Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
Warsaw Former MGP Site
Warsaw (V), Wyoming County

March 2001

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* ERIN M. CROTTY, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

Warsaw Former MGP
Warsaw (V), Wyoming County, New York

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Warsaw Former Manufactured Gas Plant (MGP) site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Warsaw Former MGP site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste and substances constituents from this site have been addressed by implementing the interim remedial measure identified in this ROD, therefore the site no longer represents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based on the results of the Investigations and the Interim Remedial Measures for the Warsaw Former MGP site, the NYSDEC has selected "No Further Action" as the remedy for the site. The components of the remedy are as follows:

- The IRM, carried out under NYSDEC and NYSDOH oversight, which consisted of excavation and off-site disposal of MGP contaminated soil/debris and the former MGP subsurface structures. The excavation area includes a large portion of the former MGP, some small sections of adjacent residential properties, and over 38,000 SF of the adjacent elementary school property.

- A groundwater monitoring program to assure the effectiveness of the IRM.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

3/31/2001	/ S /
Date	Michael J. O'Toole, Jr., Director Division of Environmental Remediation

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RECORD OF DECISION

Warsaw Former MGP Site
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SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health has selected "No Further Action," beyond the soil removal undertaken as an Interim Remedial Measure, as the remedy for the Warsaw Former Manufactured Gas Plant (MGP) site. As more fully described in Sections 3 and 4 of this document, operations at the Warsaw Former MGP site occurring between 1870 and 1919 resulted in the disposal of a number of hazardous materials including hazardous wastes at the site. These materials included coal tar, coal tar contaminated soil/debris, and coal ash. Some of these materials were released or migrated from the site to surrounding subsurface soil and groundwater. Coal tar is a by-product of the gas making process and contains numerous hazardous constituents including benzene, ethylbenzene, toluene, xylene (collectively known by the acronym "BTEX") and several polycyclic aromatic hydrocarbons (PAHs). Past disposal activities at the Warsaw MGP resulted in the following significant threats to public health and/or the environment:

- a significant threat to human health associated with exposure to PAHs from coal tar contamination in surface soil on the former MGP site, the elementary school property, and portions of adjacent residential properties;

- a potential significant threat to human health associated with coal tar contained within subsurface structures of the former MGP; and

- a potential environmental threat associated with BTEX contamination of on-site shallow groundwater.

During the course of the investigation, certain actions, known as Interim Remedial Measures (IRMs), were undertaken at the Warsaw Former MGP site in response to the threats identified above. An IRM is conducted at a site when a source of contamination or exposure pathways can be effectively addressed before completion of the remedial investigation/feasibility study. The IRM undertaken at this site included the removal and off-site disposal of several former MGP subsurface structures (including a gas relief holder, tar well and retort house) and associated subsurface coal tar-contaminated soil and debris. In addition, contaminated surface and subsurface soil down to a depth of two feet was removed over the residential property where the MGP was located, a portion of the adjacent

elementary school property, and portions of adjacent private backyards. All areas were backfilled with imported clean soil.

The success of the above IRM and the findings of the investigation at this site indicate that the site no longer poses a significant threat to human health or the environment. Therefore, "No Further Action" was selected as the remedy for this site. In accordance with this determination, the Department considers the remediation of the Warsaw Former MGP site to be complete, and NYSDEC will close out the remedial action phase of the Warsaw Former MGP site pursuant to the New York State Electric & Gas (NYSEG) multi-site consent order. As part of the remedy, a monitoring plan will be developed and implemented to verify site conditions and monitor residual contamination found in site groundwater.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Warsaw Former MGP site is located in a residential area of the Village of Warsaw, Wyoming County, New York (Figures 1 & 2). The site of the former MGP plant is currently a privately-owned residential backyard with a garage, a detached office, and an in-ground swimming pool. The site is bounded by residential properties to the east and south and the Warsaw Elementary School to the north and west. The site is relatively flat, and during the IRM, was restored through the planting of sod lawn and shrubs. The area surrounding the site is predominantly residential and is characterized by mowed lawns, landscaped gardens, and shade trees. The Village of Warsaw is serviced by public water. The source of the water supply is a reservoir located outside of the Village. No public or private water supply wells have been identified in the vicinity of the site and there have been no identified uses of groundwater around the site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The MGP was operated by a number of entities during its active use for the production of gas for lighting, cooking, and heating. It has been determined through a review of historical records that Citizen Gas Light Company started operations of the MGP in 1871. In 1892, the MGP operator became the Warsaw Gas and Electric Company, followed in 1924 by the New York Central Electric Company. It appears that plant operation ceased in 1919, and above ground structures were demolished sometime prior to 1928. In 1930, the MGP site was sold to a private citizen, and it has remained in private ownership since that time. In 1937, NYSEG merged with the New York Central Electric Company. NYSEG never operated the plant.

Historical maps indicate that the Warsaw Former MGP contained a gas holder, a tar well, and a gas production building. Manufactured gas was produced in a generator by the controlled heating of coal in the presence of steam. As the coal was heated, it released volatile gases. The gas was then purified to remove sulfide and cyanide compounds. The gas was used by local businesses and

residents for lighting, cooking, heating and other purposes. By-products of the gas making process include coal tar, gas purifier wastes, coal ash, and clinker. These waste products were either disposed of off-site, or placed on site during the MGP's operation. Some waste was left behind when the plant was closed.

3.2: Remedial History

In 1988, NYSEG prepared a Task I, Initial Prioritization Field Assessment Report which summarized preliminary field investigations. In 1990, NYSEG conducted additional field investigations and released a Task II, Field Investigation Report. These investigations were completed without NYSDEC or NYSDOH oversight.

