5.1: Petroleum pooling on River ice near the spill site.

On January 30, 2002, BBL arrived at the site to perform the background sampling and promptly discovered a plume of sheen on the river. BBL traced the sheen to a petroleum spill located nearly three miles upriver from the site. This observation highlighted two facts:

- Attempting to determine background concentrations of PAHs in river sediments could be problematic because of the many potential sources of PAHs to both upriver and downriver sediments in such an industrialized area.

- Another means of identifying site-related PAH impacts to riverbed materials and soft sediments was needed.

The NYSDEC, concerned about the impact a sheen might have on the sampling results, directed NYSEG to suspend the background-sampling program indefinitely. The NYSDEC and NYSEG agreed that the Phase II SRI (and consequently the full RI program) could be completed without performing the background sediment sampling program.

Section 8 describes the results of the sediment investigation, including the methods used to delineate site-related impacts to riverbed materials and soft sediments.

6. Scope and Status of IRMs

NYSEG has undertaken two projects coincident with the RI aimed at creating near-term remedies where site conditions have created the potential for worsening site impacts to environmental media:

- The Source Area Removal IRM, planned and executed in 2000 and 2001; and
- The 66-inch Storm Sewer IRM, initiated in 2001 and still in progress.

The work completed or planned for the IRMs is tangential to the RI, and is only briefly reviewed here. As noted below, the IRM programs function under separate work plans, and are reported separately.

6.1 Source Area Removal

NYSEG undertook the Source Area Removal IRM to mitigate potential migration of DNAPL away from its original source areas, by excavating several buried MGP features which may have acted as reservoirs or preferential pathways for DNAPL. The buried features included the No. 3 gas holder foundation, a tar-separating well adjacent to the holder, and numerous buried pipes found to contain DNAPL.

The work was completed according to the *Interim Remedial Measures Work Plan* (NYSEG, 2000), and executed by NYSEG in 2000 and 2001. The work was done in coordination with a R & D program in which various new technologies for the expedited characterization of contaminated sites were demonstrated.

NYSEG complete the field work in August, 2001, and submitted a Draft IRM Final Engineering Report in January 2002.

6.1.1 Tasks Completed

The Source Area Removal IRM included several discreet tasks. The key activities and findings (taken from the NYSEG's Final Engineering Report) are outlined below.

No. 3 Gas Holder

- NYSEG excavated the contents of holder foundation, found to be 120 feet in diameter, approximately 10 feet deep, and constructed of brick and stone in poor condition.

- The base of the holder, a 2-foot thick concrete floor, was demolished and removed.

- NAPL-containing fill and soil were removed for offsite disposal.

- A thin layer of NAPL impacted bedding material was removed from under the holder floor, which was located above a low permeability silt layer.

- The gas-holder foundation walls were removed.

- No seams of NAPL were observed in the sidewalls.

- The excavation was backfilled with stockpiled soils and clean fill.

Tar-Separating Well

- The contents and the structure of the tar-separating well were removed for off-site disposal.
- The structure was found to be 28 feet in diameter, approximately 8 feet deep, and constructed of brick.
- The fill materials contained by the structure were heavily impacted with NAPL.
- Former monitoring well MW97-13S had been drilled through the brick floor of the structure.
- The soil beneath the tank was low permeability silt with no evidence of NAPL impacts.
- No seams of NAPL were observed in the sidewalls.
- The excavation was backfilled with clean imported fill.

Test Trenching and Pipe Removal

- NYSEG excavated test trenches to locate and trace piping and other buried structures that may have contained free-phase NAPL.

- Pipes encountered during excavation that contained NAPL were removed to the extent feasible. If removal was not feasible, the pipes were plugged.

- After observing the initial trenching and removal efforts, the NYSDEC agreed that the extent of apparently impacted soils was greater than they anticipated, and that a significant volume of such soil would remain subsequent to the IRM. The NYSDEC agreed that no further excavation was needed during this IRM.

6.1.2 Research and Development Work

The R&D project, supported and co-funded by USEPA/TIO, EPRI, and several EPRI member utilities, evaluated the feasibility/applicability of several promising new technologies for expedited characterization of

contaminated sites. The locations of some test trenches were chosen to confirm the preliminary findings of the remote sensing surveys. In addition, two soil borings, SB-201 and SB-202 were drilled to provide supporting data for the R&D findings.

Additional details on the soil borings completed are available in Subsection 4.2.5 of this report. Further details on the R&D program are currently unavailable. USEPA/TIO is preparing a technical report on the findings of the R&D program, which will be submitted to the NYSDEC.

6.2 66-inch Storm Sewer

On NYSEG's behalf, BBL is designing an IRM to mitigate discharge of site-related NAPL to the Susquehanna River via the 66-inch storm sewer. BBL conducted a pre-design investigation during September 2001 to gather additional data needed to design the IRM. The primary purpose of the investigation was to evaluate whether NAPL migration along the outside of the sewer pipe was a viable mechanism for transport of NAPL to the river. If so, the IRM design would need to address NAPL moving along the outside, as well as seeping into the sewer. The investigation involved excavating several test pits and installing four piezometers along the sewer, and collecting a series of water- and NAPL-level measurements. Relevant information regarding this work is presented in Section 4.

Results of the pre-design investigation were reported in a letter from BBL to the Mr. Brian D'Amour of the NYSDEC dated June 4, 2002. This letter report concluded that an IRM to mitigate potential NAPL migration along the outside of the sewer was not warranted. The NYSDEC agreed with this conclusion and approved the pre-design report in correspondence dated June 21, 2002.

BBL prepared and submitted to the NYSDEC a draft Remedial Design Report on November 11, 2002 and is currently awaiting the NYSDEC's approval to implement the IRM.

7. Subsurface Investigation Findings

This section reports the cumulative findings of site investigations into the nature and condition of the subsurface at and near the Court Street site. The discussion is divided into the following categories:

- Geology and physical setting (Subsection 7.1);
- The occurrence and flow of groundwater (Subsection 7.2);
- The nature and extent of NAPL in the subsurface, including a discussion of soil quality (Subsection 7.3), and
- Groundwater quality (Subsection 7.4).

Findings most relevant to the nature and condition of the Susquehanna River are reported in Section 8. Due to the many relationships between land and river processes, some discussion of the river is included here (most notably, in the sections on groundwater flow and the nature and extent of NAPL).

7.1 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 (7.1.1 and 7.1.2) provide an overview of the regional and site-specific geologic settings. The third subsection (7.1.3) identifies and describes the site stratigraphy in terms of hydrostratigraphic (i.e., predominant groundwater flow) units. The final subsection (7.1.4) identifies buried utilities and structures at the site, and their potential to influence shallow groundwater and NAPL migration.

7.1.1 Regional Geologic Setting

The city of Binghamton is located in the Appalachian Plateau physiographic province, a region of similar geologic history covering the majority of central and western New York State. The rock and soil at the site are best understood in the context of the Plateau's history, discussed briefly below.

Prior to Pleistocene Glaciation

The interbedded shales, siltstone, and sandstone which form the bedrock of the region were deposited as sediments in an inland sea during the upper Devonian age (Rickard and Fisher, 1970). The long sequence of erosion that has left Central New York's present landscape began approximately 340 million years ago when the inland sea drained and the region became dry land. The rock itself has remained nearly flat lying, cushioned from the compressive mountain building forces (which created the folds and faults in like-aged rocks south in Pennsylvania), by a ductile salt layer in underlying Silurian aged rock.

The Pleistocene Glaciation

Several glacial advances have swept over Central New York. The last ice sheet retreated from its southern terminus in Pennsylvania approximately 17,000 years ago. The present day Chenango and Susquehanna Rivers locally follow valleys carved by the glacier, valleys which probably predated the glaciation but were deepened and widened by glacial ice. 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.

Post Glaciation

The present day Chenango and Susquehanna Rivers formed as the glacier receded from the area 10- to 15,000 years ago. The rivers flow largely on the glacial deposits which fill the valleys, gradually cutting into them and carrying the material downriver to be deposited again as alluvium. The soils deposited since the last glaciation are primarily this sand, silt, and clay left by the rivers and their tributary streams.

Binghamton was built on a broad lowland valley where the Chenango and Susquehanna Rivers join. The paths of the rivers, and the location of their junction have meandered across the valley floor leaving old stream channels, sand bars, and sediment-filled oxbows superimposed on the glacial outwash.

Table 7.1 Generalized Geologic Column

Upper Contact Elev.(ft. AMSL)	Thickness (ft)	Stratigraphic Unit
845	10	**Fill –** silt, sand, gravel, ash, cinders, slag. Also includes demolition debris, foundation remnants, and buried utilities.
835	10	**Alluvial Silt and Clay** -- massive, with a blocky texture and little or no organic matter.
825	30	**Outwash Sand and Gravel** –discontinuous layers of variable thickness and composition, generally fine to coarse sand, fine to coarse gravel, occasional lenses of fine sand and silt.
795	45	**Till** – dense silt and clay matrix containing embedded sand and gravel, rounded to angular, multiple rock-types.
750		**Bedrock** – Dark gray shale, slightly weathered, horizontal bedding.

Note: elevations and thicknesses approximated for center of site.

Man's Influence

In two centuries of intensive habitation, the people of Binghamton have significantly modified the landscape. The rivers are now dammed and lined by flood walls and dikes. Formerly swampy areas in the valley floor have been drained or raised with fill. A consideration of the near-surface geology must now include these man-made influences.

7.1.2 Site Geologic Setting

The site occupies a small parcel of land (about 4.3 acres) by the north bank of Susquehanna River (see Figure 1), approximately 1.4 miles upstream of its junction with the Chenango River. Site investigations have identified the five principal geologic units beneath the site described in Table 7.1. These units show a sequence of events specific to the site's geologic history:

- Shale bedrock deposited as silt and clay in the Devonian Period;
- Dense basal till deposited by the Pleistocene glacier(s);
- Outwash sand and gravel deposited by meltwater rivers as the glacier receded;
- Post-glacial alluvial silt and clay, probably deposited in an abandoned river channel, left as the of the Susquehanna and Chenango Rivers meandered across the valley; and
- Fill and an assortment of man-made structures, originating in the site's industrial history.

Subsection 7.1.3, below, describes the nature and hydrogeologic function these geologic units in detail.

Currently, nearly all precipitation that falls on site infiltrates to become groundwater. On the streets and properties adjacent to the site, much of the runoff enters storms drains that discharge directly to the river. Nineteenth century maps (contained in the Electronic Attachments CD) show that a creek, then named the Brandywine, flowed across the western part of the site, connecting a swampy lowland to the north with the river to the south. The swampy lowland (likely an abandoned river channel) is believed to have filled much of the current topographic depression extending north from the site, visible in the contours on Figure 1. In the latter half of the 19th century, the swampy lowlands were apparently filled and drained, and the flow of Brandywine Creek was transferred to the still-extant 66-inch storm-sewer (Figure 2).

The Susquehanna River (where it passes the site and through the City of Binghamton) forms the backbone of an enormous drainage basin, extending to the north and east. At a gauging station upstream of the site (thus

excluding the Chenango River's contribution) the average flow of the Susquehanna River is approximately 3,500 cubic feet per second (USGS, 2001). The outwash sand-and-gravel unit filling much of the Susquehanna River valley (as in runs east to west across central New York) forms the Clinton Street Ballpark Sole Source Aquifer, a USEPA designation (USEPA, 2002). While the City of Binghamton obtains its water directly from the Susquehanna River, some adjacent communities rely on groundwater pumped from this aquifer.

7.1.3 Hydrostratigraphic Units

Hydrostratigraphic units comprise geologic units of similar hydrogeologic properties (e.g., hydraulic conductivity); therefore, several geologic units can be grouped together as one hydrostratigraphic unit. The concept of hydrostratigraphic units was introduced by Maxey (1964) and reassessed by Seaber (1988). The use of hydrostratigraphic units aids interpretation and simplifies the discussion of groundwater flow. The hydrostratigraphic units at the site are discussed individually below, and the relationship of these units to one another is depicted in cross-section on Figure 6. The line of section, which is shown on Figure 1, is drawn approximately parallel with groundwater flow directions across the valley floor.

Bedrock/Till Unit

While clearly distinct geologic units, the bedrock and till form a single hydrostratigraphic unit, due to their similar role in site groundwater flow patterns. As discussed below, the bedrock/till hydrostratigraphic unit forms a lower confining unit for the significantly more conductive sand-and-gravel unit, directly above.

BBL collected core samples of the bedrock beneath the site while drilling the boreholes for monitoring wells MW01-03R and MW01-07R. At both locations, the rock was a gray-colored shale, with essentially horizontal bedding, slight weathering, and a moderate quantity of horizontal bedding plane fractures.

The bedrock surface occurs at an elevation of approximately 755 feet AMSL at both bedrock-well locations. At the boring identified "Hole 2", drilled during construction of the Tompkins Street Bridge, the bedrock surface occurred at a nearly identical elevation. Hole 2 is shown on Figure 9; its log is included in Appendix A. The three points available describe a generally flat-lying bedrock surface, approximately 92 feet below the site grade.

Table 7.2 Till Sieve Analyses

Location	Depth of Sample (ft. bgs)	Percent Passing Sieve			
		gravel	coarse sand	med. sand	silt & clay
		#4	#10	#40	#200
TB-5	54-56	61.6	50.2	37.2	29.8
TB-8	50-52	58.2	50.3	40.7	34.7
TB-12	48-50	68.2	59.8	46.8	33.9
SB-105	61-64	62.1	51.7	37.9	25.8
MW01-03R	61-63	38.9	31.4	22.1	17.2

More detailed results are presented on the Electronic Attachments CD.

At the site, till was encountered in every deep boring drilled. The material varied moderately from location to location, though was generally very dense, with a matrix of silt and clay supporting larger clasts of sand and gravel. As is typical of till, the results of the grain-size-distribution analyses (summarized in Table 7.2) show considerable range of composition, including substantial

fractions of silt and clay, sands, and gravel. Most of the grain-size analyses were performed on till samples collected with standard 1.5-inch inside-diameter split spoons; therefore, the results do not include clasts larger than the sampler diameter. The lower percentage of fines in the till sample from MW01-03R, for example, likely results in part because the sample was cored with an HQ core barrel, and included large gravel and small cobbles which would not fit in a standard split spoon (see Figure 7.1).

The topography of the till surface in the area of the site is depicted on Figure 6. The figure reveals 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 deposits.

- There are two significant knobs of till hemming the site to the southwest and northeast.

- Directly beneath the site, the till surface is generally flat, except along the site's northern edge where there is a closed depression.

- Beyond the site, the till surface slopes to the south below the Susquehanna River.



Figure 7.1 Till sample from MW01-03R.

- Till is absent beneath the Susquehanna River at one boring location (Hole 2). At this hole, in place of the till there is a thick sequence of silt and clay overlying the bedrock. The geologic origin of this material is unclear.

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.

Aquifer modeling performed in the region by Randall (1986) indicated that the bedrock and till of the region are both "very poorly permeable." Reynolds and Garry (1990) noted that till in the Susquehanna River Valley generally has a very low permeability because of its high silt content and compactness. These observations point out the key hydrogeologic property of the bedrock/till unit, namely its low hydraulic conductivity and consequently poor yield of groundwater. No production or monitoring wells have been installed in the till at or near the site. Slug tests performed at the two bedrock monitoring wells (MW01-03R and MW01-07R) yielded

estimated hydraulic conductivities of 0.5 and 3.7 feet/day, respectively. The conductivity of the till unit is expected to be even lower.

These properties suggest that the unit acts as a confining layer in the regional groundwater-flow system, and that the majority of groundwater beneath the site moves through the overlying, more permeable hydrostratigraphic units described below.

Table 7.3 Sand and Gravel Sieve Analyses

Location	Depth of Sample (ft. bgs)	Percent Passing Sieve			
		gravel	coarse sand	med. sand	silt & clay
		#4	#10	#40	#200
TB-5	34-38	97.6	97.6	94	23.3
TB-9	22-26	78.9	76.8	60.8	13.4
TB-12	42-44	52.3	48.2	30.6	7.8
TB-12	44-46	92.5	91.1	56.8	11.1
MW-2D	46-50	53.6	44.8	32.7	24.2

More detailed results are presented on the Electronic Attachments CD.

Table 7.4 Estimated Hydraulic Conductivity of the Sand and Gravel

Location	Elevation Center of Screen (ft. AMSL)	Hydraulic Conductivity (ft./day)
MW93-5D	793.5	0.6
MW93-2D	795.5	0.9
MW93-3D	802.8	14
MW93-1D	800.2	19
MW-01-17D	804.8	20
MW93-6D	789.4	77
MW97-9D	808.6	257
MW-01-17S	829.7	277
MW97-9S	829.2	703
MW97-7S	828.6	863
MW97-10D	799.1	1,620
	Geometric Mean:	56

Sand-and-Gravel Unit

The sand-and-gravel hydrostratigraphic unit is the most significant at the site for its ability to yield and transmit groundwater. This unit is laterally continuous across the site and, based on regional subsurface data and literature collected during this investigation, 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 22.5 feet (at MW01-03R) to 48.5 feet (at MW01-17D).

This unit likely consists of the bottom, coarser portion of the alluvium and the outwash sand and gravel described in Subsection 7.1.2. The sand and gravel surface map (Figure 10) shows approximately 30 feet of relief within the site and its immediate area. The sand-and-gravel surface forms a small valley under the site on a general north-south trending axis. This valley is likely a remnant of one of the former channels of the Susquehanna or Chenango Rivers where, like the present channels, river flow eroded the top of the sand and gravel unit.

The actual composition of the unit varies considerably with depth and location, comprising silt, sand, gravel and cobbles in varying distributions. Since deposition of these sediments likely occurred as stream channels meandered across the valley floor, there is little lateral continuity of composition. The samples submitted for grain size analysis reflect this heterogeneity. As summarized in Table 7.3, the components of silt, sand, and gravel, vary widely. Some intervals within the unit are nearly all coarse sand and gravel, while others have significant percentages of silt and clay, with bulk grain-size distributions not unlike the till.

The heterogeneity of the sand and gravel is well represented in the hydraulic conductivity (k) test results (Table 7.4). Values for k were estimated from slug-test data collected at eleven monitoring wells screened in the unit. Using the methods of Bouwer and Rice (1976) and Bouwer (1989), values of k were found in a range from 0.6

to 1,620 feet per day (ft/d). The bulk hydraulic conductivity of the sand and gravel is likely in the middle of that range.

BBL used historical pumping and drawdown data from the former Ranney Well, located approximately 500 feet east of the site (Figure 2), to complete an areal model that computed a k value of 328 ft/d (details concerning the approach used to estimate k using the model are provided in Appendix B). Since the Ranney Well pumping data involved a greater portion of the unit, the model value may represent a better bulk k for the unit than the values obtained from individual monitoring well slug tests. The continuity of head in the unit (i.e., the very slight vertical and horizontal gradients), suggest a strong hydraulic connection within the unit despite local variations in conductivity.

As a unit, the sand and gravel is highly permeable and is capable of yielding significant quantities of water. Historic data from the Ranney Well show that the well could maintain a pumping rate of 1,400 gpm with a sustained drawdown of approximately 6 feet (BBL, 1996).

Silt Unit

A discontinuous deposit of silt, constituting a third hydrostratigraphic unit, occurs across the majority of the site. The unit is absent below the Susquehanna River, and also east and west of the site. The extent of the silt is shown superimposed on the sand-and-gravel surface map (Figure 10). The location and thickness of the silt unit correlates with the valley-like depression in the sand and gravel surface. The silt was most likely deposited in the still waters of this former stream channel, following a shift in the course of the river. The greatest thickness of silt that was identified in borings at the site was 12.9 feet at MW01-03R, located near the eastern edge of the site.

The silt observed on site is generally described as unstratified (massive), with varying quantities of clay, a blocky texture and little discernable organic matter. The results of grain-size analysis, summarized in Table 7.5, show little to trace proportions of material larger than silt and clay.

The top of the silt unit likely formed the original land surface, prior to development of the area. The silt is currently covered by fill, and its surface is widely irregular due to construction excavations and apparent grading undertaken throughout the site's industrial history. In general, the silt surface appears to form a small mound in south-central portion of the site. The foundation of the No. 4 gas holder may penetrate through the silt to the sand and gravel in places. The foundations of gas holders Nos. 1, 2 and 3 extend into, but not through, the silt unit.

Along the course of the 66-inch storm sewer (which appears to lie at least partially in the bed of the former Brandywine Creek), a portion of the silt unit may have been disturbed. An historic topographic map depicting the flood of April 1924 (mentioned in Subsection 2.1) shows that the sewer lay in a bowl-shaped depression about 10 feet deep. This depression is inferred to be an erosional swale of the former Brandywine Creek.

Boring data from this area do not clearly identify this feature, suggesting that local silt may have been used as backfill material to level grade around the sewer, in the former Brandywine canal (which historic maps show crossed the area), and to fill the natural swale of Brandywine Creek.

The silt 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. These hydraulic functions appear to apply regardless of whether the silt is native or reworked. Groundwater flow is discussed in detail in Subsection 7.2.

Table 7.5 Silt Sieve Analyses

Location	Depth of Sample (ft. bgs)	Percent Passing Sieve			
		gravel	coarse sand	med. sand	silt & clay
		#4	#10	#40	#200
MW93-3S	8-14	100	100	98.2	82.7
MW97-11S	10-12	98.6	98.2	97.5	94.1
TW97-1S	26-28	99.4	99.3	98.7	97.7

Table 7.6 Fill Sieve Analyses

Location	Depth of Sample (ft. bgs)	Percent Passing Sieve			
		gravel	coarse sand	med. sand	silt & clay
		#4	#10	#40	#200
TP-8*	13.5	99.0	99.6	74.3	50.7
TP-207	13.0	92.3	85.9	65.3	36.0
TP-207	14.5	5.6	4.9	3.4	1.5

*TP-8 was excavated near TP-205 by NYSEG as part of the source removal IRM. Location was not surveyed and is not shown on figures.

Estimates of the k of the silt are available from two sources. Slug tests conducted in wells screening the silt (MW97-11S and MW97-12S) provide estimates of the horizontal k of the silt, and the results of undisturbed permeability testing of Shelby-tube samples of the silt provide estimates of the vertical k. Test results are included on the Electronic Attachments CD.

The k values provided by the slug tests were 24 ft/d and 3 ft/d for MW97-11S and MW97-12S, respectively. These values are somewhat high for a silt deposit. Silt deposits would be expected to have k values within the range of 0.03 to 3.3 ft/d (Brassington, 1988). The boring logs for these wells show that only a small distance separates the bottom of the wells from the top of the sand and gravel unit. It is possible that during the slug tests conducted at these wells, some of the water entering the wells was contributed by the underlying sand and gravel unit and not the silt, which would result in an overestimate of k.

The vertical k values obtained from the Shelby-tube samples were 0.0003 ft/d (one sample collected during drilling of TW97-1S) and 0.002 ft/day (one sample collected during drilling of MW97-11S). These values are low for pure silt, but within the expected range for silt with a clay component.

Fill Unit

The fill hydrostratigraphic unit consists of the saturated fill that overlies the silt unit. Where fill occurs outside the limits of the silt unit, it is generally unsaturated. The saturated thickness of the unit is slight, with a maximum observed thickness of approximately 5.5 feet at MW97-13S. The majority of water moving through this unit is likely derived from infiltrating precipitation that is mounded above the silt. The limited areal extent and small saturated thickness of the unit suggests that only a small fraction of the groundwater beneath the site moves through this unit.

The fill is composed of a wide variety of materials including silt, sand, gravel, ash, cinders, slag, and demolition debris from the former MGP structures that occupied the site. Grain-size analyses of fill samples collected from different materials found near the 66-inch storm sewer (summarized in Table 7.6) point to variability of composition.

The fill contains several man-made features (e.g., utilities, walls, and foundations) that can preferentially enhance or impede groundwater and NAPL movement, and potentially create reservoirs for these fluids. The features are discussed in more detail below. Hydraulic-conductivity data for the unit are not available; however, the hydraulic conductivity likely varies considerably due to the variable nature of the fill. Although variable, the bulk hydraulic conductivity of the unit can reasonably be expected to be moderate, due to the significant proportion of coarse materials contained in the fill and its relatively loose nature.

7.1.4 Utilities and Other Man-Made Structures

Certain buried utilities and structures at the site may influence shallow groundwater and NAPL migration. The nature of these buried features, and their roles in the site hydrogeologic system, have been studied throughout the various phases of site investigations. Depending on location and construction, such features may retard groundwater flow, create a preferential pathway, form a reservoir, or have no effect whatsoever.

The subsections below discuss the features, listed in Table 7.7, which have been assessed for the RI with respect to their potential affects on groundwater and NAPL migration.

Table 7.7 Utilities and Other Man Made Structures

Feature
Brandywine Creek and Canal beds
66-inch storm sewer
Former gas-holder foundations
Onsite foundation walls
Court Street flood wall
Former combined sanitary sewer
Municipal water lines
24-inch, “BB”, and “E” pipes

7.1.4.1 Brandywine Creek and Canal Beds

Figure 2 shows two features crossing the western portion of the site from north to south: the former Brandywine Canal, and the still extant 66-inch storm sewer. Historical maps also show a third feature, the former Brandywine Creek, which is inferred to have flowed where the sewer is now shown. The chronology of these features is discussed in the Site History section (Subsection 2.1). In summary, the known history of these features is as follows:

- By 1836, the Brandywine Canal had been constructed in the approximate location shown on Figure 2. It is inferred, though not documented, that the Brandywine Creek (or a lesser drainage feature) ran adjacent to (and east of) the canal, predating the canal’s construction.

- Between 1876 and 1885, the canal was abandoned. Brandywine Creek (now formally identified) continued to flow along a course adjacent to the path of the former canal.

- Between 1911 and 1924, Brandywine Creek was diverted into a culvert, apparently laid in the creek bed. The culvert still exists, and is shown on Figure 2, identified as the 66-inch storm sewer.

The remainder of this subsection discusses the investigation findings on the creek and canal bed, and their potential impact on site groundwater and NAPL migration. The 66-inch storm sewer is discussed in Subsection 7.1.4.2, below.

Brandywine Canal

The test pits and soil borings completed in the western portion of the site have provided no clear archeological evidence of the Brandywine Canal (e.g., stone walls, timbers, etc.). It is probable, therefore, that the canal's construction did not include extensive use of retention walls, though the later proliferation of industrial structures may have altered or destroyed any such physical evidence beyond recognition. Soil boring data provide circumstantial evidence that the canal crossed the site as shown on Figure 2. Specifically, the silt found immediately above the sand and gravel in soil borings in the inferred path of the canal (e.g., TB-9, TB-2, and MW93-1D) is inferred to be fill, based on texture and composition.

When abandoned, the canal appears to have been in-filled with local soils, mostly low-permeability silt. No walls or other structures were observed during site investigations. As such, the potential is low for the canal bed to form either a preferential pathway or a reservoir for groundwater or NAPL. Though NAPL was observed in borings believed to fall within the path of the former canal, the quantity and distribution of NAPL was similar to that observed in borings advanced elsewhere onsite. As shown on Figure 11, the shallow groundwater potentiometric surface shows no apparent deflections inferred to be due to the former canal bed.

Brandywine Creek

As discussed in Subsection 2.1 (Site History), maps of the site prior to industrial development show a creek crossing the western portion of the site, flowing from north to south and discharging to the Susquehanna River. The available historical maps suggest that Brandywine Creek was parallel to, but not coincident with, the canal discussed above. Evidence of the creek is obscured by the 66-inch storm sewer (discussed below), which was apparently constructed within the creek bed. Possible hydrogeologic implications of the creek bed, therefore, are incorporated in the discussion of the storm sewer, below.

7.1.4.2 66-inch Storm Sewer

The first evidence of the 66-inch storm sewer appears on a topographic map (mentioned in Subsection 2.1) that depicts the flood of April 1924. This map shows that the sewer existed in its present location, but that that the western portion of the site had not yet been completely in-filled to an even site grade. At that time, portions of the sewer were visible at grade, laying in a bowl-shaped depression about 10 feet deep. The area west of the sewer, now occupied by Brandywine Avenue, is shown to be a steep bank sloping toward the sewer.

The current understanding of the sewer construction has been assembled from a variety of sources:

- City of Binghamton Engineering drawings for the Tompkins Street Storm Pumping Station, dated January 1999 (included on the Electronic Attachments CD);

- A manned storm sewer inspection from MH-1 to 50 feet north of MH-2, conducted inside the sewer for the Phase I SRI (see the inspection report on the Electronic Attachments CD); and

- Numerous subsurface investigation locations (e.g., test-pits and soil borings) completed along its path, in particular five test pits (TP-204, TP-205, TP-206, TP-207 and TP-208) completed for the storm sewer IRM (see Section 6).

Figure 3 shows the sewer relative to the current site layout and the site investigation locations. The sewer is also depicted in cross-sectional view on Figure 7. The key features of the sewer construction are as follows:

- Approximately 50 feet north of the site, traveling south, the sewer changes from a 3.5 by 7 foot concrete box culvert into a 66-inch inner diameter reinforced concrete pipe.

- From that junction to manhole 1 (MH-1), the 66-inch pipe is continuous under the site, with two intermediate manholes (MH-2 and MH-1B) and an enclosed vault where the sewer bends slightly (shown on the Figure 2).

- South of MH-1, directly under Court Street, the sewer enters a 72-inch stone culvert.

- On the south side of Court Street, the stone culvert connects to the Tompkins Street Storm Pumping Station, which discharges to the Susquehanna River.

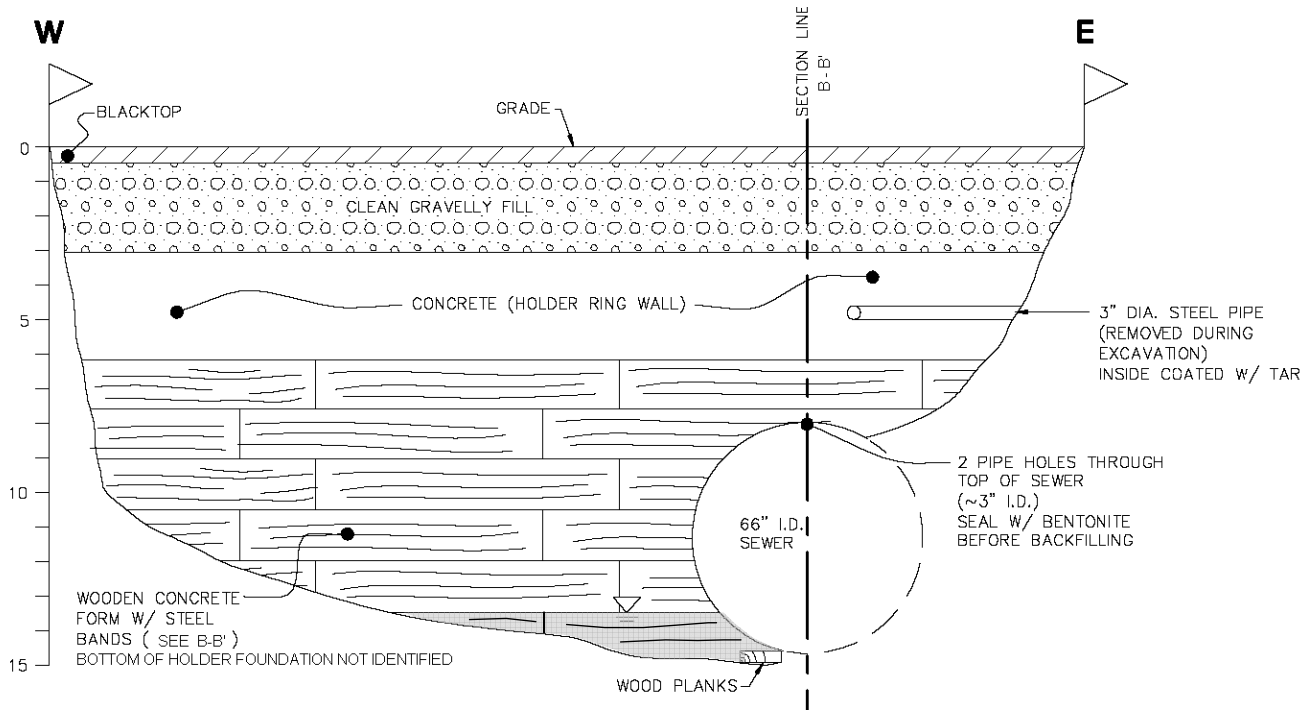


Figure 7.2 Schematic of Test Pit 209, looking north, showing the foundation of the No. 4 gas holder constructed over the 66-inch diameter storm sewer. Additional details and views are given in Appendix A. Scale is in feet.

- From MH-2 to MH-1, the sewer grades less than 1 foot, from an invert elevation of 832.2 to 831.4 feet AMSL. For reference, the mean shallow potentiometric surface elevation along the pipe is approximately 834 feet AMSL (see Figure 11).

- The No. 4 gas holder was constructed on top of the sewer, and its foundation walls were built to fit over top of the pipe. This relationship is shown schematically in Figure 7.2. Note that the bottom of the gas holder foundation was not identified in the test pit, but extended below the level of water in the pit.

BBL's investigations into the storm sewer have focused on its potential to act as a preferential pathway for groundwater or NAPL migration, either inside the pipe, or in the bedding materials surrounding it. These topics are assessed in the subsections below.

Potential Migration Inside the 66-inch Storm Sewer

The manned storm sewer inspection identified frequent tar seeps and oil weeps between manholes MH-1 and MH-2, but no areas where water appeared to actively leak into the pipe. The inspection also noted a small quantity of DNAPL (approximately one-half quart) puddled at one location (approximately 180 feet upstream of manhole MH-1). During the investigation, grab samples of water flowing in the sewer, and sediment accumulated on the sewer floor, were collected from MH-1, MH-2 and MH-3, as indicated on Figure 2. In

November 2001, as part of the Phase II SRI, BBL collected a grab sample of sediment from the sump of the pump house on Court Street.

The analytical results for compounds potentially related to the MGP are summarized on Table 7.8. (The complete summary of results is reported on Tables 7 and 16).

Table 7.8 Storm Sewer Water and Sediment Analytical Results

Sample	Location	Storm Water Concentration (ppm)		Sediment Concentration (ppm)	
		Total BTEX	Total PAHs	Total BTEX	Total PAHs
MH-3	50 ft. upstream of site	ND	ND	ND	35.4
MH-2	At upstream site boundary	ND	ND	ND	49
MH-1	At downstream site boundary	5 J	ND	ND	12.5
CSPH Sump	Downstream of site in pump house	NA	NA	0.36	126

J= estimated concentration; ND = compounds not detected; NA = compounds not analyzed.

In storm water, the analytical results indicated the presence of several VOCs, though only low concentrations of BTEX compounds. The primarily constituents detected were the chlorinated hydrocarbons TCA and DCA, which were detected in similar concentrations at all three sampling locations, at concentrations exceeding NYSDEC Ambient Water Quality Standards. TCA and DCA are not associated with MGP sources and are believed to be from an upstream, off-site source. No SVOCs were detected in the three samples. Manganese and sodium were the only inorganics detected in the three samples above NYSDEC Ambient Water Quality Standards.

No BTEX was reported for the storm sewer sediment analytical results, except in the pump house sump, where concentrations were still below 1 ppm. Higher concentrations of PAHs were identified in sediment, particularly in the pump house sump, where the total PAHs exceeded 100 ppm.

Though the concentrations of MGP related compounds in the storm sewer sediment and water are inconclusive alone, the presence of NAPL inside the pipe (noted during the sewer inspection), indicates that the inside of the sewer has the potential to contribute site-related constituents to the Susquehanna River. Options for an IRM to cut-off this potential migration pathway are currently being evaluated (see Section 6).

Potential Migration in the 66-inch Storm Sewer Bedding

The potential for the bedding materials around the 66-inch storm sewer to act a preferential pathway for groundwater and NAPL migration depends on the nature of that bedding. A great many investigation locations provide data to assess it, most significantly the following:

- A series of test pits excavated on site along the length of the sewer (TP-205 though TP-208), and
- A series of borings completed to install piezometers adjacent to the sewer (PZ01-03 though PZ01-06).

Based on the findings from these investigations, the sewer must be considered in three sections: north of, directly under, and south of the No. 4 gas holder. The findings for each section of the sewer are discussed below.

North of the No. 4 Gas Holder

The following observations refer to the section of the 66-inch storm sewer lying between the north edge of the No. 4 gas holder and MH-2:

- The sewer appears to lie entirely within a small trough in the native silt unit, inferred to be a straightened version of the former Brandywine Creek. At no point on this section was the sewer observed to come in contact with the top of the sand and gravel unit.

- With the exception of discontinuous lens of gravel observed at TP-207 (note the 14.5 foot sample grain-size results shown in Table 7.6), no coarse stream channel deposits were observed.

- The fill materials observed below and surrounding the sewer were primarily silt, with lesser amounts of other grain-sizes. There is some evidence that wooden planks or timbers may have been lain beneath the pipe (see test pit log of TP-207); however there is no evidence that the sewer was constructed on a concrete slab or any type of rigid foundation.

- The soils observed near the sewer frequently contained NAPL, though not preferentially more than was observed elsewhere onsite.

- The shallow groundwater potentiometric surface created with the aid two piezometers immediately next to the sewer (PZ01-04 and PZ01-05) shows no hydraulic deflection attributable to the sewer or its bedding materials (see Figure11).

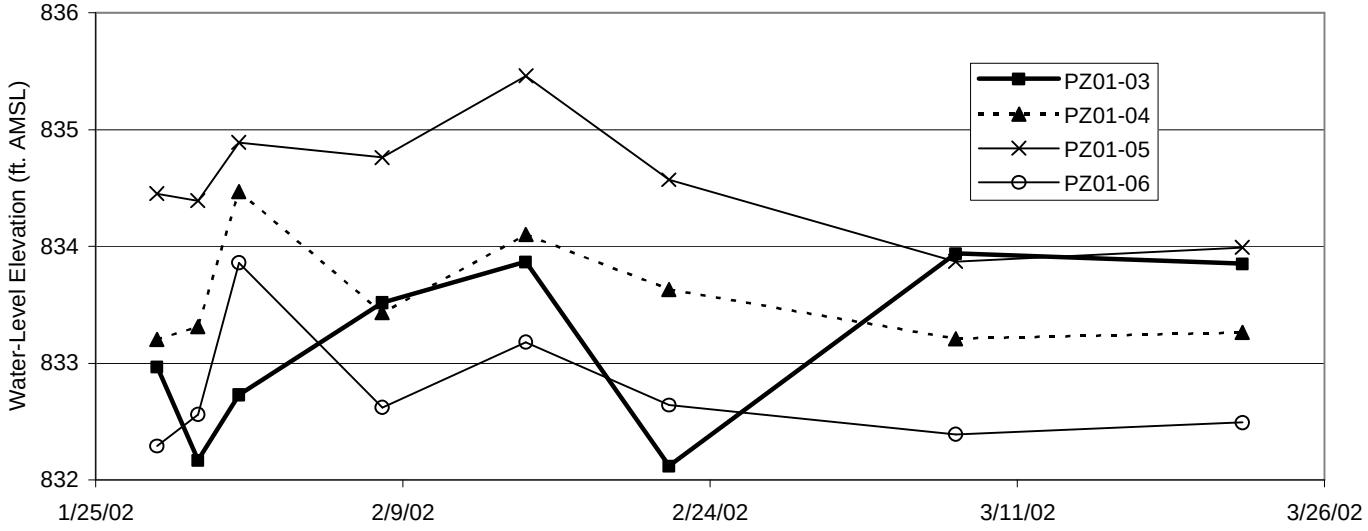
Based on these findings, the bedding materials around the section of the 66-inch storm sewer lying between the north edge of the No. 4 gas holder and MH-2 do not create a significant preferential pathway for groundwater or NAPL migration to the Susquehanna River.

Inside the Foundation of the No. 4 Gas Holder

At test pit TP-208, the foundation wall of the No. 4 gas holder was observed to extend to at least 15 feet below grade (the approximate bottom depth of the sewer), but may have extended deeper (note Figure 7.2). The foundation was created of poured reinforced concrete fitting closely around the 66-inch storm sewer, thus forming an effective cut-off wall to shallow groundwater flow.

The integrity of the foundation is best demonstrated by the water-level data collected from PZ01-03, which was installed within the holder on the western side of the storm sewer (see Figure 2). Figure 7.3 graphs the water-level fluctuations of PZ01-03 with respect to the other piezometers installed along the length of the storm sewer. Note that while the water-levels in PZ01-04, PZ01-05, and PZ01-06 respond in a like manner to recharge, the

Figure 7.3 Hydrograph of Storm Sewer Piezometers



water-level fluctuations at PZ01-03 appear to be anomalous. Most likely, the fluctuations at PZ01-03 represent a delayed response to the same recharge factors affecting the other piezometers. This model makes sense if, as the available data suggest, the holder is analogous to a coffee can pressed upside-down into the earth – with a top sealed from recharge (i.e., it is made of concrete and is paved over), an open bottom, and largely intact side walls penetrating the majority of the silt and fill units.

Piezometer PZ01-03 is screened in silt (or silty fill) similar to that observed at other locations to the north investigating the nature of the materials adjacent 66-inch storm sewer. The minor amounts of NAPL observed on fractures and partings in the silt are inferred to be residual (no NAPL has accumulated in the piezometer), and are likely from other NAPL sources, which predate construction of the gas holder in 1927.

The apparent hydraulic isolation created by the No. 4 gas holder foundation supports the conclusion that the bedding materials around the section of the 66-inch storm sewer (where it underlies the gas holder) do not create a significant preferential pathway for groundwater or NAPL migration to the Susquehanna River.

South of the No. 4 Gas Holder

The section of the 66-inch storm sewer was investigated by test pit TP-208, piezometer PZ01-06, and monitoring well MW97-8. Additionally, Figure 8 presents a cross section drawn along the portion of the flood wall where the 66-inch storm sewer passes beneath it.

The materials observed adjacent to the sewer in TP-208 consist of coarse fill (gravel, cobbles, timbers, etc.). The boring for piezometer PZ01-06 extended to 19 feet below grade and encountered no silt or other low permeability bedding materials. Water-levels collected from this piezometer are generally representative of the sand and gravel unit. In the test pit and the boring for the piezometer, NAPL was observed in the pore spaces of the coarse saturated fill. The quantity of NAPL appeared (by fraction of volume) to be greater than that observed elsewhere onsite, particularly by comparison to the numerous borings and test pits where NAPL was observed only in fractures and partings in the silt unit.

At MW97-8, fill materials near the outside of the pipe were chiefly composed of silt and were not observed to contain NAPL (Figure 7). An obstruction was drilled through at an elevation coincident with the approximate bottom of the 66-inch sewer. Beneath the obstruction were about 5.5 feet of silt that contained NAPL along fracture planes, and then sand and gravel, which also contained NAPL. Whether this silt is native or fill is uncertain; however, it appears that NAPL has preferentially migrated through it as opposed to the shallower fill materials that surround the 66-inch pipe.

The water table elevation contour map (Figure 11) shows a trough focused on PZ01-06, making that location a focal point of lateral groundwater flow in the silt and fill. While the No. 4 gas holder blocks shallow groundwater flow from the north (including the upstream portions of the storm sewer), there is no apparent barrier to groundwater flow from the east.

Though the materials observed around the storm sewer in TP-208 are not all strictly bedding, it is apparent that this fill is preferentially conductive and that the silt unit is likely absent in this area. These observations are important because they suggest a means by which shallow groundwater and NAPL could drain to the top of the sand and gravel. Therefore, the section of the sewer south of the No. 4 gas holder, and the several feet of soils that underlie it (to the top of the sand and gravel) likely form a preferential migration pathway for groundwater and, potentially, NAPL to reach the Susquehanna River. As shown on Figure 8, the flood wall will not affect groundwater and potential NAPL migration in this area because the water table, 66-inch storm sewer, and the NAPL all occur beneath it. An IRM evaluation, currently in progress, is assessing the feasibility of various means to mitigate this potential migration pathway.

7.1.4.3 Former Gas Holder Foundations

In the history of plant operations, there were a total of four gas holders. The footprint of each is shown on Figure 2. As plant operations gradually expanded, the new holders were built, each progressively larger in size (see Table 7.9). From what can be gleaned from the historical record and

Table 7.9 Former Gas Holders

Number	Year Constructed	Gas Capacity (cubic feet)
Holder 1	Circa 1888	Unknown
Holder 2	1894	180,000
Holder 3	1903	750,000
Holder 4	1927	3,000,000

Source: Former MGP property inventory (circa 1957)

modern subsurface investigations, the construction of each holder varied and, accordingly, so do the apparent effects their remnants have on the movement of shallow groundwater and NAPL. The apparent remains of each holder and their potential hydraulic affects are discussed below.

No. 1 Gas Holder

The No. 1 gas holder was the first and smallest of the holders, presumably constructed at the time the plant first began operations in 1888. No data on its construction or demolition have been found in the historical record. One boring (TB-11) was completed within the holder. That boring stopped at 14.3 feet below grade on what is inferred to be a brick foundation. The material inside the holder consisted of sand and gravel fill, with evidence of NAPL from 6 feet bgs to the bottom. The boring also noted water-saturated soil just two feet below grade (as compared to approximately 8 feet outside the holder), suggesting that the foundation is holding groundwater. At the boring for MW97-10D, located just outside the holder, silt extended to approximately 19 feet below grade; therefore the holder foundation likely does not fully penetrate the silt. The No. 1 gas holder foundation has no apparent affect on the water table surface (see Figure 11).

No. 2 Gas Holder

The No. 2 gas holder, shown in Figure 7.4, is described in a plant inventory[5] as being 84 feet in diameter and constructed to use a water seal. (A water seal, in most cases, implies that the holder extended below the ground so that groundwater could be used to seal the bottom.)

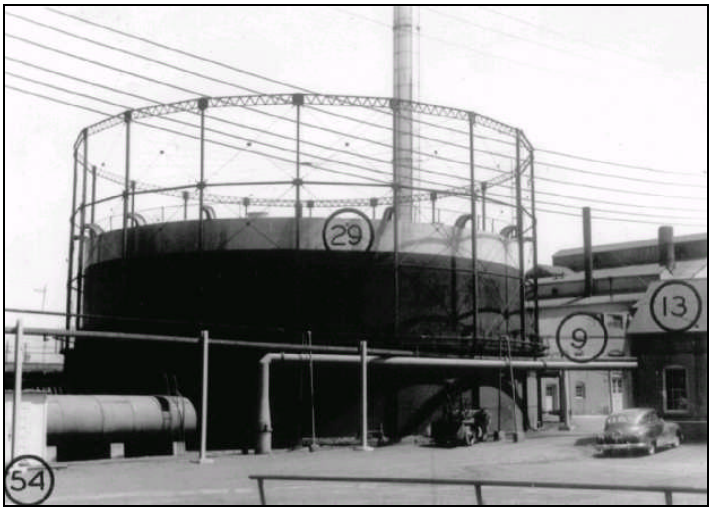


Figure 7.4 Former No. 2 gas holder.

Boring TB-3 was drilled inside the holder's footprint and, like the No. 1 holder, encountered a possible floor, here made of concrete and just 8 feet below grade.

Test pit TP-15 uncovered the brick foundation walls, still apparently intact. Test pit TP-16, excavated inside the holder, revealed very coarse fill materials (sand and gravel, bricks, boards, etc.). Given the nature of the materials used to fill the holder foundation, it is uncertain that the floor inferred from boring TB-3 was anything other than a slab of concrete fill. None of the test pits or borings noted perched or mounded water, so it is unlikely that the holder foundation is well sealed. The log of TB-3 does note what appears to be native silt beginning at 12 feet bgs; therefore, the holder foundation is not believed to penetrate the sand and gravel unit.

[5] This inventory is included, along with site historical photographs, on the Electronic attachments CD.

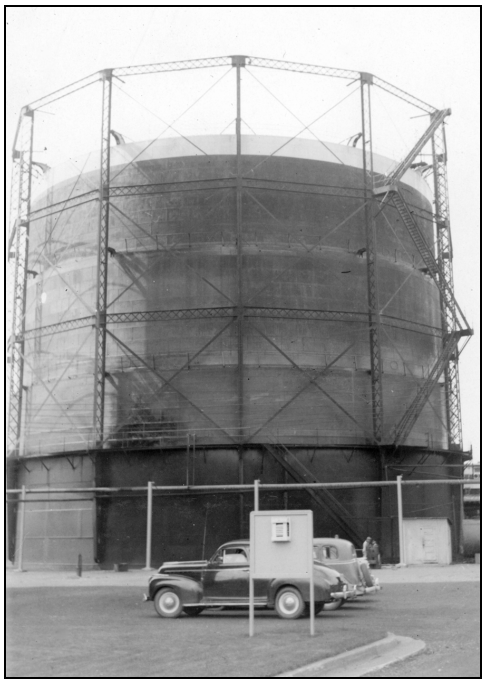


Figure 7.5 Former No. 3 gas holder.

Based on these observations, the foundation of the No. 2 gas holder is not believed to retain water, or to significantly influence the migration of groundwater or NAPL.

No. 3 Gas Holder

The No. 3 gas holder was the third of the holders constructed, and the last to use a water seal (as per the plant inventory). Shown in Figure 7.5, the holder was built with a stone and brick foundation extending approximately 10 feet below grade. This foundation, and a 2-foot think concrete floor (from roughly 8 to 10 feet bgs) were completely excavated in NYSEG's 2000-2001 source area removal IRM, described in Section 6 (NYSEG, 2002). Boring SB-201, drilled in the footprint of the holder after the foundation removal, showed silt extending from 11 to 18 feet bgs, indicating that the holder foundation did not penetrate to sand and gravel unit.

In test trenching work completed by NYSEG subsequent to the holder removal, the supervising engineer noted that water level in the gravel used to backfill the excavation appeared elevated above the surrounding water table (personal communication with T. Blazicek, 2002). Mounding in the water table due to this phenomenon is believed to account for the elevated water-level at PZ01-04.

No. 4 Gas Holder

Constructed in 1927, the No. 4 gas holder was the last and by far the largest of the holders used at the site. Shown in an air photo in Figure 7.6, the holder stood 205 feet high (per site inventory). Unlike the older holders, the No. 4 holder was constructed as a tar-seal, piston-style holder, built with a slab on grade. This type of construction did not allow the holder contents to contact groundwater, and did not require a significant reservoir of potentially



Figure 7.6 Former No. 4 gas holder, circa 1960.

impacted water to create a seal at its base. The hydraulic implications of the holder's foundation were discussed above, in Subsection 7.1.4.2, in conjunction with the 66-inch storm sewer, which passes underneath.

7.1.4.4 Buried Walls

Test pits have revealed two remnant walls that are large enough, and still adequately intact, to have potential effects on the migration of groundwater and or NAPL. This subsection discusses the findings relevant to the following features:

- The buried concrete retention wall found parallel to (and slightly west of) the 66-inch storm sewer; and
- The boundary wall on the west and south west property line.

Retention Wall

A buried concrete retention wall (shown on Figure 2) was identified in several test pits excavated during the investigation of the 66-inch storm sewer. The top of the wall was found to be between 3 and 4.5 feet below grade, running for approximately 175 feet parallel (and slightly to the west of) the 66-inch storm sewer. The ends of the wall were uncovered in test pits TP-201 and TP-202. The wall is constructed of concrete, approximately 1 foot thick at the top, and thickening slightly with depth. On the south end, TP-201 uncovered the bottom of the wall, approximately 13 feet below grade and still within the silt unit. On the north end, at TP-202, the wall extended to at least 12 feet below grade.

Because the wall was initially thought to be a remnant of the Brandywine Canal (discussed in Subsection 7.1.4.1), a third test pit, TP-203, was excavated perpendicularly from the wall to search for a suspected second wall which would form the other side of the canal. TP-203 was excavated approximately 45 feet to each side of the retention wall and identified no second wall.



Figure 7.7 Retention basin around oil tanks 6, 5 and 7 looking south (no. 4 gas holder in background).

Further review of the site's historical documentation has shown that the buried wall is likely the eastern portion of a retention basin which once enclosed the oil tanks identified by the numbers 5, 6 and 7 on Figure 2. This wall is visible on the left side of the historical photograph shown in Figure 7.7. Note that, though currently the top of the wall is at least 3 feet below grade, the photograph shows the wall top at the ground surface. This observation is consistent with notes from test pits and boring throughout

the western portion of the site, all showing that site grade was raised approximately 3 feet following the MGP closure.

Though the retention-basin wall extends several feet below the water table (which is approximately 10 feet below grade), it does not appear to have a significant effect on groundwater flow.

Western Boundary Wall

In addition to the retention wall, Figure 7.7 shows the western boundary wall, a feature that extends along the property line from the northwest corner to the southwest corner, then turns and runs 200 feet along the southern property line, ending near the Court Street site entrance. Two test pits, TP-209 and TP-210, were excavated down the face of the wall. Both test pits extended 15 feet below grade, but neither found the bottom of the boundary wall.

Both TP-209 and TP-210 were excavated within or near the footprint of the oil tank retention basin pictured in Figure 7.7. Both test pits uncovered foundation remnants between 8 and 10 feet below grade. The foundations may be related to oil tank 7. If so, the locations of the oil tanks shown on Figure 2, which were based on historical Sanborn maps, may be shifted southward slightly. At and below a depth of 8 to 10 feet, the soils were heavily impacted by a thin oily NAPL.

The western boundary coincides, approximately, with the westernmost extent of the silt unit. It appears that the wall forms a cut-off between the elevated water-table associated with the silt found onsite, and the nearly flat-lying water table observed offsite (at MW97-9S, for instance), where the silt is absent. By blocking lateral flow and limiting the possible flow paths from east to west, the wall appears to keep water levels to the east artificially high.

7.1.4.5 Court Street Flood Wall

The flood wall appears to have little potential to affect groundwater or constituent migration[6]. As discussed in Subsection 7.2.3.2, if the wall were relatively impervious to flow, its net effect would be to cause the water behind it to move downward and pass underneath it or, near the ends of the sheeting, to move laterally around the ends. In the case of the former, cross-sectional flow modeling showed that the water passing beneath the wall would discharge near the northern



Figure 7.8 View of the flood wall looking east from the Tompkins Street Bridge.

[6] Except where the flood wall is slotted to allow the BB pipe to pass through (see Subsection 7.1.4.8).

bank of the river, about the same place it would discharge if the wall were not there. In the case of the latter, the western end of the flood wall sheeting does occur near the site, about 100 feet east of the pump house. Water moving around the end of the sheeting would be expected to discharge to the riverbed near this area.

If the sheeting were relatively impervious, mounding of water behind the flood wall might also be expected to occur, though this has not happened to an appreciable degree. Reasons for the lack of groundwater mounding behind the flood wall include leakage through the flood wall (i.e., the sheeting is not impervious), drainage structures behind the flood wall, and the absence of low-permeability materials behind the wall that would prevent water from migrating downward and under the wall. Information regarding the permeability of the flood wall sheet piling is unavailable; however, as-built drawings for a project that involved re-facing, lengthening, heightening, and deepening (by driving sheet piling) the flood wall during the 1940s (contained on the Electronic Attachments CD) do not show formal drainage structures behind the flood wall near the site. Silt was identified in the borings drilled behind the flood wall, but these borings could not be located closer than about 10 feet from the wall. It is possible that some of the silt immediately behind the wall was removed and replaced with more permeable fill when the wall was built. This would allow any groundwater above or in the silt to drain down into the sand and gravel and subsequently under the flood wall.

7.1.4.6 Combined Storm/Sanitary Sewer

In addition to the 66-inch-diameter storm sewer, historic maps indicate that a second sewer passes beneath the flood wall approximately 50 feet to the east (Figure 2). As-built drawings for the flood wall show a 36-inch-diameter, cast iron sanitary sewer with an invert elevation of 830.7 feet AMSL passing beneath the flood wall and into a manhole/control structure, as shown on Figure 2. A 1974 map provided by the city of Binghamton shows this sewer identified as a "combined storm/sanitary facility." The City of Binghamton's sewer department indicated that, after leaving the control structure near the pump house, the sanitary sewer follows the north shore of the river to Susquehanna Street, a distance of approximately 2,000 feet (Brown, Personal Communication with M.K. Cobb, 1998). The best representation of the correct location of the sewer is shown on Figure 2.

The potential for the sanitary sewer to act as a preferential pathway for groundwater and site constituents depends primarily upon the following:

- Depth of the sewer relative to the water table;
- Orientation of the sewer;
- Geologic material(s) surrounding the sewer; and
- Quality of groundwater near the sewer.

Review of flood-wall drawings and environmental data collected during the site investigations, particularly at soil boring SB-109 and monitoring wells MW97-11S and MW97-12S, which appear to be installed very near the sanitary sewer, reveals that:

- The sanitary sewer occurs in the silt unit until it reaches the edge of the unit, near the former bridge abutment, at which point it is inferred to occur in the sand and gravel unit.

- Soil samples collected during drilling at SB-109, MW97-11S and MW97-12S showed no evidence of impacts from the site.

- The invert elevation of the sanitary sewer is approximately 1.5 feet below the river elevations measured at the staff gauge during this investigation.

- Groundwater samples collected from monitoring wells MW97-11S and MW97-12S show little or no evidence of impacts due to dissolved MGP-type wastes.

- Water level measurements from MW97-11S and MW97-12S are in keeping with the local water-table configuration, suggesting that there is no significant preferential drainage along the sewer (see Figure 11).

Through these observations, and assuming the sewer slopes toward the river, it can reasonably be inferred that:

- Where the sanitary sewer occurs in the silt unit, its bedding materials may represent an interval of higher hydraulic conductivity. If this is true, the water-level data suggest that the net effect is minor, and that only a small fraction of groundwater flow may preferentially follow the sewer in the down-slope direction.

- Further downslope along the sanitary sewer, where it occurs in the sand and gravel unit (near the former bridge abutment), the contrast in hydraulic conductivity between the sewer bedding material (if present) and the sand and gravel would be lessened or non-existent, reducing or eliminating the ability of the sewer to act as a preferential pathway for groundwater. Given the proximity of the sewer to the river at this point (approximately 10 feet), and the relatively high hydraulic conductivity of the sand and gravel unit, groundwater preferentially flowing along the sewer in the silt unit (if any), would be expected to drain to the river within a short distance.

- The low hydraulic conductivity of the silt suggests that the quantity of water that might be drained by the sanitary sewer bedding (if any) would be relatively small.

- Water-quality data from samples collected from MW97-11S and MW97-12S suggest that water preferentially following the sanitary sewer (if any) would not contain elevated levels of site-related

constituents, except possibly benzene, which was detected in the groundwater sample collected from MW97-11S at an estimated concentration of 4 µg/L.

7.1.4.7 Municipal Water Lines beneath Court Street

BBL's discussions with City of Binghamton personnel revealed that there are two water lines beneath Court Street, one 24 inches in diameter, the other 20 inches in diameter. The lines run parallel to the street and are located near, or just south of its centerline. The depths to the top of the lines are 5.5 feet and 5.75 feet, respectively, making the depth to the bottom of the lines about 7.5 to 8 feet. Based on the water-table elevation contour map prepared for the site (Figure 11) and an approximate grade elevation of Court Street of 845 feet AMSL, the bottom of these lines was approximately 5 feet above the water table at the time the water levels were measured (October 2, 2001). Seasonal fluctuations in the water table are unlikely to raise the zone of saturation to the level of the water-lines; therefore the lines cannot act as preferential pathways for groundwater flow.

7.1.4.8 24-inch, "BB", and "E" pipes

These three pipes, which are shown on Figure 2, pass through the same general area of the flood wall. Tracing performed by BBL found that the pipes run northward from the flood wall and pass beneath the BMH warehouse. The 24-inch pipe is the only pipe that was identified on the opposite (north) side of the warehouse, and appeared to continue northward under nearby railroad tracks. The purpose of the 24-inch pipe and "E" pipe (an 18-inch cast iron pipe) is unknown, but BBL found that they did not flow after a heavy rain storm, and that the 24-inch pipe was nearly plugged with sediment. The sediment had no coal-tar-like odors or discoloration and was found to contain no BTEX and only relatively low levels of PAHs (Table 16). BBL removed the sediment plugging the end of the 24-inch pipe and attempted to teleview it, but encountered another sediment plug about 15 feet from its end, precluding further viewing. Based on this information, discharge from the 24-inch and E pipes is not considered a likely source of site-related constituents to the river.

Similarly, the outsides of these two pipes are not considered likely preferential pathways. Although NAPL is present behind the flood wall at this location, it occurs beneath these pipes, in the sand-and-gravel unit (Figure 8). The 24-inch and E pipes are bedded in the overlying silt unit, and at the time that they were investigated, occurred above the water table. As shown on Figure 8, the top of the sheeting in this area is coincident with the bottom of the 24-inch pipe. Although not shown on the figure, this is also the case with the E pipe (information regarding the sheeting and pipe elevations can be found on the flood wall drawings contained on the Electronic Attachments CD). If there are times when the water table reaches the 24-inch and E pipes, some seepage of water or NAPL could occur along joints in the concrete wall above the sheeting. Indeed, minor staining (but no seepage) was noted in a few of the joints in this area. The staining did not occur more than several inches above the invert of the 24-inch pipe. Based on this information, BBL infers that such discharge is relatively

insignificant. Additionally, it does not appear that the 24-inch and E pipes pass through areas containing NAPL farther back from the flood wall. Figure 8 includes information for monitoring well MW-15S, which is located between the 24-inch and BB pipes, about 100 feet back from the wall. This information shows that NAPL occurred only at the top of the sand and gravel, at an elevation of approximately 827 feet AMSL, below the elevation of the 24-inch pipe and E pipe inverts. Because these two pipes are bedded in the silt, and are therefore above the NAPL, migration of NAPL along the outside of them does not appear possible. The silt at MW98-15S did exhibit petroleum-like (rather than coal-tar-like) odors; however, this is inferred to be related to the petroleum-related NAPL identified upgradient of MW98-15S, beneath the BMH warehouse.

The BB pipe has the potential to act as a preferential pathway. This pipe, which is a 10-inch diameter former water intake for the MGP, is the only pipe of the three that is perennially below the water table. More importantly, the wall's sheet piling was slotted to avoid the pipe, leaving a gap in the sheeting. The result of this is that the groundwater and NAPL that are present in the sand-and-gravel unit behind the flood wall at this location may preferentially be drawn to and pass through this gap in the sheeting, subsequently discharging to the Susquehanna River's bed near the shoreline. BBL identified the end of the BB pipe, which emerges from the riverbed about 20 feet from the shore, but identified no water flow out of it.

The area around these three pipes is the only location where NAPL was identified behind the flood wall. Because NAPL does not accumulate in piezometer PZ01-02, which is screened across this NAPL-containing interval, NAPL does not appear to be pooled behind the flood wall. Possible reasons for this include:

- The NAPL in this area is above residual saturation, but is not accumulating behind the flood wall because it has an avenue for escape (e.g., the slot in the sheeting at the BB pipe), or

- The NAPL in this area is at residual saturation. NAPL at residual saturation is by definition immobile so would not accumulate over time.

7.2 Groundwater Flow

7.2.1 Regional Groundwater Flow

The hydrogeology of the Susquehanna River Valley in the region has been the subject of considerable study. Detailed studies of the hydrogeology of the valley-fill aquifer in the region have been performed by Randall (1977 and 1978), Holecek, et al. (1982), and MacNish and Randall (1983). Ku, et al. (1975) studied stream flow in the region and its effect upon groundwater recharge, Randall (1986) and Wolcott and Coon (2002) developed finite-difference aquifer models for the region. The following discussion of regional groundwater flow is based upon these studies.

Groundwater in the sediments overlying bedrock in the Susquehanna River Valley near Binghamton is derived principally from infiltration of precipitation falling on the land and infiltration of water through the beds of tributary streams (Ku, et al., 1975). Most of the rain and snowmelt in areas of the valley where sand and gravel occur at the surface infiltrates the soil; while only a small percentage of rain or snowmelt infiltrates the top foot or two of soils on the surrounding hills bordering the valley (Ku, et al., 1975; MacNish and Randall, 1983). Tributary streams have been shown to be important sources of recharge in valleys in the region (Miller and Randall, 1991). Typically, these streams originate in uplands and lose considerable amounts of water as they flow across stratified drift of the valley floor. A small but steady flow of groundwater likely moves through the bedrock and till from upland areas toward the river valley and into the sediments.

As soon as infiltrating water reaches the water table, it begins to move toward areas of discharge. In the Susquehanna River Valley near Binghamton, the major discharge areas are the Susquehanna and Chenango Rivers. The majority of groundwater flow in the valley is interpreted to occur through stratified-drift (sand and gravel) aquifers, due to their relatively high hydraulic conductivity, large thickness, and considerable areal extent. Lesser amounts of groundwater move through silt and clay deposits, till, and bedrock.

7.2.2 Site Groundwater Flow

Groundwater flow at the site was evaluated using the following information:

- Regional hydrogeologic information (presented above).

- Water-level data collected at available monitoring wells and piezometers located at and near the site, and staff gauge SG-2, located along the Susquehanna River (Figure 2). The most comprehensive round of water-level data was collected October 2, 2001. These data and two prior rounds (December 22 and 23, 1997 and February 11, 1998) are presented on Table 2.

- Conceptual-level areal and cross-sectional groundwater flow models developed as part of this investigation.

To aid interpretation of site groundwater flow, potentiometric surface maps for the water table (Figure 11) and sand-and-gravel unit (Figure 12) were prepared using the October 2, 2001 groundwater elevation data set.

7.2.2.1 Shallow Groundwater Occurrence and Flow

The water table near the site occurs either in the fill unit, the silt unit, or the sand and gravel unit, depending on the area of the site. The water table is illustrated on Figure 11. Note that the boundaries of the silt unit are superimposed on the water table. The fact that the water table occurs in the fill unit onsite is likely the result of the relatively low vertical hydraulic conductivity of the silt unit, which retards infiltration, and results in

groundwater being mounded beneath most of the site. This condition also suggests that the water in the fill unit is derived from infiltration of precipitation that falls on the site. In areas where the silt unit is absent, to the east and west of the site, the water table occurs in the sand and gravel unit (e.g., at MW97-9S, MW97-14S, and B-1).

Several important observations regarding shallow groundwater flow can be made from the water-table depicted on Figure 11:

- East and west of the site, where the water table occurs in the sand and gravel unit, groundwater flows toward the Susquehanna River. The horizontal gradient in the sand and gravel is slight, with a maximum relief of just over 1 foot observed in the site monitoring wells.

- Where the water table occurs in or above the silt unit, lateral flow directions are radial from the apex of a mound near the center of the site. Gradients here are much higher, with approximately 7 feet of relief.

- The water table is not affected by the portions of the 66-inch-diameter storm sewer found north of the No. 4 gas holder (see Subsection 7.1.4.2).

- The foundation of the No. 4 gas holder forms a barrier to shallow groundwater flow (see Subsection 7.1.4.2).

- South of the No. 4 gas holder, where the 66-inch storm sewer emerges from underneath the gas holder, an area of permeable fill materials creates a hydraulic low, and a potential preferential pathway for migration to the Susquehanna River (see Subsection 7.1.4.2).

- Preferentially permeable fill materials emplaced after removal of the No. 3 gas holder foundation may create localized mounding, visible in the arcuate deflection of the water-table contours seen in central western portion of the site (see Subsection 7.1.4.3).

- The western boundary wall (discussed in Subsection 7.1.4.4), may form a cut-off between the elevated water-table associated with the silt found onsite, and the nearly flat-lying water table observed where silt is absent offsite.

- Groundwater is not significantly mounded behind the Court Street flood wall (discussed in Subsection 7.1.4.5), though it may inhibit some direct discharge to the Susquehanna River. The wall may promote lateral flow to the east or west toward areas of preferential discharge (e.g., at the 66-inch storm sewer, or where the silt is absent east of PZ01-02).

Contrasting the water table figure with the potentiometric surface map of the underlying sand and gravel (Figure 12), shows significant downward gradient where the water table is mounded above the silt unit. Where the silt

is absent (e.g., at MW01-17) the vertical gradient is much less pronounced (and also reversed). The extremely low vertical conductivity of the silt, which creates the mounding affect, also produces strong vertical gradients. By contrast, the high permeability of the sand and gravel prevents large pressure differentials from forming.

Based on the above observations and Figure 7, the following statements regarding shallow groundwater flow can be made:

- The majority of shallow groundwater at the site moves radially away from the center of the groundwater mound located near the center of the site, then spills off the edge of the silt unit into the sand and gravel aquifer. Once in the sand and gravel aquifer, groundwater flows to the river.

- A portion of the shallow groundwater may be collected by a preferential drainage found along the southern section of the 66-inch-diameter storm sewer (near PZ01-06) and routed to the Susquehanna River.

- Groundwater is not mounded considerably behind the flood wall. Subsection 7.1.4.5 provides details about the potential affects of the flood wall on groundwater flow.

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

7.2.2.2 Groundwater Occurrence and Flow in the Sand-and-Gravel Unit

Groundwater flowing in the sand and gravel unit beneath the site is derived primarily from three sources:

- Flow onto the site from upgradient sources;
- Water in the fill unit onsite that spills off the edge of or leaks through the silt unit (i.e., recharge); and
- Water that seeps into the sand and gravel unit from the bedrock/till unit beneath the site.

The majority of the water flowing beneath the site is likely derived from upgradient sources, given the site's relatively small surface area (and therefore low potential for recharge), and the presumed small contribution from the bedrock/till unit (although the amount of water discharging to the sand and gravel unit from the bedrock/till unit is difficult to quantify, it is described qualitatively by Randall (1986) to be "small [but] continuous"). In contrast, the areal model developed for the site as a part of the Phase I SRI, which is described in detail in the following subsection, has estimated the flux of groundwater in the sand and gravel unit beneath the site to be approximately 200 gpm.

Groundwater head measurements collected from well pairs located in areas where the water table occurs in the sand and gravel (MW97-9 and MW97-14) are essentially identical, indicating that groundwater flow in the sand and gravel unit at these locations is horizontal.

Figure 9 presents the potentiometric surface of the sand and gravel unit, using the October 2, 2001 data set. Review of the figure reveals the following about the unit:

- Groundwater flow in the sand and gravel unit is directed toward the river;
- The hydraulic gradient across the site is slight, approximately 0.003 ft/ft; and
- 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 328 ft/d, the hydraulic gradient presented above, and an effective porosity (n_e) of 30 percent (calculated based on an average moisture content of 14 percent for two samples of the unit that were analyzed for moisture content [Data area available on the Electronic Attachments CD]).

Table 7.10 Vertical Gradients from Water Table

Well Pair	Groundwater elevation at well pair members (ft. AMSL)		Vertical Gradient	Change (ft.)	Relationship
	Shallow	Deep			
MW93-2	838.29	831.47	Down	6.82	Silt to lower sand and gravel
MW97-10	835.67	831.59	Down	4.08	Silt to lower sand and gravel
MW01-9	831.87	831.68	Up	0.01	Upper to lower sand and gravel
MW01-17	831.75	831.86	Up	0.11	Upper to lower sand and gravel

Data collected October 2, 2001 (see Table 2).

As noted in Subsection 7.2.2.1, and demonstrated in Table 7.10 there is a weak upward vertical gradient within the sand and gravel. This gradient is not inferred to have a significant affect on groundwater flow beneath the site. BBL also measured the vertical gradient beneath the river using a temporary well installed at the base of the sand and gravel at the SR-102 riverbed-boring location. After allowing the well to equilibrate overnight, BBL measured the depth to water in the well, and the depth to the river surface from the top of the temporary well's casing. These measurements, obtained on August 23, 2001, indicate an upward vertical gradient of 0.22 ft/ft. This gradient measurement confirms that water in the sand-and-gravel unit discharges to the river. As expected, the magnitude of the vertical gradient in the sand and gravel increases with proximity to the river. This phenomenon is demonstrated in the groundwater flow models discussed in the Subsection 7.2.3.

As mentioned above, the sand-and-gravel unit beneath the site belongs to a much larger aquifer system encompassing much of the Susquehanna River valley in the region. This aquifer is designated the Clinton Street Ballpark Sole Source Aquifer (USEPA, 2002). While the City of Binghamton obtains its water directly from the Susquehanna River, some adjacent communities rely on groundwater pumped from this aquifer. Given the site's proximity to the river, and a groundwater flow regime in which all water discharges to the river, the areal extent of the aquifer downgradient of the site is limited to the width of Court Street.

7.2.2.3 Groundwater Occurrence and Flow in the Bedrock and Till

The low permeability of the bedrock and till units give them a very minor role in the occurrence and flow of groundwater at the site. This assessment was confirmed with two bedrock monitoring wells installed during the Phase II SRI:

- MW01-07R was installed adjacent to MW97-7S. Water levels measured from this well pair show an upward gradient, with a 0.62 foot differential.

- MW01-03R was installed adjacent to MW93-3D. Water levels measured from this well pair show an upward gradient, with a 0.81 foot differential.

As discussed in the groundwater flow modeling subsection below, groundwater in the bedrock is inferred to originate in the uplands and valley walls where bedrock is found near the ground surface, and a significant downward gradient is presumed to exist. Because the Court Street site is adjacent to a regional groundwater discharge point (e.g., the Susquehanna River), the principal flow direction of groundwater in the bedrock at the site must be upward through the till. Due to extremely low permeability of the till, the net flow is believed to be extremely small with respect to the volume of water flowing in the sand and gravel aquifer.

7.2.3 Groundwater-Flow Modeling

To develop a better understanding of groundwater flow in the sand and gravel unit, including the effect of the flood wall on groundwater flow and the relationship between the unit and the river, BBL developed two groundwater-flow models: a two-dimensional, analytical-element-method (AEM) areal model, and a cross-sectional finite-element model. The modeling program used to generate the areal model was TWODAN™ (Fitts, 1995); the program used to produce the cross-sectional model was FLONET™ (Waterloo Hydrogeologic, Inc., 1997). Details concerning the construction, calibration, and sensitivity of the models are presented in Appendix B.

7.2.3.1 Areal Model

The areal model was used to estimate the rate of groundwater discharge to the river from the sand and gravel unit beneath the site, and to provide an estimate of hydraulic head in areas of sparse data to aid construction of the cross-sectional model. Data on flood-wall construction gathered during this investigation showed that the flood wall sheet piling did not fully penetrate the sand and gravel unit; making the two-dimensional areal model

inappropriate for assessing its effects on groundwater flow. The effects of the flood wall were examined using the cross-sectional model (described below).

The results of model calibration performed (Appendix B) demonstrated that the model was capable of producing field-measured heads within acceptable limits of error both near, and across the river from the site. Figure B-1 of Appendix B shows the model-produced equipotential contours. The results of the sensitivity analysis showed that the model is more sensitive to changes in hydraulic conductivity than to changes in recharge. Increasing or decreasing the hydraulic conductivity one order of magnitude results in a concomitant increase or decrease in discharge to the river by approximately the same factor. Increasing or decreasing the recharge by an order of magnitude resulted in an increase or decrease in discharge to the river by a factor of approximately 1.4, as shown in Table B-1 of Appendix B.

The rate of groundwater discharge to the river along the length of the site (approximately 450 feet) was estimated by the model to be 0.46 cubic feet per second (cfs), or 205 gpm. Comparison of this estimate with the average flow of the Susquehanna River upstream of the site at Conklin, New York, (3,586 cfs, which is based on 96 years of measurements), shows that the quantity of water discharging to the river from the sand and gravel unit beneath the site is relatively insignificant, representing approximately 0.01 percent of the total flow of the river and a dilution ratio of approximately 8,000:1.

7.2.3.2 Cross-Sectional Model

BBL used the cross-sectional model to investigate the effects of the flood wall on groundwater flow, and to examine the distribution of regional groundwater discharge to the river. Figure B-3 of Appendix B shows the distribution of hydrostratigraphic units and model boundary conditions used in the model.

The results of model calibration performed (Appendix B) demonstrated that the model was capable of producing field-measured heads within acceptable limits of error at the site.

To add a measure of conservatism to the model, the flood wall was considered to be a relatively effective barrier to groundwater flow (i.e., it was assigned a low value of hydraulic conductivity [See Appendix B]). This assumption is conservative because a relatively impervious flood wall would have a more dramatic influence on groundwater flow conditions than a flood wall that was relatively transparent to groundwater flow.

Figure B-4 of Appendix B depicts the model output in terms of equipotential contours and streamlines. The figure shows the following:

- The simulated flood wall does not cause groundwater to mound behind it appreciably; rather, groundwater is diverted under the flood wall and discharges to the river near the shoreline, as it would be expected to do in the absence of the flood wall.

- The majority of groundwater flow beneath the site occurs through the sand and gravel unit.

- The rate of groundwater discharge to the river is estimated by the model to be 0.17 cfs (80 gpm). This value is considered reasonably close to the value of 0.46 cfs estimated by the areal model described in the previous section, which constitutes approximately 0.01 percent of the total average flow of the river.

- Groundwater flowing through the sand and gravel unit discharges along a portion of the river bottom that extends approximately to the center of the river.

7.2.4 Summary of Groundwater Flow

Using available regional hydrogeologic information and the understanding of site hydrostratigraphic units described in Subsection 4.2.1.2, the following summarizes groundwater flow at the site:

- The majority of groundwater flow beneath the site occurs in the sand and gravel unit and originates upgradient of the site.

- Groundwater in the fill unit is derived from infiltration of precipitation falling on the site. The quantity of water in the fill unit is relatively small.

- The occurrence of groundwater in the fill is likely the result of the low vertical hydraulic conductivity of the underlying silt unit, which restricts infiltration.

- A small quantity of groundwater discharges from the bedrock/till unit to the overlying sand and gravel unit.

- Groundwater in all of the hydrostratigraphic units identified discharges to the Susquehanna River.

7.3 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 a continuing source of constituents to groundwater. For these reasons, characterizing the nature and extent of NAPLs at sites such as the Court Street site, where a considerable volume of NAPL is present in the subsurface and where there are

potential off-site sources of non-MGP NAPL, is an important, challenging component of a remedial investigation.

7.3.1 NAPL Characterization

To characterize NAPLs at the site, BBL used two approaches. The first approach, referred to as "source evaluation", entailed reviewing chromatograms and analytical results for samples believed to contain, or in the case of groundwater, samples that have moved through areas containing NAPL. This source evaluation provided information about the potential origin of the NAPL, including whether or not NAPL in a given sample was likely site related. The second approach consisted of collecting and analyzing samples of NAPL that accumulated in monitoring wells or piezometers to characterize important physical properties of free-phase NAPLs.

BBL's PAH forensic specialist performed the source evaluation on a subset of NAPL-containing samples[7] by examining the total-ion-current (TIC) chromatograms generated from Method 8270 and using diagnostic ratios of selected target PAHs to describe compositional characteristics of the several candidate sources. To provide an impartial evaluation, the specialist was given only the laboratory results and did not know where within the former MGP the samples were located or any details about the MGP's operational history.

The source evaluation was able to identify whether the NAPL in a sample had the characteristics of:

- Coal tar, including whether the NAPL had the characteristics of high-temperature or low-temperature processes (useful in differentiating sources of NAPL within the plant).

- Petroleum, including whether the NAPL had the characteristics of kerosene-range products, diesel/No. 2 fuel-oil range products, or lubricating/waste oils.

- A mixture of coal tar NAPL and petroleum products.

A more detailed discussion of the source evaluation is contained in Subsection 8.4.1.3.

[7] Including a groundwater sample from a well screened across a sheen-containing interval of soil.

Table 7.11 Forensic Source-Evaluation Results

Sample I.D.	Depth (ft.)	Matrix	Location	Coal Tar Characteristics		Petroleum Characteristics		
				High Temp.	Low Temp.	Kero-sene	Diesel	Lube/ Waste
TB-02	10-14	Soil	Onsite with former oil tank area		ü			
TP-07	5	Soil	Onsite with former oil tank area		ü			
MW01-07R	20-22	Soil	Southwest of site within former filling station			ü		
SB-4	12-14	Soil	Onsite within plant operations area		ü			
SB-5	4-6	Soil	Onsite within plant operations area	ü				
SB-6	4-6	Soil	Onsite within plant operations area		ü			
SB-101	15-17	Soil	Northeast site corner			ü	ü	
TW97-3S	19*	Water	Railroad Tracks north of site				ü	ü

* Depth is to middle of well screen. Sample locations are shown on Figure 2.

Table 7.11 summarizes the evaluation's findings. The table shows that NAPL-containing samples collected on-site appear to be site-related, while samples collected north and east of the site, including beneath the BMH warehouse, are likely petroleum related.

BBL characterized the physical and chemical properties of site-derived NAPLs by collecting and analyzing two samples, one from each monitoring point where a sufficient quantity accumulated. The first sample was collected from former well MW97-13S on October 13, 1997, and the second sample from piezometer PZ01-06 on January 28, 2002. Both samples were DNAPLs and were analyzed for a suite of physical properties consisting of density (ASTM D-1481), viscosity (ASTM D-445), and interfacial tension with water (ASTM D-971). The sample from MW97-13S was also analyzed for TCL VOCs, SVOCs, TAL inorganics, and cyanide. Table 7.12 summarizes the results of the physical analyses. Table 6 summarizes the results of the chemical analyses.

Table 7.12 DNAPL Physical Properties

NAPL Sample	Measurement Temperature (°C)	Density (g/mL)	Dynamic Viscosity (cP)	Kinematic Viscosity (cSt)	Interfacial Tension (dyne/cm)
MW-13S	10	1.082	237	219	25*
PZ01-06	12	1.074	1030	959	21.9

Notes:
cP = Centipoise, cSt = Centistokes.
* Interfacial tension for this sample was measured at 22 °C.

An additional laboratory analysis was performed on the sample collected from MW97-13S to determine the wettability of the NAPL by the soil imbibition method. The analysis found that the NAPL was non-wetting with respect to groundwater on a sample of silt collected at the site. This means that groundwater has a greater affinity for the silt than the NAPL and will tend to coat the silt and occupy the smaller, more constricted pore openings. Conversely, the NAPL will preferentially occupy the larger pore openings in the silt.

Based on the analytical results of the samples described above, the DNAPL can be characterized as a highly viscous, moderately dense DNAPL that would preferentially migrate through the largest pore spaces and would

be relatively difficult to mobilize where present in pools. DNAPL migration is discussed in greater detail in Subsection 7.3.4.

LNAPL has been identified in trace amounts in two piezometers, PZ01-02 and PZ01-04; however, not in a sufficient quantity to sample. Based on the results of the source evaluation, the NAPL identified near and beneath the BMH building may also be an LNAPL, though it occurs below the water table. The conceptual model provided in Section 10 offers a possible explanation for this observation.

To provide insight on the chemical composition of the DNAPL, BBL computed mass fractions for the individual analytes detected (Table 12). The table shows that VOCs (BTEX) comprised approximately 77 percent of the detected compounds, SVOCs comprised approximately 22 percent of the detected compounds, and inorganic compounds comprised approximately one percent of the detected compounds in the NAPL sample. The sum of all analytes detected in the DNAPL sample (10,418 milligrams per kilogram [mg/kg]) constitutes approximately one percent of the total mass of the sample; therefore, approximately 99 percent of the mass of the DNAPL sample consisted of unidentified compounds. The VOCs were comprised entirely of BTEX and the SVOCs were comprised of PAHs and phenol. A variety of inorganics were detected in the sample; however, cyanide was not among them.

7.3.2 NAPL Delineation

Delineating the extent of NAPLs, particularly DNAPLs, often proves challenging at former 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 complicated, unpredictable 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. The balance of this section describes the methods BBL used to identify and discriminate between different types of NAPLs, and then discusses the horizontal and vertical extents of NAPL at the site.

7.3.2.1 Methods

BBL used two approaches to delineate the extent of both the coal-tar-related and petroleum-related NAPLs identified at the site. These approaches consisted of using visual observations and inferring the presence of NAPL by comparing analytical results to the effective solubilities of detected constituents in soil, sediment, and groundwater samples. To discriminate between coal-tar- and petroleum-related NAPLs, BBL used olfactory observations (i.e., coal-tar- versus fuel-oil-type odors) and the PAH source evaluation described in Subsection 7.3.1.

A description of the two NAPL-delineation approaches follows.

Visual Observation

Visual observations constitute the most direct means of identifying NAPL. Visual cues included direct identification of NAPL, or of oily sheens on soil, sediment, or groundwater samples. Figure 14 identifies the locations where NAPL was observed during the field investigations.

Comparing VOC and SVOC Concentrations to Effective Solubilities

This approach employed mathematical methods to infer the presence of NAPL using VOC and SVOC analytical data from the site. These methods compare the concentrations of detected constituents to their effective-solubility limits. NAPL was inferred to be present at (or near) a given sampling location if a constituent occurred at a concentration greater than one percent of its effective solubility. This approach is based on principles presented in USEPA guidance on DNAPL site evaluation (Publication 9355.4-07FS, 1992) and other sources (WCGR, 1991; Cohen and Mercer, 1993; Pankow and Cherry, 1996; Kueper, Personal Communication with M.J. Gefell, 1997).

Because this approach relies on dissolved concentrations, it is most-readily applied to groundwater analytical results; however, results from soil and sediment analyses can also be used if the porosity and water content of the sample are known. With this information, the concentration of a detected soluble compound in the pore water can be calculated from the laboratory data. For this study, if a VOC or SVOC was calculated to be in pore water at a concentration greater than 10 percent of its effective solubility, NAPL was inferred to be present at (or near) the sampling location.

Appendix D summarizes the results of the effective-solubility screening for both groundwater and pore water, and describes the mathematical methods in more detail. Figure 14 identifies the locations where NAPL was inferred using the effective-solubility approach described above.

7.3.2.2 Horizontal Limits of NAPL

Figure 14 depicts the approximate horizontal limits of both coal-tar- and petroleum-related NAPLs at the site. The reader should consider the following observations when evaluating the figure:

- The sampling locations for this investigation were necessarily biased toward discovering NAPL. That is, investigation locations were sited in those areas where historical information suggested that MGP wastes would most likely be present (e.g., the former gas holders and oil storage tanks).

- The potential NAPL locations depicted on the figure are indiscriminate with respect to depth. For example, one two-inch thick interval exhibiting a sheen in a 60-foot deep boring would result in that location being flagged for the presence of NAPL, even though the other 59 feet and 10 inches of material penetrated were NAPL free. (The following subsection addresses the vertical extent of DNAPL.)

- Given the complex stratigraphy and multiple potential source areas at the site, significant variation in the extent of NAPL is expected to occur over short distances, both horizontally and vertically, within the "probable NAPL-containing area" bounded on the figure. Similarly, it is possible that NAPL may exist outside the limits suggested by the figure; however, the density and spacing of borings makes it unlikely that any large bodies of NAPL exist outside those limits.

- At most of the locations where NAPL was identified, the NAPL existed below the water table.

- Though NAPL appears to extend to the river at two locations, NAPL occurs directly behind the flood wall at only one of them, near the 24-inch outfall (see Subsection 7.1.4.8).

NAPL was observed in several locations along the western site boundary (e.g., at boring TB-2 and wells MW97-9 and MW93-1). The area of soils containing NAPL, therefore, likely extends beyond the western site boundary a short distance beneath Brandywine Avenue. The limits of NAPL west of the site (shown on Figure 14) were deduced from the following observations:

- The absence of impacts at monitoring well pair MW01-17, and well B-1, located west of the site on the 267 Court Street property.

- The evidence that lateral migration of nonaqueous-phase liquids (NAPLs) at the site tends to follow the direction of groundwater movement, which at the western portion of the site is toward the southeast, not west.

- The absence of BTEX and PAHs in the groundwater monitored by well MW97-07, which is located between the southwestern corner of the site and the Susquehanna River, downgradient of the 267 Court

Street property and Brandywine Avenue. If coal tar were present at, or upgradient of this well, which screens the sand-and-gravel unit, we would expect to see dissolved-phase impacts. Other site wells that monitor this unit and are located near or downgradient of coal-tar NAPL (e.g., MW93-02D, MW93-03D, MW97-9D, and MW97-10D) all exhibit elevated concentrations of BTEX and/or PAHs.

7.3.2.3 Vertical Limits of NAPL

By definition, DNAPL is denser than water and therefore can potentially migrate downward beneath the water table. Under certain conditions, LNAPL can also occur beneath the water table. BBL used the same visual and effective-solubility methods described in Subsection 7.3.2.1 to evaluate the vertical limits of NAPL.

Three important observations can be made from the evaluation. First of these is that NAPL has reached the greatest depths beneath the former MGP itself. This is demonstrated by Table 7.13, which shows all locations where NAPL was observed (or inferred to be present by the effective-solubility method) below the uppermost several feet of the sand-and-gravel unit. All of these locations are on site. Where NAPL is present offsite, it appears confined to the uppermost several feet of the sand-and-gravel unit, or shallower.

Table 7.13 Deepest Occurrences of NAPL/Sheen

Location	Unit	Basal Elevation of NAPL/Sheen (FAMSL)	Max. Depth Below Top of S&G Unit (ft.)	Depth Below Water Table (ft. bgs)
SB-201	S&G	811.0	16	25
TB-2	S&G	812.6	17	29
TB-3	S&G	792.7	33.5	45
TB-8	S&G	804.9	23	33
MW93-1D	S&G	798.9*	29*	33
MW93-2D	S&G	795.6*	26.5*	43
MW93-3D	S&G	801.1	26	35
MW93-5D	S&G	793.4	33.5	45
MW97-10D	S&G	794.6	34	39
MW01-03R	S&G	802.2	23	32

Notes:
FAMSL = Feet above mean sea level.
Ft. bgs – Feet below ground surface.
S&G = Sand and gravel.
Depth below water table estimated using Figure 11.
* NAPL presence inferred from groundwater quality.

The second important observation is that NAPL is confined vertically to the sand-and-gravel unit. NAPL was not identified in till or bedrock samples. This is particularly relevant beneath the Susquehanna River. The three riverbed borings that drilled into the till identified NAPL only in the upper few feet of the riverbed. This strongly suggests that upward migration of NAPL from depth beneath the river is not occurring, and therefore is not responsible for the NAPL identified in shallow riverbed materials.

The third observation regards the vertical distribution of NAPL. In most borings where NAPL was observed, it is not present continuously from the depth at which it was first observed to the depth at which it was last observed, rather, it occurs sporadically, separated by NAPL-free intervals. This indicates that the NAPL is distributed unevenly and tends to form stringers and ganglia, particularly in the sand and gravel. This is not surprising given the stratified nature of the subsurface, and is discussed in further detail in Subsection 7.3.4.

7.3.3 Soil Evaluation

7.3.3.1 Overview

BBL evaluates soil quality here, in the NAPL evaluation, because NAPLs (primarily coal-tar DNAPL) are responsible for the majority of impacts to site soils. No areas of soils that have been affected by other MGP-related byproducts (e.g., cyanide) exist outside areas affected by NAPLs. Although site investigations identified no NAPLs at the surface, BBL performed limited surface-soil sampling, primarily to support the risk evaluation (Section 9).

MGP sites can contain several types of byproducts with different physical and chemical natures. Two byproducts that are often found at former MGP sites in large quantities, and therefore tend to be the focus of investigations, are coal-tar NAPL[8] and 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, making it easy to detect in the field. BBL identified no purifier waste at the site and samples analyzed for cyanide did not detect levels above SCGs.

To evaluate the analytical results, BBL used the SCGs contained in the NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046 (NYSDEC, 1994) and a follow-up NYSDEC memorandum from Michael J. O'Toole, Jr. dated December 20, 2000. These SCGs, referred to hereafter as "guidance values", set limits for total detected VOCs and SVOCs, specifically • 10 ppm VOCs and • 500 ppm SVOCs.

7.3.3.2 Surface Soil

The surface-soil sampling focused on areas of the site that were not recently paved or covered with clean fill. The sampling interval for these samples was generally the uppermost 0.5 feet of soil; however, during early stages of site investigations, a number of samples collected from 0 to 2 feet below grade were analyzed. While these earlier samples were not specifically collected to provide data for risk evaluation, we include them in this discussion to help understand surface and near-surface soil quality. Figure 4 summarizes analytical results for all samples collected at depths of 2 feet or less. Table 8 summarizes surface-soil analytical results. As noted in

[8] And other NAPLs.

Subsection 4.7, since many of the shallow samples were collected, the majority of the site has been covered with gravel or paved, so that the initial soil quality results are no longer valid for assessing exposure risk.

None of the samples shown on Figure 4 exceed the guidance values. The human health evaluation (Subsection 9.2) evaluates risks posed to humans by the individual constituents detected in surface-soil samples.

7.3.3.3 Subsurface Soil

Because soils that contain NAPL are assumed to exceed guidance values (see Subsection 7.3.3.1), describing the nature and extent of subsurface soils affected by the site requires discussing both soil analytical results and the extent of NAPL together. Analytical results for subsurface soils are summarized in Table 5. Selected subsurface soil analytical results are shown on Figure 5.

To meaningfully evaluate subsurface soils, this discussion divides the soils into two groups: soil above the water table (i.e., unsaturated soil) and soil below the water table (saturated soil). Figure 18 shows the extent of unsaturated soil that exceeds guidance values. In general, the areal extent is limited to the northern part of the site, encompassing several of the former oil tanks, the former No. 2 gas holder and the former retorts. The limited extent of this area reflects the fact that most soils above the water table either do not contain NAPL or have already been removed by an IRM (e.g., the former No. 3 gas holder).

Below the water table, the extent of soil that exceeds guidance values is interpreted to be, by and large, the soils containing NAPL. Figure 19 depicts the locations where saturated soils were found to contain NAPL. Note that a number of test-pit and soil-boring locations either did not encounter the water table, or did not penetrate the full thickness of the saturated soils overlying the till unit. This means that NAPL may be present in these soils beneath such relatively shallow investigation locations. The reader is reminded that, as noted in Subsection 7.3.2, the NAPL in subsurface soils is unevenly distributed. As such, in any given region of soil that contains NAPL, there will be zones of soil that do not contain NAPL and therefore would likely be below the guidance values.

As noted in Subsection 7.3.1, a region of subsurface soil located north and east of the site contains petroleum-related NAPL. This NAPL was identified in samples collected from monitoring well TW97-3S and soil borings SB-101, SB-103, and SB-104. This region is bounded to the east, west, and south by monitoring-well cluster MW97-14 and soil borings SB-22, SB-23, and SB-102, where no petroleum-related impacts were observed during drilling. The northern limit of these affected soils has not been defined but appears be to north, and upgradient of, the site. The soils affected by the petroleum-related NAPL generally occurred near and several feet below the water table, toward the bottom of the silt and the top of sand and gravel.

7.3.4 NAPL Fate and Transport

In this subsection, BBL first provides an order-of-magnitude estimate of the volume of DNAPL present in the subsurface beneath the site, and then discusses NAPL transport at the site, including problems associated with predicting how DNAPL may migrate at the site. Two facts will become apparent to the reader. First, there is likely a large volume of NAPL present in the subsurface, most of it below the water table. Second, reliably predicting DNAPL migration at the site scale, indeed even determining with certainty whether DNAPL *is* moving at the site, is not practicable with the current data set. Despite this, the information gathered at the site is adequate to develop a reasonable model that explains NAPL transport at the site sufficiently for remedial decision-making. Subsection 7.3.4.2 presents this model.

7.3.4.1 Volume Estimate

BBL estimated the quantity of coal-tar NAPL produced by the MGP using available manufactured-gas production data for the MGP and a constant factor of 730 gallons of NAPL per million standard cubic feet (gal/MM scf; Eng, 1985). Using an average gas-production rate for the Binghamton MGP of 157 MM scf/year (Eng, 1985), and a period of gas production of 51 years, we estimate that the MGP produced approximately 8,010 MM scf of gas during its lifetime. (We calculated the production period of 51 years assuming that the plant began operations in 1888, and ceased producing manufactured gas in 1939. Gas-production data provided for the MGP by Eng (1985) indicate that no gas was manufactured at the MGP in 1940 or 1950, rather, the source of gas listed during these years was "natural gas".) Using the NAPL-production factor of 730 gal/MM scf, we estimate the amount of coal-tar NAPL produced during the plant's lifetime to be approximately 5.8 million gallons. This estimate does not include the volume of other NAPLs that may have been released at the site (e.g., petroleum feedstocks) because such releases have not been confirmed. Nor does the estimate include NAPLs that may have migrated beneath the site from off-site sources such as the adjacent scrap yard, asphalt batch plant, or former oil refinery. Site data are insufficient to prove that such migration has occurred, in part because offsite property owners would not grant NYSEG access for drilling.

Information on the disposition of byproducts for the site is non-existent; however, a release to the subsurface of only one-to-ten percent of the coal tar likely generated (calculated above), which BBL believes is reasonable given the site history, would equate to 58,000 to 580,000 gallons of DNAPL. If one were to estimate the volume of soils above the till beneath the site and apply a reasonable range of bulk-retention factors (0.25 to 3 percent [Kueper, 1999]), they would find that the soils could easily accommodate many times these volumes of DNAPL.

7.3.4.2 DNAPL Distribution in the Subsurface

The distribution of DNAPL beneath the site, particularly in the sand-and-gravel unit is complex. This would be expected because the distribution of DNAPL is affected by geologic layering. Pankow and Cherry (1996) note that horizontal zones of residual or free-phase DNAPL need not be caused by a particularly low-permeability silt or clay aquitard. Rather, a minor contrast in permeability *"...as from a coarse sand layer to a finer sand..."* will cause a variation in DNAPL entry pressure. The result is lateral spreading of the DNAPL until the edge of the "aquitard" is reached or until the height of the DNAPL pool becomes great enough to overcome the entry pressure of the aquitard, in which case the DNAPL will continue migrating downward toward the base of the aquifer. Accordingly, Pankow and Cherry note that, *"Given the subtlety of geologic heterogeneity that can cause a deflection of DNAPL in the saturated zone, as well as the complexity of the spatial distribution of such geologic heterogeneity in most systems, DNAPL pathways are generally* ***unpredictable*** *in the saturated zone, even when considerable information on the stratigraphy of the subsurface environment is available."* In short, it is not possible to accurately predict the paths that DNAPL beneath the site will take in any but the broadest sense.

Accumulations of free-phase NAPL have been identified at the site, as shown in the adjacent Table 7.14. Such accumulations or "pools" are important features because they represent DNAPL that can potentially migrate, and because the time required for the pool to dissolve would be much longer than for a body of "residual" NAPL[9]. Based on the data contained in table 7.14, the pools that were encountered were small, as the NAPL either did not consistently accumulate in wells after it was removed, or the thickness in the well was so small that there was not a sufficient amount to sample. It is possible that some of the NAPL accumulations represented residual NAPL that was mobilized locally due to perturbations caused by drilling.

Table 7.14 Observations of Free-Phase NAPL

Location	Unit	NAPL Type	Sufficient Amount to Sample?	Consistently Return After Purging?
MW93-1S	Fill	DNAPL	NA[1]	NA
MW97-8S	Silt	DNAPL	No[2]	No[2]
MW97-13S	Fill	DNAPL	Yes	No[2]
PZ01-02	Silt/ S&G	LNAPL	No	Yes
PZ01-04	Fill	LNAPL	No	Yes
PZ01-06	Fill	DNAPL	Yes	No

Notes:
S&G = Sand and Gravel. NA = Not available.
[1] Well decommissioned shortly after installation.
[2] Based on information provided by NYSEG (Blazicek, 2000).

Identifying all such DNAPL pools at the Court Street site is not practical primarily because it would require drilling and sampling a prohibitively large number of boreholes. Many borings would be needed because a considerable volume of DNAPL can occur in a relatively small area. Pankow and Cherry (1996) note that 800 liters (211 gallons) of DNAPL could be contained at the bottom of a sand aquifer, with the pool measuring only 10 feet by 10 feet in area and 1-foot thick. Additionally, BBL's

[9] Residual NAPL is comprised of blobs and ganglia that have been cutoff and disconnected from a continuous NAPL body by water. Such NAPL is not mobile.

experience at numerous MGP and creosote DNAPL sites indicates that residual and pooled DNAPL cannot always be reliably distinguished by visual examination of split-spoon samples. Such a distinction is best made by installing a properly constructed well that is screened across the NAPL-containing zone. Installing a well in every single zone where NAPL is identified at such large MGP sites is also not practical.

While NAPLs are pooled at the site, it is not possible to determine with a reasonable degree of accuracy whether NAPLs are migrating at the site. This is due in part to the viscous nature of coal-tar DNAPLs in general, and particularly those characterized at the site. Because hydraulic conductivity is inversely related to viscosity, the greater the viscosity of the NAPL the slower it will migrate[10]. It is possible therefore, that it could take a long time for a moving body of viscous DNAPL to reach equilibrium.

The best evidence that NAPL is moving is either when NAPL enters an established monitoring well that was previously NAPL-free, or when NAPL is observed repeatedly discharging to the land surface or to a body of surface water. There have been no cases at the site where NAPL was found in a well where previously there had been none. Sheens or NAPL-containing riverbed materials were identified in the Susquehanna River as early as 1991 (ES, 1992) and were still present in 2001. As discussed in Section 8, the Susquehanna River adjacent to the site is predominately erosional, therefore the continual presence of sheens generated from the riverbed suggests an ongoing source of NAPL to the riverbed. However, this observation does not necessarily indicate ongoing NAPL migration through subsurface soils. The continual presence of sheens could be explained by gradual erosion downward through soils containing residual levels of NAPL. Additionally, the available data cannot distinguish NAPL discharges through soil from potential NAPL discharges out of pipes that outfall near the areas of affected sediment.

7.3.4.3 Conceptual Model for NAPL Transport

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.

This investigation identified three potential sources of NAPLs to the subsurface: the former MGP, the former oil refinery and asphalt batch plant that now occupies the same property, and the scrap yard. Most of the NAPLs identified below the land surface during this investigation are likely the result of site operations. However, the source evaluation (Section 7.3.1), coupled with the history of land use immediately north of the site, suggest that NAPL identified beneath the railroad tracks (well TW-3S) and east of the site beneath the BMH Warehouse is petroleum- rather than coal-tar related and most-likely originated off site. While it is true that petroleum

[10] Assuming all other factors (including interfacial tension) are equal.

products were used at the former MGP, the tanks were located on the opposite (west) side of the site. Given the widespread occurrence of coal-tar-related NAPL at the site, it is unlikely that petroleum released at the site could migrate off site against groundwater flow to the east without also picking up some coal-tar characteristics in its chemical signature.

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 the former oil-storage tanks (LNAPL), former gas holder Nos. 1 through 3 (primarily DNAPL[11]), and the tar-separating well (primarily DNAPL). We call these out because NAPL was either handled or generated in bulk at these areas and such features are often found to be sources of NAPLs at former MGP sites. What is clear is that much of the fill and a considerable volume of the silt beneath the site contain NAPL or elevated levels of site-related constituents.

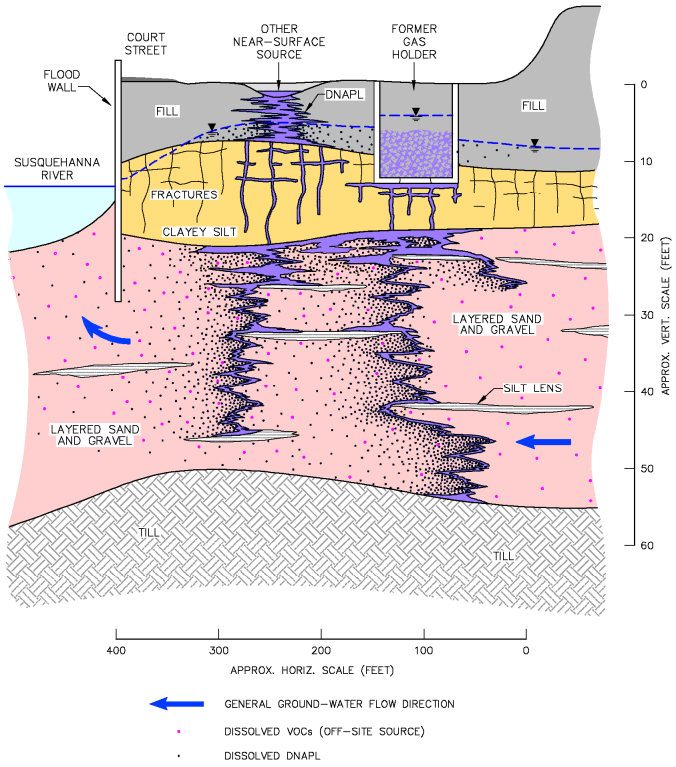


Figure 7.9 Conceptual Model for DNAPL Transport.

NAPLs have moved downward through the unsaturated zone (primarily fill) and reached the water table. LNAPL would have floated on the water surface, while DNAPL continued migrating downward through the larger pore spaces of the silt[12]. Indeed in many samples of the silt observed by BBL, DNAPL preferentially followed both vertical fractures and horizontal bedding planes. This is illustrated conceptually on Figure 7.9. Upon reaching the sand-and-gravel unit, the DNAPL spread laterally, preferentially but not exclusively in the downgradient direction. Away from the immediate source areas (e.g., the former gas holders and the tar separating well), NAPL was most frequently observed near the top of the sand and gravel unit.

In some areas, probably beneath former plant locations that encouraged DNAPL to pool (e.g., a gas holder with a leaky bottom), DNAPL quantities and heads (pressures) were great enough for the DNAPL to migrate to the base of the sand-and-gravel unit. The stratified, heterogeneous nature of the unit creates complex DNAPL migration pathways and a highly irregular DNAPL distribution. DNAPL in the sand-and-gravel unit tends to form “fingers”, blobs, and ganglia, and pool on finer-grained layers.

[11] Coal tar can be an LNAPL, although this is uncommon.
[12] LNAPLs appear less common than DNAPLs at the site, being detected in a measurable thickness in only one piezometer (PZ01-02). The quantity of LNAPL in PZ01-02 was not enough to collect a sample for physical analysis.

The till beneath the sand-and-gravel unit appears to form a capillary barrier that has prevented further downward migration of the DNAPL. Several factors are responsible for making the till a DNAPL barrier, chief among them are its very dense, fine-grained nature (and resulting low permeability) and the strong upward hydraulic gradient across it. If the source of DNAPL was not exhausted by the time the DNAPL reached the till, the DNAPL would likely migrate along the till's surface in the down-slope direction, and pool in depressions. The shape of the till's surface has been reasonably characterized through drilling of numerous borings, and no large depressions have been identified on site (Figure 9). Several observations provide insight on the extent and potential migration of DNAPL near the top of the till:

- DNAPL or sheens were identified near or at the top of the till at only 4 of the 35 locations on and off-site that reached the top of the till (TB-3, MW97-10D, MW93-3D, and MW01-3R).

- DNAPL or sheens were not observed at or near the top of the till in any offsite borings, including seven in or south of Court Street, and three in the Susquehanna River.

- DNAPL has not accumulated in any wells screened at the base of the sand and gravel.

- At MW93-3D and MW01-3R, where DNAPL or sheens were observed near the top of the till, there is no evidence of DNAPL or sheens at shallower depths.

These facts suggest that, if DNAPL is pooled on top of the till, such pools are not extensive. These facts also suggest that DNAPL has migrated laterally near the base of the sand and gravel to the area of MW93-3D and MW01-3R (Figure 2).

Offsite migration of NAPL has occurred at or near the top of the sand-and-gravel unit in several places: south of the site, along the 66-inch sewer (where the former Brandywine canal and Creek once were located), and southeast of the site, near the 24-inch outfall.

In the area of the 66-inch sewer, NAPL exists on site in the generally low-permeability, silty fill that surrounds the pipe, and in the sand and gravel beneath it. As described in Subsection 7.1.4.2, shallow groundwater flow converges near the sewer south of the former No. 4 gas holder, due in part to the localized absence of the silt unit in this area. Where the silt is absent, shallow groundwater and DNAPL can drain into the underlying sand and gravel. DNAPL is interpreted to have migrated laterally southward in the silty fill and at the top of the sand and gravel beneath the sewer, likely reaching the Susquehanna River's bed near the shore and the mouth of the 66-inch sewer. Upward gradients in the sand-and-gravel unit beneath the river as discussed in Section 7.2.2.2, and the layered nature of the sand-and-gravel unit, serve to keep the NAPL shallow and near the shore. Direct discharge of sediment containing NAPLs (both site and non-site related) from inside the 66-inch sewer may also be responsible for some or all of the affected riverbed materials near the 66-inch sewer outfall.

Near the 24-inch outfall, NAPL has similarly migrated southward laterally along the top of the sand-and-gravel unit. In this area, coal-tar NAPL is not present in the fill or upper portion of the silt; rather it appears concentrated at the top of the sand and gravel. Unlike at the 66-inch sewer, steel sheeting was driven into the sand and gravel beneath the flood wall in this area. As described in Section 7.1.4.8, the sheeting is slotted near the 24-inch outfall to accommodate a former water-intake pipe for the MGP identified as "BB". This feature is inferred to encourage groundwater and NAPL flow to converge in this area and pass through the sheeting. Additionally, the BB pipe may have more permeable bedding around it, particularly if it was laid in a trench, which would serve to preferentially direct groundwater and NAPL movement along it. Upon reaching the sheeting, migrating NAPL likely pooled and spread laterally and then downward with the hydraulic gradient and through the opening in the sheeting beneath the BB pipe. After passing the flood wall, the NAPL (and groundwater) moved upward to the river bottom near the shore. There is no evidence that significant pooling of NAPL occurs behind the flood wall, nor that significant seepage of NAPL occurs through joints in its concrete facing.

The presence of coal-tar NAPL at the top of the sand-and-gravel unit east of the on-site source areas (e.g., at SB-22, SB-23 and MW98-15S) can be explained by pumping at the former Ranney well. The modeling performed by BBL (Appendix B) indicated that the capture zone of the Ranney well likely extended beneath at least a portion of the site. While pumping, the well may have created a hydraulic gradient in the sand and gravel unit adequate to draw both groundwater and NAPL toward it. Though the coal-tar NAPL never reached the Ranney well, it was drawn far enough eastward to reach the BB pipe. When pumping was discontinued at the Ranney well, the direction of groundwater and NAPL flow returned to southward, toward the river.

The petroleum-related NAPL identified northwest of and beneath the BMH Warehouse appear to be derived from an upgradient, offsite source, most-likely the former oil refinery. Most of the soils observed to contain the petroleum-related NAPL did not appear saturated with free-phase NAPL[13], rather most exhibited odors and sheens, suggesting that much or all of this NAPL may be at residual saturation and not pooled.

[13] Droplets of free-phase, petroleum-based NAPL were only identified in one split-spoon sample, collected at boring SB-101.

7.4 Groundwater Quality

This subsection discusses the quality of groundwater at and near the site, based on the analytical results of groundwater samples collected from monitoring wells during the various phases of site investigations. The scope of each completed groundwater sampling round was outlined in Subsection 4.5 and is summarized in Table 7.15. The laboratory results of detected analytes are presented in Table 4. Figure 13 shows the concentrations of total BTEX, PAHs and cyanide, from the most recent data available for each well.

Table 7.15 Groundwater Sampling Rounds

Date	Number of Wells Sampled	TCL VOCs	BTEX	TCL SVOCs	PAHs	TAL Inorganics	Cyanide	TCL PCBs	Chloride
July 1993	8	ü		ü		ü	ü	ü	
Oct. 1993	8	ü		ü		ü	ü		
Jan. 1994	8	ü		ü		ü	ü		
April 1994	8	ü		ü		ü	ü		
Dec. 1997	25	ü		ü		ü	ü		
June 1998	3	ü		ü		ü	ü		
Oct. 2001	5		ü		ü		ü		ü

For a comprehensive list of samples, see Table 3.
2001 chloride analyses for bedrock wells only.

The analytical results are discussed in three groups, based on the screened intervals of the wells sampled: wells screened at or near the water table, at the base of the sand and gravel unit, and in bedrock.

Where applicable, the analytical results presented in Table 4 are compared to 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. Where available, the NYSDEC guidance values are used for comparison.

Discussions of inorganics focus on the results of the dissolved (filtered) analyses rather than the total (unfiltered) analyses. The reason for this approach is that considerable suspended matter was evident in most of the samples collected. Suspended matter can produce sampling artifacts; therefore, samples containing such matter should be filtered prior to analysis (Hem, 1989; Appelo and Postma, 1993).

PCB analyses conducted in the first round of sampling for the Task II RI did not detect any PCB isomers in any wells; therefore, no further PCB sampling was conducted.

Shallow Monitoring-Well Results

Volatile Organic Compounds

The most recent VOC groundwater analytical data from the 17 shallow monitoring wells sampled include six locations where one or more compounds were detected above NYSDEC Class GA groundwater standards (MW97-8S, MW97-9S, MW97-10S, MW97-11S, and MW97-13S, MW98-15S). These wells are generally located at or south of the site.

BTEX were the only VOCs detected in shallow groundwater samples. The highest concentrations of BTEX were found in three wells that screened NAPL-impacted soils: MW97-13S (34,600 µg/L), MW97-9S (5,430 µg/L) and MW97-8S (4,638 µg/L). The large gap between these concentrations and the next highest (268 µg/L at MW98-15S) suggest, not surprisingly, that the proximity of NAPL is the strongest control on dissolved BTEX concentrations. It is significant that no BTEX was detected at MW93-3S or MW97-12S (both near the center of southern property line), nor in the six shallow monitoring wells encircling the site on the west, north and east sides (B-1, MW01-17S, MW93-6S, TW97-2S, TW97-3S, MW97-14S and MW98-16S).

Time-series data, available for only four wells (MW97-2S, MW97-3S, MW97-6S and TW97-3S) show no consistent trends toward greater or lesser VOC concentrations in shallow groundwater.

These data indicate that groundwater containing concentrations of VOCs in excess of applicable standards is generally confined to the site, and south of the site along two potential preferential flow paths: the 66-inch-diameter storm sewer, and the 24-inch pipe.

Semivolatile Organic Compounds

The most recent SVOC analytical data from 17 shallow monitoring wells sampled include six locations where one or more compounds were detected above NYSDEC Class GA groundwater standards or guidance values (MW93-2S, MW97-8S, MW97-9S, MW97-13S, MW98-15S, and TW97-3S). These wells are generally located at or south of the site, except TW97-3S, which is located north of the site.

The SVOCs detected consisted primarily of PAHs and various phenolic compounds (phenol, 2,4-dichlorophenol, 2-methylphenol, and 4-methylphenol). PAHs represented the vast majority of SVOCs identified, with naphthalene being the most common single compound. The locations with the highest concentrations of VOCs, noted above, also had the highest concentrations of PAHs (MW97-13S, MW97-9S and MW97-8S) with concentrations as high as 12,053 µg/L.

As with the VOCs, the time-series data from wells MW97-2S, MW97-3S, MW97-6S and TW97-3S, show no consistent trends toward greater or lesser SVOC concentrations in shallow groundwater.

The SVOC analytical results suggest that groundwater containing concentrations of SVOCs in excess of criteria is generally confined to the site, and south of the site along two potential preferential flow paths: the 66-inch-diameter storm sewer, and the 24-inch pipe.

Inorganics

Analytical results for groundwater samples collected from most of the shallow wells show that dissolved concentrations of several inorganics occur in excess of Class GA standards. The inorganics most commonly detected in excess of standards were iron, manganese, and sodium, which are naturally occurring and are not

major constituents of typical MGP wastes. These three analytes accounted for 83 percent of the exceedances. Also occurring at concentrations exceeding standards at one or a few locations were arsenic (MW91-9S), cyanide (MW97-13S), and selenium (MW97-9S, MW97-13S, MW97-14S, and TW97-3S).

Measurements obtained during groundwater sampling indicate that several shallow downgradient wells, often those containing organic compounds, have low concentrations of dissolved oxygen (groundwater sampling logs are contained on the Electronic Attachments CD). This observation suggests that reducing (anoxic) conditions exist in areas where organic compounds are present in shallow soil and groundwater. These conditions are commonly associated with biodegradation of organic compounds, where available dissolved oxygen is consumed, creating an anoxic environment in the groundwater. In such environments, the solubility of many inorganics, including iron and manganese, increases considerably (Hem, 1989). Additionally, creation of dissolved plumes of iron and manganese due to biodegradation of the aromatic hydrocarbons has been demonstrated by Bennett et al. (1993). While iron oxide was used at some MGP's as a purifying agent, no evidence of such purifier waste has been found at the site. Iron, manganese, and sodium are abundant in the earth's crust; therefore, the aquifer material itself can act as a source of these inorganics to groundwater.

Deep Monitoring-Well Results

Volatile Organic Compounds

The most recent samples collected from all of the deep monitoring wells, except one, had concentrations of one or more VOCs above NYSDEC Class GA groundwater standards. The one exception (MW01-17D) was analyzed for BTEX only[14], therefore several of the most frequently detected VOCs were not reported. The compounds most frequently detected in excess of standards were the chlorinated aliphatic hydrocarbons 1,1,1-trichloroethane (TCA) and one of its degradation (daughter) products, 1,1-dichloroethane (DCA). One or both of these compounds probably occur at all deep wells in concentrations exceeding their respective standards, though neither was detected at MW93-3D. This seeming discrepancy can be explained by the elevated concentrations of other constituents in that well. In order to accurately quantify the major constituents, the laboratory had to dilute the sample, which increases the detection limits of the sample by an order of magnitude, making the detection limits much higher than the expected concentrations of 1,1,1-TCA and 1,1-DCA.

Other compounds reported to occur in excess of standards were BTEX (MW93-1D, MW93-2D, MW93-3D, and MW97-9D) and styrene (MW97-9D). Where detected, the total VOC concentration was greatest in the sample collected from MW93-3D (1,980 µg/L, [estimated]) and least in the sample collected from TW97-1D (16 µg/L, [estimated]). No VOCs were detected in the sample from MW01-17D; however, as noted above, this sample was analyzed for BTEX only.

[14] Groundwater samples collected for the Phase II SRI were analyzed for likely MGP-related analytes only, including BTEX, PAHs and cyanide (See Section 4.5.4).

The source of the chlorinated aliphatic hydrocarbons appears to be upgradient of, and unrelated to the site. Evidence supporting this statement consists of the following:

- These compounds are not commonly associated with MGP sites (Environmental Research & Technology, Inc. and Koppers Company, Inc., 1984).

- These compounds were never detected in any of the soil, shallow groundwater, or river sediment samples collected during site investigations.

- These compounds were detected in all three surface water samples collected from the 66-inch-diameter storm sewer, including the upgradient location. The storm-sewer sampling results are discussed in Subsection 7.1.4.2.

- These compounds were detected in groundwater samples collected from monitoring wells located hydraulically upgradient of site.

As discussed in Subsection 7.2.2, the sand and gravel underlying the site is a small part of the Clinton Street Ballpark Sole Source Aquifer (USEPA, 2002). However, the presence of these chlorinated aliphatic hydrocarbons (unrelated to the site) render the groundwater undrinkable even without the presence of site-related constituents.

The available time-series data, shown in Table 7.16, show no consistent trends toward greater or lesser BTEX concentrations in deep groundwater, except that BTEX has decreased considerably at upgradient monitoring well MW93-5D.

Semivolatile Organic Compounds

The most recent samples collected from seven of the ten deep monitoring wells, had concentrations of one or more SVOCs above NYSDEC Class GA groundwater standards or guidance values. Phenol was the only SVOC detected in concentrations above the Class GA standards (at MW93-1D and TW97-1D). PAH concentrations were above the guidance values at MW93-1D, and accounted for the remaining five exceedances (MW93-2D, MW93-3D, MW93-5D, MW97-9D, and MW97-10D).

Table 7.16 Time Series Groundwater BTEX Concentrations in Deep Overburden Wells

	Total BTEX (µg/L)				
	7/20/93	10/20/93	1/24/94	4/26/94	12/17/97
MW93-1D	372	1,187	1,230	97	1,150
MW93-2D	594	482	152	400	409
MW93-3D	1,517	2,140	1,943	244	1,980
MW93-5D	216	41	9	1	4
MW93-6D	ND	ND	ND	ND	ND

ND = none detected

The available time-series data, shown in Table 7.17 indicate several trends in PAH concentrations in deep groundwater. Concentrations in wells located downgradient of the site (i.e., MW93-1D, MW93-2D, and MW93-3D) have increased between 1993 and 1997. In contrast, concentrations have decreased in wells located upgradient of the site (MW93-5D and MW93-6D).

Table 7.17 Time Series Groundwater PAH Concentrations in Deep Overburden Wells

	Total PAHs (µg/L)				
	7/20/93	10/20/93	1/24/94	4/26/94	12/17/97
MW93-1D	143	564	451	274	800
MW93-2D	3,314	578	553	432	6,297
MW93-3D	4,392	837	643	803	7,950
MW93-5D	1,488	246	550	450	134
MW93-6D	176	960	49	4	ND

ND = none detected

The SVOC analytical results suggest that groundwater containing concentrations of SVOCs in excess of criteria is generally confined to the site, and south of the site.

Inorganics

Analytical results for groundwater samples collected from all of the deep wells show that dissolved concentrations of several inorganics occur in excess of Class GA standards. Similar to the results for shallow groundwater samples, the inorganics most commonly detected in excess of standards were manganese, sodium, and iron, which are naturally occurring and are not major constituents of typical MGP wastes. These three analytes accounted for 99 percent of the exceedances. The only other inorganic that occurred at a concentration exceeding a standard was selenium at one location (MW93-5D). Cyanide, though detected in both upgradient and downgradient wells, did not exceed the Class GA standard in any deep monitoring well.

Table 7.18
Bedrock Groundwater Analytical Results

	Concentration			
	BTEX	PAHs	Cyanide	Chloride
	(µg/L)			mg/L
MW01-03R	ND	ND	2	12.9
MW01-07R	ND	ND	3	12.2

ND = none detected; samples collected October 2001.

Similar to the case of shallow wells, field dissolved-oxygen measurements indicated reducing conditions in wells where organic compounds were present. The observed exceedances of iron and manganese are attributed to these reducing conditions, which are likely the result of biodegradation of the organic compounds.

Bedrock Monitoring Well Results

The groundwater sampling results indicate that bedrock groundwater quality has not been adversely affected by site-related constituents. As shown in Table 7.18, no PAHs or BTEX were detected in either of the two bedrock groundwater samples collected. The chloride results indicate that the bedrock groundwater is not saline. The concentration of cyanide and chloride detected in the groundwater samples from these two bedrock monitoring wells are below NYSDEC Class GA groundwater standards.

7.4.1 Potential Upgradient Groundwater Constituent Sources

A number of potential upgradient groundwater constituent sources were identified near the site. The results of the VISTA database search (described in Subsection 4.5.2) identified 18 potential contaminant sources as being located within one-half mile, and upgradient or crossgradient of the site (see the Electronic Attachments CD). These sources consisted of:

- Resource Conservation and Recovery Act (RCRA) listed hazardous-waste generators (three sites);
- NYSDEC-listed aboveground or underground storage tanks (five sites);
- NYSDEC-listed leaking underground storage tanks (eight sites); and
- NYSDEC-listed spills (two sites).

In addition to these, five other potential sources were identified through review of historical information and performance of a reconnaissance of the area. Historic Sanborn Fire Insurance Maps from 1887, 1891, 1918, 1950 (included on the Electronic Attachments CD) and the area reconnaissance identified the following potential sources located within one-quarter-mile upgradient or cross-gradient of the site:

- **Binghamton Oil Refinery.** The refinery was located immediately north-northeast of the site and appears on maps dated 1887, 1891 and 1918. As many as 18 storage tanks are depicted on the property, 13 of which are described as “sunk in the ground.”

- **Crandall, Stone & Co. Carriage Hardware Manufacturers.** This facility first appears on a map dated 1891, east of the site on the south side of Court St. across from the location of the former Raney Well (Figure 2). That facility’s name changed to “Brewer Tichener Corp., Crandall Stone Div., Automotive and Carriage Hardware Manufacturers” on a map dated 1950. The map notes describe a “plating and polishing room.”

- **Binghamton Metal Forms, Inc.** Appears on Sanborn Fire Insurance Map dated 1950, approximately 1,200 feet northeast of the site on Griswold Street.

- **Municipal Asphalt Co. Asphalt Plant.** This plant appears on the map dated 1950. A reconnaissance of the area performed during this investigation identified this plant as apparently still in operation under the name of “Barrett Paving Plant." The approximate location of this plant is identified on Figure 2.

- **Scrap Yard/Weitzman & Sons Scrap Yard.** An area identified as a “scrap yard” appears on the map dated 1950. A reconnaissance of the area performed during this investigation confirmed that a scrap yard, identified as Weitzman & Sons, currently occupies the same area. The approximate location of the yard is identified on Figure 2.

7.4.2 Groundwater Fate and Transport

Based on the detailed interpretation of groundwater flow at the site presented in Subsection 7.2 and available groundwater quality data, the following statements regarding constituent fate and transport can be made:

- Groundwater in the fill unit migrates radially away from a water-table mound near the site center, drains down into the sand and gravel unit via leakage through or off the edge of the silt unit. All of the groundwater in this unit discharges to the Susquehanna River near the site; therefore, the potential exists for dissolved, site-related constituents in fill-unit groundwater to be transported to the Susquehanna River.

- Groundwater in the sand and gravel unit migrates southward and discharges to the Susquehanna River; therefore, the potential exists for dissolved, site-related constituents in groundwater of the sand and gravel unit to be transported to the Susquehanna River.

- Migration of constituents dissolved in groundwater at the site is subject to the processes of advection (i.e., move forward), dispersion (i.e., dilute and spread laterally), and adsorption onto aquifer material as they migrate toward the river. Dissolved organic constituents will also biodegrade en route to the river, as evidenced by low levels of dissolved oxygen and increased levels of dissolved iron and manganese in groundwater that has been affected by site constituents.

Section 7.4.3, below, provides an overview of contaminant transport processes, and presents discussions of the fate and transport of the inorganic and organic constituents of concern at the site.

7.4.2.1 Transport Processes

There are five processes that govern the fate and transport of dissolved constituents (solutes) in saturated media:

- Advection;
- Dispersion;
- Diffusion;
- Retardation; and
- Biodegradation.

Advection is a transport process by which solutes may migrate along with flowing groundwater at a rate similar to the average linear groundwater velocity. Dispersion is a transport process by which solutes may migrate at rates faster or slower than the average linear groundwater velocity and is controlled by physical mixing processes, resulting in reduced solute concentrations. Diffusion is a process by which chemicals move from areas of higher concentration to areas of lower concentration. Retardation describes several processes that cause

the solute to move through the aquifer more slowly than the average linear groundwater velocity. Retardation processes include adsorption, by which an aqueous compound preferentially adheres to a solid, and precipitation, by which an aqueous compound becomes a solid by either physical or chemical means. Biodegradation is a mass-transfer process by which solutes are metabolized by aquifer microorganisms and may result in complete destruction of organic solutes, ultimately removing solute mass from groundwater.

These processes (except advection) result in reduced contaminant toxicity, mobility, and/or dissolved solute mass, commonly referred to as "natural attenuation." Natural attenuation of organic compounds in groundwater can be a corrective-action alternative at hazardous waste sites, whether as a sole remedy or remedy component (USEPA, 1997).

7.4.2.2 Organic Compounds

The migration rate of dissolved organic compounds in groundwater typically is much slower than the groundwater flow rate due to naturally-occurring attenuation processes such as hydrophobic sorption and in-situ biodegradation. The effect of hydrophobic sorption on the migration rate of organic compounds can be evaluated by using compound-specific retardation factors, which describe the compound-migration rate relative to the average linear groundwater flow velocity. Retardation factors for those organic compounds that have been detected in excess of NYSDEC Class GA standards at the site during the most recent sampling event have been calculated and are presented in Table 34. Retardation factors were calculated using:

- Organic carbon content measured for the saturated silt and sand and gravel units (Table 5);

- Soil bulk density values obtained from physical testing of the soils (silt unit) or calculated from soil moisture content data (sand and gravel unit). The bulk density and moisture content data used in the calculations are contained in soil and NAPL physical testing section of the Electronic Attachments CD; and

- K_{oc} values referenced in Mott (1995) and Ravi and Johnson (1994).

As shown in Table 12, the retardation factors for the silt unit ranged from three for phenol to 98 for xylenes; the retardation factors for the sand and gravel unit ranged from three for phenol to 101 for xylenes.

In general, the higher the retardation factor, the slower the constituent migrates in groundwater. For example, a constituent with a retardation factor of two migrates twice as slowly as the average groundwater flow velocity and a constituent with a retardation factor of 100 migrates 100 times slower than the average linear groundwater velocity.

In-situ biodegradation of organic compounds removes mass from groundwater by converting the compounds to non-hazardous byproducts, such as carbon dioxide and methane. The effect of in-situ biodegradation on the

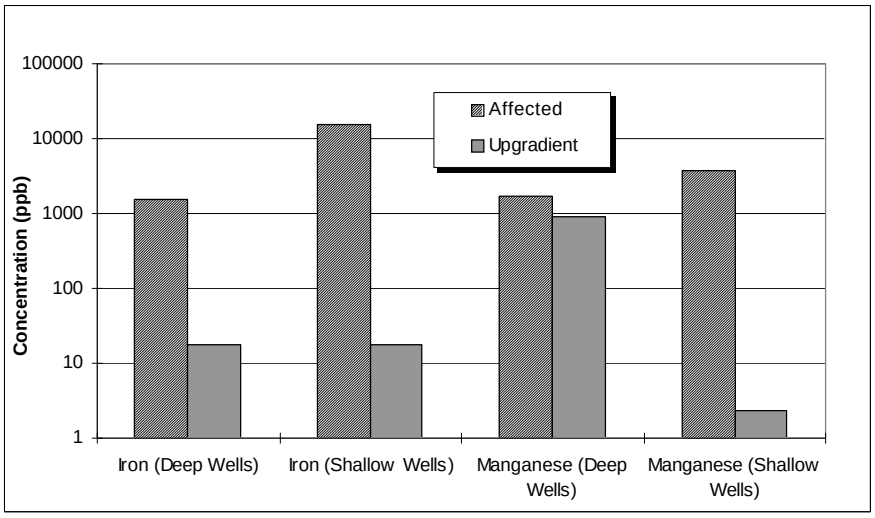
migration of organic compounds can be expressed in terms of "half-life." The term half-life is defined as the amount of time required for a given mass of a compound to be reduced by one-half; therefore, the lower the half-life for a given organic compound, the more rapidly it is degraded. The more rapidly that a compound is degraded, the less distance it travels before its concentration is reduced to "acceptable" levels. Half-lives for those organic compounds that have been detected in excess of NYSDEC Class GA standards at the site during the most recent sampling event are presented in Table 11.

Several statements can be made about the retardation factors and half-lives as presented in Table 11:

- All of the organic compounds that have been detected in excess of NYSDEC Class GA standards at the site during the most recent sampling events will migrate much more slowly than site groundwater due to their retardation factors.

- Although phenol is the least retarded of the listed organic compounds, it is the most readily biodegradable; therefore, it would not be expected to migrate far from its source. Site data demonstrate this observation; the concentration of phenol is high in the groundwater sample collected from monitoring well MW97-13S, where the presence of DNAPL has been documented, but drops off dramatically or is not detected in groundwater from most other monitoring wells.

Figure 7.10 Natural Attenuation Parameters



- All of the organic compounds detected in groundwater can be biodegraded in-situ. Evidence that biodegradation of these compounds is occurring at the site includes increased levels of dissolved iron and manganese in affected groundwater, which are indicative of biodegradation. The observed increase of these constituents is depicted in adjacent Figure 7.9, where the average iron and manganese concentrations of samples collected from the most-affected wells (those with BTEX concentrations greater than 1,000 ppb, i.e., MW93-1D, MW93-3D, MW97-8S, MW97-9S, and MW97-13S) are plotted with respect to the concentration in the site's least-affected, upgradient wells (MW97-14S&D). The plot shows that iron and manganese concentrations in samples collected from the affected wells are elevated above those collected from unaffected wells.

7.4.2.3 Inorganics

The concentrations of inorganic solutes in groundwater at concentrations exceeding NYSDEC Class GA standards (principally iron, manganese, and sodium) are anticipated to decrease downgradient of the site. As discussed in Subsection 7.4, elevated concentrations of inorganics are attributed to the presence of reducing conditions in site groundwater caused by biodegradation of the organic compounds at the site. As the reduced groundwater moves downgradient of the site, it will mix with oxygenated groundwater, creating a "transition zone," where trace metals, such as iron and manganese, coprecipitate (Fetter, 1993), resulting in a reduction of inorganics concentrations in groundwater. Farther downgradient, the concentrations of inorganics that are still above background concentrations would be further reduced by dispersion.

In addition to precipitation, inorganics tend to be adsorbed to organic material and clay minerals, further reducing their concentrations in groundwater.

8. Susquehanna River Evaluation Findings

Evaluation of the site's potential impacts to the Susquehanna River began in 1991 with the Prioritization Investigation, and has been a major focus of subsequent site investigation up though the 2001 Phase II SRI. This section discusses the findings of river work, divided into the following categories of work:

- Surface water quality;
- The results of a seepage evaluation;
- Riverbed probing;
- Riverbed sampling results; and
- Fate and Transport

8.1 Surface Water Quality

Susquehanna River surface water quality data are available from site investigations and from the City of Binghamton Water Filtration Plant (located across the river). As discussed below, these surface water sampling data, show no evidence of impacts to surface-water quality attributable to the site. It should be noted that some MGP- and non-MGP-impacted sediments produce sheens when disturbed, thus temporarily exceeding the water-quality standard for oil and floating substances (6 NYCRR Part 703.2). The nature and extent of sheen-producing riverbed materials are discussed in Subsections 8.3 and 8.4, below.

8.1.1 Site Investigation Samples

For the Prioritization Investigation in 1991, ES collected four surface-water samples from the Susquehanna River:

- SW91-1, upstream of the site, at the sediment sample location identified SED-1 (see Figure 3);
- SW91-2, near the outfall of the 66-inch storm sewer at the sample location identified SED-2; and
- SW91-3 and SW91-4, downstream of the site, at the sample location identified SED-3.

During the Task II RI in 1993, BBL reexamined the quality of the Susquehanna River by collecting five new surface-water samples (these sample locations were not surveyed; therefore, they are not shown on the site figure):

- SW93-1, approximately 400 feet downstream of the site's western boundary;
- SW93-2, adjacent to the site, near the Phase I SRI probing point P-2 (see Figure 3);

- SW93-3, near the 24-inch pipe outfall; and
- SW93-4 and SW93-5, approximately 135 and 420 feet upstream of the 24-inch pipe outfall.

Each of the samples from the Prioritization Investigation and Task II RI was submitted for laboratory analysis of VOCs, SVOCs, metals and cyanide. As indicated on Table 8.1, no organic compounds were detected. Several metals were detected, notably iron and aluminum, however, the locations and concentrations of these detections suggest they are unrelated to the site. The analytical data for the Task II RI samples are summarized on Table 14.

In 2001, BBL collected a single surface-water sample to confirm that river water was suitable to use during drilling of the Phase II SRI riverbed borings. BBL collected the sample near the intake of the City of Binghamton's water filtration plant (see Figure 2), and submitted for analysis of BTEX and PAHs. The laboratory reported no detections.

Table 8.1
Surface Water Analytical Results*

Investigation	Sample ID	VOCs	SVOCs	Total Cyanide	Amenable Cyanide
Prioritization Invest.	SW91-1	ND	ND	ND	ND
	SW91-2	ND	ND	97	45
	SW91-3	ND	ND	ND	ND
	SW91-4	ND	ND	ND	ND
Task II RI	SW93-1	ND	ND	ND	ND
	SW93-2	ND	ND	ND	ND
	SW93-3	ND	ND	ND	ND
	SW93-4	ND	ND	ND	ND

* excludes metals; discussed in Subsection 8.1;
Results in ppb; ND= not detected.

8.1.2 Water Filtration Plant Analytical Results

The City of Binghamton Water Filtration Plant, located across the Susquehanna River from the site, conducts a regular sampling program but has not found any site-related constituents in its intake water. In the October 9, 1997 sampling event, plant raw water was analyzed for VOCs, pesticides, and PCBs, and plant finished water was analyzed for selected inorganics. Among the constituents analyzed, no MGP-type constituents were detected. Plant officials have seen no evidence of contamination in their intake water (McNerney, Personal Communication with M. K. Cobb, 1998). The analytical data from the October 1997 sampling event are presented on the Electronic Attachments CD.

8.2 Riverbed Seepage Evaluation

To identify the presence of groundwater seeps in the Susquehanna riverbed, BBL completed a temperature and specific conductivity survey on September 29, 1997. The measurements, taken along three transects of 1,000 feet each and aligned parallel to the north bank of the river, showed no large fluctuations in the measured parameters. A large fluctuation in the measured parameters would have indicated a localized area of significant groundwater discharge into the river. No such area was detected. (The data collected during the survey are presented on the Electronic Attachments CD.)

Prior to sampling, BBL staff measured the water level of the river and the water levels in monitoring wells nearest the river (MW97-11S and MW97-12S), to determine the direction of the hydraulic gradient. As expected, groundwater was found at elevations above the river level, implying net groundwater flow into the river.

The temperature and conductivity of the groundwater near the river showed levels different than those taken in the river water. During the week that the temperature/conductivity survey was conducted, the temperature of the groundwater at monitoring wells MW97-11S and MW97-12S averaged approximately 15°C, whereas readings of the river water ranged between 16.8 and 18.1°C. Specific conductivity of groundwater in these wells during sampling averaged approximately 3 milliseimens per centimeter (mS/cm), whereas readings of the river water ranged between 0.194 and 0.242 mS/cm.

A large-scale groundwater seep would likely have been detected during the river sampling as a sharp increase in conductivity paired with a less dramatic decrease in temperature. Minor fluctuations do occur in the data, but are so slight that they cannot prove the existence of seeps. Though we can conclude from other data sources that groundwater is entering the river, the results of the river survey do not suggest any discreet areas of uncharacteristically rapid discharge. Therefore, groundwater discharge to the river should be considered as diffuse flow.

8.3 Riverbed Probing Results

As noted previously, probing in the Susquehanna River along the former plant site was performed during three separate investigations. The first was done in 1993 as part of the Task II RI, along three riverbed transects totaling 87 individual probing points. These three transects extended from the Tompkins Street Bridge upstream to the 24-inch outfall and ran parallel to the river's north shore (immediately off the bank, 25 feet from the bank, and 50 feet from the bank). The resulting data, presented in Appendix A-4 of the Task II RI (which is included on the Electronic Attachments CD), indicated that riverbed materials were primarily coarse sand and gravel with traces of fine sand and fine sandy clay.

The second probing round was performed during the Phase I SRI and consisted of 10 probing points, approximately 10 feet from the bank between the 24-inch outfall and the former bridge abutment. The purpose of this exercise was to investigate the presence of soft sediment between the two pipe outfalls adjacent to the site and document any sheens observed. No sheens were observed. The probing indicated that the area was largely devoid of sediment, as the riverbed was lined chiefly with gravel and cobbles.

