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TASK 3 REPORT
SUPPLEMENTAL INVESTIGATION OF A FORMER MANUFACTURED GAS PLANT SITE
WATER STREET, PENN YAN, NEW YORK

June 1994

GERAGHTY & MILLER, INC.
Environmental Services

TASK 3 REPORT
SUPPLEMENTAL INVESTIGATION OF A FORMER MANUFACTURED GAS PLANT SITE WATER STREET, PENN YAN, NEW YORK

June 1994

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Geraghty & Miller, Inc., is submitting this report to the New York State Electric and Gas Corporation (NYSEG) for work performed at a former manufactured gas plant (MGP) site located on Water Street in Penn Yan, New York. The report was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

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1.0 INTRODUCTION

In September 1993, Geraghty & Miller, Inc. (Geraghty & Miller) was retained by New York State Electric & Gas Corporation (NYSEG) to conduct a Task 3 supplemental investigation and preliminary risk assessment for a former manufactured gas plant (MGP) site located on Water Street, Penn Yan, New York. Two phases (tasks) of environmental investigations and a risk assessment had previously been completed for the site by TRC Environmental Consultants, Inc. (TRC), on NYSEG's behalf, between December 1986 and October 1990 (TRC 1986, 1990a, and 1990b). In addition, NYSEG removed a former underground tar storage tank from the site in February 1992. At the time of the tank removal, a narrow (approximately 1-foot [ft] thick) seam of coal tar was visible within the soil of the excavated area and was observed to dip toward the Keuka Lake Outlet. The tar seam and adjoining soils were excavated to the river's edge and removed from the site in accordance with New York State Department of Environmental Conservation (NYSDEC) requirements. NYSEG subsequently contracted Geraghty & Miller to further define the extent of MGP residuals shown during previous investigations and the tank pull operation to exist in the sediments of Keuka Lake Outlet, determine the source(s) of the residuals, and determine if the residuals present a significant threat to human health or the environment.

The Task 3 supplemental investigation was performed in accordance with a site investigation Work Plan, Data Collection Quality Assurance Plan (DCQAP), and Health and Safety Plan (HASP) prepared by Geraghty & Miller (Geraghty & Miller 1993) and approved by NYSEG in October 1993. The scope of the work activities performed included the performance of on-site soil borings, off-site sediment core sampling within Keuka Lake Outlet, laboratory chemical analysis of sediment samples, and an assessment of the potential risks to human health and the environment posed by the chemical constituents detected in the sediment samples obtained. This report documents the activities performed and presents the results and findings of the investigatory measures implemented.

2.0 BACKGROUND

2.1 SITE DESCRIPTION/SETTING

The former Penn Yan MGP site is located on Water Street, approximately 10 ft north of Keuka Lake Outlet, in Penn Yan, Yates County, New York (Figure 1). The site is bordered on the west by Liberty Street and on the east by the Yates-Blodgett Grainery. Water Street forms the northern border of the site, with a car dealership located on the north side of the street directly across from the site. On the north side of the corner of Water and Liberty Streets are two residences. Keuka Lake Outlet forms the southern boundary of the site.

Most of the site is currently owned by NYSEG and is occupied by a small (natural gas) regulator house which NYSEG maintains. The locations of the present site buildings, as well as the configurations of former structures, are depicted in Figure 2.

Within a 1-mile radius of the site, land use is roughly divided into 40% residential, 20% commercial, 20% agricultural, 15% open land, and 5% industrial. In the area immediately surrounding the site, land use is approximately 98% commercial and 2% residential. Five schools and one hospital are located within a 1-mile radius of the site area. All of these facilities are located to the north and northwest of the site, in directions hydraulically upgradient of the site.

2.2 SITE HYDROGEOLOGY

Site hydrogeologic conditions were determined through the performance of six on-site soil borings and the installation of monitoring wells during previous investigations of the site. The boring data show the site to be underlain by fill, fine sand and silt, clay, and coarse sand to a depth of 55 feet. The near-surface silt and clay deposits underlying the site serve as a confining unit to the downward migration of groundwater and MGP residues (TRC 1990a).

Water-level measurements obtained from the on-site monitoring wells indicated that shallow groundwater flow was southeasterly (toward Keuka Lake Outlet), with an average gradient of 0.03. The range of horizontal hydraulic conductivities measured in the shallow wells was 3.0×10^{-5} centimeters per second (cm/sec) to 6.0×10^{-4} cm/sec. The resulting average linear groundwater velocity at the water table was estimated to be 0.07 ft/day. The water table is approximately 16 ft below ground level at the northwest portion of the site and 3 ft below ground level at the southeast portion of the site near Keuka Lake Outlet. Well clusters installed in this area of the site indicate positive hydraulic (upward flow) conditions to occur within the sand unit underlying the near-surface silt and clay deposits.

Surface runoff flows across the entire site from north to south and discharges into Keuka Lake Outlet. Keuka Lake Outlet is classified by NYSDEC as a Class C surface water body in the Western Oswego River Basin. Class C status is defined as protection for fishing and fish propagation.

A United States Geological Survey gaging station is located on Keuka Lake Outlet 1/4 mile upstream of the site and has recorded data from 1965 to 1984. The average discharge at the station is 206 cubic feet per second (cfs). A minimum discharge of 3.2 cfs was recorded on September 6 through 10, 1982 (TRC 1990a). Flow into Keuka Lake Outlet is controlled by the Village of Penn Yan. The greatest percentage of annual surface runoff occurs during the months of March and April, while September is usually the low-flow month.

2.3 SITE HISTORY

Industrial activity at the Water Street site began with the H. Tuttle and Son Malt House and Wool Storage facility. The malt house existed until July 1899, when Mr. William T. Morris (president of the Penn Yan Gas Light Company) purchased the property. The MGP was constructed on the southeastern portion of the property, and gas production began shortly thereafter. On April 1, 1926, the Penn Yan Gas Light Company was purchased by New York Central Electric Corporation, and the plant continued to produce gas for approximately four

more years, until early 1930. In 1937, New York Central Electric Company merged with NYSEG. On August 16, 1943, NYSEG sold the property to Penn Yan Wine Cellars, Inc., but retained a 400-square-foot parcel for use as a gas regulator house. NYSEG subsequently purchased the property in November 1990, and is the current property owner.

