Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
LILCO - Rockaway Park MGP Site
Rockaway Park, Queens County, New York
Site Number 2-41-029

October, 2004

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

DECLARATION STATEMENT - RECORD OF DECISION

LILCO - Rockaway Park MGP Inactive Hazardous Waste Disposal Site
Rockaway Park, Queens County, New York
Site No. 2-41-029

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the LILCO - Rockaway Park 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 the LILCO - Rockaway Park 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 LILCO - Rockaway Park MGP site and the criteria identified for evaluation of alternatives, the NYSDEC has selected soil cover, shallow source excavation, 50 and 120 foot depth on-site NAPL migration barriers, 70 foot depth off-site NAPL migration barrier, and passive NAPL recovery wells. The components of the remedy are as follows:

- Excavation of visible MGP tar to eight feet below ground surface (bgs).

- Installation of on-site and off-site non-aqueous phase liquid (NAPL) migration barriers set at various depths.

- Installation of passive dense non-aqueous phase liquid (DNAPL) recovery systems.

- Installation of soil gas vapor control methods under any existing or new structures constructed on the site.

- Covering all vegetated areas with clean soil and all non-vegetated areas with either concrete or a paving system.

- Development of a site management plan to address residual contamination and any use restrictions.

- Imposition of an environmental easement.

- Annual certification of the institutional and engineering controls.

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.

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Date	Dale A. Desnoyers, Director Division of Environmental Remediation

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RECORD OF DECISION

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September, 2004

SECTION 1: <u>SUMMARY OF THE RECORD OF DECISION</u>

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 LILCO - Rockaway Park Manufactured Gas Plant (MGP) site. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this remedy. As more fully described in Sections 3 and 5 of this document, the historic operation of a MGP has resulted in the disposal of hazardous wastes, including MGP tar and purifier waste. These wastes have contaminated the surface soils, subsurface soils, groundwater and soil gas vapors at the site, and have resulted in:

- a significant threat to human health associated with potential current and future exposure to contaminated groundwater, surface soils, subsurface soils, and soil gas vapors and;
- a significant environmental threat associated with the impacts of contaminants to surface soils, subsurface soils, and groundwater.

The site is presently enclosed by fencing which prevents public access and existing surface coverage prevents human exposure to contaminated materials. To eliminate or mitigate the threats, the NYSDEC has selected the following remedy:

- Excavation of visible MGP tar to eight feet below ground surface (bgs).
- Installation of on-site and off-site non-aqueous phase liquid (NAPL) migration barriers set at various depths.
- Installation of passive dense non-aqueous phase liquid (DNAPL) recovery systems.
- Installation of soil gas vapor control methods under any existing or new structures constructed on the site.
- Covering all vegetated areas with clean soil and all non-vegetated areas with either concrete or a paving system.

- Development of a site management plan to address residual contamination and any use restrictions.

- Imposition of an environmental easement.

- Annual certification of the institutional and engineering controls.

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 site is located in the Rockaway Park section of the Rockaway Peninsula in Queens County. The site is approximately nine acres in area located in an urban setting, adjacent to Jamaica Bay. The site is bounded by Beach 108th Street on the east, Beach Channel Drive to the north and Rockaway Freeway to the south and west. The majority of the site is undeveloped, with a vacant three-story office building and several open storage structures present on the site. It should be noted that a one-acre parcel in the northwest corner of the property is no longer considered part of the site. That portion was eliminated from the site description in 2000 as part of a redefinition of the site boundaries based upon available data. A new electric substation was built at this location (see Figure 3) to allow an existing 80 year-old substation located on the northeast corner of the site to be abandoned and subsequently demolished. The site location is noted on Figure 1 and the site layout is provided on Figure 2.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site was operated as a manufactured gas plant (MGP) from the late 1870's until 1958. During that time, the plant expanded several times as land was reclaimed from Jamaica Bay. The by-products of gas production that either spilled, leaked, or were disposed on the site are responsible for the contamination.

3.2: Remedial History

After an initial site assessment by KeySpan's predecessor company, Long Island Lighting Company (LILCO), in 1998, the NYSDEC listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

Starting in 1989, several investigations occurred at the site prior to the commencement of the state-approved remedial investigation. The first investigation was performed in 1989 on behalf of the United States Environmental Protection Agency (EPA). This study involved a site inspection and the collection of several surface soil samples. After that, in 1997, KeySpan commissioned its own initial site assessment. This work expanded on the 1989 investigation and included the collection of subsurface soil borings and groundwater samples as well as a thorough records search. In 1995, workers at the adjacent Mobil Station, west of the site, found a deposit of purifier waste while excavating beneath the station's parking lot. The discovery was reported to the Region 2 Spill Response Unit which referred the site to the EPA. The EPA deemed the remediation at the Mobil Station complete in 1997. Concurrent to the remedial investigation work, a removal occurred in the de-listed portion of the site to remove weathered tar prior to the installation of the new electric substation in the northwest corner.

SECTION 4: <u>ENFORCEMENT STATUS</u>

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 Corporation entered into a Consent Order on March 31, 1999. The Order obligates the responsible parties to implement a full remedial program.

SECTION 5: <u>SITE CONTAMINATION</u>

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: <u>Summary of the Remedial Investigation</u>

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 November 1999 and December 2003. The field activities and findings of the investigation are described in the RI reports. The following activities were conducted during the RI:

- Research of historical information;
- Geophysical survey to determine depth to bedrock;
- Soil gas vapors survey to locate VOC contaminated soils and possible vapor exposure pathways;
- Excavation of 8 test pits;
- Installation of 118 soil borings and 51 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Sampling of 57 new and existing monitoring wells;
- Collection of 78 discrete groundwater samples using a direct push technique;

- A survey of public and private water supply wells in the area around the site;

- Collection of 44 aquatic sediment samples; and

- Collection of 3 indoor air samples.

To determine whether the soil, groundwater, sediment, soil gas vapors, and air 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".

- Sediment SCGs are based on the NYSDEC "Technical Guidance for Screening Contaminated Sediments."

- Indoor air SCGs are based on the New York State Department of Health Database summary of indoor and outdoor air sample results in control homes collected and analyzed by NYSDOH from 1989 through 1996.

Comment [COMMENT1]: NYSEG Bridge Street ROD No:5-10-016 March 2004

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 entire site is underlain with various sand deposits. The uppermost layers are fill pumped from the bay. Much of the area of the site was recovered from Jamaica Bay during the 1920's. The sand continues down into a barrier island deposit, followed by a transitional deposit under that, beneath which is a glacial outwash deposit. There is no known confining layer until bedrock which is identified in literature at roughly 980 feet below the current ground surface. However, subsurface sampling has identified thin bands of coarser sand within the apparently homogenous sand overburden. These bands appear to act as preferential pathways for lateral migration of DNAPL which, at this site, is MGP tar.