In 1994, NYSEG signed a Consent Order with the NYSDEC to investigate and, if necessary, remediate 33 former MGP sites located in their service area. Based on the findings of the 1988 and 1990 investigations, NYSEG included the Warsaw MGP site in the"multi-site" Consent Order.

In the Spring of 1998, NYSEG started a remedial investigation (RI). The purpose of the RI was to determine the nature and extent of contamination derived from the operations of the former MGP site. The RI Report was released in December 1998. A summary of the report's findings may be found in Section 4.1.

In May of 1999, the NYSDEC approved an IRM work plan for source and surface soil removal at the Warsaw Former MGP site. NYSEG then conducted the IRM from June through August 1999, and final site restoration work was completed in May 2000. The IRM consisted of the excavation and off-site disposal of MGP contaminated soil/debris and the former subsurface MGP structures.

In April of 2000, the NYSDEC approved the scope of work for a post-IRM Supplemental Remedial Investigation (SRI). Results of the SRI are summarized in Section 4.1.3. The purpose of the investigation was to determine the effectiveness of the removal action and the extent of any residual MGP-related contamination. In May of 2000, NYSEG conducted the field work for the SRI. In September 2000, NYSEG's consultant issued a report summarizing the findings.

SECTION 4: SITE CONTAMINATION

In 1998, NYSEG conducted a Remedial Investigation (RI). The purpose of the RI was to determine the nature and extent of MGP contamination present at the site and to evaluate ways to address the significant threats to human health and the environment posed by the presence of hazardous materials including hazardous wastes. As noted in greater detail in Section 4.2 of this PRAP, NYSEG also conducted an IRM to address the site contamination. As noted in Section 4.3 of this PRAP, NYSEG conducted a post-IRM Supplemental Remedial Investigation (SRI) to determine the effectiveness of the IRM.

4.1: Summary of the Remedial Investigation

The purpose of the remedial investigation was to define the nature and extent of any contamination resulting from previous activities at the site. As noted above, there were several

investigative phases both before and after the IRM. The following presentation briefly summarizes pre-IRM site conditions, and then provides a more detailed account of the post-IRM conditions.

The RI was conducted in two phases. The first phase was conducted in April 1998 and the second phase between July and August 1998. In December 1998, NYSEG's consultant issued a report entitled "Phase II Remedial Investigation NYSEG Warsaw, NY, Former MGP," which describes the field activities and findings of the RI in detail.

The RI included the following:

- a ground penetrating radar survey to identify former subsurface MGP structures;
- a soil gas study to assist in the location of subsequent borings and groundwater monitoring wells;
- installation of soil borings, test pits and monitoring wells for sampling and analysis of soils and groundwater, the determination of the physical properties of soil and determination of hydrogeologic conditions;
- collection and analysis of surface soil samples to evaluate the potential for exposure to site-related wastes via incidental ingestion and plant uptake; and
- surface water and sediment sampling and analysis to determine the potential for migration of site-related contaminants into Oatka Creek, and to obtain sufficient data to complete a fish and wildlife impact analysis.

To determine which media (soil, groundwater, etc.) were contaminated at levels of concern, the RI analytical data were compared to environmental Standards, Criteria, and Guidance values (SCGs). Ground and surface water SCGs identified for the Warsaw Former MGP site are NYSDEC's Ambient Water Quality Standards and Guidance Values and Part 5 of the New York State Sanitary Code. For soil SCGs, NYSDEC used Technical and Administrative Guidance Memorandum (TAGM) 4046, which provides soil cleanup guidelines for the protection of public health and the environment. In addition, site-specific background concentration levels were considered when developing SCGs for one class of contaminants (PAHs) in soil. For sediment SCGs, NYSDEC used its "Technical Guidance for Screening Contaminated Sediments."

RI results indicated that some site-related contaminants in soil and groundwater samples exceeded the applicable SCGs, and there was potential for human health exposure and environmental damage from site-related contamination. Therefore, areas of the site required remediation. Conditions prompting this determination are summarized below. More complete information can be found in the RI Report.

Chemical concentrations are reported in parts per billion (ppb) or parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrology

The site is located in the Appalachian Uplands physiographic province. This portion of New York is characterized by high plateaus and stream carved valleys. The site is located in a valley about 500 feet east of Oatka Creek. Oatka Creek flows north past the site eventually meeting the Genessee River about 30 miles to the northeast. The valley floor is about 1,050 feet above mean sea level and the valley rises over 1,000 feet in elevation to the east and west.

The upper few feet of soil are characterized by either a topsoil-type layer that is a remnant of the historical agricultural use of the valley, or fill material associated with the former MGP site. Below this layer, the site is predominantly underlain by fluvial (river deposited) sediments. The sorted silts, sands and gravels are found to a depth of about 30 feet below grade and were deposited by periodic meandering and flooding of Oatka Creek. At about 30 feet below the surface, the fluvial sediments grades into a silty clay. Bedrock was not encountered during the investigations, but a review of the geologic literature indicates that the bedrock is expected to be about 100 feet below grade and consists of Middle Devonian Shales. These are nearly horizontally bedded, calcareous, and fine grained.

Groundwater at the site occurs at 2 to10 feet below the ground surface and tends to flow to the northwest, discharging to Oatka Creek. Regional groundwater flow is expected to be to the north following the trend of the Oatka Valley.

Historical records of the site area show that Oatka Creek flowed in a meander through the present elementary school property. Due to flooding concerns, Oatka Creek was channelized into its current water course sometime between 1920 and 1930. A storm sewer pipe is located directly east of the site and carries stormwater runoff from the center of the Village. It is believed that the storm sewer pipe is located partially within the former creek channel. The storm sewer flows through the site and under the school's athletic fields and discharges to Oatka Creek.