The MGP was operational from 1899 until 1930. Few details are known about the plant closure. Following closure of the plant, the tool shed and structure west of the former coal gasification works building were dismantled, and the gas relief holder was removed.

The wastes generated at the former Water Street plant included typical coal gas manufacturing residues such as tars, sludges, ash, iron oxide-impregnated wood chips, and liquid from drip boxes. Although most of the wastes generated by the coal gas operation were collected and sold, oil-water emulsions and ammonia liquors, generated in the scrubbing steps, were pumped into a settling tank, while residual tar was drained into a tar storage vessel located along the northern shore of Keuka Lake Outlet (Figure 2). If the coal tar or water separated from the coal tars exceeded a certain level in the tar storage vessel, a drain allowed the excess to discharge into Keuka Lake Outlet. Cooling wastewater was also discharged into Keuka Lake Outlet.

In February 1992 the tar storage vessel located adjacent to Keuka Lake Outlet was removed from the site by NYSEG.

2.4 PREVIOUS INVESTIGATIONS

In December 1986, TRC, on behalf of NYSEG, completed a Task 1 investigation of the former Penn Yan-Water Street MGP site. This initial phase of the site investigation included research on the site history, the regional and local geologic setting, and the hydrological setting of the site. Preliminary field work also performed during Task 1 included a geophysical survey, an air quality survey, and a visual inspection of the site and Keuka Lake Outlet.

In February 1990, TRC completed a Task 2 Remedial Investigation of the site. The purpose of the Task 2 investigation was to determine the following:

- The presence and nature of coal gasification constituents on-site;
- The approximate horizontal and vertical extent of these constituents in site soils and groundwater;
- The general impacts of the constituents on groundwater quality;
- The potential routes of constituent migration;
- The extent to which on-site and off-site receptors may be exposed to the detected constituents; and
- Potential public health and environmental impacts.

The Task 2 field activities were initiated in November 1986 and involved the excavation of 17 test pits, the drilling and installation of six groundwater monitoring wells, and air quality monitoring to determine background conditions and the effects on the air quality from subsurface work. Samples collected as part of the Task 2 field investigation included surface soil, subsurface soil from test borings and test pits, sediment from Keuka Lake Outlet (two rounds), and groundwater and surface water (four rounds).

Four rounds of groundwater sampling results revealed that concentrations of purgeable aromatics, acid extractables and base/neutral extractable compounds were not detected above NYSDEC regulatory criteria for groundwater. However, when comparing the organic compounds to the New York State Department of Health (NYSDOH) criteria, volatile organic compound (VOC) concentrations were exceeded in three monitoring wells during the third sampling round. The only other compounds exhibiting elevated concentrations (above NYSDEC or NYSDOH regulatory criteria) were iron, sulfate, pH, and total cyanide.

Four rounds of surface-water sampling results did not indicate purgeable aromatics, acid extractables, and base/neutral extractable compounds or inorganics exceeding NYSDEC regulatory criteria. Only pH was found outside the NYSDEC criteria at three locations during

the last two sampling rounds. NYSDOH standards were exceeded at one sample location for VOCs (third round) and iron (fourth round).

The test pits confirmed areas of former MGP operations. These included the former gas relief holder and the areas adjacent to the tar storage vessel. The foundation of the former gas relief holder was uncovered at a depth of 3.8 ft below grade, and the inside of the holder was observed to contain clean sandy fill.

MGP wastes such as ash, coal, clinker, brick, wood, and coal tar stained clay were encountered in the area between the gas house building and Keuka Lake Outlet along a former railroad spur (in proximity of the tar storage vessel). Polycyclic aromatic hydrocarbons (PAHs) were detected in the soil samples obtained and analyzed from this area.

PAH compounds were also detected in five of the ten sediment samples obtained from Keuka Lake Outlet. The highest concentration of PAHs in a sediment sample was found adjacent to the tar storage vessel. The presence of high concentrations of PAHs in sediment samples from adjacent to the tar storage vessel suggested the storage vessel as a source (TRC 1990a).

Although MGP site residues were detected in subsurface soil samples in proximity of the tar storage vessel and within the sediment of Keuka Lake Outlet, calculated health risk estimates for both on-site and off-site exposure scenarios showed the site to pose no significant threat to human health (TRC 1990b).

In February 1992, NYSEG (through their contractor, SLC) excavated and removed the underground tar storage tank. The tar tank consisted of a 3,000-gallon underground storage tank (railroad tanker) buried approximately 10 ft from the bank of Keuka Lake Outlet (Figure 2). The tank and its contents were removed and disposed of, and the surrounding fill materials which were visibly contaminated were also excavated and removed from the site. A seam of coal tar (approximately 1-ft thick) was visible in the wall of the excavation and was observed to dip toward Keuka Lake Outlet. Excavating was performed to the river's edge until it was physically impossible to continue.

3.0 FIELD INVESTIGATION PROGRAM

The field investigation effort for the Penn Yan-Water Street MGP site was designed to supplement the database of information obtained during the previous site investigations (TRC 1986 and 1990a) and from observations made during the removal of an underground tar storage vessel from the site (as summarized in Section 2). The field activities conducted during the supplemental investigation generally included:

- Sweeping the area between the old gas house and former tar storage tank location with a pipe and cable locator to further ascertain the orientation and disposition of the subsurface structures encountered during tank removal in this area and to clear soil boring locations for drilling;

- Performing three soil borings and obtaining continuous split-spoon samples north-northwest of the old gas house (immediately downgradient of the old holding tank remains) and along the southeastern wall of the old gas house to determine/confirm that the old tank remains are not a source of the contaminants found to occur in Keuka Lake Outlet during previous investigations (TRC 1990a);

- Obtaining twenty-four continuous sediment core samples from Keuka Lake Outlet to determine sediment content and composition, channel configuration, and sediment thicknesses;

- Field screening and submitting nine sediment samples from Keuka Lake Outlet for laboratory chemical analysis; and

- Surveying the soil boring and sediment coring locations for future reference.

