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Focused Feasibility Study Report for Operable Unit No. 1

Court Street Former Manufactured Gas Plant Site
Binghamton, New York
Site No. 7-04-031

January 2013

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Focused Feasibility Study Report for Operable Unit No. 1

Court Street Former MGP Site
Binghamton, New York
Site No. 7-04-031

Certification Statement

I, Margaret A. Carrillo-Sheridan, P.E. certify that I am currently a NYS registered professional engineer and that this Focused *Feasibility Study Report* was prepared in accordance with all applicable statutes and regulations and in general conformance with the Division of Environmental Remediation *Technical Guidance for Site Investigation and Remediation* (DER-10) (NYSDEC, 2010).

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1 Final Remedial Investigation Report

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Executive Summary

Introduction

This *Focused Feasibility Study Report for Operable Unit No. 1* (FFS Report) presents an evaluation of remedial alternatives to address environmental impacts identified for Operable Unit No. 1 (OU-1) of the NYSEG Court Street Former Manufactured Gas Plant (MGP) Site (the site) located in Binghamton, New York. The site is identified as New York State Department of Environmental Conservation (NYSDEC) Site No. 7-04-031. This FFS Report has been prepared by ARCADIS of New York, Inc. (ARCADIS) on behalf of NYSEG in accordance with a 1996 Order on Consent (Index Number D7-001-96-03) between NYSEG and the NYSDEC (as well as the 1999 amendment to the Order on Consent).

The purpose of this FFS Report is to identify and evaluate remedial alternatives that are:

- Appropriate for site-specific conditions
- Protective of public health and the environment
- Consistent with relevant sections of NYSDEC guidance, the National Contingency Plan (NCP), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The overall objective of this FFS Report is to recommend a reliable remedy that achieves the site-specific remedial action objectives (RAOs) and the best balance the NYSDEC evaluation criteria.

Background

The site is owned by NYSEG and is located in an industrial section of the City of Binghamton, in Broome County, New York. OU-1 occupies lots identified as 271-291 and 293 Court Street. Two buildings are present on OU-1; a small gas regulator station and building used for storage. The remainder of OU-1 consists of a gravel lot used by NYSEG for equipment/material storage and parking.

The MGP operated in OU-1 from approximately 1888 to 1939. Various structures were located within OU-1, including four gas holders, seven oil tanks, a tar-separating well,

machine shop, and a governor house. By about 1969, all aboveground structures associated with the MGP had been dismantled.

IRMs

The following interim remedial measures (IRMs) and remedial activities have been completed in OU-1 to address impacted media and existing exposure/migration pathways:

- No. 2 gas holder removal
- Source area removal – No. 3 gas holder, tar separating well, and piping
- Storm sewer lining IRM
- Passive NAPL barrier IRM and NAPL monitoring
- Storm sewer replacement

Extent of Remaining Impacts

Impacted media in OU-1 generally consist of areas of subsurface soils, mostly saturated, that contain coal tar (a non-aqueous phase liquid [NAPL]), and groundwater that contains benzene, toluene, ethylbenzene, and/or xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs) dissolved from the coal tar, as well as chlorinated solvents derived from an unidentified, off-site source. Surface and near-surface soils do not contain BTEX or PAHs at concentrations greater than guidance values. The following bullets provide more detail on the extent of these impacts:

- The majority of the NAPL remaining in OU-1 is located at or below the water table. Based on the heterogeneous nature of the site geology, the NAPL is distributed irregularly throughout OU-1: NAPL has migrated below the silt and clay unit at several isolated locations throughout OU-1.

- Residual NAPL is also present beneath Court Street along two former preferential pathways: the 66-inch storm sewer (in the southwest corner of OU-1) and in the southeast corner of OU-1 where several pipes formerly penetrated the floodwall. These pathways were eliminated by the passive NAPL barrier IRM and the 66-inch storm sewer replacement. Much of the DNAPL remaining in OU-1 appears to be residual NAPL (i.e., NAPL in quantities below residual saturation and is immobile and trapped in soil pore spaces). Results of the periodic NAPL monitoring currently conducted in OU-1 (discussed in Section 2.1) further demonstrates that a majority of the NAPL remaining in OU-1 is not mobile

- The areal extent of subsurface soil above the water table (i.e., in the vadose zone) that contains elevated concentrations of total BTEX and total PAHs is located in the northern portion of OU-1 in areas associated with several oil tanks (Nos.1, 2, and 6), former No 2. gas holder, and the retorts. No. 2 and No. 3 gas holders, the tar separating well structure, and associated impacted soils within the structures, have been removed.

- Both shallow groundwater (above the silt and clay unit) and deeper groundwater (below the silt and clay unit, in the sand and gravel unit) contain BTEX and PAHs at concentrations greater that NYSDEC Class GA standards and guidance values.

Remedial Action Objectives

RAOs are developed to specify the constituents of concern (COCs) within OU-1, and to assist in developing goals for cleanup of COCs in each medium that may require remediation. The RAOs presented in the following table have been developed based on the generic RAOs listed on NYSDEC's website (http://www.dec.ny.gov/regulations/67560.html).

Table ES.1 Remedial Action Objectives

RAOs for Soil
RAOs for Public Health Protection 1. Prevent, to the extent practicable, ingestion/direct contact with MGP-related COCs/NAPL. 2. Prevent, to the extent practicable, inhalation of or exposure to MGP-related COCs from impacted soil. *RAOs for Environmental Protection* 3. Address, to the extent practicable, MGP-related COCs/NAPL in soil that could result in impacts to groundwater, surface water, or sediment.
RAOs for Groundwater
RAOs for Public Health Protection 4. Prevent, to the extent practicable, ingestion of groundwater containing MGP-related dissolved phase COCs at concentrations exceeding NYSDEC groundwater quality

standards or guidance values.

5. Prevent, to the extent practicable, contact with or inhalation of VOCs from groundwater containing MGP-related COCs at concentrations exceeding NYSDEC groundwater quality standards or guidance values.

RAOs for Environmental Protection

6. Restore groundwater to pre-disposal/pre-release conditions, to the extent practicable.

7. Address the source of MGP-related groundwater impacts to the extent practicable.

Detailed Evaluation of Alternatives

Following the development of the remedial alternatives, a detailed description of each alternative was prepared and each alternative was evaluated with respect to the following criteria presented in DER-10:

- Short-Term Impacts and Effectiveness
- Long-Term Effectiveness and Permanence
- Land Use
- Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment
- Implementability
- Compliance with SCGs
- Overall Protectiveness of the Public Health and the Environment
- Cost Effectiveness

Based on the remedial activities and IRMs that have been performed at OU-1, NYSEG and the NYSDEC agreed that the number of remedial alternatives evaluated could be limited. Remedial alternatives evaluated in the FFS include: 1) no further action; and 2) conducting groundwater/NAPL monitoring and establishing institutional controls.

Comparative Analysis of Alternatives

A comparative analysis of the alternatives was completed using the NYSDEC evaluation criteria. The results of the comparative analysis formed the basis for recommending the preferred remedy for achieving the RAOs.

Preferred Remedial Alternative

Alternative 2 was selected as the preferred remedial alternative. The primary components of the preferred remedial alternative consist of the following:

- Conducting periodic groundwater monitoring

- Conducting periodic NAPL monitoring (and recovery, as necessary)

- Establishing institutional controls for the NYSEG property in the form of deed restrictions and/or environmental easements that would limit intrusive (i.e., subsurface) activities that could result in potential exposures to residual subsurface soil and groundwater containing MGP-related impacts at concentrations greater than applicable standards and guidance values; require compliance with the SMP; and prohibit the use of non-treated groundwater from the NYSEG property.

- Preparing a Site Management Plan to document the following:

    - The institutional controls that have been established and will be maintained for OU-1

    - Known locations of soil containing COCs at concentrations greater than 6 NYCRR Part 375-6 industrial use SCOs

    - Protocols (including health and safety and community air monitoring requirements) for conducting invasive (i.e., subsurface) activities and managing potentially residually impacted material encountered during these activities

    - Protocols and requirements for conducting annual groundwater monitoring and semi-annual NAPL monitoring

    - Protocols for addressing significant changes in COC concentrations in groundwater based on the results of the annual groundwater monitoring activities

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Acronyms and Abbreviations

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and xylene
CERCLA	Comprehensive Environmental Response, Compensation and Recovery Act
CFR	Code of Federal Regulations
CLSM	controlled low-strength material
COC	constituent of concern
cy	cubic-yard
DER	Division of Environmental Remediation
DAR	Division of Air Resources
DNAPL	dense non-aqueous phase liquid
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FWRIA	Fish and Wildlife Resource Impact Analysis
GHG	greenhouse gas
GRA	general response action
HASP	health and safety plan
HDPE	high-density polyethylene
HHEA	Human Heath Exposure Assessment
IRM	interim remedial measure
LNAPL	light non-aqueous phase liquid
LDR	land disposal regulation
mg/kg	milligrams per kilogram
MGP	manufactured gas plant
NAPL	non-aqueous phase liquid
NCP	National Contingency Plan
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
O&M	operation and maintenance

OSHA	Occupational Safety and Health Administration
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
POTW	Publicly Owned Treatment Works
PPE	personal protective equipment
PVC	polyvinyl chlorinated
RAO	remedial action objectives
RCRA	Resource Conservation and Recovery Act
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SMP	site management plan
SVOC	semi-volatile organic compound
TAGM	Technical and Administrative Guidance Memorandum
TCLP	Toxicity Characteristic Leaching Procedure
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1. Introduction

This *Focused Feasibility Study Report for Operable Unit No. 1* (FFS Report) presents an evaluation of remedial alternatives to address environmental impacts identified for Operable Unit No. 1 (OU-1) of the NYSEG Court Street Former Manufactured Gas Plant (MGP) Site (the site) located in Binghamton, New York. The site is identified as New York State Department of Environmental Conservation (NYSDEC) Site No. 7-04-031. This FFS Report has been prepared by ARCADIS of New York, Inc. (ARCADIS) on behalf of NYSEG in accordance with a 1996 Order on Consent (Index Number D7-001-96-03) between NYSEG and the NYSDEC (as well as the 1999 amendment to the Order on Consent).

As indicated in the October 1, 2012 NYSDEC letter to NYSEG (NYSDEC, 2012), for ease of site management, NYSDEC has divided the site into two operable units. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release, or exposure pathway resulting from site impacts. OU-1 consists of the upland portions of the site identified as 271-291 and 293 Court Street (including Court Street). As indicated in Section 2, OU-1 has been subject to several interim remedial measures (IRMs). Operable Unit No. 2 (OU-2) consists of sediments in the Susquehanna River adjacent to the former MGP. Additional remedial investigation activities are required for OU-2 to determine remediation of Susquehanna River sediment will be required.

1.1 Regulatory Framework

Per the direction of NYSDEC, and based on remedial construction activities that have been completed at OU-1 to date, the evaluation of potential remedial measures to address remaining environmental impacts has been focused to a limited number of remedial alternatives. This FFS Report has been prepared in a manner consistent with the Order on Consent and generally consistent with NYSDEC Division of Environmental Remediation (DER) *DER-10 Technical Guidance for Site Investigation and Remediation* (DER-10) (NYSDEC, 2010a).

1.2 Purpose

The purpose of this FFS Report is to identify and evaluate remedial alternatives that are:

- Appropriate for site-specific conditions

- Protective of public health and the environment

- Consistent with relevant sections of NYSDEC guidance, the National Contingency Plan (NCP), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The overall objective of this FFS Report is to recommend a reliable remedy that achieves the site-specific remedial action objectives (RAOs) and the best balance of the NYSDEC evaluation criteria.

1.3 Report Organization

This FFS Report is organized as described in the following table.

Table 1.1 Report Organization

Section	Purpose
Section 1 – Introduction	Provides background information relevant to the development of remedial alternatives evaluated in this FFS Report.
Section 2 – IRMs and Remaining Impacts	Describes the IRMs that have been completed to date and the extent of impacts remaining following the completion of the IRMs.
Section 3 – Identification of Standards, Criteria, and Guidance	Identifies standards, criteria, and guidance (SCGs) that govern the development and selection of remedial alternatives.
Section 4 – Development of Remedial Action Objectives	Presents a summary of the risk assessment and develops site-specific RAOs that are protective of public health and the environment.
Section 5 – Detailed Evaluation of Remedial Alternatives	Presents a detailed description and analysis of each potential remedial alternative using the evaluation criteria presented in the referenced guidance documents.
Section 6 – Comparative Analysis of Alternatives	Presents a comparative analysis of each remedial alternative using the evaluation criteria.
Section 7 – Preferred Remedial Alternative	Identifies the preferred remedial alternative for addressing the environmental concerns.
Section 8 – References	Provides a list of references utilized to prepare this FFS Report.

1.4 Background Information

This section summarizes background information relevant to the development and evaluation of remedial alternatives, including location, physical setting, and history of the former MGP, as well as a summary of the previously completed investigations.

1.4.1 Site Location and Setting

The site is owned by NYSEG and is located in an industrial section of the City of Binghamton, in Broome County, New York (see Figure 1). As indicated above, OU-1 occupies lots identified as 271-291 and 293 Court Street. The 293 Court Street property was formerly used as a natural gas service center by Columbia Gas Transmission Corporation (Columbia Gas). Two buildings are present on OU-1; a small gas regulator station and building used for storage. The remainder of OU-1 consists of a gravel lot used by NYSEG for equipment/ material storage and parking.

As shown on Figure 2, OU-1 is bordered to the north by a major Norfolk Southern rail line and yard, an asphalt works plant, and a scrap yard; to the south by Court Street, which runs parallel to the Susquehanna River (separated by a flood wall); to the east by the 295 Court Street property, which contains a warehouse owned by the 295 Court Street Associates, LLC.; and to the west by Brandywine Avenue.

1.4.2 Site History and Operation

The MGP operated in OU-1 from approximately 1888 to 1939, during which time operations gradually expanded westward from the eastern portion of the site and eventually covered the entire OU-1 area. Various structures were located within OU-1, including four gas holders, seven oil tanks, a tar-separating well, machine shop, and a governor house (see Figure 2). By about 1969, all aboveground structures associated with the MGP had been dismantled.

In 1836, OU-1 appeared undeveloped and contained a canal identified on historic site mapping as “Side Cut to Chenango Canal,” referred to hereafter as the “Brandywine Canal.” Brandywine Canal was aligned roughly north-south and conveyed water through the western portion of OU-1 before passing beneath Court Street and discharging to the Susquehanna River. Historical information suggests that the path of a tributary to the Susquehanna, Brandywine Creek, followed the approximate route of the Brandywine Canal. The *Final Remedial Investigation Report* (Final RI Report)

(BBL, 2002) (included as Attachment 1) indicates that the Brandywine Canal was abandoned at some time between 1876 and 1885.

Historical drawings indicate that the on-site portion of a storm sewer was constructed between 1885 and 1924 within the former bed of Brandywine Creek. The storm sewer collects runoff from a large portion of the City of Binghamton. The storm sewer transects OU-1 from north to south and empties into the Susquehanna River through the Tompkins Road Pumping Station. The storm sewer is owned and maintained by the City of Binghamton. As discussed in Section 2.1.5, NYSEG replaced a portion of the storm sewer in 2011-2012.

1.4.3 Summary of Site Investigations

The site has been subject to several environmental investigations. Initial site investigations consisted of the following:

- *1991 – Site Prioritization Investigation*. Engineering – Science, Inc. (ES) completed a site prioritization to determine if the site posed an imminent threat to human health and/or the environment. Investigation activities consisted of the collection and laboratory analysis of the seven surface soil samples, three surface water samples, and three sediment samples. Analytical results indicated the presence of polycyclic aromatic hydrocarbons (PAHs) (a subset of semi-volatile organic compounds [SVOCs]) in surface soil samples and site-related volatile organic compounds (VOCs) and SVOCs in sediment samples. Site prioritization investigation results were documented in a report titled *Prioritization of Former MGP* (ES, 1992).

- *1993 to 1994 – Task II Remediation Investigation (Task II RI)*. Blasland, Bouck & Lee, Inc. (BBL) (now ARCADIS) conducted Task II RI activities from April 1992 to January 1994 to achieve the following objectives:

  - Locate and assess potential site-related source areas and areas of impacts

  - Define the extent of constituents in soil, groundwater, surface water, and sediment

  - Determine whether the constituents present a potential significant threat to human health and the environment

Task II RI activities included the following:

- Excavating 21 test pits/trenches
- Drilling 11 soil borings
- Installing four shallow and five deep monitoring wells
- Installing one piezometer
- Collecting soil, groundwater, surface water (from the Susquehanna River), and sediment samples for laboratory analysis

Results of the Task II RI generally indicated that non-aqueous phase liquid (NAPL) was present throughout the former MGP operations area, groundwater and sediment contained MGP-related constituents, and Susquehanna River surface water was not impacted by MGP-related constituents.

Based on the results of the Task II RI, NYSDEC and NYSEG entered into the 1996 Order on Consent (Index Number D7-001-96-03), which provided the framework for subsequent investigation activities that consisted of the following (collectively referred to herein as the Remedial Investigation):

· *1997 – Phase I Supplemental Remedial Investigation (Phase I SRI)*. Phase I SRI (originally called the Supplemental Remedial Investigation) included a subsurface investigation, a Susquehanna River evaluation, and a risk evaluation.

  Subsurface investigation activities were completed to characterize site hydrogeology and the nature and extent of MGP-related impacts. Subsurface investigation activities consisted of drilling 18 soil borings, excavating test pits, installing and gauging 16 monitoring wells and piezometers, testing hydraulic conductivity, measuring soil grain size and physical properties, performing computerized groundwater modeling, and performing geophysical surveys.

  Susquehanna River evaluation activities were completed to identify MGP-related impacts in surface water and sediments and evaluate the potential fate and transport of MGP-related constituents in surface water and sediment. Susquehanna River evaluation activities included sediment probing, sediment and surface water sampling, temperature and conductivity surveying, and deep river

bedrock drilling. Data collected during the river evaluation was used to model river transport of MGP-related impacts. The model demonstrated that impacted media could not be drawn into the City of Binghamton water filtration plant intake (located downstream of the former MGP).

The risk evaluation was completed to characterize human health and ecological risks associated with environmental media containing MGP-related constituents.

- *1998 – 293 and 295 Court Street Investigations*. The 293 and 295 Court Street Investigations were conducted to more fully characterize local hydrogeology and the nature and extent of MGP-related impacts to facilitate completion of the Remedial Investigation. Investigation activities consisted of drilling five soil borings and collecting soil samples on the 293 Court Street property and installing three monitoring wells on the 295 Court Street property. Based on the results of these investigation activities, the 1996 Order on Consent was amended in January 1999 to include the 293 Court Street property and NYSEG subsequently purchased in the 293 Court Street property in September 1999.

- *2001 – Phase II Supplemental Remedial Investigation (Phase II SRI)*. Phase II SRI activities were completed to address data gaps, as identified by NYSDEC, and facilitate completion of the Remedial Investigation. Phase II SRI activities consisted of: drilling 17 borings, excavating test pits, installing four monitoring wells and one piezometer. Additionally, NYSDEC requested that NYSEG assess the potential for exposures to construction workers completing work below Brandywine Avenue and confirm groundwater sampling results from upgradient monitoring wells.

Results of the Phase I SRI, 293 and 295 Court Street Investigations, and Phase II SRI were presented in the Final RI Report (see Attachment 1). The summary of site geology and hydrogeology (presented in the following subsection) and discussion of the nature and extent of remaining OU-1 impacts (as presented in Section 2) has been developed based on the Final RI Report, as well as the IRMs that have been completed to date (also described in Section 2).

1.4.4 Geology and Hydrogeology

Investigation activities completed to date have identified five principal geologic units within OU-1 (in descending order):

- Fill and an assortment of man-made structures (approximately 5 to 10 feet thick)

- Alluvial silt and clay (approximately 5 to 15 feet below grade and 5 to 10 feet thick)
- Outwash sand and gravel (approximately 20 feet below grade and up to 30 feet thick)
- Basal till (approximately 50 feet below grade and approximately 50 feet thick)
- Shale bedrock (approximately 100 feet below grade)

Geologic cross-sections were previously presented as Final RI Report Figures 6, 7, and 8 (see Attachment 1).

The Susquehanna River (where it passes the site and through the City of Binghamton) forms a drainage basin, extending to the north and east. The outwash sand and gravel unit fills much of the Susquehanna River valley (as in runs east to west across central New York) and forms the Clinton Street Ballpark Sole Source Aquifer, which is a United States Environmental Protection (USEPA) designation (USEPA, 2002).

The water table is generally located 8 to 10 feet below grade. A water table contour map was provided as Final RI Report Figure 11 (see Attachment 1). The majority of shallow groundwater in OU-1 moves radially away from the center of the groundwater mound located near the center of OU-1, 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 Susquehanna River. Shallow groundwater in the southwest corner of OU-1 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). As described in Section 2, a jet grout barrier wall was installed around the 66-inch storm sewer as part of the passive NAPL barrier IRM and concrete collars were installed as part of the storm sewer replacement activities to serve as trench plugs.

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 in OU-1 discharges to the Susquehanna River.

2. IRMs and Remaining Impacts

This section presents a summary of the IRMs that have been completed in OU-1 to date, and as a result of the completed IRMs, the nature and extent of impacts remaining in OU-1.

2.1 Summary of IRMs

Several IRMs have been completed in OU-1 to address impacted media and existing exposure/migration pathways. A summary of the IRMs completed to date is presented in the following subsections.

2.1.1 No. 2 Gas Holder Removal

Although documentation of the removal activities could not be located, the No. 2 gas holder was reportedly removed sometime during the late 1990s or early 2000s. As indicated in the Final RI Report (based on historical site inventory), the holder was 84 feet in diameter and was constructed to use a water seal (i.e., the holder extended below the water table so that groundwater could seal the bottom). A possible concrete floor was encountered at 8 feet below grade (during completion of a soil boring within the holder limits); however, test pits completed within the holder limits did not encounter a holder bottom. Assuming a removal depth of 10 feet below grade (similar to the source removal activities, described below), removal of the No.2 gas holder would have resulted in the excavation and transportation for off-site treatment/disposal of approximately 2,000 cubic-yards (cy) soil containing MGP-related impacts (and former gas holder construction material).

2.1.2 Source Area Removal – No. 3 Gas Holder, Tar Well, and Piping Removal

A source removal IRM was completed by NYSEG to mitigate potential further migration of NAPL from source areas within OU-1. The source area removal was completed in two separate phases. Phase 1 was conducted from October 2000 to January 2001 and included removal of the No. 3 gas holder foundation and the tar separating well. Phase 1 source area removal activities generally consisted of the following:

- Excavating the contents of No. 3 gas holder (found to be 120 feet in diameter [i.e., larger than anticipated]).

- Demolishing and removing the 2-foot thick concrete holder floor (located 10 feet below grade).
- Removing a thin layer of NAPL-impacted materiel immediately below the holder floor (the clay below the holder bottom was free of visual impacts).
- Demolishing and removing the holder wall (NAPL was not observed outside the holder wall).
- Backfilling the holder removal area with the top 2 feet of material removed from the holder excavation (i.e., an estimated 1,300 tons) and backfilling the remaining void with imported fill.
- Excavating the contents of the tar separating well (found to be 28 feet in diameter) encountered between No. 2 and No. 3 gas holders, previously identified on historical site mapping as “Settling Tank Ammonia Well”.
- Removing the tar separating well structure walls and internal baffles (NAPL was not observed outside the tar separating well structure walls).
- Removing the tar separating well brick floor (located 10 feet below grade) (NAPL was not below the tar separating well floor).
- Backfilling the tar separating well removal area with imported fill.
- Transporting approximately 9,000 tons excavated material and approximately 68,000 gallons of water off-site for treatment and/or disposal.

Phase 2 was conducted from July to August 2001 and included test trenching and pipe removal. Phase 2 source area removal activities generally consisted of the following:

- Excavating test trenches to locate piping and other buried structures potentially containing free phase NAPL.
- Removing pipes that contained NAPL, the extent practicable, and plugging pipes that could not be removed.

The extent of NAPL-impacted soil encountered during the completion of test trenches was greater than anticipated. With NYSDEC concurrence, further excavation activities

were not required as part of the source area removal IRM to address remaining NAPL-impacted soil (assumed to be present beyond the limits of the test trenches). Soil excavated during the trenching activities was placed back into the trenches, with the most visually impacted material placed in the bottom 2 feet of the trenches and a minimum of 1 foot of visually clean material placed in the top of the trench (i.e., at the ground surface).

Source removal IRM activities were documented in the July 2002 *Final Engineering Report* (FER) (NYSEG, 2002) (included as Appendix A). Test trench locations, pipes and other subsurface structures encountered (and removed, as practicable) during Phase 2 activities are shown on FER Figure 7 (see Appendix A).

2.1.3 Storm Sewer Lining

A storm sewer lining IRM was conducted by NYSEG from July to November 2003 to clean and line the 66-inch storm sewer that transected the NYSEG property to address NAPL that had been observed infiltrating the storm sewer. Objectives of the storm sewer lining IRM consisted of the following:

- Mitigate NAPL infiltration into the on-site portion of the storm sewer pipe
- Remove accumulated debris downstream of manhole MH-1 (located near the southern property boundary along Court Street)
- Remove accumulated debris (containing elevated concentrations of PAHs) from the pump house (located south of Court Street)

Storm sewer lining IRM activities generally consisted of the following:

- Removing accumulated debris in the storm sewer from manhole MH-2 (located immediately north of the NYSEG property) to the pump station (including the pump house floor).
- Power washing the interior of the sewer to remove residual material.
- Installing a polychlorinated vinyl (PVC) liner (produced by Danby Pipe Renovation™) in the 66-inch storm sewer from manhole MH-2 to manhole MH-1, as well as the in 72-inch wide, approximately 50-foot long stone culvert that extends beneath Court Street. The Danby liner system consisted of a 12-inch wide

by 1-inch thick sheet of PVC that was spirally wrapped around the interior of the storm sewer. The continuous PVC joint was sealed with a snap-together PVC gasket.

- Grouting the annular space between the liner and storm sewer pipe/culvert to hold the liner in place

- Transporting approximately 31 tons of debris (removed from the storm sewer) and 17,000 gallons of water off-site for treatment/disposal

Storm sewer lining activities were documented in the May 2005 *Storm Sewer Interim Remedial Measure Documentation Report* (BBL, 2005).

Following completion of the storm sewer lining activities, annual inspections were conducted to monitor the condition of the storm sewer and liner and inspect the liner for signs of seepage. During the 2008 inspection event, the pipe liner system was observed to be leaking in several locations along the continuous joint, potentially allowing impacted groundwater and NAPL to once again enter the storm sewer. Based on the 2008 observations, sewer inspection frequency was increased to three times per year. Similar observations of leakage were noted during the 2009 inspections.

Destructive testing of the liner system was conducted in 2009 to evaluate potential repair options. In areas where the most significant leaking was observed (where liner joints had expanded), one-foot square sections of the liner and grout material behind the liner were removed. Results of the destructive testing indicated that the grout and liner system was compromised and no longer prevented infiltration of impacted groundwater and NAPL into the storm sewer. As discussed in Section 2.1.5, the portion of the 66-inch storm sewer that transects the NYSEG property was ultimately replaced in 2011-2012.

2.1.4 Passive NAPL Barrier

The passive NAPL barrier IRM consisted of the construction of a passive NAPL barrier to mitigate potential off-site migration of NAPL and recover NAPL, to the extent practicable. Following construction of the NAPL barrier, a NAPL monitoring program was implemented to monitor for the presence of NAPL in recovery wells installed upgradient and within the barrier.

2.1.4.1 Barrier Construction

The passive NAPL barrier was constructed from the ground surface and keyed into the till unit to mitigate potential off-site migration of NAPL by intercepting and collecting mobile dense non-aqueous phase liquid (DNAPL) and light non-aqueous phase liquid (LNAPL) (if present).

Passive NAPL barrier construction activities were completed from July through December 2006. The major components of the NAPL barrier consist of the following:

- *Gravel-Filled Collection Trench* – The gravel-filled portion of the NAPL barrier was constructed using biopolymer slurry, which was used to maintain trench sidewall stability during trench excavation. NAPL collection systems were installed within the trench and the trench was backfilled with pea gravel. The trench was constructed to depths between 43 and 58 feet below ground surface (bgs), and the trench was keyed a minimum of 6 inches into the underlying till.

- *Jet-Grouted Low-Permeability Walls* – Due to the presence of a retaining wall, a former holder and the 66-inch storm sewer, two large underground natural gas pipes, and significant underground debris, installation of the gravel trench was not feasible at four locations along the barrier alignment. At each of these locations, a barrier wall was jet grouted into place from the ground surface and keyed a minimum of 6 inches into the underlying till. The jet grouted walls serve as low-permeability walls to divert groundwater (and potentially NAPL) into the gravel-filled trench.

- *DNAPL Collection System* – The gravel-filled portion of the NAPL barrier includes a DNAPL collection system that consists of 6-inch diameter high-density polyethylene (HDPE) slotted lateral collection pipe installed along the top of the till surface and 8-inch diameter stainless steel vertical DNAPL recovery wells containing a 1 to 2 foot deep sump that extends below the lateral collection piping.

- *LNAPL Collection System* – The gravel-filled portion of the NAPL barrier also includes an LNAPL collection system that consists of an HDPE geomembrane installed vertically on the downgradient side of the trench to serve as a barrier for the potential migration of mobile LNAPL, and 8-inch diameter stainless steel vertical LNAPL recovery wells installed to the bottom of the HDPE geomembrane.

Additionally, the design for the NAPL barrier included construction details for an automated LNAPL and DNAPL recovery system. However, as discussed below, based on the results of NAPL monitoring, automated NAPL recovery is not warranted based on the lack of NAPL observed to date. Therefore, an automated NAPL recovery system has not been installed at OU-1.

The location of the passive NAPL barrier and construction details are shown on Figure 3. Additional details regarding the passive NAPL barrier construction activities were presented in the June 2008 *NAPL Barrier Wall Interim Remedial Measure Engineering Certification Report* (ARCADIS, 2008) (included as Appendix C).

2.1.4.2 NAPL Monitoring

Formal NAPL monitoring in OU-1 began April 2007 (although one round of preliminary NAPL monitoring was conducted in January 2007). NAPL monitoring activities generally consist of the following:

- Quarterly monitoring of the 22 passive NAPL barrier NAPL-recovery wells (identified as RW-1 through RW-22).
- Quarterly monitoring of well MW93-6D located in the northwest corner of OU-1.
- Semi-annual monitoring of a series of “sentinel” wells (i.e., monitoring wells and piezometers) located within Court Street between the NAPL barrier and the Susquehanna River.

During the quarterly and semi-annual monitoring events, each location is monitored for depth to groundwater, depth to bottom, and, if present, the thickness of accumulated LNAPL or DNAPL. To date, measurable quantities of NAPL have not accumulated in any of the barrier recovery wells. Only odors, sheens and trace amount of tar-like material have been observed.

LNAPL was detected in two sentinel piezometers located in Court Street, downgradient of the barrier. Specifically, LNAPL was detected in June 2011 at PZ-01-02 (≤0.47 ft) and PZ-03-06B (≤0.54 ft), and again in February 2012 at piezometers PZ01-02 (trace) and PZ-03-06B (≤0.20 ft). Measureable LNAPL was noted at these two locations prior to the installation of the passive NAPL barrier. Additionally, LNAPL has never been identified in any OU-1 monitoring wells (upgradient of the barrier). Therefore, based on the continued absence of LNAPL in the barrier wall recovery wells, the presence of

LNAPL in the Court Street sentinel piezometers is not related to the performance of the passive NAPL barrier.

In July 2009, a measurable thickness of DNAPL was encountered in monitoring well MW93-6D, which is located upgradient of the passive NAPL barrier (i.e., in the northwest corner of OU-1) and was not included in the passive NAPL barrier monitoring program. However, DNAPL has not been historically observed in this monitoring well (although "coal tar residue" was noted during installation of the monitoring well). Since November 2009, monitoring well MW93-6D has been gauged as part the quarterly barrier wall recovery well monitoring. Between July 2009 and August of 2011, a total of 2.11 gallons of DNAPL were removed from monitoring well MW93-6D. As discussed between the NYSDEC, NYSEG, and ARCADIS during the November 29, 2011 storm sewer rehabilitation weekly construction progress meeting, it was necessary to decommission monitoring well MW93-6D to facilitate the installation of the new storm sewer (discussed below). Monitoring well MW93-6D was decommissioned on December 22, 2011 by overdrilling the well and the well was subsequently reinstalled on June 25, 2012.

As presented in the May 9, 2012 *Annual NAPL Monitoring Report* letter (for 2011 activities) from ARCADIS to NYSDEC (ARCADIS, 2012a). Based on the lack of accumulated NAPL in the barrier recovery wells, NYSEG recommend reducing the monitoring frequency of the barrier wall recovery wells to a semiannual basis and continuing the semi-annual monitoring of sentinel wells in Court Street for the 2012 calendar year.

