PROPOSED REMEDIAL ACTION PLAN

NYEG - Palmyra MGP
Operable Unit Number: 01
State Superfund Project
Palmyra, Wayne County
Site No. 859022
December 2010

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, have contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document repository identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repository:

Palmyra King's Daughters Free Library
127 Cuyler Street
Palmyra, NY 14522
Phone: 315-597-5276

A public comment period has been set from: **12/8/2010 to 1/21/2011**

A public meeting is scheduled for the following date: **1/12/2011 at 7:00 PM**

Public meeting location:
Palmyra Park and Club Room, 149 East Main St., Palmyra

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through 1/21/2011 to:

Anthony Karwiel
Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
alkarwie@gw.dec.state.ny.us

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 3: SITE DESCRIPTION AND HISTORY

Location Description: The former manufactured gas plant (MGP) site is located on Park Drive (formerly Railroad Ave.) in the Village of Palmyra, NY. The site comprises 0.89 acres and is owned by NYSEG. The site is bounded to the north by Mill Creek, also known as Hathaway Creek, and to the south by the Village of Palmyra right-of-way along Park Drive. Immediately to the west of the site is a strip of land which is the former tow path area for the Erie Canal. This parcel is also a right-of-way owned by the Village of Palmyra, which includes a paved driveway leading into the adjacent property. The site is bounded to the east by a residential property.

Predominant Site Features: A natural gas regulator building is located in a grass-covered area in the western portion of the site. Most of the rest of the site is used as an electrical transmission and distribution substation. The majority of the ground surface around the substation equipment is covered by gravel. A grass and brush-covered area is present in the northeast corner of the property. A perimeter fence encloses the regulator station, electric substation and vacant northeast portion of the property. Outside the perimeter fence is a brush-covered area adjacent to Mill Creek, and grass-covered strips adjacent to Park Drive and the adjacent property. No original above-grade MGP structures remain at the site. Existing structures include a gray block gas monitoring house, the old brick switch house and two electric substations.

Site History: The former MGP was constructed in 1857 by the Palmyra Gas Light Company. Between 1857 and 1895 the gas plant was destroyed twice by fire and subsequently rebuilt. Gas manufacturing ceased in September 1910. NYSEG took ownership of the company and property in 1937. The facility was dismantled by 1942. The key features of the MGP were:

• The MGP Process Building located in the southwestern area of the site. A retort and a coal storage area were present within the footprint of the building.
• A 35-foot diameter Gas Holder was present in the southwestern portion of the site. The Gas Holder continued to be used for the storage of gas until 1942. The foundation for the Gas Holder is still present in the subsurface of the site.
• A Lime Purifier located to the east of the MGP Process Building.
• A shop located to the northeast of the Gas Holder.

When the MGP was operational, the site was bounded to the south by the Erie Canal. In 1915, the canal was filled in, and a newer canal (the current NYS Barge Canal) was constructed at its current location to the north of the site.

Current Zoning and Use: The site is zoned for commercial use and is used as a gas regulator station and electric substation.

Surrounding Zoning and Use: The land surrounding the site is used for residential and commercial purposes.

Remedial Party and Program: The remedial program for the site is being performed by NYSEG under an Order on Consent with the Department.

The site was divided into two operable units. Operable Unit 1 is the on-site source area and off-site soil and groundwater contamination. Operable Unit 2 (OU2) has been designated as Mill/Hathaway Creek.

Site geology consists of fill ranging in thicknesses from 13’ in the area of the former MGP to approximately 5’ in the northeast area of the site. This fill is mostly sand and silt with varying amounts of coal fragments, brick fragments, glass, clinker-like material, ashes and coke fragments. Soil beneath the fill ranges from 10’-15’ in thickness and consists of alluvial sand and gravel with small amounts of silt. A continuous dense clay unit lies is beneath the alluvial material and acts as a barrier to contaminant migration.

The groundwater table is between 3’ and 15’ below ground surface across the site. Groundwater flow direction is from the west to the east/northeast across the site and is likely discharging into Mill Creek. Mill/Hathaway Creek emerges from a culvert upstream of the site and is contained within a 3-sided concrete structure adjacent to the site, before flowing in an earthen channel downstream of the site.