The field activities were conducted in accordance with the Work Plan, DCQAP, and HASP prepared by Geraghty & Miller (1993) for the supplemental investigation of the former

Penn Yan (Water Street) MGP Site. The following sections summarize the field activities performed.

3.1 SITE CLEARANCE

Prior to mobilizing a drilling rig to the site, the area to the north and south of the old gas house structure were swept with a pipe and cable locator to aid in ascertaining the disposition and orientation of potential subsurface structures in these areas, and the selection of soil boring locations. Once appropriate locations were established they were staked and flagged for drilling. A drilling rig was then mobilized to the site on November 2, 1993 and the field drilling and sampling phase of the field program was initiated.

3.2 ON-SITE SOIL BORINGS

Three soil borings were drilled and continuous split-spoon samples were obtained to assess subsurface soil conditions and determine if the old tank remains located north-northwest of the old gas house were a source of contamination to Keuka Lake Outlet. The locations of the soil borings are shown in Figure 2. The soil borings were performed by Buffalo Drilling Company, Inc. (BDC) under the supervision of a Geraghty & Miller geologist. The soil borings were advanced to the top of the underlying silt/clay unit (an average depth of 8 ft) using auger drilling methods. Split-spoon samples were collected continuously from the ground surface, field screened with a photoionization detector (PID), and visually inspected for presence of MGP residues.

For the purposes of lithologic descriptions, split-spoon samples were obtained continuously to the completion depth using the Standard Penetration Test (ASTM D1586). Auger cutting descriptions, air monitoring readings, and other pertinent observations were logged by the supervisory geologist. Copies of the field logs are provided in Appendix A. Split-spoon samples of unconsolidated sediment were collected and visually identified by the supervisory geologist using the Unified Soil Classification System. Standard identification practices detailed

in ASTM D 2488 were followed. The following information was recorded by the supervisory geologist:

- Sediment sample interval;
- Sampling hammer weight and distance of fall;
- Blow count (per 6-inch interval);
- Amount of sample recovered;
- Sample color;
- Sample texture;
- Sample moisture content (dry, moist, wet);
- PID readings; and
- Any unusual characteristics.

Before drilling the first borehole, between drilling of boreholes, and after drilling the final borehole (in each phase), all drilling, measuring, and sampling equipment (augers, rods, split-spoons, etc.) that could have contacted contaminated soils or water was decontaminated by steam-cleaning with potable water. The split-spoon sampler was similarly decontaminated before each use. At each boring location, polyethylene sheeting was laid out and drilled through to help confine the borehole cuttings and keep the drilling area clean. The borehole cuttings and split-spoon samples not submitted for laboratory analysis were containerized in USDOT approved 55-gallon drums. The drums were placed on wooden pallets and placed in a staging area designated by NYSEG (within the old gas house building on the site). After completing the soil boring, each borehole was sealed with a cement/bentonite grout. Each boring location was cleaned and restored to near pre-existing conditions.

3.3 SURVEYING

Upon completing the soil borings, the horizontal coordinates and elevation of each boring location were surveyed by Ronald M. Phillips, a New York State licensed surveyor. Vertical elevations and horizontal locations were measured to an accuracy of 0.01 ft and 0.1 ft,

respectively. Surveying was performed to reference control points previously established at the site by TRC (1990a). The surveyed elevation and horizontal coordinates for each of the borings are provided on Plate 1.

3.4 KEUKA LAKE OUTLET SEDIMENT CORE SAMPLING

Twenty-four (24) continuous sediment core samples were obtained from Keuka Lake Outlet to delineate and characterize the extent of off-site contaminant migration, and to enable contaminated sediment thickness and volume estimates. The sediment core sampling locations are depicted in Figure 2.

These locations were selected based on the distribution of PAHs detected in sediment grab samples obtained by TRC during previous investigations (TRC 1990a). As it appeared likely that coal tar may have collected in the reach of the outlet in the immediate proximity of the tar storage vessel, the core sampling program was initiated in this area. Additional sediment corings were performed along transect locations spaced at approximately 80-ft intervals, along Keuka Lake Outlet, with sediment core samples obtained at three evenly spaced locations along each transect line (Figure 2).

Sediment core sampling was performed from a floating platform drilling/coring rig. A continuous sediment core sample was obtained by driving a 5-ft long (3-inch diameter) split-spoon sampler through the bottom sediment and into the underlying formation material (silt/clay unit). Sediment core sampling was performed by BDC under the supervision of a Geraghty & Miller geologist. Each of the sediment core samples obtained were field screened with a PID, visually inspected for the presence of MGP residues, and logged by the supervisory geologist. Copies of the field logs for each of the core samples obtained are included in Appendix A.

Nine composite sediment samples from eight of the twenty-four core sampling locations were submitted for laboratory chemical analysis (Figure 2). At sediment core location No. 10 (directly in front and downgradient of the former tar storage vessel), a sample of the silt/clay unit underlying the river bottom sediments was also collected and submitted for laboratory

chemical analysis. In an attempt to establish potential worst-case conditions, samples which appeared to be most impacted during field screening were selected for chemical analysis. In addition, samples up and down-gradient of the tar storage vessel were also selected to enable an assessment of the potential extent of contaminant migration.

Each of the samples was placed in laboratory provided containers for the parameters to be analyzed, placed in a cooler, and delivered by the supervisory geologist to the laboratory in accordance with the DCQAP (Geraghty & Miller 1993). Copies of the chain-of-custody forms are provided in Appendix B.