2.1.5 Storm Sewer Replacement

As presented in Section 2.1.3, the Danby liner installed in the 66-inch storm sewer was observed to be leaking in 2008 and 2009. Consequently, a storm sewer replacement was conducted to address infiltration of impacted groundwater and NAPL associated with the former MGP operations into the storm sewer. The storm sewer replacement provided a water- and NAPL-tight storm sewer system across OU-1 that prevents infiltration of potentially impacted groundwater and NAPL into the City of Binghamton storm sewer (and subsequently to the Susquehanna River).

The storm sewer replacement was conducted between October 2011 and March 2012. The major components of the storm sewer replacement consisted of the following:

- Removing select portions the former 66-inch storm sewer to facilitate the installation of the new HDPE manholes and piping.

- Removing portions of the No. 4 gas holder foundation to facilitate the installation of the new HDPE manholes and piping.

- Installing four new HDPE manholes (i.e., manholes MH-1A through MH-1D).

- Installing a new 63-inch external diameter non-structural HDPE pipe. Connections between sections of new HDPE pipe were completed via butt-fusion welding to provide zero-leakage joints. Connections between the new HDPE pipe and manholes were completed using flange connections and cast-in-place concrete collars to limit movement of the pipe joint following installation. Additionally, the concrete collars serve as trench plugs to minimize the potential for trench fill materials and pipe bedding to serve as a potential preferential pathway for NAPL and/or impacted groundwater.

- Connecting the new and existing storm sewer pipes via slip-lined connections to provide zero-leakage joints.

- Abandoning the former 66-inch storm sewer via filling the remaining portion of the pipe with controlled low-strength material (CLSM).

- Restoring areas of OU-1 that were disturbed during the implementation of the storm sewer replacement.

The location of the new storm sewer piping and manholes is shown on Figure 4. Additional details regarding the storm sewer replacement activities were presented in the September 2012 *66-Inch Storm Sewer Replacement Construction Completion Report* (ARCADIS, 2012b) (included as Appendix D).

2.2 Extent of Remaining Impacts

Manufactured gas-production byproducts, typically DNAPL (i.e., coal tar) and purifier waste, often account for the majority of the impacts at former MGP sites. Principal components of coal tar that are routinely analyzed for at MGP sites are benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, which are VOCs, and PAHs, which are SVOCs. The principal toxic chemical associated with purifier waste is

cyanide, and as such, total and free cyanide analyses are typically performed during investigations of MGP sites.

The extent of impacts remaining in OU-1 (following the completion of the IRMs discussed in Section 2.1) is presented in the following subsections.

2.2.1 NAPL Distribution

As described in Section 2.1, potential source areas of DNAPL have been removed (i.e., No. 2 and No. 3 gas holders, tar separating well, and former MGP pipes containing NAPL). However, based on the nature of the NAPL (i.e., DNAPL), NAPL has migrated from source areas (above the water table) downward (below the water table), through fractures and bedding planes in the silt and clay unit, and into the sand and gravel unit. The till unit appears to be confining with respect to the downward migration of NAPL. Additionally, DNAPL has spread laterally in the direction of groundwater flow (i.e., generally southward). The approximate extent of NAPL remaining in OU-1 is shown on Figure 5. As indicated in the Final RI Report, a majority of the NAPL identified in OU-1 is located below the water table. As described in Section 2.1, the No. 3 gas holder, tar separating well, and No. 2 gas holder (reportedly) areas have been excavated to a depth of 10 feet bgs. Based on the heterogeneous nature of the site geology, NAPL is distributed irregularly throughout OU-1: NAPL has migrated below the silt and clay unit at several isolated locations throughout OU-1.

As discussed in the Final RI Report, potential preferential pathways for NAPL migration (beyond the limits of OU-1) included the 66-inch storm sewer (in the southwest corner of OU-1) and in the southeast corner of OU-1 where several pipes penetrated the flood wall. NAPL migrating along these preferential pathways is located beneath Court Street (where residual NAPL has been observed) and potentially, in part, responsible for the impacts observed in Susquehanna River sediments (i.e., OU-2, and therefore, not discussed as part of the FFS Report). However, further migration of NAPL to the Susquehanna River has been addressed through construction of the passive NAPL barrier IRM and the 66-inch storm sewer replacement. Much of the DNAPL remaining in OU-1 appears to be residual NAPL (i.e., NAPL in quantities below residual saturation and is immobile and trapped in soil pore spaces). Pooled NAPL (i.e., NAPL in quantities above residual saturation) has rarely been encountered in OU-1. Results of the periodic NAPL monitoring currently conducted in OU-1 (discussed in Section 2.1) further demonstrates that a majority of the NAPL remaining in OU-1 has limited mobility.

Additionally, as shown on Figure 5, petroleum NAPL was observed east and northeast of the NYSEG property. The petroleum NAPL is located approximately 15 to 22 feet bgs, below the silt and clay near the top of the sand and gravel. As indicated in the Final RI Report, petroleum impacts likely originate north of the former MGP, where a scrap yard and oil refinery were previously located.

2.2.2 Soil Quality

During the time of the Remedial Investigation, a majority of OU-1 was covered with paved surfaces and imported gravel. Surface soil samples were generally collected within the upper most 6 inches of soil. However, a number of samples were also collected from 0 to 2 feet below grade to characterize surface and near-surface soil conditions. Analytical results indicate that surface and near-surface soil samples did not contain BTEX compounds or PAHs at concentrations greater than guidance values. Note that because the Remedial Investigation was completed in 2002, analytical results for soil samples were compared to NYSDEC's *Technical and Administrative Guidance Memorandum* (TAGM) *HWR-94-4046* (TAGM 4046) (NYSDEC, 1994), which has since been rescinded.

Soil containing visual impacts is assumed to contain MGP-related constituents of concern (COCs) (i.e., BTEX and PAHs) at concentrations above applicable criteria. Site-specific screening values of 10 milligrams per kilogram (mg/kg) total BTEX and 500 mg/kg total PAHs have been established to aid in the delineation of soil containing MGP-related impacts. These site-specific criteria have routinely been used at other former MGP sites to evaluate the extent of soil containing MGP-related impacts.

Total BTEX and total PAH concentrations detected in subsurface soil samples (i.e., collected at depths greater than 2 feet below grade) are shown on Figure 6. In general, the areal extent of subsurface soil above the water table that contains elevated concentrations of total BTEX and total PAHs is located in the northern portion of OU-1 in areas associated with several oil tanks (Nos.1, 2, and 6), former No 2. gas holder, and the retorts. As indicated in Section 2.1, the No. 2 and No. 3 gas holders, the tar separating well structure, as well as the impacted soil within the structures, have been removed.

Below the water table, the extent of subsurface soil containing elevated concentrations of total BTEX and total PAHs strongly correlates to the NAPL distribution observed in OU-1, with the greatest concentrations of total BTEX and total PAHs generally located in the immediate vicinity of former gas holders, tar separating wells, and oil tanks.

Additionally, as shown on Figure 5, soil samples collected from the 295 Court Street property and upgradient of OU-1, contained elevated concentrations of VOCs and SVOCs (as well as NAPL) associated with petroleum-related impacts.

2.2.3 Groundwater Quality

Similar to the extent of subsurface soil containing elevated concentrations of MGP-related COCs, the extent of groundwater containing MGP-related impacts strongly correlates to the distribution of visually impacted material. Locations of groundwater samples containing BTEX and PAH compounds and cyanide at concentrations greater than NYSDEC's *Division of Water, TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (NYSDEC, 2004) Class GA standards and guidance values are shown on Figure 7. Analytical results for groundwater samples collected from OU-1(in 1997 as part of the Remedial Investigation) generally indicate the following:

- VOCs and SVOCs were detected in shallow groundwater at numerous locations throughout the NYSEG property. Additionally, VOCs and SVOCs were detected at elevated concentrations south of the NYSEG property (i.e., below Court Street) near the 66-inch storm sewer and near where several pipes penetrated the flood wall (to the southeast) (i.e., areas identified as potential historic NAPL migration pathways).

- Groundwater within the sand and gravel unit in OU-1 (i.e., on the NYSEG property and below Court Street) contains BTEX and PAH compounds at concentrations greater than NYSDEC Class GA standards and guidance values.

- Groundwater samples collected from both shallow and deep wells in OU-1 (as well as upgradient and downgradient wells) contain at least one inorganic compound at concentrations greater that NYSDEC Class GA standards and guidance values.

- Groundwater within the bedrock unit does not contain MGP-related constituents.

Additionally, as discussed in the Final RI Report, chlorinated hydrocarbons (i.e., 1,1,1-trichloroethane and 1,1-dichloroethane) were detected in groundwater samples collected from monitoring wells screened within the sand and gravel unit at concentrations greater that NYSDEC Class GA standards and guidance values. The chlorinated hydrocarbons were also detected in groundwater samples collected from deep monitoring wells at both upgradient and downgradient locations, indicating that

chlorinated hydrocarbons are present due to an upgradient source. Similar to the petroleum impacts observed east and northeast of the NYSEG property, the chlorinated hydrocarbons are likely associated with the scrap yard and oil refinery operations that were previously conducted north of the NYSEG property.

3. Identification of Standards, Criteria, and Guidance

This FFS Report was prepared in general conformance with the applicable guidelines, criteria and considerations set forth in the DER-10 and 6 NYCRR Part 375 Environmental Remediation Programs (NYSDEC, 2006). This section presents the SCGs that have been identified for OU-1.

3.1 Definition of Standards, Criteria, and Guidance

"Standards and criteria" are cleanup standards, standards of control and other substantive environmental protection requirements, criteria or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance.

"Guidance" is non-promulgated criteria, advisories and/or guidance that are not legal requirements and do not have the same status as "standards and criteria;" however, remedial programs should be designed with consideration given to guidance documents that, based on professional judgment, are determined to be applicable to the project (6 NYCRR 375-1.8[f][2][ii]).

Standards, criteria and guidance will be applied so that the selected remedy will conform to standards and criteria that are generally applicable, consistently applied and officially promulgated; and that are either directly applicable, or that are not directly applicable but relevant and appropriate, unless good cause (as defined in 6 NYCRR 375-1.8 [f][2][i]) exists why conformity should be dispensed with.

3.2 Types of Standards, Criteria, and Guidance

Potential SCGs considered in this FS Report were categorized in the following classifications:

- *Chemical-Specific SCGs* – These SCGs are health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical values for each COC. These values establish the acceptable amount or concentration of chemical constituents that may be found in, or discharged to, the ambient environment.

- *Action-Specific SCGs* – These SCGs are technology- or activity-based requirements or limitations on actions taken with respect to hazardous waste management and remediation.

- *Location-Specific SCGs* – These SCGs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in specific locations.

3.3 Standards, Criteria, and Guidance

The SCGs identified for the evaluation of remedial alternatives are presented in the following subsections. These SCGs have been identified as potentially applicable; their actual applicability will be determined during the evaluation of a particular remedy, and further described during development of the remedial design (i.e., after the final remedy has been selected). Each potential remedy will comply with the identified SCGs, or indicate why compliance with an SCG cannot or will not be obtained.

3.3.1 Chemical-Specific Standards, Criteria, and Guidelines

The potential chemical-specific SCGs for OU-1 are summarized in Table 1. Chemical-specific SCGs are the criteria that typically drive the remedial efforts at former MGP sites because they are most directly associated with addressing potential human exposure. The primary chemical-specific SCGs that exist for impacted soil and groundwater are briefly summarized below.

The SCOs presented in 6 NYCRR Part 375-6 are chemical-specific SCGs that are relevant and appropriate to OU-1. Specifically, the soil cleanup objectives (SCOs) for the protection of human health assuming a future use (commercial use SCOs) are applicable (based on current property zoning). Additionally, CP-51 *Soil Cleanup Guidance* (NYSDEC, 2010b) allows for a subsurface soil total PAH SCO of 500 mg/kg at non-residential sites (i.e., commercial and industrial use sites).

Chemical-specific SCGs that potentially apply to the waste materials generated during remedial activities are the Resource Conservation and Recovery Act (RCRA) and New York State regulations regarding identifying and listing hazardous wastes outlined in 40 Code of Federal Regulations (CFR) 261 and 6 NYCRR Part 371, respectively. Included in these regulations are the regulated levels for the Toxicity Characteristic Leaching Procedure (TCLP) constituents. The TCLP constituent levels are a set of numerical criteria at which solid waste is considered a hazardous waste by the characteristic of

toxicity. In addition, the hazardous characteristics of ignitability, reactivity and corrosivity may also apply, depending upon the results of waste characterization activities.

Groundwater beneath OU-1 is classified as Class GA and, as such, the ambient water quality standards presented in the NYSDEC's *Division of Water, TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (NYSDEC, 2004) are potentially applicable. These standards identify acceptable levels of constituents in groundwater based on potable use.

3.3.2 Action-Specific Standards, Criteria, and Guidelines

Potential action-specific SCGs are summarized in Table 2. Action-specific SCGs include general health and safety requirements, and general requirements regarding handling and disposal of waste materials (including transportation and disposal, permitting, manifesting, disposal and treatment facilities), discharge of water generated during implementation of remedial alternatives, and air monitoring requirements (including permitting requirements for on-site treatment systems). Action-specific criteria will be identified for the selected remedy in the remedial design work plan; compliance with these criteria will be required. Several action-specific SCGs that may be applicable are briefly summarized below.

The NYSDEC Division of Air Resources (DAR) policy document *DAR-1: Guidelines for the Control of Toxic Ambient Air Contaminants* (formerly issued as Air Guide 1), incorporates applicable federal and New York State regulations and requirements pertaining to air emissions, which may be applicable for soil or groundwater alternatives that result in certain air emissions. Community air monitoring may be required in accordance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan. New York Air Quality Standards provides requirements for air emissions (6 NYCRR Parts 257). Emissions from remedial activities will meet the air quality standards based on the air quality class set forth in the New York State Air Quality Classification System (6 NYCRR Part 256) and the permit requirements in New York Permits and Certificates (6 NYCRR Part 201).

One set of potential action-specific SCGs consists of the land disposal regulations (LDRs), which regulate land disposal of hazardous wastes. LDRs are applicable to alternatives involving the disposal of hazardous waste (if any). Because MGP wastes resulted from historical operations that ended before the passage of the Resource Conservation and Recovery Act (RCRA), material containing MGP-related impacts is

only considered a hazardous waste in New York if it is removed (generated) and it exhibits a characteristic of a hazardous waste. However, if the impacted material only exhibits the hazardous characteristic of toxicity for benzene (D018), it is conditionally exempt from the hazardous waste management requirements (6 NYCRR Parts 370-374 and 376) when destined for thermal treatment in accordance with the requirements set forth in NYSDEC's TAGM HWR-4061, *Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants* (DER-4) (NYSDEC, 2002). If MGP-related hazardous wastes are destined for land disposal in New York, the state hazardous waste regulations apply, including LDRs and alternative LDR treatment standards for hazardous waste soil.

The NYSDEC will no longer allow amendment of soil at MGP sites with lime kiln dust/ quick lime containing greater than 50% calcium and/or magnesium oxide (Ca/MgO) due to vapor issues associated with free oxides. Guidance issued in the form of a letter from the NYSDEC to the New York State utility companies, dated May 20, 2008, indicated that lime kiln dust/quick lime will not be permitted for use during future remedial activities.

The United States Department of Transportation (USDOT) and New York State rules for the transport of hazardous materials are provided in 49 CFR Parts 107 and 171.1 through 172.558 and 6 NYCRR 372.3. These rules include procedures for packaging, labeling, manifesting and transporting hazardous materials and are potentially applicable to the transport of hazardous materials under any remedial alternative. New York State requirements for waste transporter permits are included in 6 NYCRR Part 364, along with standards for collection, transport and delivery of regulated wastes within New York. Contractors transporting waste materials off site during the selected remedial alternative must be properly permitted.

Remedial alternatives conducted within OU-1 must comply with applicable requirements outlined under the Occupational Safety and Health Administration (OSHA). General industry standards are outlined under OSHA (29 CFR 1910) that specify time-weighted average concentrations for worker exposure to various compounds and training requirements for workers involved with hazardous waste operations. The types of safety equipment and procedures to be followed during remediation are specified under 29 CFR 1926, and record keeping and reporting-related regulations are outlined under 29 CFR 1904.

In addition to OSHA requirements, the RCRA (40 CFR 264) preparedness and prevention procedures, contingency plan and emergency procedures are potentially

relevant and appropriate to those remedial alternatives that include generation, treatment or storage of hazardous wastes.

3.3.3 Location-Specific Standards, Criteria, and Guidelines

Potential location-specific SCGs are summarized in Table 3. Examples of potential location-specific SCGs include regulations and federal acts concerning activities conducted in floodplains, wetlands and historical areas, and activities affecting navigable waters and endangered/threatened or rare species.

Based on the Federal Emergency Management Agency (FEMA) National Flood Insurance Program Map Number 3600380002C, dated June 1, 1977, OU-1 is located between the limits of a 100-year and a 500-year floodplain.

Location-specific SCGs also include local requirements, such as local building permit conditions for permanent or semi-permanent facilities constructed during the remedial activities (if any), City of Binghamton Department of Public Works (DPW) and New York State Department of Transportation (NYSDOT) street work permits, and influent/pre-treatment requirements for discharging water to the Publicly-Owned Treatment Works (POTW).

4. Development of Remedial Action Objectives

This section presents the RAOs for impacted media. These RAOs represent medium-specific goals that are protective of public health and the environment that have been developed through consideration of the results of the investigation activities and with reference to potential SCGs, as well as current and foreseeable future anticipated land uses. RAOs are developed to specify the COCs, and to assist in developing goals for cleanup of COCs in each medium that may require remediation.

4.1 Risk Evaluation Summary

A risk evaluation was conducted as part of the Remedial Investigation to evaluate potential human and environment exposure pathways to MGP-related impacts. Potential wildlife exposure pathways were evaluated by conducting a Fish and Wildlife Resource Impact Analysis (FWRIA). Potential human exposure pathways were evaluated through a Human Heath Exposure Assessment (HHEA).

As presented in the Final RI Report, the presence of COCs at concentrations above applicable criteria is not necessary indicative of unacceptable levels of risk. The determination of risk also considers dose, exposure route, and the frequency and duration of exposure. All of the following must be present for an exposure pathway to be complete:

- Contaminant source (i.e., COCs are presented in media)
- Contaminant release and transport mechanisms (i.e., exposure locations exist)
- Route of exposure (i.e., direct contact through ingestion or dermal contact, or indirect contact via inhalation).

The following conclusions were reached based on the FWRIA and HHEA:

- *Surface Soil* – Analytical results indicate that surface and near-surface soil samples did not contain BTEX or PAHs compounds at concentrations greater than guidance values: risk levels associated with site worker exposure to surface soil (i.e., former vegetated area in the eastern portion of OU-1) are below acceptable risk levels. Additionally, a vast majority of OU-1 provides no or limited value as a terrestrial habitat. Therefore, due to the limited wildlife habitat and extensive gravel cover, wildlife exposure to surface soil is unlikely.

- *Subsurface Soil* – Subsurface soil contains elevated concentration of BTEX and PAH compounds, as well as NAPL. Although routine site operations do not include intrusive activities (and intrusive activities would be conducted in accordance with NYSEG's HASP), the potential exists for workers to be exposed to subsurface soil containing MGP-related impacts. However, the potential for human exposure to subsurface soil is unlikely based on the following:

  - OU-1 is secure with fencing and a locked gate
  - an OSHA-compliant health and safety plan (HASP) exists for conducting excavation activities in OU-1
  - a majority OU-1 is covered with approximately 18 inches of gravel/imported fill or pavement

  Additionally, construction workers conducting work within Court Street or along Brandywine Avenue could be exposed to soil containing MGP-related impacts. Site and construction workers could potentially be exposed to airborne VOCs and dust during intrusive work (i.e. excavation activities). As noted in the Final RI Report, potential exposures exist to city workers performing maintenance on the 66-inch storm sewer. However, this exposure pathway has since been eliminated through the completion of the storm sewer replacement activities, discussed in Section 2.1.

- *Groundwater* – Although groundwater contains MGP-related impacts, site groundwater is not used for public drinking supply and drinking water to surrounding areas is provided via a municipal supply (derived from the Susquehanna River). Similar to subsurface soil, routine site operations do not include intrusive activities (and intrusive activities would be conducted in accordance with NYSEG's HASP). However, the potential exists for site workers to be exposed to groundwater containing MGP-related impacts within the NYSEG property and for construction workers conducting work within Court Street or along Brandywine Avenue. Based on the depth to groundwater, wildlife is not anticipated to be exposed to groundwater containing MGP-related impacts.

4.2 Remedial Action Objectives

RAOs are developed to specify the COCs, and to assist in developing goals for cleanup of COCs in each medium that may require remediation. The RAOs presented

in the following table have been developed based on the generic RAOs listed on NYSDEC's website (http://www.dec.ny.gov/regulations/67560.html).

Table 4.1 Remedial Action Objectives

RAOs for Soil
RAOs for Public Health Protection 1. Prevent, to the extent practicable, ingestion/direct contact with MGP-related COCs/NAPL. 2. Prevent, to the extent practicable, inhalation of or exposure to MGP-related COCs from impacted soil. *RAOs for Environmental Protection* 3. Address, to the extent practicable, MGP-related COCs/NAPL in soil that could result in impacts to groundwater, surface water, or sediment.
RAOs for Groundwater
RAOs for Public Health Protection 4. Prevent, to the extent practicable, ingestion of groundwater containing MGP-related dissolved phase COCs at concentrations exceeding NYSDEC groundwater quality standards or guidance values. 5. Prevent, to the extent practicable, contact with or inhalation of VOCs from groundwater containing MGP-related COCs at concentrations exceeding NYSDEC groundwater quality standards or guidance values. *RAOs for Environmental Protection* 6. Restore groundwater to pre-disposal/pre-release conditions, to the extent practicable. 7. Address the source of MGP-related groundwater impacts to the extent practicable.

5. Detailed Evaluation of Remedial Alternatives

This section presents detailed descriptions of the remedial alternatives developed to address remaining impacts. Each of the retained remedial alternatives is evaluated with respect to the criteria presented in DER-10. The results of the detailed evaluation of the remedial alternatives are used to aid in the recommendation of a preferred remedial alternative for addressing remaining impacted media.

5.1 Description of Evaluation Criteria

Consistent with DER-10, the detailed evaluation of remedial alternatives presented in this section consists of an evaluation of alternative against the following criteria:

- Short-Term Impacts and Effectiveness
- Long-Term Effectiveness and Permanence
- Land Use
- Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment
- Implementability
- Compliance with SCGs
- Overall Protectiveness of Public Health and the Environment
- Cost Effectiveness

Descriptions of the evaluation criteria are presented in the following subsections. Additional criteria, including community acceptance, will be addressed following submittal of this FFS Report.

Per DER-10, sustainability and green remediation will also be considered in the remedial evaluation with the goal of minimizing ancillary environmental impacts such as greenhouse gas emissions (GHGs) during the implementation of remedial programs. The evaluation will consider the alternative's ability to minimize energy use; reduce greenhouse gas and other emissions; maximize reuse of land and recycling of materials; and preserve, enhance, or create natural habitats, etc. Sustainability and green remediation will be discussed under the short-term impacts and effectiveness criterion.

5.1.1 Short-Term Impacts and Effectiveness

The short-term impacts and effectiveness criterion is used to evaluate the remedial alternative relative to its potential effect on public health and the environment during

construction and/or implementation of the alternative. The evaluation of each alternative with respect to its short-term impacts and effectiveness will consider the following:

- Potential short-term adverse impacts and nuisances to which the public and environment may be exposed during implementation of the alternative.
- Potential impacts to workers during implementation of the remedial actions and the effectiveness and reliability of protective measures.
- Amount of time required to implement the remedy and the time until the remedial objectives are achieved.
- The sustainability and use of green remediation practices utilized during implementation of the remedy.

5.1.2 Long-Term Effectiveness and Permanence

The evaluation of each remedial alternative relative to its long-term effectiveness and permanence is made by considering the risks that may remain following completion of the remedial alternative. The following factors will be assessed in the evaluation of the alternative's long-term effectiveness and permanence:

- Potential impacts to human receptors, ecological receptors, and the environment from untreated waste or treatment residuals remaining at the completion of the remedial alternative.
- The adequacy and reliability of institutional and/or engineering controls (if any) that will be used to manage treatment residuals or remaining untreated impacted media.

5.1.3 Land Use

This criterion evaluates the current and intended future land use of the site relative to the cleanup objectives of the remedial alternative when unrestricted use cleanup levels would not be achieved. This evaluation considers local zoning laws, proximity to residential property, accessibility to infrastructure, and proximity to natural resources including groundwater drinking supplies.

5.1.4 Reduction of Toxicity, Mobility, and Volume through Treatment

This evaluation criterion addresses the degree to which the remedial alternative will permanently reduce the toxicity, mobility, or volume of the constituents present in the media through treatment.

5.1.5 Implementability

This criterion addresses the technical and administrative feasibility of implementing the remedial alternative, including the availability of the various services and materials required for implementation. The following factors will be considered during the implementability evaluation:

- *Technical Feasibility* – This factor considers the remedial alternative's constructability, as well as the ability to monitor the effectiveness of the remedial alternative.

- *Administrative Feasibility* – This factor refers to the availability of necessary personnel and material along with potential difficulties in obtaining approvals for long-term operation of treatment systems, access agreements for construction, and acquiring necessary approvals and permits for remedial construction.

5.1.6 Compliance with SCGs

This criterion evaluates the remedial alternative's ability to comply with SCGs that were identified in Section 3. Compliance with the following items is considered during evaluation of the remedial alternative:

- Chemical-specific SCGs
- Action-specific SCGs
- Location-specific SCGs

Potentially applicable chemical-, action-, and location-specific SCGs are presented in Tables 1, 2 and 3, respectively.

5.1.7 Overall Protection of Public Health and the Environment

This criterion evaluates whether the remedial alternative provides adequate protection of public health and the environment based on the following:

- How the alternative would eliminate, reduce, or control (through removal, treatment, containment, other engineering controls, or institutional controls) any existing or potential human exposures or environmental impacts that have been identified.
- The ability of the remedial alternative to meet the site-specific RAOs.
- A combination of the above-listed criteria including: long-term effectiveness and permanence; short-term impacts and effectiveness; and compliance with SCGs.

5.1.8 Cost Effectiveness

This criterion evaluates the overall cost of the alternative relative to the effectiveness of the alternative (i.e., cost compared to long-term effectiveness and permanence, short-term impacts and effectiveness, and reduction of toxicity, mobility, and volume through treatment).

The estimated total cost to implement the remedial alternative is based on a present worth analysis of the sum of the direct capital costs (materials, equipment, and labor), indirect capital costs (engineering, licenses/permits, and contingency allowances), and operation and maintenance (O&M) costs. O&M costs may include future site management, operating labor, energy, chemicals, and sampling and analysis. These costs will be estimated with an anticipated accuracy between -30% to +50%. A 20% contingency factor is included to cover unforeseen costs incurred during implementation of the remedial alternative. Present-worth costs are calculated for alternatives expected to last more than 2 years. A 4% discount (i.e., interest) rate is used to determine the present-worth factor.

5.2 Identification of Remedial Alternatives

This Focused Feasibility Study has been conducted in general accordance with DER-10. However, this Focused Feasibility Study does not include identification of general response actions (GRAs) and associated remedial technology types and technology process options, or technology screening to retain the technology types and process options that could be implemented and would potentially be effective at achieving the site-specific RAOs.

As indicated in Section 1, based on extent of remedial construction activities that have been completed at OU-1 to date (i.e., the IRMs described in Section 2), and with concurrence from NYSDEC, the evaluation of potential remedial measures to address

remaining environmental impacts does not include an evaluation of a variety remedial alternatives (i.e., in terms of technologies and extent of remedial activities). Rather, this Focused Feasibility Study has been conducted to center on OU-1 remedial alternatives that include: 1) no further action; and 2) conducting groundwater/NAPL monitoring and establishing institutional controls. The detailed evaluation of remedial alternatives (presented in the Section 5.3) does not include additional remedial alternatives based on the following rationale:

- Removal of the No. 2 and No. 3 gas holders, the tar separating well, and removal and/or capping former MGP piping that contains NAPL has resulted in the removal of more than an estimated 8,000 cy of grossly impacted material within the former MGP structures (as well as the structures).

- Construction of the passive NAPL barrier IRM and replacement of the former 66-inch storm sewer have significantly reduced the potential for NAPL to further migrate beyond the NYSEG property (i.e., to the Susquehanna River). Installation of jet grout barrier around the 66-inch storm sewer (as part of the passive NAPL barrier IRM) and installation of concrete collars around the new 63-inch storm reduces the potential for trench fill materials and pipe bedding to serve as a preferential pathway.

- As indicated in Section 1, analytical results indicated that surface soils do not contain elevated concentrations of total BTEX or total PAHs. A majority OU-1 is covered with approximately 18 inches of gravel/imported fill or pavement. Furthermore, visually impacted material is generally encountered at a minimum depth of 5 feet below grade.

- A majority of the NAPL in OU-1 is located below the water table. Based on the heterogeneous nature of the site geology, the distribution of NAPL is highly irregular: NAPL has migrated below the silt and clay unit at several isolated locations throughout OU-1. As routine site operations do not include intrusive activities, there is limited potential for future worker exposure to impacted soil (and groundwater).

- Where MGP-related impacts are present below the silt and clay unit at isolated locations (i.e., at depths up to 40 feet below grade), more than 30 feet of visually clean overburden material would require excavation to remove the visually impacted material. Excavation activities to restore OU-1 to pre-disposal/pre-release conditions would result in the removal of more than estimated 150,000 cy

of soil. Excavation activities on this large scale would present numerous implementation challenges and would have significant disruption to the surrounding community. Soil removal activities in OU-1 would have to be conducted in a manner such that existing infrastructure (e.g., sewer lines, water lines, gas lines, Susquehanna River flood wall, and Court Street) is protected and/or relocated. Additionally, the large-scale excavation activities would take multiple years to complete (i.e., up to 5 years or more) and would result in more than an estimated 13,000 truck trips on local roadways to facilitate off-site transportation of excavated soil and importation of backfill.

5.3 Detailed Evaluation of Alternatives

This subsection presents the detailed analysis of the following alternatives:

- Alternative 1 – No Action
- Alternative 2 – Monitoring and Institutional Controls

Each alternative is evaluated against the evaluation criteria described above (as indicated, public acceptance will be evaluated following submittal of this FFS Report).

5.3.1 Alternative 1 – No Action

The “No Action” alternative was retained for evaluation for each of the environmental media to be addressed as required by DER-10. The “No Action” alternative serves as the baseline for comparison of the overall effectiveness of the other remedial alternatives. The “No Action” alternative would not involve implementation of any remedial activities to address MGP-related impacts. OU-1 would remain in its current condition and no effort would be made to change or monitor the current OU-1 conditions.

Short-Term Impacts and Effectiveness – Alternative 1

No remedial actions would be implemented to address impacted environmental media. Therefore, there would be no short-term environmental impacts, nor risks associated with remedial activities would be posed to the community.

Long-Term Effectiveness and Permanence – Alternative 1

The "No Action" alternative would not directly address impacted media or the potential for on-going releases and/or migration of impacts. However, a majority OU-1 is covered with approximately 18 inches of gravel/imported fill or pavement, which provides a physical barrier to subsurface impacts, and visually impacted material is generally encountered at a minimum depth of 5 feet below grade. Additionally, as discussed in previous sections, through construction of the passive NAPL barrier and installation of the new 63-inch storm sewer, the potential for NAPL to further migrate beyond the NYSEG property (including through preferential pathways) has been addressed. However, Alternative 1 would not include any means to monitor and document site conditions, and would not address the potential for exposure to future site workers.

Land Use – Alternative 1

The current zoning for OU-1 is listed as industrial use (i.e., heavy industrial [I-3]). Areas immediately surrounding OU-1 are also zoned for industrial use (i.e., heavy industrial [I-3]). The nearest residential areas (i.e., one and two unit dwelling [I-2] and multi-unit dwelling [R-3]) are located approximately 0.25 miles east and west of OU-1, as well as south of OU-1 (i.e., south of the Susquehanna River). The current and foreseeable future use of OU-1 and the immediately surrounding area is industrial. OU-1 will continue to be used by NYSEG for equipment/material storage and parking.

No remedial actions would be completed under this alternative and OU-1 would remain in its current condition. As routine activities conducted within OU-1 do not include exposure to MGP-related impacts in soil and groundwater, the "No Action" alternative would not alter the anticipated future intended use of OU-1.

Reduction of Toxicity, Mobility or Volume of Contamination through Treatment – Alternative 1

Under the "No Action" alternative, environmental media would not be treated (other than by natural processes), recycled, or destroyed. As indicated above, more than an estimated 8,000 cy of MGP source material has already been removed from locations above the water table. Although, the passive NAPL barrier and the new 63-inch storm sewer provide a means to contain NAPL to the NYSEG property (i.e., reduce the potential for further migration to the Susquehanna River), Alternative 1 would not include a means to remove NAPL from the subsurface or document the extent of

groundwater impacts. Therefore, the toxicity, mobility, and volume of environmental media containing MGP-related impacts would not be reduced.

Implementability – Alternative 1

The "No Action" alternative does not require implementation of any remedial activities, and therefore is technically and administratively implementable.