4.1.2: Nature of Contamination

As described in the RI report, many soil, groundwater, and sediment samples were collected on and around the site to characterize the nature and extent of contamination. These samples were analyzed for organic and inorganic constituents. The types of contaminants which exceeded their SCGs were volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). Other contaminants that sometimes may be associated with MGP sites, such as metals and cyanide, were generally not elevated in concentration.

The primary contaminants of concern detected at the site were polycyclic aromatic hydrocarbons (PAHs), which are a group of semi-volatile organic compounds derived from petroleum products and combustion, including combustion of coal during the coal gasification process. The United States Environmental Protection Agency (USEPA) considers seven PAHs to be suspected human carcinogens. To present the data in this report, the individual PAHs are totaled and referenced

as “total polycyclic aromatic hydrocarbons” or “tPAH.” The individual carcinogenic PAHs are summed and referred to as “total carcinogenic polycyclic aromatic hydrocarbons” or “tcPAH.” There are numerous sources contributing PAHs to the environment besides coal tar residues. Alternate sources of PAHs include vehicle emissions, asphalt, roofing materials and ash from other combustible sources.

Another group of chemicals typically found at MGP sites, and present at the Warsaw Former MGP, is called “volatile organic compounds.” These include benzene, toluene, ethylbenzene, and xylene. The four are also known by the acronym “BTEX.”

Cyanide can be associated with spent oxide waste, which is a by-product of the process by which impurities, such as sulfur, were removed from the manufactured gas. Waste cyanide is often present at MGPs in the form of ferrocyanide salts. In this form, it is not very soluble in water and thus has little potential for migration in subsurface soil. The results of the RI indicated no cyanide contamination in any media. No cyanide was detected in surface soil, subsurface soil or groundwater (detection limits were 0.63 ppm for soil and 5 ppb groundwater). As such, cyanide is not considered a contaminant of concern at the Warsaw Former MGP site.

Metal (or inorganic) contamination can also originate from MGP waste materials. Metals such as arsenic, chromium, copper, iron, lead, nickel, and zinc have been cited in the literature as related to MGP activities. However, metals occur naturally in soil and groundwater. Further, many human activities besides the manufacture of gas can result in metal contamination. The RI Report indicated that metals were generally within range of the background and upgradient sample results, so metals are not considered contaminants of concern in either soil, groundwater, surface water or sediments either on, or off the site.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern that were present at the site prior to the IRM. The soil and groundwater results are compared with the appropriate SCGs for the site or background concentrations. The following are the media which were investigated and a summary of the findings of the investigation.

Surface Soil

Due to the predominance of residential land use surrounding the site and the proximity of the elementary school property, a large number of surface soil samples were collected during the RI. Surface soil samples were collected from the site in all adjacent residential properties and throughout the elementary school grounds. In addition, there were several samples collected away from the contamination that reflected “background” conditions. Surface soil samples were collected from the upper two inches of the soil column.

Table 1 summaries the analytical results for surface soil samples. The table presents surface soil results for the school property, the adjacent residential backyards and the MGP site. As mentioned previously, there are several sources for tPAH contamination other then MGPs. Due to the ubiquitous nature of tPAHs in the environment, they can be found at low levels even in a residential setting such as the Village of Warsaw absent a specific source, such as an MGP. When a contaminant is found to naturally occur (as is the case with metals) or can result from ongoing human activities (such as combustion of fossil fuels), the results are then compared to "background" samples. Background samples are located in areas that were not likely to be contaminated by the site. The soil results for the Warsaw MGP site were compared to site-specific background data which indicated that typical area soils not contaminated by the site had a tPAH of about 3.1 ppm and a tcPAH of about 1.5 ppm.

In general, the surface soil results indicated that MGP residuals were found above background levels at the residential property that was formally the site of the Warsaw Former MGP. Levels of tPAH and tcPAH ranged well above background levels. Further, analytical results for surface soil samples from the adjacent school property and some residential backyards indicated that tPAH and tcPAH levels in those areas were elevated above background. These results indicated the presence and extent of MGP-derived contamination in surface soil. The RI concluded that excavation was a viable option to address tPAH and tcPAH contamination.

Groundwater

The results of the groundwater investigation indicated that MGP derived contamination was not extensive. No BTEX or PAHs were detected in water samples collected from most of the shallow and deep groundwater monitoring wells. One shallow monitoring well (MW-98-07S) placed near the former MGP structures showed trace levels of MGP contamination but the RI did not find an extensive groundwater plume. Contaminant levels in MW-98-07 included BTEX at about 2 ppb and tPAH at about 7 ppb. Based on the findings of the groundwater investigation and the lack of human exposure to groundwater at the site, groundwater contamination does not appear to be significant at the Warsaw Former MGP site.

Of note were some low level detections of trichloroethene in the site groundwater. MW-98-07S contained about 6 ppb (the current SCG is 5 ppb). Trichloroethene is an industrial chemical that was not widely used in the United States prior to World War II. Therefore, given the period of when the MGP operated (1870 - 1919), the low level detections of trichloroethene in groundwater were not considered to be derived from the MGP. As noted in Section 2, the Village of Warsaw is serviced by a pubic water supply which is located outside of the Village and there are no reported uses of the groundwater in the vicinity of the site. Therefore, the low levels of TCE found at the site have no apparent source associated with the MGP site and are not addressed by this action.