Operable Unit (OU) Number 01 is the subject of this document.

A Record of Decision has yet to be issued for OU 02.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives that restrict the use of the site to commercial or industrial as described in Part 375-1.8(g) are being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

NYSEG

The Department and NYSEG entered into a multi-site consent Order on March 30, 1994. The Order (D0-0002-9309) obligates the responsible parties to implement a full remedial program for 33 former MGP sites across the State, including the NYSEG Palmyra MGP Site.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,

- Sampling of surface water and sediment,

- Ecological and Human Health Exposure Assessments.

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Information

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor

The data has identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified for this Operable Unit at this site is/are:

benzene	benzo(a)pyrene
toluene	benzo(b)fluoranthene
ethylbenzene	benzo(ghi)perylene
fluoranthene	benzo[k]fluoranthene
naphthalene	chrysene
pyrene	fluorene
pyrene	xylene (mixed)
indeno(1,2,3-cd)pyrene	coal tar
acenaphthene	acenapthylene
anthracene	phenanthrene
benz(a)anthracene	dibenz[a,h]anthracene

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable standards, criteria and guidance for:

- groundwater
- soil

6.2: 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 issuance of the Record of Decision.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

IRM Facility Upgrade and Excavation

As part of a 2005 expansion of the Palmyra substation, NYSEG completed a limited removal and off-site disposal of coal tar impacted soil. The construction completion report for the facility upgrade was submitted by NYSEG and approved by the Department on January 4, 2007. The report contained sufficient information to confirm the presence of MGP waste requiring further investigation.

6.3: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure*.

People are not drinking the contaminated groundwater because the area is served by a public water supply that obtains its water from a different source. Also, they are not coming into contact with the groundwater unless they dig below the ground surface. The site is completely fenced, which restricts public access; however, persons who enter the site may come into contact with contaminants in the soil by walking on the dirt, digging on or below the ground surface, and otherwise disturbing the soil.

Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Because the on-site building is currently vacant and given the current use of the site, contact with contaminants due to soil vapor intrusion doesn't represent a concern. In addition, sampling indicates soil vapor intrusion is not a concern for off-site buildings.

6.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure

pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water. The Fish and Wildlife Resources Impact Analysis (FWRIA), which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

Contamination at the site has caused an impact to the groundwater resource and to the sediments of Mill (Hathaway) Creek. Groundwater contamination extends a short distance beneath off-site areas, primarily where coal tar is present to the north of Mill Creek. Sediment samples indicate that the site has contributed to contamination in Mill Creek. The degree and extent of site-related contamination in sediments will be further investigated as part of Operable Unit 2.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

To be selected, the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Exhibit B. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit C. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit D.

7.1: Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

4. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

5. Short-term Impacts and Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

7.2: Elements of the Proposed Remedy

The basis for the Department's proposed remedy is set forth at Exhibit E.

The estimated present worth cost to implement the remedy is $5,551,000. The cost to construct the remedy is estimated to be $4,872,000 and the estimated average annual cost is $71,800.

The elements of the proposed remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Excavation of soils, former MGP structures, and waste materials, except those beneath the electric substation, that contain visual tar, NAPL or soils containing greater than 500 ppm of PAHs.

3. In-situ solidification of an MGP structure containing a viscous tarry material inside the substation area, which is not accessible for excavation.

4. Construction of a containment barrier and a series of collection wells around the electric substation to prevent the migration of mobile coal tar from the containment area. The containment barrier will consist of a sheet pile wall with sealed joints.

5. NAPL collection from a series of wells installed in the off-site area to the northwest, across Mill Creek.

6. Installation of a site cover to allow for commercial use of the site. The cover will consist either of structures, such as buildings, pavement, sidewalks comprising the site development, or a soil cover in areas where the upper one foot of exposed surface soil exceeds the commercial use soil cleanup objectives (SCOs). Where the soil cover is required it will consist of a minimum of one foot of soil meeting the requirements for cover material set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to support vegetation.