Compliance with SCGs – Alternative 1

- *Chemical-Specific SCGs*: Because removal or treatment is not included as part of this alternative, the chemical-specific SCGs would not be met by this alternative.

- *Action-Specific SCGs*: This alternative does not involve implementation of any remedial activities; therefore, the action-specific SCGs are not applicable.

- *Location-Specific SCGs*: Because no remedial activities would be conducted under this alternative, the location-specific SCGs are not applicable.

Overall Protection of Public Health and the Environment – Alternative 1

As indicated above, the "No Action" alternative would not directly address impacted media. However, the passive NAPL barrier significantly reduces the potential for NAPL to migrate beyond the NYSEG property (i.e., to the Susquehanna River) and replacement of the former 66-inch concrete storm sewer with the new 63-inch HDPE storm sewer eliminates a preferential pathway for NAPL migration.

Although a majority of NAPL remaining in OU-1 is located below the water table and public groundwater in the vicinity of OU-1 is provided via municipal supply, Alternative 1 does not include means to prevent future worker exposure (i.e., direct contact, ingestion, and inhalation) to MGP-related impacts in subsurface soil and groundwater (soil RAOs #1 and #2 and groundwater RAOs #1 and #2). The passive NAPL barrier and new 63-inch storm sewer would work toward addressing NAPL that could result in impacts to groundwater, surface water, or sediment (soil RAO #3) through the collection of remaining mobile NAPL (if any) and addressing a preferential pathway for NAPL migration beyond the NYSEG property (i.e., to the Susquehanna River). Although mobile NAPL would be permanently removed, immobile NAPL and impacted soil (a source to dissolved phase impacts) would remain. Previous IRMs and the storm sewer replacement addressed a substantial amount of source material. However,

Alternative 1 is not expected to restore groundwater to pre-disposal/pre-release conditions (groundwater RAO #3) in the foreseeable future nor does it address all sources of groundwater impacts (groundwater RAO #4).

Cost Effectiveness – Alternative 1

The "No Action" alternative does not involve implementation of any active remedial activities or monitoring conditions; therefore, there are no costs associated with this alternative.

5.3.2 Alternative 2 – Monitoring and Institutional Controls

The major components of Alternative 2 consist of:

- Conducting long-term groundwater monitoring
- Continuing the on-going NAPL monitoring activities
- Developing a site management plan (SMP)
- Establishing institutional controls

Alternative 2 would address the potential for exposure to subsurface soil and groundwater containing MGP-related impacts through the implementation of institutional controls. Alternative 2 also includes NAPL monitoring to facilitate the removal of potentially mobile NAPL from the subsurface. This alternative also includes long-term groundwater monitoring to document the extent of dissolved phase impacts and potential trends in COC concentrations.

As described in Section 2, both shallow groundwater and groundwater within the sand and gravel unit contain elevated concentrations of BTEX and PAHs. Although there are no current users of groundwater or exposures to impacted groundwater in OU-1, this alternative would include conducting periodic groundwater monitoring to document potential changes in groundwater conditions. Periodic groundwater monitoring activities would consist of collecting groundwater samples from the existing groundwater monitoring well network. The specific wells to be sampled would be determined during the remedial design for this alternative. Groundwater samples would be submitted for laboratory analysis for BTEX and PAHs. Analytical results would be used to document the extent of dissolved phase impacts and potential trends in COC concentrations. Groundwater monitoring results would be presented to NYSDEC in an annual report. Based on the results of the monitoring activities, NYSEG may request to modify the quantity of wells sampled or the frequency of sampling events. However, for

the purpose of developing a cost estimate for this alternative, it has been assumed that groundwater monitoring activities would be conducted on an annual basis for 30 years.

As indicated in Section 2, semi-annual NAPL monitoring is currently conducted to evaluate the presence of (and remove if present) NAPL in the barrier wall recovery wells, as well as piezometers and groundwater monitoring wells located both upgradient and downgradient of the passive NAPL barrier. Under Alternative 2, semi-annual NAPL monitoring would continue to be conducted in OU-1. If warranted based on the rate of NAPL recovery, NAPL could be removed via an automated pumping system (similar to that included in the remedial design of the passive NAPL barrier, as described in Section 2). However, NAPL has not been observed in the barrier wall recovery wells to date and therefore, automated NAPL recovery is not anticipated to be required. For the purpose of developing a cost estimate for this alternative, the NAPL monitoring activities are assumed to consist of passive NAPL recovery with manual methods (i.e., manual bailing or by pumping with a portable pump) conducted for 30 years. Similar to the periodic monitoring, based on the results of the NAPL monitoring, NYSEG may request to modify the quantity of wells monitored or the frequency of monitoring events.

Alternative 2 would also include establishing institutional controls for the NYSEG property portion OU-1 in the form of deed restrictions and/or environmental easements to control intrusive (i.e., subsurface) activities that could result in potential exposures to subsurface soil and groundwater containing MGP-related impacts at concentrations greater than applicable standards and guidance values. Additionally, the institutional controls would require compliance with the SMP (described below) that would be prepared as part of this alternative. Although potable water is provided by a municipal supply, the institutional controls would also prohibit the use of non-treated groundwater from the NYSEG property. An annual report would be submitted to NYSDEC to document that institutional controls are maintained and remain effective.

As indicated above, this alternative would include preparation of an SMP that would document the following:

- The institutional controls that have been established and will be maintained for OU-1

- Known locations of soil containing COCs at concentrations greater than 6 NYCRR Part 375-6 industrial use SCOs

- Protocols (including health and safety and community air monitoring requirements) for conducting invasive (i.e., subsurface) activities and managing potentially impacted material encountered during these activities

- Protocols and requirements for conducting annual groundwater monitoring and semi-annual NAPL monitoring

- Protocols for addressing significant changes in COC concentrations in groundwater based on the results of the annual groundwater monitoring activities

Short-Term Impacts and Effectiveness – Alternative 2

Implementation of this alternative could result in short-term exposure to the surrounding community and field personnel. Potential exposures to field personnel conducting groundwater and NAPL monitoring would be reduced through the use of proper training and personal protective equipment (PPE), as specified in a site-specific HASP that would be developed as part of the remedial design for this alternative. Potential risks to the community could occur during groundwater and NAPL monitoring activities via exposure to NAPL, purged groundwater, and groundwater samples. Potential exposures to the community would be reduced by following appropriate procedures and protocols that would be described in the SMP.

Although this alternative does not employ green remediation practices, implementation of this alternative would utilize minimal non-renewable resources and is not anticipated to negatively impact the environment (i.e., consume non-renewable resources and energy). The qualitative carbon footprint of Alternative 2 is considered minimal. The greatest contribution to greenhouse gases would occur as a result of traveling to and from OU-1 to conduct groundwater and NAPL monitoring activities. Groundwater and NAPL monitoring would be conducted over an assumed 30-year period.

Long-Term Effectiveness and Permanence – Alternative 2

Under Alternative 2, soil and groundwater containing MGP-related COCs would not actively be addressed. However, a majority OU-1 is covered with approximately 18 inches of gravel/imported fill or pavement, which provides a physical barrier to subsurface impacts, and visually impacted material is generally encountered at a minimum depth of 5 feet below grade. Additionally, as discussed in previous sections, through construction of the passive NAPL barrier and installation of the new 63-inch storm sewer, the potential for NAPL to further migrate beyond the NYSEG property

(including through preferential pathways) has been addressed. Alternative 2 would include periodic NAPL monitoring (and recovery) to reduce the volume of mobile NAPL present in OU-1 (if any remains).

Based on the current and foreseeable future use of the site as a NYSEG storage yard, site workers do not routinely conduct activities that would potentially result in exposure to media containing MGP-related COCs. If subsurface activities were to be conducted at the site, work activities (including handling potentially impacted material) would be conducted in accordance with the procedures described in the SMP to minimize the potential for exposures to impacted media. Potential exposures to field personnel and the community during long-term groundwater and NAPL monitoring activities would be minimized by following appropriate procedures and protocols that would be established in the SMP (including community air monitoring requirements).

Alternative 2 would include the establishment of institutional controls and development of a long-term groundwater monitoring program. Institutional controls would prohibit potable uses of groundwater from OU-1. Annual verification of the institutional controls would be completed to document that the controls are maintained and remain effective. Periodic groundwater monitoring would be conducted to document the extent of dissolved phase impacts and potential trends in COC concentrations. Potential exposures to field personnel and the community during long-term groundwater monitoring activities would be reduced by following appropriate procedures and protocols that would be established in the SMP.

Land Use – Alternative 2

The current zoning for OU-1 is listed as industrial use (i.e., heavy industrial [I-3]). Areas immediately surrounding OU-1 are also zoned for industrial use (i.e., heavy industrial [I-3]). The nearest residential areas (i.e., one and two unit dwelling [I-2] and multi-unit dwelling [R-3]) are located approximately 0.25 miles east and west of OU-1, as well as south of OU-1 (i.e., south of the Susquehanna River). The current and foreseeable future use of OU-1 and the immediately surrounding area is industrial. OU-1 will continue to be used by NYSEG for equipment/material storage and parking.

Alternative 2 would not affect the current or anticipated future land use of OU-1. Institutional controls would be placed on the NYSEG property and groundwater and NAPL monitoring would be conducted for an assumed 30 years. If the NYSEG property were to be redeveloped and/or sold to another party, the SMP would be provided to potential future owners and institutional controls would remain in place.

Future owners/operators would be required to conduct site activities in accordance with the SMP and institutional controls established based on the continued presence of soil and groundwater containing MGP-related COCs.

Reduction of Toxicity, Mobility or Volume of Contamination through Treatment – Alternative 2

As indicated above, more than an estimated 8,000 cy of MGP source material has already been removed from locations above the water table. Alternative 2 does not include direct treatment of impacted media. However, the passive NAPL barrier and the new 63-inch storm sewer provide a means to contain NAPL to the NYSEG property (i.e., reduce the potential for further beyond the NYSEG property). Additionally, Alternative 2 includes periodic NAPL monitoring and passive recovery of mobile NAPL (if any) that may collect in the wells. Through the NAPL monitoring/recovery activities, the volume of mobile NAPL would be permanently reduced, thereby reducing the potential for further migration of mobile NAPL beyond the NYSEG property. NAPL removal would also reduce the volume of material that is serving as a source to dissolved phase groundwater impacts. This removal would reduce the flux of COCs from source material to groundwater, which would reduce the toxicity and volume of dissolved phase groundwater impacts. Alternative 2 also includes groundwater monitoring to document the extent and potential long-term reduction (i.e., toxicity and volume) of dissolved phase groundwater impacts.

Implementability – Alternative 2

This remedial alternative would be both technically and administratively implementable. From a technical implementability aspect, equipment and personnel qualified to conduct groundwater and NAPL monitoring activities are readily available. Administratively, institutional controls would be established for the NYSEG property, which would require coordination with state agencies (i.e., NYSDEC and NYSDOH). Access agreements and permits are required for conducting groundwater monitoring and NAPL monitoring activities within Court Street (south of the NYSEG property) and on the railroad property (north of the NYSEG property).

Compliance with SCGs – Alternative 2

- *Chemical-Specific SCGs* – Chemical-specific SCGs are presented in Table 1. Potentially applicable chemical-specific SCGs for soil include 6 NYCRR Part 375-6 soil cleanup objectives (for industrial use) and 40 CFR Part 261 and 6 NYCRR Part 371 regulations for the identification of hazardous materials. Potentially

applicable chemical-specific SCGs for groundwater include NYSDEC Class GA Standards and Guidance Values.

Alternative 2 would not address soil containing COCs at concentrations greater than 6 NYCRR Part 375-6 SCOs. Subsurface soil containing MGP-related impacts would remain in place beneath surface materials (i.e., pavement, gravel). Process residuals generated during the implementation of this alternative (e.g., purge water and NAPL from periodic monitoring activities) would be managed and characterized in accordance with 40 CFR 261 and 6 NYCRR Part 371 to determine off-site treatment/disposal requirements. NYS LDRs would apply to any materials that are characterized as a hazardous waste.

As indicated in Section 1, OU-1 groundwater contains VOCs and SVOCs at concentrations greater than NYSDEC Class GA standards and guidance values. With the exception of passive NAPL recovery, this alternative does not include removal activities to address soil containing MGP-related impacts (i.e., a source of dissolved phase impacts) and therefore, this alternative would likely not achieve groundwater SCGs within a determinate period of time.

- *Action-Specific SCGs* – Action-specific SCGs are presented in Table 2. Potentially applicable action-specific SCGs include health and safety requirements and regulations associated with handling impacted media. Work activities would be conducted in accordance with OSHA requirements that specify general industry standards, safety equipment and procedures, and record keeping and reporting regulations. Compliance with these action-specific SCGs would be accomplished by following a site-specific HASP.

  Process residuals would be subject to USDOT requirements for packaging, labeling, manifesting, and transporting hazardous or regulated materials. Compliance with these requirements would be achieved by following a NYSDEC-approved remedial design and using licensed waste transporters and permitted disposal facilities. If any of the materials are characterized as a hazardous waste, NYS LDRs could be applicable.

- *Location-Specific SCGs* – Action-specific SCGs are presented in Table 3. Periodic groundwater monitoring and NAPL monitoring activities conducted within Court Street would be completed in accordance with City of Binghamton and railroad permitting and access requirements.

Overall Protection of Public Health and the Environment – Alternative 2

Alternative 2 would mitigate the potential for long-term exposures to impacted subsurface soil and groundwater by monitoring groundwater and implementing institutional controls. Although this alternative would not utilize treatment or removal to address soil or groundwater containing MGP-related COCs at concentrations greater than applicable standards and guidance values, the passive NAPL barrier significantly reduces the potential for NAPL to migrate beyond the NYSEG property (i.e., to the Susquehanna River) and replacement of the former 66-inch concrete storm sewer with the new 63-inch HDPE storm sewer eliminates a preferential pathway for NAPL migration.

This alternative would mitigate exposures (i.e., direct contact, ingestion, and inhalation) to MGP-related impacts in subsurface soil and groundwater (soil RAOs #1 and #2 and groundwater RAOs #1 and #2) solely through the implementation of institutional controls. Potential exposure pathways (i.e., exposures to future site workers conducting intrusive activities) would remain under this alternative and the reduction of potential exposures would only occur by adhering to the institutional controls and the procedures to be presented in the SMP.

The passive NAPL barrier and new 63-inch storm sewer would work toward addressing NAPL that could result in impacts to groundwater, surface water, or sediment (soil RAO #3) through the collection and removal of remaining mobile NAPL (if any) and addressing a preferential pathway for NAPL migration beyond the NYSEG property. Although mobile NAPL would be permanently removed, immobile NAPL and impacted soil (a source to dissolved phase impacts) would remain and therefore, Alternative 2 is not expected to restore groundwater to pre-disposal/pre-release conditions (groundwater RAO #3) in the foreseeable future nor does it address all sources of groundwater impacts (groundwater RAO #4).

Cost Effectiveness – Alternative 2

The estimated costs associated with Alternative 2 are presented in Table 4. The total estimated 30-year present worth cost for this alternative is approximately $1,300,000. The estimated capital cost, including costs for preparing an SMP and establishing institutional controls, is approximately $100,000. The estimated 30-year present worth cost of O&M activities associated with this alternative, including conducting periodic groundwater and NAPL monitoring, is approximately $1,200,000.

6. Comparative Analysis of Alternatives

This section presents the comparative analysis of each remedial alternative using the evaluation criteria identified in Section 5. The alternatives evaluated in Section 5 consist of the following:

- Alternative 1 – No Action
- Alternative 2 – Monitoring and Institutional Controls

The comparative analysis identifies the advantages and disadvantages of each alternative relative to each other and with respect to the evaluation criteria. The comparative analysis of these alternatives is presented in the following subsections.

6.1 Short-Term Impacts and Effectiveness

Alternative 1 would not include any active remediation and subsequently would not present potential short-term impacts to remedial workers, the public, or the environment. Implementation of Alternative 2 could result in short-term exposure to the surrounding community and field personnel during periodic groundwater and NAPL monitoring. The potential for exposures would be reduced through the use of proper training and PPE) as specified in a site-specific HASP.

Under Alternative 2, periodic groundwater and NAPL monitoring activities would be conducted over an assumed 30 years. Alternative 1 would have no carbon footprint and Alternative 2 would have a minimal carbon footprint. The greatest contribution to greenhouse gases would occur as a result of traveling to and from OU-1 to conduct groundwater and NAPL monitoring activities. As both alternatives do not include any intrusive activities, and Alternative 2 would only pose minimal potential short-term risks and potential disturbances to remedial workers and the surrounding community, Alternatives 1 and 2 are considered equally effective on the short-term basis.

6.2 Long-Term Effectiveness and Permanence

A majority of the surface cover on OU-1 consists of gravel and asphalt pavement, which provide a physical barrier to subsurface impacts. MGP source material is generally encountered at depths greater than 5 feet below grade and groundwater is encountered at depths ranging from 8 to 10 feet below grade. Additionally, OU-1 groundwater is not used for potable (or any other) purposes and drinking water is provided via a municipal supply. Based on the current and foreseeable future use of

the NYSEG property as a storage yard, site workers do not routinely conduct activities that would potentially result in exposure to media containing MGP-related COCs. Through construction of the passive NAPL barrier and installation of the new 63-inch storm sewer, the potential for NAPL to further migrate beyond the NYSEG property (including through preferential pathways) has been addressed.

Alternative 1 would not include the implementation of any remedial activities and therefore, would not address potential long-term exposures to or impacts from media that contain MGP-related impacts. Based on the limited potential for exposures to impacted media, the periodic groundwater monitoring, institutional control, and SMP components of Alternative 2 could be considered an effective means to reduce the potential for future exposures. Additionally, Alternative 2 would include periodic NAPL monitoring (and recovery) to reduce the volume of mobile NAPL present in OU-1 (if any remains). Potential exposures to field personnel and the community during long-term groundwater and NAPL monitoring activities would be minimized by following appropriate procedures and protocols that would be established in the SMP.

Based on the institutional control, SMP, and monitoring components, Alternative 2 is considered more effective on a long-term basis, compared to Alternative 1.

6.3 Land Use

The current zoning for OU-1 is listed as industrial use (i.e., heavy industrial [I-3]). Areas immediately surrounding OU-1 are also zoned for industrial use (i.e., heavy industrial [I-3]). The nearest residential areas (i.e., one and two unit dwelling [I-2] and multi-unit dwelling [R-3]) are located approximately 0.25 miles east and west of OU-1, as well as south of OU-1 (i.e., south of the Susquehanna River). The current and foreseeable future use of OU-1 and the immediately surrounding area is industrial. OU-1 will continue to be used by NYSEG for equipment/material storage and parking.

Alternatives 1 and 2 would not affect the current or anticipated future land use of OU-1. Under Alternative 2, institutional controls would be placed on the NYSEG property and If the NYSEG property were to be redeveloped and/or sold to another party, the SMP would be provided to potential future owners and institutional controls would remain in place. Future owners/operators would be required to conduct site activities in accordance with the SMP and institutional controls established based on the continued presence of soil and groundwater containing MGP-related COCs.

6.4 Reduction of Toxicity, Mobility, and Volume through Treatment

As indicated previously, more than an estimated 8,000 cy of MGP source material has already been removed from locations above the water table. Alternative 1 would not actively treat, remove, recycle, or destroy impacted media (other than by natural processes). Although, the passive NAPL barrier and the new 63-inch storm sewer provide a means to contain NAPL to the NYSEG property (i.e., reduce the potential for further migration beyond the NYSEG property), Alternative 1 would not include a means to remove NAPL from the subsurface or document the extent of groundwater impacts.

Alternative 2 includes periodic NAPL monitoring and passive recovery of mobile NAPL (if any) that may collect in the wells. Through the NAPL monitoring/recovery activities, the volume of mobile NAPL would be permanently reduced. NAPL removal would also reduce the volume of material that is serving as a source to dissolved phase groundwater impacts. This removal would reduce the flux of COCs from source material to groundwater, which would reduce the toxicity and volume of dissolved phase groundwater impacts. Alternative 2 also includes groundwater monitoring to document the extent and potential long-term reduction (i.e., toxicity and volume) of dissolved phase groundwater impacts.

As Alternative 2 includes a means to monitor for (and remove if necessary) NAPL that accumulates in the passive NAPL barrier recovery wells, Alternative 2 is considered more effective than Alternative 1 under this criterion.

6.5 Implementability

No remedial activities would be conducted as part of Alternative 1 and therefore, Alternative 1 is considered the most implementable. Alternative 2 would include groundwater and NAPL monitoring, preparation of an SMP, and implementation of institutional controls. From a technical implementability standpoint, these activities do not require highly specialized equipment or personnel and could be easily implemented. Administratively, establishing institutional controls would require coordination with state agencies (i.e., NYSDEC and NYSDOH). Access agreements and permits are required for conducting groundwater monitoring and NAPL monitoring activities within Court Street (south of the NYSEG property) and on the railroad property (north of the NYSEG property).

6.6 Compliance with SCGs

- *Chemical-Specific SCGs* – Chemical-specific SCGs are presented in Table 1. Potentially applicable chemical-specific SCGs for soil include 6 NYCRR Part 375-6 soil cleanup objectives (for industrial use) and 40 CFR Part 261 and 6 NYCRR Part 371 regulations for the identification of hazardous materials. Potentially applicable chemical-specific SCGs for groundwater include NYSDEC Class GA Standards and Guidance Values.

  Alternatives 1and 2 would not address soil containing COCs at concentrations greater than 6 NYCRR Part 375-6 SCOs. Subsurface soil containing MGP-related impacts would remain in place beneath surface materials (i.e., pavement, gravel). Under Alternative 2, process residuals generated during the implementation of this alternative (e.g., purge water and NAPL from periodic monitoring activities) would be managed and characterized in accordance with 40 CFR 261 and 6 NYCRR Part 371 to determine off-site treatment/disposal requirements. NYS LDRs would apply to any materials that are characterized as a hazardous waste.

  As indicated in Section 1, OU-1 groundwater contains VOCs and SVOCs at concentrations greater than NYSDEC Class GA standards and guidance values. With the exception of passive NAPL recover (conducted under Alternative 2), Alternatives 1 and 2 do not include removal activities to address soil containing MGP-related impacts (i.e., a source of dissolved phase impacts) and therefore, the alternatives would likely not achieve groundwater SCGs within a determinate period of time.

- *Action-Specific SCGs* – Action-specific SCGs are presented in Table 2. Potentially applicable action-specific SCGs include health and safety requirements and regulations associated with handling impacted media. Alternative 1 does not involve implementation of any remedial activities and therefore, the action-specific SCGs are not applicable. Work activities that would be conducted under Alternative 2 would be completed in accordance with OSHA requirements that specify general industry standards, safety equipment and procedures, and record keeping and reporting regulations. Compliance with these action-specific SCGs would be accomplished by following a site-specific HASP.

Process residuals would be subject to USDOT requirements for packaging, labeling, manifesting, and transporting hazardous or regulated materials. Compliance with these requirements would be achieved by following a NYSDEC-approved remedial design and using licensed waste transporters and permitted disposal facilities. If any of the materials are characterized as a hazardous waste, NYS LDRs could be applicable.

- *Location-Specific SCGs* – Action-specific SCGs are presented in Table 3. Alternative 1 does not involve implementation of any remedial activities and therefore, the location-specific SCGs are not applicable. Under Alternative 2, periodic groundwater monitoring and NAPL monitoring activities conducted within Court Street would be completed in accordance with City of Binghamton and railroad permitting and access requirements.

6.7 Overall Protection of Public Health and the Environment

Alternative 1 would not directly address impacted media. Alternative 2 would mitigate the potential for long-term exposures to impacted subsurface soil and groundwater by monitoring groundwater, removing mobile NAPL (if present and collected), and implementing institutional controls. Although these alternatives would not utilize treatment or removal to address soil or groundwater containing MGP-related COCs at concentrations greater than applicable standards and guidance values, the passive NAPL barrier significantly reduces the potential for NAPL to migrate beyond the NYSEG property (i.e., to the Susquehanna River) and replacement of the former 66-inch concrete storm sewer with the new 63-inch HDPE storm sewer eliminates a preferential pathway for NAPL migration.

Although a majority of NAPL remaining in OU-1 is located below the water table and public water in the vicinity of OU-1 is provided via municipal supply, Alternative 1 does not include means to prevent future worker exposure (i.e., direct contact, ingestion, and inhalation) to MGP-related impacts in subsurface soil and groundwater (soil RAOs #1 and #2 and groundwater RAOs #1 and #2). Alternative 2 would mitigate exposures solely through the implementation of institutional controls. Potential exposure pathways (i.e., exposures to future site workers conducting intrusive activities) would remain under Alternative 2 and the reduction of potential exposures would only occur by adhering to the institutional controls and the procedures to be presented in the SMP.

As indicated previously, through the excavation of former MGP structures and piping, more than estimated 8,000 cy of MGP source material has been removed from OU-1.

Additionally, the passive NAPL barrier and new 63-inch storm sewer have address preferential pathways for migration beyond the NYSEG property and work to contain remaining NAPL within the NYSEG property. Therefore, Alternatives 1 and 2 would work toward addressing NAPL that could result in impacts to groundwater, surface water, or sediment (soil RAO #3) through the collection and removal of remaining mobile NAPL (if any) and addressing a preferential pathway for NAPL migration beyond the NYSEG property (i.e., to the Susquehanna River). However, only Alternative 2 provides a means to collect the NAPL that could accumulate in the recovery wells. Although mobile NAPL would be permanently removed (under Alternative 2), immobile NAPL and impacted soil (a source to dissolved phase impacts) would remain (under both Alternatives 1 and 2) and therefore, neither alternative is not expected to restore groundwater to pre-disposal/pre-release conditions (groundwater RAO #3) nor addresses all sources of groundwater impacts (groundwater RAO #4).

6.8 Cost Effectiveness

The following table summarizes the estimated costs associated with implementing each of the remedial alternatives.

Table 6.1 Estimated Costs

Alternative	Estimated Capital Cost	Estimated Present Worth Cost of O&M	Total Estimated Cost
Alternative 1 – No Action	$0	$0	$0
Alternative 2 – Groundwater Monitoring and Institutional Controls	$100,000	$1,200,000[1]	$1,300,000

Note:
1. Estimated present worth of O&M cost is over an assumed 30-year period.

The estimated capital costs for Alternative 2 are associated with preparing an SMP and establishing institutional controls and the estimated 30-year present worth cost of O&M activities includes conducting periodic groundwater and NAPL monitoring.

7. Preferred Remedial Alternative

The results of the comparative analysis (presented in Section 6) were used as a basis for identifying a preferred remedial alternative for the OU-1. The components of the preferred remedial alternative are presented in the following subsections.

7.1 Summary of Preferred Remedial Alternative

Based on the comparative analysis of the remedial alternatives presented in Section 6, Alternative 2 is the preferred remedial alternative. As described in Section 5 and Table 4, the primary components of the preferred remedial alternative consist of the following:

- Conducting periodic groundwater monitoring
- Conducting periodic NAPL monitoring (and recovery, as necessary)
- Establishing institutional controls for the NYSEG property in the form of deed restrictions and/or environmental easements that would limit intrusive (i.e., subsurface) activities that could result in potential exposures to residual subsurface soil and groundwater containing MGP-related impacts at concentrations greater than applicable standards and guidance values; require compliance with the SMP; and prohibit the use of non-treated groundwater from the NYSEG property.
- Preparing an SMP to document the following:
    - The institutional controls that have been established and will be maintained for OU-1
    - Known locations of soil containing COCs at concentrations greater than 6 NYCRR Part 375-6 industrial use SCOs
    - Protocols (including health and safety and community air monitoring requirements) for conducting invasive (i.e., subsurface) activities and managing potentially residually impacted material encountered during these activities
    - Protocols and requirements for conducting annual groundwater monitoring and semi-annual NAPL monitoring

- Protocols for addressing significant changes in COC concentrations in groundwater based on the results of the annual groundwater monitoring activities

7.2 Rationale for the Selection of the Preferred Remedial Alternative

The preferred alternative (Alternative 2) consists of groundwater and NAPL monitoring, institutional controls, and an SMP. Alternative 2 is considered effective over the long-term; reduces the toxicity, mobility, and volume of impacts; and is protective of public health and the environment when taking the following into account:

- *The most accessible MGP-related sources material has been removed from OU-1.* Removal of the No. 2 and No. 3 gas holders, the tar separating well, and removal and/or capping former MGP piping that contains NAPL has resulted in the removal of more than an estimated 8,000 cy of grossly impacted material within the former MGP structures (as well as the structures).

- *The potential for mobile NAPL (if any remains) to migrate any further beyond the NYSEG property has been significantly reduced.* Construction of the passive NAPL barrier IRM and replacement of the former 66-inch storm sewer have significantly reduced the potential for NAPL to further migrate beyond the NYSEG property (i.e., to the Susquehanna River). Installation of jet grout barrier around the 66-inch storm sewer (as part of the passive NAPL barrier IRM) and installation of concrete collars around the new 63-inch storm reduces the potential for trench fill materials and pipe bedding to serve as a preferential pathway.

- *Surface cover material does not contain MGP-related impacts.* As indicated in Section 1, analytical results indicated that surface soils do not contain elevated concentrations of total BTEX or total PAHs. A majority OU-1 is covered with approximately 18 inches of gravel/imported fill or pavement. Furthermore, visually impacted material is generally encountered at a minimum depth of 5 feet below grade.

- *Routine site operations do not include intrusive site activities.* A majority of the NAPL in OU-1 is located below the water table. Based on the heterogeneous nature of the site geology, the distribution of NAPL is highly irregular: NAPL has migrated below the silt and clay unit at several isolated locations throughout OU-1. As routine site operations do not include intrusive activities, there is limited potential for future worker exposure to impacted soil (and groundwater). If intrusive

activities were conducted, protocols and procedures set forth in the SMP (including health and safety and community air monitoring requirements) would be adhered to reduce the potential for exposure to site workers and the surrounding community.

- *There is little benefit associated with removing MGP-related impacts at depth.* Where MGP-related impacts are present below the silt and clay unit at isolated locations (i.e., at depths up to 40 feet below grade), more than 30 feet of visually clean overburden material would require excavation to removal the visually impacted material. Excavation activities to restore OU-1 to pre-disposal/pre-release conditions would result in the removal of more than estimated 150,000 cy of soil. Excavation activities on this large scale would present numerous implementation challenges and would have significant disruption to the surrounding community. Soil removal activities in OU-1 would have to be conducted in a manner such that existing infrastructure (e.g., sewer lines, water lines, gas lines, Susquehanna River flood wall, and Court Street) is protected and/or relocated. Additionally, the large-scale excavation activities would take multiple years to complete (i.e., up to 5 years or more) and would result in more than an estimated 13,000 truck trips on local roadways to facilitate off-site transportation of excavated soil and importation of backfill.

Alternative 2 would be readily implementable from both technically and administratively aspect. From a technical implementability aspect, equipment and personnel qualified to conduct groundwater and NAPL monitoring activities are readily available. Administratively, institutional controls would be established for the NYSEG property, which would require coordination with state agencies (i.e., NYSDEC and NYSDOH). Access agreements and permits are required for conducting groundwater monitoring and NAPL monitoring activities within Court Street (south of the NYSEG property) and on the railroad property (north of the NYSEG property).

Alternative 2 would mitigate exposures (i.e., direct contact, ingestion, and inhalation) to MGP-related impacts in subsurface soil and groundwater (soil RAOs #1 and #2 and groundwater RAOs #1 and #2) through the implementation of institutional controls and by adhering to the institutional controls and the procedures to be presented in the SMP. The passive NAPL barrier and new 63-inch storm sewer would work toward addressing NAPL that could result in impacts to groundwater, surface water, or sediment (soil RAO #3) through the collection and removal of remaining mobile NAPL (if any) and addressing a preferential pathway for NAPL migration beyond the NYSEG property. Although mobile NAPL would be permanently removed, immobile NAPL and

impacted soil (a source to dissolved phase impacts) would remain and therefore, Alternative 2 is not expected to restore groundwater to pre-disposal/pre-release conditions (groundwater RAO #3) nor addresses all sources of groundwater impacts (groundwater RAO #4).

7.3 Estimated Cost of Preferred Remedial Alternative

The total estimated cost associated with implementation of the preferred remedial alternative is summarized in the following table.