During the Phase II SRI a third round of probing was conducted in three transects running parallel to the north bank of the Susquehanna River (offset 2 feet, 10 feet and 20 feet from the bank). The probing transects were started near the 66-inch storm sewer and extended upstream beyond the site, ending near the location of the former Raney well. For the 108 locations probed during the Phase II SRI, the average and maximum depth of

penetrable material was 1.1 and 6.7 feet, respectively. The maximum depth was noted at a location approximately 70 feet downstream of the 24-inch outfall and 10 feet from the bank. At approximately 60% of all probed locations, the penetrable material was less than 1 foot and at approximately 36% of the locations it was less than 0.5 feet. A summary of the probing observations is presented on the Electronic Attachments CD.

Based upon the probing results for the river, the riverbed material can be described as mostly coarse materials with small pockets of finer grained material adjacent to, and downstream of, the 24-inch outfall and the 66-inch storm sewer. Available grain size distribution data is presented on the Electronic Attachments CD. Distinct sheens were noted at only 12 locations, which were generally near the 24-inch outfall and the 66-inch storm sewer.

8.4 Riverbed Sampling

Sediment and riverbed-material samples were collected and analyzed for various constituents during four separate investigations since 1991, as described previously in Section 5.4. Samples were collected upstream, adjacent to, and downstream of the former MGP site to delineate the extent of site-related constituents. As depicted on Figure 9, the vast majority of locations with sheens or NAPL occurred near the outfalls of the 66-inch storm sewer and the 24-inch outfall, though sheens were found sporadically at points both up and downstream of the site, between SS-15 and SS-1D (Figure 9). A total of 85 samples were collected for chemical analysis from 65 locations in the riverbed.

The individual sample results are presented in Table 9. An evaluation of the data, including discussions related to SVOCs (and particularly PAHs), VOCs (particularly BTEX), cyanide, TPHs, inorganic analytes, TOC, and PCBs are presented in the subsections below.

8.4.1 Assessment of PAHs in the Riverbed

In riverbed samples analyzed for TCL SVOCs, the PAHs were the most-frequently detected constituents. A discussion of the nature and extent of PAHs detected in the Susquehanna River sediments is presented below.

8.4.1.1 Distribution of PAHs

PAHs were detected in 68 of 78 samples analyzed, with a maximum total PAH concentration of 4,230 mg/kg in sample SED-2 taken from 0 – 0.5 ft below sediment surface (bss), near the 66-inch storm sewer (Figure 15). In order to understand the spatial distribution of PAHs in the riverbed, BBL evaluated the data in three dimensions: lateral distribution along the north riverbank, distance from that riverbank, and depth below the riverbed surface. For the data collected, the key findings were:

- Samples containing the higher reported PAH concentrations, the majority of the locations where sheens were noted are clustered around the 66-inch storm sewer and, to a lesser degree, around the 24-inch outfall.

- All sediment PAH concentrations greater than 100 mg/kg were within 40 feet of the bank and those reported at concentrations above 500 mg/kg were between 10 and 20 feet from the bank.

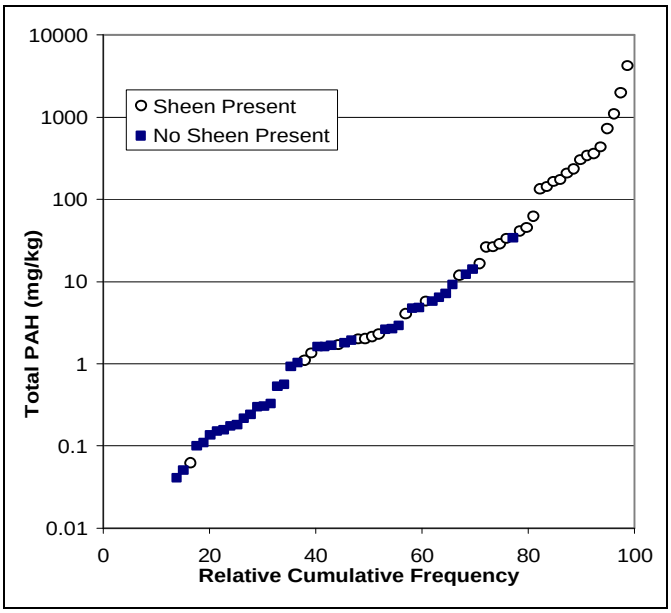
- Most of the PAH is present in the upper 2 feet of the riverbed.

These data suggest that there are sources of PAHs to the river at or near the 24-inch pipe and 66-inch storm sewer. The point-source nature of these two areas is highlighted by the rapid decline in PAH concentrations with increasing distance from the riverbank and in the downstream direction.

As part of the evaluation of PAH distribution, isoconcentration contours for three different total PAH concentrations in the uppermost riverbed samples were approximated (Figure 15). At the request of the NYSDEC, a total PAH isoconcentration line for 4 mg/kg was developed. For purposes of comparison, also presented on the figure are isoconcentration lines for 20 and 100 mg/kg PAHs. As noted, each of the three lines is clustered in the same general areas, with little difference between them. As discussed in Section 8.4.1.2 and noted on Figure 15, the area enclosed by these lines is generally the same areas where sheens were noted.

Other sources of PAHs to the riverbed materials are suggested by the presence of PAHs at concentrations up to 41 mg/kg (for sample SS-12) in samples collected upstream of the site. As described below, the laboratory data were evaluated to help identify potential multiple sources of PAHs to better distinguish site-related impacts from background and local (upstream) conditions.

Figure 8.1 Frequency Distribution of Total PAHs in Sediment



8.4.1.2 Correlation of Sheens with PAH Detections

BBL looked for sheens during all riverbed probing and sampling activities. Observations of sheens are denoted on Figure 15 with a green location symbol. The presence of sheens in the riverbed samples was further assessed by plotting sheen presence versus total sediment PAH concentration.

As noted in Figure 8.1, sheens were predominantly noted in the sediment samples containing the more elevated PAH concentrations. Table 8.2 presents summary statistics for the dataset. Overall, the

geometric average concentration for total PAHs for all samples was 3.3 mg/kg, while the geometric average concentration where sheens were observed was 31 mg/kg, suggesting a co-location of sheens and elevated PAH concentrations. BBL analyzed this potential relationship using a student t-test. Results of the analysis show that a statistical difference exists between the PAH concentrations of samples collected from locations where sheens were and were not observed.

Table 8.2 Correlation between PAH Concentrations and Observed Sheens

	All Samples	Samples without Sheens	Samples with Sheens
Sample Size	78	44	34
Frequency of PAH Detection (%)	87	80	97
Minimum PAH Concentrations (mg/kg)	ND	ND	ND
Maximum PAH Concentrations (mg/kg)	4,230	35	4,230
Median PAH Concentrations (mg/kg)	2.1	0.32	37
Geometric Average (mg/kg)	3.3	0.60	31
Arithmetic Average (mg/kg)	140	2.8	318

8.4.1.3 Potential Sources of PAHs to the Riverbed

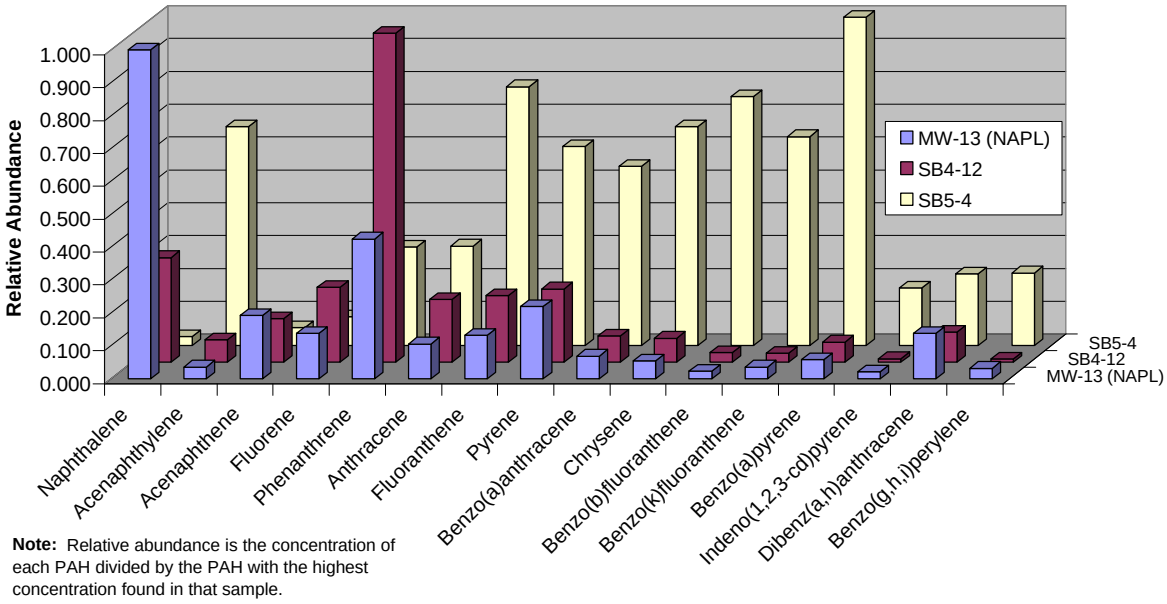
PAHs are ubiquitous in the environment, originating from both naturally-occurring and anthropogenic processes. As noted in section 5.4.1, BBL planned activities to investigate the presence of background PAHs in the many storm sewer outfalls, discharge pipes and upstream Susquehanna River sediment. However, the investigation was suspended due to the presence of an oil sheen on the Susquehanna that was observed at, and extending several miles upstream of, the investigation area on the day sampling was planned.

NYSEG and NYSDEC have agreed to move forward without further background sampling. Using available site data, a source evaluation was performed to assess the potential nature of hydrocarbon sources influencing PAH distributions in the riverbed within and around the site. The review focused on hydrocarbon compositions revealed by the relative concentrations of the target PAHs and the total ion current chromatograms from the Method 8270 gas chromatography/mass spectrometry (GC/MS) full-scan analyses. A series of characteristics were defined for three categories of sources (MGP-related tars, petroleum, and pyrogenic PAHs). Data and chromatograms for each sample were reviewed and observations were recorded for hallmark characteristics of these sources as described below.

MGP-Related Tars

PAHs constitute the predominant hydrocarbon fraction of MGP-related tars. The PAH fraction of unweathered MGP-related tars contains a high percentage of low-molecular-weight (LMW) PAHs: naphthalene, methyl-substituted naphthalenes, acenaphthene and phenanthrene. In addition to these LMW PAHs, MGP residues also contain fluoranthene, pyrene, chrysene, and other high-molecular-weight (HMW) PAHs. As MGP residues are

Figure 8.2. Changes to PAH Composition from Natural Attenuation



Note: Relative abundance is the concentration of each PAH divided by the PAH with the highest concentration found in that sample.

exposed to natural conditions in surface sediments, their PAH composition changes. The LMW PAHs are depleted through a combination of physical-chemical weathering and biodegradation whereas the HMW PAHs are more persistent. The LMW PAHs are differentially depleted according to their aqueous solubility and volatility (both are related to molecular weight); i.e., naphthalene is depleted more rapidly than acenaphthene, which is depleted more rapidly than phenanthrene, etc. The HMW PAHs, while persistent, become less bioavailable over time. The mechanism for reduced bioavailability is believed to be an increase in the sorption, or binding strength between HMW PAH molecules and sediment particles as the residue weathers.

Because the changes in PAH composition caused by natural attenuation in sediments are so readily recognizable, MGP-related tar characteristics were evaluated using the relative abundance of naphthalene, phenanthrene, and fluoranthene. The relative abundance of these three PAHs illustrate progressive stages of natural attenuation through weathering and biodegradation, with a greater abundance of naphthalene and phenanthrene present in the less attenuated samples, and little or no naphthalene present in the more attenuated samples. These changes in PAH composition are illustrated in Figure 8.2.

An additional MGP-related tar PAH compositional feature worth noting is the relative abundance of fluoranthene (Fl) and pyrene (Py). The Fl/Py ratio is an indicator of the temperature of formation of the tar, with lower temperature processes typically yielding an Fl/Py ratio <1 and higher temperature processes typically producing an Fl/Py ratio >1. Figures 8.3 and 8.4 below illustrate both thermal ratios in sediment PAH compositions. This thermal signature ratio was also evaluated as a MGP by-product characteristic.

Figure 8.3. Low-Temperature MGP By-Product PAH Composition

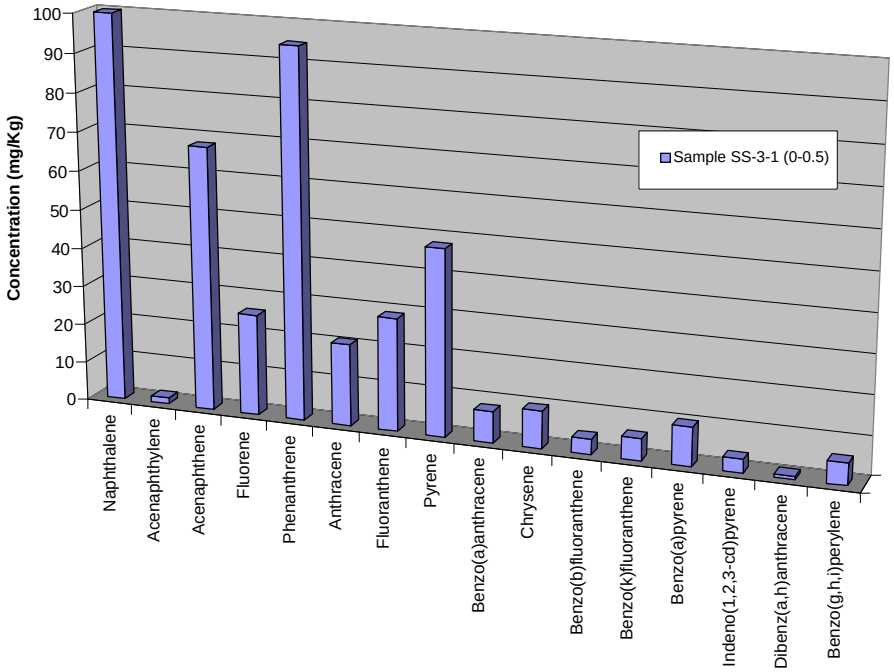
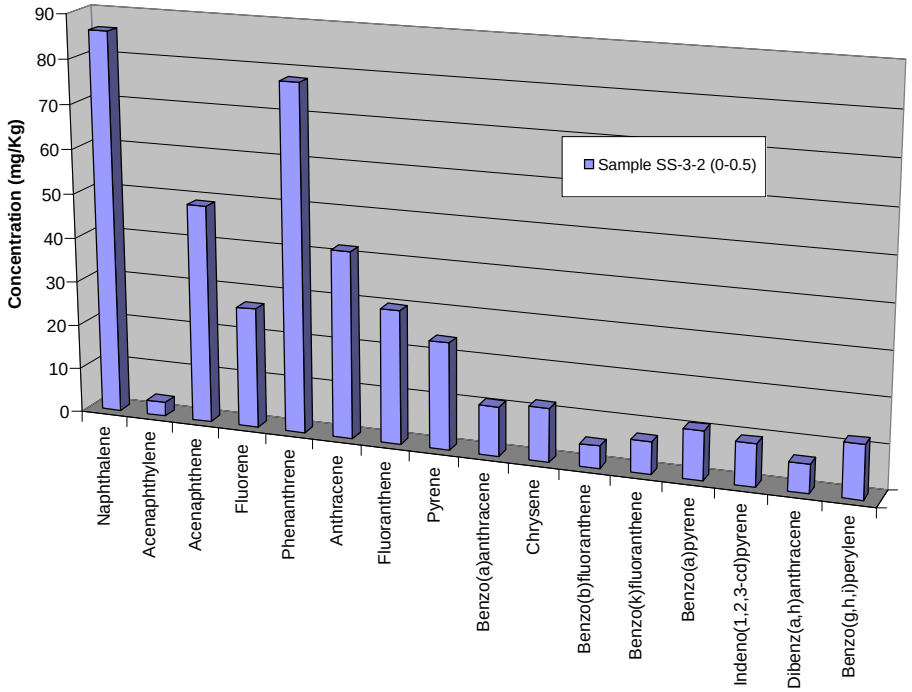


Figure 8.4. High-Temperature MGP By-Product PAH Composition



As summarized in Table 15 approximately 50 percent of riverbed samples containing PAHs exhibited characteristics of MGP-related tars. All of these were located adjacent to, or downstream of, the 24- and 66-inch sewer outfalls. With the exception of 10 of the higher-concentration samples listed in Table 15, varying degrees of weathering/biodegradation were noted.

Petroleum

Although petroleum-derived hydrocarbons include the PAHs found in MGP-related tars, petroleum residue compositions differ markedly from MGP residues. Most petroleum products contain several hydrocarbon fractions, with PAHs comprising much less of the hydrocarbon content than in MGP-related tars. In surface sediments, recent petroleum residues are notable for the "picket fence" pattern produced by the normal-alkanes that define the hydrocarbon range of the petroleum product. For example, gasoline has a lower molecular weight range than kerosene, which is lower than No. 2 fuel oil/diesel, etc. Petroleum compositions are also rapidly altered in surface sediments by natural weathering and biodegradation. As with MGP-related tars, the lower-molecular-weight, more soluble hydrocarbons are preferentially depleted. However, as petroleum residues weather, the relative abundance of persistent complex hydrocarbons increases in the residue, producing a baseline hump in the gas chromatograms of these residues. Also, their PAH composition changes, with the common (regulated) PAHs decreasing in abundance relative to their alkyl-substituted homologues. Distinct petroleum fingerprints may be recognizable in the GC/MS total ion current chromatograms that are the instrument output of the Method 8270 analysis.

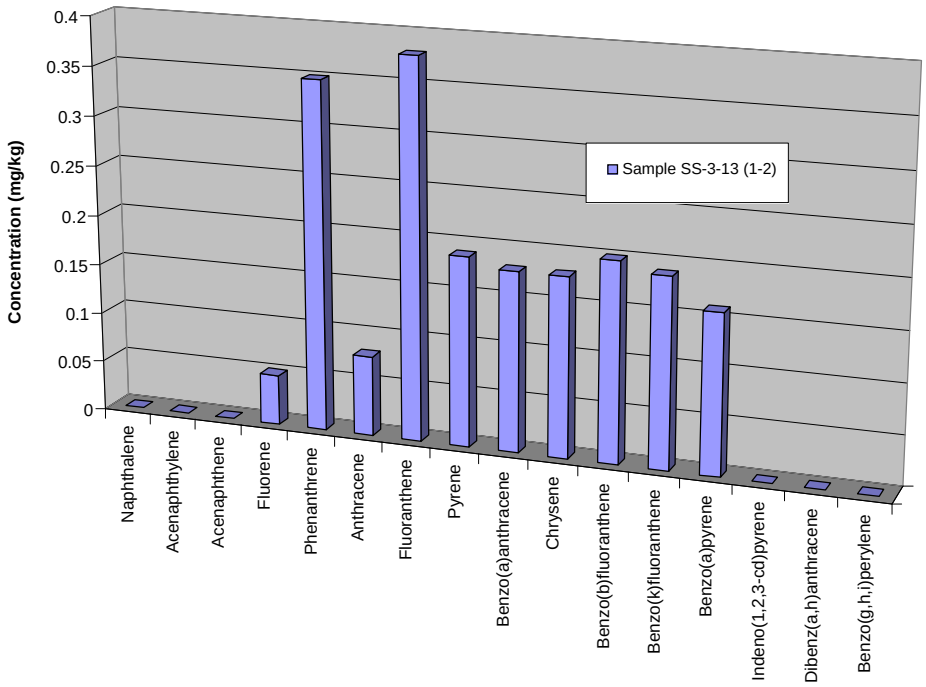
Petroleum characteristics were evaluated from the GC/MS chromatograms to indicate the potential for sources of hydrocarbons unrelated to MGP tar, multiple sources (MGP tars and petroleum), and possibly blended sources (mixtures of tar in a distillate petroleum carrier). The chromatographic features that were monitored as petroleum characteristics were the baseline humps in the GC/MS chromatograms corresponding to the hydrocarbon ranges of kerosene, No. 2 fuel/diesel, and waste/lube oil. In summary, approximately 20 percent of the locations sampled showed evidence of petroleum-related PAH components (Table 15). These samples were located upstream, adjacent to and downstream of the 24- and 66-inch sewer outfalls (Figure 8.6).

Background Pyrogenic PAHs

Although a rigorous background sampling program was not implemented, the samples that were analyzed were examined for background characteristics. PAHs are natural products that are formed through a variety of processes, including formation of petroleum, diagenesis through bacterial transformation of organic matter, and incomplete combustion (pyrolysis) of petroleum, coal and wood (Neff 1979). PAHs formed through pyrolysis (i.e., pyrogenic PAHs consisting of high-molecular-weight [HMW] PAHs) are ubiquitous and typically constitute the PAH background in urban and industrial area sediments (Youngblood and Blumer, 1975; LaFlamme and Hites, 1978; Gscwend and Hites, 1981; Tan and Heit, 1981; Tissier and Saliot, 1983; Volkman et al., 1992; and Tolosa et al., 1996). Typically, these background PAHs are introduced into sediments through atmospheric deposition of soot particles, stormwater discharges, and surface runoff of soot and road dust.

Background pyrogenic PAH compositions consist primarily of HMW PAHs, with little or no low-molecular-weight (LMW) PAHs, with the exception of phenanthrene and anthracene. An example of a sediment sample containing background pyrogenic PAH compositional features is depicted in Figure 8.5 below.

Figure 8.5. Background Pyrogenic PAH Composition



It should be noted that advanced weathering/biodegradation of MGP residues produce PAH compositions that are very similar to pyrogenic background: HMW PAHs with little or undetectable presence of LMW PAHs. For this reason, sources of low-concentration residues (e.g., less than 1 mg/kg total PAH) are very difficult to distinguish through a screening evaluation. Because the limits on the analytical sensitivity make it difficult to evaluate the source of residues with very low PAH concentrations, this evaluation categorizes samples with total PAH less than 1 mg/Kg as background.

At low concentrations, samples may often still be evaluated by their Fl/Py ratio, discussed above. This ratio is typically greater than 1 in high-temperature pyrogenic residues (e.g., soot in urban runoff and atmospheric fallout [McCarthy et al. 2000]) as well as in high-temperature-process tars (Emsbo-Mattingly 2001). By contrast, a ratio less than 1 is not typical for PAHs derived from background runoff/fallout sources. Though inconclusive by itself, evaluating this ratio provides an additional line of evidence distinguishing background characteristics and MGP by-product characteristics.

In Table 15, all samples with total PAHs less than 1 mg/Kg and measurable Fl/Py had a ratio greater than 1. All samples with total PAHs greater than 1 mg/Kg, lacking petroleum characteristics, and having a Fl/Py ratio less than 1 were categorized as having "MGP By-Product Characteristics." All samples with total PAHs greater than

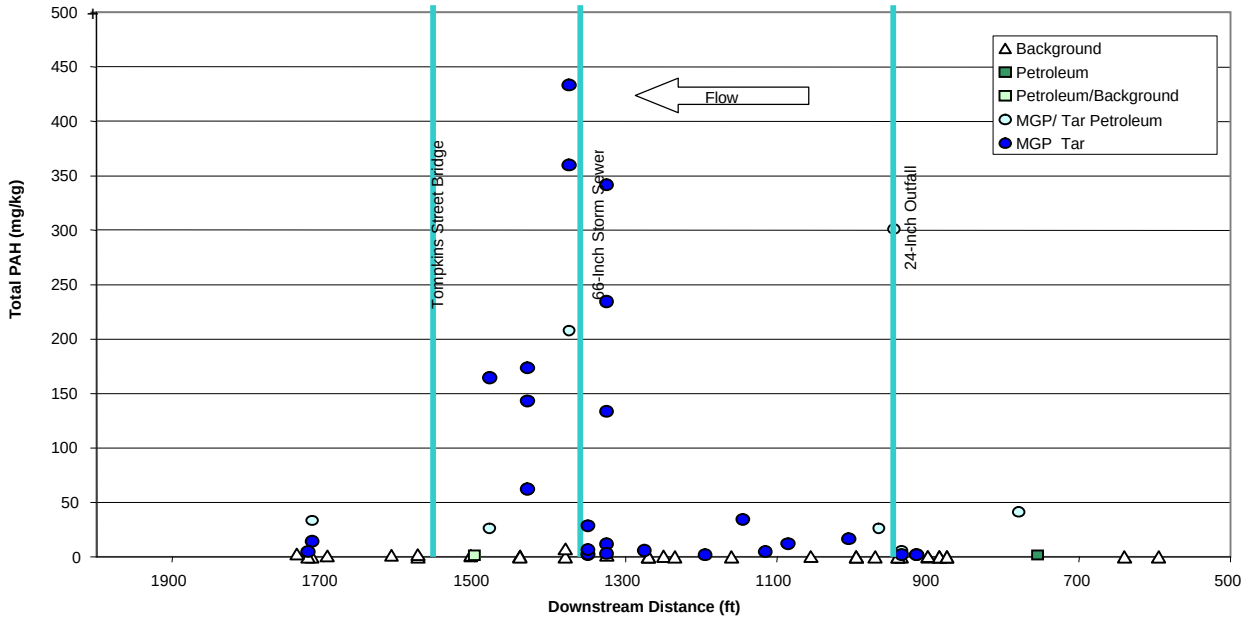
1 mg/Kg, lacking petroleum characteristics, and having a Fl/Py ratio greater than 1 were categorized as having 1) "MGP By-Product Characteristics" if there was additional evidence of a tar composition, or 2) "Background Characteristics" if there was no additional evidence of a tar composition.

In summary, approximately 40 percent of the locations sampled were characterized as having background pyrogenic PAH components (see Table 15). These samples were located upstream, adjacent to and downstream of the 24- and 66-inch sewer outfalls.

Source Evaluation Summary

Based on a review of PAH compositions and sample chromatograms, the apparent source(s) of each sample were noted in Table 15. These apparent sources are plotted as a function of total PAH concentration and river location in Figure 8.6.

Figure 8.6
PAH Concentration and Sources by Downstream Distance



Detections of (PAHs) from MGP-related tars are predominantly clustered around the 66-inch storm sewer, with less frequent detections near the 24-inch pipe outfall, and downstream of the 66-inch storm sewer as far as SS-1D (Figure 15). Additional sources include the petroleum-related and background PAHs. Based upon the source evaluation, approximately 50 percent of the sampled locations were characterized as being petroleum-related or background pyrogenic PAH components. Background PAH characteristics were noted among the samples taken along the entire length and area of the portion of river that was investigated. Petroleum-related PAHs were noted at the most upstream location sampled and co-mingled with background PAHs both above and below the Tompkins Street Bridge. Some of these petroleum-related residues are likely responsible for some of

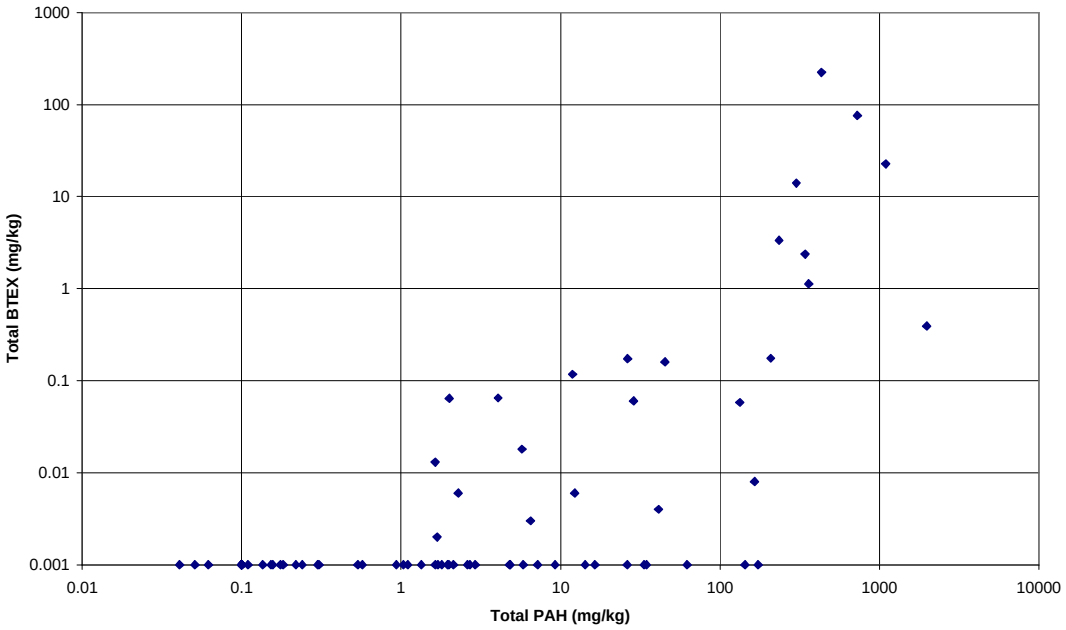
the sheens that were noted during the site investigations. Additional upstream sampling would be required to better evaluate the relative contributions of background PAHs to sediments adjacent to and downstream of the site.

8.4.2 VOC Data

For those riverbed samples analyzed for TCL VOCs, only BTEX was detected. For this reason, the discussion below is limited to BTEX.

One or more of the BTEX compounds were detected in 27 of 75 samples analyzed, with a maximum reported total BTEX concentration of 224 mg/kg noted at location SS-3-2 (near the 66-inch storm sewer) at a depth interval of 0 to 0.5 feet bss. Of the 27 samples in which BTEX was detected, 20 samples had BTEX concentrations less than 1 mg/kg, and 15 had concentrations less than 0.1 mg/kg. The arithmetic average concentration of BTEX for all samples analyzed was 4.6 mg/kg, and was only 7.2 mg/kg for the samples in which BTEX compounds were actually detected. To further assess the distribution of BTEX in riverbed samples, Figure 8.7 graphically compares the concentration of BTEX with the concentration PAHs in the riverbed samples. As shown, samples with low, presumably background concentrations of PAHs (i.e., less than 1 mg/kg) do not typically contain BTEX. With higher concentrations of PAHs, BTEX becomes more frequently detected, though typically at lesser concentrations.

Figure 8.7
Relationship between BTEX and PAH



8.4.3 Cyanide

Total cyanide was detected in only 2 of 76 samples. The highest concentration of cyanide (19.6 mg/kg) was found at location SS-1 (Figure 15) in a sample from 0 to 0.9 ft bss, collected in 1993. Subsequent sampling in the area of SS-1 (which is located downstream of the Tompkins Street Bridge) did not confirm the presence of cyanide in the area. The other detection of total cyanide (at 3.1 mg/kg in a sample from 1- to 2-ft bss at location SS-12-4) was from a location upstream of both the site and the 24-inch outfall.

8.4.4 Total Petroleum Hydrocarbons

A total of 25 samples from the 1993 and 1997 sampling events were analyzed for total petroleum hydrocarbons (TPH). In six samples, TPH was detected, ranging from 96 to 7,100 mg/kg. Two of the samples were characterized as 10W40 oil, and four were characterized as #4 fuel oil.

8.4.5 Inorganics

In the 1993 and 1997 sampling, 18 samples were also analyzed for several inorganics (metals) on the Target Analyte List. Two of these samples were taken at background locations upstream of the site. A number of the samples had quantifiable concentrations. The inorganic analytes are discussed further in Section 9. Following a review of the 1993 and 1997 inorganics data, it was decided (with NYSDEC concurrence) that the subsequent 2001 investigation would not include analysis for inorganics except cyanide.

8.4.6 Total Organic Carbon (TOC)

A total of 40 samples have been analyzed for TOC. Results ranged from 0.18% to 4.81%, with an arithmetic average of 1.38%.

8.4.7 Polychlorinated Biphenyls

A total of 10 riverbed samples were analyzed for PCBs. None were detected in any of the samples.

8.5 Fate and Transport

BBL's evaluation of sediment transport focused on the potential for sediment affected by the site to be transported upriver, to the city's Water Filtration Plant intake. A hydraulic model of the river was used to

simulate water-column sediment and constituent transport under a variety of conditions. The potential for ice-jams to occur on the river was evaluated, because such phenomena might affect sediment transport in the river.

8.5.1 River Hydraulic Model

BBL estimated the potential movement of river sediment from near the site to the city's Water Filtration Plant intake through the use of a river hydraulic model. The theoretical model simulated constituent movement through the water column under the premise that if the water column adjacent to the site did not move toward the intake, then sediment could not be transported (via the water column) in that direction. The model took into account the natural dilution and dispersion processes present in the river to evaluate the potential for sediments affected by MGP constituents to be drawn toward the intake. Because the intake is located slightly upstream and across the river, it is highly unlikely that constituent-containing sediment could be drawn to the intake even under unrealistically conservative conditions (i.e., extremely low flow and high winds). The model examined the worst-case scenario by treating the system as a point source entering a lake and predicting the subsequent plume distribution. Treating the Susquehanna River as a lake simulates extreme low-flow conditions and therefore adds a strong measure of conservatism to the model. The model took into account channel geometry, advection due to flow or wind driven currents, and characteristics of both the water and the constituents of concern.

The plume geometry and dilution characteristics were simulated using the Cornell Mixing Zone Expert System (CORMIX; Jirka and Hinton, 1992). The CORMIX model uses ambient river geometry, flow, and density data to predict the dilution and plume characteristics of a submerged point source discharge. CORMIX was developed for, and is supported by, the USEPA primarily for judging discharge compliance with regulatory mixing zone constraints. By making conservative assumptions with regard to flow characteristics and constituent releases from the sediment, the CORMIX model is applicable to the Susquehanna River to assess the characteristics of a discharge emanating from the sediment surface.

To simulate low-flow conditions, the water in the river was assumed to be approximately 3 feet deep and 400 feet wide. The discharge point was assumed to be approximately 10 feet from the north shore of the river on the river's bottom. Advective river velocity was assumed to be 0.03 meter per second (0.001 foot per second), and the discharge velocity 0.0001 meter per second (0.0003 foot per second). To estimate the constituent concentration in the discharge, a steady-state discharge of one gram per day was divided by the volume of discharge per day (3.28 cubic meters) for a concentration of 0.0003 parts per billion (ppb). The hypothetical discharge water was assumed to be the same density and temperature as the river water, and the constituent discharged was modeled as 100 percent conservative (i.e., no decay). These conditions were used by the CORMIX model to predict the resulting steady-state plume dimensions, approximate travel times, and dilution characteristics.

The results of this model simulation represent extreme low-flow conditions in the Susquehanna River, with a minor yet still extant downstream advective component of transport. The result is a predicted constituent plume that is rapidly diluted, attaches to the north river bank, and is not likely to impact the water or sediment quality of the south side of the river for miles downstream. During steady-state conditions, the plume is completely vertically mixed approximately 12 feet downstream of the discharge. At that point the dilution at the center of the plume is 106 to 1, and the concentration is 0.000003 ppb. The centerline of the plume will have the least dilution and the highest concentration; as the plume spreads out, the constituent concentration at the edge of the plume can be considerably less than at the centerline. At a distance of approximately 56 feet downstream, the centerline dilution increases to 367 to 1 and the predicted concentration drops to 0.0000008 ppb. The plume at this point is approximately 20 feet wide and attaches to the north bank of the river. Far-range model predictions for low-flow conditions include a dilution ratio of approximately 3,300 to 1 and a constituent concentration of 0.00000009 ppb at a point approximately 3.1 miles downstream. Predicted time of travel for the 3.1 miles is slightly over 19 days, which illustrates the extreme low-flow assumption. It is unlikely that, during these conditions, a significant amount of sediment transport could occur.

The CORMIX model predicts the constituent plume based on turbulent diffusivity, which in practice incorporates such factors as hydrologic mixing and eddy diffusivity, and is typically orders of magnitude greater than molecular diffusion. Turbulent diffusivities in the horizontal and vertical directions are provided in the CORMIX output, and, for the assumed conditions are 0.00055 meters squared per second (m^2/s) and 0.00044 m^2/s, respectively. To evaluate the discharge under truly stagnant conditions, such as a lake, these values can be used in the governing advective-diffusion equation based on the conservation of mass to estimate the steady-state concentration of a constituent at a given distance from the source. The solution for the advective diffusion equation is provided in *The Handbook of Hydrology* (Maidment, 1993), and with the advective terms zeroed out is as follows:

$$C_{(x,y,z)} = q / 4x\pi(E_Y E_X)^{½}$$

where: C is the concentration (mass/volume);
q is the mass loading (mass/time);
x is the distance from the source; and
E_Y and E_X are the horizontal and vertical diffusivities (area/time).

Assuming a one gram per day loss of the constituent from the sediment and the diffusivities from the CORMIX results, the approximate concentration of a constituent across the river near the intake (approximately 122 meters away from the source) is computed to be 0.00000002 ppb at steady-state conditions with no advective transport. This concentration reflects a dilution ratio of more than 20,000 to one in the absence of advective transport, and indicates that there is little likelihood that a dissolved constituent from the sediment on the north shore of the river could be transported across and upstream to the vicinity of the water intake in concentrations quantifiable using standard analytical methods. There remains even lesser possibility that sediment or particulate-bound constituents could be transported in the absence of advective transport.

These analyses illustrate the diffusive transport of constituents under the extremely conservative conditions of very low to no flow in the Susquehanna River; however, USGS flow data collected from the gauge at Conklin, New York (USGS No. 1503000, approximately 2 miles upstream) indicate a daily average flow of 3,586 cfs, which will increase the advective transport and dilution ratio several orders of magnitude. The lowest flow ever recorded at the gage was 85 cfs in October 1964. Assuming the same channel dimensions as above and an average water depth of three feet, a flow of 85 cfs would correspond to a velocity of 0.071 feet per second, approximately 20 times the velocity assumed in the CORMIX model. It is evident that even with low flow and velocity, advective transport is more then adequate to prevent the constituents in the sediment from diffusing across the river to the vicinity of the water intake.

The effect of wind will not impact the general conclusions of the advective-diffusive transport analysis. In, general, wind over water bodies will cause resistance of water surface velocity in flowing water, and will serve to cause wind-induced circulation in stagnant waters. Wind in itself cannot cause advective flow throughout the depth of the water column. In the case of moving water, a wind in the opposite direction of flow will cause flow resistance or even reversal at the surface, but only with a corresponding increase of water velocity at depth, which would further increase the dispersion and advective transport of a sediment-derived pollutant. As the wind direction changes to become perpendicular to water flow, its effect on water velocity decreases. The water in the Susquehanna River at the site was not stagnant; therefore, any wind circulation patterns would also have a net downstream advective component that would prevent constituent transport directly across the river.

8.5.2 Ice-Jam Evaluation

To evaluate the effects, if any, of ice jams on water-column transport of Susquehanna River sediment near the site, BBL conducted a historical investigation of ice-jam occurrence, and NYSEG staff documented icing conditions during the winter of 1997-1998.

BBL contacted the U.S. Army Corps of Engineers, the city of Binghamton, and the USGS; none of these entities had records indicating the occurrence of ice-jams in the river near the site. No entities were identified that regularly collect river-icing data for the stretch of the river near the site.

To determine whether ice-jamming was occurring downriver and affecting the river near the site, NYSEG staff documented icing conditions and measured the stage of the Susquehanna River three times per week during the 1997-1998 winter season beginning on January 19, 1998, and ending on March 20, 1998. By comparing the river stage to river discharge (as recorded by the USGS at the Conklin, NY station), the occurrence of ice jamming could be identified, since an ice jam would result in a backup of river water behind it, causing the stage of the river to be higher than the stage of similar discharges in the absence of ice jamming. Analysis of river stage and discharge data shows no anomaly that would represent ice jamming. Stage and discharge data are presented in Table 13.

9. Risk Evaluation

9.1 Overview

This section presents the human health evaluation and the ecological assessment for the NYSEG Court Street Site. The human health evaluation is a semi-quantitative evaluation that identifies potentially complete exposure pathways and quantifies potential risks for the most likely pathways. The ecological assessment is consistent with NYSDEC (1994) guidance for conducting a Fish and Wildlife Impact Analysis (FWIA). The FWIA characterizes site resources, identifies potential ecological receptors, and provides a preliminary evaluation of potential effects. Collectively, the information from the human health evaluation and the FWIA will be used to assist in developing remedial strategies for the site.

9.2 Human Exposure Evaluation

The purpose of this section is to evaluate the potential for human exposure to chemicals of potential interest (COPI) detected in environmental media found on and near the site. The evaluation is based on site-specific information on the environmental setting, current and foreseeable future land uses, and analytical data for the site. Information collected during the various phases of site investigation, including analytical data, form much of the basis for the conclusions rendered in this evaluation.

9.2.1 Environmental Setting

The NYSEG Court Street Site is located in the City of Binghamton. The site is bordered to the north by railroad tracks, which are elevated on a gravel embankment or concrete pilings. The site is bordered to the east by leased commercial/industrial property and to the west by a concrete retaining wall and Brandywine Avenue. To the south, the property is bounded by Court Street and the Susquehanna River. Approximately 90% of the site proper is unvegetated and covered with gravel or asphalt. The site and surrounding land use is predominantly industrial, and there are no residential areas adjacent to the site.

9.2.2 Constituents of Potential Interest

This evaluation defines COPI as constituents detected in one or more samples of soil, groundwater, surface water, riverbed materials, or effluent and sediment from storm sewers, regardless of whether they are site-derived. The available data indicate that the principle COPI for the site are PAHs; however, other constituents including VOCs have been detected on site.

Although COPI have been detected in soil, groundwater, surface water, riverbed materials, and storm-sewer sediment and effluent, the mere presence of COPI is not necessarily indicative of site-related activities nor of unacceptable risks to human health. Whether the occurrence of a chemical presents an unacceptable risk to human health depends upon variables such as dose, exposure route, and the frequency and duration of exposure.

9.2.3 Exposure Pathways

An initial step in evaluating potential human exposure is identifying complete exposure pathways. There are three elements necessary for an exposure pathway to be complete: 1) COPI are present in environmental media, 2) locations exist where human exposure to these media could occur, and 3) routes of exposure exist that could allow COPI to be taken up by the human body (e.g., direct contact through ingestion or dermal contact, or indirect contact via inhalation).

The following subsections present potential exposure pathways and describe the likelihood that such pathways could become complete.

9.2.3.1 Potential Direct Contact with On-Site Soils

The potential direct contact exposure pathway (i.e., ingestion or dermal contact) is not likely to be completed for three reasons. First, fencing and a locked gate secure the site; therefore, only authorized workers have access. Second, NYSEG requires that an OSHA-compliant health and safety plan be prepared prior to any excavation work at the site. Third, an approximately 18-inch thick layer of gravel/clean fill or pavement covers most of the site, effectively isolating workers from exposure to surface soils in the covered areas.

Because a small portion of the site (near SSO-1, SSO-2, and SSO-3) is grass covered, BBL evaluated the potential risks of worker exposure to surface soil in this area by conducting a conservative risk calculation (Table 10). Using the USEPA's standard default worker exposure scenario for soil ingestion (the largest component of total risk), along with the maximum detected PAH and inorganic concentrations detected in SSO-1 (9/15/98), yields a total excess lifetime cancer risk of seven in one million (7E-06) and a hazard index of 0.08. These results indicate that even under an extremely conservative exposure scenario, risks associated with exposure to this area would be considered acceptable by regulatory agencies such as the USEPA (i.e., total excess lifetime cancer risk less than one in ten thousand, and non-carcinogenic hazard index less than one). Factoring in dermal exposure would at most double the risk estimate. Even so, the total risk values would still be well within the USEPA's acceptable range (one in ten thousand to one in one million).

Potential worker exposure to on-site subsurface soils may also occur. Although PAH concentrations in subsurface soils are frequently higher than surface soils, the potential for exposure (and hence risk) is expected

to be relatively low. Specifically, most of the subsurface soil samples with elevated PAH concentrations were collected at depths ranging from 4 to 18 feet, and exposure to soils at this depth would be limited to excavation activities. Excavation activities are typically infrequent and of short duration (especially compared to the 250 days per year for 25 years exposure that was assumed in the surface soil risk quantification). In addition, NYSEG's Health and Safety Plan would address methods to minimize potential worker exposure during excavation activities.

9.2.3.2 Potential Direct Contact with Off-Site Soils

Humans are unlikely to come in contact with off-site soils because most of the area surrounding the site is either paved (Brandywine Avenue, Court Street, and the BMH parking lot) or covered by about ten feet of fill (railroad tracks north of the site). The potential does exist for construction workers to contact subsurface soils when digging along Brandywine Avenue or Court Street. Soil samples collected along Brandywine Avenue (from borings SB-110, SB-111, SB-112) were largely non-detect, and the uppermost 20 feet of soils at nearby monitoring well pair MW97-9 were visually clean. An exception is the soil sample collected from boring SB-111, which had a total PAH concentration of 416 mg/kg (at a depth of 7 to 7.5 feet). BBL attributes the source of PAHs in this sample to the coal and ash that comprised it. Coal and ash were commonly used as fill materials in the past. Most soil samples collected beneath Court Street (i.e., samples SB-105, SB-106, SB-107, and SB-108) had relatively low total PAH concentrations (maximum of 53 mg/kg in sample SB-106). PAH concentrations detected in the off-site soils were generally lower than those detected in on-site soils. Also, potential exposure would be more infrequent than that assumed for on-site workers (250 days per year for 25 years). As such, risks for off-site soils would be even lower and acceptable.

9.2.3.3 Potential Inhalation of Vapor/Particulates

Exposure to COPI released from soil to ambient air is not of concern for on-site workers or other potential receptors. The cover of clean fill, grass, and pavement for both on-site and off-site areas mitigates potential exposure associated with the volatilization of organic compounds or the ejection of inorganics on airborne particulates. Although the inhalation of vapors or particulates may occur in the event of excavation activities, these activities are typically infrequent and of relatively short duration. Also, NYSEG's Health and Safety Plan would address methods to minimize potential exposure during on-site excavation activities (where most of the subsurface PAHs were detected).

9.2.3.4 Potential Exposure to Groundwater and NAPL

Groundwater affected by the site is not used for drinking, nor is it likely to be in future. The municipal water supply for Binghamton and the surrounding vicinity is derived from the Susquehanna River. Direct contact

exposure to groundwater or exposure to NAPL is unlikely to occur during day-to-day activities at the site. NYSEG's Health and Safety Plan would address the air monitoring requirements and personal protective equipment necessary to protect workers in the event that NAPL were encountered.

9.2.3.5 Potential Exposure to Susquehanna River Sediment and Surface Water

Dermal contact with surface water and riverbed materials in the Susquehanna River is possible, but not likely to occur on a frequent basis. Access to the river adjacent to the site is difficult due to the high retaining wall and steep banks; however, there is a small footpath leading down to the river near the Tompkins Street Bridge. Children have been seen fishing in the river, and the presence of fishing line and lures indicates that the area near the pump house is a popular location for fishing. Although a potential receptor might stand in the river while fishing or wading, it is unlikely that riverbed materials will come into contact with the skin. The riverbed materials in the area of the Susquehanna River next to the site are compacted such that an individual tend would stand on top of them rather than sinking beneath them. This surficial layer of riverbed material may also serve to effectively isolate sediment-associated PAHs.

9.2.3.6 Potential Exposure to Storm Sewer Sediment and Surface Water

Low concentrations of COPI were detected in sediment and water samples collected from the storm sewer outfalls. However, due to difficult access and the location of the outfalls, exposure to these media is unlikely. The only likely exposure associated with the storm sewer would be for city workers conducting maintenance on the sewer system. However, worker exposure would be limited by the health and safety procedures that are involved when working in a sewer system (e.g., rubber gloves, high boots, coveralls). Also, PAHs were not detected in water samples from the storm sewer, and storm sewer sediment PAH concentrations were relatively low (maximum detected total PAH concentration of 126 mg/kg).

9.2.4 Summary

Based on an evaluation of the current and foreseeable use of the site and the nature and location of COPI, the most likely exposure pathways are:

- Worker exposure to on-site surface soil and subsurface soil, NAPL, and groundwater: potential exposure would be limited by the relatively low PAH concentrations in uncovered surface soil, and health and safety procedures used during excavation activities.

- Worker exposure for city employees performing maintenance in the storm sewer: potential exposure would be limited by health and safety practices.

- Exposure for people conducting recreational activities along the Susquehanna River: exposure would be limited by physical conditions (e.g., the nature of the sediment bed, depth of water).

9.3 Ecological Assessment Results

9.3.1 Overview

This subsection describes the FWIA that BBL conducted for the site. The objectives of the FWIA were 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. BBL completed the FWIA in accordance with Steps I, IIA, and IIB of the FWIA guidance prepared by the NYSDEC (1994). Results of the FWIA will be used to aid in remedial decision-making.

Step I is performed to characterize the terrestrial and aquatic ecology of the site and surrounding areas to develop a list of potential ecological receptors. The specific components of Step I are: 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.

The specific components of Step II performed for this FWIA are IIA) pathway analysis and IIB) criteria-specific analysis. Step IIA is an exposure pathway evaluation based on the receptor information generated in Step I and the location of site-related constituents. Step IIB is a criteria-specific analysis which compares constituent levels in the environmental media to media-specific numerical screening levels. Step IIB is a screening step used to evaluate the potential significance of the complete exposure pathways and determine if further ecological evaluation is warranted.

9.3.2 Site Description

The site is bordered to the north by railroad tracks, to the east by BMH warehouse and sales offices, to the south by Court Street, and to the west by Brandywine Avenue. The northern border of the site is bounded by railroad tracks elevated on a gravel embankment or concrete pilings. A concrete retaining wall is present along the western border adjacent to Brandywine Avenue. This wall is approximately 4 feet tall at the southwest corner of the site, and slopes down to 1 foot at the northwest corner of the site. The site perimeter is fenced, with the main entrance gate along the southern border off of Court Street. The site itself consists of a gravel storage area with a small patch of vegetation located in the southeastern portion of the site. Approximately 90 percent of the site consists of a level, unvegetated gravel and asphalt lot that is used for equipment storage. A few shrubs, small trees, vines, and herbaceous plants are located along the steep bank bordering the railroad tracks. The Susquehanna River is located on the south side of Court Street.

9.3.2.1 Ecological Characterization

BBL reviewed topographic and regional maps to identify the general physical and ecological features of the site and surrounding areas. Information from the NYSDEC Natural Heritage Program database was also used. A field biologist conducted a walkover of the site and adjacent areas on October 31, 1997 (referred-to hereafter as the "site visit". During the site visit, the biologist assessed habitat value, vegetative covertypes, and associated fish and wildlife species within a 0.5-mile radius of the site. Covertype mapping for the site and surrounding areas was performed by identifying the dominant vegetative assemblages and classifying similar areas into ecological communities. Figure 16 presents a map depicting the site location and natural resources within a 2-mile radius of the site. Figure 17 presents the covertype map. The site visit assisted in the evaluation of wildlife habitat value and human resource value for each covertype, and included an evaluation of the presence of stressed flora and/or fauna.

Vegetative Covertypes

A limited amount of vegetation exists at the site, and is located primarily along the railroad tracks north of the site. The scant vegetation consists primarily of staghorn sumac, boxelder, tree-of-heaven, honeysuckle, grape, Virginia creeper, catnip, knapweed, black raspberry, and other species that are common in disturbed areas. Four general covertypes have been identified within a 0.5-mile radius of the site (see Figure 17). These covertypes are described as:

1) Industrial;
2) Urban;
3) Wooded; and
4) Field.

Coverage of the vegetative types is described as follows.

Industrial Vegetative Covertype - The entire site is described as industrial covertype. This covertype also occurs in a band to the north and west of the site, as well as more limited areas to the east and south. The industrial covertype generally consists of industrial buildings, paved and gravel lots, as well as limited amounts of cultivated vegetation (i.e., lawns, ornamental shrubs, and trees). Opportunistic vegetation exists on unused portions of property (i.e., edges of the site, the railroad embankment). In general, the majority of the land is actively used, and little or no vegetation is present. Plant species observed or expected to occur within the industrial covertype are presented on the Electronic Attachments CD included with this report. These species include, but are not limited to, tree-of-heaven, boxelder, ragweed, knapweed, and Virginia creeper. These species commonly occur in disturbed areas.

Urban Vegetative Covertype - The urban covertype generally consists of residential and commercial sections of the city of Binghamton. This covertype is characterized by commercial or residential buildings, public parks, roads, and parking lots, with less than 40 percent vegetative cover. In general, vegetative cover (lawns, ornamental trees, and shrubs) is greater in residential areas. Plant species observed or expected to occur within the urban vegetative covertype are presented on the Electronic Attachments CD. In addition to those species listed, other ornamental herbaceous and woody species are also expected to occur within this covertype.

Wooded Vegetative Covertype - The wooded vegetative covertype consists of areas where the dominant vegetation consists of mature trees. This covertype is located along the shores of the Susquehanna River, as well as a small area located just upstream of the Water Treatment Plant on the south bank. Plant species observed or expected to occur within the wooded vegetative covertype are presented on the Electronic Attachments CD. These species include, but are not limited to, silver maple, willow, boxelder, sensitive fern, beggars ticks, and grasses.

Field Vegetative Covertype - The field vegetative covertype consists of a small open field where the dominant vegetation is grasses and forbs. This covertype is located to the southeast of the site, east of the Water Treatment Plant. Plant species observed or expected to occur within the field vegetative covertype are presented on the Electronic Attachments CD. These species include, but are not limited to, goldenrod, blackberry, aster, Queen Anne's lace, and grasses.

9.3.2.2 Surface Waters

The main surface water near the site is the Susquehanna River, which is located just south of the site, flows westward and averages about 400 feet in width. The river bank consists of anthropogenic features (e.g., concrete retaining walls, etc.) and natural river banks. Vegetation growing along the natural river banks includes silver maple, willow, red-osier dogwood, grasses, asters, vervain, and other miscellaneous plants.

The NYSDEC best usage classification for the Susquehanna River is "Class A." According to New York Regulations Title 6 Part 701.6, the best usages for "Class A" streams are as a source of water for drinking, culinary or food processing purposes, primary and secondary contact recreation, and fishing. "Class A" waters shall also be suitable for fish propagation and survival. Currently, the river is used as a source of drinking water, for fishing and other recreational activities, and supports fish propagation.

Wetlands

Based on the New York State Freshwater Wetlands Maps for the Binghamton East, Binghamton West, Chenango Forks, and Castle Creek quadrangles (NYSDOT, 1984), one New York State regulated wetland is located, at least in part, within a 2-mile radius of the site. Wetland CC-11 is located partially within the 2-mile

radius of the site. Wetland CC-11 is located north and hydraulically upstream of the site. As such, it is expected to be hydrologically isolated from any site conditions.

9.3.2.3 Fish and Wildlife

In general, the wildlife species inhabiting or using the site are likely to consist of common species typical of urbanized and disturbed areas in New York. During the site visit, the only wildlife observed near the site was a seagull. No threatened/endangered species or critical habitats were observed during the site visit. The potential fish and wildlife species inhabiting each of the covertypes are described in the following sections.

Industrial Vegetative Covertype - The site itself, as well as a significant portion of the surrounding land, is classified as an industrial vegetative covertype. Most of the area is covered with buildings, pavement, or gravel. Due to the sparse vegetation and limited habitat of this covertype and the on-going level of human activity and disturbance, very few wildlife species are expected to inhabit the industrial areas. Furthermore, wildlife access to the site itself is limited due to a fenced perimeter and surrounding urban land uses. The limited number of wildlife species that may utilize this covertype are presented on the Electronic Attachments CD. These species include rock dove, house sparrow, gray squirrel, and mice. In general, the limited number of species inhabiting or using this covertype is likely to consist of common species capable of utilizing urbanized or disturbed areas in New York State.

Urban Vegetative Covertype - The urban vegetative covertype has limited vegetation and habitat capable of supporting a variety of wildlife species. Those species that utilize this covertype generally consist of species that are capable of utilizing habitats that are created by urban landscapes. Wildlife species observed or typical of the urban vegetative covertype are presented on the Electronic Attachments CD. These species include, but are not limited to grey squirrel, mice, American robin, rock dove, house sparrow, and house finch.

Wooded Vegetative Covertype - The wooded vegetative covertype is present as a narrow border along some of the banks of the Susquehanna River and is also present in a small area to the east of the Water Treatment Plant. Wildlife species typical of wooded vegetative covertypes are presented on the Electronic Attachments CD. These species include, but are not limited to, gray squirrel, mice, red-eyed vireo, baltimore oriole, American robin, veery, and downy woodpecker. Some of the typical woodland species such as raccoon, striped skunk, and whitetail deer may not use this covertype due to its relatively small size and surrounding urban land uses.

Field Vegetative Covertype - The field vegetative covertype is present as a small field to the east of the Water Treatment Plant. Wildlife species typical of field vegetative covertypes are presented on the Electronic Attachments CD. These species include, but are not limited to, cottontail rabbit, mice, bobolink, song sparrow, and swallows. Larger mammals such as whitetail deer, raccoon, and striped skunk may not use this covertype due to its relatively small size and surrounding urban land use.

Susquehanna River - Fish and wildlife species typical of the Susquehanna River habitat are presented on Electronic Attachments CD. These species include, but are not limited to, beaver, otter, turtles, water snakes, smallmouth bass, walleye, sunfish, and minnows. In general, fish and wildlife species inhabiting or using this covertype are likely to be common species adapted to riverine systems.

9.3.2.4 Threatened/Endangered Species and Significant Habitat

No threatened or endangered plant or animal species were observed during the site visit. BBL requested reviews of USFWS records and NYSDEC Natural Heritage Program files to assist in evaluating sensitive species or habitats near the site. The USFWS records indicated that no endangered or threatened species are known to exist near the site (Stilwell, 2002). The NYSDEC Natural Heritage Program files revealed that one endangered vascular plant, one endangered animal species, and one special concern animal species have been recorded to within a 2-mile radius of the site (Mackey, 2002). These threatened, endangered, and special concern species and their respective occurrences are as follows:

- Peregrine falcon (*Falco peregrinus*), a state endangered bird, was recorded in the summer of 2000 as nesting in a building located within the city of Binghamton, approximately 0.75-mile southwest of the site;

- Downy wood mint (*Blephilia ciliate*), a state endangered vascular plant, was recorded historically (pre-1889) as occurring in Ely Hill, Binghamton, which is located north of the Chenango River and the site; and

- Pygmy snaketail (*Ophiogomphus howei*), a state special concern insect, was recorded historically (no date provided) as occurring along the Susquehanna River in Binghamton.

As discussed in subsection 4.5.5.1 (Pathway Analysis), riverbed materials represent the only potentially-complete exposure pathway for biota (specifically benthic macroinvertebrates and fish) to site-related constituents. As such, none of the species listed above would be susceptible to potential impacts from site-related constituents.

9.3.2.5 Observations of Stress

BBL's biologist did not observe evidence of stressed vegetation or negative impacts on wildlife was not observed for the site or areas adjacent to the site during the site visit.

9.3.3 Fish and Wildlife Resource Values

Step IC of the FWIA consists of an assessment of 1) the general ability of the area within 0.5 miles 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.

9.3.3.1 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 human disturbance; and
- **High Value**: Critical habitat for rare species and/or extensive undeveloped habitat supporting a great diversity and abundance of wildlife without functional constraints imposed by human disturbance.

Industrial Vegetative Covertype - The entire site is described as industrial vegetative covertype. The site is mostly gravel, and includes small, scattered areas of vegetation. The industrial vegetative covertype also occurs in a band to the north and west of the site, as well as more limited areas to the east and south. The covertype provides inadequate food, shelter, and nesting areas for most species. The high level of human activity and disturbance also limits the potential wildlife usage. As such, the industrial vegetative covertype offers no value to wildlife.

Urban Vegetative Covertype - The urban vegetative covertype occurs to the northeast, south, and west of the site. This covertype has more vegetation than the industrial covertype, but the vegetation present is usually limited to lawns and ornamental plantings of trees, shrubs, and herbaceous plants. This covertype is also subject to a high degree of human disturbance, and also offers limited food and cover for wildlife species. The only wildlife species expected to regularly utilize this habitat are those that are urban-adapted. The urban vegetative covertype offers low value to wildlife.

Wooded Vegetative Covertype - The wooded vegetative covertype is located along most of the banks of the Susquehanna River as a narrow border, and is also present as a section of woods located to the east of the Water Treatment Plant. This covertype has natural vegetation, and offers food and cover for a variety of woodland animal species. This covertype offers adequate food, cover, and shelter for a variety of wildlife species, but is subject to periodic human disturbance. Due to human disturbance of this area and surrounding urban land uses, it only offers low to moderate value to wildlife.

Field Vegetative Covertype - The field vegetative covertype is present as a small field to the east of the Water Treatment Plant. This covertype has natural vegetation, and offers food and cover for a variety of field animal species. However, this area is located near a residential area, and is subject to human use. This covertype offers adequate food, cover, and shelter for a variety of wildlife species, but is subject to periodic human disturbance. Due to the relatively small size of the area and the human disturbance from surrounding urban land uses, this covertype only offers low to moderate value to wildlife.

Susquehanna River - The Susquehanna River is located south of the site. The Susquehanna River has natural vegetation present along much of its banks. The river is relatively undisturbed, and offers adequate food, cover, and shelter for a variety of aquatic and terrestrial organisms. This covertype offers moderate value to wildlife.

9.3.3.2 Value of Resources to Humans

The site itself consists of a gravel storage area with a small patch of vegetation (lawn) located in the southeastern portion of the site. The site perimeter is fenced so public access is limited. As such, the on-site resources are minimal, and have no value to humans. Current human use of fish and wildlife resources near the site are associated with the Susquehanna River. Activities associated with the river include recreational boating, fishing, and wildlife observation. These uses are likely to remain consistent in the future, and are not likely to be affected by activities or conditions at the site.

9.3.4 Applicable Fish and Wildlife Regulatory Criteria

The following New York State laws, rules, regulations, and guidelines are applicable to this FWIA.

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

- 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.

- Guidelines
  - NYSDEC Division of Fish and Wildlife document entitled "Technical Guidance for Screening Contaminated Sediment," dated January 1999.

9.3.5 Impact Assessment

Step II of FWIA includes an impact assessment to determine the impacts, if any, on fish and wildlife resources. This impact assessment includes a pathway analysis (Step IIA), and a criteria-specific analysis (Step IIB).

9.3.5.1 Pathway Analysis

The objective of the pathway analysis is to identify constituents of interest associated with the site, and to evaluate potential pathways by which fish and wildlife receptors may be exposed. A complete exposure pathway exists if there is a source, a potential point of exposure, and a viable route of exposure and receptor at the exposure point. If any one of these elements is missing, then the pathway is not complete and exposure cannot occur. If no fish or wildlife receptors or complete exposure pathways are present, then potential impacts to resources are considered to be minimal. If a "minimum impact" conclusion results from Step IIA, then it is not necessary to continue with further steps of the FWIA.

Potential media of interest associated with the site include surface water, riverbed materials, groundwater, and surface soil. Potential pathways of exposure associated with these media are discussed in the following sections.

Surface Water – As described in Section 8.1, no organic compounds were detected in river-water samples collected during the various phases of investigations described in this report, and concentrations of inorganic constituents were generally similar in samples collected upstream, downstream, and adjacent to the site. When disturbed, some MGP- and non-MGP-impacted sediments produce temporary sheens. Based on these findings, there appears to be no effect of the site upon the quality of water in the Susquehanna River, and therefore no

potential exposure for fish and wildlife to site-related chemicals in surface water, except briefly when sheen-producing sediments are disturbed.

Riverbed materials – Constituents detected in riverbed materials include VOCs, SVOCs, and inorganics. Exposure may occur to fish and benthic organisms residing in or near riverbed materials. In addition, wildlife could potentially be exposed to riverbed materials constituents via direct contact or ingestion. Because a complete exposure pathway may exist, riverbed materials are evaluated in Subsection 9.4.5.2 - Criteria-Specific Analysis.

Groundwater – Constituents detected in groundwater include VOCs, SVOCs, and inorganics. There are no groundwater seeps at the site, and exposure for wildlife to groundwater would only occur if the animal burrowed down to the water table. However, given that the minimum depth to groundwater at the site is approximately 7 to 8 feet, burrowing animals are not likely to burrow down to the water table. Trees present at the site could root deep enough to be exposed to groundwater, but no signs of stressed vegetation were observed at the site. As such, complete exposure pathways do not exist for groundwater.

Surface Soil – As described in Section 7.3.3.2, site-related constituents exist in the surface soils at the site; however, these soils represent only about 10 percent of the site. Either gravel or pavement covers the balance of the site. Wildlife resources could potentially be exposed to surface soils via direct contact and ingestion of organisms that live in the soil (e.g., earthworms). However, the terrestrial habitat of the site for wildlife is extremely limited. Due to the limited wildlife habitat at the site and the extensive gravel cover, wildlife exposure to site soils is not likely to exist.

9.3.5.2 Criteria-Specific Analysis

Because the pathway analysis identified the potential for a complete exposure pathway for riverbed materials, BBL performed a criteria-specific analysis to evaluate the significance of potential complete exposure pathways to ecological resources. This assessment involved comparing constituent concentrations detected in riverbed materials to sediment screening levels found in the NYSDEC document entitled "Technical Guidance for Screening Contaminated Sediments" dated January 1999. For organic compounds, there are three types of ecological risk-based screening levels for sediment: 1) protection of benthic aquatic life from acute toxicity, 2) protection of benthic aquatic life from chronic toxicity, and 3) protection of wildlife from bioaccumulation. Screening levels have not been developed for all constituents; therefore, BBL used other sediment-screening values from the Ontario Ministry of Environment (1993) when NYSDEC screening levels were not available. If riverbed-material concentrations are below screening levels, it is assumed that there is a minimal potential for adverse effects to the resource. However, due to the conservative nature of these screening levels, concentrations that exceed them do not necessarily mean that an ecological risk exists, but rather that additional investigation or evaluation may be warranted.

Riverbed-material samples were collected during June 1993, October 1997, and August 2001, and their analytical results were compared to sediment screening levels for the criteria-specific analysis. Sediment screening levels were adjusted for total organic carbon (TOC) content on a sample-specific basis, except for the 1997 samples, which were based on a site-specific average TOC concentration of 2%. Background samples were also evaluated. Only the shallowest riverbed-material data are used for comparison (generally the 0 to 0.5-foot interval) because organisms are only expected to be exposed to the top few inches of riverbed materials. Table 9 presents the comparison of riverbed-material data to the NYSDEC screening levels. The sampling locations are shown on Figure 3.

Inorganics

1993 Data

Twelve riverbed-material samples (and one duplicate sample) were collected adjacent to and downstream of the site, and two samples were collected upstream of the site. The upstream samples are considered background locations. Concentrations of several inorganics in the twelve samples collected adjacent to and downstream of the site exceeded the chronic toxicity screening levels. These inorganics were chromium, copper, iron, lead, mercury, and nickel. One of these samples (SS-02) also had a lead concentration that exceeded its acute toxicity criterion. Both of the background samples (SS-13 and SS-14) had concentrations of arsenic, copper, iron, lead, manganese, and nickel that exceeded their respective chronic toxicity screening levels. Note that neither the NYSDEC nor the Ontario Ministry of Environment criteria includes cyanide.

1997 Data

BBL collected 23 riverbed-material samples (and two duplicate samples) in 1997. Only two of the riverbed-material samples (and one duplicate sample) were analyzed for inorganics. These samples exceeded the chronic toxicity screening levels for copper, iron, lead, mercury, nickel, and/or zinc. Lead was the only inorganic with concentrations that exceeded the acute toxicity screening levels.

2001 Data

The 2001 riverbed-material samples were not analyzed for inorganics for which there are applicable screening levels.

Organics

1993 Data

Nine of the 12 riverbed-material samples collected in 1993 were analyzed for VOCs. One sample (SS-11) exceeded the chronic toxicity screening levels for total xylenes and the acute toxicity screening levels for ethylbenzene. Each of the 12 riverbed-material samples collected in 1993 was analyzed for SVOCs. Eleven of the samples exceeded the chronic toxicity screening levels. Six of the samples (SS-03, SS-06, SS-09, SS-10, SS-11, and SS-12) also exceeded the acute toxicity screening levels. SVOCs that exceeded the acute screening

levels include 2-methylnaphthalene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Only two samples (SS-03 and SS-11) exceeded the acute toxicity screening levels for total PAHs. These samples include sample SS-03 (collected near the 66-inch storm sewer outfall) and sample SS-11 (collected near the 24-inch pipe outfall).

The 1993 background samples (SS-13 and SS-14) did not exceed toxicity screening levels for volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs).

1997 Data

Each of the 23 riverbed-material samples collected in 1997 was analyzed for VOCs. Of these, one sample (SS-3-1) exceeded the chronic toxicity screening levels for ethylbenzene, and two samples (SS-3-2 and SS-3-5) exceeded the acute toxicity screening levels for benzene, ethylbenzene, and/or total xylenes. Each of the 23 riverbed-material samples were also analyzed for SVOCs, and 12 of the samples exceeded the chronic and/or acute toxicity screening levels. Seven of the samples (SS-3-1, SS-3-2, SS-3-3, SS-3-5, SS-3-6, SS-3-11, and SS-3-12) also exceeded the acute toxicity screening levels, including fluorene, 2-methylnaphthalene, acenaphthylene, anthracene, benzo(a)anthracene, chrysene, naphthalene, and/or phenanthrene. Only 5 samples (SS-3-1, SS-3-2, SS-3-5, SS-3-6, and SS-3-11) exceeded the acute toxicity screening levels for total PAHs. These samples were collected near the 66-inch storm sewer outfall.

2001 Data

A total of 17 riverbed-material samples (and two duplicate samples) were collected in 2001. Fourteen of these samples were analyzed for VOCs, and none exceeded the chronic and/or acute toxicity screening levels. The same 14 samples were also analyzed for SVOCs, and seven of the samples exceeded the chronic and/or acute toxicity screening levels for several constituents. Five of the samples (SR-102, SR-108, SR-109, SR-112, and SS-1D) also exceeded the acute toxicity screening levels, and the constituents included acenaphthylene, anthracene, benzo(a)anthracene, chrysene, fluorene, naphthalene, and phenanthrene. Only one sample (SR-102) exceeded the acute toxicity screening levels for total PAHs. This sample was collected near the 66-inch storm sewer outfall.

Data Evaluation

The riverbed-material screening results suggest that the Susquehanna River sediments and bed material have been affected by site-related organic constituents. Figure 15 presents the sampling locations and total PAH concentrations. The majority of the riverbed-material samples with exceedances of the chronic and/or acute toxicity values for total PAHs (4 and 45 mg/Kg, respectively) are located near the 24-inch pipe outfall and the 66-inch storm sewer outfall.

9.3.6 Summary and Conclusions

The FWIA for the site was conducted in accordance with NYSDEC (1994) guidance. The site is described as a predominately industrial covertype. Most of the site is covered with gravel or asphalt, and provides limited terrestrial habitat. Furthermore, the site itself has a fenced perimeter, which limits site access to local fauna. Although several threatened or endangered species were recorded in or near the site, there are no potential impacts to these species. One state wetland (CC-11) is located north and upgradient of the site, indicating that there is no threat to this resource from site-related constituents. Susquehanna River sediments and bed materials represent the only complete exposure pathway for wildlife at the site. Concentrations of most inorganics are similar to background concentrations; however, several organics (notably PAHs) detected in the riverbed materials exceed the NYSDEC screening levels. The majority of the samples that contained PAHs above screening levels were collected near the 24-inch pipe outfall and the 66-inch storm sewer outfall. These locations generally correlated well with those locations where sheens could be generated by disturbing the riverbed materials.

The sediment screening levels used in this assessment are conservative screening-level values for the protection of benthic aquatic life (i.e., invertebrates). Exceeding these screening levels in the Susquehanna River does not identify actual risks to benthic species, but merely indicates that the potential for adverse effects cannot be dismissed based on the available data.

10. Summary and Conclusions

With the findings presented in this report, NYSEG has characterized the nature and extent of the former MGP's impacts on the environment and can proceed with a Feasibility Study. The investigation included a detailed analysis of the following:

- The site's geology and physical setting;
- The nature and extent of impacts to soil, groundwater, and the Susquehanna River;
- The dynamics of groundwater and NAPL migration at the site; and
- The nature of potential risks posed to human health and the environment by the site.

This section provides a summary of these findings, including conceptual models of relevant processes.

10.1 Site Setting

The Court Street Former MGP Site is located on the north side of Court Street in an industrial section of Binghamton, New York. The Susquehanna River runs just south of the site, immediately across Court Street. The eastern third of the property is used as a natural gas service center by Columbia Gas. The remaining portion of the site is a lot used only as an equipment storage and parking area for NYSEG's Court Street Service Center.



Figure 10.1: View of site floodwall and site from Tompkins Street Bridge.

The site housed an MGP that manufactured gas from 1888 to about 1939, during which time operations gradually expanded westward from the eastern portion of the site, eventually covering the entire site. By about 1969, all aboveground structures at the plant had been dismantled. As discussed later, many foundations and other buried structures remain in place.

10.2 Hydrogeology

10.2.1 Geology and Physical Setting

The conceptual model of site hydrogeology is illustrated on Figure 10.2. Though generalized, the figure shows the relationship of the key stratigraphic units influencing the occurrence and flow of groundwater, NAPL, and dissolved constituents. The key units can be described as follows:

- **Fill** – Silt, sand, gravel, ash, cinders, and slag. Also includes demolition debris, foundation remnants, and buried utilities. The fill is largely unsaturated, but can contain and transmit significant quantities of groundwater where the water table is mounded due to foundations or the underlying silt and clay.

- **Alluvial Silt and Clay** – Massive, with a blocky texture and little or no organic matter. This unit forms a discontinuous lens up to 13 feet thick that underlies the entire site, but pinches out to the east, west, and south. The silt and clay unit is largely saturated, but poorly permeable.

- **Outwash Sand and Gravel** – Comprises discontinuous layers of variable thickness and composition. Generally composed of fine to coarse sand and fine to coarse gravel, with occasional lenses of fine sand and silt. The sand and gravel unit is a significant aquifer, averaging 30 feet thick below the site, that is capable of transmitting large quantities of groundwater, particularly in comparison to the silt above and the till below.

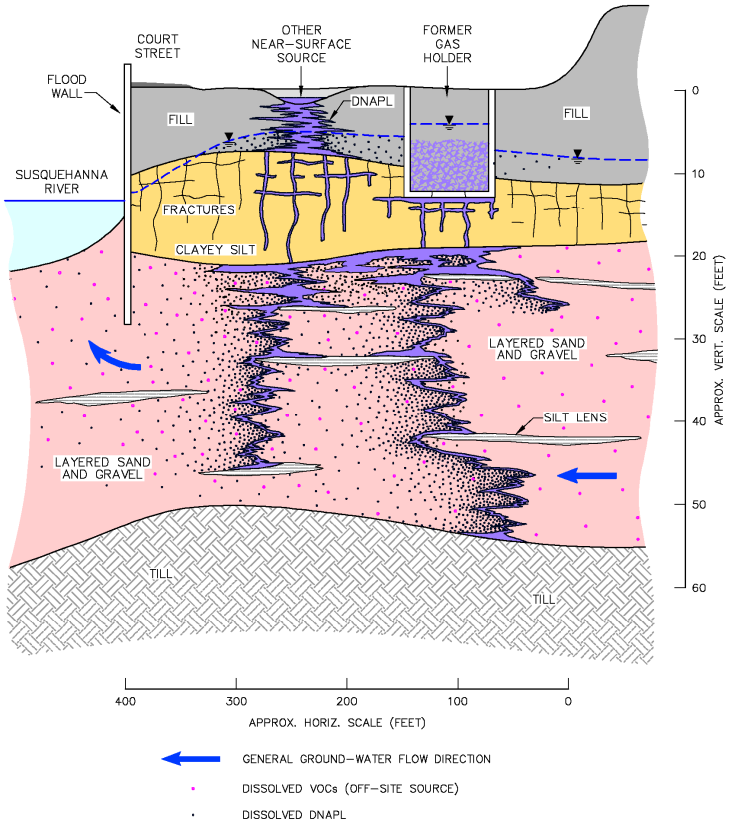


Figure 10.2: Conceptual model depicting site geology and DNAPL distribution and migration.

- **Till** – Dense silt and clay matrix containing embedded sand and gravel, rounded to angular, multiple rock-types. The till is approximately 45 feet thick beneath the site, and very poorly permeable, thus forming a lower confining unit.

- **Bedrock** (not shown) – Dark gray shale, slightly weathered, horizontal bedding. The bedrock is poorly permeable and effectively isolated from site influences by the till and a strong upward hydraulic gradient.

Several physical structures influence the occurrence and flow of shallow groundwater. The most significant are the following:

- **The 66-inch-diameter Storm Sewer** – An active storm sewer that crosses the western portion of the site from north to south (see Figure 2) and collects runoff from a large portion of the city. Traces of NAPL observed inside the sewer suggest that the interior of the sewer has the potential to contribute site-related constituents to the Susquehanna River. However, laboratory results for samples of sediment collected from the pipe were not indicative of NAPL, and showed that PAHs were present at comparable levels in pipe sediments both upstream and downstream of the site.

  North of the No. 4 gas holder, the bedding materials observed outside the sewer were not sufficiently permeable to create a preferential pathway along the outside of the pipe. South of the No. 4 gas holder, the fill beneath the sewer is more permeable and the silt is absent in at least one location. Groundwater flow appears to be focused in this area, allowing shallow groundwater and DNAPL to move preferentially southward beneath the pipe, in both the fill and at the top of the sand and gravel, toward the river. It appears that impacts to the riverbed at the sewer outlet (discussed in Subsection 10.5) are in part associated with this preferential pathway; however, it is unclear whether the impacts are ongoing or historical in nature.

- **Gas Holder Foundations** – The former MGP included four gas holders constructed (in the places shown on Figure 2) between 1888 and 1927. The foundation of the No. 3 gas holder was excavated as part of an IRM conducted by NYSEG in 2000 and 2001. The foundations of the other three holders are still largely intact. The No. 1 holder, the oldest and smallest, is believed to have a sealed bottom, and so retains perched water but has no significant effect on groundwater flow. The No. 2 holder foundation does not appear to hold water; and likewise has no apparent effect on groundwater flow. The No. 1 and No. 2 (and formerly the No. 3) holders were constructed in the general fashion illustrated on Figure 10.2. The foundation of the No. 4 gas holder, the youngest and largest, was constructed in the manner of an upside-down coffee can, sealed on the top and sides but not the bottom. The circular foundation walls of the No. 4 holder are at least 15 feet deep and act to partially cut off and divert shallow groundwater flow around the holder.

- **Court Street Flood Wall** – The flood wall appears to have little potential to adversely affect groundwater or constituent migration[15]. The actual path that groundwater behind the flood wall takes to reach the river depends primarily on how easily water can pass through the flood wall. If the wall, particularly the sheetpiling beneath the wall proper, is relatively porous, groundwater flow would be unaffected and discharge to the nearshore side of the river. If the flood wall is relatively impervious to flow, groundwater from the site would move downward beneath the wall and/or move laterally around the western end of the wall. In the case of the former, numerical groundwater-flow modeling showed that the water passing beneath the flood wall would discharge in the same general area as it would have if the wall were not there. In the case of the latter, groundwater would be expected to discharge to the river near the end of the flood

[15] Except at one location, which is described in Subsection 10.4, below.

wall, in an area of the river that has been thoroughly investigated as part of this RI. BBL found no NAPL behind the western end of the flood wall, so mobilization of NAPL around the western end of the flood wall is not a concern.

- **The 24-inch, "BB," and "E" pipes** – These three pipes pass through the same general area of the flood wall. Tracing performed by BBL found that the pipes run northward from the flood wall and pass beneath the BMH warehouse. The 24-inch pipe is the only pipe that was identified on the opposite (north) side of the warehouse and appeared to continue northward under nearby rail lines. The purpose of the 24-inch and "E" pipes is unknown, but BBL found that these pipes did not flow after a heavy rainstorm, and that the 24-inch pipe was nearly plugged with sediment. The sediment had no coal-tar-like odors or discoloration and was found to contain only relatively low levels of PAHs. BBL removed the sediment plugging the end of the 24-inch pipe and attempted to teleview it, but encountered another sediment plug about 15 feet from its end, precluding further viewing. Based on this information, discharge from the 24-inch and "E" pipes is not considered a likely source of site-related constituents to the river.

  Similarly, the outsides of the pipes are not considered likely preferential pathways. Although NAPL is present behind the flood wall at this location, as evidenced by sheens and NAPL "blobs" in split-spoon samples, it occurs beneath these pipes in the sand and gravel unit. The 24-inch and "E" pipes are bedded in the overlying silt unit, and, at the time that they were investigated, were located above the water table.

  The "BB" pipe has the potential to act as a preferential pathway. This pipe, which is a 10-inch-diameter former water intake for the MGP, is the only pipe of the three that is perennially below the water table. More importantly, the flood wall's sheetpiling was slotted to avoid the pipe, leaving a gap in the sheeting. As a result, the groundwater and NAPL that are present in the sand and gravel unit behind the flood wall at this location may preferentially be drawn to and pass through this gap in the sheeting, subsequently discharging to the Susquehanna River's bed near the shoreline. The NAPL found near the pipe does not appear to be pooled significantly, as it does not accumulate in a piezometer that is screened across the NAPL-containing interval. Subsection 10.4 discusses NAPL-related issues in this area of the site in greater detail. BBL identified the end of the BB pipe, which emerges from the riverbed about 20 feet from the shore, but identified no discernable flow out of it.

10.2.2 Groundwater Occurrence and Flow

The Susquehanna River is a major regional groundwater discharge location. Given the site's proximity to the river, groundwater on site in every stratigraphic unit will eventually discharge there. The potentiometric surface map of the sand and gravel (Figure 12) shows a clear, albeit low, gradient from all points on site toward the river. At the water table, the route of flow can be considerably more tortuous, particularly on site, where the silt and clay unit creates a groundwater mound. Groundwater flow at the water table (depicted on Figure 11), can be summarized as follows:

- The majority of shallow groundwater at the site moves radially away from the center of the groundwater mound located near the center of the site, then spills off the edge of the silt unit into the sand and gravel unit. Once in the sand and gravel aquifer, groundwater flows to the river.

- Shallow groundwater in the southwest corner of the site converges near the area where the 66-inch storm sewer passes beneath Court Street, indicating preferential flow in this area. This pattern appears to be caused by the more conductive fill material beneath the sewer in this area, and the localized absence of the silt unit (near piezometer PZ01-06). Where the silt is missing, shallow groundwater can preferentially drain down into the sand and gravel unit.

- A strong downward gradient, appropriate for a groundwater mound, is apparent from the silt to the sand and gravel. Within the sand and gravel, and from the bedrock through the till, the gradient is generally upward, suggesting that groundwater beneath the site discharges to the Susquehanna River.

10.3 Groundwater Quality

To appraise groundwater quality, BBL compared the analytical results to NYSDEC Class GA groundwater standards or guidance values. Using these criteria as a reference, the data show the following:

- In shallow groundwater, criteria for VOCs and SVOCs are most frequently exceeded at and downgradient of the site. Downgradient impacts appear to be limited to two areas where NAPL has migrated off site: at the 66-inch storm sewer, and near the 24-inch and "BB" pipes. BTEX and PAHs accounted for the majority of organics detected.

- In monitoring wells screened at the base of the sand and gravel, VOC results show the pervasive presence of several chlorinated hydrocarbons, particularly 1,1,1-trichloroethane and one of its degradation products, 1,1-dichloroethane, frequently at concentrations above the Class GA standards. Detected only in deep wells and in both upgradient and downgradient locations, these chlorinated hydrocarbons are attributed to an upgradient source.

- At the base of the sand and gravel, criteria for site-related organics (principally BTEX and PAHs) are most frequently exceeded on site and immediately downgradient of the site (i.e., between the southern property line and the Susquehanna River).

- One or more inorganics exceed criteria in each well, both shallow and deep, upgradient and downgradient, where a full TAL suite was analyzed. The highest concentrations occur where organic concentrations are also high.

- Based on sampling of groundwater from the bedrock wells, bedrock groundwater quality has not been impacted by site-related constituents.

The sand and gravel unit comprises a very small part of a much larger aquifer referred to as the Clinton Street Ballpark Sole Source Aquifer, a USEPA designation. While the City of Binghamton obtains its water directly from the Susquehanna River and is, therefore, excluded from this USEPA designation, some adjacent communities rely on groundwater pumped from this aquifer. Given the site's proximity to the river, and a groundwater flow regime in which all water discharges to the river, the areal extent of the site's impacts is highly unlikely to expand beyond its current bounds. This means that the fraction of the aquifer that has been affected by the former MGP is very small, and is unlikely to expand significantly over time. In addition, the presence of chlorinated hydrocarbons (unrelated to the site) renders the groundwater in this portion of the aquifer undrinkable, even without the presence of site-related constituents.

10.4 NAPL Evaluation

NAPLs in the ground beneath the site, primarily coal-tar DNAPL, are responsible for most of the environmental impacts resulting from the former MGP. As shown on Figure 10.2, NAPL is present in both unsaturated and saturated soils beneath the site. Most of the NAPL released appears to be a DNAPL, and, due to the shallow water table beneath the site, most of the NAPL and NAPL-affected soils occur in the saturated zone. DNAPL has moved through the silt beneath the site, exploiting the larger pore spaces afforded by bedding planes and fractures. Upon entering the underlying sand and gravel, much of the DNAPL spreads laterally, preferentially but not exclusively, in the direction of groundwater flow (generally southward). At some locations, all apparently on site, the DNAPL has also migrated downward to the base of the sand and gravel. The paths that it has taken are tortuous and unpredictable; as a result, the DNAPL is distributed very irregularly beneath the site. The till that underlies the sand and gravel appears to be an effective capillary barrier, preventing further downward migration of the DNAPL.

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, although DNAPL did accumulate in three monitoring wells or piezometers: MW97-8, MW97-13S, and PZ01-06. Once removed from these wells, the DNAPL either did not return (MW97-8 and PZ01-06) or returned very slowly. Other small DNAPL pools likely exist at the site, as they are typically hard to find, but extensive DNAPL pools are unlikely to have gone undetected given the extensive network of monitoring wells, soil borings, and test pits installed.

Migration off site appears limited to two areas, one associated with the 66-inch storm sewer near the southwest corner of the site, and the other associated with an area where several pipes penetrate the flood wall southeast of the site. Subsection 10.2.1 summarizes the role these features have played in NAPL migration. In summary, it appears that NAPL has migrated southward beneath the 66-inch storm sewer, both in the fill and at the top of the sand and gravel, and has most likely reached the Susquehanna River. This NAPL may be responsible, at least in part, for impacted riverbed materials that occur near the outfall of the sewer. Inside the sewer is evidence that NAPL has seeped into it through joints. As such, the affected riverbed materials could also be the result of such discharge. It is reasonable to assume that both of these mechanisms are partly responsible for the affected riverbed materials.

East of the site, NAPL is inferred to have migrated eastward along the top of the sand and gravel due to pumping at the former Ranney well. Pumping was discontinued before the NAPL reached the well, and the NAPL appears to have then moved southward, along with the groundwater. The path that the NAPL appears to have taken after it started to move southward is coincident with the paths of three pipes in the area (see Subsection 10.2.1). Where these pipes pass through the flood wall is the only place where NAPL was found behind the wall, though the NAPL is not extensively pooled in this area. The steel sheeting beneath the flood wall in this area is slotted, accommodating a former water-intake pipe for the MGP. This gap in the sheeting could allow preferential migration of groundwater and NAPL through the wall, and is believed chiefly responsible for impacted riverbed materials in this area.

To date, the investigations performed have not conclusively demonstrated ongoing NAPL migration. Due to the viscous nature of the NAPL, which can result in very slow migration, and uncertainty involving the quantity, release points, and release durations, determining whether NAPL at the site is still moving is not practicable. In the two areas where NAPL appears to reach from the site to the river, it would be prudent to assume that migration is ongoing when considering remedial options.

A NAPL with different chemical characteristics exists east and northeast of the site and extends beneath the BMH warehouse. This NAPL occurs near the base of the silt and the top of the sand and gravel, and is characterized by a distinct petroleum-like odor and a chromatographic chemical signature that is indicative of petroleum, not coal tar. While petroleum products were used by the MGP, they were stored at the opposite end of the site. It is unlikely that petroleum released at the site would have migrated northeastward through coal-tar-impacted areas. If such migration did occur, BBL expects that the NAPL would exhibit characteristics of both coal-tar- and petroleum-based NAPLs; it does not. The northern limit of this petroleum-based NAPL is not defined, but likely exists north of the site, where a scrap yard and an oil refinery existed for many years.

10.5 Susquehanna River

10.5.1 Water Quality

The site has not adversely affected the quality of river water. Laboratory results for samples of river water, collected in 1991, 1993, and 2001, did not exceed applicable NYSDEC criteria. Results of tests performed by the City of Binghamton on samples of river water drawn into its filtration plant, located across the river from the site, show no discernable effect from the site. When disturbed, some MGP- and non-MGP-impacted sediments produce sheens, thus temporarily exceeding the water-quality standard for oil and floating substances (6 NYCRR Part 703.2). The source of sheens in the river is discussed in Subsection 10.5.2.

BBL surveyed the river bottom along the north shore to identify preferential points of groundwater discharge to the river, but found none. Groundwater discharge to the river, therefore, is interpreted to be diffuse.

10.5.2 Sediment Quality

BBL probed the riverbed materials upriver, downriver, and adjacent to the site, searching for significant deposits of soft sediment and areas that produced a sheen on the water surface when disturbed. Adjacent to the site, the Susquehanna riverbed is largely devoid of soft sediment, except in a few small, sporadic locations. Otherwise, the riverbed consists mainly of gravel and cobbles. Riverbed materials that produced sheens were confined largely to areas around and downstream of the 66-inch and 24-inch pipe outfalls, though a few other points were identified that produced sheens, some upstream of the pipe outfalls and the site.

Analytical results for samples of the riverbed material found the following:

- Site-related PAHs are present within 40 feet of the riverbank closest to the site, and are generally allocated with the sheens observed while probing and collecting samples.

- Along the bank, these areas of site-related PAHs are generally restricted to the 66-inch storm sewer area and, to a lesser extent, the 24-inch outfall.

- Higher concentrations of PAHs are largely restricted to the upper 2 feet of riverbed material.

- Higher concentrations of BTEX in the riverbed materials correlate well with samples containing higher levels of PAHs.

- Concentrations of most inorganics are similar to background concentrations.

Expert review of the laboratory GC/MS chromatograms has shown that the presence of PAHs in the river could be attributed to several sources (including petroleum and background pyrogenic sources) in addition to the former MGP. At approximately 50% of the locations sampled, PAHs appear to reflect petroleum and/or background characteristics. The site-related PAHs are clustered around the outfalls of the 66-inch storm sewer and the 24-inch pipe. An isolated deposit of sediment located a few hundred feet downstream of the 66-inch storm sewer also contains site-related PAHs. A number of samples contained levels of PAHs above NYSDEC screening levels. The majority of these samples were located near the 24- and 66-inch sewer outfalls. One of the 1993 samples that exceeded screening levels (SS-12) is located upstream of both the site and the two outfall areas. This upstream sample revealed prominent petroleum characteristics possibly associated with No. 4 or higher fuel oil.

In summary, the sampling data have identified PAHs in riverbed materials that can be attributed to several sources in addition to the MGP site. Clearly site-related PAHs in the riverbed are largely limited to areas near two distinct points of probable discharge: the outfalls of 66-inch storm sewer and the 24-inch pipe. Detections of these site-related PAHs do not extend far from their probable entry points and remain near the riverbed surface. The limited vertical extent of PAHs is consistent with the upward groundwater gradient measured between the river and the underlying soils.

The river hydraulic model used to evaluate whether site-related constituents in sediments could be transported across the river to the City's water-filtration-plant intake found that there is little likelihood site-related constituents could be transported intake in concentrations quantifiable using standard analytical methods. This modeling also found that the effects of wind would not impact the general conclusions of the model.

No record of ice-jams was found for the reach of the river near the site, and none were identified during the winter of 1997-1998; therefore, altered water-column transport of Susquehanna River sediment due to ice jams is not considered to be a concern at the site.

10.6 Human Health and Ecological Assessment

10.6.1 Human Health Evaluation

The site does not pose a significant threat to human health because, based on the current and foreseeable use of the site and the nature and location of chemicals of potential interest (COPI) in environmental media associated with the site, human exposure to COPI is unlikely to occur. The site is fenced and gated, with access controlled by NYSEG. The site area is either paved or covered by lawn or clean fill materials, precluding direct contact.

Off site, in the Susquehanna River, human exposure to sediments containing COPI is possible, though likely to be seasonal in nature.

10.6.2 Ecological Assessment

The ecological assessment identified two areas where the potential exists for adverse impacts to wildlife; both are isolated areas of the Susquehanna River's bed. One area is located near and downriver of the 66-inch sewer outfall; the other is near and downriver of the 24-inch outfall. In these two areas, concentrations of several constituents, notably PAHs, exceed the NYSDEC sediment screening levels for the protection of benthic aquatic life (i.e., invertebrates). The locations of sediment samples that exceeded the NYSDEC acute-toxicity values generally correlated well with those locations where sheens could be generated by disturbing the sediment.

Site-related constituents have not adversely affected the quality of the Susquehanna River water.

10.7 Data Adequacy

The findings presented in this report adequately characterize the following:

- The site's geology and physical setting;
- The nature and extent of site impacts to soil, groundwater, and the Susquehanna River;
- The dynamics of groundwater and NAPL migration at the site; and
- The nature of risks posed to human health and the environment by the site.

NYSEG has characterized the nature and extent of the former MGP's impacts on the environment so that a Feasibility Study can commence.

10.8 Compliance with Order on Consent

All of the requirements for a remedial investigation listed in the Order on Consent have been met, or rendered moot. Table 10.1, below, lists the stated objectives of the Order on Consent, and the sections of this report discussing the data collected to achieve them.

Table 10.1 Compliance with the Order on Consent Objectives

Order on Consent Objectives	Relevant Section of Text
1) Source area delineation and characterization to allow planning for remediation on property [NYSEG] controls.	Section 7.3 NAPL Evaluation
2) Install wells upgradient of the site in order to determine the impact the Site's contamination may have on groundwater quality, to the extent access can be obtained.	Section 7.4 Groundwater Quality
3) Determine the existence and extent of NAPLs on the Site and between the Site and Susquehanna River	Section 7.3 NAPL Evaluation
4) Determine the existence and extent of hazardous substance and petroleum contamination originating from the Site along the banks and in the sediment of that portion of the Susquehanna River located across from the and downgradient from the Site.	Section 8.3 Riverbed Sampling
5) Search for preferential pathways impacting sediments through the study of, inter alia, temperature gradients indicating seeps, nearby storm sewers, and the former creek bed.	Section 7.14 Utilities and Man-made Structures Section 8.2 Riverbed Seepage Evaluation
6) Analyze municipal water at the Susquehanna River intake for the presence of MGP constituents.	Section 8.1 Surfacewater Quality
7) Evaluate whether contaminated sediments could be drawn to such intake.	Section 8.6 River Fate and Transport Evaluation
8) Perform, in coordination with the City of Binghamton, a pump test to determine if the cone of depression from the City's Ranney well extends to the groundwater underlying the site.	Rendered moot by decommissioning of the Raney Well (discussed in Section 3.1).
9) Perform a water quality analysis during such pump test to determine if coal-tar constituents are impacting the Ranney Well.	

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Tables

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In this final draft, the report title has changed from *Phase II Supplemental Remedial Investigation Report* to *Remedial Investigation Report.* The following tables have not been reprinted to reflect this change. No other details have been modified for this final edition.

TABLE 1

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
WELL CONSTRUCTION DETAILS

Location ID	Unit Screened	Date Completed	Northing Coordinate ft.	Easting Coordinate ft.	Measuring Point Elev. ft. AMSL	Ground Surface Elev. ft. AMSL	Well Diam. in.	Casing Type	Screen Slot Size in.	Screen Length ft.	Sump Length ft.	Depth to Screened Interval (ft. bgs) Top	Depth to Screened Interval (ft. bgs) Bottom	Well Depth ft. bgs	Estimated Hydraulic Conductivity (K) ft./day
Monitoring Wells															
MW93-1S (ab)	fill/upper S&G	5/28/1993	na	na	na	na	2	SS	0.01	10.0	0.4	10.3	20.3	20.7	na
MW93-1D	lower S&G	5/27/1993	766785.9	1006318.9	848.07	846.1	2	SS	0.01	10.0	0.3	40.9	50.9	51.2	19
MW93-2D	lower S&G	6/2/1993	766833.6	1006452.4	846.22	844.1	2	SS	0.01	10.0	0.4	43.6	53.6	54.0	0.9
MW93-2S	silt	6/4/1993	766831.5	1006446.3	846.42	844.1	2	SS	0.01	10.0	0.6	4.2	14.2	14.8	5.0
MW93-3D	lower S&G	6/1/1993	766875.5	1006563.0	846.84	844.6	2	SS	0.01	9.6	0.0	37.0	46.6	46.6	14
MW93-3S	silt/S&G	6/9/1993	766893.9	1006612.2	846.60	844.2	2	SS	0.01	10.0	0.0	12.0	22.0	22.0	3.0
MW-01-03R	bedrock	8/3/2001	766879.9	1006546.1	847.05	844.2	2	PVC	0.01	10.0	0.0	98.0	108.0	108.0	0.5
MW93-5D	lower S&G	6/3/1993	767166.6	1006453.9	847.61	844.9	2	SS	0.01	9.9	0.5	46.5	56.4	56.9	0.6
MW93-6D	lower S&G	6/8/1993	767154.8	1006230.8	846.80	844.2	2	SS	0.01	10.0	0.1	49.8	59.8	59.9	77
MW93-6S	silt/S&G	6/7/1993	767154.3	1006224.6	847.13	844.5	2	SS	0.01	10.0	0.0	13.0	23.0	23.0	9.0
MW97-7S	upper S&G	9/25/1997	766680.6	1006336.5	849.36	849.6	2	PVC	0.01	10.0	0.2	16.0	26.0	26.2	863
MW-01-07R	bedrock	8/24/2001	766675.0	1006347.1	848.57	849.0	2	PVC	0.01	10.0	0.0	99.0	109.0	109.0	3.7
MW97-8S	silt	9/30/1997	766776.1	1006414.0	845.69	846.0	2	PVC	0.01	10.0	2.0	12.0	22.0	24.0	86
MW97-9D	lower S&G	9/23/1997	766894.7	1006248.2	847.13	847.4	2	PVC	0.01	10.0	0.2	33.8	43.8	44.0	257
MW97-9S	upper S&G	9/23/1997	766901.7	1006245.7	846.99	847.2	2	PVC	0.01	10.0	0.2	13.0	23.0	23.2	703
MW97-10D	lower S&G	9/23/1997	766984.0	1006658.0	843.68	844.1	2	PVC	0.01	10.0	0.2	40.0	50.0	50.2	1620
MW97-10S	silty fill	9/19/1997	766983.7	1006661.5	843.43	844.0	2	PVC	0.01	8.0	0.0	4.0	12.0	12.0	57
MW97-11S	silty fill	9/26/1997	766805.9	1006507.2	844.15	844.6	2	PVC	0.01	10.0	0.2	7.6	17.6	17.8	24
MW97-12S	silty fill	9/25/1997	766836.5	1006626.2	843.56	844.0	2	PVC	0.01	10.0	0.2	7.3	17.3	17.5	3.0
MW97-13S (ab)	coarse fill	9/18/1997	767079.8	1006456.8	844.66	844.8	2	PVC	0.01	5.0	2.0	5.0	10.0	12.0	na
MW97-14D	lower S&G	12/11/1997	767165.7	1006893.2	845.57	845.9	2	PVC	0.01	5.0	0.1	34.9	39.9	40.0	na
MW97-14S	upper S&G	12/11/1997	767165.8	1006897.1	845.55	845.9	2	PVC	0.01	10.0	0.1	9.9	19.9	20.0	na
MW98-15S	silt	5/19/1998	766964.3	1006809.4	842.35	842.6	2	PVC	0.01	10.0	0.0	5.0	15.0	15.0	na
MW98-16D	lower S&G	5/21/1998	767088.5	1007110.2	841.70	841.9	2	PVC	0.01	5.0	0.0	38.5	43.5	43.5	na
MW98-16S	fill/upper S&G	5/21/1998	767090.4	1007112.8	841.56	841.9	2	PVC	0.01	10.0	0.0	7.0	17.0	17.0	na
MW-01-17D	lower S&G	9/18/2001	767043.1	1006086.3	861.16	861.5	2	PVC	0.01	5.0	0.0	54.2	59.2	59.2	20
MW-01-17S	upper S&G	9/19/2001	767034.1	1006087.9	861.32	861.7	2	PVC	0.01	10.0	0.0	27.0	37.0	37.0	277
Piezometers															
PZ93-1	coarse fill	6/9/1993	767153.1	1008516.9	848.37	844.7	2	PVC	0.01	5.0	0.0	3.5	8.5	8.5	na
PZ-01-02	silt/S&G	8/16/2001	766866.4	1006781.2	841.93	842.3	2	PVC	0.01	10.0	2.0	9.0	19.0	21.0	na
PZ-01-03	silty fill	9/12/2001	766894.7	1006354.7	845.17	845.5	2	PVC	0.02	10.0	0.0	6.0	16.0	16.0	na
PZ-01-04	silty fill	9/12/2001	767004.0	1006317.7	848.32	845.3	2	PVC	0.01	10.0	0.0	4.6	14.6	14.6	0.2
PZ-01-05	silty fill	9/13/2001	767133.0	1006247.3	847.79	844.9	2	PVC	0.02	10.0	0.0	4.5	14.5	14.5	na
PZ-01-06	coarse fill	9/14/2001	766805.0	1006397.2	844.54	845.1	2	PVC	0.02	10.0	0.0	8.0	18.0	18.0	0.1
Temporary Wells															
TW97-1D	lower S&G	12/9/1997	767242.7	1006210.2	857.07	857.4	2	PVC	0.01	5.0	0.1	56.4	61.4	61.5	na
TW97-1S	silt	12/9/1997	767248.1	1006209.7	857.10	857.4	2	PVC	0.01	10.0	0.1	17.0	27.0	27.1	na
TW97-2D	lower S&G	12/5/1997	767243.1	1006470.8	856.00	856.4	2	PVC	0.01	5.0	0.1	64.0	69.0	69.1	na
TW97-2S	coarse fill/silt	12/3/1997	767242.4	1006479.3	856.09	856.4	2	PVC	0.01	10.0	0.1	14.4	24.4	24.5	na
TW97-3S	upper S&G	12/2/1997	767238.7	1006688.6	855.52	855.8	2	PVC	0.01	10.0	0.1	14.0	24.0	24.1	na
Other Observation Wells															
B-1	upper S&G	2/15/1991	766763.8	1006030.2	863.45	863.8	4	PVC	0.01	10.0	0.0	29.8	39.8	39.8	na
City Wel11	S&G	na	767091.9	1007137.3	842.03	842.0	na	na	na	na	na	na	na	na	na
City Well 2	S&G	na	767076.6	1007187.1	841.50	841.7	na	na	na	na	na	na	na	na	na
DGC-6D	S&G	na	na	na	844.73	na	na	na	na	na	na	na	na	na	na
DGC-6S	S&G	na	na	na	844.82	na	na	na	na	na	na	na	na	na	na

Notes:
Elevations given in feet above Mean Sea Level (ft. AMSL), 1929 National Geodetic Vertical Datum (NGVD); northing and easting coordinates on New York State Plain grid.
Depths given in feet below ground surface (ft. bgs).
na indicates not available.
In location ID Column, (ab) indicates the well has been abandoned.
Hydraulic conductivity estimated from rising-head slug tests for all but PZ01-04 and PZ01-06 (specific capacity tests). Test reductions are on electronic attachments CD.
In Unit Screened Column, S&G indicates sand and gravel hydrostratigraphic unit.
In casing type column, SS indicates stainless steel, PVC indicates polyvinyl chloride.
In stickup length column, negative numbers indicate the depth of casing below ground surface at a flushmount.
Other Observation Wells section includes offsite wells installed for unrelated investigations:
Well B-1, installed by NYSEG at 267 Court St. Service Center Property.
City Wells 1 and 2, installed for City of Binghamton adjacent to former Raney Well.
DGC-6S&D, installed for Almy Bros. Site RI (Dunn, 1991), south of river (see Figure 1)

TABLE 2

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
WATER-LEVEL DATA

Location ID	Unit Screened	Measuring Point Elev.	Depth to Screened Interval		Well Depth	December 22-23, 1997		February 11, 1998		October 2, 2001	
		ft. AMSL	Top	Bottom	ft. bgs	depth	elev.	depth	elev.	depth	elev.
Monitoring Wells											
MW93-1D	lower S&G	848.07	40.9	50.9	51.2	16.18	831.89	15.69	832.38	16.55	831.52
MW93-2D	lower S&G	846.22	43.6	53.6	54.0	14.37	831.85	13.92	832.30	14.75	831.47
MW93-2S	silt	846.42	4.2	14.2	14.8	8.28	838.14	8.34	838.08	8.13	838.29
MW93-3D	lower S&G	846.84	37.0	46.6	46.6	15.02	831.82	14.58	832.26	15.41	831.43
MW93-3S	silt/S&G	846.60	12.0	22.0	22.0	14.70	831.90	14.15	832.45	15.15	831.45
MW-01-03R	bedrock	847.05	98.0	108.0	108.0					14.81	832.24
MW93-5D	lower S&G	847.61	46.5	56.4	56.9	15.36	832.25	14.73	832.88	15.72	831.89
MW93-6D	lower S&G	846.80	49.8	59.8	59.9	14.62	832.18	14.01	832.79	14.92	831.88
MW93-6S	silt/S&G	847.13	13.0	23.0	23.0	14.94	832.19	14.34	832.79	15.24	831.89
MW97-7S	upper S&G	849.36	16.0	26.0	26.2	17.68	831.68	17.35	832.01	18.08	831.28
MW-01-07R	bedrock	848.57	99.0	109.0	109.0					16.67	831.90
MW97-8S	silt	845.69	12.0	22.0	24.0	14.25	831.44	13.97	831.72	13.81	831.88
MW97-9D	lower S&G	847.13	33.8	43.8	44.0	15.15	831.98	14.63	832.50	15.45	831.68
MW97-9S	upper S&G	846.99	13.0	23.0	23.2	15.01	831.98	14.50	832.49	15.32	831.67
MW97-10D	lower S&G	843.68	40.0	50.0	50.2	11.71	831.97	11.20	832.48	12.09	831.59
MW97-10S	silty fill	843.43	4.0	12.0	12.0	8.09	835.34	8.20	835.23	7.76	835.67
MW97-11S	silty fill	844.15	7.6	17.6	17.8	12.24	831.91	11.39	832.76		
MW97-12S	silty fill	843.56	7.3	17.3	17.5	11.76	831.80	11.86	831.70	11.43	832.13
MW97-13S	coarse fill	844.66	5.0	10.0	12.0	4.42	840.24	4.19	840.47		
MW97-14D	lower S&G	845.57	34.9	39.9	40.0	13.10	832.47	12.62	832.95	13.63	831.94
MW97-14S	upper S&G	845.55	9.9	19.9	20.0	13.07	832.48	12.60	832.95	13.59	831.96
MW98-15S	silt	842.35	5.0	15.0	15.0					11.35	831.00
MW98-16D	lower S&G	841.70	38.5	43.5	43.5					10.38	831.32
MW98-16S	fill/upper S&G	841.56	7.0	17.0	17.0					10.30	831.26
MW-01-17D	lower S&G	861.16	54.2	59.2	59.2					28.30	832.86
MW-01-17S	upper S&G	861.32	27.0	37.0	37.0					29.57	831.75
Piezometers											
PZ93-1	coarse fill	848.37	3.5	8.5	8.5	9.58	838.79	9.49	838.88	9.38	838.99
PZ-01-02	silt/S&G	841.93	9.0	19.0	21.0					11.71	830.22
PZ-01-03	silty fill	845.17	6.0	16.0	16.0					11.68	833.49
PZ-01-04	silty fill	848.32	4.6	14.6	14.6					12.60	835.72
PZ-01-05	silty fill	847.79	4.5	14.5	14.5					14.51	833.28
PZ-01-06	coarse fill	844.54	8.0	18.0	18.0					13.78	830.76
Temporary Wells											
TW97-1D	lower S&G	857.07	56.4	61.4	61.5	24.86	832.21	24.27	832.80	25.17	831.90
TW97-1S	silt	857.10	17.0	27.0	27.1	25.78	831.32	21.53	835.57	21.45	835.65
TW97-2D	lower S&G	856.00	64.0	69.0	69.1	23.70	832.30	23.05	832.95		
TW97-2S	coarse fill/silt	856.09	14.4	24.4	24.5	19.02	837.07	19.01	837.08		
TW97-3S	upper S&G	855.52	14.0	24.0	24.1	18.45	837.07	18.44	837.08	18.15	837.37
Other Observation Wells											
B-1	upper S&G	863.45	29.8	39.8	39.8	31.31	832.14	30.86	832.59		
City Wel11	S&G	842.03	na	na	na			9.60	832.43		
City Well 2	S&G	841.50	na	na	na	9.63	831.87	9.25	832.25		
DGC-6D	S&G	844.73	na	na	na			11.48	833.25		
DGC-6S	S&G	844.82	na	na	na			11.09	833.73		
Staff Gauges											
SG-1 (1997-1998)	Susquehanna	na	na	na	na		831.33		831.63		
SG-2 (2001)	Susquehanna	na	na	na	na						830.21

Notes:

Elevations given in feet above Mean Sea Level (AMSL), 1929 National Geodetic Vertical Datum (NGVD).
na = not available; blank spaces indicate measurements not taken.
Depths given in feet below ground surface (ft. bgs).
In Unit Screened Column, S&G indicates sand and gravel hydrostratigraphic unit.
Other Observation Wells section includes offsite wells installed for unrelated investigations:
Well B-1, installed by NYSEG at 267 Court St. Service Center Property.
City Wells 1 and 2, installed for City of Binghamton adjacent to former Raney Well.
DGC-6S&D, installed for Almy Bros. Site RI (Dunn, 1991), south of river (see Figure 1)

TABLE 3-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SOIL ANALYTICAL SAMPLE SUMMARY

Location	Depth Range	Date Sampled	VOCs	SVOCs	R	I	TOC	PCBs	TPH
Surface Soil Samples									
Task II RI Samples									
SF-01	(0 - 2")	5/1/1993	X[2]	X[5]		X		X	
SF-02	(0 - 2")	5/1/1993	X[2]	X[5]		X		X	
SF-03	(0 - 2")	5/1/1993	X[2]	X[5]		X		X	
SF-04	(0 - 2")	5/1/1993	X[2]	X[5]		X		X	
SF-05 (DUP)	(0 - 2")	5/1/1993	X[2]	X[5]		X		X	
Phase I SRI Samples									
SB-123	(0 - 2")	9/18/1997						X	
SB-456	(0 - 2")	9/16/1997						X	
SF-05	(0 - 2")	5/1/1993	X	X		X		X	
SS-123 (DUP)	(0 - 2")	9/18/1997						X	
SS-123	(0 - 2")	9/18/1997						X	
SS0-1	(0 - 2")	9/15/1997	X[2]	X[5]		X[7]*			
SS0-1	(0 - 2")	9/19/1997	X[2]	X[5]		X[7]			
SS0-2	(0 - 2")	9/15/1997	X[2]	X[5]		X[7]*			
SS0-3	(0 - 2")	9/15/1997	X[2]	X[5]		X[7]*			
Test Pit Samples									
Task II RI Samples									
TP-02	(6')	5/1/1993	X[2]	X[5]		X*			
TP-05	(6')	5/1/1993	X[2]	X[5]	X	X*			X
TP-07	(5')	5/1/1993	X[2]	X[5]		X*			
TP-14	(6')	5/1/1993	X[2]	X[5]		X			
TP-15	(6')	5/1/1993	X[2]	X[5]		X*			
TP-21 (DUP)	(8')	5/1/1993	X[2]	X[5]		X*			
Subsurface Soil Samples									
Task II RI Samples									
TB93-01	(28 - 30')	5/1/1993	X[2]	X[5]		X			
TB93-02	(10 - 14')	5/1/1993	X[2]	X[5]	X	X*			X
TB93-05	(10 - 14')	5/1/1993	X[2]	X[5]	X	X			X
TB93-06	(6 - 8.5')	5/1/1993	X[2]	X[5]	X	X*			X
TB93-10	(12 - 14')	5/1/1993	X[2]	X[5]		X			
TB93-11	(10 - 16')	5/1/1993	X[2]	X[5]	X	X*			X
Phase I SRI Samples									
MW97-12S	(12.0' - 14.0')	9/25/1997					X		
MW97-7 (DUP)	(18.0' - 20.0')	9/25/1997	X[2]	X[5]		X[7]			
MW97-7	(18.0' - 20.0')	9/25/1997	X	X					
MW97-7 (DUP)	(28.0' - 30.0')	9/25/1997					X		
MW97-7	(28.0' - 30.0')	9/25/1997					X		
SB97-1	(2.0' - 4.0')	9/18/1997	X[3]	X[4]					
SB97-1	(4.0' - 6.0')	9/18/1997	X[3]	X[4]					
SB97-2	(2.0' - 4.0')	9/17/1997	X[3]	X[4]					
SB97-2	(4.0' - 6.0')	9/17/1997	X[3]	X[4]					
SB97-3	(0.0' - 2.0')	9/17/1997	X[3]	X[4]					
SB97-3	(4.0' - 6.0')	9/17/1997	X[3]	X[4]					
SB97-4	(2.0' - 4.0')	9/16/1997	X[3]	X[4]					
SB97-4	(12.0' - 14.0')	9/16/1997	X[3]	X[4]	X				
SB97-5	(2.0' - 4.0')	9/16/1997	X[3]	X[4]					
SB97-5	(4.0' - 6.0')	9/16/1997	X[3]	X[4]	X				
SB97-6	(0.0' - 2.0')	9/17/1997	X[3]	X[4]					
SB97-6 (DUP)	(4.0' - 6.0')	9/17/1997	X[3]	X[4]	X				
SB97-6	(4.0' - 6.0')	9/17/1997	X[3]	X[4]	X				
SB97-7	(0.0' - 2.0')	9/17/1997	X[3]	X[4]					
SB97-7	(4.0' - 6.0')	9/17/1997	X[3]	X[4]					
SB97-8	(0.0' - 2.0')	9/18/1997	X[3]	X[4]					
SB97-8 (DUP)	(2.0' - 4.0')	9/19/1997	X[3]	X[4]					
SB97-8	(2.0' - 4.0')	9/19/1997	X[1]	X4					
TB-12	(46.0' - 48.0')	9/25/1997					X		
TB-13	(18.0' - 20.0')	9/30/1997	X[2]	X[5]		X[7]			

See Notes on Page 2.

TABLE 3-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SOIL ANALYTICAL SAMPLE SUMMARY

Location	Depth Range	Date Sampled	VOCs	SVOCs	R	I	TOC	PCBs	TPH
MW98-15S	(9 - 11')	5/18/1998	X[2]	X[5]					X
SB-4 (DUP)	(12 - 14')	5/18/1998			X[6]	X[9]			
SB-4	(12 - 14')	5/18/1998			X	X			
SB-6	(4 - 6')	5/18/1998			X[6]	X[9]			
SB-20	(7 - 10')	5/18/1998	X[2]	X[5]		X[8]			
SB-21	(4 - 6')	5/20/1998	X[2]	X[5]		X[8]			
SB-22	(12 - 16')	5/20/1998	X[2]	X[5]	X[6]	X[8]			X
SB-23 (DUP)	(16 - 18')	5/22/1998	X[2]	X[5]	X[6]	X[8]			X
SB-23	(16 - 18')	5/22/1998	X	X		X			
SB-112	(4 - 6')	9/17/2001	X[1]	X4					
TP-21	NA	5/1/1993	X	X		X			
Supplemental Remedial Investigation									
MW-01-07R	(20 - 22')	7/25/2001	X[1]	X[4]					
MW-01-07R	(22 - 24')	7/25/2001							X
SB-101 (DUP)	(10 - 12')	8/3/2001	X[1]	X[4]					
SB-101	(10 - 12')	8/3/2001	X[1]	X[4]					
SB-101	(15 - 17')	8/7/2001	X[1]	X[4]					X
SB-102	(10 - 12')	8/6/2001	X[1]	X[4]					
SB-102	(21 - 23')	8/6/2001	X[1]	X[4]					
SB-103	(8 - 10')	8/27/2001	X[1]	X[4]					
SB-103	(14 - 16')	8/27/2001	X[1]	X[4]					
SB-104	(10 - 12')	8/29/2001	X[1]	X[4]					
SB-104	(20 - 22')	8/30/2001	X[1]	X[4]					
SB-105	(8 - 10')	8/9/2001	X[1]	X[4]					
SB-105	(14 - 16')	8/9/2001	X[1]	X[4]					
SB-106	(7 - 9')	8/8/2001	X[1]	X[4]					
SB-106	(13 - 15')	8/8/2001	X[1]	X[4]					
SB-107	(7 - 8')	8/10/2001	X[1]	X[4]					
SB-108 (DUP)	(6 - 8')	8/13/2001	X[1]	X[4]					
SB-108	(6 - 8')	8/13/2001	X[1]	X[4]					
SB-108	(35 - 37')	8/14/2001	X[1]	X[4]					
SB-109	(10 - 11')	8/15/2001	X[1]	X[4]					
SB-109	(17 - 19')	8/15/2001	X[1]	X[4]					
SB-110	(7 - 9')	9/17/2001	X[1]	X[4]					
SB-111	(7 - 7.5')	9/17/2001	X[1]	X[4]					
SB-112 (DUP)	(4 - 6')	9/17/2001	X[1]	X[4]					

Notes:
DUP = Duplicate sample collected.
NA = Not Available.
VOCs = Volatile Organic Compounds by Method 8240, 8260 or 95-1.
SVOCs = Semivolatile Organic Compounds by Method 8270 or 95-2.
R = Reactive compounds (Cyanide by 7.3.3.2 and Sulfide by 7.3.4.1).
I = Inorganics analyzed by Method 7470 for mercury and sulfide 7.3.4.
TOC = Total Organic Carbon by Method 8060.
PCBs = Polychlorinated biphenyls by Method 8080.
TPH = Total Petroleum Hydrocarbons by Method 8015.
[1]BTEX = Method 8260A.
[2]VOCs by Method 8240
[3]BTEX by Method 8240.
[4]PAHs = Method 8270A.
[5]SVOCs by Method 8270.
[6]Reactive Cyanide only.
[7]Inorganics by Method 6010.
[8]Inorganics by Method CLP-M.
[9]Sulfide analysis performed only.
*Total cyanide by Method 335.3 and amenable cyanide by Method 335.1 also analyzed.
1993/1994 samples analyzed under ASP Category B, revision 12/1991.
1997 samples analyzed under ASP Category B, revision 10/1995.
2001 samples analyzed under ASP Category B, revision 2000.

TABLE 3-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SEDIMENT ANALYTICAL SAMPLE SUMMARY

Location	Depth Range	Date Sampled	VOCs	SVOCs	I	TOC	PCBs	S	TPH
Task II RI Samples									
SS-01	(0 - 0.9')	5/1/1993	X	X	X*	X		X	
SS-02	(0 - 0.7')	5/1/1993	X	X	X*	X		X	
SS-03	(0 - 1.2')	5/1/1993	X	X	X*	X		X	
SS-04	(0 - 0.9')	5/1/1993	X	X	X*	X		X	
SS-05	(0 - 0.8')	5/1/1993	X	X	X*	X		X	
SS-06	(0 - 0.6')	5/1/1993	X	X	X*	X		X	
SS-07	(0 - 1')	5/1/1993	X	X	X*	X		X	
SS-08	(0 - 1.4')	5/1/1993	X	X	X*	X		X	
SS-09	(0 - 0.8')	5/1/1993	X	X	X*	X		X	
SS-10 (DUP)	(0 - 0.8')	5/1/1993	X	X	X*	X		X	
SS-10	(0 - 0.8')	5/1/1993	X	X	X	X		X	
SS-11	(0 - 0.7')	5/1/1993	X	X	X*	X		X	
SS-12	(0 - 0.8')	5/1/1993	X	X	X*	X		X	
SS-13	(0 - 0.9')	5/1/1993	X	X	X*	X		X	
SS-14	(0 - 1.1')	5/1/1993	X	X	X*	X		X	
Phase I SRI Samples									
MH-1	NA	10/13/1997	X	X	X*				
MH-2	NA	10/13/1997	X	X	X*				
MH-3	NA	10/13/1997	X	X	X*				
PIPE	NA	10/7/1997	X	X	X*				X
SS-1-A	(0.0' - 0.5')	10/10/1997	X	X	X*				X
SS-1-B (DUP)	(0.0' - 0.5')	10/10/1997	X	X	X*				X
SS-1-B	(0.0' - 0.5')	10/10/1997	X	X	X				X
SS-12-1	(0.0' - 0.5')	10/9/1997	X	X	X[3*]				X
SS-12-1	(1.0' - 2.0')	10/9/1997	X	X	X[3*]				X
SS-12-1	(2.0' - 3.0')	10/9/1997	X	X	X[3*]				X
SS-12-2	(0.0' - 0.5')	10/9/1997	X	X	X[3*]				X
SS-12-2	(1.0' - 2.0')	10/9/1997	X	X	X[3*]				X
SS-12-3	(0.0' - 0.5')	10/9/1997	X	X	X[3*]	X			X
SS-12-3	(1.0' - 2.0')	10/9/1997	X	X	X[3]				X
SS-12-4	(0.0' - 0.5')	10/9/1997	X	X	X[3]				X
SS-12-4	(1.0' - 2.0')	10/9/1997	X	X	X[3*]		X		X
SS-12-5	(0.0' - 0.5')	10/10/1997	X	X	X[3]				X
SS-12-5 (DUP)	(1.0' - 2.0')	10/10/1997	X	X	X[3]		X		X
SS-12-5	(1.0' - 2.0')	10/10/1997	X	X	X[3]		X		X
SS-12-6	(0.0' - 0.5')	10/10/1997	X	X	X[3]	X			X
SS-12-6	(1.0' - 2.0')	10/10/1997	X	X	X[3*]				X
SS-12-7	(0.0' - 0.5')	10/10/1997	X	X	X[3]		X		X
SS-12-7	(1.0' - 2.0')	10/10/1997	X	X	X[3]				X
SS-3-1	(0.0' - 0.5')	10/8/1997	X	X	X[3*]				X
SS-3-1	(1.0' - 2.0')	10/8/1997	X	X	X[3*]				X
SS-3-1	(3.0' - 4.0')	10/8/1997	X	X	X[3*]		X		X
SS-3-2	(0.0' - 0.5')	10/7/1997	X	X	X[3*]		X		X
SS-3-3 (DUP)	(0.0' - 0.5')	10/8/1997	X	X	X[3*]				X
SS-3-3	(0.0' - 0.5')	10/8/1997	X	X	X[3]				X
SS-3-3	(1.0' - 2.0')	10/8/1997	X	X	X[3*]				X
SS-3-3	(3.0' - 4.0')	10/8/1997	X	X	X[3*]		X		X
SS-3-4	(0.0' - 0.5')	10/7/1997	X	X	X[3*]				X
SS-3-4	(1.0' - 2.0')	10/7/1997	X	X	X[3*]				X
SS-3-5	(0.0' - 0.5')	10/7/1997	X	X	X[3*]	X			X
SS-3-5	(1.0' - 2.0')	10/7/1997	X	X	X[3*]				X
SS-3-6	(0.0' - 0.5')	10/7/1997	X	X	X[3*]		X		X
SS-3-6	(2.0' - 3.0')	10/7/1997	X	X	X[3*]				X
SS-3-7	(0.0' - 0.5')	10/7/1997	X	X	X[3*]				X
SS-3-7	(1.0' - 2.0')	10/7/1997	X	X	X[3*]				X
SS-3-8	(0.0' - 0.5')	10/8/1997	X	X	X[3*]	X			X
SS-3-8	(1.0' - 2.0')	10/8/1997	X	X	X[3*]				X
SS-3-9	(0.0' - 0.5')	10/8/1997	X	X	X[3*]				X

See Notes on Page 2.

TABLE 3-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SEDIMENT ANALYTICAL SAMPLE SUMMARY

Location	Depth Range	Date Sampled	VOCs	SVOCs	I	TOC	PCBs	S	TPH
SS-3-9	(1.0' - 2.0')	10/8/1997	X	X	X[3*]				X
SS-3-10	(0.0' - 0.5')	10/8/1997	X	X	X[3*]				X
SS-3-10	(1.0' - 2.0')	10/8/1997	X	X	X[3*]				X
SS-3-11	(0.0' - 0.5')	10/8/1997	X	X	X[3*]				X
SS-3-11	(1.0' - 2.0')	10/8/1997	X	X	X[3*]		X		X
SS-3-11	(2.0' - 3.0')	10/8/1997	X	X	X[3*]				X
SS-3-12	(0.0' - 0.5')	10/8/1997	X	X	X[3*]				X
SS-3-12	(1.0' - 2.0')	10/8/1997	X	X	X[3*]				X
SS-3-13	(0.0' - 0.5')	10/8/1997	X	X	X[3*]				X
SS-3-13	(1.0' - 2.0')	10/8/1997	X	X	X[3*]				X
SS-3-14	(0.0' - 0.5')	10/8/1997	X	X	X[3*]		X		X
SS-3-14	(1.0' - 2.0')	10/8/1997	X	X	X[3*]				X
Phase II SRI Samples									
SS-15	(0 - 0.8')	8/24/2001	X[1]	X[2]	X[3]	X			
SS-1C	(0 - 0.7')	8/24/2001			X[3]	X			
SS-1D	(0 - 0.7')	8/24/2001	X[1]	X[2]	X[3]	X			
SS-1E	(0 - 0.6')	8/24/2001			X[3]	X			
SR-101	(0 - 2')	8/16/2001	X[1]	X[2]	X[3]	X			
SR-102 (DUP)	(0 - 2')	8/21/2001	X[1]	X[2]	X[3]	X			
SR-102	(0 - 2')	8/21/2001	X[1]	X[2]	X[3*]	X			
SR-104	(0 - 1')	8/23/2001	X[1]	X[2]	X[3]	X			
SR-105	(0 - 2')	8/24/2001	X[1]	X[2]	X[3]	X			
SR-106	(0 - 2')	8/27/2001	X[1]	X[2]	X[3]	X			
SR-107	(0 - 2')	8/27/2001	X[1]	X[2]	X[3]	X			
SR-108 (DUP)	(0 - 2')	8/28/2001	X[1]	X[2]	X[3]	X			
SR-108	(0 - 2')	8/28/2001	X[1]	X[2]	X[3*]	X			
SR-109	(0 - 2')	8/28/2001	X[1]	X[2]	X[3]	X			
SR-109	(4 - 6')	8/28/2001		X[2]	X[3]				
SR-109	(8 - 10')	8/29/2001			X[3]				
SR-110	(0 - 2')	8/29/2001	X[1]	X[2]	X[3]	X			
SR-111	(0 - 2')	8/29/2001	X[1]	X[2]	X[3]	X			
SR-112	(0 - 2')	8/29/2001	X[1]	X[2]	X[3]	X			
SR-113	(0 - 2')	8/30/2001	X[1]	X[2]	X[3]	X			
SR-114	(0 - 2')	8/31/2001			X[3]	X			
CSPH SUMP	NA	11/29/2001	X[1]	X[2]					
CSPH SUMP (DUP)	NA	11/29/2001	X[1]	X[2]					

Notes:
DUP = Duplicate sample collected.
VOCs = Volatile Organic Compounds by Method 8240.
SVOCs = Semivolatile Organic Compounds by Method 8270.
I = Inorganics by Method 6010, 7470 for mercury, 335.3 for total cyanide and 335.1 for amenable cyanide.
NA = Not Available.
TOC = Total Organic Carbon by Method 9060 (for pre-2001 data) or Lloyd Kahn (for 2001 data).
PCBs = Polychlorinated biphenyls by Method 8080.
S = Total Solids.
TPH = Total Petroleum Hydrocarbons by Method 310-13.
[1]BTEX = Method 8260A.
[2]PAHs = Method 8270.
[3]Cyanide = for total cyanide by Method 335.3 (1997 data) and by Method 335.2 (for 2001 data).
*Total cyanide and amenable cyanide analysis.
1993/1994 samples analyzed under ASP Category B, revision 12/1991.
1997 samples analyzed under ASP Category B, revision 10/1995.
2001 samples analyzed under ASP Category B, revision 2000.

TABLE 3-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL SAMPLE SUMMARY

Location	Date Sampled	VOCs	SVOCs	PCBs	I	L
Task II RI Samples						
MW93-1D	7/20/1993	X	X	X	X	
MW93-1D	10/20/1993	X	X		X	
MW93-1D	1/24/1994	X	X		X	
MW93-1D	4/26/1994	X	X		X	
MW93-2D	7/20/1993	X	X	X	X	
MW93-2D	10/20/1993	X	X		X	
MW93-2D	1/24/1994	X	X		X	
MW93-2D	4/26/1994	X	X		X	
MW93-2S	7/20/1993	X	X	X	X	
MW93-2S	10/20/1993	X	X		X	
MW93-2S	1/24/1994	X	X		X	
MW93-2S	4/26/1994	X	X		X	
MW93-3D	7/20/1993	X	X	X	X	
MW93-3D	10/20/1993	X	X		X	
MW93-3D	1/24/1994	X	X		X	
MW93-3D	4/26/1994	X	X		X	
MW93-3S (DUP)	7/20/1993	X	X	X	X	
MW93-3S (DUP)	10/20/1993	X	X		X	
MW93-3S (DUP)	1/24/1994	X	X		X	
MW93-3S (DUP)	4/26/1994	X	X		X	
MW93-5D	7/20/1993	X	X	X	X	
MW93-5D	10/20/1993	X	X		X	
MW93-5D	1/24/1994	X	X		X	
MW93-5D	4/26/1994	X	X		X	
MW93-6D	7/20/1993	X	X	X	X	
MW93-6D	10/20/1993	X	X		X	
MW93-6D	1/24/1994	X	X		X	
MW93-6D	4/26/1994	X	X		X	
MW93-6S	7/20/1993	X	X	X	X	
MW93-6S	10/20/1993	X	X		X	
MW93-6S	1/24/1994	X	X		X	
MW93-6S	4/26/1994	X	X		X	
Phase I SRI Samples						
MW93-1D	12/18/1997	X	X		X	
MW93-2D	12/18/1997	X	X		X	
MW93-2S	12/18/1997	X	X		X	
MW93-3D	12/18/1997	X	X		X	
MW93-3S	12/18/1997	X	X		X	
MW93-5D	12/19/1997	X	X		X	
MW93-6D	12/17/1997	X	X		X	
MW93-6S	12/17/1997	X	X		X	
MW97-10D	12/18/1997	X	X		X	
MW97-10S	12/18/1997	X				
MW97-10S	12/19/1997		X		X	
MW97-11S	12/19/1997	X	X		X	
MW97-12S	12/19/1997	X	X		X	
MW97-13S (DUP)	12/22/1997	X	X		X	
MW97-13S	12/22/1997	X	X		X	
MW97-14D	12/22/1997	X	X		X	
MW97-14S	12/22/1997	X	X		X	
MW97-7	12/19/1997	X	X		X	
MW97-8	12/19/1997	X	X		X	
MW97-9D	12/19/1997	X	X		X	

See Notes on Page 2.

TABLE 3-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL SAMPLE SUMMARY

Location	Date Sampled	VOCs	SVOCs	PCBs	I	L
MW97-9S	12/19/1997	X	X		X	
NYSEG #1	12/19/1997	X	X		X	
TW97-1D	12/22/1997	X	X		X	
TW97-2D	12/22/1997	X	X		X	
TW97-2S	12/22/1997	X	X		X	
TW97-3S (DUP)	12/22/1997	X	X		X	
MW98-15S (DUP)	6/5/1998	X	X		X[4]	
MW98-16D	6/5/1998	X	X		X[4]	
MW98-16S	6/5/1998	X	X		X[4]	
Phase II SRI Samples						
MW01-03R (DUP)	10/1/2001	X[1]	X[2]		X[3]	X
MW01-07R	10/1/2001	X[1]	X[2]		X[3]	X
MW01-17D (DUP)	10/2/2001	X[1]	X[2]		X[3]	
MW01-17S	10/2/2001	X[1]	X[2]		X[3]	
TW97-3S	10/2/2001	X[1]	X[2]		X[3]	

Notes:
DUP = Duplicate sample collected.
VOCs = Volatile Organic Compounds by Method 8240 .
SVOCs = Semivolatile Organic Compounds by Method 8270.
PCBs = Polychlorinated Biphenyls by Method 8080.
I = Inorganics by Method 6010/7000.
L = Chloride by Method E325.3.
[1]BTEX = Method 8260.
[2]PAHs = Method 8270.
[3]Cyanide = by Method 335.2 for total cyanide.
[4]Inorganics by Method SW846 6010, including Methods 7470 for mercury and 9010 for cyanide.
1993/1994 samples analyzed under ASP Category B, revision 12/1991.
1997 samples analyzed under ASP Category B, revision 10/1995.
2001 samples analyzed under ASP Category B, revision 2000.

TABLE 4-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW93-1D 7/20/1993 FS	MW93-1D 10/20/1993 FS	MW93-1D 1/24/1994 FS	MW93-1D 4/26/1994 FS	MW93-1D 12/18/1997 FS	MW93-2S 7/20/1993 FS	MW93-2S 10/20/1993 FS	MW93-2S 1/24/1994 FS	MW93-2S 4/26/1994 FS	MW93-2S 12/18/1997 FS	MW93-2D 7/20/1993 FS	MW93-2D 10/20/1993 FS
1,1,1-Trichloroethane	5	25. UD	25. UD	50. UD	**2. J**	50. U	5. U	5. U	5. U	5. U	10. U	**17**	**15**
1,1-Dichloroethane	5	**26. D**	**19. JD**	**20. JD**	**21**	**8. J**	5. U	5. U	5. U	5. U	10. U	**11**	**10**
Concentrations above the NY	5	25. UD	25. UD	50. UD	5. U	50. U	5. U	5. U	5. U	5. U	10. U	5. U	5. U
1,2-Dichloroethene, Total	5	25. UD	25. UD	50. UD	5. U	50. U	5. U	5. U	5. U	5. U	10. U	5. U	5. U
Acetone	50 G	50. UD	50. UD	100 UD	10. U	50. U	10. U	**10**	10. U	10. U	10. U	10. U	10. U
Benzene	0.7	660 UD	**1,000 D**	**890 D**	**67**	**810**	5. U	5. U	**1. J**	5. U	10. U	**19**	**19**
Carbon tetrachloride	5	25. UD	25. UD	50. UD	5. U	50. U	5. U	5. U	5. U	5. U	10. U	5. U	5. U
Chloroform	7	25. UD	25. UD	50. UD	5. U	50. U	5. U	5. U	5. U	5. U	10. U	5. U	5. U
Ethylbenzene	5	**250 D**	**29. D**	**200 D**	**2. J**	**160**	**3. J**	5. U	**6**	5. U	10. U	**64**	**52**
Methylene chloride	5	25. UD	**11. JD**	50. UD	**0.80 J**	50. U	5. U	1. U	5. U	**1. JB**	10. U	**3. J**	5. U
Styrene	5	25. UD	25. UD	50. UD	5. U	50. U	5. U	5. U	5. U	5. U	10. U	5. U	**49**
Toluene	5	**12. JD**	**8. JD**	50. UD	**1. J**	**10. J**	5. U	5. U	5. U	5. U	10. U	**71. B**	**61**
Vinyl acetate	NA	50. UD	50. UD	100 UD	**1. J**	--	10. U	10. U	10. U	10. U	--	10. U	10. U
Xylenes, Total	5 d	**110 D**	**150 D**	**140 D**	**27**	**170**	**5**	**7**	**80**	5. U	10. U	**440**	**350**
Total BTEX		**372**	**1,187**	**1,230**	**97**	**1,150**	**8**	**7**	**87**	ND	ND	**594**	**482**
Total Volatiles		**398**	**1,217**	**1,250**	**122**	**1,158**	**8**	**17**	**87**	**1**	ND	**625**	**556**

See Notes on Page 7.

TABLE 4-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW93-2D 1/24/1994 FS	MW93-2D 4/26/1994 FS	MW93-2D 12/18/1997 FS	MW93-3S 7/20/1993 FS	MW93-3S 7/20/1993 DUP	MW93-3S 10/20/1993 FS	MW93-3S 10/20/1993 DUP	MW93-3S 1/24/1994 FS	MW93-3S 1/24/1994 DUP	MW93-3S 4/26/1994 FS	MW93-3S 4/26/1994 DUP	MW93-3S 12/18/1997 FS
1,1,1-Trichloroethane	5	**16. JD**	**18**	**11. J**	25. UD	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
1,1-Dichloroethane	5	**11. JD**	**12**	**10. J**	25. UD	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Concentrations above the NY	5	25. UD	**2. J**	20. U	25. UD	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
1,2-Dichloroethene, Total	5	25. UD	**2. J**	20. U	25. UD	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Acetone	50 G	50. UD	10. U	20. U	50. UD	62. UD	10. U	10. U	**10**	10. U	10. U	10. U	10. U
Benzene	0.7	**18. JD**	**17**	**16. J**	**790 D**	1,000 UD	5. U	5. U	5. U	**1. J**	5. U	5. U	10. U
Carbon tetrachloride	5	25. UD	5. U	20. U	25. UD	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Chloroform	7	25. UD	**0.40 J**	20. U	25. UD	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Ethylbenzene	5	**42. D**	**39**	**68**	**65. D**	100 UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Methylene chloride	5	25. UD	**2. JB**	20. U	**45. D**	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Styrene	5	**48. D**	**34**	20. U	25. UD	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Toluene	5	**60. D**	**44**	**15. J**	25. UD	31. UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Vinyl acetate	NA	50. UD	**9. J**	--	50. UD	62. UD	10. U	10. U	10. U	10. U	10. U	**3. J**	--
Xylenes, Total	5 d	**32. D**	**300**	**310**	**66. D**	100 UD	5. U	5. U	5. U	5. U	5. U	5. U	10. U
Total BTEX		**152**	**400**	**409**	**921**	ND	ND	ND	ND	**1**	ND	ND	ND
Total Volatiles		**227**	**479**	**430**	**966**	ND	ND	ND	**10**	**1**	ND	**3**	ND

See Notes on Page 7.