7. Green Remediation and sustainability efforts will be considered during the design and implementation of the remedy to the extent practicable, including:
• using renewable energy sources
• reducing green house gas emissions
• encouraging low carbon technologies
• fostering green and healthy communities
• conserving natural resources
• increasing recycling and reuse of clean materials
• designing cover systems to be usable for habitat or recreation
• designing storm water management systems to recharge aquifers

8. Imposition of an institutional control in the form of an environmental easement for the controlled property that:
(a) requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3).

(b) limits the use and development of site property to commercial use, which would also allow industrial use, as permitted by local zoning
(c) restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or County DOH;
(d) prohibits agriculture or vegetable gardens on the controlled property;
(e) requires compliance with the Department approved Site Management Plan

9. Since the remedy results in contamination remaining at the site that does not allow for unrestricted use, a Site Management Plan is required, which includes the following:

(a) an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to assure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls:
The Environmental Easement discussed in Paragraph 8 above.

Engineering Controls:
The containment system discussed in Paragraph 4, the NAPL collection system discussed in Paragraph 5, and the soil cover discussed in Paragraph 6 above.

This plan includes, but may not be limited to:
(i) an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
(ii) descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
(iii) a provision to evaluate the potential for soil vapor intrusion should the on-site building become occupied or should any buildings be developed on the site and to implement actions (e.g., mitigation or monitoring) recommended to address exposures related to soil vapor intrusion.
(iv) provisions for the management and inspection of the identified engineering controls;
(v) maintaining site access controls and Department notification; and
(vi) the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

(b) a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but not be limited to:
(i) monitoring of groundwater to assess the performance and effectiveness of the remedy;
(ii) a schedule of monitoring and frequency of submittals to the Department; and
(iii) a provision to evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified.

(c) an Operation and Maintenance Plan for the NAPL collection system.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the remedial investigation. As described in the RI report, waste/ source materials were identified at the site which are impacting groundwater, soil and sediment.

This section describes the findings for all environmental media that were evaluated. As described in the RI report, groundwater, soil, sediment and soil vapor intrusion samples were collected to characterize the nature and extent of contamination. Because sediments are part of OU2, which will be addressed by a separate PRAP and ROD, sediment sampling results are not presented in this document.

For each environmental medium, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into two categories; volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). For comparison purposes the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 are also presented.

Waste/Source Areas

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site where substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and source areas, in the form of coal tar, were identified at the site within and near former MGP structures. Lenses and stringers of coal tar were found through the upper soil column in the southwestern portion of the site, near the former gas holder and the footprint of the MGP process building. The foundation of a small structure inside the electric substation area (Structure A), was also found to contain a viscous, tarry material mixed with fill. These areas are noted on Figure 2.

Coal tar is a reddish brown to black oily liquid by-product which formed as a condensate as the gas cooled and which does not readily dissolve in water. Materials such as coal tar are commonly referred to as NAPLs. The terms NAPL and coal tar are used interchangeably in this document. Although most coal tars are slightly denser than water, the difference in density is minimal. Consequently, this tar can either float or sink when in contact with water.

Specific volatile organic compounds (VOCs) of concern are benzene, toluene, ethylbenzene and xylenes. These are referred to collectively as BTEX in this document. Specific semivolatile organic compounds of concern are the polycyclic aromatic hydrocarbons (PAHs):

acenaphthene acenaphthylene

anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(g,h,i)perylene
benzo(k)fluoranthene
pyrene
chrysene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
dibenzo(a,h)anthracene

Total PAH concentrations as referred to in this plan are the sum of the individual PAHs listed above. The italicized PAHs are probable human carcinogens.

Coal tar contains high levels of PAH compounds, often greater than 100,000 parts per million. Tars also exceed SCGs for BTEX by several orders of magnitude. The waste/source areas identified will be addressed in the remedy selection process.

Groundwater

Eighteen (18) shallow groundwater monitoring wells were installed during the RI and previous investigations at upgradient, cross-gradient and downgradient locations from various former MGP features. The extent of site-related, dissolved-phase groundwater contamination corresponds roughly to the NYSEG substation property, with the downgradient edge of the plume close to the boundary of the property at 133 Park Drive. The highest concentrations of MGP-related contaminants in groundwater were detected in the former MGP process area, which is the coal tar source area. Based on upgradient sampling results and chemical fingerprinting, it appears that upgradient groundwater has also been impacted to a lesser degree by petroleum-related compounds not related to the site, and these contaminants are migrating with groundwater into the MGP site investigation area. Cyanide was also detected in a limited area of the site in concentrations greater than the groundwater standard.

