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MEMORANDUM

FILE COPY

TO: Wendy Kuehner, NYSDOH



FROM: Amen M. Omorogbe, DER

SUBJECT: Record of Decision - Former Clifton MGP, Site #: 2-43-023

DATE: April 20, 2004

Attached for your records are two copies of the Record of Decision for the referenced site. If you have any questions, please call me at 2-9564.

attachment.



Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
Former Clifton MGP Site
Operable Unit No. 1
Staten Island, Richmond County New York
Site Number: 2-43-023

March 2004

DECLARATION STATEMENT - RECORD OF DECISION

Former Clifton MGP Inactive Hazardous Waste Disposal Site Operable Unit No.1 Richmond County, New York Site No. 2-43-023

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for Operable Unit #: 1 at the Former Clifton MGP site, a Class 2 inactive hazardous waste disposal site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for Operable Unit 1 of the Former Clifton MGP inactive hazardous waste disposal site, and the public's 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 releases of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and/or the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation and Feasibility Study (RI/FS) for the Former Clifton MGP site and the criteria identified for evaluation of alternatives, the NYSDEC has selected containment of impacted area through vertical barriers and surface capping. The components of the remedy are as follows:

- Containment of the former relief holder foundation and subsurface impacted materials using a jet grout (or equivalent) vertical barrier wall to be constructed and keyed into a weathered bedrock confining layer located approximately 125 feet below ground surface (bgs);
- Installation of a low permeability cap over the entire OU-1 area to prevent exposure to contaminated soil and limit infiltration of precipitation;

- Installation of extraction wells within the containment area for passive recovery of dense non-aqueous phase liquid (DNAPL) and if and when necessary, to maintain groundwater inward gradient through pumping;
- Institutional controls, consisting of an environmental easement which will include restrictions on groundwater usage or future use of the land for residential purposes, maintenance of site access restrictions (e.g., fencing, lockable gates), a soil management plan, and long-term groundwater and DNAPL monitoring;
- Soil gas survey.

New York State Department of Health Acceptance

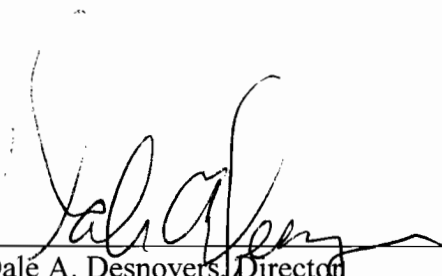
The New York State Department of Health (NYSDOH) concurs that the remedy selected for this site is protective of human health.

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.

MAR 31 2004

Date



Dale A. Desnoyers, Director
Division of Environmental Remediation

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RECORD OF DECISION

**Former Clifton MGP Site
Operable Unit No. 1
Staten Island, Richmond County, New York
Site No.2-24-023
March, 2004**

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 (NYSDOH), has selected this remedy for the Former Clifton MGP Site, Operable Unit No. 1. The site is currently separated into two parcels of land (see Fig. 2), 40 Willow Avenue and 25 Willow Avenue which are identified as Operable Units 1 and 2 respectively. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, the operation of a manufactured gas plant (MGP) at the Former Clifton MGP Site, including a former relief gas holder at 40 Willow Avenue has, resulted in the disposal and/or leaking of hazardous wastes, including coal tar containing benzene, toluene, ethylbenzene, xylene and polycyclic aromatic hydrocarbons. These wastes have contaminated the soils and groundwater at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to contaminated soil and groundwater.
- a significant environmental threat associated with the impacts of MGP contaminants to groundwater.

To eliminate or mitigate these threats, the NYSDEC has selected the following remedy:

- Containment of the former relief holder foundation and subsurface impacted materials using a jet grout (or equivalent) vertical barrier wall consisting of approximately 460 linear feet and a thickness of three feet constructed and keyed into a weathered bedrock confining layer located approximately 125 feet below ground surface (bgs), preventing DNAPL migration through subsurface soil and contact with the surrounding groundwater;
- Installation of a low permeability cap over the entire OU-1 area to prevent exposure to contaminated soil and limit infiltration of precipitation;
- Installation of extraction wells within the containment area for passive recovery of DNAPL and if and when necessary, to maintain a groundwater inward gradient through pumping;
- A soil gas survey will be performed at the site prior to and after the installation of the containment cell, to evaluate soil vapor quality; and

- Institutional controls, consisting of an environmental easement which will include restrictions on groundwater usage or future use of the land for residential purposes, maintenance of site access restrictions (e.g., fencing, lockable gates), a soil management plan, and long-term groundwater and DNAPL monitoring.

The selected remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially 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.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Former Clifton MGP site is located in Richmond County, New York (see Figure 1). Operable Unit (OU) No.1 of the site is the 40 Willow Avenue parcel of the Clifton Site. The OU-1 parcel is approximately one acre in area and is located at the southwest corner of the intersection of Bay Street and Willow Avenue in the Clifton Section of Staten Island. The site is bounded to the northwest by Willow Avenue; to the northeast by Bay Street; to the south by a residential section of Staten Island which fronts Lynhurst Avenue and to the west by a two-story commercial building. To the northwest, across Willow Avenue, is the remainder of the Former Clifton MGP Site (i.e., the 25 Willow Avenue Parcel, OU-2). The area surrounding the 40 Willow Avenue is characterized by a combination of urban residential and commercial uses. New York Harbor is the closest surface water body to OU-1 and is located approximately 500 to 600 feet northeast.

OU-1, which is the subject of this PRAP, consists of the 40 Willow Avenue parcel of the Former Clifton MGP Site. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

The remaining operable unit for this site is Operable Unit No. 2 which consists of the remainder of the MGP on the 25 Willow Avenue parcel.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The Former Clifton MGP was operated by Richmond County Gas Light from 1856 to 1901. The plant was then operated by the New York and Richmond Gas Company from 1901 until 1957. Brooklyn Union, now KeySpan acquired the latter company in 1957, at which point MGP operations ceased.

The 40 Willow Avenue parcel (OU-1) is the location of a former relief holder which was part of the plant structure, and historically used to store manufactured gas. Over the years, by-products, such as coal tar generated from the MGP operations have leaked or been released from the former relief holder resulting in the contamination of soil and groundwater. The holder was an aboveground structure that stood approximately 150 feet tall. The structure was situated on a

circular foundation, which measures approximately 85 feet in diameter and extends about 18 feet below ground surface. The holder had a storage capacity of about one million cubic feet. Demolition of the gas plant and system structures occurred in the spring of 1959. The holder foundation remains in the subsurface.

3.2: Remedial History

In 1993, Brooklyn Union, now KeySpan excavated about 20 cubic yards of soil during which an 8-inch diameter steel well, located just below the surface, was discovered. A mixture of water and free-product was removed from the well for disposal. The 90 foot deep well was subsequently sealed with cement grout.

On June 15, 1994, 43 tons of contaminated soil was excavated east of the former relief holder and disposed of in accordance with the NYSDEC regulations. Detailed remedial history can be found in the site remedial investigation report located at the document repositories.

SECTION 4: 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 NYSDEC and KeySpan entered into a Consent Order on April 14, 1998. The Order obligates the responsible parties to implement a full remedial program.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between February 1999 and June 2002. The field activities and findings of the investigation are described in the RI report.

The following activities were conducted during the RI:

- Research of historical information.
- Excavation of 5 test pits to determine the structural integrity of the subsurface structure and to better define the outer holder wall of the former relief holder No. 2.
- Installation of 43 soil borings, 3 monitoring wells and 12 piezometers for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions.

- Collection of approximately 15 groundwater samples from various wells and piezometers.
- Collection of approximately 94 surface soil samples and 88 subsurface soil samples.

To determine whether the site soil and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC “Ambient Water Quality Standards and Guidance Values” and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the NYSDEC “Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels”.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: Site Geology and Hydrogeology

The Remedial Investigation conducted at the site revealed four distinctive stratigraphic units. These units are, in order of increasing depth: 1), fill, which consists of silt, sand and gravel mixed with slag 2), alluvial deposits encountered beneath the layer of fill. The thickness of this unit ranged from 2 feet to approximately 10 feet; 3), Glacial deposits encountered beneath the alluvial deposits and 4), beneath the glacial deposits lies saprolite or a weathered bedrock layer. The saprolite is believed to be the lower confining layer of the deep aquifer beneath the site. The top of the saprolite elevation ranges from 110 to approximately 125 feet bgs.

Two aquifers are present beneath the site, a shallow, unconfined aquifer and a deep semi-confined aquifer. The water table elevations for the shallow unconfined aquifer ranged from about 3 feet bgs to approximately 7 feet bgs. The deep aquifer is under confining pressure and is located within the glacial deposits above the saprolite.

5.1.2: Nature of Contamination

As described in the RI report, many surface soil and subsurface soil samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and inorganics (metals).

The VOCs of concerns are benzene, toluene, ethylbenzene and xylenes. In this document, these compounds are referred to collectively as total BTEX and “total BTEX concentrations” is the sum of the concentrations of benzene, toluene, ethylbenzene and xylenes.

Specific PAHs of concern are the following:

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

In this document, PAH concentrations are referred as either total PAHs (TPAHs) or carcinogenic PAHs (cPAHs). The TPAH concentration is the sum of the concentrations of each (italicized and non-italicized) PAH listed above. The cPAH concentration is the sum of the concentrations of each italicized PAH listed above.

Also detected in the subsurface soil is a dense oily liquid that does not readily dissolve in water. Material such as this is referred to as dense non-aqueous phase liquid (DNAPL). DNAPL or tar was detected to a depth of approximately 80 feet bgs (see Fig. 3). The presence of this DNAPL is contributing to concentrations of BTEX and PAHs in the site soil and groundwater.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

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

Table 1 summarizes the degree of contamination for the contaminants of concern in both soil and groundwater and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Surface Soil

Surface soil is defined as the soil located from zero to six inches bgs. Surface soil samples collected at the site and at background locations in the vicinity of the site show TPAHs

concentrations ranging from 22.4 ppm to 84.7 ppm. CPAHs concentrations ranged from ND ppm to over 10 ppm. BTEX compounds were not analyzed for these surface soil samples. Lead was the only metal associated with the operation of the former MGP that was detected at the site above guidance values with concentrations ranging from ND to over 1900 ppm.

Subsurface Soil

The remedial investigation conducted at the site revealed that the lateral extent of tar, staining, sheens, odors and chemical compounds was generally limited to the vicinity of the former relief holder. Test pits placed down to about 8 feet within the center of the former relief holder did not show evidence of tar saturated material. However, soil borings located within the former relief holder indicate heavy tar saturation between 16 feet and 20 feet bgs. The glacier deposits located on the northwest portion of the site consist of a dense silt unit and a silt-sand unit which appears to provide a hydrogeologic confining layer between the upper aquifer and the lower confined aquifer. This unit has not, however, acted as confining unit to the downward mobility of tar. Tar saturated soils were detected to a depth of approximately 80 feet bgs, with tar blebs being observed to 100 feet bgs, while tar-like odors were detected at the top of the weathered bedrock at 124 feet bgs.

Site investigation also shows downward migration of tar within and immediately adjacent to the holder with a limited horizontal component. About 70 percent of the tar has migrated downward outside of the holder foundation. Tar staining, tar blebs/sheens were observed about 45 feet below the ground surface, which appears to be moving toward Lynhurst Avenue ending under the residential properties. A series of borings placed at about 120 ft away from the site in front of the residential properties across Lynhurst Avenue did not indicate contamination in soil and groundwater. Therefore, site contamination detected at about 50 feet below the ground surface has not migrated beyond the residential properties.

Samples of the coal tar obtained within the former relief holder test pits and borings indicated BTEX concentrations ranging up to 10,000 ppm. TPAHs ranged from 3.4 ppm to over 85,000 ppm while cPAHs were detected at concentrations ranging from 2.2 ppm to over 9,000 ppm at a depth of between 4 to 8 feet bgs.

Outside of the former relief holder, BTEX concentrations range from non-detect to 5,000 ppm. TPAH concentrations ranged from non-detect to 20,000 ppm, while concentrations of cPAHs ranged from non-detect to 2,500 ppm.

Groundwater

Groundwater at OU-1 is contaminated with MGP related materials. Measurable amounts of DNAPL (about 4 feet at 70 feet bgs) were observed in monitoring well RW-7 located just outside (in the southern side) of the former relief holder at 40 Willow Avenue. Analytical samples obtained from the site investigation from areas adjacent and within the residential properties show that shallow groundwater down to about 25 ft bgs is free of site contamination.

5.2: 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 RI/FS.

KeySpan performed an IRM which removed soils impacted by lead based paint (which apparently flaked off the steel holder superstructure) to a minimum depth of 3 feet bgs, from the southern portion of 40 Willow Avenue parcel and the adjacent residential properties in 2002. Approximately 4,300 tons of contaminated soil was removed and replaced with clean soil. The purpose of the IRM was to mitigate potential exposure associated with the lead impacted soil by eliminating any potential contact by the occupants of the adjacent residential dwellings.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 7.1 of the RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

There are no known completed exposure pathways at the site. However, potential exposure pathways are:

- Dermal contact with contaminated surface soil, subsurface soil or groundwater
- Incidental ingestion of contaminated soils or groundwater
- Inhalation of contaminated soil vapors

Surface and subsurface soils contain elevated levels of site-related contaminants. Unpaved portions of 40 Willow Avenue are enclosed by a locked chain link fence topped with barbed wire and the remainder of the site is paved, restricting access to contaminated surface and subsurface soils. If contaminated soil is brought to the surface through excavation or other site activities, exposures could occur via dermal contact or incidental ingestion. KeySpan completed an interim

remedial measure in 2002 to remove contaminated surface soils from adjacent residences, eliminating this exposure pathway.

No one is currently using the site groundwater for drinking or other uses and municipal water serves the area. Municipal water is obtained from reservoirs in upstate New York. Although unlikely, a well could be installed in the future. Depth to groundwater is three to seven feet bgs, therefore incidental ingestion of and dermal contact with contaminated groundwater is possible during construction activities.

A soil vapor survey will be implemented concurrent with the chosen remedy to evaluate this potential exposure pathway.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, 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. The following environmental exposure pathways and ecological risks have been identified:

Analytical results from groundwater samples indicate that groundwater beneath the site is impacted by contaminants resulting from the operation of the Former Clifton MGP. This groundwater impact has resulted in significant damage to the groundwater underneath the site and beyond due to migration. However, groundwater samples collected to date at the adjacent residential properties indicate that shallow groundwater down to approximately 25 feet bgs is free of site contamination. Contaminated materials were detected in thin discontinuous layers in the subsurface at depths approximately 50 ft bgs.

The site and the immediate surrounding areas are characterized by commercial facilities, buildings and paved parking lots and therefore provide minimal habitat to wildlife. Residential yards and constant physical disturbances prevent a wildlife population from developing. Due to the transient nature of the use of the site by birds and other small animals, the frequency and duration of exposure is limited. Therefore, contaminants present at this operable unit of the site will not pose a current nor future risk to wildlife.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to contaminants in surface and subsurface soil exceeding SCGs;
- exposures of persons to contaminants in groundwater that exceed groundwater quality standards;
- migration of DNAPL from subsurface soil into groundwater that may create exceedances of groundwater quality standards; and
- continued groundwater migration through subsurface soil that contain DNAPL.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected 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. Potential remedial alternatives for the Former Clifton MGP Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that will 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. The cost to implement all alternatives has been estimated using a discount rate of 5%, assuming a 30-year period of monitoring. 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 will cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated surface and subsurface soils at the site.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative will leave the site in its present condition and will not provide any additional protection to human health or the environment.

The cost to implement Alternative 1, based on an annual operation and maintenance (O&M), for a period of 30 years has been estimated as follows:

<i>Present Worth:</i>	\$54,130
<i>Capital Cost:</i>	\$0
<i>Annual OM&M:</i>	\$3,620

Time to Implement: None

Alternative 2: Containment of Impacted Area through Vertical Barriers and Surface Capping

Alternative 2 includes actions which will allow for encapsulation through surface and subsurface containment of source materials. These actions will inhibit contact between source materials within the barrier and groundwater outside the barrier. The components of Alternative 2 will include the following:

- Installation of a jet grout (or equivalent) vertical barrier wall consisting of approximately 460 linear feet and a thickness of three feet constructed and keyed into a weathered bedrock confining layer located approximately 125 feet bgs,. This action will isolate the DNAPL present in the holder and subsurface from acting as a source of contamination to groundwater outside the walls and prevent further migration of DNAPL.
- Installation of a low permeability cap over the entire OU-1 area (see Fig. 5). The cap will prevent human exposure to contaminated soil and inhibit infiltration of precipitation.
- Installation of an appropriate number of wells screened in the DNAPL zone within the containment cell for the purposes of passive DNAPL recovery including other monitoring and if and when necessary for maintaining an inward groundwater gradient through pumping. The number of wells and locations will be determined during the design phase of this project.
- Institutional controls, consisting of an environmental easement which will include restrictions on groundwater usage or future use of the land for residential purposes, maintain site access restrictions through fencing and lockable gates, and require a site management plan.
- Long-term monitoring of soil groundwater and DNAPL to determine the effectiveness of the proposed remedy.

The cost to implement Alternative 2, based on an annual operation and maintenance (O&M), for a period of 30 years has been estimated as follows:

<i>Present Worth:</i>	\$4,010,600
<i>Capital Cost:</i>	\$3,178,460
<i>Annual OM&M:</i>	\$54,130

Time to Implement: 4 months

Alternative 3: Containment via Vertical Barriers, Capping and Holder Removal.

This alternative will consist of all of the components of Alternative 2 with the addition of the removal of the contents and foundation structure associated with the former relief holder. Under this alternative, removal of contaminated materials will be limited to the contents of the holder, the holder structure itself, and impacted soils located in the immediate vicinity of the holder. The component of this alternative will include the following

- All components of Alternative 2 including institutional controls; and
- Excavation of approximately 6,000 tons of soil and 1,500 tons of holder structure materials.
- Backfilling and restoration of the excavated areas with certified clean materials from an off-site source.
- Long-term monitoring of site groundwater and DNAPL to determine the effectiveness of the remedial option.

The cost to implement Alternative 3, based on annual operation and maintenance (O&M) for a period of 30 years has been estimated as follows:

<i>Present Worth:</i>	\$13,027,900
<i>Capital Cost:</i>	\$12,195,798
<i>Annual OM&M:</i>	\$54,130

Time to Implement: 8 months

Alternative 4: Removal of Soil Containing Source Materials

Alternative 4 will include removal of MGP related source area materials and backfill the excavation with clean fill from off-site source. The components of Alternative 4 will include the following:

- Excavation of approximately 81,000 tons of source area materials down to a depth of about 80 feet bgs in the areas underneath and immediately surrounding the former relief holder.
- Blending of the excavated materials using coal fines and other inert materials to reduce moisture content and improve characteristics to meet off-site treatment facilities requirements.
- Off-site disposal and/or treatment of the excavated materials at facilities permitted to handle the materials.
- Backfilling of the excavated areas with clean fill from an off-site location.