TABLE 4-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW93-3D 7/20/1993 FS	MW93-3D 10/20/1993 FS	MW93-3D 1/24/1994 FS	MW93-3D 4/26/1994 FS	MW93-3D 12/18/1997 FS	MW01-03R 10/1/2001 FS	MW93-5D 7/20/1993 FS	MW93-5D 10/20/1993 FS	MW93-5D 1/24/1994 FS	MW93-5D 4/26/1994 FS	MW93-5D 12/19/1997 FS	MW93-6S 7/20/1993 FS
1,1,1-Trichloroethane	5	**6. JD**	25. UD	83. UD	**2. J**	100 U	--	**35**	**40**	**35**	**26**	**24**	5. U
1,1-Dichloroethane	5	**17. JD**	**17. JD**	**18. JD**	**2. J**	100 U	--	**3. J**	**7**	**7**	**4. J**	**2. J**	5. U
Concentrations above the NY	5	25. UD	25. UD	83. UD	5. U	100 U	--	5. U	**3. J**	**2. J**	**2. J**	10. U	5. U
1,2-Dichloroethene, Total	5	25. UD	25. UD	83. UD	5. U	100 U	--	5. U	5. U	5. U	**3. J**	10. U	5. U
Acetone	50 G	50. UD	50. UD	170 UD	10. U	100 U	--	10. U	10. U	10. U	10. U	10. U	10. U
Benzene	0.7	**51. D**	**68. D**	**68. JD**	**8**	**80. J**	10. U	**50**	**9**	**1. J**	5. U	10. U	5. U
Carbon tetrachloride	5	25. UD	25. UD	83. UD	5. U	100 U	--	**4. J**	5. U	5. U	5. U	10. U	5. U
Chloroform	7	25. UD	25,000 UD	83. UD	5. U	100 U	--	**2. J**	5. U	**1. J**	**1. J**	10. U	5. U
Ethylbenzene	5	**530 D**	**890 D**	**790 D**	**86**	**800**	10. U	**100**	5. U	5. U	5. U	**1. J**	5. U
Methylene chloride	5	**15. JD**	25. UD	83. UD	**0.80 J**	100 U	--	**7**	5. U	5. U	**0.70 J**	10. U	**4. J**
Styrene	5	25. UD	25. UD	83. UD	5. U	100 U	--	5. U	5. U	5. U	5. U	10. U	5. U
Toluene	5	**76. D**	**82. D**	**85. D**	**10**	**100**	10. U	**12**	5. U	5. U	5. U	10. U	5. U
Vinyl acetate	NA	50. UD	50. UD	170 UD	10. U	--	--	10. U	10. U	10. U	10. U	--	10. U
Xylenes, Total	5 d	**860 D**	**1,100 D**	**1,000 D**	**140**	**1,000**	--	**54**	**32**	**8**	**1. J**	**3. J**	5. U
Total BTEX		**1,517**	**2,140**	**1,943**	**244**	**1,980**	ND	**216**	**41**	**9**	**1**	**4**	ND
Total Volatiles		**1,555**	**2,157**	**1,961**	**249**	**1,980**	ND	**267**	**91**	**54**	**37.7**	**30**	**4**

See Notes on Page 7.

TABLE 4-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW93-6S 10/20/1993 FS	MW93-6S 1/24/1994 FS	MW93-6S 4/26/1994 FS	MW93-6S 12/17/1997 FS	MW93-6D 7/20/1993 FS	MW93-6D 10/20/1993 FS	MW93-6D 1/24/1994 FS	MW93-6D 4/26/1994 FS	MW93-6D 12/17/1997 FS	MW97-7 12/19/1997 FS	MW01-07R 10/1/2001 FS	MW97-8 12/19/1997 FS
1,1,1-Trichloroethane	5	5. U	5. U	5. U	10. U	**47**	**40**	**42**	**39**	**26**	10. U	--	200 U
1,1-Dichloroethane	5	5. U	5. U	5. U	10. U	**6**	**6**	**6**	**7**	**4. J**	10. U	--	200 U
Concentrations above the NY	5	5. U	5. U	5. U	10. U	**3. J**	**3. J**	**4. J**	**3. J**	**1. J**	10. U	--	200 UJ
1,2-Dichloroethene, Total	5	5. U	5. U	5. U	10. U	5. U	5. U	5. U	**3. J**	10. U	10. U	--	200 U
Acetone	50 G	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	--	200 U
Benzene	0.7	**4. J**	**28**	**10**	10. U	5. U	5. U	5. U	5. U	10. U	10. U	10. U	**2,700**
Carbon tetrachloride	5	5. U	5. U	5. U	10. U	5. U	5. U	5. U	5. U	10. U	10. U	--	200 U
Chloroform	7	5. U	5. U	5. U	10. U	**1. J**	5. U	**2. J**	**2. J**	10. U	10. U	--	200 U
Ethylbenzene	5	5. U	**22**	**0.40 J**	10. U	5. U	5. U	5. U	5. U	10. U	10. U	10. U	**900**
Methylene chloride	5	5. U	5. U	5. U	10. U	**4. J**	5. U	5. U	**0.80 J**	10. U	10. U	--	200 U
Styrene	5	5. U	5. U	5. U	10. U	5. U	5. U	5. U	5. U	10. U	10. U	--	200 U
Toluene	5	5. U	5. U	5. U	10. U	5. U	5. U	5. U	5. U	10. U	10. U	10. U	**38. J**
Vinyl acetate	NA	10. U	10. U	10. U	--	10. U	10. U	10. U	10. U	--	--	--	--
Xylenes, Total	5 d	**4. J**	**13**	**3. J**	10. U	5. U	5. U	5. U	5. U	10. U	**1. J**	--	**1,000**
Total BTEX		**8**	**63**	**13.4**	ND	ND	ND	ND	ND	ND	**1**	ND	**4,638**
Total Volatiles		**8**	**63**	**13.4**	ND	**61**	**49**	**54**	**54.8**	**31**	1	ND	**4,638**

See Notes on Page 7.

TABLE 4-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW97-9S 12/19/1997 FS	MW97-9D 12/19/1997 FS	MW97-10S 12/18/1997 FS	MW97-10D 12/18/1997 FS	MW97-11S 12/19/1997 FS	MW97-12S 12/19/1997 FS	MW97-13S 12/22/1997 FS	MW97-13S 12/22/1997 DUP	MW97-14S 12/22/1997 FS	MW97-14D 12/22/1997 FS	MW98-15S 6/5/1998 FS	MW98-15S 6/5/1998 DUP
1,1,1-Trichloroethane	5	250 U	**4. J**	10. U	**21**	10. U	10. U	200 U	2,000 U	10. U	**14**	100 U	20. U
1,1-Dichloroethane	5	250 U	**6. J**	10. U	**2. J**	10. U	10. U	200 U	2,000 U	10. U	10. U	100 U	20. U
Concentrations above the NY	5	250 UJ	10. U	10. U	10. U	10. U	10. U	200 UJ	2,000 UJ	10. UJ	10. UJ	100 U	20. U
1,2-Dichloroethene, Total	5	250 U	10. U	10. U	10. U	10. U	10. U	200 U	2,000 U	10. U	10. U	100 U	20. UJ
Acetone	50 G	250 U	10. U	10. U	10. U	10. U	10. U	**74. J**	2,000 U	10. U	10. U	100 U	20. U
Benzene	0.7	**4,400**	**13**	10. U	10. U	**4. J**	10. U	**22,000 D**	**22,000**	10. U	10. U	100 U	**3. J**
Carbon tetrachloride	5	250 U	10. U	10. U	10. U	10. U	10. U	200 U	2,000 U	10. U	10. U	100 U	20. U
Chloroform	7	250 U	10. U	10. U	10. U	10. U	10. U	200 U	2,000 U	10. U	10. U	100 U	20. U
Ethylbenzene	5	**630**	**7. J**	**13**	10. U	10. U	10. U	**2,600 J**	**2,900**	10. U	10. U	**250**	**240**
Methylene chloride	5	250 U	10. U	10. U	10. U	10. U	10. U	200 U	2,000 U	10. U	10. U	100 U	20. U
Styrene	5	250 U	**12**	10. U	10. U	10. U	10. U	200 U	2,000 U	10. U	10. U	100 U	20. U
Toluene	5	250 U	**54**	10. U	10. U	10. U	10. U	**7,400 D**	**7,200**	10. U	10. U	100 U	20. U
Vinyl acetate	NA	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	5 d	**400**	**130**	**5. J**	10. U	10. U	10. U	**2,600 J**	**2,500**	10. U	10. U	100 U	**25**
Total BTEX		**5,430**	**204**	**18**	ND	**4**	ND	**34,600**	**34,600**	ND	ND	**250**	**268**
Total Volatiles		**5,430 U**	**226**	**18**	**23**	**4**	ND	**34,674**	**34,600**	ND	14	**250**	**268**

See Notes on Page 7.

TABLE 4-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW98-16S 6/5/1998 FS	MW98-16D 6/5/1998 FS	MW01-17S 10/2/2001 FS	MW01-17D 10/2/2001 FS	MW01-17D 10/2/2001 DUP	B-1 12/19/1997 FS	TW97-1D 12/22/1997 FS	TW97-2S 12/22/1997 FS	TW97-2D 12/22/1997 FS	TW97-3S 12/22/1997 FS	TW97-3S 12/22/1997 DUP	TW97-3S 10/2/2001 FS
1,1,1-Trichloroethane	5	**3. J**	**12**	--	--	--	**2. J**	**12**	10. U	**26**	10. U	10. U	--
1,1-Dichloroethane	5	10. U	10. U	--	--	--	**2. J**	**4. J**	10. U	10. U	10. U	10. U	--
Concentrations above the NY	5	10. U	10. U	--	--	--	10. U	10. UJ	10. UJ	10. UJ	10. UJ	10. UJ	--
1,2-Dichloroethene, Total	5	10. UJ	10. UJ	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Acetone	50 G	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Benzene	0.7	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U
Carbon tetrachloride	5	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Chloroform	7	10. U	**1. J**	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Ethylbenzene	5	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U
Methylene chloride	5	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Styrene	5	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Toluene	5	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U
Vinyl acetate	NA	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	5 d	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Total BTEX		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Volatiles		**3**	**13**	ND	ND	ND	**4**	**16**	ND	**26**	ND	ND	ND

See Notes on Page 7.

TABLE 4-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS

Notes:
All concentrations reported in micrograms per liter (ug/L); also expressed as parts per billion (ppb).
NYSDEC GA Criteria values as reported in NYSDEC, Division of Water Technical and Operational Guidance Series (1.1.1) Memorandum, Ambient Water Quality Standards and Guidance Values, dated October 1993.
Detections are bolded.
Concentrations above the NYSDEC GA criteria values are shaded.
ND = Not detected.
D = Concentration is based on a diluted sample analysis.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Criteria Notes:
d = Value listed applies to each isomer (1,2-, 1,3-, and 1,4-) individually.
G = Guidance value.

TABLE 4-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW93-1D 7/20/1993 FS	MW93-1D 10/20/1993 FS	MW93-1D 1/24/1994 FS	MW93-1D 4/26/1994 FS	MW93-1D 12/18/1997 FS	MW93-2S 7/20/1993 FS	MW93-2S 10/20/1993 FS	MW93-2S 1/24/1994 FS	MW93-2S 4/26/1994 FS	MW93-2S 12/18/1997 FS	MW93-2D 7/20/1993 FS	MW93-2D 10/20/1993 FS
2,4-Dimethylphenol	1 a	10. U	10. U	11. U	10. U	10. U	12. U	10. U	11. U	10. U	10. U	10. U	10. U
2,4-Dinitrotoluene	5	10. U	10. U	11. U	10. U	10. U	12. U	10. U	11. U	10. U	10. U	10. U	10. U
2-Methylnaphthalene	NA	**19**	**23**	**8. J**	10. U	**2. J**	12. U	**9. J**	**180**	**24**	**8. J**	**320**	**220**
2-Methylphenol	1 a	10. U	10. U	11. U	10. U	10. U	12. U	10. U	11. U	10. U	10. U	10. U	10. U
4-Methylphenol	1 a	10. U	10. U	11. U	10. U	10. U	12. U	10. U	11. U	10. U	10. U	10. U	10. U
4-Nitrophenol	1 a	10. U	10. U	11. U	10. U	25. U	12. U	10. U	11. U	10. U	26. U	10. U	10. U
Acenaphthene	20 G	**35**	**160**	**120**	**73**	**160 D**	**18**	**24**	**41**	**15**	**12**	**100**	**120**
Acenaphthylene	NA	**4. J**	**19**	**12**	**10**	**6. J**	**1. J**	10. U	**6. J**	**7. J**	**2. J**	**230**	**200**
Anthracene	50 G	**3. J**	**10**	**4. J**	**12**	10. U	**5. J**	**6. J**	**8. J**	**8. J**	**1. J**	**7. J**	**4. J**
Benzo(a)anthracene	0.002 G	10. U	**7. J**	11. U	**12**	10. U	0.90 U	10. U	11. U	**14**	10. U	10. U	10. U
Benzo(a)pyrene	ND	10. U	**4. J**	11. U	**9. J**	10. U	12. U	10. U	11. U	**14**	10. U	10. U	10. U
Benzo(b)fluoranthene	0.002 G	10. U	10. U	11. U	**4. J**	10. U	12. U	10. U	11. U	**8. J**	10. U	10. U	10. U
Benzo(g,h,i)perylene	NA	10. U	10. U	11. U	**3. J**	10. U	12. U	10. U	11. U	**8. J**	10. U	10. U	10. U
Benzo(k)fluoranthene	0.002 G	10. U	10. U	110 U	**11**	10. U	12. U	10. U	110 U	**9. J**	10. U	10. U	10. U
Benzoic Acid	NA	25. U	26. U	28. U	26. U	--	31. U	25. U	28. U	26. U	--	24. U	24. U
bis(2-Ethylhexyl)phthalate	50	10. U	10. U	110 U	10. U	10. U	12. U	10. U	110 U	10. U	10. U	10. U	10. U
Carbazole	NA	**1. J**	**4. J**	110 U	10. U	**7. J**	**2. J**	10. U	110 U	10. U	10. U	**2. J**	10. U
Chrysene	0.002 G	10. U	**6. J**	110 U	**11**	10. U	12. U	10. U	110 U	**13**	10. U	10. U	10. U
Di-n-butyl phthalate	50	10. U	10. U	110 U	10. U	10. U	**2. J**	10. U	110 U	10. U	10. U	10. U	10. U
Dibenz(a,h)anthracene	NA	10. U	10. U	110 U	10. U	10. U	12. U	10. U	110 U	**3. J**	10. U	10. U	10. U
Dibenzofuran	NA	**2. J**	**6. J**	110 U	**4. J**	**5. J**	**1. J**	**4. J**	**8. J**	10. U	**2. J**	**4. J**	10. U
Diethyl phthalate	50 G	10. U	10. U	110 U	10. U	10. U	12. U	10. U	110 U	10. U	10. U	10. U	10. U
Fluoranthene	50 G	**2. J**	**13**	110 U	**22**	10. U	**4. J**	**6. J**	**5. J**	**20**	10. U	**3. J**	10. U
Fluorene	50 G	**11**	**26**	**11**	**11**	**5. J**	**29**	**11**	**27**	**13**	**10**	**33**	**13**
Hexachloroethane	5	10. U	10. U	110 U	10. U	10. U	12. U	10. U	110 U	10. U	10. U	10. U	10. U
Indeno(1,2,3-cd)pyrene	0.002 G	10. U	10. U	110 U	10. U	10. U	12. U	10. U	110 U	10. U	10. U	10. U	10. U
Naphthalene	10 G	**42**	**200**	**260**	10. U	**610 D**	**12**	10. U	**640 D**	**71**	**45**	**2,600**	**3,600 D**
Phenanthrene	50 G	**25**	**79**	**36**	**66**	**16**	**12**	**35**	**63**	**40**	**10**	**17**	**21**
Phenol	1 a	10. U	10. U	110 U	10. U	**3. J**	12. U	10. U	110 U	10. U	10. U	10. U	10. U
Pyrene	50 G	**2. J**	**17**	110 U	**30**	**1. J**	**6. J**	**10**	**6. J**	**35**	10. U	**4. J**	10. U
Total PAHs		**143**	**564**	**451**	**274**	**800**	**87**	**101**	**640**	**302**	**88**	**3,314**	**578**
Total Semivolatiles		**146**	**574**	**451**	**278**	**815**	**92**	**105**	**640**	**302**	**90**	**3,320**	**578**
Total PCBs		ND	--	--	--	--	ND	--	--	--	--	ND	--

See Notes on Page 7.

TABLE 4-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW93-2D 1/24/1994 FS	MW93-2D 4/26/1994 FS	MW93-2D 12/18/1997 FS	MW93-3S 7/20/1993 FS	MW93-3S 7/20/1993 DUP	MW93-3S 10/20/1993 FS	MW93-3S 10/20/1993 DUP	MW93-3S 1/24/1994 FS	MW93-3S 1/24/1994 DUP	MW93-3S 4/26/1994 FS	MW93-3S 4/26/1994 DUP	MW93-3S 12/18/1997 FS
2,4-Dimethylphenol	1 a	11. U	10. U	10. U	**11. J**	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
2,4-Dinitrotoluene	5	11. U	10. U	10. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
2-Methylnaphthalene	NA	**160**	**96**	**580 EJ**	**1. J**	**0.90 J**	10. U	12. U	110 U	10. U	10. U	10. U	10. U
2-Methylphenol	1 a	11. U	10. U	10. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
4-Methylphenol	1 a	11. U	10. U	10. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
4-Nitrophenol	1 a	11. U	10. U	25. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	26. U
Acenaphthene	20 G	**120**	**120**	**100 EJ**	**1. J**	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
Acenaphthylene	NA	**250**	**180**	**210 EJ**	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
Anthracene	50 G	11. U	**3. J**	10. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
Benzo(a)anthracene	0.002 G	11. U	10. U	10. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
Benzo(a)pyrene	ND	11. U	10. U	10. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
Benzo(b)fluoranthene	0.002 G	11. U	10. U	10. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
Benzo(g,h,i)perylene	NA	11. U	10. U	10. U	12. U	10. U	10. U	12. U	110 U	10. U	10. U	10. U	10. U
Benzo(k)fluoranthene	0.002 G	11. U	10. U	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Benzoic Acid	NA	27. U	24. U	--	30. U	25. U	25. U	29. U	27. U	25. U	25. U	24. U	--
bis(2-Ethylhexyl)phthalate	50	11. U	10. U	10. U	12. U	**4. J**	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Carbazole	NA	11. U	10. U	**4. J**	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Chrysene	0.002 G	11. U	10. U	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Di-n-butyl phthalate	50	11. U	10. U	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Dibenz(a,h)anthracene	NA	11. U	10. U	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Dibenzofuran	NA	11. U	10. U	**2. J**	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Diethyl phthalate	50 G	11. U	10. U	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Fluoranthene	50 G	11. U	**3. J**	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Fluorene	50 G	**7. J**	**8. J**	**3. J**	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Hexachloroethane	5	11. U	10. U	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Indeno(1,2,3-cd)pyrene	0.002 G	11. U	10. U	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Naphthalene	10 G	**5,600 D**	**3,800 D**	**5,400 D**	**110**	**92**	10. U	12. U	11. U	10. U	10. U	10. U	**2. J**
Phenanthrene	50 G	**16**	**18**	**4. J**	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Phenol	1 a	11. U	10. U	10. U	**7. J**	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Pyrene	50 G	11. U	**4. J**	10. U	12. U	10. U	10. U	12. U	11. U	10. U	10. U	10. U	10. U
Total PAHs		**553**	**432**	**6,297**	**112**	**92.9**	ND	ND	ND	ND	ND	ND	**2**
Total Semivolatiles		**553**	**432**	**6,303**	**130**	**96.9**	ND	ND	ND	ND	ND	ND	**2**
Total PCBs		--	--	--	ND	ND	--	--	--	--	--	--	--

See Notes on Page 7.

TABLE 4-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW93-3D 7/20/1993 FS	MW93-3D 10/20/1993 FS	MW93-3D 1/24/1994 FS	MW93-3D 4/26/1994 FS	MW93-3D 12/18/1997 FS	MW-01-03R 10/1/2001 FS	MW93-5D 7/20/1993 FS	MW93-5D 10/20/1993 FS	MW93-5D 1/24/1994 FS	MW93-5D 4/26/1994 FS	MW93-5D 12/19/1997 FS	MW93-6S 7/20/1993 FS
2,4-Dimethylphenol	1 a	10. U	10. U	10. U	10. U	10. U	--	10. U	10. U	10. U	10. U	10. U	10. U
2,4-Dinitrotoluene	5	10. U	10. U	10. U	10. U	10. U	--	10. U	10. U	10. U	10. U	10. U	10. U
2-Methylnaphthalene	NA	**520**	**360 D**	**320 D**	**290 D**	**210 EJ**	--	**150**	**17**	**27**	**8. J**	10. U	10. U
2-Methylphenol	1 a	10. U	10. U	10. U	10. U	10. U	--	10. U	10. U	10. U	10. U	10. U	10. U
4-Methylphenol	1 a	10. U	10. U	10. U	10. U	10. U	--	10. U	10. U	10. U	10. U	10. U	10. U
4-Nitrophenol	1 a	10. U	10. U	10. U	10. U	25. U	--	10. U	10. U	10. U	10. U	25. U	10. U
Acenaphthene	20 G	190 U	**250**	**210**	**200**	**180 EJ**	11. U	25. U	**15**	**25**	**15**	**1. J**	**34**
Acenaphthylene	NA	94. U	**130**	**110**	**120**	**51**	11. U	**180**	**22**	**140**	**76**	**30**	**0.90 J**
Anthracene	50 G	31. U	**42**	**32**	**47**	**18**	11. U	**10**	**10**	**130**	**10**	**2. J**	**0.80 J**
Benzo(a)anthracene	0.002 G	**6**	**12**	**8. J**	**16**	10. U	11. U	**2. J**	10. U	**4. J**	10. U	10. U	10. U
Benzo(a)pyrene	ND	4. U	**11**	**6. J**	**14**	10. U	11. U	**2. J**	**5. J**	**3. J**	10. U	10. U	10. U
Benzo(b)fluoranthene	0.002 G	2. U	**5. J**	10. U	**6. J**	10. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U
Benzo(g,h,i)perylene	NA	10. U	**4. J**	10. U	**5. J**	10. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U
Benzo(k)fluoranthene	0.002 G	10. U	**7. J**	10. U	10. U	10. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U
Benzoic Acid	NA	24. U	25. U	25. U	24. U	--		**16. J**	26. U	24. U	25. U	--	26. U
bis(2-Ethylhexyl)phthalate	50	10. U	10. U	10. U	10. U	10. U	--	10. U	**27**	10. U	10. U	10. U	10. U
Carbazole	NA	31. U	**32**	**37**	**32**	**1. J**	--	**1. J**	10. U	10. U	10. U	10. U	**1. J**
Chrysene	0.002 G	6. U	**12**	**8. J**	**15**	**1. J**	11. U	**2. J**	**6. J**	**4. J**	10. U	10. 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
Dibenz(a,h)anthracene	NA	10. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U
Dibenzofuran	NA	**20. J**	**22**	**23**	**24**	**18**	11. U	**2. J**	10. U	10. U	10. U	10. U	**3. J**
Diethyl phthalate	50 G	10. U	10. U	10. U	10. U	10. U	--	10. U	10. U	10. U	10. U	10. U	10. U
Fluoranthene	50 G	**16. J**	**28**	**19**	**34**	**7. J**	11. U	**9. J**	**13**	**12**	**8**	**2. J**	10. U
Fluorene	50 G	**100**	**120**	**84**	**130**	**86. EJ**	11. U	**52**	**20**	**62**	**34**	10. U	**12**
Hexachloroethane	5	10. U	10. U	10. U	10. U	10. U	--	10. U	10. U	10. U	10. U	10. U	10. U
Indeno(1,2,3-cd)pyrene	0.002 G	10. U	10. U	10. U	10. U	10. U	11. UJ	10. U	10. U	10. U	10. U	10. U	10. U
Naphthalene	10 G	**3,600**	**4,600 D**	**6,500 D**	**3,200 D**	**7,300 D**	11. U	**1,000**	**63**	**550 D**	**110**	**79**	**3. J**
Phenanthrene	50 G	**130**	**180**	**140**	**170**	**89. EJ**	11. U	**68**	**53**	**86**	**79**	**17**	**8. J**
Phenol	1 a	10. U	10. U	10. U	10. U	10. U	--	**8. J**	10. U	10. U	10. U	10. U	10. U
Pyrene	50 G	**20**	**36**	**26**	**46**	**8. J**	11. U	**13**	**22**	**18**	**110**	**3. J**	10. U
Total PAHs		**4,392**	**837**	**643**	**803**	**7,950**	ND	**1,488**	**246**	**550**	**450**	**134**	**58.7**
Total Semivolatiles		**4,412**	**891**	**703**	**859**	**7,969**	ND	**1,515**	**273**	**550**	**450**	**134**	**62.7**
Total PCBs		ND	--	--	--	--	--	ND	--	--	--	--	ND

See Notes on Page 7.

TABLE 4-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW93-6S 10/20/1993 FS	MW93-6S 1/24/1994 FS	MW93-6S 4/26/1994 FS	MW93-6S 12/17/1997 FS	MW93-6D 7/20/1993 FS	MW93-6D 10/20/1993 FS	MW93-6D 1/24/1994 FS	MW93-6D 4/26/1994 FS	MW93-6D 12/17/1997 FS	MW97-7 12/19/1997 FS	MW01-07R 10/1/2001 FS	MW97-8 12/19/1997 FS
2,4-Dimethylphenol	1 a	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	10. U
2,4-Dinitrotoluene	5	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	10. U
2-Methylnaphthalene	NA	10. U	10. U	**140**	10. U	10. U	**160**	10. U	11. U	10. U	10. U	--	**720 D**
2-Methylphenol	1 a	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	10. U
4-Methylphenol	1 a	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	10. U
4-Nitrophenol	1 a	10. U	10. U	12. U	25. U	10. U	10. U	10. U	11. U	25. U	25. U	--	25. U
Acenaphthene	20 G	**36**	10. U	**46**	**3. J**	**60**	**31**	**40**	11. U	10. U	10. U	11. U	**170 EJ**
Acenaphthylene	NA	10. U	10. U	12. U	10. U	10. U	**180**	10. U	11. U	10. U	10. U	11. U	**26**
Anthracene	50 G	10. U	10. U	12. U	10. U	**6. J**	**19**	10. U	11. U	10. U	10. U	11. U	**20**
Benzo(a)anthracene	0.002 G	10. U	10. U	12. U	10. U	10. U	**8. J**	10. U	11. U	10. U	10. U	11. U	**4. J**
Benzo(a)pyrene	ND	10. U	10. U	12. U	10. U	10. U	**8. J**	10. U	11. U	10. U	10. U	11. U	**4. J**
Benzo(b)fluoranthene	0.002 G	10. U	10. U	12. U	10. U	10. U	**5. J**	10. U	11. U	10. U	10. U	11. U	**4. J**
Benzo(g,h,i)perylene	NA	10. U	10. U	12. U	10. U	10. U	**4. J**	10. U	11. U	10. U	10. U	11. U	**1. J**
Benzo(k)fluoranthene	0.002 G	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	11. U	10. U
Benzoic Acid	NA	25. U	24. U	30. U	--	25. U	**30**	24. U	27. U	--	--		--
bis(2-Ethylhexyl)phthalate	50	10. U	10. U	12. U	10. U	**3. J**	**16**	10. U	11. U	10. U	10. U	--	10. U
Carbazole	NA	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	**12**
Chrysene	0.002 G	10. U	10. U	12. U	10. U	10. U	**9. J**	10. U	11. U	10. U	10. U	11. U	**5. J**
Di-n-butyl phthalate	50	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	10. U
Dibenz(a,h)anthracene	NA	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	11. U	10. U
Dibenzofuran	NA	**3. J**	10. U	**4. J**	**1. J**	**5. J**	10. U	10. U	11. U	10. U	10. U	11. U	**16**
Diethyl phthalate	50 G	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	10. U
Fluoranthene	50 G	10. U	10. U	12. U	10. U	**2. J**	**21**	10. U	11. U	10. U	10. U	11. U	**15**
Fluorene	50 G	**4. J**	10. U	12. U	10. U	**41**	**63**	10. U	11. U	10. U	10. U	11. U	**96. EJ**
Hexachloroethane	5	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	10. U
Indeno(1,2,3-cd)pyrene	0.002 G	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	11. UJ	**1. J**
Naphthalene	10 G	**3. J**	10. U	12. U	10. U	**2. J**	**960 D**	10. U	11. U	10. U	10. U	11. U	**3,000 D**
Phenanthrene	50 G	**7. J**	**8. J**	**19**	10. U	**63**	**110**	**9. J**	**4. J**	10. U	10. U	11. U	**100 EJ**
Phenol	1 a	10. U	10. U	12. U	10. U	10. U	10. U	10. U	11. U	10. U	10. U	--	**12**
Pyrene	50 G	10. U	10. U	12. U	10. U	**2. J**	**33**	10. U	11. U	10. U	10. U	11. U	**20**
Total PAHs		**50**	**8**	**205**	**3**	**176**	**960**	**49**	**4**	ND	ND	ND	**4,186**
Total Semivolatiles		**53**	**8**	**209**	**4**	**184**	**960**	**49**	**4**	ND	ND	ND	**4,226**
Total PCBs		--	--	--	--	ND	--	--	--	--	--	--	--

See Notes on Page 7.

TABLE 4-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW97-9S 12/19/1997 FS	MW97-9D 12/19/1997 FS	MW97-10S 12/19/1997 FS	MW97-10D 12/18/1997 FS	MW97-11S 12/19/1997 FS	MW97-12S 12/19/1997 FS	MW97-13S 12/22/1997 FS	MW97-13S 12/22/1997 DUP	MW97-14S 12/22/1997 FS	MW97-14D 12/22/1997 FS	MW98-15S 6/5/1998 FS	MW98-15S 6/5/1998 DUP
2,4-Dimethylphenol	1 a	10. U	10. U	10. U	10. U	10. U	10. U	**440 EJ**	**430 EJ**	10. U	10. U	10. U	10. U
2,4-Dinitrotoluene	5	10. U	10. U	10. U	10. U	10. U	10. U	50. U	50. U	10. U	10. U	**2. J**	10. U
2-Methylnaphthalene	NA	**500 D**	**25**	10. U	**36**	10. U	10. U	**1,800 D**	**1,600 D**	10. U	10. U	**290 D**	**300 D**
2-Methylphenol	1 a	10. U	10. U	10. U	10. U	10. U	10. U	**740 DJ**	**650 DJ**	10. U	10. U	10. U	10. U
4-Methylphenol	1 a	10. U	10. U	10. U	10. U	10. U	10. U	**1,900 D**	**1,700 D**	10. U	10. U	10. U	10. U
4-Nitrophenol	1 a	25. U	25. U	25. U	25. U	25. U	25. U	120 U	120 U	25. U	25. U	**2. J**	24. UJ
Acenaphthene	20 G	**140 EJ**	**6. J**	**2. J**	**23**	**3. J**	10. U	**150**	**140**	10. U	10. U	**130**	**120**
Acenaphthylene	NA	**21**	**28**	10. U	**5. J**	10. U	10. U	**79**	**75**	10. U	10. U	**5. J**	10. U
Anthracene	50 G	**43**	**1. J**	10. U	**12**	10. U	10. U	**140**	**120 J**	10. U	10. U	**17**	**13**
Benzo(a)anthracene	0.002 G	**27**	10. U	10. U	**3. J**	10. U	10. U	**82**	**62. J**	10. U	10. U	**4. J**	**2. J**
Benzo(a)pyrene	ND	**21**	10. U	10. U	**2. J**	10. U	10. U	**85. J**	**65. J**	10. U	10. U	**3. J**	**1. J**
Benzo(b)fluoranthene	0.002 G	**21**	10. U	10. U	**2. J**	10. U	10. U	**67. J**	**54. J**	10. U	10. U	**2. J**	**1. J**
Benzo(g,h,i)perylene	NA	**6. J**	10. U	10. U	10. U	10. U	10. U	**25. J**	**15. J**	10. U	10. U	10. U	10. U
Benzo(k)fluoranthene	0.002 G	10. U	10. U	10. U	10. U	10. U	10. U	**21. J**	**14. J**	10. U	10. U	**2. J**	10. U
Benzoic Acid	NA	--	--	--	--	--	--	--	--	--	--		
bis(2-Ethylhexyl)phthalate	50	10. U	10. U	10. U	10. U	10. U	10. U	50. U	50. UJ	10. U	10. U	**1. J**	10. UJ
Carbazole	NA	**11**	10. U	10. U	10. U	10. U	10. U	50. U	**26. J**	10. U	10. U	10. U	10. U
Chrysene	0.002 G	**16**	10. U	10. U	**4. J**	10. U	10. U	**97**	**74. J**	10. U	10. U	**3. J**	**2. J**
Di-n-butyl phthalate	50	10. U	10. U	10. U	10. U	10. U	10. U	50. U	50. UJ	10. U	10. U	10. U	10. U
Dibenz(a,h)anthracene	NA	**3. J**	10. U	10. U	10. U	10. U	10. U	50. UJ	50. UJ	10. U	10. U	10. U	10. U
Dibenzofuran	NA	**20**	10. U	10. U	**2. J**	10. U	10. U	**16. J**	**14. J**	10. U	10. U	**4. J**	**4. J**
Diethyl phthalate	50 G	10. U	10. U	**1. J**	10. U	10. U	10. U	50. U	50. U	10. U	10. U	10. U	10. U
Fluoranthene	50 G	**45**	10. U	10. U	**10**	10. U	10. U	**150**	**120 J**	10. U	10. U	**13**	**9. J**
Fluorene	50 G	**13**	**3. J**	10. U	**18**	10. U	10. U	**96**	**85**	10. U	10. U	**50**	**44**
Hexachloroethane	5	10. U	10. U	10. U	10. U	10. U	10. U	50. U	50. UJ	10. U	10. U	**3. J**	10. U
Indeno(1,2,3-cd)pyrene	0.002 G	**6. J**	10. U	10. U	10. U	10. U	10. U	**21. J**	**12. J**	10. U	10. U	10. U	10. U
Naphthalene	10 G	**2,200 D**	**910 D**	10. U	**49**	10. U	10. U	**8,200 D**	**7,600 D**	10. U	10. U	**420 D**	**450 D**
Phenanthrene	50 G	**200 EJ**	**8. J**	10. U	**45**	10. U	10. U	**750 DJ**	**550 DJ**	10. U	10. U	**76**	**64**
Phenol	1 a	**35**	10. U	10. U	10. U	10. U	10. U	**3,100 D**	**2,900 D**	10. U	**1. J**	10. U	10. U
Pyrene	50 G	**91. EJ**	**1. J**	10. U	**13**	10. U	10. U	**290**	**230 J**	10. U	10. U	**16**	**11**
Total PAHs		**3,353**	**982**	**2**	**222**	**3**	ND	**12,053**	**10,816**	ND	ND	**1,031**	**1,017**
Total Semivolatiles		**3,419**	**982**	**3**	**224**	**3**	ND	**18,249**	**16,536**	ND	**1**	**1,043**	**1,021**
Total PCBs		--	--	--	--	--	--	--	--	--	--	--	--

See Notes on Page 7.

TABLE 4-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW98-16S 6/5/1998 FS	MW98-16D 6/5/1998 FS	MW01-17S 10/2/2001 FS	MW01-17D 10/2/2001 FS	MW01-17D 10/2/2001 DUP	B-1 12/19/1997 FS	TW97-1D 12/22/1997 FS	TW97-2S 12/22/1997 FS	TW97-2D 12/22/1997 FS	TW97-3S 12/22/1997 FS	TW97-3S 12/22/1997 DUP	TW97-3S 10/2/2001 FS
2,4-Dimethylphenol	1 a	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
2,4-Dinitrotoluene	5	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
2-Methylnaphthalene	NA	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
2-Methylphenol	1 a	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
4-Methylphenol	1 a	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
4-Nitrophenol	1 a	24. UJ	24. UJ	--	--	--	25. U	25. U	25. U	25. U	25. U	25. U	--
Acenaphthene	20 G	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	**2. J**	**2. J**	11. U
Acenaphthylene	NA	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Anthracene	50 G	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Benzo(a)anthracene	0.002 G	10. UJ	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Benzo(a)pyrene	ND	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	**1. J**	11. U
Benzo(b)fluoranthene	0.002 G	10. UJ	10. UJ	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Benzo(g,h,i)perylene	NA	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Benzo(k)fluoranthene	0.002 G	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Benzoic Acid	NA						--	--	--	--	--	--	
bis(2-Ethylhexyl)phthalate	50	**9. J**	**2. J**	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Carbazole	NA	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Chrysene	0.002 G	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Di-n-butyl phthalate	50	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Dibenz(a,h)anthracene	NA	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Dibenzofuran	NA	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Diethyl phthalate	50 G	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Fluoranthene	50 G	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	**1. J**	11. U
Fluorene	50 G	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Hexachloroethane	5	10. U	10. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Indeno(1,2,3-cd)pyrene	0.002 G	10. U	10. U	11. UJ	11. UJ	10. UJ	10. U	10. U	10. U	10. U	10. U	10. U	11. UJ
Naphthalene	10 G	10. U	10. U	11. U	11. U	10. U	10. U	**5. J**	**2. J**	10. U	10. U	10. U	11. U
Phenanthrene	50 G	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	11. U
Phenol	1 a	10. U	10. U	--	--	--	10. U	**4. J**	**1. J**	10. U	**2. J**	10. U	--
Pyrene	50 G	10. U	10. U	11. U	11. U	10. U	10. U	10. U	10. U	10. U	**3. J**	**4. J**	11. U
Total PAHs		ND	ND	ND	ND	ND	ND	**5**	**2**	ND	**5**	**8**	ND
Total Semivolatiles		**9**	**2**	ND	ND	ND	ND	**9**	**3**	ND	**7**	**8**	ND
Total PCBs		--	--	--	--	--	--	--	--	--	--	--	--

See Notes on Page 7.

TABLE 4-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Notes:
All concentrations reported in micrograms per liter (ug/L); also expressed as parts per billion (ppb).
NYSDEC GA Criteria values as reported in NYSDEC, Division of Water Technical and Operational Guidance Series (1.1.1) Memorandum, Ambient Water Quality Standards and Guidance Values, dated October 1993.
Detections are bolded.
Concentrations above the NYSDEC GA criteria values are shaded.
ND = Not detected.
D = Concentration is based on a diluted sample analysis.
E = The compound was quantitated above the calibration range.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Criteria Notes:
a = Value listed applies to the sum of these substances.
d = Value listed applies to each isomer (1,2-, 1,3-, and 1,4-) individually.
G = Guidance value.
NA = Not available/Not applicable.

TABLE 4-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED INORGANIC CONSTITUENTS

Location	NYSDEC	MW93-1D	MW93-1D	MW93-1D	MW93-1D	MW93-1D	MW93-2S	MW93-2S	MW93-2S	MW93-2S	MW93-2S	MW93-2D	MW93-2D
Date Sampled	GA	7/20/1993	10/20/1993	1/24/1994	4/26/1994	12/18/1997	7/20/1993	10/20/1993	1/24/1994	4/26/1994	12/18/1997	7/20/1993	10/20/1993
Sample Type	Criteria	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Aluminum	NA	**28,800**	**20,200**	**10,100**	**3,660**	**575 JN**	**27,400**	**35,700**	**43,600**	**70,200**	**1,480 JN**	**24,300**	**9,990**
Aluminum, Dissolved	NA	--	--	--	--	19. UN	--	--	--	--	19. UN	--	--
Antimony	3 G	5. U	5. U	3. U	3. U	4.9 UJ*	5. U	5. U	3. U	3. U	4.9 UJ*	5. U	5. U
Antimony, Dissolved	3 G	--	--	--	--	4.9 UJ*	--	--	--	--	4.9 UJ*	--	--
Arsenic	25	**19.4**	**15.7**	**10.2**	**8.1 B**	**6.1 B**	**9.7 J**	**14.1**	**18.8**	**19.5**	4.6 U	**15.3**	**10.5**
Arsenic, Dissolved	25	--	--	--	--	4.6 U	--	--	--	--	4.6 U	--	--
Barium	1,000	**200**	**144 J**	**93. J**	**93. B**	**47.9 BE**	**248 J**	**338**	**473**	**555**	**47.7 BE**	**192 J**	**112 J**
Barium, Dissolved	1,000	--	--	--	--	**42.1 BE**	--	--	--	--	**37.6 BE**	--	--
Beryllium	3 G	--	--	--	--	1. U	--	--	--	--	1. U	--	--
Beryllium, Dissolved	3 G	--	--	--	--	1. U	--	--	--	--	1. U	--	--
Cadmium	5	**5**	4. U	3. U	3. U	10. U	6. U	**5**	**6**	**3. B**	10. U	4. U	4. U
Cadmium, Dissolved	5	--	--	--	--	10. U	--	--	--	--	10. U	--	--
Calcium		--	--	--	--	**140,000**	--	--	--	--	**68,300**	--	--
Calcium, Dissolved		--	--	--	--	**138,000**	--	--	--	--	**71,000**	--	--
Chromium	50	**112**	68. U	**25**	**10**	**52.5 JN**	**38**	**56**	**62**	**582**	**52.8 JN**	**76**	**24**
Chromium, Dissolved	50	--	--	--	--	1.4 UN	--	--	--	--	1.4 UN	--	--
Cobalt	NA	--	--	--	--	2. U	--	--	--	--	2. U	--	--
Cobalt, Dissolved	NA	--	--	--	--	2. U	--	--	--	--	2. U	--	--
Copper	200	**81**	62. U	**32**	**20. B**	20. U	**43**	**103**	**134**	**124**	20. U	**49**	**26**
Copper, Dissolved	200	--	--	--	--	20. U	--	--	--	--	20. U	--	--
Iron	300	**48,700**	40,800 U	**20,500**	**6,900**	**2,780 JN***	**40,300**	**58,200**	**72,000**	**121,000**	**2,530 JN***	**41,700**	**20,000**
Iron, Dissolved	300	--	--	--	--	**1,810 N***	--	--	--	--	**28.6 BN***	--	--
Lead	25	**33.4**	24.7 U	**12.3**	**16.9**	R	**48.1**	**81**	**71.5**	**167**	R	1. U	**14.4**
Lead, Dissolved	25	--	--	--	--	R	--	--	--	--	R	--	--
Magnesium	35,000 G	--	--	--	--	**24,000**	--	--	--	--	**3,210 B**	--	--
Magnesium, Dissolved	35,000 G	--	--	--	--	**23,600**	--	--	--	--	**2,770 B**	--	--
Manganese	300	**3,170**	3,150 U	**2,740**	**2,380**	**2,220 ***	**1,580**	**1,870**	**2,760**	**2,950**	**283 ***	**2,980**	**2,540**
Manganese, Dissolved	300	--	--	--	--	**2,190 ***	--	--	--	--	**94.7 ***	--	--
Mercury	2	**0.15 J**	0.10 U	0.10 U	0.10 U	0.20 U	**0.2**	**0.33**	0.10 U	**0.5**	0.20 U	**0.13 J**	0.10 U
Mercury, Dissolved	2	--	--	--	--	0.20 U	--	--	--	--	0.20 U	--	--
Nickel	100	**74**	**53**	**22. J**	**10. B**	**5.1 B**	**49**	**89**	**98**	**270**	**44.9**	**56**	**27. J**
Nickel, Dissolved	100	--	--	--	--	1.3 U	--	--	--	--	**4.3 B**	--	--
Potassium		--	--	--	--	**1,080 B**	--	--	--	--	**2,830 B**	--	--
Potassium, Dissolved		--	--	--	--	**938 B**	--	--	--	--	**2,810 B**	--	--
Selenium	10	**1.1 J**	1. U	1. U	1. U	4.3 U	**2. J**	1. U	2. U	1. U	4.3 U	**1.1 J**	1. U
Selenium, Dissolved	10	--	--	--	--	4.3 U	--	--	--	--	4.3 U	--	--
Silver	50	7. U	7. U	**4. J**	3. U	2. UJ	7. U	7. U	3. U	**3. B**	2. UJ	7. U	7. U
Silver, Dissolved	50	--	--	--	--	2. UJ	--	--	--	--	2. UJ	--	--
Sodium	20,000	--	--	--	--	**44,600**	--	--	--	--	**11,400**	--	--
Sodium, Dissolved	20,000	--	--	--	--	**44,400**	--	--	--	--	**10,500**	--	--
Thallium	4 G	--	--	--	--	5.6 U	--	--	--	--	5.6 U	--	--
Thallium, Dissolved	4 G	--	--	--	--	5.6 U	--	--	--	--	5.6 U	--	--
Vanadium	NA	**49. J**	**40. J**	**21. J**	**19. B**	1. U	**35. J**	**60**	**55**	**97**	**2.5 B**	**34. J**	**24. J**
Vanadium, Dissolved	NA	--	--	--	--	1. U	--	--	--	--	**1.3 B**	--	--
Zinc	300	**138**	**148**	**55**	**31**	**17.4 B**	**178**	**283**	**346**	**533**	**27.1**	**124**	**59**
Zinc, Dissolved	300	--	--	--	--	6.1 U	--	--	--	--	**11.7 B**	--	--
Cyanide, Amenable	200	--	--	--	--	--	--	--	10. U	--	--	--	--
Cyanide, Total	200	10. U	10. U	10. U	10. U	10. U	10. U	10. U	**17.8**	10. U	10. U	10. U	10. U

See Notes on Page 7.

TABLE 4-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED INORGANIC CONSTITUENTS

Location	NYSDEC	MW93-2D	MW93-2D	MW93-2D	MW93-3S	MW93-3S	MW93-3S	MW93-3S	MW93-3S	MW93-3S	MW93-3S	MW93-3S	MW93-3S
Date Sampled	GA	1/24/1994	4/26/1994	12/18/1997	7/20/1993	7/20/1993	10/20/1993	10/20/1993	1/24/1994	1/24/1994	4/26/1994	4/26/1994	12/18/1997
Sample Type	Criteria	FS	FS	FS	FS	DUP	FS	DUP	FS	DUP	FS	DUP	FS
Aluminum	NA	**5,980**	**21,300**	**647 JN**	**183,000**	**119,000**	**218,000**	**119,000**	**191,000**	**108,000**	**115,000**	**150,000**	**15,600 JN**
Aluminum, Dissolved	NA	--	--	19. UN	--	--	--	--	--	--	--	--	19. UN
Antimony	3 G	3. U	3. U	4.9 UJ*	5. U	5. U	5. U	5. U	3. U	3. U	3. U	3. U	4.9 UJ*
Antimony, Dissolved	3 G	--	--	4.9 UJ*	--	--	--	--	--	--	--	--	4.9 UJ*
Arsenic	25	**5.2 J**	**13.2**	4.6 U	**54.7**	**45.2**	**82.8**	**39.9**	**69.2**	**36.5**	**50.1**	**41.3**	**10.3**
Arsenic, Dissolved	25	--	--	4.6 U	--	--	--	--	--	--	--	--	4.6 U
Barium	1,000	**81. J**	**217**	**69.9 BE**	**876**	**690**	**1,010**	**803**	**924**	**722**	**572**	**837**	**253 E**
Barium, Dissolved	1,000	--	--	**61. BJE**	--	--	--	--	--	--	--	--	**49.1 BE**
Beryllium	3 G	--	--	1. U	--	--	--	--	--	--	--	--	**1. B**
Beryllium, Dissolved	3 G	--	--	1. U	--	--	--	--	--	--	--	--	1. U
Cadmium	5	3. U	3. U	10. U	**5**	**6**	4. U	**4. J**	**7**	**8**	3. U	3. U	10. U
Cadmium, Dissolved	5	--	--	10. U	--	--	--	--	--	--	--	--	10. U
Calcium		--	--	**125,000**	--	--	--	--	--	--	--	--	**108,000**
Calcium, Dissolved		--	--	**119,000**	--	--	--	--	--	--	--	--	**96,500**
Chromium	50	**9. J**	**39**	**5.2 BJN**	**255**	**175**	**795**	**529**	**3,320**	**1,810**	**5,260**	**13,700**	**2,760 JN**
Chromium, Dissolved	50	--	--	1.4 UN	--	--	--	--	--	--	--	--	**1.8 BN**
Cobalt	NA	--	--	2. U	--	--	--	--	--	--	--	--	**28.4 B**
Cobalt, Dissolved	NA	--	--	2. U	--	--	--	--	--	--	--	--	2. U
Copper	200	**20. J**	**47**	20. U	**390**	**291**	**393**	**269**	**425**	**260**	**262**	**501**	**113**
Copper, Dissolved	200	--	--	20. U	--	--	--	--	--	--	--	--	20. U
Iron	300	**11,900**	**43,400**	**1,370 JN***	**249,000**	**179,000**	**313,000**	**179,000**	**305,000**	**171,000**	**215,000**	**312,000**	**35,700 JN***
Iron, Dissolved	300	--	--	**354 N***	--	--	--	--	--	--	--	--	17.9 UN*
Lead	25	**6.4**	**29.5**	R	**211**	**136**	**228**	**140**	**176**	**94.5**	**116**	**80.8**	**21.3 J**
Lead, Dissolved	25	--	--	R	--	--	--	--	--	--	--	--	R
Magnesium	35,000 G	--	--	**29,500**	--	--	--	--	--	--	--	--	**11,300**
Magnesium, Dissolved	35,000 G	--	--	**28,000**	--	--	--	--	--	--	--	--	**7,180**
Manganese	300	**2,540**	**3,380**	**2,170 ***	**4,630**	**3,920**	**4,320**	**2,980**	**4,540**	**3,090**	**2,780**	**3,820**	**541 ***
Manganese, Dissolved	300	--	--	**2,050 ***	--	--	--	--	--	--	--	--	**11.6 B***
Mercury	2	0.10 U	0.10 U	0.20 U	**0.58**	**0.53**	**0.43**	**0.6**	**0.11 J**	0.10 U	**0.18 B**	0.10 U	0.20 U
Mercury, Dissolved	2	--	--	0.20 U	--	--	--	--	--	--	--	--	0.20 U
Nickel	100	**10. J**	**50**	**4.1 B**	**335**	**238**	**618**	**460**	**1,100**	**641**	**486**	**1,110**	**212**
Nickel, Dissolved	100	--	--	1.3 U	--	--	--	--	--	--	--	--	**50.1**
Potassium		--	--	**1,760 B**	--	--	--	--	--	--	--	--	**5,590**
Potassium, Dissolved		--	--	**1,680 B**	--	--	--	--	--	--	--	--	**4,050 B**
Selenium	10	1. U	1. U	4.3 U	**1.4 J**	**2.1 J**	1. U	1. U	**2. J**	**2.2 J**	**1.1 B**	1. U	**9.9**
Selenium, Dissolved	10	--	--	4.3 U	--	--	--	--	--	--	--	--	**9.8**
Silver	50	**53**	**5. B**	2. UJ	7. U	7. U	7. U	7. U	3. U	**4. J**	3. U	3. U	2. UJ
Silver, Dissolved	50	--	--	2. UJ	--	--	--	--	--	--	--	--	2. UJ
Sodium	20,000	--	--	**67,100**	--	--	--	--	--	--	--	--	**30,900**
Sodium, Dissolved	20,000	--	--	**64,400**	--	--	--	--	--	--	--	--	**26,000**
Thallium	4 G	--	--	5.6 U	--	--	--	--	--	--	--	--	5.6 U
Thallium, Dissolved	4 G	--	--	5.6 U	--	--	--	--	--	--	--	--	5.6 U
Vanadium	NA	**11. J**	**41. B**	1. U	**249**	**162**	**285**	**162**	**236**	**131**	**169**	**233**	**26.4 B**
Vanadium, Dissolved	NA	--	--	1. U	--	--	--	--	--	--	--	--	1. U
Zinc	300	**36**	**29**	**13.8 B**	**885**	**624**	**1,020**	**589**	**1,040**	**549**	**544**	**741**	**92.3**
Zinc, Dissolved	300	--	--	6.1 U	--	--	--	--	--	--	--	--	6.1 U
Cyanide, Amenable	200	--	--	--	--	--	--	--	10. U	**14.3**	10. U	10. U	--
Cyanide, Total	200	10. U	10. U	10. U	10. U	29.3 U	10. U	10. U	**11.4**	**14.3**	**13.3**	**10.4**	10. U

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TABLE 4-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED INORGANIC CONSTITUENTS

Location / Date Sampled / Sample Type	NYSDEC GA Criteria	MW93-3D 7/20/1993 FS	MW93-3D 10/20/1993 FS	MW93-3D 1/24/1994 FS	MW93-3D 4/26/1994 FS	MW93-3D 12/18/1997 FS	MW01-03R 10/1/2001 FS	MW93-5D 7/20/1993 FS	MW93-5D 10/20/1993 FS	MW93-5D 1/24/1994 FS	MW93-5D 4/26/1994 FS	MW93-5D 12/19/1997 FS	MW93-6S 7/20/1993 FS
Aluminum	NA	**18,700**	**11,600**	**2,840**	**8,550**	**423 JN**	--	**9,210**	**59,700**	**9,070**	**2,690**	19. UN	**112,000**
Aluminum, Dissolved	NA	--	--	--	--	19. UN	--	--	--	--	--	19. UN	--
Antimony	3 G	5. U	5. U	3. U	3. U	**31.8 BJ***	--	5. U	5. U	3. U	3. U	4.9 UJ*	5. U
Antimony, Dissolved	3 G	--	--	--	--	4.9 UJ*	--	--	--	--	--	4.9 UJ*	--
Arsenic	25	**10.4**	**9. J**	**3.6 J**	**5.3 B**	4.6 U	--	**4.9 J**	**35.3**	**5.6 J**	2. U	4.6 U	**63.3**
Arsenic, Dissolved	25	--	--	--	--	4.6 U	--	--	--	--	--	4.6 U	--
Barium	1,000	**201**	**166 J**	**92. J**	**142 B**	**115 BE**	--	**154 J**	**720**	**141 J**	**82. B**	**71.6 BE**	**648**
Barium, Dissolved	1,000	--	--	--	--	**109 BJE**	--	--	--	--	--	**71. BJE**	--
Beryllium	3 G	--	--	--	--	1. U	--	--	--	--	--	1. U	--
Beryllium, Dissolved	3 G	--	--	--	--	1. U	--	--	--	--	--	1. U	--
Cadmium	5	**4**	4. U	3. U	3. U	10. U	--	4. U	**8**	3. U	3. U	10. U	**6**
Cadmium, Dissolved	5	--	--	--	--	10. U	--	--	--	--	--	10. U	--
Calcium		--	--	--	--	**133,000**	--	--	--	--	--	**131,000**	--
Calcium, Dissolved		--	--	--	--	**129,000**	--	--	--	--	--	**140,000**	--
Chromium	50	55. U	**28**	**5. J**	**14**	**7.7 BJN**	--	**65**	**359**	**42**	**10**	1.4 UN	**201**
Chromium, Dissolved	50	--	--	--	--	1.4 UN	--	--	--	--	--	1.4 UN	--
Cobalt	NA	--	--	--	--	2. U	--	--	--	--	--	2. U	--
Cobalt, Dissolved	NA	--	--	--	--	2. U	--	--	--	--	--	2. U	--
Copper	200	**51**	**40**	**12. J**	**24. B**	20. U	--	**31**	**170**	**30**	4. U	20. U	**409**
Copper, Dissolved	200	--	--	--	--	20. U	--	--	--	--	--	20. U	--
Iron	300	**29,600**	**23,700**	**5,750**	**16,500**	**1,970 JN***	--	**15,200**	**113,000**	**17,200**	**2,660**	**121 JN***	**217,000**
Iron, Dissolved	300	--	--	--	--	**1,290 N***	--	--	--	--	--	17.9 UN*	--
Lead	25	**25.9**	**23.4**	**8**	**17**	R	--	**10.7**	**106**	**13.2**	**5.8**	R	**228**
Lead, Dissolved	25	--	--	--	--	R	--	--	--	--	--	R	--
Magnesium	35,000 G	--	--	--	--	**23,900**	--	--	--	--	--	**26,200**	--
Magnesium, Dissolved	35,000 G	--	--	--	--	**23,300**	--	--	--	--	--	**28,400**	--
Manganese	300	**1,590**	**1,500**	**1,030**	**1,450**	**1,180 ***	--	**892**	**2,000**	**728**	**708**	**407 ***	**16,100**
Manganese, Dissolved	300	--	--	--	--	**1,130 ***	--	--	--	--	--	**406 ***	--
Mercury	2	**0.12 J**	0.10 U	0.10 U	0.10 U	0.20 U	--	0.10 U	**0.28**	0.10 U	0.10 U	0.20 U	**0.45**
Mercury, Dissolved	2	--	--	--	--	0.20 U	--	--	--	--	--	0.20 U	--
Nickel	100	**37. J**	**30. J**	8. U	**16. B**	**3.5 B**	--	**52**	**271**	**39. J**	**8. B**	**3.2 B**	**259**
Nickel, Dissolved	100	--	--	--	--	1.3 U	--	--	--	--	--	**2.8 B**	--
Potassium		--	--	--	--	**2,030 B**	--	--	--	--	--	**2,700 B**	--
Potassium, Dissolved		--	--	--	--	**2,060 B**	--	--	--	--	--	**2,460 B**	--
Selenium	10	**1.3 J**	1. U	1. U	1. U	4.3 U	--	**1.9 J**	1. U	**1.1 J**	1. U	4.3 U	**3.1 J**
Selenium, Dissolved	10	--	--	--	--	4.3 U	--	--	--	--	--	**12.1**	--
Silver	50	7. U	7. U	3. U	3. U	2. UJ	--	7. U	**7. J**	3. U	3. U	2. UJ	7. U
Silver, Dissolved	50	--	--	--	--	2. UJ	--	--	--	--	--	2. UJ	--
Sodium	20,000	--	--	--	--	**69,900**	--	--	--	--	--	**86,700**	--
Sodium, Dissolved	20,000	--	--	--	--	**69,300**	--	--	--	--	--	**90,000**	--
Thallium	4 G	--	--	--	--	5.6 U	--	--	--	--	--	5.6 U	--
Thallium, Dissolved	4 G	--	--	--	--	5.6 U	--	--	--	--	--	5.6 U	--
Vanadium	NA	**34. J**	**24. J**	**7. J**	**25. B**	**1. B**	--	**19. J**	**100**	**18. J**	**19. B**	1. U	**173**
Vanadium, Dissolved	NA	--	--	--	--	1. U	--	--	--	--	--	1. U	--
Zinc	300	**90**	**73**	**25**	**45**	**18.3 B**	--	**172**	**383**	**66**	**12. B**	**7.2 B**	**696**
Zinc, Dissolved	300	--	--	--	--	**8.5 B**	--	--	--	--	--	**6.5 B**	--
Cyanide, Amenable	200	--	--	--	--	--	--	--	**39.3**	--	--	--	--
Cyanide, Total	200	10. U	10. U	10. U	10. U	10. U	**2. B**	10. U	**39.3**	10. U	10. U	10. U	14.5 U

See Notes on Page 7.

TABLE 4-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED INORGANIC CONSTITUENTS

Location	NYSDEC	MW93-6S	MW93-6S	MW93-6S	MW93-6S	MW93-6D	MW93-6D	MW93-6D	MW93-6D	MW93-6D	MW97-7	MW01-07R	MW97-8
Date Sampled	GA	10/20/1993	1/24/1994	4/26/1994	12/17/1997	7/20/1993	10/20/1993	1/24/1994	4/26/1994	12/17/1997	12/19/1997	10/1/2001	12/19/1997
Sample Type	Criteria	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Aluminum	NA	**75,100**	**101,000**	**31,600**	**4,430 JN**	**14,000**	**9,690**	**7,510**	**3,050**	**278 JN**	**5,070 JN**	--	**5,930 JN**
Aluminum, Dissolved	NA	--	--	--	19. UN	--	--	--	--	19. UN	**1,270 N**	--	**30.5 BN**
Antimony	3 G	5. U	3. U	3. U	4.9 UJ*	5. U	5. U	3. U	3. U	4.9 UJ*	4.9 UJ*	--	4.9 UJ*
Antimony, Dissolved	3 G	--	--	--	4.9 U*	--	--	--	--	4.9 U*	4.9 UJ*	--	4.9 UJ*
Arsenic	25	**43.4**	**56.7**	**20.7**	**16.5**	**12.4**	**11.2**	**7.1 J**	**2.9 B**	4.6 U	**6.3 B**	--	**4.8 B**
Arsenic, Dissolved	25	--	--	--	4.6 U	--	--	--	--	4.6 U	4.6 U	--	4.6 U
Barium	1,000	**712**	**561**	**246**	**215 E**	**148 J**	**142 J**	**104 J**	**95. B**	**97.9 BE**	**1,770 E**	--	**597 E**
Barium, Dissolved	1,000	--	--	--	**92.1 BJE**	--	--	--	--	**93.8 BJE**	**978 JE**	--	**459 JE**
Beryllium	3 G	--	--	--	1. U	--	--	--	--	1. U	**2.5 B**	--	1. U
Beryllium, Dissolved	3 G	--	--	--	1. U	--	--	--	--	1. U	1. U	--	1. U
Cadmium	5	**6**	**25**	3. U	10. U	**4. J**	4. U	**5**	3. U	10. U	10. U	--	10. U
Cadmium, Dissolved	5	--	--	--	10. U	--	--	--	--	10. U	10. U	--	10. U
Calcium		--	--	--	**165,000**	--	--	--	--	**144,000**	**247,000**	--	**156,000**
Calcium, Dissolved		--	--	--	**157,000**	--	--	--	--	**137,000**	**188,000**	--	**155,000**
Chromium	50	**151**	**174**	**58**	**29. JN**	**46**	**25**	**16**	**10**	**37.3 JN**	1.4 UN	--	**8.4 BJN**
Chromium, Dissolved	50	--	--	--	1.4 UN	--	--	--	--	1.4 UN	1.4 UN	--	1.4 UN
Cobalt	NA	--	--	--	**5.2 B**	--	--	--	--	2. U	**19.8 B**	--	**9.2 B**
Cobalt, Dissolved	NA	--	--	--	2. U	--	--	--	--	2. U	**3.9 B**	--	2. U
Copper	200	**330**	**345**	**114**	20. U	**39**	**37**	**25**	**12. B**	20. U	**94.9**	--	**47**
Copper, Dissolved	200	--	--	--	20. U	--	--	--	--	20. U	**28.3**	--	20. U
Iron	300	**158,000**	**236,000**	**99,400**	**93,100 JN***	**24,200**	**18,900**	**14,300**	**6,280**	**1,760 JN***	**2,280 JN***	--	**15,000 JN***
Iron, Dissolved	300	--	--	--	**2,890 N***	--	--	--	--	17.9 UN*	**294 N***	--	**2,580 N***
Lead	25	**246**	**186**	**68**	**11. J**	**20.2**	**24**	**11.4**	**5.4**	R	**29.2 J**	--	**51.2**
Lead, Dissolved	25	--	--	--	R	--	--	--	--	R	R	--	R
Magnesium	35,000 G	--	--	--	**17,900**	--	--	--	--	**26,000**	**60,300**	--	**21,500**
Magnesium, Dissolved	35,000 G	--	--	--	**16,400**	--	--	--	--	**24,700**	**27,900**	--	**19,600**
Manganese	300	**16,500**	**17,900**	**9,570**	**7,140 ***	**613**	**538**	**344**	**236**	**275 ***	**18,300 ***	--	**2,810 ***
Manganese, Dissolved	300	--	--	--	**6,590 ***	--	--	--	--	**159 ***	**6,190 ***	--	**2,140 ***
Mercury	2	**0.66**	**0.22**	0.10 U	0.20 U	**0.15 J**	0.10 U	0.10 U	0.10 U	0.20 U	0.20 U	--	0.20 U
Mercury, Dissolved	2	--	--	--	0.20 U	--	--	--	--	0.20 U	0.20 U	--	0.20 U
Nickel	100	**194**	**214**	**75**	**12.3 B**	**37. J**	**28. J**	**19. J**	**12. B**	**39.2 B**	**51.5**	--	**15.7 B**
Nickel, Dissolved	100	--	--	--	**1.6 B**	--	--	--	--	**26.4 B**	**9.6 B**	--	**3.4 B**
Potassium		--	--	--	**3,890 B**	--	--	--	--	**2,090 B**	**14,600**	--	**22,100**
Potassium, Dissolved		--	--	--	**3,410 B**	--	--	--	--	**2,130 B**	**14,100**	--	**22,500**
Selenium	10	1. U	2. U	1. U	**33.8**	**1.4 J**	1. U	1. U	1. U	4.3 U	**8.2**	--	4.3 U
Selenium, Dissolved	10	--	--	--	**4.6 B**	--	--	--	--	4.3 U	**7.9 J**	--	**9.2**
Silver	50	7. U	**24**	3. U	2. U	7. U	7. U	**5. J**	**4. B**	2. UJ	2. UJ	--	2. UJ
Silver, Dissolved	50	--	--	--	2. UJ	--	--	--	--	2. UJ	2. UJ	--	2. UJ
Sodium	20,000	--	--	--	**74,900**	--	--	--	--	**80,700**	**387,000 J**	--	**700,000**
Sodium, Dissolved	20,000	--	--	--	**71,200**	--	--	--	--	**78,600**	**476,000 J**	--	**710,000**
Thallium	4 G	--	--	--	5.6 U	--	--	--	--	5.6 U	5.6 U	--	5.6 U
Thallium, Dissolved	4 G	--	--	--	5.6 U	--	--	--	--	5.6 U	**5.7 B**	--	5.6 U
Vanadium	NA	**143**	**149**	**74**	**10.6 B**	**26. J**	**29. J**	**16. J**	**19. B**	1. U	**5. B**	--	**12.8 B**
Vanadium, Dissolved	NA	--	--	--	**1.2 B**	--	--	--	--	1. U	**2.6 B**	--	**1.4 B**
Zinc	300	**542**	**622**	**181**	**59.2**	**75**	**61**	**63**	**16. B**	**6.2 B**	**63.6**	--	**92.3**
Zinc, Dissolved	300	--	--	--	**7.8 B**	--	--	--	--	**7.2 B**	**21.6**	--	**10.6 B**
Cyanide, Amenable	200	10. U	10. U	--	--	--	--	--	--	--	--	--	--
Cyanide, Total	200	**22.3**	**11.7**	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	**16**	10. U

See Notes on Page 7.

TABLE 4-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED INORGANIC CONSTITUENTS

Location Date Sampled Sample Type	NYSDEC GA Criteria	MW97-9S 12/19/1997 FS	MW97-9D 12/19/1997 FS	MW97-10S 12/19/1997 FS	MW97-10D 12/18/1997 FS	MW97-11S 12/19/1997 FS	MW97-12S 12/19/1997 FS	MW97-13S 12/22/1997 FS	MW97-13S 12/22/1997 DUP	MW97-14S 12/22/1997 FS	MW97-14D 12/22/1997 FS	MW98-15S 6/5/1998 FS	MW98-15S 6/5/1998 DUP
Aluminum	NA	92,600 JN	1,080 JN	1,770 JN	23,200 JN	105,000 JN	26,400 JN	313 JN	191 BJN	15,800 JE	32,800 JE	1,530	1,400
Aluminum, Dissolved	NA	23.1 BN	19. UN	19. UN	19. UN	19. BN	31.1 BN	69.3 BN	53.6 BN	84.5 BE	89.7 BE	40. U	40. U
Antimony	3 G	7.6 BJ*	4.9 UJ*	4.9 UJ*	4.9 UJ*	986 J*	4.9 UJ*	1,370 J*	53.2 BJ*	4.9 UJ	16.6 BJ	7. UJ	7. UJ
Antimony, Dissolved	3 G	4.9 UJ*	4.9 UJ*	4.9 UJ*	4.9 UJ*	4.9 UJ*	4.9 UJ*	4.9 UJ*	4.9 UJ*	4.9 U	4.9 U	7. UJ	7. UJ
Arsenic	25	153	4.6 U	5.5 B	21.2	64.9	13.2	29.1	25	4.6 U	24.1	20.4	23
Arsenic, Dissolved	25	35.3	4.6 U	6.2 B	4.6 U	4.6 U	10.2	24	22.8	4.6 U	4.6 U	25.6	26.6
Barium	1,000	1,720 E	71.4 BE	94. BE	417 E	572 E	858 E	278 E	310 E	264 E	366 E	205	214
Barium, Dissolved	1,000	773 JE	46.3 BE	70.4 BJE	94.7 BJE	162 BJE	210 JE	277 JE	285 JE	54.7 BJE	56.6 BJE	212	222
Beryllium	3 G	5.4	1. U	1. U	1.1 B	4.4 B	6.5	1. U	1. U	6.5	1.8 B	1. U	1. U
Beryllium, Dissolved	3 G	1. U	1. U	1. U	1. U	1. U	1. U	1. U	1. U	1. BJ	1.1 BJ	1. U	1. U
Cadmium	5	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	1. U	1. U
Cadmium, Dissolved	5	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	10. U	1. U	1. U
Calcium		155,000	103,000	72,900	165,000	229,000	138,000	383,000	421,000	240,000	160,000	75,100	77,700
Calcium, Dissolved		169,000	105,000	68,700	136,000	168,000	140,000	419,000	429,000	145,000	143,000	80,600	83,500
Chromium	50	107 JN	1.4 UN	1.4 UN	33. JN	146 JN	19.9 JN	15.4 JN	2.7 BJN	2.1 B	45.1	2. U	2.2 B
Chromium, Dissolved	50	1.4 UN	1.4 UN	1.4 UN	1.4 UN	1.4 UN	1.4 UN	1.4 UN	1.4 UN	1. U	1. U	2. U	2. U
Cobalt	NA	67.9	2. U	3.1 B	21.4 B	79.3	34.2 B	8.1 B	5.2 B	46.7 B	31.2 B	2. U	2. B
Cobalt, Dissolved	NA	2.6 B	2. U	2. U	2. U	2.7 B	2.2 B	5.5 B	5.9 B	2. U	2. U	2. U	2. U
Copper	200	437	20. U	20. U	67.4	246	235	20. U	20. U	108	78.2	21.7 B	23.6 B
Copper, Dissolved	200	20. U	20. U	20. U	20. U	20. U	20. U	20. U	20. U	20. U	20. U	2. U	2. U
Iron	300	246,000 JN*	2,570 N*	5,070 JN*	46,500 JN*	165,000 JN*	50,400 JN*	8,960 JN*	9,100 JN*	906	64,500	8,700	9,000
Iron, Dissolved	300	38,000 N*	38.8 BN*	2,760 N*	17.9 UN*	1,510 N*	7,490 N*	5,740 N*	6,120 N*	17.9 U	17.9 U	7,060	7,780
Lead	25	134	R	38.6	64.4	140	113	10.2 J	R	16.9	38.6	5.8	3.2
Lead, Dissolved	25	R	R	R	R	R	R	R	R	R	R	2. U	2. U
Magnesium	35,000 G	42,300	21,300	3,130 B	37,600	70,300	25,100	55,800 J	62,000	45,500	44,600	8,680	8,890
Magnesium, Dissolved	35,000 G	25,300	21,900	2,840 B	25,500	31,300	26,500	68,400 J	69,000	13,800	29,400	8,740	9,030
Manganese	300	10,900 *	1,140 *	2,000 *	2,390 *	8,000 *	9,830 *	821 *	902 *	1,420	2,600	1,720	1,790
Manganese, Dissolved	300	8,360 *	1,030 *	1,940 *	866 *	5,840 *	8,350 *	776 *	827 *	2.3 B	884	1,850	1,880
Mercury	2	0.21	0.20 U	0.20 U	0.20 U	0.20 U	0.42	0.20 U	0.20 U	0.20 U	0.20 U	0.10 U	0.10 U
Mercury, Dissolved	2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.10 U	0.10 U
Nickel	100	163	5. B	5.1 B	45.9	190	47.6	12.5 B	15. B	80.1 J	71.8 J	4.3 B	4.4 B
Nickel, Dissolved	100	1.9 B	1.9 B	2.2 B	1.3 U	3.4 B	1.8 B	18.7 B	18.4 B	2.2 B	2.9 B	2. U	2. U
Potassium		16,300 J	1,770 B	6,040	7,030	20,300	15,200	27,000 J	30,200 J	4,050 B	9,900	5,240	5,320
Potassium, Dissolved		9,290 J	1,560 B	6,470	2,590 B	7,800	14,100	40,200 J	38,100 J	3,490 B	5,700	5,610	5,780
Selenium	10	7.4 J	4.3 U	4.3 U	4.3 U	4.3 UJ	4.3 U	4.3 U	R	15.4 J*	5. BJ*	R	R
Selenium, Dissolved	10	24.7 J	8.6	5.4	4.3 U	7	8.3	11.8	R	20. *	7. *	R	R
Silver	50	2. UJ	2. UJ	2. UJ	2. UJ	2. BJ	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	3. U	3. U
Silver, Dissolved	50	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	3. U	3. U
Sodium	20,000	79,600	29,600	29,600	96,800	354,000	347,000 J	363,000 J	407,000	28,500	127,000	109,000	108,000
Sodium, Dissolved	20,000	94,400	30,300	31,100	87,200	403,000	474,000 J	490,000 J	486,000	30,800	137,000	110,000	107,000
Thallium	4 G	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 B	5.6 U	5.6 U	6.3 B	5.6 U	6. U	6. U
Thallium, Dissolved	4 G	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	6. U	6. U
Vanadium	NA	141	2. B	5.4 B	32.7 B	166	68.2	17.6 B	3.6 B	1.9 B	50. B	2.4 B	2.2 B
Vanadium, Dissolved	NA	2.7 B	1. U	1. U	1. U	1. U	1. U	1.7 B	2. B	1. U	1. U	2. U	2. U
Zinc	300	438	15.1 B	47.8	164	733	244	30.6	35.2	182	203	17.1 B	20.4
Zinc, Dissolved	300	31	6.1 U	11.3 B	6.1 U	41.6	12.8 B	10.8 B	15.3 B	6.1 U	6.7 BJ	3. U	3. U
Cyanide, Amenable	200	29	--	--	--	23	--	290	290	--	--		
Cyanide, Total	200	29	10. U	10. U	10. U	23	10. U	580	600	23	10. U	17.9 J	20.5 J

See Notes on Page 7.

TABLE 4-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED INORGANIC CONSTITUENTS

Location	NYSDEC	MW98-16S	MW98-16D	MW01-17S	MW01-17D	MW01-17D	B-1	TW97-1D	TW97-2S	TW97-2D	TW97-3S	TW97-3S	TW97-3S
Date Sampled	GA	6/5/1998	6/5/1998	10/2/2001	10/2/2001	10/2/2001	12/19/1997	12/22/1997	12/22/1997	12/22/1997	12/22/1997	12/22/1997	10/2/2001
Sample Type	Criteria	FS	FS	FS	FS	DUP	FS	FS	FS	FS	FS	DUP	FS
Aluminum	NA	40. U	**265**	--	--	--	19. UN	**2,920 JE**	**10,800 JE**	**2,750 JE**	19. UE	19. UE	--
Aluminum, Dissolved	NA	40. U	40. U	--	--	--	**21.5 BN**	**82.5 BE**	**84.5 BE**	**86.1 BE**	**80. BE**	**102 BE**	--
Antimony	3 G	7. UJ	7. UJ	--	--	--	4.9 UJ*	4.9 UJ	4.9 UJ	4.9 UJ	4.9 UJ	4.9 UJ	--
Antimony, Dissolved	3 G	7. UJ	7. UJ	--	--	--	4.9 UJ*	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	--
Arsenic	25	3. U	3. U	--	--	--	4.6 U	4.6 U	**5.7 B**	4.6 U	4.6 U	4.6 U	--
Arsenic, Dissolved	25	3. U	**4.2 B**	--	--	--	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	--
Barium	1,000	**62.1 B**	**103 B**	--	--	--	**151 BE**	**191 BE**	**204 E**	**186 BE**	**39.3 BE**	**39.8 BE**	--
Barium, Dissolved	1,000	**63.1 B**	**102 B**	--	--	--	**96.2 BJE**	**71.6 BJE**	**45.9 BE**	**87.7 BJE**	**38.6 BE**	**39.3 BE**	--
Beryllium	3 G	1. U	1. U	--	--	--	1. U	1. U	**2.1 B**	1. U	1. U	1. U	--
Beryllium, Dissolved	3 G	1. U	1. U	--	--	--	1. U	**1.4 B**	**1.1 BJ**	**1. BJ**	**1. BJ**	**1. BJ**	--
Cadmium	5	1. U	1. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Cadmium, Dissolved	5	1. U	1. U	--	--	--	10. U	10. U	10. U	10. U	10. U	10. U	--
Calcium		**108,000**	**132,000**	--	--	--	**138,000**	**158,000**	**188,000**	**146,000**	**150,000**	**153,000**	--
Calcium, Dissolved		**111,000**	**135,000**	--	--	--	**146,000**	**154,000**	**202,000**	**152,000**	**171,000**	**172,000**	--
Chromium	50	**2.3 B**	2. U	--	--	--	1.4 UN	**3.5 B**	**11.8**	**6.1 B**	1. U	1. U	--
Chromium, Dissolved	50	2. U	2. U	--	--	--	1.4 UN	1. U	1. U	1. U	1. U	1. U	--
Cobalt	NA	2. U	2. U	--	--	--	2. U	**7.2 B**	**24.4 B**	**8.3 B**	2. U	2. U	--
Cobalt, Dissolved	NA	2. U	2. U	--	--	--	2. U	2. U	2. U	2. U	2. U	2. U	--
Copper	200	2. U	2. U	--	--	--	20. U	**30.5**	**102**	**28.4**	20. U	20. U	--
Copper, Dissolved	200	2. U	**5.9 B**	--	--	--	20. U	20. U	20. U	20. U	20. U	20. U	--
Iron	300	50. U	**354**	--	--	--	**65.9 BJN***	**5,610**	**18,500**	**5,540**	**57.2 B**	**44.1 B**	--
Iron, Dissolved	300	50. U	50. U	--	--	--	17.9 UN*	**22. B**	**70.3 B**	17.9 U	**43.4 B**	**66. B**	--
Lead	25	2. U	2. U	--	--	--	R	**26.9**	**131**	**22**	R	R	--
Lead, Dissolved	25	2. U	2. U	--	--	--	R	R	R	R	R	R	--
Magnesium	35,000 G	**17,900**	**24,000**	--	--	--	**28,900**	**27,000**	**15,600**	**30,300**	**11,300**	**11,500**	--
Magnesium, Dissolved	35,000 G	**18,300**	**24,300**	--	--	--	**31,500**	**26,100**	**14,100**	**31,400**	**13,300**	**13,400**	--
Manganese	300	**132**	**105**	--	--	--	**793 ***	**464**	**1,830**	**770**	**797**	**809**	--
Manganese, Dissolved	300	**128**	**124**	--	--	--	**346 ***	**227**	**836**	**380**	**847**	**755**	--
Mercury	2	0.10 U	0.10 U	--	--	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	--
Mercury, Dissolved	2	0.10 U	0.10 U	--	--	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	--
Nickel	100	2. U	2. U	--	--	--	**3.8 B**	**9.6 B**	**32.3 B**	**11.2 B**	**2.2 B**	**2. B**	--
Nickel, Dissolved	100	2. U	**2.2 B**	--	--	--	**2.2 B**	**2.3 B**	**2.8 B**	**2.6 B**	**2.8 B**	**2.8 B**	--
Potassium		**4,690 B**	**2,700 B**	--	--	--	**5,090**	**4,580 B**	**4,470 B**	**3,570 B**	**3,650 B**	**3,660 B**	--
Potassium, Dissolved		**5,000 B**	**2,790 B**	--	--	--	**4,930 B**	**4,330 B**	**3,870 B**	**3,210 B**	**3,620 B**	**3,720 B**	--
Selenium	10	R	R	--	--	--	4.3 U	4.3 UJ*	**7.1 J***	4.3 UJ*	**6.8 J***	**9.2 J***	--
Selenium, Dissolved	10	R	R	--	--	--	**5.3**	**5.8 ***	**8.5 ***	**5.2 ***	**12. ***	**12.7 ***	--
Silver	50	3. U	3. U	--	--	--	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	--
Silver, Dissolved	50	3. U	3. U	--	--	--	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	2. UJ	--
Sodium	20,000	**78,200**	**112,000**	--	--	--	**123,000**	**75,300**	**19,100**	**86,000**	**19,000**	**19,100**	--
Sodium, Dissolved	20,000	**79,300**	**118,000**	--	--	--	**131,000**	**84,000**	**21,100**	**95,700**	**19,800**	**19,800**	--
Thallium	4 G	6. U	6. U	--	--	--	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	--
Thallium, Dissolved	4 G	6. U	6. U	--	--	--	5.6 U	5.6 U	**6.2 B**	5.6 U	5.6 U	5.6 U	--
Vanadium	NA	2. U	2. U	--	--	--	1. U	**5.6 B**	**25. B**	**4.5 B**	1. U	1. U	--
Vanadium, Dissolved	NA	2. U	2. U	--	--	--	1. U	1. U	1. U	1. U	1. U	1. U	--
Zinc	300	3. U	3. U	--	--	--	**29.5**	**44.5**	**142**	**35.4**	6.1 U	6.1 U	--
Zinc, Dissolved	300	3. U	3. U	--	--	--	**9. B**	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	--
Cyanide, Amenable	200			--	--	--	--	--	**79**	--	**60**	--	--
Cyanide, Total	200	10. UJ	10. UJ	1. U	**3. B**	**3. B**	10. U	10. U	**100**	10. U	**78**	--	**32**

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TABLE 4-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
DETECTED INORGANIC CONSTITUENTS

Notes:
All concentrations reported in micrograms per liter (ug/L); also expressed as parts per billion (ppb).
Detections are bolded.
* = Duplicate analysis not within control limits.
B = The reported value was obtained from a reading less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit.
D = Concentration is based on a diluted sample analysis.
E = The reported value is estimated due to matrix interference.
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
N = Spiked sample recovery not within control limits.
R = The sample results are rejected.
U = The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

Criteria Notes:
a = Value listed applies to the sum of these substances.
d = Value listed applies to each isomer (1,2-, 1,3-, and 1,4-) individually.
G = Guidance value.
NA = Not available/Not applicable.

TABLE 5-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED VOLATILE ORGANIC COMPOUNDS

Location	MW97-7	MW97-7	SB97-1	SB97-1	SB97-2	SB97-2	SB97-3	SB97-3	SB97-4	SB97-4	SB97-5
Depth Range	(18.0' - 20.0')	(18.0' - 20.0')	(2.0' - 4.0')	(4.0' - 6.0')	(2.0' - 4.0')	(4.0' - 6.0')	(0.0' - 2.0')	(4.0' - 6.0')	(12.0' - 14.0')	(2.0' - 4.0')	(2.0' - 4.0')
Date Sampled	9/25/97	9/25/97	9/18/97	9/18/97	9/17/97	9/17/97	9/17/97	9/17/97	9/16/97	9/16/97	9/16/97
Sample Type	FS	DUP	FS	FS	FS	FS	FS	FS	FS	FS	FS
1,2-Dichloroethane	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--
Acetone	0.01 UJ	0.01 UJ	--	--	--	--	--	--	--	--	--
Benzene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzene (TCLP)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Ethylbenzene	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--
Methylene chloride	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--
Styrene	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--
Toluene	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--
o-Xylene	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--
m,p-Xylene	--	--	--	--	--	--	--	--	--	--	--
Total BTEX	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

See Notes on Page 7.

TABLE 5-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED VOLATILE ORGANIC COMPOUNDS

Location	SB97-5	SB97-6	SB97-6	SB97-7	SB97-7	SB97-8	SB97-8	SB97-8	TB-13	SB-20	SB-21
Depth Range	(4.0' - 6.0')	(0.0' - 2.0')	(4.0' - 6.0')	(0.0' - 2.0')	(4.0' - 6.0')	(0.0' - 2.0')	(2.0' - 4.0')	(2.0' - 4.0')	(18.0' - 20.0')	(7 - 10')	(4 - 6')
Date Sampled	9/16/97	9/17/97	9/17/97	9/17/97	9/17/97	9/18/97	9/19/97	9/19/97	9/30/97	5/18/98	5/20/98
Sample Type	FS	FS	FS	FS	FS	FS	FS	DUP	FS	FS	FS
1,2-Dichloroethane	--	--	--	--	--	--	--	--	**0.003 J**	32. U	72. U
Acetone	--	--	--	--	--	--	--	--	0.01 UJ	32. UJ	72. U
Benzene	0.01 U	0.01 U	**2.4 DJ**	0.01 U	**0.01 J**	0.01 U	0.01 U	0.01 U	**0.18 J**	**17. J**	72. U
Benzene (TCLP)	0.01 U	0.01 U	**2.4 DJ**	0.01 U	**0.01 J**	0.01 U	0.01 U	0.01 U	**0.18 J**	**17. J**	72. U
Ethylbenzene	--	--	--	--	--	--	--	--	**0.03**	**100**	**300**
Methylene chloride	--	--	--	--	--	--	--	--	0.01 U	32. U	72. UJ
Styrene	--	--	--	--	--	--	--	--	0.01 U	32. U	**85**
Toluene	--	--	--	--	--	--	--	--	**0.06 J**	**5.6 J**	**180**
o-Xylene	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	--	--	--	--	--	--	--	--	**0.09**	**97**	**430**
m,p-Xylene	--	--	--	--	--	--	--	--	--	--	--
Total BTEX	ND	ND	**2.4**	ND	**0.01**	ND	ND	ND	**0.36**	**220**	**910**

See Notes on Page 7.

TABLE 5-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED VOLATILE ORGANIC COMPOUNDS

Location	SB-22	SB-23	SB-23	MW98-15S	SB-101	SB-101	SB-101	SB-102	SB-102	SB-103
Depth Range	(12 - 16')	(16 - 18')	(16 - 18')	(9 - 11')	(10 - 12')	(15 - 17')	(10 - 12')	(10 - 12')	(21 - 23')	(14 - 16')
Date Sampled	5/20/98	5/22/98	5/22/98	5/18/98	8/3/01	8/7/01	8/3/01	8/6/01	8/6/01	8/27/01
Sample Type	FS	FS	DUP	FS	FS	FS	DUP	FS	FS	FS
1,2-Dichloroethane	76. U	40. U	3.8 U	0.12 U	--	0.06 U	--	--	--	--
Acetone	76. U	40. U	3.8 U	0.19 UJ	--	0.06 U	--	--	--	--
Benzene	76. U	40. U	**5.5**	0.12 U	0.006 U	0.06 U	0.006 U	0.007 U	0.005 U	0.04 U
Benzene (TCLP)	76. U	40. U	**5.5**	0.12 U	0.006 U	0.06 U	0.006 U	0.007 U	0.005 U	0.04 U
Ethylbenzene	**100**	**200**	**74**	0.12 U	0.006 U	**0.2**	0.006 U	0.007 U	0.005 U	0.04 U
Methylene chloride	76. UJ	40. UJ	3.8 UJ	0.12 U	--	0.06 U	--	--	--	--
Styrene	76. U	40. U	3.8 U	0.12 U	--	0.06 U	--	--	--	--
Toluene	76. U	**4.8 J**	**1.3 J**	0.12 U	0.006 U	0.06 U	0.006 U	0.007 U	0.005 U	0.04 U
o-Xylene	--	--	--	--	0.006 U	**0.06**	0.006 U	0.007 U	0.005 U	**0.02 J**
Xylenes, Total	**67. J**	**64**	**22**	0.12 U	--	--	--	--	--	--
m,p-Xylene	--	--	--	--	0.01 U	0.11 U	0.01 U	0.01 U	0.01 U	**0.07 J**
Total BTEX	**167**	**269**	**103**	ND	ND	**0.26**	ND	ND	ND	**0.09**

See Notes on Page 7.

TABLE 5-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED VOLATILE ORGANIC COMPOUNDS

Location	SB-103	SB-104	SB-104	SB-105	SB-105	SB-106	SB-106	SB-107	SB-108	SB-108
Depth Range	(8 - 10')	(10 - 12')	(20 - 22')	(14 - 16')	(8 - 10')	(13 - 15')	(7 - 9')	(7 - 8')	(35 - 37')	(6 - 8')
Date Sampled	8/27/01	8/29/01	8/30/01	8/9/01	8/9/01	8/8/01	8/8/01	8/10/01	8/14/01	8/13/01
Sample Type	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
1,2-Dichloroethane	--	--	--	--	--	--	--	--	--	--
Acetone	--	--	--	--	--	--	--	--	--	--
Benzene	0.006 U	0.005 U	0.05 U	0.005 U	0.006 U	0.05 U	0.006 U	0.006 U	0.005 U	0.006 U
Benzene (TCLP)	0.006 U	0.005 U	0.05 U	0.005 U	0.006 U	0.05 U	0.006 U	0.006 U	0.005 U	0.006 U
Ethylbenzene	0.006 U	0.005 U	0.05 U	0.005 U	0.006 U	**0.3**	0.006 U	0.006 U	0.005 U	0.006 U
Methylene chloride	--	--	--	--	--	--	--	--	--	--
Styrene	--	--	--	--	--	--	--	--	--	--
Toluene	0.006 U	0.005 U	0.05 U	0.005 U	0.006 U	0.05 U	0.006 U	0.006 U	0.005 U	0.006 U
o-Xylene	0.006 U	0.005 U	0.05 U	0.005 U	0.006 U	**0.1**	0.006 U	0.006 U	0.005 U	0.006 U
Xylenes, Total	--	--	--	--	--	--	--	--	--	--
m,p-Xylene	0.01 U	0.01 U	0.10 U	0.01 U	0.01 U	**0.11**	0.01 U	0.01 U	0.01 U	0.01 U
Total BTEX	ND	ND	ND	ND	ND	**0.51**	ND	ND	ND	ND

See Notes on Page 7.

TABLE 5-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED VOLATILE ORGANIC COMPOUNDS

Location	SB-108	SB-109	SB-109	SB-110	SB-111	SB-112	SB-112	TB93-01	TB93-02	TB93-05
Depth Range	(6 - 8')	(10 - 11')	(17 - 19')	(7 - 9')	(7 - 7.5')	(4 - 6')	(4 - 6')	(28 - 30')	(10 - 14')	(10 - 14')
Date Sampled	8/13/01	8/15/01	8/15/01	9/17/01	9/17/01	9/17/01	9/17/01	5/1/93	5/1/93	5/1/93
Sample Type	DUP	FS	FS	FS	FS	FS	DUP	FS	FS	FS
1,2-Dichloroethane	--	--	--	--	--	--	--	0.03 UD	4. UD	3. UD
Acetone	--	--	--	--	--	--	--	**0.07 DB**	**6. JD**	**8. D**
Benzene	0.006 U	0.006 U	**0.004 J**	0.006 U	0.006 U	0.005 U	0.006 U	**0.05 D**	**33. D**	**33. D**
Benzene (TCLP)	0.006 U	0.006 U	**0.004 J**	0.006 U	0.006 U	0.005 U	0.006 U	**0.05 D**	**33. D**	**33. D**
Ethylbenzene	0.006 U	0.006 U	**0.02**	0.006 U	0.006 U	0.005 U	0.006 U	**0.49 D**	**39. D**	**53. D**
Methylene chloride	--	--	--	--	--	--	--	**0.01 JD**	**2. JD**	**1. JD**
Styrene	--	--	--	--	--	--	--	**0.12 D**	**43. D**	**92. D**
Toluene	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.005 U	0.006 U	**0.10 D**	**66. D**	**98. D**
o-Xylene	0.006 U	0.006 U	**0.004 J**	0.006 U	0.006 U	0.005 U	0.006 U	--	--	--
Xylenes, Total	--	--	--	--	--	--	--	**1. D**	**75. D**	**128 D**
m,p-Xylene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--
Total BTEX	ND	ND	**0.03**	ND	ND	ND	ND	**1.6**	**213**	**312**

See Notes on Page 7.

TABLE 5-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED VOLATILE ORGANIC COMPOUNDS

Location	TB93-06	TB93-10	TB93-11	TP-02	TP-05	TP-07	TP-14	TP-15	TP-21	TP-21
Depth Range	(6 - 8.5')	(12 - 14')	(10 - 16')	(6')	(6')	(5')	(6')	(6')	(8')	(8')
Date Sampled	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93
Sample Type	FS	FS	FS	FS	FS	FS	FS	FS	FS	DUP
1,2-Dichloroethane	4. UD	1. UD	2. UD	0.03 UD	104 UD	40. UD	0.03 UD	45. UD	0.03 UD	0.01 UD
Acetone	**9. JD**	**2. D**	4. UD	**0.27 D**	208 UD	**54. JD**	**0.10 D**	**73. JD**	**0.14 D**	**0.20 D**
Benzene	**33. D**	**2. D**	**32. D**	**1. D**	**691 D**	**124 D**	**0.13 D**	**479 D**	**0.05 D**	**0.03 D**
Benzene (TCLP)	**33. D**	**2. D**	**32. D**	**1. D**	**691 D**	**124 D**	**0.13 D**	**479 D**	**0.05 D**	**0.03 D**
Ethylbenzene	**92. D**	**2. D**	**7. D**	**1. D**	**1,830 D**	**781 D**	**0.19 D**	**827 D**	**0.03 JD**	**0.01 JD**
Methylene chloride	**2. JD**	**0.38 JD**	2. UD	**0.02 JD**	104 UD	**19. JD**	**0.02 JD**	**19. JD**	**0.01 JD**	**0.008 JD**
Styrene	**8. D**	**1. D**	**35. D**	**0.04 D**	104 UD	40. UD	0.03 UD	**37. JD**	0.03 UD	0.01 UD
Toluene	**66. D**	**9. D**	**50. D**	**0.18 D**	**1,040 D**	**397 D**	**0.07 D**	**870 D**	**0.03 JD**	**0.03 D**
o-Xylene	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	**91. D**	**15. D**	**46. D**	**1. D**	**1,460 D**	**773 D**	**0.23 D**	**857 D**	**0.14 D**	**0.04 D**
m,p-Xylene	--	--	--	--	--	--	--	--	--	--
Total BTEX	**282**	**28**	**135**	**3.2**	**5,021**	**2,075**	**0.62**	**3,033**	**0.24**	**0.1**

See Notes on Page 7.

TABLE 5-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED VOLATILE ORGANIC COMPOUNDS

Notes:
All concentrations reported in milligrams per kilogram (mg/Kg); also expressed as parts per million (ppm).
Detections are bolded.
ND = Not detected.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
-- = Not analyzed.

TABLE 5-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location	MW97-7	MW97-7	SB97-1	SB97-1	SB97-2	SB97-2	SB97-3	SB97-3	SB97-4	SB97-4	SB97-5
Depth Range	(18.0' - 20.0')	(18.0' - 20.0')	(2.0' - 4.0')	(4.0' - 6.0')	(2.0' - 4.0')	(4.0' - 6.0')	(0.0' - 2.0')	(4.0' - 6.0')	(12.0' - 14.0')	(2.0' - 4.0')	(2.0' - 4.0')
Date Sampled	9/25/97	9/25/97	9/18/97	9/18/97	9/17/97	9/17/97	9/17/97	9/17/97	9/16/97	9/16/97	9/16/97
Sample Type	FS	DUP	FS	FS	FS	FS	FS	FS	FS	FS	FS
2,4-Dinitrotoluene	0.40 U	0.38 U	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	0.40 U	0.38 U	--	--	--	--	--	--	--	--	--
Acenaphthene	0.40 U	0.38 U	0.41 U	**2.2**	3.6 U	0.36 U	4.3 U	**2. J**	**5.8 J**	0.61 U	0.35 U
Acenaphthylene	0.40 U	0.38 U	**0.31 J**	**0.58 J**	3.6 U	**0.12 J**	**2.6 J**	**8. J**	**3. J**	**0.85**	**0.54**
Anthracene	0.40 U	0.38 U	**0.10 J**	**4.1**	3.6 U	**0.07 J**	**1.3 J**	**3.1 J**	**8.4 J**	**0.48 J**	**0.24 J**
Benzo(a)anthracene	0.40 U	0.38 U	**0.29 J**	**4.7**	3.6 U	**0.22 J**	**4. J**	**16**	**3.5 J**	**0.71**	**0.42**
Benzo(a)pyrene	0.40 U	0.38 U	**0.34 J**	**4**	3.6 U	**0.26 J**	**5.1**	**15**	**2.7 J**	**0.85**	**0.63**
Benzo(b)fluoranthene	0.40 U	0.38 U	**0.25 J**	**3.4**	3.6 U	**0.34 J**	**4.9**	**12**	**1.3 J**	**0.74**	**0.6**
Benzo(ghi)perylene	0.40 U	0.38 U	**0.26 J**	**2.7**	3.6 U	**0.15 J**	**1.9 J**	**15**	**0.45 J**	**0.27 J**	**0.21 J**
Benzo(k)fluoranthene	0.40 U	0.38 U	**0.26 J**	**3.1**	3.6 U	**0.30 J**	**4.1 J**	**13**	**1.2 J**	**0.71**	**0.47**
Bis(2-ethylhexyl) phthalate	0.40 U	0.38 U	--	--	--	--	--	--	--	--	--
Carbazole	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.40 U	0.38 U	**0.36 J**	**4.7**	3.6 U	**0.38**	**4.8**	**19**	**3.2 J**	**0.84**	**0.48**
Di-n-butyl phthalate	0.40 U	0.38 U	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	**0.06 J**	**0.07 J**	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.40 U	0.38 U	0.41 U	**0.22 J**	3.6 U	0.36 U	4.3 U	9.4 U	4. UJ	0.61 U	0.35 U
Dibenzofuran	0.40 U	0.38 U	--	--	--	--	--	--	--	--	--
Fluoranthene	0.40 U	0.38 U	**0.37 J**	**16. D**	3.6 U	**0.64**	**12**	**46**	**8.9 J**	**1.3**	**0.84**
Fluorene	0.40 U	0.38 U	0.41 U	**2**	3.6 U	0.36 U	4.3 U	**4.9 J**	**10. J**	0.61 U	**0.07 J**
Indeno(1,2,3-cd)pyrene	0.40 U	0.38 U	**0.20 J**	**2.4**	3.6 U	**0.11 J**	**1.8 J**	**10**	**0.46 J**	**0.22 J**	**0.14 J**
Naphthalene	0.40 U	0.38 U	0.41 U	**0.87**	3.6 U	**0.07 J**	**0.81 J**	9.4 U	**14. J**	0.61 U	0.35 U
Phenanthrene	0.40 U	0.38 U	**0.11 J**	**18. D**	3.6 U	**0.25 J**	**3.9 J**	**6.6 J**	**46. DJ**	**0.67**	**0.30 J**
Pyrene	0.40 U	0.38 U	**0.72**	**15. D**	3.6 U	**0.39**	**5.2**	**59**	**9.8 J**	**0.75**	**0.47**
Total PAHs	ND	ND	**3.6**	**84**	ND	**3.3**	**52.4**	**230**	**119**	**8.4**	**5.4**
Total Semivolatiles	**0.06**	**0.07**	**3.6**	**84**	ND	**3.3**	**52.4**	**230**	**119**	**8.4**	**5.4**

See Notes on Page 7.

TABLE 5-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location	SB97-5	SB97-6	SB97-6	SB97-7	SB97-7	SB97-8	SB97-8	SB97-8	TB-13	SB-20	SB-21
Depth Range	(4.0' - 6.0')	(0.0' - 2.0')	(4.0' - 6.0')	(0.0' - 2.0')	(4.0' - 6.0')	(0.0' - 2.0')	(2.0' - 4.0')	(2.0' - 4.0')	(18.0' - 20.0')	(7 - 10')	(4 - 6')
Date Sampled	9/16/97	9/17/97	9/17/97	9/17/97	9/17/97	9/18/97	9/19/97	9/19/97	9/30/97	5/18/98	5/20/98
Sample Type	FS	FS	FS	FS	FS	FS	FS	DUP	FS	FS	FS
2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	0.39 U	21. U	7.5 U
2-Methylnaphthalene	--	--	--	--	--	--	--	--	**0.18 J**	**180**	**71**
Acenaphthene	**1.8 J**	1.5 U	**82**	0.36 U	0.43 U	1.5 U	2. U	0.41 U	0.39 U	**210**	**7.2 J**
Acenaphthylene	**22**	**1. J**	**15. J**	**0.42**	**0.27 J**	**0.37 J**	**0.82 JN**	**0.25 J**	0.39 U	**18. J**	**16**
Anthracene	**10**	**0.28 J**	**63**	**0.19 J**	**0.14 J**	**0.46 J**	2. U	**0.07 J**	0.39 U	**89**	**9.2**
Benzo(a)anthracene	**18**	**0.57 J**	**31. J**	**0.77**	**1**	**1.9**	**0.54 JN**	**0.23 J**	0.39 U	**61**	**6.8 J**
Benzo(a)pyrene	**33**	**1.9**	**28. J**	**0.86**	**1.8**	**2.3**	**1.7 JN**	**0.59**	0.39 U	**46. J**	**5.6 J**
Benzo(b)fluoranthene	**25**	**1.3 J**	**11. J**	**0.66**	**1.5**	**2.3**	**1.1 JN**	**0.45**	0.39 U	**58. J**	**3.5 J**
Benzo(ghi)perylene	**7.3**	**0.85 J**	**9.9 J**	**0.35 J**	**0.61**	**1.3 J**	**1.2 JN**	**0.66**	0.39 U	21. UJ	7.5 U
Benzo(k)fluoranthene	**21**	**0.87 J**	**15. J**	**0.57**	**1.4**	**2.1**	**1.1 JN**	**0.46**	0.39 U	**22. J**	**3.6 J**
Bis(2-ethylhexyl) phthalate	--	--	--	--	--	--	--	--	0.39 UJ	21. UJ	7.5 UJ
Carbazole	--	--	--	--	--	--	--	--	--	**3.8 J**	7.5 U
Chrysene	**22**	**0.73 J**	**32. J**	**0.85**	**1.1**	**2.3**	**0.70 JN**	**0.31 J**	0.39 U	**42**	**5.6 J**
Di-n-butyl phthalate	--	--	--	--	--	--	--	--	0.39 U	21. U	7.5 U
Di-n-octyl phthalate	--	--	--	--	--	--	--	--	0.39 U	21. UJ	7.5 U
Dibenzo(a,h)anthracene	7.2 U	1.5 U	42. U	0.36 U	**0.06 J**	1.5 U	2. U	0.41 U	0.39 U	21. UJ	7.5 U
Dibenzofuran	--	--	--	--	--	--	--	--	0.39 U	**17. J**	**2.5 J**
Fluoranthene	**26**	**0.75 J**	**77**	**1.2**	**1.3**	**4.4**	**0.32 JN**	**0.31 J**	0.39 U	**100**	**13**
Fluorene	**2.9 J**	1.5 U	**100**	0.36 U	0.43 U	**0.20 J**	2. U	0.41 U	**0.05 J**	**130**	**14**
Indeno(1,2,3-cd)pyrene	**5.8 J**	**0.75 J**	**8.3 J**	**0.32 J**	**0.6**	**1.2 J**	**0.88 JN**	**0.44**	0.39 U	21. UJ	7.5 U
Naphthalene	**0.92 J**	1.5 U	**200**	0.36 U	**0.07 J**	1.5 U	2. U	**0.05 J**	**0.4**	**390 D**	**93**
Phenanthrene	**9.9**	**0.28 J**	**300 D**	**0.57**	**0.45**	**2**	2. U	**0.17 J**	**0.11 J**	**310**	**47**
Pyrene	**20**	**0.58 J**	**92**	**1.4**	**1**	**3.5**	**0.69 JN**	**0.44**	0.39 U	**210**	**27**
Total PAHs	**226**	**9.9**	**1,064**	**8.2**	**11.3**	**24.3**	**9.1**	**4.4**	**0.74**	**1,866**	**323**
Total Semivolatiles	**226**	**9.9**	**1,064**	**8.2**	**11.3**	**24.3**	**9.1**	**4.4**	**0.74**	**1,887**	**325**

See Notes on Page 7.

TABLE 5-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location	SB-22	SB-23	SB-23	MW98-15S	SB-101	SB-101	SB-101	SB-102	SB-102	SB-103
Depth Range	(12 - 16')	(16 - 18')	(16 - 18')	(9 - 11')	(10 - 12')	(15 - 17')	(10 - 12')	(10 - 12')	(21 - 23')	(14 - 16')
Date Sampled	5/20/98	5/22/98	5/22/98	5/18/98	8/3/01	8/7/01	8/3/01	8/6/01	8/6/01	8/27/01
Sample Type	FS	FS	DUP	FS	FS	FS	DUP	FS	FS	FS
2,4-Dinitrotoluene	4. U	46. U	45. U	0.41 U	--	--	--	--	--	--
2-Methylnaphthalene	**130 D**	**84**	**63**	0.41 U	--	--	--	--	--	--
Acenaphthene	**110 D**	**150**	**110**	**2.7**	0.41 U	**21**	0.41 U	0.44 U	0.37 U	4.1 U
Acenaphthylene	**7.5**	46. U	**5.4 J**	0.41 U	0.41 U	4. U	0.41 U	0.44 U	0.37 U	4.1 U
Anthracene	**37**	**43. J**	**33. J**	**1.6**	0.41 U	**16**	0.41 U	0.44 U	0.37 U	4.1 U
Benzo(a)anthracene	**22**	**21. J**	**16. J**	**1.4 J**	0.41 U	**5.5**	0.41 U	0.44 U	0.37 U	4.1 U
Benzo(a)pyrene	**15. J**	**15. J**	**10. J**	1.2 UJ	0.41 U	**3.9 J**	0.41 U	0.44 U	0.37 U	4.1 U
Benzo(b)fluoranthene	**8.3 J**	**15. J**	**12. J**	1.2 UJ	0.41 U	**2.1 J**	0.41 U	0.44 U	0.37 U	4.1 U
Benzo(ghi)perylene	**1.5 J**	46. U	45. U	0.13 UJ	0.41 U	4. U	0.41 U	0.44 U	0.37 U	4.1 U
Benzo(k)fluoranthene	**10. J**	**5.5 J**	45. U	0.54 UJ	0.41 U	**2.5 J**	0.41 U	0.44 U	0.37 U	4.1 U
Bis(2-ethylhexyl) phthalate	4. U	46. UJ	45. UJ	0.41 UJ	--	--	--	--	--	--
Carbazole	4. U	46. U	45. U	0.41 U	--	--	--	--	--	--
Chrysene	**14**	**21. J**	**16. J**	**1.3 J**	0.41 U	**5.5**	0.41 U	0.44 U	0.37 U	4.1 U
Di-n-butyl phthalate	4. U	46. U	45. U	0.41 U	--	--	--	--	--	--
Di-n-octyl phthalate	4. UJ	46. U	45. U	0.81 UJD	--	--	--	--	--	--
Dibenzo(a,h)anthracene	4. UJ	46. U	45. U	0.81 UJD	0.41 U	4. U	0.41 U	0.44 U	0.37 U	4.1 U
Dibenzofuran	**3.7 J**	46. U	45. U	0.41 U	0.41 U	4. U	0.41 U	0.44 U	0.37 U	4.1 U
Fluoranthene	**45**	**57**	**42. J**	**2.4**	0.41 U	**13**	0.41 U	**0.26 J**	0.37 U	4.1 U
Fluorene	**44**	**68**	**49**	**1.6**	0.41 U	**12**	0.41 U	0.44 U	0.37 U	4.1 U
Indeno(1,2,3-cd)pyrene	**1.5 J**	46. U	45. U	0.12 UJ	0.41 U	4. U	0.41 U	0.44 U	0.37 U	4.1 U
Naphthalene	**390 D**	**690**	**500**	0.41 U	0.41 U	4. U	0.41 U	0.44 U	0.37 U	4.1 U
Phenanthrene	**150 D**	**170**	**130**	**5.1**	0.41 U	**30**	0.41 U	0.44 U	0.37 U	4.1 U
Pyrene	**81. D**	**70**	**53**	**4.8 D**	0.41 U	**14. D**	0.41 U	0.44 U	0.37 U	4.1 U
Total PAHs	**1,067**	**1,410**	**1,039**	**20.9**	ND	**126**	ND	**0.26**	ND	ND
Total Semivolatiles	**1,071**	**1,410**	**1,039**	**20.9**	ND	**126**	ND	**0.26**	ND	ND

See Notes on Page 7.

TABLE 5-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location	SB-103	SB-104	SB-104	SB-105	SB-105	SB-106	SB-106	SB-107	SB-108	SB-108
Depth Range	(8 - 10')	(10 - 12')	(20 - 22')	(14 - 16')	(8 - 10')	(13 - 15')	(7 - 9')	(7 - 8')	(35 - 37')	(6 - 8')
Date Sampled	8/27/01	8/29/01	8/30/01	8/9/01	8/9/01	8/8/01	8/8/01	8/10/01	8/14/01	8/13/01
Sample Type	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--
Acenaphthene	0.40 U	0.41 U	0.43 U	0.36 U	0.42 U	**7**	0.39 U	0.41 U	0.38 U	0.39 U
Acenaphthylene	0.40 U	0.41 U	0.43 U	0.36 U	0.42 U	4.1 U	0.39 U	0.41 U	0.38 U	0.39 U
Anthracene	0.40 U	**0.30 J**	0.43 U	0.36 U	0.42 U	**3.6 J**	0.39 U	0.41 U	0.38 U	0.39 U
Benzo(a)anthracene	0.40 U	**0.52**	0.43 U	0.36 U	0.42 U	4.1 U	0.39 U	0.41 U	0.38 U	**0.71**
Benzo(a)pyrene	0.40 U	**0.43**	0.43 U	0.36 U	0.42 U	4.1 U	**0.35 J**	0.41 U	0.38 U	**0.88**
Benzo(b)fluoranthene	0.40 U	**0.47**	0.43 U	0.36 U	0.42 U	4.1 U	**0.39**	0.41 U	0.38 U	**0.89**
Benzo(ghi)perylene	**0.20 J**	**0.28 J**	0.43 U	0.36 U	0.42 U	4.1 U	**0.32 J**	0.41 U	0.38 U	**0.43**
Benzo(k)fluoranthene	0.40 U	**0.40 J**	0.43 U	0.36 U	0.42 U	4.1 U	**0.28 J**	0.41 U	0.38 U	**0.7**
Bis(2-ethylhexyl) phthalate	--	--	--	--	--	--	--	--	--	--
Carbazole	--	--	--	--	--	--	--	--	--	--
Chrysene	0.40 U	**0.55**	0.43 U	0.36 U	0.42 U	4.1 U	**0.37 J**	0.41 U	0.38 U	**0.75**
Di-n-butyl phthalate	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.40 U	0.41 U	0.43 U	0.36 U	0.42 U	4.1 U	0.39 U	0.41 U	0.38 U	0.39 U
Dibenzofuran	0.40 U	0.41 U	0.43 U	0.36 U	0.42 U	4.1 U	0.39 U	0.41 U	0.38 U	0.39 U
Fluoranthene	**0.30 J**	**1.1**	0.43 U	0.36 U	0.42 U	**3.4 J**	**0.7**	**0.23 J**	0.38 U	**1.1**
Fluorene	0.40 U	0.41 U	0.43 U	0.36 U	0.42 U	**3.1 J**	0.39 U	0.41 U	0.38 U	0.39 U
Indeno(1,2,3-cd)pyrene	0.40 U	**0.30 J**	0.43 U	0.36 U	0.42 U	4.1 U	**0.24 J**	0.41 U	0.38 U	**0.45**
Naphthalene	0.40 U	0.41 U	0.43 U	0.36 U	0.42 U	**20**	0.39 U	0.41 U	0.38 U	0.39 U
Phenanthrene	0.40 U	**1.1**	0.43 U	0.36 U	0.42 U	**11**	**0.58**	0.41 U	0.38 U	0.39 U
Pyrene	**0.20 J**	**1.3**	0.43 U	0.36 U	0.42 U	**4.6**	**0.89**	0.41 U	0.38 U	**0.81**
Total PAHs	**0.7**	**6.8**	ND	ND	ND	**52.7**	**4.1**	**0.23**	ND	**6.7**
Total Semivolatiles	**0.7**	**6.8**	ND	ND	ND	**52.7**	**4.1**	**0.23**	ND	**6.7**

See Notes on Page 7.

TABLE 5-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location	SB-108	SB-109	SB-109	SB-110	SB-111	SB-112	SB-112	TB93-01	TB93-02	TB93-05
Depth Range	(6 - 8')	(10 - 11')	(17 - 19')	(7 - 9')	(7 - 7.5')	(4 - 6')	(4 - 6')	(28 - 30')	(10 - 14')	(10 - 14')
Date Sampled	8/13/01	8/15/01	8/15/01	9/17/01	9/17/01	9/17/01	9/17/01	5/1/93	5/1/93	5/1/93
Sample Type	DUP	FS	FS	FS	FS	FS	DUP	FS	FS	FS
2,4-Dinitrotoluene	--	--	--	--	--	--	--	1. U	83. UD	86. UD
2-Methylnaphthalene	--	--	--	--	--	--	--	**6**	**630 D**	**930 D**
Acenaphthene	0.39 U	0.41 U	**0.95**	0.39 U	**12**	0.37 U	0.39 U	**4**	**58. JD**	**75. JD**
Acenaphthylene	0.39 U	0.41 U	0.39 U	0.39 U	**3.2**	0.37 U	0.39 U	**2**	**220 D**	**430 D**
Anthracene	**0.28 J**	0.41 U	0.39 U	0.39 U	**25**	0.37 U	0.39 U	**2**	**120 D**	**170 D**
Benzo(a)anthracene	**1.4**	0.41 U	0.39 U	0.39 U	**26**	0.37 U	0.39 U	1. U	83. UD	**96. D**
Benzo(a)pyrene	**1.4**	0.41 U	0.39 U	0.39 U	**22**	0.37 U	0.39 U	**0.38 J**	**60. JD**	**77. JD**
Benzo(b)fluoranthene	**1.3**	0.41 U	0.39 U	0.39 U	**22**	0.37 U	0.39 U	**0.17 J**	**21. JD**	**33. JD**
Benzo(ghi)perylene	**0.79**	0.41 U	0.39 U	0.39 U	**8.4**	0.37 U	0.39 U	1. U	**21. JD**	**30. JD**
Benzo(k)fluoranthene	**0.85**	0.41 U	0.39 U	0.39 U	**17**	0.37 U	0.39 U	**0.23 J**	**38. JD**	**46. JD**
Bis(2-ethylhexyl) phthalate	--	--	--	--	--	--	--	**0.29 JB**	83. UD	86. UD
Carbazole	--	--	--	--	--	--	--	--	--	--
Chrysene	**1.3**	0.41 U	0.39 U	0.39 U	**24**	0.37 U	0.39 U	**1. J**	**60. JD**	**88. D**
Di-n-butyl phthalate	--	--	--	--	--	--	--	1. U	83. UD	86. UD
Di-n-octyl phthalate	--	--	--	--	--	--	--	1. U	83. UD	86. UD
Dibenzo(a,h)anthracene	0.39 U	0.41 U	0.39 U	0.39 U	**2.3**	0.37 U	0.39 U	1. U	**12. JD**	86. UD
Dibenzofuran	0.39 U	0.41 U	0.39 U	0.39 U	**13**	0.37 U	0.39 U	**1. J**	**19. JD**	**27. JD**
Fluoranthene	**2.2**	0.41 U	0.39 U	0.39 U	**90. D**	0.37 U	0.39 U	**1**	**130 D**	**190 D**
Fluorene	0.39 U	0.41 U	**0.26 J**	0.39 U	**17**	0.37 U	0.39 U	**4**	**110 D**	**220 D**
Indeno(1,2,3-cd)pyrene	**0.73**	0.41 U	0.39 U	0.39 U	**8**	0.37 U	0.39 U	**0.13 J**	**21. JD**	**27. JD**
Naphthalene	0.39 U	0.41 U	0.39 U	0.39 U	**13**	0.37 U	0.39 U	**7**	**1,200 D**	**1,500 DB**
Phenanthrene	**0.79**	0.41 U	**0.47**	0.39 U	**100 D**	0.37 U	0.39 U	**8**	**440 D**	**670 D**
Pyrene	**1.6**	0.41 U	0.39 U	0.39 U	**26**	0.37 U	0.39 U	**2**	**230 D**	**300 D**
Total PAHs	**12.6**	ND	**1.7**	ND	**416**	ND	ND	**37.9**	**3,371**	**4,882**
Total Semivolatiles	**12.6**	ND	**1.7**	ND	**429**	ND	ND	**38**	**3,390**	**4,909**

See Notes on Page 7.

TABLE 5-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location	TB93-06	TB93-10	TB93-11	TP-02	TP-05	TP-07	TP-14	TP-15	TP-21	TP-21
Depth Range	(6 - 8.5')	(12 - 14')	(10 - 16')	(6')	(6')	(5')	(6')	(6')	(8')	(8')
Date Sampled	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93
Sample Type	FS	FS	FS	FS	FS	FS	FS	FS	FS	DUP
2,4-Dinitrotoluene	190 UD	40. UD	**58. JD**	22. UD	440 UD	86. UD	8.6 UD	240 UD	0.88 U	0.73 U
2-Methylnaphthalene	**2,200 D**	**110 D**	**5,900 D**	**7. JD**	**3,600 D**	**870 D**	**31. D**	**2,400 D**	**0.40 J**	**1**
Acenaphthene	**660 D**	**16. JD**	**350 JD**	**170 D**	**780 D**	**150 D**	**20. D**	**270 D**	**0.08 J**	**0.21 J**
Acenaphthylene	**510 D**	**27. JD**	**3,200 D**	10. UD	**740 D**	**280 D**	**8. JD**	**1,000 D**	**0.46 J**	**0.20 J**
Anthracene	**460 D**	**33. JD**	**3,000 D**	**50. D**	**550 D**	**180 D**	**18. D**	**720 D**	**1**	**0.26 J**
Benzo(a)anthracene	190 UD	**22. JD**	**2,400 D**	**21. JD**	440 UD	86. UD	**22. D**	**460 D**	**2**	**1. J**
Benzo(a)pyrene	**250 D**	**21. JD**	**980 D**	**11. JD**	**300 JD**	**100 D**	**19. D**	**380 D**	**4**	**1**
Benzo(b)fluoranthene	**110 JD**	**9. JD**	**750 D**	**10. JD**	**130 JD**	**47. JD**	**17. D**	**200 JD**	**2**	**1. J**
Benzo(ghi)perylene	**130 JD**	**8. JD**	**330 JD**	**4. JD**	**110 JD**	**36. JD**	**10. D**	**160 JD**	**2**	**1**
Benzo(k)fluoranthene	**160 JD**	**12. JD**	**200 JD**	**7. JD**	**150 JD**	**44. JD**	**14. D**	**310 D**	**2**	**1. J**
Bis(2-ethylhexyl) phthalate	190 UD	40. UD	250 UD	22. UD	440 UD	86. UD	8.6 UD	240 UD	**1. J**	0.73 U
Carbazole	--	--	--	--	--	--	--	--	--	--
Chrysene	**250 D**	**22. JD**	**890 D**	**19. JD**	**300 JD**	**100 D**	**22. D**	**440 D**	**3**	**1**
Di-n-butyl phthalate	190 UD	40. UD	250 UD	22. UD	440 UD	86. UD	8.6 UD	240 UD	**0.19 J**	0.73 U
Di-n-octyl phthalate	190 UD	40. UD	250 UD	22. UD	440 UD	86. UD	8.6 UD	240 UD	0.88 U	0.73 U
Dibenzo(a,h)anthracene	**44. JD**	40. UD	**77. JD**	22. UD	440 UD	**14. JD**	**5. JD**	**47. JD**	**1. J**	**0.17 J**
Dibenzofuran	**78. JD**	40. UD	**290 D**	**22. D**	**100 JD**	**28. JD**	**5. JD**	**260 D**	0.88 U	0.73 U
Fluoranthene	**570 D**	**62. D**	**2,300 D**	**48. D**	**630 D**	**200 D**	**40. D**	**880 D**	**4**	**2**
Fluorene	**490 D**	**70. D**	**2,100 D**	**130 D**	**650 D**	**180 D**	**23. D**	**720 D**	**0.21 J**	**0.28 J**
Indeno(1,2,3-cd)pyrene	**100 JD**	**7. JD**	**270 D**	**5. JD**	**100 JD**	**35. JD**	**10. D**	**160 JD**	**2**	**1. J**
Naphthalene	**3,300 D**	**590 D**	**10,000 D**	**27. D**	**6,700 D**	**1,500 D**	**21. D**	**4,000 D**	**0.48 J**	**0.36 J**
Phenanthrene	**1,600 D**	**200 D**	**7,100 D**	**280 D**	**2,100 D**	**640 D**	**74. D**	**2,100 D**	**3**	**3**
Pyrene	**920 D**	**99. D**	**3,300 D**	**66. D**	**1,200 D**	**370 D**	**50. D**	**1,100 D**	**8**	**2**
Total PAHs	**11,754**	**1,308**	**43,147**	**855**	**18,040**	**4,746**	**404**	**15,347**	**35.6**	**16.5**
Total Semivolatiles	**11,832**	**1,308**	**43,495**	**876**	**18,140**	**4,774**	**409**	**15,607**	**36**	**16.5**

See Notes on Page 7.

TABLE 5-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Notes:
All concentrations reported in milligrams per kilogram (mg/Kg); also expressed as parts per million (ppm).
Detections are bolded.
ND = Not detected.
D = Concentration is based on a diluted sample analysis.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
-- = Not analyzed.

TABLE 5-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED INORGANIC COMPOUNDS

Location	MW97-7	TB-13	SB-4	SB-4	SB-6	SB-20	SB-21	SB-22	SB-23	SB-23	TB93-01	TB93-02
Depth Range	(18.0' - 20.0')	(18.0' - 20.0')	(12 - 14')	(12 - 14')	(4 - 6')	(7 - 10')	(4 - 6')	(12 - 16')	(16 - 18')	(16 - 18')	(28 - 30')	(10 - 14')
Date Sampled	9/25/97	9/30/97	5/18/98	5/18/98	5/18/98	5/18/98	5/20/98	5/20/98	5/22/98	5/22/98	5/1/93	5/1/93
Sample Type	FS	FS	FS	DUP	FS	FS	FS	FS	FS	DUP	FS	FS
Aluminum	**8,890 J**	**11,000**	--	--	--	**9,840**	**6,020**	**8,910**	**7,290**	**6,160**	**7,600**	**10,700**
Antimony	**1.4 BJ**	0.52 UJ	--	--	--	1.8 UJ	1.6 UJ	1.7 UJ	2.3 UJ	2.2 UJ	0.33 U	0.37 U
Arsenic	**6**	**2.5**	--	--	--	**4.1**	**3.9**	**4.6**	**16.3**	**13.7**	**4**	**10**
Barium	**128 J**	**62.4**	--	--	--	**83.4**	**44. B**	**37.8 B**	**83.5**	**75.2**	**14. J**	**66**
Beryllium	**0.42 B**	**0.39 B**	--	--	--	**0.48 B**	**0.24 B**	**0.44 B**	**0.41 B**	**0.35 B**	--	--
Cadmium	0.05 U	0.06 U	--	--	--	0.25 U	0.23 U	0.24 U	0.32 U	0.31 U	0.44 U	0.49 U
Calcium	**13,500 J**	**1,510**	--	--	--	**17,200 J**	**42,700 J**	**1,270 J**	**3,430 J**	**2,410 J**	--	--
Chromium	**12.3**	**14.7**	--	--	--	**15.3**	**7.7**	**11.6**	**11.4**	**9.6**	**30**	**14**
Cobalt	**6.7**	**9.6**	--	--	--	**7.1 B**	**4.9 B**	**8.8 B**	**11.1 B**	**8.5 B**	--	--
Copper	**22.4**	**12.2**	--	--	--	**20.7**	**17**	**17.1**	**32.4**	**26.9**	**16**	**22**
Iron	**18,700 J**	**18,800**	--	--	--	**16,900**	**12,800**	**20,300**	**30,200**	**25,100**	**16,500**	**19,400**
Lead	**13.6**	**10.3 J**	--	--	--	**115**	**21.9**	**10.6**	**19.9**	**16.4**	**7**	**123**
Magnesium	**5,270 J**	**3,750**	--	--	--	**3,780**	**3,520**	**2,840**	**3,040**	**2,560**	--	--
Manganese	**1,390 J**	**242**	--	--	--	**198**	**482**	**208**	**891**	**679**	**314**	**512**
Mercury	**0.03 B**	**0.02 B**	--	--	--	**0.11 B**	**0.08 B**	0.06 U	0.08 U	0.07 U	0.06 U	**0.11 J**
Nickel	**19.4 J**	**23.7 J**	--	--	--	**24.5**	**11.1**	**19.9**	**27.4**	**21.9**	**24**	**18**
Potassium	**1,020**	**488 B**	--	--	--	**813 B**	**386 B**	**604 B**	**1,030 B**	**947 B**	--	--
Selenium	0.31 UJ	0.32 U	--	--	--	**1.1 B**	0.68 U	0.73 U	0.97 U	0.92 U	0.21 U	**0.45 J**
Sodium	**90.4 B**	51.7 U	--	--	--	118 U	105 U	113 U	150 U	142 U	--	--
Thallium	**1.7 J**	**0.84 BJ**	--	--	--	1.5 U	1.4 U	1.5 U	1.9 U	1.8 U	--	--
Vanadium	**13.1 J**	**12.5**	--	--	--	**15.5**	**10. B**	**11.8 B**	**14.3 B**	**11.9 B**	**14**	**18**
Zinc	**62.1 J**	**57.1**	--	--	--	**133 J**	**36.4 J**	**55.2 J**	**68.6 J**	**58.2 J**	**54**	**109**
Cyanide, Total	0.59 U	0.59 U	--	--	--	0.61 U	**0.79**	0.59 U	0.78 U	0.73 U	3. U	**12**
Cyanide, Amenable	--	--	--	--	--	--	--	--	--	--	--	**4**
Reactive Sulfide	--	--	100 UJ	100 UJ	100 UJ	--	--	**470 J**	100 UJ	--	--	--

See Notes on Page 2.

TABLE 5-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - DETECTED INORGANIC COMPOUNDS

Location	TB93-05	TB93-06	TB93-10	TB93-11	TP-02	TP-05	TP-07	TP-14	TP-15	TP-21	TP-21
Depth Range	(10 - 14')	(6 - 8.5')	(12 - 14')	(10 - 16')	(6')	(6')	(5')	(6')	(6')	(8')	(8')
Date Sampled	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93
Sample Type	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	DUP
Aluminum	**14,400**	**9,940**	**11,300**	3,400 U	**10,200**	**4,640**	**9,980**	**12,100**	**8,420**	**10,400**	**11,800**
Antimony	0.38 U	**0.41 J**	0.31 U	**2. J**	0.40 U	**5. J**	0.39 U	0.33 U	0.43 U	**1. J**	0.33 U
Arsenic	**4**	**13**	**4**	**2**	**15**	**22**	**13**	**8**	**3**	**10**	**6**
Barium	**70**	**87**	**45**	**27**	**120**	**70**	**141**	**95**	**54**	**50**	**37**
Beryllium	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.50 U	**1**	0.41 U	**1. J**	0.54 U	**2**	**1**	**1**	0.58 U	0.46 U	0.44 U
Calcium	--	--	--	--	--	--	--	--	--	--	--
Chromium	**19**	**44**	**15**	**6**	**18**	**9**	**18**	**18**	**10**	**14**	**14**
Cobalt	--	--	--	--	--	--	--	--	--	--	--
Copper	**15**	**47**	**11**	**26**	**31**	**37**	**36**	**42**	**26**	**20**	**14**
Iron	**22,900**	**21,900**	**20,500**	**10,100**	**31,100**	**19,700**	**20,300**	**25,000**	**8,740**	**17,600**	**18,900**
Lead	**26**	**343**	**10**	**183**	**39**	**894**	**282**	**297**	**887**	**32**	**31**
Magnesium	--	--	--	--	--	--	--	--	--	--	--
Manganese	**514**	**367**	**220**	**198**	**178**	**292**	**572**	**409**	**174**	**230**	**193**
Mercury	0.07 U	**0.44**	0.06 U	**0.46**	**0.14**	**2**	**1**	**0.33**	**0.29**	**0.08 J**	**0.12**
Nickel	**21**	**23**	**20**	**8**	**20**	**18**	**24**	**24**	**10**	**17**	**18**
Potassium	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.26 U	**2**	0.20 U	**4**	**2**	**2**	**1**	**1**	**1**	**1**	**2**
Sodium	--	--	--	--	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--	--	--	--	--
Vanadium	**22**	**19**	**14**	**8**	**32**	**15**	**19**	**21**	**17**	**18**	**18**
Zinc	**80**	**159**	**56**	**80**	**62**	**223**	**273**	**198**	**78**	**65**	**58**
Cyanide, Total	3. U	**27**	3. U	**50**	**6**	**68**	**23**	2.9 U	**42**	2.5 U	**18**
Cyanide, Amenable	--	3. U	--	3. U	**6**	**24**	2.9 U	--	3.5 U	--	**18**
Reactive Sulfide	--	--	--	--	--	--	--	--	--	--	--

Notes:
All concentrations reported in milligrams per kilogram (mg/Kg); also expressed as parts per million (ppm).
Detections are bolded.
B = The reported value was obtained from a reading less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit.
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
-- = Not analyzed.

TABLE 5-D

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUBSURFACE SOIL ANALYTICAL RESULTS - MISCELLANEOUS COMPOUNDS

Location	MW97-7	MW97-7	MW97-12S	TB-12	SB-22	SB-23	MW98-15S	SB-101	TB93-02	TB93-05	TB93-06	TB93-11	TP-05
Depth Range	(28.0' - 30.0')	(28.0' - 30.0')	(12.0' - 14.0')	(46.0' - 48.0')	(12 - 16')	(16 - 18')	(9 - 11')	(15 - 17')	(10 - 14')	(10 - 14')	(6 - 8.5')	(10 - 16')	(6')
Date Sampled	9/25/97	9/25/97	9/25/97	9/25/97	5/20/98	5/22/98	5/18/98	8/7/01	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93
Sample Type	FS	DUP	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Total Organic Carbon (TOC)	**18,100**	**17,700**	**25,100**	**8,200**	--	--	--	--	--	--	--	--	--
TPH as #2 Fuel Oil	--	--	--	--	--	--	--	**1,380**	--	--	--	--	--
Total Petroleum Hydrocarbons	--	--	--	--	**9,316**	**15,315**	**1,180**	--	**23,900**	**8,390**	**20,100**	**15,000**	**13,100**

Notes:
All concentrations reported in milligrams per kilogram (mg/Kg); also expressed as parts per million (ppm).
Detections are bolded.
-- = Not analyzed.

TABLE 6

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
NON-AQUEOUS PHASE LIQUID ANALYTICAL RESULTS

Location	MW97-13S
Date Samples	10/13/1997
Sample Type	FS
Volatile Organic Compounds	
1,1,1-Trichloroethane	1.2 U
1,1,2,2-Tetrachloroethane	1.2 U
1,1,2-Trichloroethane	1.2 U
1,1-Dichloroethane	1.2 UJ
1,1-Dichloroethene	1.2 U
1,2-Dichloroethane	1.2 UJ
1,2-Dichloroethene (Total)	1.2 U
1,2-Dichloropropane	1.2 U
2-Butanone	1.2 U
2-Hexanone	1.2 U
4-Methyl-2-pentanone	1.2 U
Acetone	1.2 U
Benzene	**1,600 D**
Bromodichloromethane	1.2 U
Bromoform	1.2 U
Bromomethane	1.2 U
Carbon Disulfide	1.2 U
Carbon Tetrachloride	1.2 U
Chlorobenzene	1.2 U
Chloroethane	1.2 U
Chloroform	1.2 U
Chloromethane	1.2 U
cis-1,3-Dichloropropene	1.2 U
Dibromochloromethane	1.2 U
Ethylbenzene	**2,400 D**
Methylene chloride	1.2 U
Styrene	1.2 U
Tetrachloroethene	1.2 U
Toluene	**1,700 D**
trans-1,3-Dichloropropene	1.2 U
Trichloroethene	1.2 U
Vinyl Acetate	1.2 U
Vinyl chloride	1.2 U
Xylenes, Total	**2,300 D**
Semivolatile Organic Compounds	
1,2,4-Trichlorobenzene	R
1,2-Dichlorobenzene	R
1,3-Dichlorobenzene	R
1,4-Dichlorobenzene	R
2,4,5-Trichlorophenol	R
2,4,6-Trichlorophenol	R
2,4-Dichlorophenol	R
2,4-Dimethylphenol	R
2,4-Dinitrophenol	R
2,4-Dinitrotoluene	R
2,6-Dinitrotoluene	R
2-Chloronaphthalene	R
2-Chlorophenol	R
2-Methylnaphthalene	**450 J**
2-Methylphenol	R
2-Nitroaniline	R
2-Nitrophenol	R
3,3'-Dichlorobenzidine	R
3-Nitroaniline	R
4,6-Dinitro-2-methylphenol	R

See Notes on Page 4.

TABLE 6

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
NON-AQUEOUS PHASE LIQUID ANALYTICAL RESULTS

Location	MW97-13S
Date Samples	10/13/1997
Sample Type	FS
4-Bromophenyl phenyl ether	R
4-Chloro-3-methylphenol	R
4-Chloroaniline	R
4-Chlorophenyl-phenylether	R
4-Methylphenol	R
4-Nitroaniline	R
4-Nitrophenol	R
Acenaphthene	**140 J**
Acenaphthylene	**26 J**
Anthracene	**77 J**
Benzo(a)anthracene	**50 J**
Benzo(a)pyrene	**42 J**
Benzo(b)fluoranthene	**16 J**
Benzo(ghi)perylene	**23 J**
Benzo(k)fluoranthene	**26 J**
Benzoic Acid	R
Benzyl Alcohol	R
Bis(2-chloroethoxy) methane	R
Bis(2-chloroethyl) ether	R
Bis(2-ethylhexyl) phthalate	R
Bis(2-chloroisopropyl) ether	R
Butyl benzyl phthalate	R
Chrysene	**39 J**
Di-n-butyl phthalate	R
Di-n-octyl phthalate	R
Dibenzo(a,h)anthracene	R
Dibenzofuran	**14 J**
Diethyl phthalate	R
Dimethyl phthalate	R
Fluoranthene	**96 J**
Fluorene	**100 J**
Hexachlorobenzene	R
Hexachlorobutadiene	R
Hexachlorocyclopentadiene	R
Hexachloroethane	R
Indeno(1,2,3-cd)pyrene	**15 J**
Isophorone	R
N-Nitroso-Di-n-propylamine	R
N-nitrosodiphenylamine	R
Naphthalene	**730 J**
Nitrobenzene	R
Pentachlorophenol	R
Phenanthrene	**310 J**
Phenol	**16 J**
Pyrene	**160 J**
Inorganics	
Aluminum	**6.8 B**
Antimony	0.29 UJ
Arsenic	**3.1**
Barium	0.44 U
Beryllium	0.06 U
Cadmium	0.03 UJ
Calcium	**58 B**
Chromium	**0.18 B**
Cobalt	0.21 U
Copper	**0.76 B**

See Notes on Page 4.

TABLE 6

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
NON-AQUEOUS PHASE LIQUID ANALYTICAL RESULTS

Location	MW97-13S
Date Samples	10/13/1997
Sample Type	FS
Iron	**13**
Lead	**1.4**
Magnesium	22.1 U
Manganese	**0.18 B**
Mercury	**0.04 B**
Nickel	0.25 UJ
Potassium	25.9 U
Selenium	**0.66**
Silver	0.08 UJ
Sodium	34.1 U
Thallium	**0.36 BJ**
Vanadium	**0.26 B**
Zinc	**3.4 J**
Cyanide, Total	0.50 U

See Notes on Page 4.

TABLE 6

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
NON-AQUEOUS PHASE LIQUID ANALYTICAL RESULTS

Notes:
All concentrations reported in micrograms per liter (ug/L); also expressed as parts per billion (ppb).
Detections are bolded.
ND = Not detected.
B = The reported value was obtained from a reading less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit.
D = Concentration is based on a diluted sample analysis.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
R = The sample results are rejected.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

TABLE 7

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
STORM SEWER WATER ANALYTICAL RESULTS

Location	MH-1	MH-2	MH-3
Date Sampled	10/13/1997	10/13/1997	10/13/1997
Sample Type	FS	FS	FS
Volatile Organic Compounds			
1,1,1-Trichloroethane	**53**	**51**	**38**
1,1-Dichloroethane	**13. J**	**12. J**	**8. J**
Acetone	**10**	**44**	10. U
Benzene	10. U	10. U	**4. J**
Ethylbenzene	10. U	10. U	**1. J**
Total BTEX	ND	ND	**5**
Inorganics			
Aluminum	**61.4 B**	**54.8 B**	**68.9 B**
Arsenic	**3. B**	2.4 U	2.4 U
Barium	**506**	**497**	**468**
Calcium	**145,000**	**144,000**	**135,000**
Copper	**2.7 B**	**4.2 B**	**5.6 B**
Iron	15.3 UJ	15.3 UJ	15.3 UJ
Lead	1.9 UJ	1.9 UJ	1.9 UJ
Magnesium	**15,500**	**15,500**	**14,600**
Manganese	**705**	**687**	**632**
Mercury	**0.10 B**	**0.08 B**	**0.08 B**
Potassium	**15,700**	**15,500**	**14,700**
Sodium	**778,000**	**813,000**	**746,000**
Zinc	**33.3**	**51.5**	**42.2**

Notes:

All concentrations reported in micrograms per liter (ug/L); also expressed as parts per billion (ppb).

Detections are bolded.

ND = Not Detected.

B = The reported value was obtained from a reading less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit.

J = The compound/analyte was positively identified; however, the associated numerical value is an estimated concentration only.

U = The compound/analyte was analyzed for but not detected. The associated value is the compound quantitation/analyte instrument detection limit.

Semivolatile organic compounds were analyzed for, but not detected.