Groundwater sampling results from the RI and previous investigations are presented on Figure 3.

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Benzene	ND - 1400	1	7/18
Ethylbenzene	ND – 370	5	5/18
Toluene	ND – 110	5	2/18
Xylenes	ND - 1000	5	3/18
SVOCs			
Acenaphthene	ND – 120	20	2/18

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Benzo(a)anthracene	ND – 6.0	0.002	6/18
Benzo(k)fluoranthene	ND – 2.0	0.002	6/18
Chrysene	ND – 4	0.002	1/18
Naphthalene	ND – 2,200	10	4/18
INORGANICS			
Cyanide (Total)	ND – 12,600	200	2/18

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

Based on the findings of the RI, the disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: benzene, toluene, ethylbenzene, xylenes, acenaphthene, benzo(a)anthracene, benzo(k)fluoranthene, chrysene, naphthalene, and cyanide. Although some of these contaminants were also found in upgradient monitoring wells and are attributable to other sources, releases of MGP-related wastes have significantly increased levels of these contaminants in groundwater beneath the site.

Soil

Surface and subsurface soil samples were collected at the site during the RI. Surface soil samples were collected from a depth of 0-2 inches to assess direct human exposure. The results, which are presented in Table 2, indicate that surface soils at the site exceed the unrestricted SCOs for semi-volatile organics and, to a lesser extent, arsenic and cyanide.

Subsurface soil samples were collected from depths ranging from 2 to 32 feet to assess soil contamination impacts to groundwater. The results indicate that soils at the site exceed the unrestricted SCOs for volatile and semi-volatile organics.

Coal tar-impacted subsurface soil or fill is present in and around the former MGP process area, to a depth of 23 feet. In several on-site borings, soil is impacted with coal tar and contaminants of concern (COC) in concentrations greater than soil cleanup objective concentrations (SCOs). In addition to the analytical results presented in Table 3, the extent of contamination was also defined by visual observations of coal tar contamination in subsurface samples.

At an off-site property to the southwest of the former MGP process area, a very thin lens (1/8”) of coal tar was observed at a deeper interval (21 feet bgs) in one of the borings advanced there. This area with tar-impacted soil was found to be localized, and coal tar does not appear to have migrated from the former MGP process area to this location. At two properties to the north of the former MGP site, coal tar was observed in lenses and stringers in four borings at depths of approximately 12 feet below grade. Investigation borings advanced in all directions from these locations were not impacted, indicating that the full horizontal and vertical extent of the coal tar-impacted soil in this area has been determined.

Based on physical observations made during the completion of the soil borings and well installations, the geotechnical analyses, and laboratory analyses, it appears that the continuous clayey silt unit that underlies the site is acting as a confining unit which is limiting the potential downward migration of coal tar.

Only one surface soil sample and one subsurface soil sample exceeded the unrestricted SCO for cyanide, indicating that the site was not extensively used for the disposal of purifier wastes.

Table 2 - Surface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Commercial SCG[c] (ppm)	Frequency Exceeding Restricted Commercial SCG
SVOCs					
Benzo(a)anthracene	ND - 6	1	6/12	5.6	1/12
Benzo(a)pyrene	ND - 6	1	6/12	1	6/12
Benzo(b)fluoranthene	ND - 7	1	8/12	5.6	6/12
Benzo(K)Fluoranthene	ND - 3	0.8	2/12	56	0/12
Chrysene	ND - 5	1	6/12	56	0/12
Dibenzo(a,h)Anthracene	ND – 0.7	0.33	6/12	0.56	3/12
Indeno(1,2,3-Cd)Pyrene	ND - 5	0.5	8/12	5.6	0/12
INORGANICS					
Arsenic	ND - 158	13	2/12	16	2/12
Cyanide (total)	ND – 30.5	27	1/12	27	1/12

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Commercial Soil Cleanup Objectives.