Groundwater at the site is encountered at roughly eight feet below grade. The groundwater flow is generally to the north northeast. However, the groundwater immediately beneath the site is heavily influenced by tidal effects which causes fluctuations in groundwater levels and a near reversal in horizontal groundwater flow during high tide. The groundwater at the surface is brackish and is not bounded by any known aquatard.

5.1.2: <u>Nature of Contamination</u>

As described in the RI report, many soil, groundwater and sediment 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), semivolatile organic compounds (SVOCs), and cyanide.

Specific volatile organic compounds of concern are benzene, toluene, ethylbenzene and xylenes. These are referred to collectively as BTEX in this document.

The specific semivolatile organic compounds of concern in soil and groundwater are the following polycyclic aromatic hydrocarbons (PAHs):

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

The italicized PAHs are probable human carcinogens. The summation of the italicized PAHs are referred to as cPAHs.

MGP tars are present at the site in the form of a dense oily liquid which does not readily dissolve in water. Materials such as this are typically found at MGP sites and are referred to as non-aqueous phase liquids or NAPL. Since this liquid is more dense than water, it is also referred to as a dense NAPL or DNAPL. Analysis of the NAPL reveals that it contains BTEX and PAHs several orders of magnitude greater than the SCGs for these compounds. The NAPL was found to saturate certain areas of the subsurface and/or exist in scattered, discontinuous globules. Any of these conditions could coincide with high BTEX and PAH concentrations in soil, groundwater, and soil gas.

An inorganic contaminant of concern is cyanide. Cyanide, bound to iron to form ferric ferro cyanide, is found in the remnants of purifier waste. Purifier waste is generally made of wood chips which were impregnated with iron filings. The manufactured gas was passed over the chips and impurities were filtered out. The chips were occasionally replaced and spent chips were landfilled. The chips carried a species of cyanide as well as sulfur and nitrogen oxides. This ferric ferro cyanide can leach from the wood chips. While it is not dangerous in its bound form, certain conditions can release cyanide, causing an exposure risk both for humans and the environment.

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 billion (ppb) for water, parts per million (ppm) for waste, soil, and sediment, and micrograms per cubic meter ($\mu g/m^3$) for air samples. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in surface soils, subsurface soils, groundwater, sediment, and indoor air 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.

Waste Materials

The waste materials of concern for this site are the purifier waste deposits and the MGP tar deposits. The primary waste material found on the site is MGP tar. The source areas for MGP tar at the Rockaway Park site are typical of those found at other MGP sites. The gas holders, tar separator, and skimming basin are the main sources of MGP tar. The MGP tar can be found under nearly the entire site. At some locations the tar extends from the surface to over 90 feet below grade, with leading traces (e.g. sheens and odors) found as deep as 120 feet below grade. The extent of this material is noted on Figures 3 and 4. Additionally, a small portion of the MGP tar mass has been found in small, slightly coarser bands of sand to the north of the site, along the north side of Beach Channel Drive.

The other waste on-site is purifier waste. The purifier waste deposits generally do not migrate and are located in the areas where they were originally dumped. These areas are on-site and off-site and tend to be in fill areas which were historically reclaimed from Jamaica Bay. Deposits of these purifier wastes have been found in various fill areas on the West side of the site and along the bulkhead area. These fill deposits are generally within eight feet of the ground surface.

Surface Soil

Surface soil (the upper 0-2 inches of soil) samples were collected across the site. These samples were analyzed for VOCs, SVOCs, and metals, which includes cyanide. Contaminated surface soil presents a potential exposure route through ingestion, dermal contact, or through the breathing of dust or vapors coming from the surface soil. While BTEX was detected, all of the detections were below the New York State Recommended Soil Cleanup Objectives from the Technical Administrative Guidance Memorandum 4046 (TAGM 4046). PAHs were found across the site in the majority of the surface soil samples. The maximum detections of PAHs were, in the majority of samples, above the individual SCGs. The highest levels were generally found in the area of the former electric substation in the northeast corner of the site. Cyanide was found in all of the samples analyzed for cyanide, with the maximum concentrations generally found in the former electric substation.

Subsurface Soil

The subsurface soil beneath the site contains PAHs, BTEX, and cyanide. Roughly one quarter of all the samples analyzed showed detections of BTEX compounds, ranging in individual values from non-detect to 5900 ppm. Of the samples collected, less than a quarter of them exceed the SCGs for individual BTEX. The locations of the highest concentrations of these chemicals are associated with the DNAPL sources across the site. Outside of the DNAPL zones, the levels of BTEX decrease rapidly. The same pattern of detection is found with the PAHs on the site. The highest single PAH level is 9600 ppm for naphthalene. More of the subsurface samples exceeded the PAH SCGs. The number of samples that exceeded depended on which PAH it was. The highest number of exceedances was for benzo(a)pyrene. Roughly half of the samples collected showed cyanide. The highest cyanide value, of 262 ppm, is associated with a MGP carbonization tar, which is known for its high levels of cyanide. Most of the high concentrations of cyanide, however, are associated with deposits of purifier waste. The majority of the cyanide found in the subsurface is shallow (0-8 feet below grade). These contaminants in the subsurface are an environmental concern as they act as a potential source of groundwater contamination.

Sediments

Sediment samples, in this case the sandy bottom of Jamaica Bay, were collected in the vicinity of the bulkhead adjacent to the MGP site, from the surface, as well as at depth. The majority of the samples contained only minor levels of BTEX and PAHs and no cyanide. These levels are considered to represent background conditions and can be attributed to non-point sources. The only exceptions were in three samples taken only a few feet from the bulkhead, directly north of the site where a thin seam of visually contaminated material was encountered at two to four feet below the sediment surface. This is where the highest VOC and PAH levels were located. It is believed that this is an isolated area associated with a free phase contaminant which does not represent a human health or environmental exposure risk. The only elevated level of cyanide came from a sample at the eastern edge of the bulkhead just off the shore line, at 0.35 ppm. This isolated cyanide contamination does not represent a significant exposure potential to humans or the environment. The locations of the sediment samples are noted in Figure 5.