- Dewatering and on-site treatment of approximately 43,200 gallons per day of groundwater for discharge to a local public owned treatment works;
- Institutional controls, consisting of an environmental easement to restrict future use of the land outside of the removal areas; and
- Long-term monitoring to determine the effectiveness of the remedial option.

The cost to implement Alternative 4, based on annual operation and maintenance (O&M) for a period of 30 years has been estimated as follows:

<i>Present Worth:</i>	\$28,495,000
<i>Capital Cost:</i>	\$27,781,839
<i>Annual OM&M:</i>	\$46,380

Time to Implement: 12 months

Alternative 5: *In-situ* Stabilization and Solidification of Source Materials

Alternative 5 will include *in-situ* soil treatment of source materials within, beneath and around former relief holder. In addition, this alternative will include surface asphalt capping of the impacted area to inhibit exposure to contaminants and restrict stormwater infiltration in the source area. Institutional controls will be implemented as part of this alternative. The components of Alternative 5 include the following:

- In-place stabilization/solidification of soil and coal tar within, beneath and areas immediately surrounding the former relief holder. This action will a stable cement like matrix in which the product source is trapped and becomes immobile.
- Treatability studies will be instituted to characterize the appropriate cement additives or stabilizing reagents, dosage rates and other performance parameters for final design of the stabilization/solidification technology.
- Excavations of the top one foot of surface materials to allow for the installation of six inches of compacted clean stone and six inch asphalt cap. The cap will prevent human exposure to contaminated soil and inhibit infiltration of precipitation;
- Institutional controls, consisting of an environmental easement to restrict future use of the land, maintain site access restrictions through fencing and lockable gates; and
- Long-term monitoring to determine the effectiveness of the remedial option.

The cost to implement Alternative 5, based on annual operation and maintenance (O&M) for a period of 30 years has been estimated as follows:

<i>Present Worth:</i>	\$15,606,000
<i>Capital Cost:</i>	\$14,773,953
<i>Annual OM&M:</i>	\$54,130

Time to Implement: 12 months

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. 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 NYSDEC has determined to be applicable on a case-specific basis.

The next five “primary balancing criteria” are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term 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.
4. 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.
5. 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.
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 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. The costs for each alternative are presented in Table 2 at the end of this document

This final criterion 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.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP have been evaluated. The responsiveness summary (Appendix A) presents the public comments received and the manner in which the NYSDEC addressed the concerns raised. While the community raised a lot of issues regarding the other portion of the site and their concerns in respect to the power plant in the Island, there were no major comments opposing the remedy proposed.

In general, the public comments received were supportive of the selected remedy. Several comments were received, however, pertaining to concerns regarding the OU-2 phase of the investigation which is not complete. The OU-2 investigation will be complete and the information will be made available to the public by the end of the calendar year.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the Administrative Record (Appendix B) and the discussion presented below, the NYSDEC has selected Alternative No. 2, Containment of Impacted Area through Vertical Barrier and Surface Capping, as the remedy for this site. The elements of this remedy are described at the end of this section.

The selected remedy is based on the results of the RI and the evaluation of alternatives presented in the FS. The selected remedy when properly implemented, will eliminate or mitigate all threats to public health and the environment presented by the contaminated materials at the OU-1 portion of the Former Clifton MGP site. The selected remedy will also achieve the remedial action objectives (RAOs) established for OU-1.

Alternative 1 will not provide protection to human health and the environment nor comply with SCGs, since source material and contaminated soil will remain in place with no further action, and was, therefore, eliminated from further evaluation. Alternatives 2, 3, 4 and 5 will all be protective of public health and the environment. Alternative 2, which is the selected remedy, will totally encapsulate the source materials from further contact with the environment and public. A jet grout (or equivalent) vertical barrier wall consisting of approximately 460 linear feet and a

thickness of three feet will be constructed and keyed into a weathered bedrock confining layer located approximately 125 feet bgs, preventing DNAPL migration through subsurface soil and contact with the surrounding groundwater. The low permeability cap will eliminate human exposure through direct contact and/or ingestion of site contaminated soil.

Alternative 3, in addition to all components of Alternative 2 will include removal of a holder structure and the contents. This alternative, though meeting RAOs, will pose several short-term impacts during implementation. These impacts will include, significant disruption to the community as a result of the need for a temporary structure during excavation, dewatering, treatment and disposal of water and vapors and truck traffic. Though implementation of Alternative 3 will provide about 30% reduction in the volume of contaminated source materials, it will result in greater short-term adverse impacts on the community during construction and will only afford minimal additional protection to human health and the environment over Alternative 2. Given the additional cost of over \$9 million and significant community disruption associated with Alternative 3, it is not justified to select Alternative 3 over Alternative 2.

Alternative 4 will remove soil containing source materials and will achieve the RAOs. However, contaminated materials outside of the source areas will remain on-site. Similar to Alternative 3, there are logistical and implementation issues associated with this alternative. The huge excavation required under this alternative will result in significantly greater short-term impacts than those encountered under Alternative 3. The additional time and significant increase in cost of approximately \$24 million over Alternative 2 coupled with the fact that it will not provide additional protection to public health and the environment make this alternative undesirable over Alternative 2.

Alternative 5 which calls for *in-situ* stabilization and solidification of source materials will achieve RAOs established for OU-1 and presents similar implementability issues as Alternative 2. Both will provide an equal amount of protection to public health and the environment. Considering the extra \$11 million and additional 8 months to implement Alternative 5 without providing additional protection to human health and the environment, it is undesirable when compared to Alternative 2.

It is important to note that while Alternative 2 will encapsulate the source materials within a containment cell, residual contamination will be left in-place outside of the cell (see Figs.3 and 4). However, the residual contamination outside the cell is generally located at approximately between 45 feet and 120 feet bgs. This residual contamination exists in thin layers in the subsurface and does not appear to be wide spread immediately outside the cell. Due to the depth of the residual contamination and the remedial investigation finding that shallow groundwater is not impacted immediately outside of the proposed containment wall location and within the adjacent residential properties, human exposure by direct contact and/or ingestion of site contaminated soil or vapor is not expected.

Considering 1.) the depth of residual contamination outside the encapsulated area, 2.) the limitations posed by the full commercial and residential development of the OU-1 portion of the site, 3.) sporadic spread of the contamination in thin discontinuous layers in the subsurface and 4.) incomplete exposure pathways to the residual contamination, it is not necessary nor

technically feasible to remove this residual contamination. The proposed remedy is expected to allow natural attenuation of residual contamination by cutting off the source of contamination.

The proposed remedy (Alternative 2) will encapsulate the source materials thereby isolating the materials from the environment. Soil and groundwater outside of the barrier walls will no longer be impacted by the encapsulated contaminated materials. Residual contamination outside the barrier walls will be reduced over time via natural attenuation thereby achieving chemical-specific SCGs over time. Alternative 2 will address short-term impacts to the community through a combination of adequate institutional and engineering controls and a site-specific health and safety plan. Alternative 2 will provide long-term effectiveness and permanence due to the encapsulation of source materials as mentioned above. The continued effectiveness of the barrier will be measured via periodic monitoring and by comparing water level measurements within and outside of the vertical barrier cutoff wall. The capping system will be visually inspected and another layer of asphalt will be added to the existing cap if any defects are observed. Alternative 2 will provide significant reduction of the mobility of the contaminated materials beyond the encapsulated area.

On the basis of the above evaluations, Alternative 2 is the preferred alternative. Alternative 2 will present a more balanced and cost effective remedy when compared to the other alternatives.

The estimated present worth cost to implement the remedy is \$4,010,600. The cost to construct the remedy is estimated to be \$3,178,460 and the estimated average annual operation, maintenance, and monitoring costs for 30 years is \$54,130.

The elements of the selected remedy are as follows:

- A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.
- Installation of vertical barrier walls around the area impacted by source materials to a depth of approximately 125 feet bgs and keyed into the weathered bedrock layer (see Figs.5 & 6). The wall will be approximately 460 linear feet, with a thickness of three feet and will isolate the source from contact with groundwater outside the walls and prevent migration of DNAPL. The wall will be constructed using jet grout technology to create continuous, overlapping adjacent columns. Alternate process options for the vertical barrier walls, such as vibrating beam panels etc. may be further evaluated during the design phase of this remedy.
- Installation of a low permeability cap over the entire OU-1 area (see Fig. 5). The cap will prevent human exposure to contaminated soil and inhibit infiltration of precipitation.
- Installation of wells screened in the DNAPL zone within the containment cell for the purposes of passive DNAPL recovery and monitoring. The wells will be screened at various depths where DNAPL has been found present. The number of wells and locations

will be determined during the design phase of this project. When determined necessary, these wells will be pumped to maintain an inward groundwater gradient within the containment cell.

- Institutional controls consisting of an environmental easement which will include restriction on groundwater usage or future use of the land for residential purposes, maintenance of site access restrictions through fencing and lockable gates and site management plan. The site management plan will be developed to: (a) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan will require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; and (c) identify any use restrictions. KeySpan will provide an annual certification, prepared and submitted by a professional engineer or environmental professional acceptable to the Department, which will certify that the institutional controls and engineering controls put in place, are unchanged from the previous certification and nothing has occurred that will impair the ability of the control to protect public health or the environment or constitute a violation or failure to comply with any operation and maintenance or site management plan.
- A soil gas survey will be performed at the site prior to and after the installation of the containment cell, to evaluate soil vapor quality; and
- Long-term monitoring of groundwater and DNAPL in and outside the containment area to 1.) determine the effectiveness of the proposed remedy, 2.) assure that significant groundwater mounding is not occurring as a result of the construction of the containment cell, and 3.) assure that shallow groundwater remains un-impacted and further migration of contaminants from the containment cell into groundwater is not occurring. If the jet grouting is found to be deficient based on monitoring results, additional grouting or other remedial technology options will be performed to address the defect. The capping system will be monitored to ensure that the integrity of the system is maintained.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the Former Clifton MGP site environmental restoration process, a number of Citizen Participation activities were undertaken 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:

- Repositories for documents pertaining to the site were established;
- A public contact list, which included nearby property owners, elected officials, local media and other interested parties, was established;

- A public meeting was held on March 04, 2004 to present and receive comment on the PRAP;
- A follow up meeting was held on March 11, 2004 with a community advisory committee to further explain the proposed remedy; and
- A responsiveness summary (Appendix A) was prepared to address the comments received during the PRAP public comment period.

TABLE 1
Nature and Extent of Contamination

Surface Soil	Contaminants of Concern	Concentration Range Detected (ppm)^a	SCG^b (ppm)^a	Frequency of Exceeding SCG
Semi Volatile Organic Compounds (SVOCs) cPAHs	Benzo(a)anthracene	0.12 - 9.4	0.224	36/38
	Benzo(a)pyrene	0.11 - 8.8	0.061	38/38
	Benzo(b)fluoranthene	0.075 - 8.4	1.1	19/38
	Benzo(k)fluoranthene	0.093 - 10	1.1	22/38
	Chrysene	0.19 - 12	0.4	35/38
	Dibenzo(a,h)anthracene	ND - 3.8	0.014	33/38
	Indeno(1,2,3-cd)pyrene	ND - 8.4	3.2	2/38
Subsurface Soil	Contaminants of Concern	Concentration Range Detected (ppm)^a	SCG^b (ppm)^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)				
	Benzene	ND - 5,400	0.06	42/105
	Ethylbenzene	ND-1,000	5.5	28/105
	Toluene	ND-3,700	1.5	31/105
	Xylenes (Total)	ND-1,600	1.2	39/105
Semi Volatile Organic Compounds (SVOCs)				
	Benzo(a)anthracene	ND-2,300	0.224	48/102
	Benzo(a)pyrene	ND-1,900	0.061	45/66
	Benzo(b)fluoranthene	ND-790	1.1	17/66
	Benzo(g,h,i)perylene	ND-720	50	4/66
	Benzo(k)fluoranthene	ND-1,100	1.1	21/66
	Chrysene	ND-2,500	0.4	43/66
	Dibenzo(a,h)anthracene	ND-34	0.014	10/66
	indeno(1,2,3-cd)pyrene	ND - 480	3.2	11/102

Groundwater	Contaminants of Concern	Concentration Range Detected (ppb) ^a	SCG ^b (ppb) ^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND-20,000	1	6/24
	Ethylbenzene	ND-1,300	5	6/24
	Toluene	ND-9,800	5	7/24
	Xylenes (Total)	ND-2,800	5	8/24
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND	0.002	0/24
	Benzo(a)pyrene	ND	0.002	0/24
	Benzo(b)fluoranthene	ND	ND	0/24
	Benzo(k)fluoranthene	ND	0.002	0/24
	Indeno(1,2,3-cd)pyrene	ND	0.002	1/24
	Chrysene	ND	0.002	0/24
	Dibenzo(a,h)anthracene	ND	NA	0/24

^a ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;

^b SCG = standards, criteria, and guidance values;

ND = Not Detected
NA = Not Available

Table 2
Remedial Alternative Costs

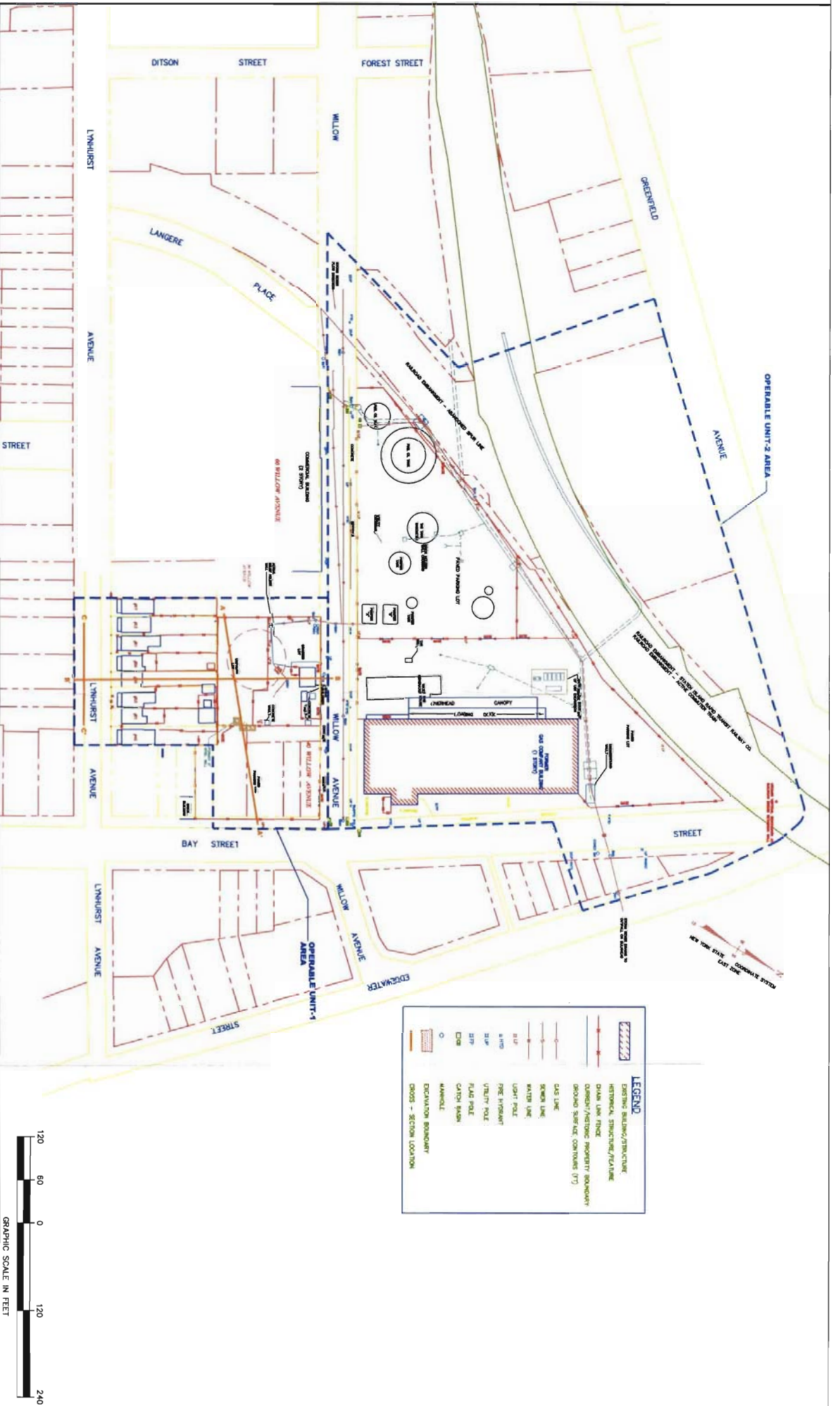
Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
Alternative 1: No Action	\$0	\$3,620	\$55,700
Alternative 2: Containment of impacted area through vertical barriers and surface capping	\$3,178,460	\$54,130	\$4,010,600
Alternative 3: Containment via vertical barriers, capping and holder removal	\$12,195,798	\$54,130	\$13,027,900
Alternative 4: Removal of soil containing source materials	\$27,781,839	\$46,380	\$28,495,000
Alternative 5: In-situ stabilization and solidification of source materials	\$14,773,953	\$54,130	\$15,606,000