TABLE 8-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - DETECTED VOLATILE ORGANIC COMPOUNDS

Location	SF-01	SF-02	SF-03	SF-04	SF-05	SF-05	SS0-1	SS0-1	SS0-2	SS0-3
Depth Range	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")
Date Samples	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	9/15/97	9/19/97	9/15/97	9/15/97
Sample Type	FS	FS	FS	FS	FS	DUP	FS	FS	FS	FS
Ethylbenzene	0.005 U	0.006 U	0.005 U	0.005 U	0.006 U	0.006 U	**0.001 JN**	0.01 U	0.01 U	0.01 U
Tetrachloroethene	0.005 U	0.006 U	0.005 U	0.005 U	0.006 U	0.006 U	**0.005 J**	0.01 U	0.01 U	**0.002 JN**
Xylenes, Total	0.005 U	0.006 U	0.005 U	0.005 U	0.006 U	0.006 U	**0.02**	0.01 U	0.01 U	0.01 U
Total BTEX	ND	ND	ND	ND	ND	ND	**0.02**	ND	ND	ND

Notes:

All concentrations reported in milligrams per kilogram (mg/Kg); also expressed as parts per million (ppm).
Detections are bolded.
ND = Not detected.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
N = The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

TABLE 8-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - DETECTED SEMIVOLATILE ORGANIC COMPOUNDS

Location	SF-01	SF-02	SF-03	SF-04	SF-05	SF-05	SS0-1	SS0-1	SS0-2	SS0-3
Depth Range	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")
Date Sampled	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	9/15/97	9/19/97	9/15/97	9/15/97
Sample Type	FS	FS	FS	FS	FS	DUP	FS	FS	FS	FS
2-Methylnaphthalene	**0.03 J**	0.37 U	**0.06 J**	0.35 U	**0.02 J**	0.37 U	**0.22 J**	0.43 U	**0.10 J**	0.72 U
Acenaphthene	**0.31 J**	**0.05 J**	**0.21 J**	0.35 U	**0.13 J**	**0.10 J**	**0.33 J**	**0.05 J**	**0.05 J**	**0.09 J**
Acenaphthylene	0.34 U	**0.06 J**	**0.12 J**	0.35 U	**0.06 J**	**0.04 J**	**0.96 J**	**0.30 J**	**0.57**	0.72 U
Anthracene	**0.43**	**0.14 J**	**0.46**	0.35 U	**0.27 J**	**0.21 J**	**0.79 J**	**0.16 J**	**0.24 J**	**0.23 J**
Benzo(a)anthracene	**0.63**	**0.63**	**1.8**	**0.076 J**	**1.3**	**1**	**2.1**	**0.72**	**0.73**	**1.1**
Benzo(a)pyrene	**0.45**	**0.58**	**1.4**	**0.059 J**	**1.2**	**0.91**	**2**	**0.98**	**1.1**	**1.1**
Benzo(b)fluoranthene	**0.59**	**0.87**	**2.3**	**0.11 J**	**1.9**	**1.6**	**1.6**	**0.61**	**0.82**	**0.87**
Benzo(ghi)perylene	**0.20 J**	**0.28 J**	**0.55**	0.35 U	**0.51**	**0.38**	**1.8**	**0.82 J**	**0.22 J**	**0.54 J**
Benzo(k)fluoranthene	**0.29 J**	**0.31 J**	**0.62**	0.35 U	**0.7**	**0.41**	**1.3 J**	**0.69**	**0.87**	**0.8**
Benzoic Acid	0.85 U	0.94 U	0.90 U	0.89 U	0.96 U	0.94 U	7.8 UJ	**0.04 J**	2.1 UJ	3.6 UJ
Bis(2-ethylhexyl) phthalate	**0.06 J**	**0.09 J**	**0.58**	**0.35**	**0.20 J**	**0.09 J**	**0.32 J**	**0.08 J**	**0.06 J**	**0.13 J**
Chrysene	**0.58**	**0.56**	**1.5**	**0.08 J**	**1.3**	**0.99**	**2.4**	**0.8**	**0.92**	**1.4**
Di-n-butyl phthalate	**0.02 J**	0.37 U	**0.06 J**	**0.13 J**	**0.02 J**	**0.07 J**	1.6 U	0.43 U	0.42 UJ	0.72 U
Dibenzo(a,h)anthracene	**0.06 J**	0.37 U	**0.19 J**	0.35 U	**0.16 J**	**0.12 J**	**0.16 J**	**0.07 J**	0.42 U	0.72 U
Dibenzofuran	**0.19 J**	**0.02 J**	**0.07 J**	0.35 U	**0.04 J**	**0.03 J**	**0.35 J**	0.43 U	0.42 U	0.72 U
Dimethyl phthalate	0.34 U	**0.09 J**	0.36 U	0.35 U	0.38 U	0.37 U	1.6 U	0.43 U	0.42 U	0.72 U
Fluoranthene	**1.7**	**1**	**2.7**	**0.25 J**	**2.3**	**1.9**	**4.5**	**1.1**	**1.8 J**	**2.6**
Fluorene	**0.32 J**	**0.05 J**	**0.19 J**	0.35 U	**0.10 J**	**0.08 J**	**0.53 J**	0.43 U	**0.06 J**	**0.10 J**
Indeno(1,2,3-cd)pyrene	**0.22 J**	**0.24 J**	**0.61**	**0.037 J**	**0.55**	**0.39**	**1.5 J**	**0.67**	**0.24 J**	**0.60 J**
Naphthalene	**0.04 J**	0.37 U	**0.06 J**	**0.02 J**	0.38 U	0.37 U	**0.48 J**	0.43 U	0.42 U	0.72 U
Phenanthrene	**1.8**	**0.58**	**1.6**	**0.25 JB**	**1.2**	**1**	**4**	**0.67**	**0.61 J**	**1.2**
Pyrene	**1.2**	**1.3**	**3.4**	**0.19 J**	**2.4**	**2**	**3.2**	**1.6**	**0.91**	**1.6**
Total PAHs	**8.8**	**6.6**	**17.8**	**1.1**	**14.1**	**11.1**	**27.9**	**9.2**	**9.2**	**12.2**
Total Semivolatiles	**9.1**	**6.8**	**21.2**	**1.3**	**14.4**	**11.3**	**28.5**	**9.4**	**9.3**	**12.4**

Notes:
All concentrations reported in milligrams per kilogram (mg/Kg); also expressed as parts per million (ppm).
Detections are bolded.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

TABLE 8-C

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - DETECTED INORGANIC COMPOUNDS

Location	SF-01	SF-02	SF-03	SF-04	SF-05	SF-05	SS0-1	SS0-1	SS0-2	SS0-3
Depth Range	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")
Date Sampled	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	5/1/93	9/15/97	9/19/97	9/15/97	9/15/97
Sample Type	FS	FS	FS	FS	FS	DUP	FS	FS	FS	FS
Aluminum	**7,050**	**5,250**	**9,040**	**8,260**	**8,140**	**7,450**	**8,730**	**10,600**	**9,800**	**7,720**
Antimony	0.31 U	0.33 U	**0.45 J**	0.32 U	0.34 U	0.33 U	**1.9 BJ**	**1.6 BJ**	**0.86 BJ**	**5.6 BJ**
Arsenic	**3.7**	**5.5**	**8.7**	**8**	**5.5**	**6**	**8.4 J**	**7.3 J**	**6.5 J**	**6.9 J**
Barium	**41.5**	**37.2**	**68.5**	**39.2**	**57.6**	**49.3**	**86.8**	**81.1**	**76.2**	**49.3**
Beryllium	--	--	--	--	--	--	**0.28 B**	**0.42 B**	**0.36 B**	**0.22 B**
Cadmium	0.41 U	0.44 U	**1.1**	0.42 U	**1.4**	**0.78 J**	**2.4**	0.06 UJ	**0.20 B**	**0.28 B**
Calcium	--	--	--	--	--	--	**11,500**	**3,920**	**4,480**	**21,800**
Chromium	**9.8**	**8.1**	**15.2**	**12.1**	**14.5**	**14.7**	**27.7**	**16.5**	**15**	**11.9**
Cobalt	--	--	--	--	--	--	**8.6**	**9.1**	**8.3**	**6.9**
Copper	**18.9**	**17.4**	**33.1**	**18.3**	**25.5**	**21.3**	**32**	**24.8**	**23.5**	**22.9**
Iron	**16,000**	**13,000**	**24,700**	**19,500**	**15,100**	**14,500**	**22,900**	**21,700**	**20,100**	**19,300**
Lead	**13.1**	**56.1**	**142**	**15.9**	**93.9**	**117**	**186**	**107**	**90.7**	**52.8**
Magnesium	--	--	--	--	--	--	**4,030**	**3,850**	**3,870**	**5,020**
Manganese	**391**	**378**	**579**	**458**	**418**	**382**	**449 J**	**574**	**529 J**	**437 J**
Mercury	0.05 U	**0.43**	**9.8**	0.05 U	**0.29**	**0.13**	**11.4 J**	**0.25**	**0.23 J**	**0.15 J**
Nickel	**15.5**	**11.6**	**21.8**	**17.7**	**15.2**	**15.3**	**21**	**22.1**	**20.5**	**18.8**
Potassium	--	--	--	--	--	--	**896**	**978**	**1,040**	**584**
Silver	0.61 U	0.66 U	0.64 U	0.63 U	0.69 U	0.67 U	**0.23 BJ**	0.15 UJ	0.15 UJ	0.12 UJ
Sodium	--	--	--	--	--	--	**481 B**	58.5 U	**526 B**	**439 B**
Thallium	--	--	--	--	--	--	**1.6 J**	**1.6**	**1.7 J**	**4.5**
Vanadium	**12.1**	**15.4**	**13.8**	**10.5**	**15**	**16.8**	**15.3**	**15.7**	**14.8**	**12.8**
Zinc	**59.4**	**67.2**	**138**	**51**	**253**	**112**	**170**	**110**	**100**	**87.7**

Notes:
All concentrations reported in milligrams per kilogram (mg/Kg); also expressed as parts per million (ppm).
Detections are bolded.
B = The reported value was obtained from a reading less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit.
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

TABLE 8-D

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - POLYCHLORINATED BIPHENYLS

Location	SB-123	SS-123	SS-123	SB-456
Depth Range	(0 - 2")	(0 - 2")	(0 - 2")	(0 - 2")
Sample Number	SB-022A	SB-022B	SB-025	SB-010
Date Sampled	9/18/1997	9/18/1997	9/18/1997	9/16/1997
Sample Type	FS	FS	DUP	FS
Aroclor-1016	0.09 U	0.10 U	0.10 U	0.09 U
Aroclor-1221	0.13 U	0.14 U	0.14 U	0.13 U
Aroclor-1232	0.09 U	0.10 U	0.10 U	0.09 U
Aroclor-1242	0.09 U	0.10 U	0.10 U	0.09 U
Aroclor-1248	0.09 U	0.10 U	0.10 U	0.09 U
Aroclor-1254	0.09 U	0.10 U	0.10 U	0.09 U
Aroclor-1260	0.09 U	**0.07 J**	0.10 U	0.09 U

Notes:
Results reported in milligrams per kilogram (mg/Kg);
also expressed as parts per million (ppm).
Detections are bolded.
J = The compound was positively identified; however, the
associated numerical value is an estimated concentration only.
U = The compound was analyzed for but not detected.
The associated value is the compound quantitation limit.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Location	Benthic Aquatic Life Toxicity Criteria (1,2)		SS-13	SS-14	SS-01	SS-02	SS-03	SS-03	SS-04	SS-05
Depth Range			(0.0' - 0.8')	(0.0' - 1.0')	(0.0' - 0.8')	(0.0' - 0.5')	(0.0' - 1.0')	(0.0' - 1.0')	(0.0' - 0.9')	(0.0' - 0.8')
Date Sampled	Chronic	Acute	6/16/1993	6/16/1993	6/16/1993	6/16/1993	6/16/1993	6/16/1993	6/16/1993	6/16/1993
Sample Type	(ug/g OC)	(ug/g OC)	FS	FS	FS	FS	FS	DL	FS	FS
Volatile Organic Compounds (VOCs) (mg/Kg)										
Acetone	NA	NA	--	--	--	--	0.051	--	0.021	--
1,1,1-Trichloroethane	NA	NA	--	--	--	--	--	--	--	--
2-Butanone	NA	NA	--	--	--	--	--	--	--	--
Benzene	28	103	--	--	--	--	0.018	--	--	0.002
Ethylbenzene	24	212	--	--	--	--	0.27	--	--	--
Methylene Chloride	NA	NA	-	-	--	--	0.008	--	0.015	--
Styrene	NA	NA	--	--	--	--	--	--	--	--
Toluene	49	235	-	-	--	--	0.006	--	--	--
Xylenes, Total	92	833	--	--	--	--	0.099	--	--	--
Total BTEX	NA	NA	--	--	--	--	0.4	--	--	--
Semivolatile Organic Compounds (SVOCs) (mg/Kg)										
2-Methylnaphthalene	34	304	--	--	--	--	**55**	**55**	--	0.028
3-Nitroaniline	NA	NA	--	--	--	--	--	--	--	--
4-Methylphenol	NA	NA	--	--	--	--	--	--	--	--
4-Nitroaniline	NA	NA	--	--	--	--	--	--	--	--
4-Nitrophenol	NA	NA	--	--	--	--	--	--	--	--
Acenaphthene	140	NA	--	--	0.028	0.027	**250**	**290**	--	**0.54**
Acenaphthylene	0.044 (a)	0.64 (a)	--	--	**0.067**	--	**16**	**16**	--	--
Anthracene	107	986	--	--	0.088	0.037	**110**	**110**	--	--
Benzo(a)anthracene	12	94	0.017	0.021	**0.37**	**0.16**	**70**	**69**	0.027	**0.049**
Benzo(a)pyrene	0.37 (c)	1440 (b)	0.013	0.018	**0.42**	0.13	**87**	**84**	0.026	0.046
Benzo(b)fluoranthene	NA	NA	--	--	0.47	0.2	65	62	--	0.051
Benzo(ghi)perylene	0.17 (c)	320 (b)	--	--	**0.23**	--	**32**	**44**	--	--
Benzo(k)fluoranthene	0.24 (c)	1340 (b)	--	--	0.14	0.074	**22**	**17**	--	--
Bis(2-ethylhexyl) phthalate	199.5	NA	--	0.15	0.13	0.17	--	--	0.052	0.05
Butyl benzyl phthalate	NA	NA	--	--	--	--	--	--	--	--
Chrysene	0.34 (c)	460 (b)	--	--	**0.36**	0.16	**62**	**62**	-	0.049
Di-n-butyl phthalate	NA	NA	0.07	0.1	0.032	0.043	--	--	0.076	0.05
Di-n-octyl phthalate	NA	NA	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.06 (c)	130 (b)	--	--	0.034	**0.4**	**5.8**	**6.5**	-	-
Dibenzofuran	NA	NA	--	--	0.4	0.4	11	45	0.48	0.41
Fluoranthene	1020	NA	0.028	0.042	0.72	0.32	**170**	**190**	0.058	0.1
Fluorene	8	73	--	--	0.029	0.016	**110**	**120**	0.017	0.018
Indeno(1,2,3-cd)pyrene	0.2 (c)	320 (b)	--	--	**0.22**	0.072	**26**	**32**	--	--
N-nitrosodiphenylamine	NA	NA	--	--	--	--	--	--	--	--
Naphthalene	30	258	--	--	--	--	**120**	**130**	--	**0.18**
Phenanthrene	120	950 (b)	0.02	0.02	0.37	0.18	**270**	**400**	0.063	0.042
Pyrene	961	8775	0.023	0.035	0.79	0.26	**240**	**280**	0.049	0.12
Total PAHs	4 (a)	45 (a)	0.1	0.1	**4.3**	2.0	**1711**	**1968**	0.2	1.2
Total Semivolatiles	NA	NA	0.2	0.4	4.9	2.6	1722	2013	0.8	1.7
Inorganics (mg/Kg)										
Aluminum	NA	NA	12500	12000	6560	6000	11800	--	8920	9810
Antimony	2	25	0.42	--	--	--	--	--	--	--
Arsenic	6	33	**7.1**	**10.2**	3.9	4.1	3.2	--	1.9	3.9
Barium	NA	NA	64.9	68.5	57.5	52.7	85.4	--	63.8	58.6
Beryllium	NA	NA	- -	- -	--	--	--	--	--	--
Cadmium	0.6	9	--	--	--	--	--	--	--	--
Calcium	NA	NA	--	--	--	--	--	--	--	--
Chromium	26	110	17.2	17.5	13.3	9	15.2	--	11.9	13.4
Cobalt	NA	NA	- -	- -	--	--	--	--	--	--
Copper	16	110	**18.1**	**22.1**	**22.9**	15	**37.1**	--	13.9	13.8
Iron	20,000	40,000	**28300**	**27800**	18500	15400	19800	--	15500	**20400**
Lead	31	110	21.3	**43.5**	**89.4**	**117**	**42.1**	--	24	20.8
Magnesium	NA	NA	- -	- -	--	--	--	--	--	--
Manganese	460	1100	**517**	425	365	331	400	--	247	431
Mercury	0.15	1.3	-	-	--	--	**0.43**	--	--	--
Nickel	16	50	**25.3**	**26.8**	14.9	12.4	**20.9**	--	17.2	**19.9**
Potassium	NA	NA	- -	- -	--	--	--	--	--	--
Selenium	NA	NA	-	-	--	--	--	--	--	--
Silver	1	2.2	-	-	--	--	--	--	--	--
Sodium	NA	NA	- -	- -	--	--	--	--	--	--
Thallium	NA	NA	- -	- -	--	--	--	--	--	--
Vanadium	NA	NA	14.7	13.8	9.3	8.4	13.9	--	11.6	11.8
Zinc	120	270	82.9	101	84	65.1	92.2	--	63.4	69.3
Cyanide, Total	NA	NA	--	--	19.6	--	--	--	--	--
Miscellaneous Compounds (mg/Kg)										
TPH as #4 Fuel Oil	NA	NA	--	--	--	--	--	--	--	--
TPH as 10W40 Oil	NA	NA	--	--	--	--	--	--	--	--
Total Organic Carbon (TOC) (3)										
TOC (mg/Kg)	NA	NA	1,800	5,000	14,600	6,700	29,000	29,000	2,400	3,600
% TOC	NA	NA	0.18	0.5	1.46	0.67	2.9	2.9	0.24	0.36

See Notes on Page 9.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Location	Benthic Aquatic Life Toxicity Criteria (1,2)		SS-06	SS-07	SS-08	SS-09	SS-10	SS-10	SS-11	SS-11
Depth Range			(0.0' - 0.5')	(0.0' - 0.9')	(0.0' - 1.0')	(0.0' - 0.7')	(0.0' - 0.7')	(0.0' - 0.7')	(0.0' - 0.6')	(0.0' - 0.6')
Date Sampled	Chronic	Acute	6/16/1993	6/16/1993	6/16/1993	6/16/1993	6/16/1993	6/16/1993	6/16/1993	6/16/1993
Sample Type	(ug/g OC)	(ug/g OC)	FS	FS	FS	FS	FS	DUP	FS	DL
Volatile Organic Compounds (VOCs) (mg/Kg)										
Acetone	NA	NA	--	0.019	0.035	0.021	0.12	0.13	--	--
1,1,1-Trichloroethane	NA	NA	--	--	--	--	--	--	--	--
2-Butanone	NA	NA	--	--	--	--	--	--	--	--
Benzene	28	103	--	--	--	--	--	--	--	--
Ethylbenzene	24	212	--	--	--	--	0.068	0.097	**12**	--
Methylene Chloride	NA	NA	-	--	-	-	-	0.025	-	-
Styrene	NA	NA	--	--	--	--	--	--	--	--
Toluene	49	235	--	--	0.006	--	--	--	--	--
Xylenes, Total	92	833	--	--	--	--	0.071	0.11	**2.4**	--
Total BTEX	NA	NA	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (SVOCs) (mg/Kg)										
2-Methylnaphthalene	34	304	0.036	--	0.078	0.25	0.65	0.63	**55**	**57**
3-Nitroaniline	NA	NA	--	--	--	--	--	--	--	--
4-Methylphenol	NA	NA	--	--	--	--	--	--	--	--
4-Nitroaniline	NA	NA	--	--	--	--	--	--	--	--
4-Nitrophenol	NA	NA	--	--	--	--	--	--	--	--
Acenaphthene	140	NA	1.2	--	0.042	0.9	2.2	2.3	**29**	**30**
Acenaphthylene	0.044 (a)	0.64 (a)	**0.82**	**0.087**	**0.21**	**0.24**	**1.6**	**1.5**	**2.5**	**2.4**
Anthracene	107	986	0.83	0.085	0.26	0.5	1	1.1	**12**	**12**
Benzo(a)anthracene	12	94	**2.8**	**0.35**	**0.91**	**1**	**1.4**	**1.4**	**6.8**	**6.5**
Benzo(a)pyrene	0.37 (c)	1440 (b)	**3.7**	**0.43**	**1.2**	**1**	**1.9**	**1.9**	**6.2**	**5.9**
Benzo(b)fluoranthene	NA	NA	3.7	0.47	1.2	1.2	1.7	1.6	5.5	5
Benzo(ghi)perylene	0.17 (c)	320 (b)	**1.4**	**0.27**	**0.58**	**0.57**	**2.1**	**2**	**2.7**	**3**
Benzo(k)fluoranthene	0.24 (c)	1340 (b)	**0.77**	0.14	**0.36**	**0.35**	**0.41**	**0.37**	**1.6**	--
Bis(2-ethylhexyl) phthalate	199.5	NA	0.075	--	--	0.094	0.2	0.14	--	--
Butyl benzyl phthalate	NA	NA	--	--	--	--	--	--	--	--
Chrysene	0.34 (c)	460 (b)	**2.9**	**0.36**	**1**	**0.98**	**1.3**	**1.2**	**6.1**	**6.1**
Di-n-butyl phthalate	NA	NA	--	0.052	0.042	0.063	--	--	--	--
Di-n-octyl phthalate	NA	NA	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.06 (c)	130 (b)	**0.32**	-	**0.096**	**0.13**	--	--	**0.6**	**0.63**
Dibenzofuran	NA	NA	0.5	0.5	0.48	0.22	0.095	0.097	-	-
Fluoranthene	1020	NA	4.3	0.59	1.8	2	2.4	2.2	16	17
Fluorene	8	73	**0.17**	0.021	0.062	**0.58**	**0.9**	**0.93**	**14**	**14**
Indeno(1,2,3-cd)pyrene	0.2 (c)	320 (b)	**1.9**	**0.26**	**0.64**	**0.56**	**1.5**	**1.5**	**2.2**	**2.3**
N-nitrosodiphenylamine	NA	NA	--	--	--	--	--	--	--	--
Naphthalene	30	258	**0.73**	0.063	0.14	**0.63**	**1.4**	**1.3**	--	**67**
Phenanthrene	120	950 (b)	**1.7**	0.25	0.7	**1.8**	2.2	2.2	**40**	**45**
Pyrene	961	8775	6	0.77	2.4	2.2	3.9	3.9	**24**	22
Total PAHs	4 (a)	45 (a)	**33.3**	**4.1**	**11.7**	**14.9**	**26.6**	**26.0**	**224**	**296**
Total Semivolatiles	NA	NA	33.9	4.7	12.2	15.3	26.9	26.3	224	296
Inorganics (mg/Kg)										
Aluminum	NA	NA	11000	10500	9390	7810	7330	9150	8690	--
Antimony	2	25	--	--	--	--	--	--	0.46	--
Arsenic	6	33	3.2	3.2	3.3	4.1	3.2	4.3	4.6	--
Barium	NA	NA	78.4	79.3	60.1	49.9	34.7	40.3	47.3	--
Beryllium	NA	NA	--	--	--	--	--	--	--	--
Cadmium	0.6	9	--	--	--	--	--	--	--	--
Calcium	NA	NA	--	--	--	--	--	--	--	--
Chromium	26	110	**47.3**	14.3	11.9	12.2	10.4	12.3	11.6	--
Cobalt	NA	NA	--	--	--	--	--	--	--	--
Copper	16	110	**24.9**	**34.5**	**21.4**	**24.5**	**32.1**	**35.1**	**27.6**	--
Iron	20,000	40,000	19300	19300	16600	16800	13900	18900	18200	--
Lead	31	110	**71.5**	**44.9**	**41.3**	**35**	**34.6**	**56.4**	**251**	--
Magnesium	NA	NA	--	--	--	--	--	--	--	--
Manganese	460	1100	319	247	255	222	153	161	230	--
Mercury	0.15	1.3	**0.18**	0.1	0.06	--	--	0.11	--	--
Nickel	16	50	**21.4**	**22.6**	**17.7**	**16.8**	14.2	**18.1**	**17.2**	--
Potassium	NA	NA	--	--	--	--	--	--	--	--
Selenium	NA	NA	--	--	--	--	--	--	--	--
Silver	1	2.2	--	--	--	--	--	--	--	--
Sodium	NA	NA	--	--	--	--	--	--	--	--
Thallium	NA	NA	--	--	--	--	--	--	--	--
Vanadium	NA	NA	12.5	12.8	11	11	9.8	10.6	10.6	--
Zinc	120	270	76.3	78.7	63.7	73.4	90.4	93	68.1	--
Cyanide, Total	NA	NA	3.7	3.9	3	2.7	2.8	3.2	--	--
Miscellaneous Compounds (mg/Kg)										
TPH as #4 Fuel Oil	NA	NA	--	--	--	--	--	--	--	--
TPH as 10W40 Oil	NA	NA	--	--	--	--	--	--	--	--
Total Organic Carbon (TOC) (3)										
TOC (mg/Kg)	NA	NA	13,800	15,000	17,000	7,400	26,000	22,900	23,400	23,400
% TOC	NA	NA	1.38	1.5	1.7	0.74	2.6	2.29	2.34	2.34

See Notes on Page 9.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Location	Benthic Aquatic Life Toxicity Criteria (1,2)		SS-12	SS-1-A	SS-1-B	SS-1-B	SS-3-1	SS-3-2	SS-3-3	SS-3-3
Depth Range			(0.0' - 0.8')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')
Date Sampled	Chronic	Acute	6/16/1993	10/10/1997	10/10/1997	10/10/1997	10/8/1997	10/7/1997	10/8/1997	10/8/1997
Sample Type	(ug/g OC)	(ug/g OC)	FS	FS	FS	DUP	FS	FS	FS	DUP
Volatile Organic Compounds (VOCs) (mg/Kg)										
Acetone	NA	NA	0.019	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	NA	--	0.01 UJ	0.01 UJ	0.01 UJ	0.01 U	1.4 U	0.01 U	0.01 U
2-Butanone	NA	NA	--	0.01 UJ	0.006 J	0.01 UJ	0.01 U	1.4 U	0.01 U	0.006 J
Benzene	28	103	--	0.01 U	0.01 U	0.01 U	0.03	**2.4**	0.002 J	0.004 J
Ethylbenzene	24	212	--	0.01 U	0.01 U	0.01 U	**1. D**	**120 DJ**	0.008 J	0.08 J
Methylene Chloride	NA	NA	0.007	--	--	--	--	--	--	--
Styrene	NA	NA	--	0.01 U	0.01 U	0.01 U	0.01 U	0.92 J	0.01 U	0.01 U
Toluene	49	235	0.004	0.01 U	0.01 U	0.01 U	0.004 J	**1.5**	0.01 U	0.002 JN
Xylenes, Total	92	833	--	0.01 U	0.01 U	0.01 U	0.09	**100 DJ**	0.002 J	0.02 J
Total BTEX	NA	NA	--	0.000 U	0.000 U	0.000 U	1	224	0.01	0.11
Semivolatile Organic Compounds (SVOCs) (mg/Kg)										
2-Methylnaphthalene	34	304	0.17	0.42 U	0.43 U	0.39 U	**23. D**	**49. D**	**1.3**	**2.2**
3-Nitroaniline	NA	NA	--	2.1 U	2.2 U	1.9 U	R	1.8 U	R	R
4-Methylphenol	NA	NA	--	0.42 U	0.43 U	0.39 U	0.07 J	0.37 U	0.40 U	0.39 U
4-Nitroaniline	NA	NA	--	2.1 U	2.2 U	1.9 U	R	1.8 U	R	2. U
4-Nitrophenol	NA	NA	--	2.1 U	2.2 U	1.9 U	2.2 U	1.8 U	2. U	2. U
Acenaphthene	140	NA	**1.5**	0.42 U	0.06 J	0.08 J	**68. D**	**49. D**	**5.6 D**	**6.3 DJ**
Acenaphthylene	0.044 (a)	0.64 (a)	**0.55**	0.42 U	**0.06 J**	0.39 U	**1.6**	**3.2 EJ**	**0.12 J**	**0.09 J**
Anthracene	107	986	**1.8**	0.42 U	0.33 J	0.32 J	**21. JD**	**42. D**	**3.8 D**	2.1
Benzo(a)anthracene	12	94	**2.4**	0.09 J	**1**	**0.37 J**	**8. JD**	**11. JD**	**0.7**	**0.35 J**
Benzo(a)pyrene	0.37 (c)	1440 (b)	**2.6**	0.12 J	**1.2**	**0.44**	**10. EJ**	**8.6 J**	**0.71**	**0.39 J**
Benzo(b)fluoranthene	NA	NA	3	0.42 U	1.3	0.4	0.44 U	5.4 J	0.36 J	0.19 J
Benzo(ghi)perylene	0.17 (c)	320 (b)	**1.8**	0.04 J	**0.24 J**	0.10 J	**2.7 J**	**1.5**	**0.58 J**	0.08 J
Benzo(k)fluoranthene	0.24 (c)	1340 (b)	**0.62**	0.42 U	**1**	**0.56**	**9.5 EJ**	**4.5 J**	**0.47**	**0.35 J**
Bis(2-ethylhexyl) phthalate	199.5	NA	0.05	0.42 U	0.43 U	0.39 U	0.10 J	1.1	0.09 J	0.07 J
Butyl benzyl phthalate	NA	NA	--	0.42 U	0.43 U	0.39 U	0.44 U	0.37 U	0.40 U	0.39 U
Chrysene	0.34 (c)	460 (b)	**2.3**	0.10 J	**1.2**	**0.41**	**9.6 JD**	**12. JD**	**0.92**	**0.51**
Di-n-butyl phthalate	NA	NA	0.11	0.42 U	0.43 U	0.39 U	0.44 U	0.18 J	0.40 U	0.39 U
Di-n-octyl phthalate	NA	NA	--	0.42 U	0.43 U	0.39 U	0.44 U	0.37 U	0.40 U	0.39 U
Dibenzo(a,h)anthracene	0.06 (c)	130 (b)	-	0.42 U	**0.13 J**	0.05 J	**0.77 J**	**0.49**	0.04 J	0.39 U
Dibenzofuran	NA	NA	-	0.42 U	0.43 U	0.06 J	0.08 J	2.6	0.19 J	0.19 J
Fluoranthene	1020	NA	4.9	0.24 J	2.6 D	1.9	**29. D**	**30. D**	2	1.4
Fluorene	8	73	**0.74**	0.42 U	0.10 J	0.15 J	**26. D**	**27. JD**	**2.2**	**2.2**
Indeno(1,2,3-cd)pyrene	0.2 (c)	320 (b)	**1.6**	0.04 J	**0.25 J**	0.10 J	**2.5 J**	**1.4**	**0.44 J**	0.07 J
N-nitrosodiphenylamine	NA	NA	--	0.42 U	0.43 U	0.39 U	0.44 U	0.37 UJ	0.40 U	0.39 U
Naphthalene	30	258	**1**	0.42 U	0.43 U	0.39 U	**100 D**	**86. D**	**3.7 D**	**3.7 D**
Phenanthrene	120	950 (b)	**5**	0.18 J	1.2	1.2	0.44 U	**78. D**	**6.1 D**	**4.9 D**
Pyrene	961	8775	**8.6**	0.12 J	1.1	0.69	**48. JD**	**24. D**	2.1	1.5
Total PAHs	4 (a)	45 (a)	**38.6**	0.94	**11.8**	**6.8**	**360**	**433**	**31**	**26**
Total Semivolatiles	NA	NA	38.7	0.94	11.8	6.8	360	437	31	27
Inorganics (mg/Kg)										
Aluminum	NA	NA	11600	7,360	8,770	5,340	--	--	--	--
Antimony	2	25	--	0.94 BJ	0.53 BJ	0.49 BJ	--	--	--	--
Arsenic	6	33	2.5	5.6	5.9	4.2	--	--	--	--
Barium	NA	NA	66.8	84.3	95	66.5	--	--	--	--
Beryllium	NA	NA	--	0.37 B	0.37 B	0.25 B	--	--	--	--
Cadmium	0.6	9	--	0.03 UJ	0.04 UJ	0.04 BJ	--	--	--	--
Calcium	NA	NA	--	5,910	6,730	5,020	--	--	--	--
Chromium	26	110	13.9	9.9	11.9	8.2	--	--	--	--
Cobalt	NA	NA	--	6.4	8.2	5.4 B	--	--	--	--
Copper	16	110	**30.4**	**31.7**	**27.3**	**21.2**	--	--	--	--
Iron	20,000	40,000	18900	14,800	**22,100**	12,800	--	--	--	--
Lead	31	110	**37.9**	**122**	**139**	**192**	--	--	--	--
Magnesium	NA	NA	--	2,380	3,260	2,040	--	--	--	--
Manganese	460	1100	456	330	456	299	--	--	--	--
Mercury	0.15	1.3	--	**0.26**	**0.36**	**0.24**	--	--	--	--
Nickel	16	50	**18.3**	14.2 J	**30.1 J**	11.2 J	--	--	--	--
Potassium	NA	NA	--	826	471 B	295 B	--	--	--	--
Selenium	NA	NA	--	0.26 U	0.99	0.45 B	--	--	--	--
Silver	1	2.2	--	0.09 UJ	0.34 BJ	0.79 BJ	--	--	--	--
Sodium	NA	NA	--	133 B	46.6 U	38.9 U	--	--	--	--
Thallium	NA	NA	--	0.30 UJ	0.34 UJ	0.28 UJ	--	--	--	--
Vanadium	NA	NA	14.1	14.1	13.7	9.2	--	--	--	--
Zinc	120	270	82	102 J	**130 J**	102 J	--	--	--	--
Cyanide, Total	NA	NA	--	0.63 U	0.65 U	0.58 U	0.66 U	0.57 U	0.60 U	0.59 U
Miscellaneous Compounds (mg/Kg)										
TPH as #4 Fuel Oil	NA	NA	--	94. U	98. U	87. U	1,700	7,100	89. U	200 J
TPH as 10W40 Oil	NA	NA	--	94. U	98. U	96	99. U	86. U	89. U	88. U
Total Organic Carbon (TOC) (3)										
TOC (mg/Kg)	NA	NA	7,000	--	--	--	--	--	--	--
% TOC	NA	NA	0.7	--	--	--	--	--	--	--

See Notes on Page 9.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Location	Benthic Aquatic Life Toxicity Criteria (1,2)		SS-3-4	SS-3-5	SS-3-6	SS-3-7	SS-3-8	SS-3-9	SS-3-10	SS-3-11
Depth Range			(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')
Date Sampled	Chronic	Acute	10/7/1997	10/7/1997	10/7/1997	10/7/1997	10/8/1997	10/8/1997	10/8/1997	10/8/1997
Sample Type	(ug/g OC)	(ug/g OC)	FS	FS	FS	FS	FS	FS	FS	FS
Volatile Organic Compounds (VOCs) (mg/Kg)										
Acetone	NA	NA	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Butanone	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.002 JN
Benzene	28	103	0.01 U	0.004 J	0.004 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Ethylbenzene	24	212	0.01 U	**3.3 DJ**	0.04	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methylene Chloride	NA	NA	--	--	--	--	--	--	--	--
Styrene	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	49	235	0.01 U	0.002 JN	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.001 JN
Xylenes, Total	92	833	0.01 U	0.06	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total BTEX	NA	NA	0.000 U	3.4	0.06	0.000 U	0.000 U	0.000 U	0.000 U	0.001
Semivolatile Organic Compounds (SVOCs) (mg/Kg)										
2-Methylnaphthalene	34	304	0.37 U	**20. JD**	**10. JD**	0.37 U	0.43 U	0.37 U	0.37 U	**3.6**
3-Nitroaniline	NA	NA	1.8 U	1.8 U	1.8 U	1.8 U	R	R	R	R
4-Methylphenol	NA	NA	0.37 U	0.37 U	0.37 U	0.37 U	0.43 U	0.37 U	0.37 UJ	0.75 U
4-Nitroaniline	NA	NA	1.8 U	1.8 U	1.8 U	1.8 U	R	R	R	3.7 U
4-Nitrophenol	NA	NA	1.8 U	1.8 U	1.8 U	1.8 U	2.2 U	1.8 U	1.8 U	3.7 U
Acenaphthene	140	NA	0.61	**47. D**	**35. D**	0.94	0.43 U	0.37 U	0.37 U	**17. JD**
Acenaphthylene	0.044 (a)	0.64 (a)	0.37 U	**0.45**	**1.3**	0.37 U	0.43 U	0.37 U	0.37 U	**0.78**
Anthracene	107	986	0.10 J	**5.7 J**	**4.6 J**	0.04 J	0.43 U	0.37 U	0.37 U	**13. JD**
Benzo(a)anthracene	12	94	0.08 J	**2.2**	**4.3 EJ**	0.37 U	0.43 U	0.37 U	0.05 J	**6.8 EJ**
Benzo(a)pyrene	0.37 (c)	1440 (b)	0.09 J	**2.4**	**5. EJ**	0.04 J	0.43 U	0.37 U	0.06 J	**6.6 EJ**
Benzo(b)fluoranthene	NA	NA	0.37 U	0.99	2	0.37 U	0.43 U	0.37 U	0.37 U	3.4
Benzo(ghi)perylene	0.17 (c)	320 (b)	0.06 J	**1.3**	**2.2**	0.37 U	R	R	0.04 J	**1.5 J**
Benzo(k)fluoranthene	0.24 (c)	1340 (b)	0.05 J	**1.4**	**2.2**	0.37 U	0.43 U	0.37 U	0.37 U	**4**
Bis(2-ethylhexyl) phthalate	199.5	NA	0.39	0.08 J	0.37 U	0.04 J	0.43 U	0.37 U	0.11 J	0.23 J
Butyl benzyl phthalate	NA	NA	0.37 U	0.37 U	0.37 U	0.37 U	0.43 U	0.37 U	0.37 U	0.75 U
Chrysene	0.34 (c)	460 (b)	0.08 J	**2.2**	**3.6 EJ**	0.37 U	0.43 U	0.37 U	0.06 J	**7.8 EJ**
Di-n-butyl phthalate	NA	NA	0.15 J	0.37 U	0.37 U	0.37 U	0.43 U	0.37 U	0.37 U	0.75 U
Di-n-octyl phthalate	NA	NA	0.06 J	0.37 U	0.37 U	0.37 U	0.43 U	0.10 J	0.37 U	0.75 U
Dibenzo(a,h)anthracene	0.06 (c)	130 (b)	0.37 U	**0.22 J**	**0.56**	0.37 U	R	R	R	**0.16 J**
Dibenzofuran	NA	NA	0.37 U	0.37 U	0.37 U	0.37 U	0.43 U	0.37 U	0.37 U	0.48 J
Fluoranthene	1020	NA	0.28 J	10. JD	18. UD	0.09 J	0.43 U	0.37 U	0.09 J	**24. D**
Fluorene	8	73	**0.18 J**	**12. JD**	13. UD	**0.18 J**	0.43 U	0.37 U	0.37 U	**12. JD**
Indeno(1,2,3-cd)pyrene	0.2 (c)	320 (b)	0.04 J	**0.95**	**1.8**	0.37 U	R	R	R	**1.3 J**
N-nitrosodiphenylamine	NA	NA	0.37 U	0.37 U	0.37 U	0.37 U	0.43 U	0.37 U	0.37 U	0.75 U
Naphthalene	30	258	0.37 U	**94. D**	**21. D**	0.04 J	0.43 U	0.37 U	0.04 J	**1.6**
Phenanthrene	120	950 (b)	0.66	**26. JD**	**40. D**	0.34 J	0.43 U	0.37 U	0.08 J	**42. D**
Pyrene	961	8775	0.38	7.6 EJ	16. UD	0.13 J	0.43 U	0.37 U	0.12 J	**28. D**
Total PAHs	4 (a)	45 (a)	2.6	**234**	**134**	1.8	ND	ND	0.54	**174**
Total Semivolatiles	NA	NA	3.2	234	134	1.8	ND	ND	5.4	174
Inorganics (mg/Kg)										
Aluminum	NA	NA	--	--	--	--	--	--	--	--
Antimony	2	25	--	--	--	--	--	--	--	--
Arsenic	6	33	--	--	--	--	--	--	--	--
Barium	NA	NA	--	--	--	--	--	--	--	--
Beryllium	NA	NA	--	--	--	--	--	--	--	--
Cadmium	0.6	9	--	--	--	--	--	--	--	--
Calcium	NA	NA	--	--	--	--	--	--	--	--
Chromium	26	110	--	--	--	--	--	--	--	--
Cobalt	NA	NA	--	--	--	--	--	--	--	--
Copper	16	110	--	--	--	--	--	--	--	--
Iron	20,000	40,000	--	--	--	--	--	--	--	--
Lead	31	110	--	--	--	--	--	--	--	--
Magnesium	NA	NA	--	--	--	--	--	--	--	--
Manganese	460	1100	--	--	--	--	--	--	--	--
Mercury	0.15	1.3	--	--	--	--	--	--	--	--
Nickel	16	50	--	--	--	--	--	--	--	--
Potassium	NA	NA	--	--	--	--	--	--	--	--
Selenium	NA	NA	--	--	--	--	--	--	--	--
Silver	1	2.2	--	--	--	--	--	--	--	--
Sodium	NA	NA	--	--	--	--	--	--	--	--
Thallium	NA	NA	--	--	--	--	--	--	--	--
Vanadium	NA	NA	--	--	--	--	--	--	--	--
Zinc	120	270	--	--	--	--	--	--	--	--
Cyanide, Total	NA	NA	0.59 U	0.64 U	0.57 U	0.59 U	0.65 U	0.55 U	0.55 U	0.56 U
Miscellaneous Compounds (mg/Kg)										
TPH as #4 Fuel Oil	NA	NA	89. U	670	150	89. U	98. U	3,900 J	83. U	84. U
TPH as 10W40 Oil	NA	NA	89. U	97. U	85. U	89. U	98. U	82. U	83. U	690
Total Organic Carbon (TOC) (3)										
TOC (mg/Kg)	NA	NA	--	14,200	--	--	11,100	--	--	--
% TOC	NA	NA	--	1.42	--	--	1.11	--	--	--

See Notes on Page 9.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Location	Benthic Aquatic Life Toxicity Criteria (1,2)		SS-3-12	SS-3-13	SS-3-14	SS-12-1	SS-12-2	SS-12-3	SS-12-4	SS-12-5
Depth Range			(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')	(0.0' - 0.5')
Date Sampled	Chronic	Acute	10/8/1997	10/8/1997	10/8/1997	10/9/1997	10/9/1997	10/9/1997	10/9/1997	10/10/1997
Sample Type	(ug/g OC)	(ug/g OC)	FS	FS	FS	FS	FS	FS	FS	FS
Volatile Organic Compounds (VOCs) (mg/Kg)										
Acetone	NA	NA	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ
2-Butanone	NA	NA	0.004 JN	0.004 JN	0.004 JN	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ
Benzene	28	103	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Ethylbenzene	24	212	0.01 U	0.01 U	0.01 U	0.02	0.001 JN	0.01 U	0.01 U	0.01 U
Methylene Chloride	NA	NA	--	--	--	--	--	--	--	--
Styrene	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	49	235	0.01 U	0.001 JN	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylenes, Total	92	833	0.01 U	0.01 U	0.01 U	0.002 J	0.01 U	0.01 U	0.01 U	0.01 U
Total BTEX	NA	NA	0.000 U	0.001	0.000 U	0.02	0.001	0.000 U	0.000 U	0.000 U
Semivolatile Organic Compounds (SVOCs) (mg/Kg)										
2-Methylnaphthalene	34	304	0.18 J	0.38 UJ	0.37 U	**0.69**	0.35 U	0.43 U	0.39 U	0.40 U
3-Nitroaniline	NA	NA	R	1.9 UJ	R	2. U	1.7 U	2.1 U	1.9 U	2. U
4-Methylphenol	NA	NA	0.37 U	0.38 UJ	0.37 U	0.40 U	0.35 U	0.43 U	0.39 U	0.40 U
4-Nitroaniline	NA	NA	1.8 U	1.9 UJ	1.9 U	2. U	1.7 U	2.1 U	1.9 U	2. U
4-Nitrophenol	NA	NA	1.8 U	1.9 UJ	1.9 U	2. U	1.7 U	2.1 U	1.9 U	2. U
Acenaphthene	140	NA	2.8	0.38 UJ	0.37 U	0.68	0.07 J	0.40 J	0.39 U	0.40 U
Acenaphthylene	0.044 (a)	0.64 (a)	**0.21 J**	0.38 UJ	0.37 U	**0.06 J**	0.35 U	0.43 U	0.39 U	0.40 U
Anthracene	107	986	1.3	0.38 UJ	0.37 U	0.24 J	0.35 U	0.05 J	0.39 U	0.40 U
Benzo(a)anthracene	12	94	**1.3**	0.38 UJ	0.09 J	0.15 J	0.35 U	0.07 J	0.39 U	0.40 U
Benzo(a)pyrene	0.37 (c)	1440 (b)	**1.6**	0.38 UJ	0.10 J	0.18 J	0.04 J	0.12 J	0.39 U	0.40 U
Benzo(b)fluoranthene	NA	NA	1.1	0.38 UJ	0.09 J	0.07 J	0.35 U	0.08 J	0.39 U	0.40 U
Benzo(ghi)perylene	0.17 (c)	320 (b)	**0.39 J**	0.38 UJ	R	0.10 J	0.35 U	**0.23 J**	0.39 U	0.40 U
Benzo(k)fluoranthene	0.24 (c)	1340 (b)	**1.3**	0.38 UJ	0.13 J	0.10 J	0.35 U	0.08 J	0.39 U	0.40 U
Bis(2-ethylhexyl) phthalate	199.5	NA	0.09 J	0.06 J	0.17 J	0.40 U	0.08 J	0.43 U	0.39 U	0.40 U
Butyl benzyl phthalate	NA	NA	0.37 U	0.38 UJ	0.37 U	0.40 U	0.35 U	0.43 U	0.39 U	0.40 U
Chrysene	0.34 (c)	460 (b)	**1.6**	0.38 UJ	0.12 J	0.17 J	0.35 U	0.12 J	0.39 U	0.40 U
Di-n-butyl phthalate	NA	NA	0.37 U	0.38 UJ	0.37 U	0.40 U	0.35 U	0.43 U	0.39 U	0.40 U
Di-n-octyl phthalate	NA	NA	0.37 U	0.38 UJ	0.37 U	0.40 U	0.35 U	0.43 UJ	0.39 U	0.05 J
Dibenzo(a,h)anthracene	0.06 (c)	130 (b)	0.04 J	0.38 UJ	0.37 U	0.40 U	0.35 U	0.43 U	0.39 U	0.40 U
Dibenzofuran	NA	NA	0.33 J	0.38 UJ	0.37 U	0.40 U	0.35 U	0.43 U	0.39 U	0.40 U
Fluoranthene	1020	NA	3.8 D	0.04 J	0.22 J	0.42	0.35 U	0.21 J	0.05 J	0.40 U
Fluorene	8	73	**2.3**	0.38 UJ	0.37 U	**0.32 J**	0.35 U	**0.12 J**	0.39 U	0.40 U
Indeno(1,2,3-cd)pyrene	0.2 (c)	320 (b)	**0.39 J**	0.38 UJ	R	0.07 J	0.35 U	0.09 J	0.39 U	0.40 U
N-nitrosodiphenylamine	NA	NA	0.37 U	0.38 UJ	0.37 U	0.40 U	0.35 U	0.43 U	0.39 U	0.40 U
Naphthalene	30	258	0.5	0.38 UJ	0.37 U	**0.62**	0.35 U	0.07 J	0.39 U	0.40 U
Phenanthrene	120	950 (b)	**3.9 D**	0.38 UJ	0.11 J	1.3	0.35 U	0.20 J	0.39 U	0.40 U
Pyrene	961	8775	3.5 D	0.38 UJ	0.18 J	0.57	0.04 J	0.29 J	0.39 U	0.40 U
Total PAHs	4 (a)	45 (a)	**26**	0.04	1	**6**	0.15	2.1	0.05	ND
Total Semivolatiles	NA	NA	28.8	0.1	4.2	6	0.24	2.1	0.05	0.05
Inorganics (mg/Kg)										
Aluminum	NA	NA	--	--	--	--	--	--	--	--
Antimony	2	25	--	--	--	--	--	--	--	--
Arsenic	6	33	--	--	--	--	--	--	--	--
Barium	NA	NA	--	--	--	--	--	--	--	--
Beryllium	NA	NA	--	--	--	--	--	--	--	--
Cadmium	0.6	9	--	--	--	--	--	--	--	--
Calcium	NA	NA	--	--	--	--	--	--	--	--
Chromium	26	110	--	--	--	--	--	--	--	--
Cobalt	NA	NA	--	--	--	--	--	--	--	--
Copper	16	110	--	--	--	--	--	--	--	--
Iron	20,000	40,000	--	--	--	--	--	--	--	--
Lead	31	110	--	--	--	--	--	--	--	--
Magnesium	NA	NA	--	--	--	--	--	--	--	--
Manganese	460	1100	--	--	--	--	--	--	--	--
Mercury	0.15	1.3	--	--	--	--	--	--	--	--
Nickel	16	50	--	--	--	--	--	--	--	--
Potassium	NA	NA	--	--	--	--	--	--	--	--
Selenium	NA	NA	--	--	--	--	--	--	--	--
Silver	1	2.2	--	--	--	--	--	--	--	--
Sodium	NA	NA	--	--	--	--	--	--	--	--
Thallium	NA	NA	--	--	--	--	--	--	--	--
Vanadium	NA	NA	--	--	--	--	--	--	--	--
Zinc	120	270	--	--	--	--	--	--	--	--
Cyanide, Total	NA	NA	0.56 U	0.57 U	0.56 U	0.60 U	0.52 U	0.64 U	0.58 U	0.60 U
Miscellaneous Compounds (mg/Kg)										
TPH as #4 Fuel Oil	NA	NA	83. U	85. U	84. U	180	78. U	96. U	88. U	91. U
TPH as 10W40 Oil	NA	NA	83. U	85. U	84. U	89. U	78. U	96. U	88. U	91. U
Total Organic Carbon (TOC) (3)										
TOC (mg/Kg)	NA	NA	--	--	--	--	--	9,800	--	--
% TOC	NA	NA	--	--	--	--	--	0.98	--	--

See Notes on Page 9.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Location	Benthic Aquatic Life		SS-12-6	SS-12-7	SR-101	SR-102	SR-102	SR-104	SR-105
Depth Range	Toxicity Criteria (1,2)		(0.0' - 0.5')	(0.0' - 0.5')	(0 - 2')	(0 - 2')	(0 - 2')	(0 - 1')	(0 - 2')
Date Sampled	Chronic	Acute	10/10/1997	10/10/1997	8/16/2001	8/21/2001	8/21/2001	8/23/2001	8/24/2001
Sample Type	(ug/g OC)	(ug/g OC)	FS	FS	FS	FS	DUP	FS	FS
Volatile Organic Compounds (VOCs) (mg/Kg)									
Acetone	NA	NA	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	NA	0.01 UJ	0.01 UJ	--	--	--	--	--
2-Butanone	NA	NA	0.01 UJ	0.02 J	--	--	--	--	--
Benzene	28	103	0.01 U	0.01 U	0.005 U	0.06 U	0.04 U	0.005 U	0.006 U
Ethylbenzene	24	212	0.01 U	0.01 U	0.005 U	0.16	0.19	0.005 U	0.006 U
Methylene Chloride	NA	NA	--	--	--	--	--	--	--
Styrene	NA	NA	0.01 U	0.01 U	--	--	--	--	--
Toluene	49	235	0.01 U	0.01 U	0.005 U	0.06 U	0.04 U	0.005 U	0.006 U
Xylenes, Total	92	833	0.01 U	0.01 U	--	--	--	--	--
Total BTEX	NA	NA	0.000 U	0.000 U	0.000 U	0.16	0.19	0.000 U	0.000 U
Semivolatile Organic Compounds (SVOCs) (mg/Kg)									
2-Methylnaphthalene	34	304	0.44 U	0.46 U	--	--	--	--	--
3-Nitroaniline	NA	NA	2.2 U	2.3 U	--	--	--	--	--
4-Methylphenol	NA	NA	0.44 U	0.46 U	--	--	--	--	--
4-Nitroaniline	NA	NA	2.2 U	2.3 U	--	--	--	--	--
4-Nitrophenol	NA	NA	2.2 U	2.3 U	--	--	--	--	--
Acenaphthene	140	NA	0.44 U	0.15 J	0.37 U	**27**	**12**	**0.57**	0.37 U
Acenaphthylene	0.044 (a)	0.64 (a)	0.44 U	0.46 U	0.37 U	**3.2**	2. U	0.38 U	0.37 U
Anthracene	107	986	0.44 U	0.46 U	0.37 U	**23**	**10**	0.38 U	0.37 U
Benzo(a)anthracene	12	94	0.44 U	0.46 U	0.37 U	**14**	**4**	0.38 U	0.37 U
Benzo(a)pyrene	0.37 (c)	1440 (b)	0.44 U	0.46 U	0.19 J	**9.9**	**2.8**	0.38 U	0.37 U
Benzo(b)fluoranthene	NA	NA	0.44 U	0.46 U	0.19 J	6.3	1.5	0.38 U	0.37 U
Benzo(ghi)perylene	0.17 (c)	320 (b)	0.44 U	0.46 U	0.37 U	**2.5**	2. U	0.38 U	0.37 U
Benzo(k)fluoranthene	0.24 (c)	1340 (b)	0.44 U	0.46 U	0.37 U	**4.9**	**1.5**	0.38 U	0.37 U
Bis(2-ethylhexyl) phthalate	199.5	NA	0.44 U	0.46 U	--	--	--	--	--
Butyl benzyl phthalate	NA	NA	0.44 U	0.46 U	--	--	--	--	--
Chrysene	0.34 (c)	460 (b)	0.44 U	0.46 U	0.22 J	**12**	**3.6**	0.38 U	0.37 U
Di-n-butyl phthalate	NA	NA	0.44 U	0.46 U	--	--	--	--	--
Di-n-octyl phthalate	NA	NA	0.44 U	0.46 U	--	--	--	--	--
Dibenzo(a,h)anthracene	0.06 (c)	130 (b)	0.44 U	0.46 U	0.37 U	1.8 U	2. U	0.38 U	0.37 U
Dibenzofuran	NA	NA	0.44 U	0.46 U	0.37 U	7.7	2.5	0.38 U	0.37 U
Fluoranthene	1020	NA	0.44 U	0.46 U	0.39	**29**	9.2	0.38 U	0.37 U
Fluorene	8	73	0.44 U	0.07 J	0.37 U	**29**	**12**	0.38 U	0.37 U
Indeno(1,2,3-cd)pyrene	0.2 (c)	320 (b)	0.44 U	0.46 U	0.37 U	**2.2**	2. U	0.38 U	0.37 U
N-nitrosodiphenylamine	NA	NA	0.44 U	0.46 U	--	--	--	--	--
Naphthalene	30	258	0.44 U	0.46 U	0.37 U	**29**	**15**	0.38 U	0.37 U
Phenanthrene	120	950 (b)	0.44 U	0.46 U	0.37 U	**91. D**	**26**	0.38 U	0.37 U
Pyrene	961	8775	0.44 U	0.46 U	0.35 J	**25**	10	0.38 U	0.37 U
Total PAHs	4 (a)	45 (a)	ND	0.22	1.3	**308**	**108**	0.57	ND
Total Semivolatiles	NA	NA	ND	0.22	1.3	316	110	0.57	ND
Inorganics (mg/Kg)									
Aluminum	NA	NA	--	--	--	--	--	--	--
Antimony	2	25	--	--	--	--	--	--	--
Arsenic	6	33	--	--	--	--	--	--	--
Barium	NA	NA	--	--	--	--	--	--	--
Beryllium	NA	NA	--	--	--	--	--	--	--
Cadmium	0.6	9	--	--	--	--	--	--	--
Calcium	NA	NA	--	--	--	--	--	--	--
Chromium	26	110	--	--	--	--	--	--	--
Cobalt	NA	NA	--	--	--	--	--	--	--
Copper	16	110	--	--	--	--	--	--	--
Iron	20,000	40,000	--	--	--	--	--	--	--
Lead	31	110	--	--	--	--	--	--	--
Magnesium	NA	NA	--	--	--	--	--	--	--
Manganese	460	1100	--	--	--	--	--	--	--
Mercury	0.15	1.3	--	--	--	--	--	--	--
Nickel	16	50	--	--	--	--	--	--	--
Potassium	NA	NA	--	--	--	--	--	--	--
Selenium	NA	NA	--	--	--	--	--	--	--
Silver	1	2.2	--	--	--	--	--	--	--
Sodium	NA	NA	--	--	--	--	--	--	--
Thallium	NA	NA	--	--	--	--	--	--	--
Vanadium	NA	NA	--	--	--	--	--	--	--
Zinc	120	270	--	--	--	--	--	--	--
Cyanide, Total	NA	NA	0.65 U	0.69 U	0.47 U	0.53 U	0.56 U	0.55 U	0.54 U
Miscellaneous Compounds (mg/Kg)									
TPH as #4 Fuel Oil	NA	NA	98. U	103 U	--	--	--	--	--
TPH as 10W40 Oil	NA	NA	98. U	103 U	--	--	--	--	--
Total Organic Carbon (TOC) (3)									
TOC (mg/Kg)	NA	NA	28,100	--	8,701	17,811	24,835	2,322	1,723
% TOC	NA	NA	2.81	--	0.87	1.78	2.48	0.23	0.17

See Notes on Page 9.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Location	Benthic Aquatic Life Toxicity Criteria (1,2)		SR-106	SR-107	SR-108	SR-108	SR-109	SR-110	SR-111
Depth Range			(0 - 2')	(0 - 2')	(0 - 2')	(0 - 2')	(0 - 2')	(0 - 2')	(0 - 2')
Date Sampled	Chronic	Acute	8/27/2001	8/27/2001	8/28/2001	8/28/2001	8/28/2001	8/29/2001	8/29/2001
Sample Type	(ug/g OC)	(ug/g OC)	FS	FS	FS	DUP	FS	FS	FS
Volatile Organic Compounds (VOCs) (mg/Kg)									
Acetone	NA	NA	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	NA	--	--	--	--	--	--	--
2-Butanone	NA	NA	--	--	--	--	--	--	--
Benzene	28	103	0.005 U	0.005 U	0.006 U	0.005 U	0.007 U	0.006 U	0.005 U
Ethylbenzene	24	212	0.005 U	0.005 U	0.006 U	0.005 U	0.007 U	0.006 U	0.005 U
Methylene Chloride	NA	NA	--	--	--	--	--	--	--
Styrene	NA	NA	--	--	--	--	--	--	--
Toluene	49	235	0.005 U	0.005 U	0.006 U	0.005 U	0.007 U	0.006 U	0.005 U
Xylenes, Total	92	833	--	--	--	--	--	--	--
Total BTEX	NA	NA	0.000 U	0.000 U	0.000 U	0.000 U	0.000 U	0.000 U	0.000 U
Semivolatile Organic Compounds (SVOCs) (mg/Kg)									
2-Methylnaphthalene	34	304	--	--	--	--	--	--	--
3-Nitroaniline	NA	NA	--	--	--	--	--	--	--
4-Methylphenol	NA	NA	--	--	--	--	--	--	--
4-Nitroaniline	NA	NA	--	--	--	--	--	--	--
4-Nitrophenol	NA	NA	--	--	--	--	--	--	--
Acenaphthene	140	NA	0.30 J	0.36 U	**0.48 J**	0.40 UJ	1.3 J	0.38 U	0.37 U
Acenaphthylene	0.044 (a)	0.64 (a)	0.38 U	0.36 U	0.37 UJ	0.40 UJ	**0.85 J**	0.38 U	0.37 U
Anthracene	107	986	0.38 U	0.36 U	**0.53 J**	0.40 UJ	1.7 J	0.38 U	0.37 U
Benzo(a)anthracene	12	94	0.38 U	0.36 U	**0.85 J**	0.40 UJ	**3.6 J**	0.38 U	0.37 U
Benzo(a)pyrene	0.37 (c)	1440 (b)	0.38 U	0.36 U	**0.81 J**	0.40 UJ	**3.1 J**	0.38 U	0.37 U
Benzo(b)fluoranthene	NA	NA	0.38 U	0.36 U	0.85 J	0.40 UJ	2.1 J	0.38 U	0.20 J
Benzo(ghi)perylene	0.17 (c)	320 (b)	0.38 U	0.36 U	**0.43 J**	0.40 UJ	**1.9 J**	0.38 U	0.37 U
Benzo(k)fluoranthene	0.24 (c)	1340 (b)	0.38 U	0.36 U	**0.56 J**	0.40 UJ	**0.89 J**	0.38 U	0.37 U
Bis(2-ethylhexyl) phthalate	199.5	NA	--	--	--	--	--	--	--
Butyl benzyl phthalate	NA	NA	--	--	--	--	--	--	--
Chrysene	0.34 (c)	460 (b)	0.38 U	0.36 U	**0.95 J**	0.40 UJ	**3.9 J**	0.38 U	0.20 J
Di-n-butyl phthalate	NA	NA	--	--	--	--	--	--	--
Di-n-octyl phthalate	NA	NA	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.06 (c)	130 (b)	0.38 U	0.36 U	0.37 UJ	0.40 UJ	**0.67 J**	0.38 U	0.37 U
Dibenzofuran	NA	NA	0.38 U	0.36 U	0.37 UJ	0.40 UJ	0.45 UJ	0.38 U	0.37 U
Fluoranthene	1020	NA	0.38 U	0.36 U	2.1 J	0.40 UJ	3.2 J	0.38 U	0.30 J
Fluorene	8	73	0.38 U	0.36 U	**0.19 J**	0.40 UJ	**1.4 J**	0.38 U	0.37 U
Indeno(1,2,3-cd)pyrene	0.2 (c)	320 (b)	0.38 U	0.36 U	**0.40 J**	0.40 UJ	**1.1 J**	0.38 U	0.37 U
N-nitrosodiphenylamine	NA	NA	--	--	--	--	--	--	--
Naphthalene	30	258	0.38 U	0.36 U	**0.22 J**	0.40 UJ	**0.67 J**	0.38 U	0.37 U
Phenanthrene	120	950 (b)	0.38 U	0.36 U	**1.9 J**	0.40 UJ	1.5 J	0.38 U	0.37 U
Pyrene	961	8775	0.38 U	0.36 U	1.4 J	0.40 UJ	5.6 J	0.38 U	0.4
Total PAHs	4 (a)	45 (a)	0.3	ND	**11.7**	ND	**33.5**	ND	1.1
Total Semivolatiles	NA	NA	0.3	ND	11.7	ND	33.5	ND	1.1
Inorganics (mg/Kg)									
Aluminum	NA	NA	--	--	--	--	--	--	--
Antimony	2	25	--	--	--	--	--	--	--
Arsenic	6	33	--	--	--	--	--	--	--
Barium	NA	NA	--	--	--	--	--	--	--
Beryllium	NA	NA	--	--	--	--	--	--	--
Cadmium	0.6	9	--	--	--	--	--	--	--
Calcium	NA	NA	--	--	--	--	--	--	--
Chromium	26	110	--	--	--	--	--	--	--
Cobalt	NA	NA	--	--	--	--	--	--	--
Copper	16	110	--	--	--	--	--	--	--
Iron	20,000	40,000	--	--	--	--	--	--	--
Lead	31	110	--	--	--	--	--	--	--
Magnesium	NA	NA	--	--	--	--	--	--	--
Manganese	460	1100	--	--	--	--	--	--	--
Mercury	0.15	1.3	--	--	--	--	--	--	--
Nickel	16	50	--	--	--	--	--	--	--
Potassium	NA	NA	--	--	--	--	--	--	--
Selenium	NA	NA	--	--	--	--	--	--	--
Silver	1	2.2	--	--	--	--	--	--	--
Sodium	NA	NA	--	--	--	--	--	--	--
Thallium	NA	NA	--	--	--	--	--	--	--
Vanadium	NA	NA	--	--	--	--	--	--	--
Zinc	120	270	--	--	--	--	--	--	--
Cyanide, Total	NA	NA	0.55 U	0.53 U	0.55 U	0.58 U	0.66 U	0.56 U	0.55 U
Miscellaneous Compounds (mg/Kg)									
TPH as #4 Fuel Oil	NA	NA	--	--	--	--	--	--	--
TPH as 10W40 Oil	NA	NA	--	--	--	--	--	--	--
Total Organic Carbon (TOC) (3)									
TOC (mg/Kg)	NA	NA	3,781	11,045	2,748	2,658	18,637	5,837	16,757
% TOC	NA	NA	0.38	1.1	0.27	0.27	1.86	0.58	1.68

See Notes on Page 9.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Location	Benthic Aquatic Life		SR-112	SR-113	SR-114	SS-15	SS-1C	SS-1D	SS-1E
Depth Range	Toxicity Criteria (1,2)		(0 - 2')	(0 - 2')	(0 - 2')	(0 - 0.8')	(0 - 0.7')	(0 - 0.7')	(0 - 0.6')
Date Sampled	Chronic	Acute	8/29/2001	8/30/2001	8/31/2001	8/24/2001	8/24/2001	8/24/2001	8/24/2001
Sample Type	(ug/g OC)	(ug/g OC)	FS	FS	FS	FS	FS	FS	FS
Volatile Organic Compounds (VOCs) (mg/Kg)									
Acetone	NA	NA	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	NA	--	--	--	--	--	--	--
2-Butanone	NA	NA	--	--	--	--	--	--	--
Benzene	28	103	0.005 U	0.006 U	--	0.009 U	--	0.16	--
Ethylbenzene	24	212	0.005 U	0.006 U	--	0.009 U	--	0.03 U	--
Methylene Chloride	NA	NA	--	--	--	--	--	--	--
Styrene	NA	NA	--	--	--	--	--	--	--
Toluene	49	235	0.005 U	0.006 U	--	0.009 U	--	0.03 U	--
Xylenes, Total	92	833	--	--	--	--	--	--	--
Total BTEX	NA	NA	0.000 U	0.000 U	--	0.000 U	--	0.16	--
Semivolatile Organic Compounds (SVOCs) (mg/Kg)									
2-Methylnaphthalene	34	304	--	--	--	--	--	--	--
3-Nitroaniline	NA	NA	--	--	--	--	--	--	--
4-Methylphenol	NA	NA	--	--	--	--	--	--	--
4-Nitroaniline	NA	NA	--	--	--	--	--	--	--
4-Nitrophenol	NA	NA	--	--	--	--	--	--	--
Acenaphthene	140	NA	0.38 U	0.40 UJ	--	2.7 U	--	**4.7**	--
Acenaphthylene	0.044 (a)	0.64 (a)	**0.30 J**	0.40 UJ	--	2.7 U	--	**0.41**	--
Anthracene	107	986	**0.51**	0.40 UJ	--	2.7 U	--	**4.6**	--
Benzo(a)anthracene	12	94	**1.1**	0.30 J	--	2.7 U	--	**2.6**	--
Benzo(a)pyrene	0.37 (c)	1440 (b)	**1.5**	**0.40 J**	--	2.7 U	--	**1.4**	--
Benzo(b)fluoranthene	NA	NA	0.88	0.40 J	--	2.7 U	--	0.9	--
Benzo(ghi)perylene	0.17 (c)	320 (b)	**0.81**	0.40 UJ	--	2.7 U	--	**0.78**	--
Benzo(k)fluoranthene	0.24 (c)	1340 (b)	**0.8**	0.40 UJ	--	2.7 U	--	**0.82**	--
Bis(2-ethylhexyl) phthalate	199.5	NA	--	--	--	--	--	--	--
Butyl benzyl phthalate	NA	NA	--	--	--	--	--	--	--
Chrysene	0.34 (c)	460 (b)	**1.1**	0.30 J	--	2.7 U	--	**2.5**	--
Di-n-butyl phthalate	NA	NA	--	--	--	--	--	--	--
Di-n-octyl phthalate	NA	NA	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.06 (c)	130 (b)	0.38 U	0.40 UJ	--	2.7 U	--	0.40 U	--
Dibenzofuran	NA	NA	0.38 U	0.40 UJ	--	2.7 U	--	0.40 U	--
Fluoranthene	1020	NA	1.7	0.42 J	--	2.7 U	--	5.1	--
Fluorene	8	73	0.38 U	0.40 UJ	--	2.7 U	--	**3.7**	--
Indeno(1,2,3-cd)pyrene	0.2 (c)	320 (b)	**0.6**	0.40 UJ	--	2.7 U	--	**0.56**	--
N-nitrosodiphenylamine	NA	NA	--	--	--	--	--	--	--
Naphthalene	30	258	0.38 U	0.40 UJ	--	2.7 U	--	**0.55**	--
Phenanthrene	120	950 (b)	**0.47**	0.22 J	--	2.7 U	--	**9.4 D**	--
Pyrene	961	8775	**4.5**	0.66 J	--	1.7 J	--	7.2 D	--
Total PAHs	4 (a)	45 (a)	**14.3**	2.7	--	1.7	--	**45**	--
Total Semivolatiles	NA	NA	14.3	2.7	--	1.7	--	45	--
Inorganics (mg/Kg)									
Aluminum	NA	NA	--	--	--	--	--	--	--
Antimony	2	25	--	--	--	--	--	--	--
Arsenic	6	33	--	--	--	--	--	--	--
Barium	NA	NA	--	--	--	--	--	--	--
Beryllium	NA	NA	--	--	--	--	--	--	--
Cadmium	0.6	9	--	--	--	--	--	--	--
Calcium	NA	NA	--	--	--	--	--	--	--
Chromium	26	110	--	--	--	--	--	--	--
Cobalt	NA	NA	--	--	--	--	--	--	--
Copper	16	110	--	--	--	--	--	--	--
Iron	20,000	40,000	--	--	--	--	--	--	--
Lead	31	110	--	--	--	--	--	--	--
Magnesium	NA	NA	--	--	--	--	--	--	--
Manganese	460	1100	--	--	--	--	--	--	--
Mercury	0.15	1.3	--	--	--	--	--	--	--
Nickel	16	50	--	--	--	--	--	--	--
Potassium	NA	NA	--	--	--	--	--	--	--
Selenium	NA	NA	--	--	--	--	--	--	--
Silver	1	2.2	--	--	--	--	--	--	--
Sodium	NA	NA	--	--	--	--	--	--	--
Thallium	NA	NA	--	--	--	--	--	--	--
Vanadium	NA	NA	--	--	--	--	--	--	--
Zinc	120	270	--	--	--	--	--	--	--
Cyanide, Total	NA	NA	0.57 U	0.58 U	0.60 U	0.80 U	0.56 U	0.56 U	0.56 U
Miscellaneous Compounds (mg/Kg)									
TPH as #4 Fuel Oil	NA	NA	--	--	--	--	--	--	--
TPH as 10W40 Oil	NA	NA	--	--	--	--	--	--	--
Total Organic Carbon (TOC) (3)									
TOC (mg/Kg)	NA	NA	3,402	26,107	19,639	48,175	3,916	16,978	3,800
% TOC	NA	NA	0.34	2.61	1.96	4.81	0.39	1.7	0.38

See Notes on Page 9.

TABLE 9-A

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFICIAL RIVERBED SAMPLES ANALYTICAL RESULTS

Notes:

(1) Sediment criteria are from NYSDEC (1999) *Technical Guidance for Screening Contaminated Sediments* . Units are in ug/g OC and are adjusted for sample-specific TOC concentration. If NYSDEC criteria are not available, additional values are used as described below.

(a) Effects Range-Low (ERL) and Effects Range-Median (ERM) values, respectively from Long et al. (1995), as reported in NYSDEC (1999). Units are in mg/kg and are not adjusted for sample-specific TOC concentration.

(b) Ontario Ministry of Environment (OME, 1993) Severe Effect Levels. Units are in ug/g OC and are adjusted for sample-specific TOC concentration.

(c) Ontario Ministry of Environment (OME, 1993) Lowest Effect Levels. Units are in mg/kg and are not adjusted for sample-specific TOC concentration.

(2) Criteria which are presented in ug/g OC (organic carbon) are adjusted for each sample based on sample-specific TOC concentrations. For example, for benzo(a)anthracene (chronic value of 12 ug/g OC; acute value of 94 ug/g OC) and 1997 sample MH-1 (TOC of 2%, or 20 g OC/Kg), the criteria are adjusted as follows:

chronic: (12 ug/g OC) * (20 g OC/Kg) = 240 ug/Kg, or 0.240 mg/Kg

acute: (94 ug/g OC) * (20 g OC/Kg) = 1,880 ug/Kg, or 1.88 mg/Kg

The benzo(a)anthracene concentration detected in sample MH-1 was 1.3 mg/Kg. This concentration exceeds the sample-specific chronic value, but not the sample-specific acute value.

For 2001 sample SR-102 (TOC of 1.78%, or 17.8 gOC/Kg), the criteria are adjusted as follows:

chronic: (12 ug/g OC) * (17.8 g OC/Kg) = 213.6 ug/Kg, or 0.214 mg/Kg

acute: (94 ug/g OC) * (17.8 g OC/Kg) = 1,673.2 ug/Kg, or 1.673 mg/Kg

The benzo(a)anthracene concentration detected in sample SR-102 was 14 mg/Kg. This concentration exceeds the sample-specific chronic and acute values.

(3) For the 1997 samples that lacked TOC data, criteria were adjusted based on a site-specific average of 2% TOC concentration, which is an average of samples SS-3-5, SS-3-8, SS-12-3, and SS-12-6 (criteria for these individual samples were adjusted based on their sample-specific TOC concentration). Criteria for the 1993 and 2001 samples were a adjusted on sample-specific basis for TOC concentration.

BTEX - Benzene, Toluene, Ethylbenzene, and Xylene.
PAHs - Polynuclear Aromatic Hydrocarbons.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
TOC - Total Organic Carbon.
Results are reported in milligrams per kilogram (mg/Kg) .
FS = Field sample.
DL = Dilution run.
DUP = Field duplicate.
NA = Not available.
U = Compound was analyzed for but not detected. Value shown is the detection limit.
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 was positively identified; however, the associated numerical value is an estimated concentration only.
D = Concentration is based on a diluted sample analysis.
R = Sample results are rejected.
E = The compound was quantitated above the calibration range.
N = The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
ND = All associated compounds were analyzed for but none were detected.
-- = Not analyzed.
Detected concentration exceeds the Benthic Aquatic Life Chronic Toxicity Criteria.
Detected concentration exceeds the Benthic Aquatic Life Acute Toxicity Criteria.

TABLE 9-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
DEEP RIVERBED SAMPLES ANALYTICAL RESULTS

Location	SS-3-1	SS-3-1	SS-3-3	SS-3-3	SS-3-4	SS-3-5	SS-3-6
Depth Range	(1.0' - 2.0')	(3.0' - 4.0')	(1.0' - 2.0')	(3.0' - 4.0')	(1.0' - 2.0')	(1.0' - 2.0')	(2.0' - 3.0')
Date Samples	10/8/1997	10/8/1997	10/8/1997	10/8/1997	10/7/1997	10/7/1997	10/7/1997
Sample Type	FS	FS	FS	FS	FS	FS	FS
Volatile Organic Compounds							
2-Butanone	0.01 UJ	0.01 U	**0.004 J**	0.01 U	**0.003 J**	0.01 U	0.01 U
Benzene	**0.06 J**	**0.006 J**	**0.06 J**	0.01 U	0.01 U	**0.01 J**	**0.002 J**
Ethylbenzene	**16. D**	**0.04**	**50. DJ**	**0.03**	0.01 U	**2.3 DJ**	**0.09**
Toluene	**0.02**	0.01 U	**0.04 J**	0.01 U	**0.001 JN**	**0.001 JN**	0.01 U
Xylenes, Total	**6.6 D**	**0.02**	**26. DJ**	**0.04**	**0.002 J**	**0.06**	**0.02**
Semivolatile Organic Compounds							
2-Methylnaphthalene	**84. JD**	**0.45**	**55. JD**	**0.08 J**	0.37 U	**15. JD**	**0.74**
3-Nitroaniline	**0.14 J**	R	R	R	1.8 U	1.8 U	1.8 U
4-Nitroaniline	R	R	**0.32 J**	R	1.8 U	1.8 U	1.8 U
4-Nitrophenol	4.2 U	1.9 U	4.4 U	2. U	1.8 U	1.8 U	1.8 U
Acenaphthene	**170 D**	**0.88**	**110 D**	**0.36 J**	**1.7**	**53. D**	**2.8**
Acenaphthylene	**4.9**	**0.04 J**	**1.7**	0.40 U	**0.05 J**	**2**	**0.06 J**
Anthracene	**75. JD**	**0.18 J**	**27. JD**	**0.13 J**	**0.21 J**	**16. JD**	**0.34 J**
Benzo(a)anthracene	**28. JD**	**0.09 J**	**8.5 EJ**	**0.05 J**	**0.18 J**	**6.9 J**	**0.21 J**
Benzo(a)pyrene	**36. JD**	**0.07 J**	**9.6 EJ**	**0.04 J**	**0.22 J**	**7.5 E**	**0.22 J**
Benzo(b)fluoranthene	**13. JD**	0.38 U	0.89 U	0.40 U	**0.08 J**	**3.4 J**	**0.09 J**
Benzo(ghi)perylene	**5.9 J**	**0.05 J**	**4.8 J**	R	**0.15 J**	**12. JD**	**0.15 J**
Benzo(k)fluoranthene	**20. JD**	**0.06 J**	**6.3**	0.40 U	**0.11 J**	**3.1 J**	**0.12 J**
Bis(2-ethylhexyl) phthalate	0.84 U	**0.18 J**	**0.10 J**	**0.07 J**	**0.11 J**	0.37 U	**0.05 J**
Chrysene	**32. JD**	**0.09 J**	**9.2 EJ**	**0.06 J**	**0.19 J**	**7.2 J**	**0.24 J**
Di-n-octyl phthalate	0.84 U	**0.09 J**	0.89 U	0.40 U	**0.04 J**	0.37 U	0.37 U
Dibenzo(a,h)anthracene	**1.8 J**	R	**0.91 J**	R	0.37 U	**0.82**	0.37 U
Dibenzofuran	**0.54 J**	0.38 U	0.89 U	0.40 U	0.37 U	0.37 U	0.37 U
Fluoranthene	**90. D**	**0.21 J**	**28. JD**	**0.15 J**	**0.57**	**30. JD**	**0.71**
Fluorene	**66. JD**	**0.24 J**	**42. JD**	**0.18 J**	**0.49**	**20. JD**	**0.85**
Indeno(1,2,3-cd)pyrene	**5.6 J**	R	**3.7 J**	R	**0.10 J**	**2.6**	**0.10 J**
N-nitrosodiphenylamine	0.84 U	0.38 U	0.89 U	0.40 U	0.37 U	0.37 UJ	0.37 U
Naphthalene	**310 D**	**0.73**	**260 D**	**0.33 J**	**0.04 J**	**70. D**	**2.1**
Phenanthrene	0.84 U	**0.68**	**110 D**	**0.46**	**1.6**	**67. D**	**2.2**
Pyrene	**150 DJ**	**0.30 J**	**48. JD**	**0.17 J**	**0.82**	**25. JD**	**0.98**
Polychlorinated Biphenyls							
PCBs (all)	--	ND	--	ND	--	--	--
Inorganics							
Aluminum	--	--	--	--	--	--	--
Antimony	--	--	--	--	--	--	--
Arsenic	--	--	--	--	--	--	--
Barium	--	--	--	--	--	--	--
Beryllium	--	--	--	--	--	--	--
Cadmium	--	--	--	--	--	--	--
Calcium	--	--	--	--	--	--	--
Chromium	--	--	--	--	--	--	--
Cobalt	--	--	--	--	--	--	--
Copper	--	--	--	--	--	--	--
Iron	--	--	--	--	--	--	--
Lead	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--
Manganese	--	--	--	--	--	--	--
Mercury	--	--	--	--	--	--	--
Nickel	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--
Silver	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--
Cyanide, Total	0.63 U	0.57 U	0.67 U	0.59 U	0.59 U	0.60 U	0.68 U
Cyanide, Amenable	0.63 U	0.57 U	0.67 U	0.59 U	0.59 U	0.60 U	0.68 U
Total Petroleum Hydrocarbons							
TPH as #4 Fuel Oil	**10,000**	86. U	**6,900 J**	89. U	89. U	**600**	**150**

See Notes on Page 5.

TABLE 9-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
DEEP RIVERBED SAMPLES ANALYTICAL RESULTS

Location	SS-3-7	SS-3-8	SS-3-9	SS-3-10	SS-3-11	SS-3-11	SS-3-12
Depth Range	(1.0' - 2.0')	(1.0' - 2.0')	(1.0' - 2.0')	(1.0' - 2.0')	(1.0' - 2.0')	(2.0' - 3.0')	(1.0' - 2.0')
Date Samples	10/7/1997	10/8/1997	10/8/1997	10/8/1997	10/8/1997	10/8/1997	10/8/1997
Sample Type	FS	FS	FS	FS	FS	FS	FS
Volatile Organic Compounds							
2-Butanone	0.01 U	**0.009 J**	0.01 U	0.01 U	**0.002 JN**	**0.002 JN**	**0.008 JN**
Benzene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.06 U
Ethylbenzene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.06 U
Toluene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.008 JN**
Xylenes, Total	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.06 U
Semivolatile Organic Compounds							
2-Methylnaphthalene	0.37 U	0.39 U	0.39 U	0.40 U	**3.1**	**1.1**	**0.27 J**
3-Nitroaniline	1.8 U	R	R	R	R	R	R
4-Nitroaniline	1.8 U	1.9 U	R	2. U	3.8 U	3.7 U	2. U
4-Nitrophenol	1.8 U	1.9 U	2. U	2. U	3.8 U	3.7 U	**0.73 J**
Acenaphthene	**0.89**	0.39 U	**0.06 J**	0.40 U	**15. D**	**4.3**	**19. JD**
Acenaphthylene	0.37 U	0.39 U	0.39 U	0.40 U	**0.56 J**	**0.55 J**	**1.1**
Anthracene	**0.09 J**	0.39 U	**0.08 J**	0.40 U	**10. D**	**5.1**	**6.5 J**
Benzo(a)anthracene	**0.08 J**	0.39 U	**0.56**	0.40 U	**4.8**	**3.9**	**3.5 J**
Benzo(a)pyrene	**0.08 J**	0.39 U	**0.91**	0.40 U	**4.6**	**4.7**	**2.5**
Benzo(b)fluoranthene	0.37 U	0.39 U	**0.84**	0.40 U	**1.8**	**2**	**1.3**
Benzo(ghi)perylene	**0.05 J**	R	**0.88 J**	R	**1. J**	**0.96 J**	**0.30 J**
Benzo(k)fluoranthene	**0.04 J**	0.39 U	0.39 U	0.40 U	**3.5**	**3.3**	**2.1**
Bis(2-ethylhexyl) phthalate	**0.04 J**	**0.04 J**	**0.23 J**	**0.09 J**	**0.14 J**	**0.14 J**	**0.10 J**
Chrysene	**0.07 J**	0.39 U	**0.69**	0.40 U	**5.4**	**5.3**	**3.4 J**
Di-n-octyl phthalate	0.37 U	0.39 U	**0.10 J**	0.40 U	0.76 U	0.74 U	0.41 U
Dibenzo(a,h)anthracene	0.37 U	R	**0.06 J**	R	**0.12 J**	**0.09 J**	**0.06 J**
Dibenzofuran	0.37 U	0.39 U	0.39 U	0.40 U	**0.27 J**	**0.15 J**	**2**
Fluoranthene	**0.23 J**	0.39 U	**1.1**	**0.06 J**	**16. D**	**6.6 D**	**9.5 JD**
Fluorene	**0.26 J**	0.39 U	0.39 U	0.40 U	**9.3 D**	**3**	**22. D**
Indeno(1,2,3-cd)pyrene	0.37 U	R	**0.71 J**	R	**0.89 J**	**0.84 J**	**0.32 J**
N-nitrosodiphenylamine	0.37 U	0.39 U	0.39 U	0.40 U	**0.26 J**	0.74 U	0.41 U
Naphthalene	**0.08 J**	0.39 U	0.39 U	0.40 U	**1.3**	**0.76**	**0.68**
Phenanthrene	**0.7**	0.39 U	**0.38 J**	**0.04 J**	**42. D**	**11. D**	**79. D**
Pyrene	**0.35 J**	0.39 UJ	**0.92**	**0.07 J**	**24. D**	**8.7 D**	**13. JD**
Polychlorinated Biphenyls							
PCBs (all)	--	--	--	--	ND	--	--
Inorganics							
Aluminum	--	--	--	--	--	--	--
Antimony	--	--	--	--	--	--	--
Arsenic	--	--	--	--	--	--	--
Barium	--	--	--	--	--	--	--
Beryllium	--	--	--	--	--	--	--
Cadmium	--	--	--	--	--	--	--
Calcium	--	--	--	--	--	--	--
Chromium	--	--	--	--	--	--	--
Cobalt	--	--	--	--	--	--	--
Copper	--	--	--	--	--	--	--
Iron	--	--	--	--	--	--	--
Lead	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--
Manganese	--	--	--	--	--	--	--
Mercury	--	--	--	--	--	--	--
Nickel	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--
Silver	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--
Cyanide, Total	0.59 U	0.58 U	0.59 U	0.60 U	0.57 U	0.56 U	0.61 U
Cyanide, Amenable	0.59 U	0.58 U	0.59 U	0.60 U	0.57 U	0.56 U	0.61 U
Total Petroleum Hydrocarbons							
TPH as #4 Fuel Oil	88. U	88. U	88. U	90. U	**590**	**160**	**490**

See Notes on Page 5.

TABLE 9-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
DEEP RIVERBED SAMPLES ANALYTICAL RESULTS

Location	SS-3-13	SS-3-14	SS-12-1	SS-12-1	SS-12-2	SS-12-3	SS-12-4
Depth Range	(1.0' - 2.0')	(1.0' - 2.0')	(1.0' - 2.0')	(2.0' - 3.0')	(1.0' - 2.0')	(1.0' - 2.0')	(1.0' - 2.0')
Date Samples	10/8/1997	10/8/1997	10/9/1997	10/9/1997	10/9/1997	10/9/1997	10/9/1997
Sample Type	FS	FS	FS	FS	FS	FS	FS
Volatile Organic Compounds							
2-Butanone	**0.06 J**	**0.004 JN**	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ
Benzene	0.01 U	**0.002 JN**	**0.002 J**	0.01 U	0.01 U	0.01 U	0.01 U
Ethylbenzene	0.01 U	0.01 U	**0.003 J**	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	0.01 U	**0.01 J**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylenes, Total	0.01 U	0.01 U	**0.001 J**	0.01 U	0.01 U	0.01 U	0.01 U
Semivolatile Organic Compounds							
2-Methylnaphthalene	0.39 UJ	0.39 UJ	**0.37 J**	0.40 U	0.40 U	0.45 U	0.41 U
3-Nitroaniline	1.9 UJ	2. UJ	2. U	2. U	2. U	2.2 U	2. U
4-Nitroaniline	1.9 UJ	2. UJ	2. U	2. U	2. U	2.2 U	2. U
4-Nitrophenol	1.9 UJ	2. UJ	2. U	2. U	2. U	2.2 U	2. U
Acenaphthene	0.39 UJ	0.39 UJ	**0.26 J**	0.40 U	**0.11 J**	**0.6**	0.41 U
Acenaphthylene	0.39 UJ	0.39 UJ	0.40 U	0.40 U	0.40 U	0.45 U	0.41 U
Anthracene	**0.08 J**	**0.04 J**	**0.09 J**	0.40 U	0.40 U	**0.12 J**	0.41 U
Benzo(a)anthracene	**0.18 J**	**0.15 J**	**0.04 J**	0.40 U	0.40 U	**0.05 J**	0.41 U
Benzo(a)pyrene	**0.16 J**	**0.15 J**	**0.05 J**	0.40 U	0.40 U	**0.06 J**	**0.06 J**
Benzo(b)fluoranthene	**0.20 J**	**0.18 J**	0.40 U	0.40 U	0.40 U	0.45 U	**0.05 J**
Benzo(ghi)perylene	0.39 UJ	0.39 UJ	0.40 U	0.40 U	0.40 U	**0.08 J**	0.41 U
Benzo(k)fluoranthene	**0.19 J**	**0.20 J**	0.40 U	0.40 U	0.40 U	0.45 U	**0.06 J**
Bis(2-ethylhexyl) phthalate	**0.07 J**	**0.09 J**	**0.05 J**	0.40 U	0.40 U	0.45 U	0.41 U
Chrysene	**0.18 J**	**0.16 J**	**0.05 J**	0.40 U	0.40 U	**0.06 J**	0.41 U
Di-n-octyl phthalate	0.39 UJ	0.39 UJ	0.40 U	0.40 U	0.40 UJ	0.45 U	**0.08 J**
Dibenzo(a,h)anthracene	0.39 UJ	0.39 UJ	0.40 U	0.40 U	0.40 U	0.45 U	0.41 U
Dibenzofuran	0.39 UJ	0.39 UJ	0.40 U	0.40 U	0.40 U	0.45 U	0.41 U
Fluoranthene	**0.38 J**	**0.35 J**	**0.14 J**	0.40 U	0.40 U	**0.19 J**	**0.09 J**
Fluorene	**0.05 J**	0.39 UJ	**0.14 J**	0.40 U	0.40 U	**0.22 J**	0.41 U
Indeno(1,2,3-cd)pyrene	0.39 UJ	0.39 UJ	0.40 U	0.40 U	0.40 U	0.45 U	0.41 U
N-nitrosodiphenylamine	0.39 UJ	0.39 UJ	0.40 U	0.40 U	0.40 U	0.45 U	0.41 U
Naphthalene	0.39 UJ	0.39 UJ	**0.5**	0.40 U	0.40 U	**0.06 J**	0.41 U
Phenanthrene	**0.35 J**	**0.23 J**	**0.46**	**0.06 J**	0.40 U	**0.39 J**	0.41 U
Pyrene	**0.19 J**	**0.18 J**	**0.18 J**	0.40 U	0.40 U	**0.17 J**	**0.04 J**
Polychlorinated Biphenyls							
PCBs (all)	--	--	--	--	--	--	ND
Inorganics							
Aluminum	--	--	--	--	--	--	--
Antimony	--	--	--	--	--	--	--
Arsenic	--	--	--	--	--	--	--
Barium	--	--	--	--	--	--	--
Beryllium	--	--	--	--	--	--	--
Cadmium	--	--	--	--	--	--	--
Calcium	--	--	--	--	--	--	--
Chromium	--	--	--	--	--	--	--
Cobalt	--	--	--	--	--	--	--
Copper	--	--	--	--	--	--	--
Iron	--	--	--	--	--	--	--
Lead	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--
Manganese	--	--	--	--	--	--	--
Mercury	--	--	--	--	--	--	--
Nickel	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--
Silver	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--
Cyanide, Total	0.58 U	0.59 U	0.60 U	0.59 U	0.60 U	0.67 U	**3.1**
Cyanide, Amenable	0.58 U	0.59 U	0.60 U	0.59 U	0.60 U	--	0.62 U
Total Petroleum Hydrocarbons							
TPH as #4 Fuel Oil	87. U	88. U	**170**	89. U	90. U	100 U	93. U

See Notes on Page 5.

TABLE 9-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
DEEP RIVERBED SAMPLES ANALYTICAL RESULTS

Location	SS-12-5	SS-12-5	SS-12-6	SS-12-7	SR-109	SR-109
Depth Range	(1.0' - 2.0')	(1.0' - 2.0')	(1.0' - 2.0')	(1.0' - 2.0')	(4 - 6')	(8 - 10')
Date Samples	10/10/1997	10/10/1997	10/10/1997	10/10/1997	8/28/2001	8/29/2001
Sample Type	FS	DUP	FS	FS	FS	FS
Volatile Organic Compounds						
2-Butanone	0.01 UJ	0.01 UJ	**0.01**	0.01 UJ	--	--
Benzene	0.01 U	0.01 U	0.01 U	0.01 U	--	--
Ethylbenzene	0.01 U	0.01 U	0.01 U	0.01 U	--	--
Toluene	0.01 U	0.01 U	0.01 U	0.01 U	--	--
Xylenes, Total	0.01 U	0.01 U	0.01 U	0.01 U	--	--
Semivolatile Organic Compounds						
2-Methylnaphthalene	0.41 U	0.40 U	0.43 U	0.41 U	--	--
3-Nitroaniline	2. U	2. U	2.1 U	2. U	--	--
4-Nitroaniline	2. U	2. U	2.1 U	2. U	--	--
4-Nitrophenol	2. U	2. U	2.1 U	2. U	--	--
Acenaphthene	0.41 U	0.40 U	0.43 U	**0.13 J**	0.36 UJ	--
Acenaphthylene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Anthracene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Benzo(a)anthracene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Benzo(a)pyrene	**0.05 J**	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Benzo(b)fluoranthene	**0.06 J**	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Benzo(ghi)perylene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Benzo(k)fluoranthene	**0.05 J**	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Bis(2-ethylhexyl) phthalate	0.41 U	0.40 U	0.43 U	0.41 U	--	--
Chrysene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Di-n-octyl phthalate	0.41 U	0.40 U	0.43 UJ	0.41 U	--	--
Dibenzo(a,h)anthracene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Dibenzofuran	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Fluoranthene	**0.11 J**	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Fluorene	0.41 U	0.40 U	0.43 U	**0.05 J**	0.36 UJ	--
Indeno(1,2,3-cd)pyrene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
N-nitrosodiphenylamine	0.41 U	0.40 U	0.43 U	0.41 U	--	--
Naphthalene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Phenanthrene	0.41 U	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Pyrene	**0.05 J**	0.40 U	0.43 U	0.41 U	0.36 UJ	--
Polychlorinated Biphenyls						
PCBs (all)	ND	ND	--	--	--	--
Inorganics						
Aluminum	--	--	--	--	--	--
Antimony	--	--	--	--	--	--
Arsenic	--	--	--	--	--	--
Barium	--	--	--	--	--	--
Beryllium	--	--	--	--	--	--
Cadmium	--	--	--	--	--	--
Calcium	--	--	--	--	--	--
Chromium	--	--	--	--	--	--
Cobalt	--	--	--	--	--	--
Copper	--	--	--	--	--	--
Iron	--	--	--	--	--	--
Lead	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--
Manganese	--	--	--	--	--	--
Mercury	--	--	--	--	--	--
Nickel	--	--	--	--	--	--
Potassium	--	--	--	--	--	--
Silver	--	--	--	--	--	--
Sodium	--	--	--	--	--	--
Thallium	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--
Zinc	--	--	--	--	--	--
Cyanide, Total	0.62 U	0.60 U	0.64 U	0.61 U	0.54 U	0.57 U
Cyanide, Amenable	--	--	0.64 U	--	--	--
Total Petroleum Hydrocarbons						
TPH as #4 Fuel Oil	93. U	90. U	97. U	92. U	--	--

See Notes on Page 5.

TABLE 9-B

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
DEEP RIVERBED SAMPLES ANALYTICAL RESULTS

Notes:
Results are reported in milligrams per kilogram (mg/Kg) .
FS = Field sample.
DUP = Field duplicate.
NA = Not available.
U = Compound was analyzed for but not detected. Value shown is the detection limit.
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 was positively identified; however, the associated numerical value is an estimated concentration only.
D = Concentration is based on a diluted sample analysis.
R = Sample results are rejected.
E = The compound was quantitated above the calibration range.
N = The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
ND = All associated compounds were analyzed for but none were detected.
-- = Not analyzed.

TABLE 10

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
EXPOSURE AND RISK QUANTIFICATION FOR HYPOTHETICAL WORKERS (1) INCIDENTAL INGESTION OF SOIL

Chemical of Potential Interest	Maximum Concentration Detected on Uncovered Surface Soil Samples (3)	Units	Non-Carcinogenic Risk			Carcinogenic Risk		
			Intake (2) (mg/kg-day)	Reference Dose (4) (mg/kg-day)	Hazard Quotient	Intake (2) (mg/kg-day)	Cancer Slope Factor (5) 1/(mg/kg-day)	Risk
Acenaphthene	330	ug/kg	3.22896E-07	0.06	5.3816E-06	NC	NC	
Acenaphthylene	960	ug/kg	9.39335E-07			NC	NC	
Anthracene	790	ug/kg	7.72994E-07	0.3	2.57665E-06	NC	NC	
Benzo(a)anthracene	2100	ug/kg	2.05479E-06			7.33855E-07	0.73	5.35714E-07
Benzo(a)pyrene	2000	ug/kg	1.95695E-06			6.9891E-07	7.3	5.10204E-06
Benzo(b)fluoranthene	1600	ug/kg	1.56556E-06			5.59128E-07	0.73	4.08163E-07
Benzo(g,h,i)perylene	1800	ug/kg	1.76125E-06			NC	NC	
Benzo(k)fluoranthene	13000	ug/kg	1.27202E-05			4.54291E-06	0.073	3.31633E-07
bis(2-Ethylhexyl)phthalate	320	ug/kg	3.13112E-07	0.02	1.56556E-05	1.11826E-07	0.014	1.56556E-09
Chrysene	2400	ug/kg	2.34834E-06			8.38692E-07	0.0073	6.12245E-09
Dibenzofuran	350	ug/kg	3.42466E-07			NC	NC	
Dibenz(a,h)anthracene	160		1.56556E-07			5.59128E-08	7.3	4.08163E-07
Fluoranthene	4500	ug/kg	4.40313E-06	0.04	0.000110078	NC	NC	
Fluorene	350	ug/kg	3.42466E-07	0.04	8.56164E-06	NC	NC	
Indeno(1,2,3-cd)pyrene	1500	ug/kg	1.46771E-06			5.24182E-07	0.73	3.82653E-07
Naphthalene	480	ug/kg	4.69667E-07			NC	NC	
Phenanthrene	4000	ug/kg	3.91389E-06			NC	NC	
Pyrene	3200	ug/kg	3.13112E-06	0.03	0.000104371	NC	NC	
Antimony	1.9	mg/kg	1.8591E-06	0.0004	0.00464775	NC	NC	
Arsenic	8.4	mg/kg	8.21918E-06	0.0003	0.02739726	2.93542E-09	1.5	4.40313E-09
Barium	86.4	mg/kg	8.45401E-05	0.07	0.001207716	NC	NC	
Beryllium	0.28	mg/kg	2.73973E-07	0.005	5.47945E-05	9.78474E-11	4.3	4.20744E-10
Cadmium	2.4	mg/kg	2.34834E-06	0.001	0.002348337	NC	NC	
Chromium	27.7	mg/kg	2.71037E-05	1	2.71037E-05	NC	NC	
Cobalt	8.6	mg/kg	8.41487E-06			NC	NC	
Copper	32	mg/kg	3.13112E-05	0.037	0.000846247	NC	NC	
Iron	22900	mg/kg	0.022407045			NC	NC	
Lead	186	mg/kg	0.000181996			6.49986E-08	NV	
Magnesium	4030	mg/kg	0.003943249			NC	NC	
Manganese	449	mg/kg	0.000439335	0.14	0.003138105	NC	NC	
Mercury	11.4	mg/kg	1.11546E-05	0.0003	0.037181996	NC	NC	
Nickel	21	mg/kg	2.05479E-05	0.02	0.001027397	NC	NC	
Selenium	0.32	mg/kg	3.13112E-07	0.005	6.26223E-05	NC	NC	
Silver	0.23	mg/kg	2.25049E-07	0.005	4.50098E-05	NC	NC	
Thallium	1.6	mg/kg	1.56556E-06			NC	NC	
Vanadium	15.3	mg/kg	1.49706E-05	0.007	0.002138664	NC	NC	
Zinc	170	mg/kg	0.000166341	0.3	0.000554468	NC	NC	
				Hazard Index =	0.080924094		Total CancerRisk =	7.18088E-06

See Notes on Page 2.

TABLE 10

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
EXPOSURE AND RISK QUANTIFICATION FOR HYPOTHETICAL WORKERS (1) INCIDENTAL INGESTION OF SOIL

Notes:
NV = no value; NC = not a carcinogen

(1) Assumes that a hypothetical on-site worker will be exposed to the maximum contaminated surface soil every work day for 25 years
(2) Intake - (C x CF x IR x EF x ED)/(BW x AT) where:
C = Soil Concentration (mg/kg)
CF = Conversion Factor = 1E-09 ug/kg or 1E-06 mg/kg
IR = Soil Ingestion Rate = 100 mg/day
EF = Exposure Frequency = 250 days
ED = Exposure Duration = 25 years
BW = Body Weight = 70 kg
AT = 25 x 250 days for non-carcinogenic risk; 25550 days for carcinogenic risk (70 yr lifespan)
(3) Uncovered surface soil samples include SS-01, SS-02, SS-03, and SF-05.
(4) Reference Dose generated by USEPA
(5) Carcinogenic Slope Factor generated by USEPA

TABLE 11

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
FATE AND TRANSPORT PARAMETERS

Organic Compounds	Compound Koc	Retardation Factor of Silt **	Retardation Factor of Sand and Gravel **	Biodegradation Half-Life (days)***
Benzene	83	9.7	10.1	5-16
Toluene	275	29.8	31.2	4-22
Ethylbenzene	832	88.3	92.5	3-10
Xylenes	912	96.7	101.3	7-28
Phenol*	14	2.5	2.5	0.25-3.5

Notes:

* The Koc value for this compound obtained from Ravi and Johnson (1994), all others obtained from Mott (1995).

** Computed using moisture content and bulk density data collected during the SRI and methods presented in Freeze and Cherry (1979).

*** Howard, P. H. 1991. Handbook of Environmental Degradation Rates. Lewis Publishers: Chelsea, Michigan. Taken as the maximum of reported ranges for unacclimated, aqueous aerobic biodegradation half lives.

TABLE 12

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
CALCULATED MASS FRACTIONS FOR INDIVIDUAL ANALYTES DETECTED IN DNAPL

Chemical Constituent of NAPL	Concentration (ppm)	Mass Fraction (%)
Benzene	1,600	15.4
Toluene	1,700	16.3
Ethylbenzene	2,400	23
Xylenes	2,300	22.1
Total VOCs	**8,000**	**76.8**
2-Methylnaphthalene	450	4.3
Acenaphthene	140	1.3
Acenaphthylene	26	0.2
Anthracene	77	0.7
Benzo(a)anthracene	50	0.5
Benzo(a)pyrene	42	0.4
Benzo(a)fluoranthene	16	0.2
Benzo(ghi)perylene	23	0.2
Benzo(k)fluoranthene	26	0.2
Chrysene	39	0.4
Dibenzofuran	14	0.1
Fluoranthene	96	0.9
Fluorene	100	1
Indeno(1,2,3-cd)pyrene	15	0.1
Naphthalene	730	7
Phenanthrene	310	3
Phenol	16	0.2
Pyrene	160	1.5
Total SVOCs	**2,330**	**22.4**
Aluminum	6.8	0.07
Arsenic	3.1	0.03
Calcium	58	0.6
Chromium	0.18	0.002
Copper	0.76	0.007
Iron	13	0.1
Lead	1.4	0.01
Manganese	0.18	0.002
Mercury	0.04	0.0004
Selenium	0.66	0.006
Thallium	0.36	0.003
Vanadium	0.26	0.002
Zinc	3.4	0.03
Total Inorganics	**88.14**	**0.8**
Total	**10,418**	**100**

TABLE 13

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUSQUEHANNA RIVER STAGE AND DISCHARGE DATA

Date	Discharge (cfs)	River Stage (ft AMSL)
1/19/1998	5,790	833.29
1/21/1998	4,800	832.91
1/23/1998	3,870	832.57
1/26/1998	3,720	832.51
1/28/1998	2,960	832.23
1/30/1998	2,600	832.09
2/2/1998	2,310	831.99
2/4/1998	2,160	831.89
2/6/1998	2,010	831.81
2/9/1998	1,650	831.65
2/11/1998	1,610	831.63
2/13/1998	4,530	832.89
2/16/1998	2,680	832.11
2/18/1998	3,230	832.49
2/20/1998	6,520	833.53
2/23/1998	4,800	832.95
2/25/1998	NA	832.83
2/27/1998	4,580	832.85
3/2/1998	12,800	835.25
3/4/1998	9,920	834.59
3/6/1998	7,040	833.75
3/9/1998	10,500	834.87
3/11/1998	23,100	830.63
3/13/1998	11,600	834.97
3/16/1998	6,530	833.61
3/18/1998	5,420	833.19
3/20/1998	6,710	833.65

Notes:
1) River stage measurements taken at site staff gauge SG-1.
2) Discharge recorded at USGS Station number 01503000, Susquehanna River at Conklin, NY.
3) NA = Not Available.
4) cfs = cubic feet per second.
5) ft AMSL = feet above mean level, 1929 NGVD.

TABLE 14

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
SURFACE WATER ANALYTICAL RESULTS

Location / Sample Type	NYSDEC Criteria	SW93-1 FS	SW93-2 FS	SW93-3 FS	SW93--4 FS	SW93-4 DUP	SW93-5 FS
Aluminum	NA	**631**	**260**	**316**	**255**	**358**	**373**
Antimony	3 G	3.0 U	3.0 U	**3.4 J**	3.0 U	3.0 U	3.0 U
Barium	1,000	**21 J**	**21 J**	**23 J**	**22 J**	**22 J**	**22 J**
Copper	200	**4.0 J**	**4.0 J**	4.0 U	**4.0 J**	**4.0 J**	**4.0 J**
Iron	300	**486**	**340**	**323**	**726**	**342**	**327**
Lead	50	**2.6 J**	**1.5 J**	**1.7 J**	**2.1 J**	**3.8**	**5.0**
Manganese	300	**68**	**67**	**69**	**69**	**66**	**67**
Zinc	300	**10 J**	**6.0 J**	**5.0 J**	**8.0 J**	**6.0 J**	**7.0 J**

Notes:
All concentrations reported in micrograms per liter (ug/L); also expressed as parts per billion (ppb).
Table modified from Table F-6 in the Task II Remedial Investigation Report (BBL, 1996).
Samples collected on June 17, 1993.
Detections are bolded.
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
Surface water samples were also analyzed for VOCs and SVOCs, but none were detected.
An additional surface water sample was collected in 2001 and analyzed for BTEX and PAHs, but none were detected.

Criteria Notes:
G = Guidance value.
NA = Not applicable.

TABLE 15

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

FORENSIC SOURCE EVALUATION FINDINGS

Location	Depth Range	Total PAH	MGP-Related Tar Characteristics					Petroleum Characteristics			Background Characteristics		
			Napth. > Phen. > Fluor.	Napth. < Phen. > Fluor.	Napth. < Phen.< Fluor.	Fluor. / Pyrene > 1	Fluor. / Pyrene < 1	Kerosene Range	Diesel Range	Waste/ Lube Oil Range	Total PAHs < 1 mg/kg	Fluor. / Pyrene > 1	Fluor. / Pyrene < 1
	feet bgs	mg/Kg dry wt											
1993 Riverbed Samples													
SS-01	0-0.9	4.8			x		x						
SS-02	0-0.7	1.6										x	
SS-03	0-1.2	1,979		x			x						
SS-04	0-0.9	0.24									x	x	
SS-05	0-0.8	1.7	x				x						
SS-06	0-0.6	35			x		x						
SS-07	0-1	4.8			x		x						
SS-08	0-1.4	12			x		x						
SS-09	0-0.8	16			x		x						
SS-10	0-0.8	26			x		x		x	x			
SS-11	0-0.7	301	x				x		x	x			
SS-12	0-0.8	41		x			x			x			
SS-13	0-0.9	0.1									x	x	
SS-14	0-1.1	0.14									x	x	
1997 Riverbed Samples													
SS-12-1	0-0.5	5.7 J		x			x		x				
SS-12-1	1-2	2.3 J	x				x						
SS-12-1	2-3	0.062 J									x		
SS-12-2	0-0.5	0.15 J									x		
SS-12-2	1-2	0.11 J									x		
SS-12-3	0-0.5	2.1 J			x		x						
SS-12-3	1-2	2.0 J		x		x							
SS-12-4	0-0.5	0.051 J									x		
SS-12-4	1-2	0.31 J									x		
SS-12-5	0-0.5	ND									x		
SS-12-5	1-2	0.31 J									x		
SS-12-6	0-0.5	ND									x		
SS-12-6	1-2	ND									x		
SS-12-7	0-0.5	0.22 J									x		
SS-12-7	1-2	0.18 J									x		
SS-1A	0-0.5	0.94								x		x	
SS-1B	0-0.5	11.8			x	x							
SS-1B (DUP)	0-0.5	6.8			x	x				x			
SS-3-1	0-0.5	360 J	x				x						
SS-3-1	1-2	1,092 J	x				x						
SS-3-1	3-4	4.1 J											
SS-3-10	0-0.5	0.54 J									x		
SS-3-10	1-2	0.18 J									x		
SS-3-11	0-0.5	170 J		x		x							
SS-3-11	1-2	140 J		x			x						
SS-3-11	2-3	62 J		x			x						
SS-3-12	0-0.5	26 J		x		x				x			
SS-3-12	1-2	170 J		x			x						
SS-3-13	0-0.5	0.041 J									x		
SS-3-13	1-2	2.0 J										x	
SS-3-14	0-0.5	1.0 J										x	
SS-3-14	1-2	1.6 J										x	
SS-3-2	0-0.5	430 J	x			x							
SS-3-3	0-0.5	31 J		x			x						
SS-3-3	1-2	720 J	x				x						
SS-3-3	3-4	2.0 J		x			x						
SS-3-4	0-0.5	2.6 J		x			x						
SS-3-4	1-2	6.5 J		x			x						
SS-3-5	0-0.5	230 J	x			x							
SS-3-5	1-2	340 J	x			x							
SS-3-6	0-0.5	130 J		x		x							
SS-3-6	2-3	12 J		x			x						
SS-3-7	0-0.5	1.8 J									x		
SS-3-7	1-2	2.9 J		x			x						
SS-3-8	0-0.5	ND									x		
SS-3-8	1-2	ND									x		
SS-3-9	1-2	7.2 J										x	
SS-3-9	0-0.5	ND									x		

TABLE 15

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

FORENSIC SOURCE EVALUATION FINDINGS

Location	Depth Range	Total PAH	MGP-Related Tar Characteristics					Petroleum Characteristics			Background Characteristics		
			Napth. > Phen. > Fluor.	Napth. < Phen. > Fluor.	Napth. < Phen.< Fluor.	Fluor. / Pyrene > 1	Fluor. / Pyrene < 1	Kerosene Range	Diesel Range	Waste/ Lube Oil Range	Total PAHs < 1 mg/kg	Fluor. / Pyrene > 1	Fluor. / Pyrene < 1
	feet bgs	mg/Kg dry wt											
2001 Riverbed Samples													
SR-101	0-2	1.3								x	x		
SR-102	0-2	308		x			x		x				
SR-104	0-1	0.57									x		
SR-105	0-2	ND									x		
SR-106	0-2	0.26									x		
SR-107	0-2	ND									x		
SR-108	0-2	12			x	x							
SR-109	0-2	33.5			x		x		x	x			
SR-109	4-6	ND									x		
SR-110	0-2	ND									x		
SR-111	0-2	1.1									x		
SR-112	0-2	14			x		x						
SR-113	0-2	2.7											x
SS-1D	0-0.7	45		x			x		x	x			
SS-15	0-0.8	1.7								x			
CSPH SUMP	sump sediment			x		x				x			
CSPH SUMP (DUP)	sump sediment			x		x				x			
Soil Samples													
TB-02	10-14	3,371	x			x							
TP-07	5	4,746	x			x							
SB-4	12-14	118.71		x			x						
SB-5	4-6	225.62			x	x							
SB-6	4-6	1064.2		x			x						
SB-101	15-17	125.5						x	x				
SB-101	10-12	ND									x		
MW01-7R	20-22	0.2						x					
Groundwater and NAPL Samples													
TW97-2S	groundwater	2									x		
TW97-3S	groundwater	8							x	x			
MW-13	NAPL	NA	x				x						

Acronyms and Abbreviations:
Napth = Naphthalene.
Phen. = Phenanthrene.
Fluor = Fluoranthene.
PAHs = Polycyclic Aromatic Hydrocarbons.
ug/kg, mg/kg = micrograms and milligrams per kilogram.
dry wt. = dry weight.
bgs = below ground surface (riverbed sample depths referenced to riverbed surface).

TABLE 16

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
PIPE AND SEWER SEDIMENT SAMPLE ANALYTICAL RESULTS

Location	MH-1	MH-2	MH-3	24-INCH PIPE	CSPH SUMP	CSPH SUMP
Date Sampled	10/13/1997	10/13/1997	10/13/1997	10/7/1997	11/29/2001	11/29/2001
Sample Type	FS	FS	FS	FS	FS	DUP
Volatile Organic Compounds						
1,1,1-Trichloroethane	0.01 U	0.10 U	**0.002 J**	0.01 U	--	--
2-Butanone	0.01 U	0.10 U	0.01 U	0.01 U	--	--
Acetone	0.01 U	0.10 U	0.01 U	0.01 U	--	--
Benzene	0.01 U	0.10 U	0.01 U	0.01 U	**0.008**	**0.01**
Ethylbenzene	0.01 U	0.10 U	0.01 U	0.01 U	**0.08**	**0.18**
Methylene chloride	0.01 U	0.10 U	0.01 U	0.01 U	--	--
Styrene	0.01 U	0.10 U	0.01 U	0.01 U	--	--
Toluene	0.01 U	0.10 U	0.01 U	0.01 U	**0.01**	**0.01**
o-Xylene	--	--	--	--	**0.04**	**0.08**
Xylenes, Total	0.01 U	0.10 U	0.01 U	0.01 U	--	--
m,p-Xylene	--	--	--	--	**0.02**	**0.07**
Total BTEX	ND	ND	ND	ND	**0.16**	**0.36**
Semivolatile Organic Compounds						
2-Methylnaphthalene	4.4 U	6.7 U	38. U	0.37 U	--	--
3-Nitroaniline	22. U	33. U	190 U	1.8 U	--	--
4-Methylphenol	4.4 U	6.7 U	38. U	0.37 U	--	--
4-Nitroaniline	22. UJ	33. UJ	190 UJ	1.8 U	--	--
4-Nitrophenol	22. U	33. U	190 U	1.8 U	--	--
Acenaphthene	4.4 U	**14**	38. U	**0.62**	**9.3**	**8**
Acenaphthylene	4.4 U	6.7 U	38. U	**2**	7. U	7.1 U
Anthracene	4.4 U	**1.8 J**	38. U	**0.86**	**5. J**	**5. J**
Benzo(a)anthracene	**1.3 J**	**1.6 J**	38. U	**2.3**	**6. J**	**6. J**
Benzo(a)pyrene	**1.2 J**	**2.1 J**	**4.7 J**	**3.7 DJ**	**5. J**	**5. J**
Benzo(b)fluoranthene	**0.97 J**	**2. J**	**4.8 J**	**1.5**	**6. J**	**6. J**
Benzo(ghi)perylene	**0.59 J**	**1.1 J**	**6. J**	**0.93**	**3. J**	**4. J**
Benzo(k)fluoranthene	**1. J**	**1.8 J**	**5.8 J**	**1.6**	**5. J**	**5. J**
Bis(2-ethylhexyl) phthalate	4.4 U	6.7 U	38. U	**0.29 J**	--	--
Butyl benzyl phthalate	4.4 U	6.7 U	**180**	0.37 U	--	--
Chrysene	**1.3 J**	**2.2 J**	38. U	**2.4**	**8.1**	**7.7**
Di-n-butyl phthalate	4.4 U	6.7 U	38. U	0.37 U	--	--
Di-n-octyl phthalate	4.4 U	6.7 U	38. U	0.37 U	--	--
Dibenzo(a,h)anthracene	4.4 U	6.7 U	38. U	**0.21 J**	7. U	7.1 U
Dibenzofuran	4.4 U	**1.8 J**	38. U	0.37 U	7. U	**1. J**
Fluoranthene	**2.9 J**	**5.4 J**	**4.9 J**	**5.5 D**	**17**	**18**
Fluorene	4.4 U	**9.9**	38. U	0.37 U	**7.4**	**7. J**
Indeno(1,2,3-cd)pyrene	4.4 U	**1.1 J**	**4.8 J**	**0.77**	**3. J**	7.1 U
N-nitrosodiphenylamine	4.4 U	6.7 U	38. U	0.37 U	--	--
Naphthalene	4.4 U	6.7 U	38. U	**0.32 J**	**12**	**10**
Phenanthrene	**1.6 J**	**2.5 J**	38. U	**0.16 J**	**23**	**21**
Pyrene	**1.6 J**	**3.5 J**	**4.4 J**	**3.9 DJ**	**16**	**15**
Total PAHs	**12.5**	**49**	**35.4**	**26.8**	**126**	**118**
Total Semivolatiles	**12.5**	**50.8**	**215**	**27.1**	**126**	**119**
Inorganics						
Aluminum	**4,880**	**11,800**	**13,500**	**11,600**	--	--
Antimony	**2.4 BJ**	**4.2 BJ**	**3.7 BJ**	**1.4 BJ**	--	--
Arsenic	**4.3**	**13**	**16.2**	**7.5**	--	--
Barium	**42.8**	**230**	**226**	**70.9**	--	--
Beryllium	**0.21 B**	**0.37 B**	**0.43 B**	**0.47 B**	--	--
Cadmium	**0.20 BJ**	**2.7**	**3.7**	**0.93**	--	--
Calcium	**35,100**	**35,100**	**12,400**	**2,190**	--	--
Chromium	**27.8**	**46.5**	**44.8**	**16.5 J**	--	--
Cobalt	**4. B**	**11.2**	**12.6**	**10.3**	--	--
Copper	**70.1**	**153**	**159**	**21.2**	--	--
Iron	**16,800**	**52,100**	**64,200**	**23,800**	--	--
Lead	**219**	**284**	**326**	**30.9**	--	--
Magnesium	**4,100**	**8,180**	**7,720**	**3,640**	--	--
Manganese	**195**	**513**	**1,050**	**355**	--	--
Mercury	**0.13 B**	**0.57**	**0.7**	**0.07 B**	--	--
Nickel	**14.9 J**	**34.2 J**	**38.9 J**	**23.7 J**	--	--
Potassium	**601 B**	**1,360**	**1,580**	**991**	--	--
Selenium	**1.4**	**1.6**	**1.6**	0.36 U	--	--
Silver	**0.42 BJ**	**1.4 BJ**	**1.6 J**	**0.39 BJ**	--	--
Sodium	**99.6 B**	**155 B**	**245 B**	**804**	--	--
Thallium	**3.3 J**	**3.7 J**	**3.5 J**	**1.2 BJ**	--	--

See Notes on Page 2.

TABLE 16

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

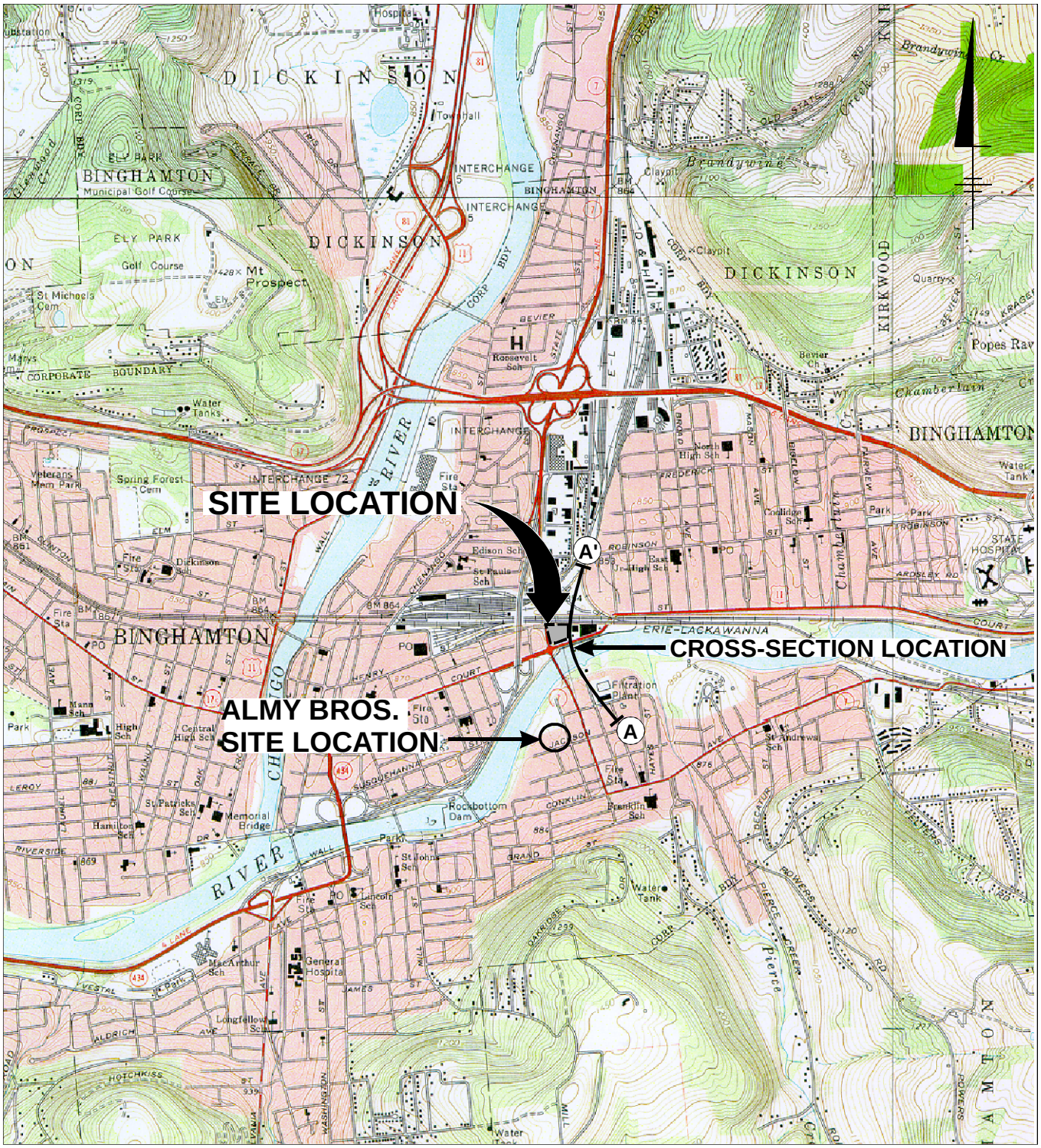
SUPPLEMENTAL REMEDIAL INVESTIGATION
PIPE AND SEWER SEDIMENT SAMPLE ANALYTICAL RESULTS

Location Date Sampled Sample Type	MH-1 10/13/1997 FS	MH-2 10/13/1997 FS	MH-3 10/13/1997 FS	24-INCH PIPE 10/7/1997 FS	CSPH SUMP 11/29/2001 FS	CSPH SUMP 11/29/2001 DUP
Vanadium	**11.9**	**35.8**	**38.2**	**15.8 J**	--	--
Zinc	**194 J**	**641 J**	**770 J**	**94.4**	--	--
Cyanide, Total	**1.2**	**3.8**	**1.5**	0.71 U	--	--
Cyanide, Amenable	0.67 U	1. U	0.57 U	0.71 U	--	--
Total Petroleum Hydrocarbons						
TPH as .4 Fuel Oil	--	--	--	**390**	--	--
TPH as 10W40 Oil	--	--	--	110 U	--	--

Notes:
Results are reported in milligrams per kilogram (mg/Kg) .
-- = Not analyzed.
B = The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
CSPH = Court Street pump house.
D = Concentration is based on a diluted sample analysis.
DUP = Field duplicate.
FS = Field sample.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
ND = All associated compounds were analyzed for but none were detected.
U = Compound was analyzed for but not detected. Value shown is the detection limit.

Figures

BBL®
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engineers & scientists



REFERENCE: Base map source: USGS 7.5 Min. Topo. Quad., Binghamton East, NY., Binghamton West, NY., Castle Creek, NY., Chenango Forks, NY. (1968, Photorevised 1976).

2,000 ft 0 2,000 ft

GRAPHIC SCALE



QUADRANGLE LOCATION

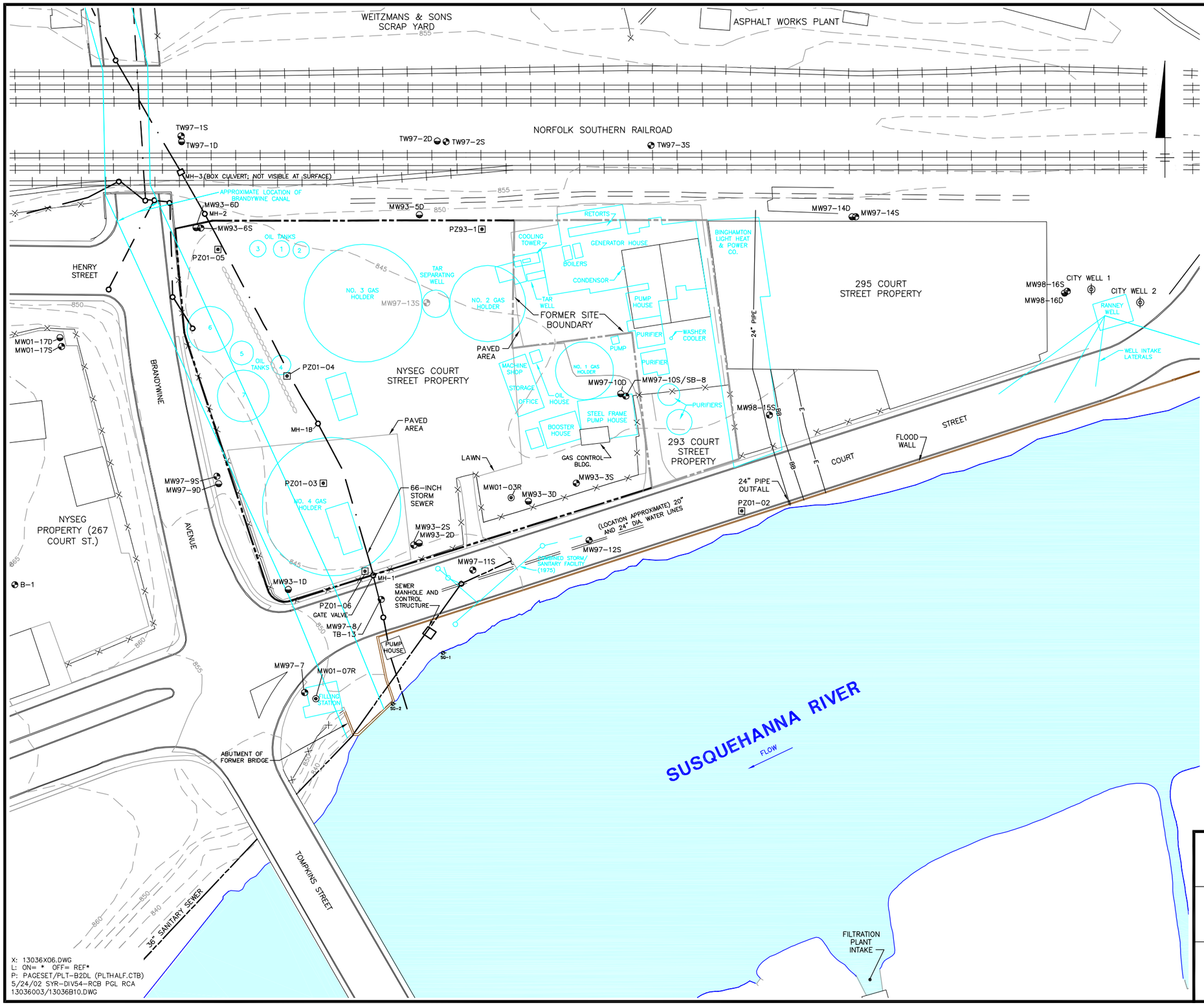
NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SUPPLEMENTAL REMEDIAL INVESTIGATION

SITE LOCATION AND SELECTED FEATURES

BBL® BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 1

04/30/02 SYR-D54-DJH
13036003/13036n02.CDR



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- STAFF GAUGE
- DECOMMISSIONED MONITORING WELL

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
3. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING NATIONAL GEODETIC VERTICAL DATUM OF 1929, HORIZONTAL DATUM: NAD 83 NEW YORK STATE CENTRAL 3102.
4. ALL INVESTIGATION LOCATIONS SURVEYED BY HAWK ENGINEERING, P.C. BINGHAMTON, N.Y. EXCEPT THE FOLLOWING SEDIMENT PROBING AND SAMPLING LOCATIONS:
   - LOCATIONS WITH AN "SS" OR "SF" PREFIX;
   - LOCATIONS WITH A "-2" SUFFIX; AND
   - SEDIMENT SAMPLING LOCATIONS SED-1 AND SED-2.
5. STORM SEWER LOCATION DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, ENTITLED: PRELIMINARY REPORT, COMPREHENSIVE STORM DRAINAGE, EXISTING FACILITIES. PREPARED BY VERNON O. SHUMAKER, CONSULTING ENGINEER, VESTAL, NEW YORK, DATE NOT PROVIDED.

0 100' 200'

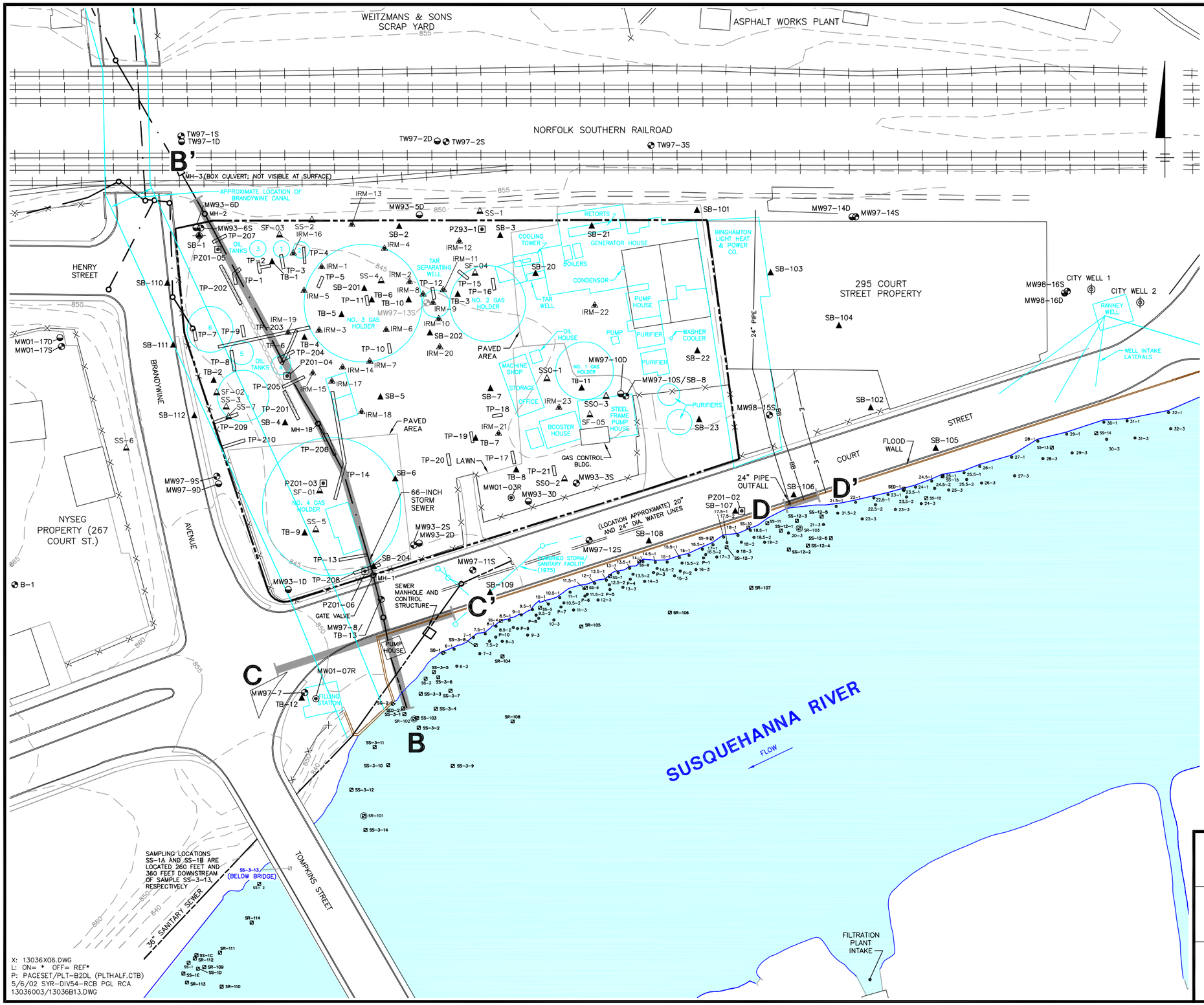
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SITE PLAN

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 2



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT
- SOIL BORING
- STAFF GAUGE
- SEDIMENT PROBING POINT
- SEDIMENT BORING AND/OR SAMPLING LOCATION
- DEEP RIVERBED BORING LOCATION
- IRM CONFIRMATORY SAMPLE LOCATION
- DECOMMISSIONED MONITORING WELL
- B B' LINE OF CROSS-SECTION

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
3. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING NATIONAL GEODETIC VERTICAL DATUM OF 1929, HORIZONTAL DATUM: NAD 83 NEW YORK STATE CENTRAL 3102.
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   - LOCATIONS WITH AN "SS" OR "SF" PREFIX;
   - LOCATIONS WITH A "-2" SUFFIX; AND
   - SEDIMENT SAMPLING LOCATIONS SED-1 AND SED-2.
5. LOCATIONS OF CONFIRMATORY SAMPLING POINTS IRM-1 THROUGH IRM-23 FROM FIGURE 6 OF THE JANUARY 2002 "INTERIM REMEDIAL MEASURES, FINAL ENGINEERING REPORT" PREPARED BY NYSEG LICENSING AND ENVIRONMENTAL OPERATIONS DEPARTMENT.
6. STORM SEWER LOCATION DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, ENTITLED: PRELIMINARY REPORT, COMPREHENSIVE STORM DRAINAGE, EXISTING FACILITIES. PREPARED BY VERNON O. SHUMAKER, CONSULTING ENGINEER, VESTAL, NEW YORK, DATE NOT PROVIDED.

0 100' 200'

GRAPHIC SCALE

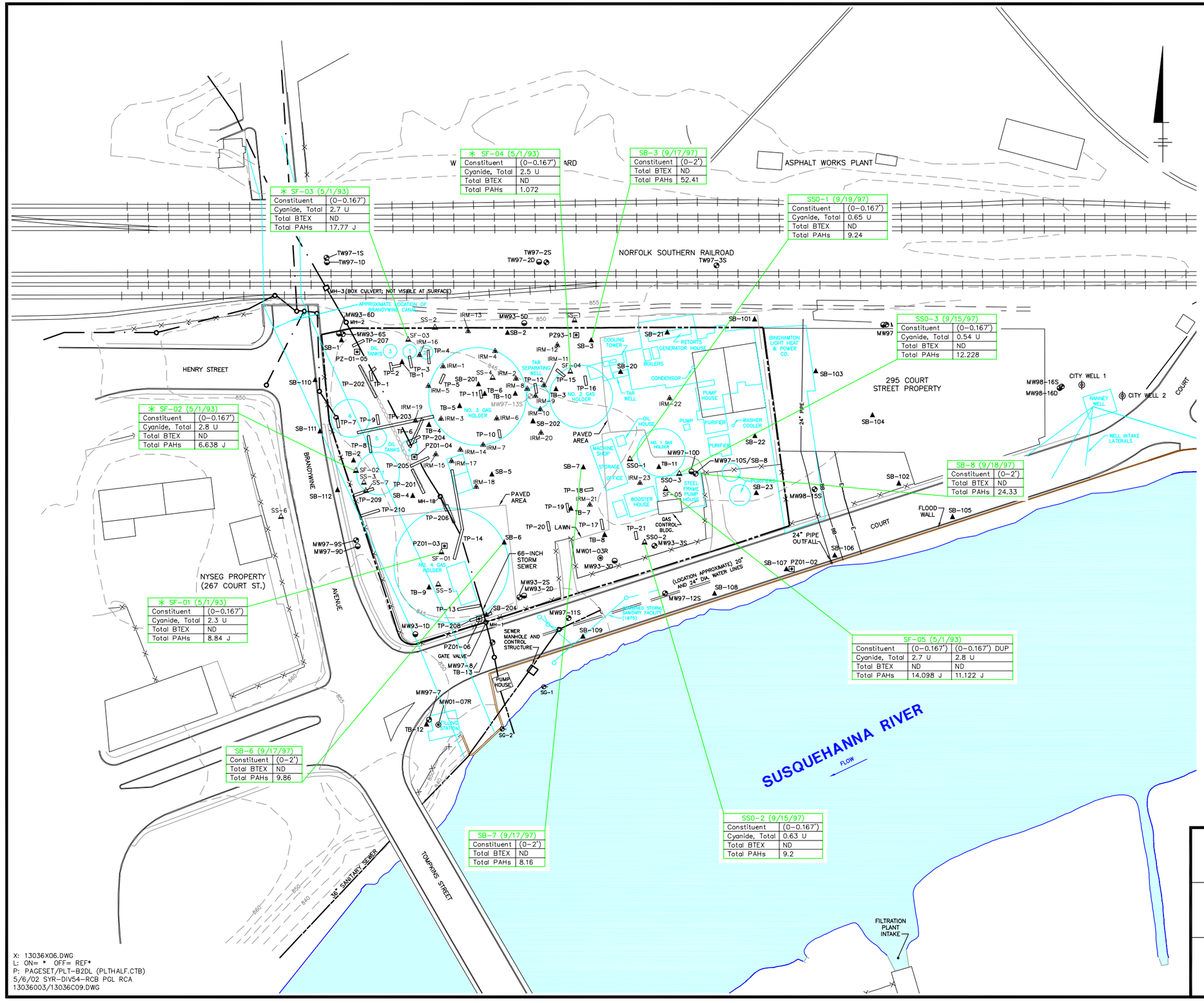
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5/6/02 SYR-DIV54-RCB PGL RCA
13036003/13036B13.DWG

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

INVESTIGATION LOCATIONS

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 3



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT
- SOIL BORING
- STAFF GAUGE
- SEDIMENT BORING AND/OR SAMPLING LOCATION
- IRM CONFIRMATORY SAMPLE LOCATION
- DECOMMISSIONED MONITORING WELL

* SF-02 (5/1/93)	
Constituent	(0-0.167')
Cyanide, Total	2.8 U
Total BTEX	ND
Total PAHs	6.638 J

- SAMPLE ID
- SAMPLE DATE
- TOTAL CYANIDE
- BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE
- TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS

RESULTS ARE IN MILLIGRAMS PER KILOGRAM (mg/Kg) EQUIVALENT TO PARTS PER MILLION (ppm)

U CYANIDE CONCENTRATION WAS NOT DETECTED ABOVE THE INDICATED INSTRUMENT DETECTION LIMIT

ND CONCENTRATIONS WERE NOT DETECTED ABOVE THE INSTRUMENT DETECTION LIMIT

J ESTIMATED VALUE

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
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6. * = SURFACE SOIL SAMPLING LOCATION SF-1 IS NOW PAVED OVER WITH ASPHALT; SURFACE SOIL SAMPLING LOCATIONS SF-2, SF-3, AND SF-4 ARE NOW COVERED WITH GRAVEL. ACCORDINGLY, THESE LOCATIONS NO LONGER FALL INTO THE 0-2 FEET BELOW GRADE INTERVAL. AND MAY NOT CONSTITUTE A DIRECT ROUTE FOR HUMAN EXPOSURE.
7. STORM SEWER LOCATION DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, ENTITLED: PRELIMINARY REPORT, COMPREHENSIVE STORM DRAINAGE, EXISTING FACILITIES. PREPARED BY VERNON O. SHUMAKER CONSULTING ENGINEER, VESTAL, NEW YORK, DATE NOT PROVIDED.