Groundwater

Groundwater contamination is evident across the entire site, extending only a small distance beyond the site limits. The limited off-site migration of the groundwater contamination is believed to be due to the large tidal influence on the groundwater flow beneath the site and the natural break down of those contaminants away from the source areas. There are two plumes originating on the site as shown on Figure 6. One is associated with the DNAPL source areas and is present under most of the site with a small portion of it proceeding to the north. A second plume, containing only BTEX compounds travels from the southeast corner of the site to the northeast and across Beach 108th Street. This second plume terminates under the wastewater treatment plant to the east of the site. The BTEX compounds found in the plumes are at levels much higher than the PAHs, as would be expected due to their higher solubility. The maximum concentrations for the individual BTEX compounds ranges from 9,900 ppb to 61,000 ppb. The maximum concentration was for benzene. Less than half of the samples collected have contaminant levels that exceed the SCGs for the individual BTEX compounds. The maximum PAH concentrations range from 410 ppb to 9,860 ppb, excluding naphthalene. With the exception of naphthalene, only a handful of the samples had contaminant levels that exceed the SCGs. Naphthalene is found at a maximum concentration of 38,900 ppb. Again, naphthalene is more prevalent than the other PAHs in the groundwater because of naphthalene's relatively high solubility. Naphthalene levels exceed SCGs more times than any other contaminant with the exception of benzene. Cyanide is also present in some of the wells. It is found mostly in the shallow wells at low levels. The maximum concentration of cyanide is 4.67 ppb. This location is most likely linked to a deposit of purifier waste removed during the new substation construction work. Cyanide exceeds SCGs in only a small fraction of the samples analyzed for cyanide. The groundwater contamination represents a low exposure potential because it is not used as a drinking water source, but could be a concern if the site were developed. The potential environmental hazard associated with the contaminated groundwater is due to its potential discharge into Jamaica Bay.

Soil Gas Vapors

Twenty five soil gas vapor samples were collected across the site and analyzed for BTEX compounds and naphthalene. Naphthalene was not detected in any of the samples. BTEX compounds were detected in all samples. The most common of the BTEX compounds detected was toluene. Toluene also provided the highest single concentration of 1,800 $\mu g/m^3$. The highest total BTEX concentration was also 1,800 $\mu g/m^3$. It should be noted that the next highest level of BTEX was due to toluene which was upgradient of the site.

Air

Three indoor samples, one from the office building and two from open storage structures onsite, and one ambient air sample were collected from the site. The samples were analyzed for BTEX compounds and naphthalene. Only one sample, taken from the office building on the north side of site, showed any detectable contaminants. A total BTEX concentration of 33.2 $\mu g/m^3$ was detected. This was comprised of mainly xylene with the only other constituent being toluene. Naphthalene was not detected in any of the air samples.

5.2: <u>Interim Remedial Measures</u>

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.

One IRM was completed on the site in March 2002. The purpose of the IRM was to remove a deposit of purifier waste located at the ground surface and perform a removal of piping (cut-and-plug) in the publically-owned bulkhead property to the north of the site. The purpose of the purifier waste removal was to prevent human exposures. The purpose of the cut-and-plug was to eliminate possible preferential pathways for tar from the site to migrate off-site. Due to the structural instability of the bulkhead at the time, the waste removal was deemed unsafe and not conducted. However, the cut and plug did proceed and three pipes were cut and the sections within the bulkhead area were removed. The pipes were then plugged with bentonite and their ends were noted for future reference. The bulkhead has now been repaired and the originally proposed removal, with an expanded scope, has been completed.

5.3: <u>Summary of Human Exposure Pathways</u>:

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 6.2 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 currently no completed human exposure pathways at the site due to the following:

- buildings, pavement, gravel and grass cover across the site;
- a fence and gates control access to the site; and
- a public water supply provides potable water to the site and surrounding area.

However, in the absence of remediation, the following potential exposure pathways exist:

- humans could come into direct contact with, or incidentally ingest, contaminated soils if existing cover materials are removed and existing security measures that restrict access to the site do not continue;
- humans may inhale contaminated air-borne particulates if existing cover materials are removed and dust is generated;
- humans may be exposed to indoor air contamination if measures are not taken to minimize potential vapor intrusion to new buildings; and
- humans may be exposed to contaminated groundwater if a private well is installed for non-potable use (e.g., as a production well) or for a supplemental source of potable water.

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:

- At this time, sediment sampling has not indicated any significant impacts to Jamaica Bay that require remediation. However, contamination from the migration of DNAPL and groundwater from the site could potentially enter Jamaica Bay. Jamaica Bay is an environmentally sensitive area which includes several tidal wetland areas, as well as many species of flora and fauna. Furthermore it is a valuable recreational resource to the surrounding community. The contamination of the bay with MGP by-products could lead to a decrease in the bay's ability to support wildlife and could potentially lead to its devaluation as a recreational asset.

Site contamination has also impacted the groundwater resource in the fill, barrier island and glacial outwash deposits underneath the site.

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 PAHs, BTEX, and cyanide in soil, groundwater and soil gas vapors;

- environmental exposures of flora or fauna to PAHs, BTEX, and cyanide in soil, groundwater, soil gas vapors and sediment;

- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and

- the release of contaminants from surface soil, subsurface soil, soil gas vapors, groundwater, and sediment into surface water, indoor air, ambient air, sediment, and soil gas vapors through storm water erosion, vaporization, wind borne dust, and groundwater discharge.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards and

- recommended soils cleanup values for surface soils.

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 LILCO - Rockaway Park 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. 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 soils, groundwater, and soil gas vapors at the site. Sediment sampling did not indicate any significant impacts that require remediation.

Alternative 1: No Further Action

Present Worth: *$1,500,000*
Capital Cost: *$0*
Annual OM&M: *$100,000*

The No Further Action alternative recognizes remediation of the site conducted under a previously completed IRM. To evaluate the effectiveness of the remediation completed under the IRM, only continued monitoring is necessary.
This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2: Soil Cover and Passive NAPL Recovery

Present Worth: *$11,300,000*

Capital Cost: *$9,800,000*
Annual OM&M: *$100,000*

The installation of a soil cover would prevent human exposures to contaminated media and would limit the infiltration of storm water which would reduce contact with the DNAPL reducing its' contribution to the groundwater contamination. Passive DNAPL collection, which is the collection of DNAPL from collection wells, would reduce the volume of DNAPL in the subsurface which should prevent some further migration and reduce its ability to act as a source of groundwater contamination. A critical component of this remedy would be institutional controls, in the form of an environmental easement, to prevent the use of groundwater, control intrusive ground work and minimize the potential for soil gas vapor intrusion into any newly constructed buildings on the property. Long-term groundwater monitoring and monitoring of the soil cover integrity would also be necessary. The construction phase of the project would require six months to complete.