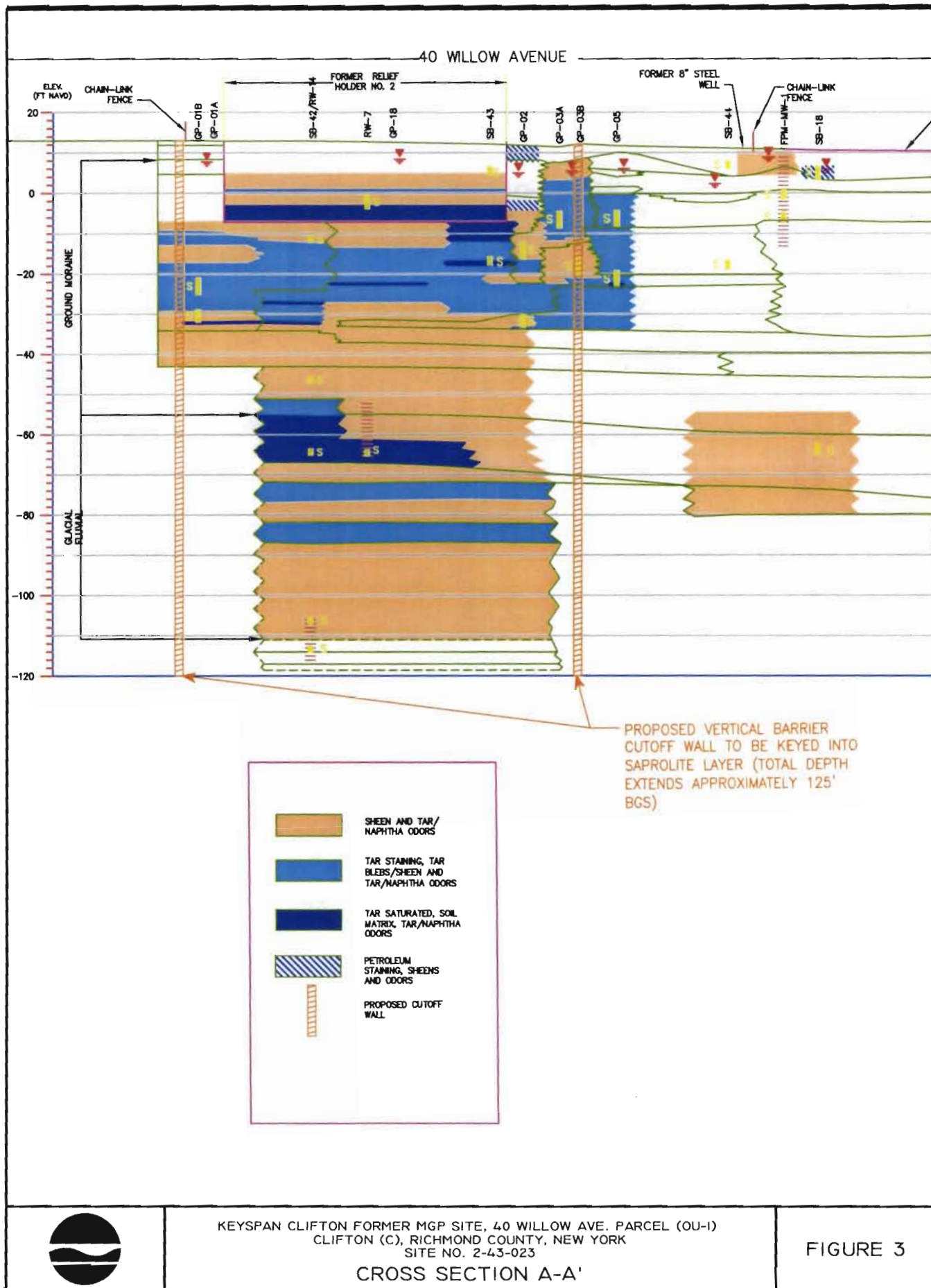


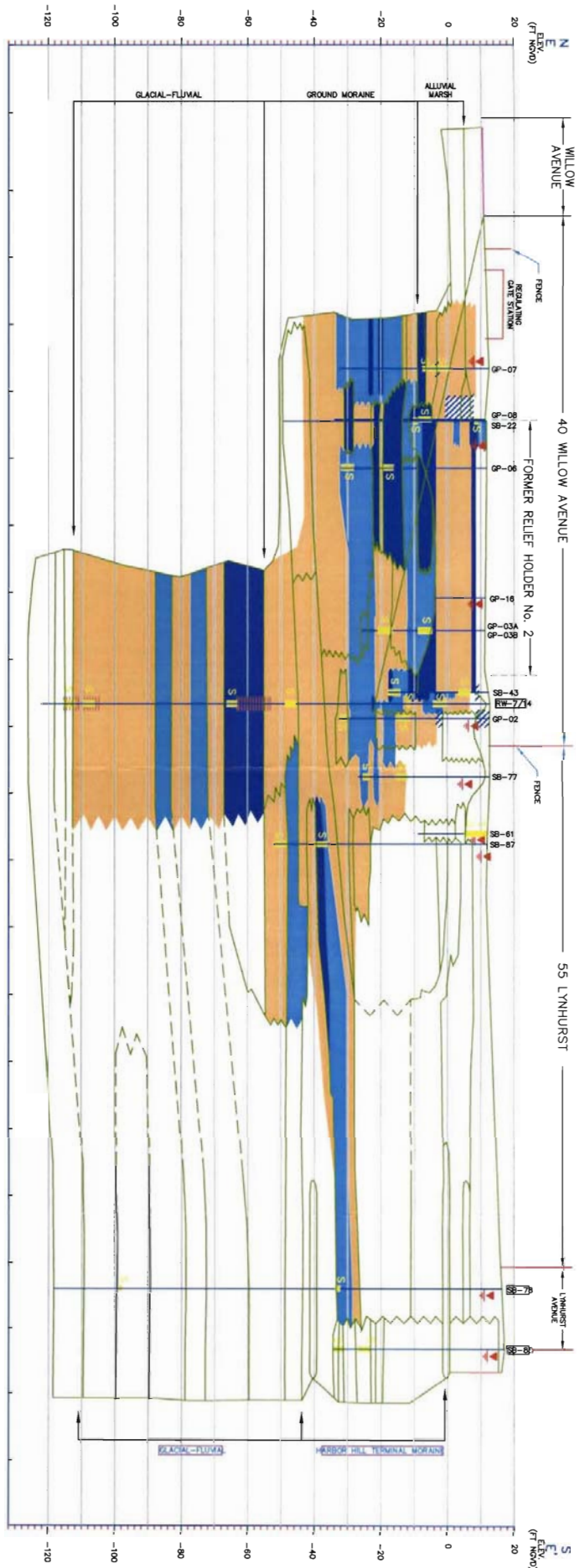
<p>KEYSPAN CORPORATION FORMER CLIFTON MANUFACTURED GAS PLANT SITE 40 WILLOW AVE. PARCEL OPERATING UNIT 1 (OU-1) STATEN ISLAND, NEW YORK</p>	<p>LOCATION MAP</p>
<p>FIGURE 1</p>	



SITE OPERABLE UNIT MAP







SOURCES:

FIGURE IS BASED ON CROSS SECTION DEVELOPED BY PS&S ENGINEERING WHICH WAS IN TURN BASED ON CROSS-SECTION TRANSDUCED FROM A PLAN ENTITLED "GEOLOGIC CROSS SECTIONS D-0", E-E', AND F-F' PREPARED BY GE CONSULTANTS, INC. OF COLCHESTER, CONNECTICUT AND DATED SEPTEMBER 2002.

NOTE:

VISUAL IMPACTS WITHIN RELIEF HOLDER ARE BASED ON OBSERVATIONS FROM GP-16, BORINGS SB-22, GP-06, GP-03A AND GP-03B WERE COMPLETED OUTSIDE THE FORMER RELIEF HOLDER NO. 2.

KEYSPAN CLIFTON FORMER MGP SITE, 40 WILLOW AVE. PARCEL, (OU-1)
CLIFTON (C), RICHMOND COUNTY, NEW YORK
SITE NO. 2-43-023

CROSS SECTION B-B'

FIGURE 4



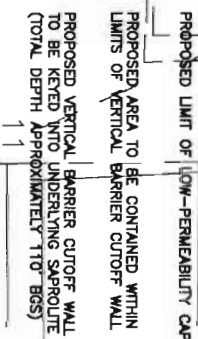
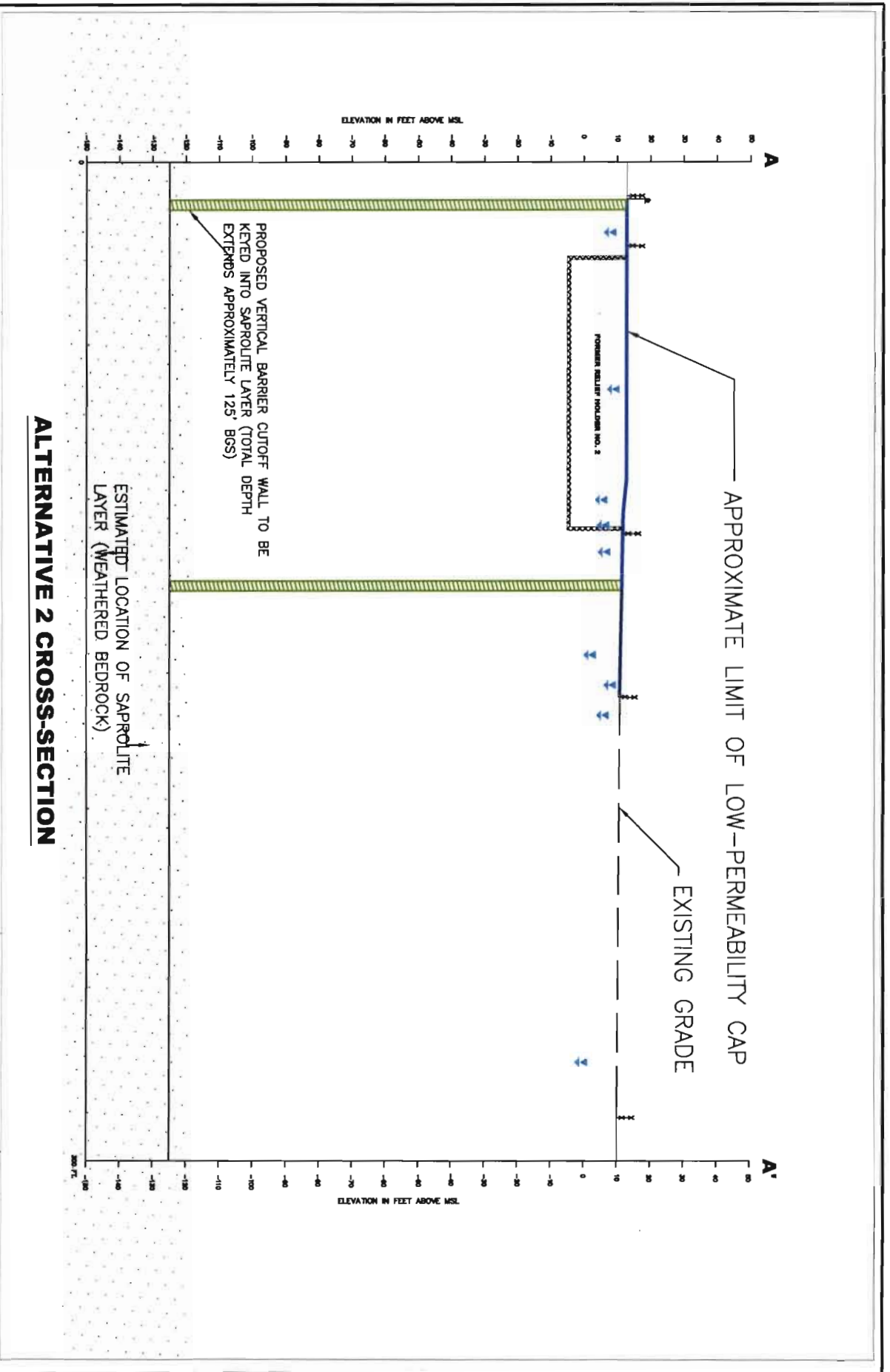


FIGURE 5



ALTERNATIVE 2 CROSS-SECTION



FORMER CLIFTON MGP, SITE #: 2-43-023

ALTERNATIVE 2 - CROSS SECTION

FIGURE 6

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

**Former Clifton MGP Site
Operable Unit No. 1
Staten Island, Richmond County, New York
Site No. 2-43-023**

The Proposed Remedial Action Plan (PRAP) for the Former Clifton MGP site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 18, 2004. The PRAP outlined the remedial measure proposed for the contaminated soil and groundwater at the Former Clifton MGP site.

The release of the PRAP was announced by distributing a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on March 4, 2004, which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) 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 was to have ended on March 19, 2004, however it was extended to March 26, 2004, at the request of the public. A second meeting was held on March 11, 2004 with a community group which was formed and coordinated by the Borough President's office environmental engineer. The purpose of the meeting was to further explain the investigations conducted at the site.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the NYSDEC's responses:

COMMENT 1: Where has everyone been the last 45 years? If work had been done then the damage would have been lessened.

RESPONSE 1: The NYSDEC did not have the legal authority to investigate former Manufactured Gas Plants until 1995, since MGP were not operating when the Resource Conservation and Recovery Act (RCRA) was adopted, thus their wastes were not listed as hazardous. In 1995, the definition of characteristic hazardous waste was changed to include benzene, which is found in MGP wastes, giving the NYSDEC a legal avenue to address these types of sites. On April 17, 1998, Brooklyn Union Gas Co. (predecessor to KeySpan Energy), signed a consent order with the NYSDEC to investigate and remediate the Clifton site. We have no way of knowing if environmental damage could have been lessened if remediation was accomplished sooner, given the fact that the facility operated for so many years and tar contamination was migrating mostly downward.

COMMENT 2: Why is the cheapest remediation selected?

RESPONSE 2: Five remedial alternatives were assembled to address the site contamination. Each of the alternatives were evaluated against eight criteria established by the NYSDEC. To be

selected, an alternative must be protective of human health and the environment and comply with statutory requirements. Cost is the last balancing criterion used to evaluate alternatives and is only utilized when two or more alternatives meet all the other criteria. In this case, while alternative two has the lowest cost among the other alternatives except the no action option, it provides equal protection to human health and the environment as the most expensive option, and it results in fewer short-term impacts to the community, without sacrificing effectiveness. Alternative 2 is, therefore, the most balanced and cost effective remedy. The proposed remedy has significantly fewer short-term impacts to the local community including less truck traffic and a much shorter construction period. The option including excavation and removal of all the source materials, for example, would include excavation of approximately 100,000 cubic yards of contaminated soil and waste and take over a year to complete. That would mean thousands of truck trips through the area. This option would also involve the use of a sprung structure, which would extend into the backyards, resulting in an impact to the adjacent residents.

COMMENT 3:

Why were the elected officials not officially notified of the meeting?

RESPONSE 3:

The NYSDEC apologizes if the announcement of the meeting did not reach you as intended. We used a procedure to hand deliver and distribute the announcement that has worked well in the past. Over three hundred notices were hand delivered and distributed by KeySpan in the local area including the community board but they apparently didn't reach everyone at the same time. We will be making adjustment to the mailing list to ensure that future announcements get to the intended recipients. We are making a commitment to meet and work with the community when milestones of the remedial process are reached. KeySpan agreed to work closely with a citizen's committee if one is formed.

COMMENT 4:

Your presentation did not include lead contamination at the adjacent residential properties.

RESPONSE 4:

The focus of this meeting is the contamination associated with the former holder foundation, which impacts the subsurface soil and groundwater. While our presentation included lead contamination at the adjacent residential properties fronting Lynhurst Avenue, it was not discussed at length, as the lead contaminated soil was removed by KeySpan. A meeting was held previously to discuss the lead contamination and the IRM.

COMMENT 5:

Why was this site not cleaned sooner?

RESPONSE 5:

Please see response 1.

COMMENT 6:

What are the long term health effects for area residents exposed to the contaminants of the former MGP plant?

RESPONSE 6:

Contaminants detected at the Clifton MGP OU1 site include lead, polyaromatic hydrocarbons (PAHs) and the volatile organic compounds, benzene, toluene, ethylbenzene and xylene (BTEX). The contaminants were detected in on-site surface soils and in subsurface soils. The on-site portion of OU1 is inaccessible to the public due to a chain link fence topped with barbed wire. Subsurface contaminants are at a depth of approximately 35 feet below the ground surface, preventing contact. Because of the lack of contact with these materials, health effects are not expected. Additional information

about the above chemicals, including the health effects associated with exposures to them, can be found at the following website: www.atsdr.cdc.gov (ToxFAQs). The Remedial Investigation for Operable Unit 2 is in progress. The NYSDOH will review the results of investigation and evaluate the potential for exposures once the data becomes available. Elevated levels of lead were found in the surface soils of yards adjacent to the site. However, these soils have been removed and replaced by clean soils to eliminate the potential for exposure. Prior to the removal, the yards were maintained with grass, which would have limited exposure and the likelihood of residents to experience health effects. A blood test can detect elevated levels of lead in a person's blood and children are commonly screened for lead poisoning. If residents have had a blood test for lead performed by their physician, the NYSDOH can assist them in evaluating the results.

COMMENT 7:

Did you test the indoor air within 25 Willow Ave. to see if it safe to work in?

RESPONSE 7:

Subslab soil gas samples were collected underneath the concrete slab at 25 Willow Avenue as part of the remedial investigation for OU-2. These results are currently under review by the NYSDOH. Indoor air was not tested during this phase of the investigation because, we believe that the current use of the property will interfere with the sampling results. The results of the OU-2 investigation so far do not indicate exposure issues to the people working at 25 Willow Avenue.

COMMENT 8:

Why were the workers at the Saturn dealership located in 25 Willow Ave not notified of this meeting?

RESPONSE 8:

A notice was provided to the business owner. In the future we will work to insure notices are delivered directly to employees at this location.

COMMENT 9:

Is 25 Willow Avenue safe to work in?

RESPONSE 9:

The investigation for the 25 Willow Avenue parcel is still underway, so the full extent of contamination has not yet been determined. Based on available data, public exposures are not expected under current conditions. During the investigation, some tar seeps were noted in the parking area of the site. These seeps were immediately covered with steel plates to prevent exposures to the contaminants. Currently, soil gas data are being evaluated. If these or any other data indicate that exposures are occurring to site related contaminants, steps will be taken immediately to eliminate that exposure pathway.

COMMENT 10:

If you create a wall and bring large quantities of significantly contaminated soil and tar to the surface where will it eventually go? If you're handling it and staging it at the surface, how will you ensure the contamination doesn't spread in the community.

RESPONSE 10:

For the proposed remedy, installation of a deep jet grout wall containing the waste, it is anticipated that a large shroud wall will be constructed alongside the property lines to prevent any impacts to the back yards. This technique has been implemented in Manhattan and has been successful. There will also be a community air monitoring program and a health and safety plan to prevent the release of the contaminants. For the grout containment wall, materials at the surface will be a grout or cement and soil mix that will be disposed of properly. Measures to prevent contamination release or exposure will be developed during design, and the public will be given the opportunity to review

and comment on the design documents. The grout wall will be installed as close as possible to the backyard property lines.

COMMENT 11: Testing has been done throughout the years, where have you been?