0 120' 240'

GRAPHIC SCALE

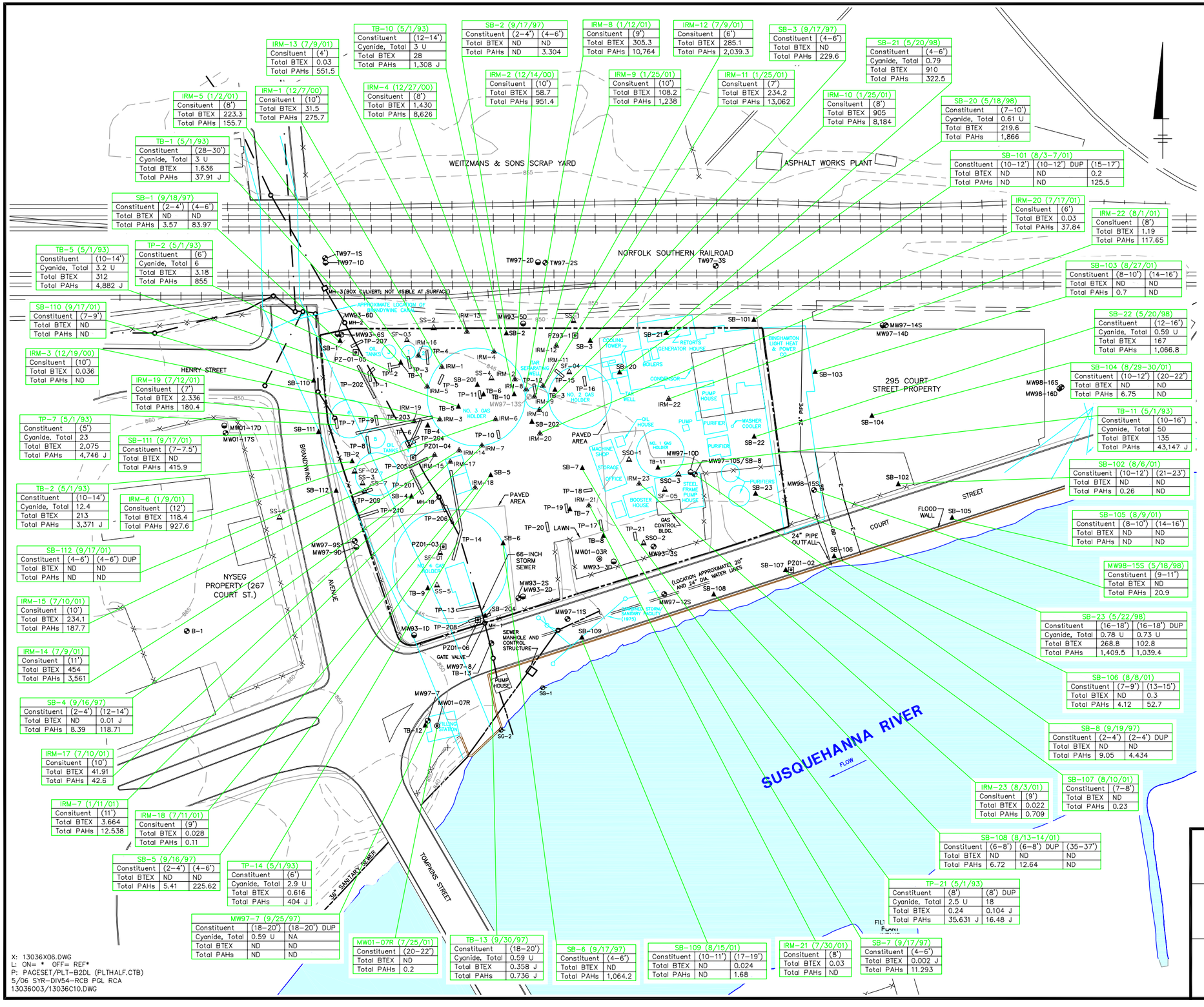
NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SUMMARY OF SOIL ANALYTICAL DATA (0 - 2')

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 4

X: 13036X06.DWG
L: ON= * OFF= REF*
P: PAGESET/PLT-B2DL (PLTHALF.CTB)
5/6/02 SYR-DIV54-RCB PGL RCA
13036003/13036C09.DWG



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT
- SOIL BORING
- STAFF GAUGE
- SEDIMENT BORING AND/OR SAMPLING LOCATION
- IRM CONFIRMATORY SAMPLE LOCATION
- DECOMMISSIONED MONITORING WELL

SB-22 (5/20/98)

Constituent	(12–16')
Cyanide, Total	0.59 U
Total BTEX	167
Total PAHs	1,066.8

- SAMPLE ID
- SAMPLE DATE
- TOTAL CYANIDE
- BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE
- TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS

RESULTS ARE IN MILLIGRAMS PER KILOGRAM (mg/Kg) EQUIVALENT TO PARTS PER MILLION (ppm)

- U — CYANIDE CONCENTRATION WAS NOT DETECTED ABOVE THE INDICATED INSTRUMENT DETECTION LIMIT
- ND — CONCENTRATIONS WERE NOT DETECTED ABOVE THE INSTRUMENT DETECTION LIMIT
- J — ESTIMATED VALUE

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
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0 120' 240'

GRAPHIC SCALE

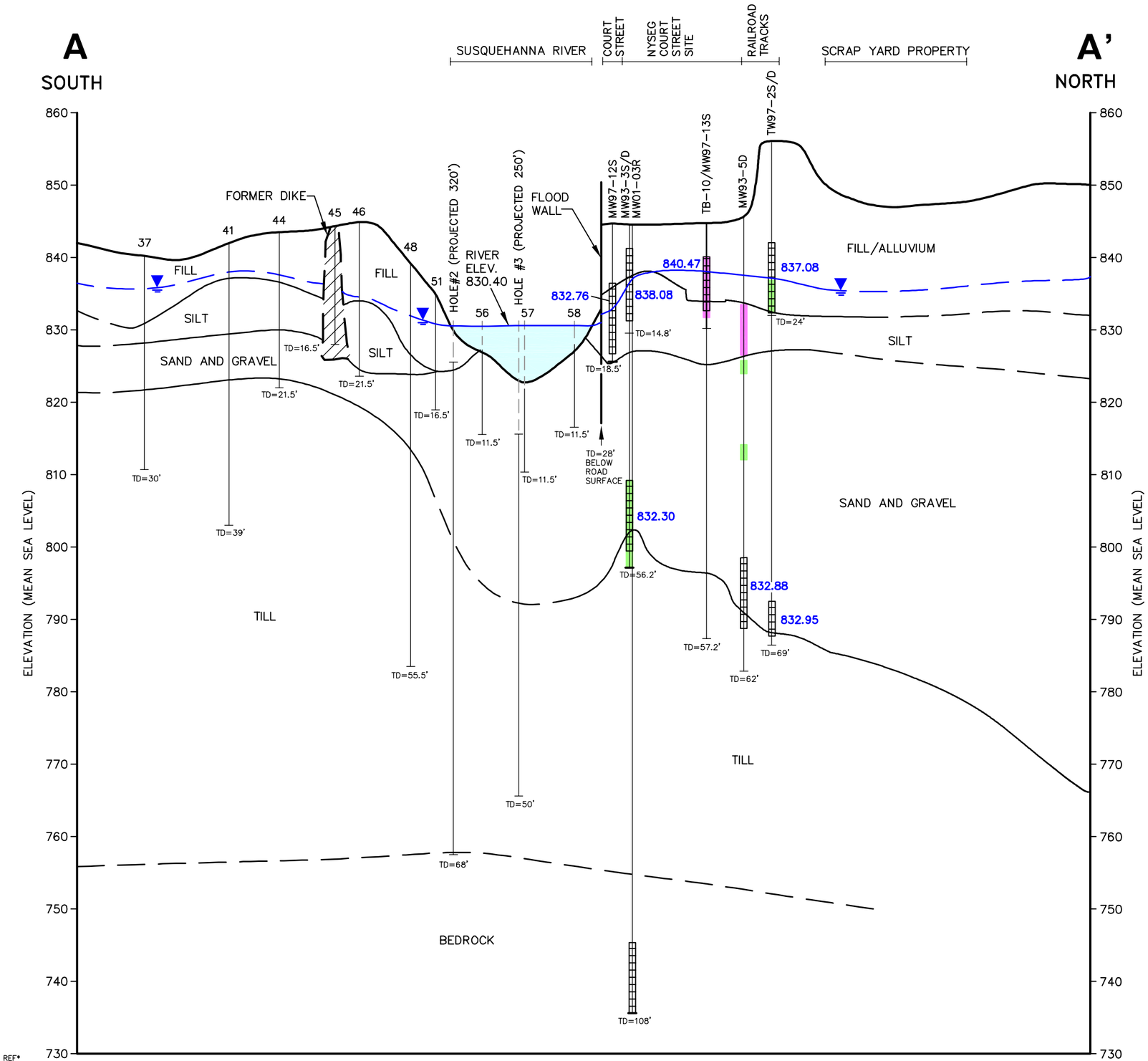
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5/06 SYR–DIV54–RCB PGL RCA
13036003/13036C10.DWG

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SUMMARY OF SOIL ANALYTICAL DATA (GREATER THAN 2')

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 5



LEGEND

- 37 — WELL/WELL CLUSTER IDENTIFICATION
- WATER TABLE
- SHEEN
- 837.08 — WATER LEVEL ELEVATION (10/2/01)
- WELL SCREEN
- NAPL
- TD=30' — TOTAL DEPTH OF BORING

NOTES:

1. GROUND SURFACE ELEVATIONS BASED ON CITY OF BINGHAMTON MAP, SHEET 303, 1974 AND USGS 7.5 MINUTE TOPOGRAPHIC MAP, BINGHAMTON WEST QUADRANGLE, 1968. ALL ELEVATIONS ABOVE MEAN SEA LEVEL, 1929 NATIONAL GEODETIC VERTICAL DATUM.
2. POSTED RIVER STAGE AND WATER TABLE ELEVATIONS MEASURED OCTOBER, 2001.
3. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING NATIONAL GEODETIC VERTICAL DATUM OF 1929, HORIZONTAL DATUM: NAD 83 NEW YORK STATE CENTRAL 3102.
4. STRATIGRAPHIC CONTACTS INFERRED FROM AVAILABLE SUBSURFACE LOGS AND CONTOUR MAPS GENERATED TO APPROXIMATE TILL AND SILT SURFACES.
5. WELLS WITH PREFIXES MW, TB, AND TW INSTALLED BY BBL IN 1993 AND 1997. WELLS DESIGNATED BY NUMBER ONLY WERE CONSTRUCTED FOR THE CITY OF BINGHAMTON WATER FILTRATION PROJECT, 1957. WELLS DESIGNATED "HOLE" WERE CONSTRUCTED BY THE STATE OF NEW YORK, DEPARTMENT OF PUBLIC WORKS, FOR THE CONSTRUCTION OF THE TOMPKINS STREET BRIDGE, 1960.
6. DASHED LINES ARE INFERRED.

0 300' 600'

HORIZONTAL SCALE (FEET)

NEW YORK STATE ELECTRIC & GAS CORP.
COURT STREET SITE
BINGHAMTON, NEW YORK
PHASE II SRI

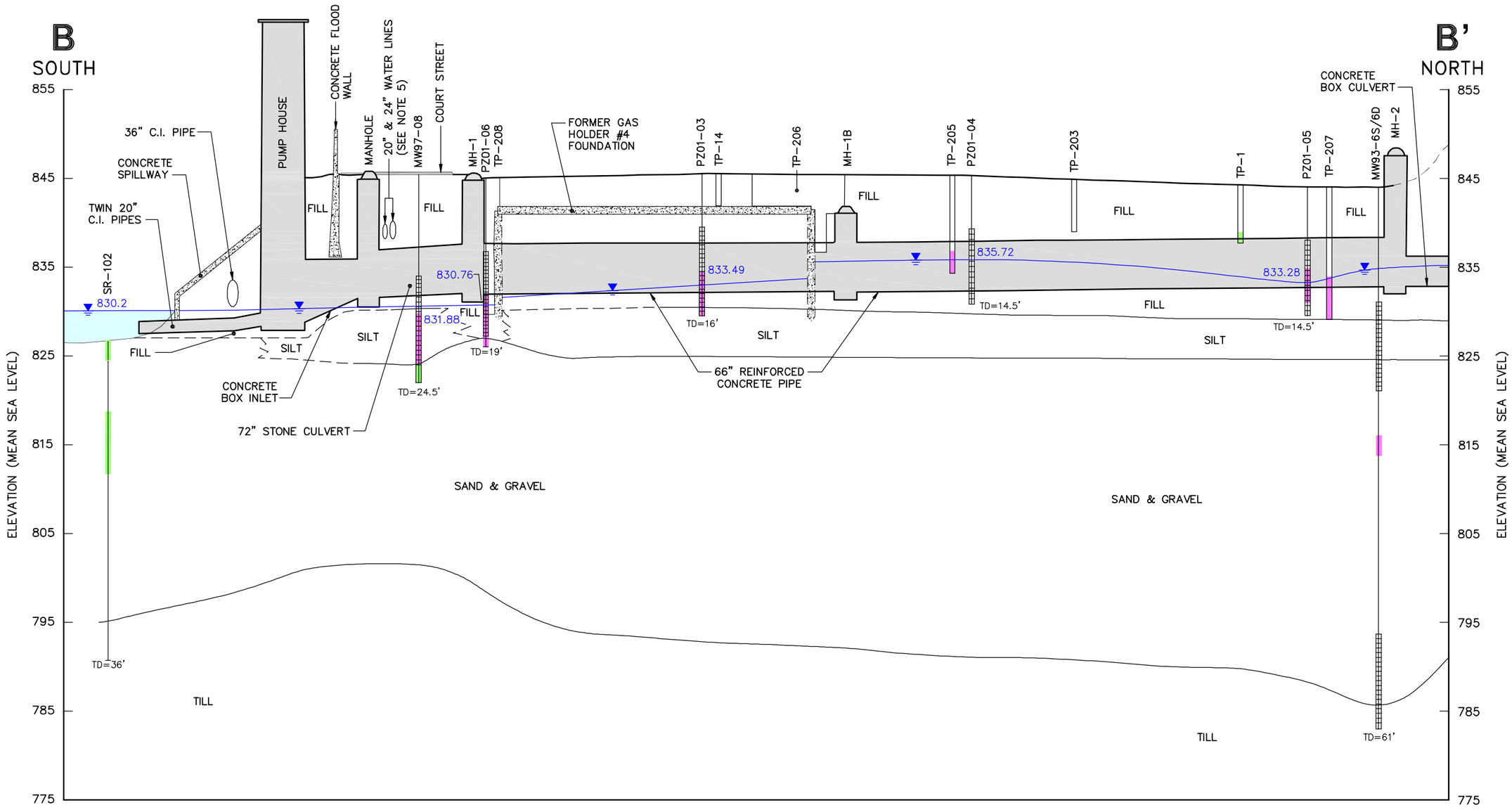
GEOLOGIC CROSS-SECTION A-A'

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 6

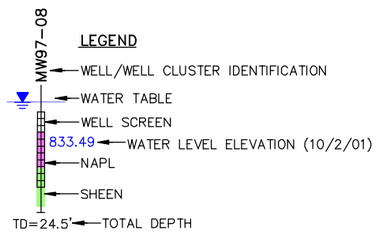
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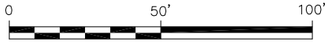
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XREFS: IMAGES: PROJECTNAME: ---



NOTES:

1. GROUND SURFACE ELEVATIONS BASED ON CITY OF BINGHAMTON MAP, SHEET 303, 1974 AND USGS 7.5 MINUTE TOPOGRAPHIC MAP, BINGHAMTON WEST QUADRANGLE, 1968. ALL ELEVATIONS ABOVE MEAN SEA LEVEL, 1929 NATIONAL GEODETIC VERTICAL DATUM.
2. RIVER STAGE AND WATER TABLE ELEVATIONS MEASURED OCTOBER, 2001.
3. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.
4. DASHED LINES ARE INFERRED.
5. THE LOCATIONS OF THESE WATER LINES ARE APPROXIMATE. IT IS POSSIBLE THAT THEIR RESPECTIVE LOCATIONS MAY BE REVERSED.



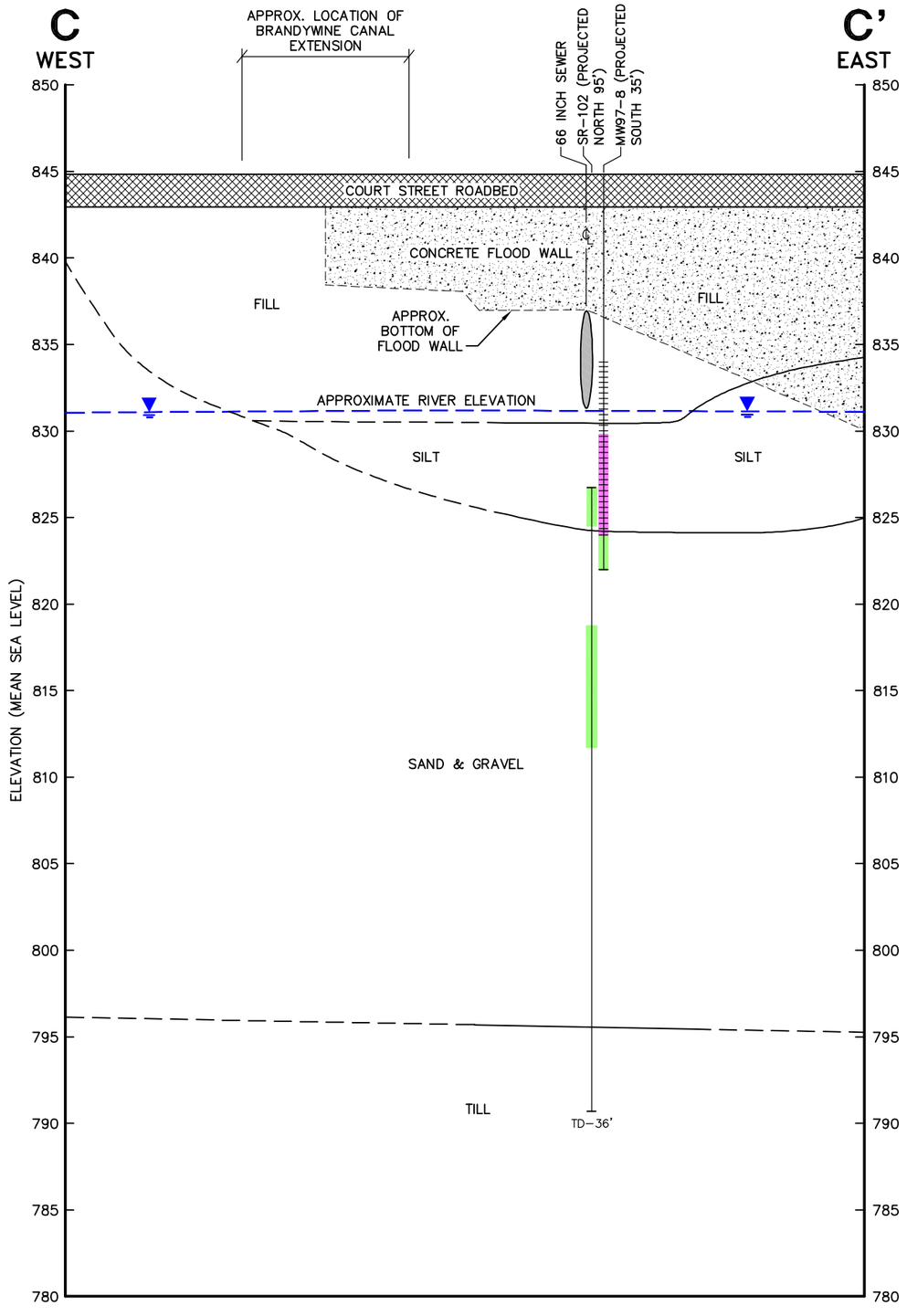


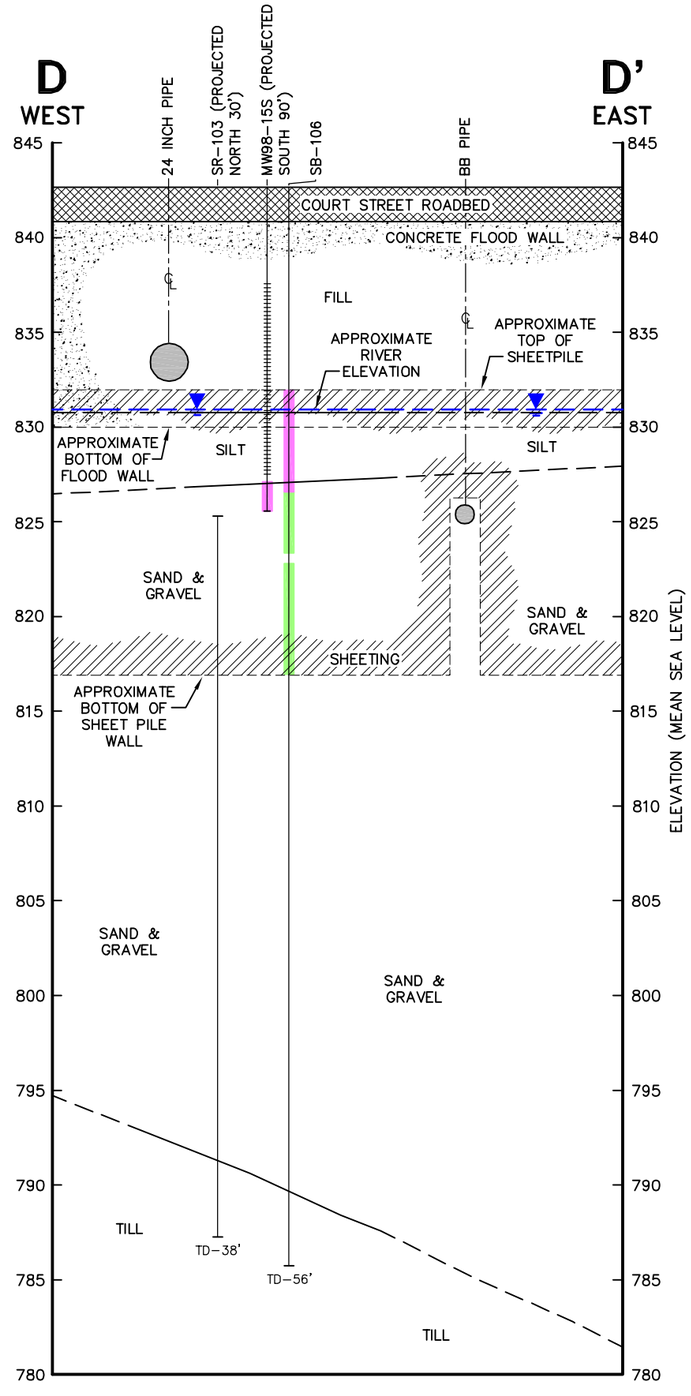
NEW YORK STATE ELECTRIC & GAS CORP.
COURT STREET SITE
BINGHAMTON, NEW YORK
PHASE II SRI

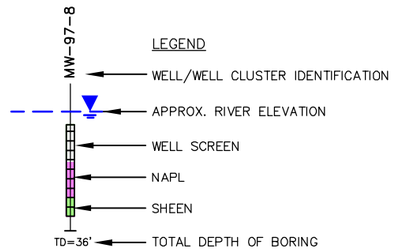
GEOLOGIC CROSS-SECTION B-B'

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
7







NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. DASHED LINES ARE INFERRED.

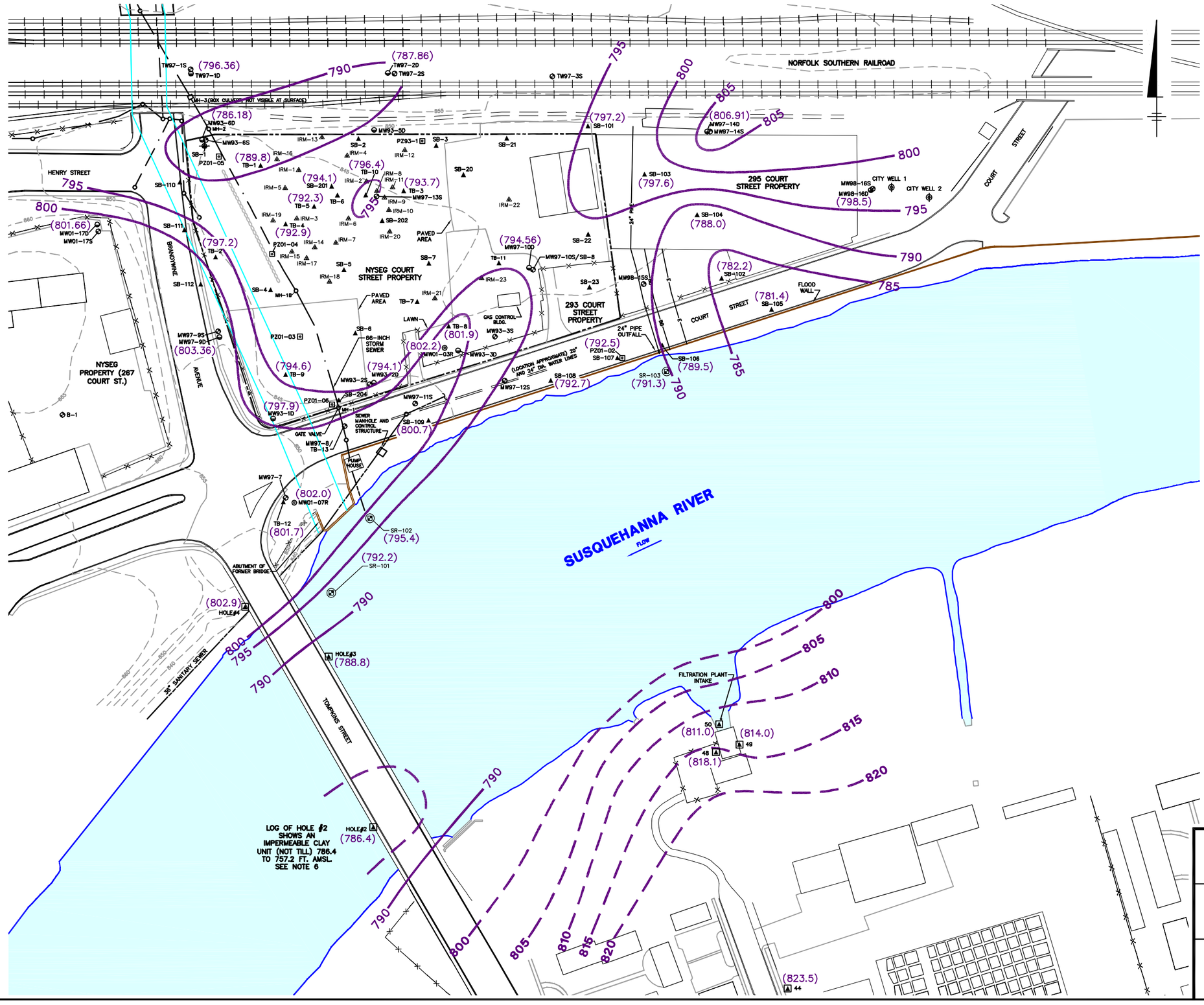
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NEW YORK STATE ELECTRIC & GAS CORP.
COURT STREET SITE
BINGHAMTON, NEW YORK
PHASE II SRI

GEOLOGIC CROSS-SECTIONS C-C' AND D-D'

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 8



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SOIL BORING
- DEEP RIVERBED BORING LOCATION
- HISTORICAL BORING (SEE NOTE 5)
- IRM CONFIRMATORY SAMPLE LOCATION
- (823.8) TOP OF TILL ELEVATION (FT. AMSL)
- 820 TILL SURFACE ELEVATION CONTOUR (FT. AMSL) DASHED WHERE INFERRED

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
3. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING NATIONAL GEODETIC VERTICAL DATUM OF 1929, HORIZONTAL DATUM: NAD 83 NEW YORK STATE CENTRAL 3102.
4. STORM SEWER LOCATION DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, ENTITLED: PRELIMINARY REPORT, COMPREHENSIVE STORM DRAINAGE, EXISTING FACILITIES. PREPARED BY VERNON O. SHUMAKER, CONSULTING ENGINEER, VESTAL, NEW YORK, DATE NOT PROVIDED.
5. ALL SURFACE SOIL SAMPLING, SOIL BORING, TEST BORING, MONITORING WELL, CITY WELL, AND TEMPORARY MONITORING WELL LOCATIONS SURVEYED BY HAWK ENGINEERING, P.C., BINGHAMTON, N.Y.
6. HISTORICAL BORINGS DESIGNATED "HOLE", ADVANCED BY THE STATE OF NEW YORK, DEPARTMENT OF PUBLIC WORKS, FOR THE CONSTRUCTION OF THE TOMPKINS STREET BRIDGE, 1960. HISTORICAL BORINGS DESIGNATED BY NUMBER ONLY, ADVANCED FOR THE CITY OF BINGHAMTON WATER FILTRATION PROJECT, 1957.
7. LOCATIONS OF CONFIRMATORY SAMPLING POINTS IRM-1 THROUGH IRM-23 FROM FIGURE 6 OF THE JANUARY 2002 "INTERIM REMEDIAL MEASURES, FINAL ENGINEERING REPORT" PREPARED BY NYSEG LICENSING AND ENVIRONMENTAL OPERATIONS DEPARTMENT.

0 130' 260
GRAPHIC SCALE

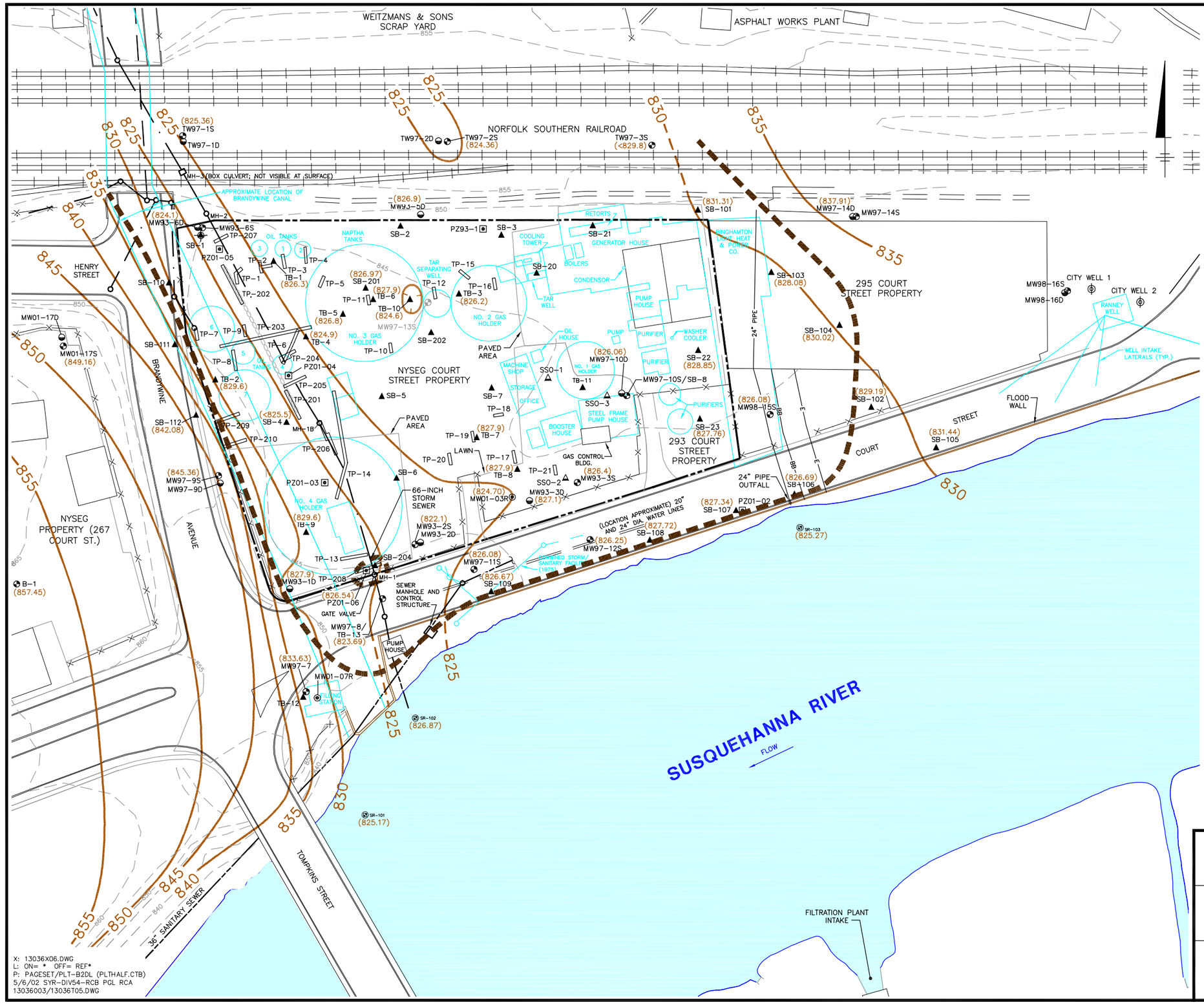
NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

TILL SURFACE ELEVATION CONTOUR MAP

BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 9

CITY:SYRACUSE, N.Y. DIV/GROUP:ENVCAD-141 DB: RCB, SDL, R.ALLEN LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REP*
G:\ENVCAD\SYRACUSE\ACTIB0013041\000200004\IDWG\PHASE-11 SRI\2002-RE-ISSUE\13036T01.DWG LAYOUT: 9 SAVED: 10/2/2009 2:58 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/5/2009 1:54 PM BY: ALLEN, ROYCE
XREFS: 13036X06 IMAGES: PROJECTNAME: ---



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT
- SOIL BORING
- DEEP RIVERBED BORING LOCATION
- DECOMMISSIONED MONITORING WELL
- (837.91) SAND AND GRAVEL SURFACE ELEVATION (FT. AMSL)
- 835 SAND AND GRAVEL SURFACE ELEVATION CONTOUR (FT. AMSL)
- EDGE OF SILT

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
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5. ALL SURFACE SOIL SAMPLING, SOIL BORING, TEST BORING, MONITORING WELL, CITY WELL, AND TEMPORARY MONITORING WELL LOCATIONS SURVEYED BY HAWK ENGINEERING, P.C., BINGHAMTON, N.Y.
6. HISTORICAL BORINGS ADVANCED BY THE STATE OF NEW YORK, DEPARTMENT OF PUBLIC WORKS, FOR THE CONSTRUCTION OF THE TOMPKINS STREET BRIDGE, 1960.

0 100' 200'

GRAPHIC SCALE

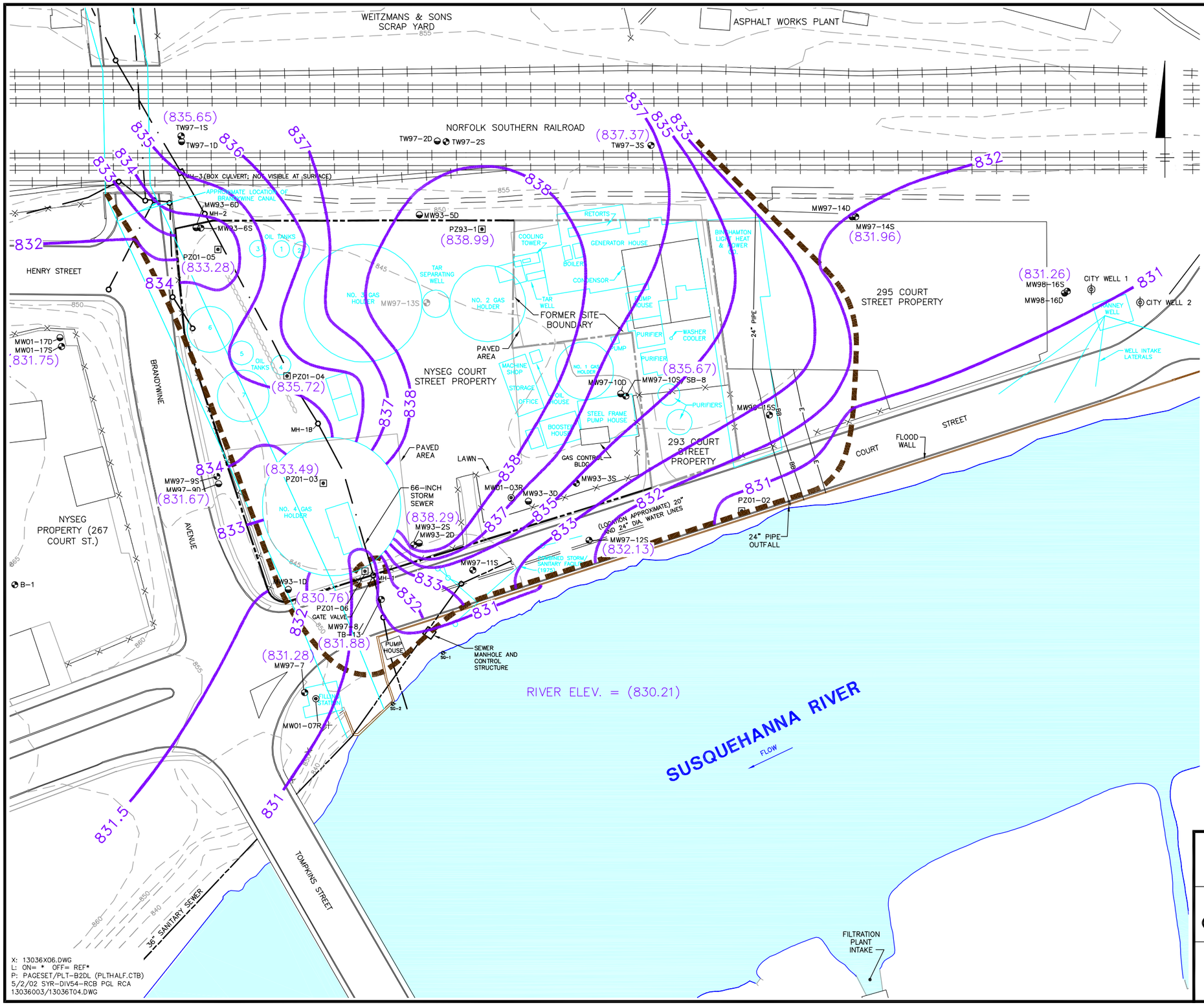
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NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SAND AND GRAVEL SURFACE ELEVATION MAP

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 10



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- STAFF GAUGE
- DECOMMISSIONED MONITORING WELL
- (831.26) WATER TABLE ELEVATION (FT. AMSL)
- 832 WATER TABLE ELEVATION CONTOUR (FT. AMSL) DASHED WHERE INFERRED
- EDGE OF SILT

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
3. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING NATIONAL GEODETIC VERTICAL DATUM OF 1929, HORIZONTAL DATUM: NAD 83 NEW YORK STATE CENTRAL 3102.
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0 100' 200'

GRAPHIC SCALE

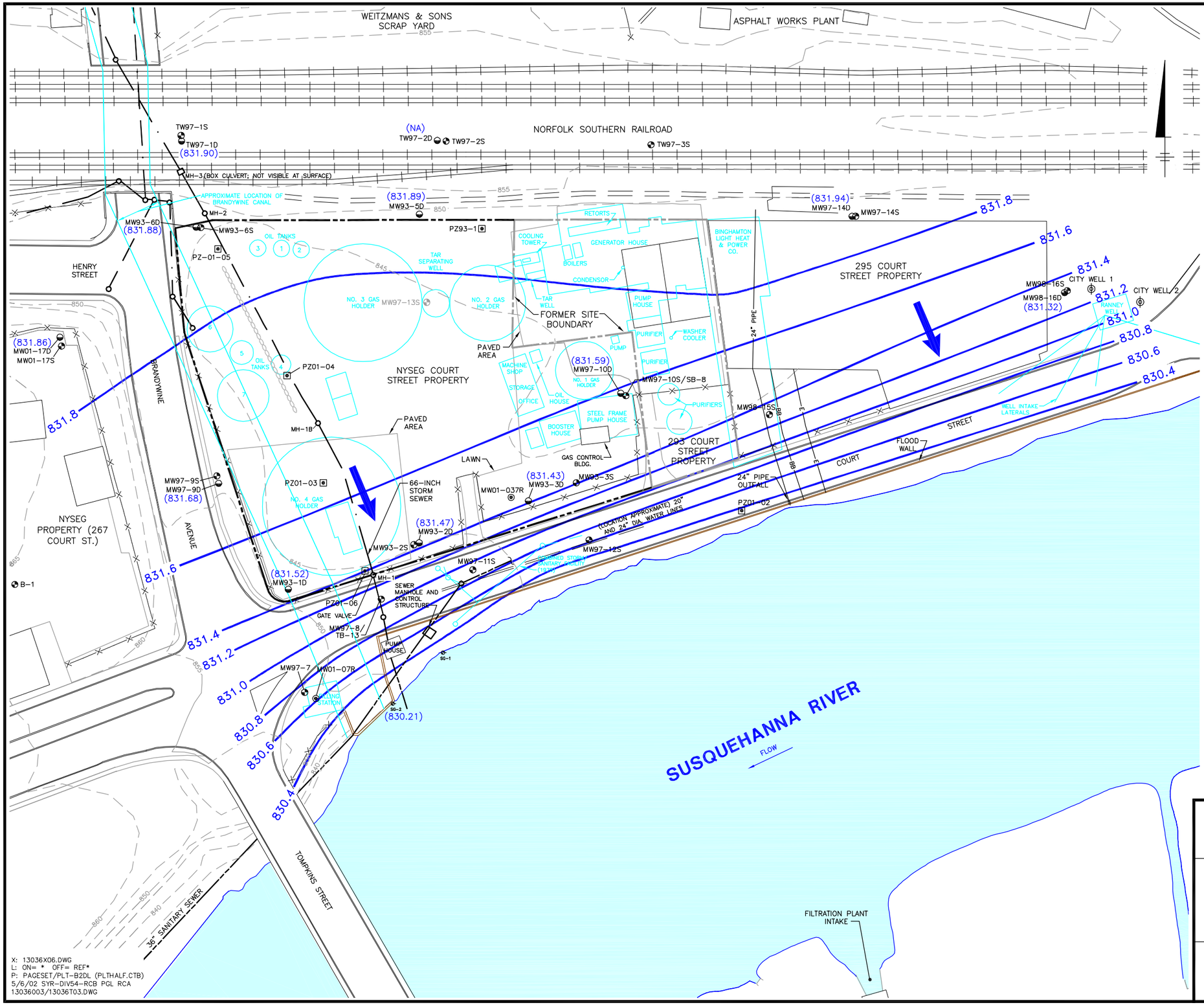
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13036003/13036T04.DWG

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

WATER TABLE ELEVATION CONTOUR MAP - OCTOBER 2, 2001

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 11



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- STAFF GAUGE
- DECOMMISSIONED MONITORING WELL
- (831.68) DEEP GROUNDWATER POTENTIOMETRIC ELEVATION IN FEET ABOVE MEAN SEA LEVEL (NA = NOT AVAILABLE)
- 831.8 DEEP GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR (FT. AMSL)
- GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
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   - LOCATIONS WITH AN "SS" OR "SF" PREFIX;
   - LOCATIONS WITH A "-2" SUFFIX; AND
   - SEDIMENT SAMPLING LOCATIONS SED-1 AND SED-2.
5. ONLY WELLS INTERPRETED TO BE SCREENED IN THE SAND AND GRAVEL UNITS WERE USED FOR THESE CONTOURS.
6. CONTOUR INTERVAL = 0.2 FEET.
7. STORM SEWER LOCATION DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, ENTITLED: PRELIMINARY REPORT, COMPREHENSIVE STORM DRAINAGE, EXISTING FACILITIES. PREPARED BY VERNON O. SHUMAKER, CONSULTING ENGINEER, VESTAL, NEW YORK, DATE NOT PROVIDED.

0 100' 200'

GRAPHIC SCALE

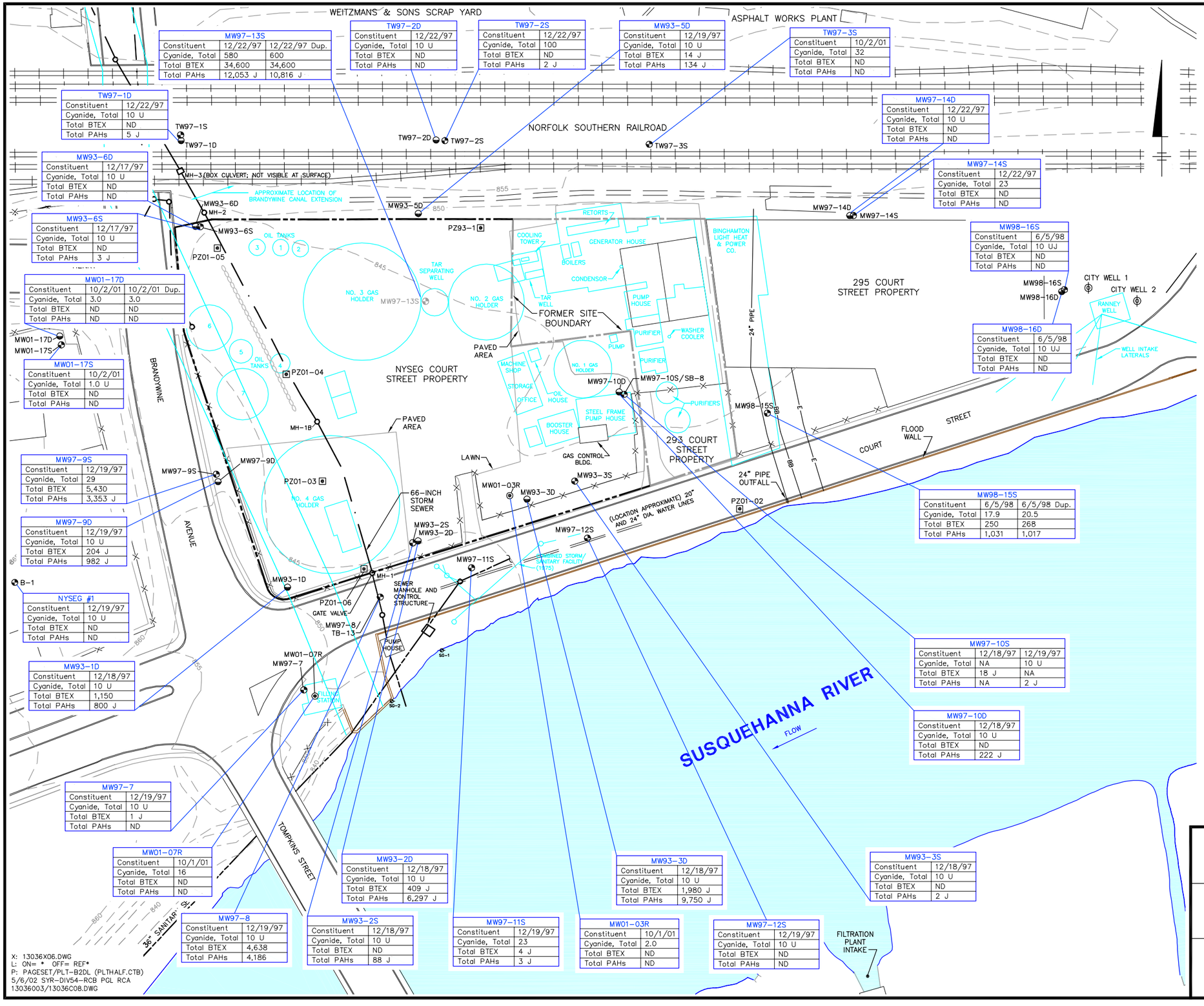
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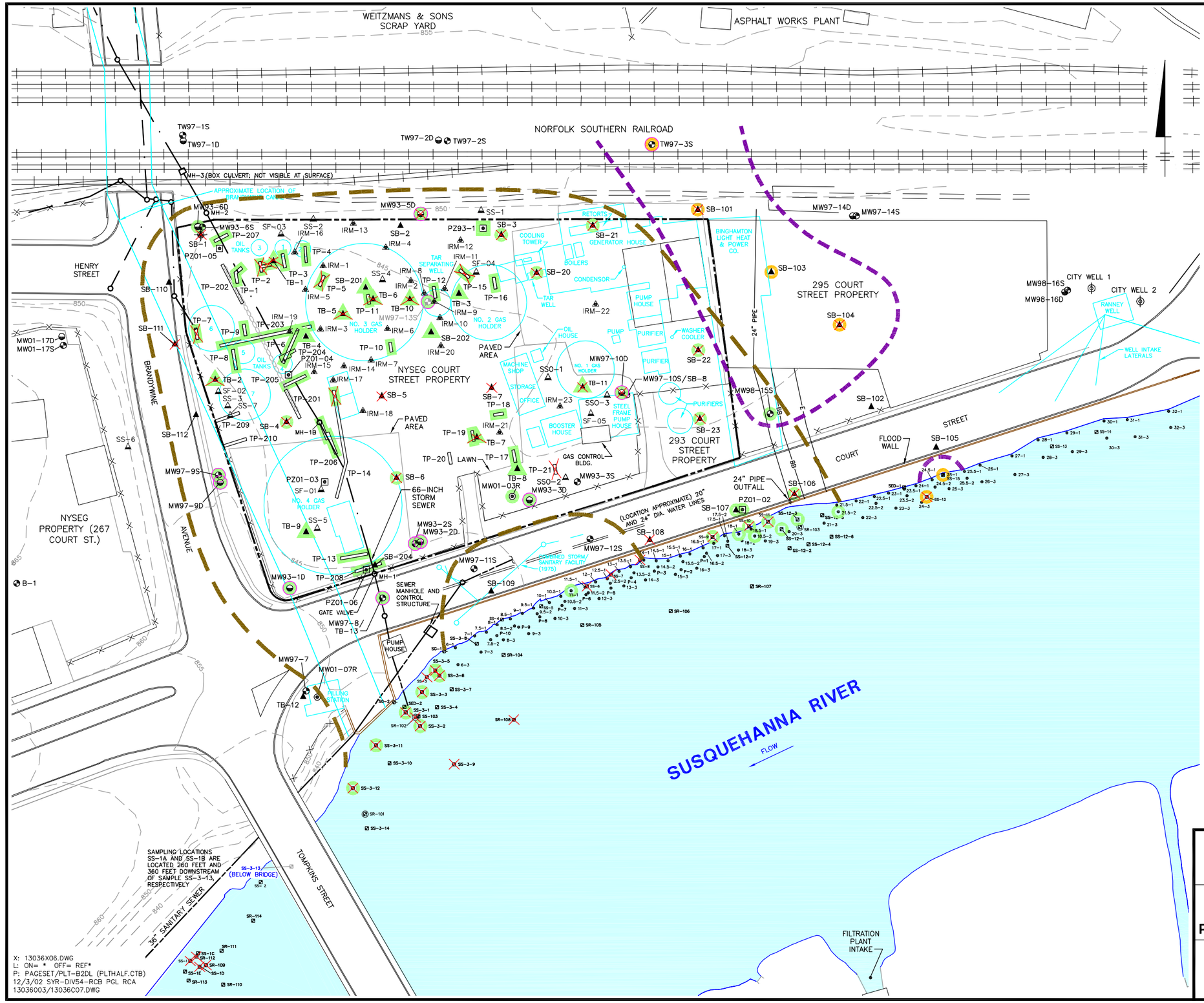
NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SAND AND GRAVEL UNIT GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP - OCTOBER 1, 2001

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 12


WEITZMANS & SONS SCRAP YARD
ASPHALT WORKS PLANT
NORFOLK SOUTHERN RAILROAD
MW97-13S
Constituent | 12/22/97 | 12/22/97 Dup.
Cyanide, Total | 580 | 600
Total BTEX | 34,600 | 34,600
Total PAHs | 12,053 J | 10,816 J
TW97-2D
Constituent | 12/22/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | ND
TW97-2S
Constituent | 12/22/97
Cyanide, Total | 100
Total BTEX | ND
Total PAHs | 2 J
MW93-5D
Constituent | 12/19/97
Cyanide, Total | 10 U
Total BTEX | 14 J
Total PAHs | 134 J
TW97-3S
Constituent | 10/2/01
Cyanide, Total | 32
Total BTEX | ND
Total PAHs | ND
TW97-1D
Constituent | 12/22/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | 5 J
MW97-14D
Constituent | 12/22/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | ND
MW97-14S
Constituent | 12/22/97
Cyanide, Total | 23
Total BTEX | ND
Total PAHs | ND
MW93-6D
Constituent | 12/17/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | ND
MW93-6S
Constituent | 12/17/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | 3 J
MW01-17D
Constituent | 10/2/01 | 10/2/01 Dup.
Cyanide, Total | 3.0 | 3.0
Total BTEX | ND | ND
Total PAHs | ND | ND
MW01-17S
Constituent | 10/2/01
Cyanide, Total | 1.0 U
Total BTEX | ND
Total PAHs | ND
MW98-16S
Constituent | 6/5/98
Cyanide, Total | 10 UJ
Total BTEX | ND
Total PAHs | ND
MW98-16D
Constituent | 6/5/98
Cyanide, Total | 10 UJ
Total BTEX | ND
Total PAHs | ND
MW98-15S
Constituent | 6/5/98 | 6/5/98 Dup.
Cyanide, Total | 17.9 | 20.5
Total BTEX | 250 | 268
Total PAHs | 1,031 | 1,017
MW97-9S
Constituent | 12/19/97
Cyanide, Total | 29
Total BTEX | 5,430
Total PAHs | 3,353 J
MW97-9D
Constituent | 12/19/97
Cyanide, Total | 10 U
Total BTEX | 204 J
Total PAHs | 982 J
NYSEG #1
Constituent | 12/19/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | ND
MW93-1D
Constituent | 12/18/97
Cyanide, Total | 10 U
Total BTEX | 1,150
Total PAHs | 800 J
MW97-10S
Constituent | 12/18/97 | 12/19/97
Cyanide, Total | NA | 10 U
Total BTEX | 18 J | NA
Total PAHs | NA | 2 J
MW97-10D
Constituent | 12/18/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | 222 J
MW97-7
Constituent | 12/19/97
Cyanide, Total | 10 U
Total BTEX | 1 J
Total PAHs | ND
MW01-07R
Constituent | 10/1/01
Cyanide, Total | 16
Total BTEX | ND
Total PAHs | ND
MW93-2D
Constituent | 12/18/97
Cyanide, Total | 10 U
Total BTEX | 409 J
Total PAHs | 6,297 J
MW93-3D
Constituent | 12/18/97
Cyanide, Total | 10 U
Total BTEX | 1,980 J
Total PAHs | 9,750 J
MW93-3S
Constituent | 12/18/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | 2 J
MW97-8
Constituent | 12/19/97
Cyanide, Total | 10 U
Total BTEX | 4,638
Total PAHs | 4,186
MW93-2S
Constituent | 12/18/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | 88 J
MW97-11S
Constituent | 12/19/97
Cyanide, Total | 23
Total BTEX | 4 J
Total PAHs | 3 J
MW01-03R
Constituent | 10/1/01
Cyanide, Total | 2.0
Total BTEX | ND
Total PAHs | ND
MW97-12S
Constituent | 12/19/97
Cyanide, Total | 10 U
Total BTEX | ND
Total PAHs | ND
TW97-1S
TW97-1D
TW97-2D
TW97-2S
TW97-3S
MW97-14D
MW97-14S
MW93-6D
MW93-6S
MW93-5D
MH-2
MH-3 (BOX CULVERT; NOT VISIBLE AT SURFACE)
APPROXIMATE LOCATION OF BRANDYWINE CANAL EXTENSION
PZ93-1
PZ01-05
PZ01-04
PZ01-03
PZ01-02
PZ01-06
MW01-17D
MW01-17S
MW01-03R
MW01-07R
MW97-7
MW97-8/TB-13
MW97-9S
MW97-9D
MW97-10D
MW97-10S/SB-8
MW97-11S
MW97-12S
MW93-1D
MW93-2S
MW93-2D
MW93-3D
MW93-3S
MW98-15S
MW98-16S
MW98-16D
MH-1
MH-1B
B-1
SG-1
SG-2
RETORTS
GENERATOR HOUSE
COOLING TOWER
BOILERS
CONDENSOR
BINGHAMTON LIGHT HEAT & POWER CO.
TAR SEPARATING WELL
TAR WELL
PUMP HOUSE
PURIFIER
WASHER COOLER
PUMP
NO. 1 GAS HOLDER
NO. 2 GAS HOLDER
NO. 3 GAS HOLDER
NO. 4 GAS HOLDER
OIL TANKS
MACHINE SHOP
STORAGE
OFFICE
OIL HOUSE
STEEL FRAME PUMP HOUSE
BOOSTER HOUSE
GAS CONTROL BLDG.
PAVED AREA
LAWN
295 COURT STREET PROPERTY
NYSEG COURT STREET PROPERTY
293 COURT STREET PROPERTY
FORMER SITE BOUNDARY
24" PIPE
24" PIPE OUTFALL
66-INCH STORM SEWER
(LOCATION APPROXIMATE) 20" AND 24" DIA. WATER LINES
SEWER MANHOUSE AND CONTROL STRUCTURE
GATE VALVE
COMBINED STORM/SANITARY FACILITY (1925)
PUMP HOUSE
FILLING STATION
CITY WELL 1
CITY WELL 2
RANNEY WELL
WELL INTAKE LATERALS
FLOOD WALL
FILTRATION PLANT INTAKE
SUSQUEHANNA RIVER
FLOW
BRANDYWINE AVENUE
COURT STREET
TOMPKINS STREET
36" SANITARY SEWER
855
850
845
840
860
865
855
850
845
840
860
865
855
850
845
840
860
865



LEGEND:

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT
- SOIL BORING
- STAFF GAUGE
- SEDIMENT PROBING POINT
- SEDIMENT BORING AND/OR SAMPLING LOCATION
- DEEP RIVERBED BORING LOCATION
- IRM CONFIRMATORY SAMPLE LOCATION
- DECOMMISSIONED MONITORING WELL
- GROUNDWATER SAMPLING LOCATION WITH ORGANIC COMPOUNDS DETECTED >1% OF EFFECTIVE SOLUBILITY
- SOIL SAMPLE WITH ORGANIC COMPOUNDS DETECTED >10% OF EFFECTIVE SOLUBILITY
- LOCATIONS WHERE NAPL VISUALLY IDENTIFIED, OR INFERRED FROM SHEEN
- AS ABOVE, EXCEPT PAH EVALUATION SHOWED THAT THE NAPL WAS PETROLEUM-RELATED RATHER THAN COAL-TAR RELATED
- PROBABLE EXTENT OF COAL-TAR-RELATED NAPL
- PROBABLE EXTENT OF PETROLEUM-RELATED NAPL

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
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6. ADDITIONAL SURFACE SEDIMENT SAMPLES SS-1-A AND SS-1-B ARE LOCATED APPROXIMATELY 260 FEET AND 360 FEET, RESPECTIVELY, DOWNSTREAM OF SAMPLE SS-3-13.
7. INDICATION OF POTENTIAL NAPL PRESENCE IS BASED ON VISUAL OBSERVATION OF NAPL AND COMPARISON OF OBSERVED CONSTITUENT CONCENTRATIONS TO RESPECTIVE SOLUBILITY LIMIT (USEPA, 1992). SEE TEXT FOR DETAILS.
8. SEDIMENT SAMPLE SS-03 COLLECTED FOR TASK 2 RI CONDUCTED BY BBL, 1996 AND LOCATED ADJACENT TO SAMPLE SS-3-5.

0 100' 200'

GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SUBSURFACE REGIONS WHERE THE PRESENCE OF COAL-TAR AND PETROLEUM-RELATED NAPLs IS PROBABLE

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 14

SS-10		
Constituent	(0–0.7')	(0–0.8') DUP
TOTAL PAHs	26	26

SS-8	
Constituent	(0–1')
TOTAL PAHs	12

SS-12-7		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	0.22 J	0.18 J

SS-12-1			
Constituent	(0–0.5')	(1–2')	(2–3')
TOTAL PAHs	5.7 J	2.3 J	0.062 J

SS-12-5			
Constituent	(0–0.5')	(1–2')	(1–2') DUP
TOTAL PAHs	ND	0.31 J	ND

SS-12-6		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	ND	ND

SS-7	
Constituent	(0–0.9')
TOTAL PAHs	4.8

SS-9	
Constituent	(0–0.7')
TOTAL PAHs	16

SS-11	
Constituent	(0–0.6')
TOTAL PAHs	301

SS-12-3		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	2.1 J	2 .0 J

SS-12-4		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	0.051 J	0.31 J

SED-1	
Constituent	(0–0.3')
TOTAL PAHs	0.33

SS-12	
Constituent	(0–0.8')
TOTAL PAHs	41

SS-15	
Constituent	(0–0.8')
TOTAL PAHs	1.7

SS-13	
Constituent	(0–0.8')
TOTAL PAHs	0.10

SS-14	
Constituent	(0–1')
TOTAL PAHs	0.14

SS-6	
Constituent	(0–0.5')
TOTAL PAHs	35

SS-5	
Constituent	(0–0.8')
TOTAL PAHs	1.7

SS-4	
Constituent	(0–0.9')
TOTAL PAHs	0.24

SS-3	
Constituent	(0–1')
TOTAL PAHs	1979

SS-3-3				
Constituent	(0–0.5')	(0–0.5') DUP	(1–2')	(3–4')
TOTAL PAHs	31 J	26 J	720 J	2.0 J

SS-3-4		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	2.6 J	6.5 J

SR-102		
Constituent	(0–2')	(0–2') DUP
TOTAL PAHs	308	108

SS-3-12		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	26 J	170 J

SR-101	
Constituent	(0–2')
TOTAL PAHs	1.3

SS-3-14		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	1.0 J	1.6 J

SS-3-13		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	0.041 J	2.0 J

SS-2	
Constituent	(0–0.5')
TOTAL PAHs	1.6

SR-111	
Constituent	(0–2')
TOTAL PAHs	1.1

SR-112	
Constituent	(0–2')
TOTAL PAHs	14

SS-1	
Constituent	(0–0.8')
TOTAL PAHs	4.8

SR-113	
Constituent	(0–2')
TOTAL PAHs	2.7

SR-109		
Constituent	(0–2')	(4–6')
TOTAL PAHs	33	ND

SS-1D	
Constituent	(0–0.7')
TOTAL PAHs	45

SR-110	
Constituent	(0–2')
TOTAL PAHs	ND

SS-3-10		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	0.54 J	0.18 J

SS-3-11			
Constituent	(0–0.5')	(1–2')	(2–3')
TOTAL PAHs	170 J	140 J	62 J

SS-3-9		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	ND	7.2 J

SS-3-2	
Constituent	(0–0.5')
TOTAL PAHs	430 J

SS-12-2		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	0.15 J	0.11 J

SR-107	
Constituent	(0–2')
TOTAL PAHs	ND

SR-106	
Constituent	(0–2')
TOTAL PAHs	0.26

SR-105	
Constituent	(0–2')
TOTAL PAHs	ND

SS-3-8		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	ND	ND

SR-104	
Constituent	(0–1')
TOTAL PAHs	0.57

SS-3-5		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	230 J	340 J

SS-3-6		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	130 J	12 J

SS-3-7		
Constituent	(0–0.5')	(1–2')
TOTAL PAHs	1.8 J	2.9 J

SR-108		
Constituent	(0–2')	(0–2') DUP
TOTAL PAHs	12	ND

SED-2	
Constituent	(0–0.5')
TOTAL PAHs	4230

SS-3-1			
Constituent	(0–0.5')	(1–2')	(3–4')
TOTAL PAHs	360 J	1,092 J	4.1 J

HENRY STREET

TOMPKINS STREET AVENUE

COURT STREET

24" PIPE OUTFALL

24" PIPE

SUSQUEHANNA RIVER

FLOW

SAMPLING LOCATIONS SS-1A AND SS-1B ARE LOCATED 260 FEET AND 360 FEET DOWNSTREAM OF SAMPLE SS-3-13, RESPECTIVELY. ANALYTICAL RESULTS ON TABLE 5.

(BELOW BRIDGE)

X: 13036X06.DWG
L: ON= * OFF= REF*
P: PAGESET/PLT-B2DL (PLTHALF.CTB)
5/24/02 SYR-DIV54-RCB SDL RCA
13036003/13036B09.DWG

LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORIC FEATURE
- 20 — 20 TOTAL PAH ISOCONCENTRATION LINES FOR UPPERMOST RIVERBED SAMPLES
- STAFF GAUGE
- RIVER SEDIMENT PROBE SAMPLE (SEE NOTE 5)
- SEDIMENT BORING AND/OR SAMPLING LOCATION (SEE NOTE 5)
- GREEN INDICATES PRESENCE OF OBSERVED SHEEN

SS-1	
Constituent	(0–0.8')
TOTAL PAHs	4.8

- SAMPLE ID
- SAMPLE DEPTH IN FEET
- CONCENTRATIONS ARE mg/Kg (ppm)
  ND – NOT DETECTED
  J – ESTIMATED VALUE
  DUP – DUPLICATE SAMPLE

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
3. ALL INVESTIGATION LOCATIONS SURVEYED BY HAWK ENGINEERING, P.C. BINGHAMTON, N.Y. EXCEPT THE FOLLOWING SEDIMENT PROBING AND SAMPLING LOCATIONS:
   – LOCATIONS WITH AN "SS" OR "SF" PREFIX;
   – LOCATIONS WITH A "–2" SUFFIX; AND
   – SEDIMENT SAMPLING LOCATIONS SED–1 AND SED–2.
4. DATA FOR ALL SAMPLES DESIGNATED "SR", AND SAMPLES SS–1D AND SS–15, HAVE NOT YET BEEN VALIDATED.
5. GREEN COLORATION INDICATES THE FOLLOWING:
   – LOCATIONS WHERE A RAINBOW–COLORED SHEEN WAS GENERATED WHEN THE SEDIMENT WAS DISTURBED, AND/OR
   – LOCATIONS WHERE RECOVERED SEDIMENT CORES EXHIBITED A RAINBOW SHEEN, BLACK STAINING, AND/OR NAPL DROPLETS.

0 100' 200'

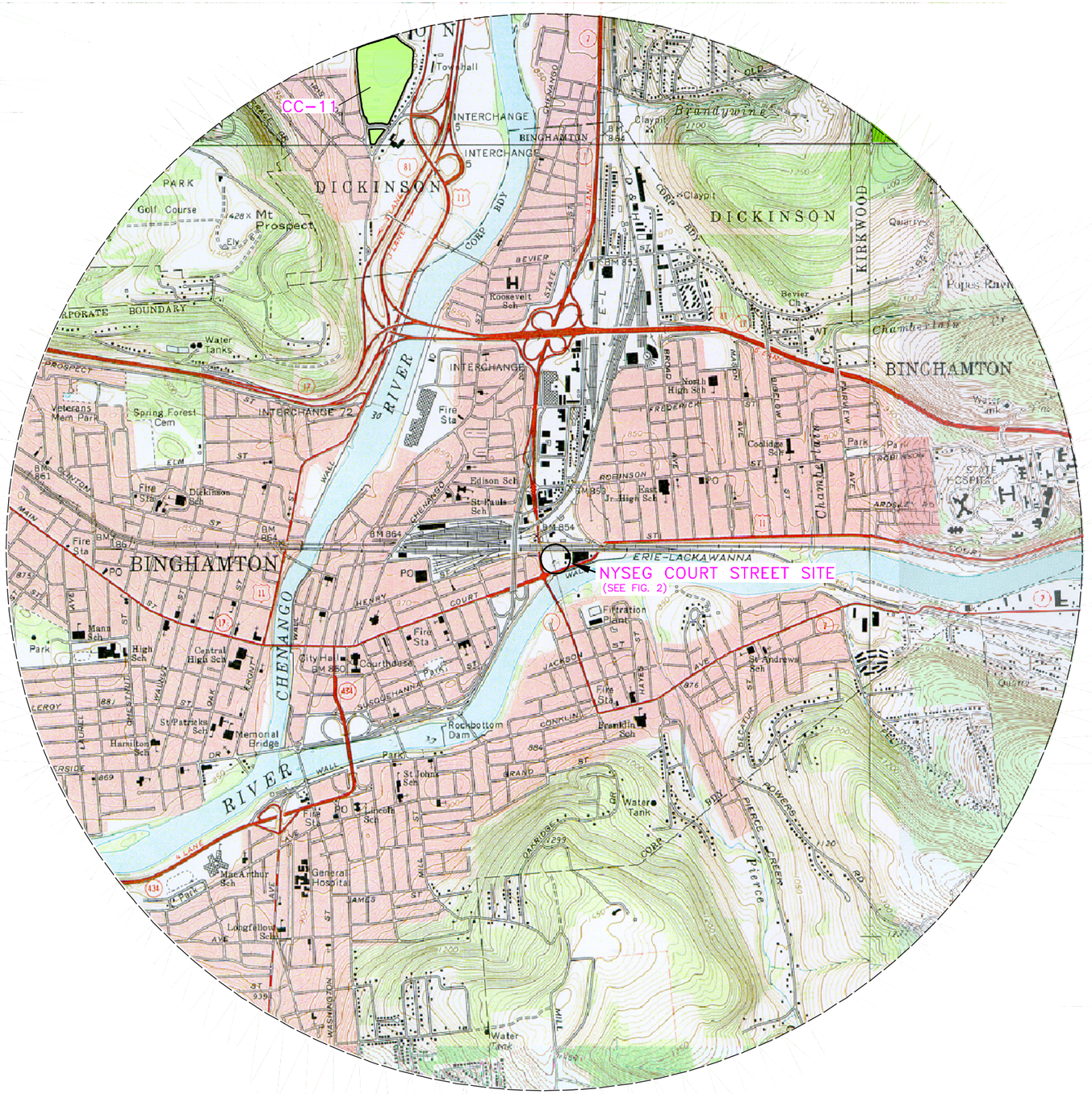
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SELECTED SEDIMENT DATA

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 15



LEGEND

NYS REGULATED WETLAND

NOTES:

1. BASE MAP IS A SCANNED IMAGE OF USGS 7.5 MINUTE SERIES QUADRANGLES: CASTLE CREEK AND AND BINGHAMTON WEST, 1973, @ A SCALE OF 1" = 2000'.
2. NYS REGULATED WETLANDS WERE DIGITIZED FROM NYS DEPARTMENT OF TRANSPORTATION 7.5 MINUTE SERIES PLANIMETRIC MAP: CASTLE CREEK QUADRANGLE, 1973, @ A SCALE OF 1" = 2000'.

0 2400' 4800'

SCALE: 1"=2400'

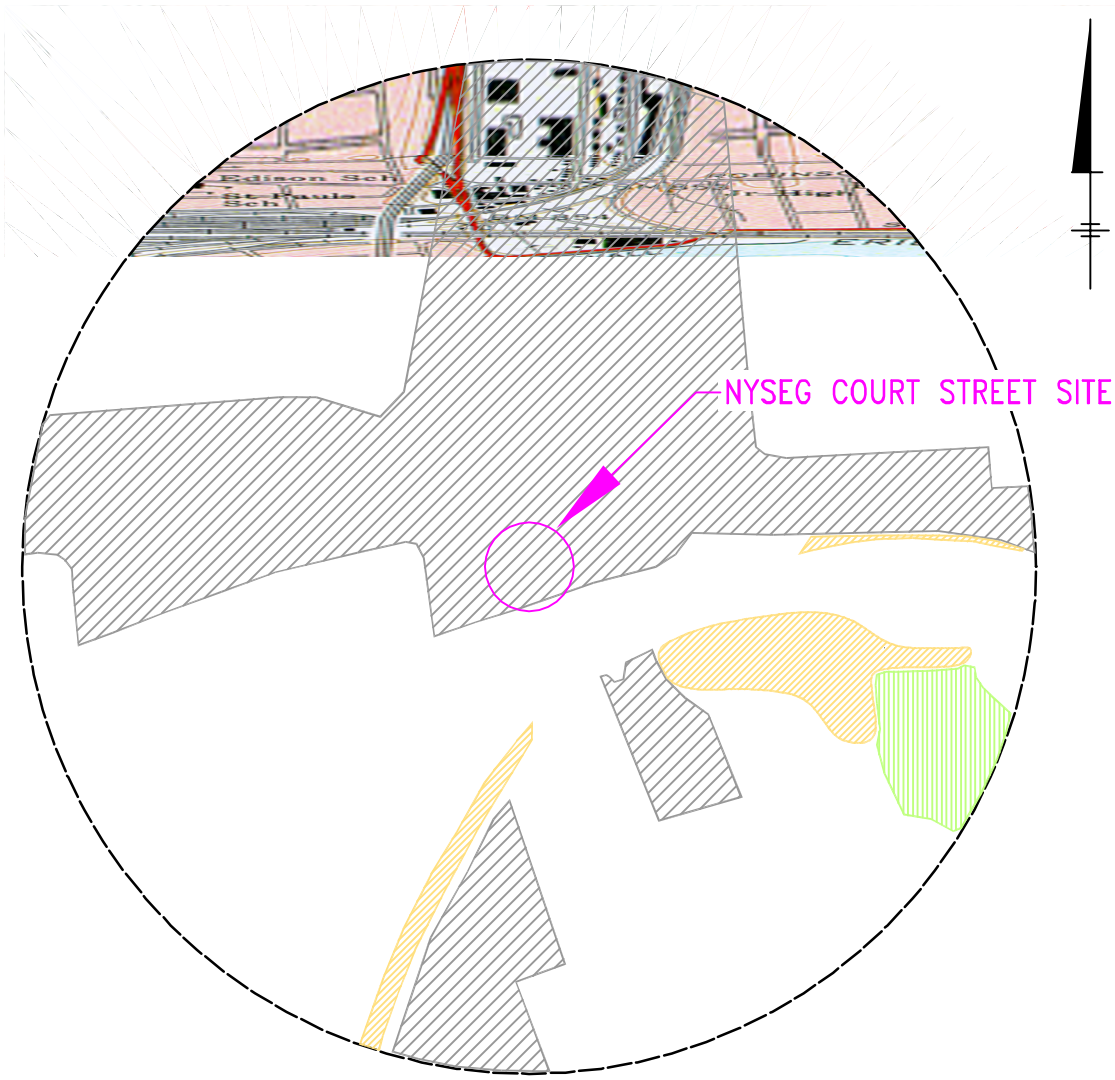
NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SITE LOCATION AND NATURAL RESOURCES WITHIN 2 MILES OF THE SITE

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 16

RASTER IMAGE: 13036G01.TIF
P:PAGESET/PLT-BL (PLTHALF.CTB)
4/30/02 SYR-54-PGL RCA
13036003/13036R01.DWG



DRAFT

LEGEND

- FIELD VEGETATIVE COVERTYPE
- WOODED VEGETATIVE COVERTYPE
- URBAN VEGETATIVE COVERTYPE
- INDUSTRIAL VEGETATIVE COVERTYPE

0 1000' 2000'

SCALE: 1"=1000'

NOTES:

1. BASE MAP IS A SCANNED IMAGE OF USGS 7.5 MINUTE SERIES QUADRANGLE BINGHAMTON WEST, 1973, @ A SCALE OF 1" = 2000'.
2. NYS REGULATED WETLANDS WERE DIGITIZED FROM NYS DEPARTMENT OF TRANSPORTATION 7.5 MINUTE SERIES PLANIMETRIC MAP: BINGHAMTON WEST QUADRANGLE, 1973, @ A SCALE OF 1" = 2000'.

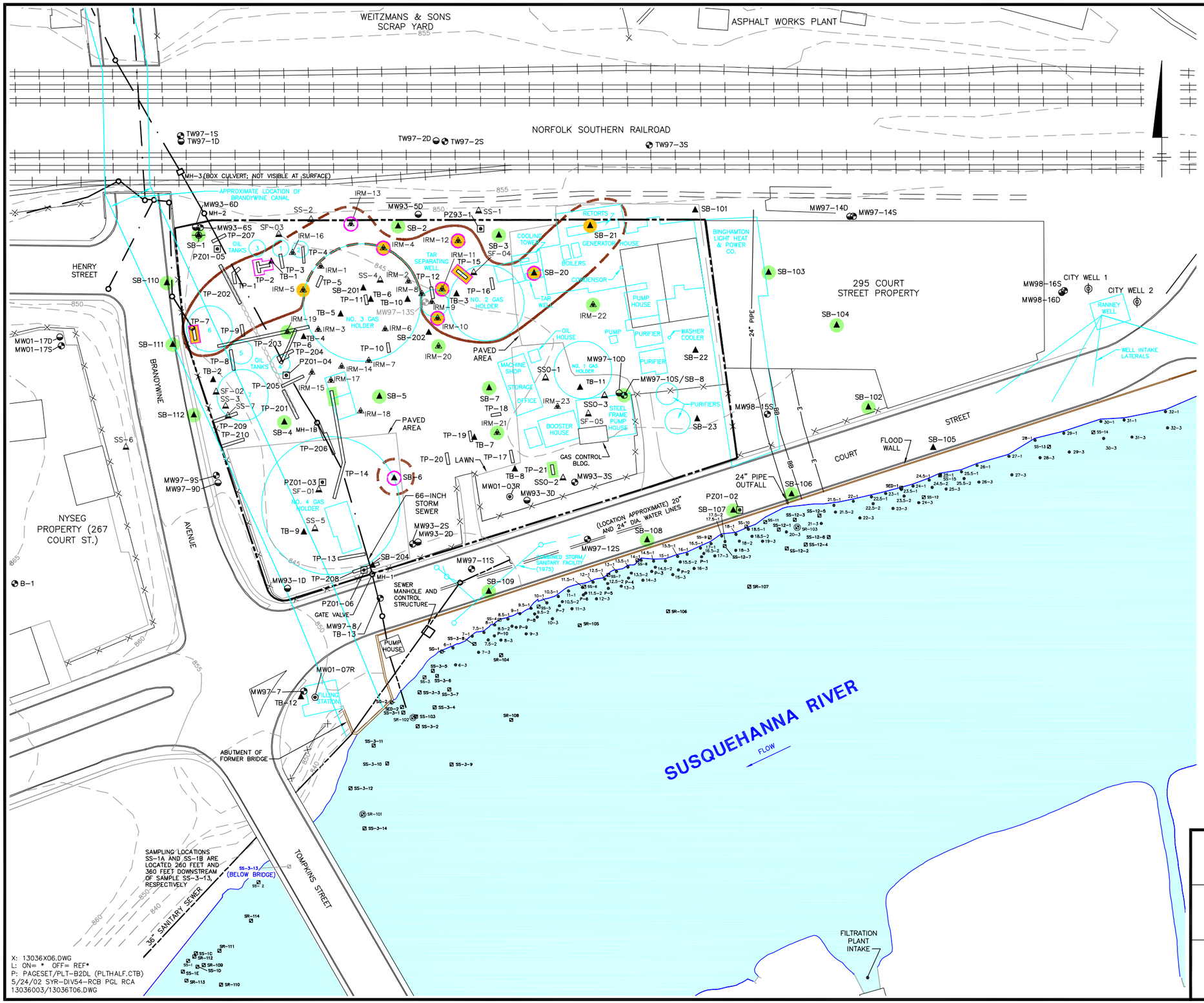
RASTER IMAGE: 130MAP.TIF
P:PAGESET/PLT-AP (PLT-FULL.CTB)
4/30/02 SYR-54-PGL
RCA13036036/13036R02.DWG

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

GENERAL VEGETATIVE COVERTYPES WITHIN 0.5 MILES OF THE SITE

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 17



LEGEND

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT
- SOIL BORING
- STAFF GAUGE
- SEDIMENT PROBING POINT
- SEDIMENT BORING AND/OR SAMPLING LOCATION
- DEEP RIVERBED BORING LOCATION
- IRM CONFIRMATORY SAMPLE LOCATION
- DECOMMISSIONED MONITORING WELL
- VOCs ABOVE GUIDANCE VALUES
- SVOCs ABOVE GUIDANCE VALUES
- VOCs AND SVOCs BELOW GUIDANCE VALUES
- INFERRED LIMITS OF UNSATURATED SOILS EXCEEDING GUIDANCE VALUES

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
3. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING NATIONAL GEODETIC VERTICAL DATUM OF 1929, HORIZONTAL DATUM: NAD 83 NEW YORK STATE CENTRAL 3102.
4. ALL INVESTIGATION LOCATIONS SURVEYED BY HAWK ENGINEERING, P.C. BINGHAMTON, N.Y. EXCEPT THE FOLLOWING SEDIMENT PROBING AND SAMPLING LOCATIONS:
   - LOCATIONS WITH AN "SS" OR "SF" PREFIX;
   - LOCATIONS WITH A "-2" SUFFIX; AND
   - SEDIMENT SAMPLING LOCATIONS SED-1 AND SED-2.
5. LOCATIONS OF CONFIRMATORY SAMPLING POINTS IRM-1 THROUGH IRM-23 FROM FIGURE 6 OF THE JANUARY 2002 "INTERIM REMEDIAL MEASURES, FINAL ENGINEERING REPORT" PREPARED BY NYSEG LICENSING AND ENVIRONMENTAL OPERATIONS DEPARTMENT.

0 100' 200'

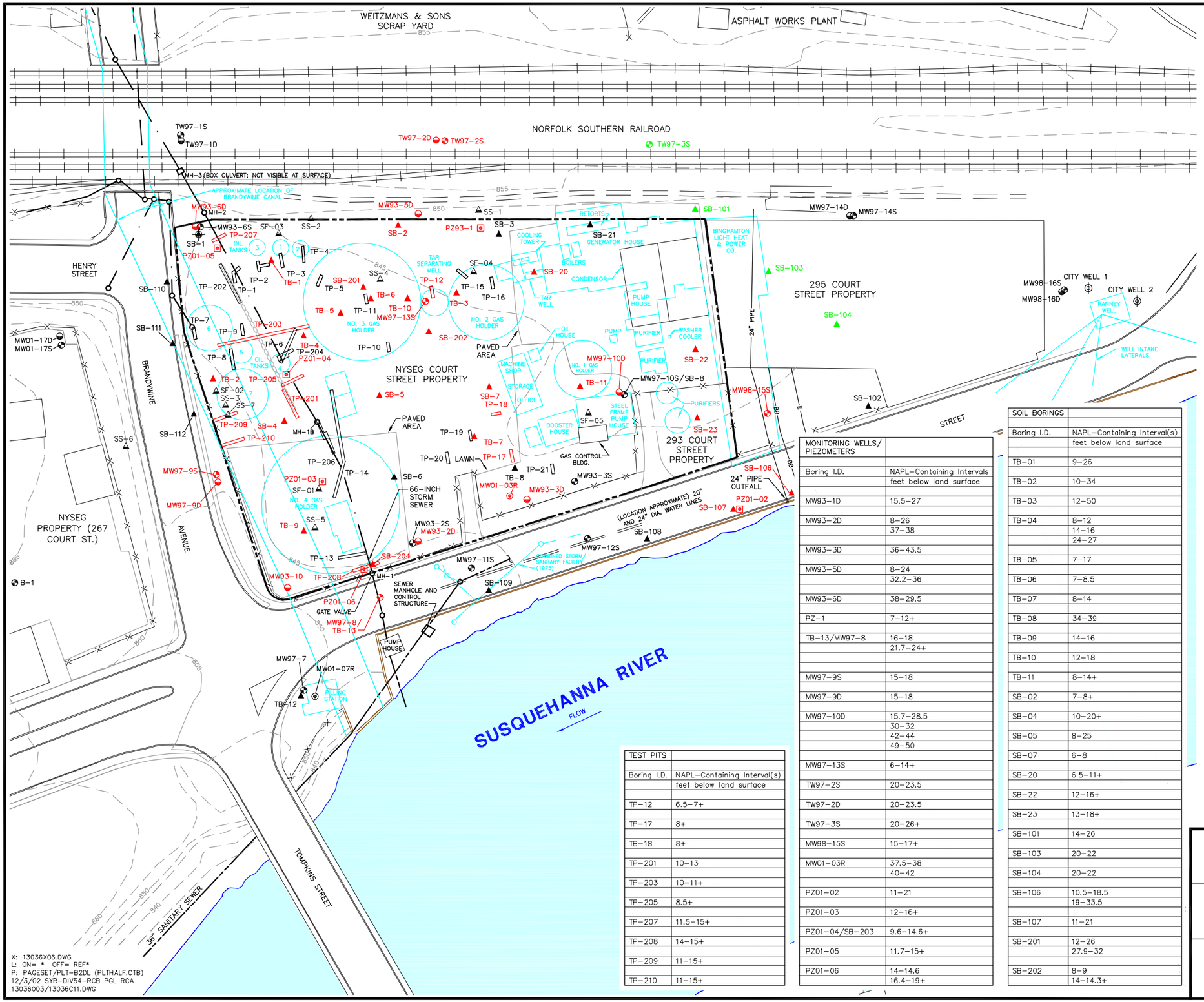
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

UNSATURATED SOILS EXCEEDING GUIDANCE VALUES

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 18



TEST PITS	
Boring I.D.	NAPL–Containing Interval(s) feet below land surface
TP–12	6.5–7+
TP–17	8+
TB–18	8+
TP–201	10–13
TP–203	10–11+
TP–205	8.5+
TP–207	11.5–15+
TP–208	14–15+
TP–209	11–15+
TP–210	11–15+

MONITORING WELLS/ PIEZOMETERS	
Boring I.D.	NAPL–Containing Intervals feet below land surface
MW93–1D	15.5–27
MW93–2D	8–26 37–38
MW93–3D	36–43.5
MW93–5D	8–24 32.2–36
MW93–6D	38–29.5
PZ–1	7–12+
TB–13/MW97–8	16–18 21.7–24+
MW97–9S	15–18
MW97–9D	15–18
MW97–10D	15.7–28.5 30–32 42–44 49–50
MW97–13S	6–14+
TW97–2S	20–23.5
TW97–2D	20–23.5
TW97–3S	20–26+
MW98–15S	15–17+
MW01–03R	37.5–38 40–42
PZ01–02	11–21
PZ01–03	12–16+
PZ01–04/SB–203	9.6–14.6+
PZ01–05	11.7–15+
PZ01–06	14–14.6 16.4–19+

SOIL BORINGS	
Boring I.D.	NAPL–Containing Interval(s) feet below land surface
TB–01	9–26
TB–02	10–34
TB–03	12–50
TB–04	8–12 14–16 24–27
TB–05	7–17
TB–06	7–8.5
TB–07	8–14
TB–08	34–39
TB–09	14–16
TB–10	12–18
TB–11	8–14+
SB–02	7–8+
SB–04	10–20+
SB–05	8–25
SB–07	6–8
SB–20	6.5–11+
SB–22	12–16+
SB–23	13–18+
SB–101	14–26
SB–103	20–22
SB–104	20–22
SB–106	10.5–18.5 19–33.5
SB–107	11–21
SB–201	12–26 27.9–32
SB–202	8–9 14–14.3+

LEGEND:

- FLOOD WALL
- RAILROAD TRACK
- FENCE
- SITE PROPERTY LINES (APPROXIMATE)
- SEWER LINE (APPROXIMATE)
- 840 GROUND SURFACE ELEVATION CONTOUR (FT. AMSL)
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- TEST PIT
- SOIL BORING
- SATURATED SOILS OBSERVED TO CONTAIN NAPL (RED)
- SATURATED SOILS OBSERVED TO CONTAIN NAPL, EXCEPT PAH ELEVALUATION SHOWED THAT NAPL WAS PETROLEM RELATED RATHER THAN COAL–TAR RELATED (GREEN)

NOTES:

1. BASE MAP PROVIDED BY NYSEG (JUNE 12, 1997).
2. SURFACE ELEVATIONS DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, FLOWN DECEMBER 2, 1973 AND MAPPED APRIL 1, 1974.
3. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL USING NATIONAL GEODETIC VERTICAL DATUM OF 1929, HORIZONTAL DATUM: NAD 83 NEW YORK STATE CENTRAL 3102.
4. STORM SEWER LOCATION DIGITIZED FROM CITY OF BINGHAMTON MAP, SHEET 303, ENTITLED: PRELIMINARY REPORT, COMPREHENSIVE STORM DRAINAGE, EXISTING FACILITIES. PREPARED BY VERNON O. SHUMAKER, CONSULTING ENGINEER, VESTAL, NEW YORK, DATE NOT PROVIDED.
5. "+" SYMBOL INDICATES THAT THE FULL THICKNESS OF SATURATED SOILS CONTAINING NAPL WAS NOT PENETRATED.

0 100' 200'

GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS CORP.
BINGHAMTON, NEW YORK
COURT STREET SITE
PHASE II SRI

SATURATED SOILS OBSERVED TO CONTAIN NAPL

BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 19

X: 13036X06.DWG
L: ON= * OFF= REF*
P: PAGESET/PLT-B2DL (PLTHALF.CTB)
12/3/02 SYR-DIV54-RCB PGL RCA
13036003/13036C11.DWG

Appendices

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Appendix A

Subsurface Logs

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Soil Borings

New York State Electric and Gas
Binghamton, NY

Court Street Boring Log Key

AMSL	= Above Mean Sea Level
ags	= above ground surface
bgs	= below ground surface
in.	= inch
ft.	= feet
ID	= Inner Diameter
OD	= Outer Diameter
HSA	= Hollow Stem Auger
MGP	= Manufactured Gas Plant
NA	= Not Applicable
-	= Not Available
PVC	= Polyvinyl Chloride
SS	= Split Spoon
WOH	= Weight of Hammer
WOR	= Weight of Rod

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-01 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/17/93 – 5/7/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 60 ft.
Borehole Depth: 59.0 ft.
Ground Surface Elev.: 844.8 ft.

General Location:
Adjacent to oil tank 1,
Northeast area of site.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															
1												Brown fine to coarse SAND and fine to medium GRAVEL, dry, loose, (FILL).			
2			52		1.6			4.8	20.0			some red brick at 2.0' – 5.0'.			Cement/bentonite grout 59.0' – 0.0'
3	1		18 10	28											
4			12 27		1.1			1.0	15.3						
5	2		3 5	8								Black stained little slag, little coal, moist, loose.			
6			5 6		1.0			23.7	648						
7	3		3 2	5								Black stained SILT, little clay, some **oil globules** in matrix, moist, soft, nonplastic.			
8			1 WOH		0.8			27.6	633						
9	4		WOH 2									SILT and CLAY, some **coal tar residue** and **oil globules** in matrix, wet.			
10			2		1.4			4.9	803						
11	5											grades to gray, damp to moist			
12			16		2.0			24.8	1207						
13	6		10 11	21											
14			11 5		1.8			23.5	595			grades to little clay, nonplastic			
15	7		7 9	16											
16			10 5		0.8			12.6	383			grades to some clay, trace sand			
17	8		6 8	14											
18			8 12		1.2			39.6	934						
19	9		10 11	21											
20			14 9		1.0			28.7	213			Brown/gray fine to medium GRAVEL, little sand, some **coal tar residue** and **oil globules**, wet, loose, slight odor, sheen.			
21	10		10 11	21											
22			11												

Geologist Initials: TRO + VAD

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-01 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/17/93 – 5/7/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 60 ft.
Borehole Depth: 59.0 ft.
Ground Surface Elev.: 844.8 ft.

General Location:
Adjacent to oil tank 1,
Northeast area of site.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			17		0.8			18.5	531						
23	11		17	23											
24			16												
			15												
			29		0.6			22.4	409						
25	12		10	21											
			11												
26			11									grades to coarse SAND and fine GRAVEL.			
			8		1.8			4.5	256						
27	13		10	21			BSVIBM9301					No coal tar residue or oil globules visible after 26 ft.			
			11												
28			12												
			16		2.0			41.7	—			Gray fine to medium SAND, trace silt, wet, loose.			
29	14		11	28											
			27									grades to fine SAND, some fine to medium gravel, some silt, moist.			
30			24												
			21		0.9			35.0	539						
31	15		20	42								Dark gray/brown medium to coarse SAND and fine to medium GRAVEL, wet, loose.			
			22												
32			25												
			22		1.1			10.6	57.2						
33	16		18	32								Dark gray-brown fine to medium SAND, little silt, wet, loose.			
			14												
34			8												
			11		0.7			7.0	163						
35	17		11	22											
			11												
36			13												
			9		0.3			14.3	211						
37	18		8	17											
			9												
38			11												
			3		0.6			21.0	61.7						
39	19		4	8											
			4												
40			4												
			8		1.3			4.1	72.4			grades to red brown			
41	20		9	24											
			15												
42			13												
			9		1.4			5.2	13.4						
43	21		8	17											
			9												
44			9												

Geologist Initials: TRO + VAD

Project No.: 130.05

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-01 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/17/93 – 5/7/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Borehole Depth: 60 ft.
Borehole Depth: 59.0 ft.
Ground Surface Elev.: 844.8 ft.

General Location:
Adjacent to oil tank 1,
Northeast area of site.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			10		1.3			10.4	31.6			grades to trace clay			
45	22		10 14	24											
46			10 8		1.8			8.1	91.6			grades to fine SAND and SILT, little clay, wet, soft.			
47	23		10 11	21											
48			11 WOH		0.8			14.0	252			Gray-brown fine to medium SAND, some silt, wet, loose.			
49	24		4 4	8											
50			6 11		0.6			4.3	69.7			grades to trace silt, trace fine gravel, medium dense.			
51	25		12 13	25											
52			13 12		0.8			5.8	114						
53	26		15 20	35											
54			25												
55			10		0.5				158			Gray brown fine SAND and fine to medium GRAVEL, trace silt, wet, hard.			
56	27		14 17	31											
57			25 17		0.4				213						
58	28		19 30	49											
59			30									Bottom of boring at 59.0 ft.			
60												**NOTES:** Augered 0.0' – 2.0' feet without sampling. Borehole grouted to surface with cement/bentonite grout. Test boring located adjacent to oil tank 1 on northwest side of site.			
61															
62															
63															
64															
65															

Geologist Initials: TRO + VAD

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-02 Well No.

Client: NYSEG
Site: Court St, Binghamton, NY

Date Start/Finish: 5/18/93 – 5/18/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 48.4 ft.
Borehole Depth: 48.4 ft.
Ground Surface Elev.: 845.6 ft.

General Location:
Near oil tanks 5, 6, 7 & 8,
Northeast area of site.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Msc. Test	Well Column	Well Materials
0															
1												Brown fine to coarse SAND and fine to medium GRAVEL, dry, loose. (FILL)			
2			50/.4		1.2			10.5	2.2						Cement/bentonite grout 48.4' – 0.0'
3	1											Brown fine to coarse SAND, trace fine gravel, some silt, trace slag, damp, medium dense.			
4			10		1.1			10.1	12.4			trace brick and moist at 4.0 ft.			
5	2		15 21	36											
6			12 13		NR			NR	NR						
7	3		12 10	22								grades to little fine gravel, trace silt and clay, coal tar odor.			
8			8 6		0.7			30.6	2349						
9	4		6 2	8								wet at 9.0 ft.			
10			4		0.9			915	1758						
11	5		7 12	19								grades to black fine to coarse SAND, fine to medium GRAVEL and BRICK, some **coal tar residue** in matrix, wet, loose.			
12			31 6		1.0		BSVIBM9302	765	2563						
13	6		4 12	16								Gray SILT, little clay, trace **coal tar residue** in matrix, moist, stiff.			
14			13 10					417	2255			iron oxidation staining.			
15	7		10 11	21											
16			13 7		1.0			78.7	1548						
17	8		8 5	13								Gray-brown fine to medium SAND, little clay, trace silt, some **oil globules** in matrix, some iron oxidation, wet, loose.			
18			5 2		0.7			360	2449						
19	9		3 2	5											
20			3 5		0.2			307	1968						
21	10		5 4	9											
			3												

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-02 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/18/93 – 5/18/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 49.4 ft.
Borehole Depth: 48.4 ft.
Ground Surface Elev.: 845.6 ft.

General Location:
Near oil tanks 5, 6, 7 & 8,
Northeast area of site.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			5		0.9			406	816						
23	11		4 2	6											
24			3 2		1.0			78.8	78.5			grades to brown fine GRAVEL, some **oil globules** in matrix, wet, loose.			
25	12		3 3	6											
26			4 6		0.8			42.0	76.2			Gray-brown fine to medium SAND, trace silt, trace **oil globules** in matrix, wet, loose.			
27	13		6 6	12											
28			6 2		1.3			43.7	12.4						
29	14		3 3	6											
30			7 5		1.0			41.5	32.2			grades to little **oil globules** in matrix.			
31	15		5 8	13								grades with trace fine to medium gravel.			
32			9 15		1.3			24.5	98.5						
33	16		20 12	32											
34			12 20		0.6			9.3	61.8			grades to fine to coarse SAND, some silt, trace red oxidation staining, moist, medium dense, no oil visible.			
35	17		20 50/.4												
36			50/.1		NR			NR	NR			grades to very dense.			
37	18														
38			50/.4		0.4			10.9	56.4			grades with fine GRAVEL, damp.			
39	19														
40			20		1.2			26.1	127.9			grades to dense.			
41	20		44 30	74											
42			17 44		0.8			45.2	19.6						
43	21		44 29	73											
			17												

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-02 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/18/93 – 5/18/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 49.4 ft.
Borehole Depth: 48.4 ft.
Ground Surface Elev.: 845.6 ft.

General Location:
Near oil tanks 5, 6, 7 & 8,
Northeast area of site.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44															
45	22		20 50 50/.3		0.3			9.8	218						
46			44		0.5			31.0	90.6			grades to very dense, damp to dry			
47	23		50/.2												
48	24		50/.4		0.1			13.0	236						
49												Bottom of boring at 48.4 ft. (TILL)			
50															
51															
52															
53															
54															
55															
56															
57															
58															
59															
60															
61															
62															
63															
64															
65															

NOTES:
Augered 0.0' – 2.0' feet without sampling.
Borehole grouted to surface with cement/bentonite grout.
Test boring located in oil tank 4 on the west side of site.

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-03 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/19/93 – 5/19/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 57 ft.
Borehole Depth: 56.0 ft.
Ground Surface Elev.: 844.7 ft.

General Location:
Gasholder No. 2

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0–2			32		1.8			20.0	6.0			Brown fine to coarse SAND and fine to medium GRAVEL, trace silt, dry, loose.			Cement/bentonite grout 56.0' – 0.0'
2–4	1		16 13 15	29								brick fragments at 2.9' – 3.3'.			
4–6	2		2 2 2 6	4	0.3			1537	505			black staining at 3.3'. grades to trace silt, moist.			
6–8	3		50/2		0.2			2500	739						
8–10	4		43 50/2		0.4			2500	313			CONCRETE, strong coal tar odor, dry to damp.			
10–12	5		50/5		0.3			38.1	589			Gray brown fine to coarse SAND, little fine to medium gravel, trace silt, moist.			
12–14	6		7 12 15 16	27	1.2			1514	579			Gray brown SILT, trace clay, some **coal tar residue** in matrix, oxidation staining, moist, stiff.			
14–16	7		7 9 9 9	18	1.0			341	378			grades to damp, no coal tar residue. grades to little clay, trace fine to coarse sand and fine to medium gravel, moist, medium stiff, some **coal tar residue** in matrix.			
16–18	8		8 7 8 8	15	1.0			1664	482						
18–20	9		2 1 1 1	2	0.7			925	123			Black fine SAND, saturated, very loose, coal tar odor and oil sheen on water.			
20–22	10		2 2 3 3	5	1.5			0.0	143						

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-03 **Well No.**

Client: NYSEG

Site: Court St., Binghamton, NY

Date Start/Finish: 5/19/93 – 5/19/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 57 ft.
Borehole Depth: 56.0 ft.
Ground Surface Elev.: 844.7 ft.

General Location:
Gasholder No. 2

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			3												
23	11		6 9	15				0.0	12.9						
24			8 3		1.6			NA	48.6			grades to fine to coarse SAND, very loose.			
25	12		6 4	10											
26			6 3		2.0			NA	11.5						
27	13		5 5	10											
28			8 6		2.0			NA	18.3						
29	14		6 9	15								grades to gray-brown fine SAND.			
30			8 4		—			NA	27.1						
31	15		4 5	9								grades with trace silt, little oil sheen, odor.			
32			7 6		1.6			NA	166						
33	16		7 8	15											
34			11 7		1.4			NA	44.2						
35	17		10 12	22											
36			12 13		1.8			NA	41.2						
37	18		13 19	32											
38			12 6		1.2			NA	42.4						
39	19		13 14	27											
40			20 7		1.6			NA	10.9						
41	20		9 12	21											
42			12 7		2.0			NA	28.9						
43	21		9 10	19								grades with some medium sand, some oil sheen.			
44			10												

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-03 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/19/93 – 5/19/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 57 ft.
Borehole Depth: 56.0 ft.
Ground Surface Elev.: 844.7 ft.

General Location:
Gasholder No. 2

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			6		0.6			36.5	22.9						
45	22		9												
			10	19											
			13												
46			7		0.7			27.7	128			grades to brown fine to medium SAND, trace oil sheen, medium dense.			
47	23		9												
			17	26											
48			12												
			13		1.0			10.7	330						
49	24		15												
			20	35											
50			35												
			13		0.8			71.1	448			Gray-brown fine to medium SAND, some oil sheen, trace medium gravel, wet, medium dense to dense.			
51	25		35												
			50/.4												
52			26		0.3			5.3	51.3			Brown fine to coarse SAND, trace to little silt, little fine to medium gravel, moist, medium dense to dense, no oil sheen.			
53			50/.3												
54	26		24		0.2			20.7	44.3			gravel is slightly embedded, some silt.			
			17												
55	27		31	48											
			26												
56												Bottom of boring at 56.0 ft.			
57															
58															
59															
60															
61															
62															
63															
64															
65															

NOTES:
Augered 0.0' – 2.0' feet without sampling.
Borehole terminated due to heaving sand entering the augers
Borehole grouted to surface with cement/bentonite grout.

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-04 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/20/93 – 5/20/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 55 ft.
Borehole Depth: 54.0 ft.
Ground Surface Elev.: 844.9 ft.

General Location:
Outside Southwest side of gasholder No. 3

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Msc. Test	Well Column	Well Materials
0															
1															
2			16		0.8			25.2	147			Brown fine to coarse SAND and fine to medium GRAVEL, dry, loose.			
3	1		12 2	14											Cement/bentonite grout 54.0' – 0.0'
4			17 7		0.6			24.8	303			grades to fine to coarse SAND, fine to medium GRAVEL, and BRICK FRAGMENTS, trace silt. Black staining at 3.8 ft.			
5	2		6 12	18								**coal tar residue** in matrix.			
6			12 18		1.0			96.7	261			Black fine to coarse SAND, fine to medium GRAVEL, ASH, and CINDERS, some **coal tar residue**, wet, loose.			
7	3		35 14	49											
8			15 6		1.2			25.3	154			Brown/gray/green SILT, trace iron oxidation, trace **coal tar residue** in matrix, damp, medium stiff.			
9	4		4 5	9											
10			7 7		1.5			22.0	171						
11	5		11 12	23											
12			16 7		1.3			15.8	113			No coal tar residue in matrix 12.0' – 14.0'.			
13	6		14 14	28											
14			14 5		1.2			8.6	120			trace **coal tar residue** in matrix 14.0' – 16.0'.			
15	7		8 11	19											
16			12 8		1.3			4.5	144			grades to dark gray SILT, little clay, moist, medium stiff, no coal tar residue			
17	8		8 5	13											
18			6 WOH		NR										
19	9		5 6	11											
20			8 16		0.9			2.2	39.2						
21	10		14 14	28								Gray brown fine to coarse SAND, little fine to medium gravel, little silt, wet, medium dense.			
22			18												

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-04 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/20/93 – 5/20/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 55 ft.
Borehole Depth: 54.0 ft.
Ground Surface Elev.: 844.9 ft.

General Location:
Outside Southwest side of gasholder No. 3

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			14 17		1.0			4.3	22.9						
23	11		21 19	38											
24			4 4		0.8			5.3	91.6			Gray brown fine to coarse SAND and fine to medium GRAVEL, trace oil sheen in matrix, wet, loose, slight odor.			
25	12		6 12	10											
26			12 12		1.2			0.0	17.2			grades to gray brown fine to medium SAND, trace silt, wet, loose, slight odor, no oil sheen after 27.0 feet.			
27	13		6 5	18											
28			5 5					0.3	8.7			grades to fine SAND, slight odor.			
29	14		6 11	11											
30			6 6		1.8			1.8	8.7						
31	15		7 7	13											
32			4 7		1.5			1.5	18.9						
33	16		9 9	16											
34			8 10		1.4			0.4	6.4						
35	17		14 14	24											
36			4 7		1.7			0.1	10.5			grades to brown fine SAND, trace silt, oxidation staining.			
37	18		7 10	14											
38			5 8		1.0			0.1	10.3						
39	19		9 10	17											
40			7 7		0.9			0.3	12.0			grades to little silt.			
41	20		8 10	15											
42			26 12		0.5			1.6	13.8			grades to gray brown fine to coarse SAND, some silt, little fine to medium gravel, trace clay, moist to wet, medium dense.			
43	21		12 26	24											

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-04 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/20/93 – 5/20/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 55 ft.
Borehole Depth: 54.0 ft.
Ground Surface Elev.: 844.9 ft.

General Location:
Outside Southwest side of gasholder No. 3

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft).	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44															
45	22		50/.2		NR			NR	NR						
46															
47															
48			35		0.8			3.5	81.6						
49	23		31 15	46								grades to dense.			
50			8 13		0.6			0.6	33.8						
51	24		31 30	61											
52			27 50/.2					0.6	39.5			grades to very dense, embedded grains of sand and gravel.			
53	25														
54												Bottom of boring at 54.0 ft. (TILL)			
55															
56												**NOTES:** Augered 0.0' – 2.0' feet without sampling. Augered to top of till from 52.0' to 54.0'. Borehole grouted to surface with cement/bentonite grout.			
57															
58															
59															
60															
61															
62															
63															
64															
65															

Geologist Initials: STH

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-05 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/20/93 – 5/21/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 57 ft.
Borehole Depth: 56.0 ft.
Ground Surface Elev.: 844.3 ft.

General Location:
Gasholder No. 3

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															
1												Brown fine to coarse SAND and fine to medium GRAVEL, dry, loose, (FILL).			
2			13		1.0			6.4	534						
			12									grades with some red brick.			
3	1		13	25											Cement/bentonite grout 56.0' – 0.0'
			13									grades with little slag, moist.			
4			10		0.8			515	514						
			8									grades to dark brown, some **coal tar residue** and **oil globules** in matrix, wet.			
5	2		5	13											
			3												
6			6		0.4			115	853						
			50/.1									grades to black, saturated with **coal tar residue** and **oil globules**.			
7	3														
8															
9							BSWTB9305								
10			12		0.6			167	NA						
			3									Black SILT and fine SAND, trace fine to medium gravel, some **coal tar residue** and **oil globules** in matrix, strong odor, wet, soft.			
11	4		4	7											
			4												
12			21		1.4			146	NA						
			11									Gray/green SILT, little clay, little fine sand, some **oil globules** in matrix, some iron oxidation, damp, medium stiff.			
13	5		7	18											
			4												
14			8		0.8			90.0	259						
			8									grades to trace clay, little **oil globules** in matrix, damp to moist, nonplastic.			
15	6		9	17											
			8												
16			4		1.8			77.0	163						
			4												
17	7		14	18											
			11									Dark gray CLAY, some silt, moist, soft, plastic. no coal tar residue or oil globules after 17.0'.			
18			11		0.9			28.0	782						
			10												
19	8		9	19								Brown fine to coarse SAND and fine to medium GRAVEL, trace silt, wet, loose.			
			11												
20			WOH		0.8			53.0	129			grades to little silt, saturated.			
			19												
21	9		12	31											
			13												

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-05 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/20/93 – 5/21/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 57 ft.
Borehole Depth: 56.0 ft.
Ground Surface Elev.: 844.3 ft.

General Location:
Gasholder No. 3

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			8		0.6			21.5	78.4			grades to gray brown fine to medium SAND, trace to little fine to medium gravel, saturated, loose.			
23	10		12 18	30											
24			18 5		0.8			100	568						
25	11		8 12	20											
26			8 5		1.2							grades to trace fine to medium gravel.			
27	12		7 9	16											
28			25 1		0.9			6.0	57.2						
29	13											grades to trace silt, no gravel.			
30			8 9		0.8			29.3	239						
31	14		10 9	19											
32			4 6		1.4			6.1	16.9			grades to wet to moist.			
33	15		9 11	15											
34			8 13		1.0			1.1	31.2			grades to fine SAND, little silt, wet.			
35	16		14 16	17											
36			9 10		1.2			2.5	15.7						
37	17		11 13	21											
38			8 9		0.8			12.5	33.0						
39	18		9 11	18											
40			12 8		1.0			0.1	28.8						
41	19		8 5	16											
42			10 9		1.0			3.0	30.7						
43	20		9 10	18											

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-05 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/20/93 – 5/21/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 57 ft.
Borehole Depth: 56.0 ft.
Ground Surface Elev.: 844.3 ft.

General Location:
Gasholder No. 3

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			11		0.5			3.5	38.5			grades to trace gravel.			
45	21		12 13 10	24											
46			26		0.8			50.0	35.9						
47	22		36 12 13	48											
48			16		0.6			57.0	648			grades to no gravel.			
49	23		15 14 14	29											
50			12		1.2			92.0	126						
51	24		15 16 15	31											
52			15		0.6			11.6	113			Brown fine to medium SAND and SILT, some fine to coarse gravel, trace clay, moist, medium dense to dense.			
53	25		16 50/.4												
54			48		0.4			11.2	57.5						
55	26		34 30 29	64								grades to moist to damp, dense.			
56												Bottom of boring at 56.0 ft. (TILL)			
57															
58															
59															
60															
61															
62															
63															
64															
65															

NOTES:
Augered 0.0' – 2.0' feet without sampling.
Borehole grouted to surface with bentonite/cement grout.
Test boring located west portion of 7500,000 cu. ft. gas holder # 3.

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-06 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/24/93 – 5/24/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: - **Auger Size** : 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 9.5 ft.
Borehole Depth: 8.5 ft.
Ground Surface Elev.: 844.8 ft.

General Location:
Gasholder No. 3

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															
1												Brown fine to coarse SAND and fine to medium GRAVEL, dry, loose. (FILL)			
2			61		2.0			0.1	0.0						
3	1		19	34								grades to some brick, little black staining, slight odor, damp.			Cement/bentonite grout 8.5' – 0.0'
4			15		0.6			16.3	566			grades to some wood boards, wet.			
5	2		1	17											
6			16		NR		BSVIBN9306	NA	NA			some **oil globules**, wet.			
7	3		29	17											
8			4												
9			1												
10			16												
11			50/2												
12												Bottom of boring at 8.5 ft. (CONCRETE)			
13												**NOTES:** Augered 0.0' – 2.0' feet without sampling. Auger refusal at 8.5' concrete chips in spoon and auger. Borehole grouted to surface with cement/bentonite grout.			
14															
15															
16															
17															
18															
19															
20															
21															
22															

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-07 Well No.

Client: NYSEG
Site: Court St, Binghamton, NY

Date Start/Finish: 5/24/93 – 5/24/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 25 ft.
Borehole Depth: 24.0 ft.
Ground Surface Elev.: 843.9 ft.

General Location:
South center area of site, downgradient of potential source areas.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															
1												Brown fine to coarse SAND and fine to medium GRAVEL, dry, loose.			
2			60/2		0.2			0.4	13.9						Cement/bentonite grout 24.0' – 0.0'
3	1														
4			4		0.1			0.0	NA						
5	2		4	8											
6			6		0.1			9.4	29.3						
7	3		2	4											
8			2		1.8			0.0	21.1			Gray/brown SILT, some clay, little to some black viscous, **coal tar residue** in matrix, moist to wet, soft, nonplastic.			
9	4		3	6											
10			2		1.4			0.0	6.9			grades to some oxidation staining, slightly plastic.			
11	5		4	7											
12			7		1.6			0.0	21.9			No coal tar residue in matrix after 14.0'.			
13	6		9	18											
14			2		1.6			0.0	12.2			grades to gray SILT and CLAY, semiplastic.			
15	7		4	7											
16			3		0.8			0.0	2.1			Gray/brown fine to coarse SAND and fine to medium GRAVEL, little silt, saturated, loose to medium dense.			
17	8		5	14											
18			4		0.5			0.0	0.0						
19	9		7	18											
20			13		1.4			0.0	0.0						
21	10		9	16											
22			7												

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-07 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/24/93 – 5/24/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 25 ft.
Borehole Depth: 24.0 ft.
Ground Surface Elev.: 843.9 ft.

General Location:
South center area of site,
downgradient of potential source areas.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22	11		7	14	1.2			0.0	37.3			Dark gray fine to coarse SAND, little silt, saturated, loose.			
23			7												
24			7									Bottom of boring at 24.0 ft.			
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38															
39															
40															
41															
42															
43															
44															

NOTES:
Augered 0.0' – 2.0' feet without sampling.
Borehole terminated at 24.0' after confirming depth to silt layer.
Borehole grouted to surface with cement/bentonite grout.

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-08 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/24/93 – 5/25/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size:** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 53.8 ft.
Borehole Depth: 52.8 ft.
Ground Surface Elev.: 843.9 ft.

General Location:
South center area of site, downgradient of potential source areas.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0												GRASS cover, TOPSOIL.			
2			2		1.2			0.0	0.0			Brown fine to medium SAND, some ash, some coal, some slag, moist, loose. (FILL)			Cement/bentonite grout 52.8' – 0.0'
3	1		3	6											
4			4												
4			2		1.0			0.0	0.3						
5	2		3	9								grades to primarily ASH.			
6			6												
6			5												
6			3		1.8			0.0	4.4			Brown SILT, some clay, some oxidation staining, moist, soft.			
7	3		1	3											
8			2									grades to gray SILT and CLAY, wet, soft, semiplastic.			
8			2		0.4			0.0	0.4						
9	4		2	4								grades to trace fine gravel, wet.			
9			2												
10			4												
10			5		1.7			0.0	1.7			grades to gray SILT, little clay, moist, non to slightly plastic.			
11	5		6	12											
12			7												
12			6		1.4			0.0	1.6						
13	6		7	16											
13			9												
14			12												
14			5		1.8			0.0	1.7			grades to gray/brown SILT, little fine sand, little clay, moist, nonplastic.			
15	7		8	14											
15			6									grades to trace clay, damp.			
16			5												
16			7		NR			0.0	NA			Gray fine to coarse SAND, saturated, loose.			
17	8		9	17											
17			8												
18			7												
18			3		NR			NA	14.6						
19	9		4	13											
19			8												
20			4												
20			2		0.7			0.0	1.8						
21	10		3	4											
22			1												
22			2												

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-08 Well No.

Client: NYSEG
Site: Court St, Binghamton, NY

Date Start/Finish: 5/24/93 – 5/25/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size:** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 53.8 ft.
Borehole Depth: 52.8 ft.
Ground Surface Elev.: 843.9 ft.

General Location:
South center area of site, downgradient of potential source areas.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			3		0.8			1.2	70.1			grades to trace silt, slight coal tar odor.			
23	11		6 9	15											
24			8 7		0.6			0.6	26.3						
25	12		4 7	11											
26			7 7		0.5			0.6	58.1			Gray/brown SILT, little clay lense 26.3' – 26.4'.			
27	13		8 8	16		-						grades to dark gray fine SAND, trace silt, saturated,			
28			8 6		0.8		BSVJBM9301	11.6	53.4						
29	14		6 9	15											
30			10 4		1.0			4.8	116			slight coal tar odor.			
31	15		4 5	9											
32			10 9		0.7			2.1	77.0			grades to fine to medium SAND.			
33	16		7 9	16											
34			7 3		1.0			16.0	27.0						
35	17		4 6	10								lenses of **coal tar residue** in matrix, and **oil globules**, 34.4' – 39.0'.			
36			8 8		1.0			36.0	438						
37	18		6 8	14											
38			6 6		1.4			30.8	3375						
39	19		9 10	19								No coal tar residue or oil globules after 39.0'			
40			10 6		1.0			5.3	70.5			grades to fine SAND, trace silt.			
41	20		10 10	20											
42			11 8		1.2			13.0	27.5						
43	21		10 12	22								Brown SILT, some fine to coarse sand, some fine gravel, wet, medium dense.			
			14												

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-08 Well No.

Client: NYSEG
Site: Court St, Binghamton, NY

Date Start/Finish: 5/24/93 – 5/25/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 53.8 ft.
Borehole Depth: 52.8 ft.
Ground Surface Elev.: 843.9 ft.

General Location:
South center area of site,
downgradient of potential source areas.

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			9		0.9			4.0	70.4			grades to wet to moist.			
45	22		37 13	50											
46			12 25		0.4			0.0	139						
47	23		18 20	38											
48			15 7		0.4			4.7	34.0			grades to moist.			
49	24		7 12	19											
50			20 20		0.8			0.4	20.6			grades to gray SILT and fine to medium GRAVEL, moist to damp, dense.			
51	25		40 35	75											
52			36 35		NR			1.2	NA			grades to very dense.			
53	26		50/.5									Bottom of boring at 52.8 ft. (TILL)			

NOTES:
Augered 0.0' – 2.0' feet without sampling.
Augered from 52.5 to 52.8' to confirm the presence of till.
Borehole grouted to surface with cement/bentonite grout.
WOH – Weight of hammer
NR – No recovery
NA – Not available

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-09 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/25/93 – 5/25/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 59.5 ft.
Borehole Depth: 58.5 ft.
Ground Surface Elev.: 845.6 ft.

General Location:
Gasholder No. 4

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															
1															
2			20		1.2			0.0	0.9			Brown fine to coarse SAND and fine to coarse GRAVEL, dry, loose. (FILL)			Cement/bentonite grout 58.5' – 0.0'
3	1		24												
			17	41											
4			50/2									CONCRETE			
5	2		4		1.6			1.2	4.2			Brown fine to coarse SAND and fine to medium GRAVEL, dry, loose.			
			7												
6			6	11											
			5		1.0			4.6	38.3			grades to damp, slight coal tar odor.			
7	3		3												
			2	5											
8			3												
			5		0.6			4.7	31.7						
9	4		4												
			7	11											
10			10												
			6		0.6			0.1	9.8			grades to moist, no odor.			
11	5		5												
			4	9											
12			7												
			6		0.2			0.4	17.2			grades to wet.			
13	6		4												
			3	7											
14			9												
			9		0.9			0.5	10.3			Gray/brown SILT, little clay, moist to wet, stiff.			
15	7		11												
			12	23								grades with fine to medium GRAVEL, little **coal tar residue** in matrix, wet.			
16			12												
			10		0.2			0.0	10.5			Gray/brown fine to coarse SAND, saturated, loose. No coal tar residue or oil globules after 16.0'.			
17	8		9												
			2	11											
18			2												
			3		0.6			3.5	28.5			grades with little fine gravel, slight odor.			
19	9		4												
			1	5											
20			2												
			WOH		1.6			1.9	35.1						
21	10		WOH												
			WOH												
22			2												

Geologist Initials: VAD + TRD

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-09 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/25/93 – 5/25/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 59.5 ft.
Borehole Depth: 58.5 ft.
Ground Surface Elev.: 845.6 ft.

General Location:
Gasholder No. 4

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			4		1.0			0.6	34.5						
23	11		4 6	10											
24			9 WOH		1.3			1.4	7.3			grades to fine to coarse SAND and fine to medium GRAVEL.			
25	12		3 3	6								grades to dark gray fine to medium SAND.			
26			4 3		1.8			0.0	2.9						
27	13		3 3	6			BSVJBM9301								
28			4 4		1.6			0.0	1.7						
29	14		8 18	26											
30			18 5		0.5			1.4	3.5			grades to fine to coarse SAND and fine to medium GRAVEL.			
31	15		7 10	17											
32			12 10		1.0			0.0	0.7			grades to brown fine SAND, wet, medium dense.			
33	16		11 12	23											
34			13 12		0.6			0.0	0.9						
35	17		6 7	13											
36			9 11		0.8			0.0	0.4						
37	18		11 12	23											
38			13 10		1.2			0.0	0.0			grades to fine to coarse SAND lense 38.0' – 38.6'.			
39	19		13 11	24											
40			12 4		0.8			0.0	0.0						
41	20		6 11	17											
42			12 7		0.6			0.0	0.0						
43	21		7 9	16											
44			12												

Geologist Initials: VAD + TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-09 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/25/93 – 5/25/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 59.5 ft.
Borehole Depth: 58.5 ft.
Ground Surface Elev.: 845.6 ft.

General Location:
Gasholder No. 4

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			9		1.0			0.0	0.0			grades to fine to coarse SAND.			
45	22		10 13 16	23											
46			6		1.0			0.0	0.0						
47	23		9 10 12	19											
48			7		1.0			0.0	0.1						
49	24		20 18 10	38											
50					1.6			0.0	0.4						
51	25		10 9												
52			13 9	22	0.6			0.0	0.6			Gray SILT and fine to medium GRAVEL, wet, stiff.			
53	26		9 45	54								grades to moist.			
54			50/.5		0.6			0.0	0.0						
55	27		18 25 23	48								grades to damp.			
56	28		37 100/.5		NR			NA	NA			Gray green fine to medium SAND and fine to medium GRAVEL, some silt, embedded gravel, damp, hard. (TILL)			
57	29		150/.3		NR			NA	NA						
58			58		0.6			NA	NA						
59	30		50 61	111								Bottom of boring at 58.5 ft..			
60												**NOTES:** Augered 0.0' – 2.0' feet without sampling. Borehole grouted to surface with cement/bentonite grout. WOH – Weight of hammer NR – No recovery NA – Not available			
61															
62															
63															
64															
65															

Geologist Initials: VAD"+ TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-10 Well No.

Client: NYSEG
Site: Court St, Binghamton, NY

Date Start/Finish: 5/27/93 – 5/27/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 58.2 ft.
Borehole Depth: 57.2 ft.
Ground Surface Elev.: 844.4 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															
1												Brown fine to coarse SAND and fine to medium GRAVEL, little silt, dry, loose. (FILL)			
2			48		1.3			0.0	3.1						Cement/bentonite grout 57.2' – 0.0'
3	1		15 14	29								grades with black staining and little brick.			
4			7 2		0.6			200	48.4						
5	2		2 1	3											
6			2 2		0.8			714	483			mixed with some **coal tar residue**.			
7	3		2 50/.4									Black SILT, some fine to coarse sand and fine to medium gravel, wet, loose.			
8												CONCRETE.			
9															
10			9 7		1.8			518	282			Gray SILT, trace clay, moist, stiff, some black staining, no coal tar residue in matrix.			
11	4		8 8	15											
12			7 12		1.9		BSVTBN9310	237	517			grades to some **coal tar residue** in matrix.			
13	5		13 14	25											
14			5 6		1.8			3.5	473						
15	6		9 7	15											
16			7 9		1.6			27.3	248			No coal tar residue after 18.0'.			
17	7		9 9	18											
18			5 5		0.8			4.3	127						
19	8		6 3	11											
20			3 3		1.1			2.3	41.1			Dark gray fine to coarse SAND and fine to medium GRAVEL, wet, loose.			
21	9		4 4	7											

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-10 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/27/93 – 5/27/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 58.2 ft.
Borehole Depth: 57.2 ft.
Ground Surface Elev.: 844.4 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			3		1.6			2.4	45.6			grades to fine to coarse SAND, little silt.			
23	10		3	6											
24			4		1.6			0.2	24.2						
25	11		6	15								grades to brown fine SAND and SILT.			
26			9		1.5			0.4	18.8						
27	12		10												
28			4	11	1.0			2.3	27.7			grades to brown to dark gray fine to coarse SAND.			
29	13		5												
30			1												
31	14		6	7											
32			6		1.0			2.3	12.2						
33	15		4												
34			5	10								Brown SILT, some fine sand lense 31.0' – 31.5'.			
35	16		5		1.2			0.9	29.1						
36			6												
37	17		6	12											
38			5		1.1			0.4	27.7						
39	18		6												
40			11	23											
41	19		12												
42			14												
43	20		3		0.8			0.8	27.0						
			5												
			8	13											
			9												
			9		0.8			0.1	11.1						
			10												
			15	25											
			16												
			5		1.1			0.0	8.1			grades to brown fine SAND, some silt.			
			9												
			14	23											
			15												
			7		1.0			1.5	9.0						
			7												
			7	14											
			8												

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-10 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/27/93 – 5/27/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 58.2 ft.
Borehole Depth: 57.2 ft.
Ground Surface Elev.: 844.4 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			7		0.9			1.1	20.4						
45	21		9 14	23											
			13												
46			23		1.0			1.7	79.9						
47	22		17 15	32											
			17												
48			13		0.5			0.8	65.4						
49	23		25 13	48								Brown/gray SILT and fine to medium GRAVEL, moist to wet, medium dense.			
			15												
50			18		1.1			3.9	41.3			grades to dense.			
51	24		14 15	29											
			26												
52			11		0.6			7.5	100						
53	25		13 17	30											
			18												
54			9		1.1			2.7	19.2						
55	26		14 33	47											
			50/.3									Gray/green fine to medium SAND and fine to medium GRAVEL, some silt, moist, dense to very dense. (TILL)			
56			8		0.1			11.5	40.6						
57	27		28 50/.2									Bottom of boring at 57.2 ft.			
58															
59															
60															
61															
62															
63															
64															
65															

NOTES:
Augered 0.0' – 2.0' feet without sampling.
Augered to 57.2 to confirm presence of till.
Borehole grouted to surface with cement/bentonite grout.
WOH – Weight of hammer
NR – No recovery
NA – Not available

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND, BOUCK & LEE INC.
ENGINEERS & SCIENTISTS

Boring No. TB-11 Well No.

Client: NYSEG
Site: Court St., Binghamton, NY

Date Start/Finish: 5/27/93 – 5/27/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I. D.
Hammer Weight: 140-lbs.
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 2 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 15.3 ft.
Borehole Depth: 14.3 ft.
Ground Surface Elev.: 845.4 ft.

General Location:
Gasholder No. 1

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Analytical Sample	Sample ID	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															
1												Brown fine to coarse SAND and fine to medium GRAVEL, trace silt, damp, loose.			
2			10		0.1			0.0	7.0			grades to wet.			Cement/bentonite grout 35.6' – 0.0'
3	1		13 21	34											
4			16 19		0.8			0.0	17.9						
5	2		10 11	21											
6			8 8		0.8			14.7	231			grades with some black thick **coal tar residue** and **oil globules.**			
7	3		6 8	14											
8			4 10		0.7		BSVXBN9311	39.7	341						
9	4		4 40	44								saturated.			
10			30 3		1.6	X		57.3	374			saturated with black thick **coal tar residue.**			
11	5		56 32	88		X									
12			7 4		1.6	X		46.0	NA						
13	6		6 5	11						▽					
14	7		4 60/.3		0.3			31.0	NA			red brick pieces in end of spoon.			
15												Bottom of boring at 14.3 ft.			
16															
17															
18															
19															
20															
21															
22															

NOTES:
Augered 0.0' – 2.0' feet without sampling.
Auger to 14.3' possible foundation.
Borehole grouted to surface with cement/bentonite grout.
WOH – Weight of hammer
NR – No recovery
NA – Not available

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

Date Start/Finish: 9/18/97 / 9/18/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 1006227.93547
Easting: 767146.92645

Borehole Depth: 10 ft.
Ground Surface: 844.07 feet

Geologist: Matthew W. Erbe

Soil Boring No: SB-01

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

DEPTH	ELEVATION	Sample Interval	Sample Type Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
gs elevation 844.07 ft.									**GROUND SURFACE**
		S-1		5 17 20 16	37	1.4	0.0		Gray medium GRAVEL, very loose (FILL). Brown fine to medium GRAVEL, some Silt, trace fine Sand, slag, coal and concrete fragments, loose, moist. As above, trace ceramic fragments.
		S-2		5 6 6 5	12	1.8	0.0		Brown to light brown fine to medium GRAVEL, some Silt and Clay, moderately cemented, little to some slag, coal, and brick fragments, moist (FILL).
	840								
5		S-3		5 7 7 6	14	1.6	0.7		Light brown fine to medium GRAVEL and SILT, little to trace slag, coal, and brick fragments, moist (FILL). As above, piece of white and black slag. Black fine to coarse SAND size coal and slag, moist (FILL).
		S-4		6 4 3 3	7	0.8	0.0		Light brown fine to medium GRAVEL and SILT, weakly cemented, moist. Dark brown SILT, little fine Gravel, trace coal fragments, moist to wet (FILL).
	835	S-5		2 3 3 5	6	2.0	0.0		As above, poor recovery. Brown fine SAND, little fine to medium Gravel, coal fragments (2mm), white flakes (waste material), weakly cemented, moist to wet (FILL).
10									Brown fine SAND and SILT, trace fine Gravel, slag (2mm), and coal (FILL). Orange brown CLAYEY SILT, Fe mottling, trace brick and coal, wet (FILL). Greenish gray CLAYEY SILT, some black streaks, moderate cementation, trace brick, stiff (FILL). At 9.8' bgs, brick fragment (3mm).
	830								Bottom of boring 10.0' bgs.
15									

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:
PCB composite sample taken from (1.0-1.2'). Sample intervals (2-4' & 4-6') analyzed of PAHs, total benzene, TCLP benzene. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
9/18/97	834.27	9.8 ▼

Project: 130.36.002
Script: gmbore
Date: 04/01/98

Date Start/Finish: 9/17/97 / 9/17/97 **Drilling Company:** MAXIM Technologies, Inc. **Driller's Name:** Rodney Bush **Drilling Method:** HSA **Auger Size:** 4.25 ID in. **Rig Type:** 82 Acker **Spoon Size:** 3 in.	**Northing:** 1006432.46799 **Easting:** 767156.11764 **Borehole Depth:** 8 ft. **Ground Surface:** 844.87 feet **Geologist:** LaRae N. Mishler	**Soil Boring No: SB-02** **Client:** New York State Electric & Gas **Location:** Court Street Yard Binghamton, New York

DEPTH	ELEVATION	Sample Interval	Sample Type Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
	gs elevation 844.87 ft.								**GROUND SURFACE**
		S-1		15 17 19 18	36	1.7	0.0		Brown fine to coarse SAND and fine to coarse GRAVEL, little Silt, loose, dry. (FILL)
									Light brown fine to medium SAND and fine to coarse GRAVEL, little Silt, dry to moist. (FILL) At 0.7', 0.1' thick layer of black coated fragments.
		S-2		10 11 8 5	19	1.5	0.0		Black fine to coarse SAND and fine to coarse GRAVEL sized coal fragments, moist. (FILL)
									As above, Fe staining, piece of white slag.
									As above, no Fe staining, no white slag.
5	840	S-3		4 10 8 4	18	1.0	0.0		Brick.
									No recovery from 5-6'.
		S-4		5 4 3 4	7	0.8	48.7		Coal fragments, trace pieces of brick. (FILL)
									Saturated.
									Slag, black coated, slight sheen, odor. (FILL)
									Bottom of boring 8.0' bgs.
10	835								
15	830								

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

PCB composite sample taken at 0.7'. Sample intervals (2-4' & 4-6') analyzed for PAHs, total benzene, TCLP benzene. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 9/17/97 / 9/17/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 1006534.54148
Easting: 767146.48907

Borehole Depth: 6 ft.
Ground Surface: 844.81 feet

Geologist: LaRae N. Mishler

Soil Boring No: SB-03

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

DEPTH	ELEVATION	Sample Interval	Sample Type Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
	gs elevation 844.81 ft.								**GROUND SURFACE**
		S-1		15 20 14 8	34	1.3	0.0		Brown fine to coarse SAND and fine to medium GRAVEL, little Silt, loose, dry. (FILL) Color change to dark brown, coal fragments.
		S-2		6 5 4 3	9	0.4	0.0		Black coated fine to coarse Sand size fragments, trace slag. (FILL) Orange-brown SILT and fine SAND, 0.1" black layer at 2.05'.
5	840	S-3		3 2 1 3	3	1.6	15.0		Tan fine SAND (0.1' thick), dense, moist. (FILL) At 2.2', tan/orange color change. At 2.3', brick. Brown fine to medium SAND and SILT, brick fragments, moist. (FILL) Orange SILT and fine SAND, moist. (FILL) White/tan fine to medium SAND, trace Silt, moist. (FILL) Fine to coarse SAND and fine to coarse GRAVEL sized coal fragments. (FILL) At 6.0', saturated, slight sheen, odor.
10	835								Bottom of boring 6.0' bgs.
15	830								

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:
PCB composite sample taken at 1.3'. Sample intervals (0-2' & 4-6') analyzed of PAHs, total benzene, TCLP benzene. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth

Project: 130.36.002
Script: gmbore
Date: 04/01/98

Date Start/Finish: 9/16/97 / 9/16/97 **Drilling Company:** MAXIM Technologies, Inc. **Driller's Name:** Rodney Bush **Drilling Method:** HSA **Auger Size:** 4.25 ID in. **Rig Type:** 82 Acker **Spoon Size:** 3 in.	**Northing:** 1006315.68988 **Easting:** 766956.04409 **Borehole Depth:** 20 ft. **Ground Surface:** 845.48 feet **Geologist:** LaRae N. Mishler	**Soil Boring No: SB-04** **Client:** New York State Electric & Gas **Location:** Court Street Yard Binghamton, New York

DEPTH	ELEVATION	Sample Interval	Sample Type	Number	Blow/6 in.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
gs elevation 845.48 ft.										**GROUND SURFACE**
	845	S-1			21 29 35 34	64	1.6	0.0		Brown SILT and fine to medium, rounded GRAVEL, dry.
		S-2			16 27 35 36	62	1.7	0.0		Gray fine to coarse GRAVEL, subrounded to angular, trace Silt, dry. Brown SILT and fine to coarse SAND, little fine to medium Gravel, moist. At 2.3', black-coated coarse, angular Sand.
5		S-3			14 13 14 9	27	2.0	14.1		At 3.2', cobble (>3"). At 3.7', trace black-coated sand-size fragments.
	840	S-4			3 3 4 5	7	2.0	0.3		Brown SILT and fine to medium GRAVEL, moist. (FILL) Fine to coarse GRAVEL and fine to medium SAND, coated with black residue, odor. (FILL) Greenish gray SILT, some fine to medium Sand, black staining, Fe staining, moist. (FILL) From 7.4' to 7.8', white staining, pieces of ceramic.
		S-5			2 1 4 3	5	0.8	16.1		At 9.0', black coated fragments. At 9.5', white ceramic fragments.
10	835	S-6			1 2 4 6	6	1.2	20.1		At 9.9', black staining, slight sheen, slight odor, moist. Greenish gray SILT, slightly plastic, Fe staining, moist.
		S-7			5 7 10 14	17	1.8	37.1		As above, dark red spotting throughout with slight sheen.
15		S-8			3 4	11	1.7	124		

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

PCB composite sample taken from (2.0-2.2'). Sample intervals (2-4' & 12-14') analyzed of PAHs, total benzene, TCLP benzene. Sample interval (12-14') analyzed for reactivity.
bgs - below ground surface.

Saturated Zones

Date / Time	Elevation	Depth
9/16/97	828.98	16.5 ▼

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

Soil Boring No: SB-04

Total Depth = 20 ft.

DEPTH	ELEVATION	Sample Interval	Sample Type Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
	830	S-8		7 8	11	1.7	124		At 14' bgs, greenish gray SILT, dark red spotting throughout, sheen, odor.
		S-9		6 10 10 11	20	1.6	115		As above, moist.
		S-10		2 3 3 2	6	0.8	62.4		As above.
20	825								At 19.7', sheen, brown oily spots, odor, saturated at 20'. Bottom of boring 20.0' bgs.
25	820								
30	815								
35									

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:
Water in augers up to 16.5' below ground surface. Tape was covered with brown oily substance.