Alternative 3: Soil Cover, Shallow Source Excavation, and Passive NAPL Recovery

Present Worth: *$24,300,000*
Capital Cost: *$22,800,000*
Annual OM&M: *$100,000*

This alternative would be the same as Alternative 2, but in addition to the soil cover and NAPL recovery there would be a shallow source excavation down to 8 feet below grade, the depth to the groundwater surface. This would remove visible tar in the subsurface to further reduce the potential for human exposures, mobilization of tar to Jamaica Bay and groundwater contamination. It is anticipated that the on-site groundwater will not achieve SCGs. The source removal will only reduce the groundwater contaminant levels slowly over time, but the tidal influence on the groundwater means the plume area is expected to remain stable. This reduction and the plume stability would be confirmed with long-term groundwater monitoring. While this removal would preclude the necessity of some of the institutional controls, an environmental easement would still be necessary to include a restriction on groundwater use, a site management plan for soil cover maintenance and groundwater monitoring, as well as soil gas vapor protection for future construction. The construction phase of the project would require one year to complete.

Alternative 3A: Soil Cover, Shallow Source Excavation (18 feet), and Passive NAPL Recovery

Present Worth: *$54,400,000*
Capital Cost: *$52,900,000*
Annual OM&M: *$100,000*

This alternative would be the same as Alternative 3 but would include a deeper excavation to remove more source material. This additional excavation would mean even less potential for human exposures, groundwater contamination, and less chance contamination would migrate to Jamaica Bay. It is anticipated that the source removal will lead to a reduction in levels of contaminants in the groundwater, but it will only reduce slowly over time because a large fraction of the source material will remain in place, but the plume area is expected to remain stable. This reduction and the plume stability would be confirmed with long-term groundwater monitoring. However many of the same institutional controls and long-term monitoring necessary under Alternative 3 would still be required to prevent human and ecological exposures. The construction phase for this alternative would require one and a half years to complete.

Alternative 4: Soil Cover, Shallow Source Excavation, 50 foot on-site NAPL migration barrier, and Passive NAPL Recovery

Present Worth: *$27,900,000*
Capital Cost: *$26,400,000*
Annual OM&M: *$100,000*

This alternative would have the same components of Alternative 3, but it would also include a subsurface NAPL migration barrier along the north edge of the site which would extend down to fifty feet below grade. This additional component would not prevent future human exposures, but would prevent further migration of deep tar off the site and potentially into Jamaica Bay. The environmental easement for this remedy would include the same institutional controls and long-term monitoring necessary for Alternative 3. The construction phase for this alternative would require two years to complete.

Alternative 4A: Soil Cover, Shallow Source Excavation, 50 and 120 foot on-site NAPL migration barrier, 70 foot off-site NAPL migration barrier, and Passive NAPL Recovery

Present Worth: *$30,200,000*
Capital Cost: *$28,700,000*
Annual OM&M: *$100,000*

This alternative would have the same components of Alternative 4, but the design of the subsurface migration barrier would be more complex to insure no additional NAPL migration occurs. This alternative calls for the 50 foot NAPL barrier of Alternative 4, but that barrier would be extended to 120 feet below grade in the center of the north boundary of the site to prevent the very deep tar deposits from migrating off-site. An additional NAPL migration barrier, extending to seventy feet below grade, would be installed north of the site in the bulkhead area. This would prevent migration of the remaining tar that is under Beach Channel Drive. While the other components in this alternative would prevent human exposures, this component's objective is to prevent further migration of deep tar off the site and potentially into Jamaica Bay. A similar environmental easement as for Alternative 4 would be necessary for this remedy. The construction phase for this alternative would require two and a half years to complete.

Alternative 5: Soil Cover, Shallow Source Excavation, 50 and 120 foot on-site NAPL migration barrier, *In situ* Stabilization, and Passive NAPL Recovery

Present Worth: *$47,300,000*

Capital Cost: *$45,800,000*
Annual OM&M: *$100,000*

This alternative would have many of the same components of Alternative 4A, but instead of addressing the tar under Beach Channel Drive and the bulkhead with a subsurface NAPL migration barrier, *in situ* stabilization would be used to contain and prevent the tar from migrating. Most of the same institutional controls and long-term monitoring necessary for Alternative 4A would be necessary for this remedy. The construction phase for this alternative would require two and a half years to complete.

Alternative 6: Restoration of the site to Pre-release conditions

Present Worth: *$195,000,000*

This alternative would include the removal of all contaminated material at the site to a maximum depth of 120 feet below grade. As this alternative was discounted during the initial screening of alternatives, a detailed cost estimate was not prepared. The cost estimate is based solely on the estimate of 1.3 million cubic yards of soil to be removed at $150 per cubic yard. This alternative would require four to five years to complete the construction phase, and would still require institutional controls to prevent the use of groundwater at the site until monitoring had shown the groundwater had, through natural attenuation, met the Ambient Water Quality Standards and Guidance Values.

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-Effectivness. 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.

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. In general, the public comments received were supportive of the selected remedy.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the Administrative Record (Appendix B) and the discussion presented below, the NYSDEC has selected Alternative 4A, Soil Cover, Shallow Source Excavation, 50 and 120 foot on-site NAPL migration barrier, 70 foot off-site NAPL migration barrier, and Passive NAPL Recovery 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.

Alternative 4A is being selected because, as described below, it satisfies the threshold criteria by preventing both human exposures and ecological exposures and provides the best balance of the primary balancing criteria described in Section 7.2. It will achieve the remediation goals for the site by removing soils at or near the surface which would potentially expose people, flora, and fauna to PAHs, BTEX, and cyanide. This removal also prevents the contamination of shallow groundwater and, therefore, the production of soil gas vapors. Flora and fauna are further prevented from exposure to contaminated media through the NAPL migration barriers, and NAPL collection. This also prevents source material from acting as a source of deep groundwater contamination. Finally, the soil cover, source removal, NAPL migration barriers, and NAPL collection all work together to prevent contamination from transferring from one media to another. It is not anticipated that groundwater SCGs will be obtained on-site. It should be noted that all the alternatives, with the exception of Alternative 6, would result in very limited on-site groundwater contamination reduction over time due to the large fraction of source material still in place in the subsurface. However, the plume is not expected to enlarge in size and some reduction should occur.

As remedial Alternatives 2, 3, 3A, 4, 5, and 6 also met the two threshold criteria, the decision to choose this remedy rested upon the remaining five balancing criteria.

Alternative 2 would require the least construction with the shortest construction time and therefore, would have the least short-term impacts. Alternative 6, with its extended schedule and massive scale of construction would present the most short term impacts. Alternative 3A also would have greater short-term impacts due to the deeper excavation . Alternatives 3, 4, 4A, and 5 would all have similar short-term impacts due to the same shallow excavation and installation of similar remedial components. Of these, Alternatives 4 and 5 would have the longest construction schedules at two and a half years, although still significantly less than the time required for Alternative 6.