RESPONSE 11: A remedial investigation is conducted in phases or rounds of environmental sampling in order to determine the nature and extent of the site contamination. A round of sample may reveal a need for additional sampling events. These multiple sampling events may result in the investigation spanning several months or in this case several years. The NYSDEC and NYSDOH have been involved during the entire investigation and will continue to review data as they become available. As mentioned above, if data indicate that exposures are occurring due to site related contaminants, steps will be taken immediately to eliminate that exposure pathway.

COMMENT 12: This is a Record of Decision and yet all the reports in the repository have not been finalized.

RESPONSE 12: While reports have been reviewed by both NYSDEC and NYSDOH, final approval of the reports has not been issued to KeySpan pending the finalization of the Proposed Remedial Action Plan. After public input, the Final Record of Decision will be issued and the Feasibility Study will be formally approved. A draft report detailing the recently completed interim remedial measure removing lead impacted soil to a minimum depth of 3 feet below the ground surface is currently being reviewed by both NYSDEC and NYSDOH. This report should be available as a final document in about one month.

COMMENT 13: I don't understand this process you're using, there is no court stenographer or recording of the meeting similar to what's done at a public hearing. How do we know our comments are being taken and will be considered? It seems the decision is already made so why should we comment?

RESPONSE 13: This is not a public hearing, it is a public meeting. We have individuals taking notes and writing down the questions and concerns. The questions will be answered in a responsiveness summary and public concerns will be taken into account and evaluated before issuing the Record of Decision.

COMMENT 14: What are you doing about informing the community of the contaminated site? Tell the people what you are doing. We think an advisory committee should be established of local citizens and workers. KeySpan Energy Corporation indicated a willingness to work with such a committee if formed.

RESPONSE 14: Please see Response 3.

COMMENT 15: This would not have taken place if this site was in a rich community. The New York Power authority and the NYSDEC allowed a generator to be installed in this community and we were promised it would only be temporary and operate eight hours a day. It now operates 24/7 and is exceeding its discharge limitations. Why should we trust you?

RESPONSE 15: We understand your frustration considering your experience with the nearby power plant and other environmental concerns you expressed tonight. We value your input as

demonstrated by our presence here tonight, and we are here to receive your input, comments and concerns for the proposed plan for the former MGP site.

COMMENT 16:

Black material is bubbling up at 25 Willow Ave. How often was testing done?

RESPONSE 16:

We assume you are referring to tar that was oozing to the surface through cracks at a portion of a parking lot at the 25 Willow Ave. KeySpan, with NYSDEC oversight implemented a temporary measure to prevent human exposure to the tar. In addition, KeySpan routinely performs visual inspection of the area to ascertain that the measure remains effective. Additionally, this portion of the site is related to operable unit (OU) 2 which is currently under investigation.

COMMENT 17:

The fence on Willow Ave surrounding the contaminated site is left open.

RESPONSE 17:

The fenced area in OU-1 is divided into two portions. The open gate you referred to leads to an empty parking lot which, based on the site investigation, is not contaminated by waste from the MGP site. The other parcel includes the contaminated area and is securely locked and not accessible to the general public or unauthorized persons.

COMMENT 18:

If the proposed remedy is selected for construction, what happens to the contaminants when the wall is placed? Does the dirt displaced leach onto other properties?

RESPONSE 18:

The purpose of the wall will be to prevent migration of contaminated groundwater outside the containment cell. One advantage of using jet grouting technology to construct the containment wall is that it generates fewer spoils which will result in more manageable and lesser impacts such as odors, dust and traffic. The displaced spoils that are generated will be properly handled, containerized and removed from the site.

COMMENT 19:

If KeySpan cannot sell the property there must be something wrong with the property.

RESPONSE 19:

The OU-1 portion of the site is currently the location of a gas regulating facility operated by KeySpan. It is not expected that the use of the site will change in the near future.

COMMENT 20:

There are private wells in the area that could be affected by the site contaminants. The car dealer may have private wells for car washing through which contaminants may reach humans.

RESPONSE 20:

We are not aware of the presence of private wells in the vicinity of the site. However, we will be conducting private well surveys in the near future to determine if any private water supply wells are located in the area.

COMMENT 21:

You indicated that the tar is under the homes on Lynhurst, but does not go as far as Lynhurst Avenue itself. When the borings were being installed in front of my home on Lynhurst, Steve Sellinger the NYSDEC inspector told me the tar was there on the other side.

RESPONSE 21:

The information we have is that the tar itself does not extend beyond Lynhurst Avenue. After looking at the boring logs for that area it was determined the boring on the north side of Lynhurst, adjacent to the homes, had evidence of sheens and odors. Sheens and odors are the result of contamination from the tar, rather than the actual tar itself. Three borings on the southern side of Lynhurst, away from the homes, showed no evidence of

contamination. So, although there is some indication of contamination on the north side of the street, it does not appear to go beyond Lynhurst Avenue.

COMMENT 22: There are second and third generation of children born with autism and nobody knows the cause. Was a health study ever done in the area?

RESPONSE 22: It is correct that the cause of autism is currently unknown. However, research to date suggests that autism may be genetic. There is currently no evidence to indicate it is caused by environmental factors. A site-specific health study has not been completed for this site by the NYSDOH. Based on current information, a site-specific study is not warranted at this time. In addition, due to the limited number of persons potentially exposed, a health study would not be statistically accurate and confidentiality could be compromised for the persons involved.

COMMENT 23: There is illegal dumping and buried tanks by KeySpan at the site behind the residential yards.

RESPONSE 23: We are not aware of any buried tanks associated with the former MGP besides the holder foundation identified during the site investigation. We do not know of any illegal dumping at the site but will look into the matter. We are, however, aware of a water storage tank placed at the site by KeySpan. The tank was used to store water removed from a damaged well that was being abandoned.

COMMENT 24: Why is KeySpan answering questions for NYSDEC ? Who is doing what? Does everyone work for everyone?

RESPONSE 24: KeySpan is not answering questions for NYSDEC. However, there are some specific questions regarding site operation and the investigation that are better answered by KeySpan.

COMMENT 25: I am the owner of the building (988 Bay St.) next to the site. Why was my property not tested for lead? Also, there is an odor from the floor when tiles were replaced.

RESPONSE 25: The investigation did not identify that the 988 Bay Street property was contaminated by lead, which flaked off from the paint on the former holder. We will however, review the data from the investigation during the remedial design to determine if there is a need to sample the property. The site investigation did not show contamination within the first 25 feet of soil and there was no indication of a soil vapor problem at the adjacent homes.

COMMENT 26: Testing has been performed at this site since 1996. How can the Borough Hall environmental engineer not know about this site? Where are the reports from the testing?

RESPONSE 26: Please see Response 3 and 12.

COMMENT 27: When did the state find out these types of plants existed?

RESPONSE 27: As indicated in Response 1, the State did not have the legal authority to investigate these types of sites until 1995.

- COMMENT 28:** How is indoor air at 25 Willow Ave? Site workers were wearing spacesuits during investigations right next to the employees at 25 Willow Ave. Why was nothing done to protect the employees?
- RESPONSE 28:** As is standard practice, workers conducting initial investigations at any hazardous waste site are required to wear appropriate levels of protective equipment until the nature of the contamination at the site is known. In addition, a community air monitoring plan (CAMP) is used to monitor environmental conditions during the investigation to ensure that community members are not exposed to site contamination. There was no evidence that workers at 25 Willow Avenue were at risk as a result of contamination associated with the former manufactured gas plant. As indicated earlier, a potential exposure pathway due to the tar reaching the surface was addressed by KeySpan by an interim remedial measure implemented at the site. Please also see Response 9.
- COMMENT 29:** Why has no work been done on OU-2 portion of the site?
- RESPONSE 29:** Multiple rounds of investigations have been conducted at the OU-2 location to date. A work plan was recently approved for an additional set of soil and groundwater sampling locations to determine how far the contamination has migrated off-site. We anticipate that site investigations at OU-2 will be completed by the fall of this year (2004).
- COMMENT 30:** There are over one hundred employees at 66 Willow Ave next to the site. Was air monitoring conducted during the lead IRM?
- RESPONSE 30:** Yes. Air quality was continuously monitored during the removal of lead contaminated soil at the adjacent residential properties.
- COMMENT 31:** There is a garden at a home on Lynhurst Ave, and several of the children have autism, could the site be the cause?
- RESPONSE 31:** Please see the response to Comments 6 and 22.
- An additional meeting was held on March 11, 2004 with a citizen's group which was formed and coordinated by the Borough President's office environmental engineer. This meeting included a presentation of the Remedial Investigation (RI) for both site operable units and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an additional opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy.
- COMMENT 32:** Is 66 Willow part of the former plant site?
- RESPONSE 32:** The 66 Willow property was not part of the former gas plant operations.
- COMMENT 33:** There was an area of dumping near 40 Willow Ave. by KeySpan which was eventually cleaned up. This should be included in the history record.
- RESPONSE 33:** KeySpan used the area near 40 Willow Ave as a transfer station. The operation was later moved to another facility.
- COMMENT 34:** There is a storm sewer on the Saturn property that has sheens and smells of naphthalene.
- RESPONSE 34:** Soil and sediment samples were taken from the storm sewer as part of the investigation for the second operable unit of the site. As we indicated earlier, the OU-2 investigation is

expected to be completed by the fall of this year. The results from the investigation will be presented to the public when the investigation report is completed.

- COMMENT 35:** There were boreholes made in the Saturn shop floor. What's the status and results of those?
- RESPONSE 35:** Subslab soil gas samples were collected underneath the concrete slab in that area as part of the remedial investigation. The results have been forwarded to NYSDEC and NYSDOH and are currently under review.
- COMMENT 36:** There was also black stuff oozing from the pavement?
- RESPONSE 36:** Metal plates were installed over these areas to prevent any contact with contaminated materials. This is just a temporary measure and was approved by the NYSDOH. These areas will be addressed as part of the OU-2 investigation and remedy.
- COMMENT 37:** The workers should have the data and be made aware what potential exposures there are.
- RESPONSE 37:** The data is currently under review by the new York State Department of Health and information can be released after that review is complete. Generally, if the NYSDOH identifies an immediate concern, they will act promptly to insure any harmful exposures are reduced or eliminated.
- COMMENT 38:** There were drums of material stored in a back room in at the Saturn facility. What were those?
- RESPONSE 38:** These drums contained drill cuttings from the installation of borings. They were contained and isolated in a locked room so there should have been no exposure issues. The drums have been removed for proper disposal.
- COMMENT 39:** The analytical data tables showing contamination, is that on the plant site or in the backyards?
- RESPONSE 39:** The tables of data are from the plant site itself, not from the backyards.
- COMMENT 40:** Contaminants such as 'benzo(a)pyrene' were found and are known to harm people, how will this impact the residents?
- RESPONSE 40:** The contaminants associated with OU1 are not accessible to the public. On-site surface soils are surrounded by a chain link fence and barbed wire. Contamination detected beneath the residences is about 35 feet below the ground surface. The 35 feet of clean soils and groundwater restricts the potential for exposure or contact with these contaminants, and without exposure, health effects associated with the contaminants are not possible.
- COMMENT 41:** We were promised we would have piece of paper or release for our property after the lead cleanup was completed that we had a clean bill of health. We will need this if we ever want to sell our property.

RESPONSE 41: It is not a standard practice to issue individual letters to property owners that say each individual property is safe. There is a final remediation report for the lead removal that is currently under review by both the NYSDEC and NYSDOH. That report typically has a certification, stamped by a professional engineer that all work has been completed in accordance with approved plans and specifications. The report will be available in the document repository once it is approved. Upon request, the State will provide a letter to homeowners that says the IRM was completed to the satisfaction of the State, according to the work plan.

COMMENT 42: How are you going to contain any contamination during construction to insure the backyards are not contaminated again? How close will the injected wall be to the backyard property lines?

RESPONSE 42: Please see Response 10.

COMMENT 43: Did you get an answer about the borings that were conducted in front of my house on Lynhurst Avenue. Did they show tar like the NYSDEC inspector indicated?

RESPONSE 43: Please see our response to comment #21.

A Letter dated March 04, 2004 from State Senator Seymour Lachman. The following are the comments and responses to the letter:

Comment 44: What are the long term health affects for area residents exposed to the contaminants of the former MGP plant?

Response 44: Please see Response 6.

Comment 45: Why has the NYSDEC and the NYSDOH taken nearly half a century to address this egregious problem?

Response 45: Please see Response 1.

Comment 46: What are the exact environmental ramifications for the island as a whole.

Response 46: Based on the investigation from the OU-1 portion of the site, it appears that contamination has not migrated beyond Lynhurst Avenue which is about 150 feet away from the source of the contamination. In addition, most of the contamination has migrated downward with little horizontal component resulting in little environmental impact.

A letter dated March 26, 2004 was received from Mr. Nicholas Dmytryszyn, P.E., Environmental Engineer to the Staten Island Borough President. The following are the comments and responses to the letter:

Comment 47: The RI, FS, and IRM reports should be finalized with community review and input, and that this should be completed before the remedial plan's 100% design is completed for OU-1.

Response 47: The RI and FS reports have been reviewed by both the NYSDEC and the NYSDOH. Both agencies comments and concerns regarding the reports have been satisfactorily addressed by KeySpan. Copies of these documents are available in the document repositories. The reports will be approved by the NYSDEC once the ROD is signed. The IRM report is

currently under review and should be finalized within the next couple of weeks. An approved copy will also be placed in the document repositories.

Comment 48: The plan did not indicate if this is the first MGP site that KeySpan is remediating. If not, how were the other sites remediated? Was jet-grouting an option there? More importantly, how close were the nearest residents to the contaminated site?

Response 48: KeySpan has several other MGP sites at various stages of investigation and remediation. This is the first KeySpan's site where jet-grouting is specified to contain contaminants in the subsurface. However, containment is also a feature of the remedy at the KeySpan Coney Island site.

Comment 49: The concept of jet-grouting to construct the three-foot wide, 125-foot deep containment wall is inadequately described. While it is understood that the design has not been finalized, the community has some basic concerns: will the jet grouting re-contaminate the backyards that were remediated under the IRM? Where will the grouting first begin - along Willow Avenue or long the backyards of Lynhurst residents? what about noises.

Response 49: A detailed description of the jet grouting construction was not provided in the PRAP. The Jet grouting procedure is more fully described in the Feasibility Study Report which is available in the document repositories. One of the reasons why jet grouting technology is being proposed at this site is its ability to generate fewer spoils and it will result in more manageable and lesser impacts to the community. Spoils from the jet grouting will be containerized and sent off-site for disposal. The spoils will be managed to prevent contact with the adjacent properties. The jet grouting construction details will be developed during the design phase of this project. It has been suggested that the wall installation begin on the Willow Avenue side of the contaminated area. This will be taken into consideration during the design of the remedy. Noise levels will be monitored during the construction of the remedy to ensure that it is within standard limits.

Comment 50: Above ground, the proposed remedial plan appears to be, for the community, the least disruptive. However, will the jet grouting create any *underground* issue? For example: could the accompanying vibrations affect foundations? would the vibrations be a source of potential underground pressure that could "force" any contaminated plume to, for example, "bulge" upwards and out?

Response 50: While it is not believed that the use of the jet grouting to contain the contaminated material will result in significant vibration or upward and lateral movements of the contaminated material, this will be evaluated further during the design.

Comment 51: A baseline soil gas survey of the abutting residential properties should be scheduled and completed before any remedial action is initiated. During remedial activities, periodic soil gas surveys should be conducted and the results compared to the established baseline.

Response 51: A Soil gas vapor survey will be conducted adjacent to the residential properties before and after the installation of the containment wall. This requirement is specified in the ROD.

Comment 52: Before any remedial action begins, the responsible party should determine if any street excavation in the immediate vicinity of the work has been scheduled.

- Response 52:** We do not anticipate that implementation of the selected remedy will result in street excavation.
- Comment 53:** How will stormwater runoff from the OU-1 site be handled throughout remediation?
- Response 53:** A plan will be developed during design and put in place to properly handle and manage stormwater runoff during remediation.
- Comment 54:** What is the effective lifespan of the proposed underground wall?
- Response 54:** The integrity of the wall to contain the contaminated material will be maintained by KeySpan indefinitely. An operation and maintenance plan will be developed during design and put into place upon completion of the remedy.
- Comment 55:** What is the required monitoring after the remediation? In other words, how will the residents know that underground wall is in fact doing its job?
- Response 55:** Long-term monitoring of groundwater and DNAPL in and outside the containment wall will be performed to determine the effectiveness of the wall. If the jet grouting is found to be deficient based on monitoring results, additional grouting or other remedial technology options will be performed to address the defect. This is stated in the ROD.
- Comment 56:** Who will be overseeing KeySpan's site remediation work?
- Response 56:** KeySpan will have an engineering firm responsible to implement the work at the site. The NYSDEC will also provide oversight during critical portions of the work.
- Comment 57:** Health studies need to be completed before commencing of any work.
- Response 57:** Please see Response 22.
- Comment 58:** Provide studies on how effective the jet grouting will contain all chemicals involved present and future. Also list of sites where this method has been successfully used.
- Response 58:** Keyspan has provided the NYSDEC documentation detailing approximately twenty case summaries and technical papers associated with the performance of the jet grout process. This information will be made available to the document repositories
- Comment 59:** Air quality should be checked before and after the project with all involved homes (basements).
- Response 59:** Soil vapor sampling in the area of the adjoining homes will be conducted prior to and after the remediation, as discussed in the body of the ROD.
- Comment 60:** What precautions will be put into effect while remediation is being done.
- Response 60:** During the remediation there will be a community air monitoring program as well as the site health and safety program that will be implemented. These programs will be developed as part of the design and will be available for public comment.
- Comment 61:** If this project should damage the resale value of the homes involved- KeySpan is responsible for the difference of the value.
- Response 61:** It is a common element of construction being conducted adjacent to homes that the condition of those homes be inspected, surveyed and documented prior to the start of

construction. It is also common that any damage to those homes be the responsibility of the construction contractor or utility funding the work. These details will be developed during the design and be available for public comment.

Comment 62: KeySpan will be held responsible for future related health matters involved indefinitely, since benzene has a shelf life of 29 years and coal tar shelf life is not known to us as of yet.

Response 62: The NYSDEC and NYSDOH will be reviewing the design as it is prepared to insure that, during the construction phase, practices meet accepted standards that are protective of public health and the environment. KeySpan may be legally accountable for other site related matters.

Comment 63: How is KeySpan going to handle the lead that is onsite, since they did not remediate that land when they remediated the resident's yards?

Response 63: Soil samples from the onsite area do not indicate lead levels that are a public health concern. Additionally, the selected remedy calls for the installation of a low permeability cap over the entire area which would prevent exposure to any soils.