Saturated Zones

Date / Time	Elevation	Depth
9/16/97	828.98	16.5 ▼

Project: 130.36.002
Script: gmbore
Date: 04/01/98

Date Start/Finish: 9/16/97 / 9/16/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 1006412.89901
Easting: 766980.32487

Borehole Depth: 14 ft.
Ground Surface: 844.20 feet

Geologist: Matthew W. Erbe

Soil Boring No: SB-05

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

DEPTH	ELEVATION	Sample Interval	Sample Type Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
gs elevation 844.20 ft.									**GROUND SURFACE**
		S-1		26 34 45 40	79	2.0	0.0		Brown SILT and fine to medium GRAVEL, loose, dry. (FILL).
									Dark brown fine to medium GRAVEL and SILT, dense. (FILL).
		S-2		45 29 21 21	50	1.0	0.0		At 1.2', trace black coated fragments. At 1.5', piece of orange plastic, trace fine to coarse Sand. As above, some slag, Fe staining, white ceramic (0.5") at 2.5'.
	840								At 2.75', orange spots.
5		S-3		17 21 10 11	31	1.2	1.8		At 2.9', cobble, loose, dry. Dark brown fine to medium GRAVEL, coarse SAND, and SILT, some black staining, dry. (FILL).
		S-4		2 3 3 2	6	1.8	0.0		Yellow brown CLAY with orange specks, black Sand, trace orange brick. (FILL). At 5.1', black sheen on soil, then gray SILT and GRAVEL, dry. (FILL).
		S-5		1 2 2 3	4	1.3	0.0		Gray brown SILT and CLAY, brick fragment at 6.1', wet to moist. (FILL). Gray brown SILT, some Clay, orange staining throughout, moist.
	835								
10		S-6		2 4 6 7	10	1.8	0.3		As above. Medium Gravel seam (0.1' thick), dry to moist.
		S-7		3 4 5 6	9	2.0	1.4		Gray SILT and CLAY, orange staining, moist. At 12.1' and 12.3', 0.5" thick black Silt seams. Rootlets from 12.5' to 13.2'.
	830								Bottom of boring 14.0' bgs.
15									

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Remarks:
PCB composite sample taken from (1.0-1.2'). Sample intervals (2-4' & 4-6') analyzed of PAHs, total benzene, TCLP benzene. Sample interval (4-6') analyzed for reactivity and as MS/MSD. 3" spoons from (0-6') then 2" (8-14'). bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth

Project: 130.36.002
Script: gmbore
Date: 04/01/98

Date Start/Finish: 9/17/97 / 9/17/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 1006427.73148
Easting: 766898.97821

Borehole Depth: 6 ft.
Ground Surface: 844.22 feet

Geologist: LaRae N. Mishler

Soil Boring No: SB-06

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

DEPTH	ELEVATION	Sample Interval	Sample Type	Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
	gs elevation 844.22 ft.									**GROUND SURFACE**
		S-1			35 24 19 15	43	1.8	0.0		Brown fine to coarse GRAVEL, rounded, little Silt, loose, dry.
		S-2			9 9 7 7	16	1.5	1.2		Dark brown fine to medium GRAVEL and SILT, dense, moist. (FILL) At 1.5', Fe staining, then black staining to 2.0'. As above.
	840	S-3			3 2 5 15	7	1.0	85.1		At 3.8', charred wood layer (0.5" thick). At 3.7', Silt content increases, moist at bottom of spoon. Greenish brown fine to medium GRAVEL and SILT, black staining, moist. (FILL)
5										At 5.8', coarse Gravel coated in viscous black substance, then grass and viscous black substance, strong odor.
	835									Bottom of boring 6.0' bgs.
10										
	830									
15										

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Remarks:
PCB composite sample taken from (1.0-1.2'). Sample intervals (0-2' & 4-6') analyzed of PAHs, total benzene, TCLP benzene. Sample interval (4-6') analyzed for reactivity and duplicate of reactivity. 2" Split spoons used (6-14'). bgs - below ground surface.

Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 9/17/97 / 9/17/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 1006526.09842
Easting: 766989.33265

Borehole Depth: 8 ft.
Ground Surface: 844.20 feet

Geologist: LaRae N. Mishler

Soil Boring No: SB-07

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

DEPTH	ELEVATION	Sample Interval	Sample Type Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
	gs elevation 844.20 ft.								**GROUND SURFACE**
		S-1		15 25 26 13	51	2.0	0.5		Brown medium to coarse SAND and fine GRAVEL, some Silt, loose, dry. (FILL)
		S-2		10 5 4 3	9	1.8	0.0		Dark brown fine to medium GRAVEL and fine to coarse SAND, some Silt, dry to moist. (FILL) At 0.6', Fe staining. At 0.8', black staining to 1.0'. Brick fragments. Black, small fragment of coal.
5	840	S-3		6 3 3 3	6	1.7	0.0		As above, black layer from 2.4' to 2.5'. SLAG waste, black, red, and white fragments, fine to coarse Sand and fine to medium Gravel-sized. (FILL) Dark brown SILT and fine to coarse SAND, trace fine to medium Gravel, moist. (FILL)
		S-4		4 3 2 3	5	0.6	0.0		Black SILT and fine to coarse SAND. (FILL) SLAG waste. Brown SILT, Fe stained, moist. (FILL)
10	835								SLAG waste, Fe stained. At 5.2', piece of coal. Saturated at 6.7' bgs. Dark green SILT and CLAY, saturated.
	830								Bottom of boring 8.0' bgs.
15									

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Remarks:
Sample intervals (0-2' & 4-8') analyzed of PAHs, total benzene, TCLP benzene. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth

Project: 130.36.002
Script: gmbore
Date: 04/01/98

Date Start/Finish: 9/24/97 / 9/24/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 2 in.

Northing: 1006333.76425
Easting: 766677.81012

Borehole Depth: 50 ft.
Ground Surface: 849.77 feet

Geologist: Matthew W Erbe

Soil Boring No: TB-12

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

DEPTH	ELEVATION	Sample Interval	Sample Type	Sample Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
gs elevation 849.77 ft.										**GROUND SURFACE**
		S-1			7 42 39 41	81	1.0	0.0		Brown SILT, grass rootlets, loose, dry (TOPSOIL). Brown SILT and fine GRAVEL, loose, dry. (FILL) Light gray SILT, very fine SAND, and medium to coarse subround to subangular GRAVEL, loose, dry. (FILL)
		S-2			53 47 32 26	79	1.0	0.0		Light brown very fine SAND and SILT, some fine to medium GRAVEL, trace coal fragments, loose, dry. (FILL)
5	845	S-3			14 10 8 6	18	0.7	1.1		As above.
		S-4			9 9 8 7	17	1.0	0.0		Light brown fine SAND and medium GRAVEL, trace coal, medium dense, dry. (FILL)
		S-5			7 7 4 4	11	0.7	0.0		Light brown fine SAND and medium GRAVEL, trace SILT, medium dense, moist. (FILL)
10	840	S-6			4 4 3 2	7	0.5	0.0		Wet at 9.5' bgs. As above, loose. One 0.02' white fine Gravel seam.
		S-7			3 4 5 3	9	0.0	NA		No recovery.
15	835	S-8			1 1	2	0.3	0.0		Brown SILT and fine to medium GRAVEL, trace fine Sand, brick fragments, saturated, very loose. (FILL)

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Remarks:
Sampled for TOC 46-48' and 48-50' bgs. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

Soil Boring No: TB-12

Total Depth = 50 ft.

DEPTH	ELEVATION	Sample Interval	Sample Type Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
		S-8		1 1	2	0.3	0.0		As above, no brick.
		S-9		1 2 2 2	4	0.3	0.9		As above, color change to reddish brown.
		S-10		3 2 3 3	5	0.7	1084		Moderate brownish gray fine SAND, some fine to medium Gravel, loose, odor.
20	830	S-11		3 4 4 7	8	0.5	763		Brown gray fine to medium GRAVEL, little dark gray, fine Sand, trace Silt, loose, strong odor.
		S-12		5 3 4 3	7	0.6	252		Dark gray fine to medium GRAVEL, trace very fine and coarse Sand, Silt, loose, strong odor.
25	825	S-13		6 5 4 5	9	0.3	301		Brown fine SAND and fine to medium GRAVEL, no odor.
		S-14		5 2 2 3	4	0.3	80.1		As above.
		S-15		2 3 3 4	6	0.7	2.9		As above, some coarse Sand.
30	820	S-16		13 19 19 16	38	1.5	44.6		Olive gray SILT and fine GRAVEL, dense.
		S-17		16 16 16 17	32	1.8	42.1		Brown very fine to fine SAND and fine GRAVEL, very loose.
35	815	S-18		15 17	43	1.0	15.2		As above, dense.
									Brown SILT, very fine SAND, and fine GRAVEL.
									Brown to dark gray fine to coarse SAND and medium GRAVEL, little to some Silt, moderately cemented, trace rounded white granite and red sandstone Gravel.
									Brown fine to coarse, subangular SAND, dense.
									Grades to medium to coarse, rounded GRAVEL, moderately cemented by grayish brown Silt.
									One red sandstone fragment.
									Brown fine to medium, subangular SAND, trace Silt.

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

Soil Boring No: TB-12

Total Depth = 50 ft.

DEPTH	ELEVATION	Sample Interval	Sample Type Number	Blow/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geologic Column	Stratigraphic Description
		S-18		26 33	43	1.0	15.2		As above, no Silt.
		S-19		19 25 17 16	42	2.0	47.5		Grades to grayish brown fine to coarse, well rounded GRAVEL, some Silt, trace medium Sand. Yellow brown Silt and fine, rounded Gravel seam, moderately cemented.
		S-20		19 13 13 14	26	1.0	23.8		Light brownish gray fine to medium GRAVEL, some SILT, little to trace fine to medium Sand (many rock types present), loose cementation, medium dense.
40	810	S-21		12 20 36 25	56	1.0	16.9		As above, some Silt and fine to medium Sand.
		S-22		17 10 9 8	19	1.5	3.1		As above. Grades to fine to medium SAND. Brown fine to medium, subangular SAND, trace fine Gravel.
45	805	S-23		7 7 8 11	15	2.0	45.2		Brown fine to medium, subangular SAND, trace Silt. At 44.7', 0.1" thick fine to medium Gravel and Sand seam. At 44.9', 0.1" thick Silty Sand seam. At 45.9', 0.1" thick Silty Sand seam.
		S-24		7 11 20 35	31	2.0	30.5		Brown fine to medium, subangular SAND, trace Silt, dense.
		S-25		57 89 42 37	131	1.5	2.5		Gray brown SILT and coarse SAND to fine GRAVEL (rounded, many types), trace fine Sand, very dense (TILL). As above, little fine Sand (TILL).
50	800								Bottom of spoons 50.0' bgs. Bottom of boring 48.0' bgs.
55	795								

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Remarks:
3" split spoon used 48-50' bgs. A shelby tube attempt at that interval was unsuccessful.

Saturated Zones

Date / Time	Elevation	Depth

DRAFT

Date Start/Finish: 5/18/98 / 5/18/98 **Drilling Company:** MAXIM Technologies, Inc. **Driller's Name:** Rodney Bush **Drilling Method:** Hollow-Stemmed Auger **Auger Size:** ID 4.25 in. **Rig Type:** CME 55 **Spoon Size:** 2 in.	**Northing:** 767108.10962 **Easting:** 1006570.99605 **Borehole Depth:** 11 ft. **Ground Surface:** 844.62 feet **Geologist:** Michael Cobb	**Soil Boring No: SB-20** **Client:** New York State Electric & Gas **Location:** 293 Court Street Property, Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
gs elevation 844.62 ft.										**GROUND SURFACE**	
										Asphalt (pavement).	
		S-1 2" SS		3 1 1 1	2	0.9	1.2			Dark brown to black fine SAND, some Silt and medium Sand, little coarse Sand, trace brick fragments, dry to moist.	
		S-2 2" SS		1 1 2 1	3	0.9	2.1			Dark brown to black fine to coarse SAND, some silt and coal cinders, moist.	
5	840	S-3 2" SS		1 1 1 1	2	0.8	23.7			Dark brown to black coarse SAND to fine GRAVEL, some fine to medium SAND, oily staining, odor, moist.	Borehole backfilled with cement/bentonite grout.
		S-4 2" SS		1 1 1 1	2	0.9	12.1			In spoon-tip (5-7' interval), light gray SILT, black oily staining.	
10	835	S-5 2" SS		1 1 1 1	2	1.0	12.1			Olive gray SILT and CLAY, little medium to coarse Sand, thick black oily staining, wet, strong odor. Black SILT with stringers of fine to coarse Sand, black oily staining, wet, strong odor.	
										Bottom of spoons at 11' bgs. Bottom of boring at 9' bgs.	
15	830										

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Remarks:

bgs = below ground surface. SS = Split-Spoon Samples collected from 7-11' bgs submitted for anaylses of VOCs, SVOCs, TCLP Benzene, Total and Amenable Cyanide, and Metals.

Saturated Zones

Date / Time	Elevation	Depth

DRAFT

Date Start/Finish: 5/21/98 / 5/21/98 **Drilling Company:** MAXIM Technologies, Inc. **Driller's Name:** Rodney Bush **Drilling Method:** Hollow-Stemmed Auger **Auger Size:** ID 4.25 in. **Rig Type:** CME 55 **Spoon Size:** 3 in.	**Northing:** 767156.49965 **Easting:** 1006628.23657 **Borehole Depth:** 6 ft. **Ground Surface:** 845.77 feet **Geologist:** Michael Cobb	**Soil Boring No: SB-21** **Client:** New York State Electric & Gas **Location:** 293 Court Street Property, Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
gs elevation 845.77 ft.									**GROUND SURFACE**	
845	S-1 3" SS		6 8 7	14	1.1	0.0			Concrete surface. Light brown fine to coarse SAND and fine GRAVEL, loose, dry.	Borehole backfilled with Type I Portland Cement/Bentonite Grout.
	S-2 3" SS		7 22 11 9	33	0.3	629			Poor recovery. Olive gray SILT and fine to coarse SAND, some orange mottling and black staining. Bottom 4" of spoon is covered with black oily liquid. In spoon tip, black stained medium to coarse SAND and fine GRAVEL, strong odor. Water in borehole at 3.5' bgs.	
5 840	S-3 3" SS		9 6 9 50/.4'	15	0.3	178			Concrete fragments, fine to medium GRAVEL, little medium to coarse SAND, trace copper wire fragments, heavy black oily staining, water and NAPL on spoon, low viscosity, strong odor.	
									Bottom of boring at 6' bgs.	
10 835									Water in borehole interpretted to be perched in a buried foundation, and not necessarily in communication with deeper groundwater.	
15										

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Remarks:

bgs = below ground surface. SS = Split-Spoon. NAPL = Non Aqueous Phase Liquid. Samples collected from 4-6' bgs submitted for analysis of VOCs, SVOCs, Total and Amenable Cyanide, and Metals.

Saturated Zones

Date / Time	Elevation	Depth

DRAFT

Date Start/Finish: 5/20/98 / 5/20/98 **Drilling Company:** MAXIM Technologies, Inc. **Driller's Name:** Rodney Bush **Drilling Method:** Hollow-Stemmed Auger **Auger Size:** ID 4.25 in. **Rig Type:** CME 55 **Spoon Size:** 2 in.	**Northing:** 767029.22909 **Easting:** 1006736.02707 **Borehole Depth:** 16 ft. **Ground Surface:** 844.85 feet **Geologist:** Michael Cobb	**Soil Boring No: SB-22** **Client:** New York State Electric & Gas **Location:** 293 Court Street Property, Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
gs elevation 844.85 ft.										**GROUND SURFACE**	
										Concrete surface.	
		S-1 2" SS		8 9 3	17	0.2	1.2			Medium brown fine to coarse SAND and fine GRAVEL, dry.	
		S-2 2" SS		3 4 50/ .4'	50+	0.2	8.0			Strike concrete at 3.4' bgs.	
5	840	S-3 3" SS		17 7 5 6	12	1.2	0.6			Dark reddish brown fine to coarse SAND, little silt concentrated in lenses, trace coal fragments, moist.	
		S-4 2" SS		3 2 3 2	5	1.1	41.4			Dark brown SILT, some fine to coarse Sand, little coal fragments, grading to black SILT, trace coal fragments, trace red staining, faint odor.	Borehole backfilled with Type I Portland Cement/Bentonite Grout.
		S-5 2" SS		2 2 2 3	4	1.8	88.0			Black stained SILT, some to little fine Sand, no fill traces, faint odor, becoming wet at 8.3'bgs.	
10	835	S-6 2" SS		6 4 2 3	6	1.7	318			Black stained SILT, as above. Oily staining and strong odor, wet.	
		S-7 2" SS		2 3 6 7	9	2.0	580				
15	830	S-8 2" SS		3 5	12	1.9	763				

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Remarks:

bgs = below ground surface. SS = Split-Spoon. Samples combined from 12-16' bgs for analysis of VOCs, SVOCs, Total, Amenable and Reactive Cyanide, Metals, and TPH.

Saturated Zones

Date / Time	Elevation	Depth

Client:
New York State Electric & Gas

Location:
293 Court Street Property,
Binghamton, New York

Soil Boring No: SB-22

Total Depth = 16 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
		S-8 2" SS		7 20	12	1.9	763			At 14' bgs, Black stained SILT, little fine Sand, slight sheens, strong odor, wet. In spoon tip, fine to coarse SAND and fine GRAVEL, reddish-brown NAPL, strong odor, wet.	
										Bottom of boring at 16' bgs.	
20	825										
25	820										
30	815										
35	810										

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth

DRAFT

Date Start/Finish: 5/19/98 / 5/19/98
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: Hollow-Stemmed Auger

Auger Size: ID 4.25 in.
Rig Type: CME 55
Spoon Size: 2 and 3 in.

Northing: 766957.97596
Easting: 1006737.77404

Borehole Depth: 18 ft.
Ground Surface: 843.26 feet

Geologist: Michael Cobb

Soil Boring No: SB-23

Client:
New York State Electric & Gas

Location:
293 Court Street Property,
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
gs elevation 843.26 ft.									**GROUND SURFACE**	
	S-1 2" SS		2 2 3 9	5	0.9	0.2			Grass covered surface. Medium brown fine SAND, some Silt, trace fine gravel, little rootlets and organic debris, moist.	
840	S-2 2" SS		7 7 8 13	15	1.2	0.8			Pale reddish-brown SILT, some to little fine SAND, little rootlets, Reddish brown to black medium to coarse SAND, some fine Sand and fine Gravel-sized cinders, loose, dry to moist.	
5	S-3 2" SS		6 3 2 2	5	0.4	0.2			Medium brown fine to coarse SAND, little Silt, trace fine Gravel, rootlets, loose, moist.	
	S-4 2" SS		3 3 4 5	7	2.0	0.2			Pale reddish brown SILT and fine SAND, trace medium to coarse Sand, moist. Becomes wet at 7.5 bgs.	Borehole backfilled with Type I Portland Cement/Bentonite Grout.
835	S-5 2" SS		5 4 3 4	7	0.3	0.3				
10	S-6 2" SS		4 4 5 5	9	1.3	0.2			Pale reddish brown SILT, some fine Sand concentrated in seams, trace medium Sand, wet.	
	S-7 2" SS		2 2 3 3	5	1.7	1553			As above, grading to black fine SAND, some Silt, oily sheens, petroleum-like odor, wet.	
830	S-8 3" SS		3 5	18	2.0	1340			As above with more SILT, heavy sheens, strong odor, wet.	
15										

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Remarks:

bgs = below ground surface. SS = Split-Spoon. Samples collected from 16-18' bgs submitted for analysis of VOCs, SVOCs, Total, Amenable and Reactive Cyanide, Metals, and TPH.

Saturated Zones

Date / Time	Elevation	Depth

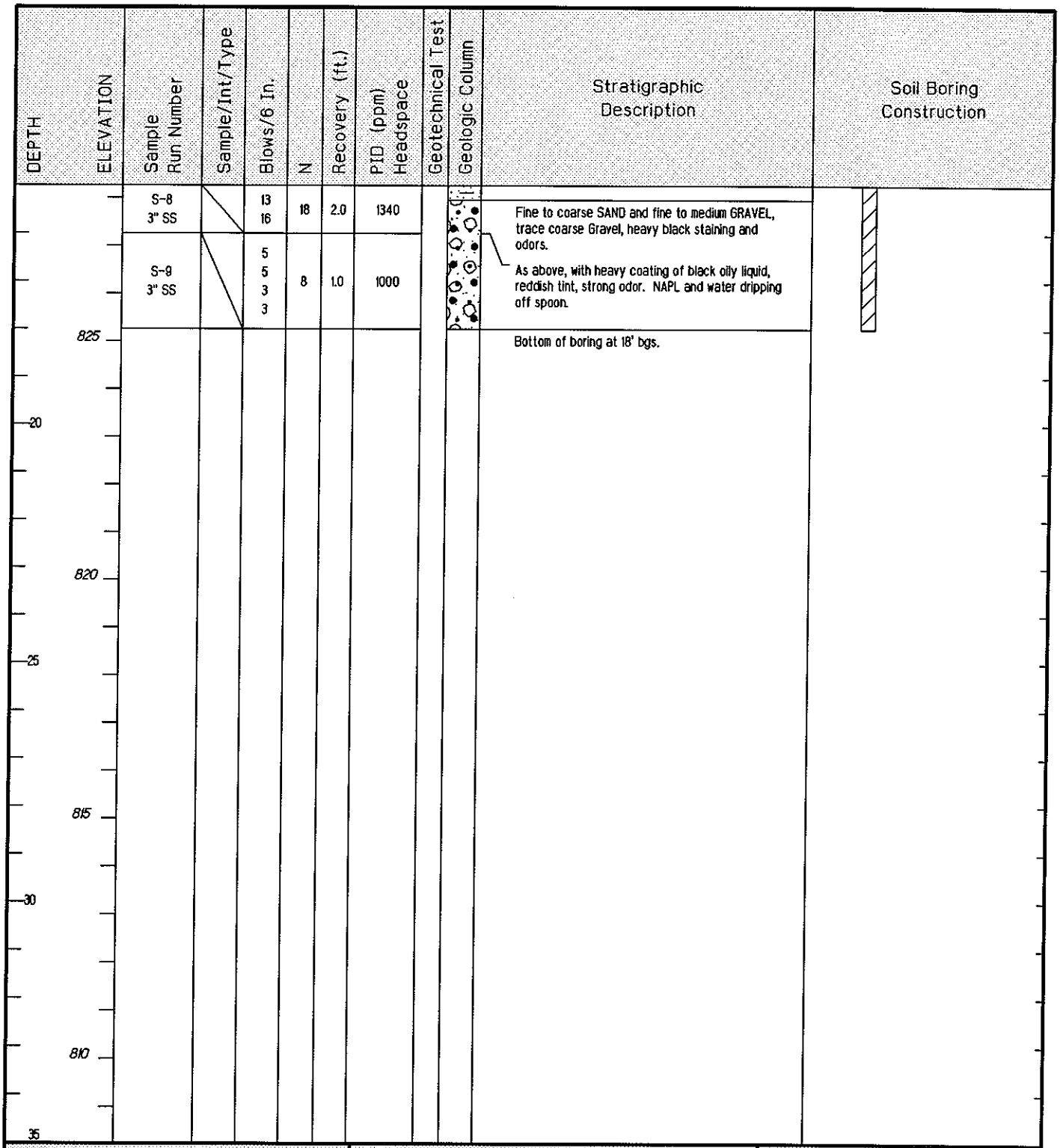
Project: 130.36.006
Script: nbblwell
Date: 02/24/99

Client:
New York State Electric & Gas

Location:
293 Court Street Property,
Binghamton, New York

Soil Boring No: SB-23

Total Depth = 18 ft.



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Remarks:
NAPL = Non Aqueous Phase Liquid.

Saturated Zones

Date / Time	Elevation	Depth

Project: 130.36.006
Script: nbblwell
Date: 02/24/99

Date Start/Finish: 08/03/01 - 08/06/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. and 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 767172.61 **Easting:** 1006735.65 **Casing Elevation:** NA **Surface Elevation:** 846.31 ft. AMSL **Borehole Depth:** 50 ft. bgs **Descriptions By:** Michael K. Cobb	**Boring ID: SB-101** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0								
845	1	0-2	NA 15 20 17	35	0.5	0.0		Asphalt. Medium brown and gray fine to coarse SAND and GRAVEL [FILL], dry, no odor/staining/sheen.
	2	2-4	6 3 5 8	8	1.6	0.2		SAND and GRAVEL as above but with weathered Brick debris, trace white fibers, no odor/staining/sheen.
5	3	4-6	3 6 3 3	9	1.0	0.2		Black fine grained COAL, no odor/staining/sheen. Tan orange/rust mottled SILT, gray staining, blocky and spongy texture, moist, no odor or sheen.
840	4	6-8	4 6 6 7	12	1.0	0.2		Medium reddish brown SILT, trace black/rust mottling, no odor/staining/sheen.
	5	8-10 3-in SS	8 7 12 14	NA	1.0	0.0		Dark brown fine to coarse SAND and fine to medium GRAVEL, trace red Brick and Coal fragments, moist, medium dense, no odor/staining/sheen.
10								Light red-brown SILT, little Coal fragments and coarse Sand.
835	6	10-12 3-in SS	6 6 6 9	NA	0.6	0.6		Tan SILT, trace Clay and fine Sand, stiff, moist to wet, little oxidation staining.
	7	12-14	5 6 10 12	16	1.8	420		
15	8	14-16	3 3 5 5	8	1.0	230		SILT as above but wet. Dark gray-brown stained fine to coarse SAND and fine to coarse rounded GRAVEL, trace Silt, wet, little thin amber-olive NAPL, mostly as sheens, indistinct non-MGP odor (possibly fuel oil).

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Remarks: Horiz. datum: NAD83-State Plane NY Central; Vert.: NGVD 29
*=The validity of these readings are considered suspect based on field observation of the collected sample and errat behavior of the PID instrument.
For adequate sample volume, the upper 19 feet of SB-101 were drilled twice at adjacent locations. Description of the interval from 15-19' bgs from second boring.
Sample collected from 10'-12' with a duplicate.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-101

Borehole Depth: 50 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
830			3 4 4 5					Fine to coarse SAND and fine to medium GRAVEL as above, sheen in spoon, medium dense, no NAPL, no odor/staining/sheen.
	9	16-18		8	0.9	47		Sand and Gravel as above, with trace sheens/NAPL. Shake test at 17'-19; bgs : olive green NAPL floating on water.
	10	18-20	WOR 3 2 3	5	1.2	48.1		As above, with sheens and faint non-MGP odor.
20								
825	11	20-22	3 3 2 1	5	0.05	>9999*		
	12	22-24 3-in SS	2 1 3 3	NA	0.2	6800		
	13	24-26	1 3 3 2	6	0.2	4500		SAND and GRAVEL as above but with little Silt.
25								
820	14	26-28 3-in SS	7 6 9 6	NA	49	1.5		Fine well-sorted SAND, no odor/staining/sheen.
	15	28-30	1 1 4 5	5	1.5	15.7		Medium brown fine SAND, little medium Sand, medium dense, slight odor, no sheen/staining.
30								
815	16	30-32	1 2 3 3	5	1.5	540		Olive brown fine to medium well sorted SAND, wet, loose to medium dense, no odor/staining/sheen.
	17	32-34	3 4 5 7	9	1.0	53.1		
35	18	34-36	1 2 4 5	6	1.0	7.5		

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Remarks: Horiz. datum: NAD83-State Plane NY Central; Vert.: NGVD 29
*=The validity of these readings are considered suspect based on field observation of the collected sample and errat behavior of the PID instrument.
For adequate sample volume, the upper 19 feet of SB-101 were drilled twice at adjacent locations. Description of the interval from 15-19' bgs from second boring.
Sample collected from 10'-12' with a duplicate.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-101

Borehole Depth: 50 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
810	19	36-38	4 6 6 7	12	1.5	19.6		Olive brown fine to medium well sorted SAND, wet, loose to medium dense, trace Silt, no odor/staining/sheen.
	20	38-40	3 7 7 8	14	NA	>9999*		Olive fine SAND, trace Silt, trace coarse Sand, loose to medium dense, no odor/staining/sheen.
40								
805	21	40-42	3 3 7 8	10	0.8	9.1		
	22	42-44	2 5 8 10	13	1.0	16.5		Dark brown fine medium SAND, trace fine to coarse Gravel, medium dense, no odor/staining/sheen.
45	23	44-46	2 4 8 12	12	0.5	79		
800	24	46-48	6 11 18 20	29	0.7	-		Same as above but with little fine Gravel and coarse Sand.
	25	48-50	2 9 40 NA	49	0.9	0.9		
50								Tan SILT and CLAY matrix and gray medium to coarse SAND, little fine rounded to angular Gravel, hard, no odor/staining/sheen. [TILL]
795								
55								

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Remarks: Horiz. datum: NAD83-State Plane NY Central; Vert.: NGVD 29
*=The validity of these readings are considered suspect based on field observation of the collected sample and errat behavior of the PID instrument.
For adequate sample volume, the upper 19 feet of SB-101 were drilled twice at adjacent locations. Description of the interval from 15-19' bgs from second boring.
Sample collected from 10'-12' with a duplicate.

Date Start/Finish: 08/06/01 - 08/08/01	**Northing:** 766971.14	**Boring ID:** **SB-102**
Drilling Company: Lyon Drilling	**Easting:** 1006912.67	
Driller's Name: Dave Lyons		**Client:** New York State Electric and Gas
Drilling Method: Hollow Stem Auger	**Casing Elevation:** NA	
Sampler Size: 2-in. Split Spoon	**Surface Elevation:** 842.19 ft. AMSL	
Auger Size: 3.25-in. ID	**Borehole Depth:** 61.8 ft. bgs	**Location:** Court Street, Binghamton, NY
Rig Type: Trailer-mounted CME-45	**Descriptions By:** Jerry Shi	

Depth (ft. bgs)	Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	845								
0		1	0-2	NA NA 7 25	NA	1.0	0.0		Asphalt. Concrete slab. FILL consisting of Bricks, some fine Gravel and coarse Sand, dry, no odor/staining/sheen.
	840	2	2-4	41 50/.3 NA NA	NA	0.8	0.0		Brown FILL consisting of coarse SAND, little Gravel, little Brick, dry, no odor/staining/sheen. Concrete slab at 2.8' bgs. Augers grind to 3.8', still in slab. Boring abandoned; rig offset 8'; augered to 4' bgs.
5		3	4-6	7 11 14 8	25	0.9	0.0		Gray brown FILL consisting of fine to coarse Sand and fine Gravel, crushed Stone and Concrete, dry, no odor/staining/sheen.
	835	4	6-8	6 5 3 3	8	0.3	0.0		First attempt: spoon and auger refusal at 6.1' bgs. Boring abandoned; rig offset 3 feet; and augered to 6' bgs. Second attempt: Brown FILL consisting of fine to medium Sand, little fine to medium Gravel as crushed stone, trace Brick, dry, no odor/staining/sheen.
		5	8-10	5 3 3 3	6	0.0	-		No recovery.
10		6	10-12	4 48 50/.3 NA	NA	1.2	0.0		Olive brown FILL consisting of medium to coarse Sand and fine to medium Gravel (Limestone and Concrete pebbles), trace Wood, loose, wet, no odor/staining/sheen.
	830	NA	12-13	NA	NA	NA	NA		No Sample.
		7	13-15	4 9 5 4	14	0.8	0.2		Olive brown fine to medium GRAVEL and medium to coarse SAND, trace Wood, loose, wet, no odor/staining/sheen.
15		8	15-17	1 1	5	1.0	0.0		Brown medium SAND, little fine to medium Gravel, no odor/staining/sheen. Olive brown fine SAND, little Silt, moist, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Due to difficult drilling, boring abandoned after 3.8' (first attempt), and 6.1' (second attempt). Third attempt completed to 61.8' bgs.
Samples collected from 10'-12' and 21'-23' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-102

Borehole Depth: 61.8 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	8	15-17	4 2	5	1.0	0.0		Olive brown fine SAND, little Silt, trace medium to coarse Sand and fine Gravel, moist, yellow staining from 15.8' - 16.0' bgs, no odor or sheen.
825	9	17-19	2 1 2 3	3	1.0	0.1		Gray-brown fine SAND and fine to medium GRAVEL, little Silt, increased amount of Gravel from 18.9' - 19.0' bgs, wet, no odor/staining/sheen.
20	10	19-21	7 9 9 15	18	1.0	0.0		Gray-brown fine to coarse GRAVEL, some fine Sand, trace Wood, loose, wet, no odor/staining/sheen.
820	11	21-23	12 15 12 10	27	1.5	0.0		Olive brown fine SAND and SILT, no odor/staining/sheen. Gray fine to coarse GRAVEL, little fine Sand and Silt, loose, wet, no odor/staining/sheen.
	12	23-25	15 15 14 11	29	1.5	4.5		Gray medium to coarse GRAVEL, little fine to coarse Sand, wet, no odor/staining/sheen.
25	13	25-27	12 10 11 9	21	0.2	5.2		
815	14	27-29	12 24 20 14	44	1.6	5.1		Olive brown medium to coarse Sand, saturated, no odor/staining/sheen. Olive brown fine to medium GRAVEL, little medium to coarse Sand, loose, wet, no odor/staining/sheen.
30	15	29-31	21 14 19 16	33	1.5	0.3		Olive brown fine to coarse GRAVEL, little medium to coarse Sand, wet, no odor/staining/sheen.
810	16	31-33	15 18 18 17	36	2.0	0.5		Olive brown fine to medium GRAVEL, little medium to coarse Sand, wet, no odor/staining/sheen.
	17	33-35	10 11 14 9	24	2.0	0.0		Olive brown medium to coarse SAND, trace fine Sand and fine Gravel, wet, no odor/staining/sheen.
35	18	35-37	5 4	11	0.5	0.1		Olive brown fine to medium GRAVEL, little medium to coarse Sand, trace coarse Gravel, wet, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Due to difficult drilling, boring abandoned after 3.8' (first attempt), and 6.1' (second attempt). Third attempt completed to 61.8' bgs.
Samples collected from 10'-12' and 21'-23' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-102

Borehole Depth: 61.8 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	18	35-37	7 5	11	0.5	0.1		Olive brown fine to medium GRAVEL, little medium to coarse Sand, trace coarse Gravel, wet, no odor/staining/sheen.
805	19	37-39	24 26 14 12	40	0.8	0.0		Olive brown fine to coarse GRAVEL, trace medium to coarse Sand, trace Silt, dense, wet, no odor/staining/sheen.
40	20	39-41	21 12 8 10	20	0.5	0.0		
800	21	41-43	4 4 6 7	10	0.4	0.0		
	22	43-45	27 21 14 10	35	0.5	0.0		
45	23	45-47	10 8 8 7	16	0.5	0.0		
795	24	47-49.2	7 9 18 12	27	0.5	0.0		
50	25	49.2-51.2	8 7 8 10	15	1.2	0.0		Olive brown fine to coarse GRAVEL, little medium to coarse Sand, wet, no odor/staining/sheen.
790	26	51.2-53.2	6 8 5 6	13	0.4	0.0		
	27	53.2-55.2	4 5 5 5	10	0.3	0.0		
55	28	55.2-57	4 7	21	0.4	-		Olive brown fine to medium GRAVEL, some fine to medium Sand, wet, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Due to difficult drilling, boring abandoned after 3.8' (first attempt), and 6.1' (second attempt). Third attempt completed to 61.8' bgs.
Samples collected from 10'-12' and 21'-23' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-102

Borehole Depth: 61.8 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
785	28	55.2-57	14 8	21	0.4	-		Olive brown fine to medium GRAVEL, some fine to medium Sand, wet, no odor/staining/sheen.
	29	57-59	11 17 24 26	41	0.5	-		Olive brown fine to medium GRAVEL, little Silt and Clay, trace coarse Sand, dense, stiff, wet, no odor/staining/sheen
60	30	59-61	19 27 54 50/.4	81	1.2	-		As above, with increase in Clay and Silt, wet, no odor/staining/sheen. Olive fine SAND matrix, little Silt, some medium to coarse Sand and Gravel, hard, no odor/staining/sheen. [TILL]
	31	61-61.8	48 50/.3	NA	-	-		Olive fine SAND matrix, little Silt, some medium to coarse fine angular Gravel, hard, no odor/staining/sheen. [TILL]
780								
65								
775								
70								
770								
75								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Due to difficult drilling, boring abandoned after 3.8' (first attempt), and 6.1' (second attempt). Third attempt completed to 61.8' bgs.
Samples collected from 10'-12' and 21'-23' bgs.

Date Start/Finish: 8/27/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Dave Lyons **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. Split Spoon **Auger Size:** 3.25-in. ID **Rig Type:** Trailer-mounted CME-45	**Northing:** 767108.96 **Easting:** 1006810.71 **Casing Elevation:** NA **Surface Elevation:** 846.08 ft. AMSL **Borehole Depth:** 54 ft. bgs **Descriptions By:** K. White/M. Cobb	**Boring ID: SB-103** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0								
845	1	0-2	NA 5 14 10	19	1.0	0.0		Concrete floor inside warehouse, 295 Court Street. Blackish-gray FILL consisting of fine to coarse Sand and Gravel, loose, moist, no odor/sheen/staining.
	2	2-4	4 11 50/.4 NA	NA	0.4	0.0		FILL consisting of Brick fragments, Slag, fine to coarse Sand, loose, moist, no odor/sheen/staining. Brownish-gray FILL consisting of fine to coarse Sand and Gravel, trace Silt, loose, moist, no odor/sheen/staining.
5	3	4-6	5 3 2 2	5	1.5	0.0		Mulitcolored (gray, black, red) FILL consisting of fine to coarse sand-size Ash, Slag, Coal and Brick fragments, some Gravel-sized Concrete chips, little Silt, loose, moist, no odor/sheen/staining.
840	4	6-8	2 2 2 2	4	1.0	0.3		As above, except no Concrete or Brick fragments, loose, moist.
	5	8-10	1 2 2 2	4	NA	250		Grayish brown SILT, moist to wet, one embedded piece of Slag, soft, no odor/sheen/staining. Brownish gray SILT, soft, moist to wet, no odor/sheen/staining.
10								
835	6	10-12	WOR 1 1 2	2	0.9	16.7		Brownish-gray and grayish-black mottled SILT, soft, blocky structure, wet, no odor/sheen/staining.
	7	12-14	1 1 1 2	2	1.0	11.1		As above, with trace fine Sand, massive, odor. As above, brownish-black coloration, petroleum-type (non-naphthalene) odor, loose, wet.
15	8	14-16	2 3 4 4	7	0.7	52.4		Brownish-gray SILT, trace fine Sand, faint bedding evident, moderately stiff, moist to wet, odor (as above), no sheen or staining.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-103

Borehole Depth: 54 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
830	9	16-18	9 6 4 5	10	1.9	1.9		Brownish-gray and grayish-black mottled SILT, trace Clay and fine Sand, medium dense, wet, faint bedding evident, odor (as above), no sheen or staining.
								Brownish-gray fine rounded GRAVEL and fine to coarse SAND, some Silt, medium dense, moist to wet, no odor/sheen/staining.
	10	18-20	1 3 6 8	9	0.2	7.6		Brownish-gray rounded GRAVEL (many rock types), some to little medium to coarse Sand, little to trace Silt, loose, wet, faint odor (as above), no sheen or staining.
20								
825	11	20-22	12 15 11 11	26	1.4	5.1		Brownish-gray rounded GRAVEL, some to little medium to coarse Sand, little Silt, dense, wet, faint odor (as above). Faint sheen noted on water at top of spoon, but not on sample.
	12	22-24	3 10 14 15	24	0.0	7.4		As above, with trace Silt, no sheen, faint odor.
25	13	24-26	9 11 8 7	19	1.2	2.4		
820	14	26-28	8 8 8 9	16	0.5	1.8		No Recovery, pushed Gravel.
	15	28-30	9 12 12 7	24	0.7	20.1		Olive gray-brown fine to medium SAND, little rounded coarse Sand and fine Gravel, wet, no odor/sheen/staining.
30								
815	16	30-32	3 5 5 7	10	1.5	3.3		As above, trace Silt, less coarse Sand and fine Gravel, no odor/sheen/staining.
	17	32-34	3 4 3 5	7	2.0	5.2		Olive gray-brown fine to medium SAND, trace coarse Sand and fine subangular Gravel, wet, no odor/staining/sheens.
35	18	34-36	4 7 9 11	16	1.1	2.3		Olive gray-brown fine SAND, little medium to coarse Sand, little Silt, somewhat cohesive, wet, no odor/staining/sheens.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-103

Borehole Depth: 54 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
810	19	36-38	6 6 8 9	14	1.8	-		Olive gray-brown fine to medium SAND, little coarse Sand and Silt, somewhat cohesive, slight yellow cast, no odor/staining/sheens.
	20	38-40	8 8 7 8	15	1.1	9.6		As above, trace Silt, no cohesive, no odor/staining/sheens.
40								
805	21	40-42	6 7 8 9	15	1.3	20.7		Olive-gray fine to medium SAND, trace coarse Sand, trace Silt in horizontal laminations, wet, no odor/staining/sheens.
	22	42-44	10 7 8 9	15	0.5	21.1		Olive-gray fine to coarse SAND, little fine subrounded Gravel, wet, no odor/staining/sheens.
45	23	44-46	10 9 14 9	23	0.7	14.4		
800	24	46-48	17 9 10 14	19	0.7	54		Olive-gray medium to coarse SAND, little fine Sand and fine subangular Gravel, no odor/staining/sheens.
	25	48-50	9 18 15 16	33	0.0	0.0		Light olive-gray SILT and CLAY with little fine Sand matrix, some medium to coarse Sand and fine angular Gravel, medium cohesive, no odor/staining/sheens. [TILL]
50								
795	26	50-52	10 12 30 22	42	0.7	0.0		
	27	52-54	28 31 34 60	65	1.5	1.5		Light olive-gray SILT and CLAY matrix, some medium to coarse Sand, little fine subrounded to subangular Gravel, hard, cohesive, no odor/staining/sheens. [TILL]
55								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Date Start/Finish: 08/29/01 - 08/31/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Dave Lyons **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 3.25" ID **Rig Type:** Trailer-mounted CME-45	**Northing:** 767055.12 **Easting:** 1006880.36 **Casing Elevation:** NA **Surface Elevation:** 846.02 ft. AMSL **Borehole Depth:** 64 ft. bgs **Descriptions By:** Michael K. Cobb	**Boring ID:** SB-104 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0			NA					Concrete floor inside warehouse, 295 Court Street.
845	1	0-2	NA 18 26	18	0.8	0.0		Medium brown FILL consisting of fine Sand, little coarse Sand and fine Gravel, Concrete, Brick, dry, no odor/staining/sheen.
	2	2-4	22 18 8 12	26	1.2	0.0		Medium brown FILL consisting of fine Sand and Brick, Concrete rubble, 3" Brick fragment lodged in shoe, dry, no odor/staining/sheen.
5	3	4-6	6 12 26 28	38	1.3	0.0		Medium brown fine to coarse SAND and fine GRAVEL, Concrete, Brick, dry, no odor/staining/sheen.
840	4	6-8	NA 7 12 10	19	0.1	0.0		Trace recovery: Concrete rubble, no odor/staining/sheen, dry.
	5	8-10 3-in SS	1 1 1 2	NA	0.4	0.0		BRICK fragments (powder to 3" wide), little fine to coarse Sand, dry, no odor/staining/sheen.
10								
835	6	10-12 3-in SS	2 2 1 3	NA	1.3	0.0		Medium brown medium SAND, some coarse rounded Sand, little fine Gravel, no fines, wet, trace Brick fragments, no odor/staining/sheen.
	7	12-14 3-in SS	10 18 16 18	NA	1.2	0.0		As above, little medium to coarse Gravel, cobble-sized Fill Concrete, Brick, wet, no odor/staining/sheen.
15	8	14-16	10 38 50/0 NA	38	0.8	0.0		Auger through Concrete Slab.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 10'-12', 16'-18', and 20'-22' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: **SB-104**

Borehole Depth: 64 ft. bgs

Depth (ft. bgs)	Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
		9	16-18 3-in SS	15 12 14 14	NA	1.3	0.0		Light olive SILT, blocky, little horizontal bedding, trace oxidation mottling, wet, no odor/staining/sheen.
		10	18-20	1 2 5 4	7	1.6	0.0 42.5		As above, grading to little fine Sand, no odor/staining/sheen. Dark olive fine to coarse SAND, some Silt, soupy, loose, wet, little petroleum-type odor (non-naphthalene), no sheen.
20	825	11	20-22 3-in SS	2 2 3 3	NA	1.2	73.4		As above, some dark gray fine to medium rounded Gravel, soupy, wet, odor as above, possible slight rainbow sheen.
		12	22-24	5 1 2 1	3	0.5	27.2		As above, faint odor as above, olive color, no sheens.
25	820	13	24-26	5 6 7 6	13	0.3	0.0		Olive fine to coarse SAND and fine rounded GRAVEL, little Silt, soupy, no sheen or staining, faint odor as above. (Gravel lodged in base of spoon)
		14	26-28	7 10 19 20	29	1.1	0.2		As above, Gravel is rounded to subangular, no discernable odor, no staining/sheen.
30	815	15	28-30	5 7 8 8	15	0.8	0.0		Olive fine to coarse SAND, some fine Gravel, trace Silt and subangular to angular Gravel, more compact, no odor/staining/sheen.
		16	30-32	8 11 10 10	21	0.9	0.0		
		17	32-34	3 6 10 12	16	1.3	0.0		Olive-gray medium to coarse SAND and fine to medium subrounded to angular GRAVEL, little fine Sand, wet, compact, medium dense, no odor/staining/sheen.
35	810	18	34-36	8 15 22 19	37	0.8	0.0		

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 10'-12', 16'-18', and 20'-22' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-104

Borehole Depth: 64 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	19	36-38	12 14 16 10	30	1.2	0.4		Olive-gray medium to coarse SAND and fine to medium subrounded to angular GRAVEL, little fine Sand, wet, compact, medium dense, no odor/staining/sheen.
	20	38-40	4 8 6 14	14	0.6	0.0		As above, Gravel is mostly rounded, some fines appear to have washed out, no odor/staining/sheen.
40 805	21	40-42 3-in SS	17 12 17 19	NA	0.5	0.0		Olive-gray fine to coarse SAND and fine to coarse GRAVEL, mostly rounded, trace Silt, wet, no odor/staining/sheen.
	22	42-44	5 7 9 12	16	0.5	-		As above, except only fine to medium Gravel fits in spoon, no odor/staining/sheen.
45	23	44-46	9 10 10 12	20	1.0	-		
800	24	46-48	14 9 12 9	21	0.7	0.0		Olive-gray fine to coarse SAND and fine to medium rounded to angular GRAVEL, wet, moderately dense, no odor/staining/sheen.
	25	48-50	8 8 12 9	20	0.5	0.0		
50 795	26	50-52	8 9 11 9	20	1.0	0.0		Light olive fine to medium SAND, some coarse Sand and fine to medium rounded to subrounded Gravel, trace Silt, wet, no odor/staining/sheen.
	27	52-54	1 4 6 7	10	0.7	0.0		
55	28	54-56	4 8 10 10	18	0.5	0.0		Olive-gray fine to coarse SAND and fine to medium angular to subrounded GRAVEL, little Silt, wet, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 10'-12', 16'-18', and 20'-22' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-104

Borehole Depth: 64 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	29	56-58	4 5 6 6	11	0.3	0.0		Olive-gray fine to coarse SAND and fine to medium angular to subrounded GRAVEL, little Silt, wet, no odor/staining/sheen.
	30	58-60	112/.5 NA NA NA	NA	0.2	0.0		Olive-gray SILT, CLAY, coarse SAND and fine to medium GRAVEL, broken, cohesive, no odor/staining/sheen.
60 785	31	60-62	28 18 14 14	32	0.2	0.0		Olive-gray SILT and CLAY matrix, greater fraction medium to coarse Sand and Gravel, broken/angular Rock, otherwise cohesive, wet, no odor/staining/sheen. [TILL]
	32	62-64	14 4 11 16	15	1.0	0.0		
65 780								
70 775								
75								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 10'-12', 16'-18', and 20'-22' bgs.

Date Start/Finish: 08/08/01 - 08/10/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Dave Lyons **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 3.25-in. ID **Rig Type:** Trailer-mounted CME-45	**Northing:** 766930 **Easting:** 1006978.77 **Casing Elevation:** NA **Surface Elevation:** 841.44 ft. AMSL **Borehole Depth:** 64.0 ft. bgs **Descriptions By:** Jerry Shi	**Boring ID: SB-105** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0								
840	1	0-2	NA	NA	NA	NA		Blacktop (Court Street road surface). CONCRETE.
	2	2-4	6 4 4 3	8	0.2	0.0		Gray-brown FILL consisting of fine to coarse Gravel, little fine to coarse Sand, trace Asphalt and Silt,dry, no odor/staining/sheen.
5	3	4-6	1 2 2 3	4	1.5	0.0		Brown FILL consisting of Silt, trace fine Gravel, Sand, and Coal, dry to damp, no odor/staining/sheen.
835	4	6-8	5 5 5 5	10	1.7	0.0		As above, damp, no odor/staining/sheen.
	5	8-10	5 5 1 1	6	1.0	0.0		
10	6	10-12	1 1 1 1	2	1.5	0.0		Brown fine SAND, trace medium Gravel, damp, no odor/staining/sheen.
830	7	12-14	WOR 1 2 3	3	1.0	0.0		Brown fine SAND, trace fine to medium Gravel, no odor/staining/sheen. Silt layer and color changes to gray, wet from 12.5' - 12.6' bgs. Increased Gravel from 12.8' - 13.0' bgs.
15	8	14-16 3-in SS	3 3 5 6	NA	1.0	0.0		Olive brown fine to coarse GRAVEL, some medium to coarse Sand, little fine Sand, wet, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples taken at 14'-16' and 52'-54' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-105

Borehole Depth: 64.0 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
825	9	16-18 3-in SS	5 5 2 2	NA	1.2	0.0		Gray-brown fine SAND and fine to coarse GRAVEL, wet, no odor/staining/sheen. Yellow-brown fine Sand and fine to coarse GRAVEL, trace Silt, wet, no odor/staining/sheen. Dark gray fine SAND, some Gravel, wet, no odor/staining/sheen.
	10	18-20 3-in SS	2 3 2 8	NA	1.5	0.0		Dark brown fine to medium SAND, little fine to medium Gravel, trace Silt and Wood, wet, no odor/staining/sheen. Brown fine to medium SAND, little fine to medium Gravel, trace Silt, wet, no odor/staining/sheen.
20	11	20-22 3-in SS	2 14 17 16	NA	1.2	0.0		Dark brown fine to medium SAND, little fine to coarse Gravel, wet, no odor/staining/sheen. Brown fine to coarse GRAVEL, some medium to coarse Sand, little fine Sand, wet, no odor/staining/sheen.
820	12	22-24 3-in SS	3 8 12 16	NA	0.5	0.0		Olive-brown fine to medium GRAVEL, some medium to coarse Sand, little fine Sand, wet, no odor/staining/sheen.
25	13	24-26 3-in SS	12 19 21 20	NA	0.6	0.0		Olive-brown fine to coarse GRAVEL, some medium to coarse Sand, little fine Sand, wet, no odor/staining/sheen.
815	14	26-28 3-in SS	12 14 12 12	NA	1.5	0.0		
	15	28-30 3-in SS	14 15 8 7	NA	1.0	0.0		
30	16	30-32 3-in SS	6 7 10 11	NA	0.4	0.0		
810	17	32-34 3-in SS	2 5 7 9	NA	0.0	0.0		No recovery.
35	18	34-36 3-in SS	12 10 11 12	NA	0.5	0.0		Olive-brown fine to coarse GRAVEL, some medium to coarse Sand, little fine Sand, wet, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples taken at 14'-16' and 52'-54' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: **SB-105**

Borehole Depth: 64.0 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
805	19	36-38 3-in SS	10 12 16 14	NA	0.2	0.0		Olive-brown fine to coarse GRAVEL, some medium to coarse Sand, little fine Sand, wet, no odor/staining/sheen.
	20	38-40 3-in SS	15 14 11 10	NA	0.0	0.0		No recovery.
40	21	40-42 3-in SS	21 14 12 10	NA	0.4	0.0		Olive brown fine to coarse GRAVEL, little fine to coarse Sand, wet, no odor/staining/sheen.
800	22	42-44 3-in SS	12 10 9 7	NA	0.1	0.0		
45	23	44-46 3-in SS	31 15 12 14	NA	0.2	0.0		
795	24	46-48 3-in SS	26 10 10 14	NA	0.2	0.0		
	25	48-50 3-in SS	17 14 14 10	NA	0.1	0.0		Olive brown fine to coarse GRAVEL and medium to coarse SAND, little fine Sand, wet, no odor/staining/sheen.
50	26	50-52	3 4 4 4	8	1.8	0.0		Brown fine to medium SAND, trace Silt and fine to medium Gravel, wet, no odor/staining/sheen.
790	27	52-54 3-in SS	WOR 2 5 6	NA	0.5	0.0		Olive brown fine to coarse GRAVEL, some fine to coarse Sand, trace Silt, wet, no odor/staining/sheen.
55	28	54-56 3-in SS	8 15 14 11	NA	0.2	0.0		

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples taken at 14'-16' and 52'-54' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-105

Borehole Depth: 64.0 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
785	29	56-58	5 4 4 7	8	0.3	0.0		Olive brown fine to coarse GRAVEL, some fine to coarse Sand, trace Silt, wet, no odor/staining/sheen.
	30	58-60	10 11 16 14	27	0.3	0.0		
60	31	60-62 3-in SS	10 15 40 42	NA	1.0	0.0		Olive brown CLAY and SILT matrix embedded with fine to coarse GRAVEL, tight, hard, no odor/staining/sheen. [TILL]
780	32	62-64	26 27 50/.3 NA	NA	1.0	0.0		As above, with increased Clay and Silt content, harder, more tight, wet, no odor/staining/sheen. [TILL]
65								
775								
70								
770								
75								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples taken at 14'-16' and 52'-54' bgs.

Date Start/Finish: 08/08/01 - 08/09/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyons **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. and 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 766882.5 **Easting:** 1006834.09 **Casing Elevation:** NA **Surface Elevation:** 841.99 ft. AMSL **Borehole Depth:** 56 ft. bgs **Descriptions By:** Michael K. Cobb	**Boring ID:** **SB-106** **Client:** New York State Electrical and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	NA	0-1.1	NA	NA	NA	NA		Blacktop (Court street road surface). Solid steam auger to 1.1' bgs, no sample.
840	1	1.1-3	5 3 2 2	5	1.0	0.0		Dark brown fine SAND, little coarse Sand and fine Gravel, Coal fragments, dry to moist, no odor/staining/sheen. Red-brown fine SAND, little Silt, little medium to coarse Sand, moist, no odor/staining/sheen.
	2	3-5	3 3 3 3	6	0.4	0.0		Red-brown fine SAND, some medium to coarse Sand and fine Gravel, moist, no odor/staining/sheen.
5	3	5-7	5 5 4 2	9	1.5	0.0		As above, with Coal and Cinder fragments. Reddish-tan SILT, trace coarse Sand, Coal fragments, moist, little oxidation staining, no odor/sheen.
835	4	7-9.5	4 1 WOR WOR WOR	1	1.0	0.3		Dark olive fine SAND, some Silt, trace coarse Sand and fine Gravel, very loose, wet, faint, indistinct petroleum odor, no staining or sheen. [Overdrive spoon 0.5', rod falls from 8.0'-9.5' bgs]
10	5	9.5-11 3-in SS	3 6 3	NA	0.0	250		Olive SILT, trace brick fragments, black staining, trace amber NAPL, soft, wet, MGP-like odor. Tan SILT, trace Clay and fine Sand, stiff, moist to wet, little oxidation staining at 10.2' bgs.
830	6	11-13	3 3 4 5	7	0.9	16.7		Olive SILT and CLAY, trace Brick fragments (as coarse Sand), trace amber NAPL/sheens, blocky, wet, soft to medium stiff, slight MGP-type odor, trace horizontal laminations.
	7	13-15 3-in SS	3 2 2 3	NA	0.0	0.0		Olive SILT, little Clay, black staining, trace amber NAPL on fracture planes, blocky, wet, MGP-type odor.
15	8	15-17 3-in SS	2 3	NA	0.7	11.1		Fine to coarse SAND and fine to coarse GRAVEL, wet, sheens throughout, slight MGP-type odor.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Client:
New York State Electrical and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-106

Borehole Depth: 56 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	8	15-17 3-in SS	4 4	NA	0.7	11.1		Soupy fine to coarse SAND and fine to coarse GRAVEL, wet, sheens throughout, slight MGP-type odor.
825	9	17-19 3-in SS	30 11 12 3	NA	1.9	52.4		Dark gray to olive fine to medium GRAVEL, some fine to coarse Sand, trace Silt, wet, medium dense to dense, odor, trace sheens.
								Dark gray to olive SILT, some fine Gravel, wet, soft, no odor/staining/sheen.
20	10	19-21 3-in SS	WOR WOR WOR 7	NA	0.2	7.6		Loose, rounded GRAVEL, trace sheens, wet (fines may have washed out), faint indistinct odor.
820	11	21-23 3-in SS	9 7 4 2	NA	1.4	5.1		Olive-gray fine to coarse SAND and fine rounded GRAVEL, trace Silt, loose to medium dense, wet, no odor, sheens in water.
	12	23-25 3-in SS	1 WOR WOR WOR	NA	1.3	7.4		Olive-gray fine to coarse GRAVEL, some coarse Sand, little fine to medium Sand, wet, loose, soupy, trace sheens in spoon and odor as above.
25	13	25-27 3-in SS	3 5 5 7	NA	1.2	2.4		As above, grading to olive-gray fine to medium SAND, some rounded to angular fine to coarse Gravel, wet, no sheen, faint MGP-type odor.
815	14	27-29	7 7 7 5	14	0.5	1.8		Olive-gray soupy fine to coarse SAND and fine to medium GRAVEL, wet, no sheens, slight MGP-type odor. [Poor revcovery, much of material was washed from spoon]
30	15	29-31 3-in SS	17 14 19 20	NA	0.7	20.1		Dark brown to black fine to medium SAND, little coarse Sand and fine to coarse rounded Gravel, slight odor, no staining or sheen.
810	16	31-33 3-in SS	21 17 8 7	NA	1.5	3.3		Dark gray to olive fine to coarse GRAVEL and fine to coarse SAND, trace Silt, medium dense to dense, no sheen or staining, slight odor, wet.
								Olive-gray medium to coarse SAND and fine to medium GRAVEL, trace Silt, wet, trace odor as above, no staining or sheens.
	17	33-35 3-in SS	7 6 7 9	NA	2.0	5.2		Olive-gray fine to medium SAND (lenses of predominantly fine Sand), trace fine to medium Gravel, wet, no odor/staining/sheens.
35	18	35-37 3-in SS	WOR 3	NA	1.1	2.3		Olive well sorted fine to medium SAND, wet, very loose to loose, faint odor, no staining or sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Client:
New York State Electrical and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-106

Borehole Depth: 56 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	18	35-37 3-in SS	6 9	NA	1.1	2.3		Olive well sorted fine to medium SAND, wet, very loose to loose, faint odor, no staining or sheen.
805	19	37-39	1 2 3 5	5	1.1	1.8		Olive fine to medium well sorted SAND, very loose to loose, wet, faint odor, no staining or sheen.
40	20	39-41	1 2 4 3	6	1.1	1.1		As above, with trace Silt, faint odor, no staining or sheen.
800	21	41-43	WOR 1 3 7	4	1.3	20.7		
	22	43-45	WOR WOR 6 7	6	0.5	21.1		Olive-gray well sorted fine SAND, trace Silt, loose, wet, faint odor as above, no odor or sheen.
45	23	45-47	3 3 4 3	7	0.7	14.4		Fine to medium rounded GRAVEL lense, little fine to coarse Sand, no odor/staining/sheen. Olive-gray fine to medium SAND, little coarse Sand and fine Gravel, wet, loose, faint odor as above, no staining or sheen.
795	24	47-49	5 9 10 12	19	0.7	54		Olive-gray fine to coarse SAND and fine to medium GRAVEL, trace Silt, wet, faint odor as above, no staining ro sheen.
	25	49-50	50/.3	NA	0.0	0.0		No Recovery. Spoon refusal at 49.3' bgs.
50	26	50-52	7 10 18 20	28	0.7	0.0		Olive-gray fine to coarse SAND and fine Gravel, some Clay, medium plasticity, blocky texture, hard and dense, moist, slight odor, no staining or sheen.
790	27	52-54	6 44 41 48	85	2.0	2.0		Brown medium well sorted SAND, little odor, no staining or sheen. Olive-gray SILT, some fine to coarse Sand and fine Gravel, trace odor, no staining or sheen. [TILL]
55	28	54-56	15 40 50/.2	NA	0.8	2.7		As above, Gravel is composed of more Shale fragments than above. [TILL]

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Date Start/Finish: 8/10/01 **Drilling Company:** Lyon Drilling Company **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** Track CME 55	**Northing:** 766865.77 **Easting:** 1006774.63 **Casing Elevation:** NA **Surface Elevation:** 842.34 ft. AMSL **Borehole Depth:** 53 ft. bgs **Descriptions By:** A. Roy-Perreault A. Roy-Perreault	**Boring ID: SB-107** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
845								
0	NA	NA	NA	NA	NA	NA		Blacktop (Court Street road surface).
840	1	1-3	4 26 18 18	44	0.5	1.5		Light gray FILL consisting of Sand, some fine sand- to fine gravel-sized Concrete fragments , medium to dense, no odor/staining/sheen. Gray FILL consisting of fine to medium angular Gravel and fine to coarse Sand, dry, medium dense, no odor/staining/sheen.
	2	3-5	7 7 5 3	13	2.0	1.3		Olive SILT and CLAY, little fine to coarse Sand, moist, no odor/staining/sheen.
5	3	5-7	3 3 3 2	6	1.3	1.1		As above, trace fine bone, little white pulp.
835	4	7-9	WOR - 5 6	5	1.2	0.6		As above, wet. As above, dark gray stained, slight MGP-type odor, soft, wet
10	5	9-11	11 10 8 7	18	0.4	27		Medium brown fine to medium GRAVEL, little fine to coarse Sand, loose, faint odor as above, no odor/staining/sheen.
830	6	11-13 3-in SS	3 4 5 6	NA	2.0	56.2		Olive to gray SILT, soft, blocky, horizontal bedding, little light amber NAPL on bedding planes (11.5'-11.9'), @ 12.8', little mpg odor.
	7	13-15 3-in SS	WOR 3 5 6	NA	2.0	2.3		As above, trace rounded fine Gravel, very soft (13.0' - 13.8') to soft (13.8' - 15.0'), trace amber NAPL on bedding, vertical fractures, and roots, wet, MGP-type odors.
15	8	15-17 3-in SS	5 7	NA	2.0	27		Fine to coarse GRAVEL and fine to coarse SAND, little Silt, trace amber NAPL, sheen, MGP-type odor, wet, soupy, loose.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 6'-8' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-107

Borehole Depth: 53 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	8	15-17 3-in SS	7 8	NA	2.0	27		Fine to coarse GRAVEL and fine to coarse SAND, little Silt, trace amber NAPL, sheen, MGP-type odor, wet, soupy, loose.
825	9	17-19 3-in SS	12 9 5 5	NA	1.8	1.8		Dark gray to brown fine to coarse SAND and fine to medium rouned to subrounded GRAVEL, trace Silt, sheen on water, wet, loose to medium dense, MGP-type odor.
20	10	19-21 3-in SS	7 7 3 5	NA	1.7	1.5		
	11	21-23 3-in SS	9 10 10 10	NA	2.0	1.6		As above, no staining or sheens, slight MGP-type odors.
820	12	23-25 3-in SS	6 16 16 20	NA	1.6	0.0		
25	13	25-27 3-in SS	15 12 11 15	NA	2.0	1.7		
815	14	27-29 3-in SS	22 8 8 -	NA	0.7	-		
	15	29-31 3-in SS	7 10 7 7	NA	0.2	0.7		Recovered material is same as above, majority of material appears to have fallen/washed out of the spoon, becoming more loose, more soupy, no odor/staining/sheen.
30	16	31-33 3-in SS	7 13 8 -	NA	0.5	1.1		Dark gray to brown fine to coarse SAND and fine to medium GRAVEL, medium dense, slight odor, no sheen or staining. Dark gray to brown fine to coarse SAND, some fine to medium Gravel, medium dense, slight odor, no sheen or staining.
810	17	33-35 3-in SS	6 6 4 7	NA	1.1	6.7		Dark gray well sorted fine to medium SAND, trace fine Gravel, increase in fine to medium Gravel to SAND and rounded GRAVEL from 33.5'-33.6' bgs, loose, wet, faint odor, no staining or sheen.
35	18	35-37	4 3	6	1.2	2.4		Dark gray to brown fine to medium SAND, some coarse Sand and fine Gravel, loose, wet, faint odor, no staining or sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 6'-8' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-107

Borehole Depth: 53 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	18	35-37	3 3	6	1.2	2.4		Dark gray-brown fine to medium GRAVEL, some fine to coarse Sand, trace Silt, loose, wet, faint odor, no staining or sheen.
805								Fine to medium well sorted SAND as above from 35'-35.5' bgs.
	19	37-39	5 5 1 1	6	0.8	0.5		Dark gray to brown GRAVEL as above from 35.5'-37' bgs.
40	20	39-41	4 4 4 4	8	1.0	0.5		
	21	41-43 3-in SS	4 2 WOR 3	NA	NA	0.5		No recovery.
800	22	43-45 3-in SS	15 3 5 8	NA	1.0	-		Fine to coarse GRAVEL, little fine Sand, very soupy, very loose to loose, no odor/staining/sheen.
45	23	45-47 3-in SS	4 3 3 5	NA	2.0	2.0		
795	24	47-49 3-in SS	5 6 7 6	NA	1.8	0.7		As above, except trace fine Sand and Silt, no odor/staining/sheen.
50	25	49-51 3-in SS	33 21 15 16	NA	1.3	0.0		Medium gray fine SAND and fine to medium GRAVEL, dense, wet, no odor/staining/sheen.
790		51-53	33 22 44 50	66	1.1	0.0		Light olive SILT, little fine Sand matrix, medium to coarse Sand and fine Gravel clasts, angular to subrounded, mostly shale, hard, no odor/staining/sheen. [TILL]
55								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 6'-8' bgs.

Date Start/Finish: 8/13/01 **Drilling Company:** Lyon Drilling Company **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** Track CME 55	**Northing:** 766835.7 **Easting:** 1006686.51 **Casing Elevation:** NA **Surface Elevation:** 842.72 ft. AMSL **Borehole Depth:** 51 ft. bgs **Descriptions By:** A. Roy-Perreault	**Boring ID: SB-108** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
845								
0								
	1	0-2	NA	NA	1.0	0.0		Blacktop (Court Street road surface). Hard SAND and GRAVEL observed on the wall of the hole. No sample taken. CONCRETE, auger to 2' bgs.
840	2	2-4	1 2 4 7	5	0.9	0.0		Dark brown FILL consisting of fine to coarse Sand, little fine to medium Gravel, trace Coal and Brick fragments, dry, very loose to loose, no odor/staining/sheen. Dark brown FILL consisting of Clay and Silt, moist, soft to medium plasticity, no odor/staining/sheen.
5	3	4-6	3 3 2 2	6	0.9	0.0		Dark brown FILL consisting of fine Sand, some medium to coarse Sand and fine to medium Gravel, little Silt, trace Clay and Coal fragments, very loose to loose, no odor/staining/sheen.
	4	6-8 3-in SS	1 2 4 3	NA	0.9	0.0		FILL as above, except some Clay, moist to wet, no odor/staining/sheen.
835	5	8-10	9 4 3 1	2	1.0	0.0		Dark brown fine SAND and SILT, little Clay, trace medium Gravel, wet to moist, no odor/staining/sheen. Olive CLAY, little Silt, wet and very soft, black staining, slight odor, no sheen.
10	6	10-12	1 1 1 1	5	1.5	0.0		Dark gray plastic CLAY, some Silt, wet, very soft and blocky texture, black staining, no odor, no sheen in water.
830	7	12-14	1 2 3 4	4	1.5	0.0		Dark gray to olive gray SILT, little Clay, low plasticity, wet, blocky texture, trace oxidation and black staining, no odor or sheen.
15	8	14-16	2 2 2 3	4	1.8	0.1		As above but with more oxidation staining and slight odor. Dark gray fine to coarse SAND and GRAVEL, little Silt, soupy texture, wet, very loose, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 6'-8' (with duplicate), 18'-20', and 35'-37' bgs.
Water level measured to be 14' bgs during drilling.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-108

Borehole Depth: 51 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
825	9	16-18	3 2 2 2	31	2.0	0.0		Dark gray fine to coarse SAND and fine to medium GRAVEL, little Silt, soupy texture, wet, very loose, slight odor, no staining or sheen.
	10	18-20 3-in SS	6 13 18 24	NA	2.0	0.3		As above but with coarse Gravel, sheen observed in drilling water.
20	11	20-22 3-in SS	28 30 30 28	NA	1.8	0.0		As above but dense, higher content in fines, little odor, no staining or sheen.
820	12	22-24 3-in SS	30 30 20 11	NA	0.9	0.1		Dark brown fine to coarse GRAVEL, some fine to coarse Sand, trace Silt, medium dense to dense, little odor, stronger odor from 25' - 28' bgs.
25	13	24-26 3-in SS	13 17 17 14	NA	0.9	0.0		
	14	26-28 3-in SS	15 12 8 9	NA	0.5	0.4		
815	15	28-30 3-in SS	6 13 13 19	NA	1.0	0.0		As above with larger Gravel pieces, amber staining from Silt increasing at 30' bgs. Negative shake test.
30	16	30-32 3-in SS	14 14 11 10	NA	0.8	0.4		
810	17	32-33.5 3-in SS	12 9 8	NA	0.8	0.6		Dark brown fine to medium GRAVEL, some fine to coarse Sand, Trace Silt, medium dense to dense, little odor.
	18	33.5-35 3-in SS	13 13 10	NA	0.5	0.5		Dark brown fine to coarse GRAVEL, some fine to coarse Sand, Trace Silt, medium dense to dense, medium odor.
35	19	35-37 3-in SS	13 20	NA	0.8	1.0		As above, strong odor, no staining or sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 6'-8' (with duplicate), 18'-20', and 35'-37' bgs.
Water level measured to be 14' bgs during drilling.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-108

Borehole Depth: 51 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	19	35-37 3-in SS	28 28	NA	0.8	1.0		As above, strong odor, no staining or sheen.
805	20	37-39 3-in SS	24 19 20 20	NA		0.2		Dark brown fine to coarse GRAVEL and fine to coarse SAND, trace Silt, medium dense to dense, orangish staining, strong odor, no sheen.
40	21	39-41 3-in SS	16 24 13 13	NA	0.7	0.7		Dark brown fine to coarse SAND, some fine to medium Gravel, little Clay and Silt, wet, dense, slight odor, no sheen or staining.
800	22	41-43	1 2 5 6	7	1.0	0.2		Dark brown fine to medium SAND, trace coarse Sand, slight odor, no staining or sheen.
	23	43-45	3 6 7 10	13	0.9	0.1		Dark olive-gray fine to medium SAND, well sorted, faint odor, loose to medium dense, no sheen or staining.
45	24	45-47	2 6 6 6	12	1.5	0.0		As above, with trace coarse Sand, wet, no odor or sheen. SILT layer with fine Sand, black non-oily staining throughout (<0.1') wet, medium stiff, no sheen or odor.
795	25	47-49	3 4 7 7	11	0.3	0.0		Olive CLAY and SILT, fine to coarse Sand and fine Gravel, medium stiff to stiff, moist, no odor/staining/sheen.
50	26	49-51	3 9 12 20	21	0.4	0.0		Olive-gray SILT and CLAY, some angular to rounded fine to medium Gravel, hard, no odor/staining/sheen. [TILL]
790								
55								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 6'-8' (with duplicate), 18'-20', and 35'-37' bgs.
Water level measured to be 14' bgs during drilling.

Date Start/Finish: 08/15/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. and 3-in Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 766782.95 **Easting:** 1006524.7 **Casing Elevation:** NA **Surface Elevation:** 843.67 ft. AMSL **Borehole Depth:** 55 ft. bgs **Descriptions By:** Michael K. Cobb	**Boring ID: SB-109** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
845								
0	1	0-1	NA	NA	0.0	0.0		Blacktop (Court Street road surface).
	2	1-3	24 16 6 6	22	1.5	1.1		Dark brown to black SILT and fine SAND, and gray crushed fine to medium Gravel, Coal chunks, dry, no odor/staining/sheen. Dark SILT and fine SAND, little coarse Sand and fine Gravel (fill), dry, crumbly, no odor/staining/sheen.
840	3	3-5	2 3 9 6	12	0.6	1.6		Olive SILT, little fine Sand, trace coarse Sand, fine Gravel, oxidized/mottled, moist, medium stiff, no odor/staining/sheen.
5	4	5-7	2 3 3 4	6	1.1	1.2		Dark brown fine SAND, some to little Silt, fine Sand, and fine Gravel, no odor/staining/sheen. Light olive brown SILT, little Clay, medium plastic, moist, blocky, horizontal bedding, no odor/staining/sheen.
835	5	7-9	3 4 6 6	10	1.0	0.0		As above, with increasing oxidation/mottling, trace black organic matter, moist, no odor/staining/sheen.
10	6	9-11	1 2 2 3	4	2.0	0.6		As above, except moist, grading to wet, no odor/staining/sheen.
	7	11-13	3 3 5 6	8	2.0	0.0		Light olive brown SILT, low to medium plastic, hortizontal bedding, little oxidation/mottling, moist to wet, no odor/staining/sheen.
830	8	13-15	3 4 5 6	9	2.0	0.0		As above, trace black organic material, moist, no odor/staining/sheen.
15	9	15-17	3 3	8	1.5	0.0		As above, trace rounded fine Gravel embedded in matrix.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 10'-11', 13'-15', & 17'-19' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-109

Borehole Depth: 55 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	9	15-17	5 5	8	1.5	0.0		As above, trace rounded fine Gravel embedded in matrix. As above, grading to medium gray.
825	10	17-19	2 6 9 12	15	1.0	NA		Medium gray fine SAND, some Silt, wet, soft, no odor/staining/sheen. Dark gray-olive fine SAND, little coarse Sand and fine Gravel, trace Silt, wet, faint MGP-type odor, no staining or sheen.
20	11	19-21 3-in SS	3 8 7 9	NA	0.0	NA		Olive to multicolored fine to coarse GRAVEL, some fine to coarse Sand, trace Silt, wet, soupy, loose, faint MGP-odor, no staining or sheen.
	12	21-23 3-in SS	14 6 5 3	NA	1.5	0.0		Olive-gray fine to coarse GRAVEL, rounded to subangular, some fine to coarse Sand, little Silt, no odor/staining/sheen. Black well sorted medium SAND, trace coarse Sand and Gravel, medium dense, faint MGP odor, no staining or sheen.
820	13	23-25 3-in SS	3 4 5 6	NA	1.8	0.0		Dark gray medium SAND, little coarse Sand and fine rounded Gravel, loose, wet, parting fine Sand at 24' bgs, faint odor as above, no staining or sheen.
25	14	25-27	1 3 4 5	7	2.0	0.0		
	15	27-29	5 5 6 6	11	1.5	0.0		Dark gray fine SAND, little Silt, seam with some Silt at 27.4' bgs, trace fine rounded Gravel, no odor/staining/sheen. Olive fine SAND, well sorted, no odor/staining/sheen.
815								Medium gray very fine SAND, well sorted, ocassional Silt laminae with oxidation staining, loose, no odor or sheen.
30	16	29-31	2 3 5 6	8	1.1	0.0		Olive fine SAND, trace Silt, loose, no odor/staining/sheen.
	17	31-33	WOR 1 1 3	2	1.8	0.0		Medium gray fine SAND, loose, wet, no odor/staining/sheen. Olive-gray to brown fine SAND, trace coarse Sand, fine Gravel, rounded, no odor/staining/sheen.
810	18	33-35	2 3 5 5	8	1.8	0.1		Olive gray brown fine SAND, little medium Sand, loose, wet, no odor/staining/sheen.
35	19	35-37	2 6	13	2.0	0.0		

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 10'-11', 13'-15', & 17'-19' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-109

Borehole Depth: 55 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	19	35-37	7 7	13	2.0	0.0		Olive gray brown fine SAND, little medium Sand, loose, wet, no odor/staining/sheen.
805	20	37-39 3-in SS	5 5 8 -	13	1.0	0.0		Olive gray fine SAND, little medium Sand, trace Silt, loose to medium dense, wet, no odor/staining/sheen.
40	21	39-40	4 5	5	1.0	0.0		
	22	40-42	3 6 7 9	13	1.0	0.0		Dark gray fine to medium SAND, little coarse Sand and fine rounded Gravel, trace Silt, medium dense, faint odor, no staining or sheen.
	23	42-44	8 5 8 50/0.4	17	1.3	0.0		Olive-gray medium to coarse SAND, little fine Sand, Silt, and fine Gravel, wet, medium dense, no odor/staining/sheen.
800	NA	44-44.5	NA	NA	NA	NA		Olive-gray SILT and fine SAND matrix, coarse Sand and fine Gravel clasts, grading stiff to hard, no odor/staining/sheen. [TILL]
45	24	44.5-46.5	11 13 8 10	21	1.0	0.0		
	25	46.5-48.5	16 20 8 22	28	1.2	0.0		Olive gray fine SAND and SILT matrix, some coarse Sand and angular to subangular fine to medium Gravel, little soupy, no odor/staining/sheen.
795	26	48.5-50.5	17 5 7 29	12	1.0	0.0		Olive gray SILT, little Clay and fine Sand matrix, sticky, some angular fine Gravel and coarse Sand clasts, wet, little soupy, non cohesive, no odor/staining/sheen.
50	NA	50.5-51	NA	NA	NA	NA		
	27	51-53	12 8 14 15	22	1.2	0.0		As above, but cohesive, no odor/staining/sheen.
790	28	53-55	11 21 27 28	48	0.9	0.9		Olive gray SILT and CLAY matrix, fine to medium subangular and subrounded Gravel and coarse Sand clasts, broken Gravel-Cobble, wet, hard, no odor/staining/sheen. [TILL]
55								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 10'-11', 13'-15', & 17'-19' bgs.

Date Start/Finish: 09/17/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 767098.16 **Easting:** 1006195.8 **Casing Elevation:** NA **Surface Elevation:** 841.89 ft. AMSL **Borehole Depth:** 10 ft. bgs **Descriptions By:** Michael K. Cobb	**Boring ID:** **SB-110** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	1	0.5-1.6	NA	NA	0.0	0.0		Blacktop (Brandywine Ave. road surface). CONCRETE.
840	2	1.6-3.0	5 7 11	12	0.9	0.0		Reddish brown FILL consisting of fine Sand and Silt, some coarse Sand and fine rounded to angular Gravel, trace Coal, dry to moist, no odor/staining/sheen.
	3	3-5	10 5 4 3	9	0.3	0.0		
5	4	5-7 3-in SS	9 11 7 7	NA	0.5	0.0		As above, moist. At 6.0' bgs, driller reports material is softer.
835								Reddish-brown SILT, little medium coarse Sand and fine rounded Gravel, no odor/staining/sheen.
	5	7-9 3-in SS	3 4 8 7	NA	1.5	0.0		Olive gray SILT, little black organic materials (possible staining), little coarse Sand, fine to medium rounded Gravel, moist, no odor/staining/sheen.
10	6	9-10 3-in SS	4 8	NA	1.0	0.0		As above, with increased rust mottling and decreased organic material. (No water in the borehole, opened to 10.0')
830								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 7'-9' bgs.

Date Start/Finish: 09/17/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 767035.13 **Easting:** 1006201.67 **Casing Elevation:** NA **Surface Elevation:** 843.33 ft. AMSL **Borehole Depth:** 10 ft. bgs **Descriptions By:** Michael K. Cobb	**Boring ID:** **SB-111** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
845								
0	1	0.5-1.6	NA	NA	0.0	0.0		Blacktop (Brandywine Ave. road surface). CONCRETE.
	2	1.6-3.0	3 9 10 7	19	1.4	0.0		Medium brown FILL consisting of fine Sand, some medium to coarse Sand and fine Gravel, Coal, crushed stone, little black/white Ash and Cinders, dry, crumbly, no odor/staining/sheen.
840	3	3-5	2 4 6 3	10	1.3	0.0		Black, white, reddish brown FILL consisting of Coal, Cinders, Ash, fine to coarse Sand and Gravel, loose, moist, no odor/staining/sheen.
5	4	5-7 3-in SS	4 3 4 3	NA	0.9	0.0		
	5	7-9 3-in SS	4 6 5 7	NA	2.0	0.0		Reddish brown SILT and fine SAND, some coarse Sand and fine to medium rounded Gravel, moist, no odor/staining/sheen.
835	6	9-10	5 4	NA	0.7	0.0		
10								
830								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 7'-9' bgs.

Date Start/Finish: 09/17/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 766963.13 **Easting:** 1006223.28 **Casing Elevation:** NA **Surface Elevation:** 846.08 ft. AMSL **Borehole Depth:** 10 ft. bgs **Descriptions By:** Michael K. Cobb	**Boring ID: SB-112** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0								
845	1	0-2	2 5 7 6	12	1.1	0.0		Medium brown SILT and fine SAND, organics (roots), moist, no odor/staining/sheen. Light brown fine SAND, some medium to coarse Sand, loose, dry, no odor/staining/sheen.
	2	2-4	5 9 19 29	28	2.0	0.0		Medium brown fine SAND, some coarse Sand and fine Gravel, trace Coal, moist.
5	3	4-6 3-in SS	4 10 12 18	NA	1.5	0.0		Black, white, red brown mixed FILL consisting of Coal, Cinders, Ash, medium to coarse Sand, fine to medium Gravel, moist, no odor/staining/sheen. Medium brown fine to coarse SAND and fine to coarse subrounded GRAVEL, moist, no odor/staining/sheen.
840	4	6-8 3-in SS	7 6 4 6	NA	1.2	0.0		As above, little Silt, little oxidation mottling, moist, no odor/staining/sheen.
	5	8-10 3-in SS	5 7 8 12	NA	1.2	0.0		As above, with fragments of red Sandstone, black shale flakes, moist, no odor/staining/sheen.
10								
835								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 4'-6' bgs.

Date Start/Finish: 09/10/01 **Drilling Company:** Lyon Drilling Company **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** Track CME 55	**Northing:** 767092.91 **Easting:** 1006396.54 **Casing Elevation:** NA **Surface Elevation:** 844.97 ft. AMSL **Borehole Depth:** 54 ft. bgs **Descriptions By:** Michael Cobb	**Boring ID:** SB-201 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 845								
	1	0-10	NA	NA	NA	NA		Gravel recently topfilled at the surface. Blind auger to 10' bgs through FILL (area has been excavated to 10-12' bgs as part of Holder 3 IRM). (Depth to water measured at 6.8' bgs in augers).
5 840								
10 835	2	10-12	6 10 10 10	20	1.3	59.9		Dark gray SILT and coarse SAND, few fine to medium Gravel (crushed stone fill), moist, no odor/staining/sheen. Light gray rust-mottled SILT, little Clay, very stiff, slight MGP odor, black staining, no sheen, dry-moist.
	3	12-14	5 10 8 8	18	1.2	203		Olive-gray SILT, little Clay, trace black oily staining along bedding planes, blocky, horizontal bedding, moist to wet, rust mottling, MGP odor. Sheens and little black oily staining (trace black NAPL) along bedding planes from 14'-16' bgs.
15 830	4	14-16	4 6 6 8	12	1.8	88.8		

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 14'-16' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-201

Borehole Depth: 54 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	5	16-18	2 4 4 5	8	1.4	58.4		Olive-gray SILT, little Clay, trace black oily staining along bedding planes, blocky, horizontal bedding, moist to wet, rust mottling, MGP odor. Sheens and little black oily staining (trace black NAPL) along bedding planes from 14'-16' bgs.
	6	18-20	WOR WOR 3 4	NA	0.8	28.3		Dark olive fine to coarse SAND and fine GRAVEL, little Silt, trace sheen (silvery), trace black oily NAPL, loose.
20 *825*	7	20-22	4 6 6 8	12	1.4	15.1		Dark olive fine to coarse SAND, some fine Gravel, heavy amber/rainbow sheens, trace spots of oily NAPL (no blebs), wet, MGP odor.
	8	22-24	6 7 9 7	16	0.8	0.5		As above with trace silvery sheens, no NAPL, MGP odor.
25 *820*	9	24-26	7 2 4 8	6	0.7	0.0		Dark olive-gray fine to coarse SAND, little coarse Sand and fine to medium Gravel, trace sheens, no NAPL, no odor.
	10	26-28	6 4 4 4	8	0.5	68.5		Dark olive fine to coarse SAND and fine GRAVEL, partially saturated with black tar (medium viscosity) in last 0.03'.
	11	28-30	2 3 4 5	7	0.3	0.0		Olive grey fine SAND, trace rounded fine Gravel, well sorted, trace sheens, no tar/NAPL, wet.
30 *815*	12	30-32 3-in SS	6 7 10 10	NA	1.2	0.0		
	16	32-34 3-in SS	6 6 7 7	NA	1.3	0.0		As above, medium Sand lens from 32.5' to 32.7' bgs.
35 *810*	14	34-36 3-in SS	6 9 9 10	NA	1.3	0.0		As above, rust colored banding at 35.5'-35.6' bgs, and a 1 cm wide lens of red SILT and CLAY, no sands at 36.7' bgs, no odor/staining/sheen throughout interval.

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BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 14'-16' bgs.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SB-201

Borehole Depth: 54 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	15	36-38 3-in SS	7 10 7 12	NA	1.2	0.0		Light olive fine SAND, well sorted, little reddish banding at 36-36.5' bgs, no sheens, no NAPL, no odor, wet.
	16	38-40 3-in SS	7 10 12 12	NA	1.5	0.0		As above but no red banding, little Silt in <1/2" bands at 38-38.2' bgs, no odor/staining/sheen.
40 805	17	40-42	5 8 6 5	14	1.2	0.0		Olive gray-brown fine SAND, trace Silt throughout, plus trace partings Silt, wet, no odor/staining/sheen.
	18	42-44	5 5 5 6	10	1.2	0.0		As above, little reddish fine to medium Sand at 42-42.5' bgs.
								Olive gray-brown fine to medium SAND, seam of very fine Sand from 44.2-44.3' bgs, well sorted, no odor/staining/sheen.
45 800	19	44-46	8 8 6 8	14	1.2	0.0		Olive-gray fine to medium SAND, little coarse Sand and fine rounded Gravel, loose, wet, no odor/staining/sheen.
	20	46-48	2 2 3 5	5	1.5	0.0		Olive gray fine to medium SAND, trace Silt, wet, loose, 1/2" seam red SILT with little Clay at 47.5' bgs, possible trace sheens (may be from water column), trace coarse Sand and fine rounded Gravel with trace sheen from 48'-48.3' bgs.
	21	48-50	5 8 7 8	15	1.6	0.0		Brown fine SAND, little Silt, wet, no odor/staining/sheen.
50 795								Brown fine to medium SAND well sorted, no odor/staining/sheen.
	22	50-52	7 9 17 15	26	1.1	0.0		Olive-gray SILT AND CLAY matrix, coarse Sand and fine Gravel clasts, dense, moderately cohesive, no odor/staining/sheen. [TILL]
	23	52-54	50/ 0.7 NA NA NA	NA	0.1	0.0		
55 790								

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engineers & scientists

Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 14'-16' bgs.

Date Start/Finish: 09/11/01 **Drilling Company:** Lyon Drilling Company **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** Track CME 55	**Northing:** 767047.42 **Easting:** 1006463.39 **Casing Elevation:** NA **Surface Elevation:** 844.43 ft. AMSL **Borehole Depth:** 14 ft. bgs **Descriptions By:** Michael Cobb	**Boring ID:** **SB-202** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
845								
0								Gravel Topfill. Blind auger to 6.0' bgs, Concrete slab encountered at 4.1' bgs.
	NA	0-6	NA	NA	NA	NA		
840								
5	1	6-8	WOH 1 1 1	2	1.5	42.6		Medium to coarse SAND as cinders, few fine Gravel, little Silt, loose, slight MGP odor, staining, no sheen, wet.
	2	8-10	1 WOH 6 3	6	1.8	91.2 14.7		As above, rainbow sheens, trace blebs of black oily NAPL. Gray SILT and CLAY, grading to olive-gray, blocky soft, black stained, rust mottling from 9-9.4' bgs, wet.
835								
10	3	10-12	2 5 6 6	11	1.7	39.9		Light brown red mottled SILT, blocky, horizontal bedding (sheens in wash may impact PID), no internal staining, sheen, or odor.
	4	12-14	2 6 7 7	13	1.6	32.4		
830								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Date Start/Finish: 09/14/01	**Northing:** 766809.75	**Boring ID:** **SB-204**
Drilling Company: Lyon Drilling Company	**Easting:** 1006406.15	
Driller's Name: Harry Lyon	**Casing Elevation:** NA	**Client:** New York State Electric and Gas
Drilling Method: Hollow Stem Auger	**Surface Elevation:** 844.82 ft. AMSL	
Sampler Size: 3-in. Split Spoon	**Borehole Depth:** 1 ft. bgs	**Location:** Court Street
Auger Size: 4.25-in. ID		Binghamton, NY
Rig Type: Truck CME 55	**Descriptions By:** Michael Cobb	

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 845	NA	0-14	NA	NA	NA	NA		Auger through Test Pit from 0 - 14' bgs.
5 / 840								
10 / 835								
	1	14-14.3	50/0.3	NA	0.2	NA		Fine to coarse GRAVEL, soupy, heavy black tar (dripping off spoon), Wood fragments, strong MGP-type odor.
15 / 830	NA	14.3-15	NA	NA	NA	NA		Auger refusal at 15' bgs.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Monitoring Wells and Piezometers

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW931S

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 5/28/93 – 5/28/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 20.7 ft.
Borehole Depth: 20.7 ft.
Ground Surface Elev.: ft.

General Location:
Abandoned

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0												Brown fine to coarse SAND and fine to coarse GRAVEL, dry, loose.			2-inch diameter stainless steel (SS) well riser 10.3' – 2.4' above ground level
1															
2															Cement surface pad 1.5' – 0.0'
3												grades with little brick fragments.			
4															Cement/bentonite grout 5.4' – 1.5'
5															
6															
7															Bentonite seal 7.8' – 5.4'
8												Brown fine to coarse SAND, trace clay, damp to moist, loose.			
9												grades with little fine to medium gravel.			Grade # 00 Silica Sand pack 8.3' – 7.8'
10															
11												Brown gray SILT and fine to medium GRAVEL, some fine to coarse sand, moist, loose.			
12															
13															
14															
15															0.010-inch slot stainless steel (SS) well screen 20.3' – 10.3'
16												Wet at 15.5. grades with little **oil globules**.			
17															Grade # 0 Silica Sand pack 20.7' – 8.3'
18															
19												Brown fine to coarse SAND and fine to medium GRAVEL, some silt, trace clay, some **coal tar residues** in matrix, wet, very loose.			
20															

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW931S

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 5/28/93 – 5/28/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: ft.
Corehole Depth: 20.7 ft.
Borehole Depth: 20.7 ft.
Ground Surface Elev.: ft.

General Location:
Abandoned

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
20															
21												Bottom of boring at 20.7 ft.			Bottom of well set at 20.7'
22												**NOTES:** Augered 0.0' – 20.7' feet without sampling. Characterization of MW931S was determined by MW931D Well MW931S was abandoned and grouted to the surface. NR – No recovery NA – Not available Water level obtained 7/7/93			
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38															
39															
40															

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW931D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 5/27/93 – 5/27/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 848.75 ft.
Corehole Depth: 512 ft.
Borehole Depth: 512 ft.
Ground Surface Elev.: 845.9 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															6-inch diameter outer protective PVC casing with locking cap installed to 2.85' above ground level.
1												Brown fine to coarse SAND and fine to coarse GRAVEL, dry, loose.			
2															Cement surface pad 1.5' – 0.0'
3												grades with little brick fragments.			
4			17		0.9			0.0	0.0						
5	1		8 21	29											
6			13 7		0.9			0.0	0.0						
7	2		4 4	8											
8			4 17		0.6			0.0	0.0			grades to brown fine to coarse SAND, trace clay, damp to moist, loose.			
9	3		12 7	19											
10			3 9		0.6			NA	0.0			grades with little fine to medium gravel.			
11	4		8 7	15								Brown gray SILT and fine to medium GRAVEL, some fine to coarse sand, moist, loose.			
12			8 13		0.2			NA	0.6						
13	5		7 5	12											2-inch diameter stainless steel (SS) well riser 40.85' – 2.24' above ground level
14			4 4		0.5			NA	7.6	▽					
15	6		4 3	7											
16			3 4		1.1			NA	47.1			Wet at 15.5. grades with little **oil globules.**			
17	7		3 5	8											
18			4 4		1.1			NA	69.8						
19	8		3 4	7								Brown fine to coarse SAND and fine to medium GRAVEL, some silt, trace clay, little **oil globules** in matrix, wet, very loose.			
20			3 4		NR			NA	NA						
21	9		2 3	5											
22			4												

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW931D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 5/27/93 – 5/27/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 848.75 ft.
Corehole Depth: 512 ft.
Borehole Depth: 512 ft.
Ground Surface Elev.: 845.9 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			4		0.4			NA	83.5			grades to some **oil globules.**			
23	10		4	8											
24			4												
			1		0.4			NA	55.5			grades to fine to coarse SAND, little fine gravel, some black staining, wet, very loose, oil sheen.			
25	11		3												
			5	8											
			7												
26			6		1.2			NA	29.7						
			8												
27	12		9	17								No oil sheen or oil globules after 27.0'			
			10												
28			3		0.9			NA	24.4						
			3												
29	13		3	6								grades to fine to medium SAND, some silt, trace black staining.			
			4												
30			5		1.4			NA	9.9						
			8												
31	14		11	19											
			12												
32			8		1.8			NA	12.3						
			10												
33	15		16	26											
			36												
34			15		0.6			13.3	11.3			grades to fine to medium GRAVEL, little fine to coarse sand, wet, loose.			
			11												
35	16		15	26											
			12												
36			9		NR			NA	NA						
			9												
37	17		10	19											
			12												
38			7		1.0			1.0	6.7			grades to fine SAND, some silt, wet, loose.			
			11												
39	18		13	24											
			13												
40			8		1.0			1.4	5.9						
			10												
41	19		20	30											
			15												
42			9		0.6			0.8	8.0			Fine to coarse SAND, trace silt lense 41.0 – 41.8 ft. grades to fine SAND and SILT.			
			10												
43	20		17	27											
			17												

Cement/bentonite grout 35.6' – 1.5'

Bentonite seal 38.5' – 35.6'

Grade # 00 Silica Sand pack 39.0' – 38.5'

0.010-inch slot stainless steel (SS) well screen 50.85' – 40.85'

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW93ID

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 5/27/93 – 5/27/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 848.75 ft.
Corehole Depth: 51.2 ft.
Borehole Depth: 51.2 ft.
Ground Surface Elev.: 845.9 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44															
45	21		11 12 16 17	28	1.0			0.0	4.3			grades to fine to coarse SAND, wet, loose.			
46			8 17		1.1			0.6	5.3			Fine SAND and SILT lenses at 46.5 – 46.7 and 47.0 – 47.3 ft.			Grade # 0 Silica Sand pack 51.2' – 39.0'
47	22		50/.3												
48			50/.3		0.1			1.3	NA			Brown SILT and fine GRAVEL, little fine to coarse sand, wet, dense.			
49	23														
50			31		0.3			2.0	10.4			grades to brown/green, very dense.			
51	24		57 50/.4												
52												Bottom of boring at 51.2 ft.			Bottom of well set at 51.2'
53															
54															
55															
56															
57															
58															
59															
60															
61															
62															
63															
64															
65															

NOTES:
Augered 0.0 – 4.0' feet without sampling.
Ground water level 6/16/93.
WOH – Weight of hammer
NR – No recovery
NA – Not available
Water level obtained 7/7/93

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW932S

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/4/93 – 6/4/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2–inch I.D.
Hammer Weight: 140
Height of Fall: 30–inches
Drilling Method: HSA
Bit Size: **Auger Size** : 4 1/2–inch ID

Northing:
Easting:
Well Casing Elev.: 847.0 ft.
Corehole Depth: 14.8 ft.
Borehole Depth: 14.8 ft.
Ground Surface Elev.: 844.0 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test
0													
1												Brown fine to coarse SAND and fine to coarse GRAVEL, dry, loose.	
2												grades to dry to damp.	
3													
4										▽		grades to moist.	
5													
6												grades to wet.	
7													
8													
9												Brown SILT, some clay, trace wood slivers, some black staining and coal tar odor, wet, soft, semiplastic.	
10													
11												grades to brown–gray SILT, little clay, little fine sand, some thick black **coal tar residue** and **oil globules** in matrix, moist, soft.	
12													
13												grades to no coal tar in matrix.	
14													
15												Bottom of boring at 14.8 ft.	
16													
17												**NOTES:** Augered 0.0' – 14.8' feet without sampling.	
18												Characterization of MW932S was determined by MW932D	
19												NR – No recovery	
20												NA – Not available	
21												Water level obtained 7/7/93	

Well Column / Well Materials

- 6–inch diameter outer protective PVC casing with locking cap installed to 3.0' above ground level.
- Cement surface pad 1.5' – 0.0'
- Cement/bentonite grout 2.0' – 1.5'
- 2–inch diameter stainless steel (SS) well riser 4.2' – 2.45' above ground level
- Bentonite seal 3.0' – 2.0'
- Grade # 00 Silica Sand pack 3.5' – 3.0'
- 0.010–inch slot stainless steel (SS) well screen 14.2' – 4.2'
- Grade # 0 Silica Sand pack 14.8' – 3.5'
- Bottom of well set at 14.8'

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW932D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/2/93 – 6/2/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 846.9 ft.
Corehole Depth: 56.2 ft.
Borehole Depth: 56.2 ft.
Ground Surface Elev.: 844.1 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															6-inch diameter outer protective PVC casing with locking cap installed to 2.80' above ground level.
1												Brown fine to coarse SAND and fine to coarse GRAVEL, dry, loose.			Cement surface pad 1.5' – 0.0'
2			21		0.3			0.0	0.0						
3	1		9 7 7	16								grades to dry to damp.			
4			2		0.4			0.0	0.0						
5	2		2 2 2	4								grades to moist.			
6			2		NR			0.0	NA						
7	3		2 2 2	4								grades to wet.			
8			WOH		1.8			0.1	13.4						
9	4		2 2 4	4								Brown SILT, some clay, trace wood slivers, some black staining and coal tar odor, wet, soft, semiplastic.			
10			3		1.7			6.8	15.4			grades to brown-gray SILT, little clay, little fine sand, some thick black **coal tar residue** and **oil globules** in matrix, moist, soft.			
11	5		4 4 5	8											
12			11		1.6			0.0	12.7	▽		grades to no coal tar residue in matrix.			2-inch diameter stainless steel (SS) well riser 43.6' – 2.18' above ground level
13	6		10 10 11	20											
14			10		1.6			4.5	76.4			grades to some **coal tar residue** and **oil globules** in matrix.			
15	7		11 5 5	16											
16			8		1.3			6.3	65.5			grades to brown, **little coal tar residue** and black staining.			
17	8		8 8 5	16											
18			4		1.6			15.5	114			grades to gray SILT, some clay, trace sand, little wood slivers, trace oil sheen in matrix, wet, medium stiff, semiplastic.			
19	9		5 6	11											
20			5 2		1.0			13.2	121			grades to dark gray SILT and CLAY, little wood slivers, trace oil sheen in matrix, wet, soft, plastic.			
21	10		2 2 2 3	4											

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW932D

Project: NYSEG

Location: Court St., Binghamton, NY

Date Start/Finish: 6/2/93 – 6/2/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 846.9 ft.
Corehole Depth: 56.2 ft.
Borehole Depth: 56.2 ft.
Ground Surface Elev.: 844.1 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			13		1.0			1.2	13.4						
45	22		17	34								Gray-brown fine SAND, some fine to medium gravel, little silt, moist, medium dense.			
46			17												
			11		0.9			1.5	11.3						
47	23		20												0.010-inch slot stainless steel (SS) well screen 53.6' – 43.6'
			28	48								grades to brown fine to coarse SAND and fine to medium GRAVEL, little silt, wet, medium dense.			
48			26												
			29		1.3			1.2	13.0						
49	24		26												
			19	45											
50			12												Grade # 0 Silica Sand pack 56.2' – 41.3'
			16		0.9			2.2	8.3			grades to fine SAND, SILT, and fine to medium GRAVEL, wet, medium dense.			
51	25		17												
			17	34											
52			9												
			15		0.7			2.2	7.1			grades to fine SAND and SILT, little coarse sand and fine gravel, wet to moist, medium dense.			
53	26		28												
			27	55											
54			20												
			9		0.4			1.6	NA			grades to some fine to medium gravel, dense to very dense.			Bottom of well set at 54.0'
55	27		70/.3												
56	28		100/.3		NR			NA	NA						
												Bottom of boring at 56.2 ft.			
57															
58												**NOTES:**			
59												Augered 0.0 – 2.0' feet without sampling.			
60												Ground water level 6/16/93.			
61												WOH – Weight of hammer			
62												NR – No recovery			
63												NA – Not available			
64												Water level obtained 7/7/93			
65															
66															

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No: MW9335

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/9/93 – 6/9/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.28 ft.
Corehole Depth: 22.0 ft.
Borehole Depth: 22.0 ft.
Ground Surface Elev.: 844.2 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
20	10		1 1 2 3	3				0.0	43.8			grades with trace fine gravel.			
22												Bottom of boring at 22.0 ft.			Bottom of well set at 22.0'

NOTES:
Augered 0.0' – 2.0' feet without sampling.
Ground water level 6/16/93.
WOH – Weight of hammer
NR – No recovery
NA – Not available
Water level obtained 7/7/93

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW933D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/1/93 – 6/1/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size** : 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.53 ft.
Corehole Depth: 48 ft.
Borehole Depth: 48 ft.
Ground Surface Elev.: 844.6 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															6-inch diameter outer protective PVC casing with locking cap installed to 2.93' above ground level.
1												Brown fine to coarse SAND and fine to coarse GRAVEL, dry, loose.			
2			2		0.7			0.0	0.0						
3	1		3 4	7								grades with some clay.			
4			6												
5	2		8 9 11	20	0.7			1.0	0.0			Ash lense 3.5' – 3.8' grades to fine to coarse SAND and fine GRAVEL, little silt, dry, loose.			
6			18												
7	3		13 8 6	14	0.3			0.6	0.0			grades to gray brown, dry to damp.			
8			4 7		0.3			0.7	0.3			grades to dark brown fine to coarse SAND, some fine to medium gravel, little silt, moist, medium dense.			
9	4		3 4 6	7											
10			3 4		1.8			1.0	0.0			Brown SILT, little clay, some oxidation staining, moist to wet, medium stiff.			
11	5		4 6	8											
12			8 6		2.0			0.6	0.0			grades to some clay, wet.			
13	6		5 4	11						▽					
14			3 4		1.6			0.8	0.0						
15	7		5 6	9								grades to gray SILT, little clay, some oxidation staining, wet, medium stiff.			
16			12 6		1.0			1.2	0.0						
17	8		7 9	13											
18			2 3		0.1			1.7	13.2			Gray fine to coarse SAND and fine to medium GRAVEL, little silt, wet to saturated, loose.			
19	9		3 6	6											
20			WOH		0.4			4.3	24.3			grades to black fine to coarse SAND, trace silt, saturated, loose.			
21	10		2 2 3	4											Cement surface pad 1.5' – 0.0'

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW933D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/1/93 – 6/1/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size:** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.53 ft.
Corehole Depth: 48 ft.
Borehole Depth: 48 ft.
Ground Surface Elev.: 844.6 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			3 4 5	9	1.3			3.4	27.5			grades with trace fine gravel.			
23	11		6												
24			WOH		1.1			3.8	52.9			Slight hydrocarbon odor.			
25	12		3 6 6	9											Cement/bentonite grout 31.0' – 1.5'
26			4 4 6	10	1.2			8.3	37.5						
27	13		7									grades to brown fine SAND and SILT. wet, loose.			
28			WOH		0.6			1.6	41.4			Lenses of fine to coarse SAND 28.0' – 30.0'.			
29	14		3 3 6	6											2-inch diameter stainless steel (SS) well riser 37.0' – 2.31' above ground level
30			6 5 5	10	0.8			0.8	43.7			Layers of oxidation staining 30.0' – 32.0'.			
31	15		5 9 5												
32			4 5	9	1.0			7.4	30.7						Bentonite seal 34.1' – 31.0'
33	16		5 5												
34			5 6		NR			NA	NA						
35	17		11 14	17											Grade # 00 Silica Sand pack 35.5' – 34.1'
36			7 9		0.8			11.9	172			grades to black-gray fine to coarse SAND, little silt, some oil sheen in matrix.			
37	18		9 10	18											
38			5 9		1.0			5.5	46.2						
39	19		9 10	18											
40			5 7		1.4			NA	15.9			oil sheen in matrix			
41	20		7 11	14											0.010-inch slot stainless steel (SS) well screen 46.6' – 37.0'
42			5 6		1.5			NA	NA						
43	21		7 7	13											
44															

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW933D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/1/93 – 6/1/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.53 ft.
Corehole Depth: 48 ft.
Borehole Depth: 48 ft.
Ground Surface Elev.: 844.6 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			10		0.6			6.1	56.2			Brown SILT, some fine to coarse sand and fine to medium gravel, wet to moist, loose. No oil sheen or coal tar residue after 43.5'.			Grade # 0 Silica Sand pack 48.0' – 35.5'
45	22		15 20	35											
46			27 19		0.8			0.0	9.5						Bottom of well set at 46.6'
47	23		21 43	65								grades to some fine gravel, little fine to coarse sand, moist, dense.			
48			47									Bottom of boring at 48.0 ft.			
49															
50															
51															
52															
53															
54															
55															
56															
57															
58															
59															
60															
61															
62															
63															
64															
65															
66															

NOTES:
Augered 0.0 – 2.0' feet without sampling.
Ground water level 6/16/93.
WOH – Weight of hammer
NR – No recovery
NA – Not available
Water level obtained 7/7/93

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW935D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/3/93 – 6/3/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 848.3 ft.
Corehole Depth: 62 ft.
Borehole Depth: 62 ft.
Ground Surface Elev.: 844.9 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															
1												Brown fine to coarse SAND and fine GRAVEL, some silt, trace clay, moist, loose.			6-inch diameter outer protective PVC casing with locking cap installed to 3.4' above ground level.
2			1 2		0.6			0.3	0.0						
3	1		1 2	3								Gray ASH, some coal, moist, very loose.			
4			1 2		1.1			0.2	1.3			Brown fine to coarse SAND, some silt, trace clay, moist, loose.			Cement surface pad 1.5' – 0.0'
5	2		1 1	3								Gray ASH, some coal lense 5.5' – 6.0'.			
6			WOH		0.2			5.6	15.7			grades to fine to coarse SAND, some medium size coal, trace silt, wet, very loose.			
7	3		1 1	2											
8			WOH		1.3			11.5	374			Gray-brown ASH, some fine to coarse sand, some **coal tar residue** in matrix, wet, very loose.			
9	4		WOH 1	1											
10			4		1.1			45.2	496			Gray-brown SILT, some clay, some **coal tar residue** and fiberous material in matrix, wet, very soft.			
11	5		4 5	9						▽					
12			10 10		0.9			2.4	262			grades to green-gray SILT, trace clay, some **coal tar residue** in matrix, damp to moist, medium stiff.			2-inch diameter stainless steel (SS) well riser 46.47' – 2.76' above ground level
13	6		12 20	32											
14			24 7		1.9			7.0	263			grades to brown-gray SILT, some oxidation staining, damp, very stiff.			
15	7		10 12	22											
16			12 7		1.1			73.5	337			grades with trace **amber coal tar residue** in matrix.			
17	8		19 14	33											
18			9 4		1.9			71.3	283			Brown fine to coarse SAND and fine to medium GRAVEL, some silt, some **oil globules**, wet, loose.			
19	9		5 7	12											
20			8 4		1.6			11.6	47.2			grades to dark gray fine SAND, some silt, trace oil sheen, wet, loose. slight coal tar odor.			
21	10		4 4	8											
22			4												

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW935D

Project: NYSEG
Location: Court St, Binghamton, NY

Date Start/Finish: 6/3/93 – 6/3/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 848.3 ft.
Corehole Depth: 62 ft.
Borehole Depth: 62 ft.
Ground Surface Elev.: 844.9 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			3		1.6			4.9	16.9						
23	11		4 4	8											
24			4 5		1.6			9.2	6.2			grades to brown fine SAND, some silt, no evidence of coal tar residue or oil globules, wet, loose.			
25	12		6 7	13											Cement/bentonite grout 40.0' – 1.5'
26			7 3		1.8			6.9	4.4			grades to fine to coarse SAND.			
27	13		4 5	9											
28			5 4		1.7			4.8	6.3						
29	14		4 6	10								grades to fine SAND, some silt.			
30			9 4		1.5			2.5	10.2						
31	15		5 9	14								Brown SILT, some clay lense 30.5' – 31.0'.			
32			12 9		2.0			13.2	7.1			grades to tan brown fine SAND and SILT.			
33	16		12 9	21								grades to brown fine to coarse SAND, little silt, oil sheen at 32.2 feet in isolated area.			
34			12 5		2.0			7.7	128						
35	17		5 6	11								grades to some silt, trace coal pieces, trace oil sheen.			
36			6 6		1.1			15.5	178			grades to fine SAND and SILT.			
37	18		9 7	16								No oil sheen or coal tar residue after 36.0'			
38			7 6		1.1			1.8	6.5						
39	19		7 9	16											
40			13 5		1.2			4.8	NA			Oxidation staining.			
41	20		6 9	15											Bentonite seal 43.4' – 40.0'
42			10 5		1.3			1.8	4.3						
43	21		8 10	18											Grade # 00 Silica Sand pack 44.0' – 43.4'
44			8												

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW935D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/3/93 – 6/3/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size:** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 848.3 ft.
Corehole Depth: 62 ft.
Borehole Depth: 62 ft.
Ground Surface Elev.: 844.9 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			1		1.2			2.5	40.2			grades to fine to coarse SAND, little silt.			
45	22		6 9	15								grades to fine SAND and SILT.			
46			13 6		1.1			3.1	46.3						
47	23		8 9	17											
48			12 8		1.0			4.4	3.5						0.010-inch slot stainless steel (SS) well screen 56.37' – 46.47'
49	24		8 13	21											
50			13 12		1.0			20.6	191						
51	25		13 15	28								black stained silt lense at 51.0' – 51.1'.			
52			15 9		1.8			NA	5.7			grades to fine to coarse SAND, some silt.			
53	26		10 15	25								Silt lenses at 53.0' and 53.5'			
54			18		0.2			0.0	3.8			Green-brown SILT, some fine to medium gravel, little fine to coarse sand, damp to moist, medium dense.			Grade # 0 Silica Sand pack 62.0' – 44.0'
55	27														
56															
57															
58															
59															
60			16		0.4			0.0	NA			grades to medium dense to dense.			Bottom of well set at 56.92'
61	28		16 28	34											
62			34									Bottom of boring at 62.0 ft.			
63												**NOTES:** Augered 0.0 – 2.0' feet without sampling. Ground water level 6/16/93. WOH – Weight of hammer NR – No recovery NA – Not available			
64															
65															
66															

Geologist Initials: TRO

Project No.: 130.08

Remarks: Augered 54.2' – 60.0' without sampling. Water level obtained 7/7/93

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW936S

Project: NYSEG

Location: Court St., Binghamton, NY

Date Start/Finish: 6/7/93 – 6/7/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.85 ft.
Corehole Depth: 24.0 ft.
Borehole Depth: 24.0 ft.
Ground Surface Elev.: 844.4 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description
0												
1												
2			3 9		1.5			0.1	0.0			Brown fine to coarse SAND and fine to medium GRAVEL, trace silt and clay, moist, loose.
3	1		7 5	16								
4			2 2		0.1			0.0	0.0			Black COAL, fine to coarse SAND and ASH, trace slag, dry, loose.
5	2		2 2	4								
6			2 2		0.2			0.0	0.0			
7	3		2 2	4								
8			2 2		1.2			0.0	0.0			Brown SILT, some clay, moist, soft.
9	4		1 2	3								grades to little clay, trace fine gravel, stiff.
10			3 3		NA			31.7	55.7			
11	5		3 3	6						▽		grades to gray SILT, some clay, little wood pieces, some black staining, moist, stiff.
12			4 5		1.3			6.9	10.0			
13	6		6 6	12								grades to little clay, some oxidation staining.
14			5 5		2.0			0.6	3.5			
15	7		8 9	17								
16			12 9		1.8			0.0	1.9			
17	8		9 10	19								ASH lense at 16.5 ft.
18			12 4		0.1			0.9	2.2			grades to dark gray SILT, some clay, moist to wet, medium stiff.
19	9		3 3	6								Brown fine to coarse SAND, wet, very loose.
20			3 WOH		1.8			0.9	5.4			
21	10		2 2	4								grades to dark gray fine to coarse SAND and fine to medium GRAVEL.
22			3									grades to fine to coarse SAND, trace medium gravel.

Msc. Test	Well Column	Well Materials
		6-inch diameter outer protective PVC casing with locking cap installed to 3.45' above ground level.
		Cement surface pad 1.5' – 0.0'
		2-inch diameter stainless steel (SS) well riser 12.95' – 2.79' above ground level
		Cement/bentonite grout 7.5' – 1.5'
		Bentonite seal 10.5' – 7.5'
		Grade # 00 Silica Sand pack 11.0' – 10.5'
		0.010-inch slot stainless steel (SS) well screen 22.95' – 12.95'
		Grade # 0 Silica Sand pack 24.0' – 11.0'

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW936S

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/7/93 – 6/7/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.85 ft.
Corehole Depth: 24.0 ft.
Borehole Depth: 24.0 ft.
Ground Surface Elev.: 844.4 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22															
23	11		2 3 3 3	6	1.1			1.2	3.1						Bottom of well set at 23.0'
24												Bottom of boring at 24.0 ft.			
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38															
39															
40															
41															
42															
43															
44															

NOTES: Augered 0.0' – 2.0' feet without sampling.
Ground water level 6/16/93.
WOH – Weight of hammer
NR – No recovery
NA – Not available
Water level obtained 7/7/93

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW938D

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/8/93 – 6/8/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.51 ft.
Corehole Depth: 60.8 ft.
Borehole Depth: 60.8 ft.
Ground Surface Elev.: 844.1 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															6-inch diameter outer protective PVC casing with locking cap installed to 3.41' above ground level.
1															
2															Cement surface pad 1.5' – 0.0'
3															
4															
5	1		8 6 3 2	9	0.3			0.0	0.0			Brown fine to coarse SAND, some fine to medium gravel, trace silt and clay, damp, loose.			
6															
7															
8															
9															
10	2		3 2 1 1	3	NR			0.0	NA	▽					2-inch diameter stainless steel (SS) well riser 49.8' – 2.77' above ground level
11															
12															
13															
14												grades to moist.			
15	3		3 6 7 8	13	0.6			0.0	0.0			Brown-gray SILT, little clay, moist, medium stiff.			
16															
17															
18															
19															
20	4		1 2 1 1	3	0.8			0.0	3.5			Dark gray fine to coarse SAND, some fine to medium gravel, trace silt, wet, loose.			
21															
22															

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW936D

Project: NYSEG

Location: Court St., Binghamton, NY

Date Start/Finish: 6/8/93 – 6/8/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.51 ft.
Corehole Depth: 60.8 ft.
Borehole Depth: 60.8 ft.
Ground Surface Elev.: 844.1 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
22			1 1 2		1.1			0.0	NA			grades to fine to coarse SAND, some silt.			
23	5		3 3	5											
24			3 4		1.8			0.0	0.0						
25	6		4 4	8											Cement/bentonite grout 43.8' – 1.5'
26			6 4					16.3	0.2						
27	7		6 5	11											
28			6 5		1.9			NA	47.3			grades with some **coal tar residue** in matrix.			
29	8		4 6	10											
30			5 8		0.8			0.0	1.1			No coal tar residue or oil sheen after 29.5'.			
31	9		9 12	21								grades to brown fine SAND and SILT.			
32			14 6		1.2			0.0	0.2						
33	10		7 11	18											
34			13 5		1.1			1.0	0.2						
35	11		5 6	11								grades to gray brown fine to coarse SAND, trace silt.			
36			7 7		1.1			1.1	0.7			grades with trace fine to medium gravel.			
37	12		9 9	18											
38			11 4		1.3			0.1	0.2						
39	13		9 13	22											
40			10 10		1.3			1.5	0.8						
41	14		10 13	23											
42			16 17		1.6			0.0	0.0						Bentonite seal 46.8' – 43.8'
43	15		7 7	14											
44			13												

Geologist Initials: TRO

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. MW936D

Project: NYSEG

Location: Court St., Binghamton, NY

Date Start/Finish: 6/8/93 – 6/8/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 847.51 ft.
Corehole Depth: 60.8 ft.
Borehole Depth: 60.8 ft.
Ground Surface Elev.: 844.1 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
44			7		1.3			0.0	0.0						
45	16		9 15 15	24											
46			15 9		1.8			0.0	0.0			grades to medium dense.			
47	17		11 15	20											Grade # 00 Silica Sand pack 48.0' – 46.8'
48			9 11		1.9			0.4	0.0			grades to little silt.			
49	18		13 15	24			-								
50			18 19		1.8			0.0	0.4						Grade # 0 Silica Sand pack 60.8' – 48.0'
51	19		16 16	35											
52			19 22		1.7			0.5	0.0			Fine SAND and SILT lense at 51.2 feet. grades to gray/brown fine to coarse SAND, some silt, moist, medium dense.			
53	20		23 17	45											
54			21 11		0.4			0.6	0.0						
55	21		11 20	22											
56			19 31		0.3			0.0	1.2						0.010-inch slot stainless steel (SS) well screen 59.8' – 49.8'
57	22		27 23	58											
58			32 24		1.1			0.0	0.0			Brown-green SILT and fine to medium GRAVEL, medium dense.			
59	23		23 23	47								grades to brown fine to coarse SAND and fine GRAVEL, some silt, wet, medium dense.			
60	24		20 100/.3		0.4			0.3	0.1			grades to brown-green SILT and fine to medium GRAVEL, some sand, moist, dense to very dense.			Bottom of well set at 59.85'
61												Bottom of boring at 60.8 ft.			
62												**NOTES:** Augered 0.0 – 5.0' feet without sampling. Ground water level 6/16/93. WOH – Weight of hammer NR – No recovery NA – Not available			
63															
64															
65															

Geologist Initials: TRO

Project No.: 130.08

Remarks:
Water level obtained 7/7/93

Water Levels

Date	Time	Elevation

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & SCIENTISTS

Well No. P2-1

Project: NYSEG
Location: Court St., Binghamton, NY

Date Start/Finish: 6/9/93 – 6/9/93
Drilling Company: Parratt Wolf Inc.
Driller's Name: Doug Richmond
Rig Type: CME Mobil – 57
Spoon Size: 2-inch I.D.
Hammer Weight: 140
Height of Fall: 30-inches
Drilling Method: HSA
Bit Size: **Auger Size :** 4 1/2-inch ID

Northing:
Easting:
Well Casing Elev.: 848.4 ft.
Corehole Depth: 12 ft.
Borehole Depth: 12 ft.
Ground Surface Elev.: 844.8 ft.

General Location:

Depth (Ft.)	Sample/Run Number	Sample/Int/Type	Blows/6 in.	N	Recovery (Ft.)	Recovery (%)	RQD (%)	PID Field (ppm)	PID Headspace (ppm)	Drilling Water Level	Geologic Col.	Stratigraphic Description	Misc. Test	Well Column	Well Materials
0															2-inch diameter schedule 40 PVC well riser 3.6' – 2.24' above ground level
1												Brown fine to coarse SAND and fine to medium GRAVEL, trace silt and clay, some brick fragments.			
2			5		1.2			0.0	0.0						
3	1		4												Cement/bentonite grout 1.0' – 0.0'
4			3		1.1			19.9	49.2			Gray COAL and ASH, some fine to coarse sand, dry, loose.			Bentonite seal 2.0' – 1.0'
5	2		3									Brown fine to medium GRAVEL, trace fine to coarse sand, some black staining, wet, loose, sheen on water.			
6					0.8			7.7	103						
7	3									▽		Gray SILT, trace clay, some black staining, wet, soft.			
8					0.6			11.5	247			Brown fine to coarse SAND and fine to medium GRAVEL, trace silt and clay, lense 7.0' – 7.5'.			0.010-inch slot schedule 40 PVC well screen 8.5' – 3.5'
9	4														
10					1.4			2.3	275			Black stained wood pieces 7.5' – 8.0' and 9.0' – 10.0'.			Grade # 0 Silica Sand pack 12.0' – 2.0'
11	5											grades to gray SILT and CLAY, some black staining, some coal tar residue, soft, semiplastic.			
12												Bottom of boring at 12.0 ft.			Bottom of Piezometer well set at 8.5'
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															

NOTES: Augered 0.0' – 2.0' feet without sampling.
Ground water level 6/16/93.
WOH – Weight of hammer
NR – No recovery
NA – Not available
Water level obtained 7/7/93

Geologist Initials: TRO + VAD

Project No.: 130.08

Remarks:

Water Levels

Date	Time	Elevation

Date Start/Finish: 9/25/97 / 9/25/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 766680.61143
Easting: 1006336.48768
Well Casing: 849.36 feet

Borehole Depth: 26.5 ft.
Ground Surface: 849.63 feet

Geologist: Matthew W Erbe

Well No: MW97-7S

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 849.63 ft.										Flushmount manhole installed.
									GROUND SURFACE	
									Brown SILT, fine SAND and GRAVEL, grass rootlets, loose, dry (TOPSOIL).	Cement surface pad 0.0' to 0.5' bgs.
									Light brown fine SAND, SILT, and fine to medium, subrounded GRAVEL.	#0 Silica sand drain 0.5' to 1.5' bgs.
845 5										2" diameter, Schedule 40 PVC well riser 0.27' to 18.0' bgs.
									Statigraphic descriptions not accompanied by other sampling data (e.g. blow counts) are inferred from auger cuttings. See log of adjacent test boring TB-12 for complete stratigraphic description and sampling details.	Portland cement/5% bentonite grout 1.5' to 12.0' bgs.
840 10									Light brown SILT and fine to coarse, subrounded GRAVEL (many types), trace cobbles, loose, dry.	
									Brown fine to medium GRAVEL, some Silt, trace fine Sand, loose, dry.	Bentonite chips 12.0' to 14.0' bgs.
835 15										

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Remarks:
Augered to 18' below grade and collected sample (18-20') for TCL VOCs, TCL SVOCs, TAL Inorganics, and Cyanide.
Augered to 28' below grade and collected sample (28-30') for TOC. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.01	17.62 ▼

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

Well No: MW97-7S

Total Depth = 26.5 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description
										Brown fine to medium, rounded GRAVEL, little fine Sand and Silt, moist.
20	830	S-1		NA	NA	0.7	NA			As above.
										Wet at 21.0' bgs.
25	825	S-2		NA	NA	0.3	NA			Three small red sandstone and granite Gravels.
		S-3		NA	NA	1.0	NA			Gray brown fine to coarse GRAVEL, some Silt, little fine to medium Sand, saturated.
30	820									Bottom of boring 26.5' bgs. Bottom of spoons 30.0' bgs.
35	815									

Well Construction

- #0 Silica sand pack 14.0' to 26.5' bgs.
- 2" diameter, 0.01" slotted, Schedule 40 PVC well screen 16.0' to 26.0' bgs.
- 0.2' sump 26.0' to 26.2' bgs.
- Backfilled spoon hole with bentonite chips 26.5' to 30.0' bgs.

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.01	17.82 ▼

Project: 130.38.002
Script: nbblwell
Date: 08/04/98

Date Start/Finish: 9/29/97 / 9/30/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: John Warner
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 766776.05437
Easting: 1006414.00581
Well Casing: 845.69 feet

Borehole Depth: 24.5 ft.
Ground Surface: 845.97 feet

Geologist: Matthew W. Erbe

Well No: TB-13/MW97-8S

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 845.97 ft.										GROUND SURFACE	4" diameter flushmount curb box installed
	845	S-1		NA	NA	NA	NA			Augered through 0.5' of asphalt then 1.3' of concrete (ROADWAY).	Asphalt surface seal 0.0' to 1.0' bgs.
		S-2		15 16 11 6	27	1.0	33.1			Light brown SILT, little to some fine Gravel (subrounded), one sandstone fragment, trace Sand, brick, dry. (FILL)	#0 Silica sand 0.5' to 1.0' bgs inside of curb box
5		S-3		7 5 4 6	9	1.3	29.1			Light brown SILT, little to some fine Gravel, trace medium Gravel and Sand, dry. (FILL)	Portland cement/5% bentonite grout 1.0' to 8.0' bgs.
	840									Trace reddish orange brick and coal fragments.	
		S-4		10 10 10 6	20	0.2	28.0			As above, poor recovery.	2" diameter, Schedule 40 PVC well riser 0.28' to 12.0' bgs.
		S-5		4 7 8 5	15	1.0	37.7			As above, moist.	Bentonite chips 8.0' to 10.0' bgs.
10										Gray SILT, medium plasticity, Fe mottling, trace black specks and slag in spoon tip, moist. (FILL)	
	835	S-6		5 4 3 1	7	1.2	19.4			Gray SILT, few black specks (wood-like), Fe mottling, moist to wet.	
		S-7		2 2 2 5	4	1.6	1033			No black specks, trace wet reddish black staining (stringers).	#0 Silica sand pack 10.0' to 22.5' bgs.
15		S-8		100/.2	NA	0.2	66.2			Poor recovery. Brown SILT, trace to little coarse Sand, fibrous wood pieces, moist. (FILL)	

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Remarks:
First attempt refusal at 1' bgs on metal. Second attempt refusal at 14.3' bgs due to concrete/rebar. Moved west approximately 8' for third attempt. Began 2" split spoons at 14' bgs. (Cont. p.2)

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	831.72	14.25 ▼

Project: 130.36.002
Script: nbblwell
Date: 04/06/98

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

Well No: TB-13/MW97-8S

Total Depth = 24.5 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
	830	S-8		NA	NA	0.2	66.2			At 14.3', drilled through obstruction (concrete?) to 14.8' bgs.	
		S-9		8 9 9 10	18	1.5	2400			Gray SILT, mottled Fe staining, black oily substance along interior of fracture planes, dry, odors.	
		S-10		17 16 15 14	31	1.5	910			As above, no black staining.	
20	825	S-11		2 4 4 4	8	0.7	1834			As above.	
		S-12		2 1 1 2	2	0.5	340			Gray SILT and fine to medium, rounded GRAVEL, trace Sand, saturated. Product visible, black with red sheen, naphthalene-like odor. Black stained fine to medium SAND, little to some Silt, heavy sheen, and odor.	
25	820									Bottom of spoons at 24' bgs. Bottom of boring at 24.5' bgs.	
30	815										
35											

#0 Silica sand pack 10.0' to 22.5' bgs.

2" diameter, 0.01" slotted, Schedule 40 PVC well screen 12.0' to 22.0' bgs w/ DNAPL funnel collar set at 22.0' bgs.

2" diameter, Schedule 40 PVC sump 22.0' to 24.0' bgs.

Bentonite slurry 22.0' to 24.0' bgs.

Bentonite chips 24.0' to 24.5' bgs.

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Remarks:

Sampled interval (18-20') for TCL VOCs/SVOCs, TAL inorganics, and cyanide, MS/MSD. bgs - below ground surface NA - not available. DNAPL - dense non-aqueous phase liquid.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	831.72	14.25 ▼

Date Start/Finish: 9/23/97 / 9/23/97
Drilling Company: MAXIM Drilling
Driller's Name: John Warner
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: NA in.

Northing: 766901.69748
Easting: 1006245.69188
Well Casing: 846.99 feet

Borehole Depth: 23 ft.
Ground Surface: 847.21 feet

Geologist: Michael R Arlauckas

Well No: MW97-9S

Client:
New York State Electric & Gas

Location:
Brandywine Avenue
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 847.21 ft.									**GROUND SURFACE**	Flushmount manhole installed.
845 / 5									*No sampling performed. See log of adjacent well MW97-9D for stratigraphic description.*	Cement surface pad 0.0' to 0.5' bgs. #0 Silica sand drain 0.5' to 1.0' bgs. 2" diameter, Schedule 40 PVC well riser 0.2' to 13.0' bgs.
840 / 10										Portland cement/5% bentonite grout 1.0' to 8.9' bgs. Bentonite chips 8.9' to 11.2' bgs.
835 / 15										#0 Silica sand pack 11.2' to 23.2' bgs.

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Remarks:
Moved approximately 4' north of MW97-9D and augered directly to 23.0' below grade. bgs - below ground surface. NA - not available.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.49	14.72

Client:
New York State Electric & Gas

Location:
Brandywine Avenue
Binghamton, New York

Well No: MW97-9S

Total Depth = 23 ft.

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
0 / 830									No sampling performed. See log of adjacent well MW97-9D for stratigraphic description.	#0 Silica sand pack 11.2' to 23.2' bgs.
20 / 825									Bottom of boring 23.0' bgs.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 13.0' to 23.0' bgs.
25 / 820										0.2' sump 23.0' to 23.2' bgs.
30 / 815										
35										

BBL
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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.49	14.72 ▼

Date Start/Finish: 9/22/97 / 9/23/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: John Warner
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 2 in.

Northing: 766894.67686
Easting: 1006248.18164
Well Casing: 847.13 feet

Borehole Depth: 44 ft.
Ground Surface: 847.36 feet

Geologist: Keith A White

Well No: MW97-9D

Client:
New York State Electric & Gas

Location:
Brandywine Avenue
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 847.36 ft.										Flushmount curb box installed.
									GROUND SURFACE	
	S-1		2 14 22 24	36	1.0	0.0			Moderate brown SILT and fine to medium SAND, little coarse Sand and fine subangular Gravel, moist (TOPSOIL).	Cement surface pad 0.0' to 0.5' bgs.
845	S-2		30 40 25 18	65	0.8	0.0			Dark yellowish brown fine to coarse SAND and fine to medium subrounded Gravel, some Silt, occassional coal fragments, dry to moist (FILL).	#0 Silica sand drain 0.5' to 1.0' bgs.
5	S-3		8 8 8 7	16	0.3	0.0			As above, no clear evidence of fill (i.e. coal fragments, etc.) Poor recovery, Cobble fragment in spoon end. Recovered material is "slough" from above.	2" diameter, Schedule 40 PVC well riser 0.3' to 34.0' bgs.
840	S-4		11 14 18 20	32	0.9	0.0			Dark yellowish brown fine to coarse SAND and fine to medium, rounded to subrounded GRAVEL, little to some Silt, dry to moist.	
	S-5		11 16 13 11	29	1.0	0.0			Dark yellowish brown fine to coarse SAND and fine to medium, subrounded GRAVEL, little to some Silt, few bright gravels, most are gray siltstone, dry to moist.	
10	S-6		8 11 9 5	20	0.8	0.0			As above, one red sandstone gravel.	Portland cement/5% bentonite grout 1.0' to 29.8' bgs.
835	S-7		5 4 3 2	7	0.7	0.0			As above, subangular to subrounded Gravels, occassional red sandstone gravel, moist to wet.	
15	S-8		2 2	5	0.4	0.0			As above, wet.	

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Remarks:
bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.50	14.86 ▼

Client:
New York State Electric & Gas

Location:
Brandywine Avenue
Binghamton, New York

Well No: MW97-9D

Total Depth = 44 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-8		3 2	5	0.4	0.0				
	830	S-9		3 2 2 1	4	0.5	149			As above, occassional small droplets of residual brown oily product. Naphthalene type odor.	2" diameter, Schedule 40 PVC well riser 0.3' to 34.0' bgs.
		S-10		3 3 2 3	5	1.0	182			Grayish brown fine to medium SAND, little Silt, saturated, faint petroleum-like odor.	
20		S-11		2 2 2 3	4	2.0	356			As above, one fine Gravel.	
	825	S-12		2 1 1 3	2	1.0	136			Color change to dark yellowish brown. Grayish brown fine to medium SAND, little coarse Sand, some to little Silt, no bedding evident, loose, saturated.	
25		S-13		1 1 5 13	6	1.1	153			Color change to dark yellow brown, some Silt, trace Clay.	Portland cement/5% bentonite grout 1.0' to 28.8' bgs.
		S-14		6 8 10 14	18	0.5	26.4			Dark yellow brown fine to medium SAND and SILT, occassional fine Sand parting (<1/8" thick).	
	820	S-15		10 9 8 8	17	1.0	39.2			Grayish brown fine to medium SAND, trace fine rounded Gravel and coarse Sand, loose, saturated. Gravel stuck in spoon end.	
30		S-16		8 11 13 14	24	0.2	21.8			Coarse SAND and GRAVEL (subround to well rounded), many bright Gravels (~30-45%), trace Silt and fine Sand. Subround to well rounded GRAVEL (as above), little fine to coarse Sand, trace grayish brown Silt.	Bentonite chips 28.8' to 32.0' bgs.
	815	S-17		4 5 6 8	11	0.7	45.0			Poor recovery, Gravel wedged in spoon end. Grayish brown coarse SAND and GRAVEL, subround to rounded, little to trace Silt.	#0 Silica sand pack 32.0' to 44.0' bgs.
35		S-18		5 6	12	1.0	0.4			Grayish brown fine SAND, some to little Silt.	

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Remarks:
Water in augers up to 16.5' below ground surface.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.50	14.86 ▼

Client:
New York State Electric & Gas

Location:
Brandywine Avenue
Binghamton, New York

Well No: MW97-9D

Total Depth = 44 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-18		6 9	12	1.0	0.4			At 34'bgs, grayish brown fine SAND, little Silt, no bedding visible.	
	810	S-19		7 9 8 11	17	2.0	15.4			As above, one olive gray Silt seam (1/8" thick) at 36.2'.	
		S-20		1 1 1 3	2	1.2	37.6			As above, no layering evident. Some Sand heaved into augers.	#0 Silica sand pack 32.0' to 44.0' bgs.
40		S-21		5 7 40 25	47	0.5	50.0			Grayish brown fine SAND, trace Silt. Fine to coarse SAND and GRAVEL, some to little Silt.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 33.8' to 43.8' bgs.
	805	S-22		11 17 28 18	45	0.0	NA			No recovery.	
45		S-23		25 25 27 28	52	0.4	NA			Dark yellow brown to grayish brown fine to coarse SAND, SILT, and subrounded to rounded GRAVEL (many different rock types), dense, moist to wet (TILL).	0.2' sump 43.8' to 44.0' bgs.
	800	S-24		24 37 76 50	113	0.9	NA			As above, very dense.	
50										Bottom of boring 44.0' bgs. Bottom of spoons 48.0' bgs.	
	795										
55											

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.50	14.86 ▼

Date Start/Finish: 9/19/97 / 9/19/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 766983.73366
Easting: 1006661.51156
Well Casing: 843.43 feet

Borehole Depth: 12.5 ft.
Ground Surface: 844.04 feet

Geologist: Matthew W. Erbe

Well No: SB-08/MW97-10S

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 844.04 ft.											
										GROUND SURFACE	Flushmount manhole cover
		S-1		5 20 10 8	30	2.0	0.0			Brown SILT, trace fine to medium Gravel, rootlets (grass), loose, dry. (TOPSOIL)	Cement surface pad.
		S-2		8 7 7 7	14	2.0	9.1			Brown SILT and fine GRAVEL, trace rootlets, loose, dry. (TOPSOIL)	#0 Silica sand drain 1.0' to 1.5' bgs.
	840									Light brown SILT, little coal fragments, trace Gravel (rounded), moist. (FILL)	Portland cement/5% bentonite grout 1.5' to 2.5' bgs.
5		S-3		7 6 5 5	11	0.2	7.5			As above, Fe staining.	Hydrated bentonite chips 2.5' to 3.5' bgs.
										Greenish gray SILT, some coal fragments, trace to little blueish white waste (10mm), stiff, moist.	2" diameter, Schedule 40 PVC well riser 0.6' to 4.0' bgs.
		S-4		6 5 7 5	12	0.7	7.3			0.1' thick coal seam, some silt.	
										Poor recovery, brown SILT and fine GRAVEL, loose, moist to wet.	2" diameter, 0.01" slotted, sch 40 PVC well screen 4.0' to 12.0' bgs.
	835	S-5		1 3 3 4	6	2.0	140			Olive gray SILT, trace fine, rounded Gravel, coal, brick, soft, saturated (FILL).	
10										Brown SILT and fine GRAVEL, trace coal, saturated.	#0 Silica sand pack 3.5' to 12.0' bgs.
		S-6		2 3 3 3	6	2.0	106			Olive gray SILT and very fine SAND, black mottling, soft, saturated.	
										As above.	
										Bottom of spoons at 12.0' bgs. Bottom of boring 12.5' bgs.	Hydrated bentonite chips 12.0' to 12.5' bgs.
	830										
15											

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Remarks:
PCB composite sample taken from 1.0-1.2'bgs. Sample intervals (0-2' & 2-4') analyzed for PAHs, total benzene, TCLP benzene. Sample interval (0-2') analyzed as MS/MSD. Sample interval (2-4') analyzed as duplicate.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	835.23	8.81 ▼

Project: 130.36.002
Script: nbblwell
Date: 04/06/98

Date Start/Finish: 9/22/97 / 9/23/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 2 in.

Northing: 766984.04794
Easting: 1006658.01039
Well Casing: 843.68 feet

Borehole Depth: 54 ft.
Ground Surface: 844.06 feet

Geologist: Matthew W Erbe

Well No: MW97-10D

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 844.06 ft.											
										GROUND SURFACE	Flushmount curb box installed
		S-1		20 54 19 11	73	1.7	0.0			Brown SILT, highly organic, grass rootlets, loose, dry (TOPSOIL). At 0.2', brown SILT and fine to medium GRAVEL, one cobble. At 0.5', GRAVEL, concrete, trace brick, rootlets. (FILL)	Cement surface pad 0.0' to 0.5' bgs.
		S-2		14 10 11 8	21	1.5	128			Brown SILT, little fine Gravel, trace coal fragments, slag, Fe staining, few white plastic pieces.	#0 Silica sand drain 0.5' to 15' bgs.
	840									Olive gray SILT, little fine Gravel, trace coal, slag, Fe staining, odor (FILL).	
5		S-3		1 2 1 2	3	2.0	487			Wet. Olive gray SILT, Fe staining, trace coarse Sand, brick fragments, coal, wet, sheens, odor (FILL).	2" diameter, Schedule 40 PVC well riser 0.4' to 40.0' bgs.
		S-4		2 3 2 3	5	1.2	247			Some coal, medium stiff, black staining, odors. As above, saturated (FILL).	
	835	S-5		4 4 5 6	9	2.0	303			Olive gray SILT, black staining, odors, saturated.	
10		S-6		2 2 2 2	4	1.5	184			As above.	Portland cement/5% bentonite grout 1.5' to 35.0' bgs.
		S-7		2 3 5 6	8	1.5	407			As above.	
	830	S-8		1 3	8	1.5	1339			Stiff, one fine Gravel. As above, little fine Gravel.	
15											

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Remarks:
bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.48	11.58 ▼

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

Well No: MW97-10D

Total Depth = 54 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-8		5 6	8	1.5	1339			Black fine SAND and GRAVEL, some Silt, loose, heavy coatings of reddish orange sheen, odor.	
		S-9		2 3 4 3	7	0.2	454			Poor recovery. Gray SILT and fine, rounded GRAVEL, Fe staining, odor.	
	825	S-10		1/ (12") 1/ (12")	1	0.5	494			Black-stained fine to medium SAND, very loose, saturated, sheen, odor.	
20		S-11		1 3 2 3	5	0.0	NA			As above.	2" diameter, Schedule 40 PVC well riser 0.4' to 40.0' bgs.
		S-12		2 3 4 5	7	0.8	498			As above.	
	820	S-13		3 4 7 8	11	1.0	397			As above.	Portland cement/5% bentonite grout 1.5' to 35.0' bgs.
25		S-14		4 6 8 8	14	2.0	314			Black stained fine to medium SAND and olive gray SILT, soft, heavy sheens, odors.	
										One red, rounded Cobble.	
	815	S-15		2 5 5 7	10	2.0	202			Black fine to medium SAND, medium dense, mottled sheens, odor.	
30										Dark brownish black fine to medium SAND, medium dense, no sheens.	
		S-16		2 4 6 7	10	2.0	108			Dark brownish gray fine to medium, subround SAND, trace Silt, mottled sheen, odors.	
		S-17		3 4 7 8	11	2.0	97.1			Dark olive brown fine to medium SAND, little Silt, less sheen.	
	810									As above.	
35		S-18		2 5	12	1.0	12.3			0.01' Silty Sand seam.	
										As above.	