Surface Water / Creek Sediments

The Warsaw Former MGP site is located about 500 feet east of Oatka Creek. Oatka Creek is classified by New York State as a class B stream, indicating that the best usage of the stream is primary and secondary contact recreation and fishing. Class B waters are suitable for fish propagation and survival. Because of the proximity to the stream, a study was conducted to determine if contamination from the MGP site had reached Oatka Creek. In the first phase of the investigation, NYSEG's consultant conducted a probing study of the stream sediments. If MGP material is in the stream sediments, it can often be identified by the sheen produced by probing of the sediments. The probing study was conducted from about 100 feet upstream of the MGP site to about 200 feet downstream of the storm sewer outfall. The probing did not reveal any visible MGP residuals.

In July 1998, five surface water and sediment samples were collected and analyzed for MGP constituents. Table 1 presents the finding of the analytical sampling. There were only minor detections of BTEX in the surface water samples and no detectable levels of tPAHs. In creek sediments there were no detectable levels of BTEX. There were some low levels of tPAHs in creek sediments that were slightly above an upstream sample result. As with surface soil, there is a background level of PAHs in sediments due to combustion of fossil fuels or other manmade activities. Based on the results of the RI, the low frequency of occurrence of PAHs noted in creek sediments are not expected to have a significant impact on the ecology of Oatka Creek and there appears to be little impact to Oatka Creek from the former MGP site.

Subsurface Soil

The results of the RI conducted prior to the IRM indicated that MGP-related contamination was present in the subsurface near the location of the former MGP. Samples from soil borings and test pits conducted in the former plant area contained elevated levels of BTEX and tPAHs. The most heavily contaminated test pit location was at TP-98-01 which, at a depth of about 6 feet below grade, contained coal tar and coal tar residuals. A subsurface soil sample from this location contained BTEX at 64 ppm and tPAHs of 10,275 ppm. These results are significantly elevated above the appropriate SCGs. For example, the SCG for xylene is 1.2 ppm compared to an analytical result of 40 ppm, and the SCG for tPAHs is 500 ppm compared to an analytical result of over 10,000 ppm. There were several other subsurface soil sample locations in and around the former MGP that had levels of MGP constituents above SCGs. These findings indicated a source of coal tar and coal tar residues existed below the surface.

4.2: Interim Remedial Measures

An Interim Remedial Measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the Remedial Investigation/Feasibility Study (RI/FS).

The findings of the RI indicated a subsurface source area of coal tar on the residential property that was the location of the former MGP and residual MGP constituents in surface soils in the adjacent

school property and some adjacent private yards. Based on these findings, NYSEG proposed an IRM to address the contamination. In May of 1999, the NYSDEC approved the IRM work plan for the Warsaw Former MGP site. NYSEG then conducted the IRM from June through August of 1999. Final site restoration work was completed in
May 2000. The IRM was carried out under NYSDEC and NYSDOH oversight and consisted of excavation and off-site disposal of MGP contaminated soil/debris and the former MGP subsurface structures. The excavation area includes a large portion of the backyard of 49 West Court Street, some small sections of adjacent residential properties, and over 38,000 square feet of the elementary school property. Figure 3 shows the approximate area of the excavation. A minimum of 2 feet of soil was removed from the surface over the entire area. Some areas of the school property were excavated deeper then 2 feet. Soil adjacent to the relief holder was removed down to approximately 7 feet and soil below the holder was removed to a depth of about 12 feet below grade. Approximately 18,000 tons of contaminated soil were removed from the site and disposed of at approved off-site waste disposal facilities. The excavation was filled with imported clean soil and topped with 4 inches of top soil. The site was regraded and landscaped to approximate original conditions.

Post excavation confirmation soil sample analytical results demonstrated that the IRM was successful in reducing site contaminants. Table 2 presents the analytical results for confirmation soil samples. Soil cleanup objectives for tPAHs and tcPAHs were developed to allow for unrestricted residential use. This results in the most stringent (lowest) remedial goals for the site-related contaminants. Other remedial goals were developed using the appropriate SCGs. The soil analytical results indicate that cleanup objectives for unrestricted residential use were met for the elementary school property. On the MGP site, only two samples were in excess of unrestricted residential cleanup objectives. One sample was located directly below the former gas holder at a depth of 12 feet below grade. This sample was located approximately 7 feet below the water table; and due to excessive water in the excavation, it was deemed impractical to excavate further. The second point was located on the western border of the former MGP site at a depth of 4 feet. This sidewall sample was located directly adjacent to a gas pipeline and it was deemed unsafe to dig further. During the subsequent Supplemental Investigation, two test borings were advanced to determine if soil beyond the gas line was contaminated with MGP residues. No contamination was found (see Section 4.3). Because exposure to subsurface soil in these areas is unlikely, neither of these exceedences represent a public health concern. The confirmation soil samples indicate that the IRM reduced the potential for MGP residues to impact groundwater and eliminated, to the extent practicable, potential exposure to contaminated surface and subsurface soil.

4.3: <u>Supplemental Investigation</u>:

In May 2000, following completion of the IRM, NYSEG conducted a supplemental remedial investigation (SRI) of the Warsaw Former MGP site. The objectives of the SRI were to determine the effectiveness of the IRM, to determine the extent of any MGP impacts in subsurface soil at the western edge of the IRM excavation (towards the school property), and to determine the quality of groundwater after the remediation.

A report entitled Post-Interim Remedial Measures, Supplemental Investigation, Warsaw Former MGP Site, dated September 2000 has been prepared which describes the field activities and findings of the RI in detail.

The SRI included the following activities:

- subsurface soil investigation; and
- additional groundwater investigation.