Table 7.1 – Cost Estimate for the Preferred Remedial Alternative

Alternative	Estimated Capital Cost	Estimated Present Worth of O&M Cost[1]	Total Estimated Cost
Alternative 2 – Monitoring and Institutional Controls	$100,000	$1,200,000	$1,300,000

Notes:

1. Estimated present worth of O&M cost is over an assumed 30-year period.

8. References

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Tables

Table 1
Summary of Chemical-Specific SCGs

Focused Feasibility Study Report for OU-1
NYSEG - Court Street Former MGP Site - Binghamton, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Federal				
National Primary Drinking Water Standards	40 CFR Part 141	S	Establishes maximum contaminant levels (MCLs) which are health-based standards for public water supply systems.	These standards are potentially applicable if an action involves future use of ground water as a public supply source.
RCRA-Regulated Levels for Toxic Characteristics Leaching Procedure (TCLP) Constituents	40 CFR Part 261	S	These regulations specify the TCLP constituent levels for identification of hazardous wastes that exhibit the characteristic of toxicity.	Excavated materials may be sampled and analyzed for TCLP constituents prior to disposal to determine if the materials are hazardous based on the characteristic of toxicity.
Universal Treatment Standards/Land Disposal Restrictions (UTS/LDRs)	40 CFR Part 268	S	Identifies hazardous wastes for which land disposal is restricted and provides a set of numerical constituent concentration criteria at which hazardous waste is restricted from land disposal (without treatment).	Applicable if waste is determined to be hazardous and for remedial alternatives involving off-site land disposal.
New York State				
NYSDEC Guidance on Remedial Program Soil Cleanup Objectives	6 NYCRR Part 375	G	Provides an outline for the development and execution of the soil remedial programs. Includes soil cleanup objective tables.	These guidance values are to be considered, as appropriate, in evaluating soil quality.
Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	S	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.	Applicable for determining if materials generated during implementation of remedial activities are hazardous wastes. These regulations do not set cleanup standards, but are considered when developing remedial alternatives.
Soil Cleanup Guidance	CP-51	G	Provides the framework and policies for the selection of soil cleanup levels.	Guidance would be used to develop site-specific soil cleanup objectives (SCOs).
NYSDEC Ambient Water Quality Standards and Guidance Values	Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1	G	Provides a compilation of ambient water quality standards and guidance values for toxic and non-conventional pollutants for use in the NYSDEC programs.	These standards are to be considered in evaluating groundwater and surface water quality.
New York State Surface Water and Groundwater Quality Standards	6 NYCRR Parts 700-705	S	Establishes quality standards for surface water and groundwater.	Potentially applicable for assessing water quality at the site during remedial activities.

Table 2
Summary of Action-Specific SCGs

Focused Feasibility Study Report for OU-1
NYSEG - Court Street Former MGP Site - Binghamton, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Federal				
Occupational Safety and Health Act (OSHA) - General Industry Standards	29 CFR Part 1910	S	These regulations specify the 8-hour time-weighted average concentration for worker exposure to various compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is not possible to maintain the work atmosphere below required concentrations. Appropriate training requirements will be met for remedial workers.
OSHA - Safety and Health Standards	29 CFR Part 1926	S	These regulations specify the type of safety equipment and procedures to be followed during site remediation.	Appropriate safety equipment will be on-site and appropriate procedures will be followed during remedial activities.
OSHA - Record-keeping, Reporting and Related Regulations	29 CFR Part 1904	S	These regulations outline record-keeping and reporting requirements for an employer under OSHA.	These regulations apply to the company(s) contracted to install, operate and maintain remedial actions at hazardous waste sites.
RCRA - Preparedness and Prevention	40 CFR Part 264.30 - 264.31	S	These regulations outline requirements for safety equipment and spill control when treating, handling and/or storing hazardous wastes.	Safety and communication equipment will be installed at the site as necessary. Local authorities will be familiarized with the site.
RCRA - Contingency Plan and Emergency Procedures	40 CFR Part 264.50 - 264.56	S	Provides requirements for outlining emergency procedures to be used following explosions, fires, etc. when storing hazardous wastes.	Emergency and contingency plans will be developed and implemented during remedial design. Copies of the plan will be kept on-site.
90 Day Accumulation Rule for Hazardous Waste	40 CFR Part 262.34	S	Allows generators of hazardous waste to store and treat hazardous waste at the generation site for up to 90 days in tanks, containers and containment buildings without having to obtain a RCRA hazardous waste permit.	Potentially applicable to remedial alternatives that involve the storing or treating of hazardous materials on-site.
Land Disposal Facility Notice in Deed	40 CFR Parts 264 and 265 Sections 116-119(b)(1)	S	Establishes provisions for a deed notation for closed hazardous waste disposal units, to prevent land disturbance by future owners.	The regulations are potentially applicable because closed areas may be similar to closed RCRA units.
RCRA - General Standards	40 CFR Part 264.111	S	General performance standards requiring minimization of need for further maintenance and control; minimization or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products. Also requires decontamination or disposal of contaminated equipment, structures and soils.	Decontamination actions and facilities will be constructed for remedial activities and disassembled after completion.
Standards Applicable to Transporters of Applicable Hazardous Waste - RCRA Section 3003	40 CFR Parts 170-179, 262, and 263	S	Establishes the responsibility of off-site transporters of hazardous waste in the handling, transportation and management of the waste. Requires manifesting, recordkeeping and immediate action in the event of a discharge.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.
United States Department of Transportation (USDOT) Rules for Transportation of Hazardous Materials	49 CFR Parts 107 and 171.1 - 172.558	S	Outlines procedures for the packaging, labeling, manifesting and transporting of hazardous materials.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.
Clean Air Act-National Ambient Air Quality Standards	40 CFR Part 60	S	Establishes ambient air quality standards for protection of public health.	Remedial operations will be performed in a manner that minimizes the production of benzene and particulate matter.
USEPA-Administered Permit Program: The Hazardous Waste Permit Program	RCRA Section 3005; 40 CFR Part 270.124	S	Covers the basic permitting, application, monitoring and reporting requirements for off-site hazardous waste management facilities.	Any off-site facility accepting hazardous waste from the site must be properly permitted. Implementation of the site remedy will include consideration of these requirements.
Land Disposal Restrictions	40 CFR Part 368	S	Restricts land disposal of hazardous wastes that exceed specific criteria. Establishes Universal Treatment Standards (UTSs) to which hazardous waste must be treated prior to land disposal.	Excavated materials that display the characteristic of hazardous waste or that are decharacterized after generation must be treated to 90% constituent concentration reduction capped at 10 times the UTS.
RCRA Subtitle C	40 U.S.C. Section 6901 et seq.; 40 CFR Part 268	S	Restricts land disposal of hazardous wastes that exceed specific criteria. Establishes UTSs to which hazardous wastes must be treated prior to land disposal.	Potentially applicable to remedial activities that include the dredging and disposal waste material from the site.

Table 2
Summary of Action-Specific SCGs

Focused Feasibility Study Report for OU-1
NYSEG - Court Street Former MGP Site - Binghamton, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
New York State				
NYSDEC's Monitoring Well Decommissioning Guidelines	NPL Site Monitoring Well Decommissioning dated May 1995	G	This guidance presents procedure for abandonment of monitoring wells at remediation sites.	This guidance is applicable for soil or groundwater alternatives that require the decommissioning of monitoring wells onsite.
Guidelines for the Control of Toxic Ambient Air Contaminants	DAR-1 (Air Guide 1)	G	Provides guidance for the control of toxic ambient air contaminants in New York State and outlines the procedures for evaluating sources of air pollution.	This guidance may be applicable for soil or groundwater alternatives that results in certain air emissions.
New York Permits and Certificates	6 NYCRR Part 201	G	Provides instructions and regulations for obtaining a permit to operate air emission source.	Permits are not required for remedial actions taken at hazardous waste sites; however, documentation for relevant and appropriate permit conditions would be provided to NYSDEC prior to and during implementation of this alternative.
New York State Air Quality Classification System	6 NYCRR Part 256	G	Outlines the air quality classifications for different land uses and population densities.	Air quality classification system will be referenced during the treatment process design.
New York Air Quality Standards	6 NYCRR Part 257	G	Provides air quality standards for different chemicals (including those found at the site), particles, and processes.	Emissions from the treatment process will meet the air quality standards.
Discharges to Public Waters	New York State Environmental Conservation Law, Section 71-3503	S	Provides that a person who deposits gas tar, or the refuse of a gas house or gas factory, or offal, refuse, or any other noxious, offensive, or poisonous substances into any public waters, or into any sewer or stream running or entering into such public waters, is guilty of a misdemeanor.	During the remedial activities, MGP-impacted materials will not be deposited into public waters or sewers.
New York Hazardous Waste Management System - General	6 NYCRR Part 370	S	Provides definitions of terms and general instructions for the Part 370 series of hazardous waste management.	Hazardous waste is to be managed according to this regulation.
Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	S	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.	Applicable for determining if solid waste generated during implementation of remedial activities are hazardous wastes. These regulations do not set cleanup standards, but are considered when developing remedial alternatives.
Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities	6 NYCRR Part 372	S	Provides guidelines relating to the use of the manifest system and its recordkeeping requirements. It applies to generators, transporters and facilities in New York State.	This regulation will be applicable to any company(s) contracted to do treatment work at the site or to transport or manage hazardous material generated at the site.
New York Regulations for Transportation of Hazardous Waste	6 NYCRR Part 372.3 a-d	S	Outlines procedures for the packaging, labeling, manifesting and transporting of hazardous waste.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.
Waste Transporter Permits	6 NYCRR Part 364	S	Governs the collection, transport and delivery of regulated waste within New York State.	Properly permitted haulers will be used if any waste materials are transported off-site.
NYSDEC Technical and Administrative Guidance Memorandums (TAGMs)	NYSDEC TAGMs	G	TAGMs are NYSDEC guidance that are to be considered during the remedial process.	Appropriate TAGMs will be considered during the remedial process.
New York Regulations for Hazardous Waste Management Facilities	6 NYCRR Part 373.1.1 - 373.1.8	S	Provides requirements and procedures for obtaining a permit to operate a hazardous waste treatment, storage and disposal facility. Also lists contents and conditions of permits.	Any off-site facility accepting waste from the site must be properly permitted.
Land Disposal of a Hazardous Waste	6 NYCRR Part 376	S	Restricts land disposal of hazardous wastes that exceed specific criteria.	New York defers to USEPA for UTS/LDR regulations.
NYSDEC Guidance on the Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants	TAGM 4061 (DER-4)	G	Outlines the criteria for conditionally excluding coal tar waste and impacted soils from former MGPs which exhibit the hazardous characteristic of toxicity for benzene (D018) from the hazardous waste requirements of 6 NYCRR Parts 370 - 374 and 376 when destined for thermal treatment.	This guidance will be used as appropriate in the management of MGP-impacted soil and coal tar waste generated during the remedial activities.
National Pollutant Discharge Elimination System (NPDES) Program Requirements, Administered Under New York State Pollution Discharge Elimination System (SPDES)	40 CFR Parts 122 Subpart B, 125, 301, 303, and 307 (Administered under 6 NYCRR 750-758)	S	Establishes permitting requirements for point source discharges; regulates discharge of water into navigable waters including the quantity and quality of discharge.	Removal activities may involve treatment/disposal of water. If so, water generated at the site will be managed in accordance with NYSDEC SPDES permit requirements.

Table 3
Summary of Location-Specific SCGs

Focused Feasibility Study Report for OU-1
NYSEG - Court Street Former MGP Site - Binghamton, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Federal				
Historical and Archaeological Data Preservation Act	16 USC 469a-1	S	Provides for the preservation of historical and archaeological data that might otherwise be lost as the result of alteration of the terrain.	The National Register of Historic Places register would be consulted to determine the presence of historical sites in the immediate vicinity of the MGP site.
National Historic and Historical Preservation Act	16 USC 470; 36 CFR Part 65; 36 CFR Part 800	S	Requirements for the preservation of historic properties.	The National Register of Historic Places register would be consulted to determine the presence of historical sites in the immediate vicinity of the MGP site.
Hazardous Waste Facility Located on a Floodplain	40 CFR Part 264.18(b)	S	Requirements for a treatment, storage and disposal (TSD) facility built within a 100-year floodplain.	Hazardous waste TSD activities (if any) will be designed to comply with applicable requirements cited in this regulation.
Endangered Species Act	16 USC 1531 et seq.; 50 CFR Part 200; 50 CFR Part 402	S	Requires federal agencies to confirm that the continued existence of any endangered or threatened species and their habitat will not be jeopardized by a site action.	During the threatened/endangered species evaluation, two species (i.e., peregrine falcon and pygmy snaketail) were identified on the USFWS list of Threatened, Endangered, Sensitive Species in the City of Binghamton. In addition, one plant species (i.e., downy wood mint) was identify by the NHP as sensitive species in the vicinity of the site.
New York State				
New York State Freshwater Wetlands Act	ECL Article 24 and 71; 6 NYCRR Parts 662-665	S	Activities in wetlands areas must be conducted to preserve and protect wetlands.	Does not appear to be applicable as the site is not located in a wetlands area.
New York State Parks, Recreation, and Historic Preservation Law	New York Executive Law Article 14	S	Requirements for the preservation of historic properties.	The National Register of Historic Places register would be consulted to determine the presence of historical sites in the immediate vicinity of the MGP site.
Endangered & Threatened Species of Fish and Wildlife	6 NYCRR Part 182	S	Identifies endangered and threatened species of fish and wildlife in New York.	The peregrine falcon, pygmy snaketail, and downy wood mint are candidates on the List of Endangered, Threatened and Special Concern Fish & Wildlife Species of New York State.
Local				
Local Building Permits	N/A	S	Local authorities may require a building permit for any permanent or semi-permanent structure, such as an on-site water treatment system building or a retaining wall.	Substantive provisions are potentially applicable to remedial activities that require construction of permanent or semi-permanent structures.
Local Street Work Permits	N/A	S	Local authorities will require a permits for conducting work within and closing local roadways.	Street work permits will be required to conduct remedial activities within public roadways.

Table 4
Cost Estimate for Alternative 2 - Monitoring and Institutional Controls

Focused Feasibility Study Report for OU-1
NYSEG - Court Street Former Manufactured Gas Plant Site - Binghamton, New York

Item #	Description	Estimated Quantity	Unit	Unit Price	Estimated Cost
Capital Costs					
1	Site Management Plan	1	LS	$30,000	$30,000
2	Institutional Controls	1	LS	$50,000	$50,000
				Subtotal Capital Cost	$80,000
				Contingency (20%)	$16,000
				Total Capital Cost	$96,000
Operation and Maintenance Costs					
3	Annual Verification of Institutional Controls	1	LS	$5,000	$5,000
4	Annual Permitting and Access Agreements	1	LS	$10,000	$10,000
5	Annual Groundwater Sampling	1	EVENT	$7,000	$7,000
6	Laboratory Analysis of Groundwater Samples	20	EACH	$250	$5,000
7	Semi-Annual NAPL Monitoring	2	EVENT	$5,000	$10,000
8	Waste Disposal	6	DRUM	$700	$4,200
9	Annual Summary Report	1	LS	$15,000	$15,000
				Subtotal O&M Cost	$56,200
				Contingency (20%)	$11,240
				Total Annual O&M Cost	$67,440
10	30-Year Total Present Worth Cost of O&M				$1,166,175
				Total Estimated Cost:	**$1,262,175**
				Rounded To:	**$1,300,000**

General Notes:

1. Cost estimate is based on ARCADIS of New York's (ARCADIS') past experience and vendor estimates using 2013 dollars.

2. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual projected cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. ARCADIS is not licensed to provide financial or legal consulting services; as such; this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.

3. All costs assume construction field work to be conducted by non-unionized labor.

Assumptions:

1. Site management plan cost estimate includes labor necessary to prepare a site management plan to document: the institutional controls that have been established and will be maintained for OU-1; known locations of soil containing COCs at concentrations greater than 6NYCRR Part 375-6 industrial use SCOs; protocols (including health and safety requirements) for conducting invasive (i.e., subsurface) activities and managing potentially impacted material encountered during these activities; protocols and requirements for conducting annual groundwater monitoring and semi-annual NAPL monitoring; protocols for addressing significant changes in COC concentrations in groundwater based on the results of the annual monitoring activities.

2. Institutional controls cost estimate includes legal expenses to establish environmental easements and/or deed restrictions. Institutional controls would: limit intrusive (i.e., subsurface) activities that could result in potential exposures to remaining subsurface soil and groundwater containing MGP-related impacts at concentrations greater than applicable standards and guidance values; require compliance with the SMP; and prohibit the use of non-treated groundwater from the NYSEG property.

Table 4
Cost Estimate for Alternative 2 - Monitoring and Institutional Controls

Focused Feasibility Study Report for OU-1
NYSEG - Court Street Former Manufactured Gas Plant Site - Binghamton, New York

3. Annual verification of institutional controls cost estimate includes administrative costs for confirming institutional controls to minimize the potential for human exposure to soil and groundwater are present. Annual costs associated with institutional controls include verifying the status of institutional controls and preparing/submitting notification to the NYSDEC to demonstrate that the institutional controls are being maintained and remain effective.

4. Annual permitting and access agreements cost estimate includes costs associated with preparing permitting and access agreement application packages for conducting annual groundwater monitoring and semi-annual NAPL monitoring activities within Court Street and on the railroad property.

5. Annual groundwater sampling cost estimate includes labor, equipment, and materials necessary to conduct annual groundwater sampling activities. Cost estimate assumes groundwater samples will be collected from up to 16 groundwater monitoring wells using low-flow sampling procedures. Cost estimate assumes 2 workers will require 2 days to complete the sampling activities. Estimate includes costs for labor, field vehicle, and equipment rental. Costs associated with lane closures to conduct sampling in Court Street are covered under semi-annual NAPL monitoring.

6. Laboratory analysis of groundwater samples cost estimate includes the analysis of groundwater samples for BTEX and PAHs. Estimate assumes laboratory analysis of groundwater samples from up to 16 groundwater monitoring wells and up to 4 QA/QC samples per sampling event.

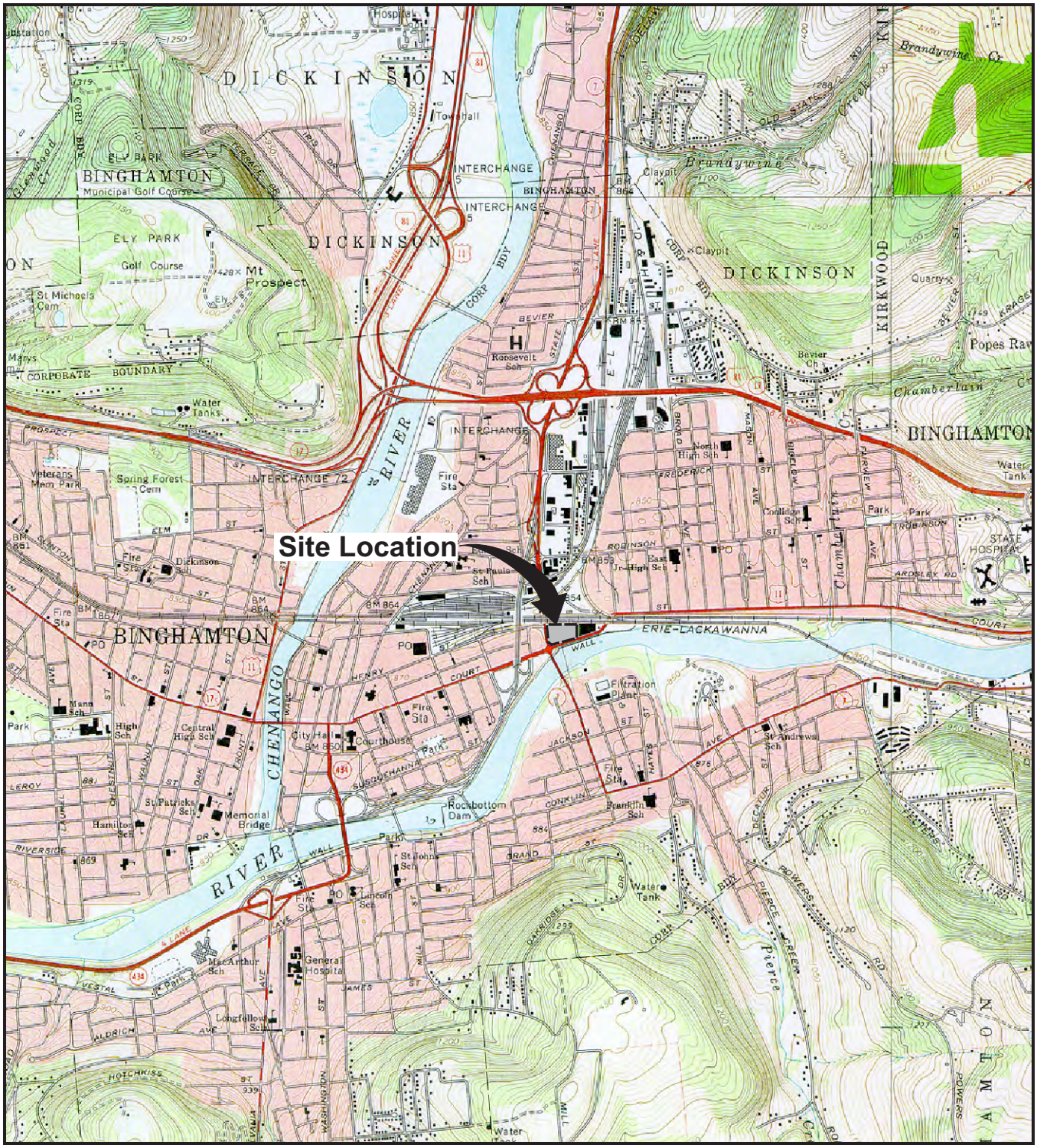
7. Semi-annual NAPL monitoring cost estimate includes labor, equipment, and materials necessary to conduct semi-annual NAPL monitoring activities. Cost estimate assumes up to 50 NAPL recovery wells, piezometers, and groundwater monitoring wells will be gauged for NAPL (and NAPL would be removed, if encountered). Cost estimate assumes 4 workers will require 1 day to complete the NAPL monitoring activities. Estimate includes costs for labor, field vehicles, traffic control devices (for work conducted in Court Street), and equipment rental.

8. Waste disposal cost estimate includes off-site disposal of drummed PPE, disposable sampling equipment, NAPL (if encountered) and purge water generated/collected during annual groundwater monitoring and semi-annual NAPL

9. Annual summary report cost estimate includes labor necessary to prepare an annual report summarizing annual groundwater monitoring and semi-annual NAPL monitoring activities and results. Annual report to be submitted to NYSDEC.

10. Present worth is estimated based on a 4% beginning-of-year discount rate. It is assumed that "year zero" is 2013.

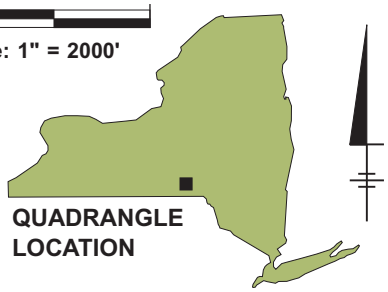
Figures



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).

2000' 0 2000'

Approximate Scale: 1" = 2000'



NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK

OU-1 FOCUSED FEASIBILITY STUDY

SITE LOCATION MAP

ARCADIS

FIGURE
1

12/11/2012 SYRACUSE, DIV/GROUP: ENV/IM-DV DJHOWES
B0013103/0003/00010/CDR/13103N01.CDR

NORFOLK SOUTHERN RAILROAD

BOX CULVERT (NOT VISIBLE AT SURFACE)

MH-3

MH-2

MH-1D

MH-1C

APPROXIMATE LOCATION OF BRANDYWINE CANAL

HENRY STREET

BRANDYWINE AVENUE

OIL TANKS

NO. 3 GAS HOLDER

NO. 2 GAS HOLDER

TAR SEPARATING WELL

TAR WELL

COOLING TOWER

RETORTS

GENERATOR HOUSE

BOILERS

CONDENSOR

BINGHAMTON LIGHT HEAT & POWER CO.

PROPERTY (295 COURT STREET)

PUMP HOUSE

PURIFIER

WASHER COOLER

PUMP

OIL HOUSE

MACHINE SHOP

STORAGE

OFFICE

NO. 1 GAS HOLDER

STEEL FRAME PUMP HOUSE

BOOSTER HOUSE

PURIFIERS

GAS CONTROL BLDG.

24" UNKNOWN PIPE

FORMER WATER INTAKE

UNKNOWN PIPE

RANNEY WELL

WELL INTAKE LATERALS

COURT STREET

FLOOD WALL

24" PIPE OUTFALL

20" AND 24" DIA. WATER LINES (APPROXIMATE LOCATION)

COMBINED STORM/ SANITARY FACILITY (1975)

NEW 63-INCH STORM SEWER

FORMER 66-INCH STORM SEWER

MH-1B

NAPL BARRIER WALL

NO. 4 GAS HOLDER

MH-1A

MH-1

GATE VALVE

PUMP HOUSE

SEWER MANHOLE AND CONTROL STRUCTURE

FILLING STATION

ABUTMENT OF FORMER BRIDGE

SUSQUEHANNA RIVER

FLOW

TOMPKINS STREET

36" SANITARY SEWER

FILTRATION PLANT INTAKE

LEGEND:

- FLOOD WALL
- OPERABLE UNIT BOUNDARY
- NYSEG PROPERTY LINES
- S — SANITARY SEWER LINE
- D — STORM SEWER LINE
- ABANDONED STORM SEWER LINE
- 840 — GROUND SURFACE ELEVATION (FT AMSL)
- NAPL BARRIER WALL
- JET GROUT PANEL
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- RAILROAD TRACK
- x — x — FENCE

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 LOCATIONS ARE APPROXIMATE. SITE PLAN DEPICTS BOTH HISTORIC AND CURRENT SITE FEATURES.

0 50' 100'
GRAPHIC SCALE

NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK
OU-1 FOCUSED FEASIBILITY STUDY

SITE PLAN

ARCADIS

FIGURE 2

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: K. WHITE PM: J. BRIEN TM: J. BRIEN TR: J. GOLUBSKI LYR:(On)ON="OFF"=REF"
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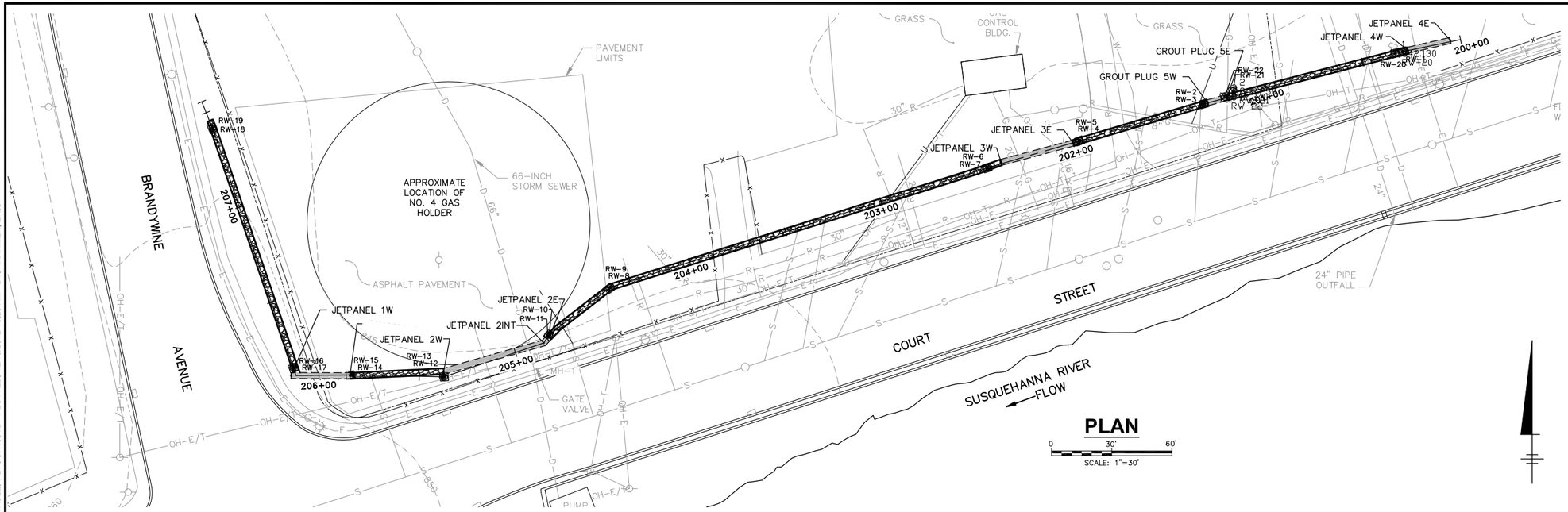
13103X03
13103X01



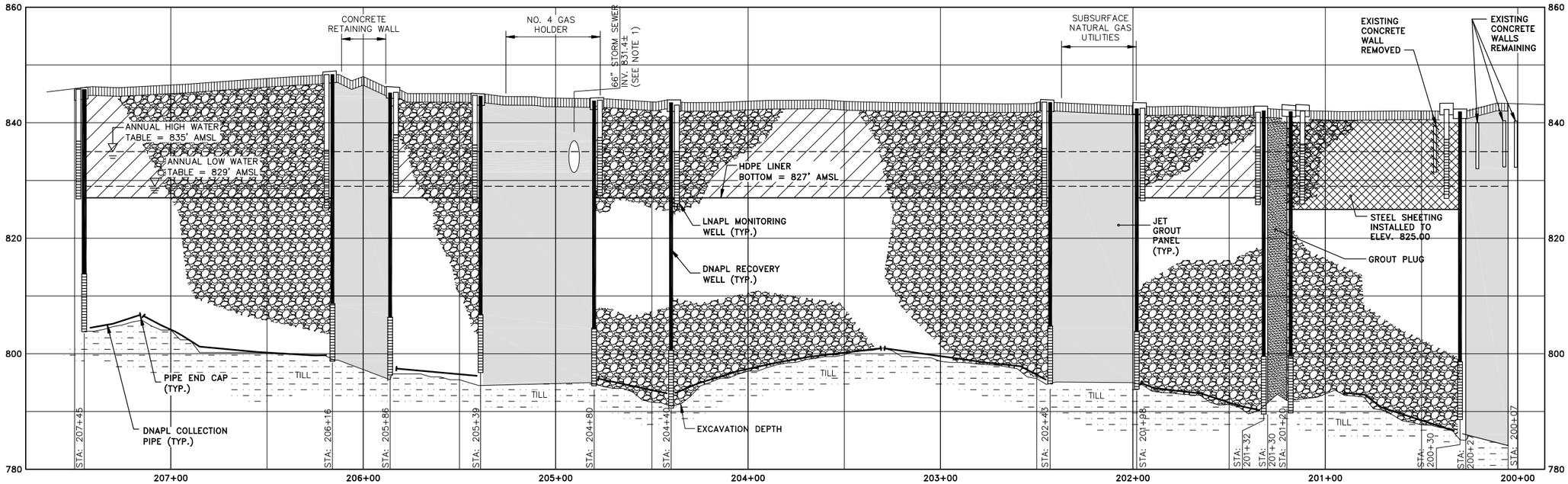
PLAN

0 30' 60'

SCALE: 1"=30'

LEGEND:

- ALIGNMENT OF NAPL BARRIER WALL
- WELL VAULT, DNAPL RECOVERY WELL, AND LNAPL MONITORING WELL
- JETPANEL 2W — AS-BUILT JET GROUT PANEL LOCATION AND SURVEYED POINT (SEPTEMBER 2006)
- GROUT PLUG
- SURFACE RESTORATION TO MATCH SURROUNDING GRADE
- 60 MIL HDPE GEOMEMBRANE LINER
- GRANULAR FILL
- EXISTING TILL LAYER
- EXISTING MANHOLE LOCATION
- EXISTING LIGHT POLE
- EXISTING UTILITY POLE
- W — EXISTING POTABLE WATER SUPPLY LINE
- D — EXISTING STORM SEWER LINE
- S — EXISTING SANITARY SEWER
- E — EXISTING UNDERGROUND ELECTRIC TRANSMISSION LINE
- OH-E — EXISTING OVERHEAD ELECTRIC TRANSMISSION LINE
- OH-T — EXISTING OVERHEAD TELECOMMUNICATION TRANSMISSION LINE
- OH-E/T — EXISTING OVERHEAD ELECTRIC AND TELECOMMUNICATION TRANSMISSION LINE
- G — EXISTING NATURAL GAS TRANSMISSION LINE
- R — RETIRED NATURAL GAS TRANSMISSION LINE
- U — UNDERGROUND UTILITY ADDED BY NYSEG POST BARRIER WALL CONSTRUCTION



PROFILE

0 30' 60'

HORIZONTAL SCALE: 1"=30'

0 10' 20'

VERTICAL SCALE: 1"=10'

NOTES:

1. BARRIER WALL ALIGNMENT BASED ON SURVEYED LOCATION OF RECOVERY WELLS AND JET GROUT PANEL LOCATIONS SURVEYED BY NYSEG ON AUGUST 17, 2006 AND DECEMBER 28, 2006.
2. TOP OF CASING AND GROUND ELEVATIONS ARE BASED ON SURVEYS CONDUCTED BY NYSEG DURING DECEMBER 2006 AND JULY 2007.
3. THE EXCAVATION DEPTH OF THE BOTTOM OF THE BARRIER WALL TRENCH, AS PRESENTED ON THIS DRAWING IS APPROXIMATE AND BASED ON MEASUREMENTS MADE FROM THE GROUND SURFACE DURING TRENCH CONSTRUCTION. THE TRENCH BOTTOM, AND HORIZONTAL CONVEYANCE PIPE LOCATIONS HAVE NOT BEEN SURVEYED, AND ARE THEREFORE APPROXIMATE.
4. LNAPL MONITORING WELL, DNAPL RECOVERY WELL, AND WELL VAULT DIMENSIONS ARE NOT TO SCALE.
5. HDPE PANELS ARE OVERLAPPED A MINIMUM OF 4 FEET.
6. RECOVERY WELLS LOCATED BY GLOBAL POSITIONING SYSTEM (GPS). REFER TO NORTH AMERICAN DATUM 1983 (NAD83). STATE PLANE: NEW YORK CENTRAL VERTICAL DATUM NAVD 88.
7. FIGURE BASED ON DECEMBER 2006 SITE CONDITIONS.

NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK
OU-1 FOCUSED FEASIBILITY STUDY

NAPL BARRIER WALL IRM

ARCADIS

FIGURE 3

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: K. WHITE PM: J. BRIEN TM: J. BRIEN TR: J. GOLUBSKI LYR:(On)ON=*OFF=*REF*
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XREFS: 13103XLD 13103X04 13103X05 IMAGES: PROJECTNAME: ---

BRANDYWINE AVENUE

COURT STREET

NORFOLK SOUTHERN RAILROAD

NO. 4 GAS HOLDER

NO. 3 GAS HOLDER

OIL TANKS

OIL TANKS

EXISTING 66"ø CONCRETE PIPE AND MANHOLE FILLED WITH CLSM

EXISTING PIPE REMOVED

EXISTING PIPE REMOVED

NEW 8'ø HDPE MANHOLE MH–1D

EXISTING CONCRETE MANHOLE MH–2

NEW 8'ø HDPE MANHOLE MH–1C

NEW 63"ø HDPE PIPE

EXISTING CONCRETE MANHOLE MH–1

NEW 8'ø HDPE MANHOLE MH–1A

NEW 8'ø HDPE MANHOLE MH–1B

EXISTING STONE CHAMBER
RIM 845.80
830.58 – 66"

EXISTING TOMPKINS ROAD PUMP STATION

EXISTING NAPL BARRIER WALL

860

850

845

840

LEGEND:

- OPERABLE UNIT BOUNDARY
- PROPERTY LINE
- EXISTING STORM SEWER
- GROUND SURFACE ELEVATION CONTOUR (FT AMSL)
- RAILROAD TRACKS
- LIMITS OF TEMPORARY SHEETING/IMPORTED FILL
- NAPL BARRIER WALL
- JET GROUT PANEL
- PRE–EXISTING STORM SEWER ACCESS POINT FOR CLSM BACKFILL
- CONCRETE COLLAR (CAST–IN–PLACE)
- REMOVED PORTIONS OF EXISTING STORM SEWER
- ABANDONED SECTION OF RCP FILLED WITH CLSM

NOTES:

1. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
2. LOCATIONS, SIZES, DEPTHS, AND MATERIALS ASSOCIATED WITH SUBSURFACE PIPING OBTAINED FROM NYSEG REPORT ENTITLED "INTERIM REMEDIAL MEASURES FINAL ENGINEERING REPORT" (JULY 2002).

0 20' 40'
GRAPHIC SCALE

NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK
OU-1 FOCUSED FEASIBILITY STUDY

STORM SEWER REPLACEMENT IRM

ARCADIS

FIGURE
4

WEITZMANS & SONS SCRAP YARD

ASPHALT WORKS PLANT

NORFOLK SOUTHERN RAILROAD

HENRY STREET

BRANDYWINE AVENUE

COURT STREET

TOMPKINS STREET

APPROXIMATE LOCATION OF BRANDYWINE CANAL

MH-3 (BOX CULVERT; NOT VISIBLE AT SURFACE)

BINGHAMTON LIGHT HEAT & POWER CO.

PROPERTY (295 COURT STREET)

CITY WELL 1

CITY WELL 2

RANNEY WELL

WELL INTAKE LATERALS

24" PIPE OUTFALL

(LOCATION APPROXIMATE) 20" AND 24" DIA. WATER LINES

66-INCH STORM SEWER

36" SANITARY SEWER

SUSQUEHANNA RIVER FLOW

FILTRATION PLANT INTAKE

FLOOD WALL

NO. 4 GAS HOLDER

NO. 2 GAS HOLDER

NO. 3 GAS HOLDER

NO. 1 GAS HOLDER

TAR SEPARATING WELL

OIL TANKS

COOLING TOWER

BOILERS

GENERATOR HOUSE

CONDENSER

TAR WELL

PUMP HOUSE

OIL HOUSE

PUMP

PURIFIER

WASHER COOLER

MACHINE SHOP

STORAGE

OFFICE

BOOSTER HOUSE

STEEL FRAME PUMP HOUSE

GAS CONTROL BLDG.

SEWER MANHOLE AND CONTROL STRUCTURE

PUMP HOUSE

FILLING STATION

GATE VALVE

UNKNOWN PIPE

TP-1 6.5-7
TP-2 6-6.5
TP-3 5.5-6.5
TP-4 4.5-6.5
TP-5 5-6
TP-6 2-3
TP-7 4.5-5
TP-8 7-8
TP-9 5-5.5
TP-10 5-6
TP-11 5-14
TP-12 6.5-7
TP-14 5-6
TP-15 3-6
TP-16 5.5-6
TP-17 7.5-8
TP-18 7-8
TP-19 7.5-8
TP-20
TP-21
TP-202 7-12
TP-203 5.5-10.5
TP-204 8-9
TP-205 8.5-9
TP-206 3-7
TP-207 14-15
TP-208 12-15
TB-1 8-26
TB-2 10-35
TB-3 12-52
TB-4 5-9 13-15 24-26
TB-5 4.5-16
TB-6 5.5-8
TB-7 8-9
TB-8 34-39
TB-9 15-16
TB-10 5-6 12-14
TB-11 5-14
TB-12
SB-1
SB-2
SB-3 5-6
SB-4 2-6 12-20
SB-5
SB-6 5.8-6
SB-7
SB-20 9-11
SB-21 4-6
SB-22 15-16
SB-23 13-18
SB-101 15-15.5 16-24
SB-102
SB-103 20-22
SB-104 20-22
SB-105
SB-106 9.5-19.5 23-25
SB-107
SB-108
SB-109
SB-110
SB-111
SB-112
SB-201 14-21 26-27 48-48.3
SB-202 8-9
MW93-6D 28-29
MW93-5D 8-21 34-35
MW93-1D 15.5-24
MW93-2D 32-33 36-42
MW93-2S 10-12
MW93-3D 36-44
MW93-3S
MW97-6S
MW97-7
MW97-8/TB-13 21.5-22
MW97-9D 15-18
MW97-9S 15-18
MW97-10D 4-5 15.5-16 18-32 42-44 49-50
MW97-10S/SB-8
MW97-11S
MW97-12S
MW97-13S 6-14
MW97-14D
MW97-14S
MW98-15S 15-17
MW98-16D
MW98-16S
MW01-03R 40-42
MW01-07R
MW01-17D
MW01-17S
NMW-2
PZ01-02 11-16
PZ01-03
PZ01-04
PZ01-05
PZ01-06 12-19
PZ03-07-CD
PZ03-07-AB
PZ03-08-CD
PZ03-08-AB
PZ03-06-CD
PZ03-06-AB
PZ03-05-B
PZ03-05-ACD
PZ03-04-ABD
PZ03-03-ABD
PZ03-02-AD
PZ03-01-D
PZ93-1 4.5-5
SSO-1
SSO-2
SSO-3
SF-01
SF-02
SF-03
SF-05
SS-1
SS-2
SS-3
SS-4
SS-5
SS-6
SS-7
TW97-1S
TW97-1D
TW97-2D
TW97-2S
TW97-3S 20-26
B-1

IRM-1 IRM-2 IRM-3 IRM-4 IRM-5 IRM-6 IRM-7 IRM-8 IRM-9 IRM-10 IRM-11 IRM-12 IRM-13 IRM-14 IRM-15 IRM-16 IRM-17 IRM-18 IRM-19 IRM-20 IRM-21 IRM-22 IRM-23

LEGEND:

- FLOOD WALL
- OPERABLE UNIT BOUNDARY
- NYSEG PROPERTY LINES
- SANITARY SEWER LINE
- STORM SEWER LINE
- ABANDONED STORM SEWER LINE
- 840 GROUND SURFACE ELEVATION CONTOUR (FT AMSL)
- NAPL BARRIER WALL
- JET GROUT PANEL
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- RAILROAD TRACK
- FENCE
- REMOVAL AREA (SEE NOTE 7)
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT
- SOIL BORING
- IRM CONFIRMATORY SAMPLE LOCATION
- DECOMMISSIONED MONITORING WELL
- LOCATION ID / ft bgs — DEPTH OF IMPACTS (FEET BELOW GROUND SURFACE)
- NAPL OR SHEEN (MGP-RELATED)
- NAPL OR SHEET (PETROLEUM-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.
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.
6. ALL LOCATIONS ARE APPROXIMATE. SITE PLAN DEPICTS BOTH HISTORIC AND CURRENT SITE FEATURES.
7. No. 2 GAS HOLDER REMOVED. No. 3 GAS HOLDER AND TAR SEPARATING WELL REMOVED IN 2000 TO A DEPTH OF 10 FEET BELOW GRADE.

0 50' 100'
GRAPHIC SCALE

NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK
OU-1 FOCUSED FEASIBILITY STUDY

APPROXIMATE EXTENT OF NAPL IN OU-1

ARCADIS

FIGURE 5

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: K. WHITE PM: J. BRIEN TM: J. BRIEN TR: J. GOLUBSKI LYR:(Opt)ON="OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ---
13103XLD
13103X03
13103X01

IRM-13 (7/9/01)	
Consituent	(4')
Total BTEX	0.03
Total PAHs	551.5

TB-10 (5/1/93)	
Constituent	(12–14')
Cyanide, Total	3 U
Total BTEX	28
Total PAHs	1,308 J

SB-2 (9/17/97)		
Constituent	(2–4')	(4–6')
Total BTEX	ND	ND
Total PAHs	ND	3.304

IRM-8 (1/12/01)	
Consituent	(9')
Total BTEX	305.3
Total PAHs	10,764

IRM-12 (7/9/01)	
Consituent	(6')
Total BTEX	285.1
Total PAHs	2,039.3

SB-3 (9/17/97)	
Constituent	(4–6')
Total BTEX	ND
Total PAHs	229.6

SB-21 (5/20/98)	
Constituent	(4–6')
Cyanide, Total	0.79
Total BTEX	910
Total PAHs	322.5

IRM-5 (1/2/01)	
Consituent	(8')
Total BTEX	223.3
Total PAHs	155.7

IRM-1 (12/7/00)	
Consituent	(10')
Total BTEX	31.5
Total PAHs	275.7

IRM-4 (12/27/00)	
Consituent	(8')
Total BTEX	1,430
Total PAHs	8,626

IRM-2 (12/14/00)	
Consituent	(10')
Total BTEX	58.7
Total PAHs	951.4

IRM-9 (1/25/01)	
Consituent	(10')
Total BTEX	108.2
Total PAHs	1,238

IRM-11 (1/25/01)	
Consituent	(7')
Total BTEX	234.2
Total PAHs	13,062

IRM-10 (1/25/01)	
Consituent	(8')
Total BTEX	905
Total PAHs	8,184

SB-20 (5/18/98)	
Constituent	(7–10')
Cyanide, Total	0.61 U
Total BTEX	219.6
Total PAHs	1,866

TB-1 (5/1/93)	
Constituent	(28–30')
Cyanide, Total	3 U
Total BTEX	1.636
Total PAHs	37.91 J

SB-101 (8/3–7/01)			
Constituent	(10–12')	(10–12') DUP	(15–17')
Total BTEX	ND	ND	0.2
Total PAHs	ND	ND	125.5

SB-1 (9/18/97)		
Constituent	(2–4')	(4–6')
Total BTEX	ND	ND
Total PAHs	3.57	83.97

IRM-20 (7/17/01)	
Consituent	(6')
Total BTEX	0.03
Total PAHs	37.84

IRM-22 (8/1/01)	
Consituent	(8')
Total BTEX	1.19
Total PAHs	117.65

TB-5 (5/1/93)	
Constituent	(10–14')
Cyanide, Total	3.2 U
Total BTEX	312
Total PAHs	4,882 J

TP-2 (5/1/93)	
Constituent	(6')
Cyanide, Total	6
Total BTEX	3.18
Total PAHs	855

SB-103 (8/27/01)		
Constituent	(8–10')	(14–16')
Total BTEX	ND	ND
Total PAHs	0.7	ND

SB-110 (9/17/01)	
Constituent	(7–9')
Total BTEX	ND
Total PAHs	ND

SB-22 (5/20/98)	
Constituent	(12–16')
Cyanide, Total	0.59 U
Total BTEX	167
Total PAHs	1,066.8

IRM-3 (12/19/00)	
Consituent	(10')
Total BTEX	0.036
Total PAHs	ND

SB-104 (8/29–30/01)		
Constituent	(10–12')	(20–22')
Total BTEX	ND	ND
Total PAHs	6.75	ND

IRM-19 (7/12/01)	
Consituent	(7')
Total BTEX	2.336
Total PAHs	180.4

TB-11 (5/1/93)	
Constituent	(10–16')
Cyanide, Total	50
Total BTEX	135
Total PAHs	43,147 J

TP-7 (5/1/93)	
Constituent	(5')
Cyanide, Total	23
Total BTEX	2,075
Total PAHs	4,746 J

SB-111 (9/17/01)	
Constituent	(7–7.5')
Total BTEX	ND
Total PAHs	415.9

SB-102 (8/6/01)		
Constituent	(10–12')	(21–23')
Total BTEX	ND	ND
Total PAHs	0.26	ND

TB-2 (5/1/93)	
Constituent	(10–14')
Cyanide, Total	12.4
Total BTEX	213
Total PAHs	3,371 J

IRM-6 (1/9/01)	
Consituent	(12')
Total BTEX	118.4
Total PAHs	927.6

SB-105 (8/9/01)		
Constituent	(8–10')	(14–16')
Total BTEX	ND	ND
Total PAHs	ND	ND

SB-112 (9/17/01)		
Constituent	(4–6')	(4–6') DUP
Total BTEX	ND	ND
Total PAHs	ND	ND

MW98-15S (5/18/98)	
Constituent	(9–11')
Total BTEX	ND
Total PAHs	20.9

IRM-15 (7/10/01)	
Consituent	(10')
Total BTEX	234.1
Total PAHs	187.7

SB-23 (5/22/98)		
Constituent	(16–18')	(16–18') DUP
Cyanide, Total	0.78 U	0.73 U
Total BTEX	268.8	102.8
Total PAHs	1,409.5	1,039.4

IRM-14 (7/9/01)	
Consituent	(11')
Total BTEX	454
Total PAHs	3,561

SB-106 (8/8/01)		
Constituent	(7–9')	(13–15')
Total BTEX	ND	0.3
Total PAHs	4.12	52.7

SB-4 (9/16/97)		
Constituent	(2–4')	(12–14')
Total BTEX	ND	0.01 J
Total PAHs	8.39	118.71

SB-8 (9/19/97)		
Constituent	(2–4')	(2–4') DUP
Total BTEX	ND	ND
Total PAHs	9.05	4.434

IRM-17 (7/10/01)	
Consituent	(10')
Total BTEX	41.91
Total PAHs	42.6

SB-107 (8/10/01)	
Constituent	(7–8')
Total BTEX	ND
Total PAHs	0.23

IRM-23 (8/3/01)	
Consituent	(9')
Total BTEX	0.022
Total PAHs	0.709

IRM-7 (1/11/01)	
Consituent	(11')
Total BTEX	3.664
Total PAHs	12.538

IRM-18 (7/11/01)	
Consituent	(9')
Total BTEX	0.028
Total PAHs	0.11

SB-108 (8/13–14/01)			
Constituent	(6–8')	(6–8') DUP	(35–37')
Total BTEX	ND	ND	ND
Total PAHs	6.72	12.64	ND

SB-5 (9/16/97)		
Constituent	(2–4')	(4–6')
Total BTEX	ND	ND
Total PAHs	5.41	225.62

TP-14 (5/1/93)	
Constituent	(6')
Cyanide, Total	2.9 U
Total BTEX	0.616
Total PAHs	404 J

TP-21 (5/1/93)		
Constituent	(8')	(8') DUP
Cyanide, Total	2.5 U	18
Total BTEX	0.24	0.104 J
Total PAHs	35.631 J	16.48 J

MW97-7 (9/25/97)		
Constituent	(18–20')	(18–20') DUP
Cyanide, Total	0.59 U	NA
Total BTEX	ND	ND
Total PAHs	ND	ND

MW01-07R (7/25/01)	
Constituent	(20–22')
Total BTEX	ND
Total PAHs	0.2

TB-13 (9/30/97)	
Constituent	(18–20')
Cyanide, Total	0.59 U
Total BTEX	0.358 J
Total PAHs	0.736 J

SB-6 (9/17/97)	
Constituent	(4–6')
Total BTEX	ND
Total PAHs	1,064.2

SB-109 (8/15/01)		
Constituent	(10–11')	(17–19')
Total BTEX	ND	0.024
Total PAHs	ND	1.68

IRM-21 (7/30/01)	
Consituent	(8')
Total BTEX	0.03
Total PAHs	ND

SB-7 (9/17/97)		
Constituent	(4–6')	
Total BTEX	0.002 J	
Total PAHs	11.293	

WEITZMANS & SONS SCRAP YARD

ASPHALT WORKS PLANT

NORFOLK SOUTHERN RAILROAD

PROPERTY (295 COURT STREET)

HENRY STREET

BRANDYWINE AVENUE

COURT STREET

TOMPKINS STREET

FLOOD WALL

24" PIPE OUTFALL

24" UNKNOWN PIPE

66-INCH STORM SEWER

36" SANITARY SEWER

SUSQUEHANNA RIVER

FILL PLAN

APPROXIMATE LOCATION OF BRANDYWINE CANAL

MH-3 (BOX CULVERT; NOT VISIBLE AT SURFACE)

SEWER MANIFOLD AND CONTROL STRUCTURE

(LOCATION APPROXIMATED; 20" AND 24" DIA. WATER LINES)

CONCRETE SANITARY SEWER (1975)

STORM FACILITY

GATE VALVE

PUMP HOUSE

OIL TANKS

GAS HOLDER

TAR SEPARATING WELL

NO. 1 GAS HOLDER

NO. 2 GAS HOLDER

COOLING TOWER

RETORTS

GENERATOR HOUSE

BOILERS

CONDENSOR

TAR WELL

PUMP HOUSE

OIL HOUSE

PUMP

PURIFIER

WASHER COOLER

MACHINE SHOP

STORAGE

OFFICE

BOOSTER HOUSE

NO. 1 GAS HOLDER

STEEL FRAME PUMP HOUSE

GAS CONTROL BLDG.

PURIFIERS SB-23

LAWN

BINGHAMTON LIGHT, HEAT & POWER CO.

LAKE

LEGEND:

- FLOOD WALL
- OPERABLE UNIT BOUNDARY
- NYSEG PROPERTY LINES
- SANITARY SEWER LINE
- STORM SEWER LINE
- ABANDONED STORM SEWER LINE
- 840 GROUND SURFACE ELEVATION CONTOUR (FT AMSL)
- NAPL BARRIER WALL
- JET GROUT PANEL
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- RAILROAD TRACK
- FENCE
- REMOVAL AREA (SEE NOTE 8)
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT
- SOIL BORING
- SEDIMENT BORING AND/OR SAMPLING LOCATION
- IRM CONFIRMATORY SAMPLE LOCATION
- DECOMMISSIONED MONITORING WELL

SB-24 (5/21/98)	
Constituent	(12–16')
Cyanide, Total	0.59 U
Total BTEX	167
Total PAHs	1,066.8

- SAMPLE ID
- SAMPLE DATE
- SAMPLE DEPTH
- TOTAL CYANIDE
- BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE
- TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS

RESULTS ARE IN MILLIGRAMS PER KILOGRAM (mg/Kg)

- 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.
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 THE 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.
7. ALL LOCATIONS ARE APPROXIMATE. SITE PLAN DEPICTS BOTH HISTORIC AND CURRENT SITE FEATURES.
8. No. 2 GAS HOLDER REMOVED IN. No. 3 GAS HOLDER AND TAR SEPARATING WELL REMOVED IN 2000 TO A DEPTH OF 10 FEET BELOW GRADE.
9. HIGHLIGHTED CONCENTRATIONS INDICATE TOTAL BTEX AND TOTAL PAH CONCENTRATIONS GREATER THAN 10 AND 500 MG/KG, RESPECTIVELY.

0 60' 120'
GRAPHIC SCALE

NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK
OU-1 FOCUSED FEASIBILITY STUDY

SUBSURFACE SOIL ANALYTICAL SUMMARY

ARCADIS

FIGURE 6

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LDI(Opt) PIC: K. WHITE PM: J. BRIEN TM: J. BRIEN TR: J. GOLUBSKI LYR(Opt)ON="OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\B0013103\03000\010\DWG\13103C01.dwg LAYOUT: 6 SAVED: 12/24/2012 10:08 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/24/2012 10:10 AM BY: KRAHMER, ERIC
XREFS: IMAGES: PROJECTNAME: ---
13103XLD
13103X03
13103X01

WEITZMANS & SONS SCRAP YARD

ASPHALT WORKS PLANT

NORFOLK SOUTHERN RAILROAD

PROPERTY
(295 COURT STREET)

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

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

MW97-7	
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

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

MW93-2D	
Constituent	12/18/97
Cyanide, Total	10 U
Total BTEX	409 J
Total PAHs	6,297 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

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

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

MW97-10S		
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

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	

MH-3 (BOX CULVERT; NOT VISIBLE AT SURFACE)

MW93-6D
MH-2
MW93-6S
MW93-5D
PZ93-1
PZ01-05
MW01-17D
MW01-17S
PZ01-04
MW97-9S
MW97-9D
PZ01-03
NO. 4 GAS HOLDER
MH-1B
NEW 63-INCH STORM SEWER
66-INCH STORM SEWER
MW93-2S
MW93-2D
MW01-03R
MW93-3D
MW93-3S
MW97-12S
PZ01-02
MW97-11S
MW01-10
MH-1
SEWER MANIFOLD AND CONTROL STRUCTURE
ABANDONED STORM/ SANITARY FACILITY (1975)
PZ01-06
GATE VALVE
MW97-8/ TB-13
PUMP HOUSE
MW01-07R
MW97-7
MW-2
PZ 03-02-AD
PZ 03-01-D
PZ 03-03-ABD
PZ 03-04-ABD
PZ 03-05-B
PZ 03-05-ACD
PZ 03-06-CD
PZ 03-06-AB
PZ 03-07-CD
PZ 03-07-AB
PZ 03-08-CD
PZ 03-08-AB
24" PIPE OUTFALL
(LOCATION APPROXIMATE) 20" AND 24" DIA. WATER LINES
MW97-1D
MW97-2D
MW97-2S
MW97-3S
MW97-5D
MW97-6D
MW97-6S
MW97-10D
MW97-10S/SB-8
MW98-15S
MW98-16S
MW98-16D
B-1
TW97-1S
TW97-1D
TW97-2D
TW97-2S
TW97-3S
MW97-14D
MW97-14S
OIL TANKS
TAR SEPARATING WELL
NO. 3 GAS HOLDER
NO. 2 GAS HOLDER
COOLING TOWER
RETORTS
GENERATOR HOUSE
BOILERS
CONDENSOR
TAR WELL
BINGHAMTON LIGHT HEAT & POWER CO.
PUMP HOUSE
PURIFIER
WASHER COOLER
PUMP
MACHINE SHOP
STORAGE
OFFICE
OIL HOUSE
NO. 1 GAS HOLDER
STEEL FRAME PUMP HOUSE
BOOSTER HOUSE
GAS CONTROL BLDG.
PURIFIERS
24" UNKNOWN PIPE
INTAKE
FLOOD WALL
COURT
STREET
CITY WELL 1
CITY WELL 2
RANNEY WELL
WELL INTAKE LATERALS
BRANDYWINE
APPROXIMATE LOCATION OF BRANDYWINE CANAL EXTENSION
AVENUE
TOMPKINS STREET
36" SANITARY SEWER
SUSQUEHANNA RIVER
FLOW
FILTRATION PLANT INTAKE
855
850
845
840
860

LEGEND:

- FLOOD WALL
- OPERABLE UNIT BOUNDARY
- NYSEG PROPERTY LINES
- SANITARY SEWER LINE
- STORM SEWER LINE
- ABANDONED STORM SEWER LINE
- 840 GROUND SURFACE ELEVATION CONTOUR (FT AMSL)
- NAPL BARRIER WALL
- JET GROUT PANEL
- HISTORICAL FEATURE
- BURIED CONCRETE WALL
- RAILROAD TRACK
- FENCE
- REMOVAL AREA (SEE NOTE 6)
- NAPL OR SHEEN (MGP-RELATED)
- NAPL OR SHEEN (PETROLEUM-RELATED)
- MONITORING WELL (SHALLOW)
- MONITORING WELL (DEEP)
- MONITORING WELL (BEDROCK)
- PIEZOMETER
- CITY MONITORING WELL
- DECOMMISSIONED MONITORING WELL

MW99-3S	
Constituent	12/18/97
Cyanide, Total	10 U
Total BTEX	ND
Total PAHs	2 J

- SAMPLE ID
- SAMPLE DATE
- TOTAL CYANIDE
- BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE
- TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS

RESULTS ARE IN MICROGRAMS PER LITER (µg/L)

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

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 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. ALL LOCATIONS ARE APPROXIMATE. SITE PLAN DEPICTS BOTH HISTORIC AND CURRENT SITE FEATURES.
6. No. 2 GAS HOLDER REMOVED. No. 3 GAS HOLDER AND TAR SEPARATING WELL REMOVED IN 2000 TO A DEPTH OF 10 FEET BELOW GRADE.
7. HIGHLIGHTED CONCENTRATIONS INDICATE THE PRESENCE OF INDIVIDUAL BTEX OR PAH COMPOUNDS AT CONCENTRATIONS GREATER THAN NYSDEC CLASS GA STANDARDS AND GUIDANCE VALUES.

0 50' 100'
GRAPHIC SCALE

NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK
OU-1 FOCUSED FEASIBILITY STUDY

GROUNDWATER ANALYTICAL SURVEY

ARCADIS

FIGURE
7

ARCADIS

Appendix A

Source Area Removal Final Engineering Report

NYSEG

NEW YORK STATE ELECTRIC & GAS CORPORATION
Corporate Drive, Kirkwood Industrial Park, P.O. Box 5224
Binghamton, New York 13902-5224

INTERIM REMEDIAL MEASURES

FINAL ENGINEERING REPORT

FOR ACTIVITIES AT

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT SITE
City of Binghamton, Broome County, New York

JULY 2002

Prepared By:
NYSEG Licensing & Environmental Operations Department

Reviewed and Approved By:
New York State Department of Environmental Conservation

NYSEG

August 27, 2002

Mr. David A. Crosby, P.E.
Division of Hazardous Waste Remediation
NYS Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7013

Subject: ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at NYSEG Binghamton Court Street Former Manufactured Gas Plant Site, City of Binghamton, Broome County, New York, dated July 2002

Dear Mr. Crosby:

Enclosed are four (4) copies of the ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at the Binghamton Court Street Former Manufactured Gas Plant Site. NYSEG completed the interim remedial measures project in August 2001.

Should you have any questions or comments concerning the Final Engineering Report, please feel free to contact me at (607) 762-8683.

Sincerely,

Bert W Finch
Project Manager
Licensing & Environmental Operations

Enclosures

cc: J. Simone, P.E. NYSEG
NYSEG MGP File
NYSEG Letter Book

NYSEG

August 27, 2002

Mr. Mike Rivara
NYS Department of Health
Flannigan Square
547 River Street
Troy, New York 12180

Subject: ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at NYSEG Binghamton Court Street Former Manufactured Gas Plant Site, City of Binghamton, Broome County, New York, dated July 2002

Dear Mr. Rivara:

Enclosed is the ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at the Binghamton Court Street Former Manufactured Gas Plant Site. NYSEG completed the interim remedial measures project in August 2001.

Should you have any questions or comments concerning the Final Engineering Report, please feel free to contact me at (607) 762-8683.

Sincerely,

Bert W Finch
Project Manager
Licensing & Environmental Operations

Enclosures

cc: D. Crosby, P.E. NYSDEC
G. Robinson NYSDOH
J. Simone, P.E. NYSEG
NYSEG MGP File
NYSEG Letter Book

NYSEG

August 27, 2002

Mr. Gary Robinson
NYS Department of Health
217 South Saline Street
Syracuse, New York 13204-2400

Subject: ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at NYSEG Binghamton Court Street Former Manufactured Gas Plant Site, City of Binghamton, Broome County, New York, dated July 2002

Dear Mr. Robinson:

Enclosed is the ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at the Binghamton Court Street Former Manufactured Gas Plant Site. NYSEG completed the interim remedial measures project in August 2001.

Should you have any questions or comments concerning the Final Engineering Report, please feel free to contact me at (607) 762-8683.

Sincerely,

Bert W Finch
Project Manager
Licensing & Environmental Operations

Enclosures

cc: D. Crosby, P.E. NYSDEC
M. Rivara NYSDOH
J. Simone, P.E. NYSEG
NYSEG MGP File
NYSEG Letter Book

NYSEG

August 27, 2002

Mr. Scott Deyette
Division of Hazardous Waste Remediation
NYS Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7013

Subject: ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at NYSEG Binghamton Court Street Former Manufactured Gas Plant Site, City of Binghamton, Broome County, New York, dated July 2002

Dear Mr. Deyette:

Enclosed is the ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at the Binghamton Court Street Former Manufactured Gas Plant Site. NYSEG completed the interim remedial measures project in August 2001.

Should you have any questions or comments concerning the Final Engineering Report, please feel free to contact me at (607) 762-8683.

Sincerely,

Bert W Finch
Project Manager
Licensing & Environmental Operations

Enclosures

cc: D. Crosby, P.E. NYSDEC
J. Simone, P.E. NYSEG
NYSEG MGP File
NYSEG Letter Book

NYSEG

August 27, 2002

Mr. Ronald Brink
Broome County Department of Health
225 Front Street
Binghamton, New York 13901

Subject: ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at NYSEG Binghamton Court Street Former Manufactured Gas Plant Site, City of Binghamton, Broome County, New York, dated July 2002

Dear Mr. Brink:

Enclosed is the ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at the Binghamton Court Street Former Manufactured Gas Plant Site. NYSEG completed the interim remedial measures project in August 2001.

Should you have any questions or comments concerning the Final Engineering Report, please feel free to contact me at (607) 762-8683.

Sincerely,

Bert W Finch
Project Manager
Licensing & Environmental Operations

Enclosures

cc: D. Crosby, P.E. NYSDEC
J. Simone, P.E. NYSEG
NYSEG MGP File
NYSEG Letter Book

NYSEG

August 27, 2002

Ms. Lisa Wise
Broome County Public Library
78 Exchange Street
Binghamton, New York 13905

Subject: ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at NYSEG Binghamton Court Street Former Manufactured Gas Plant Site, City of Binghamton, Broome County, New York, dated July 2002

Dear Ms. Wise:

Enclosed is the ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at the Binghamton Court Street Former Manufactured Gas Plant Site. NYSEG completed the interim remedial measures project in August 2001. Please place the Final Engineering Report in the document repository for NYSEG (New York State Electric & Gas Corporation) Binghamton Court Street Former Manufactured Gas Plant (MGP) Site.

Should you have any questions or comments concerning the Final Engineering Report, please feel free to contact me at (607) 762-8683.

Sincerely,

Bert W Finch
Project Manager
Licensing & Environmental Operations

Enclosures

cc: D. Crosby, P.E. NYSDEC
J. Simone, P.E. NYSEG
NYSEG MGP File
NYSEG Letter Book

NYSEG

Interoffice Memorandum

Office

August 27, 2002

To: Robert Pass

From: Bert W Finch

Enclosed is the ***APPROVED*** Interim Remedial Measures Final Engineering Report for Activities at the Binghamton Court Street Former Manufactured Gas Plant Site. NYSEG completed the interim remedial measures project in August 2001. Please place the Final Engineering Report in the document repository for NYSEG (New York State Electric & Gas Corporation) Binghamton Court Street Former Manufactured Gas Plant (MGP) Site.