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.48	11.58 ▼

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

Well No: MW97-10D

Total Depth = 54 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-18		7 7	12	1.0	12.3			Brown gray very fine to fine SAND, little Silt, no sheen.	
		S-19		2 4 5 6	9	0.5	15.8			Poor recovery. As above.	
	805	S-20		3 4 7 8	11	1.0	5.3			Brown very fine to medium SAND, trace Silt. As above.	
40		S-21		2 4 7 8	11	1.0	9.0			Brown fine to medium, subangular SAND, trace Silt, loose.	
		S-22		3 5 7 10	12	1.5	55.8			As above, trace sheens.	
	800	S-23		2 5 6 9	11	1.8	70.1			As above. Two 0.1' Silty Sand seams at 45.1' and 45.5' bgs.	
45		S-24		4 4 6 7	10	2.0	27.5			Brown fine to medium SAND, little fine, rounded to subrounded GRAVEL, trace Silt, loose.	
	795	S-25		4 15 17 19	32	1.6	248			Brown SILT and fine, angular GRAVEL, trace fine to medium Sand. Brown fine to medium SAND, trace Silt, sheens.	
50		S-26		11 15 30 40	45	0.5	41.5			Light brown SILT and fine to medium, angular to subrounded GRAVEL, trace to little, fine to medium, angular Sand. (TILL) Brown SILT and red brown to gray, medium to coarse, rounded GRAVEL. (TILL)	
		S-27		30 24 23 90	47	0.6	31.4			Light brown medium to coarse GRAVEL, very fine SAND and SILT, several well rounded, red sandstone Gravel and subangular dark gray Gravel, Fe staining, very dense (TILL).	
	790									Bottom of spoons 54.0' bgs. Bottom of boring 52.0' bgs.	
55											

Bentonite chips 35.0' to 37.0' bgs.

#0 Silica sand pack 37.0' to 52.2' bgs.

2" diameter, 0.01" slotted, Schedule 40 PVC well screen 40.0' to 50.0' bgs.

0.2' sump 50.0' to 50.2' bgs.

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.48	11.58 ▼

Date Start/Finish: 9/26/97 / 9/26/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: John Warner
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 2 in.

Northing: 766805.93078
Easting: 1006507.19296
Well Casing: 844.15 feet

Borehole Depth: 18.5 ft.
Ground Surface: 844.58 feet

Geologist: Michael R Arlauckas

Well No: MW97-11S

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

gs elevation 844.58 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
										GROUND SURFACE	4" diameter flushmount curb box installed
		S-1		NA	NA	NA	NA			Augered through asphalt and crushed stone (ROADWAY).	Asphalt surface seal.
		S-2		16 18 15 7	33	1.4	0.0			Light brown very fine SAND, some angular to subround fine Gravel, little Silt, trace coal fragments, dry. (FILL)	#0 Silica sand 1.0' to 3.8' bgs.
	840	S-3		7 7 9 10	16	1.1	5.1			Brown very fine SAND, little angular fine to medium Gravel, trace Silt, rock fragments, moist. (FILL)	Bentonite chips 3.8' to 5.8' bgs.
5		S-4		14 10 12 12	22	0.8	11.1			Tan to brown very fine to fine SAND, some Silt, little fine Gravel (angular), rock fragments, moist. (FILL)	2" diameter, Schedule 40 PVC well riser 0.4' to 7.6' bgs.
		S-5		18 4 3 2	7	1.5	30.9			As above.	
	835									Light brown SILT and very fine SAND, brown mottling, moist.	
10		S-6		NA	NA	2.0	NA			Pushed shelby tube 10' to 12'.	#0 Silica sand pack 5.8' to 18.0' bgs.
		S-7		1 2 3 4	5	1.7	259			Gray SILT and very fine SAND, light brown mottling, moist.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 7.6' to 17.6' bgs.
	830	S-8		3 4	9	1.6	12.8			As above.	
15											

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Remarks:
NA=Not available. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.76	11.82

Project: 130.36.002
Script: nbblwell
Date: 04/06/98

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

Well No: MW97-11S

Total Depth = 18.5 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-8		5 4	9	1.6	12.8			As above.	
		S-9		7 7 7 5	14	1.6	43.5				
		S-10		2 5 14 12	19	0.7	27.8			Gray SILT and very fine SAND, moist.	
20	825									Gray SILT and very fine to medium SAND.	0.2' sump 17.6' to 17.8' bgs.
										SAND and GRAVEL, wet.	Hydrated bentonite chips 17.8' to 18.5' bgs.
25	820									Bottom of spoons 20.0' bgs.	
										Bottom of boring 18.5' bgs.	
30	815										
35	810										

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.76	11.82 ▼

Date Start/Finish: 9/25/97 / 9/25/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: John Warner
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 2 in.

Northing: 766836.48624
Easting: 1006626.15635
Well Casing: 843.56 feet

Borehole Depth: 18 ft.
Ground Surface: 844.00 feet

Geologist: Michael R Arlauckas

Well No: MW97-12S

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 844.00 ft.											4" diameter flushmount manhole installed
										GROUND SURFACE	
		S-1		NA	NA	NA	NA			Augered through asphalt and crushed stone.	Asphalt surface seal
		S-2		8 20 18 13	38	0.6	NA			Light brown very fine SAND, some subrounded to angular Gravel, little Silt, trace coal, dry. (FILL)	#0 Silica sand drain 0.5' to 3.3. bgs.
	840									As above.	
5		S-3		5 17 9 13	26	1.1	NA			Brown very fine SAND, trace Gravel and Silt. (FILL)	Bentonite chips 3.3' to 5.3' bgs.
		S-4		10 10 7 6	17	0.0	NA			Brown very fine SAND, little angular Gravel. (FILL) Black fine to medium SAND, coal (FILL). No recovery.	2" diameter, Schedule 40 PVC well riser 0.4' to 7.3' bgs.
	835	S-5		2 1 1 1	2	0.7	NA			Grayish brown SILT and CLAY, moist. Brown very fine SAND, brown staining, moist.	
10		S-6		3 5 6 6	11	1.0	NA			Gray SILT and very fine SAND, light brown mottling, moist.	#0 Silica sand pack 5.3' to 17.5' bgs.
		S-7		3 3 4 5	7	1.9	NA			Gray SILT, light brown mottling, moist.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 7.3' to 17.3' bgs.
	830	S-8		3 4	8	1.8	NA			Grayish brown very fine SAND, mottled, wet.	
15											

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Remarks:
NA=Not available. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	831.70	12.30

Project: 130.36.002
Script: nbblwell
Date: 04/06/98

Client:
New York State Electric & Gas

Location:
Court Street
Binghamton, New York

Well No: MW97-12S

Total Depth = 18 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-8		4 7	8	1.8	NA			At 14.9' bgs, gray SILT and very fine SAND, mottled, moist.	
		S-9		5 6 3 4	9	1.8	NA			As above.	
										Gray SAND and GRAVEL, wet.	0.2' sump 17.3' to 17.5' bgs.
										Bottom of boring 18.0' bgs.	Hydrated bentonite chips 17.5' to 18.0' bgs.
	825										
20											
	820										
25											
	815										
30											
	810										
35											

BBL
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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	831.70	12.30 ▼

Date Start/Finish: 9/18/97 / 9/18/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 767079.84950
Easting: 1006456.79965
Well Casing: 844.66 feet

Borehole Depth: 12.5 ft.
Ground Surface: 844.84 feet

Geologist: Matthew W Erbe

Well No: MW97-13S

Client:
New York State Electric & Gas

Location:
Court Street Yard
Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 844.84 ft.										**GROUND SURFACE**	Flushmount curb box installed.
		S-1		13 13 19 20	32	2.0	9.9			Light gray to dark gray fine to medium GRAVEL, loose, dry. (FILL) Brown fine to medium SAND, trace fine Gravel, loose, dry. (FILL) Coal fragments.	Cement surface pad 0.0' to 0.8' bgs.
		S-2		8 10 19 21	29	1.5	11.1			Brown fine to medium, rounded GRAVEL, trace coal, red quartzite, loose, dry. (FILL) As above.	#0 Silica sand drain 0.8' to 1.4' bgs. Portland cement/5% bentonite grout 1.4' to 2.5' bgs. Bentonite chips 2.5' to 3.5' bgs.
5	840	S-3		6 5 4 3	9	0.3	564			Black fine to medium SAND, some 1" brick fragments, coal (2mm), loose. (FILL) 0.1' brown decomposed wood, black staining, moist. (FILL) Dark brown fine GRAVEL, moist, petroleum odor. (FILL)	2" diameter, Schedule 40 PVC well riser 0.2' to 5.0' bgs.
		S-4		4 2 4 3	6	1.2	1011			Black fine, angular GRAVEL and fine to coarse SAND, trace fibers, moist, strong odors. (FILL) Brown fine GRAVEL, some medium to coarse Sand and Silt, trace cinders, slag, coal and wood pieces, strong odors, sheens. Black NAPL throughout. (FILL)	#0 Silica sand pack 3.5' to 10.0' bgs.
		S-5		75/.3 8 8 3	16	0.4	545			Poor recovery. As above. 0.1' angular, medium Gravel-sized brick and cement, fragments, loose, dry.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 5.0' to 10.0' bgs w/ DNAPL funnel collar set at 10.0' bgs.
10	835	S-6		5 8 11 12	19	2.0	437			Gray SILT, orange mottling, very stiff, crumbly texture, black oily coating along vertically oriented planes of weakness, NAPL, odor.	DNAPL collection sump 10.0' to 12.0' bgs.
		S-7		10 16 15 18	31	1.0	382				Bentonite slurry 10.0' to 12.0' bgs.
15	830									Bottom of spoons 14.0' bgs. Bottom of boring 12.5' bgs.	Bentonite chips 12.0 to 12.5 bgs.

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Remarks:
2" spoons from 10' to 14' below grade. bgs - below ground surface. NAPL - Non Aqueous Phase Liquid.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	840.47	4.37

Project: 130.36.002
Script: nbblwell
Date: 04/06/98

Date Start/Finish: 12/10/97 / 12/11/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker

Northing: 767165.84629
Easting: 1006897.14703
Well Casing: 845.55 feet

Borehole Depth: 20 ft.
Ground Surface: 845.86 feet

Geologist: Matthew W. Erbe

Well No: MW97-14S

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 845.86 ft.										GROUND SURFACE	9" diameter flushmount curb box installed.
	845									*No sampling conducted. See log of adjacent well MW97-14D for sampling and stratigraphic details.*	Cement surface seal 0.0' to 0.5' bgs.
5											#0 Silica sand 0.4' to 1.0' bgs inside of curb box.
	840										Type I Portland Cement/5% Bentonite Grout 1.0' to 6.0' bgs.
											2" diameter, Schedule 40 PVC well riser 0.3' to 9.9' bgs.
											Bentonite chips 6.0' to 8.0' bgs.
10											#0 Silica sand pack 8.0' to 20.0' bgs.
	835										
											2" diameter, 0.01" slotted, Schedule 40 PVC well screen 9.9' to 19.9' bgs.
15											

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Remarks:
bgs - below ground surface. NA=Not available. Installed approximately 4' east of MW97-14D.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.95	12.91 ▼

Project: 130.36.007
Script: nbblwell
Date: 04/01/98

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: MW97-14S

Total Depth = 20 ft.

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
0 / 830									No sampling conducted. See log of adjacent well MW97-14D for sampling and stratigraphic details.	#0 Silica sand pack 8.0' to 20.0' bgs.
										2" diameter, 0.01" slotted, Schedule 40 PVC well screen 9.9' to 19.9' bgs.
20 / 825									Bottom of boring at 20' bgs.	2" diameter, Schedule 40 PVC sump 19.9' to 20.0' bgs.
25 / 820										
30 / 815										
35										

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.95	12.91 ▼

Project: 130.36.007
Script: nbblwell
Date: 04/01/98

Date Start/Finish: 12/10/97 / 12/11/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 2 in.

Northing: 767165.72745
Easting: 1006893.23697
Well Casing: 845.57 feet

Borehole Depth: 40 ft.
Ground Surface: 845.91 feet

Geologist: Matthew W. Erbe

Well No: MW97-14D

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 845.91 ft.											9" diameter flushmount curb box installed.
										GROUND SURFACE	
	845	S-1		NA 5 8 13	13	0.6	0.0			Asphalt. (FILL)	Cement surface seal 0.0' to 0.5' bgs.
										Dark brown SILT, some fine to coarse Sand and fine Gravel, trace brick, stiff, dry. (FILL)	#0 Silica sand 0.4' to 1.0' bgs inside of curb box.
		S-2		9 30/.2 NA NA	NA	0.4	0.0			Tan fine SAND and SILT, some fine, subangular Gravel.	
										At 2.8', concrete.	
5		S-3		2 3 2 6	5	0.0	NA			No Recovery.	Type 1 Portland Cement/5% Bentonite Grout 1.0' to 30.0' bgs.
	840	S-4		27 6 6 5	12	0.1	NA			Poor recovery. Brown SILT, fine to coarse, round to subround Sand, slag, brick, concrete, medium dense, dry to moist (FILL).	
		S-5		2 1 1 1	2	0.1	0.2			Orange, very fine to fine SAND, some Silt, rootlets, occassional coarse, round Sand, very loose, moist.	2" diameter, Schedule 40 PVC well riser 0.3' to 34.9' bgs.
10											
	835	S-6		1 1 1 2	2	1.5	0.8			Orange, very fine SAND, some Silt, rootlets, several faint, red-brown laminations throughout, very loose, moist to wet.	
		S-7		2 2 4 2	6	2.0	1.6			As above.	
15		S-8		1 10	5	1.1	1.7			Grades to orange-brown, very fine to fine SAND, little Silt, loose, wet.	

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Remarks:
bgs - below ground surface. NA=Not available. First attempt had auger refusal at 6' bgs. Moved 3' south and refusal again, augers pull up stiff steel cables and rebar. Third attempt moved 10' east.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.95	12.96 ▼

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: MW97-14D

Total Depth = 40 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
	830	S-8		4 5	5	1.1	1.7			Brown, fine SAND, some very fine Sand, little Silt, orange mottling and laminations.	Type I Portland Cement/5% Bentonite Grout 1.0' to 30.0' bgs.
		S-9		4 5 8 10	11	1.5	1.9				
		S-10		5 7 7 7	14	0.8	1.1			Orange-brown, fine to coarse SAND, little Silt and fine, angular Gravel, medium dense, wet.	2" diameter, Schedule 40 PVC well riser 0.3' to 34.9' bgs.
20	825	S-11		6 8 12 12	20	0.7	1.0			Orange-brown, well rounded, fine to medium GRAVEL (quartzite, red sandstone, dark gray siltstone), little Silt, trace fine to coarse Sand, medium dense, wet.	
		S-12		10 11 15 17	26	0.5	1.1			As above, more fine Gravel, little fine to coarse Sand.	
25	820	S-13		13 10 10 7	20	0.5	0.9			Gray-brown, fine to coarse Sand, some fine Gravel, little Silt.	
		S-14		25 17 14 19	31	0.2	0.8			Orange-brown, fine to coarse SAND and fine, round to subangular GRAVEL, little Silt.	
		S-15		13 15 14 9	29	0.5	1.4			As above, gray-brown, some fine to coarse Sand.	
30	815	S-16		15 14 7 10	21	1.0	0.9			As above.	Bentonite chips 30.0' to 32.0' bgs.
		S-17		11 10 10 10	20	0.1	0.9			Dark gray, fine to medium, subangular GRAVEL, some fine to coarse Sand, little orange-brown Silt, loose.	
35		S-18		10 9	22	0.9	0.4			Brown, fine to medium SAND, some fine subangular Gravel, trace Silt, medium dense.	#0 Silica sand pack 32.0' to 40.0' bgs.

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.95	12.98 ▼

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: MW97-14D

Total Depth = 40 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
	810	S-18		13 10	22	0.9	0.4				
		S-19		5 5 9 9	14	0.8	0.3			Dark gray well sorted fine to coarse subangular SAND, trace Silt and medium rounded Gravel (siltstone), coarsening downward.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 34.9' to 39.9' bgs.
		S-20		4 11 16 16	27	0.7	0.2			Brownish gray fine to medium SAND, trace coarse subangular Sand and Silt. Pushed GRAVEL from 39' to 40' bgs. (TILL?)	
40	805	S-21		12 38 24 65/.4	62	0.8	0.3			Olive-gray coarse SAND and fine to medium, round to subround GRAVEL (siltstone, shale), some fine to medium Sand, little Clay and Silt, well cemented, very dense (TILL).	2" diameter, Schedule 40 PVC sump 39.9' to 40.0' bgs.
										Bottom of spoons at 42' bgs. Bottom of boring at 40' bgs.	
45	800										
60	795										
55											

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.95	12.96 ▼

Date Start/Finish: 12/9/97 / 12/9/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 767248.13253
Easting: 1006209.68240
Well Casing: 857.10 feet

Borehole Depth: 27.1 ft.
Ground Surface: 857.43 feet

Geologist: Matthew W. Erbe

Well No: TW97-1S

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 857.43 ft.									GROUND SURFACE	9" diameter flushmount curb box installed
855 / 5									*No sampling conducted 0 to 24' bgs. See boring log of adjacent test well TW97-1D for sampling and stratigraphic details.*	Cement surface seal 0.0' to 0.5' below grade #0 Silica sand 0.4' to 1.0' below grade inside of curb box Backfilled with soil cuttings 1.0' to 13.0' below grade
850 / 10				6						2" diameter, Schedule 40 PVC well riser 0.3' to 17.0' below grade
845 / 15										Bentonite chips 13.0' to 15.0' below grade

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Remarks:
NA=Not available. bgs = below ground surface Lithologic description from 0-24' bgs & 28-28' bgs obtained from TW97-1D boring. Auger refusal at 20' below ground surface (bgs), moved ~4' north of TW97-1D.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	835.57	21.86 ▼

Project: 130.36.005
Script: nbblwell
Date: 04/01/98

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: TW97-1S

Total Depth = 27.1 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
										No sampling conducted 0 to 24' bgs. See boring log of adjacent test well TW97-1D for sampling and stratigraphic details.	
20	840				6						#0 Silica sand pack 15.0' to 27.1' below grade
	835										
25		S-1		2 2 4 7		2.0	NA			Gray SILT, some Clay, trace Sand, Fe stained mottling, rootlets.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 17.0' to 27.0' below grade
		S-2				2.0	NA			*Shelby Tube sample taken.*	
30	830									Bottom of boring at 28' bgs.	2" diameter, Schedule 40 PVC sump 27.0' to 27.1' below grade
	825										
35											

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Remarks:
Collected 2-inch spoon from 24-26' bgs.
Collected shelby tube from 26-28' bgs.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	835.57	21.86 ▼

Project: 130.36.005
Script: nbblwell
Date: 04/01/98

Date Start/Finish: 12/5/97 / 12/9/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 767242.73080
Easting: 1006210.19995
Well Casing: 857.07 feet

Borehole Depth: 64 ft.
Ground Surface: 857.36 feet

Geologist: Matthew W. Erbe

Well No: TW97-1D

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 857.36 ft.										9" diameter flushmount curb box installed
									GROUND SURFACE	
	S-1		3 7 8 6	15	1.3	0.0			Black fine to coarse Sand size cinders, coal, slag, Fe staining, medium dense, dry (FILL).	Cement surface seal 0.0' to 0.5' bgs.
855	S-2		4 4 5 5	9	1.5	0.0			As above, color change to yellow, orange and black, loose.	#0 Silica sand 0.4' to 1.0' bgs inside of curb box.
5	S-3		5 5 5 6	10	1.0	0.0			As above.	Backfilled with soil cuttings 1.0' to 52.0' bgs.
850	S-4		4 3 5 3	8	1.0	0.0			As above.	
	S-5		4 2 3 2	5	1.0	0.0			As above.	2" diameter, Schedule 40 PVC well riser 0.3' to 56.4' bgs.
10	S-6		3 2 2 2	4	1.1	0.0			As above.	
845	S-7		2 2 2 3	4	1.3	0.0			As above.	
15	S-8		9 10	20	1.0	17.0				

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Remarks:
NA=Not available. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.80	24.56

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: TW97-1D

Total Depth = 64 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-8		10 8	20	1.0	17.0			Black SILT, some fine Sand, moist, gasoline-like odors.	
		S-9		11 13 10 11	23	1.0	0.0			Gray fine to medium SAND, concrete, fine coal fragments.	
	840	S-10		11 7 7 8	14	0.9	0.0			Orange, fine to medium, subrounded GRAVEL, some Silt, little Clay, fine to coarse Sand, coal, medium dense (FILL).	
										As above, angular to subrounded GRAVEL.	
20		S-11		9 8 5 5	13	1.2	0.0			As above, shale fragments from 19.2-19.4', 1/4" thick, black stained rope at 20'. (FILL)	
	835	S-12		3 5 6 7	11	1.7	0.0			Gray SILTY CLAY, medium plasticity, black stained, trace coal fragments, stiff, moist. (FILL)	
										As above, medium to high plasticity, medium to coarse, rounded Sand, fine Gravel, moist. (FILL)	
25		S-13		NA	NA	0.0	NA			No Recovery. Pushed piece of shale.	
		S-14		11 11 13 11	24	1.5	0.0			Gray SILT, some very fine Sand, trace Clay, rootlets, Fe mottling, very stiff.	
	830	S-15		9 15 13 19	28	1.7	0.0			As above.	
30		S-16		NA	NA	0.9	0.0			Gray Silt, some medium to coarse Sand, fine, subrounded Gravel, moist.	
	825	S-17		7 6 6 4	12	0.4	0.0			Tan and gray fine to coarse subangular SAND and fine subrounded GRAVEL, little Silt, medium dense, wet.	
35		S-18		2 3	8	0.0	NA			No Recovery.	

Backfilled with soil cuttings 1.0' to 52.0' bgs.

2" diameter, Schedule 40 PVC well riser 0.3' to 56.4' bgs.

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Remarks:
2-inch spoons collected from 26-64' bgs.
Attempted shelby tube from 24-26' bgs.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.80	24.56 ▼

Project: 130.36.005
Script: nbblwell
Date: 04/01/98

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: TW97-1D

Total Depth = 64 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-18		5 3	8	0.0	NA				
	820	S-19		2 4 5 8	9	1.0	0.0			Gray, fine to medium SAND, little Silt, trace coarse Sand, loose.	Backfilled with soil cuttings 1.0' to 52.0' bgs.
		S-20		7 10 15 9	25	0.6	0.0			Fine, rounded GRAVEL, some fine to medium Sand, little Silt. At 37.6', Fine to medium SAND, some Silt, trace Clay. Gray, fine to coarse, subangular to subround SAND, trace Silt, medium dense. Well rounded medium Gravel in spoon tip.	2" diameter, Schedule 40 PVC well riser 0.3' to 56.4' bgs.
40		S-21		1 1 1 1	2	1.0	0.0			Brownish-gray fine to medium SAND, trace coarse Sand and Silt, very loose.	
	815	S-22		5 3 3 4	6	1.0	0.0			As above, well graded, subangular grains, loose.	
45		S-23		2 3 4 7	7	1.0	6.7			As above, no visual evidence of product.	
	810	S-24		3 5 6 8	11	1.0	2.8			As above, medium dense.	
		S-25		4 4 6 7	10	1.0	2.1			As above.	
50		S-26		5 6 7 8	13	0.9	1.1			As above At 50.5', 0.05'-thick medium Sand seam, some fine Sand, trace Silt.	
	805	S-27		4 7 10 10	17	1.0	1.1			As above.	Bentonite chips 52.0' to 54.0' bgs.
55		S-28		5 6	14	1.0	1.5			Brown fine subangular Sand, trace Silt, medium dense.	

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Remarks:
WOH = Weight of hammer. 3-inch spoon collected from 36-38' bgs.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.80	24.56 ▼

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: TW97-1D

Total Depth = 64 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-28		8 10	14	1.0	1.5				#0 Silica sand pack 54.0' to 69.5' bgs.
	800	S-29		4 18 26 22	44	1.2	1.7			Brown fine round to subround GRAVEL, some fine to coarse Sand, trace Silt, dense.	
		S-30		6 12 15 22	27	2.0	1.3			Brown fine to medium subround to subangular Sand, trace Silt, medium dense. Color change to Brownish gray.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 58.4' to 61.4' bgs.
60		S-31		1 8 22 29	30	1.2	1.8				
	795	S-32		26 29 20 32	49	0.0	NA			Fine to medium rounded GRAVEL, little fine to coarse Sand, trace Silt, red-brown mottling, dense (TILL). Fine rounded GRAVEL, some fine to coarse Sand, little Silt in spoon tip (TILL).	2" diameter, Schedule 40 PVC sump 61.4' to 61.5' bgs.
65										Bottom of spoons at 64' bgs. Bottom of boring at 62' bgs.	
	790										
70											
	785										
75											

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.80	24.56 ▼

Date Start/Finish: 12/2/97 / 12/3/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 767242.41559
Easting: 1006479.26406
Well Casing: 856.09 feet

Borehole Depth: 24 ft.
Ground Surface: 856.43 feet

Geologist: Matthew W. Erbe

Well No: TW97-2S

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 856.43 ft.									GROUND SURFACE	9" diameter flushmount curb box installed.
855									*No sampling conducted. See boring log of adjacent test well TW97-2D for sampling and stratigraphic details.*	Cement surface seal 0.0' to 1.0' bgs.
5										#0 Silica sand 0.5' to 1.0' bgs inside of curb box.
850										Backfilled with soil cuttings 1.0' to 10.4' bgs.
10										2" diameter, Schedule 40 PVC well riser 0.3' to 14.4' bgs.
845										Bentonite chips 10.4' to 12.4' bgs.
15										#0 Silica sand pack 12.4' to 24.5' bgs.

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Remarks:
NA=Not available. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	837.08	19.35 ▼

Project: 130.36.005
Script: nbblwell
Date: 04/01/98

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: TW97-2S

Total Depth = 24 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
0	840									*No sampling conducted. See boring log of adjacent test well TW97-2D for sampling and stratigraphic details.*	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 14.4' to 24.4' bgs.
20	835										
25	830									Bottom of boring at 24.5' bgs.	2" diameter, Schedule 40 PVC sump 24.4' to 24.5' bgs.
30	825										
35											

BBL
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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	837.08	19.35 ▼

Date Start/Finish: 12/3/97 / 12/5/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 767243.11930
Easting: 1006470.78451
Well Casing: 856.00 feet

Borehole Depth: 69 ft.
Ground Surface: 856.36 feet

Geologist: Matthew W. Erbe

Well No: TW97-2D

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 856.36 ft.										9" diameter flushmount curb box installed.
									GROUND SURFACE	
855	S-1		8 8 14 17	22	0.7	16.3			Black fine to coarse SAND, little fine to medium subrounded Gravel and cinders, trace Silt, coal, slag, and brick, medium dense, dry (FILL).	Cement surface seal 0.0' to 1.0' bgs. #0 Silica sand 0.5' to 1.0' bgs inside of curb box.
	S-2		14 13 11 10	24	0.1	0.0			As above, poor recovery.	
5	S-3		5 3 3 3	6	1.5	0.0			As above, some brown Silt and fine to coarse Sand.	Backfilled with soil cuttings 1.0' to 58.0' bgs.
850	S-4		5 4 9 16	13	1.5	0.0			At 5.7', highly oxidized slag and fine to coarse Sand, coal fragments, loose, dry. (FILL) As above, medium dense, moist to dry.	
	S-5		8 10 9 12	19	1.0	0.0			Light brown fine to coarse subrounded SAND and fine rounded GRAVEL, trace SILT, slag, red mottling, dry to moist. (FILL)	2" diameter, Schedule 40 PVC well riser 0.4' to 64.0' bgs.
10	S-6		9 8 7 6	15	0.7	0.0			Brown fine to coarse subangular to subround SAND and GRAVEL (siltstone), trace Silt, moist. (FILL)	
845	S-7		8 9 8 10	17	0.2	0.0			As above, poor recovery. Coarse, rounded Gravel in spoon tip.	
15	S-8		6 9	22	0.7	0.0			Brown fine to coarse rounded GRAVEL and subangular SAND, trace coal fragments, moist (FILL).	

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Remarks:
bgs - below ground surface NA=Not available. Lithologic description from 0-24' below ground surface (bgs) was taken from TW97-2S boring.

Saturated Zones

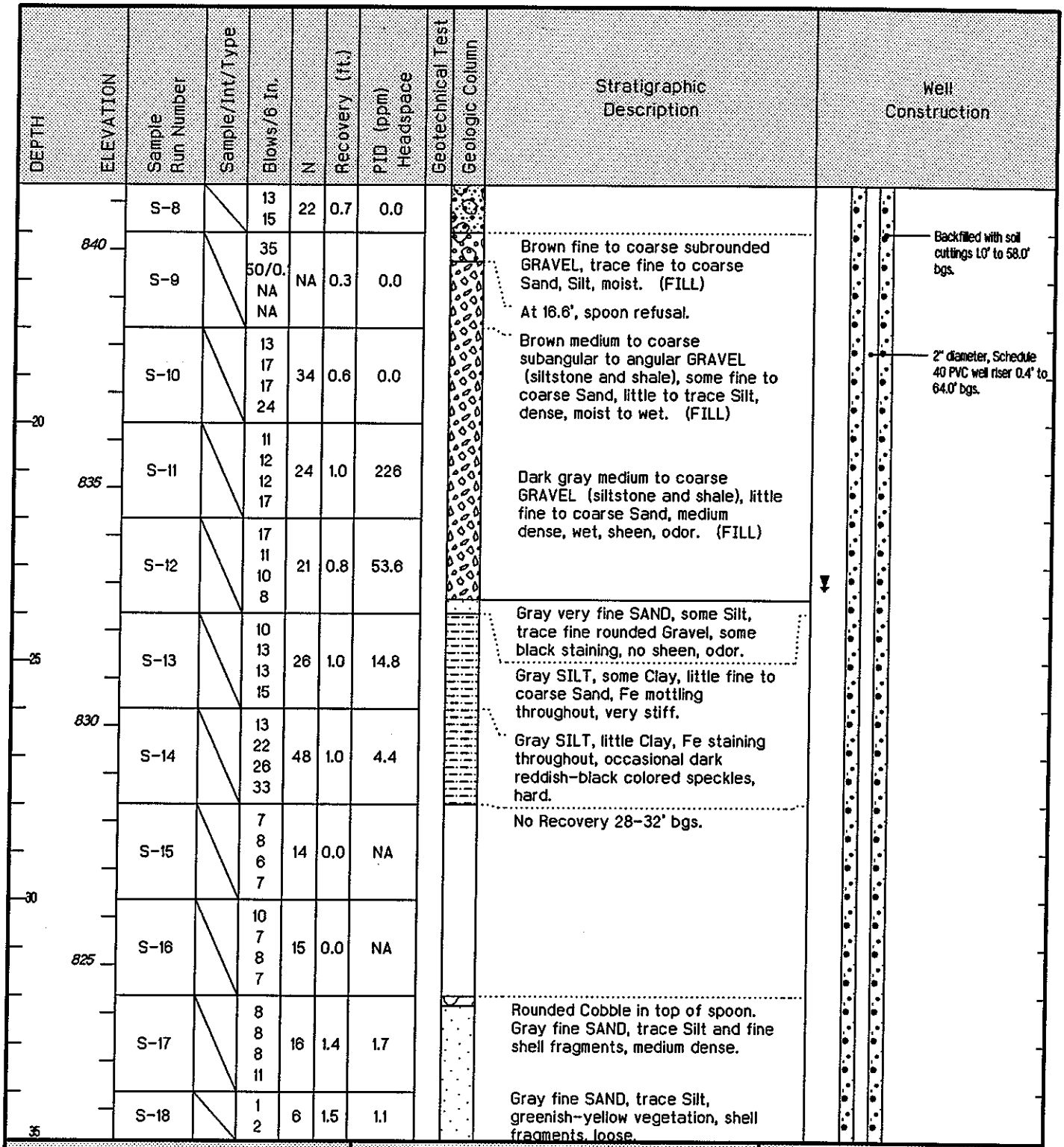
Date / Time	Elevation	Depth
2/11/98	832.95	23.41

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: TW97-2D

Total Depth = 69 ft.



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Remarks:
2-inch spoons collected from 24-70' bgs.
3-inch spoon collected from 32-34' bgs.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.95	23.41 ▼

Project: 130.36.005
Script: nbblwell
Date: 04/01/98

Client: New York State Electric & Gas

Location: Conrail Right of Way, Binghamton, New York

Well No: TW97-2D

Total Depth = 69 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-18		4 5	6	1.5	1.1			As above, no vegetation evident.	Backfilled with soil cuttings 1.0' to 58.0' bgs.
	820	S-19		6 5 4 4	9	1.3	2.9			As above, little Silt.	
		S-20		2 4 6 8	10	2.0	3.7			As above, color change to brown-gray.	2" diameter, Schedule 40 PVC well riser 0.4' to 64.0' bgs.
40	815	S-21		WOH 1 4 5	5	1.3	6.5			Gray to brown fine to medium SAND, grades to fine Sand, little to trace Silt, shell fragments, medium dense.	
		S-22		5 5 8 7	13	1.2	2.9			Grayish brown fine to medium SAND, little Silt, Fe staining, shell fragments.	
45		S-23		4 5 7 8	12	1.3	1.4			Brown fine SAND, little medium Sand and Silt, Fe stained.	
	810	S-24		6 6 6 9	12	1.1	1.4			Brownish-gray fine to medium SAND.	
		S-25		8 6 6 6	12	1.3	0.6			At 49.0', heavy Fe staining for 0.4'.	
50		S-26		6 7 8 7	15	1.7	0.1			Gray fine to medium SAND, trace Silt and coarse Sand and shell fragments.	
	805	S-27		5 6 9 10	15	2.0	0.7			Brown fine to medium SAND, trace Silt and coarse rounded Sand.	
55		S-28		2 5	20	2.0	0.0			Brown fine SAND, trace Silt and medium Sand.	

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Remarks:
WOH = Weight of hammer.

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.95	23.41 ▼

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: TW97-2D

Total Depth = 69 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-28		15 20	20	2.0	0.0				
	800	S-29		3 5 7 11	12	2.0	0.0			Brown fine SAND, little Silt, trace fine rounded Gravel (red sandstone, quartzite).	
		S-30		2 5 7 9	12	1.0	0.1			Brown fine to medium subangular to round SAND, little Silt, trace fine rounded Gravel (sandstone).	
60	795	S-31		1 2 4 5	6	1.5	0.0			As above, trace Silt, no Gravel, loose.	
		S-32		1 3 5 7	8	2.0	0.0			Brown fine SAND, some medium Sand, trace Silt.	
65		S-33		1 2 4 6	6	2.0	0.0			At 63.9', Silty Sand seam 0.1' thick. As above.	
	790	S-34		1 3 5 12	8	2.0	0.0			As above.	
70		S-35		1 5 15 13	20	1.0	0.0			Brown fine rounded to subrounded GRAVEL, some fine to coarse Sand and Silt, little to trace Clay, medium dense (TILL).	
	785									Bottom of spoons at 70' bgs. Bottom of boring at 69' bgs.	
75											

Backfilled with soil cuttings 1.0' to 58.0' bgs.

2" diameter, Schedule 40 PVC well riser 0.2' to 64.0' bgs.

Bentonite chips 58.0' to 61.0' bgs.

#0 Silica sand pack 61.0' to 69.1' bgs.

2" diameter, 0.01" slotted, Schedule 40 PVC well screen 64.0' to 69.0' bgs.

2" diameter, Schedule 40 PVC sump 69.0' to 69.1' bgs.

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	832.95	23.41 ▼

Project: 130.36.005 Script: nbblwell Date: 04/01/98

Date Start/Finish: 12/1/97 / 12/2/97
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: HSA

Auger Size: 4.25 ID in.
Rig Type: 82 Acker
Spoon Size: 3 in.

Northing: 767238.71380
Easting: 1006688.58601
Well Casing: 855.52 feet

Borehole Depth: 26 ft.
Ground Surface: 855.80 feet

Geologist: Matthew W. Erbe

Well No: TW97-3

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 855.80 ft.											
										GROUND SURFACE	9" diameter flushmount curb box installed
	855	S-1		6 8 13 10	21	1.7	0.2			Black cinders and coal fragments, some slag and fine to coarse Sand, medium dense (FILL).	Cement surface seal 0.0' to 1.0' below grade #0 Silica sand 0.5' to 1.0' below grade inside of curb box
		S-2		6 8 7 9	15	1.5	0.0			Brown fine SAND and orange Gravel-sized slag (highly oxidized), black staining, some Silt, little coarse Sand, medium dense, moist. (FILL)	
5		S-3		6 5 6 5	11	1.2	0.0			Black fine to coarse Sand-sized coal fragments, cinders and slag, medium dense, dry. (FILL)	Backfilled with soil cuttings 1.0' to 10.0' below grade
	850	S-4		6 9 3 5	12	1.0	0.0			Light brown fine to coarse SAND, some fine, round to subangular Gravel, little Silt, medium dense, moist (FILL).	
		S-5		8 8 9 10	17	0.7	0.0			Brown fine to coarse SAND and medium to coarse subangular GRAVEL, trace Silt, medium dense, moist (FILL).	2" diameter, Schedule 40 PVC well riser 0.3' to 14.0' below grade
10										As above, dense.	
	845	S-6		9 15 16 26	31	0.6	0.0				Bentonite chips 10.0' to 12.0' below grade
		S-7		32 25 21 21	46	0.0	NA			No Recovery.	#0 Silica sand pack 12.0' to 24.0' below grade
15		S-8		30 20	36	1.0	0.0				

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Remarks:
NA=Not available. bgs - below ground surface

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	837.08	18.72

Project: 130.36.005
Script: nbblwell
Date: 04/01/98

Client:
New York State Electric & Gas

Location:
Conrail Right of Way
Binghamton, New York

Well No: TW97-3

Total Depth = 28 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description
0	840	S-8		16 12	36	1.0	0.0			At 14' bgs, brown fine to coarse SAND and very angular GRAVEL, little coal and shell fragments, trace Silt, dense, moist (FILL).
		S-9		13 14 22 19	36	1.1	0.0			Brown and gray fine to coarse SAND and rounded to very angular GRAVEL (siltstone and shale), Fe staining, dense, dry, few moist Silty seams.
		S-10		18 11 7 10	18	0.8	35.2			Gray and brown fine to coarse, very angular GRAVEL (siltstone and shale), some fine to coarse Sand, little to trace Silt, Fe staining, medium dense, wet.
20	835	S-11		6 13 7 11	20	1.0	180			Gray fine to coarse very angular GRAVEL (siltstone and shale), little fine to coarse Sand and Silt, medium dense, heavy sheen, gasoline-like odor.
		S-12		7 6 5 6	11	0.8	101			Gray very fine SAND, some Silt, trace fine rounded Gravel, some black staining, medium dense, sheen, odor.
25	830	S-13		5 4 2 4	6	1.0	1067			Gray fine to coarse, rounded SAND and GRAVEL, some Silt, loose, sheen, odor.
										Bottom of spoons at 26' bgs. Bottom of boring at 24' bgs.
30	825									
35										

Well Construction

- #0 Silica sand pack 12.0' to 24.0' below grade
- 2" diameter, 0.01" slotted, Schedule 40 PVC well screen 14.0' to 24.0' below grade
- 2" diameter, Schedule 40 PVC sump 24.0' to 24.f below grade

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
2/11/98	837.08	18.72 ▼

Date Start/Finish: 5/19/98 / 5/19/98
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: Hollow-Stemmed Auger

Auger Size: ID 4.25 in.
Rig Type: CME 55
Spoon Size: 2 and 3 in.

Northing: 766964.26256
Easting: 1006809.38656
Well Casing: 842.35 feet

Borehole Depth: 17 ft.
Ground Surface: 842.58 feet

Geologist: Michael Cobb

Well No: MW98-15S

Client:
New York State Electric & Gas

Location:
295 Court Street Property,
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 842.58 ft.									**GROUND SURFACE**	9" diameter steel flushmount curb box.
									Asphalt and concrete slab (pavement).	Cement surface seal.
840	S-1 2" SS		7 10 7 5	17	<0.1	0.8			Medium brown medium to coarse SAND, some fine Gravel, medium gravel in spoon tip, dry. (FILL)	Sand drain 1' to 2' bgs.
	S-2 2" SS		3 2 2 1	4	0.1	0.8			Medium brown fine to medium SAND, some coarse Sand, little to trace fine Gravel, dry to moist. (FILL)	2" diameter, Schedule 40 PVC well riser 0.2' to 5' bgs.
5	S-3 2" SS		5 6 8 10	14	0.3	1.2			Medium brown fine to coarse SAND, trace Silt, trace rootlets, dry to moist. (FILL)	Bentonite chips 3' to 4' bgs.
835	S-4 3" SS		30 53 7 9	60	0.9	1.0			Medium brown fine to coarse SAND and fine to medium GRAVEL, some large concrete fragments, dry to moist. (FILL)	
10	S-5 3" SS		2 2 3 3	5	1.9	320			Dark gray to black SILT, slight black staining, moist to wet, petroleum-like odor.	Granusil silica sand pack 4' to 15' bgs.
	S-6 3" SS		4 4 5 8	9	1.9	700			Dark olive gray SILT, some fine Sand in seams, little black staining, soft, wet, petroleum-like odor.	
830	S-7 2" SS		3 4 4 3	8	1.8	8.1			As above, dark olive gray SILT, little fine Sand, wet, petroleum-like odors.	2" diameter, 0.01" slotted, Schedule 40 PVC well screen 5' to 15' bgs.
15										

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Remarks:

Samples collected from 9-11' bgs submitted for analysis of VOCs, SVOCs, and TPH. bgs = below ground surface. NA = Not available. SS = Split-Spoon.

Saturated Zones

Date / Time	Elevation	Depth
6/5/98	832.27	10.31

Client:
New York State Electric & Gas

Location:
295 Court Street Property,
Binghamton, New York

Well No: MW98-15S

Total Depth = 17 ft.

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
0	S-8 2" SS		5 3 2 1	5	0.9	1161			Fine to coarse SAND and fine GRAVEL, loose, wet, reddish-brown oily liquid throughout sample and pooling in spoon, strong petroleum-like odor.	Spoon-hole plugged with bentonite chips.
825									Bottom of spoons at 17' bgs. Bottom of boring at 15' bgs.	
20										
820										
25										
815										
30										
810										
35										

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
6/5/98	832.27	10.31 ▽

Date Start/Finish: 5/21/98 / 5/21/98
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: Hollow-Stemmed Auger

Auger Size: ID 4.25 in.
Rig Type: CME 55

Northing: 767090.44712
Easting: 1007112.84029
Well Casing: 841.56 feet

Borehole Depth: 17 ft.
Ground Surface: 841.90 feet

Geologist: Michael Cobb

Well No: MW98-16S

Client:
New York State Electric & Gas

Location:
295 Court Street Property,
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 841.90 ft.									GROUND SURFACE	9" diameter steel flushmount curb box.
840									No sampling conducted. See the boring log of adjacent well MW98-16D for a stratigraphic description and sampling details.	Cement surface seal.
5										Sand drain 0.7' to 3' bgs.
835										2" diameter, Schedule 40 PVC well riser 0.3' to 7' bgs.
10										Bentonite chips 3' to 5' bgs.
830										Granusil silica sand pack 5' to 17' bgs.
15										2" diameter, 0.01" slotted, Schedule 40 PVC well screen 7' to 17' bgs.

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Remarks:
A confirmatory split-spoon taken from 10-12' bgs matched the corresponding sample from MW98-16D. Drillers report concrete layer from 11.9-12.7' bgs. bgs - below ground surface.

Saturated Zones

Date / Time	Elevation	Depth
6/5/98	833.52	8.38

Project: 130.36.007
Script: nbblwell
Date: 10/12/98

Client:
New York State Electric & Gas

Location:
295 Court Street Property,
Binghamton, New York

Well No: MW98-16S

Total Depth = 17 ft.

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
825										2" diameter, 0.01" slotted, Schedule 40 PVC well screen 7' to 17' bgs.
20									Bottom of boring at 17' bgs.	
820										
25										
815										
30										
810										
35										

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
6/5/98	833.52	8.38 ▽

Project: 130.36.007 Script: nbblwell
Date: 10/12/98

Date Start/Finish: 5/20/98 / 5/21/98
Drilling Company: MAXIM Technologies, Inc.
Driller's Name: Rodney Bush
Drilling Method: Hollow-Stemmed Auger

Auger Size: ID 4.25 in.
Rig Type: CME 55
Spoon Size: 2 and 3 in.

Northing: 767088.50563
Easting: 1007110.21662
Well Casing: 841.70 feet

Borehole Depth: 46 ft.
Ground Surface: 841.91 feet

Geologist: Michael Cobb

Well No: MW98-16D

Client:
New York State Electric & Gas

Location:
295 Court Street Property,
Binghamton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 841.91 ft.									**GROUND SURFACE**	8" diameter steel flushmount curb box.
									Asphalt.	Cement surface seal.
840	S-1	3" SS	10 20 30	30	1.2	2.1			Medium brown fine to coarse SAND, and fine GRAVEL, some medium Gravel, dry to moist. (FILL)	
	S-2	3" SS	13 13 9 9	22	1.0	1.0			Medium brown fine to coarse SAND, and fine to medium GRAVEL, angular to subangular, moist. (FILL)	Sand drain 0.7' to 3.5' bgs.
5	S-3	3" SS	7 6 5 4	11	1.1	1.0				
835	S-4	3" SS	3 4 4 5	8	1.3	0.8			Becoming very moist at 5.8' bgs. Trace coal-like fragments. Gravel is subrounded to subangular. (FILL)	Type I Portland Cement/Bentonite Grout 3.5' to 32.5' bgs.
	S-5	3" SS	2 2 5 6	7	2.0	1.0			Brown SILT and fine SAND, little fine to coarse Gravel, trace black staining, grading to black SILT and fine SAND, little fine to medium Gravel, very moist. (FILL)	2" diameter, Schedule 40 PVC well riser 0.2' to 38.5' bgs.
10	S-6	3" SS	2 2 2 30	4	1.1	0.3			Olive gray SILT and fine SAND, little medium to coarse Sand and fine Gravel, rounded to subrounded, wet. (perched water) (FILL)	
830	S-7	3" SS	NA 8 8 5	16	1.5	0.5			Dense fill. Timber and cobble fragments lodged in spoon tip (10-12"). Drillers auger to 12.5' bgs.	
									SILT and fine SAND, some concrete and wood fragments, moist.	
									Red-brown SILT and fine SAND, some fine to medium Gravel, moist.	
15	S-8	2" SS	1 2	4	0.2	0.9			Medium GRAVEL-sized concrete fragments, moist.	

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Remarks:
PID results below water table not shown due to moisture interference with instrument. bgs = below ground surface. NA = Not available. SS = Split-Spoon.

Saturated Zones

Date / Time	Elevation	Depth
6/5/98	832.59	9.32 ▽

Project: 130.36.007 Script: nbblwell
Date: 10/12/98

Client:
New York State Electric & Gas

Location:
295 Court Street Property,
Binghamton, New York

Well No: MW98-18D

Total Depth = 46 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
		S-8 2" SS		2 3	4	0.2	0.9			At 14' bgs. Medium brown medium SAND, little to some fine Sand, trace coarse Sand, wet. (Upon breaking through concrete at 14' bgs, water rises in borehole to 9.5' bgs.)	
	825	S-9 2" SS		3 4 5 5	9	0.2				Medium brown medium to coarse SAND and fine GRAVEL, rounded to subrounded, wet.	
		S-10 2" SS		9 8 9 10	17	0.2					
20		S-11 2" SS		8 9 12 10	21	0.3				As above, some fine Sand, wet.	
	820	S-12 2" SS		5 7 8 7	15	0.5					
25		S-13 2" SS		7 10 7 8	17	0.5				As above. Possible seams of well sorted medium SAND throughout unit. Poor recovery prevents accurate stratigraphic placement.	
	815	S-14 2" SS		7 9 7 8	16	0.2				As above, with fine to medium GRAVEL and medium to coarse SAND, little fine SAND, wet.	
		S-15 2" SS		6 5 5 6	10	0.3					
30		S-16 2" SS		13 5 4 5	9	0.5					
	810	S-17 2" SS		9 7 6 5	13	0.3					
35		S-18 2" SS		6 7	12	0.2					

Type I Portland Cement/Bentonite Grout 3.5' to 32.5' bgs.

2" diameter, Schedule 40 PVC well riser 0.3' to 38.5' bgs.

Bentonite chips 32.5' to 35.0' bgs.

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
6/5/98	832.59	9.32

Project: 130.36.007 Script: nbblwell Date: 10/12/98

Client:
New York State Electric & Gas

Location:
295 Court Street Property,
Binghamton, New York

Well No: MW98-16D

Total Depth = 46 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description
		S-18 2" SS		5 6	12	0.2				
	805	S-19 2" SS		7 9 18 12	27	2.0				Medium brown fine to medium SAND, no gravel, no silt, wet.
		S-20 2" SS		8 7 6 4	13	1.8				As above, with little fine gravel. Brown fine to medium SAND, trace coarse Sand, wet.
40		S-21 2" SS		15 10 8 8	18	2.0				As above, a few seams with some fine subrounded gravel, wet.
	800	S-22 2" SS		14 10 9 9	19	2.0				
45		S-23 2" SS		4 6 8 10	14	0.4				Light brown SILT, some coarse Sand and fine Gravel, little fine to medium Sand, wet. (TILL). As above, light brown SILT, some fine to coarse Sand and fine Gravel, soft, wet.
	795									Bottom of spoons at 46' bgs. Bottom of boring at 44' bgs.
50										
	790									
55										

Well Construction

- Granusil silica sand pack 35.0' to 44.0' bgs.
- 2" diameter, 0.01" slotted, Schedule 40 PVC well screen 38.5' to 43.5' bgs.

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth
6/5/98	832.59	9.32 ▽

Project: 130.36.007
Script: nbblwell
Date: 10/12/98

Date Start/Finish: 07-24-01 / 08-02-01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger\ Spun Casing\HX Rock Coring **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 766879.91 **Easting:** 1006546.13 **Casing Elevation:** 847.05 ft. AMSL **Surface Elevation:** 844.19 ft. AMSL **Well Depth:** 108.1 ft. bgs **Descriptions By:** Michael K. Cobb	**Well ID:** **MW01-03R** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
845 / 0								
	1	0-2	3 4 4 5	8	1.2	0.0		Medium brown SILT and fine SAND, little coarse Sand and fine Gravel, Organics, loose, dry, no odor/sheen/staining.
	2	2-4	3 3 3 2	6	0.4	0.1		Medium brown fine SAND, some Silt, little coarse Sand and fine Gravel, dry, loose, no odor/sheen/staining.
840 / 5	3	4-6	2 1 2 3	3	0.6	0.2		Medium dark brown SILT, some medium to coarse Sand, some fine to medium Gravel, Coal fragments, medium Till lodged in shoe, moist, no odor/sheen/staining.
	4	6-8	8 4 1 2	5	1	0.1		Medium brown fine SAND, some medium to coarse Sand and Gravel, moist, no odor/sheen/staining. Gray brown CLAY, little Silt, trace fine to medium rounded Gravel, soft, medium plasticity, moist, little oxidation staining, no odor or sheen.
835 / 10	5	8-10	1 3 3 6	6	0.8	0.1		Tan SILT, trace Clay, soft, blocky, moist, little oxidation, trace black staining, no odor or sheen.
	6	10-12	1 3 3 4	6	1.7	0.1		Tan SILT and CLAY, moderately plastic, blocky texture, moist to wet, soft, oxidation staining, no black staining, no odor, or sheen.
	7	12-14	3 4 5 7	9	1.6	0.3		
830 / 15	8	14-16	3 5 7 7	12	0.4	0.3		Tan CLAY, little Silt, medium to high plasticity, wet, no odor, trace oxidation staining, no odor or sheen.

Well Construction

- 2" PVC Riser (~2.5 ags - 98' bgs)
- Cement/Bentonite Grout (0 - 93' bgs)
- Cement/Bentonite Grout (0 - 45' bs)
- 6-inch OD Steel Casing (0 - 45' bgs)
- 10-inch Auger Hole (0 - 45' bgs)

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
7/23/01	13.3'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: **MW01-03R**

Well Depth: 108.1 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
	9	16-18 3-in SS	7 7 7 6	NA	1.6	0.2		Tan to gray SILT and CLAY, medium to highly plastic, blocky texture, wet, oxidation staining, no odor or sheen.	2" PVC Riser (~2.5 ags - 98' bgs)
825	10	18-20	1 1 5 9	6	1.1	0.0		No Recovery. Medium angular gravel-sized Quartz lodged in shoe.	Cement/Bentonite Grout (0 - 93' bgs)
20	11	20-22	5 7 10 7	17	1.2	0.2		Medium SAND, little fine Sand, loose, wet, no odor/sheen/staining. Tan CLAY and SILT, blocky, stiff, no odor/sheen/staining. Medium gray SAND, some coarse Sand and fine Gravel, trace fine Sand and Silt, wet, loose, no odor/sheen/staining.	
	12	22-24	3 4 3 7	7	1.8	0.2		Medium gray medium SAND, some coarse Sand, little fine Gravel, trace fine Sand and Silt, wet, loose, no odor/sheen/staining.	
820	13	24-26	2 3 5 7	8	1.2	0.2		Dark gray to black fine SAND, trace coarse Sand, wet, loose, faint MGP-type odor, no sheen or staining.	Cement/Bentonite Grout (0 - 45' bs)
25	14	26-28	3 5 7 4	12	1.1	0.3		Dark gray-black medium SAND, little fine to coarse Sand, trace fine rounded Gravel, wet, faint MGP-type odor, no sheen or staining.	6-inch OD Steel Casing (0 - 45' bgs)
815	15	28-30	WOR 1 3 3	4	2	0.0		As above, with trace medium Gravel, 1" tan Silt and Clay seam, soft at 29.5' bgs.	
30	16	30-32	2 3 4 4	7	2	0.1		Dark gray medium SAND, little coarse Sand and fine Gravel, trace medium rounded Gravel, no odor/sheen/staining.	10-inch Auger Hole (0 - 45' bgs)
	17	32-34	WOR 2 2 3	4	2	0.2		Medium gray very fine SAND and SILT, wet, soft, faint MGP odor throughout, no sheen or staining. Medium gray fine to medium SAND, loose, wet, faint odor, no sheen or staining.	
810									
35	18	34-36	1 1 4 8	5	2	0.1		Medium gray very fine SAND, little Silt, dilatant, faint odor, no sheen or staining. Medium gray fine SAND, trace Silt, Silt\Clay parting, wet, faint odor, little MGP odor from 34'-34.5', staining at 35.1' bgs, no sheen.	

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engineers & scientists

Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
7/23/01	13.3'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-03R

Well Depth: 108.1 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	19	36-38	4 6 6 7	12	2	0.1		Medium gray fine SAND, little trace Silt, little parting of Silt at 38.5', Amber discoloration in bands from 37.5'-38' bgs, MGP-type odor concentrated in bands, no sheen or staining.
805	20	38-40	WOH/ 1.5 4 NA	NA	1.5	0.0		Dark gray-black (olive) fine to medium SAND, very loose, wet, 1" thick wide tan soft Silty Clay lens at 38.5' bgs, no odor/sheen/staining
40	21	40-42	4 8 16 18	24	2	18.5		Dark gray black fine SAND, Intervals of black NAPL (medium viscosity), Trace NAPL throughout fine intervals, mostly saturated with NAPL from 41'-42' bgs.
	22	42-44	30 50\4" NA NA	NA	0.2	0.2		Tan SILT and fine to medium angular GRAVEL, little fine to coarse Sand, dense, No NAPL, no odor/sheen/staining. [TILL]
800	23	44-46	38 41 35 39	76	1.2	0.1		Olive tan SILT and fine to coarse GRAVEL, Black shale fragments, very hard, no odor/staining. [TILL]
45	24	46-48	50/0.3'	NA	0.0	0.0		No Recovery. Rounded Gravel and broken Rock found in the spoon, loose and no fines. Infer Cobble or Boulder obstruction. Rollerbit through boulder to 47.8' bgs.
795	25	48-50	38 60 50/0.2' NA	60	1.1	0.0		Light brown matrix composed of SILT, little Clay, some gray Rock fragments (mostly Shale with trace fossil), fine subangular to angular Gravel and coarse Sand, no odor/sheen/staining, hard. [TILL]
50	26	50-52	45 50/0.2' NA NA	NA	0.7	0.0		As above, with trace medium Sand. [TILL]
	27	52-54	50/0.3'	NA	0.0	0.0		No Recovery. Rollerbit advances to 54.5' bgs. Cobbles and boulder from 52'-53' bgs, less hard from 53'-54'.
790	NA	54-54.5	NA	NA	NA	NA		
55	28	54.5-55.2	70 50/0.2'	NA	0.6	0.1		Light gray brown SILT matrix and coarse SAND and fine angular GRAVEL (mostly black shale), little Clay, very hard, wet, no odor/sheen/staining. [TILL]
	NA	55.2-56	NA	NA	NA	NA		No Sampling, drill to 56' bgs.

Well Construction

- 2" PVC Riser (~2.5 ags - 98' bgs)
- Cement/Bentonite Grout (0 - 45' bs)
- 6-inch OD Steel Casing (0 - 45' bgs)
- 10-inch Auger Hole (0 - 45' bgs)
- 4.5-inch Borehole (45' - 103' bgs)
- Cement/Bentonite Grout (0 - 93' bgs)

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
7/23/01	13.3'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-03R

Well Depth: 108.1 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
	29	56-56.7	46 50/0.2'	NA	0.5	0.0		Light gray-brown (khaki) SILT matrix with gray-black coarse SAND and fine subangular to angular GRAVEL, little Clay, massive (no consistent concentration of clasts), very hard, wet, no odor/sheen/staining. [TILL]	2" PVC Riser (~2.5 ags - 98' bgs)
	NA	56.7-58	NA	NA	NA	NA		No Sampling, drill to 58' bgs.	
	30	58-58.3	50/0.3'	NA	0.3	0.1		As above from 56'-56.7' bgs, with little medium Sand.	
785								No Sampling, drill to 61.2' bgs.	
60	NA	58.3-61.2	NA	NA	NA	NA			Cement/Bentonite Grout (0 - 93' bgs)
	31	61.2-62.8	HW Core	NA	1.1	0.0		HQ CORE RUN (61.2-62.8' bgs): Light brown SILT and little CLAY matrix with medium to coarse SAND and fine to coarse subrounded to angular GRAVEL, multiple rock types (includes shale, siltstone, pink granite), wet, hard, No odor/sheen/stains. [TILL]	
	NA	62.8-63.5	NA	NA	NA	NA		No Sampling, drill to 63.5' bgs.	
	32	3-in SS	50/0.2'	NA	0.1	0.0		As above from 61.2'-62.8' bgs. [TILL]	
780								No Sampling, drill to 66.2' bgs.	
65	NA	63.7-66.2	NA	NA	NA	NA			4.5-inch Borehole (45' - 103' bgs)
	33	66.2-66.9	45 50/0.2'	NA	0.7	0.0		As above from 61.2'-62.8' bgs. [TILL]	
	NA	66.9-68	NA	NA	NA	NA		No Sampling, drill to 68' bgs.	
	34	68-68.7	50 50/0.2'	NA	0.7	0.0		As above from 61.2'-62.8' bgs, with trace oxidation staining, no odor or sheen. [TILL]	
775	NA	68.7-70	NA	NA	NA	NA		No Sampling, drill to 70' bgs.	
70	35	70-70.7	55 50/0.2'	NA	0.5	0.8		Light brown SILT and little CLAY matrix with medium to coarse SAND and fine to coarse subrounded to angular GRAVEL, multiple rock types (includes shale, siltstone, pink granite), little oxidation staining, little dark brown discoloration at 70.7 ' bgs, wet, hard, no odor/sheen/stains. [TILL]	
	NA	70.7-72.6	NA	NA	NA	NA		No Sampling, drill to 72' bgs.	
	36	72-72.6	55 50/0.1'	NA	0.5	0.6		As above from 70'-70.2' bgs. [TILL]	
770	NA	72.6-75	NA	NA	NA	NA		No Sampling, drill to 75' bgs, no sheens in return water.	
75	37	75-75.4	75/0.4'	NA	0.4	0.0		Light brown SILT, little brown Silt and Clay matrix, some medium to coarse Sand and Gravel (primary shale fragments), horizontal bedded (possible weathered Brown), no odor/sheen/staining. [TILL]	
	NA	75.4-80.5	NA	NA	NA	NA			

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
7/23/01	13.3'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-03R

Well Depth: 108.1 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	NA	75.4-80.5	NA	NA	NA	NA		No Sampling, drill to 80.5' bgs, no sheens in return water.
765 / 80	38	80.5-81.2	48 50/0.2'	NA	0.5	0.0		Light brown SILT and medium to coarse SAND, some fine angular Gravel, little Clay matrix, gray oxidation staining, hard, wet, no odor or sheen. [TILL]
	NA	81.2-85.5	NA	NA	NA	NA		No Sampling, drill to 85.5' bgs.
760 / 85	39	85.5-86.2	25 50/0.2'	NA	0.4	0.0		As above from 80.5'-81.2' bgs. [TILL]
	NA	86.2-90.2	NA	NA	NA	NA		No Sampling, drill to 90.2' bgs. Driller reports hard drilling, probable Cobbles throughout zone.
755 / 90	40	90.2-90.7	75	NA	0.5	0.0		As above from 80.5'-81.2' bgs, with more weathered shale. [TILL] Refusal at 90.7' bgs.
	NA	90.7-94.2	NA Min/ft	NA RQD	NA	NA		No Sampling. Driller reports rock surface at 92' bgs. Rollerbit advance to 94.2' bgs to confirm.
750 / 95	1	94.2-97.5	3:00 3:30	34	2.5	NA		Dark gray SHALE with horizontal bedding, slightly weathered, medium hard, no staining/sheens/odor. BREAKS: Oxidation on fracture face at 94.5'; Clay in fracture at 95' and 95.4' bgs; broken zone from 92.2'-95.4'.

Well Construction

- 2" PVC Riser (~2.5 ags - 98' bgs)
- Cement/Bentonite Grout (0 - 93' bgs)
- 4.5-inch Borehole (45' - 103' bgs)
- Bentonite (93' - 96' bgs)

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
7/23/01	13.3'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

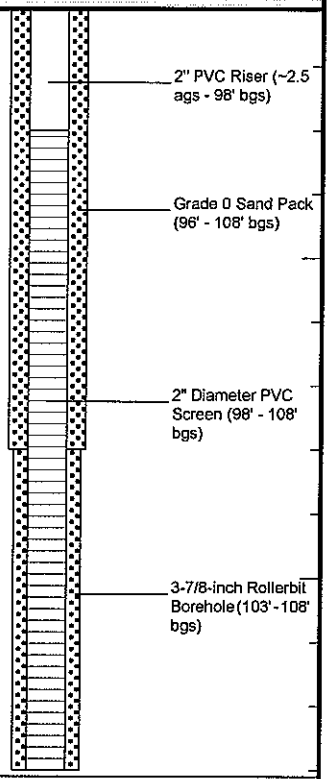
Site Location:
Court Street
Binghamton, NY

Well ID: MW01-03R

Well Depth: 108.1 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	1	94.2-97.5	4:30 5:30	34	2.5	NA		Dark gray SHALE with horizontal bedding, slightly weathered, medium hard, no staining/sheens/odor. BREAKS: Little Clay in fracture at 95.2'; Trace weathering (ill-fitting fracture) at 95.7'; vertical hairline fracture from 96.4'-96.6'; and Vertical break from 96.6'-96.7'.
745 100	2	97.5-102.4	5:00 10:00 10:00 9:00 10:00	20.4	4.9	NA		Dark gray to almost black SHALE, slightly weathered, horizontal bedding and closed bedding, medium hard, no sheens, no odor, no staining. BREAKS: Horizontal breaks at 98.3 (trace Clay), 98.9' (Clay, weathered), 99.3' & 99.4' (trace Clay), 101.6' (little Clay, slight weathering), 102.1' & 102.2' (slight weathering); Broken zone from 98.5'-98.7' (gray Clay, weathered), 100.6'-100.7' & 101.9'-102'. Subvertical fracture from 98.7'-98.9'.
740 105	3	102.4-108.1	6:00 6:00 6:00 6:00 6:00 6:00	86	5.2	NA		No Recovery, clay seam or void. Dark gray, close bedded SHALE, medium hard, slightly weathered, horizontal bedding, no odor/sheens/staining. BREAKS: Horizontal breaks at 102.8' (slightly weathered), 103.2'-103.4' (trace Clay, slightly weathered), 103.5' (little weathered, Clay), 104.9' (trace weathering), 105' & 105.2' (trace weathering), 105.9' (trace Clay), 106.4' (mostly fresh), & 107.4' (trace Clay); vertical fracture from 104.9'-105.9' (trace weathering, cuts across horizontal fractures). Boring first drilled and sampled to till with 4-¼ HSA, then overdrilled with 6-¼ HSA to set outer steel casing. Till drilled with 4.5-in. OD spun casing to refusal at 72.5' bgs. Remainder of till drilled uncased with 3-7/8-in. rollerbit to rock surface. HQ core drilled 15' into rock. After hole collapsed, spun casing withdrawn to replace bit, then readvanced to rock surface and 11' into rock to 103' bgs. Rollerbit cleared hole to 108' bgs and well set.
735 110								
730 115								

Well Construction



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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

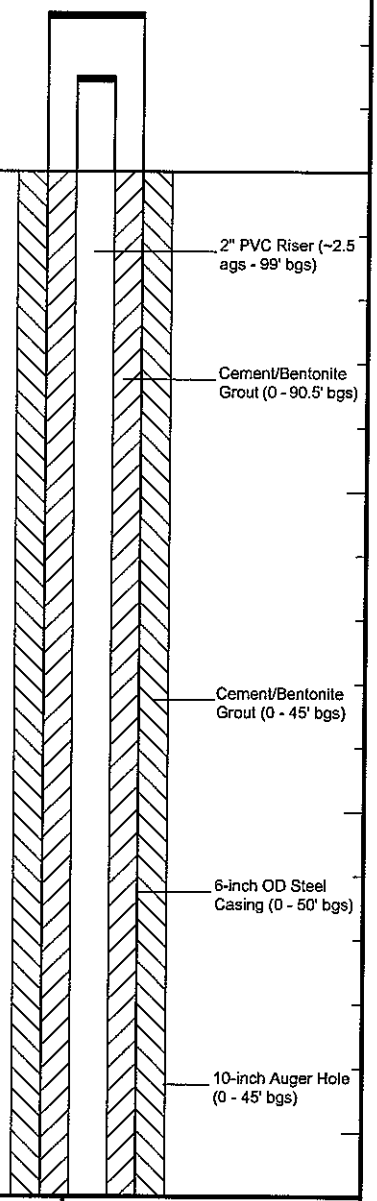
Date	Depth	Elev.
7/23/01	13.3'	

Depth measured from top of casing.

Date Start/Finish: 07/25/01-8/23/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger\ Spun Casing\HX Rock Coring **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 766675.03 **Easting:** 1006347.09 **Casing Elevation:** 848.57 ft. AMSL **Surface Elevation:** 848.99 ft. AMSL **Well Depth:** 108.5 ft. bgs **Descriptions By:** Michael K. Cobb, A.Roy-Perreault	**Well ID:** MW01-07R **Client:** New York State Electric and Gas **Location:** Court Street, Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
850 / 0								
	1	0-2	8, 26, 27, 17	33	1.2	0.0		Light brown FILL consisting of fine Sand, little Silt, little fine to coarse Sand and fine Gravel, Organics, dry, no odor, no odor/staining/sheen.
	2	2-4	12, 25, 35, 18	60	1.1	0.0		Light brown FILL consisting of fine to coarse Sand and fine to medium Gravel, little Silt, trace Brick fragments, dry to moist, no odor/staining/sheen.
845 / 5	3	4-6	8, 20, 15, 11	35	1.1	0.0		
	4	6-8	8, 9, 12, 11	21	1.1	0.0		Light brown fine to coarse SAND and fine to medium GRAVEL, trace Silt, moist, no odor/staining/sheen.
840 / 10	5	8-10	18, 7, 9, 11	16	1.0	0.0		Light brown fine to coarse SAND, little Gravel, trace to little Silt, dry, no odor/staining/sheen.
	6	10-12	15, 29, 50/.3", NA	29	0.0	0.0		No Recovery.
	7	12-14	NA, 6, 5, 6	11	0.2	0.0		Coarse FILL, augered to 12-1/2". Fine SAND, little medium Sand, trace coarse Sand and Gravel, moist, no odor/staining/sheen.
835 / 15	8	14-16	4, 4, 4, 2	8	1.0	0.0		Brown medium SAND, little coarse rounded Sand and Gravel, moist to wet, no odor/staining/sheen.

Well Construction



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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 20'-22' bgs and 22'-24' bgs.

Water Level Data

Date	Depth	Elev.
8/23/01	17.8'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-07R

Well Depth: 108.5 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
	9	16-18	2 2 2 2	4	0.3	0.0		Brown fine to coarse SAND, some Gravel, trace Silt, wet, no odor/staining/sheen.	2" PVC Riser (~2.5 ags - 99' bgs)
830	10	18-20	WOR 2 3 3	5	0.5	16.2		Brown fine to coarse SAND, some fine Gravel, little Silt, wet, no staining/sheen, faint petroleum-type odor.	Cement/Bentonite Grout (0 - 90.5' bgs)
20	11	20-22	4 3 5 5	8	2.0	36.1		Dark brown fine to medium SAND, trace fine to medium Gravel, wet, loose, soupy, no staining or sheen, slight petroleum-type odor.	
	12	22-24	3 4 3 1	7	2.0	9.8			
825								As above, little Silt, oxidation staining, less odor.	Cement/Bentonite Grout (0 - 45' bgs)
25	13	24-26	1 1 1 2	2	0.0	NA		No Recovery. Infer same as above, soupy material apparently ran out of spoon through basket.	
	14	26-28	2 8 8 7	16	1.0	0.7		Brown fine to medium GRAVEL, little fine to medium Sand and Silt, trace odor, wet, loose and soupy, no sheen or staining.	6-inch OD Steel Casing (0 - 50' bgs)
820	15	28-30	7 8 7 8	15	1.0	0.0		Brown fine to coarse SAND and medium GRAVEL, partings of Silt, trace Silt in the matrix, wet, medium dense, no sheen/staining/odor.	
30	16	30-32	8 16 6 3	22	0.7	0.0		Brown fine to coarse SAND and fine to medium GRAVEL, trace Silt, trace odor, medium dense, soupy, wet, no staining or sheen.	10-inch Auger Hole (0 - 45' bgs)
	17	32-34	3 4 3 4	7	1.0	0.0		Brown fine to coarse rounded GRAVEL (fines and Sand have probably been flushed out of spoon), loose, no odor/sheen/staining.	
815									
35	18	34-36	8 6 9 11	15	0.7	0.0		Dark brown fine to coarse SAND and fine to coarse GRAVEL, trace Silt, wet, medium dense, no odor/sheen/staining.	

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 20'-22' bgs and 22'-24' bgs.

Water Level Data

Date	Depth	Elev.
8/23/01	17.8'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-07R

Well Depth: 108.5 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	19	36-38	10 14 24 18	38	0.5	0.5		Dark brown fine to coarse SAND and fine to coarse GRAVEL, little Silt, wet, medium dense, no odor/sheen/staining.
810	20	38-40	14 15 19 16	34	1.0	0.0		Brown fine to coarse GRAVEL, trace Silt, some fine to coarse Sand, wet, medium dense to dense, no sheen/staining/odor.
40	21	40-42	10 12 10 18	22	1.0	0.0		Brown fine to medium GRAVEL, some fine to coarse Sand, trace Silt, medium dense, wet, no odor/staining/sheen.
	22	42-44	10 11 11 11	22	1.0	0.0		
805	23	44-46	5 4 4 10	8	1.1	0.0		Dark brown fine to medium SAND, well sorted, loose to medium dense, no odor/staining/sheen.
45	24	46-48	15 15 21 28	36	1.2	0.0		As above, little fine to medium SAND. Light brown SILT, some coarse Sand, fine Gravel and Clay, dense, wet, no odor/staining/sheen. No Recovery.
800	25	48-50	15 30 45 48	75	0.6	0.1		Light brown to tan CLAY and SILT, some medium to coarse Sand and fine Gravel, very stiff to hard, no odor/staining/sheen. [TILL]
50	26	50-52	6 14 15 32	29	0.8	3.1		Olive-gray SILT and CLAY matrix, and coarse Sand and fine to medium angular Gravel, hard, cohesive, no odor/staining/sheen.
	27	52-54	21 33 36 50/0.2	69	0.7	2.2		As above, with little dark brown weathered Rock fragments.
795	28	54-56	21 50/0.1 NA NA	NA	0.1	NA		Broken Cobble in shoe.
55								

Well Construction

- 2" PVC Riser (~2.5 ags - 99' bgs)
- Cement/Bentonite Grout (0 - 45' bgs)
- 6-inch OD Steel Casing (0 - 50' bgs)
- 10-inch Auger Hole (0 - 45' bgs)
- Cement/Bentonite Grout (0 - 90.5' bgs)
- 4.5-inch borehole (50' - 94' bgs)

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 20'-22' bgs and 22'-24' bgs.

Water Level Data

Date	Depth	Elev.
8/23/01	17.8'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-07R

Well Depth: 108.5 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
	29	56-58	6 12 4 11	16	0.8	NA		Light olive-gray fine to medium angular to subangular GRAVEL and medium to coarse SAND, little Silt and fine Sand, non-cohesive, no odor/staining/sheen.	2" PVC Riser (~2.5 ags - 99' bgs)
790	30	58-59.5	18 26 32	58	1.1	0.0		Olive-gray SILT/CLAY matrix, medium to coarse Sand and fine angular Gravel, clasts, hard, no odor/staining/sheen. [TILL]	
60	NA	59.5-63	NA	NA	NA	NA		Rollerbit advance to 63' bgs.	Cement/Bentonite Grout (0 - 90.5' bgs)
785	31	63-64.4	30 44 50/0.4	44	0.2	0.0		Light olive TILL as described from 58'-59.5' bgs.	
65	NA	64.4-68.5	NA	NA	NA	NA		Rollerbit advanced to 68.5' bgs (Cobble encountered from 68'-68.6' bgs).	4.5-inch borehole (50' - 94' bgs)
780	32	68.5-69.7	22 40 50/0.2	40	0.5	0.0		Light olive SILT, little Clay, little fine to medium angular Gravel and medium to coarse Sand, no odor/staining/sheen. [TILL]	
70	NA	69.7-73.2	NA	NA	NA	NA		Rollerbit advanced to 73.2' bgs.	
775	33	73.2-74.4	37 58 50/0.2	58	1.0	0.0		Light brown fine SAND and SILT, blocky, wet, no odor/staining/sheen.	
75	NA	74.4-78	NA	NA	NA	NA		Rollerbit advanced to 78' bgs.	

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engineers & scientists

Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 20'-22' bgs and 22'-24' bgs.

Water Level Data

Date	Depth	Elev.
8/23/01	17.8'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-07R

Well Depth: 108.5 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
								Rollerbit advanced to 78' bgs.
	NA	74.4-78	NA	NA	NA	NA		
770	34	78-80	50 50/0.3 NA NA	NA	0.9	0.0		Olive-gray SILT, little Clay matrix and angular to subangular medium to coarse Sand and fine Gravel, trace medium Gravel, cohesive, hard, no odor/staining/sheen.
80								Rollerbit advanced to 83.5' bgs.
	NA	80-83.5	NA	NA	NA	NA		
	35		100/.3	NA	0.3	0.0		Olive and olive-gray SILT and CLAY matrix, some medium to coarse Sand and fine angular to subangular Gravel, hard, no odor/staining/sheen. [TILL]
765								Rollerbit advanced to 88' bgs.
85	NA	83.8-88	NA	NA	NA	NA		
	36	88-88.3	100/.3	NA	0.3	0.0		As above from 83.5'-83.8' bgs, broken Shale fragments (cobbles and boulders), no odor/staining/sheens.
760								Driller reports rock surface at 91.5' bgs. Rollerbit advanced to 94' bgs to confirm.
90	NA	88.3-94	NA	NA	NA	NA		
			Min/ft	RQD				
755			6:30					Dark gray to black SHALE, horizontal bedding, slightly weathered, hard, no staining/sheen/odor. BREAKS: Horizonal breaks at 94.7' (trace Clay), 95.7 (trace Clay, slightly weathered), 95.9' (trace Clay).
95	1	94-99	11:00	84	5.0	NA		

Well Construction

- 2" PVC Riser (~2.5 ags - 99' bgs)
- Cement/Bentonite Grout (0 - 90.5' bgs)
- 4.5-inch borehole (50' - 94' bgs)
- Bentonite (90.5' - 93.5' bgs)
- 3 7/8-inch Corehole (94' - 109' bgs)
- Grade 0 Sand Pack (93.5' - 109' bgs)

BBL
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engineers & scientists

Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 20'-22' bgs and 22'-24' bgs.

Water Level Data

Date	Depth	Elev.
8/23/01	17.8'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-07R

Well Depth: 108.5 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
750	1	94-99	9:30 7:30 8:30	84	5.0	NA		Dark gray to black SHALE, horizontal bedding, slightly weathered, hard, no staining/sheen/odor. BREAKS: Horizonal breaks at 96.9' (broken on outside), 97.5 (trace Clay), 97.6' (trace Clay), 98.3' (trace Clay), 98.4' (trace Clay), 99' (trace Clay); sub-vertical fracture from 98.8'-98.85'.	2" PVC Riser (~2.5 ags - 99' bgs)
100	2	99-104	6:00 7:15 8:00 7:00 6:00	87	5.0	NA		Dark gray to black SHALE as above. BREAKS: Horizontal breaks at 99.6' (trace Clay), 100.2', 100.4', and 100.8' (no Clay or weathering), 102.5 (trace Clay, smooth), 103.3' and 103.4 (trace Clay).	Grade 0 Sand Pack (93.5' - 109' bgs) 2" Diameter PVC Screen (99' - 109' bgs)
745 105	3	104-109	8:00 9:00 6:30 6:00 7:00	88	4.5	NA		Dark gray to black SHALE as above. BREAKS: Broken zones from 103.7-103.8' and at 106.3' (Clay and rock fragments), Horizontal breaks at 104.6' (very flat and smooth surface, trace Clay), 105.2' (trace Clay, very smooth, weathering on outside), 105.8' (No Clay), 106.6' (Trace Clay), 107.2' (trace Clay, very smooth, weathering on outside), 107.7 (Rough surface, trace Clay). Boring first drilled and sampled to till with 4-¼ HSA, then overdrilled with 6-¼ HSA to set outer steel casing. Till drilled with 4.5-inch OD spun casing to 94' bgs, 2.5' into rock surface. HQ drilled an additional 15' into rock. Well set in corehole at 108' bgs.	3 7/8-inch Corehole (94' - 109' bgs)
740 110 735 115									

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 20'-22' bgs and 22'-24' bgs.

Water Level Data

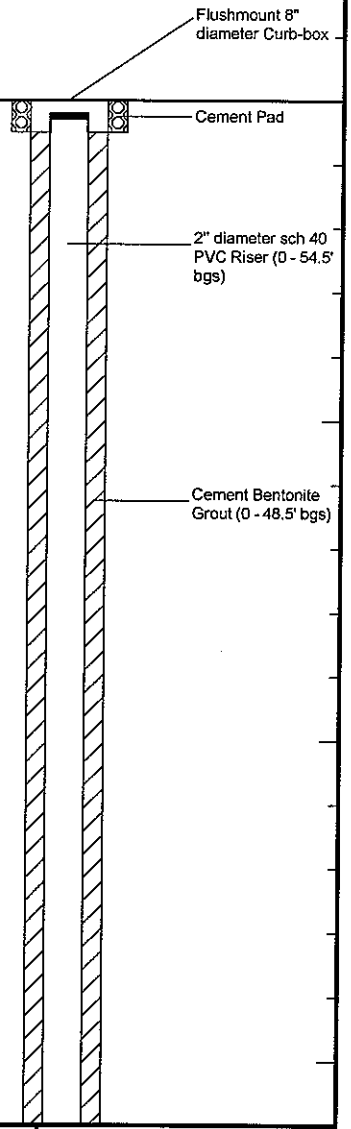
Date	Depth	Elev.
8/23/01	17.8'	

Depth measured from top of casing.

Date Start/Finish: 9/18/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 767043.09 **Easting:** 1006086.29 **Casing Elevation:** 861.45 ft. AMSL **Surface Elevation:** 861.16 ft. AMSL **Well Depth:** 61.3 ft. bgs **Descriptions By:** Michael K. Cobb	**Well ID:** **MW01-17D** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	NA	0-0.5	NA	NA	0.0	NA		ASPHALT.
860	1	0.5-2	5 3 3	8	1.2	1.2		Dark brown to black medium to coarse SAND FILL as Cinders, little Gravel, dry, loose, no odor/staining/sheen.
								Red-brown fine SAND, some Silt, little medium to coarse Sand and Gravel, trace Fill, moist, no odor/staining/sheen.
	2	2-4	2 7 10 7	17	0.9	1.0		Light brown fine to coarse SAND and fine to medium GRAVEL (broken coarse Gravel probable Cobbles), no Fill traces apparent, dry, crumbly, no odor/staining/sheen.
5	3	4-6	12 11 10 6	21	0.6	1.4		
855	4	6-8	16 7 8 7	15	1.6	2.0		Light brown fine to coarse SAND and fine to medium rounded GRAVEL, no Fill traces, dry, crumbly, no odor/staining/sheen.
	5	8-10	8 10 8 14	18	0.8	1.6		
10								
850	6	10-12	19 14 10 10	24	1.0	2.8		
	7	12-14	18 4 4 4	8	1.0	2.2		Medium brown fine to coarse SAND, some fine Gravel, little medium Gravel, dry, generally loose, moist in shoe, no odor/staining/sheen.
15	8	14-16	3 4 3 1	7	0.5	1.3		As above, moist throughout, trace Silt in partings, no odor/staining/sheen.

Well Construction



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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/18/01	30'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-17D

Well Depth: 61.3 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
845	9	16-18	2 2 2 3	4	0.9	1.6		Medium brown fine to coarse SAND, some fine Gravel, little medium Gravel, trace Silt in partings, moist to wet, generally loose, no odor/staining/sheen.
	10	18-20	3 7 10 10	17	1.0	1.4		As above, with pink granite Gravel, moist to wet, no odor/staining/sheen. Hole checked, no standing water.
20								
840	11	20-22	16 7 8 5	15	1.2	1.1		Light to medium brown fine to medium GRAVEL and fine to coarse SAND, moist, no odor/staining/sheen.
	12	22-24	8 6 8 16	14	0.1	NA		Rock in shoe, poor recovery.
25	13	24-26	12 34 5 4	39	1.3	2.4		Medium brown fine to coarse SAND and fine to medium GRAVEL, many rock types/colors, moist, no odor/staining/sheen.
835	14	26-28	3 14 3 3	17	0.7	2.2		
	15	28-30 3-in SS	WOR NA NA NA	NA	0.3	1.8		As above, trace brown Silt, no odor/staining/sheen.
30								
830	16	30-32 3-in SS	6 6 2 4	NA	1.3	1.5		Multicolored fine to coarse GRAVEL, some fine to coarse Sand, little brown Silt smearing all, wet, no odor/staining/sheen.
	17	32-34	1 2 2 3	4	1.8	3.0		Brown fine to medium SAND, trace coarse Sand and fine Gravel, loose, soupy, wet, no odor/staining/sheen.
35	18	34-36	6 4 3 3	7	1.1	2.3		Dark brown fine to medium SAND, little coarse Sand and fine Gravel, trace Silt, wet, soupy, no odor/staining/sheen.

Well Construction

2" diameter sch 40 PVC Riser (0 - 54.5' bgs)

Cement Bentonite Grout (0 - 48.5' bgs)

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/18/01	30'	

Depth measured from top of casing.

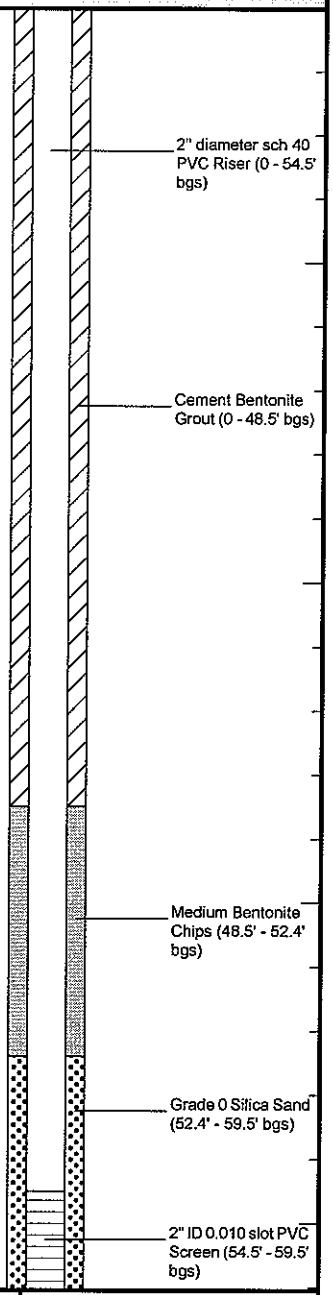
Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-17D

Well Depth: 61.3 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
825	19	36-38	3 3 7 9	10	0.2	1.6		Dark brown fine to medium SAND, little coarse Sand and fine Gravel, trace Silt, poor recovery, wet, soupy, no odor/staining/sheen.
	20	38-40	2 2 4 6	6	1.2	2.5		Dark olive-gray fine SAND, trace Silt, well sorted, loose, wet, no bedding apparent, no odor/staining/sheen.
40	21	40-42	4 2 2 2	4	1.1	2.1		Olive-gray fine to medium SAND, some coarse Sand and fine rounded Gravel, loose, wet, no odor/staining/sheen.
820	22	42-44	2 1 2 3	3	1.0	2.2		
	23	44-46	4 4 5 5	9	1.0	2.9		
45	24	46-48	NA 4 7 10	11	1.2	2.9		Medium brown fine to medium SAND, some coarse Sand and fine Gravel (generally rounded), trace Silt in pockets, wet, no odor/staining/sheen.
815	25	48-50	5 7 7 9	14	0.9	2.3		Olive well-sorted fine SAND, trace Silt, wet, no bedding, no odor/staining/sheen.
50	26	50-52	2 5 7 10	12	1.8	2.8		As above, trace coarse Sand and fine Gravel.
810	27	52-54	7 7 9 9	16	0.9	3.5		Olive well sorted fine SAND, trace Silt, medium dense, wet, no odor/staining/sheen.
55	28	54-56	5 9 10 10	19	0.9	2.5		Olive-gray fine SAND, some medium Sand, trace fine to medium Gravel, medium dense, wet, no odor/staining/sheen.



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engineers & scientists

Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/18/01	30'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: MW01-17D

Well Depth: 61.3 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
805	29	56-58	4 7 8 9	15	0.8	3.8		Olive fine SAND, some medium to coarse Sand and fine rounded Gravel (multicolored), wet, medium dense, no odor/staining/sheen.	Grade 0 Silica Sand (52.4' - 59.5' bgs)
	30	58-60	9 11 12 25	22	0.6	1.3			2" ID 0.010 slot PVC Screen (54.5' - 59.5' bgs)
60	31	60-61.3	30 34 44 50/0.3	78	0.3	NA		Olive-gray SILT and CLAY, some clasts of coarse Sand and fine subrounded Gravel, hard, cohesive, no odor/staining/sheen. [TILL]	Formation Collapse (59.5' - 61.3' bgs)
800									
65									
795									
70									
790									
75									

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

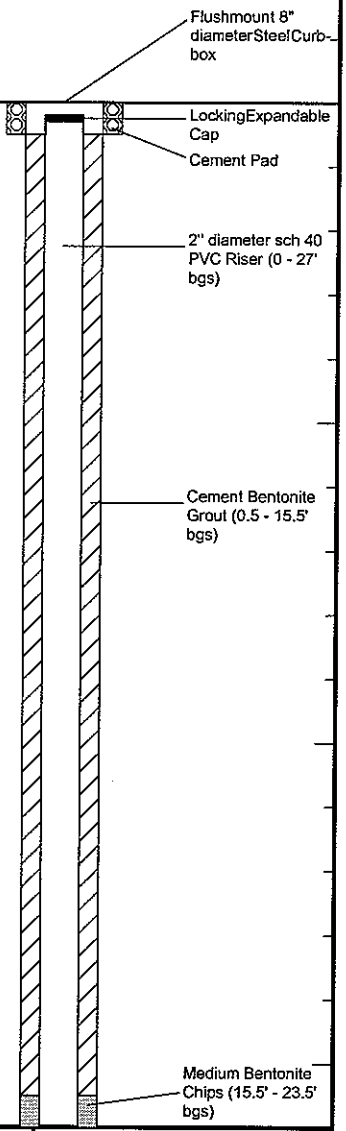
Date	Depth	Elev.
9/18/01	30'	

Depth measured from top of casing.

Date Start/Finish: 9/19/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 767034.1 **Easting:** 1006087.89 **Casing Elevation:** 861.32 ft. AMSL **Surface Elevation:** 861.65 ft. AMSL **Well Depth:** 37 ft. bgs **Descriptions By:** Michael K. Cobb	**Well ID:** **MW01-17S** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 860	NA	NA	NA	NA	NA	NA		No Sampling. Blind Drill with auger plug. For soil descriptions, see the boring log of adjacent well MW01-17D.
5 / 855								
10 / 850								
15								

Well Construction



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engineers & scientists

Remarks: Hole is 9' South of 17D.
Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/19/01	30'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

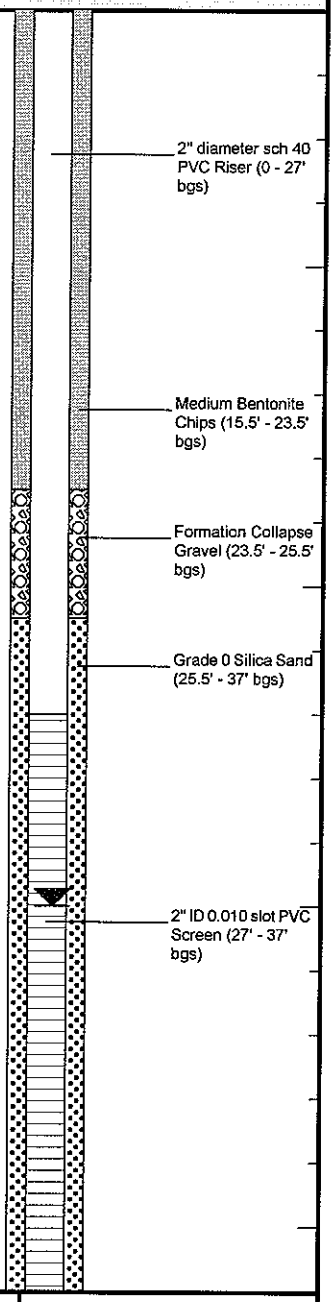
Site Location:
Court Street
Binghamton, NY

Well ID: MW01-17S

Well Depth: 37 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
845	NA	NA	NA	NA	NA	NA		No Sampling. Blind Drill with auger plug. For soil descriptions, see the boring log of adjacent well MW01-17D.
20								
840								
25								
835								
30								
830								
35								

Well Construction



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Remarks: Hole is 9' South of 17D.
Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/19/01	30'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: **MW01-17S**

Well Depth: 37 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
825	NA	NA	NA	NA	NA	NA		No Sampling. Blind Drill with auger plug. For soil descriptions, see the boring log of adjacent well MW01-17D.	Grade 0 Silica Sand (25.5' - 37' bgs); 2" ID 0.010 slot PVC Screen (27' - 37' bgs)
40									
820									
45									
815									
50									
810									
55									

BBL
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engineers & scientists

Remarks: Hole is 9' South of 17D.
Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

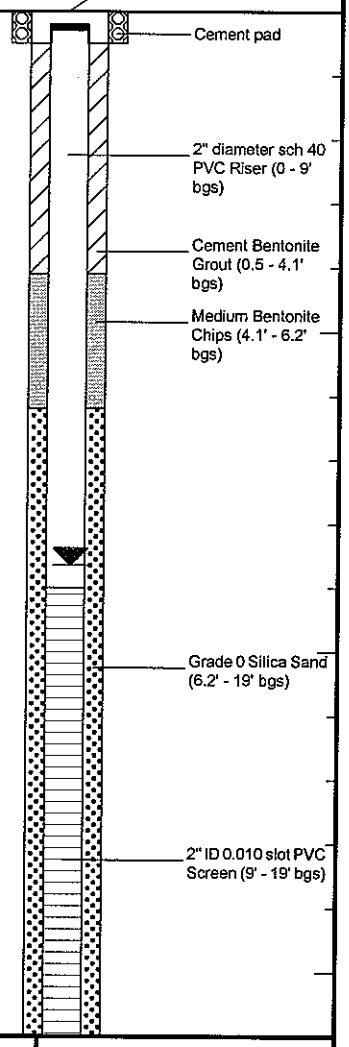
Water Level Data

Date	Depth	Elev.
9/19/01	30'	

Depth measured from top of casing.

Date Start/Finish: 8/16/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 766866.42 **Easting:** 1006781.15 **Casing Elevation:** 841.93 ft. AMSL **Surface Elevation:** 842.29 ft. AMSL **Well Depth:** 21 ft. bgs **Descriptions By:** Michael K. Cobb	**Well ID:** PZ01-02 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 842	NA	NA	NA	NA	NA	NA		No Sampling. Blind Drill with 4-1/4" HSA from 0 - 21' bgs. For soil descriptions, see the boring log of adjacent soil boring SB-107.
5 / 837								
10 / 832								
15 / 827								



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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/21/01	8.65'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: PZ01-02

Well Depth: 21 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
825 / 0	NA	NA	NA	NA	NA	NA		No Sampling. Blind Drill with 4-1/4" HSA from 0 - 21' bgs. For soil descriptions, see the boring log of adjacent soil boring SB-107.	Grade 0 Silica Sand (6.2' - 19' bgs); 2" ID 0.010 slot PVC Screen (9' - 19' bgs); Medium Bentonite Chips (19' - 21' bgs); 2' Sump (19' - 21' bgs)
20									
820									
25									
815									
30									
810									
35									

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

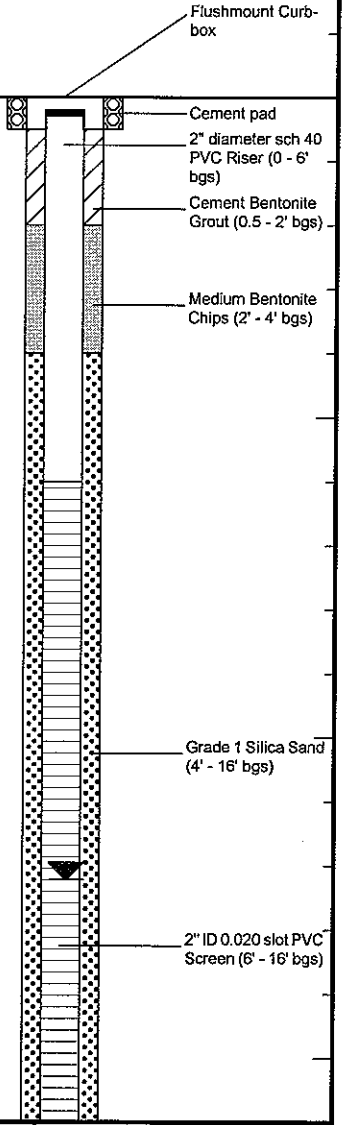
Date	Depth	Elev.
9/21/01	8.65'	

Depth measured from top of casing.

Date Start/Finish: 9/11/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 766894.74 **Easting:** 1006354.66 **Casing Elevation:** 845.17 ft. AMSL **Surface Elevation:** 845.49 ft. AMSL **Well Depth:** 16 ft. bgs **Descriptions By:** Michael K. Cobb	**Well ID:** PZ01-03 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 845	NA	0-4.5	NA	NA	NA	-		Auger through Black Top. Auger through loose Gravel FILL. Auger through brown fine to coarse Sand and Gravel FILL. Auger through slab. Infer Gas Holder 4 foundation.
5 / 840	1	4.5-6	6 3 3	9	0.3	-		Light olive fine to coarse SAND and fine to medium Gravel, little Silt, wet, no odor/staining/sheen.
	2	6-8	4 2 2 3	4	0.5	-		Light olive SILT and fine to coarse SAND, fine Gravel, cinder-like Fill, moist, no odor/staining/sheen.
	3	8-10	2 2 2 1	4	0.0	-		Trace Recovery: Light olive SILT, SAND, and GRAVEL, soupy, no odor/staining/sheen.
10 / 835	4	10-12 3-in SS	1 2 3 4	NA	2.0	-		Olive SILT and fine to coarse SAND, fine Gravel, various Fill materials (Coal, Porcelain), no odor/staining/sheen. White and black ASH and CINDERS, moist to wet, no odor/staining/sheen. Olive-brown SILT, blocky, horizontal bedding, MGP odor, trace black NAPL blebs.
	5	12-14	WOR 2 1 1	3	1.8	-		Olive SILT, black oily NAPL in fractures, partings throughout. As above, little fine to medium Sand, more NAPL and MGP odor. As above, large Gravel at 14.3' bgs, moist to wet, soft.
15 / 830	6	14-16	1 2 8 12	10	0.2	-		Light gray SILT, yellow-brown mottled, medium dense, blocky, black staining and black oily NAPL.

Well Construction



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engineers & scientists

Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
PID was not giving reliable headspace readings, apparent moisture interference.

Water Level Data

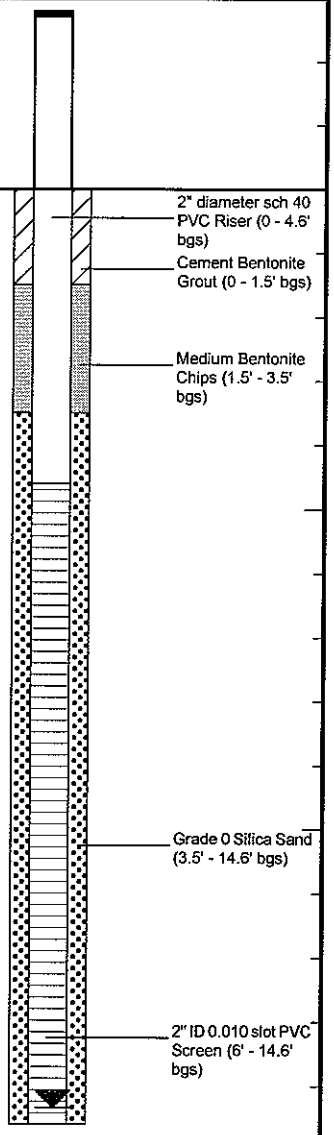
Date	Depth	Elev.
9/17/01	12.28'	

Depth measured from top of casing.

Date Start/Finish: 9/12/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. and 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 767003.98 **Easting:** 1006317.74 **Casing Elevation:** 848.32 ft. AMSL **Surface Elevation:** 845.33 ft. AMSL **Well Depth:** 16 ft. bgs **Descriptions By:** Michael K. Cobb	**Well ID:** PZ01-04/SB-203 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 845	1	0-2	2 5 8 6	13	1.3	8.1		Medium brown fine to coarse SAND, some fine to medium Gravel, Brick and crushed Rock fragments, moist, no odor/staining/sheen.
	2	2-4	8 24 16 14	40	1.0	2.2		As above, trace Coal fragments.
5 / 840	3	4-6	7 18 14 11	32	1.2	84.7		As above, faint MGP-like odor.
	4	6-8	11 11 8 6	19	0.5	313		Dark gray to black fine to medium SAND, some coarse Sand and fine Gravel, black stained, faint MGP-like odor, moist.
	5	8-10	1 1 1 1	2	1.2	234		Dark olive-gray SILT, little fine to medium Sand and fine to medium Gravel, black and amber NAPL, oily, MGP odor, soft, probable Fill.
10 / 835	6	10-12 3-in SS	1 1 1 2	NA	2.0	259		As above, NAPL in pores/partings, high organic content, no bedding, apparently reworked.
	7	12-14 3-in SS	2 1 2 2	NA	2.0	193.5		As above, heavily NAPL impacted, high organic content (roots and wood).
								As above, reworked SILT, Organics, NAPL impacted.
15 / 830	8	14-16 3-in SS	2 NA NA NA	NA	0.5	84.9		Refusal at 14.6' bgs. Infer concrete slab at 14.6' underlying sewer.

Well Construction



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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/17/01	14.28'	

Depth measured from top of casing.

Date Start/Finish: 9/13/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 767133.02 **Easting:** 1006247.31 **Casing Elevation:** 847.79 ft. AMSL **Surface Elevation:** 844.93 ft. AMSL **Well Depth:** 15.5 ft. bgs **Descriptions By:** Michael K. Cobb	**Well ID:** PZ01-05 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 845	NA	NA	NA	NA	NA	NA		Auger, no sampling from 0 - 6' bgs. As per driller, softer at 5' bgs.
5 / 840	1	6-8	5 6 3 7	9	1.2	33.4		Olive-gray SILT, little coarse Sand and fine Gravel, no odor/staining/sheen. Dark brown to black SILT, little medium to coarse Sand and fine Gravel, no odor/staining/sheen.
	2	8-10	3 5 3 2	8	0.2	NA		Poor Recovery. Little medium to coarse SAND, granite coarse Gravel lodged in shoe, no odor/staining/sheen.
10 / 835	3	10-12	1 1 1 1	2	1.1	40.5		Black stained SILT, little Clay, little Organic Matter, soft, little black to amber oily NAPL, wet.
	4	12-14	1 1 2 1	3	1.8	120.5		SILT and coarse SAND, fine Gravel (possible Sluff), very soft, soupy, black oily NAPL. Olive-gray blocky SILT, interbedded with black-brown organic-rich SILT, very soft, wet, black stained, trace NAPL, much less impacted than above.
15 / 830	5	14-15.5 3-in SS	3 8 14	NA	1.3	5.3		Gray blocky SILT, little yellow-brown mottling, no NAPL, trace staining, faint MGP-type odor, stiff to medium stiff.

Well Construction

- 2" diameter sch 40 PVC Riser (0 - 4.6' bgs)
- Cement Bentonite Grout (0 - 1.5' bgs)
- Medium Bentonite Chips (1.5' - 3.5' bgs)
- Grade 1 Silica Sand (3.5' - 14.6' bgs)
- 2" ID 0.020 slot PVC Screen (6' - 14.6' bgs)
- Backfill Bentonite (14.5' - 15.5' bgs)

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

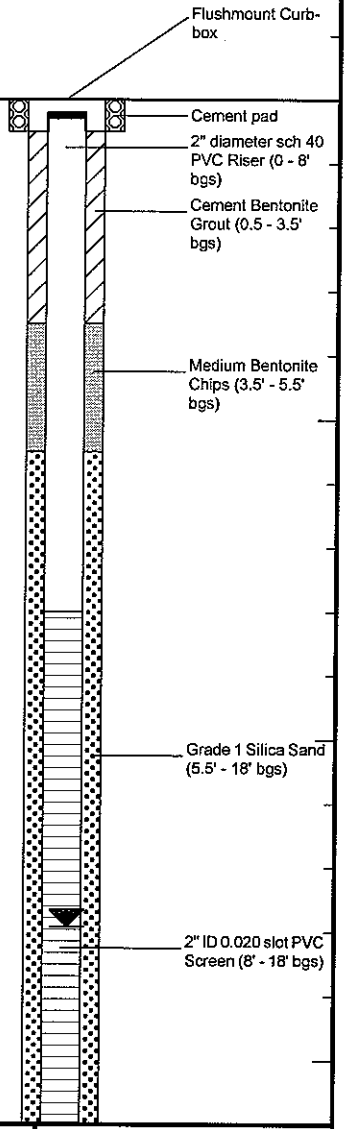
Date	Depth	Elev.
9/17/01	13.36'	

Depth measured from top of casing.

Date Start/Finish: 9/14/01 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon **Drilling Method:** Hollow Stem Auger **Sampler Size:** 2-in. & 3-in. Split Spoon **Auger Size:** 4.25-in. ID **Rig Type:** CME 55-Truck Mount Rig	**Northing:** 766804.95 **Easting:** 1006397.19 **Casing Elevation:** 844.54 ft. AMSL **Surface Elevation:** 845.11 ft. AMSL **Well Depth:** 19 ft. bgs **Descriptions By:** Michael K. Cobb	**Well ID:** PZ01-06 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 845	NA	0-14	NA	NA	NA	NA		Auger through Test Pit 208.
5 / 840								
10 / 835	1	14-14.6 3-in SS	24 50/0.1	NA	0.6	79.5		WOOD (timber), NAPL saturated, sheens and MGP-type odor.
15 / 830	NA	14.6-16.4	NA	NA	NA	NA		Auger through WOOD.

Well Construction



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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/17/01	12.83'	

Depth measured from top of casing.

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Well ID: PZ01-06

Well Depth: 19 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows per 6 Inches/ Minutes per foot	N - Value / RQD (%)	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well Construction
	NA	14.6-16.4	NA	NA	NA	NA		Auger through WOOD.	Grade 1 Silica Sand (5.5' - 18' bgs)
	2	16.4-18 3-in SS	12 10 18	NA	0.0	NA		No Recovery after 2 attempts. Thin amber NAPL on spoons, MGP odor.	2" ID 0.020 slot PVC Screen (8' - 18' bgs)
	3	18-19 3-in SS	3 5	NA	0.3	54		Medium to coarse GRAVEL, little fine to coarse Sand, soupy, rounded, little NAPL.	Medium Bentonite Chips (18' - 19' bgs)
20 825									
25 820									
30 815									
35 810									

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Water Level Data

Date	Depth	Elev.
9/17/01	12.83'	

Depth measured from top of casing.

Susquehanna River Borings

Date Start/Finish: 08/16/01 - 08/20/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. and 3-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766555.56 **Easting:** 1003696.01 **River Bottom Elevation:** 825.17 ft. AMSL **Borehole Depth:** 36.0 ft. bgs **Water Depth:** 5.6 ft. **Descriptions By:** W. Lilley A. Roy-Perreault	**Boring ID:** **SR-101** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 825	1	0-2 3-in SS	14 15 16 21	NA	0.7	1685		Dark gray to olive fine to coarse SAND and fine to coarse angular to rounded GRAVEL, little Silt, medium MGP-odor, little sheen.
	2	2-4 3-in SS	35 25 15 13	NA	0.6	713		Light olive rounded fine to coarse GRAVEL, some fine to coarse Sand, little Silt, medium dense to dense, no odor/staining/sheen.
5 / 820	3	4-6 3-in SS	13 12 13 16	NA	0.7	3.9		Dark brown fine to medium rounded GRAVEL, some fine to coarse Sand, little Silt, medium dense to dense. No odor, staining, nor sheen.
	4	6-8 3-in SS	5 6 13 17	NA	0.2	26.1		Mulicolored subrounded to rounded GRAVEL, some medium to coarse Sand, medium dense to dense, no odor/staining/sheen.
	5	8-10 3-in SS	21 25 35 40	NA	0.5	0.0		Light brown fine to medium subrounded to rounded GRAVEL and fine to coarse SAND, little Silt, dense to very dense, no odor/staining/sheen.
10 / 815	6	10-12	35 51 26 24	77	0.8	0.0		
	7	12-14	20 20 14 17	34	0.8	0.0		
15 / 810	8	14-16	31 20 17 21	37	0.8	0.0		Dark brown fine to medium SAND, little fine to medium Gravel and coarse Sand, dense to very dense, well sorted, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SR-101

Borehole Depth: 36.0 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	9	16-18	9 14 19 21	33	0.8	0.0		Dark brown well sorted fine to medium SAND, little fine to coarse Gravel and coarse Sand, medium dense to dense, no odor/staining/sheen.
	10	18-20	23 29 24 30	53	0.5	0.0		
20 805	11	20-22 3-in SS	18 34 38 42	NA	0.9	0.0		Brown fine to coarse GRAVEL and medium to coarse SAND, sorted, wet, no odor/staining/sheen.
	12	22-24 3-in SS	12 36 38 39	NA	1.0	0.0		
25 800	13	24-26 3-in SS	17 27 27 25	NA	1.2	0.0		
	14	26-28 3-in SS	18 32 28 29	NA	1.3	0.0		Gray brown fine GRAVEL, some medium to coarse Sand, trace Silt, no odor/staining/sheen.
	15	28-30 3-in SS	18 27 39 30	NA	1.1	0.0		Gray brown coarse SAND and fine to medium GRAVEL, no odor/staining/sheen.
30 795	16	30-32 3-in SS	25 23 60 32	NA	1.1	0.0		
	17	32-34 3-in SS	10 27 52 60	NA	1.0	0.0		Gray SILT, SAND and GRAVEL, trace Clay, no odor/staining/sheen. [TILL]
35 790	18	34-36	12 100/ 0.2	NA	0.2	0.0		

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Date Start/Finish: 08/21/01 - 08/24/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 3-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766654.32 **Easting:** 1006447.25 **River Bottom Elevation:** 826.87 ft. AMSL **Borehole Depth:** 36.0 ft. bgs **Water Depth:** 3.9 ft. **Descriptions By:** William Lilley	**Boring ID:** **SR-102** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 825	1	0-2 3-in SS	7 15 16 7	NA	0.6	0.0		Black to dark gray coarse SAND and GRAVEL, odors, staining, and sheen.
	2	2-4 3-in SS	13 12 7 7	NA	0.5	0.0		Dark gray coarse SAND, trace Shells, well sorted, no odor/staining/sheen.
5	3	4-6 3-in SS	5 7 5 5	NA	0.3	3.9		Gray coarse SAND, trace Silt and Shells, well sorted, no odor/staining/sheen.
820	4	6-8 3-in SS	5 10 6 8	NA	0.4	26.1		Gray GRAVEL and coarse SAND, no odor/staining/sheen.
	5	8-10 3-in SS	8 9 5 6	NA	0.5	0.0		Gray GRAVEL and coarse SAND, trace Silt, slight sheen, no odor/staining.
10	6	10-12 3-in SS	10 11 10 6	NA	0.2	0.0		
815	7	12-14 3-in SS	21 17 11 7	NA	0.4	0.0		
15	8	14-16 3-in SS	11 9 9 11	NA	0.9	0.0		Gray coarse SAND, some fine to medium Gravel, trace Silt, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SR-102

Borehole Depth: 36.0 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
810	9	16-18 3-in SS	7 9 9 8	NA	0.4	0.0		Gray coarse SAND, some fine to medium Gravel, well sorted, no odor/staining/sheen.
	10	18-20 3-in SS	14 21 12 18	NA	0.6	0.0		Gray fine to medium SAND, little fine Gravel, trace Silt, no odor/staining/sheen.
20	11	20-22 3-in SS	17 27 20 21	NA	1.7	0.0		Gray coarse SAND and fine GRAVEL, unsorted, wet, no odor/staining/sheen.
805	12	22-24 3-in SS	12 12 9 7	NA	0.6	0.0		Gray fine GRAVEL, some medum to coarse Sand, trace Silt, no odor/staining/sheen.
25	13	24-26 3-in SS	42 19 19 17	NA	1.8	0.0		
800	14	26-28 3-in SS	18 23 19 14	NA	0.3	0.0		
	15	28-30 3-in SS	43 23 16 14	NA	0.5	0.0		
30	16	30-32 3-in SS	11 13 17 18	NA	0.8	0.0		
795	17	32-34 3-in SS	11 19 21 18	NA	0.8	0.0		Olive gray SILT, SAND and GRAVEL, no odor/staining/sheen. [TILL]
35	18	34-36 3-in SS	60 44 50 51	NA	1.2	0.0		

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Date Start/Finish: 08/13/01 - 08/15/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. and 3-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766848.69 **Easting:** 1006839.89 **River Bottom Elevation:** 825.27 ft. AMSL **Borehole Depth:** 38.0 ft. bgs **Water Depth:** 5.5 ft. **Descriptions By:** Michael K. Cobb	**Boring ID: SR-103** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 825	1	0-2	2 1 1 1	2	0.2	1.2		Gray-brown fine to medium SAND, loose, no odor/staining/sheen.
	2	2-4 3-in SS	3 3 3 3	NA	1.0	1.3		Dark olive-gray fine to medium SAND, little rounded fine to medium Gravel, loose, wet, no odor/staining/sheen.
5 / 820	3	4-6	15 13 10 12	23	0.9	0.0		Dark olive gray fine to medium rounded to subangular GRAVEL, some fine to coarse Sand, medium dense, no odor/staining/sheen.
	4	6-8 3-in SS	10 10 9 12	NA	1.2	0.0		Multicolored rounded fine to medium GRAVEL, some dark olive-gray medium to coarse Sand, many rock types (mostly sandstone), no odor/staining/sheen.
	5	8-10 3-in SS	10 9 12 13	NA	1.1	1.1		
10 / 815	6	10-12	13 15 30 33	45	1.0	1.5		
	7	12-14	13 15 15 14	30	1.2	2.5		
15 / 810	8	14-16	5 5 6 10	11	1.0	3.5		Multicolored fine angular GRAVEL, some olive-gray fine to coarse Sand, no odor/staining/sheen.

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SR-103

Borehole Depth: 38.0 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	9	16-18	7 10 9 9	19	1.1	2.8		Multicolored fine angular GRAVEL, some olive-gray fine to coarse Sand, no odor/staining/sheen.
	10	18-20	6 8 10 10	18	0.7	0.0		
20 / 805	11	20-22 3-in SS	17 19 15 16	NA	0.9	0.3		Olive fine to coarse SAND and rounded to subrounded fine to medium GRAVEL, medium dense to dense, no odor/staining/sheen. Olive well sorted fine to medium SAND, medium dense, no odor/staining/sheen.
	12	22-24 3-in SS	5 5 5 7	NA	1.5	5.4		Olive well sorted fine to medium SAND, no odor/staining/sheen. Olive fine to medium SAND, some coarse Sand and fine to coarse Gravel, trace Silt, medium dense, no odor/staining/sheen.
25 / 800	13	24-26	5 5 6 7	11	2.0	0.0		Olive well sorted fine to medium SAND, no odor/staining/sheen. Olive fine to medium SAND, some coarse Sand and fine to coarse Gravel, trace Silt, no odor/staining/sheen.
	14	26-28 3-in SS	6 6 8 6	NA	0.4	0.0		Multicolored fine to medium GRAVEL, some fine to coarse Sand, little Silt, loose, medium dense, no odor/staining/sheen.
	15	28-30 3-in SS	20 15 12 12	NA	1.0	0.3		Multicolored fine to coarse GRAVEL, sorted, medium dense, no odor/staining/sheen.
30 / 795	16	30-32 3-in SS	14 10 10 12	NA	0.5	0.0		Multicolored fine to coarse subangular to rounded GRAVEL, some coarse Sand, medium dense, no odor/staining/sheen.
	17	32-34 3-in SS	15 36 25 20	NA	0.8	0.0		Multicolored fine to coarse subangular to rounded GRAVEL. Olive-gray GRAVEL and CLAY in tip of shoe, no odor/staining/sheen.
35 / 790	18	34-36 3-in SS	8 16 19 29	NA	0.1	1.3		Olive gray CLAY and SILT, some fine to coarse Sand and fine to medium Gravel, hard, no odor/staining/sheen. [TILL]

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Client:
New York State Electric and Gas

Site Location:
Court Street
Binghamton, NY

Boring ID: SR-103

Borehole Depth: 38.0 ft. bgs

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	19	36-38 3-in SS	20 40 41 52	81	0.2	0.0		Olive gray CLAY and SILT, some fine to coarse Sand and fine to medium Gravel, hard, no odor/staining/sheen. [TILL]
40 / 785								
45 / 780								
50 / 775								
55 / 770								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29

Date Start/Finish: 08/23/01 - 08/23/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766718.06 **Easting:** 1006537.24 **River Bottom Elevation:** 827.77 ft. AMSL **Borehole Depth:** 6.0 ft. bgs **Water Depth:** 3.0 ft. **Descriptions By:** William Lilley	**Boring ID:** **SR-104** **Client:** New York State Electrical and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
830								
0	1	0-2	15 12 12 11	24	0.7	0.0		Gray GRAVEL, little Sand, trace Silt, slight sheen, no odor/staining.
825	2	2-4	11 13 12 11	25	0.5	0.0		As above, no odor/staining/sheen.
5	3	4-6	16 10 5 6	15	0.7	0.0		Gray coarse SAND, little fine Gravel, no odor/staining/sheen.
820								
10								
815								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Date Start/Finish: 08/24/01 - 08/24/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766748.61 **Easting:** 1006617.7 **River Bottom Elevation:** 828.67 ft. AMSL **Borehole Depth:** 8.0 ft. bgs **Water Depth:** 2.1 ft. **Descriptions By:** William Lilley	**Boring ID:** **SR-105** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
830 / 0								
	1	0-2	5 14 21 19	35	0.5	15.0		Gray fine to coarse GRAVEL, little coarse Sand, trace Silt, slight sheen, no odor/staining/sheen.
825	2	2-4	18 17 15 7	32	0.7	4.0		Gray GRAVEL and SAND, trace Silt, slight sheen, no odor or staining.
5	3	4-6	7 7 6 2	13	0.1	0.0		Gray coarse SAND and fine GRAVEL, trace Silt, no odor/staining/sheen.
	4	6-8	15 10 8 9	19	0.3	0.0		
820								
10								
815								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Date Start/Finish: 08/27/01 - 08/27/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766762.9 **Easting:** 1006707.93 **River Bottom Elevation:** 824.67 ft. AMSL **Borehole Depth:** 6.0 ft. bgs **Water Depth:** 6.1 ft. **Descriptions By:** William Lilley	**Boring ID:** SR-106 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
825								
0	1	0-2	7 15 11 5	26	0.7	0.0		Gray GRAVEL, some coarse Sand, slight sheen, no odor or staining.
	2	2-4	4 8 5 6	13	0.4	0.0		Gray brown GRAVEL and SAND, trace Silt, no odor/staining/sheen.
820 5	3	4-6	5 1 1 1	2	0.3	0.0		Gray SAND, some fine to medium Gravel, trace Silt, no odor/staining/sheen.
815 10								
810 15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Date Start/Finish: 08/27/01 - 08/27/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766788.13 **Easting:** 1006790.99 **River Bottom Elevation:** 822.3 ft. AMSL **Borehole Depth:** 6.0 ft. bgs **Water Depth:** 8.5 ft. **Descriptions By:** William Lilley	**Boring ID:** SR-107 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
825								
0	1	0-2	7 13 15 18	28	1.0	0.0		Gray brown GRAVEL, some Sand, trace Silt, no odor/staining/sheen.
820	2	2-4	7 33 18 15	46	1.0	0.0		Gray brown coarse SAND and fine to medium GRAVEL, trace Silt, no odor/staining/sheen.
5	3	4-6	14 34 15 14	49	1.0	0.0		
815								
10								
810								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Date Start/Finish: 08/28/01 - 08/28/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766651.94 **Easting:** 1006547.79 **River Bottom Elevation:** 828.7 ft. AMSL **Borehole Depth:** 6.0 ft. bgs **Water Depth:** 2.1 ft. **Descriptions By:** William Lilley	**Boring ID:** **SR-108** **Client:** New York State Electrical and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
825 / 0	1	0-2	7 8 14 10	22	0.5	0.0		Gray brown GRAVEL, some medium to coarse Sand, trace Silt and Brick, slight sheen, no odor or staining.
820	2	2-4	27 16 10 6	26	0.3	0.0		Gray coarse SAND and fine GRAVEL, trace Silt, no odor/staining/sheen.
5	3	4-6	12 17 13 18	29	0.5	0.0		Gray medium to coarse SAND, some coarse Gravel, trace Silt, no odor/staining/sheen.
815								
10								
810								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs with duplicate and MS/MSD.

Date Start/Finish: 08/28/01 - 08/28/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766401.41 **Easting:** 1006233.58 **River Bottom Elevation:** 826.37 ft. AMSL **Borehole Depth:** 12.0 ft. bgs **Water Depth:** 4.4 ft. **Descriptions By:** William Lilley	**Boring ID:** **SR-109** **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 825	1	0-2	5 5 8 11	13	0.1	2.8		CONCRETE and GRAVEL, little Sand, slight sheen, no odor/staining/sheen.
	2	2-4	10 11 16 50	27	1.0	12.0		Gray to brown GRAVEL, some sand, trace Silt, slight sheen, no odor or staining.
5	3	4-6	28 24 9 7	33	1.1	21.0		Brown GRAVEL and SAND, trace Silt, no odor/staining/sheen.
820	4	6-8	13 14 22 18	36	0.9	35.0		Gray brown GRAVEL and SAND, trace Silt, no odor/staining/sheen.
	5	8-10	20 18 14 14	32	0.4	0.0		
10	6	10-12	31 23 19 15	44	1.1	0.0		Brown GRAVEL and SAND, trace Silt, no odor/staining/sheen.
815								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Samples collected from 0-2' & 4'-6' bgs.

Date Start/Finish: 8/29/01	**Northing:** 766381.63	**Boring ID:** SR-110	
Drilling Company: Atlantic Testing Laboratories	**Easting:** 1006251.2		
Driller's Name: Mark Childs	**River Bottom Elevation:** 822.27 ft. AMSL	**Client:** New York State Electric and Gas	
Drilling Method: Drive and Wash	**Borehole Depth:** 6.0 ft. bgs		
Sampler Size: 2-in. Split Spoon	**Water Depth:** 8.5 ft.	**Location:** Court Street	
Auger Size: 4-inch diameter		Binghamton, NY	
Rig Type: Barge-Mounted CME-55	**Descriptions By:** William Lilley		

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
825 / 0								
	1	0-2	9 5 4 4	13	0.3	0.0		Gray GRAVEL, little Sand, trace Cinders, Asphalt, and Bricks, no odor/staining/sheen.
820	2	2-4	47 61 44 41	105	0.3	0.0		Gray GRAVEL, some Sand, little brown Silt, no odor/staining/sheen.
5	3	4-6	7 32 33 27	65	0.9	0.0		Gray GRAVEL, some Sand, trace brown SILT, no odor/staining/sheen.
815								
10								
810								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Date Start/Finish: 08/29/01 - 08/29/01 **Drilling Company:** Atlantic Testing Laboratories **Driller's Name:** Mark Childs **Drilling Method:** Drive and Wash **Sampler Size:** 2-in. Split Spoon **Auger Size:** 4-inch diameter **Rig Type:** Barge-Mounted CME-55	**Northing:** 766416.09 **Easting:** 1006249.44 **River Bottom Elevation:** 825.77 ft. AMSL **Borehole Depth:** 6.0 ft. bgs **Water Depth:** 5.0 ft. **Descriptions By:** William Lilley	**Boring ID:** SR-111 **Client:** New York State Electric and Gas **Location:** Court Street Binghamton, NY

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 825	1	0-2	9 9 15 22	24	0.7	0.0		Gray Gravel, some Sand, trace Silt, slight sheen, no odor/staining/sheen.
	2	2-4	17 31 31 20	62	0.5	0.0		Gray brown coarse SAND, little fine Gravel, trace Silt, no odor/staining/sheen.
5 / 820	3	4-6	14 19 22 14	41	0.9	0.0		Gray brown GRAVEL and coarse SAND, trace Silt, no odor/staining/sheen.
10 / 815								
15 / 810								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Date Start/Finish: 08/30/01	**Northing:** 766410.22	**Boring ID:** **SR-112**	
Drilling Company: Atlantic Testing Laboratories	**Easting:** 1006223.77		
Driller's Name: Mark Childs	**River Bottom Elevation:** 827.77 ft. AMSL	**Client:** New York State Electric and Gas	
Drilling Method: Drive and Wash	**Borehole Depth:** 6.0 ft. bgs		
Sampler Size: 2-in. Split Spoon	**Water Depth:** 3.0 ft.	**Location:** Court Street	
Auger Size: 4-inch diameter		Binghamton, NY	
Rig Type: Barge-Mounted CME-55	**Descriptions By:** William Lilley		

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
830 / 0								
	1	0-2	10 13 10 25	23	0.3	0.0		Gray brown coarse GRAVEL, little Sand, trace Silt, no odor/staining/sheen.
825	2	2-4	19 16 21 21	37	0.5	0.0		Brown GRAVEL and SAND, trace Silt, no odor/staining/sheen.
5	3	4-6	22 21 18 28	39	0.2	0.0		Gray fine GRAVEL and coarse SAND, trace Silt, no odor/staining/sheen.
820								
10								
815								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Date Start/Finish: 08/30/01	**Northing:** 766385.69	**Boring ID:** **SR-113**
Drilling Company: Atlantic Testing Laboratories	**Easting:** 1006215.85	
Driller's Name: Mark Childs		**Client:** New York State Electric and Gas
Drilling Method: Drive and Wash	**River Bottom Elevation:** 827.17 ft. AMSL	
Sampler Size: 2-in. Split Spoon	**Borehole Depth:** 6.0 ft. bgs	
Auger Size: 4-inch diameter	**Water Depth:** 3.6 ft.	**Location:** Court Street, Binghamton, NY
Rig Type: Barge-Mounted CME-55		
	Descriptions By: William Lilley	

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
830 / 0	1	0-2	15, 16, 19, 22	35	0.1	0.0		Gray GRAVEL, little coarse Sand, trace Silt, no odor/staining/sheen.
825 / 5	2	2-4	18, 24, 24, 16	48	1.0	0.0		Brown GRAVEL, some fine to medium Sand, trace Silt, no odor/staining/sheen.
	3	4-6	15, 13, 14, 13	27	0.7	0.0		
820 / 10								
815 / 15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Date Start/Finish: 08/31/01	**Northing:** 766446.82	**Boring ID:** **SR-114**
Drilling Company: Atlantic Testing Laboratories	**Easting:** 1006281.67	
Driller's Name: Mark Childs		
Drilling Method: Drive and Wash	**River Bottom Elevation:** 827.17 ft. AMSL	**Client:** New York State Electric and Gas
Sampler Size: 2-in. Split Spoon	**Borehole Depth:** 6.0 ft. bgs	
Auger Size: 4-inch diameter	**Water Depth:** 3.6 ft.	
Rig Type: Barge-Mounted CME-55		**Location:** Court Street, Binghamton, NY
	Descriptions By: Michael K. Cobb	

Depth (ft. bgs) / Elevation (ft. AMSL)	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
830 / 0	1	0-2	2, 9, 7, 9	16	0.1	0.0		Olive gray fine angular GRAVEL and coarse SAND, little fine to medium Sand, no odor/staining/sheen.
825	2	2-4	19, 21, 24, 45	45	0.3	0.4		Olive fine GRAVEL and medium to coarse SAND, wet, no odor/staining/sheen.
5	3	4-6	32, 30, 16, 14	46	0.6	0.6		Olive gray fine GRAVEL and medium to coarse SAND, little medium to coarse Gravel and fine Sand, trace Silt, wet, no odor/staining/sheen.
820								
10								
815								
15								

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Remarks: Horiz. datum: NAD83-State Plane NY Central
Vert. datum: NGVD 29
Sample collected from 0-2' bgs.

Test Pits

TEST PIT LOG

BINGHAMTON TP–01

DEPTH (FT.)	STRATA CHANGE	South — DESCRIPTION — Northeast	COMMENTS
0			
		Brown fine to coarse SAND and GRAVEL (Fill), damp	
		⇒ 120° Bend in Pit	
1		Brown fine to coarse SAND and GRAVEL (fill), some slabs of concrete and wood branches, damp	PID ~ 0.0 ppm from 0 to 7.0 ft.
2			
3			
		Black stained soil, moist	
4			
5		Brown SAND and SILT, some gravel, moist	Slight coal tar odor
			Notes:
6			– PID readings obtained from excavation piles and above open test pits.
			– Bend in trench was to determine presence of foundation. No foundation was found.
7		Slight oil sheen on water surface Bottom of test pit at 7.0 ft.	
8		Distance from south end of pit	

2 4 6 8 10 12 14 16 18 20

GROUND SURFACE ELEVATION: 844.9
DATE EXCAVATED: 5/11/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

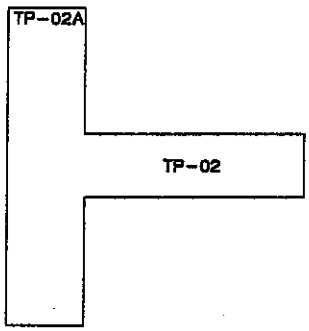
DEPTH OF TEST PIT	7.0 ft
DEPTH TO GROUND WATER	7.0 ft
TEST PIT NO.	TP–01

TEST PIT LOG

BINGHAMTON TP–02

DEPTH (FT.)	STRATA CHANGE	West DESCRIPTION East	COMMENTS
0		Brown SAND and GRAVEL, some to little brick and concrete slabs (Fill), damp	PID – 0.0 ppm from 0.0 to 3.5 ft.
1			
2			
3			
4		Bottom of test pit at 3.5 ft.	

Test pits 2 & 2A orientation



Notes:

- Total length of pit is 10 ft.
- Test Pit TP–02A was added to the end of TP–02 to search for foundation or other structures.
- PID readings obtained from excavation piles and open test pit.

GROUND SURFACE ELEVATION: 844.9
DATE EXCAVATED: 5/11/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 3.5 ft.
Depth to Ground Water: Not Encountered

Test Pit No. TP–02

TEST PIT LOG

BINGHAMTON TP–02A

DEPTH (FT.)	STRATA CHANGE	North DESCRIPTION South	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL, some to little Brick and concrete slabs (Fill), damp	PID – 0.0 ppm from 0.0 to 4.5 ft.
– 1			
– 2			
– 3			
– 4		Black stained COAL, SLAG, and fine to medium GRAVEL, moist	
– 5			PID – 4.1 ppm from 4.5 to 6.5 ft.
– 6	(6.5 ft) V	Oil sheen on water surface Grades to saturated with coal tar residue, oil sheen in soil Bottom of test pit at 6.5 ft.	
– 7			Notes: – Test Pit TP–02A is 11 ft. in length. – TP–02A was added to the end of TP–02 to search for foundation or other structures. – PID readings obtained from excavation piles and open test pit. – See diagram on TP–02 Test Pit Log. – Sample #BSVXTPXX02 was obtained from 6.0 ft. and submitted to the laboratory for chemical characterization.

GROUND SURFACE ELEVATION: 844.5
DATE EXCAVATED: 5/11/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit:	6.5 ft.
Depth to Ground Water:	6.5 ft.

Test Pit No. TP–02A

TEST PIT LOG

BINGHAMTON TP–03

DEPTH (FT.)	STRATA CHANGE	North DESCRIPTION South	COMMENTS
– 0		Brown/Grey fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 5.5 ft.
– 1			
– 2			
		Grades to black stained with SLAG, some coal and brick fragments, some orange oxidation staining, moist from 2.5 to 5.5 ft.	
– 3		* retrieved a metal sign "Columbia Gas System, Gas Works"	
– 4			
– 5			
		Black SAND and SILT, little gravel, trace slag sheen in soil, saturated with coal tar residue some dry, brittle pieces of coal tar residue, moist, Oil sheen on water surface	– 21.1 ppm from 6.0 to 6.5 ft.
– 6			
	(6.5)	Bottom of test pit at 6.5 ft.	Notes:
– 7			– Test Pit TP–03 is 14 ft. in length
			– PID readings obtained from excavation piles and open test pit.

GROUND SURFACE ELEVATION: 844.7
DATE EXCAVATED: 5/11/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 6.5 ft.
Depth to Ground Water: 6.5 ft.

Test Pit No. TP–03

TEST PIT LOG

BINGHAMTON TP–04

DEPTH (FT.)	STRATA CHANGE	North DESCRIPTION South	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 4.5 ft.
– 1			
– 2		Grades to black stained with COAL and SLAG from 1.5 to 6.5 ft.	
– 3			
– 4		Coal tar residue from 4.5 ft to 6.5 ft.	– 4.1 ppm from 4.5 to 6.25 ft.
– 5			
– 6	(6.5 ft) V	Some red oxidation staining from 6.0 to 6.5 ft., saturated with amber coal tar residue. Oil sheen on water surface.	– 13.5 ppm from 6.25 to 6.5 ft.
– 7		Bottom of pit 6.5 ft.	Notes: – Test Pit TP–04 is 12 ft. in length – PID readings obtained from excavation piles and open test pit.

GROUND SURFACE ELEVATION: 844.7
DATE EXCAVATED: 5/11/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 6.5 ft.
Depth to Ground Water: 6.5 ft.

Test Pit No. TP–04

TEST PIT LOG

BINGHAMTON TP–05

DEPTH (FT.)	STRATA CHANGE	Northeast DESCRIPTION Southwest	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 2 ft.
– 1			
– 2		Grades to black stained with BRICK, and WOOD BOARDS Strong coal tar odor from 2.0 to 6.0 ft.	– 177.0 ppm at 2.0 to 2.5 ft. – 0.0 ppm at 2.5 to 6.0 ft.
– 3			
– 4			
– 5			
– 6	(6.0 ft)	Brick and wood boards covered w/coal tar residue at 6.0 feet Bottom of test pit at 6.0 feet	
– 7			

Notes:

- Test Pit TP–05 is 12 ft. in length
- PID readings obtained from excavation piles and open test pit.
- Sample #BSVXTPXX05 was obtained from 6.0 ft and submitted to the laboratory for chemical characterization.

GROUND SURFACE ELEVATION: 844.6
DATE EXCAVATED: 5/11/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 6.0 ft.
Depth to Ground Water: 6.0 ft.

Test Pit No. TP–05

TEST PIT LOG

BINGHAMTON TP–06 & 06A

DEPTH (FT.)	STRATA CHANGE	Southwest — DESCRIPTION — Northeast	COMMENTS
0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0 to 2.0 ft.
1			
2		Grade to black stained, with some brick fragments, concrete, wood boards	– 14.5 ppm for 2.0 to 4.5 ft.
		Thick "gooey" coal tar from 2.0 to 3.0 ft.	– 242.0 ppm from excavation pile from 2.0 to 4.5 ft.
3			
4		Bottom of TP–06A at 4.0 ft.	0.0 ppm from 4.5 to 7.0 ft.
5		Black fine to coarse GRAVEL, some sand and silt, damp	
6			Notes:
			– TP–06A was added northwest side of TP–06 to evaluate extent and limits of coal tar residue.
7	(7.0 ft)	Bottom of TP–06 at 7.0 ft.	– PID readings obtained from excavation piles and upon test pits.
			– Drager Tube obtained from excavation piles at 4 ft were nondetect for Hydrogen Cyanide and Hydrogen Sulfide.

5 10 15 25 30 35

GROUND SURFACE ELEVATION: 845.4
DATE EXCAVATED: 5/12/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

DEPTH OF TEST PIT	7.0 ft
DEPTH TO GROUND WATER	7.0 ft
TEST PIT NO.	TP–06 & TP–06A

TEST PIT LOG

BINGHAMTON TP–07

DEPTH (FT.)	STRATA CHANGE	South DESCRIPTION North	COMMENTS
– 0		Brown fine to coarse SAND and fine to coarse GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 3.5 ft.
– 1		Several 4 ft by 3 ft concrete slabs with rerod	
– 2			
– 3		Grades with BRICKS, and WOOD BOARDS (Bricks in layers)	
		Black stained from 3.0 to 5.0 ft.	648 ppm from 3.5 to 5.2 ft
– 4			
– 5	(5.0 ft)	Matallic luster and sheen on water surface and in soil Strong coal tar odor Bottom of Test Pit at 5.2 ft.	

Notes:

- Test Pit TP–07 is 12 ft. in length
- PID readings obtained from excavation piles and open test pit.
- Sample #BSVXTPXX07 was obtained from 5.0 ft and submitted to the laboratory for chemical characterization.

GROUND SURFACE ELEVATION: 845.0
DATE EXCAVATED: 5/12/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 5.2 ft.
Depth to Ground Water: 5.0 ft.

Test Pit No. TP–07

TEST PIT LOG

BINGHAMTON TP–08

DEPTH (FT.)	STRATA CHANGE	North DESCRIPTION South
0		Brown coarse to fine SAND and GRAVEL (Fill), damp
1		
2		
3		Some concrete pieces with rerod, 1.5" dia. orange plastic pipe
4		Concrete at 3.5 ft. possible foundation of oil tank 5 / Brown fine to coarse SAND and SILT, damp
5		Bottom of concrete at 4.5 ft. / some brick
6		Black stained fine to coarse SAND and fine to coarse GRAVEL, some brick, moist
7		Black thick "gooey" coal tar residue, Naphtha odor
8	(8.0 ft) V	Oil sheen on water surface at 8.0 ft. Bottom of test pit at 8.0 ft.

2 4 6 8 10 12 14 16 18 20

COMMENTS

PID – 0.0 ppm from 0 to 8.0 ft.

Notes:

- Test Pit TP–08 is 21 ft. in length.
- PID readings obtained from excavation piles and upon test pits.

GROUND SURFACE ELEVATION: 845.7
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

DEPTH OF TEST PIT 8.0 ft
DEPTH TO GROUND WATER 8.0 ft

TEST PIT NO. TP–08

TEST PIT LOG

BINGHAMTON TP–09

DEPTH (FT.)	STRATA CHANGE	Northwest DESCRIPTION Southeast	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 5.5 ft.
– 1		– some 1" diameter orange plastic pipe	
– 2			
– 3			
– 4		Grades to black stained with some wood boards, little brick	
– 5		Oil Sheen on water surface and in soil Thick "gooey" coal tar residue with metallic luster	
	(5.5 ft)	Bottom of Test Pit at 5.5 ft.	
– 6			

Notes:

- Test Pit TP–9 is 12 ft. in length
- PID readings obtained from excavation piles and open test pit.
- PID reading for ambient air 17.5 ppm directly over excavation pile 0.0 ppm at 5.0 ft from excavation pile.