Upon completion of sediment core sampling, a permanent location/reference marker was installed along the stream bank and surveyed to enable reidentification of sediment core sampling locations. Each reference marker consists of a concrete monument which was marked with orange survey paint. The locations were also flagged to enhance visibility. The surveyed locations are shown in Figure 3.

3.5 ANALYTICAL PROGRAM

A total of 9 sediment samples from Keuka Lake Outlet and four QA/QC samples (one trip blank, one field blank, one method spike, and one method spike duplicate) were obtained and submitted to the laboratory for the following analytical parameters/methods:

Volatile Organic Compounds (VOCs)	Method 8240
Base/Neutral Extractables	Method 8270
Cyanide	Method 9010
Metals	Methods 6000 & 7000 series
Phenols and Sulfides	Total & Acid Extractable

Laboratory chemical analysis of the sediment samples was performed by Galson Laboratories, East Syracuse, New York. Validation of the laboratory analytical data package was performed by Geraghty & Miller to ensure compliance with NYSDEC ASP category B protocol. Copies of the analytical data sheets and Geraghty & Miller's data validation reports are provided in Appendices B and C, respectively.

4.0 RESULTS AND FINDINGS

This section of the report presents the laboratory analytical results for the sediment samples collected from Keuka Lake Outlet and summarizes the findings of the field activities conducted during the supplemental investigation of the Penn Yan (Water Street) MGP site. This section is divided into three subsections: a presentation of field observations and findings; a presentation of the analytical results including a comparison to regulatory standards; and a discussion of data trends and contaminant migration interpretations.

4.1 FIELD OBSERVATIONS - FIELD SCREENING RESULTS

On-Site Soil Borings

Three soil borings were performed to establish whether coal tar residues were present within the soils in proximity of the former gas holding tank and the former tar storage vessel. The locations of the soil borings are shown in Figure 2. At Boring SB-05 (immediately downgradient of the former gas holding tank), approximately 3.5 ft of fill material was found to overly the natural silty clay formation material at the site. The fill consisted of brown to black sand and gravel with varying amounts of cinders, coke, wood chips, and coal bits. The presence of coal tar was not observed, and PID readings were not recorded during drilling. Consequently, samples for chemical analysis were not obtained.

At Borings SB-06 and SB-07 (in the former underground tar storage vessel location) approximately 8 ft of similar (fill) material was found to occur above the natural silty clay formation material at the site. The presence of coal tar residues was not observed, and PID readings were not recorded during drilling, with the exception of an 8 parts per million (ppm) reading that was obtained from wood chips encountered at a depth of approximately 4 ft in Boring SB-07; this reading was attributed to the railroad ties which previously existed in this area (TRC 1990a). Based on the visual observations and field screening results, samples for chemical analysis were not obtained.

Keuka Lake Outlet Sediment Core Samples

Twenty-four sediment core samples were obtained along the reach of Keuka Lake Outlet from the Liberty Street bridge to the train tressle, located approximately 200 ft downgradient from the former tar storage vessel location (Figure 2).

The bottom sediment was found to generally range from 3 to 5 ft in thickness and consist of a silty muck with varying amounts of organic matter, sand, and gravel. Greatest sediment thicknesses were found along the inner bend (along the northern shore) of the Outlet where a "sand bar" feature is located. PID readings obtained for the sediment core samples were found to be highest at Locations 10, 13, 14, and 15, in the immediate proximity of the former tar storage vessel (Figure 2). Table 1 provides a summary of the PID readings obtained. Core log descriptions for each of the sediment cores are provided in Appendix A.

4.2 ANALYTICAL RESULTS

A total of 9 sediment samples were collected from Keuka Lake Outlet and submitted for laboratory chemical analysis. The sediment sample locations are shown in Figure 2. A summary of the analytical results is provided in Tables 2 and 3. Only those compounds detected above method detection limits are shown. The analytical data sheets are provided in Appendix B. The following presents a summary of compounds detected in the sediment samples:

- PAHs were detected in each sediment sample collected, except sampling location No. 4, an upgradient location. Total PAH concentrations ranged from not detected above method detection limits at No. 4 to 3,964 ppm at No. 10. Highest total PAH concentrations were detected at sample locations No. 10 (3,964 ppm) and No. 14 (2,080 ppm), in the immediate proximity of the former tar storage vessel. Concentrations of naphthalene, phenanthrene, fluoranthene, 2-methylnaphthalene, and anthracene accounted for more than half of the total PAH concentrations detected. Other semivolatile organic compounds detected

included dibenzofuran and carbazole. The concentrations of these compounds were also highest at Locations 10 (180 ppm and 70 ppm) and 14 (100 ppm and 41 ppm), respectively;

- Benzene, toluene, ethylbenzene, and xylenes (total) were detected at Locations 10, 13, and 14, which were collected from the immediate proximity of the former tar storage vessel. These VOCs were not detected in the other samples analyzed. Low (10 parts per billion range) concentrations of methylene chloride and acetone were also detected in several of the samples. Methylene chloride and acetone are common laboratory solvents and their detection is most likely due to laboratory contamination;

- Eleven heavy metals (aluminum, arsenic, barium, chromium, copper, iron, lead, manganese, nickel, vanadium, and zinc) were detected in each of the sediment samples collected. Cadmium was detected in Samples 10 and 15 at concentrations of 1.60 and 0.88 ppm, respectively. Mercury, at concentrations of less than 0.4 ppm, was detected in Samples 4, 10, 14, 15 and 19. Silver was detected only in sample No. 5 at a concentration of 5.3 ppm. Heavy metal concentrations were generally highest in Sample 10 (3 to 5 ft) obtained from the silt/clay unit beneath Keuka Lake Outlet; and

- Cyanide was detected in only one sample, No. 10 (0 to 2 ft), at a concentration of 17.1 ppm. Total sulfides were detected in each sediment sample analyzed. The highest total sulfide concentration of 846 ppm was detected in downgradient sample No. 19. Total phenols were detected in each sample, with the exception of upgradient Samples 4 and 5. The highest total phenol concentration (86 ppm) was detected in sample No. 10 (0 to 2 ft), located in proximity of the former underground tar storage vessel.