This section summarizes the result of the supplemental investigation and extent of contamination for the contaminants of concern that remain at the site following the IRM. Soil and groundwater results are compared with the appropriate SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Subsurface Soil

Two test borings were advanced to delineate the vertical extent of potential MGP residues in the Warsaw Elementary School parking lot. The borings were advanced to a depth of about 12 feet. These locations were located near the to western edge of the IRM excavation and near the location of an elevated IRM confirmation soil result. Visual observation of the two borings did not indicate any MGP residues. Sample results confirmed the lack of MGP residues. No volatile organic contaminants (including BTEX) were noted in soil samples from the borings. Sampling for PAHs indicated levels below the site background concentration established during the 1998 RI. One sample had no detectable levels of tPAH and the other boring had tPAH at 1.67 ppm and tcPAH at less than 0.38 ppm.

Groundwater

Samples were collected from the five remaining groundwater monitoring wells and two Geoprobe® temporary well points. Several of the monitoring wells sampled during the RI were removed during the IRM to allow for the soil excavation efforts. To characterize these areas where the monitoring wells were lost, two groundwater samples were collected by use of a Geoprobe® rig. Figure 4 shows the location of the sampling points.

The results of the VOC analysis for the geoprobe groundwater samples indicated low levels of MGP residues in the site groundwater. Benzene was detected above SCGs in the two Geoprobe® sampling locations at 130 ppb and 14 ppb (the SCG is 0.7 ppb). Toluene and xylene were detected in one monitoring well but at levels below the applicable groundwater standard of 5 ppb. BTEX compounds were not found in the up gradient monitoring well, the cross gradient monitoring wells or the farthest down gradient monitoring well. There were no SVOCs (or tPAH) noted in any groundwater samples.

A number of inorganics exceeded the groundwater standards in both the up gradient and down gradient monitoring wells. These include sodium, iron, magnesium, lead and antimony. The occurrence of inorganics in groundwater does not appear to be related to the MGP site and is likely naturally occurring, except in the case of lead, which may be associated with an upgradient source. There were no detectable levels of cyanide in any of the samples.

The SRI indicated that slightly elevated levels of BTEX remain in the groundwater directly down gradient of the former MGP site, but the levels drop off considerably beneath the elementary school property. This remaining contamination appears to be a dissolved phase plume. Because the

source of the plume has been removed, as noted by the confirmation soil results, it is expected that the BTEX levels will decrease with time. The two soil borings indicate that the elevated MGP contamination found in one confirmation soil sample was isolated and did not represent an extensive area of residual contamination.

4.4: Summary of Human Exposure Pathways:

This section describes potential human exposures to site-related contaminants. A more detailed discussion of the health risks can be found in Section 6.4 ("Selection of Exposure Pathways") of the RI Report and in the Section 9.0 ("Conclusions") of the SRI report. This summary of human exposure is based on data in the 1998 RI Report, the 1999 IRM Report and the 2000 SRI Report. This summary discusses past (pre-IRM) and current (post IRM) conditions at the remediated site.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are: (1) the source of contamination; (2) the environmental media and transport mechanisms; (3) the point of exposure; (4) the route of exposure; and (5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which were known to have existed or may have existed at the site prior to the IRM were:

- incidental (accidental) ingestion of, and dermal contact with, PAH-contaminated surface soil among residents living on contaminated residential properties and children playing on contaminated portions of the school property;

- consumption of home grown garden vegetables contaminated with PAHs from garden soil; and

- potential incidental ingestion of, and direct contact with, PAH contaminated subsurface soil and groundwater among utility workers in future subsurface excavations.

After the soil removal carried out as part of the IRM, either these exposures pathways were eliminated or exposure was reduced to acceptable levels. Exposure to PAHs and BTEX no longer poses an unacceptable health risk. Surface soil was removed over the entire MGP site, on selected portions of adjacent residential properties, and over a large area of the elementary school property. The surface soil was replaced by clean soil from a certified source. Surface soil samples outside of the excavation area indicate levels at or below background levels for tPAHs. There appears to be little or no remaining impact to the elementary school property and sampling indicates that all adjacent residential properties were cleaned up to levels that would allow for unrestricted residential usage. The surface water and sediment investigation indicated an absence of site-related contaminants and no potential for exposure among children playing in the stream or among fishermen. There is some minimal contamination in the subsurface soil that could potentially expose utility workers in a subsurface

excavation, however, the low level of the contaminant concentrations in subsurface soil and groundwater coupled with the anticipated short duration of the utility worker exposure indicate that the risk would be minimal.

4.5: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site. The Fish and Wildlife Impact Assessment (FWIA) included in the RI presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources.

Based on the findings of the assessment, it does not appear that the MGP residuals have exerted a noticeable influence over plant, fish or wildlife habitats in the study area. The FWIA indicated that wildlife species identified around the site are typical of those found in residential/village settings and there are no indications that the former MGP activities have limited or impacted habitation by these species. The fish species observed in Oatka Creek appear to be typical of those found in a shallow fast moving stream environment. The stream investigation indicated no obvious MGP residues during the probing study of the sediments. Sampling of surface water indicated no detectable levels of tPAHs and only slight detections of BTEX compounds (less then 1 ppb). The low level of BTEX in the water column could be associated with urban runoff and does not appear to be indicative of an impact from the former MGP. Sediment sampling indicated low frequency of occurrence of tPAHs that are not likely to significantly affect the creek's ecology. The results of the FWIA indicate no environmental exposure and/or ecological risks associated with the Warsaw Former MGP site. The results of the FWIA support the findings of the RI that impacts to Oatka Creek from the former MGP are unlikely and remediation is not required.

SECTION 5: ENFORCEMENT STATUS

The MGP plant was demolished around 1927. At that time, the MGP was owned by New York Central Electric Company. In 1930, the MGP property was sold to a private citizen and has remained in private ownership since that time. In 1937, NYSEG merged with the New York Central Electric. While NYSEG never operated the plant, their historical ownership of the property makes them a potential responsible party.