GROUND SURFACE ELEVATION: 845.6 PROJECT: NYSEG Binghamton Court Street

DATE EXCAVATED: 5/12/93 PROJECT NO.: 130.08

CLASSIFIED BY: TRO & VAD

EQUIPMENT USED: John Deere Backhoe

SUMMARY

Depth of Test Pit: 5.5 ft.

Depth to Ground Water: 5.5 ft.

Test Pit No. TP–9

TEST PIT LOG

BINGHAMTON TP–10

DEPTH (FT.)	STRATA CHANGE	South DESCRIPTION North	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 5 ft.
– 1			
– 2		Grades to black stained, with some BRICK, some wood boards from 2.0 to 5.0 ft.	
– 3			
– 4			
		Coal tar odor and moist at 4.5 ft.	
– 5	(5.0 ft)	Oil sheen on water surface	
		Bottom of test pit at 5.0 ft.	
– 6			

Notes:

– Test Pit TP–10 is 10 ft. in length

– PID readings obtained from excavation piles and open test pit. Ambient air PID reading 3.5 ppm at pile

GROUND SURFACE ELEVATION: 844.7
DATE EXCAVATED: 5/12/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 5.0 ft.
Depth to Ground Water: 5.0 ft.

Test Pit No. TP–10

TEST PIT LOG

BINGHAMTON TP–11

DEPTH (FT.)	STRATA CHANGE	South DESCRIPTION North	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL, little concrete with rerod, little wood, damp	PID – 0.0 ppm from 0.0 to 4.0 ft.
– 1			
– 2		– some black staining in soil	
– 3		– red brick in layers to 4 ft.	
– 4	(4.0 ft)	slight coal tar odor slight oil sheen on water surface Bottom of test pit at 4.0 ft.	

Notes:

– Test Pit TP–11 is 10 ft. in length

– PID readings obtained from excavation piles and open test pit.

GROUND SURFACE ELEVATION: 844.4
DATE EXCAVATED: 5/12/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 4.0 ft.
Depth to Ground Water: 4.0 ft.

Test Pit No. TP–11

TEST PIT LOG

BINGHAMTON TP–12

DEPTH (FT.)	STRATA CHANGE	South — DESCRIPTION — North
0		Brown fine to coarse SAND and GRAVEL, some red brick, (Fill), damp
1		
2		
3		Grades to dark brown with BRICK, some black staining, coal tar odor from 2.5 to 7.0 ft.
4		Red brick & mortar foundation
5		
6		
7		Slight coal tar odor at 7.0 ft
(7.0 ft)		Slight oil sheen on water surface
		Bottom of test pit at 7.0 ft.
8		

1 2 3 4 5 6 7 8 9 10 11 12

COMMENTS

PID – 0.0 ppm from 0 to 7.0 ft.

General location: Ammonia Well

Notes:

- Test Pit TP–12 is 12 ft. in length.
- PID readings obtained from excavation piles and upon test pits.

GROUND SURFACE ELEVATION: 844.7
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO. 130.08

SUMMARY

DEPTH OF TEST PIT 7.0 ft
DEPTH TO GROUND WAT 7.0 ft

TEST PIT NO. TP–12

TEST PIT LOG

BINGHAMTON TP–13

DEPTH (FT.)	STRATA CHANGE	West — DESCRIPTION — East
0		Brown fine to coarse SAND and GRAVEL (Fill), damp
1		– little orange plastic pipe
2		
3		Concrete foundation Gas holder No. 4
		End of concrete
		Bottom of test pit at 2.5 ft.
4		

2 4 6 8 10 12 14 16 18 20 22 24 26 28

COMMENTS

PID – 0.0 ppm from 0 to 2.5 ft.

General location: Gas holder No. 4

Notes:

- Test Pit TP–13 is 26 ft. in length.
- Located edge of foundation.
- Test pit could not be excavated to depth due to close proximity of cars.

GROUND SURFACE ELEVATION: 844.9
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

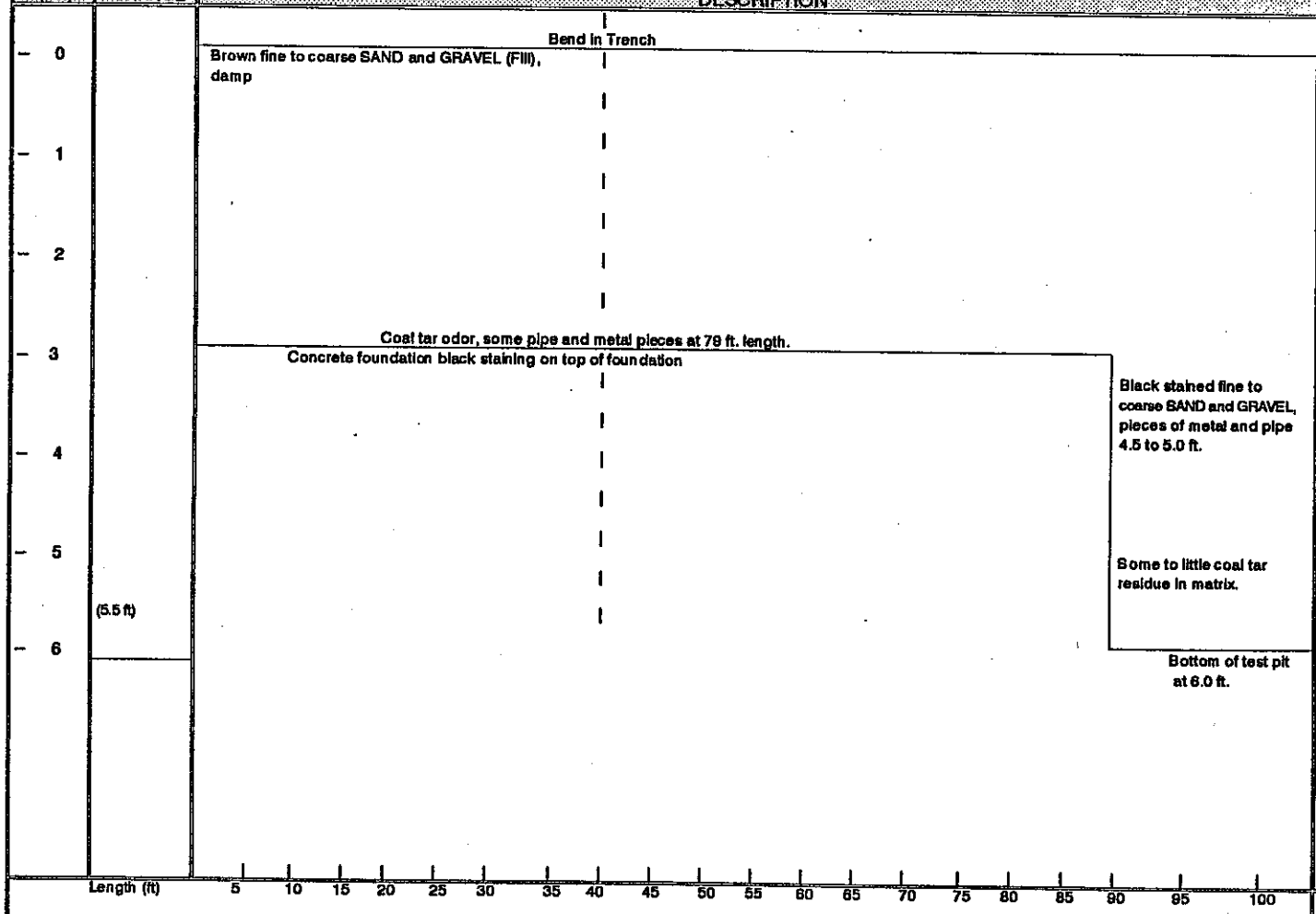
SUMMARY

DEPTH OF TEST PIT 2.5 ft
DEPTH TO GROUND WATER NA

TEST PIT NO. TP–13

TEST PIT LOG

BINGHAMTON TP–14



COMMENTS

PID – 0.0 ppm from 0 to 6.0 ft.

General location: Gas holder No. 4

Notes:

- PID reading obtained from excavation piles and above open test pit.
- Aerial view on Figure 4.
- Sample #BSVXTPXX14 obtained from north end at 6.0 ft. and submitted to the laboratory for chemical characterization.

GROUND SURFACE ELEVATION: 845.0
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

DEPTH OF TEST PIT	6.0 ft
DEPTH TO GROUND WATER	5.5 ft

TEST PIT NO. TP–14

TEST PIT LOG

BINGHAMTON TP–15

DEPTH (FT.)	STRATA CHANGE	Northwest — DESCRIPTION — Southeast
0		Brown fine to coarse SAND and GRAVEL (Fill), damp
1		Black stained from 1.5 to 2.5 feet
2		Brick Foundation
3		Ash, some coal, gravel, little wood, damp 4" diameter pipe at 3.0 filled with coal tar residue (PID > 2500)
4		
5		Black, thick, coal tar residue, moist
6	(6.0 ft)	Black fine to coarse SAND and GRAVEL, wet saturated with coal tar residue and oil globules, viscous Oil sheen on water surface Bottom of test trench at 6.0 ft.

1 2 3 4 5 6 7 8 9 10 11 12 13

General location: Gas holder No. 2

COMMENTS

PID – 0.0 ppm from 0 to 6.0 ft.

– Slight Coal tar odor

Notes:

– Test Pit TP15 is 13 ft. in length.

– PID reading obtained from excavation piles and above open test pit.

– Sample #BSVXTPXX15 was obtained from 6 ft. and submitted to the laboratory for chemical characterization.

GROUND SURFACE ELEVATION: 844.7
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

DEPTH OF TEST PIT 6.0 ft
DEPTH TO GROUND WATER 6.0 ft

TEST PIT NO. TP–15

TEST PIT LOG

BINGHAMTON TP–16

DEPTH (FT.)	STRATA CHANGE	South DESCRIPTION North	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 5.5 ft.
– 1			
– 2		Grades with BRICKS, little wood boards, some to little ash, some black staining from 1.5 to 5.5 feet	
– 3			
– 4			
– 5			
	(5.5 ft)	Oil sheen on top of water surface Bottom of test pit at 5.5 ft.	
– 6			

Notes:

– Test Pit TP–16 is 12 ft. in length

– PID readings obtained from excavation piles and open test pit.

GROUND SURFACE ELEVATION: 844.7 PROJECT: NYSEG Binghamton Court Street
DATE EXCAVATED: 5/13/93 PROJECT NO.: 130.08
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

General location: Gas holder No. 2

SUMMARY

Depth of Test Pit: 5.5 ft.
Depth to Ground Water: 5.5 ft.

Test Pit No. TP–16

TEST PIT LOG

BINGHAMTON TP–17

DEPTH (FT.)	STRATA CHANGE	North DESCRIPTION South	COMMENTS
		Grass	
– 0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 8.0 ft.
– 1			
		Black stained from 1.5 to 7.0 feet –removed concrete slab (6" x 2.5' long)	
– 2			
		Black fine to coarse SAND, fine to coarse GRAVEL, and ASH, little plastic cable	
– 3			
– 4			
– 5			
– 6			
			Notes:
– 7		Black to brown SILT and CLAY, moist.	– Test Pit TP–17 is 12 ft. in length.
			– PID readings obtained from excavation piles and open test pit.
– 8	(8.0 ft.)	Oil sheen on water surface.	
		Bottom of test pit at 8.0	
– 9			

GROUND SURFACE ELEVATION: 843.8
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG, Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit:	8.0 ft.
Depth to Ground Water:	8.0 ft.

Test Pit No. TP–17

TEST PIT LOG

BINGHAMTON TP–18

DEPTH (FT.)	STRATA CHANGE	South DESCRIPTION North	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 8.0 ft.
– 1			
		grades to black stained with SLAG and ASH from 1.5 to 6.0 feet.	
– 2			
– 3			
– 4			
– 5			– Slight coal tar odor
– 6		Gray CLAY, some black staining, moist	Notes:
			– Test Pit TP–18 is 10.0 ft. in length.
– 7		Coal tar residue in clay	– PID readings obtained from excavation piles and open test pit.
	(7.5 ft)	Oil sheen on water surface.	
– 8		Bottom of test pit at 8.0 ft.	
– 9			

GROUND SURFACE ELEVATION: 844.6
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG, Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit:	8.0 ft.
Depth to Ground Water:	8.0 ft.

Test Pit No. TP–18

TEST PIT LOG

BINGHAMTON TP–19

DEPTH (FT.)	STRATA CHANGE	North DESCRIPTION South	COMMENTS
– 0		Brown fine to coarse SAND and GRAVEL, little brick, metal pipes (Fill), damp	PID – 0.0 ppm from 0.0 to 8.5 ft.
– 1			
– 2		Black stained from 2.0 to 7.0 feet, some concrete blocks	
– 3			
– 4			
– 5		some black stained wood timbers	
– 6			
– 7			Notes: – Test Pit TP–19 is 11 ft. in length. – PID readings obtained from excavation piles and open test pit.
– 8	(8.0 ft.)	Gray CLAY, some black staining, moist, slight coal tar odor Bottom of test pit at 8.5 ft.	
– 9			

GROUND SURFACE ELEVATION: 843.8
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG, Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 8.5 ft.
Depth to Ground Water: 8.0 ft.

Test Pit No. TP–19

TEST PIT LOG

BINGHAMTON TP–20

DEPTH (FT.)	STRATA CHANGE	North DESCRIPTION South	COMMENTS
0		Brown fine to coarse SAND and GRAVEL (Fill), damp	PID – 0.0 ppm from 0.0 to 8.5 ft.
1		Black stained from 1.5 to 7.0 feet	
2		Dark Brown to Black fine to coarse SAND, fine to coarse GRAVEL, and ASH, little plastic cable	
3			
4			
5			
6			Notes:
7		Reddish brown SILT little clay, damp, slightly plastic	– Test Pit TP–20 is 12 ft. in length.
8			– PID readings obtained from excavation piles and open test pit.
	(8.5 ft.)	Bottom of test pit at 8.5	
9			

GROUND SURFACE ELEVATION: 843.6
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG, Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 8.5 ft.
Depth to Ground Water: 8.5 ft.

Test Pit No. TP–20

TEST PIT LOG

BINGHAMTON TP–21

DEPTH (FT.)	STRATA CHANGE	North DESCRIPTION South	COMMENTS
0		Brown fine to coarse SAND and GRAVEL (Fill)	PID – 0.0 ppm from 0.0 to 8.0 ft.
1			
2			
		Brown SILT and CLAY, moist	
3			
4			
5			
6			
			Notes:
7			– Test Pit TP–21 is 10.0 ft. in length.
			– PID readings obtained from excavation piles and open test pit.
8	(8.0 ft)	Brown to Black SILT and CLAY, some gravel, moist	– Sample #BSVXTPXX21 and duplicate sample #BSVXTPXX41 obtained from 8 ft and submitted to the laboratory for chemical characterization.
		Bottom of test pit at 8.0 ft.	
9			

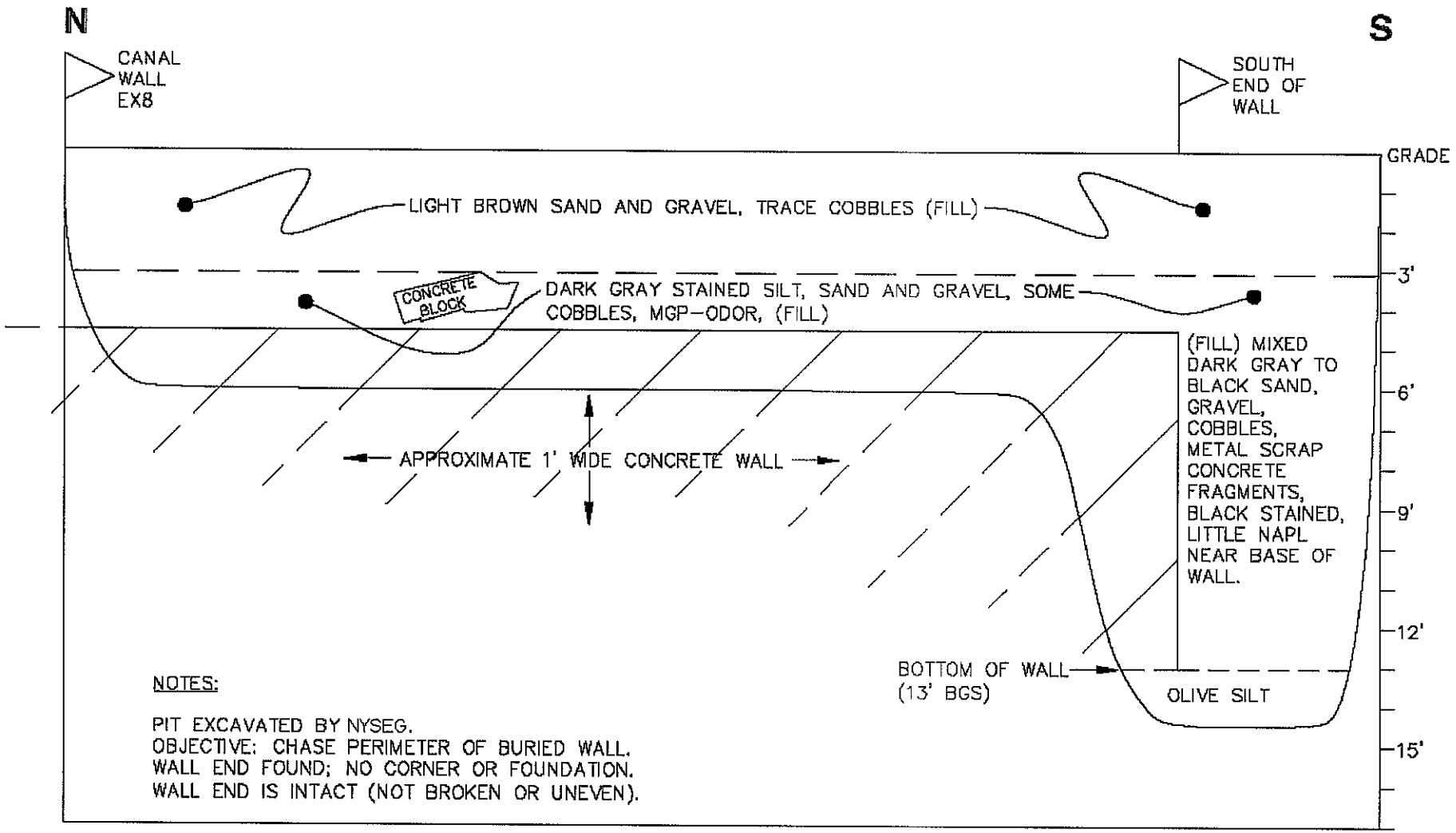
GROUND SURFACE ELEVATION: 844.5
DATE EXCAVATED: 5/13/93
CLASSIFIED BY: TRO & VAD
EQUIPMENT USED: John Deere Backhoe

PROJECT: NYSEG, Binghamton Court Street
PROJECT NO.: 130.08

SUMMARY

Depth of Test Pit: 8.0 ft.
Depth to Ground Water: 8.0 ft.

Test Pit No. TP–21



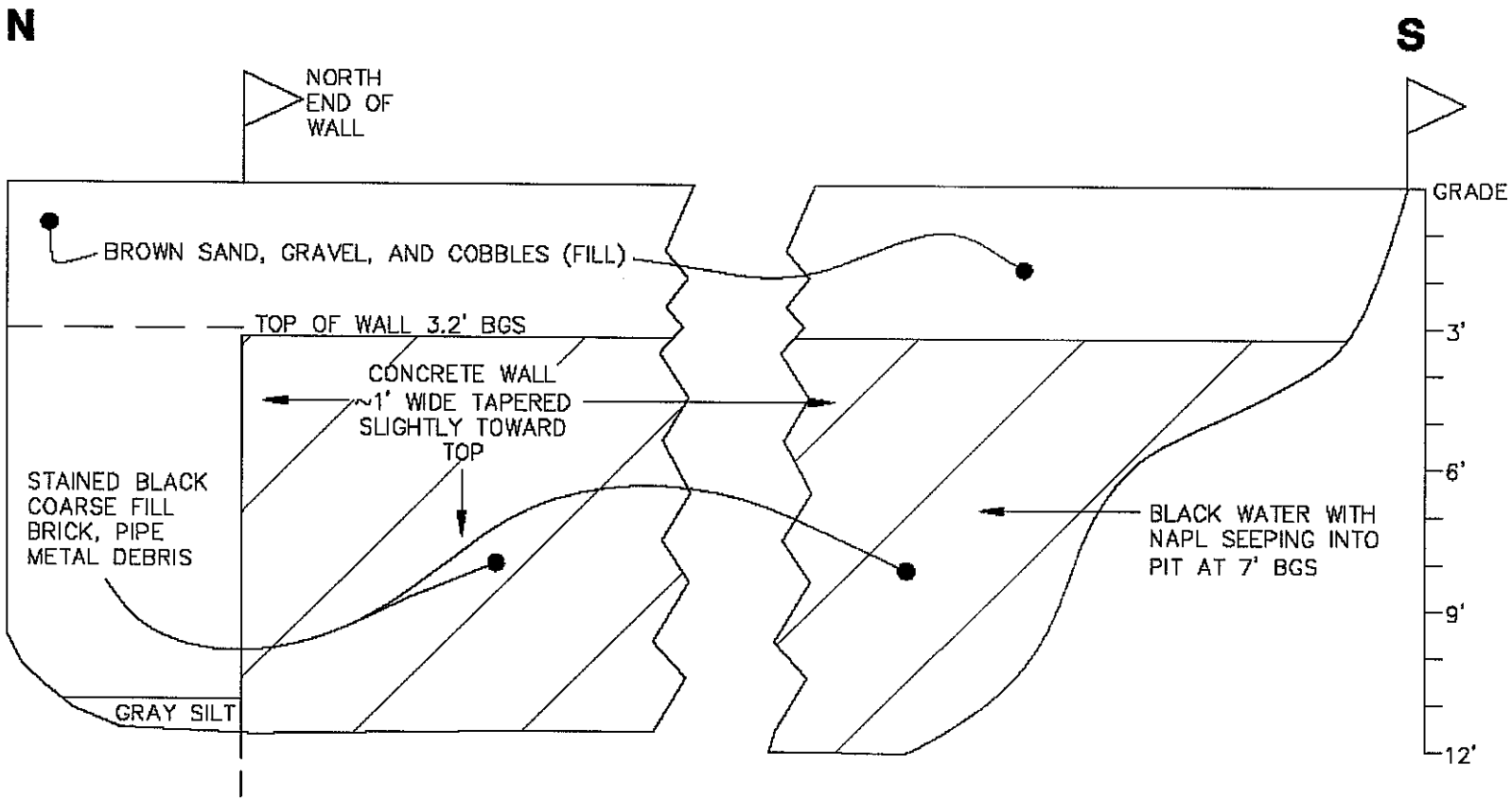
NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK
PHASE II SRI

TEST PIT 201

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE

X: 13036X00.DWG
P: PAGESET/PLT-AL
1/8/02 SYR-54-PGL
13036003/13036V01.DWG



NOTES:

OBJECTIVE: EXTEND KNOWN TRACE OF BURIED WALL NORTH FROM PIN FLAG MARKING THE NORTHERN END OF PRIOR NYSEG IRM TRENCH.
END OF WALL FOUND; NO BOTTOM (>11.5' BGS); NO CORNER FOUND

0 4' 8'

GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK

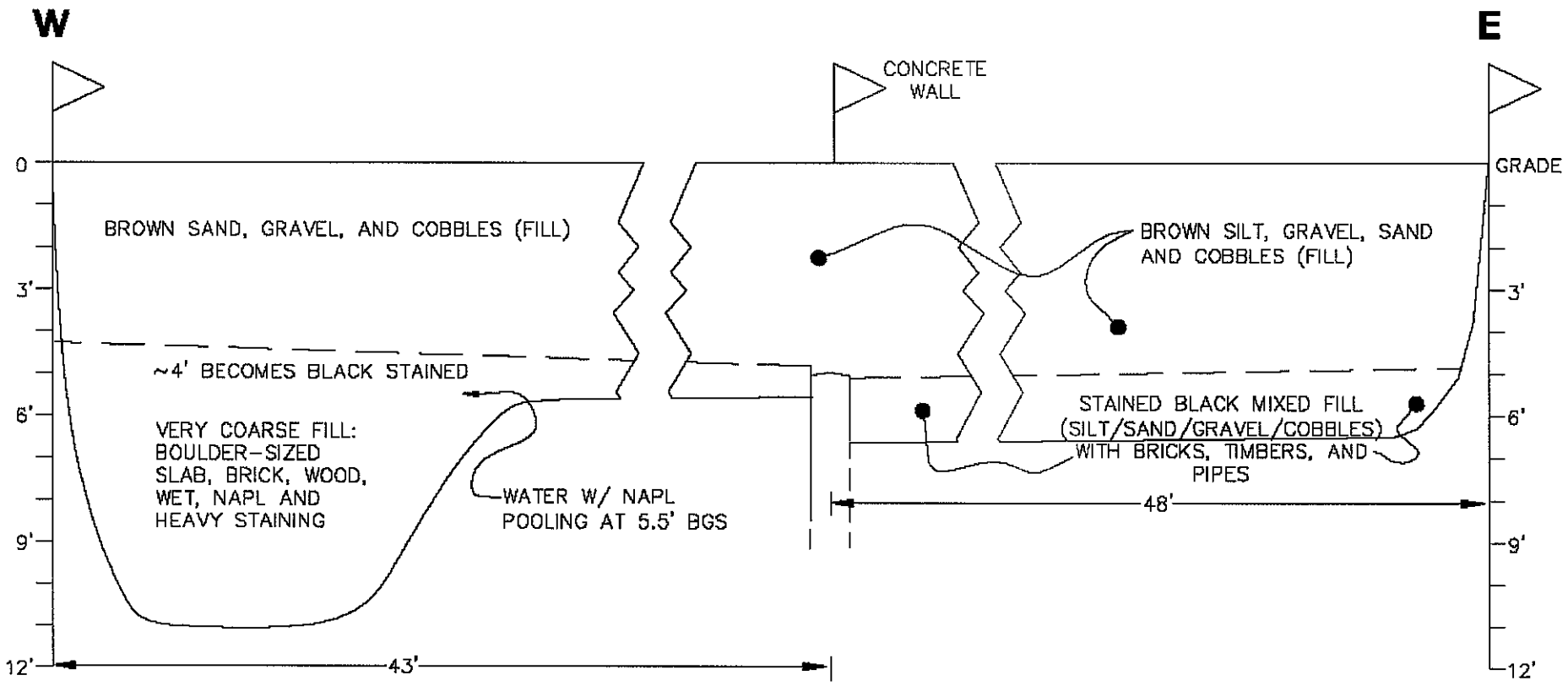
PHASE II SRI

TEST PIT 202

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE

X: 13038X00.DWG
P: PAGESET/PLT-AL
1/8/02 SYR-54-PGL
13038003/13038V02.DWG



NOTES:

EXCAVATED IN TWO EPISODES (FROM WALL EAST ON 9/11, FROM WALL WEST ON 9/13).

OBJECTIVE: TO FIND POSSIBLE 2ND WALL EXPECTED PARALLEL TO BURIED WALL, AS SEEN IN TEST PITS 201 AND 202.
NO 2ND WALL FOUND.



GRAPHIC SCALE

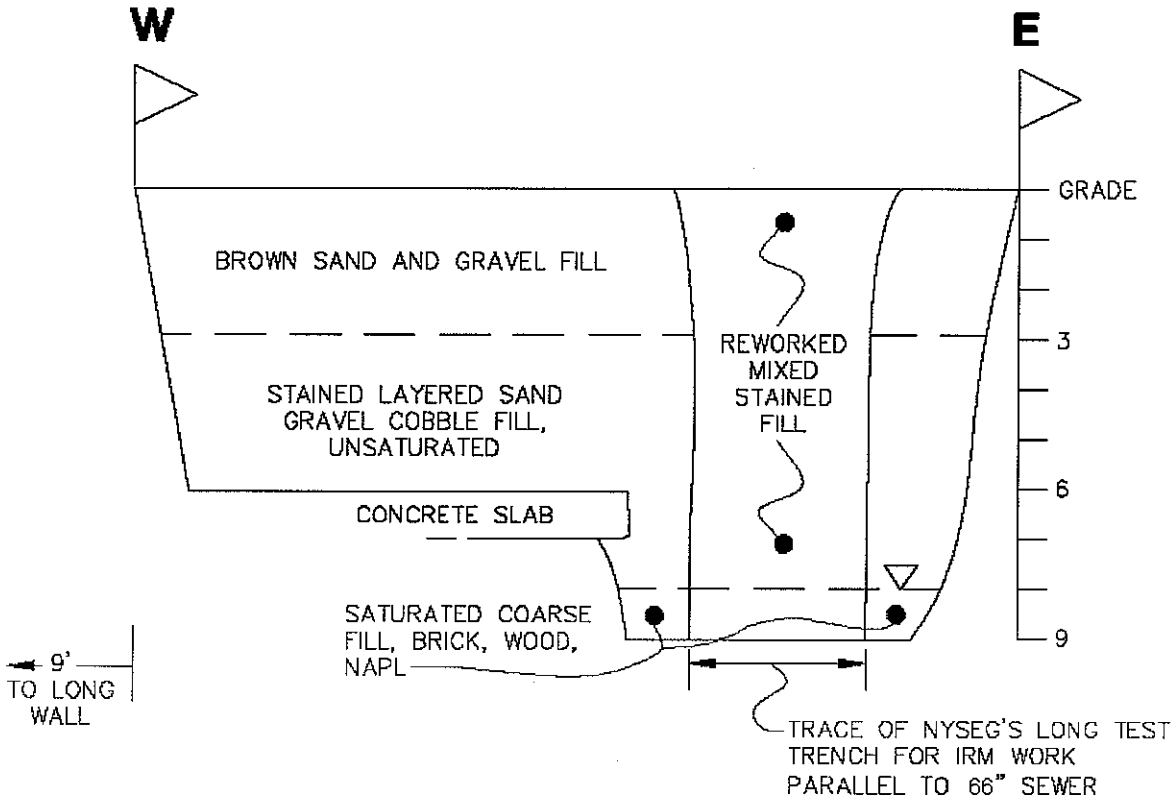
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1/9/02 SYR-54-PGL
13038003/13036V03.DWG

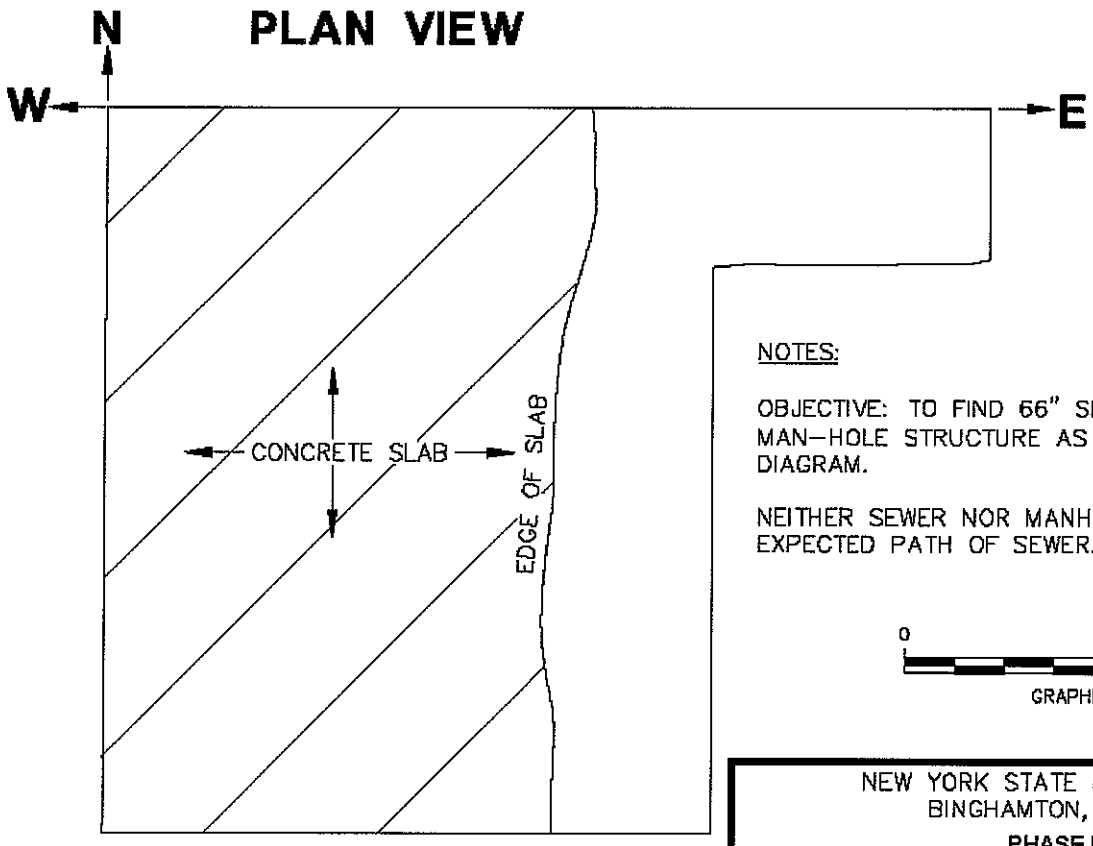
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BINGHAMTON, NEW YORK
PHASE II SRI

TEST PIT 203

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE

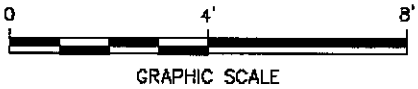




NOTES:

OBJECTIVE: TO FIND 66" SEWER AND POSSIBLE MAN-HOLE STRUCTURE AS PER SEWER "AS-BUILT" DIAGRAM.

NEITHER SEWER NOR MANHOLE FOUND; SLAB OVER EXPECTED PATH OF SEWER.



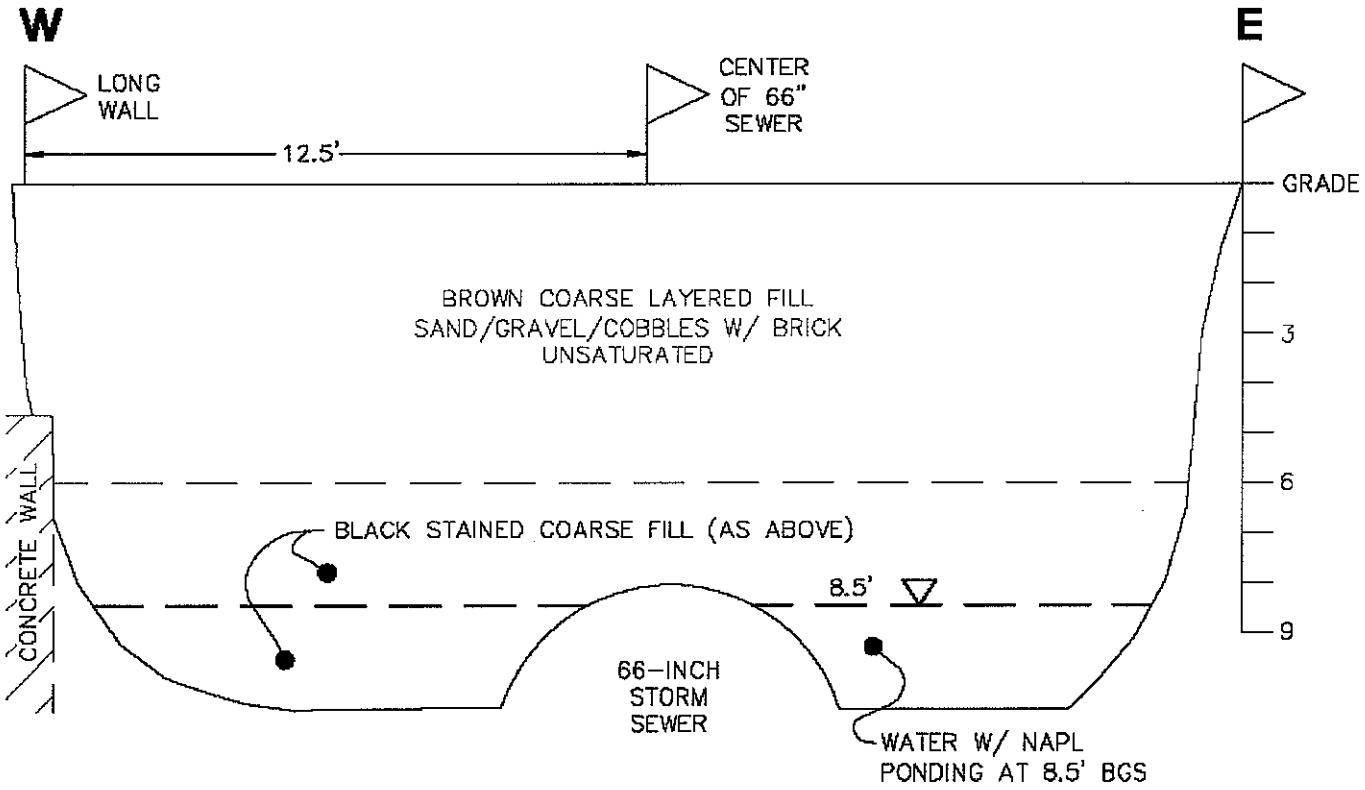
NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK
PHASE II SRI

TEST PIT 204

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE

X: 13036X01.DWG
P: PAGESET/PLT-AP
1/9/02 SYR-54-PGL
13036003/13036V07.DWG

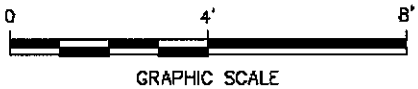


NOTES:

OBJECTIVE: TO FIND 66" STORM SEWER, INVESTIGATE BEDDING.

PIT NOT EXCAVATED TO DEPTH OF SEWER DUE TO WATER FILLING PIT

PIEZOMETER PZ01-04 INSTALLED ADJACENT TO PIT (NORTH)



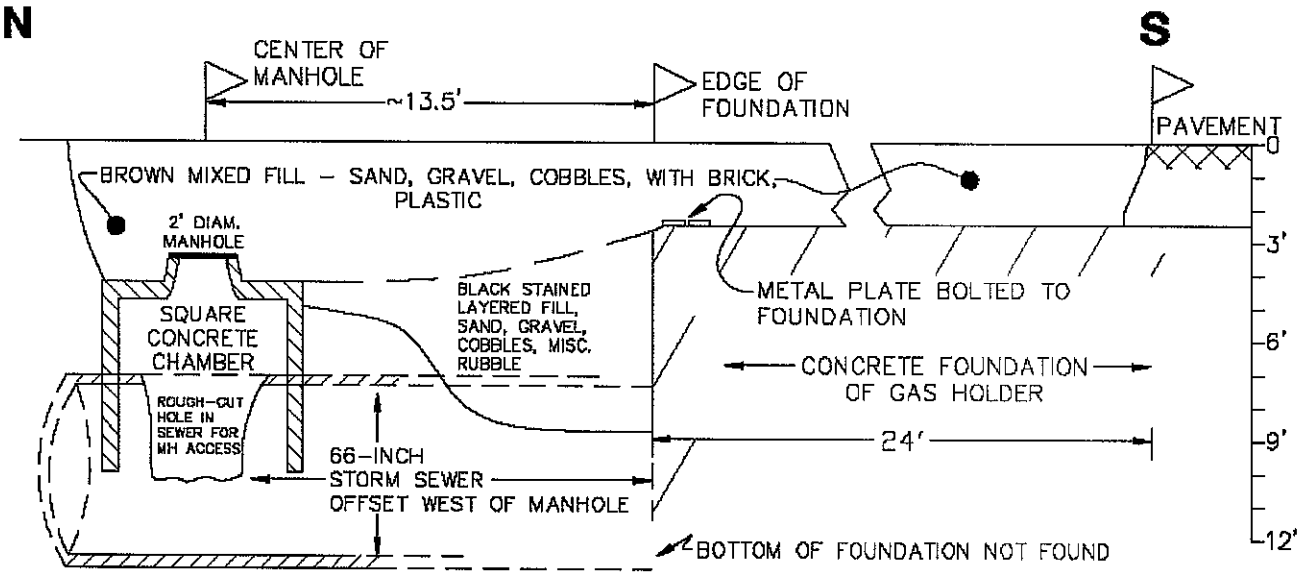
NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK
PHASE II SRI

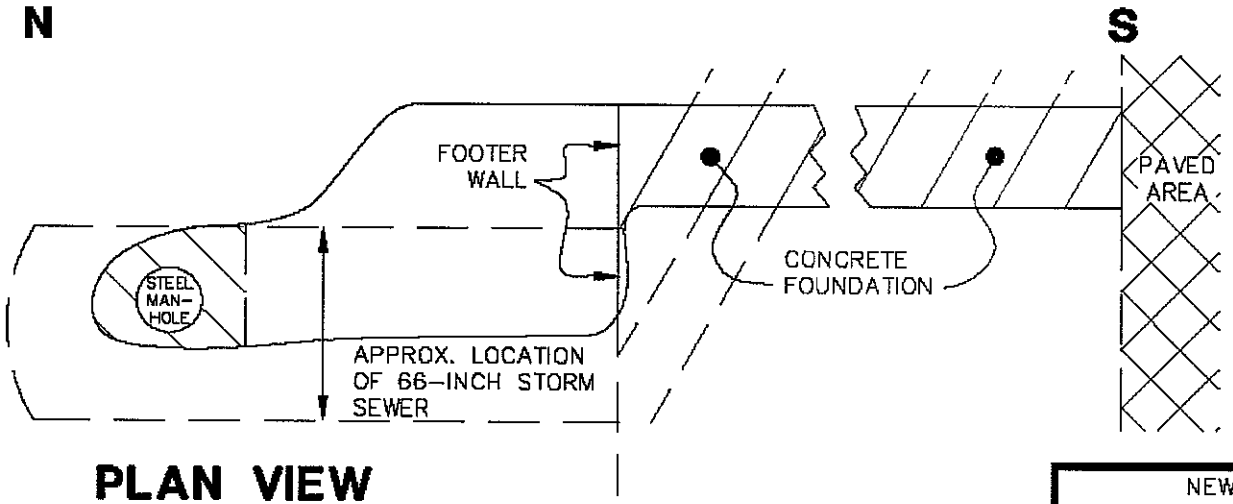
TEST PIT 205

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE

X: 13036X01.DWG
P: PAGESET/PLT-AP
1/10/02 SYR-54-PGL
13036003/13036V08.DWG





PLAN VIEW

0 6' 12'

GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK

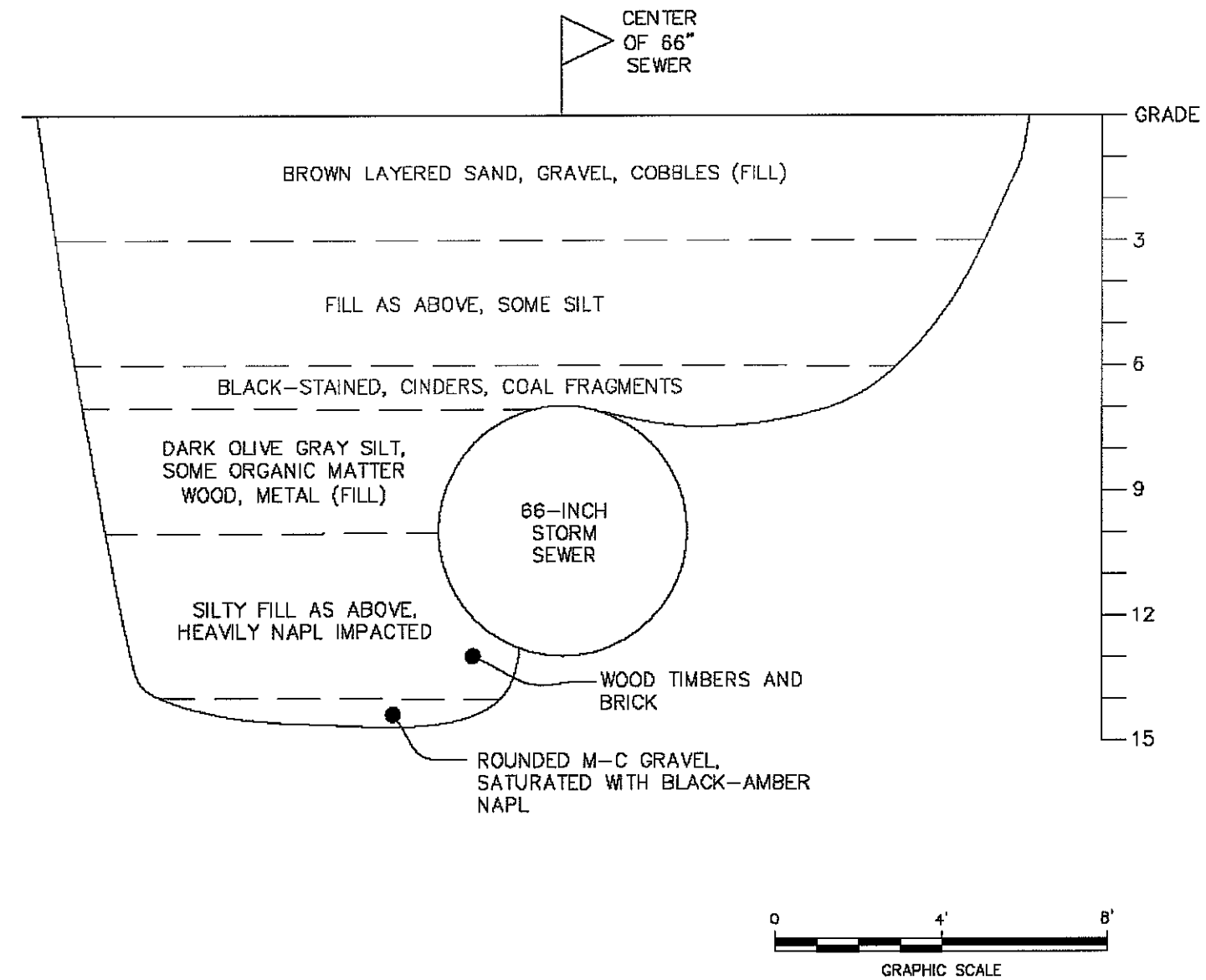
PHASE II SRI

TEST PIT 206

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE

X: 13D38X00.DWG
P: PAGESET/PLT-AL
1/9/02 SYR-54-PGL
13036003/13D36VD4.DWG



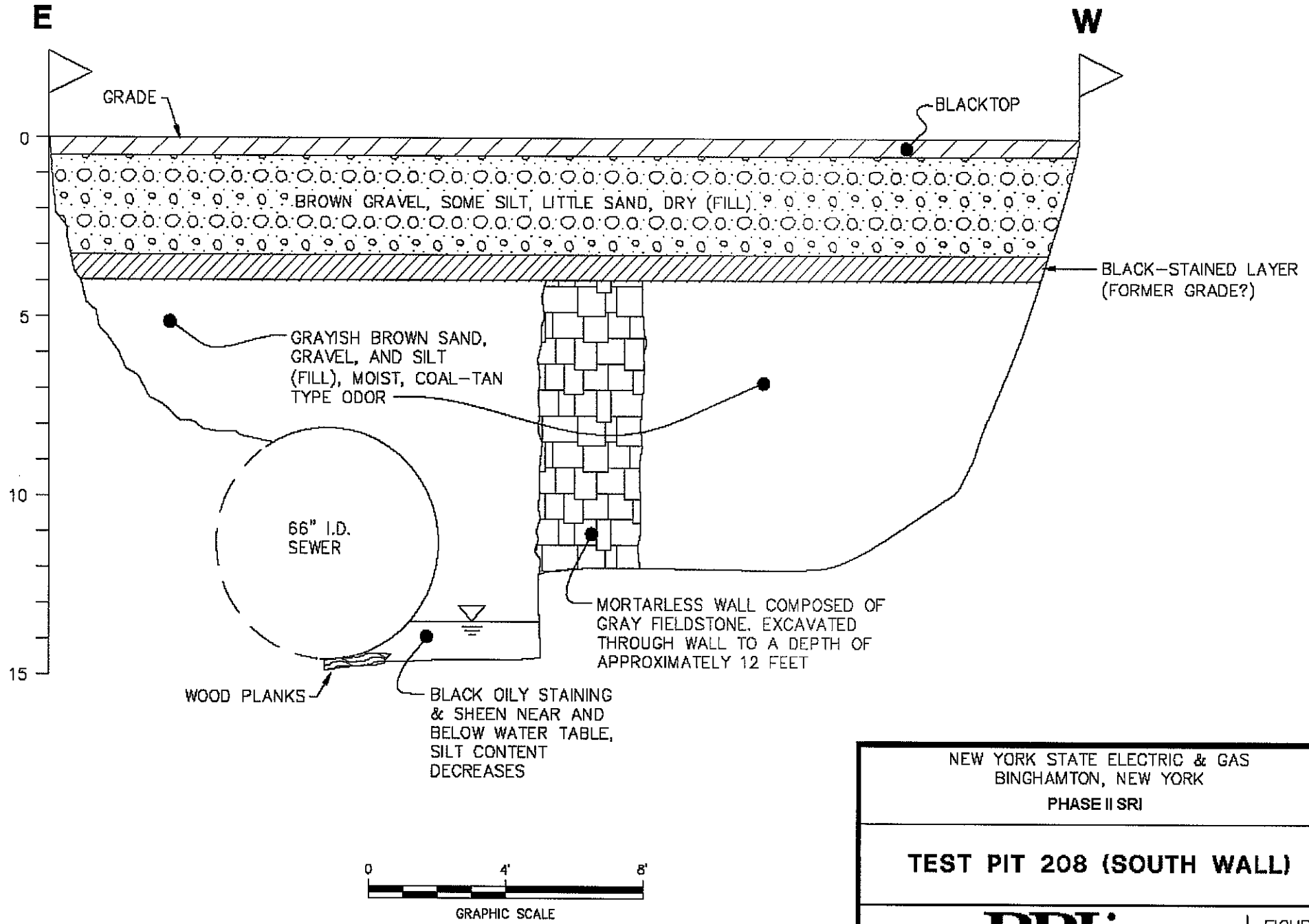
NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK
PHASE II SRI

TEST PIT 207

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE

X: 13036X01.DWG
P: PAGESET/PLT-AP
1/10/02 SYR-54-PGL
13036003/13036V09.DWG



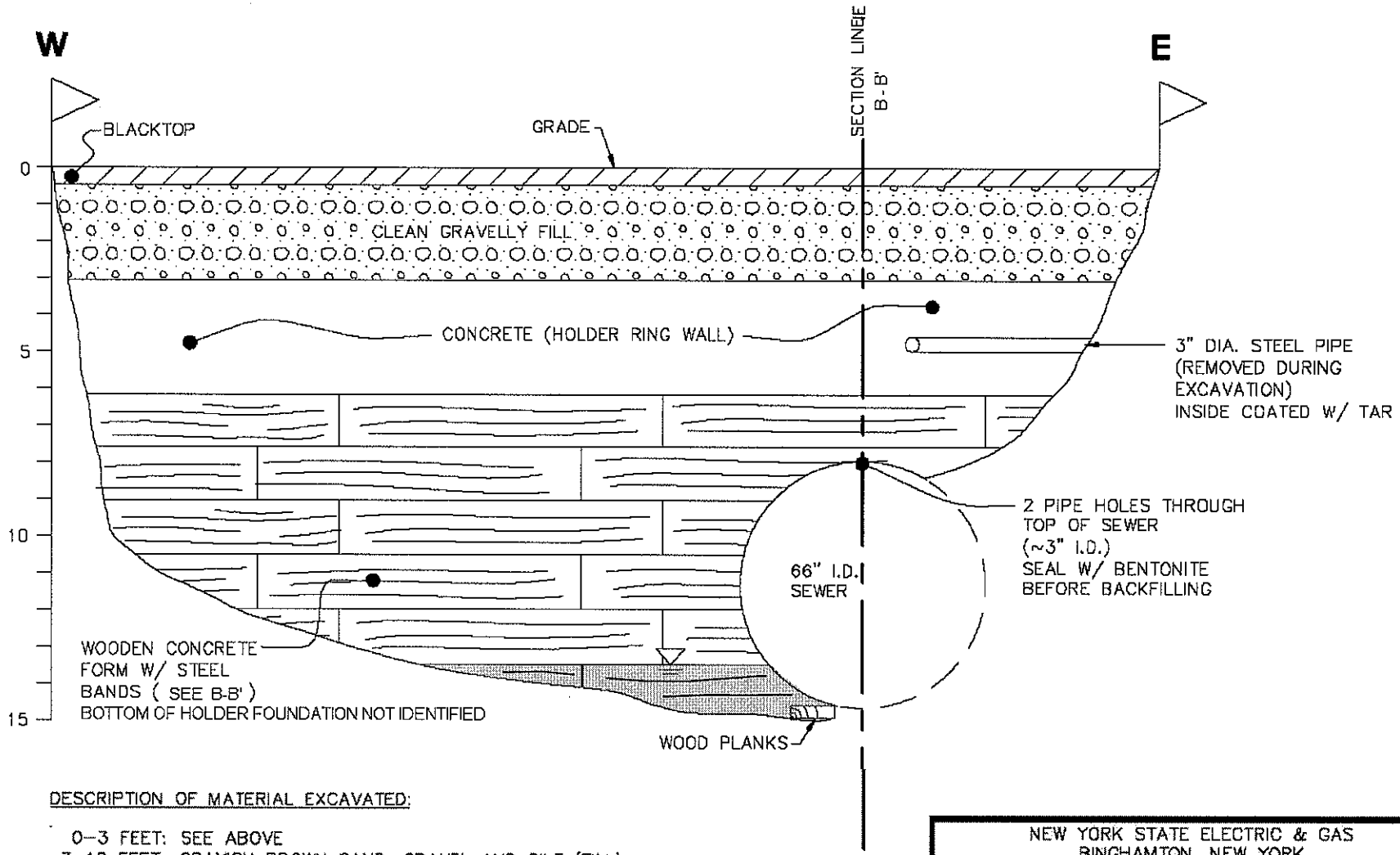
NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK
PHASE II SRI

TEST PIT 208 (SOUTH WALL)

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE

X: 13036X00.DWG
P: PAGESET/PLT-AL
1/9/02 SYR-54-FGL
13036003/13036V06.DWG



DESCRIPTION OF MATERIAL EXCAVATED:

0–3 FEET: SEE ABOVE
3–12 FEET: GRAYISH BROWN SAND, GRAVEL AND SILT (FILL).
OCCASIONAL BRICKS, COAL, AND CINDERS.
OCCASIONAL STAINING AND COAL–TAR–TYPE ODOR, MOIST.
12–15 FEET: BLACK OILY SAND AND GRAVEL, LITTLE SILT, SHEENS, SATURATED.

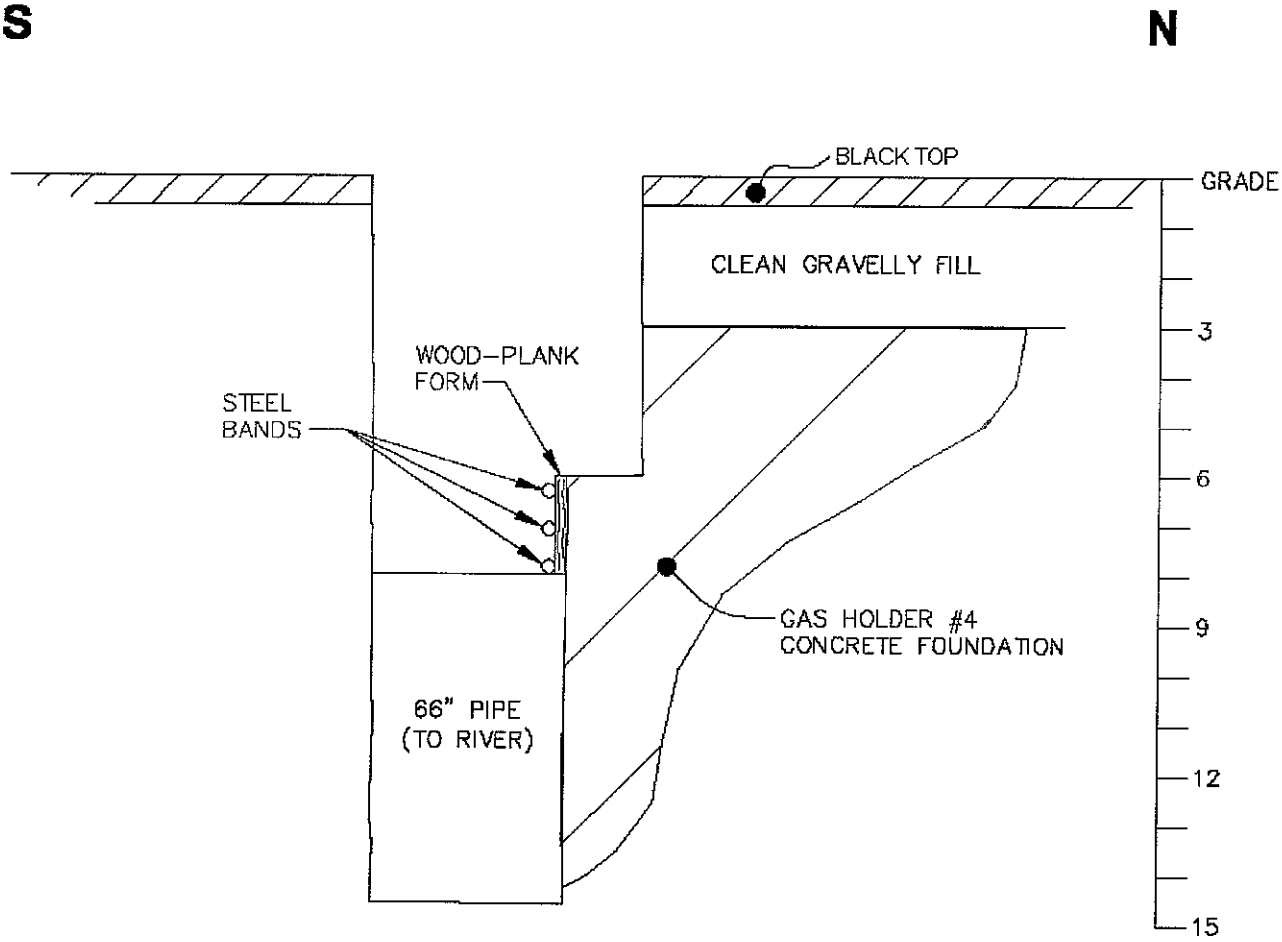
0 4' 8'
GRAPHIC SCALE

Xr: 13038X00.DWG
Pt: PAGESET/PLT-AL
1/9/02 SYR-54-PGL
13038003/13038V08.DWG

NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK
PHASE II SRI

TEST PIT 208 (NORTH WALL)

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists



0 4' 8'

GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK

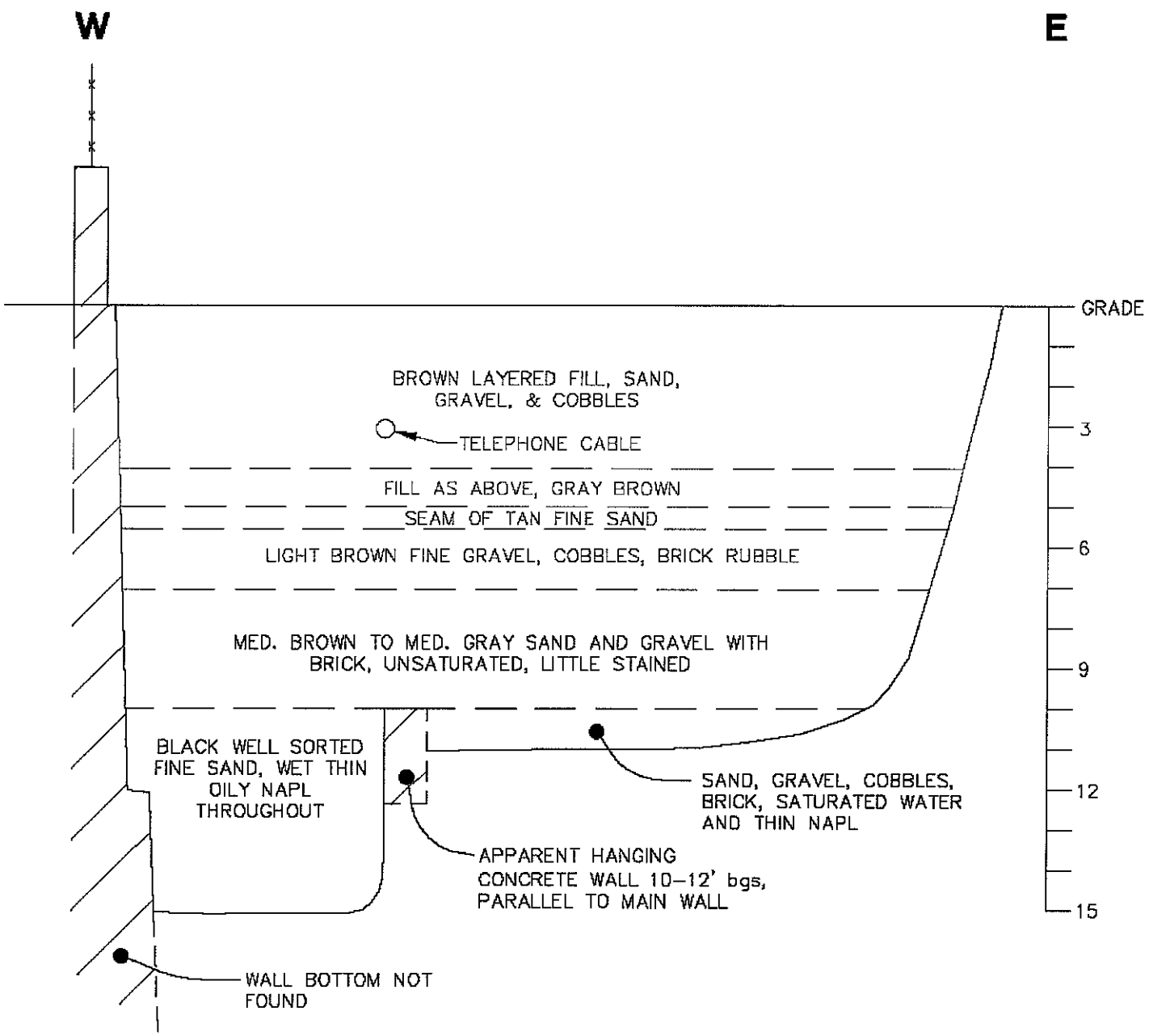
PHASE II SRI

TEST PIT 208 (EAST WALL)

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE

X: 13036X01.DWG
P: PACESET/PLT-AP
1/28/02 SYR-54-PGL RCA
13036003/13036V10.DWG





GRAPHIC SCALE

NOTE

1. EXCAVATED WEST TO EAST FROM BRANDYWINE AVE. FENCELINE.

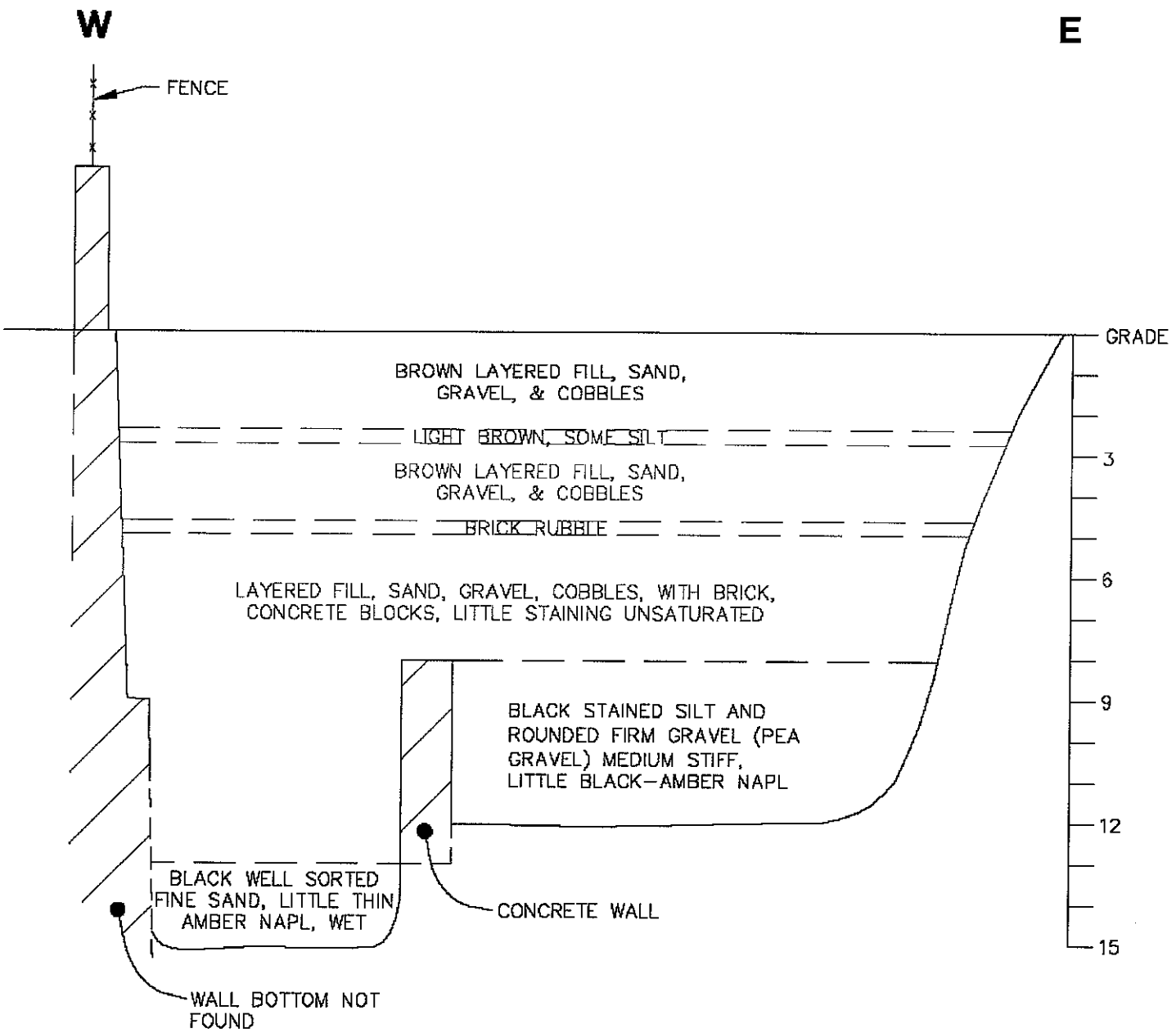
NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK
PHASE II SRI

TEST PIT 209

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE

K: 13036X01.DWG
P: PAGESET/PLT-AP
1/30/02 SYR-54-PCL RCA
13036003/13036V11.DWG





GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
BINGHAMTON, NEW YORK

PHASE II SRI

TEST PIT 210

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE

X: 13036X01.DWG
P: PAGESET/PLT-AP
1/30/02 SYR-54-PGL RCA
13036003/13036V12.DWG

Historical Borings and Wells

DATE
STARTED 2-14-91
FINISHED 2-15-91
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS, INC. **SUBSURFACE LOG**

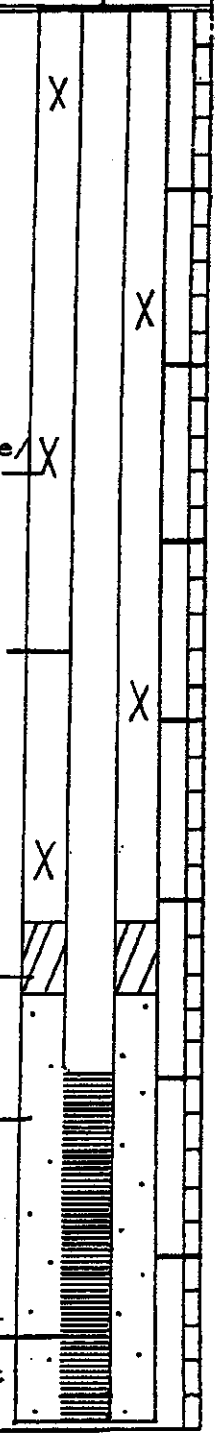
HOLE NO. B-1
SURF. ELEV.
G. W. DEPTH See Notes

PROJECT Tank Investigation (ESI# GD-91-016)
LOCATION Columbia Gas Binghamton, New York

DEPTH IN FT.	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	SOIL OR ROCK CLASSIFICATION
0								ASPHALT 0.8'
								Miscellaneous FILL material 2.0'
		1	8	8	8	16		FILL: fine-medium Gravel, Some Silt,
			9					trace sand (Damp)
		2	9	10	11	21		grades to little silt, trace
5			12					sand
		3	14	11	17	28		Brown fine-medium SAND & GRAVEL,
			19					trace silt (Damp-Firm)
		4	20	30	39	69		(very-Compact)
			34					
10		5	12	19	20	39		(Compact)
			18					
		6	15	18	15	33		
			9					
		7	10	11	6	17		
15			12					(Firm)
		8	11	10	7	17		
			11					
		9	30	39	39	78		(very-Compact)
			16					
20		10	11	13	7	20		(Firm)
			6					
		11	4	3	4	7		(Loose)
			6					
		12	5	5	4	9		
25			3					
		13	4	4	10	14		(Firm)
			16					
		14	18	19	19	38		(Compact)
30			19					
		15	29	25	17	42		
			14					(Wet-Firm)
		16	12	5	14	19		
			15					
35		17	9	16	15	31		(Compact)
			13					
		18	18	15	19	34		
			23					
		19	18	15	25	40		
40			18					

NOTES

Curb Box with Lock



N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow. CLASSIFICATION Visual by
C = No. blows to drive " casing " with lb. weight falling "per blow. Driller (M.W.)
METHOD OF INVESTIGATION 3½" I.D. Hollow Stem Augers, 8½" I.D. Hollow Stem Augers

DATE
STARTED 2-14-91
FINISHED 2-15-91
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC. **SUBSURFACE LOG**

HOLE NO. B-1
SURF. ELEV.
G. W. DEPTH See Notes

PROJECT Tank Investigation (ESI# GD-91-016)
LOCATION Columbia Gas Binghamton, New York

DEPTH FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40					Boring Terminated @ 40.0'	Groundwater first encountered @ 32.0', with augers @ 30.0'.
45						With augers @ 38.0', groundwater @ 31.0'.
						On 2-18-91, A.M., groundwater @ 31.5'.

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow. CLASSIFICATION Visual by Driller (M.W.)

C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

METHOD OF INVESTIGATION: 3¼" I.D. Hollow Stem Augers, 8¼" I.D. Hollow Stems Augers

DISTRICT NO. 9
COUNTY Broome
B.S.M. PROJ. NO. 9-289

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS

SUBSURFACE INFORMATION

HOLE NO. 1
LINE & STA. Tom L. 6/01
OFFSET RT. 3'

NAME Tompkins St. Bridge NC.
QUAD. LOCATION
PED. CLASS.
DATE, START 8/15/60 GND. ELEV. 849.8
DATE, FINISH ~~XX~~ 8/17/60 G.W. ELEV. 829.2

CASING O.D. 3 1/2" I.D. 2 1/2" WEIGHT OF HAMMER 300 # HAMMER FALL
SAMPLER O.D. 2" ~~1 1/2~~ I.D. 1 1/2" INSIDE LENGTH OF SAMPLER 18" CASING SAMPLER 18"

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4	10	40	200	FIELD IDENTIFICATION OF SOIL & REMARKS
0	6										
	13										
	9										
	5										
5	6										
	3	J1	1 1 2		17.1 M.	Br.	82.5	68.2	48.0	26.4	Sand, gravel, & ashes. (0' - 9.0')
	3										
	7										
	12										
10	19										
	10	J2	3 3 5		16.4 M.	Br.	77.2	68.3	51.4	33.2	Sand, fine sand, and gravel. (9.0' - 14.5')
	21								51.4	33.2	
	15										
	20										
15	14										
	10										
	9	J3	2 1 1		16.7 W.	Br.	73.2	92.0	90.4	60.2	Silt, sand, & some organic. (14.5' -, 19.5')
	8										
	7										
20	10										
	10										
	20	J4	1/2 1/2 4		W.	Br.					Silt, sand, & some gravel. (19.5' - 25.0')
	12										
	7										
25	9										
	73										
	85										
	48	J5	18 18 20		9.3 M.	Br.	54.5	41.5	24.0	11.7	Sand, gravel, & some stone. (25.0' - 31.0')
	66										
30	54										
	55										
	35										
	35	J6	1 3 4		W.	Br.					Sand, & some gravel. (31.0' - 54.0')
	44										
35	48										
	54										
	70										
	71										
	40	J7	7 7 10		M.	Br.					
40	51										
	67										
	89										
	78										
	48	J8	4 3 3		W.	Br.					
45	55										
	42										
	40										
	44										
	43										
50	65	J9	5 9		W.	Br.	60.9	47.4	26.9	12.6	

DRILLING INSPECTOR T. F. Weidman ASS'T. SOILS ENGINEER W. M. Green

SAMPLES SHOULD BE TAKEN AT APPROXIMATELY 5 FT. INTERVALS AND WHEREVER THERE IS AN INDICATION OF POSSIBLE CHANGE OF STRATA. CLEAN TO END OF CASING AND TAKE ALL SAMPLES "DRY" WITH SAMPLER BELOW END OF CASING. DO NOT DRIVE THE SAMPLER FARTHER THAN ITS INSIDE LENGTH WITHOUT CLEANING. LOCATION OF LAYER BOUNDARIES MUST BE SHOWN IN "CROSS SECTION" COLUMN. SAMPLES SHOULD BE VISUALLY IDENTIFIED ACCORDING TO B.S.M. INSTRUCTIONS. MOISTURE CONTENT SHOULD BE INDICATED IN "MOISTURE" COLUMN AS W = WET, M = MOIST, OR D = DRY. ANY LOSS OF WASH WATER OR UPWARD FLOW OF WATER AND MATERIAL INTO CASING SHOULD BE EMPHASIZED UNDER "REMARKS".

DISTRICT NO. 9
COUNTY Broome
B.S.M. PROJ. NO. 9-289

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS

SUBSURFACE INFORMATION

HOLE NO. 1
LINE & STA. Tom L. 6/01
OFFSET Rt. 3'

NAME Tompkins St. Bridge NO.
QUAD. LOCATION DATE, START 8/15/60 GND. ELEV. 849.8
PED. CLASS. DATE, FINISH 8/17/60 G.W.ELEV. 829.2

CASING O.D. 3 1/2" I.D. 2 1/2" WEIGHT OF HAMMER 300 # HAMMER FALL
SAMPLER O.D. 2" I.D. 1 1/2" INSIDE LENGTH OF SAMPLER 18" CASING SAMPLER 18"

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4	10	40	200	FIELD IDENTIFICATION OF SOIL & REMARKS
50	90													
	98													
	86													
	70													
55	61													
	98	J10	6	5				21.7	M. Gr.	86.9	81.4	78.2	75.7	Silt, trace clay, & some gravel.
	83				5									(54.0' - 58.0')
	73													
	65													
60	71													
	87	J11	4	3				13.4	M. Gr.	24.7	19.1	14.2	7.1	Silt, trace clay.
	87				3									(58.0' - 66.0')
	88													
	77													
65	86													
	89													
	99	J12	21	10				6.4	M. Gr. & Br.	35.7	31.8	23.5	19.4	Sand, gravel, & silt.
	81				9									(66.0' - 69.0')
	122													
70	200													
	231													
	92	J13	18	23				10.0	W. Br.	53.3	44.3	33.7	26.3	Sand & gravel.
	96				11									(69.0' - 77.0')
	97													
75	85													
	66													
	94													
		J14	26	78				7.5	M. Gr.	67.1	55.3	35.5	23.6	Sand, gravel, & clay.
80					29									(77.0' - 78.5')
														Bottom of hole 78.5'.
85														
90														
95														
100														

DRILLING INSPECTOR T. F. Weidman ASS'T. SOILS ENGINEER W. M. Green

SAMPLES SHOULD BE TAKEN AT APPROXIMATELY 5 FT INTERVALS AND WHEREVER THERE IS AN INDICATION OF POSSIBLE CHANGE OF STRATA. CLEAN TO END OF CASING AND TAKE ALL SAMPLES "DRY" WITH SAMPLER BELOW END OF CASING. DO NOT DRIVE THE SAMPLER FARTHER THAN ITS INSIDE LENGTH WITHOUT CLEANING. LOCATION OF LAYER BOUNDARIES MUST BE SHOWN IN "CROSS SECTION" COLUMN. SAMPLES SHOULD BE VISUALLY IDENTIFIED ACCORDING TO B.S.M. INSTRUCTIONS. MOISTURE CONTENT SHOULD BE INDICATED IN "MOISTURE" COLUMN AS W = WET, M = MOIST, OR D = DRY. ANY LOSS OF WASH WATER OR UPWARD FLOW OF WATER AND MATERIAL INTO CASING SHOULD BE EMPHASIZED UNDER "REMARKS".

FORM SM 12A RI A

DISTRICT NO. 9
COUNTY Broome
B.S.M. PROJ. NO. 9-289

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS

SUBSURFACE INFORMATION

HOLE NO 2
LINE & STA Tom L 4+92
OFFSET Rt. 85'

NAME Tompkins Street Bridge NO.
QUAD. LOCATION DATE, START 8/29/60 GND. ELEV. 325.4
PED. CLASS. DATE, FINISH 9/ 2/60 G.W. ELEV. 330.6

CASING O.D. 3 1/2" I.D. 2 1/2" WEIGHT OF HAMMER 300 # HAMMER FALL
SAMPLER O.D. 2" I.D. 1 1/2" INSIDE LENGTH OF SAMPLER 18" CASING 18" SAMPLER 18"

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4	10	40	200	FIELD IDENTIFICATION OF SOIL & REMARKS
0	48										
	65										
	57										
	58										(0.0 - 7.5) Sand, Gravel, & Stone
5	34	J-1	18 19 17		W	Br.	51.8	37.9	22.2	12.0	
	47										
	41										
	38										
	30										
10	43										(7.5 - 18.0) Sand & some Gravel
	22	J-2	7 6 6		W	Br.					
	36										
	65										
	58										
	32										~~(18.0 - 25.0)~~ ~~Sand~~
15	57	J-3	6 9 9		W	Br.	76.0	70.6	34.7	16.7	
	67										
	89										
	45										
	38										
20	47										(18.0 - 25.0) Sand
	38	J-4	3 3 3				100	99.2	91.6	5.8	
	36										
	41										
	48										
25	41										
	42										(25.0 - 30.0) Sand, Gravel, & some Clay
	85	J-5	8 12 16		D	Gr & Br	77.3	73.2	46.4	20.6	
	90										
	81										
30	67										(30.0 - 36.5) Sand
	66										
	71	J-6	3 4 6		W	Br					
	69										
	86						100	98.1	66.4	9.7	
35	85										
	96										
	148										(36.5 - 39.0) Sand, Gravel, & Stone
	116	J-7	19 13 6		M	Br	58.2	44.4	26.9	12.5	
	109	J-8			M	Br					
40	90										(39.0 - 59.0) Silt
	74					& Gr	92.5	91.7	89.2	88.4	
	107										
	96	J-9	4 4 3		M	Gr & Rd					Silt & some thin layers Red Clay.
	71										
45	75										
	68										
	73					Gr &					Silt & some thin layers Red Clay.
	88										
50	100	J-10	2 2 3		M	Rd	100	100	100	87.5	

DRILLING INSPECTOR T. F. Weidman ASS'T SOILS ENGINEER W.M. Green

SAMPLES SHOULD BE TAKEN AT APPROXIMATELY 5 FT INTERVALS AND WHEREVER THERE IS AN INDICATION OF POSSIBLE CHANGE OF STRATA. CLEAN TO END OF CASING AND TAKE ALL SAMPLES "DRY" WITH SAMPLER BELOW END OF CASING. DO NOT DRIVE THE SAMPLER FARTHER THAN ITS INSIDE LENGTH WITHOUT CLEANING. LOCATION OF LAYER BOUNDARIES MUST BE SHOWN IN "CROSS SECTION" COLUMN. SAMPLES SHOULD BE VISUALLY IDENTIFIED ACCORDING TO B.S.M. INSTRUCTIONS. MOISTURE CONTENT SHOULD BE INDICATED IN "MOISTURE" COLUMN AS W: WET, M: MOIST, OR D: DRY. ANY LOSS OF WASH WATER OR UPWARD FLOW OF WATER AND MATERIAL INTO CASING SHOULD BE EMPHASIZED UNDER "REMARKS".

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS

SUBSURFACE INFORMATION

DISTRICT NO. 9
COUNTY Broome
B.S.M PROJ. NO. 9-289

HOLE NO 2
LINE & STA. Tom L 4+92
OFFSET Rt, 85'

NAME Tompkins Street Bridge
QUAD. LOCATION
PED. CLASS

DATE, START 8/29/60
DATE, FINISH 9/ 2/60

NO.
GND. ELEV. 325.4
G.W. ELEV. 330.6

CASING O.D. 3 1/2" I.D. 2 1/2"
SAMPLER O.D. 2" I.D. 1 1/2"

WEIGHT OF HAMMER 300 #
INSIDE LENGTH OF SAMPLER 18"

HAMMER FALL
CASING 18" SAMPLER 18"

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4	10	40	200	FIELD IDENTIFICATION OF SOIL & REMARKS
0	85										
	86										
	83										
	77										
	75	J-11	1 3 5		M	Gr & Rd					Silt and some thin layers Red Clay.
55	80										
	73										
	67										
	62										(59.0 - 62.0) Silt, Sand, & Gravel.
	94	J-12	12 13 11		M	Br					
60	79				22.0		100	100	100	4.7	
	94										
	172										(62.0 - 67.6) Clay, Sand, & Stone
	300										
	140	J-13	17 15 44		M	Gr					
65	124				6.9		57.7	37.6	21.2	15.9	
	170										
	524	for .6'									Drilled with Ax Diamond from 67.6' to 72.6'. Rock recovery, 4.2'.34 PSC, Sandstone.
70											Drilled with Ax Diamond from 72.6' to 77.6'. Rock recovery 4.8 Sandstone.
											Bottom of Hole - 77.6'.
75											
80											

DRILLING INSPECTOR T. F. Weidman
ASS'T. SOILS ENGINEER W. M. Green

SAMPLES SHOULD BE TAKEN AT APPROXIMATELY 5 FT INTERVALS AND WHEREVER THERE IS AN INDICATION OF POSSIBLE CHANGE STRATA. CLEAN TO END OF CASING AND TAKE ALL SAMPLES "DRY" WITH SAMPLER BELOW END OF CASING. DO NOT DRIVE SAMPLER FARTHER THAN IT'S INSIDE LENGTH WITHOUT CLEANING. LOCATION OF LAYER BOUNDARIES MUST BE SHOWN "CROSS SECTION" COLUMN. SAMPLES SHOULD BE VISUALLY IDENTIFIED ACCORDING TO B.S.M. INSTRUCTIONS. MOIST CONTENT SHOULD BE INDICATED IN "MOISTURE" COLUMN AS W = WET, M = MOIST, OR D = DRY. ANY LOSS OF WASH WATER UPWARD FLOW OF WATER AND MATERIAL INTO CASING SHOULD BE EMPHASIZED UNDER "REMARKS".

SHEET 2 OF 2 SHEETS FOR HOLE NO.

FORM SM 12A R1 A

DISTRICT NO. 9
COUNTY Broome
B S.M. PROJ. NO. 9-289

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS

SUBSURFACE INFORMATION

HOLE NO 3
LINE & STA. Tom 2+91
OFFSET Rt. 58'

NAME Tompkins Street Bridge NO. 815.8
QUAD. LOCATION ____ DATE, START 8/23/60 GND. ELEV ~~830.8~~
PED. CLASS. ____ DATE, FINISH 8/25/60 G.W ELEV ~~825.8~~ 830.8

CASING O.D. 3 1/2" I.D. 2 1/2" WEIGHT OF HAMMER 300# HAMMER FALL
SAMPLER O.D. 2" I.D. 1 1/2" INSIDE LENGTH OF SAMPLER 24 " CASING 18" SAMPLER 18"

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER (0/6 6/12 12/18 18/24)	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4 / 10 / 40 / 200	FIELD IDENTIFICATION OF SOIL & REMARKS
0	33							
	38							
	39							
	30							
5.0'	30							
6.5'	5	J 1	13 10 9		W	Br.	41.0 / 28.6 / 16.8 / 6.9	0.0 - 9.0 Sand , Gravel,& some Stone.
	30							
	42							
9.0'	46							
	33							
11.0'	42							
12.5'	32	J 2	9 8		M	Br.	91.4 / 88.2 / 57.0 / 16.7	9.0 - 13.5 Sand & some Gravel
13.5'	39		9					
	70							
	88							
	115							
	153							
	64	J 3	10 16		M	Br. & Gr.	34.2 / 26.8 / 22.5 / 11.7	13.5 - 21.0 Sand , Gravel , & some Clay
	69		16					
20	92							
	66							
	109							
	103	J 4	24 24		W	Br.	42.4 / 32.2 / 29.0 / 13.5	21.0 - 27.0 Sand, Gravel , & Stone
	97		19					
25	115							
	87							
	104							
	128					Br.		27.0 - 32.0
	100	J 5	21 65 40		M	&		Sand, Gravel, Stone, & some Clay
30	168					Gr.	64.4 / 47.4 / 33.7 / 21.0	
	115							
	190							
	112					Gr.		
	69	J 6	10 9 7		W	&		32.0 - 46.5
35	76					Br.		
	104							
	117							
	101							
	149					Gr.		37-42
40	85	J 7	20 16 18		M	&		Sand, Gravel, some Stone & Clay
	75					Br.	53.9 / 43.6 / 31.4 / 22.4	
	81							
	75							
	78							
45	104	J 8	23 23 22		M	Br.		
	130							
	267							
	464							
	885							46.5 -50.5 (Bottom of Hole)
50		J 9	60 58 63		M	Br.	87.2 / 71.2 / 50.7 / 20.5	Washed out & Broke Stone at 48.2' with Chopping Bit.Clay, Sand,& St.

DRILLING INSPECTOR T. F. Weidman ASS'T. SOILS ENGINEER W. M. Green

SAMPLES SHOULD BE TAKEN AT APPROXIMATELY 5 FT INTERVALS AND WHEREVER THERE IS AN INDICATION OF POSSIBLE CHANGE IN STRATA. CLEAN TO END OF CASING AND TAKE ALL SAMPLES "DRY" WITH SAMPLER BELOW END OF CASING DO NOT DRIVE THE SAMPLER FARTHER THAN ITS INSIDE LENGTH WITHOUT CLEANING. LOCATION OF LAYER BOUNDARIES MUST BE SHOWN IN "CROSS SECTION" COLUMN. SAMPLES SHOULD BE VISUALLY IDENTIFIED ACCORDING TO B.S.M. INSTRUCTIONS. MOISTURE CONTENT SHOULD BE INDICATED IN "MOISTURE" COLUMN AS W = WET, M = MOIST, OR D = DRY. ANY LOSS OF WASH WATER OR UPWARD FLOW OF WATER AND MATERIAL INTO CASING SHOULD BE EMPHASIZED UNDER "REMARKS".

FORM SM 12A R1 A SHEET 1 OF 1 SHEETS FOR HOLE NO. 3

DISTRICT NO. 9
COUNTY Broome
B.S.M PROJ. NO. 9-289

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS

SUBSURFACE INFORMATION

HOLE NO. 4
LINE & STA. CL 10+76
OFFSET Lt.30'

NAME Tompkins St. Bridge NO. 845.4
QUAD. LOCATION DATE, START 8/9/60 GND. ELEV. 835.4
PED. CLASS DATE, FINISH 8/12/60 G.W.ELEV. 832.6

CASING O.D. 3 1/2" I.D. 2 1/2" WEIGHT OF HAMMER 300# 18" HAMMER FALL
SAMPLER O.D. 2" 1 3/4" I.D. 1 1/2" INSIDE LENGTH OF SAMPLER 25" CASING SAMPLER 18"

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4	10	40	200	FIELD IDENTIFICATION OF SOIL & REMARKS
0	7										
	7										
	8										
	17										
5	14				7.7						
	5	J1	1 1 1		W.	Br.	23.7	19.4	10.5	6.0	Fill. Ashes, gravel, & sand. (0' - 8.0')
	5										
	27										
10	14				8.7						
	11	J2	4 3		W.	Br.	40.0	27.6	13.8	8.3	Fill. Sand, gravel, & brick. (8.0' - 15.0')
	22		3								
	18										
	16										
15	14										
	40	J3	16 8		W.	Br.					Sand & gravel. (15.0' - 33.0')
	41		7								
	43										
20	44										
	63										
	30	J4	9 7		9.1						
	44		4		W.	Br.	98.7	98.7	98.7	98.7	
	56										
25	52										
	59										
	74										
	47	J5	7 10		W.	Br.					
	82		18								
30	87										
	84										
	92										
	105										
	88	J6	13 8		W.	Br.					Sand, fine sand, & gravel. (33.0' - 36.0')
35	68		8				56.9	49.8	32.9	16.0	
	87										
	115										
	138				8.5						
	95	J7	10 10		W.	Br.					Sand & gravel. (36.0' - 42.5')
40	153		13								
	115										
	139						42.9	31.8	20.6	10.5	
	315										
	307										
45	175	J8	56 99		M.	Br.					Clay & stone, sand. (42.5 - 56.0)
	222		16 for .3'								Struck solid at 45.3'. Drilled with AX sawtooth from 45.3' to 49.0'
	215										
	964				10.1						Boulder recovery .9' 7 Psc. Drilled down second time with Hawthorne fro
50	213	J9	46 100		M.	Br.	79.4	66.6	51.8	42.8	48.0' to 49.0'.

DRILLING INSPECTOR T. F. Weidman ASS'T. SOILS ENGINEER W. M. Grean

SAMPLES SHOULD BE TAKEN AT APPROXIMATELY 5 FT INTERVALS AND WHEREVER THERE IS AN INDICATION OF POSSIBLE CHANGE OF STRATA. CLEAN TO END OF CASING AND TAKE ALL SAMPLES "DRY" WITH SAMPLER BELOW END OF CASING. DO NOT DRIVE THE SAMPLER FARTHER THAN ITS INSIDE LENGTH WITHOUT CLEANING. LOCATION OF LAYER BOUNDARIES MUST BE SHOWN IN "CROSS SECTION" COLUMN. SAMPLES SHOULD BE VISUALLY IDENTIFIED ACCORDING TO B.S.M. INSTRUCTIONS. MOISTURE CONTENT SHOULD BE INDICATED IN "MOISTURE" COLUMN AS W = WET, M = MOIST, OR D = DRY. ANY LOSS OF WASH WATER OR UPWARD FLOW OF WATER AND MATERIAL INTO CASING SHOULD BE EMPHASIZED UNDER "REMARKS".

FORM SM 12A RI A

DISTRICT NO. 9
COUNTY Broome
B.S.M. PROJ. NO. 9-289

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS

SUBSURFACE INFORMATION

HOLE NO 4
LINE & STA. CL 10/ 76
OFFSET Lt. 30'

NAME Tompkins St. Bridge
NO. 845.4
QUAD. LOCATION
DATE, START 8/9/60
GND. ELEV. [illegible]
PED. CLASS.
DATE, FINISH 8/12/60
G.W. ELEV. [illegible]
832.6

CASING O.D. 3 1/2" I.D. 2 1/2" WEIGHT OF HAMMER 300 # HAMMER FALL 18"
SAMPLER O.D. 1 3/4" I.D. 1 1/4" INSIDE LENGTH OF SAMPLER 25" CASING SAMPLER 18"

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4	10	40	200	FIELD IDENTIFICATION OF SOIL & REMARKS
0			183 for .1'								Struck solid at 50.1'. Drilled with AX sawtooth from 50.1' to 55.0'. Stone recovery .5'.
55		T10	4 13 23				48.6	43	35.6	25.0	Bottom of hole 56.5'.
60											
65											

DRILLING INSPECTOR T. F. Weidman ASS'T. SOILS ENGINEER W. M. Green

SAMPLES SHOULD BE TAKEN AT APPROXIMATELY 5 FT. INTERVALS AND WHEREVER THERE IS AN INDICATION OF POSSIBLE CHANGE OF STRATA. CLEAN TO END OF CASING AND TAKE ALL SAMPLES "DRY" WITH SAMPLER BELOW END OF CASING. DO NOT DRIVE THE SAMPLER FARTHER THAN ITS INSIDE LENGTH WITHOUT CLEANING. LOCATION OF LAYER BOUNDARIES MUST BE SHOWN IN "CROSS SECTION" COLUMN. SAMPLES SHOULD BE VISUALLY IDENTIFIED ACCORDING TO B.S.M. INSTRUCTIONS. MOISTURE CONTENT SHOULD BE INDICATED IN "MOISTURE" COLUMN A. W = WET, M = MOIST, OR D = DRY. ANY LOSS OF WASH WATER OR UPWARD FLOW OF WATER AND MATERIAL INTO CASING SHOULD BE EMPHASIZED UNDER "REMARKS".

FORM SM 12A RI A

Appendix B

Groundwater Modeling Information

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Appendix B-1

Court Street Site TWODAN™ Model

Appendix B-1 – Court Street Site TWODAN™ Model

Introduction

In April, 1997, Blasland, Bouck & Lee, Inc. (BBL) constructed a conceptual-level analytic element groundwater flow model of the region surrounding the Court Street Site to examine regional groundwater flow conditions and to identify areas where additional field data were required. In March 1998, this steady-state two-dimensional model was subsequently refined using site-specific and regional data obtained during the Phase I Supplemental Remedial Investigation (SRI). The model was calibrated with respect to the February 11, 1998 potentiometric data shown in Table 2 and on Figure 8 of this report. The model was used for estimating the groundwater discharge rate to the Susquehanna River near the site. A sensitivity analysis of the input parameters was used to examine the effects that varying the hydraulic conductivity and recharge parameters had upon the calibration statistics.

The following subsections provide a summary of the model software, approach, construction, and results.

Groundwater Flow Model

Conceptual Model

BBL used data collected during the Task II RI (BBL, 1996), and during this SRI to develop a conceptual model of groundwater flow near the site (refer to Section 4.2.1 of this report). The conceptual groundwater flow model is as follows:

- The majority of groundwater flow from the Susquehanna River valley to the Susquehanna River occurs through the sand and gravel unit and is generally horizontal;

- Shallow groundwater in the fill and silt units represents a small fraction of groundwater flow near the site (i.e., less than 0.1 percent), and is contributed to the sand and gravel unit as vertical-flux-specified infiltration from above the sand and gravel unit; and

- The base of the sand and gravel unit represents a no-flow boundary (i.e., water contributed to the sand and gravel unit from the underlying till [or bedrock] is insignificant).

Model Software

BBL selected the TWODAN™ Analytic Element Method (AEM) software (Fitts, 1995) as the appropriate program to model groundwater flow in the sand and gravel aquifer. The AEM model type is endorsed by the United States Environmental Protection Agency (USEPA), and is a mathematical construct of groundwater flow

based on the superposition of geometrically-specified analytic functions (Strack, 1989; Haitjema, 1995). Each of these analytic functions represents groundwater-flow features such as groundwater flux sources, flux sinks, aquifer heterogeneities, and hydraulic barriers. TWODAN™, as used in this context, is a single layer, two-dimensional, steady-state groundwater flow model.

Once the analytic element parameters are determined, the continuous distribution of potentiometric heads throughout the model domain is saved through a series of analyte solutions (Strack, 1989; Haitjema, 1995). A continuous potentiometric head distribution surface is computed for the aquifer without interpolation, and velocities are solved using analytical solutions at specific points along a flow path.

The method has been widely applied to the solution of steady-state, two-dimensional groundwater flow problems (Fitts, 1994), and is described in detail by Strack (1989). Demonstrated uses of AEM include:

- The study of regional groundwater flow (Haitjema, 1992);
- Modeling capture zones of groundwater recovery systems (Grubb, 1993, and Bakker and Strack, 1996);
- Well discharge optimization (Fitts, 1994); and
- Simulation of hydraulic barriers (Fitts, 1997).

The model assumes the following:

- Darcy conditions of groundwater flow apply (laminar flow);
- Flow represents steady-state conditions;
- The fluid is spatially uniform, and has constant physical properties;
- The porous medium, unless modified by aquifer heterogeneity elements, has isotropic horizontal hydraulic conductivity, homogeneous base elevation, and constant porosity; the base of the porous medium is impermeable;
- The flow is two-dimensional, using the Dupuit-Forchheimer condition, where resistance to flow in the vertical direction is assumed to be negligible;
- Line discharge elements completely penetrate the aquifer; and
- Horizontal flow barrier elements completely penetrate the aquifer, and have uniform conductance.

Initial Model Parameters

Numerical parameters were assigned to the model domain attributes and boundary conditions based on information obtained from the Task II RI Report (BBL, 1996), literature on the hydrogeology of the region (Coates, 1973; and Randall, 1986), USGS Topographic map data, and both regional and site data obtained as part of the Phase I SRI. The initial model was developed using the following procedures and parameters:

- Elevation data from all available sources were converted with respect to the 1929 National Geodetic Vertical Datum (NGVD) definition of mean sea level (MSL);

- The hydraulic conductivity of the sand and gravel unit was 330 feet per day (ft/d);

- The thickness of the sand and gravel unit was modeled as the site-wide average of 38 feet;

- The base elevation for the sand and gravel unit was modeled as the site-wide average of 793 feet above MSL (FAMSL);

- The regional recharge rate was specified as 10 inches per year, applied as a set of variable-sized circular infiltration elements, small near the site and larger further away;

- The recharge rate in developed areas, as depicted on U.S.G.S. topographic maps, was specified as 5 inches per year; and

- The stages of the Susquehanna River and the Chenango River were modeled as series of head-specified line elements. Head values for the elements were estimated using points of known river elevation, including data from staff gauge SG-1 (831.63 FAMSL), the crest of the Rockbottom Dam (830.6 FAMSL), and information contained in U.S.G.S. topographic maps of the area.

The hydraulic conductivity of 330 ft/d was obtained by iterative "calibration" of the original regional TWODANTM conceptual model using Ranney Well drawdown and discharge (i.e., pumping-rate) data provided in the Task II RI Report (BBL, 1996). The Ranney well was simulated in the model using head-specified line elements for the intake laterals. The reported drawdown and discharge measurements described in the Task II RI were then used to calibrate the hydraulic conductivity and infiltration rates. Specifying a six-foot steady-state drawdown at the Ranney Well, the model hydraulic conductivities and infiltration rates were adjusted by the same factor until the model computed a combined discharge of 1400 gpm from the Ranney Well head-specified line elements.

It is our judgment that this pumping-based aquifer conductivity value better describes the field-scale hydraulic conductivity of the Sand and Gravel Unit than the geometric mean of the available slug test data (See Appendix

C of this report). This conductivity is slightly higher than the overall hydraulic conductivity used in the USGS model of Southwestern Broome County (Randall, 1985) of 130 ft/d.

Model Calibration

The February 11, 1998 potentiometric surface for the sand and gravel unit on site, as depicted in the Sand and Gravel Unit Potentiometric Elevation Contour Map (Figure 8 of this report), was selected as the calibration target, since it was developed using the most complete set of hydraulic head measurements obtained during the SRI. The groundwater potentiometric elevations and hydraulic gradients for this date were compared and are consistent with historical data for the site. The majority of these hydraulic-head data (calibration targets) are on or near the site. To provide control on the south side of the river, a hydraulic-head measurement was obtained from a monitoring well that screens the sand and gravel unit across the river (DGC-6D).

To achieve calibration conditions, polygonal aquifer-heterogeneity elements were added to the model to adjust potentiometric elevations to be reasonable in the areas off site, and close as possible to conditions observed on site. These included two sets of aquifer-heterogeneity elements. The first simulated the decreasing thickness (or diminishing transmissivity) of the sand and gravel unit, down to 10 feet along the valley walls. The second simulated the increasing thickness of sand and gravel unit (or increasing transmissivity) beneath the valley floor northeast of the site, as noted by Randall (1986), to a spatially-estimated average of 70 feet.

These parameters were adjusted until a solution which had a statistically close match to the target calibration heads was obtained. The difference between the modeled and target calibration heads for a specific target location is called the residual. The average of the residual is defined as the mean residual (MR), whereas the absolute mean residual (AMR) is the mean of the absolute values of each of the residuals.

Model Results

The simulated sand and gravel unit potentiometric elevation contours are shown on Figure D-1. The rate of groundwater discharge from the north side of Susquehanna River along the length of the site (450 ft) was estimated by the model to be approximately 0.46 cubic feet per second (205 gpm).

The calibration statistics for this simulation are shown in Table D-1. The MR and the AMR for this simulation are reasonably close to zero (both are within 1 foot).

Sensitivity Analysis

To examine the effect of the model input parameters on the model results, BBL conducted a sensitivity analysis. Two sets of parameters were examined in the sensitivity analysis: recharge to the aquifer, and the aquifer hydraulic conductivity. The calibrated parameters were adjusted by one order-of-magnitude upward and downward. The results of the sensitivity analysis (Table D-1) show that the model is more sensitive to changes

in hydraulic conductivity than to changes in recharge. Increasing or decreasing the hydraulic conductivity an order of magnitude results in a concomitant increase or decrease in discharge to the river by approximately the same factor. Increasing or decreasing the recharge by an order of magnitude resulted in an increase or decrease in discharge to the river by a factor of approximately 1.4.

Conclusions

The model output a reasonably good representation of the regional and site conditions of groundwater flow in the sand and gravel unit. The model output (Figure D-1) generally agrees with regional historical water level data provided in available boring and well logs and is similar to the hand-contoured data set presented in Figure _ of this report.

The model can be used to target potential upgradient sources of the aliphatic-hydrocarbon contamination detected in the lower portion of the sand and gravel unit at the site (see Section 4.2.1.4 of this report).

References

Bakker, M., and O.D.L. Strack. 1996. Capture Zone Delineation in Two-Dimensional Groundwater Flow Models. Water Resources Research 32: 1309-1315.

Blasland, Bouck & Lee, Inc. (BBL). 1996. Task II Remedial Investigation Report. Former Manufactured Gas Plant Site. Courts Street. Binghamton, New York. New York State Electric & Gas Corporation. June 1996.

Coates, D.R. 1973. Glacial Geology of the Binghamton-Western Catskill Region. Publications in Geomorphology, State University of New York, Binghamton, New York.

Fitts, C.R. 1994. Well Discharge Optimization Using Analytic Elements. Ground Water 32: 547-550.

Fitts, C.R. 1995. Two-Dimensional Analytic Element (TWODANJ) Software Manual.

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Grubb, S. 1993. Analytical Model for Estimation of Steady-State Capture Zones of Pumping Wells in Confined and Unconfined Aquifers. Ground Water 31: 27-32.

Haitjema, H.M. 1992. Modeling Regional Groundwater Flow in Fulton County, Indiana: Using the Analytic Element Method. Ground Water 30:660-666.

Haitjema, H.M. 1995. Analytical Element Modeling of Groundwater Flow. Academic Press: New York.

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Strack, O.D.L. 1989. Groundwater Mechanics. Prentice-Hall, New Jersey.

TABLE B-1

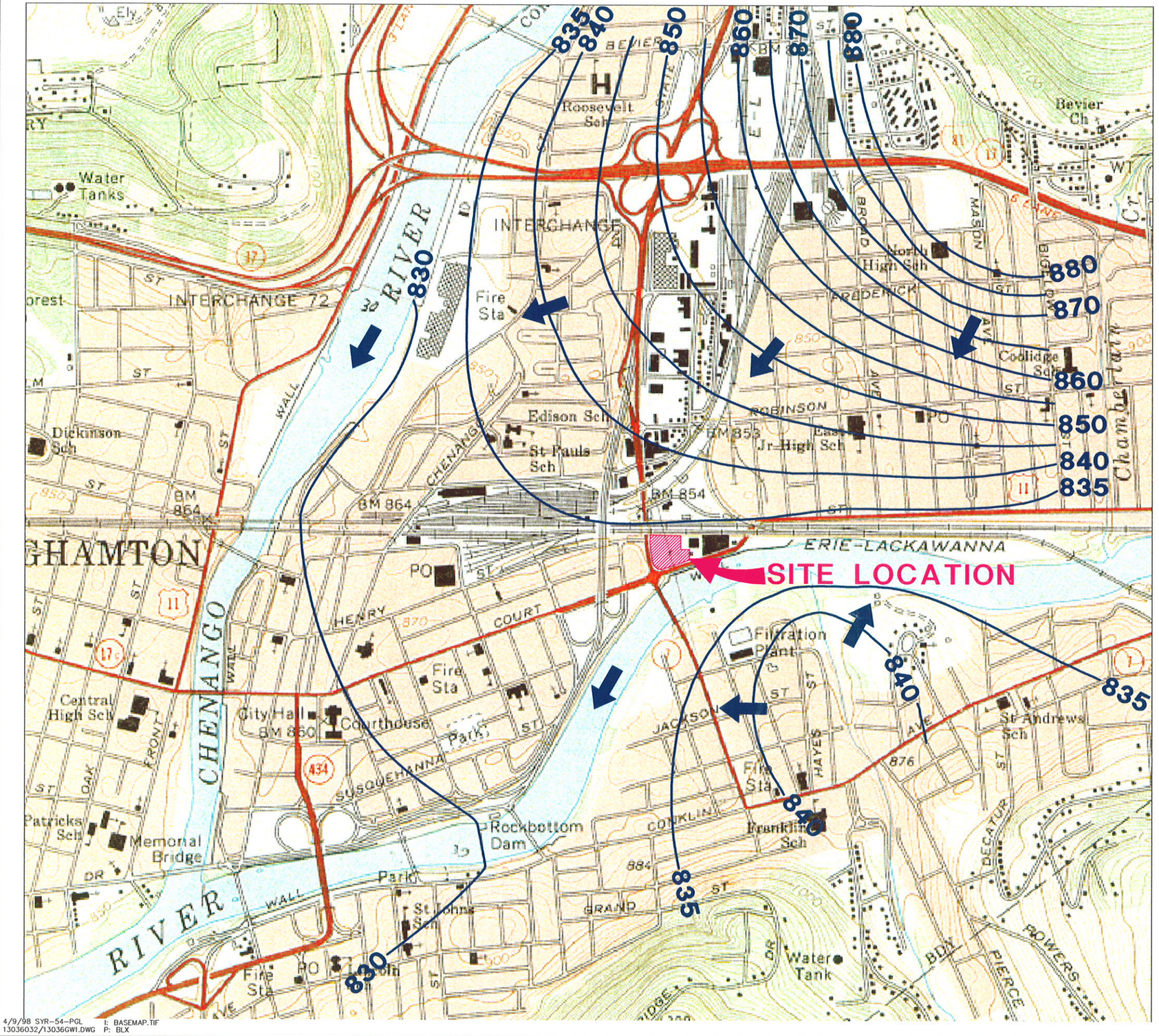
NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION
CALIBRATION AND SENSITIVITY ANALYSIS RESULTS
TWODAN GROUNDWATER FLOW MODEL

Simulation	Mean Residual (ft)	Absolute Mean Residual (ft)	Groundwater Discharge* from Site (gpm)
Calibrated Simulation	-0.5	0.67	205
Increased Recharge 10x	-1.2	1.24	283
Decreased Recharge 10x	-0.5	0.64	194
Increased Hydraulic Conductivity 10x	-0.48	0.64	2230
Decreased Hydraulic Conductivity 10x	-1.17	1.24	31

Note:
* Groundwater discharge to the Susquehanna River from the north side of the river, along the southern site boundary.

Figure B-1





LEGEND:

835 — MODEL-COMPUTED WATER TABLE ELEVATION CONTOURS (FT. AMSL)

RIVER AND GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP SOURCE: USGS 7.5 MIN. TOPO. QUAD., BINGHAMTON EAST, NY., BINGHAMTON WEST, NY., CASTLE CREEK, NY., CHENANGO FORKS, NY. (1968, PHOTOREVISED 1976).
2. ALL PROPERTY BOUNDARY LINES ARE APPROXIMATE.
4. CALIBRATION BASED ON FEBRUARY 11, 1998 ELEVATION POTENTIOMETRIC ELEVATION CONTOUR MAP FOR THE SAND AND GRAVEL UNIT.
5. SEE TEXT FOR MODEL INPUT PARAMETERS AND ASSUMPTIONS.

0 1,200' 2,400'

GRAPHIC SCALE

NYSEG COURT STREET SITE
BINGHAMTON, NEW YORK
SUPPLEMENTAL REMEDIAL INVESTIGATION

POTENTIOMETRIC SURFACE ELEVATION CONTOURS FOR SAND & GRAVEL UNIT FROM STEADY-STATE MODEL

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **B-1**

4/9/98 SYR-54-PGL I: BASEMAP.TIF
13036032/13036GW1.DWG P: BLX

Appendix B-2

Court Street Site FLONET™ Model

Appendix B-2 – Court Street Site FLONET™ Model

Introduction

BBL constructed a conceptual-level, cross-sectional model to simulate regional groundwater flow in the Susquehanna River valley near the Court Street Site. The purposes of this model were to examine the possible hydraulic influence of the flood wall adjacent to the site on groundwater flow, and to examine the distribution and rate of groundwater discharging into the Susquehanna River from the site.

The following subsections provide a summary of the conceptual model, model software, approach, construction, and results.

Groundwater Flow Model

Conceptual Model

BBL used data collected during the Task II RI (BBL, 1996), and during this SRI to develop a conceptual model of groundwater flow near the site (refer to Section 4.2.1 of the SRI report). The conceptual groundwater flow model is described as follows:

- Three hydrostratigraphic units represent groundwater flow at the site: alluvium, sand and gravel, and bedrock/till. This interpretation differs slightly from that presented in Section 4.2.1.2 of the SRI report. Specifically, the fill unit and silt unit described in the SRI report were combined into a single unit intended to represent the fine-grained alluvium that is reported to mantle most of the valley floor in the region (Randall, 1986). This change was considered justified because both the fill and silt units identified at the site are limited in areal extent and are not regional features.

- The bedrock/till unit was subdivided into till and bedrock so that individual hydrogeological parameters could be attributed to each.

- The majority of groundwater flow from the Susquehanna River valley to the Susquehanna River occurs horizontally at the site through the sand and gravel unit.

- A limited rate of groundwater discharge occurs upward into the sand and gravel unit from the till unit.

- A flood wall of low hydraulic conductivity exists along the north bank of the river and extends from the land surface to an elevation of approximately 817 feet above mean sea level (FAMSL). The flood wall partially penetrates the sand and gravel unit.

The cross-sectional model represents groundwater flow within a 6,000-foot long section that traverses the valley floor, and approximates groundwater flow paths from near the north and south valley walls to the River (Figure D-2). The cross-sectional model cuts through the location of the Court Street Site and is aligned parallel to the regional groundwater flow directions based on the results of the AEM model described in Appendix D-1. Near the site, the cross-sectional model location is coincident with the cross section presented in Figure 4 of the SRI Report.

Model Software

The cross-sectional flow model was developed using the FLONETJ Finite Element Method (FEM) software (Waterloo Hydrologic Software Version 3.1, 1997). The dual-formulation FEM model is based upon the work of Frind and Matanga (1985), and deforms the initial water table and the upper portion of the finite-element mesh by adjusting the results for head and flux simultaneously at the nodes throughout the model domain.

The model assumes the following conditions:

- Flow is in steady-state;
- The water is spatially uniform and has constant physical properties;
- Flow is two-dimensional (no flow into and out of the line of section);
- Recharge is applied to the top row in the mesh; and
- The flood wall is nearly impermeable.

Initial Model Parameters

Numerical parameters were assigned to the model domain attributes and boundary conditions based on information obtained from the Task II RI Report (BBL, 1996), literature on the hydrogeology of the region (Coates, 1973 and Randall, 1986), USGS Topographic map data, and both regional and site data collected during this SRI. The initial model was developed using the following rules/parameters:

- Elevation data from all sources were converted with respect to the 1929 National Geodetic Vertical Datum (NGVD) definition of mean sea level (MSL);

- The top of the initial model mesh was specified as ground surface along the cross section;

- The vertical and horizontal hydraulic conductivities were specified using polygonal property zones for each of the hydrostratigraphic units as shown in Figure D-3, using the values shown in Table D-2;

- The hydraulic conductivity of the flood wall was specified as 3.5 X 10-8 centimeters per second (cm/sec), based on the range of values for hot and cold-rolled sheet pile presented in Starr (ca. 1992);

- The regional recharge rate was specified as 10 inches per year, across the top of the model mesh;

- The Susquehanna River was modeled as a constant head boundary condition, at an elevation of 831.63 feet MSL, which was measured by BBL staff at staff gage SG-1 on February 11, 1998;

- Constant head boundaries were specified at the north (840 FAMSL) and south (838 FAMSL) vertical edges of the model mesh, representing the regional flux of groundwater in to the model domain (Figure D-3).

Model Calibration

The February 11, 1998 potentiometric elevation data for the sand and gravel unit on site, as depicted in Figure 8 of this SRI Report, were selected as the calibration targets, since they represent the most complete round of water level measurements conducted on site. The potentiometric elevations and hydraulic gradients for this date were compared with and found to be consistent to historical data for the site.

To achieve calibrated head conditions, the vertical hydraulic conductivity of the hydrogeologic units was adjusted by varying the vertical anisotropy to obtain a solution with a reasonable match to the target calibration heads. Final calibrated horizontal and vertical hydraulic conductivity values are presented in Table D-2.

Model Results

The model-produced potentiometric head elevation contours are shown on Figure D-4. This figure shows that:

- A flood wall of low permeability causes the majority of groundwater behind it to be diverted beneath it, before discharging to the river just in front of it. In the absence of the flood wall, groundwater would be expected discharge to the river in the same general area.

- Groundwater near the base of the sand and gravel unit beneath the site discharges near the center of the river.

The model calculated the discharge of water from beneath the site to be approximately 0.2 cfs (80 gpm), assuming a shoreline length (width of the site) of 425 feet. This is considered reasonably close to the value of 0.5 cfs (205 gpm) calculated by the areal model described in Appendix D-1.

References

Coates, D.R. 1973. Glacial Geology of the Binghamton-Western Catskill Region. Publications in Geomorphology, State University of New York, Binghamton, New York.

Frind, E.O. and G.B. Matanga, 1985. The Dual Formulation of Flow for Contaminant Transport Modeling 1, Review of Theory and Accuracy Aspects, Water Resources Research, 21(2), 159-169.

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Waterloo Hydrogeologic Inc., 1997. FLONET/TRANS (Version 3.1) User Manual, Waterloo Centre for Groundwater Research, Waterloo, Ontario, Canada.

TABLE B-2

NEW YORK STATE ELECTRIC AND GAS CORPORATION
COURT STREET SITE
BINGHAMTON, NEW YORK

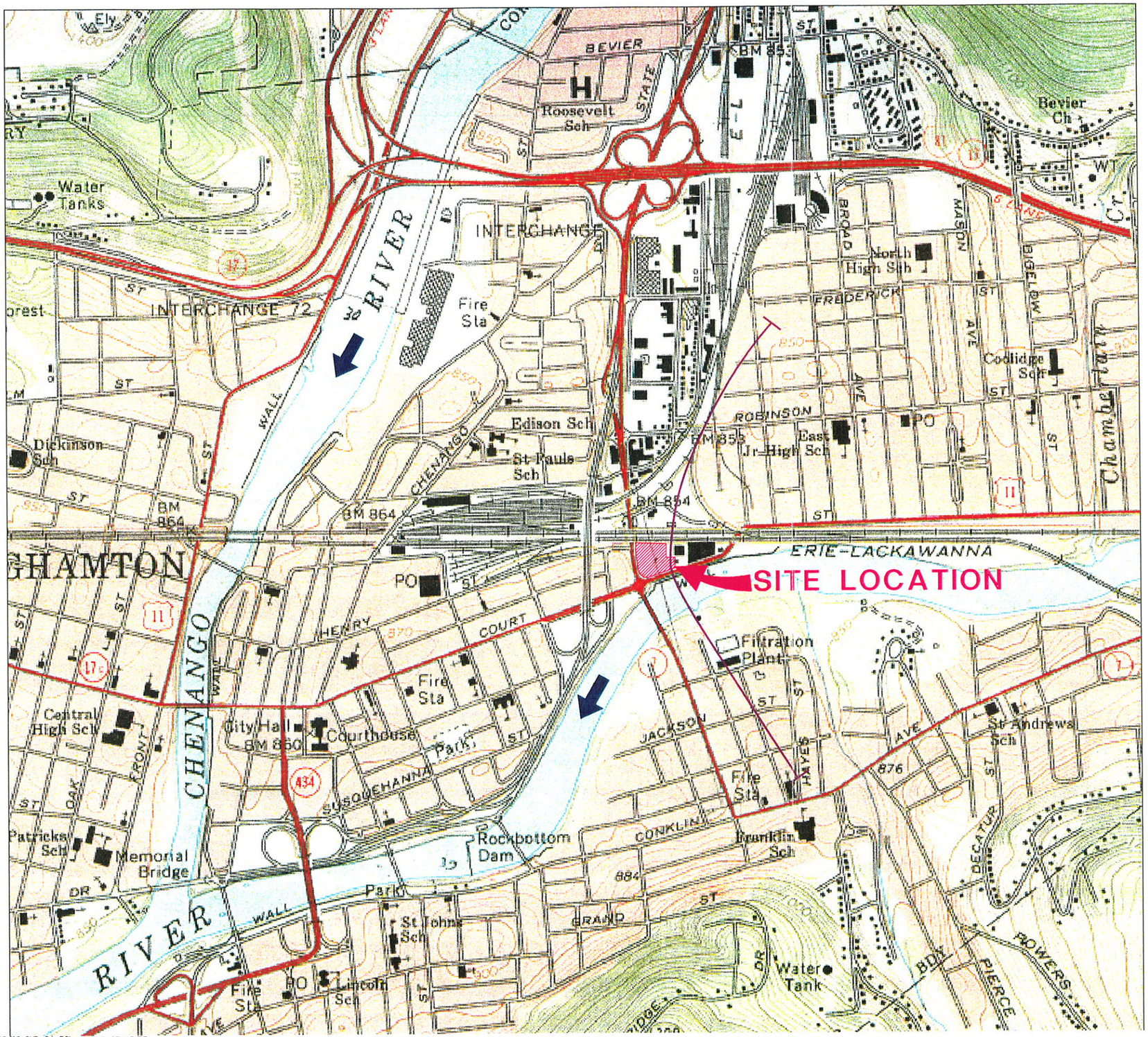
SUPPLEMENTAL REMEDIAL INVESTIGATION
CALIBRATED FLONET MODEL HYDRAULIC CONDUCTIVITY VALUES

Hydrogeologic Unit	Hydraulic Conductivity (Feet/Day)	
	Horizontal*	Vertical
FILL/SILT	0.15	0.006
SAND/GRAVEL	327.91	65.58
TILL	0.03	0.03
BEDROCK	0.01	0.001

Notes:
Horizontal hydraulic conductivities selected based on:

(FILL/SILT) The range of hydraulic conductivities for silt provided in Brassington (1998).
(SAND/GRAVEL) Pumping data for the Ranney Well (see Appendix D-1).
(TILL) The range of hydraulic conductivities for till provided in Freeze and Cherry (1979).
(BEDROCK) The range of hydraulic conductivities for shale and sandstone provided Freeze and Cherry (1979).

Figure B-2



LEGEND:

RIVER FLOW DIRECTION

NOTES:

1. BASE MAP SOURCE: USGS 7.5 MIN. TOPO. QUAD., BINGHAMTON EAST, NY., BINGHAMTON WEST, NY., CASTLE CREEK, NY., CHENANGO FORKS, NY. (1968, PHOTOREVISED 1976).

2. ALL PROPERTY BOUNDARY LINES ARE APPROXIMATE.

0 1,200' 2,400'

GRAPHIC SCALE

NYSEG COURT STREET SITE
BINGHAMTON, NEW YORK
SUPPLEMENTAL REMEDIAL INVESTIGATION

LINE OF SECTION FOR FLONET MODEL

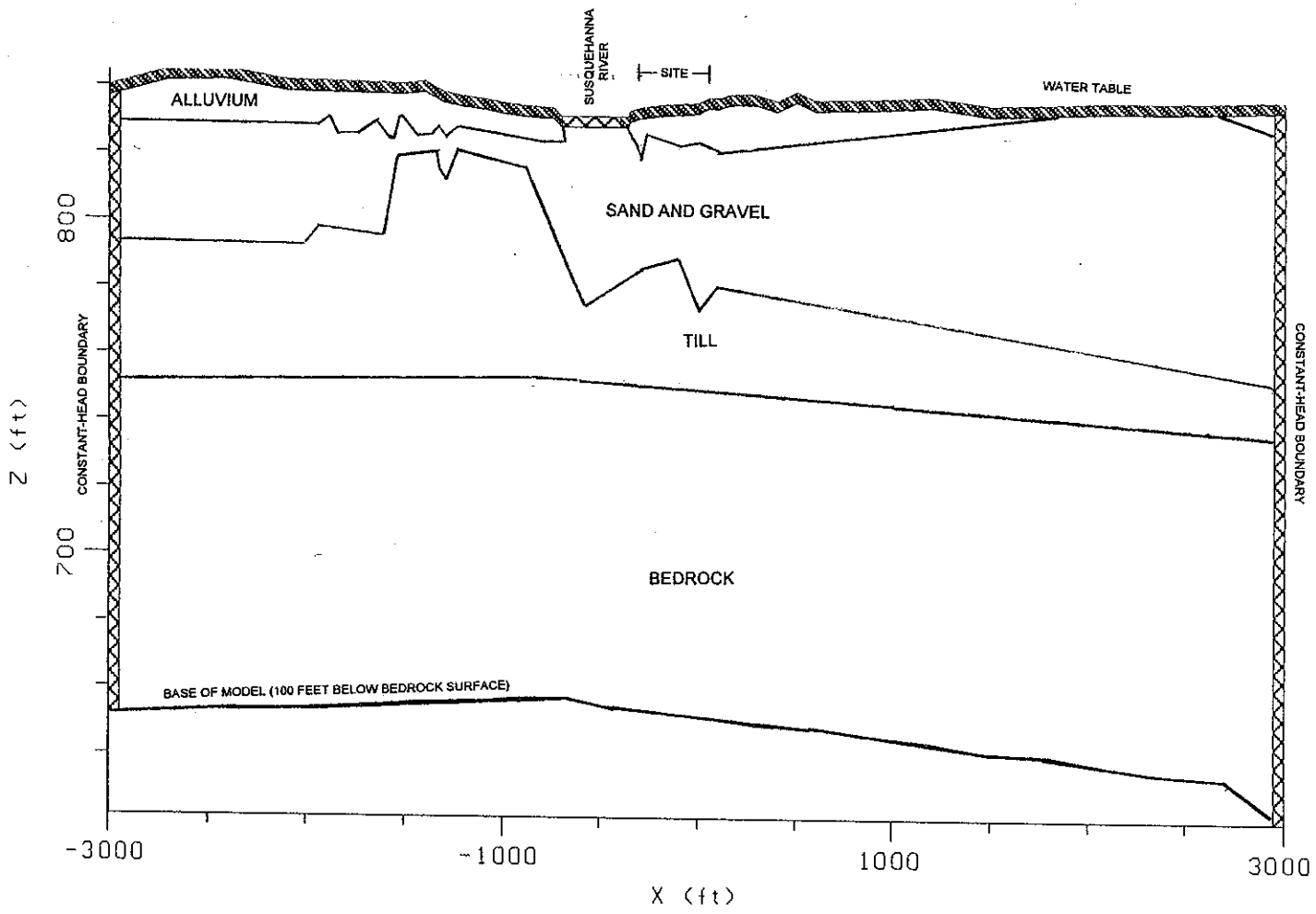
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FIGURE **B-2**

4/15/98 SYR-54-PGL I: BASEMAP.TIF
13036032/13036N01.DWG P: BLX

Figure B-3

Model Boundaries and Hydrostratigraphic Units



Project : BH33
Date : 10 Apr 98

Model Dimensions
No Rows : 21
No Columns : 46

Units
L :ft
T : days
S :ft2/day
V :ft/day
C : mg/L

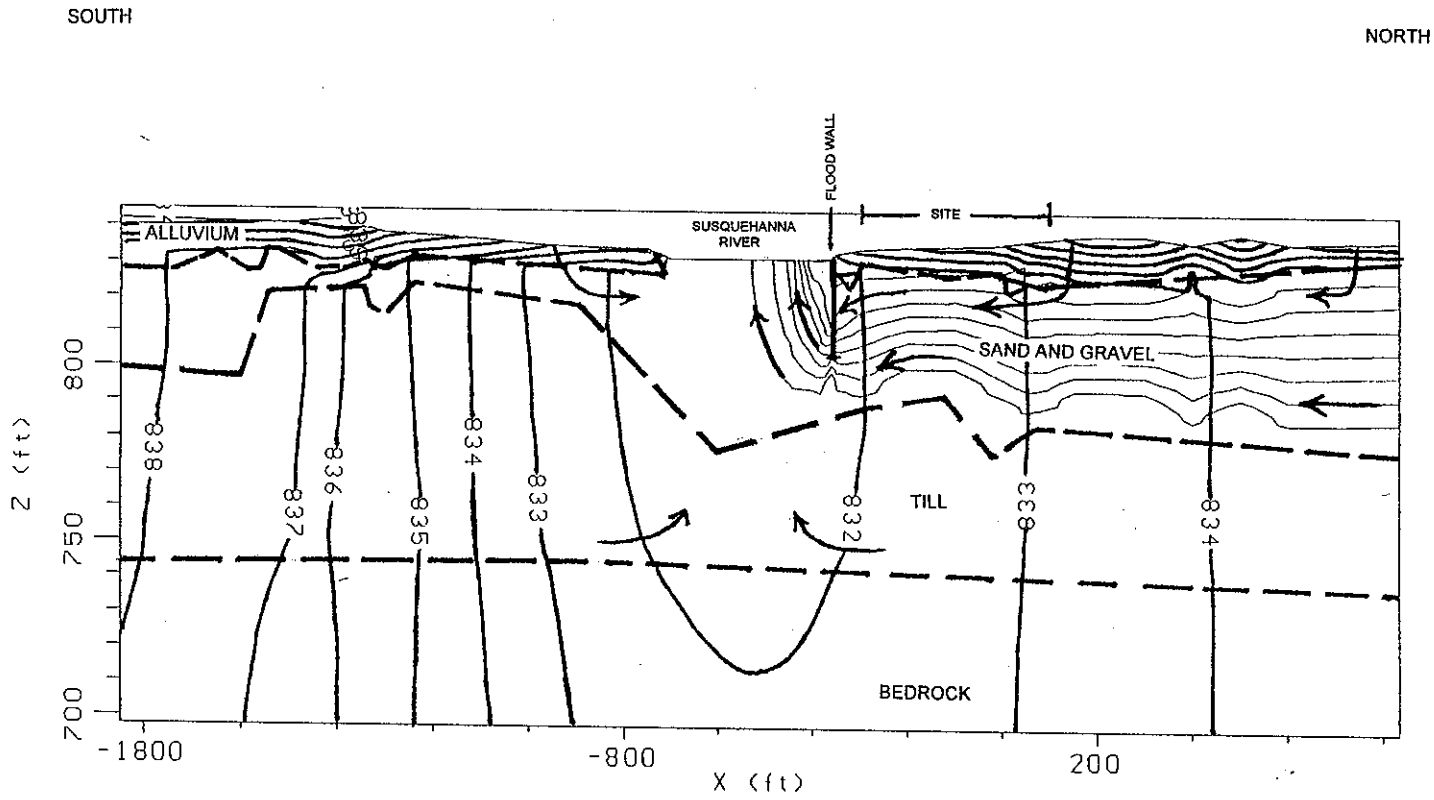
Notes:

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FIGURE B-3

Figure B-4

MODEL-SIMULATED EQUIPOTENTIALS AND STREAMLINES



Project : BH33
Date : 15 Apr 98

Model Dimensions
No Rows : 21
No Columns : 46

Units
L :ft
T : days
S :ft2/day
V :ft/day
C : mg/L

Notes:

FLONET CROSS-SECTIONAL MODEL
NYSEG COURT STREET SITE
BINGHAMTON, NEW YORK

GEOLOGIC CONTACT
EQUIPOTENTIAL LINE (FAMSL)
GROUNDWATER STREAMLINE
GROUNDWATER FLOW DIRECTION

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FIGURE B-4

Appendix C

Storm Sewer Inspection Report

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Storm Sewer Inspection

Client: New York State Electric & Gas, Binghamton, New York
Project Number: 130.36.002
Pipe Inspected: From Manhole #1, Upstream to Manhole #2
Pipe Material: Concrete, 5' sections
Pipe Diameter: 66"

Footage	Description
0	Manhole #1
6	(2) 1 ½" pipes @ 12:00 protruding into pipe 1.5' with tar seeping out; 2-3" of gravel begins
9	tar weep @ 9:00
17	tar weep @ 5:00
25	tar weep @ 7:00
20	hole in pipe @ 4:00 at joint
35	gravel ends, clean pipe
66	oily weep @ 7:00
78	oily weep @ 4:00
90	oily weep @ 4:00
106	oily weep @ 6:00
138	vault; no open manway to surface; approximately 5' by 5' by 7' high; pipe bends to the left
155	for the next 10 feet all joints have weeps, no notable oil but mineral deposits are present
165	oily joint @ 6:00 and manhole with manway to surface; access covered by asphalt
169	oily weep @ 6:00
175	flush 2" pipe @ 12:00; tar seeping in
180	oily joints @ 5:00 and 9:00
184	approximately ½ quart of DNAPL laying at the bottom of the pipe
205	oily weep @ 2:00 and 4:00
271	oily weeps for the next 100'
227	2-3' of rock and gravel at bottom of pipe begins
314	oily weeps end
326	oily weep @ 6:00
359	oily weep @ 7:00
386	end gravel; water is ponded behind gravel
405	Manhole #2

Storm Sewer Inspection Report

Client: New York State Electric & Gas, Binghamton, New York
Project Number: 130.36.002
Pipe Inspected: From Manhole #2, Upstream
Pipe Material: Concrete, 5' sections
Pipe Diameter: 66"

Footage	Description
0	Manhole #2
12	lateral on left completely filled with sediment
14	brown stained area on right; doesn't appear to be oil or tar
44	brown staining on right-hand wall, doesn't appear to be oil or tar
50	brown staining on right-hand wall, start of 4' high box culvert; too much water to get any further up the pipe

Appendix D

NAPL Screening Methods

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Appendix D – NAPL Screening Methods

Aqueous VOC Concentrations

Mathematical methods were used to estimate the dense non-aqueous phase liquid (DNAPL) zone in overburden using aqueous volatile organic compound (VOC) and semivolatile organic compound (SVOC) data from the site. These methods rely on a comparison between detected concentrations and effective solubility limits based on principles presented in United States Environmental Protection Agency (USEPA) guidance on DNAPL site evaluation (Publication 9355.4-07FS, 1992) and other sources (WCGR, 1991; Cohen and Mercer, 1993; Pankow and Cherry, 1996; Kueper, pers. com. with M.J. Gefell, 1997). DNAPL presence is strongly suggested and can reasonably be expected to exist in immediate proximity to any monitoring well exhibiting VOC concentrations greater than one percent of the compound effective solubility within and downstream of known or suspected DNAPL release locations (WCGR, 1991; USEPA, 1992; Cohen and Mercer, 1993; Pankow and Cherry, 1996). Locations where sampled groundwater concentrations exceed 1 percent (or calculated pore-water concentrations in soil samples exceed 10 percent) of a component's effective solubility were included in the DNAPL zone shown on Figure 9. Note that this method was also used for comparison with calculated aqueous concentrations in soil (and sediment) samples to estimate DNAPL presence or absence. Locations where calculated pore-water concentrations in soil samples exceed 10 percent of a component's effective solubility were also included in the DNAPL zone. This appendix summarizes the results of effective solubility screening and describes the mathematical method in detail.

The criterion for groundwater samples described above, 1 percent of effective solubility, likely provides a conservative measure (underestimate) of the probable DNAPL distribution. Concentrations below one percent of the effective solubility can exist near DNAPL. Dissolved concentrations of DNAPL constituents in groundwater samples are typically below the constituent effective solubility limits due to several factors, including:

1) Heterogeneous distribution of residual and pooled DNAPL;
2) Hydrodynamic dispersion within the geologic medium;
3) Borehole dilution; and
4) Rate-limited mass transfer at low DNAPL saturations.

Mathematical Method

The groundwater and soil-quality databases were queried to identify each location where VOCs or SVOCs were detected during the most recent sampling event at the location. The analytical data included aqueous concentrations detected at wells and piezometers and total soil concentrations, which were used to calculate equilibrium aqueous concentrations. Where primary and duplicate samples were collected, the higher of the two values was used for each constituent. To assess DNAPL presence, the measured concentration of each

compound detected in ground water (or calculated as present within soil based on equilibrium partitioning assumptions) (Cm_i) was compared to the effective solubility limits of the chemical (C_i). Any groundwater sampling location for which the ratio of Cm_i/C_i was greater than 0.01 was included within the DNAPL zone. Similarly, any soil sampling location for which the ratio of Cm_i/C_i was greater than 0.10 was included within the DNAPL zone.

The mathematical approach is complicated at the site by the presence of a highly complex mixture of DNAPLs in the subsurface. Several simplifying assumptions were used to allow a mathematical assessment of the solubility ratio discussed above, including:

- The suite of VOCs and SVOCs detected (or calculated) in the aqueous phase at each location comprises the exact suite of compounds in the source DNAPL. This assumption allows effective solubilities to be evaluated based on the correct number of compounds in a hypothetical DNAPL mixture, rather than applying a common solubility reduction factor for all locations, which would require that the DNAPL have the same properties everywhere. This approach, therefore, provides a useful means to account for the fact that DNAPL composition may vary spatially at the site.

- The degree of sorption is the same for each compound. This assumption is justified by the likely, near saturation of available sorption sites due to the length of time that DNAPL has been in the subsurface.

- The dispersion is the same for each compound. This assumption is justified by the fact that dispersion is a physical property of the geologic medium, and does not vary between different solutes.

- The degradation rates are the same for each compound. This assumption is considered reasonable given that samples obtained in the DNAPL zone would be located near enough to DNAPL that travel times available for degradation processes would be limited. While this is considered the weakest of the assumptions in the method, this weakness is counter-balanced by the fact that this approach accounts for every solute detected (or calculated) in the aqueous phase. Also, this is only one of several methods used to delineate the DNAPL zone.

These assumptions lead to the result that each measured VOC or SVOC concentration in groundwater (or calculated as present within soil based on equilibrium partitioning assumptions) (Cm_i) is proportional to the chemical's effective solubility limit (C_i). This result is presumed to be valid at the interface between the water and the DNAPL, where all compounds in the DNAPL are at the effective solubility limits in the aqueous phase, in accordance with Raoult's Law. In terms of a proportionality constant ($\acute{\alpha}$), we assume that $Cm_i / C_i = \acute{\alpha}$, where $\acute{\alpha} = 1$ at the DNAPL-water interface, and diminishes with increasing distance from the DNAPL source zone because of dispersion, degradation, and borehole dilution (which are assumed equal for each DNAPL constituent). Note that $\acute{\alpha}$ also equals the detected percent of the effective solubility for compound *I*. Using

these assumptions, the derivation below describes the development of a relatively simple expression to compare measured concentrations to effective solubilities for any mixture of constituents.

According to Raoult's Law, we know that:

$$C_i = M_i S_i, \text{ or } M_i = C_i / S_i ,$$

where: M_i = chemical mole fraction in the DNAPL phase; and
S_i = chemical pure-phase solubility.

Since the sum of the DNAPL-constituent mole fractions must add up to unity, it follows that:

$$(C_1 / S_1) + (C_2 / S_2) + (C_3 / S_3)....+(C_n / S_n) = 1,$$

where: n is the number of components comprising the DNAPL.

Based on the discussion above, we can replace C_i with $Cm_i / \acute{\alpha}$, which leads to:

$$\acute{\alpha} = [(Cm_1 / S_1) + (Cm_2 / S_2) + (Cm_3 / S_3)....+ (Cm_n / S_n)].$$

Given the relationship that $Cm_i / C_i = \acute{\alpha}$, we obtain the following equation relating any mixture of measured chemicals to their estimated effective solubility limits:

$$\frac{Cm_i}{C_i} = \sum_{i=1}^{n} \frac{Cm_i}{S_i}$$

BBL used the groundwater analytical database to solve the equation above using the groundwater VOC and SVOC data from wells and piezometers in the overburden hydrogeologic unit, and the pure-phase (textbook) solubilities for each detected compound. Wells and piezometers that meet or exceed the 0.01 criterion (1 percent of effective solubility) are shown on Figure __. Similarly, saturated and unsaturated soil samples with calculated aqueous VOC concentrations that meet or exceed a 0.10 criterion (10 percent of effective solubility) were included within the DNAPL zone.

Soil and Sediment VOC Concentrations

The mathematical aqueous solubility assessment described above was applied to soil and sediment samples by calculating equilibrium pore-water concentrations based on the methods of Feenstra *et al.* (November 1991). Unlike groundwater samples from wells, soil samples are not subject borehole dilution effects. To help delineate the probable DNAPL zone, therefore, the soil VOC and SVOC data were evaluated with respect to 10

percent of the effective solubility limit, indicating that DNAPL was present in the soil sample analyzed by the laboratory.

For comparison with effective solubility criteria, equilibrium pore-water concentrations within the soil and sediment samples were estimated using the following expression (based on Feenstra *et al.*, November 1991):

$$Cm_i = C_t \varrho_b / [(K_{oc})(f_{oc})(\varrho_b)+(n_W)+(H_C)(n_A)],$$

where: Cm_i = calculated chemical concentration in pore water (mg/L or ug/cm^3);
C_t = measured total soil concentration (ug/g or mg/kg, dry weight);
K_{oc} = organic carbon based partition coefficient (cm^3/g);
f_{oc} = fraction of organic carbon in soil (dimensionless);
ϱ_b = dry bulk density of soil sample (g/cm^3);
n_W = water-filled porosity (volume fraction);
H_C = Henry's Law constant (dimensionless); and
n_A = air-filled porosity (volume fraction, equal to zero in the saturated zone).

This equation was used to assess the DNAPL distribution based on saturated and unsaturated (vadose) soil and sediment sampling results from the site and site-specific soil-water partitioning parameters characterized during the completion of the SRI. In the saturated and unsaturated zones, the calculated pore-water concentrations were compared to 10 percent of the effective solubility limits using the mathematical method described above to help delineate the DNAPL zone. The results of the soil and sediment screening are shown on Figure __.

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Electronic Attachments

(provided on separate CD)

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