Alternative 6 would have the best long-term effectiveness. Alternatives 2 and 3 would have long-term effectiveness that rely heavily on institutional controls which is less preferred. Remedial Alternatives 3A, 4, and 4A would have proven long term effectiveness (from the source removal, NAPL collection, and NAPL migration containment barriers) which rely more on enforceable ongoing maintenance procedures. Alternative 5, with its use of *in situ* stabilization, has an indeterminate long-term effectiveness as the long-term effectiveness of stabilization is, as yet, unproven.

Alternative 6 would have the greatest reduction of toxicity, mobility or volume. Alternative 2 would have minimal reduction in mobility and no reduction in toxicity or volume. The remaining active Alternatives (3, 3A, 4, 4A, and 5) would have similar levels of reduction due to the source removal, NAPL collection, and containment aspects of each alternative. However, of those six alternatives, 4A would represent the most feasible and implementable overall reduction in toxicity, mobility, and volume due to the source removal combined with the NAPL collection, soil cover, and the various deep NAPL migration barriers which provide containment.

Alternative 2 would be the most easily implemented. Alternative 6, due to the extensive deep excavation, for all intents and purposes, would not be implementable. The support activities required to excavate that deep under the soil and groundwater conditions at the site would make implementing this alternative unusually complex. Any excavation below the groundwater table to the depth required for a significant source removal would be nearly infeasible, as the subsurface geology makes dewatering the excavation extremely difficult to achieve. This is due to the subsurface geoleogy at the site, as the underlying sand is highly permeable, allowing sea water to laterally flow in from the adjacent Jamaica Bay and Atlantic Ocean at a very high rate. There is also no known confining aquatard until you reach the Raritan Confining Unit at roughly 500 below sea level. Alternatives 3, 4, and 4A would all be roughly equally implementable, as the excavation in those options cease at the groundwater level. However, 3A, with its excavation below the groundwater level, and 5, with its *in situ* stabilization, would be less implementable than 3, 4, and 4A.

Cost-effectiveness varies greatly between the alternatives. Alternative 6 would be several times more costly than the next highest alternative and would provide no greater protection from exposure than all but Alternative 2. While Alternative 2 would be the least costly it would provide the least protection from exposures. This would leave Alternatives 3, 3A, 4, 4A, and 5. Alternatives 3, 4, and 5 would provide less or equal protection than the remaining two for roughly the same cost or greater. Alternative 3A's cost would be almost twice that of 4A due to the proposed excavation depth below the groundwater table and there would still be a large amount of waste left which would not be contained. Alternative 4A, through source removal, soil cover, migration barriers, and NAPL collection, will address all of the source material and will still be the alternative in the middle of the cost range.

The estimated present worth cost to implement the remedy is $30,200,000. The cost to construct the remedy is estimated to be $28,700,000 and the estimated average annual operation, maintenance, and monitoring costs for 30 years is $100,000.

The elements of the selected remedy are as follows:

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

2. Shallow excavation will occur in specified areas to the depth of groundwater, at approximately eight feet below grade, to remove source material. Source material is described as soils containing visible tar, oils, or purifier wastes.

3. Installation of a DNAPL migration barrier along the north edge of the site which will extend to 120 feet below grade in the central portion of the site and to 50 feet below grade on either side of that. The specific technology used to create this barrier will be decided in the design process, but it will most likely be either a slurry wall or a jet grout barrier.

4. Installation of a DNAPL migration barrier along the bulkhead area which will extend to 70 feet below grade.

5. Installation of several passive DNAPL collection wells on-site at areas of heavy mobile DNAPL concentration and in the bulkhead area.

6. Installation of a soil cover across the entire site. The cover will consist of two feet of clean soil with a geotextile construction barrier underlying the soil cover. In areas where buildings or pavement related to future development are planned, the soil cover will not be necessary

7. The site will be restored by grading, placement of topsoil, and seeding of excavated and/or filled areas.

8. The installation of sub-slab depressurization systems will be required under any existing and newly constructed buildings on the site.

9. Development of a site management plan 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) provide for the operation and maintenance of the components of the remedy; and (c) identify any use restrictions on site development or groundwater use.

10. KeySpan will provide an annual certification, prepared and submitted by a professional engineer or environmental professional acceptable to the NYSDEC, which will 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 soil management plan.

11. Imposition of an institutional control in the form of an environmental easement that will: (a) require compliance with the approved site management plan, (b) limit the use and development of the property to restricted residential, commercial, or industrial, subject to approval by the appropriate agencies; (c) restrict use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the New York City Department of Health; and, (d) require the property owner to complete and submit to the NYSDEC an annual certification.

12. The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

13. Since the remedy results in untreated hazardous waste remaining at the site, a long term monitoring program will be instituted, as described in the site

management plan. Groundwater monitoring, and NAPL collection will occur at regular intervals every year. This program would allow the effectiveness of the source removal, NAPL collection and NAPL migration barriers to be monitored and would be a component of the operation, maintenance, and monitoring for the site.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation 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 September 8, 2004 to present and receive comment on the PRAP.
- A responsiveness summary (Appendix A) was prepared to address the comments received during the public comment period for the PRAP.

TABLE 1
Nature and Extent of Contamination
(July, 1989- November, 2003)

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND[d]- 0.016	0.06	0 of 42
	Toluene	ND-0.028	1.5	0 of 42
	Ethylbenzene	ND-0.002	5.5	0 of 42
	Xylenes	ND-0.014	1.2	0 of 42
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND-79	0.224	46 of 50
	Benzo(a)pyrene	ND-66	0.061	49 of 50
	Benzo(b)fluoranthene	ND-71	1.1	40 of 50
	Benzo(k)fluoranthene	ND-35	1.1	31 of 50
	Chrysene	ND-100	0.4	44 of 50
	Dibenzo(a,h)anthracene	ND-13	0.014	31 of 50
	Indeno(1,2,3-cd)pyrene	ND-41	3.2	21 of 50
	2-Methylnaphthalene	ND-42	36.4	1 of 50
	Acenaphthene	ND-3	50	0 of 50
	Acenaphthylene	ND-26	41	0 of 50
	Anthracene	ND-16	50	0 of 50
	Benzo(g,h,i)perylene	ND-38	50	0 of 50
	Fluoranthene	0.2-130	50	5 of 50
	Fluorene	ND-8.6	50	0 of 50
	Naphthalene	ND-49	13	3 of 50
	Phenanthrene	ND-210	50	4 of 50

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	Pyrene	0.2-340	50	7 of 50
Inorganic Compounds	Cyanide	0.13-794	-	-