Table 3 - Subsurface Soil					
Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Commercial SCG[c] (ppm)	Frequency Exceeding Restricted Commercial SCG
VOCs					
Benzene	ND – 67	0.06	5/71	44	1/71
Ethylbenzene	ND – 15	1.0	5/71	390	0/71
Toluene	ND – 170	0.7	4/71	500	0/71
Xylenes	ND – 270	0.26	8/71	500	0/71
SVOCs					
Acenapthene	ND - 190	20	5/71	500	0/71
Acenaphthylene	ND - 180	100	3/71	500	0/71
Anthracene	ND - 220	100	3/71	500	0/71
Benzo(a)anthracene	ND - 170	1	10/71	5.6	8/71
Benzo(a)pyrene	ND - 100	1	10/71	1	10/71
Benzo(b)fluoranthene	ND - 120	1	10/71	5.6	7/71
Benzo(K)Fluoranthene	ND - 41	0.8	3/71	56	0/71
Chrysene	ND - 120	1	9/71	56	3/71
Dibenzo(a,h)Anthracene	ND - 16	0.33	9/71	0.56	7/71
Fluoranthene	ND - 360	100	5/71	500	0/71
Fluorene	ND - 210	30	5/71	500	0/71
Indeno(1,2,3-Cd)Pyrene	ND - 48	0.5	10/71	5.6	4/71
Naphthalene	ND - 960	12	7/71	500	1/71
Phenanthrene	ND - 630	100	6/71	500	1/71
Pyrene	ND - 270	100	4/71	500	0/71
Dibenzofuran	ND - 140	7	6/71	350	0/71
INORGANICS					
Cyanide (total)	ND – 32.8	27	1/71	27	1/71

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Commercial Soil Cleanup Objectives.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern to be addressed by the remedy selection process are: benzene, ethylbenzene, toluene, xylenes, acenapthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, dibenzofuran, and cyanide.

Soil Vapor

The potential for soil vapor intrusion resulting from site-related soil or groundwater contamination was evaluated by sampling soil vapor. At this site, soil vapor samples were collected at a depth approximately one foot above the water table at the site boundary, adjacent to the foundation of a neighboring residence, to evaluate whether additional soil vapor intrusion sampling was warranted. Based on the soil vapor sampling results (see Table 4), the groundwater and soil sampling results (Tables 2 and 3), and our experience at other MGP sites in New York State, the agencies determined that no further investigation of soil vapor or soil vapor intrusion beyond the site boundary was necessary.

However, due to the presence of MGP source areas beneath the site, there is a potential for on-site soil vapor contamination. There is also a potential for people to come into contact with this contamination due to soil vapor intrusion if the use of the on-site building changes or if new buildings are constructed on-site. Therefore, the potential for on-site soil vapor intrusion will be addressed by the remedy selection process.

Table 4 – Soil Vapor

Detected Constituents	Concentration Range Detected (ug/m3)a	SCG (ug/m3)	Frequency Exceeding SCG
Ethylbenzene	3.2 - 6.1	N/Ab	N/A
Xylenes	12.8 – 22.2	N/A	N/A
Tetrachloroethylene (PCE)	ND – 3.3	N/A	N/A

a – ug/m3: micrograms per cubic meter

b – SCGs are not available for soil vapor

Exhibit B

SUMMARY OF THE REMEDIATION OBJECTIVES

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial objectives for this site are:

Public Health Protection

Groundwater

- Prevent people from drinking groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with contaminated groundwater.

Soil

- Prevent ingestion/direct contact with contaminated soil.

Soil Vapor

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

Environmental Protection

Free Product/NAPL

- Remove free product/NAPL identified at the site to the extent technically practicable.
- Prevent and/or eliminate free product/NAPL seeps which result in visual sheens on surface water.
- Eliminate through removal, treatment and/or containment free product/NAPL as source of contamination to other environmental media.

Groundwater

- Restore the groundwater aquifer to meet ambient groundwater quality criteria, to the extent feasible.
- Prevent discharge of contaminated groundwater to surface water.

Soil

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Exhibit C

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Exhibit B) to address the contaminated media identified at the site, as described in Section 6:

On-Site Alternatives:

The following alternatives correspond to Alternatives O-1 through O-4 of the Feasibility Study and apply to the on-site area:

Alternative O-1: No Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2. This alternative leaves the site in its present condition and does not provide any additional protection of the environment. There are no costs associated with this alternative.