The NYSDEC and NYSEG entered into a Consent Order on March 30, 1994. The Order on Consent, Index # D0-002-9309, obligates NYSEG to investigate and, if necessary, remediate 33 MGP sites located in their service area. The Warsaw Former MGP site is included in the multi-site Consent Order.

SECTION 7: COMMUNITY ACCEPTANCE

Concerns of the community regarding the remedial investigation report, the interim remedial engineering report, the supplemental remedial investigation reports, and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised.

No significant public comments were received.

SECTION 7: SUMMARY OF THE REMEDIAL GOALS AND SELECTED REMEDY

The selected remedy for any site should, at a minimum, eliminate or mitigate all significant threats to public health or the environment presented by the hazardous material and waste present at the site. The State believes that the remediation now in place, which is described in Section 4.2, Interim Remedial Measures, has accomplished this objective.

Based on the results of the investigations and the IRM that was performed at the site, the NYSDEC is selecting "No Further Action" as the remedy for the site. In selecting this remedy, the NYSDEC will require that NYSEG, with state oversight, will conduct additional monitoring at the site to monitor the residual groundwater contamination noted near the former MGP. The groundwater maintenance monitoring program will continue for a period of eighteen months with sampling of groundwater at six-month intervals. At the end of the eighteen-month period, NYSEG can propose ending the monitoring effort. The Department will also consider NYSEG's obligations to remediate the Warsaw Former MGP as specified under the multi-site Consent Order as completed.

The IRM was successful at removing MGP contaminated soil to levels appropriate for unrestricted residential use and the results of the supplemental investigations indicate no impacts to the elementary school property from MGP contamination. However, the MGP operated over 75 years ago and the potential for finding isolated areas of MGP contamination beyond the limits of the IRM and investigation is possible. Therefore, NYSEG will provide the school district technical assistance should any MGP related material be discovered on the elementary school property and will support the school district in characterization and management of such materials.

SECTION 8: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- A repository for documents pertaining to the site was established.
- A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.
- In June 1998, a fact sheet was forwarded to the site mailing list to announce the results of the first phase of the Remedial Investigation.
- In December 1998, a fact sheet was forwarded to the site mailing list to announce the public information meeting to describe the findings of the Remedial Investigation.

- On December 16, 1998, a public informational meeting was held to describe the findings of the Remedial Investigation.

- In June 1999, a fact sheet was forwarded to the site mailing list to announce the Interim Remedial Measure.

- On July 1, 1999, a public informational meeting was held to describe the upcoming Interim Remedial Measure.

- In February 2001, a meeting announcement was forwarded to the site mailing list which described the selected remedy and the date and time of the public meeting.

- On March 1, 2000, a public meeting was held at the Warsaw Elementary School to describe the selected remedy and solicit public comment.

- In March, 2001 a Responsiveness Summary was prepared and made available to the public to address the comments received during the public comment period for the PRAP.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Warsaw Former MGP Site
Proposed Remedial Action Plan
Warsaw (V), Wyoming County

The Proposed Remedial Action Plan (PRAP) for the Warsaw Former MGP Site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on February 9, 2001. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil at the Warsaw Former MGP Site. The preferred remedy is "No Further Action" beyond the soil removal IRM. The Department is requiring that NYSEG, with State oversight, would conduct additional long-term monitoring at the site to monitor the residual groundwater contamination noted near the former MGP. The Department will also consider NYSEG's obligations to remediate the Warsaw Former MGP as specified under the multi-site Consent Order as completed.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on March 1, 2001, which included a presentation of the Remedial Investigation, the Interim Remedial Measure and the Supplemental Remedial Investigation as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions, and comment on the proposed remedy. These comments have become part of the Administrative Record for this site.

The public comment period for the PRAP ended on March 14, 2001**.** This Responsiveness Summary responds to all questions and comments raised at the March 1, 2001 public meeting. No written comments were received during the comment period.

The following are the comments received at the public meeting, with the NYSDEC's responses:

COMMENT 1: How deep were the wells that you found the contamination in?

RESPONSE 1: Groundwater contamination at the site was limited to the area immediately adjacent to the former MGP structures. For volatile contaminants, the only MGP contaminant detected in groundwater was benzene at 3.4 ppb (the appropriate guidance value is 0.7 ppb). This well (MW-98-07S) was located directly north of the former gas holder and was drilled to a depth of 17 feet. The screened interval is 6 to16 feet below grade. The water table fluctuates seasonally but is generally about 8 feet below grade. A deeper well (MW-98-

07D) was installed directly adjacent to the shallow well (MW-98-07S). The deeper well was installed to a depth of 25 feet and had a screened interval of 14 to 24 feet. No benzene was detected in the groundwater sample from the deeper well. However, ethylbenzene (a suspected MGP constituent) was detected at 2.3 ppb but this is below the guidance value of 5 ppb.

During the Supplemental Investigation, groundwater samples were collected from two Geoprobe® temporary well points placed to a depth of about 15 feet. The results of the VOC analysis for the Geoprobe® groundwater samples indicated low levels of MGP residues in the site groundwater. Benzene was detected above SCGs in the two Geoprobe® sampling locations at 130 ppb and 14 ppb (the SCG is 0.7 ppb). BTEX compounds were not found in the up gradient monitoring well, the cross gradient monitoring wells, or the farthest down gradient monitoring well. There were no SVOCs (or tPAH) noted in any groundwater samples.