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND-490	0.06	89 of 480
	Toluene	ND-2000	1.5	51 of 476
	Ethylbenzene	ND-2800	5.5	95 of 473
	Xylene	ND-5900	1.2	112 of 478
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND-960	0.224	199 of 479
	Benzo(a)pyrene	ND-560	0.061	234 of 479
	Benzo(b)fluoranthene	ND-560	1.1	153 of 479
	Benzo(k)fluoranthene	ND-290	1.1	128 of 479
	Chrysene	ND-940	0.4	188 of 479
	Dibenzo(a,h)anthracene	ND-55	0.014	129 of 479
	Indeno(1,2,3-cd)pyrene	ND-250	3.2	95 of 479
	2-Methylnaphthalene	ND-5750	36.4	87 of 479
	Acenaphthene	ND-1800	50	57 of 479
	Acenaphthylene	ND-1590	41	35 of 479
	Anthracene	ND-1000	50	62 of 479
	Benzo(g,h,i)perylene	ND-230	50	12 of 479
	Fluoranthene	ND-1600	50	70 of 479
	Fluorene	ND-1800	50	65 of 479
	Naphthalene	ND-9600	13	109 of 479
	Phenanthrene	ND-5900	50	86 of 479

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	Pyrene	ND-3100	50	84 of 479
Inorganic Compounds	Cyanide	ND-262	-	-

SEDIMENTS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND-0.002	-	-
	Toluene	ND-0.002	-	-
	Ethylbenzene	ND-1.2	-	-
	Xylene	ND-0.073	-	-
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND-29	ERL[c]-0.26	30 of 43
			ERM[c]-1.6	11 of 44
	Benzo(a)pyrene	ND-24	ERL-0.43	18 of 44
			ERM-1.6	8 of 44
	Benzo(b)fluoranthene	ND-18	-	-
	Benzo(k)fluoranthene	ND-8.5	-	-
	Chrysene	ND-30	ERL-0.38	29 of 44
			ERM-2.8	5 of 44
	Dibenzo(a,h)anthracene	ND-2.8	ERL-0.06	36 of 44
			ERM-0.26	31 of 44
	Indeno(1,2,3-cd)pyrene	ND-8.3	-	-
	2-Methylnaphthalene	ND-12	ERL-0.07	30 of 44
			ERM-0.67	10 of 44
	Acenaphthene	ND-170	ERL-0.02	33 of 44
			ERM-0.5	12 of 44

SEDIMENTS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	Acenaphthylene	ND-22	ERL-0.04	37 of 44
			ERM-0.64	7 of 44
	Anthracene	ND-63	ERL-0.09	35 of 44
			ERM-1.1	7 of 44
	Benzo(g,h,i)perylene	ND-8.6	-	-
	Fluoranthene	ND-49	ERL-0.6	22 of 44
			ERM-5.1	5 of 44
	Fluorene	ND-50	ERL-0.02	33 of 44
			ERM-0.54	9 of 44
	Naphthalene	ND-190	ERL-0.16	29 of 44
			ERM-2.1	5 of 44
	Phenanthrene	ND-200	ERL-0.24	32 of 44
			ERM-1.5	10 of 44
	Pyrene	ND-86	ERL-0.67	24 of 44
			ERM-2.6	14 of 44
Inorganic Compounds	Cyanide	ND-0.35	-	-

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND-61,000	1	93 of 228
	Toluene	ND-118,000	5	61 of 228
	Ethylbenzene	ND-9,900	5	89 of 228
	Xylene	ND-41,000	5	88 of 228
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND-1,350	0.002	24 of 227
	Benzo(a)pyrene	ND-790	-	-

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
	Benzo(b)fluoranthene	ND-460	0.002	18 of 227
	Benzo(k)fluoranthene	ND-550	0.002	10 of 227
	Chrysene	ND-1,470	0.002	21 of 227
	Indeno(1,2,3-cd)pyrene	ND-410	0.002	8 of 227
	Acenaphthene	ND-4,690	20	52 of 227
	Anthracene	ND-9,860	50	5 of 226
	Fluoranthene	ND-1,720	50	5 of 227
	Fluorene	ND-4,590	50	26 of 227
	Naphthalene	ND-38,900	10	90 of 228
	Phenanthrene	ND-7,720	50	35 of 227
	Pyrene	ND-4,490	50	8 of 227
Inorganic Compounds	Cyanide	ND-4.67	0.2	23 of 136

SOIL GAS	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG[b] (µg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND-714	-	-
	Toluene	4.6-1,800	-	-
	Ethylbenzene	ND-304	-	-
	Xylene	ND-158	-	-
Semivolatile Organic Compounds (SVOCs)	Naphthalene	ND	-	-

AIR	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG[b] (µg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic	Benzene	ND	-	-

AIR	Contaminants of Concern	Concentration Range Detected (μg/m³)[a]	SCG[b] (μg/m³)[a]	Frequency of Exceeding SCG
Compounds (VOCs)	Toluene	ND-10.7	-	-
	Ethylbenzene	ND	-	-
	Xylene	ND-22.5	-	-
Semivolatile Organic Compounds (SVOCs)	Naphthalene	ND	-	-

[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;
ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values;

[c] ER-L = EffectRange - Low and ER-M = Effect Range - Moderate.

[d] ND = not detected

Table 2
Remedial Alternative Costs

Alternative Number	Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
1	No Action	$0	$100,000	$1,500,000
2	Soil Cover and Passive NAPL Recovery	$9,800,000	$100,000	$11,300,000
3	Soil Cover, Shallow Source Excavation, and Passive NAPL Recovery	$22,800,000	$100,000	$24,300,000
3A	Soil Cover, Shallow Source Excavation (18 feet), and Passive NAPL Recovery	$52,900,000	$100,000	$54,400,000
4	Soil Cover, Shallow Source Excavation, 50 Foot On-site NAPL Migration Barrier, and Passive NAPL Recovery	$26,400,000	$100,000	$27,900,000
4A	Soil Cover, Shallow Source Excavation, 50 and 120 Foot On-site NAPL Migration Barrier, 70 Foot Off-site NAPL Migration Barrier, and Passive NAPL Recovery	$28,700,000	$100,000	$30,200,000
5	Soil Cover, Shallow Source Excavation, 50 and 120 Foot On-site NAPL Migration Barrier, *In situ* Stabilization, and Passive NAPL Recovery	$45,800,000	$100,000	$47,300,000
6	Restoration of the Site to Pre-release Conditions	$195,000,000	-	$195,000,000

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

LILCO - Rockaway Park MGP Site
Rockaway Park, Queens County, New York
Site No. 2-41-029

The Proposed Remedial Action Plan (PRAP) for the LILCO - Rockaway Park 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 August 18, 2004. The PRAP outlined the remedial measure proposed for the contaminated soil, sediment, groundwater, and soil gas vapors at the LILCO - Rockaway Park MGP site.