4.3 DATA EVALUATION

Sediment corings performed within Keuka Lake Outlet revealed the presence of a sediment bar along the inner bend (northern shore) of the outlet (Figure 2). Based on the composition of the sediments and its positioning along the inner bend, this feature appears to have been formed by natural stream depositional processes. Assuming an average thickness of 5 ft, an estimated 3,000 cubic yards of sediment are contained within this feature.

The results of this investigation and previous investigations revealed the presence of PAHs in samples obtained from the sediment bar and at lateral and downgradient locations from the site. The highest concentrations were detected at sample locations immediately downgradient (in the likely outfall location) of the former location of an underground tar storage vessel. This coal tar storage vessel was removed from the site by NYSEG in February 1992.

The PAH distribution pattern indicates the majority of coal tar residuals to be localized within the sediments in this area. The relatively random distribution pattern of PAHs detected in down-stream samples suggests that down-stream sediment contamination may have occurred as a result of the dissolution and down-stream transport of coal tar particles from the tar storage vessel location. This is supported by the fact that the bottom sediments in the outlet and underlying geologic materials are comprised of relatively low permeability silts, clays, and organic matter, which would inhibit the migration of free coal tar. This is further supported by the disparity in PAH results for the two samples collected at sampling location No. 10, where PAH concentrations in the sample from the 3 to 5 ft depth interval (top of the silt/clay formation material beneath the site) were on the order of 50 times less than that detected in the 0 to 2 foot depth interval (overlying river bottom sediments).

The highest concentration of heavy metals was also detected at location No. 10 (3 to 5 ft) within the silt/clay unit, indicating their presence to be largely due to the mineral composition of this unit. The concentrations of heavy metals detected in the sediment samples from Keuka Lake Outlet were also generally at concentrations commonly found in soils, and within NYSDEC

established background levels for soils in New York State and the eastern portion of the United States (Table 4).

Cyanide was detected in only one sample (No. 10) at a concentration of 17.1 ppm. The localized presence cannot be determined with certainty, however, its presence may be attributable to purifier or tar separation processes performed as part of manufactured gas production at the site. Upgradient and downgradient comparison of the total phenol concentrations also suggests the elevated concentrations in Sample 10 (0 to 2 ft) to likely be attributable to MGP site operations (overflow from the former tar storage vessel).

Acetone and methylene chloride were detected at low concentrations within several of the samples and bis(2-ethylhexyl)phthalate and butylbenzylphthalate were detected in sample No. 5. These compounds are not typically associated with MGP processes and are commonly associated with either laboratory contamination (bottle cleansing) or field sampling contamination (gloves worn by field personnel during sample collection). Benzene, toluene, ethylbenzene and xylenes were detected in Samples 10, 13, and 14, adjacent to the site. These compounds are typically associated with fuel products (e.g., gasoline) as well as coal tar. Their source cannot be determined with certainty. However, their localized presence could be attributable to incidental contamination during past tank pull operations or from fuel products from motor boat use in this area (a boat launch utilized by the public is located at the site).

4.4 COMPARISON TO REGULATORY STANDARDS

Presently, state and federal standards for soil and sediments do not exist. However, an assessment of the potential health risks posed by the compounds detected in the sediment samples relative to federal and state guidance values has been performed as part of a risk assessment prepared by Geraghty & Miller (1994) for the site. A risk assessment was also previously prepared for the site, based on earlier findings by TRC (1990a). The results of these assessments generally show the site to pose no significant impact to human health.

5.0 RISK ASSESSMENT

Health and environmental concerns resulting from past activities performed at the former Penn Yan (Water Street) MGP site are a function of contaminant concentrations, exposure routes, and potential receptors. A risk assessment for the site was previously prepared by TRC (1990b). Calculated health risk estimates for both on-site and off-site scenarios showed the site to pose no significant threat to human health.

To evaluate the potential risk to human health and the environment associated with exposure to the constituents detected in samples obtained during the supplemental investigation, a risk assessment which focused on the sediments and surface water quality in Keuka Lake Outlet was prepared by Geraghty & Miller as a separate report (Geraghty & Miller 1994). The findings and conclusions of the risk assessment report are summarized and incorporated in the following section.

6.0 CONCLUSIONS

Based upon the results of the supplemental investigation and risk assessment performed for the former Penn Yan (Water Street) MGP site, the following conclusions can be drawn:

- Soil borings performed at the site did not indicate the old gas relief holder remains north of the former gas house building to be a source of the coal tar residues detected in sediment samples obtained from Keuka Lake Outlet;

- Twenty-four corings performed through the bottom sediment of Keuka Lake Outlet did not reveal the presence of free coal tar within Keuka Lake Outlet;

- The analytical results for 9 sediment samples collected from Keuka Lake Outlet indicated MGP residues to be present within the bottom sediment of Keuka Lake Outlet adjacent to the site;

- The distribution pattern of PAH compounds detected in the sediment samples indicate the tar storage vessel, which was removed from the site by NYSEG in February 1992, to be a likely source of the tar residues detected in the bottom sediment of Keuka Lake Outlet adjacent to the site; and

- Geraghty & Miller prepared a risk assessment to determine if the residuals detected within the bottom sediment present a significant threat to human health or the environment (Geraghty & Miller 1994). Several exposure scenarios were developed in this risk assessment based on the uses of Keuka Lake Outlet. The exposure scenarios evaluated were: (1) adult exposure to surface water and sediments while swimming or wading; (2) child exposure to surface water and sediments while swimming or wading; and (3) adult and child exposure to constituents through ingestion of fish caught in Keuka Lake Outlet. Risks to potential receptors were within or below acceptable risk ranges, therefore, site-specific remediation goals for surface-water and sediment constituent concentrations were not calculated.