Comment 64: Certificates issued to all involved - stating that remediation has taken place and that the homes are safe for residential living and no future health risks or lawsuits would be of any concern to present or future homeowners. This certificate to be issued after completion of project.

Response 64: Upon completion of the work at the site, there will be a final remediation report that documents the construction at the site. This document typically includes a certification, by a professional engineer, that all work was completed in accordance with the approved plans and specifications. Copies of the report will be made available for public review.

Comment 65: Ongoing communication with residents and involved parties is critical to the success of this proposed remedial action plan.

Response 65: The NYSDEC and KeySpan have committed to work with the public to ensure understanding and involvement with the implementation of the design and the remedy for the site, as well as the ongoing investigation for OU-2.

A letter dated March 25, 2004 was received from KeySpan commenting on portion of the selected remedy. The specific comments and the responses follows:

Comment 66: KeySpan proposes that soil vapor monitoring be performed adjacent to each adjoining residential structure, instead of at the site boundary as proposed in the PRAP.

Response 66: Please see our response to comment 50.

Comment 67: KeySpan does not agree that the long-term monitoring of the quality of shallow groundwater, onsite and outside the containment area is useful to assess the effectiveness of the proposed containment.

Response 67: Long-term monitoring of groundwater quality will remain a requirement of the selected remedy.

A letter received March 2004 from Mr. Dennis Lacognata, Senior Vice President, Prompt Mailers, Inc.

Comment 68: Will Community Advisory Board be formed?

Response 68: A Community group has been formed and the first meeting , coordinated by the Borough President's office, was conducted with the NYSDEC and KeySpan.

APPENDIX B

Administrative Record

Administrative Record

Former Clifton MGP Site Operable Unit No. 1 Site No. 2-43-023

1. Proposed Remedial Action Plan for the Former Clifton MGP site, Operable Unit No.1 dated March 2004, prepared by the NYSDEC.
2. Order on Consent, Index No.D2-0001-98-04, between NYSDEC and KeySpan Corporation, executed on April 1998.
3. Final Remedial Investigation/Feasibility Study Work Plan, Clifton Former MGP Site, Staten Island, New York, prepared by GEI Consultants, Inc., November 1999.
4. Remedial Investigation Report, Clifton Former MGP Site, Operable Unit 1 (OU-1), Staten Island, New York, Volumes 1 and 2, prepared by GEI Consultants, Inc., December 2002.
5. Feasibility Study Report, Former Clifton Manufactured Gas Plant Site, 40 Willow Ave Parcel, Operable Unit 1, Staten Island, New York, prepared by Paulus, Sokolowski & Sartor Engineering, November 2003.
6. Interim Remedial Measure Summary Completion Report, Former Clifton Manufactured Gas Plant Site, 40 Willow Avenue Parcel, Operable Unit 1, Staten Island, New York, prepared by Tetra Tech FW, Inc. January 2004
7. Fact Sheet, February 2004, Remedial Action Proposed for the Former Clifton MGP Site.
8. Fact Sheet, March 2004, Comment Period Extended, Proposed Remedial Action Plan for the Former Clifton MGP Site.
9. Letter dated March 04, 2004 from State Senator Seymour Lachman commenting on the potential long-term effects of the area residents exposed to the contaminants of the former MGP plant and the regulatory agencies delayed actions on the contaminated site.

New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Western Remedial Action, 11th Floor
625 Broadway, Albany, New York 12233-7010
Phone: (518) 402-9662 • **FAX:** (518) 402-9679
Website: www.dec.state.ny.us



April 8, 2004

FILE COPY

Mrs. Tracey Bell
Manager
Environmental Asset Management
KeySpan Energy
One Metro Tech Center
Brooklyn, New York 11201-3850

Dear Mrs. Bell:

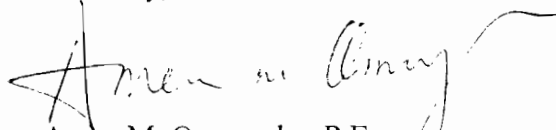
Re: Former Clifton MGP Site
Draft Remedial Investigation and Feasibility Study Reports - OU-1
Site #: 2-43-023

The New York State Department of Environmental Conservation (Department) has completed reviewing the reports entitled "Draft Remedial Investigation Report, Clifton MGP Site, Operable Unit 1, prepared by GEI Consultants Inc, dated December 2002." and the "Draft Feasibility Study Report, Former Clifton MGP Site, 40 Willow Avenue Parcel, Operable Unit 1, prepared by Paulus, Sokolowski & Sartor Engineering, P.C., dated November 2003". The reports which are revisions to the earlier draft based on our comments adequately address our comments and are therefore acceptable.

The Remedial Investigation Report and the Feasibility Study Report as mentioned above are hereby approved. Please provide a final copy of the revised reports and one compact disc copy each of the reports to this office and the New York State Department of health for our records. In addition, please send a copy each of the reports to the document repositories and the document distribution list established for the site.

If you have any questions, please call me at (518) 402-9662.

Sincerely,



Amen M. Omorogbe, P.E.
Project Manager
Manufactured Gas Plants Remedial Section
Division of Environmental Remediation

cc: W. Kuehner, NYSDOH
G. Harris, NYSDEC
B. Schick, NYSDEC



STATE OF NEW YORK
DEPARTMENT OF HEALTH

3-31-04 ~~BoS~~
~~All-orig for file~~

Flanigan Square, 547 River Street, Troy, New York 12180-2216

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

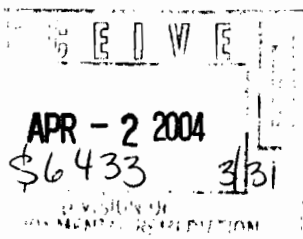
March 31, 2004

Mr. Dale Desnoyers, Director
Division of Environmental Remediation
NYS Dept. of Environmental Conservation
625 Broadway, 12th Floor
Albany, NY 12233-7011

RE: **Record of Decision**
Former Brooklyn Borough Gas Works
(Clifton MGP) Operable Unit 1
Site # 243023
Clifton, Richmond County

Dear Mr. Desnoyers:

Staff reviewed the March 2004 Record of Decision (ROD) for the Former Brooklyn Borough Gas Works (Clifton MGP) site, Operable Unit 1 (OU1), in Richmond County. OU1 consists of a parcel of land at 40 Willow Avenue. Operable Unit 2 consists of the remainder of the site on the 25 Willow Avenue property, and will be addressed separately. Based on staff's review, I understand that the ROD for OU1 calls for: containment of the former relief holder foundation and impacted materials below the holder using a vertical barrier wall; placement of a low permeability cap over the entire area encompassed by OU1 and; installation of extraction wells within the containment area for passive recovery of DNAPL. If necessary, groundwater will be pumped from the extraction wells to maintain an inward gradient. The proposed remedy also includes of an environmental easement to limit the use of the site for non-residential purposes and to prohibit groundwater usage. The long-term monitoring program would include maintenance of site access restrictions, a soil management plan, and monitoring of groundwater and NAPL. Additionally, I understand an investigation of soil vapor will be performed prior to and after installation of the barrier wall to evaluate the potential impact to adjacent residences.



Mr. Dale Desnoyers
Site #243023
March 31, 2004

Based on this information, I believe the selected remedy will be protective of human health and concur with it. If you have any questions concerning this issue, please contact Mr. Geoff Laccetti at (518) 402-7870.

Sincerely,

A handwritten signature in black ink, appearing to read "Gary A. Litwin". The signature is fluid and cursive, with a large initial "G" and a stylized "L".

Gary A. Litwin, Director
Bureau of Environmental
Exposure Investigation

cc: G. A. Carlson, Ph. D.
Mr. S. Bates/Mr. G. Laccetti /File
Mr. R. Schick - DEC, Central Office
Mr. D. Walsh - DEC, Reg. 2
Ms. J. Prudhomme - NYCDOH
Mr. B. Devine - NYSDOH MARO
Mr. D. Greeley - NYCDEP

3-31-04
OH



STATE OF NEW YORK DEPARTMENT OF HEALTH

Flanigan Square, 547 River Street, Troy, New York 12180-2216

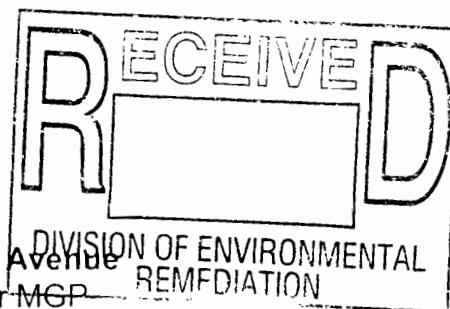
Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

March 31, 2004

Ms. Christine Morreale
61 Lynhurst Avenue
Staten Island, NY 10305

Re: **61 Lynhurst Avenue**
Clifton former MGP
Site ID# 243023
Clifton / Richmond County



Dear Ms. Morreale:

This is in response to your request for specific information regarding the interim remedial measure conducted by Keyspan to remove lead-contaminated soils from your property. This work was completed in accordance with a state-approved work plan. A minimum of three feet of soil was removed from the backyard of 61 Lynhurst Avenue. Confirmatory sampling was conducted to verify that all contaminated soils exceeding 400 parts per million were removed. Replacement soil was sampled and the clean soil was used to fill the excavation. These remedial measures were completed to the specifications agreed to by the New York State Department of Health.

If you have any questions, please call me at (518) 402-7870.

Sincerely,

Wendy S. Kuehner
Assistant Sanitary Engineer
Bureau of Environmental Exposure
Investigation

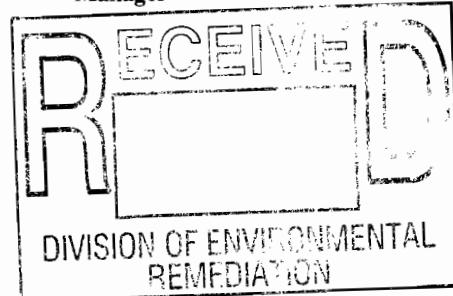
cc: Mr. G. Litwin / Mr. G. Laccetti / file
Mr. R. Schick / Mr. A. Omorogbe – DEC, Central Office
Mr. D. Walsh – DEC, Reg. 2
Ms. J. Prudhomme – NYCDOH
Mr. B. Devine – NYSDOH MARO
Mr. D. Greeley – NYCDEP



3-25-04

One Metrotech Center, 15th Floor
Brooklyn, NY 11201-3850
Telephone: 718 403-3053
Fax: 718 222-1546
Email: tbell@keyspanenergy.com

Tracey L. Bell
Manager



March 25, 2004

Amen M. Omorogbe, P.E.
Project Manager
MGP Remedial Section
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Western Remedial Action, 11th Floor
625 Broadway
Albany, New York 12233-7010

Re: Former Clifton Manufactured Gas Products Site
Richmond County, New York
Site 2-43-023
Comments on Final Remedial Action Plan

Dear Mr. Omorogbe:

In response to the public hearing held on March 4, 2004 and the public comment period for Final Remedial Action Plan for operable Unit #1 (OU1) at the Clifton MGP Site in Staten Island, New York, as issued by the New York State Department of Environmental Conservation (NYSDEC), KeySpan Corporation (KeySpan) is hereby issuing comments to NYSDCE. KeySpan has identified two significant issues of concern: the performance of a soil gas survey to be completed along the perimeter of the proposed containment area prior to and after its installation to evaluate soil vapor quality and the completion of long-term monitoring of groundwater and DNAPL inside and outside the proposed containment area to 1) determine the effectiveness of the proposed remedy; 2) assure that significant groundwater mounding has not occurred due to construction and 3) assure that shallow groundwater remains un-impacted and further migration of contaminants is not occurring.

With regard to the soil gas survey, KeySpan is of the opinion that the survey at the proposed location is unwarranted. To date, there have been no studies, investigations, and/or sampling at Clifton OU1 that identify that soil gas emissions are

or will be an environmental concern. As part of the remedial investigation (RI), KeySpan assessed the potential for groundwater to cause soil gas emissions that could affect the nearest human receptors, the residents at Lynhurst Avenue. KeySpan installed and sampled water table piezometers in each of the adjacent Lynhurst Avenue backyards and reported that groundwater beneath these residential properties is unaffected by site-related contaminants. Groundwater was also shown to be moving away from these potential receptors. Further, the source materials (NAPL) for any soil gas emissions are currently located more than 30 feet below the residential properties that constitute potential receptors.

Regardless of these findings, KeySpan acknowledges NYSDEC's desire to evaluate the soil gas conditions both before and after implementation of the remedy. Because the Lynhurst Avenue residences represent the potential receptors of soil vapors, KeySpan proposes that soil vapor monitoring be performed adjacent to each adjoining residential structure, instead of at the site boundary as proposed in the PRAP. Conceptually, the soil gas samples would be collected at an elevation equivalent to the basement floor of each building to assess the potential for vapor migration to affect the residential structures.

Therefore, KeySpan requests that the requirement to complete a soil gas survey along the perimeter of the containment area be revised to require the evaluation of soil gas adjacent to the Lynhurst Avenue residential buildings in any Record of Decision (ROD) to be published by NYSDEC for Clifton OU1.

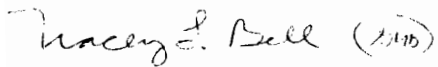
The matter of long-term groundwater monitoring inside and outside the containment area is more problematic. KeySpan would agree that the monitoring of groundwater levels will assist in determining the effectiveness of the containment area (i.e. the containment area been properly constructed and the containment area construction is not deteriorating over time) and in determining if groundwater mounding behind the containment area is occurring. KeySpan does not agree that the long-term monitoring of the quality of shallow groundwater, onsite and outside the containment area is useful to assess the effectiveness of the proposed containment. The primary purpose of constructing the containment area is to prevent the migration of source materials (NAPL). The shallow groundwater at the 40 Willow Avenue parcel both inside and outside the proposed containment area is currently impacted. As noted above, however these dissolved impacts have not and will not migrate toward the nearest potential human receptors on Lynhurst Avenue. After construction of the proposed containment area, the existing impacts to the shallow groundwater will remain. A definitive conclusion on the effectiveness/ impact of the containment area on shallow groundwater quality would not be reasonable or practical and is better achieved by monitoring the water levels inside and outside the containment area. Therefore, KeySpan requests that the requirement to assess the effectiveness of the proposed containment area upon the shallow groundwater quality not be included in the ROD to be published for Clifton OU1.

March 26, 2004

If there are any questions regarding our comments or if additional information is required, please contact me.

Sincerely,

KEYSPAN CORPORATION

A handwritten signature in cursive script that reads "Tracey L. Bell" followed by a circled date "2/1/05".

Tracey L. Bell
Project Manager

Cc: B. McClellan, KBS
J. Bolan, KBS
D. Terry, GEI

3-4-04



THE SENATE
STATE OF NEW YORK

SEYMOUR P. LACHMAN
SENATOR, 23RD DISTRICT
DEPUTY MINORITY WHIP

COMMITTEE ASSIGNMENTS:
RANKING MINORITY MEMBER
TRANSPORTATION

MEMBER:
AGING
CHILDREN & FAMILIES
CONSUMER PROTECTION
CRIME VICTIMS, CRIME & CORRECTION
EDUCATION
FINANCE
HIGHER EDUCATION

ALBANY OFFICE
ROOM 406
LEGISLATIVE OFFICE BUILDING
ALBANY, NEW YORK 12247
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STATEN ISLAND OFFICE
36 RICHMOND TERRACE
STATEN ISLAND, NEW YORK 10301
(718) 448-8566
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LACHMAN@SENATE.STATE.NY.US

Questions and Comments for the
New York State Department of Environmental Conservation and the
New York State Department of Health
Regarding the Clifton Manufactured Gas Plant
March 4, 2004

My name is Seymour Lachman. I represent the 23rd District in the New York State Senate, which includes portions of Brooklyn and Staten Island. I would first like to thank the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) for hosting this community hearing regarding the Proposed Remedial Action Plan of the former Manufactured Gas Plant (MGP) in the Clifton area of Staten Island. I would also like to mention that I appreciate that the NYSDEC and NYSDOH are finally trying to correct this serious problem that has been in existence since 1959. However, to say that this plan is long overdue is an understatement. The residents of this community are owed an explanation as to why it has taken forty-five years to address this major environmental and health issue.

The residents of the Rosebank and Clifton areas have been environmentally abused for years. Within a three-block radius they are subject to the collateral environmental damage of a power plant and a chemical manufacturing facility. Adding to these existing hazards, is the fact

that the community has now discovered it is situated upon a highly contaminated site, as a direct result of the former MGP site in Clifton.

This area is not only industrial, but also residential. Many generations of Staten Islanders have raised their families here. So, with this in mind, I ask you three questions: Firstly, what are the long term health affects for area residents exposed to the contaminants of the former MGP plant? Secondly, why has the NYSDEC and the NYSDOH taken nearly half a century to address this egregious problem? Thirdly, what are the *exact* environmental ramifications for the island as a whole?

In closing, I would like to thank you for allowing me the time to express my concerns and those of my constituents in the 23rd district. While I commend your agencies for finally addressing this environmental hazard, I anticipate serious answers to all of the community's concerns expressed here tonight. Thank you.

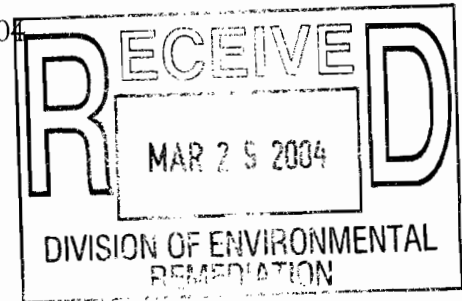


CITY OF NEW YORK
PRESIDENT
OF THE
BOROUGH OF STATEN ISLAND

JAMES P. MOLINARO
PRESIDENT

BOROUGH HALL, STATEN ISLAND, N.Y. 10301

March 26, 2004



Mr. Amen M. Omorogbe, P.E.
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7014

Re: Comments to proposed remedial action plan for the former Clifton MGP site on Staten Island

Dear Mr. Omorogbe:

On behalf of the Borough President and the recently formed Rosebank-Clifton MGP Community Advisory Committee (CAC), the following are general and specific comments to the proposed remedial action plan for the former manufactured gas plant site in Clifton. In addition, attached are unedited questions and issues as submitted to the Borough President's office by CAC residents abutting the OU-I site.

General Comments

Based on the review of the available information provided by Keyspan and the in-depth presentation during the first meeting of the CAC, it is agreed that the selected alternative for remediating the site known as Operating Unit I (OU-I) appears to be the least disruptive to the immediate community and the most effective method within the shortest construction period to best contain and isolate the underground source of pollution. However, as evident during the March 4th P. S. 13 meeting, the issue of insufficient public outreach revealed a more important issue that must be addressed before remediation begins, as it goes to the heart of the community's continuing concerns. And without its resolution, the public will remain at a disadvantage when determining how effective they can be as active, participating partners in the site's successful remediation.