The release of the PRAP was announced by sending 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 September 8, 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 for the PRAP ended on September 22, 2004.

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: At the last meeting, a gentleman inquired about the contents of a monitoring well in his yard, what were the results of that question?

RESPONSE 1: NYSDEC prepared a data package specifically for him which gave him the data for that well (RPGP-12). The data indicated there were no contaminants detected in the well. That data is available in the Remedial Investigation Report.

COMMENT 2: I would like the tap water tested in my building down the street from the site. I am concerned about contaminants leaking into the water supply pipes.

RESPONSE 2: Based on the remedial investigation, there is no evidence that the contaminants from the site have migrated under your building. The contamination is not present in the same area and depth as the water supply pipes, and if it was, a small leak in the pipes would force water out, not allow contamination to move inside. If you are still concerned about your tap water, you can contact the New York City Department of Environmental Protection.

COMMENT 3: While work was being performed on the new substation, our office down the street was inundated with odors. A representative from the New York City Department of Environmental Protection tested the air and found trace amounts of chemicals in the air. I am concerned of the long-term effects of this exposure.

RESPONSE 3: The Department investigated the reports of odors during the new substation construction and determined they were attributable to the creosote-covered pilings being installed to support the substation which were stored on-site. The chemicals in creosote have a very low odor threshold. This means that you will smell those chemicals at very low concentrations. The exposure was short-term and it is unlikely there will be any long-term effects.

COMMENT 4: Contaminants were found under the Mobil station across the street from the site; what happened to that?

RESPONSE 4: Those contaminants were removed as part of a cleanup directed by the United States Environmental Protection Agency, as an emergency removal activity prior to the start of the Department's investigation of this site. The material was not there as a result of subsurface migration from the MGP site, but appear to have been placed there at some time during the filling that occurred as that area was reclaimed from Jamaica Bay.

COMMENT 5: Please further explain the concept of a collection well.

RESPONSE 5: It is a large diameter well that is placed in an area where we know there is tar in the subsurface. The tar will follow the path of least resistance and go into the well. These passive collection wells are regularly emptied of tar and, over time, they should have removed the mobile tar in the subsurface within the well's area of influence.

COMMENT 6: How much material are you planning to remove in the proposed remedy?

RESPONSE 6: It is estimated that about 80,000 cubic yards will be excavated for off-site disposal.

COMMENT 7: Will the excavation cause any contamination to become airborne?

RESPONSE 7: There is the possibility that excavation will allow some contaminants to become airborne. However, the design phase will evaluate this possibility and will include measures to minimize the possibility of public exposures to these particles. Monitoring of particulates and vapor will also be required during construction through a community air monitoring plan (CAMP)

COMMENT 8: What kind of things will you do to minimize exposures from airborne particles during excavation?

RESPONSE 8: During the design phase, several techniques for dust control will be evaluated. The methods of controlling the airborne emissions range from staging area tarping, to misting the soil to weigh the dust particles down, to erecting a temporary structure to enclose the working area . There will, at a minimum, be a set of monitoring stations set up along the perimeter to detect if any off-site releases of contaminants are occurring and allow Keyspan to initiate appropriate actions to eliminate them..

COMMENT 9: What is the proposed future use for the site?

RESPONSE 9: The future use of the site is not dictated by the remediation. For this site, NYSDEC and NYSDOH have determined that the remedy will allow for commercial, industrial, or restricted residential uses. The actual future use of the property can be determined by a future property owner, provided the use is in line with the requirements of the selected remedy, site management plan, and local zoning codes, etc. NYSDEC makes no decisions pertaining to the specific redevelopment of the site after selecting a remedy.

COMMENT 10: Would the site be suitable for a community center?

RESPONSE 10: Yes.

COMMENT 11: Which do you deem more toxic, the tars or the hydrocarbons that float on the water?

RESPONSE 11: As the tars are considered a more concentrated form of the contaminants, then it would be deemed more toxic. However, there are no completed human exposure pathways associated with the sheens found on the groundwater or with the tars in the subsurface.

COMMENT 12: I am concerned that the many private irrigation wells on the peninsula are drawing the contaminants into them.

RESPONSE 12: If those wells were present, the high hydraulic conductivity of the sand in which the groundwater is found would not result in a sufficient draw-down by those wells to influence the groundwater flow and draw any contaminants from the site into those wells. This is confirmed with the groundwater data collected off-site which shows the groundwater contamination has not migrated under any off-site private properties.

COMMENT 13: Doesn’t groundwater flow from north to south? I understand that is the regional groundwater flow direction.

RESPONSE 13: While groundwater in the majority of Queens may flow from north to south, in the Rockaways, specifically at this site, groundwater flow is generally from south to north. Tidal changes do influence the groundwater flow at the site and can, sometimes, reverse the groundwater flow for short periods of time under the site, but the predominant direction of groundwater flow at the site is from south to north.

COMMENT 14: Is there contaminated groundwater off-site?

RESPONSE 14: Groundwater contamination exists off-site, as indicated in the remedial investigation reports, a short distance to the south and north, and it is found under the wastewater treatment plan to the east. However, groundwater contamination has not been identified under any private properties in the area.

COMMENT 15: Have you considered steam recovery as a treatment option?

RESPONSE 15: Steam recovery is not an effective option at this site because the sand in the subsurface would allow the tar to migrate vertically and you would likely not recover much tar, but instead could cause the tar to migrate over a larger and deeper area.

COMMENT 16: New York City has placed several monitoring stations along the water main in our area. Is this due to the contaminants getting into the water main?

RESPONSE 16: No, according to the New York City Department of Environmental Protection (DEP) website, the monitoring stations were installed at various points within all five boroughs to allow for more efficient means of sampling the drinking water and to bring the water supply system in compliance with federal and State drinking water regulations. Also, please refer to Response 2.

COMMENT 17: Is it acceptable to perform a remediation without removing all the contaminants?

RESPONSE 17: Yes.

COMMENT 18: Why is capping not acceptable?

RESPONSE 18: Capping, by itself, would not provide long-term protection from potential impacts to Jamaica Bay. Also, capping would not be effective given the likelihood of excavation for future development on the site.

COMMENT 19: Is there a sheen noted in Jamaica Bay now?

RESPONSE 19: No.

COMMENT 20: Has this remediation been done elsewhere in the United States. If so, is it successful?