7.0 REFERENCES

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Table 1. Summary of PID Readings for Sediment Core Samples Obtained from Keuka Lake Outlet, Penn Yan (Water Street), New York.

Location Number	PID Reading (ppm)
SS-01	1.1
SS-02	1.4
SS-03	1.4
SS-04	1.1
SS-08	1.1
SS-09	1.1
SS-10	64.8
SS-11	1.7
SS-12	2.6
SS-13	22.6
SS-14	11.3
SS-15	6.0
SS-16	1.4
SS-17	1.7
SS-18	2.3

* Note: Only locations where positive readings were obtained are shown.

Table 2. Summary of Organic Compounds Detected in Sediment Core Samples Collected from Keuka Lake Outlet, Penn Yan (Water Street), New York.

Parameter	Location: / Sample ID:	4 PYTUSS9304	5 PYTUSS9305	10 (0-2 ft) PYTCSS9310	10 (3-5 ft) PYTCSS9310	13 PYTCSS9313	14 PYTCSS9314	15 PYTCSS9315	19 PYTDSS9319	23 PYTDSS9323	Field Blank	Trip Blank
Volatile Organics												
Methylene chloride		--	0.01	--	--	--	--	0.011	0.012	0.014	--	--
Acetone		0.14	0.02	--	0.016	0.017	--	0.074	0.028	0.043	--	--
Trichloroethene		--	--	--	0.002 J	--	--	--	--	--	--	--
Benzene		--	--	2.0	0.002 J	0.004 J	0.3 J	--	--	--	--	--
Toluene		--	--	0.79 J	0.004 J	0.006 J	0.24 J	--	--	--	--	--
Ethylbenzene		--	--	3.9	0.008	0.012	3.4	--	--	--	--	--
Xylene (total)		--	--	10.0	0.022	0.031	7.8	--	--	--	--	--
Semivolatile Organics												
PAHs:												
Acenaphthene		--	0.13 J	270	5.5	11	170	6.8	7.0	17	--	NA
Acenaphthylene		--	0.12 J	25 J	--	1.8 J	9.5 J	--	1.3 J	0.64 J	--	NA
Anthracene		--	0.37 J	290	4.2	12	99	4.1	23	14	--	NA
Benzo(a)anthracene		--	1.4 JD	160	3.3	8.1	87	3.6	37	16	--	NA
Benzo(b)fluoranthene		--	1.3 JD	83	2.0 J	4.8	54	2.2 J	29	10	--	NA
Benzo(k)fluoranthene		--	1.1 JD	97	1.6 J	5.3	45	2.4 J	22	9.5	--	NA
Benzo(a)pyrene		--	1.2 JD	110	2.2 J	5.2	58	2.8 J	32	10	--	NA
Benzo(g,h,i)perylene		--	-- JD	32 J	0.47 J	--	--	0.84 J	6.0 J	--	--	NA
Chrysene		--	1.5 JD	140	2.8	6.8	68	3.1	31	13	--	NA
Dibenzo(a,h)anthracene		--	-- JD	--	--	0.7 J	5.6 J	--	2.9 J	1.2 J	--	NA
2-Methylnaphthalene		--	--	370	6.9	13	190	5.9	--	13	--	NA
Fluoranthene		--	2.6	380	8.1	19	210	9.4	78	30	--	NA
Fluorene		--	0.19 J	210	4.4	9.0	120	4.1	6.5	12	--	NA
Indeno(1,2,3-cd)pyrene		--	0.85 JD	57 J	1.2 J	2.8	34	1.5 J	18	5.6	--	NA
Naphthalene		--	0.10 J	820	16	36	420	17	--	10	--	NA
Phenanthrene		--	1.9 J	620	13	28	350	14	55	37	--	NA
Pyrene		--	2.9 JD	300	6.0	15	160	7.4	71	24	--	NA
	Total PAHs	--	15.66	3,964	77.67	178.5	2,080.1	85.14	419.7	222.94	--	NA
Other:												
Benzoic acid		0.56 J	--	--	--	--	--	--	--	--	--	NA
bis(2-Ethylhexyl)phthalate		--	1.8 JD	--	--	--	--	--	--	--	--	NA
Butylbenzylphthalate		--	-- JD	--	--	--	--	--	--	--	--	NA
Carbazole		--	0.14 J	70	1.5 J	4.0	41	1.8 J	--	4.4	--	NA
Dibenzofuran		--	--	180	3.7	7.8	100	3.2	2.8 J	10	--	NA
3,3'-Dichlorobenzidine		--	-- JD	--	--	--	--	--	--	--	--	NA
Di-n-butylphthalate		--	0.11 J	--	--	--	--	--	--	--	--	NA
Di-n-octylphthalate		--	-- JD	--	--	--	--	--	--	--	--	NA

Samples were collected November 4 and 5, 1993.
Concentrations reported in milligrams per kilogram (ppm).
-- Compound not detected at or above the quantitation limit (method detection limit x dilution factor).
D Result from analysis run at a dilution factor of 250.
J Estimated value.
NA Not analyzed.

Table 3. Summary of Inorganic Compounds Detected in Sediment Core Samples Collected from Keuka Lake Outlet, Penn Yan (Water Street), New York.