As noted in the ROD, tricholoethene was detected in several wells around the site. The highest concentration was 7.2 ppb in MW-2S (also directly adjacent to the former holder). There were several other monitoring wells that occasionally had detection of tricholoethene. Trichloroethene is an industrial chemical that was not widely used in the United States prior to World War II. Therefore, given the period of when the MGP operated (1870 - 1919) the low level detections of trichloroethene in groundwater were not considered to be derived from the MGP. As noted in Section 2, the Village of Warsaw is serviced by a pubic water supply which is located outside of the village and there are no reported uses of the groundwater in the vicinity of the site. Therefore, the low levels of TCE found at the site have no apparent source associated with the MGP site and are not addressed by this action.

COMMENT 2: How deep were the deepest wells?

RESPONSE 2: As noted in the response to comment #1, the deepest monitoring wells were installed to a depth of about 25 to 30 feet and screened from about 15 to 30 feet below grade. At a depth of about 25 to 30 feet, the site geology changes from an alluvial (river deposited) sand, silt and gravels to primarily a silty clay. The monitoring wells were drilled down to the silty clay to determine if any contamination was on top of this less permeable unit. As noted in the response to comment #1, very little contamination was found in the groundwater at depth.

COMMENT 3: Will NYSEG actually have people on site during the construction of the school addition? If something is found during the school construction, will the NYSDEC be involved?

RESPONSE 3: The IRM was successful at removing MGP contaminated soil to levels appropriate for unrestricted residential use and the results of the supplemental investigations indicate no impacts to the elementary school property from MGP contamination. However, the MGP operated over 75 years ago and the potential for finding isolated areas of MGP contamination beyond the limits of the IRM and investigation are possible. Therefore, NYSEG will provide the school district technical assistance should any MGP related material be discovered on the elementary school property and will support the school district in characterization and management of such materials.

NYSEG has committed to provide oversight personnel during the excavation phase of the school construction project. If material is uncovered that appears to be contaminated with MGP wastes, the NYSDEC would then provide field oversight of actions taken by NYSEG to assist the school district. If MGP material is found, it is anticipated that NYSEG would provide for proper characterization (sampling), containerization and proper off-site disposal of such materials.

COMMENT 4: Will you have to monitor other areas beyond what you have pointed out?

RESPONSE 4: At this point in time, beyond the technical assistance to the school district for the proposed building construction and the long-term monitoring program outlined above, there are no plans to further investigate the site. However, should at any time school officials or local residents find material that appears to be MGP related they should contact either NYSDEC or NYSEG officials. If the material is determined to be MGP related, the NYSDEC will request NYSEG to take appropriate actions.

APPENDIX B

Administrative Record

Administrative Record
Warsaw Former MGP
Warsaw (V), Wyoming (C)

- Letter from NYSDEC to NYSEG, RE: Approval of the Supplemental Remedial Investigation Report, dated March 23, 2001.
- Proposed Remedial Action Plan, Warsaw Former MGP, prepared by the NYSDEC, dated February 2001.
- Letter from NYSDEC to NYSEG, RE: Approval of the Interim Remedial Measures Final Engineering Report, dated February 6, 2001.
- Post-Interim Remedial Measures Supplemental Investigation Warsaw Former Manufactured Gas Plant Site, prepared by NYSEG, dated February 2001.
- Fact Sheet, Former Warsaw Manufactured Gas Plant Site, Proposed Remedial Action Plan, prepared by the NYSDEC, dated January 2001.
- Letter from NYSDOH to NYSDEC, RE: Approval of the Proposed Remedial Action Plan, dated January 30, 2001.
- Interim Remedial Measures Final Engineering Report for Activities at Warsaw Former Manufactured Gas Plant Site, prepared by NYSEG, dated January 2001.
- Letter from NYSDEC to NYSEG, RE: Approval of the Interim Remedial Measures Work Plan, dated July 21, 1999.
- Fact Sheet, Former Warsaw Manufactured Gas Plant Site, Interim Remedial Measures, prepared by the NYSDEC, dated June 1999.
- Interim Remedial Measures Health and Safety Plan for Activities at Warsaw Former Manufactured Gas Plant Site, prepared by NYSEG, dated May 1999.
- Letter from NYSDEC to NYSEG, RE: Approval of the Remedial Investigation, dated December 24, 1998.

- Phase II Remedial Investigation Report, Warsaw Former MGP, Vol. I & II, prepared by Stearns and Wheler, dated December 1998.

- Fact Sheet, Former Warsaw Manufactured Gas Plant Site, Preliminary Results of Phase 2 Investigation, prepared by the NYSDEC, dated August 1998.

- Phase II Remedial Investigation Work Plan, Warsaw Former MGP, prepared by Stearns and Wheler, dated July 1998.

- Phase I Remedial Investigation Report, Warsaw Former MGP, prepared by Stearns and Wheler, dated June 1998.

- Letter from NYSDEC to NYSEG, RE: Approval of the Remedial Investigation Work Plan, dated March 31, 1998.

- Fact Sheet, Former Warsaw Manufactured Gas Plant Site, Remedial Investigation, prepared by the NYSDEC, dated March 1998.

- Citizen Participation Plan for the Remedial Investigation/Feasibility Study at the Former Manufactured Gas Plant Site, Warsaw New York, prepared by NYSEG, dated February 1998.

- Task 2 Report, Field Investigation Program, Investigation of Former Warsaw Manufactured Gas Plant Site, Warsaw, New York, prepared by E.C. Jordan, dated July 1990.

- Task 1 Report, Preliminary Site Evaluation, Coal Gasification Sites, Warsaw, prepared by E.C. Jordan, dated June 1988.