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NYSEG

NEW YORK STATE ELECTRIC & GAS CORPORATION
Corporate Drive, Kirkwood Industrial Park, P.O. Box 5224
Binghamton, New York 13902-5224

INTERIM REMEDIAL MEASURES

FINAL ENGINEERING REPORT

FOR ACTIVITIES AT

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT SITE
City of Binghamton, Broome County, New York

JULY 2002

Prepared By:
NYSEG Licensing & Environmental Operations Department

Reviewed and Approved By:
New York State Department of Environmental Conservation

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G Final Engineering Report - NYSDEC approval letter

List of Acronyms Referred to in the Document

ACGIH	American Congress of Government Industrial Hygienists
ALJ	Administrative Law Judge
ANSI	American National Standards Institute
AQMP	Air-Quality Monitoring Program
ASP	analytical service protocol
ASTM	American Society for Testing and Materials
AWQC	Ambient Water Quality Criteria
BTEX	benzene, toluene, ethylbenzene and xylene
BTU	British thermal unit
cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbons
C	centigrade
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chain-of-Custody
CPP	Citizen Participation Plan
CPR	cardiopulmonary resuscitation
CQAP	Construction Quality Assurance Plan
CTS	coal tar soils
DI	deionized
DUSR	Data Usability Summary Report
ECL	Environmental Conservation Law
EEI	Edison Electric Institute
ELAP	Environmental Laboratory Approval Program
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
F	Fahrenheit
FS	feasibility study
GC	gas chromatograph
GCS-DN	gas chromatograph station downwind
GCS-UP	gas chromatograph station upwind
GHF	gas holder foundation
HASP	Health and Safety Plan
HEPA	high efficiency particulate air

HSM	Health & Safety Manager
IARC	International Agency for Research on Cancer
ID	identification
IRMs	interim remedial measures
Kg	kilogram
L	liter
LGAC	liquid-phase granular activated carbon
mg	milligram
MGP	manufactured gas plant
MS	matrix spike
MCD	matrix spike duplicate
MMBTU	million British thermal units
MSDS	material safety data sheet
NCP	National Contingency Plan
NIOSH	National Institute for Occupational Safety and Health
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
NYSEG	New York State Electric & Gas Corporation
OSHA	Occupational Safety and Health Act or Administration
PAHs	polycyclic aromatic hydrocarbons
PC	personal computer
PCBs	polychlorinated biphenyls
PEL	permissible exposure limits
PHSC	Project Health and Safety Coordinator
PID	photo ionization detector
POTW	Public Owned Treatment Works
PM	Project Manager
ppb	part per billion
PPE	personal protective equipment
ppm	parts per million
PSA	preliminary site assessment
QA	quality assurance
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
QC	quality control

O&M	operation and maintenance
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	remedial investigation/feasibility study
ROD	record of decision
RTS1	Real-time Station 1
RTS4	Real-time Station 4
SAP	Sampling and Analysis Plan
SCGs	Standards, Criteria, and Guidance
SGC	short-term guideline concentrations
SHSO	Site Health & Safety Officer
SPL	sound pressure level
STEL	short-term exposure limits
SVOCs	semivolatile organic compounds
SW	solid waste
T & A	time and activity
TAGM	technical and administrative guidance memorandum
TCLP	toxicity characteristic leachate procedure
TLVs	threshold limit values
TPAH	total polycyclic aromatic hydrocarbons
UFPO	Underground Facility Protection Organization
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds
VOA	volatile organic analysis

1.0 INTRODUCTION

This report documents the implementation of approved remedial measures at a NYSEG-owned former manufactured gas plant site located on Court Street in the City of Binghamton, New York (see Figure 1). The remedial work can be substantially characterized as controlled excavation of contaminated soil and several underground structural remnants of a former manufactured gas plant and approved disposal of excavated materials.

The remedial work as established in a document titled *Interim Remedial Measures Work Plan for Activities at Binghamton Court Street Former Manufactured Gas Plant Site, City of Binghamton, Broome County, New York*, dated November 2000 was reviewed and approved by the NYSDEC in accordance with Section III of Order on Consent Index D0-0002-9309, conducted from November 2000 through January 2001 and July 2001 through August 2001.

1.1 Site History

The manufactured gas plant was constructed in 1888 by the Binghamton Gas & Electric Company. Numerous improvements and expansions were made to meet demand for gas. Gas Manufacturing continued for 64 years until 1952 (see Figure 2).

The above ground structures associated with the gas manufacturing process were removed in 1969. NYSEG acquired the site when it purchased Columbia Gas of New York in 1990. In 1991 NYSEG began investigating the environmental conditions of the Site.

A detailed site history was prepared by Basland Bouck Engineers, P.C. for the *Remedial Investigation Work Plan, Former Manufactured Gas Plant Site Court Street Binghamton, New York*, dated April 1993.

1.2 Executive Summary

This Interim Remedial Measures *(IRM)* was successfully completed in a safe and timely manner with essentially no impact to the ambient air quality as documented

in the results of the community air monitoring plan. There were no unresolved complaints received for odor, traffic, noise, or dust.

The *IRM* was to remove #3 gas holder foundation, a tar well and piping containing coal tar. This *IRM* removed a potential reservoir of NAPL and eliminated a preferential pathways for NAPL migration.

1.3 Certification

I hereby certify that all activities that comprised the *IRM* were performed in full accordance with the NYSDEC approved *IRM Work Plan* and Order on Consent Index No. D0-0002-9309.

WARNING: It is a violation of Title VIII of the Education Law of New York State, Article 145, for any person, unless acting under the direction of a licensed professional engineer, to alter this document.

Signature:

Name: Joseph M. Simone, P.E.
Title: Engineering Supervisor
License Number: 073728

2.0 PROJECT OBJECTIVES

The overall goal of the *IRM* was to remove the #3 gas holder foundation (GHF), a tar well and piping containing coal tar in order to remove a potential reservoir of NAPL and eliminate preferential pathways for NAPL migration.

3.0 PROJECT EXECUTION

This project was completed in accordance with the *IRM Work Plan*. Site setup and preparation started on October 31, 2000. Soil excavation began on November 13, 2000 following completion of site preparation. Phase I - #3 GHF and Tar Well removal was completed January 26, 2001 and the site was secured for the Winter. Phase II - test trenches and pipe removal started on July 9, 2001. The *IRM* remediation was completed on August 7, 2001. Appendix A contains a photographic log of the project.

3.1 Excavation Activities

3.1.1 #3 Gas Holder Foundation

The GHF was 120 feet in diameter, much larger than anticipated (see Figure 6). The GHF's wall was constructed of brick and stone was in poor condition and damaged in several areas. The bottom of the GHF was approximately 10 feet below ground level. The top two feet of soil was excavated and stockpiled for subsurface fill. Then the remaining contents of GHF were removed and disposed. After removing the contents of the GHF, the GHF concrete floor (2 feet thick) was removed. In addition, a thin layer of NAPL was removed underneath the floor. The soil below the floor was clay with no evidence of staining. The GHF was first filled with stockpiled subsurface fill, then the remaining area was filled with clean imported fill. The remaining GHF wall was then removed. The only soil removed out side of the GHF was for benching purposes only. No seems of DNAPL were observed in the sidewalls of the excavation.

3.1.2 Tar Well

A 28-foot diameter brick structure was found between #3 GHF and #2 GHF. This structure was labeled as a settling tank ammonia well on previous Figures. This

structure, which contained coal tar residues, may have been a tar well at one point during MGP operation. Monitoring Well MW97-13S had been drilled through the brick floor of this structure. The bottom of the structure was approximately 10 feet below ground level. The structure had internal baffles. The contents and the structure were removed. The soil below the floor was clay with no evidence of staining. The only soil removed out side of the structure was for benching purposes only. No seems of DNAPL were observed in the sidewalls of the excavation. The excavated area was filled with clean imported fill.

3.1.3 Test Trenches and Pipe Removal

As part of the soil/tarry waste removal program, NYSEG excavated test trenches in an attempt to locate piping that may contain tarry waste (see Figure 5&7). No vessels containing tarry waste were encountered during the test trenching or pipe removal. Some DNAPL seems were observed in the bottom of test trenches. NYSEG in consultation with the NYSDEC on site representative determined that additional excavation was not warranted during this *IRM*. The decision was based on the volume of soil that would need to be excavated above the DNAPL layer. Soil excavated from the test trenches were returned to it, with the most visibly stained soil being placed on the bottom of the trench and at least one foot of clean fill was placed on top.

Pipes encountered during excavation or test trenching that contained coal tar were chased and removed to the extent practicable. Piping that was not removed was plugged with clay. Phase 2, test trenching near the former #3 GHF was difficult due to the high level of groundwater in this area. A R&D Final Technical Report is presently being prepared to document the test trenches and the extent of pipe removal. This report will be submitted to the NYSDEC at a later date. The final R&D Report is will be available in the Document Repositories.

3.2 Engineering Controls

Engineering controls for this project were successful in preventing fugitive emissions. The engineering controls consisted of covering the soil stockpiles and impacted soils with polyethylene as soon as possible after any activity and at the end of the work day. In addition, application of a light mist of BIO SOLVE® to

impacted soil had the effect of controlling emissions during the soil removal operation.

During the initial removal operations, odor concerns were brought to the attention of NYSEG's by occupants of the Columbia Transmission Corporation office building, adjacent to the MGP structures. NYSEG in conjunction with the NYSDOH performed real-time air monitoring (see Section 4.3). The air monitoring results were non detect for chemicals of concern. To address the nuisance odor problem, NYSEG installed four Austin Health Mate air purifiers inside the office building as an engineering control. After the installation of the air purifiers, no further concerns were brought to the attention of NYSEG.

3.3 Disposal Activities

Material that was classified as non-hazardous waste based upon the pre-remediation in situ sampling (see Appendix B) was loaded directly into dump trailers. The material was then transported to Seneca Meadows Landfill Inc., Waterloo, New York.

Material that was classified as RCRA hazardous was transported to either Casie Ecology Oil Salvage Inc., Vineland, NJ to be thermally treated or Horizon Environmental Inc., Grandes-Piles Quebec, Canada to be landfilled. Very little excavated material could be sent for thermal treatment due to the presence of considerable debris.

Contaminated water from the gas relief holder foundation and test trenches, waste water from equipment decontamination and liquid tar and oil from piping were pumped into a frac tank, or 1,500 gallon containers or tank trucks. The water was then transported to either Casie Ecology Oil Salvage, Inc., Vineland, NJ; CECOS International, Niagara Falls, NY; Industrial Oil Tank Services, Inc., Oriskany, NY; or Clean Harbors of Baltimore Inc. Baltimore, MD for treatment. Table 3-1 summarizes the disposition of solid material and Table 3-2 summarizes the disposition of water for this project.

Table 3-1
Solid Material Disposition Summary

Facility		Tonnage
Seneca Meadows Landfill, Waterloo, NY	Landfill	2,418.84
Casie Ecology Oil Salvage, Inc., Vineland, NJ	Thermally treated	46.93
Horizon Environmental, Inc., Grandes-Piles, Quebec, Canada	Landfill	6,554.66
* For list of shipments by date see Appendix C		

Table 3-2
Water Disposition Summary

Facility	Gallons
Casie Ecology Oil Salvage, Inc., Vineland, NJ	24,716
CECOS International, Niagara Falls, NY	11,295
Industrial Oil Tank Services, Inc., Oriskany, NY	17,760
Clean Harbors of Baltimore Inc. Baltimore, MD	11,163
* For list of shipments by date see Appendix C	

3.4 Post Excavation Soil Sampling

The analytical results of all post excavation soil samples are shown on Figure 6 and are summarized in Appendix E along with a copy of the laboratory reports. A Data Usability Summary Report (DUSR) narrative for all post excavation soil samples collected is also included in Appendix F.

The remaining NAPL and other contamination issues will be addressed in the upcoming remedial investigation/feasibility study where a final remedy for the Site will be determined.

3.5 Site Restoration

Approximately 1,300 tons of stockpiled subsurface fill was placed in the bottom of the excavation for #3 GHF. The remaining area of #3 GHF and all other excavations were filled with imported clean common fill. Soil excavated from the test trenches were returned to it, with the most visibly stained soil being placed on the bottom of the trench and at least one foot of clean fill was placed on top. Final grades were established for proper rain runoff.

Materials (i.e., sand, stone, liners. Etc.) used to prepare the equipment contamination reduction pad and the stockpile management area were characterized and disposed of at Seneca Meadows Landfill, Waterloo, NY . In addition, all personal protective equipment (PPE) and plastic sheeting used to cover soil was disposed of appropriately, Fencing material that was installed during construction was removed.

Restoration was completed by placing and compacting crusher-run over the project area. The site has returned to its former use as an equipment and piping storage area.

4.0 COMMUNITY AIR MONITORING

4.1 Real-Time Air Monitoring - Volatile Organic Compounds & Total Suspended Particulates

Real time air quality data were collected from the site perimeter using (1) a Mini-Rae™ photo ionization detector (PID) to monitor total volatile organic compound (VOC) releases; and (2) a Mini-Ram™ to monitor total airborne suspended particulates, in accordance with sections 5.3.2 and 5.3.3 of the *Work Plan*. The real-time measurements were taken hourly to determine if air quality at the site perimeter was being impacted by excavation activities and whether excavation activities should be suspended. The peak total VOC and total suspended particulate data are presented in Table 4-1. A complete summary of real-time air monitoring data can be found in Appendix D.

The results of the real-time community air monitoring indicate that the concentrations for total VOC and total suspended particulates, as measured during

the project, did not exceed the action levels specified in the *Work Plan*. Hence, excavation activities were not interrupted due to unacceptable levels of total VOCs or total suspended particulates measured at the site perimeter.

Table 4-1
Binghamton Court Street FORMER MGP SITE
IRM REMEDIATION PROJECT
Summary of Results
Real-Time Air Monitoring Program
November 13, 2000 through August 7, 2001

Parameter	Action Levels	Peak Concentration
Total VOC	5.0 ppm *	3.8 ppm***
Total Suspended Particulates	0.15 mg/M^3 **	0.04 mg/M^3****

Note: A summary of all Real-Time Air Monitoring results can be found in Appendix D.
* Note: The OSHA (1910.1028) Short-Term exposure limit is 5.0 ppm.
** NYSDEC TAGM HWR-89-4031
*** November 28, 2000, 13:32, RTS-2
****July 9, 2001, 10:30, RTS-4; July 20, 2001, 10:45, RTS-1; August 6, 2001: 12:23, RTS-3; 14:43, RTS-3; 14:46, RTS-2; 14:49, RTS-1; August 7, 2001: 12:32, RTS-3; 13:40, RTS-3; 13:43, RTS-2; 14:47, RTS-3; 14:50, RTS-2; 14:53, RTS-1.

4.2 Speciated Real-Time Air Monitoring (BTEX)

A significant effort in determining BTEX (benzene, toluene, ethylbenzene and xylene) compounds in ambient air was undertaken during the Binghamton Court Street Former MGP Site Remediation Project. The purpose in generating these data was twofold: (1) to supplement total VOC real-time air measurements with a specific benzene measurement if the total VOC action level of 5 ppm was exceeded; and (2) to ensure that emissions of BTEX to the surrounding community during periods of construction activity potentially conducive to the airborne release of these compounds did not exceed acceptable levels.

Upwind and downwind air sampling stations were set up at the site perimeter based on meteorological data. Air samples were collected at the perimeter stations and analyzed on-site using a portable gas chromatograph (GC) in accordance with Section 5.3.4 of the *Work Plan*. The results of average and peak BTEX concentrations for the speciated real-time air monitoring program are summarized

in Table 4-2. A complete summary of speciated BTEX air monitoring results can be found in Appendix D.

The results of the speciated real-time air monitoring indicate that the peak concentration for benzene exceeded the Short Term Guidance Concentration (SGC) as published in NYSDEC's Air Guide-1. However, the average (results averaged over the duration of the entire project) benzene result fell below the SGC. The peak and average concentrations for ethylbenzene, toluene and the xylenes were also below their respective SGCs.

Periodically, an air sample was submitted to the laboratory for determination of BTEX compounds by EPA method TO-14 after it had been run by the on-site portable GC. Over the course of the IRM, a total of eleven samples were submitted to the laboratory for BTEX determination. This was done to compare the results being generated by the on-site portable GC with more sensitive and sophisticated laboratory methodology. The results of the comparative study and the associated lab reports are presented in Appendix D. In general, the laboratory results were in agreement with the results generated by the portable GC. A notable exception included one sample where the ethylbenzene concentration as measured by the portable GC was 0.063 ppm, but the laboratory method found no detectable ethylbenzene from the same sample. It should be noted that this level of ethylbenzene was orders of magnitude lower than Air Guide -1 SGC of 24 ppm.

It should also be noted that all ambient air samples were collected in a grab sampling fashion over approximately thirty minute periods and at a frequency of every two hours as specified in Section 5.3.4 of the *Work Plan*. The Air Guide-1 SGCs are based on time-weighted average data which typically relate to the results of continuous sampling averaged over an eight to ten-hour period. While the SGCs may provide a reference point in considering the relative magnitude of BTEX compounds as collected at the grab sampling points, the fundamental difference between time-weighted average and grab sampling data should be taken into account. The average values calculated in Table 4-2 are the arithmetic mean values for all results of grab sampling for the entire project.

Table 4-2
Binghamton Court Street MGP IRM
Speciated BTEX Air Monitoring Program
Summary of Results

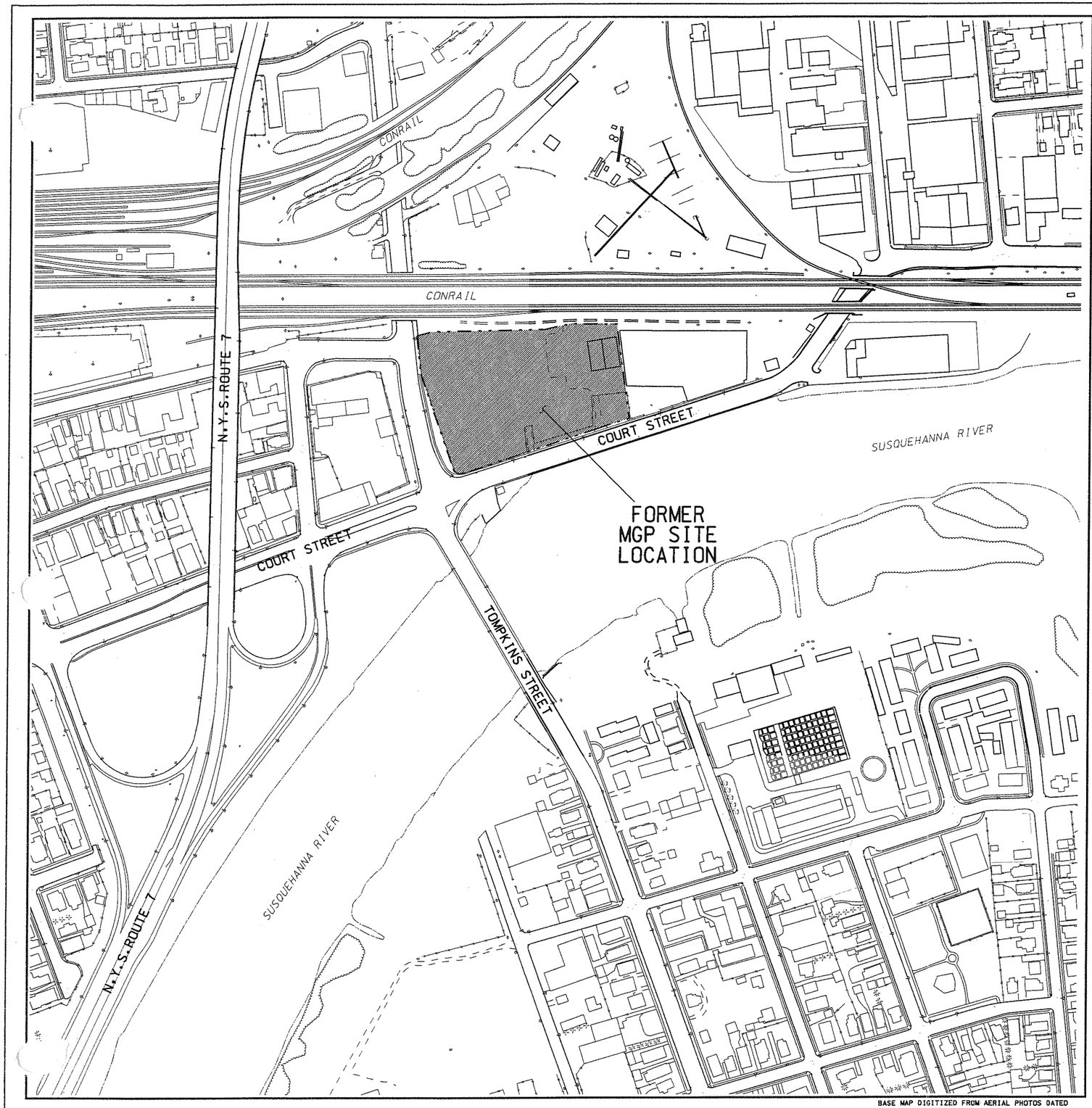
Compound	Air Guide-1 SGCs (ppm)	Average* Concentration (ppm)	Peak Concentration (ppm)***
Benzene	0.009	0.005	0.078
Toluene	24	0.002	0.113
Ethylbenzene	23	0.001	0.132
m,p-Xylene	23**	0.0002	0.042
o-Xylene	23**	0.001	0.109

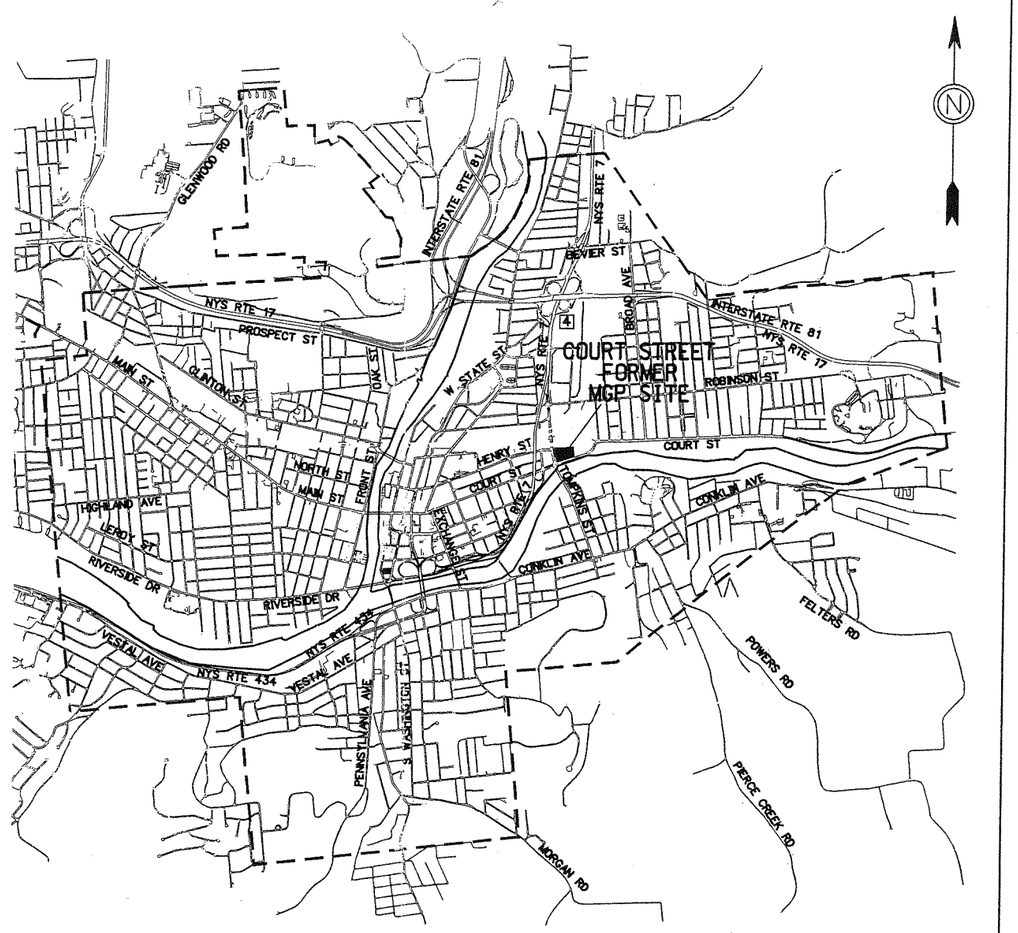
Note: A summary of all Speciated BTEX Community Air Monitoring results can be found in Appendix D.
* Note: Average of all readings for the duration of the entire project.
** SGC for Total Xylenes
*** Benzene: 11/28/00, 14:00, RTS-2; Toluene: 8/1/01, 14:00, RTS-4; Ethylbenzene: 7/16/01, 08:00, RTS-1; m,p-xylene: 7/10/01, 08:00, RTS-1; o-xylene: 8/2/01, 10:00, RTS-1.

4.3 Columbia Gas Transmission Office Building Air Monitoring

On December 11, 2000, NYSEG received an odor complaint from occupants of the Columbia Transmission Corporation office building located east of the MGP site. In consultation with the NYSDOH, NYSEG conducted real-time air monitoring for total volatile organic compounds (VOCs) using a Mini-Rae™ photo ionization detector (PID). The PID monitoring recorded no detectable levels of total VOCs. At the same time, an air sample from the front office space was collected in a tedlar bag and submitted Performance Analytical, Inc. for determination of benzene, toluene, ethylbenzene, and xylenes (BTEX compounds). Remediation technician's notes are presented in Appendix D.) The following week, additional summa canister samples were taken from two office spaces and immediately outside the building and submitted to Performance Analytical for VOC analysis. The results of the laboratory testing indicate that low levels of VOCs were detected in the parts per billion range for all samples collected (lab reports are presented in Appendix D). The concentrations of the BTEX compounds were found to be significantly below the OSHA permissible exposure limits (PEL) and also below the New York State Air Guide-1 short term guidance criteria (SGC).

FIGURES





CITY OF
BINGHAMTON

0 150 300 450
Scale SCALE OF DETAIL Feet

BASE MAP DIGITIZED FROM AERIAL PHOTOS DATED APRIL, 1992 BY LOCKWOOD MAPPING, INC. ROCHESTER, NY.

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NYSEG	ENGINEERING SERVICES BINGHAMTON, N. Y.	
TITLE	LOCATION MAP	
BINGHAMTON COURT STREET MGP SITE		
CITY OF BINGHAMTON		
BROOME COUNTY, NEW YORK		
SCALE : AS SHOWN DATE : 02/04/00	DWG NO FIGURE 1	REV

CONRAIL PROPERTY

APPROX. PROPERTY LINE

HENRY STREET

BRANDYWINE AVENUE

66-INCH STORM SEWER

OIL TANKS 2 1 3

NAPTHA TANKS

SETTLING TANK AMMONIA WELL & TAR WELL

NO. 3 GAS HOLDER

NO. 2 GAS HOLDER

RETORTS

COOLING TOWER

GENERATOR HOUSE

BOILERS

CONDENSOR

BINGHAMTON LIGHT HEAT & POWER CO.

APPROX. PROPERTY LINE

PUMP HOUSE

PURIFIER

PUMP

WASHER COOLER

PURIFIER

OIL HOUSE

MACHINE SHOP

STORAGE

OFFICE

STEEL FRAME PUMP HOUSE

BOOSTER HOUSE

PURIFIERS

7

OIL TANKS

5

6

8

OIL TANK 4

NO. 4 GAS HOLDER

COURT STREET

SUSQUEHANNA RIVER

FLOW

N

0 25 50 75

Scale SCALE REFERENCE Feet

CADD DRAWING DO NOT REVISE MANUALLY

SYM	ZONE	REVISION	DATE	BY	CHK	APP
1		REV.NO.2 GAS HOLDER TAR WELL LOCATIONS FROM FIELD CHECK	01/02	RFB		

DWN BY: RFB	07 10 00	DSGN BY:	
CHECKED BY:			
DRAFTING:		DESIGN:	
ENGRG:			
RELEASE APPROVAL:			
AUTHORIZED BY:			
MATERIAL OR SPEC:			

NYSEG ENGINEERING SERVICES BINGHAMTON, N.Y.

TITLE FORMER OPERATIONS LAYOUT

BINGHAMTON COURT STREET FORMER MGP SITE

CITY OF BINGHAMTON

BROOME COUNTY, NEW YORK

SCALE: AS SHOWN DWG NO FIGURE 2 REV 1

TW97-1S
TW97-1D
TW97-2D
TW97-2S
CONRAIL PROPERTY
TW97-3S
MH-3 (BOX CULVERT; NOT VISIBLE AT SURFACE)
MW93-6D
MW93-6S
MH-2
AREA 4
APPROX. PROPERTY LINE
MW93-5D
MW97-14D
MW97-14S
OIL TANKS
NAPTHA TANKS
AREA 3
COOLING TOWER
RETORTS
GENERATOR HOUSE
BINGHAMTON LIGHT HEAT & POWER CO.
295 COURT STREET PROPERTY
HENRY STREET
66-INCH STORM SEWER
SETTLING TANK AMMONIA WELL
NO. 3 GAS HOLDER
NO. 2 GAS HOLDER
MW97-13S
BOILERS
CONDENSOR
TAR WELL
AREA 2
PUMP HOUSE
AREA 1
OIL HOUSE
MACHINE SHOP
STORAGE
OFFICE
PUMP
PURIFIER
WASHER COOLER
NO. 1 GAS HOLDER
MW97-10S
MW97-10D
STEEL FRAME PUMP HOUSE
PURIFIERS
BOOSTER HOUSE
EXISTING GAS CONTROL BLDG.
293 COURT STREET PROPERTY
APPROX. PROPERTY LINE
BRANDYWINE AVENUE
NYSEG COURT STREET PROPERTY
APPROXIMATE EXTENT OF PAVED AREA
APPROXIMATE EXTENT OF GRASS COVER
OIL TANK 4
NO. 4 GAS HOLDER
MW97-9S
MW97-9D
MW93-3S
MW93-3D
24" OUTFALL PIPE
FLOOD WALL
COURT STREET
MW93-2D
MW93-2S
20" AND 24" DIA. WATER LINES (LOCATION APPROXIMATE)
MW97-12S
MW97-11S
COMBINED STORM/ SANITARY FACILITY (1975)
MH-1
MW93-1D
SEWER MANHOLE AND CONTROL STRUCTURE
SUSQUEHANNA RIVER
FLOW
NYSEG PROPERTY (267 COURT ST.)
B-1
MW97-8
PUMP HOUSE
STAFF GAUGE
MW97-7

LEGEND

- EXISTING MONITORING WELL (SHALLOW)
- EXISTING MONITORING WELL (DEEP)
- INSITU SOIL SAMPLING POINT

0 30 60 90
Scale SCALE REFERENCE Feet

CADD DRAWING DO NOT REVISE MANUALLY	SYM	ZONE	REVISION	DATE	BY	CHK	APP

DWN BY:	06/01/00	DSGN BY:	/ /
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ENGRG:			/ /
RELEASE APPROVAL:			/ /
AUTHORIZED BY:			/ /
MATERIAL OR SPEC:			

NYSEG ENGINEERING SERVICES BINGHAMTON, N.Y.