Parameter	Location: / Sample ID:	4 PYTUSS9304	5 PYTUSS9305	10 (0-2 ft) PYTCSS9310	10 (3-5 ft) PYTCSS9310	13 PYTCSS9313	14 PYTCSS9314	15 PYTCSS9315	19 PYTDSS9319	23 PYTDSS9323	Field Blank	Trip Blank
Metals												
Aluminum		13,100	4,180	8,970	16,100	11,300	10,800	9,810	6,430	11,600	--	NA
Arsenic		2.3	7.8	2.6	2.1	2.8	2.4	2.6	5.1	3.1	--	NA
Barium		78.3	63.0	65.6	122	92.1	71.2	81.1	52.1	75.9	--	NA
Cadmium		--	--	--	1.6	--	--	0.88	--	--	--	NA
Chromium		19.3	10.7	15.6	23.5	18.7	18.1	19.5	16.0	19.5	--	NA
Copper		26.8	29.5	25.2	13.3	23.6	25.4	27.3	55.7	28.4	--	NA
Iron		18,600	10,200	16,200	24,200	19,600	18,000	19,100	16,400	20,600	--	NA
Lead		83.0	340	55.5	21.8	66.6	64.4	47.1	152	64.8	--	NA
Manganese		217	136	250	166	316	256	272	141	344	--	NA
Mercury		0.23	--	0.38	--	--	0.18	0.29	0.32	--	--	NA
Nickel		25.2	13.0	18.9	26.8	27.4	22.5	23.3	21.1	26.1	--	NA
Selenium		--	--	--	--	--	--	--	--	--	--	NA
Silver		--	5.3	--	--	--	--	--	--	--	--	NA
Vanadium		19.3	11.0	13.2	24.9	18.7	17.3	15.1	12.6	16.7	--	NA
Zinc		96.6	104	94.8	63.5	151	125	103	172	107	--	NA
Inorganic Compounds												
Cyanide		--	--	17.1	--	--	--	--	--	--	--	NA
Total Sulfide		143	44.1	166	32.4	98.4	44.8	261	846	184	<2.0	NA
Total Phenols		--	--	86.0	1.8	2.2	22.5	2.1	4.7	2.7	0.015	NA
Percent Total Solids		54.5	59.1	55.5	68.1	71.3	53.7	57.9	46.5	47.9	NA	NA

Samples were collected November 4 and 5, 1993.

Concentrations reported in milligrams per kilogram (ppm).

-- Analyte analyzed for but not detected.

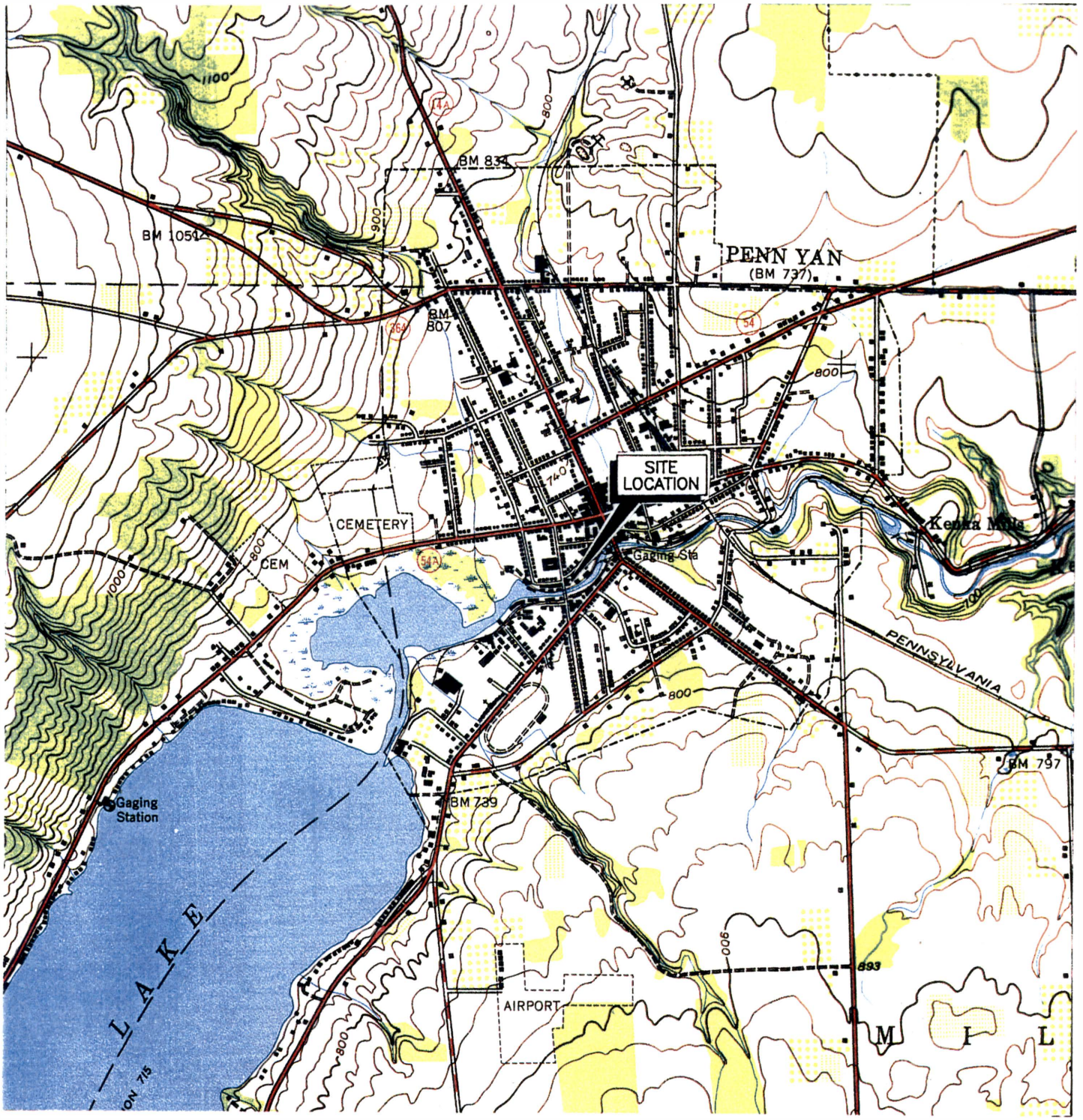
NA Not analyzed.

Table 4. The Content of Various Elements in the Lithosphere and in Soils.