Alternative O-2: Partial Excavation and Containment

This alternative includes the excavation of soils, except those beneath the electric substation, that contain coal tar or greater than 500 ppm of PAHs. Excavated soils with higher levels of contaminants would be treated at an off-site thermal desorption facility, and soils containing lower levels would be disposed at a permitted landfill. Contamination beneath the substation would be contained using a sheet pile wall and NAPL collection wells to prevent NAPL from migrating from beneath the substation into clean areas. A former structure located in the western corner of the substation area (Structure A), which is not accessible for excavation, would be treated using in-situ solidification to immobilize the viscous tar it contains. A soil cover, consisting of a minimum of one foot of soil meeting the restricted commercial requirements for cover material, would be placed over a demarcation layer across the site. Non-vegetated areas (buildings, roadways, parking lots, etc.) will be covered by a paving system or concrete at least 6 inches thick. The components of this alternative are shown on Figure 4.

This alternative also includes a fence around the substation area to prevent exposures to contaminants in surface soils. An institutional control, in the form of an environmental easement, would be placed on the property to limit the site to commercial use. The easement would also require compliance with a Site Management Plan and prohibit the use of untreated groundwater. Groundwater would be monitored to determine the degree of contaminant reduction associated with the source removal and control measures and natural attenuation processes.

Present Worth: $5,206,000
Capital Cost: $4,666,000
Average Annual Costs: $43,800

Alternative O-3: Containment Barrier

This alternative uses a low permeability cutoff wall along the upgradient sides of the substation to divert the flow of groundwater around contaminated soils. A sealed sheet pile wall would be installed along two sides of the former MGP site and soils containing source material. Surface soils that exceed the SCOs for commercial use and isolated

areas of subsurface soil contamination outside of the containment area would be excavated, disposed off-site, and backfilled with clean soil. The soil cover described in Alternative O-3 would be placed over the site. One area of subsurface contamination outside the containment area would also be excavated. A former structure located in the western corner of the substation area (Structure A) would be treated using in-situ solidification to immobilize the viscous tar it contains.

A groundwater extraction system would be installed inside the containment area to maintain an inward gradient and minimize the flow of contaminated groundwater from the site. A NAPL collection system would also be installed within the containment area. Groundwater would be monitored to determine the degree of contaminant reduction associated with the source removal and control measures and natural attenuation processes.

Present Worth: $3,936,000
Capital Cost: $2,456,000
Average Annual Costs: $119,570

Alternative O-4: Excavation to Pre-Disposal Conditions

This alternative would achieve all of the SCGs discussed in Section 6.1.1 by removing all soil that exceeds the unrestricted soil cleanup objectives listed in Part 375-6.8 (a). This alternative includes removal of the electrical substation and excavation of an estimated 11,900 cubic yards of soil from the site. Excavated soils with higher levels of contaminants would be treated at an off-site thermal desorption facility, and soils containing lower levels would be disposed at a permitted landfill. The excavations would be backfilled to existing elevations with clean soil. Groundwater monitoring would be performed to verify the Department's expectation that contaminant levels in groundwater will achieve SCGs over time.

Present Worth: $11,796,000
Capital Cost: $11,396,000
Average Annual Costs: $35,600

Off-Site Alternatives:

These alternatives apply to layer of coal tar present at depth beneath the off-site area northwest of Mill Creek, particularly the northeast corner of 111 Park Drive and the adjacent NYS Canal Corporation wetlands area. These correspond to alternatives W-1 through W-4 of the Feasibility Study.

Alternative W-1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment. There are no costs associated with this alternative.

Alternative W-2: Excavation

This alternative involves the excavation of an estimated 1,600 cubic yards of contaminated soil from the area across Mill Creek near sampling locations SB45, SB46 and SB47 (see Figure 3). Because the lens of contamination is located approximately 12 feet below ground surface at the top of the silt confining layer, the upper column of clean

soil would be removed and stockpiled for backfill. Clean soil would be imported for the remaining backfill, and the upper 12 inches would be soil that is suitable for supporting wetland vegetation. Appropriate wetlands species would be planted in disturbed areas. Groundwater monitoring would be performed to verify the Department's expectation that contaminant levels in groundwater will achieve SCGs over time.