TITLE PRE-REMEDIATION INSITU SAMPLING
BINGHAMTON COURT STREET FORMER MGP SITE
CITY OF BINGHAMTON
BROOME COUNTY, NEW YORK

SCALE: AS SHOWN | DWG NO FIGURE 3 | REV

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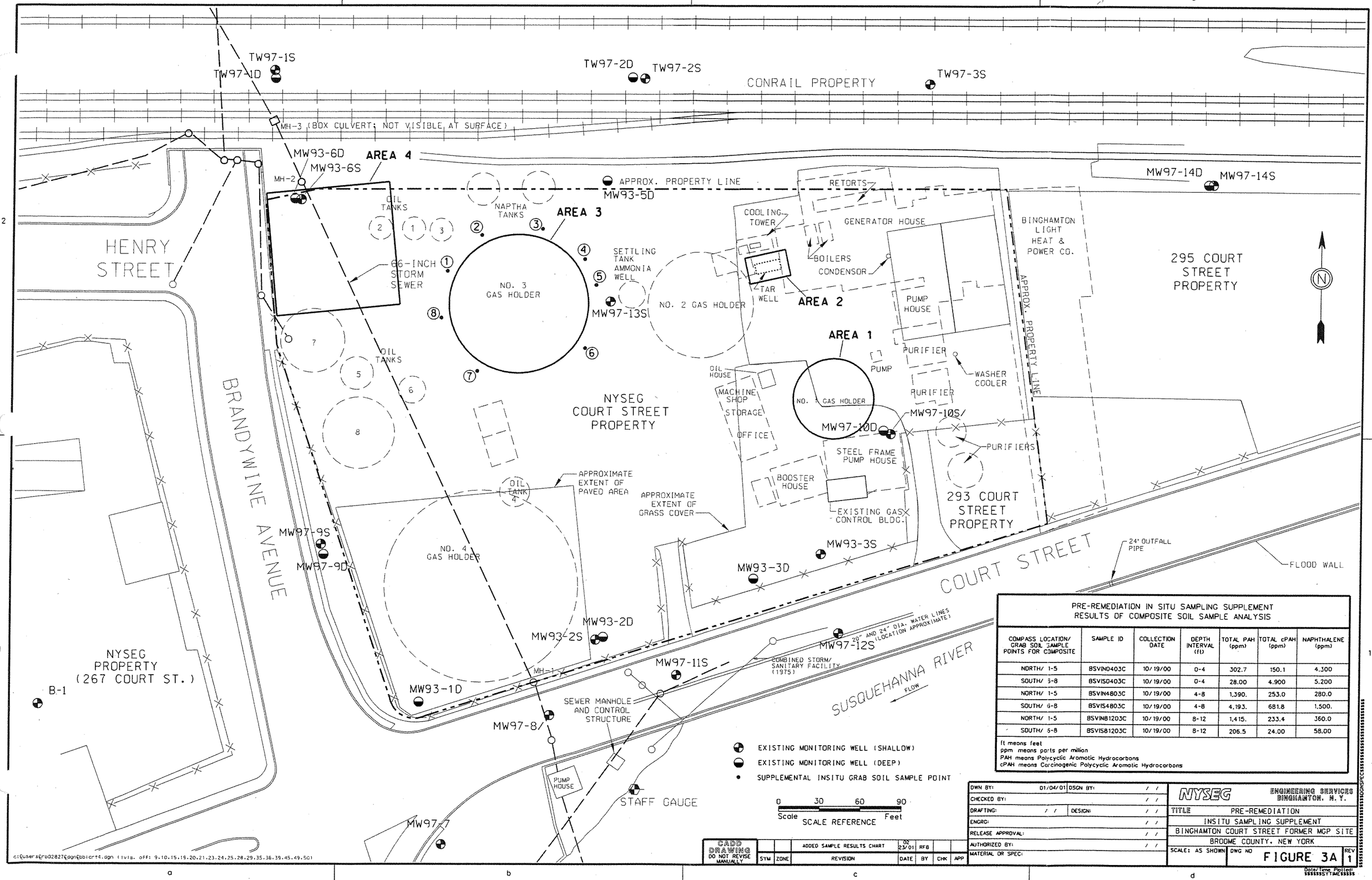

PRE-REMEDIATION IN SITU SAMPLING SUPPLEMENT
RESULTS OF COMPOSITE SOIL SAMPLE ANALYSIS

COMPASS LOCATION/ GRAB SOIL SAMPLE POINTS FOR COMPOSITE	SAMPLE ID	COLLECTION DATE	DEPTH INTERVAL (ft)	TOTAL PAH (ppm)	TOTAL cPAH (ppm)	NAPHTHALENE (ppm)
NORTH/ 1-5	BSVIN0403C	10/19/00	0-4	302.7	150.1	4.300
SOUTH/ 5-8	BSVIS0403C	10/19/00	0-4	28.00	4.900	5.200
NORTH/ 1-5	BSVIN4803C	10/19/00	4-8	1,390.	253.0	280.0
SOUTH/ 6-8	BSVIS4803C	10/19/00	4-8	4,193.	681.8	1,500.
NORTH/ 1-5	BSVIN8120JC	10/19/00	8-12	1,415.	233.4	360.0
SOUTH/ 5-8	BSVIS8120JC	10/19/00	8-12	206.5	24.00	58.00

ft means feet
ppm means parts per million
PAH means Polycyclic Aromatic Hydrocarbons
cPAH means Carcinogenic Polycyclic Aromatic Hydrocarbons

CADD DRAWING DO NOT REVISE MANUALLY			ADDED SAMPLE RESULTS CHART	02/23/01	RFB		
	SYM	ZONE	REVISION	DATE	BY	CHK	APP

DWN BY:	01/04/01	DSGN BY:	/ /
CHECKED BY:			/ /
DRAFTING:	/ /	DESIGN:	/ /
ENGRG:			/ /
RELEASE APPROVAL:			/ /
AUTHORIZED BY:			/ /
MATERIAL OR SPEC:			

NYSEG ENGINEERING SERVICES BINGHAMTON, N.Y.

TITLE: PRE-REMEDIATION
INSITU SAMPLING SUPPLEMENT
BINGHAMTON COURT STREET FORMER MGP SITE
BROOME COUNTY, NEW YORK

SCALE: AS SHOWN | DWG NO: FIGURE 3A | REV 1

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Date/Time Plotted: $$$$$$SYTIME$$$$$$

CONRAIL PROPERTY

MH-3 (BOX CULVERT; NOT VISIBLE AT SURFACE)

MH-2

APPROX. PROPERTY LINE

HENRY STREET

SUPPORT ZONE

RTS 2

EXCLUSION ZONE

TAR WELL

STOCKPILE AREA

66-INCH STORM SEWER

NO. 3 GAS HOLDER

EXCLUSION ZONE

EQUIPMENT CONTAMINATION REDUCTION PAD

20 x 40

1500 GALLON WATER TANKS

RTS 1

RTS 3

NYSEG COURT STREET PROPERTY

CONTAMINATION REDUCTION ZONE

APPROX. PROPERTY LINE

295 COURT STREET PROPERTY

N

NO. 1 GAS HOLDER

SUPPORT ZONE

EQUIPMENT TRAILER 8 x 20

APPROXIMATE EXTENT OF PAVED AREA

RTS 4

APPROXIMATE EXTENT OF GRASS COVER

EXISTING GAS CONTROL BLDG.

293 COURT STREET PROPERTY

PERSONNEL CONTAMINATION REDUCTION SHED 8 x 10

NYSEG PIPE STORAGE AREA

SUPPORT ZONE

24" OUTFALL PIPE

PORTABLE TOILET

12 x 55

CONSTRUCTION OFFICE TRAILER

SITE ENTRANCE

COURT STREET

20" AND 24" DIA. WATER LINES (LOCATION APPROXIMATE)

CONSTRUCTION PERSONNEL PARKING

MH-1

COMBINED STORM/ SANITARY FACILITY (1975)

SUSQUEHANNA RIVER

FLOW

SEWER MANHOLE AND CONTROL STRUCTURE

BRANDYWINE AVENUE

NYSEG PROPERTY (267 COURT ST.)

LEGEND

- CONTAMINATION REDUCTION ZONE
- RTS – REAL-TIME AIR MONITORING STATION

0 25 50 75
Scale SCALE REFERENCE Feet

SYM	ZONE	REVISION	DATE	BY	CHK	APP
		REVISED CONTAMINATION REDUCTION ZONE	10 24/00	RFB		
		REMOVED PROPOSED BRANDYWINE AVENUE ENTRANCE	07 26/00	RFB		

CADD DRAWING DO NOT REVISE MANUALLY

DWN BY: RFB	07/06/00	DSGN BY: BMF	07/05/00
CHECKED BY:	/ /		
DRAFTING:	/ /	DESIGN:	/ /
ENGRG:	/ /		
RELEASE APPROVAL:	/ /		
AUTHORIZED BY:	/ /		
MATERIAL OR SPEC:			

NYSEG ENGINEERING SERVICES BINGHAMTON, N. Y.

TITLE PROJECT LAYOUT
BINGHAMTON COURT STREET FORMER MGP SITE
CITY OF BINGHAMTON
BROOME COUNTY, NEW YORK

SCALE: AS SHOWN DWG NO FIGURE 4 REV 2

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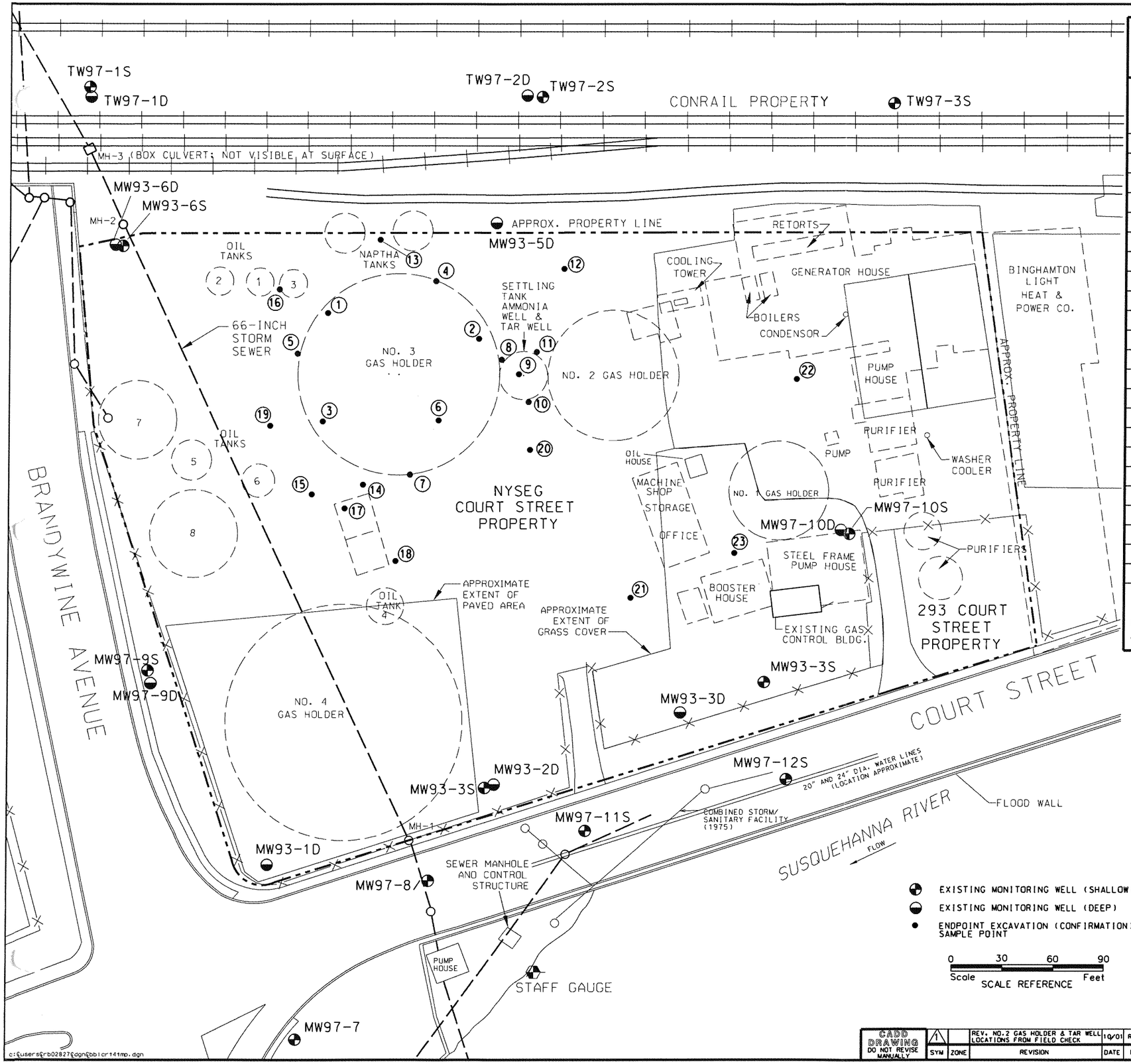

NEW YORK STATE ELECTRIC & GAS CORPORATION
BINGHAMTON COURT STREET MGP
INTERIM REMEDIAL MEASURES PROJECT
RESULTS OF ENDPOINT EXCAVATION (CONFIRMATION) SAMPLES

MAP NO.	SAMPLE ID	COLLECTION DATE	DEPTH BELOW GRADE (ft)	TOTAL BENZENE (ppm)	TOTAL PAH (ppm)	TOTAL cPAH (ppm)	NAPHTHALENE (ppm)
1	BSVCBM1001	12/07/00	10	3.1	275.7	16.4	100
2	BSVCBM1002	12/14/00	10	6.1	951.4	45.6	470
3	BSVCBM1003	12/19/00	10	0.012	<0.40	<0.40	<0.40
4	BSVCSW0804	12/27/00	8	130	8,626.	636	3,500.
5	BSVCSW0805	01/02/01	8	21	155.7	11.0	49
6	BSVCBM1206	01/09/01	12	10	927.6	77.4	360
7	BSVCSW1107	01/11/01	11	0.53	12.538	1.568	3.8
8	BSVCSW0908	01/12/08	9	9.3	10,764.	1,246.	3,900.
9	BSVCBM1009	01/25/01	10	7.2	1,238.	102.7	400
10	BSVCSW0810	01/25/01	8	61	8,184.	787	2,200.
11	BSVCSW0711	01/25/01	7	3.2	13,062.	1,172	3,900.
12	BSVCSW0612	07/09/01	6	12	2,039.3	300.3	600
13	BSVCSW0413	07/09/01	4	<0.006	551.5	250.2	4.3
14	BSVCSW1114	07/09/01	11	59	3,561.	256	1,200.
15	BSVCSW1015	07/10/01	10	3.1	187.7	9.5	8.3
16	BSVCSW0916	07/10/01	9	0.85	219.8	6.2	68
17	BSVCSEW1017	07/10/01	10	6.2	42.6	<14	27
18	BSVCSW0918	07/11/01	9	0.004	0.11	<0.41	<0.41
19	BSVCSW0719	07/12/01	7	0.063	180.4	34.7	21
20	BSVCSW0620	07/17/01	6	<0.006	37.84	1.52	0.15
21	BSVCSW0821	07/30/01	8	<0.006	<0.43	<0.43	<0.43
22	BSVCSW0822	08/01/01	8	<0.062	117.65	9.37	30
23	BSVCSW0923	08/03/01	9	<0.006	0.709	0.373	<0.41

ppm means parts per million
PAH means Polycyclic Aromatic Hydrocarbons
cPAH means Carcinogenic Polycyclic Aromatic Hydrocarbons

CADD DRAWING DO NOT REVISE MANUALLY	1		REV. NO.2 GAS HOLDER & TAR WELL LOCATIONS FROM FIELD CHECK	10/01	RFB		
	SYM	ZONE	REVISION	DATE	BY	CHK	APP

DWN BY: RFB	10/25/01	DSGN BY:	/ /
CHECKED BY:			/ /
DRAFTING:	/ /	DESIGN:	/ /
ENGRG:			/ /
RELEASE APPROVAL:			/ /
AUTHORIZED BY:			/ /
MATERIAL OR SPEC:			

NYSEG ENGINEERING SERVICES BINGHAMTON, N. Y.

TITLE ENDPOINT EXCAVATION (CONFIRMATION)
SAMPLE LOCATIONS
BINGHAMTON COURT STREET FORMER MGP SITE
BROOME COUNTY, NEW YORK

SCALE: AS SHOWN | DWG NO FIGURE 6 | REV 1

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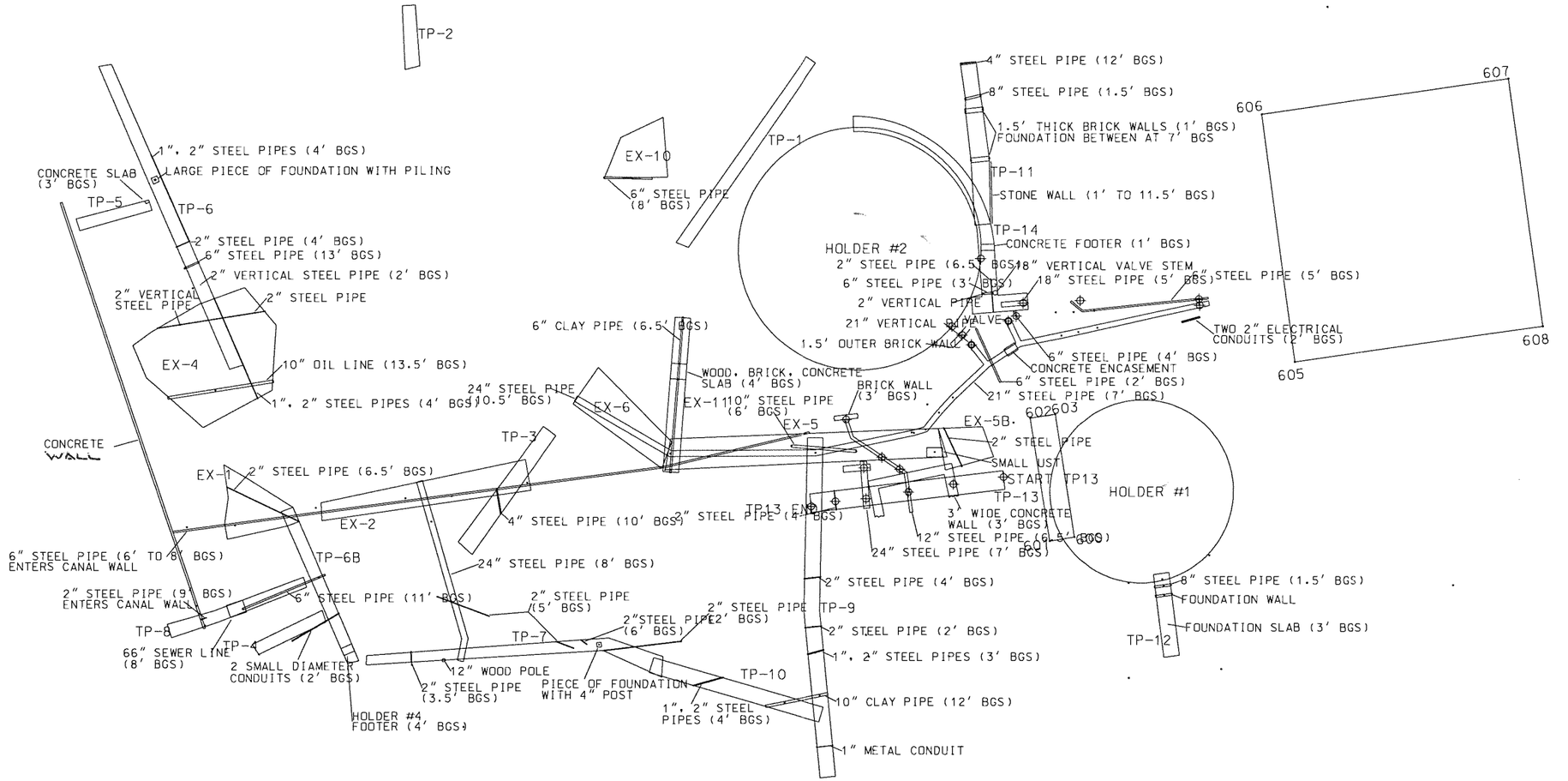

DWN BY: GJT 01/24/02	DSGN BY: / /	NYSEG	ENGINEERING SERVICES BINGHAMTON, N.Y.
CHECKED BY:	/ /		
DRAFTING: / /	DESIGN: / /	TITLE	TEST PITS AND PIPE LOCATIONS
ENGRG:	/ /		BINGHAMTON COURT STREET FORMER MGP SITE
RELEASE APPROVAL:	/ /		CITY OF BINGHAMTON
AUTHORIZED BY:	/ /		BROOME COUNTY, NEW YORK
MATERIAL OR SPEC:		SCALE	DWG NO FIGURE 7 REV

CADD DRAWING DO NOT REVISE MANUALLY

SYM	ZONE	REVISION	DATE	BY	CHK	APP
			/ /			

D:\users\Engr1997\Gcourtst_mgp\mtrenchescourtst.dgn

Date/Time Plotted: 24-JAN-2002 10:44

TW97-1S
TW97-1D
TW97-2D
TW97-2S
CONRAIL PROPERTY
TW97-3S
MH-3 (BOX CULVERT; NOT VISIBLE AT SURFACE)
MW93-6D
MH-2
MW93-6S
APPROX. PROPERTY LINE
MW93-5D
MW97-14D
MW97-14S
HENRY STREET
OIL TANKS
NAPTHA TANKS
SETTLING TANK AMMONIA WELL & TAR WELL
RETORTS
COOLING TOWER
GENERATOR HOUSE
BOILERS
CONDENSOR
BINGHAMTON LIGHT HEAT & POWER CO.
295 COURT STREET PROPERTY
66-INCH STORM SEWER
NO. 3 GAS HOLDER
MW97-10S
NO. 2 GAS HOLDER
PUMP HOUSE
APPROX. PROPERTY LINE
PURIFIER
PUMP
WASHER COOLER
OIL TANKS
NYSEG COURT STREET PROPERTY
OIL HOUSE
MACHINE SHOP
STORAGE
OFFICE
NO. 1 GAS HOLDER
MW97-10D
MW97-10S/
PURIFIER
STEEL FRAME PUMP HOUSE
BOOSTER HOUSE
293 COURT STREET PROPERTY
APPROXIMATE EXTENT OF PAVED AREA
OIL TANK 4
APPROXIMATE EXTENT OF GRASS COVER
MW97-9S
MW97-9D
10x20 PCB CONTAMINATED PIPE CAGE
NO. 4 GAS HOLDER
MW93-3S
MW93-3D
24" OUTFALL PIPE
COURT STREET
BRANDYWINE AVENUE
MW93-2D
MW93-2S
MW97-12S
MW97-11S
COMBINED STORM/ SANITARY FACILITY (1975)
NYSEG PROPERTY (267 COURT ST.)
B-1
MW93-1D
SEWER MANHOLE AND CONTROL STRUCTURE
MW97-8/
SUSQUEHANNA RIVER
FLOW
STAFF GAUGE
MW97-7

LEGEND

- EXISTING MONITORING WELL (SHALLOW)
- EXISTING MONITORING WELL (DEEP)
- PROPOSED TEST TRENCH
- EXCAVATION AREA

0 30 60 90
Scale SCALE REFERENCE Feet

SYM	ZONE	REVISION	DATE	BY	CHK	APP
3		REVISED & ADDED PROPOSED TEST TRENCHES	01 22/02	RFB		
2		ADDED PCB CONTAMINATED PIPE CAGE	03 12/01	RFB		
1		REMOVED EXCAVATION AREA STATUS FROM NO. 1 GAS HOLDER	10 24/00	RFB		

CADD DRAWING DO NOT REVISE MANUALLY

DWN BY: RFB	05/09/00	DSGN BY:	/ /
CHECKED BY:			/ /
DRAFTING:	/ /	DESIGN:	/ /
ENGRG:			/ /
RELEASE APPROVAL:			/ /
AUTHORIZED BY:			/ /
MATERIAL OR SPEC:			

NYSEG ENGINEERING SERVICES BINGHAMTON, N.Y.

TITLE: PROPOSED TEST TRENCHES
BINGHAMTON COURT STREET FORMER MGP SITE
CITY OF BINGHAMTON
BROOME COUNTY, NEW YORK

SCALE: AS SHOWN | DWG NO FIGURE 5 | REV 3

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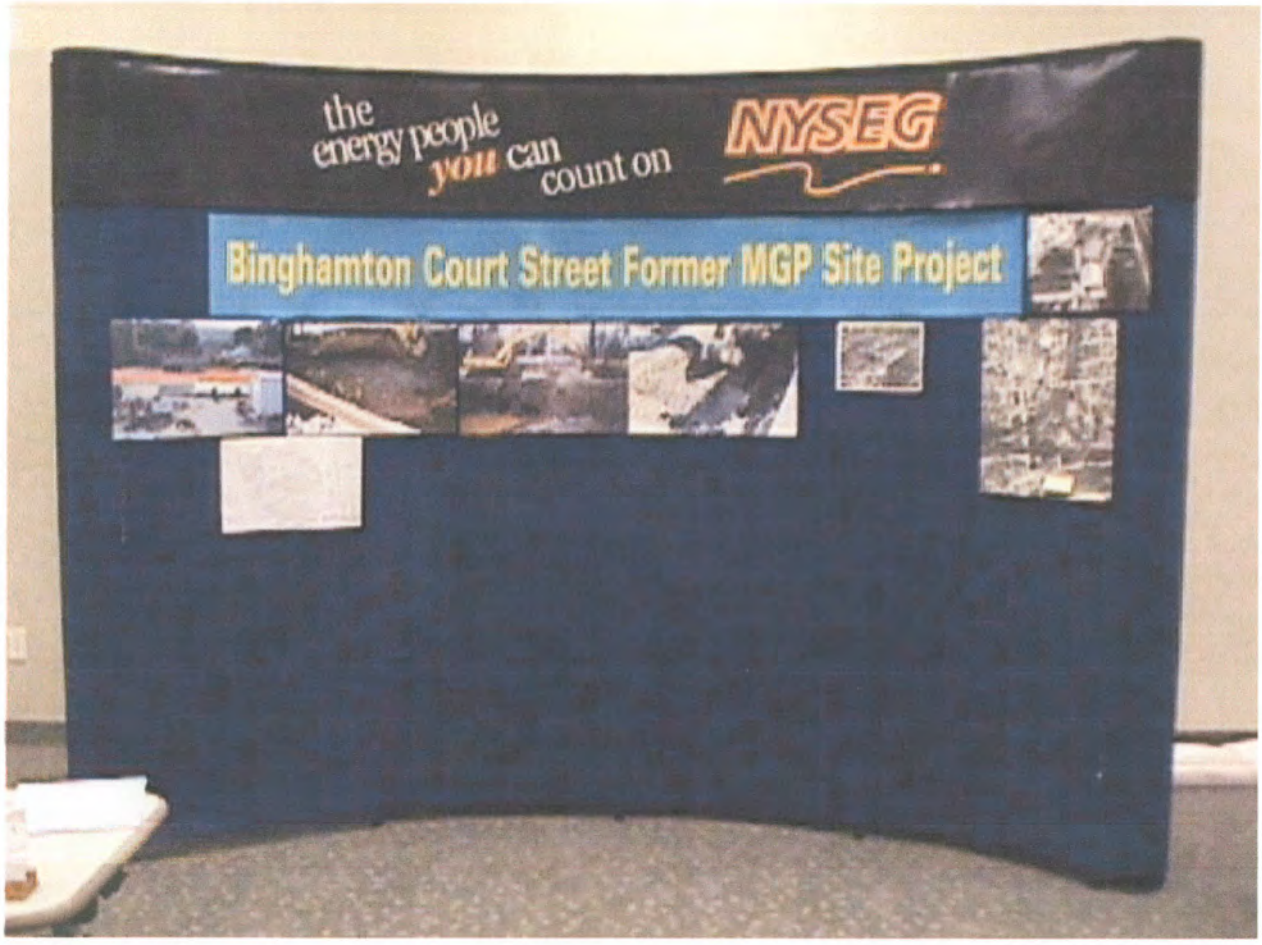
APPENDIX A

PHOTOGRAGHIC LOG

NYSEG



BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 1

As part of the Citizen Participation Plan, NYSDEC, NYSDOH and NYSEG held a Public Availability Session on November 8, 2000 at 7 p.m. at the Broome County Central Library, Decker Community Room, 185 Court Street in the City of Binghamton. Information on the IRM was presented to the attendees. NYSEG mailed a Fact Sheet to New York State, Broome County and City of Binghamton officials, media and adjacent citizens and businesses.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 2

Looking south, Equipment Contamination Reduction Area (ECRA) was constructed per *IRM Work Plan* Section 4.1.5.1. The ECRA was covered with a polyethylene sheet when not in use to minimize collection of rain water. The 1,500 gallon containers on the left were used for storing waste water.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 3

Looking north, one of the primary engineering controls which were implemented to reduce emission levels included covering piles of contaminated soils with polyethylene sheeting, per the IRM Work Plan Section 5.3.2.1. Siltation fencing was installed to control run off from work area and stockpiles.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 4

Looking north, Yellow caution tape was placed along the perimeter of the Contamination Reduction Zone and the Exclusion Zone, per IRM Work Plan Section 4.1.5. Polyethylene sheeting was placed over the excavated area to minimize surface area exposed.

In the upper right-hand corner excavated soil that was not stained was stockpiled on the Stockpile Management Area for sampling. The stockpiles were covered with polyethylene sheeting, per the IRM Work Plan Section 5.3.2.1.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 5

Looking north, The GHF, 120 feet in diameter, was larger than anticipated. The GHF wall and surrounding soil outside the GHF was excavated to a depth above the groundwater. The remaining contents within the GHF, including the water was removed and disposed off site.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 6

Looking north, remedial worker used a pressure washer to apply a light mist of water and Bio Solve® over excavated soil as an engineering control, per IRM Work Plan Section 5.3.2.1, for odors and dust.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 7

Looking west, the contents of #3 GHF consisted of soil, coal tar, rocks, bricks, concrete, twisted metal, railroad ties and large volume of wood. All of the GHF contents and the GHF structure were removed and disposed off site at permitted facilities.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 8

The bottom metal portion of the gas holder was fastened to the center of the concrete floor. The metal was removed, cut up and disposed of with the soil.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 9

Looking north, part of the gas holder metal floor was still fixed in the center of the GHF. The size of the GHF was large enough so a dozer could scrap the contents down to the concrete floor.

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 10

A test pit was excavated to visually inspect the soil condition below the GHF floor. A hammer attached to an excavator was used to break up the concrete floor of the GHF. The concrete floor was approximately 2 feet thick. A second excavator was used to remove the concrete and soil.

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 11

The soil underneth the GHF floor was silt. Approximately 6 inches of this layer was removed. The remaining silt had no visible staining.

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 12

The entire #3 GHF floor (2 feet thick) was broken up using a hammer attached to an excavator. The concrete floor and approximately 6 inches of soil was removed and disposed.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 13

While excavating below the GHF floor a 12 inch diameter steel pipe was ruptured and a tar like material entered the excavation. NYSEG's sampling technician took a sample for analysis. The analytical results of the material was fuel oil. The fuel oil was pumped into a 1500 gallon container for disposal.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 14

The 12-inch diameter fuel oil pipe continued underneth the GHF floor in a east - west direction. The fuel oil was pumped into a 1,500 gallon container for disposal. The pipe underneth the GHF was removed. Then the pipe was marked on the eastside and westside of the GHF for future action. During Phase 2 Test Trenches and Pipe Removal the pipe on the westside of the GHF was removed back to the City 66-inch storm drain.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 15

Looking southeast, two 24-inch diameter pipe flanges were found in the GHF Floor. Below the flanges were 90° elbows that were connected to the horizontal piping. There were valves in this piping near the outside perimeter of the GHF. Both valves were closed. Tar was removed from piping between the GHF and the valves. There was no tar on the outer side of the valves. The direction of one of the 24-inch diameter pipe was toward the distribution holder and the other had a tee that was connected to #2 GHF and continued toward the gas plant.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 16

Looking southeast at one of the 24-inch diameter pipes. Once all of the tar and stained soil was removed, the pipes were plugged with silt. During Phase II the pipes were removed back the valves. The valves were closed. The pipe on the outer side of the valves did not contain tar and were not removed.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 17

Once the GHF floor was removed and post excavation samples were taken, the area was filled first with subsurface fill, then 4 inch minus gravel. After filling the GHF, the remaindered of the wall was then removed and disposed.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 18

Looking east, a 24 feet diameter brick structure was found on the east side of the #3 GHF wall. This structure may have been a tar well at one point during the operation of the manufactured gas plant facility.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 19

Looking west, The 24 feet diameter brick structure was divided by brick walls. The floor of this structure was brick. Piping between the sections were present.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 20

Monitoring Well MW97-13S was located inside the Settling Tank Ammonia Well/Tar Well. The monitoring well penetrated the floor as shown in photo.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 21

Test Pit TP-1, ground water has floating NAPL. Area appears to have a lot of fill (i.e., wood, brick,concrete, etc.).

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 22

Test Pit TP-6B, NAPL flowing from the 2-inch pipe found in the north face of test pit. The 2-inch pipe was removed and placed in roll off container for disposal.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 23

Test Pit EX-2, NAPL flowing from 6-inch pipe. The 6-inch pipe was removed and placed in a roll off container for disposal.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 24

Test Pit EX-2, 6-inch pipe being removed from test pit. Pipe was cut up in lengths that would fit in roll off containers. The roll off containers were transported to Casie Ecology Oil Salvage, Inc. Vineland, NJ for proper disposal.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 25

Test Pit EX-3, The 24-inch pipe located between #3 GHF valve and #4 GHF did not contain coal tar. The pipe was marked for location.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 26

Test Pit EX-3, the 24-inch pipe from #3 GHF and valve was removed and placed in roll off container for disposal. The remaining 24-inch pipe that continued to #4 GHF did not contain coal tar and was not removed.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 27

Test Pit EX-5B, the contents were pumped into a 1,500 gallon container and the 100-200 gallon underground storage tank was removed and placed in a roll off container for disposal.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 28

Test Pit TP-8, concrete wall was discovered on the west side of the 66-inch City storm drain pipe. Wall is believed to be a containment wall for the former oil tanks.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 29

Test Pit ex-9, #2 GHF can be seen to the left of the vertical pipe. The vertical pipe was removed and placed in a roll off container for disposal.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 30

Test Pit EX-9, contents of 18-inch pipe is being vacuumed directly into vacuum truck for disposal.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 31

Test Pit EX-13, 24-inch pipe was removed and placed in roll off container for disposal. The majority of the pipe was filledd with water. NAPL is observed in the bootom of the pipe.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 32

Test Pit tp-13, contents of 12-inch pipe being vacuumed directly into vacuum truck for disposal. Pipe was removed and placed in roll off container for disposal.

NYSEG

BINGHAMTON COURT STREET
FORMER MANUFACTURED GAS PLANT
2000 REMEDIATION PROJECT
PHOTO NUMBER 33

Test Pit TP-14, test pit continued around the outer diameter of #2 GHF. This was done to help locate the #2 GHF for future projects.

APPENDIX B

PRE-REMEDIATION
IN SITU SAMPLES ANALYTICAL RESULTS

NYSEG

August 24, 2000

Mr. David A. Crosby, P. E.
Program Manager
Bureau of Construction Services
Division of Hazardous Waste Remediation
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010

Subject: Binghamton Court St. Former Manufactured Gas Plant (MGP)
Interim Remedial Measures Project (IRM)
Analytical Results of Pre-remediation In Situ Sampling

Dear Mr. Crosby:

Enclosed for your information and use are the field notes and analytical results of soil samples collected for the above noted project. These data are being used by NYSEG and several waste disposal contractors to select appropriate options to dispose of the waste streams that will be generated during the course of the IRM.