We know of no recent case on Staten Island whereby a remedial action plan for a contaminated site has been brought forward without the finalization of the baseline remedial investigation (RI) report. From elected officials to people who live next door to a site, the *final* RI report is, at a minimum, the source of information for (a) any and all historical facts, including anecdotal information from the community, and, (b) detailing and summarizing any and all exploratory work undertaken to determine, as best as possible, the site's environmental issues. In essence, the final RI acts as the bible for the site. Yet in the documents received to date, there is no discussion as to why the RI remains in a draft stage since December, 2002. In addition, the feasibility study (FS) - a document that, in our experience, typically

follows a completed RI because the FS uses as its informational foundation the final RI - also remains, as a second revision, a draft document. Furthermore, a final report on the very recent interim remedial measure (IRM) completed within residential properties on Lynhurst Avenue is not discussed in sufficient detail in either the draft RI or draft FS.

This is all very troubling to us, for how can anyone better understand the site's ramifications if its "definition" remains ambiguous to all but the regulatory agency and the responsible party? If the customary procedures and/or progressive sequence of finalized reports was not followed for this section of the Clifton MGP site, it is important for the public to not only understand this, but also how the community benefits from such an apparent timeline compression, if not irregularity. And as documents continue to linger in a draft form, closure for the public on pertinent site information becomes ever more elusive. Indeed, a quick review of CAC questions clearly indicates this while also bringing out in the open many yet to be acknowledged and publicly discussed property and health concerns.

Thus, while we understand that this letter should represent comments only for the draft remedial action plan, we respectfully remind the DEC that the RI and FS documents remain as drafts. Therefore, since the public has not had the opportunity to formally discuss and submit questions on information in those draft documents, we are requesting that the record of decision require:

1. the RI, FS, and IRM reports be finalized with community review and input, and,
2. that this should be completed *before the remedial plan's 100% design is completed for OU-I.*

Specific Comments

- The plan does not indicate if this is the first MGP site that Keyspan is remediating. If not, how were the other sites remediated? Was jet-grouting an option there? More importantly, how close were the nearest residents to the contaminated site?
- The concept of jet-grouting to construct the three-foot wide, 125-foot deep containment wall is inadequately described. While it is understood that the design has not been finalized, the community has some basic concerns: will the jet grouting re-contaminate the backyards that were remediated under the IRM? where will the grouting first begin - along Willow Avenue or along the backyards of Lynhurst residents? what about noise?
- Above ground, the proposed remedial plan appears to be, for the community, the least disruptive. However, will the jet grouting create any *underground* issues? For example: could the accompanying vibrations affect foundations? would the vibrations be a source of potential underground pressure that could "force" any contaminated plume to, for example, "bulge" upwards and out?
- A baseline soil gas survey of the abutting residential properties should be scheduled and completed before any remedial action is initiated. During remedial activities, periodic soil gas surveys should be conducted and the results compared to the established baseline.

- Before any remedial action begins, the responsible party should determine if any street excavation in the immediate vicinity work has been scheduled.
- How will stormwater runoff from the OU-I site be handled throughout remediation?
- What is the effective lifespan of the proposed underground wall?
- What is the required monitoring after remediation? In other words, how will the residents know that the underground wall is in fact doing its job?
- Who will be overseeing Keyspan's site remediation work?

Sincerely,

A handwritten signature in black ink, appearing to read "Nicholas Dmytryszyn". The signature is fluid and cursive, with a large, stylized "N" and "D".

Nicholas Dmytryszyn, P.E.
Environmental Engineer to the Borough President

CAC QUESTIONS

1. Health studies to be completed before the commencing of any work.
2. Provide studies on how effective the jet grouting will contain all chemicals involved present and future. Also, list of sites where this method has been successfully used.
3. Air quality should be checked before and after project with all involved homes (basements).
4. Retest all properties (yards - front and back) involved.
5. What precautions will be put into affect while remediation is being done?
6. If this project should damage the resale value of homes involved - Keyspan is responsible for the difference of the value.
7. Keyspan will be held responsible for future RELATED health matters involved indefinitely. (Since Benzene has a shelf life of 29 years and Coal Tar's shelf life is not known to us as of yet.)
8. How is Keyspan going to handle the lead that is on that site, since they did not remediate that land when they lead remediated the residents yards?
9. Certificates issued to all involved - stating that remediation has taken place and that homes are safe for residential living and no future health risks or lawsuits would be of any concern to present or future homeowners. (This certificate to be issued after completion of project.)
10. Ongoing communication with residents and involved parties is critical to the success of this proposed remedial action plan.



STATE OF NEW YORK DEPARTMENT OF HEALTH

Flanigan Square, 547 River Street, Troy, New York 12180-2216

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

March 31, 2004

Mr. Dale Desnoyers, Director
Division of Environmental Remediation
NYS Dept. of Environmental Conservation
625 Broadway, 12th Floor
Albany, NY 12233-7011

RE: **Record of Decision**
Former Brooklyn Borough Gas Works
(Clifton MGP) Operable Unit 1
Site # 243023
Clifton, Richmond County

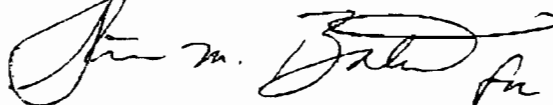
Dear Mr. Desnoyers:

Staff reviewed the March 2004 Record of Decision (ROD) for the Former Brooklyn Borough Gas Works (Clifton MGP) site, Operable Unit 1 (OU1), in Richmond County. OU1 consists of a parcel of land at 40 Willow Avenue. Operable Unit 2 consists of the remainder of the site on the 25 Willow Avenue property, and will be addressed separately. Based on staff's review, I understand that the ROD for OU1 calls for: containment of the former relief holder foundation and impacted materials below the holder using a vertical barrier wall; placement of a low permeability cap over the entire area encompassed by OU1 and; installation of extraction wells within the containment area for passive recovery of DNAPL. If necessary, groundwater will be pumped from the extraction wells to maintain an inward gradient. The proposed remedy also includes of an environmental easement to limit the use of the site for non-residential purposes and to prohibit groundwater usage. The long-term monitoring program would include maintenance of site access restrictions, a soil management plan, and monitoring of groundwater and NAPL. Additionally, I understand an investigation of soil vapor will be performed prior to and after installation of the barrier wall to evaluate the potential impact to adjacent residences.

Mr. Dale Desnoyers
Site #243023
March 31, 2004

Based on this information, I believe the selected remedy will be protective of human health and concur with it. If you have any questions concerning this issue, please contact Mr. Geoff Laccetti at (518) 402-7870.

Sincerely,

A handwritten signature in black ink, appearing to read "Gary A. Litwin", with a stylized flourish at the end.

Gary A. Litwin, Director
Bureau of Environmental
Exposure Investigation

cc: G. A. Carlson, Ph. D.
Mr. S. Bates/Mr. G. Laccetti /File
Mr. R. Schick - DEC, Central Office
Mr. D. Walsh - DEC, Reg. 2
Ms. J. Prudhomme - NYCDOH
Mr. B. Devine - NYSDOH MARO
Mr. D. Greeley - NYCDEP

**New York State Department of Environmental Conservation
Division of Environmental Remediation, 12th Floor**

625 Broadway, Albany, New York 12233-7014

Phone: (518) 402-9679 **FAX:** (518) 402-9662

Website: www.dec.state.ny.us



Erin M. Crotty
Commissioner

MEMORANDUM

TO: Dale Desnoyers Director, DER
FROM: Sal Ervolina Assistant Director, DER *me*
RE: **Recommendation to sign ROD** - Former Clifton MGP Site,
Staten Island, Richmond County, ID No. 2-43-023

DATE: MAR 31 2004

Attached is a signature-ready copy of the final Record of Decision (ROD) for the subject site. Also attached please find a copy of the final concurrence letter from the New York State Department of Health (NYSDOH).

The public was generally supportive of the selected remedy. There was some frustration with government agencies including the recent siting of a temporary power generator which was exceeding air discharge limitations and operating full time. This was resolved in part by agreeing to meet with a citizen's group and a commitment to improve communications. Several other comments were received, however, pertaining to issues regarding the OU-2 phase of the investigation which is ongoing. The OU-2 investigation will be completed at the end of the calendar year at which time the investigation results will be made available to the public. Approximately 60 people including a State Senator attended the meeting.

Technical staff from the Remedial Bureau C recommend that the ROD be signed, and I concur.

Please let me know if you would like to be briefed on this site. If you have any questions, please do not hesitate to ask.

Attachments

cc: A. Omorogbe

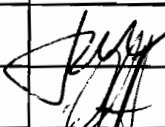
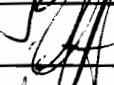
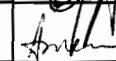
To: Sal Ervolina, Assistant Division Director

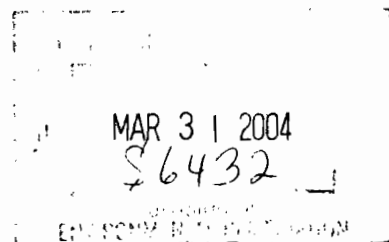
The attached is submitted for your approval by:

Amen M. Omorogbe, Remedial Bureau C, Section A

This package includes:

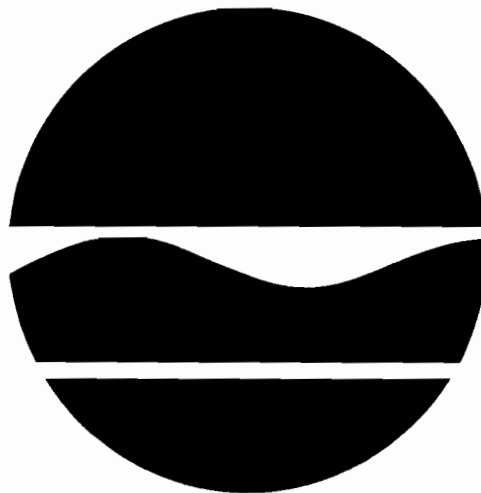
- ☒ Redline/Strikeout version of the ROD
- ☒ Your marked-up copy of the ROD
- ☒ Transmittal memo to the Division Director with the following attachments:
 - ☐ Signature-ready copy of the ROD
 - ☐ NYSDOH concurrence letter

NAME	INITIAL	DATE
Robert Schick		3/31/04
George Harris		3/31/04
Amen M. Omorogbe		3/31/04



PROPOSED REMEDIAL ACTION PLAN
Former Clifton MGP Site
Operable Unit No. 1
Richmond County, New York
Site No. 2-43-023

February 2004



Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

Former Clifton MGP

Operable Unit No. 1 - 40 Willow Ave. Holder

Richmond County, New York

Site No. 2-43-023

February 2004

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Former Clifton MGP Site, Operable Unit No. 1. The site is currently separated into two parcels of land (see Fig. 2), 40 Willow Avenue and 25 Willow Avenue which are identified as Operable Units 1 and 2 respectively. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, the operation of a manufactured gas plant (MGP) at the Former Clifton MGP Site, including a former relief gas holder at 40 Willow Avenue has, resulted in the disposal and/or leaking of hazardous wastes, including coal tar containing benzene, toluene, ethylbenzene, xylene and polycyclic aromatic hydrocarbons. These wastes have contaminated the soils and groundwater at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to contaminated soil and groundwater.
- a significant environmental threat associated with the impacts of MGP contaminants to groundwater.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy:

- Containment of the former relief holder foundation and subsurface impacted materials using a jet grout (or equivalent) vertical barrier wall consisting of approximately 460 linear feet and a thickness of three feet constructed and keyed into a weathered bedrock confining layer located approximately 125 feet below ground surface (bgs), preventing DNAPL migration through subsurface soil and contact with the surrounding groundwater;
- Installation of a low permeable cap over the entire OU-1 area to prevent exposure to contaminated soil and limit infiltration of precipitation;
- Installation of extraction wells within the containment area for passive recovery of DNAPL and if and when necessary, to maintain groundwater inward gradient through pumping; and
- Institutional controls, consisting of an environmental easement which would include restrictions on groundwater usage or future use of the land for residential purposes, maintenance of site access restrictions (e.g., fencing, lockable gates), a soil management plan, and long-term groundwater and DNAPL monitoring.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially 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.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the 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 greater detail in the November 2003 "Remedial Investigation (RI) Report" Clifton Former MGP Site, Operable Unit 1 (OU-1) Volumes 1 and 2, the draft December 2002 "Feasibility Study" (FS) Report, and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Community Board 1
One Edgewater Plaza
Room 311
Staten Island, NY 10305
Phone #: (718) 981-6900
Hours of Operation:
Contact: Joseph Carroll

NYSDEC Region 2
1 Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101-5407
Phone #: (718) 482-4995
Hours of Operations: 9am - 4pm
Contact: Amar Nagi

NYSDEC
625 Broadway
11th Floor
Albany, NY 12233-7014
Phone #: (518) 402-9564
Hours of Operations: 8am - 4 pm
Contact: Amen M. Omorogbe, P.E.

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from February 19, 2004 through March 19, 2004 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for March 4, 2004 at the Public School 13 Auditorium, 191 Vermont Avenue, Staten Island, NY beginning at 7 PM.

At the meeting, the results of the RI/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 to Mr. Omorogbe at NYSDEC, 625 Broadway, Albany, NY 12233-7014 through March 19, 2004.

The NYSDEC may modify the preferred alternative 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 NYSDEC's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Former Clifton MGP site is located in Richmond County, New York (see Figure 1). OU-1 of the site is the 40 Willow Avenue parcel of the Clifton Site. The OU-1 parcel is approximately one acre in area and is located at the southwest corner of the intersection of Bay Street and

Willow Avenue in the Clifton Section of Staten Island. The site is bounded to the northwest by Willow Avenue; to the northeast by Bay Street; to the south by a residential section of Staten Island which fronts Lynhurst Avenue and to the west by a two-story commercial building. To the northwest, across Willow Avenue, is the remainder of the Former Clifton MGP Site (i.e., the 25 Willow Avenue Parcel, OU-2). The area surrounding the 40 Willow Avenue is characterized by a combination of urban residential and commercial uses. New York Harbor is the closest surface water body to OU-1 and is located approximately 500 to 600 feet northeast.

Operable Unit (OU) No. 1, which is the subject of this PRAP, consists of the 40 Willow Avenue parcel of the Former Clifton MGP Site. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. The remaining operable unit for this site is Operable Unit No. 2 which consists of the remainder of the MGP on the 25 Willow Avenue parcel.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The Former Clifton MGP was operated by Richmond County Gas Light from 1856 to 1901. The plant was then operated by the New York and Richmond Gas Company from 1901 until 1957. Brooklyn Union, now KeySpan acquired the latter company in 1957, at which point MGP operations ceased.

The 40 Willow Avenue parcel (OU-1) is the location of a former relief holder which was part of the plant structure, and historically used to store manufactured gas. Over the years, by-products, such as coal tar generated from the MGP operations have leaked or been released from the

former relief holder resulting in the contamination of soil and groundwater. The holder was an aboveground structure that stood approximately 150 feet tall. The structure was situated on a circular foundation, which measures approximately 85 feet in diameter and extends about 18 feet below ground surface. The holder had a storage capacity of about one million cubic feet. Demolition of the gas plant and system structures occurred in the spring of 1959. The holder foundation remains in the subsurface.

3.2: Remedial History

In 1993, Brooklyn Union, now KeySpan excavated about 20 cubic yards of soil during which an 8-inch diameter steel well, located just below the surface, was discovered. A mixture of water and free-product was removed from the well for disposal. The 90 foot deep well was subsequently sealed with cement grout.

On June 15, 1994, 43 tons of contaminated soil was excavated east of the former relief holder and disposed of in accordance with the NYSDEC regulations. Detailed remedial history can be found in the site remedial investigation report located at the document repositories.

SECTION 4: 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 NYSDEC and KeySpan entered into a Consent Order on April 14, 1998. The Order obligates the responsible parties to implement a full remedial program.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between February 1999 and June 2002. The field activities and findings of the investigation are described in the RI report.

The following activities were conducted during the RI:

- Research of historical information.
- Excavation of 5 test pits to determine the structural integrity of the subsurface structure and to better define the outer holder wall of the former relief holder No. 2.
- Installation of 43 soil borings, 3 monitoring wells and 12 piezometers for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions.
- Collection of approximately 15 groundwater samples from various wells and piezometers.
- Collection of approximately 94 surface soil samples and 88 subsurface soil samples.

To determine whether the site soil and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance

Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels".

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: Site Geology and Hydrogeology

The Remedial Investigation conducted at the site revealed four distinctive stratigraphic units. These units are, in order of increasing depth: 1), fill, which consists of silt, sand and gravel mixed with slag 2), alluvial deposits encountered beneath the layer of fill. The thickness of this unit ranged from 2 feet to approximately 10 feet; 3), Glacial deposits encountered beneath the alluvial deposits and 4), beneath the glacial deposits lies saprolite or a weathered bedrock layer. The saprolite is believed to be the lower confining layer of the deep aquifer beneath the site. The top of the saprolite elevation ranges from 110 to approximately 125 feet bgs.

Two aquifers are present beneath the site, a shallow, unconfined aquifer and a deep semi-confined aquifer. The water table elevations for the shallow unconfined aquifer ranged from about 3 feet bgs to approximately 7 feet bgs. The deep aquifer is under confining pressure and is located within the glacial deposits above the saprolite.

5.1.2: Nature of Contamination

As described in the RI report, many surface soil and subsurface soil samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and inorganics (metals).

The VOCs of concerns are benzene, toluene, ethylbenzene and xylenes. In this document, these compounds are referred to collectively as total BTEX and “total BTEX concentrations” is the sum of the concentrations of benzene, toluene, ethylbenzene and xylenes.

Specific PAHs of concern are the following:

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

In this document, PAH concentrations are referred as either total PAHs (TPAHs) or carcinogenic PAHs (cPAHs). The TPAH concentration is the sum of the concentrations of each (italicized and non-italicized) PAH listed above. The cPAH concentration is the sum of the concentrations of each italicized PAH listed above.