Present Worth: $1,929,000
Capital Cost: $1,782,000
Average Annual Costs: $17,000

Alternative W-3: In-Situ Chemical Oxidation

This alternative involves the injection of a chemical oxidizer, such as Fenton's Reagent, permanganate, persulfide or ozone, into the impacted zone to destroy the contamination. An estimated 31 injection wells would be installed in a grid pattern in the area across Mill Creek near sampling locations SB45, SB46 and SB47 (see Figure 3). Multiple rounds of chemical injection would be performed to maximize the destruction of MGP source material. Natural attenuation processes would be relied upon to further reduce contaminant levels after the chemical treatment is completed. Groundwater would be monitored to determine the degree of contaminant reduction associated with the source treatment and these natural attenuation processes.

Present Worth: $699,000
Capital Cost: $552,000
Average Annual Costs: $17,000

Alternative W-4: NAPL Extraction

This alternative involves the removal of fluid coal tar from the subsurface using a series of extraction wells. An estimated 10 extraction wells would be installed at the depth at which the thin layer of NAPL is present on top of the silt confining layer. These wells would be installed in the area across Mill Creek near sampling locations SB45, SB46 and SB47 (see Figure 3). NAPL collected in these wells would be pumped out periodically and sent off-site for treatment. This system would operate until recovery of tar is no longer feasible, currently estimated to be five years.

Present Worth: $490,000
Capital Cost: $253,000
Average Annual Costs: $28,000

Exhibit D

Table 3
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Average Annual Cost ($)	Total Present Worth ($)
On-Site Remedial Alternatives			
Alternative O-1: No Action	$ 0	$ 0	$ 0
Alternative O-2: Partial Excavation and Containment	$4,666,000	$43,800	$5,206,000
Alternative O-3: Containment Barrier	$2,456,000	$119,570	$3,936,000
Alternative O-4: Excavation to Pre-Disposal Conditions	$11,396,000	$35,600	$11,796,000
Off-Site (Wetland) Remedial Alternatives			
Alternative W-1: No Action	$ 0	$ 0	$ 0
Alternative W-2: Excavation	$1,782,000	$17,000	$1,929,000
Alternative W-3: In-Situ Chemical Oxidation	$552,000	$17,000	$699,000
Alternative W-4: NAPL Extraction	$253,000	$28,000	$490,000
Proposed Remedy			
Alternatives O-2 and W-4: Partial Excavation, Containment and NAPL Extraction	$4,872,000	$71,800	$5,551,000

Exhibit E

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternatives O-2 (Partial Excavation and Containment) and W-4 (NAPL Recovery), as the remedy for this site. The elements of this remedy are described in Section 7.2 of the PRAP and shown on Figure 5.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives.

Alternatives O-2 and W-4 are being proposed because, as described below, they satisfy the threshold criteria and provide the best balance of the balancing criterion described in Section 7.1. They would achieve the remediation goals for the site by removing accessible source material from the site and containing the remaining source material beneath the electric substation. Mobile coal tar would be collected from within the contained area and from the off-site wetlands area, which will enable natural attenuation processes to reduce the level of contamination in groundwater to acceptable levels in a reasonable time frame. Although the full excavation alternatives (O-4 and W-2) would provide the highest levels of long term effectiveness and permanence, the severe short term impacts and very high costs are not justified by the small additional amount of contamination that would be removed.

Alternatives O-1 and W-1 (No Action) do not provide any protection to public health and the environment and will not be evaluated further. Alternatives O-4 and W-2 (Full Excavation) meet the threshold criteria by removing all soil contaminated above the unrestricted soil cleanup objectives. Alternatives O-2 (Partial Excavation and Containment) and O-3 (Containment) would also comply with this criterion but to a lesser degree or with lower certainty. Because Alternatives O-2, O-3 and O-4 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

Alternatives O-2 through O-4 all have significant short-term impacts that vary with the amount of associated soil excavation. Alternative O-3 would have the smallest impact of these alternatives because only surface soils would be excavated, and the rest of the impacts would be associated with installing the sheet pile containment system. Alternative O-2 would have a greater short term impact because a greater volume of soil would be excavated. Alternative O-4 would have the greatest short term impacts and would require the longest time to implement, due to the great volume of soil to be excavated and the need to relocate the electric substation. All of the off-site alternatives would have some impacts to the wetland area that would have to be minimized and mitigated. Alternative W-2 (Excavation) would significantly disturb the affected wetland area in order to perform the excavation. Alternatives W-3 (In-situ Chemical Oxidation) and W-4 (NAPL Recovery) would involve minor disturbances to the wetland associated with the installation of wells and periodic access to them.