Please note that there were no samples taken from Area 2 because the actual location of the subsurface tar well could not be firmly established. During the upcoming IRM, NYSEG will use excavation equipment to delineate the tar well location. At that time, NYSEG will either concede that the material in the tar well is a hazardous waste and dispose of it accordingly, or stockpile, sample, and analyze the material for proper disposal. The assays for the soil samples taken in Area 4 were not completed since NYSEG has canceled the excavation for the access road to Brandywine Avenue.

Should you have any questions or comments concerning the enclosed data, please feel free to contact me at (607) 762-8787.

Sincerely,
NYSEG

John J. Ruspantini, CHMM
Staff Environmental Specialist
Licensing & Environmental Operations

Enclosure

cc w/ enclosure:
J. M Simone
B.W. Finch
G. Robinson - NYSDOH Syracuse

f:\lenv\doc\crosby49.wp

An Equal Opportunity Employer

New York State Electric & Gas Corporation
Binghamton Court St. Former MGP
Interim Remedial Measures (IRM) Project
Analytical Results of Pre-remediation In Situ Sampling
Waste Characterization - Areas 1 and 3

Area	Sample ID	Sample Collect Date	Depth Interval	RCRA Waste Classifcation	TCLP Benzene (ppm)	Soil Volume (yd^3)
1	BSVI000401C	7/18/00	0-4'	Non-hazardous	<0.085	418
	BSVI040801C	7/18/00	4-8'	Non-hazardous	<0.085	418
	BSVI081201C	7/18/00	8-12'	Non-hazardous	<0.085	418
	BSVI121401C	7/18/00	12-14'	**Hazardous**	**0.650**	**209**
2*						
3	BSVI000203C	7/18/00	0-2'	Non-hazardous	<0.085	596
	BSVI020403C	7/19/00	2-4'	Non-hazardous	<0.085	596
	BSVI040603C	7/19/00	4-6'	Non-hazardous	0.11	596
	BSVI060803C	7/19/00	6-8'	**Hazardous****	**4.700**	**596**
4	BSVI000204C	7/19/00	0-2'	***	<0.085	600
	BSVI020404C	7/19/00	2-4'	***	<0.085	600
	BSVI040604C	7/19/00	4-6'	***	<0.085	600
	BSVI060804C	7/19/00	6-8'	***	<0.085	600
Total Volume Non-hazardous Area 1 and Area 3						3042
Total Volume **Hazardous** Area 1 and Area 3						805

* Area 2 was not sampled due to unsuccessful location of the subsurface tar well structure. This structure will be located during the IRM and the associated waste will be characterized at that time.

** This sample also failed the Reactivity analysis: Reactive Sulfide = 612 ppm.

*** Waste characterization for these samples was not completed due to cancellation of excavation for Area 4 road construction.

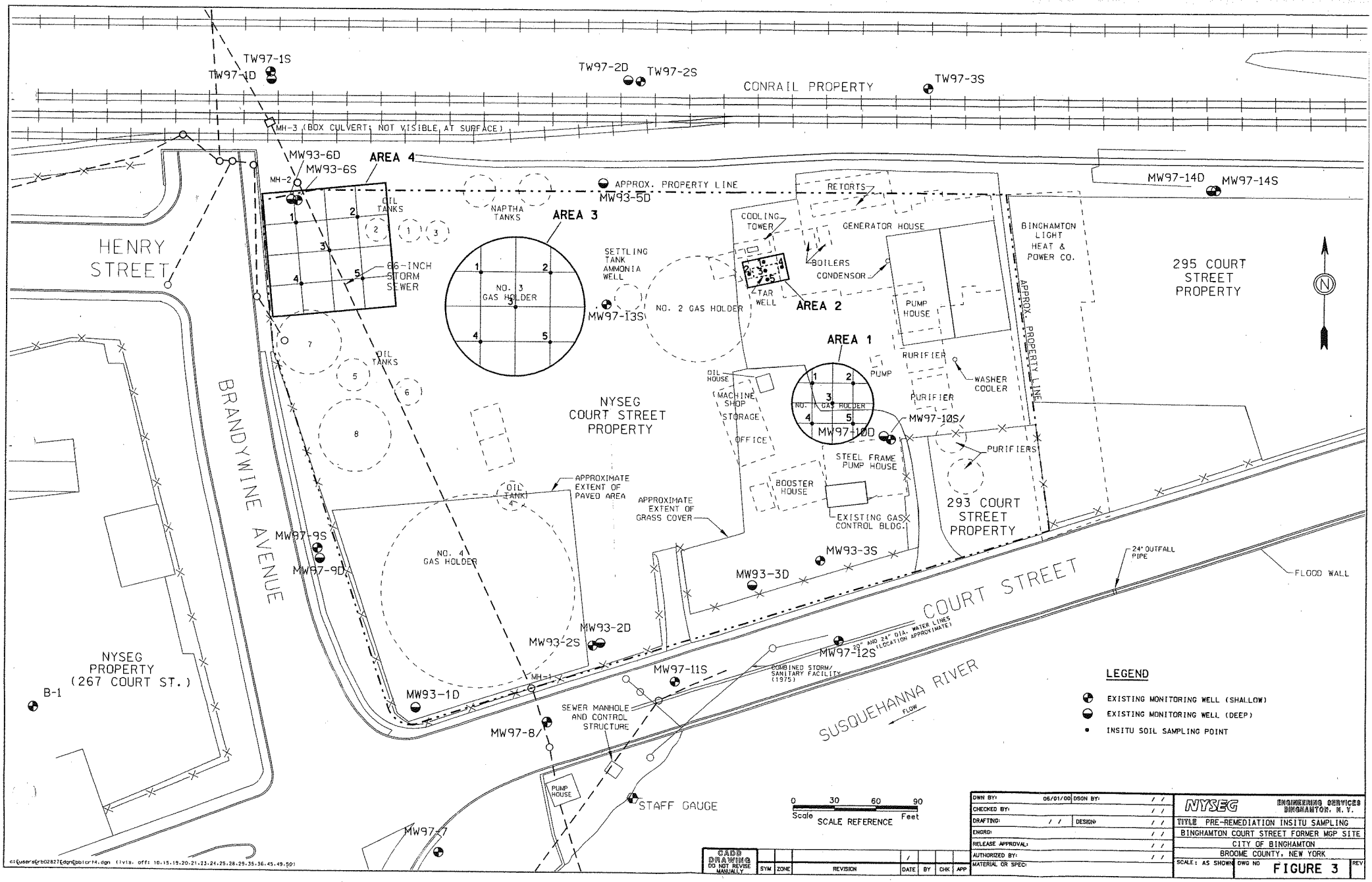
c:\wpdocs\binghamton\sampling results waste char1.wpd

New York State Electric & Gas Corporation
Binghamton Court St. Former MGP
Interim Remedial Measures (IRM) Project
Analytical Results of Pre-remediation In Situ Sampling
Soil Reuse Characterization

Area / Depth Interval / Sample Point	Sample ID	Sample Collect Date	Total Benzene (ppm)	Total PAH (ppm)	Total cPAH (ppm)	Comments
1/0-4'/5	BSVI5020401G	07/18/00	0.240	178	66.0	Worst case sampled for potential reuse
1/4-8'/4	BSVI4060801G	07/18/00	0.330	17.31	<0.660	Worst case sampled for potential reuse
1/8-12'/6	BSVI6101201G	07/18/00	60.0	13,540.	<500	Worst case soil sampled for potential reuse - supplemental sample point 6 - 21.2 ft due south of center point (#3) of gas holder 1
1/12-14'/3	BSVI3131401G	07/18/00	230	6,391.	350	Worst case soil sampled for potential reuse
3/0-2'/5	BSVI010203G	07/18/00	<0.005	18.03	6.100	Worst case soil sampled for potential reuse
3/2-4'/4	BSVI4030403G	07/19/00	0.300	1,049.	90.0	Worst case soil sampled for potential reuse
3/4-6'/4	BSVI4050603G	07/19/00	90.0	2,648.	<100	Worst case soil sampled for potential reuse
3/6-8'/3	BSVI3070803G	07/19/00	200	10,026.	360	Worst case soil sampled for potential reuse
4/0-2'/5	BSVI5010204G*	07/19/00	–	–	–	Worst case soil sampled for potential reuse
4/2-4'/4	BSVI4030404G*	07/19/00	–	–	–	Worst case soil sampled for potential reuse
4/4-6'/4	BSVI4050604G*	07/19/00	–	–	–	Worst case soil sampled for potential reuse
4/6-8'/4	BSVI4070804G*	07/19/00	–	–	–	Worst case soil sampled for potential reuse

PAH means Polycyclic Aromatic Hydrocarbons
cPAH means Carcinogenic Polycyclic Aromatic Hydrocarbons
C means composite sample
ppm means parts per million

* Laboratory analysis for these samples was not completed due to cancellation of excavation for Area 4 road construction.



CADD DRAWING DO NOT REVISE MANUALLY	SYM	ZONE	REVISION	DATE	BY	CHK	APP

DWN BY:	06/01/00	DSGN BY:	/ /
CHECKED BY:			/ /
DRAFTING:	/ /	DESIGN:	/ /
ENGR'G:			/ /
RELEASE APPROVAL:			/ /
AUTHORIZED BY:			/ /
MATERIAL OR SPEC:			

NYSEG ENGINEERING SERVICES BINGHAMTON, N.Y.

TITLE PRE-REMEDIATION INSITU SAMPLING
BINGHAMTON COURT STREET FORMER MGP SITE
CITY OF BINGHAMTON
BROOME COUNTY, NEW YORK

SCALE: AS SHOWN DWG NO FIGURE 3 REV

c:\users\rb02827\dgn\bbtcrf4.dgn (lvls: off: 10,15,19,20-21,23,24,25,28,29,35,36,45,49,50)

Binghamton Court Street MGP Site Pre-Remediation In Situ Soil Sampling Event

Tuesday, July 18, 2000, 8:20 a.m. Brian from BEAK is here, along with Jason and Jim of MARCOR. We are out in Area #1, attempting to locate the center of the relief holder, Relief Holder #1, DEC is not present yet. (Eric Knapp of DEC present mid-morning of 7-18-00)

Area 1, Sample Point 1, 0 - 4 feet recovery of approximately 2 feet, 2 inches of asphalt by 2" of concrete brown sandy soil with fill, no visible tar, no coal tar odor.

Area 1, Sample Point 1, this is interval from 4 - 8 feet approximately 3 ½ feet of recovery, wet brown sandy soil; PID reading equals 0.0 points per million, no visible tar, no coal tar odor.

Area 1, Sample Point 1, 8 - 12 feet approximately 3 ½ feet of recovery, wet fill, mild coal tar odor, PID reading 0.0 ppm. Refusal at approximately 12 feet below grade, brick present; wet cobbley soil; possibility we may have missed the holder. We will move to the center spot at Point #3.

Area 1, Sample Point 3, 0 - 4 feet approximately 2 feet of recovery, brown sandy soil fill, brick chips, no visible tar, no coal tar odor, PID reading = 0.0 ppm.

Area 1, Sample Point 3, 4 - 8 feet approximately 3 feet of recovery, wet gravely soil, no visible tar, no coal tar odor, PID 0.0 ppm.

Area 1, Sample Point 3, 8 - 12 feet, wet gravely soil, mild coal tar odor, brick chips, no visible tar, PID reading 0.0 ppm.

Area 1, Sample Point 3, 12 feet to 12 ½ feet, brown gravely soil wet, no visible tar, very mild coal tar odor, PID reading 0.0 ppm, with exception of one small piece there appears to be some coal tar residue, in the bottom of the coring. The bottom of the coring, Sample Point 3, Area 1, PID reading is approximately 2 ppm.

Area 1, Supplemental Point 6, which is approximately 21.2 feet due south of the center point of gas holder 1. Sample Point 6, 0 - 4 feet, brown cobble with fill and brick, water at approximately at 2 ½ - 3 feet, no visible tar, no coal tar odor, PID reading 0.0 ppm.

Area 1, Supplemental Sample Point 6, 4-8 feet, gravel, brick, fill, moderate coal tar odor, PID reading equals approximately 4 ppm.

Area 1, Supplemental Sample Point 6, Sampling interval 8 - 12 feet, brown gravely, sandy fill, brick, visible tar, strong coal tar odor, PID reading approximately 21 ppm.

Area 1, Supplemental Sample Point 6, 12 - 12 ½ feet, visible coal tar product, PID equals approximately 25 ppm.

Area 1, Sample Point 7, Supplemental, 0 - 4 feet approximately 4 feet south of sample point 6, Supplemental, 0 - 4 feet there is brick brown sandy soil, water at approximately 3 feet, PID reading

0.0 ppm.

Area 1, Sample Point 7, Supplemental, Sample Point 7, 4 - 8 feet refusal at approximately 7 feet, brown/black sandy soil with fill, PID reading 0.0 ppm, brick is at the bottom of the coring, no visible tar, mild coal tar odor, some coal, end of boring.

Area 1, Sample Point 5, 0 - 4 feet, brown cobbley, sandy soil, with water at approximately 3 feet, light coal tar odor at the bottom of the coring, at approximately 3 ½ feet, PID 0.0 ppm.

Area 1, Sample Point 5, 4 - 8 feet, only approximately about a foot worth of recovery is wet sandy soil, with brick and no visible tar, light coal tar odor, PID 0.0 ppm.

Area 1, Sample Point 5, offset, 4 - 8 feet, there is brown/black gravely soil with fill, no visible tar, moving into a gravely clay layer down toward the bottom at approximately 6 feet, no visible tar, light coal tar odor, PID reading equals, 0.0 ppm.

Area 1, Sample Point 5, offset, 8 - 12 feet, brown/black gravely soil, light coal tar odor, no visible tar, PID reading equals approximately 5 ppm at the bottom of coring, refusal approximately 12 feet.

Area 1, Sample Point 4, 0 - 4 feet brown sandy soil with fill, brick chips, water at approximately 3 feet, no visible tar, no coal tar odor, PID reading equals 0.0 ppm.

Area 1, Sample Point 4, 4 - 8 feet approximately two feet of recovery. Wet gravely soil, no visible tar, no coal tar odors, PID reading equals 0.0 ppm.

Area 1, Sample Point 4, 8 - 12 feet, brown sandy soil, wet with visible tar globules at approximately 11 - 12 feet, PID reading equals approximately 18 ppm, visible tar globules at approximately 10 - 11 feet, moderate coal tar odor.

Area 1, Sample Point 4, 12 - 14 ½ feet below, visible tar globules in brown gravely soil, PID reading equals approximately 20 ppm, strong coal tar odor present. End of boring, refusal at approximately 14 ½ feet.

Area 1, Sample Point 2, 0 - 4 feet approximately 3 feet of recovery, brown sandy gravely soil, fill, brick chips, no visible coal tar, no coal tar odor, PID reading equals 0.0 ppm.

Area 1, 0 - 4 foot, Sample Point 5, will take a sample at approximately 2 to 4 feet for the grab sample for PAH's and BTEX.

Area 1, Sample Point 2, 4 - 8 feet, approximately 1 ½ feet of recovery, brown clay gravely soil, no visible tar, no coal tar odor, PID reading equals 0.0 ppm.

Area 1, Sample Point 2, 8 - 12 feet approximately 3 feet of recovery, gray gravely clay with lumps of coal and fill, no visible tar, slight coal tar odor at approximately 12 feet, PID reading equals 0.0 ppm.

Area 1, Sample Point 2 , 12 - 14 ½ feet, wet, tarry, gravel, strong coal tar odor, PID reading equals approximately 100 ppm.

Composite sample from 4 to 8 feet, below grade area 1, take sample point #4 from approximately 6 - 8 as grab sample worst case for BTEX 8260 analysis and PAH 8270 analysis.

Composite Sample 8 - 12 feet take Sample Point 6, 10 - 12 feet below grade for grab sample BTEX 8260 and PAH 8270.

Area 1, Sample Point 3, 13-14 feet, will be used for the 12-14 foot interval worst case sample for BTEX 8260 and PAH 8270 analysis; end of sampling for Area 1.

Weather conditions July 18, 2000, 12:26 p.m., partly cloudy, breezy, temperature approximately 75 degrees.

Area 2, Tar well Sample Point #3, 0 - 4 feet approximately two footed recovery, fill, brick, brown, sandy, cobbley, gravely soil, no visible tar, no coal tar odor.

Area 2, Tar well Point Sampling Point 3, 4 - 8 feet approximately 2 ½ feet of recovery, brown, gravely soil, top foot and one-half to two feet. Gray clay with some evidence of coal tar contamination, mild odor, PID reading approximately 8 ppm.

Area 2, Tarwell Sample Point #3, 8 - 12 feet approximate recovery 3 inches contaminated gravely material, coal tar odor, PID reading equals approximately 10 ppm.

Area 2, Tarwell Sample Point, Supplemental, west southwest approximately 4 feet from a ledge at Tarwell center, 0 - 4 feet brown sandy soil with fill brick and mild coal tar odor, no visible tar,

Supplemental Point in Tarwell Area #2, 4 - 8 feet brick, stone, contaminated soil, PID reading, approximately 20 ppm. Strong coal tar odor, tar globs, 8 - 12 feet there is contaminated soil, pid readings approximately 120 ppm. Approximately 10 feet there is gray clay, which appears to not be impacted by the coal tar. Location of the tar well is uncertain. Therefore, abandoned Area 2 sampling.

Area 3, Sample Point #1, 0 - 2 feet, Area 3, Sample Point #1, 0 - 2 feet, brown sandy soil with gravel, no visible tar, no coal tar odor, PID 0.0 ppm.

Area 3, Sample Point 3, Sample Point #2, 0 - feet clay fill, no visible tar, no coal tar odor, PID reading equals 0.0 ppm.

Area 3, Sample Point 3, 0 - 2 feet fill brick, stone, brown, gravely soil, no visible tar, no coal tar odors, PID reading equals 0.0 ppm.

Area 3, Sample Point #4, 0 - 2 feet, brown, gravely soil, no visible tar, no tar odors, PID reading

equals 0.0 ppm.

Area 3, Sample Point #5, 0 - 2 feet brown gray gravely soil, brick, very light coal tar odor, PID reading 0.0 ppm, no visible tar, no coal tar odor.

Area 3, Sample Point #5, use interval from 1 - 2 feet as worse case sample for BTEX 8260 and PAH 8270 analysis. End of sampling for the day.

Wednesday, July 19, approximately 7:36 a.m. skies are mostly cloudy, temperature mid-50's, Day 2 of sampling at the Binghamton Court Street MGP Site for Pre-Remediation In Situ soil collection. Jim and Jason of MARCOR are present getting ready to start the continuation of sampling in Area 3. 7:50 a.m. the Eric Knapp of DEC is here, Brian of Beak is here.

Area 3, Sample Point 1, Interval 2 - 4 feet, wet gravely clay with mild to moderate coal tar odor, brick, PID reading equals 1 ½ parts per million.

Area 3, Sample Point 1, Port 6 feet, refusal at approximately 5 ½ feet, wet gravely clay, with brick, fill, mild-strong coal tar odor, coal tar reading PID 20 ppm; will offset and recollect the sample and get full recovery from 4 - 6 feet.

Area 3, Sample Point 1, 4 - 6 feet wet gravely soil, contamination at approximately, 5 - 6 feet appears to be wood, and brick at the bottom of the coring, PID reading equals approximately, 8 ppm, strong coal tar odor.

Area 3, Sample Point 1, 6 - 8 ½ feet gravely soil, strong coal tar odor, coal tar globules, present PID reading equals approximately 100 parts per million.

Area 3, Sample Point 2, 2 -3 feet round gravely, sandy soil, mixed with fill, brick, small bits of coal tar contamination slight to moderate odor, PID reading 1 ppm.

Area 3, Sample Point 2, 4 - 6 feet fill brick coal tar contamination, moderate odor, PID reading equals approximately 5 ppm.

Area 3, Sample Point 2, 6 - 8 feet wet gravely clay, coal tar contamination, strong odor, PID reading approximately 80 ppm.

Area 3, Sample Point 5, 2 - 4 feet wet gravely soil with fill brick, mild coal tar odor, PID reading equals 2 ppm.

Area 3, Sample Point 5, 4 - 6 feet wet gravely soil, with fill sand PID reading equals approximately 3 ppm, no visible tar, mild - moderate coal tar odor.

Area 3, Sample Point 5, 6 - 8 feet, refusal at approximately 8 ½ feet, wet gravely soil, fill, lot of coal tar odor, no visible tar. PID reading approximately 40 ppm, bottom of the coring noted coal tar contamination.

Area 3, Sample Point 4, 2 - 4 feet, dry gravely soil with brick and fill, no visible coal tar, mild coal tar odor, PID reading approximately 12 ppm.

Area 3, Sample Point 4, 4 - 6 feet, wet gravely soil with fill, brick, coal tar contamination at approximately 5 - 6 feet product PID reading approximately 20 ppm.

Area 3, Sample Point 4, 6 - 8 feet, refusal at approximately 8 ½ feet black gravely soil, coal tar contamination product, brick, fill, PID reading equals approximately 100 ppm, strong coal tar odor.

Area 3, Sample Point, 2 - 4 feet wet gravely soil, with fill, very slight coal tar odor, PID reading equals 0.3 ppm, no visible coal tar.

Area 3, Sample Point 3, 6 - 8 feet, refusal at approximately 8'3" about 1 foot and one-half of recovery wet gravely stained soil with fill, product at the bottom of the coring, PID reading at the bottom of the coring is approximately 125 ppm.

Area 3, composite from 2 - 4 feet, Sample Point 4, worst case for grab sample for BTEX 8260, or PAH 8270. Area 3, worst case sample from 2 - 4 feet, the interval is approximately, 3 - 4 feet from which the grab sample will be taken. For 8260 and 8270 analysis.

Area 3, compositing samples for interval 4 - 6 feet, will take Sample Point #4, from 3-4 feet of the worse case sample for BTEX 8260 and PAH 8270 analysis.

Area 4, Sample Point 1, 0 - 2 feet gravely soil with fill, bits of concrete, stone, brick, no visible tar, no coal tar odors, PID reading, equals 0.0 ppm.

Area 4, Sample Point 1, 2 - 4 feet recovery approximately 1 ½' sandy soil, no visible tar, no coal tar odor, PID 0.0 ppm.

Area 4, Sample Point 1, 4 - 6 feet brown sandy clay with fill, no visible tar, no coal tar odors, PID reading 0.0 ppm.

Area 4, Sample Point 1, 6 - 8 feet wet gravely clay, fill, no visible tar, no coal tar odor, PID reading equals 0.0 ppm.

Area 4, Sample Point 2, 0 - 2 feet brown sandy gravely soil, with fill no visible tar, no coal tar odor, PID 0.0 ppm.

Area 4, Sample Point 2, 2 - 4 feet approximately 2 inches of recovery no visible tar, no coal tar odor, PID 0.0 ppm.

Area 4, Sample Point 2, 4 - 6 feet brown sandy soil mixed with lumps of clicker and coal, no visible tar, faint coal tar odor, PID equals 1.0 ppm.

Area 4, Sample Point 2, 6 - 8 feet brown gravely soil, approximately one foot of recovery, coal tar

staining and sheen at the bottom of the quarry, pid reading equals approximately 2.5 ppm. Water is approximately 7 ½ feet.

Area 4, Sample Point 3 was moved approximately 23 ½ feet east due to pipeline for storm sewer possible interference with that. 0 - 2 feet fill, gravel, sandy soil, no visible tar, no coal tar odor, PID reading equals 0.0 ppm.

Area 4, Sample Point 3, 2 - 4 feet brown sandy, gravely soil, coal, brick, no visible tar, no coal tar odors, PID reading equals 0.0 ppm.

Area 4, Sample Point 3, 4 - 6 feet, sandy, clay soil with fragments of possible clinker, coal ash, gravel, fill, no visible tar, no coal tar odor, PID reading equals 0.0 ppm.

Area 4, Sample Point 3, 6 - 8 approximately one foot of recovery, wet, clay soil approximately 7 feet, bottom of the quarry contaminated clay, PID equals to 10 ppm, with a light to moderate coal tar odor.

Area 4, Sample Point 5, 0 - 2 feet round gravely soil, no visible tar no coal tar odor, PID equals 1.5 ppm.

Area 4, Sample Point 5, 2 - 4 feet, no noticeable tar, no coal tar odors, brown gravely sandy soil with fill, PID reading is approximately 2.0 ppm.

Area 4, Sample Point 5, 4 - 6 feet brown gravely soil with clay with segment of black fill which appears to be some type of coal or clinker, no coal tar odors, PID reading equals approximately 2.0 ppm.

Area 4, Sample Point #5, 6 - 8 feet, brown, gravely, sandy, soil will be getting into a section of black soil, with fragments of coal and clinker, fill, patch of wet tarry gravel at the bottom with a PID reading of approximately 2.5 ppm.

Area 4, Sample Point #4, 0 - 2 feet brown gravely soil with fill no visible tar, slight coal tar odor at the bottom of the coring, PID at the bottom of the coring, approximately 2.5 ppm.

Area 4, composite sample for 0 - 2 will use section between 1 and 2 feet for worst case grab samples BTEX 8260 and PAH 8270.

Area 4, Sample Point #4 2 - 4 feet, gravely soil with fill, brick, small pockets of coal tar contamination, PID reading equals approximately 10 ppm.

Area 4, Sample Point 4, 6 - 8 feet gravely soil and fill, moving into heavily contaminated gravel and soil PID reading equals approximately 300 ppm in the bottom of the coring. Strong coal tar odor.

Area 4, Sample Point 4, 6 - 8 feet brown sandy soil, gravely, wet strong coal tar odor, heavily contaminated, PID reading equals approximately 100 ppm.

Area 4, Composite 4, Interval 2 - 4 feet, take sample point number 4, to use as the worst case grab sample for BTEX 8260 and PAH 8270 analysis.

Area 4 composting for sample interval of 4 - 6 feet, choose sample point 4 as worse case from 5 - 6 feet for BTEX 8260 and PAH 8270 analysis.

Area 4, composite for sample between 6 - 8 feet will choose sample point number 4 between 7 and 8 feet to use as worst case sample for BTEX 8260 and PAH 8270 analysis.

End of Binghamton Court Street MGP Pre-remediation In Situ Sampling. Wednesday, July 19, 2000, approximate time 14:51.

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LABORATORY REPORT

for

NYS Electric & Gas
Kirkwood Industrial Park
Corporate Drive, PO 5224
Binghamton, NY 13902

Attention: John Ruspantini

Report date: 07/27/00
Number of samples analyzed: 5
AES Project ID: 000720 L
Invoice #: 215902

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CLIENT: NYS Electric & Gas
CLIENT'S SAMPLE ID: BSVI000401C
AES sample #: 000720 L01
Samples taken by: B. Balchikonis
MATRIX: Soil
Date Sampled: 07/18/00
Date sample received: 07/20/00
Location: Binghamton Ct. composite

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Total Solids	ASTM-D3987-85	87	%	KL-456	07/20/00
Ignitability	EPA-600S4-85	Non	Ignitabl	PL-F-6	07/25/00
Corrosivity	SW-846	Non	Corosive	LS-U-26	07/24/00
Reactivity	SW-846 Sec.7.3	Non	Reactive	MC-E	07/27/00
Cyanide	EPA-9012	<1	ug/g	MC-E	07/27/00
Sulfide	EPA-9030	<10	ug/g	MC-I-15	07/26/00
PCB-1016	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1221	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1232	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1242	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1248	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1254	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1260	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
TCLP Extraction (ZHE)	EPA-1311	Complete		JF-EV-47	07/20/00
Benzene - TCLP Extract	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
Carbon Tetrachloride-TCLP Ext.	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
Chlorobenzene-TCLP Extract	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
Chloroform-TCLP Extract	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
1,2-Dichloroethane-TCLP Ext.	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
1,1-Dichloroethene-TCLP Ext.	EPA-8260	<85	ug/l	JF-BV-47	07/21/00

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CLIENT: NYS Electric & Gas
CLIENT'S SAMPLE ID: BSVI000401C
AES sample #: 000720 L01 Samples taken by: B. Balchikonis Location: Binghamton Ct.
MATRIX: Soil composite
Date Sampled: 07/18/00
Date sample received: 07/20/00

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Methyl Ethyl Ketone-TCLP Ext.	EPA-8260	<170	ug/l	JF-EV-47	07/21/00
Tetrachlorethylene-TCLP Ext.	EPA-8260	<85	ug/l	JF-EV-47	07/21/00
Trichloroethylene-TCLP Extract	EPA-8260	<85	ug/l	JF-EV-47	07/21/00
Vinyl Chloride-TCLP Extraction	EPA-8260	<170	ug/l	JF-EV-47	07/21/00
TCLP Extraction	EPA-1311	Complete		TCLP-C-19	07/20/00
Nitrobenzene-TCLP Extract	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
Pyridine-TCLP Extract	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
Cresols (Total) TCLP Extract.	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
1,4-Dichlorobenzene-TCLP Ext.	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
2,4-Dinitrotoluene-TCLP Ext.	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
Hexachlorobenzene-TCLP Extract	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
Hexachlorobutadiene-TCLP Ext.	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
Hexachloroethane-TCLP Extract	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
Pentachlorophenol-TCLP Extract	EPA-8270	<500	ug/l	MT-BX-32	07/25/00
2,4,5-Trichlorophenol-TCLP Ext	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
2,4,6-Trichlorophenol-TCLP Ext	EPA-8270	<100	ug/l	MT-BX-32	07/25/00
Chlordane -TCLP Extract	EPA-8081	<0.005	mg/l	TN-TG-C47	07/21/00
Endrin-TCLP Extract	EPA-8081	<0.005	mg/l	TN-TG-C47	07/21/00
Heptachlor-TCLP Extract	EPA-8081	<0.005	mg/l	TN-TG-C47	07/21/00
Heptachlor Epoxide-TCLP Ext.	EPA-8081	<0.005	mg/l	TN-TG-C47	07/21/00

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CLIENT: NYS Electric & Gas
CLIENT'S SAMPLE ID: ESVI000401C
AES sample #: 000720 L01
Samples taken by: E. Salchikonis
MATRIX: Soil
Date Sampled: 07/18/00
Date sample received: 07/20/00
Location: Binghamton St. composite

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Lindane-TCLP Extract	EPA-8081	<0.005	mg/l	TN-TG-C47	07/21/00
Methoxychlor-TCLP Extract	EPA-8081	<0.05	mg/l	TN-TG-C47	07/21/00
Toxaphene-TCLP Extract	EPA-8081	<0.05	mg/l	TN-TG-C47	07/21/00
2,4-D TCLP Extract	EPA-8151	<2	mg/l	TN-TG-C47	07/24/00
2,4,5-TP (Silvex)-TCLP Extract	EPA-8151	<0.2	mg/l	TN-TG-C47	07/24/00
Arsenic-TCLP Extraction	EPA-6010	<0.5	mg/l	WB-I-2G-81	07/24/00
Barium-TCLP Extraction	EPA-6010	0.24	mg/l	WB-I-2G-81	07/24/00
Cadmium-TCLP Extraction	EPA-6010	<0.01	mg/l	WB-I-2G-81	07/24/00
Chromium-TCLP Extraction	EPA-6010	<0.05	mg/l	WB-I-2G-81	07/24/00
Lead-TCLP Extraction	EPA-6010	<0.5	mg/l	WB-I-2G-81	07/24/00
Mercury-TCLP Extraction	EPA-7470	<0.02	mg/l	SM-PSP-73	07/24/00
Selenium-TCLP Extraction	EPA-6010	<0.1	mg/l	WB-I-2G-81	07/24/00
Silver-TCLP Extraction	EPA-6010	<0.02	mg/l	WB-I-2G-81	07/24/00

Experience is the solution
314 North Pearl Street • Albany, New York 12207 • 800-848-4983 • (518) 434-4546 • Fax (518) 434-0891

CLIENT: NYS Electric & Gas
CLIENT'S SAMPLE ID: BSVI040801C
AES sample #: 000720 L02
Samples taken by: E. Balchikonis
MATRIX: Soil

Date Sampled: 07/18/00
Date sample received: 07/20/00
Location: Binghamton Ct.
composite

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Total Solids	ASTM-D3987-85	80	%	KL-456	07/20/00
Ignitability	EPA-600S4-85	Non	Ignitabl	PL-F-6	07/25/00
Corrosivity	SW-846	Non	Corosive	LS-U-26	07/24/00
Reactivity	SW-846 Sec.7.3	Non	Reactive	MC-E	07/27/00
Cyanide	EPA-9012	<1	ug/g	MC-E	07/27/00
Sulfide	EPA-9030	<10	ug/g	MC-I-15	07/26/00
PCB-1016	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1221	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1232	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1242	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1248	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1254	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
PCB-1260	EPA-8082	<1	ug/g	KF-PCB-AG3	07/20/00
TCLP Extraction (ZHE)	EPA-1311	Complete		JF-BV-47	07/20/00
Benzene - TCLP Extract	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
Carbon Tetrachloride-TCLP Ext.	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
Chlorobenzene-TCLP Extract	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
Chloroform-TCLP Extract	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
1,2-Dichloroethane-TCLP Ext.	EPA-8260	<85	ug/l	JF-BV-47	07/21/00
1,1-Dichloroethene-TCLP Ext.	EPA-8260	<85	ug/l	JF-BV-47	07/21/00