Element	Content in Lithosphere* (ppm)	Common Range for Soils* (ppm)	Average for Soils* (ppm)	Eastern USA Background** (ppm)
Aluminum	81,000	10,000-300,000	71,000	33,000
Arsenic	5	1-50	5	3-12***
Barium	430	100-3,000	430	15-600
Cadmium	0.2	0.01-0.70	0.06	0.1-1
Copper	70	2-100	30	1-50
Chromium	200	1-1,000	100	1.5-40***
Iron	51,000	7,000-550,000	38,000	2,000-550,000
Lead	16	2-200	10	4-61
Manganese	900	20-3,000	600	50-5,000
Mercury	0.1	0.01-0.3	0.03	0.001-0.2
Nickel	100	5-500	40	0.5-25
Silver	0.07	0.01-5	0.05	N/A
Selenium	0.09	0.1-2	0.3	0.1-3.9
Vanadium	150	20-500	100	1-300
Zinc	80	10-300	50	9-50

* Linday 1979. Chemical Equilibria in Soils.
** NYSDEC 1994. Soil Remediation Guidance Tables in TAGM for NYS Superfund Sites.
*** New York State background level.

0153.004nysegpennyan:table4.xls



QUADRANGLE LOCATION

SCALE

0 0.25 0.50

MILES

N

(SOURCE: PENN YAN, NEW YORK 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE, 1942 (1978)

GERAGHTY & MILLER, INC.
Environmental Services

SITE LOCATION

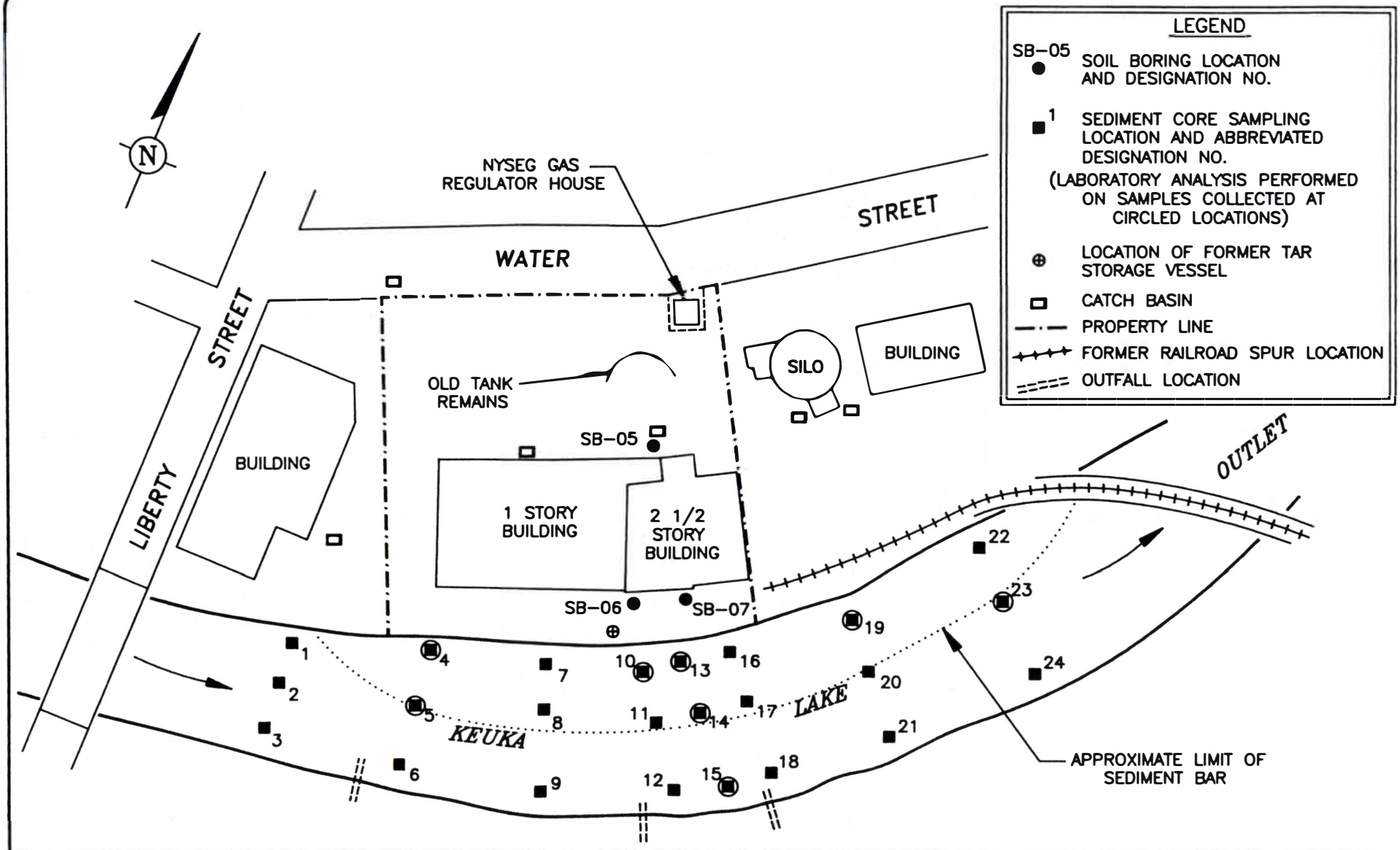
NYSEG

MGP SITE PENN YAN, NEW YORK

FIGURE

1

DATE: DEC. 1993	PRJCT. NO.: AY0153002	FILE NO.:	CAD FILE: G183	COMPILER: P. HOLLOWAY	MGR.: P. HOLLOWAY	DRAFTER: TAD/FJF



0 80
SCALE IN FEET

GERAGHTY & MILLER, INC.
Environmental Services

SOIL AND SEDIMENT BORING LOCATIONS
NYSEG SUPPLEMENTAL INVESTIGATION OF A FORMER MGP SITE
WATER STREET, PENN YAN, NEW YORK

FIGURE
2