RESPONSE 20: This exact remediation, including all of the components, has not been performed elsewhere because it was developed specifically for the site. However, all the components of the remedy (excavation, NAPL collection, NAPL migration barriers, vapor control methods, soil cover, and institutional controls) have been performed successfully at other sites and it is reasonable to assume that combining the components will provide a more protective remedy. For example, excavation was successfully implemented at the Troy (Water Street) Site; NAPL collection has been successfully implemented at the Gowanus Site; migration barriers have been successfully implemented at the PAS site; vapor control methods have been successful at the IBM Endicott site; and soil cover and institutional controls have been implemented at the 153 Cedar Street Site in Oneida.

COMMENT 21: Can materials be brought to and from the site by barge instead of by truck?

RESPONSE 21: The option of barging material to and from the site will be evaluated in remedial design.

COMMENT 22: The community would prefer the future use of the site to be commercial in nature.

RESPONSE 22: See Response 9.

COMMENT 23: Is there a biological agent you could use to treat the groundwater and soils?

RESPONSE 23: While bio-remediation could work for the groundwater plume, those treatments have not been effective on the tar, which is the major source of the groundwater contamination. Therefore, you would have to continuously treat the groundwater or else the groundwater would become re-contaminated. It is not appropriate or necessary to treat and re-treat the groundwater if there are no exposure hazards associated with the groundwater plume and it is not feasible to treat or remove all the source materials to the depth to which they extend.

COMMENT 24: What is the time frame for the next steps?

RESPONSE 24: Comments were accepted until September 22nd. Now NYSDEC and NYSDOH will finalize the decision. After that, we estimate roughly a year to eighteen months for the remedial design phase and then approximately two and a half years for construction.

COMMENT 25: How much money has been spent on the investigation phase?

RESPONSE 25: As NYSDEC does not finance the investigation, we have no records of the investigation's cost.

COMMENT 26: Why does the completion date for this site keep getting moved back?

RESPONSE 26: As this is a large site, it has taken considerable time to complete the investigation to ensure that the extent of contamination is completely known.

COMMENT 27: Given the long time period left before the contamination will be addressed are there any protections in place to protect people from accidental exposures?

RESPONSE 27: There are currently no complete human exposure routes off-site and the site is fenced to prevent exposures. There is tar that is several feet below the sidewalk and does not represent a current exposure. NYSDOH and NYSDEC do not believe that the contaminants will move further prior to the start of remedial activities. The only location where this might have occurred was near the bulkhead and not only was a new bulkhead installed which will help to prevent releases to the bay, an interim remedial measure was performed to remove contaminants found in the bulkhead area near the surface.

James Quigley submitted an email (dated September 9, 2004) which included the following comments:

COMMENT 28: How will you prevent contaminants from becoming airborne during excavation?

RESPONSE 28: See Responses 7 and 8.

COMMENT 29: How many total yards of soil are considered to be contaminated?

RESPONSE 29: The total amount of contaminated soil is estimated to be about 1.2 million cubic yards. However the remedy will only remove about 80,000 cubic yards from the site and contain the remainder utilizing soil cover, NAPL containment barriers, and NAPL collection wells.

COMMENT 30: Where do you put the tars/contaminants after you pull them out?

RESPONSE 30: The contaminants collected from the collection wells will be sent off-site to a treatment/ disposal facility..

COMMENT 31: What problems to the environment would exist when removing the tars, etc., from the recovery system?

RESPONSE 31: The only potential problem would be if the contaminants were spilled once they were removed from the well. Precautions will be developed during design and taken when the tars are removed from the wells that prevent release to the environment.

COMMENT 32: Since the contaminants are isolated in the recovery system, wouldn't that be a good time to treat it with STI bio-remediation?

RESPONSE 32: The contaminants are not isolated in the recovery system. The well has a set of screens on the bottom which allows the tar to pass into it. The screens would also allow chemicals to pass into the subsurface. At this time, NYSDEC has been unsuccessful in obtaining basic information about the STI bio-remediation process and therefore can not consider it a viable treatment alternative at this site.

APPENDIX B

Administrative Record

Administrative Record

LILCO - Rockaway Park MGP Site
Site No. 2-41-029

1. Proposed Remedial Action Plan for the LILCO - Rockaway Park MGP Site, dated August, 2004, prepared by the NYSDEC.

2. Order on Consent, Index No. D1-0002-98-11, between NYSDEC and KeySpan Corporation, executed on March 31, 1999.

3. ''Phase 1 Site Investigation Report for the Rockaway Park Former Manufactured Gas Plant Site'', January, 1997, prepared by Atlantic Environmental

4. ''Remedial Investigation/ Feasibility Study Work Plan Rockaway Park Former MGP Site'', Volume 1, November, 1999, prepared by Dvirka and Bartilucci Consulting Engineers

5. "Remedial Investigation/ Feasibility Study Work Plan Rockaway Park Former MGP Site", Volume 2, November, 1999, prepared by Dvirka and Bartilucci Consulting Engineers

6. ''Remedial Investigation/ Feasibility Study Work Plan Rockaway Park Former MGP Site'', Volume 3, November, 1999, prepared by Dvirka and Bartilucci Consulting Engineers

7. ''Substation Investigation Report and Delisting Petition'', August, 2000, prepared by Dvirka and Bartilucci Consulting Engineers

8. ''Remedial Investigation Report'', December, 2002, prepared by Dvirka and Bartilucci Consulting Engineers

9. ''Final Summary Report for Rockaway Park Former Manufactured Gas Plant Site LIPA Rockaway Beach Substation Construction Environmental Support Activities'', January, 2004, prepared by Tetra Tech FW, Inc.

10. ''Final Remedial Investigation Report'', Volume 1, January, 2004, prepared by GEI Consultants, Inc.

11. ''Final Remedial Investigation Report'', Volume 2, January, 2004, prepared by GEI Consultants, Inc.

12. "Supplemental Groundwater Investigation Report", March, 2004, prepared by GEI Consultants, Inc.

13. "Supplemental Sediment Investigation", April, 2004, prepared by GEI Consultants, Inc.

14. ''Final Summary Report Rockaway Park Former Manufactured Gas Plant Site Interim Remedial Measure'', June, 2004, prepared by Tetra Tech FW, Inc.

15. ''Feasibility Study'', July, 2004, prepared by GEI Consultants, Inc.

16. ‘‘Citizen Participation Plan for the Rockaway Park Former MGP Site’’, April, 2002, prepared by Keyspan

17. Transcript of PRAP public meeting, September 8, 2004, prepared by Radazo Reporting, Inc.

18. Fact Sheet, ‘‘Notice of Public Meeting, Proposed Remedial Action Plan, LILCO Rockaway Park MGP Site’’, August, 2004

19. Email dated September 9, 2004 from James Quigley