Also detected in the subsurface soil is a dense oily liquid that does not readily dissolve in water. Material such as this is referred to as dense non-aqueous phase liquid (DNAPL). DNAPL or tar was detected to a depth of approximately 80 feet bgs (see Fig. 3). The presence of this DNAPL is contributing to concentrations of BTEX and PAHs in the site soil and groundwater.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

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

Table 1 summarizes the degree of contamination for the contaminants of concern in both soil and groundwater and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Surface Soil

Surface soil is defined as the soil located from zero to six inches bgs. Surface soil samples collected at the site and at background locations in the vicinity of the site show TPAHs concentrations ranging from 22.4 ppm to 84.7 ppm. CPAHs concentrations ranged from ND ppm to over 10 ppm. BTEX compounds were not analyzed for these surface soil samples. Lead was the only metal associated with the operation of the former MGP that was detected at the site above guidance values with concentrations ranging from ND to over 1900 ppm.

Subsurface Soil

The remedial investigation conducted at the site revealed that the lateral extent of tar, staining, sheens, odors and chemical compounds was generally limited to the vicinity of the former relief holder. Test pits placed down to about 8 feet within the center of the former relief holder did not show evidence of tar saturated material. However, soil borings located within the former relief holder indicate heavy tar saturation between 16 feet and 20 feet bgs. The glacier deposits located on the northwest portion of the site consist of a dense silt unit and a silt-sand unit which

appears to provide a hydrogeologic confining layer between the upper aquifer and the lower confined aquifer. This unit has not, however, acted as confining unit to the downward mobility of tar. Tar saturated soils were detected to a depth of approximately 80 feet bgs, with tar blebs being observed to 100 feet bgs, while tar-like odors were detected at the top of the weathered bedrock at 124 feet bgs.

Site investigation also shows downward migration of tar within and immediately adjacent to the holder with a limited horizontal component. About 70 percent of the tar has migrated downward outside of the holder foundation. Tar staining, tar blebs/sheens were observed about 45 feet below the ground surface, which appears to be moving toward Lynhurst Avenue ending under the residential properties. A series of borings placed at about 120 ft away from the site in front of the residential properties across Lynhurst Avenue did not indicate contamination in soil and groundwater. Therefore, site contamination detected at about 50 feet below the ground surface has not migrated beyond the residential properties.

Samples of the coal tar obtained within the former relief holder test pits and borings indicated BTEX concentrations ranging up to 10,000 ppm. TPAHs ranged from 3.4 ppm to over 85,000 ppm while cPAHs were detected at concentrations ranging from 2.2 ppm to over 9,000 ppm at a depth of between 4 to 8 feet bgs.

Outside of the former relief holder, BTEX concentrations range from non-detect to 5,000 ppm. TPAH concentrations ranged from non-detect to 20,000 ppm, while concentrations of cPAHs ranged from non-detect to 2,500 ppm.

Groundwater

Groundwater at OU-1 is contaminated with MGP related materials. Measurable amounts of DNAPL (about 4 feet at 70 feet bgs) were observed in monitoring well RW-7 located just outside (in the southern side) of the former relief holder at 40

Willow Avenue. Analytical samples obtained from the site investigation from areas adjacent and within the residential properties show that shallow groundwater down to about 25 ft bgs is free of site contamination.

5.2: 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 RI/FS.

KeySpan performed an IRM which removed soils impacted by lead based paint (which apparently flaked off the steel holder superstructure) to a minimum depth of 3 feet bgs, from the southern portion of 40 Willow Avenue parcel and the adjacent residential properties in 2003. Approximately 4,300 tons of contaminated soil was removed and replaced with clean soil. The purpose of the IRM was to mitigate potential exposure associated with the lead impacted soil by eliminating any potential contact by the occupants of the adjacent residential dwellings.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 7.1 of the RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population. The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point

where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

There are no known completed exposure pathways at the site. However, potential exposure pathways are:

- Dermal contact with contaminated surface soil, subsurface soil or groundwater
- Incidental ingestion of contaminated soils or groundwater
- Inhalation of contaminated soil vapors

Surface and subsurface soils contain elevated levels of site-related contaminants. Unpaved portions of 40 Willow Avenue are enclosed by a locked chain link fence topped with barbed wire and the remainder of the site is paved, restricting access to contaminated surface and subsurface soils. If contaminated soil is brought to the surface through excavation or other site activities, exposures could occur via dermal contact or incidental ingestion. KeySpan completed an interim remedial measure in 2002 to remove contaminated surface soils from adjacent residences, eliminating this exposure pathway.

No one is currently using the site groundwater for drinking or other uses and municipal water serves the area. Municipal water is obtained from reservoirs in upstate New York. Although unlikely, a well could be installed in the future. Depth to groundwater is three to seven feet bgs, therefore incidental ingestion of and dermal

contact with contaminated groundwater is possible during construction activities.

A soil vapor survey will be implemented concurrent with the chosen remedy to evaluate this potential exposure pathway.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, 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. The following environmental exposure pathways and ecological risks have been identified:

Analytical results from groundwater samples indicate that groundwater beneath the site is impacted by contaminants resulting from the operation of the Former Clifton MGP. This groundwater impact has resulted in significant damage to the groundwater underneath the site and beyond due to migration. However, groundwater samples collected to date at the adjacent residential properties indicate that shallow groundwater down to approximately 25 feet bgs is free of site contamination. Contaminated materials were detected in thin discontinuous layers in the subsurface at depths approximately 50 ft bgs.

The site and the immediate surrounding areas are characterized by commercial facilities, buildings and paved parking lots and therefore provide minimal habitat to wildlife. Residential yards and constant physical disturbances prevent a wildlife population from developing. Due to the transient nature of the use of the site by birds and other small animals, the frequency and duration of exposure is limited. Therefore, contaminants

present at this operable unit of the site would not pose a current nor future risk to wildlife.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to contaminants in surface and subsurface soil exceeding SCGs;
- exposures of persons to contaminants in groundwater that exceed groundwater quality standards;
- migration of DNAPL from subsurface soil into groundwater that may create exceedances of groundwater quality standards; and
- continued groundwater migration through subsurface soil that contain DNAPL.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected 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. Potential remedial alternatives for the Former Clifton MGP Site were identified, screened and evaluated in the

FS report which is available at the document repositories identified in Section 1.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth 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. The cost to implement all alternatives has been estimated using a discount rate of 5%, assuming a 30-year period of monitoring. 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.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated surface and subsurface soils at the site.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

The cost to implement Alternative 1, based on an annual operation and maintenance (O&M), for a period of 30 years has been estimated as follows:

<i>Present Worth:</i> \$54,130
<i>Capital Cost:</i> \$0
<i>Annual OM&M:</i> \$3,620

Time to Implement: None

Alternative 2: Containment of Impacted Area through Vertical Barriers and Surface Capping

Alternative 2 includes actions which would allow for encapsulation through surface and subsurface containment of source materials. These actions would inhibit contact between source materials within the barrier and groundwater outside the barrier. The components of Alternative 2 would include the following:

- Installation of a jet grout (or equivalent) vertical barrier wall consisting of approximately 460 linear feet and a thickness of three feet constructed and keyed into a weathered bedrock confining layer located approximately 125 feet bgs. This action would isolate the DNAPL present in the holder and subsurface from acting as a source of contamination to groundwater outside the walls and prevent further migration of DNAPL.
- Installation of a low permeable cap over the entire OU-1 area (see Fig. 5). The cap would prevent human exposure to contaminated soil and inhibit infiltration of precipitation.
- Installation of an appropriate number of wells screened in the DNAPL zone within the containment cell for the purposes of passive DNAPL recovery including other monitoring and if and when necessary for maintaining an inward groundwater gradient through pumping. The number of wells and locations will be determined during the design phase of this project.
- Institutional controls, consisting of an environmental easement which would include restrictions on groundwater usage or future use of the land for residential purposes, maintain site access restrictions through fencing and lockable gates, and require a site management plan.

- Long-term monitoring of soil groundwater and DNAPL to determine the effectiveness of the proposed remedy.

The cost to implement Alternative 2, based on an annual operation and maintenance (O&M), for a period of 30 years has been estimated as follows:

Present Worth: \$4,010,600
Capital Cost: \$3,178,460
Annual OM&M: \$54,130

Time to Implement: 4 months

Alternative 3: Containment via Vertical Barriers, Capping and Holder Removal.

This alternative would consist of all of the components of Alternative 2 with the addition of the removal of the contents and foundation structure associated with the former relief holder. Under this alternative, removal of contaminated materials would be limited to the contents of the holder, the holder structure itself, and impacted soils located in the immediate vicinity of the holder. The component of this alternative would include the following

- All components of Alternative 2 including institutional controls; and
- Excavation of approximately 6,000 tons of soil and 1,500 tons of holder structure materials.
- Backfilling and restoration of the excavated areas with certified clean materials from an off-site source.
- Long-term monitoring of site groundwater and DNAPL to determine the effectiveness of the remedial option.

The cost to implement Alternative 3, based on annual operation and maintenance (O&M) for a period of 30 years has been estimated as follows:

Present Worth: \$13,027,900
Capital Cost: \$12,195,798
Annual OM&M: \$54,130

Time to Implement: 8 months

Alternative 4: Removal of Soil Containing Source Materials

Alternative 4 would include removal of MGP related source area materials and backfill the excavation with clean fill from off-site source. The components of Alternative 4 would include the following:

- Excavation of approximately 81,000 tons of source area materials down to a depth of about 80 feet bgs in the areas underneath and immediately surrounding the former relief holder.
- Blending of the excavated materials using coal fines and other inert materials to reduce moisture content and improve characteristics to meet off-site treatment facilities requirements.
- Off-site disposal and/or treatment of the excavated materials at facilities permitted to handle the materials.
- Backfilling of the excavated areas with clean fill from an off-site location.
- Dewatering and on-site treatment of approximately 43,200 gallons per day of groundwater for discharge to a local public owned treatment works;
- Institutional controls, consisting of an environmental easement to restrict future use of the land outside of the removal areas; and
- Long-term monitoring to determine the effectiveness of the remedial option.

The cost to implement Alternative 4, based on annual operation and maintenance (O&M) for a period of 30 years has been estimated as follows:

Present Worth: \$28,495,000
Capital Cost: \$27,781,839
Annual OM&M: \$46,380

Time to Implement: 12 months

Alternative 5: *In-situ* Stabilization and Solidification of Source Materials

Alternative 5 would include *in-situ* soil treatment of source materials within, beneath and around former relief holder. In addition, this alternative would include surface asphalt capping of the impacted area to inhibit exposure to contaminants and restrict stormwater infiltration in the source area. Institutional controls would be implemented as part of this alternative. The components of Alternative 5 include the following:

- In-place stabilization/solidification of soil and coal tar within, beneath and areas immediately surrounding the former relief holder. This action would a stable cement like matrix in which the product source is trapped and becomes immobile.
- Treatability studies would be instituted to characterize the appropriate cement additives or stabilizing reagents, dosage rates and other performance parameters for final design of the stabilization/solidification technology.
- Excavations of the top one foot of surface materials to allow for the installation of six inches of compacted clean stone and six inch asphalt cap. The cap would prevent human exposure to contaminated soil and inhibit infiltration of precipitation;

- Institutional controls, consisting of an environmental easement to restrict future use of the land, maintain site access restrictions through fencing and lockable gates; and
- Long-term monitoring to determine the effectiveness of the remedial option.

The cost to implement Alternative 5, based on annual operation and maintenance (O&M) for a period of 30 years has been estimated as follows:

Present Worth: \$15,606,000
Capital Cost: \$14,773,953
Annual OM&M: \$54,130

Time to Implement: 12 months

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. 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 NYSDEC has determined to be applicable on a case-specific basis.

The next five “primary balancing criteria” are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term 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.

4. 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.

5. 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.

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 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. The costs for each alternative are presented in Table 2 at the end of this document

This final criterion 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.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the NYSDEC 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.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The NYSDEC is proposing Alternative No. 2, Containment of Impacted Area through Vertical Barrier and Surface Capping, as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS. This proposed remedy when properly implemented, would eliminate or mitigate all threats to public health and the environment presented by the contaminated materials at the OU-1 portion of the Former Clifton MGP site. The proposed remedy would also achieve the remedial action objectives (RAOs) established for OU-1.

Alternative 1 would not provide protection to human health and the environment nor comply with SCGs, since source material and contaminated soil would remain in place with no further action, and was, therefore, eliminated from further evaluation. Alternatives 2, 3, 4 and 5 would all be protective of public health and the

environment. Alternative 2, which is the proposed remedy, would totally encapsulate the source materials from further contact with the environment and public. A jet grout (or equivalent) vertical barrier wall consisting of approximately 460 linear feet and a thickness of three feet would be constructed and keyed into a weathered bedrock confining layer located approximately 125 feet bgs, preventing DNAPL migration through subsurface soil and contact with the surrounding groundwater. The asphalt cap would eliminate human exposure through direct contact and/or ingestion of site contaminated soil.

Alternative 3, in addition to all components of Alternative 2 would include removal of a holder structure and the contents. This alternative, though meeting RAOs, would pose several short-term impacts during implementation. These impacts would include, significant disruption to the community as a result of the need for a temporary structure during excavation, dewatering, treatment and disposal of water and vapors and truck traffic. Though implementation of Alternative 3 would provide about 30% reduction in the volume of contaminated source materials, it would result in greater short-term adverse impacts on the community during construction and would only afford minimal additional protection to human health and the environment over Alternative 2. Given the additional cost of over \$9 million and significant community disruption associated with Alternative 3, it is not justified to select Alternative 3 over Alternative 2.

Alternative 4 would remove soil containing source materials and would achieve the RAOs. However, contaminated materials outside of the source areas would remain on-site. Similar to Alternative 3, there are logistical and implementation issues associated with this alternative. The huge excavation required under this alternative would result in significantly greater short-term impacts than those encountered under Alternative 3. The additional time and significant increase in cost of approximately \$24 million over Alternative 2

coupled with the fact that it would not provide additional protection to public health and the environment make this alternative undesirable over Alternative 2.

Alternative 5 which calls for *in-situ* stabilization and solidification of source materials will achieve RAOs established for OU-1 and presents similar implementability issues as Alternative 2. Both would provide an equal amount of protection to public health and the environment. Considering the extra \$11 million and additional 8 months to implement Alternative 5 without providing additional protection to human health and the environment, it is undesirable when compared to Alternative 2.

It is important to note that while Alternative 2 would encapsulate the source materials within a containment cell, residual contamination would be left in-place outside of the cell (see Figs.3 and 4). However, the residual contamination outside the cell is generally located at approximately between 45 feet and 120 feet bgs. This residual contamination exists in thin layers in the subsurface and does not appear to be wide spread immediately outside the cell. Due to the depth of the residual contamination and the remedial investigation finding that shallow groundwater is not impacted immediately outside of the proposed containment wall location and within the adjacent residential properties, human exposure by direct contact and/or ingestion of site contaminated soil or vapor is not expected.

Considering 1.) the depth of residual contamination outside the encapsulated area, 2.) the limitations posed by the full commercial and residential development of the OU-1 portion of the site, 3.) sporadic spread of the contamination in thin discontinuous layers in the subsurface and 4.) incomplete exposure pathways to the residual contamination, it is not necessary nor technically feasible to remove this residual contamination. The proposed remedy is expected to allow natural attenuation of residual contamination by cutting off the source of contamination.

The proposed remedy (Alternative 2) would encapsulate the source materials thereby isolating the materials from the environment. Soil and groundwater outside of the barrier walls would no longer be impacted by the encapsulated contaminated materials. Residual contamination outside the barrier walls would be reduced over time via natural attenuation thereby achieving chemical-specific SCGs over time. Alternative 2 would address short-term impacts to the community through a combination of adequate institutional and engineering controls and a site-specific health and safety plan. Alternative 2 would provide long-term effectiveness and permanence due to the encapsulation of source materials as mentioned above. The continued effectiveness of the barrier would be measured via periodic monitoring and by comparing water level measurements within and outside of the vertical barrier cutoff wall. The capping system would be visually inspected and another layer of asphalt would be added to the existing cap if any defects are observed. Alternative 2 would provide significant reduction of the mobility of the contaminated materials beyond the encapsulated area.

On the basis of the above evaluations, Alternative 2 is the preferred alternative. Alternative 2 would present a more balanced and cost effective remedy when compared to the other alternatives.

The estimated present worth cost to implement the remedy is \$4,010,600. The cost to construct the remedy is estimated to be \$3,178,460 and the estimated average annual operation, maintenance, and monitoring costs for 30 years is \$54,130.

The elements of the proposed remedy would be as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.
2. Installation of vertical barrier walls around the area impacted by source materials to a depth of approximately 125 feet bgs and keyed into the weathered bedrock layer (see Figs.5 & 6). The wall would be approximately 460 linear feet, with a thickness of three feet and would isolate the source from contact with groundwater outside the walls and prevent migration of DNAPL. The wall would be constructed using jet grout technology to create continuous, overlapping adjacent columns. Alternate process options for the vertical barrier walls, such as vibrating beam panels etc. may be further evaluated during the design phase of this remedy.
3. Installation of a low permeable cap over the entire OU-1 area (see Fig. 5). The cap would prevent human exposure to contaminated soil and inhibit infiltration of precipitation.
4. Installation of wells screened in the DNAPL zone within the containment cell for the purposes of passive DNAPL recovery and monitoring. The wells would be screened at various depths where DNAPL has been found present. The number of wells and locations will be determined during the design phase of this project. When determined necessary, these wells would be pumped to maintain an inward groundwater gradient within the containment cell.
5. Institutional controls consisting of an environmental easement which would include restriction on groundwater usage

or future use of the land for residential purposes, maintenance of site access restrictions through fencing and lockable gates and site management plan. The site management plan would be developed to: (a) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; and (c) identify any use restrictions. KeySpan would provide an annual certification, prepared and submitted by a professional engineer or environmental professional acceptable to the Department, which would certify that the institutional controls and engineering controls put in place, are unchanged from the previous certification and nothing has occurred that would impair the ability of the control to protect public health or the environment or constitute a violation or failure to comply with any operation and maintenance or site management plan.

6. A soil gas survey would be performed at the perimeter of the proposed containment cell prior to and after its installation, to evaluate soil vapor quality; and
7. Long-term monitoring of groundwater and DNAPL in and outside the containment area to 1.) determine the effectiveness of the proposed remedy, 2.) assure that significant groundwater mounding is not occurring as a result of the construction of the containment cell, and 3.) assure that shallow groundwater remains un-impacted and further migration of contaminants from the containment cell into groundwater is not occurring. If the jet

grouting is found to be deficient based on monitoring results, additional grouting or other remedial technology options would be performed to address the defect. The capping system would be monitored to ensure that the integrity of the system is maintained.