The time needed to achieve the remediation goals is the shortest for Alternatives O-4 and W-2 because all of the contamination would be removed, and longer for Alternative O-2 because a portion would be contained. Alternative O-3 would take the longest to achieve the remediation goals because it relies exclusively on long-term containment. Alternative W-3 would achieve the remediation goals in a shorter time frame than Alternative W-4 because it would treat more of the dissolved contamination.

Long-term effectiveness is best accomplished by those alternatives involving excavation of the contaminated overburden soils (Alternatives O-4 and W-2). Alternative O-4 provides the highest degree of long-term effectiveness because it results in removal of almost all of the chemical contamination from the site and removes the need for property use restrictions and long-term monitoring. Alternative O-2 results in the removal of approximately 95% of the contaminant mass from the site, but it also requires an environmental easement and long-term monitoring due to the contamination remaining beneath the electric substation. However, due to the on-going use of the site by NYSEG, the reliability of these controls is high. Alternative O-3 relies entirely on physical containment and institutional controls to protect human health and the environment, and has a lesser degree of long-term effectiveness. Alternative W-3 would have a high degree of long-term effectiveness because it would treat both mobile and residual phases of the off-site tar lens. Alternative W-4 would be somewhat less effective because only the mobile phase of the off-site tar would be collected.

Alternative O-4, complete excavation and off-site disposal, reduces the toxicity, mobility and volume of on-site waste by treating most of the material at an approved off-site thermal desorption facility. Soils that are permitted to be landfilled would achieve only a reduction in mobility. Alternative O-2 provides a slightly lesser degree of reduction in volume because less soil would be treated off-site. Containment of soil beneath the electric substation would reduce the mobility of this material. Alternative O-3 would contain all subsurface soils, and would only provide a reduction in waste mobility. Alternative W-2 would provide the highest degree of contaminant reduction because the tar lens would be excavated and treated at an approved off-site thermal desorption facility. Alternative W-3 would also provide a high degree of contaminant reduction because the tar lens would be treated in place. Alternative W-2 would reduce the mobility of contamination by collecting the mobile portion of the tar lens.

Alternative O-3 is the most readily implementable of the alternatives that meet the threshold criteria because it involves the least amount of soil excavation. However the installation of the sheet pile containment system near an active electric substation would present some technical difficulties. Alternative O-2 would have similar implementability as Alternative O-3. Alternative O-4 would be the most difficult alternative to implement because the electric substation would have to be relocated before the site could be remediated. Alternative W-4 would be readily implementable because tar collection wells could be installed in the off-site area and periodic removal of collected tar would be easily done. Alternative W-3 would be somewhat more difficult to implement because more chemical injection wells would be required, and chemical mixing and pumping would be necessary in the off-site area. Alternative W-2 would be relatively difficult to implement because an extensive excavation through clean soil in the off-site area would be necessary to remove the lens of tar that is present 12 feet below the surface.

The costs of the alternatives vary significantly. Alternative O-3 has a lower cost ($3.9 million), but a large portion of this is annual site management costs, which would be required into the future. Alternative O-4 (Full Excavation) has the highest total cost ($11.8 million), due to the large volume of soil excavated from the site and the need to relocate the electric substation. Partial excavation and containment (Alternative O-2) would be much less expensive than Alternative O-4 ($5.2 million), yet it would provide similar protection of the groundwater resource. Full excavation of the off-site area (Alternative W-2) is estimated to cost $1.9 million. In-situ chemical oxidation (Alternative W-3) is estimated to cost $7.0 million, and NAPL recovery (Alternative W-4) would cost $490,000.