Table 1

Nature and Extent of Contamination

Results of the Remedial Investigation
(Surface Soil Results prior to the IRM)

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (mg/kg)	FREQUENCY EXCEEDING SCGs/Background	SCG/ Bkgd (mg/kg)
Surface Soils School Property	Semivolatile Organic Compounds (SVOCs)	tPAH	0.1 to 32.0	9 of 15	3.1
		tcPAH	0.0 to 13.2	9 of 15	1.5
Surface Soils Residential Properties	Semivolatile Organic Compounds (SVOCs)	tPAH	1.9 to 31.6	9 of 17	3.1
		tcPAH	0.7 to 15.3	9 of 17	1.5
Surface Soils MGP Site	Semivolatile Organic Compounds (SVOCs)	tPAH	27.5 to 342.3	5 of 5	3.1
		tcPAH	14.0 to 182.6	5 of 5	3.1

Notes: All concentrations were rounded to the nearest tenth of a milligram per kilogram (mg/kg).
A mg/kg is equivalent to a part-per-million (ppm).

The abbreviation "SCG" stands for "Standards, Criteria and Guidance." For evaluation of soil contamination at and around the Warsaw Former MGP, SCGs are background contaminant concentrations determined upon review of the Phase II - Remedial Investigation Report (12/98)

The abbreviation "tPAH" stands for "total polycyclic aromatic hydrocarbons," which is the sum of concentrations reported for 20 polycyclic aromatic hydrocarbons.

The abbreviation "tcPAH" stands for "carcinogenic polycyclic aromatic hydrocarbons," which is the sum of concentrations reported for seven PAHs classified as probable human carcinogens (Group B2) by the US EPA (see the USEPA Integrated Risk Information System website at http://www.epa.gov/iris/subst/index.html). The tcPAHs are:

indeno(1,2,3-cd)pyrene;
benz(a)anthracene;
benzo(a)pyrene;
benzo(b)fluoranthene;
benzo(k)fluoranthene;
chrysene; and
dibenzo(a,h)anthracene.

Table 1 (Continued)

Nature and Extent of Contamination

Results of the Remedial Investigation
(Groundwater/ Surface Water Results prior to the IRM)

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (µg/L)	FREQUENCY EXCEEDING SCGs	SCG (µg/L)
Groundwater	Volatile Organic Compounds (VOCs)	benzene	ND (<0.1) to 3.4	3 of 15	0.7
		toluene	ND (<1.0)	0 of 15	5
		ethyl benzene	ND (<1.0) to 2.3	0 of 15	5
		xylene	ND (<1.0) to 0.5	0 of 15	5
		trichloroethene	ND (<1.0) to 9.8	4 of 15	5
Groundwater	Semivolatile Organic Compounds (SVOCs)	naphthalene	ND (<1.0) to 1.1	1 of 15	10
		phenanthrene	ND (<1.0) to 13	5 of 15	50
		benzo-(a)-pyrene	ND (<1.0) to 2	2 of 15	<1.0
Surface Water	Volatile Organic Compounds (VOCs)	benzene	Not Detected(<0.5)	0 of 5	0.7
		ethylbenzene	Not Detected (<0.5)	0 of 5	NS
		toluene	ND (<0.5) to 0.7	0 of 5	NS
		xylene	ND (<0.5) to 0.4	0 of 5	NS
		trichloroethene	ND (<0.5) to 0.4	1 of 5	0.6
Surface Water	Semivolatile Organic Compounds (SVOCs)	tPAH	Not Detected (<1.0)	0 of 5	NS

Note: The abbreviation "µg/L" stands for "micrograms per liter." For contaminants in clear water, this is approximately equal to one part-per-billion (ppb).

The abbreviation "SCG" stands for "Standards, Criteria and Guidance" values as set forth in 6 NYCRR 700 et seq.

The abbreviation "tPAH" stands for "total polycyclic aromatic hydrocarbons," which is the sum of concentrations reported for 20 polycyclic aromatic hydrocarbons.

Table 1 (Continued)

Nature and Extent of Contamination

Results of the Remedial Investigation
(Sediment Results prior to the IRM)

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (mg/kg)	FREQUENCY EXCEEDING SCGs/Background	Upstream sample/SCG (mg/kg)
Sediment	Volatile Organic Compounds (VOCs)	benzene	Not Detected (<0.5)	0 of 5	ND
		ethylbenzene	Not Detected (<0.5)	0 of 5	ND
		toluene	Not Detected (<0.5)	0 of 5	ND
		xylene	Not Detected (<0.5)	0 of 5	ND
Sediment	Semivolatile Organic Compounds (SVOCs)	tPAH	1.9 to 12.0	2 of 5	**3.4**
		tcPAH	0.7 to 3.8	1 of 5	1.8
		benzo (a) pyrene	0.1 to 1.0	2 of 5	0.2

Notes: Concentrations were rounded to the nearest tenth of a milligram per kilogram (mg/kg).
A mg/kg is equivalent to one part-per-million or "ppm."

The abbreviation "SCG" stands for "Standards, Criteria and Guidance." For sediment around the Warsaw Former MGP, SCGs are "background" contaminant concentrations as determined by upstream sampling.

The abbreviation "ND" indicates "Not Detected."

The abbreviation "tPAH" stands for "total polycyclic aromatic hydrocarbons," which is the sum of concentrations reported for 20 polycyclic aromatic hydrocarbons. The abbreviation "tcPAH" stands for "carcinogenic polycyclic aromatic hydrocarbons," which is the sum of concentrations reported for seven PAHs classified as probable human carcinogens (Group B2) by the US EPA (see the USEPA Integrated Risk Information System website at http://www.epa.gov/iris/subst/index.html). The tcPAHs are:

indeno(1,2,3-cd)pyrene;
benz(a)anthracene;
benzo(a)pyrene;
benzo(b)fluoranthene;
benzo(k)fluoranthene;
chrysene; and
dibenzo(a,h)anthracene.