TABLE 1

Nature and Extent of Contamination

Surface Soil	Contaminants of Concern	Concentration Range Detected (ppm) ^a	SCG ^b (ppm) ^a	Frequency of Exceeding SCG
Semi Volatile Organic Compounds (SVOCs) cPAHs	Benzo(a)anthracene	0.12 - 9.4	0.224	36/38
	Benzo(a)pyrene	0.11 - 8.8	0.061	38/38
	Benzo(b)fluoranthene	0.075 - 8.4	1.1	19/38
	Benzo(k)fluoranthene	0.093 - 10	1.1	22/38
	Chrysene	0.19 - 12	0.4	35/38
	Dibenzo(a,h)anthracene	ND - 3.8	0.014	33/38
	Indeno(1,2,3-cd)pyrene	ND - 8.4	3.2	2/38
Subsurface Soil	Contaminants of Concern	Concentration Range Detected (ppm) ^a	SCG ^b (ppm) ^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)				
	Benzene	ND - 5,400	0.06	42/105
	Ethylbenzene	ND-1,000	5.5	28/105
	Toluene	ND-3,700	1.5	31/105
	Xylenes (Total)	ND-1,600	1.2	39/105
Semi Volatile Organic Compounds (SVOCs)				
	Benzo(a)anthracene	ND-2,300	0.224	48/102
	Benzo(a)pyrene	ND-1,900	0.061	45/66
	Benzo(b)fluoranthene	ND-790	1.1	17/66
	Benzo(g,h,i)perylene	ND-720	50	4/66
	Benzo(k)fluoranthene	ND-1,100	1.1	21/66
	Chrysene	ND-2,500	0.4	43/66
	Dibenzo(a,h)anthracene	ND-34	0.014	10/66
	indeno(1,2,3-cd)pyrene	ND - 480	3.2	11/102

Groundwater	Contaminants of Concern	Concentration Range Detected (ppb) ^a	SCG ^b (ppb) ^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND-20,000	1	6/24
	Ethylbenzene	ND-1,300	5	6/24
	Toluene	ND-9,800	5	7/24
	Xylenes (Total)	ND-2,800	5	8/24
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND	0.002	0/24
	Benzo(a)pyrene	ND	0.002	0/24
	Benzo(b)fluoranthene	ND	ND	0/24
	Benzo(k)fluoranthene	ND	0.002	0/24
	Indeno(1,2,3-cd)pyrene	ND	0.002	1/24
	Chrysene	ND	0.002	0/24
	Dibenzo(a,h)anthracene	ND	NA	0/24

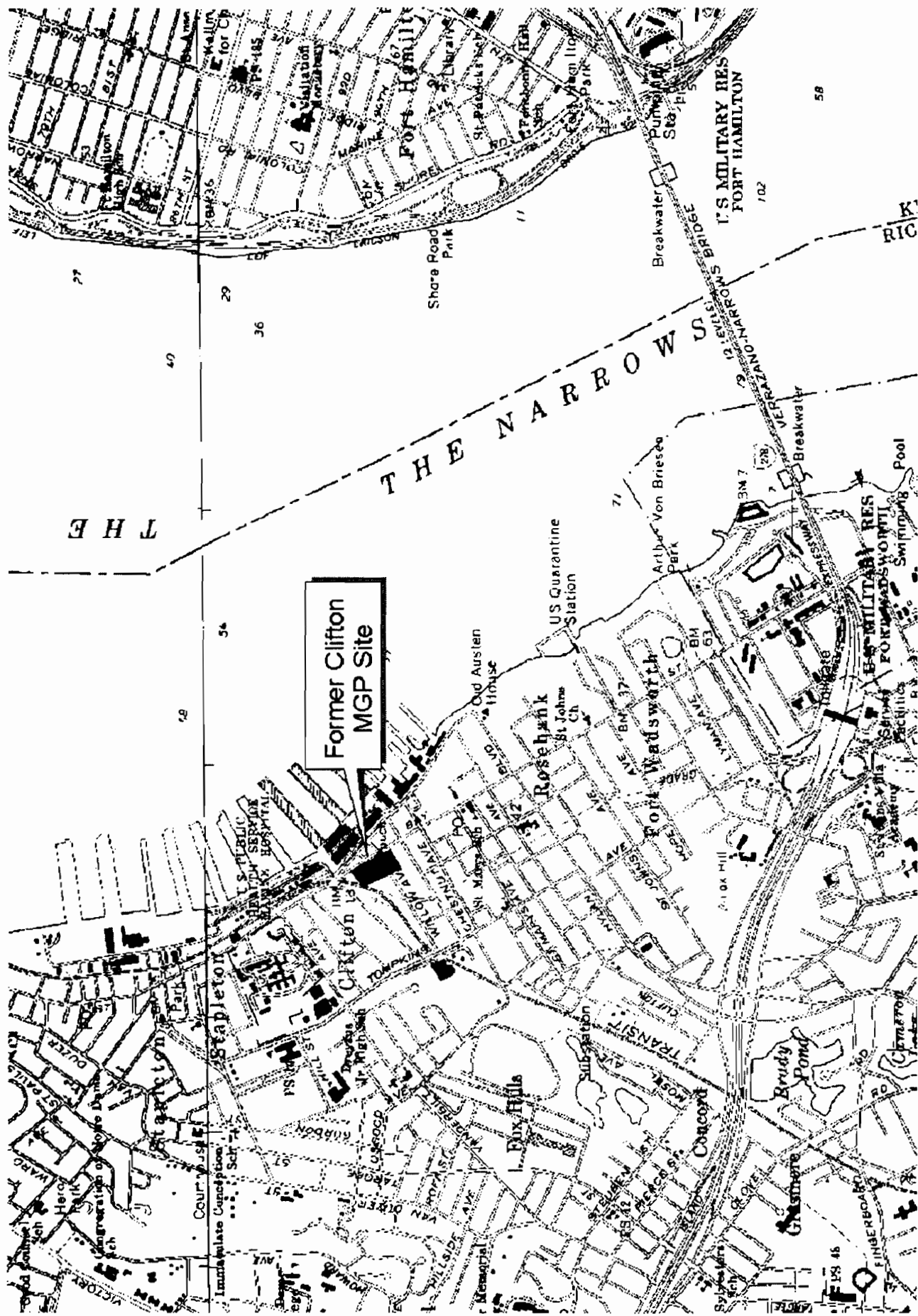
^a ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;

^b SCG = standards, criteria, and guidance values;

ND = Not Detected
NA = Not Available

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
Alternative 1: No Action	\$0	\$3,620	\$55,700
Alternative 2: Containment of impacted area through vertical barriers and surface capping	\$3,178,460	\$54,130	\$4,010,600
Alternative 3: Containment via vertical barriers, capping and holder removal	\$12,195,798	\$54,130	\$13,027,900
Alternative 4: Removal of soil containing source materials	\$27,781,839	\$46,380	\$28,495,000
Alternative 5: In-situ stabilization and solidification of source materials	\$14,773,953	\$54,130	\$15,606,000



KEYSPAN CORPORATION
FORMER CLIFTON MANUFACTURED
GAS PLANT SITE
40 WILLOW AVENUE PARCEL
OPERATING UNIT 1 (OU-1)
STATEN ISLAND, NEW YORK

FIGURE 1

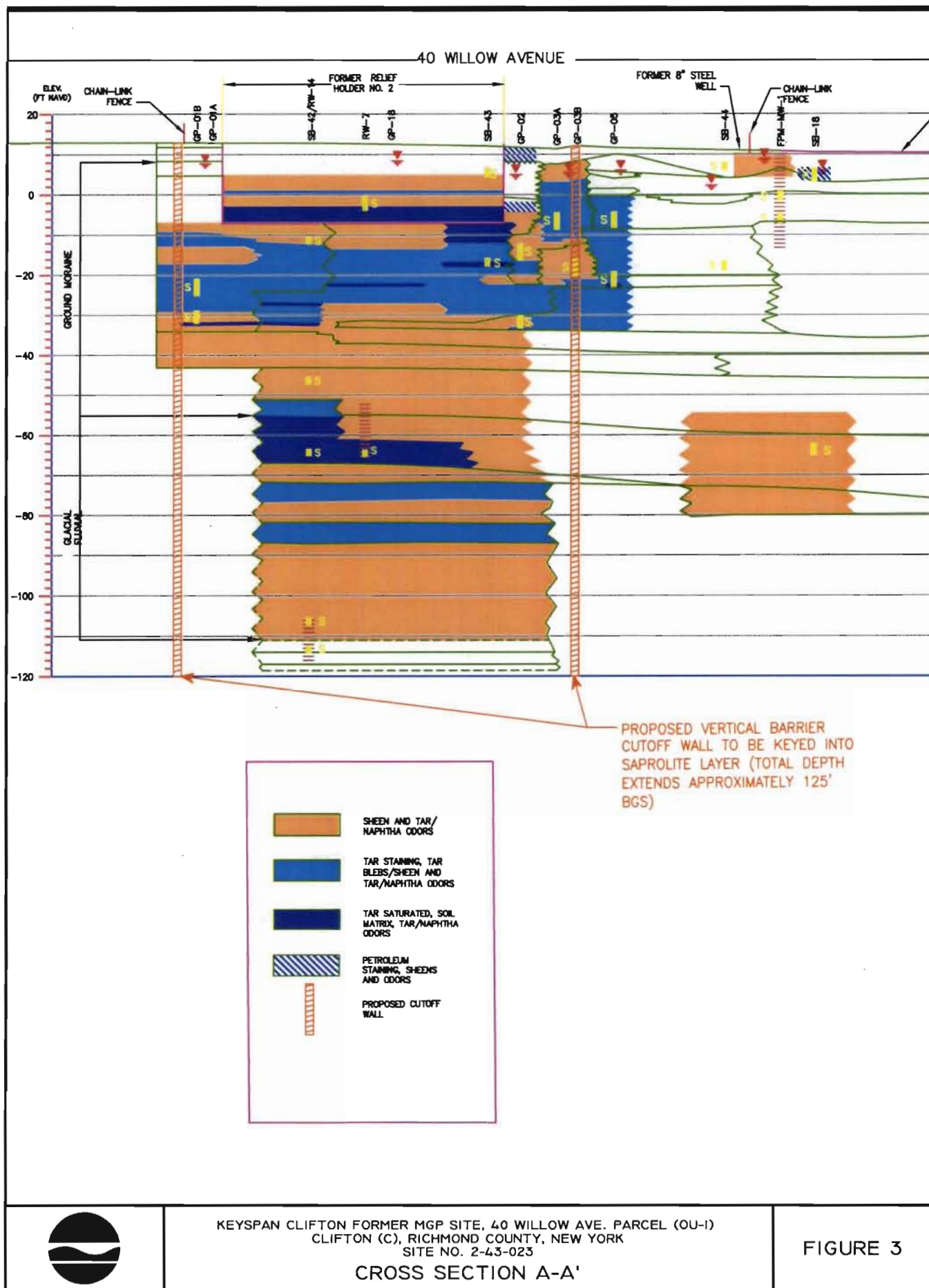
LOCATION MAP

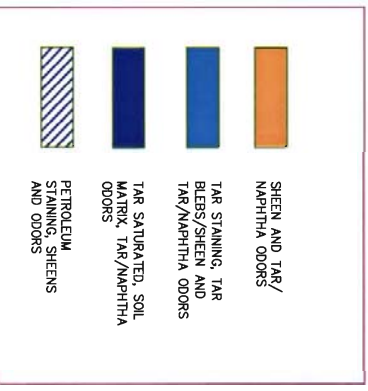
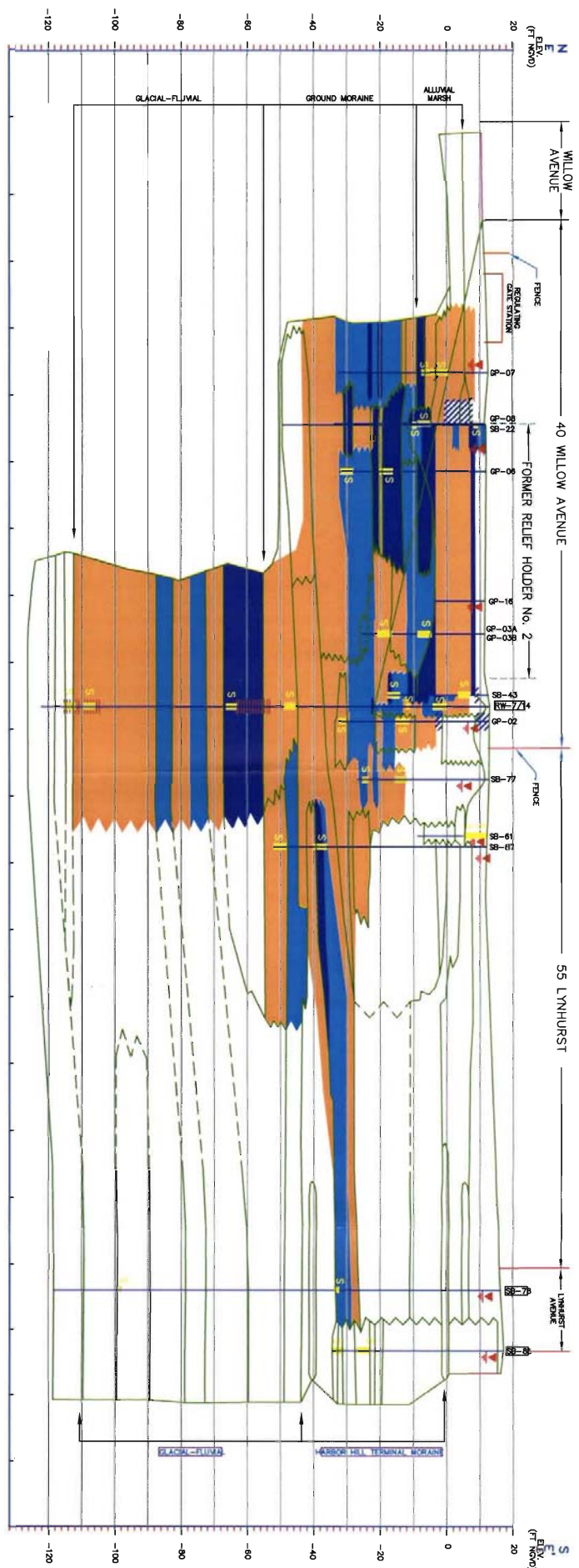




INTERVIM CORPORATION
POWDER CLUSTER MANUFACTURING
ONE PLANT BLDG.
40 MILLER STREET, FARMING-
TON, NEW YORK 11737
STONEY BEACH, NEW YORK

FIGURE 2



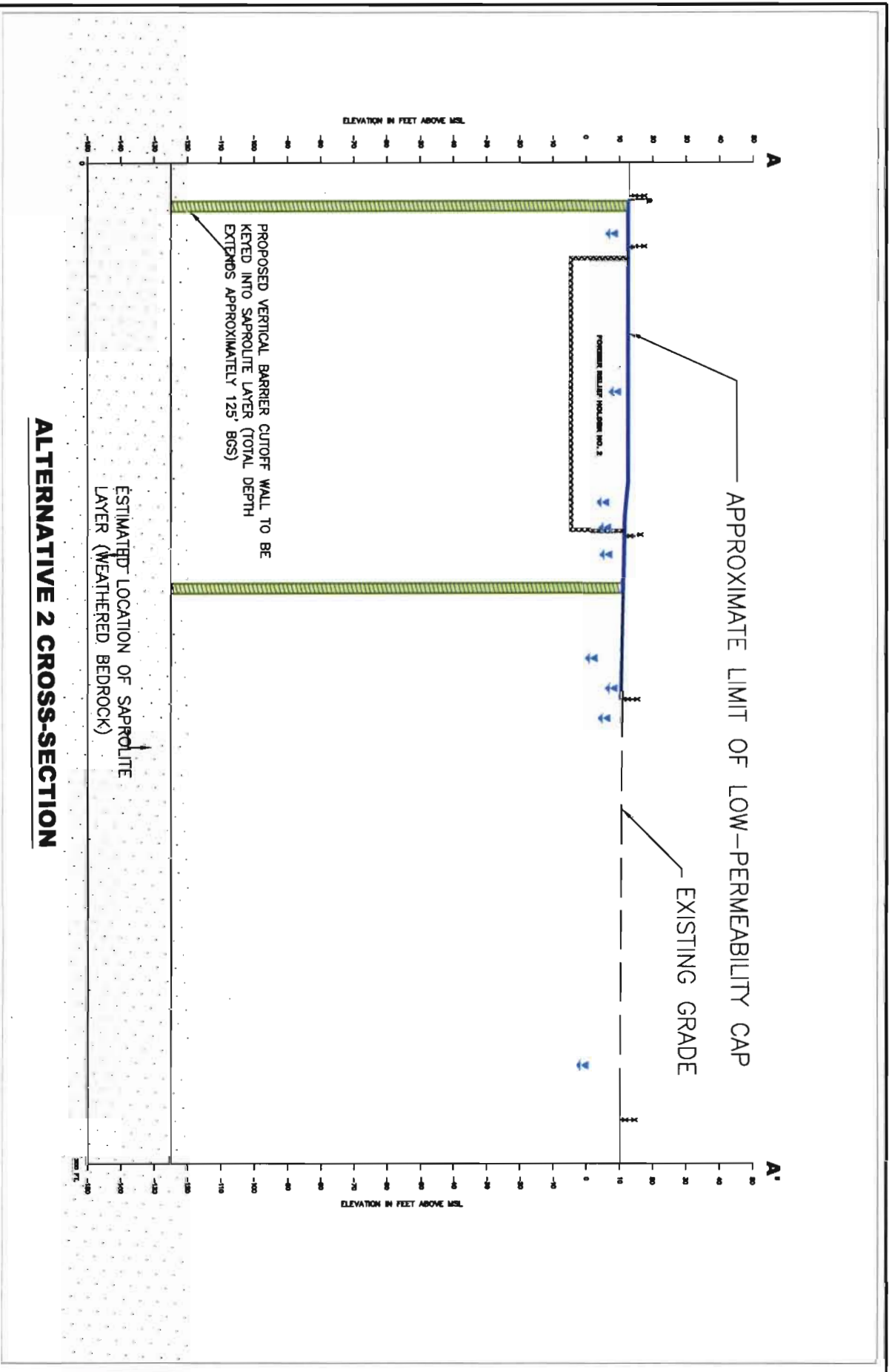


KEYSPAN CLIFTON FORMER MGP SITE, 40 WILLOW AVE. PARCEL (OU-1)
CLIFTON (CD), SITE NO. 2-43-023
CROSS SECTION B-B'

FIGURE 4



FIGURE 5



FORMER CLIFTON MGP, SITE #: 2-43-023

ALTERNATIVE 2 - CROSS SECTION

FIGURE 6