Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

Former Hudson Manufactured Gas Plant Site
Water Street - Operable Unit 1
Hudson (C), Columbia County
NYSDEC Site Number 4-11-005

March 2001

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* Erin M. Crotty, Acting *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

Former Hudson Manufactured Gas Plant Site
Operable Unit 1: Former Plant and Embayment #1
City of Hudson, Columbia County, New York
Site No. 4-11-005

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Former Hudson Manufactured Gas Plant Site, Operable Unit 1, a class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Former Hudson Manufactured Gas Plant Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC and the United States Environmental Protection Agency (USEPA). A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste and substance 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 the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Former Hudson Manufactured Gas Plant Site and the criteria identified for evaluation of alternatives, the NYSDEC in consultation with the USEPA have selected source area soil excavation, including contaminated sediment removal for treatment and/or disposal. The components of the remedy are as follows:

- Excavation and removal of approximately 10,000 cubic yards (cy) of contaminated soils for source areas at the former plant.

- Installation of DNAPL collection wells, if determined necessary, in the source areas.

- Excavation and removal of the top 10 feet of contaminated sediments in embayment #1.

- Replacement of sediment with clean material to original contours and restoration of the upper 3 feet of sediment with materials similar to the native materials removed, to provide suitable habitat for benthic organisms.

- Institutional Controls and Long-term monitoring

New York State Department of Health Acceptance

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

Declaration

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

_____ _____

Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

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SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the United States Environmental Protection Agency (USEPA) and the New York State Department of Health have selected this remedy to address the potential threat to the public health and significant threat to the environment created by the presence of hazardous waste at the Former Hudson Manufactured Gas Plant Site, Operable Unit 1. As more fully described in Sections 3 and 4 of this document, this site is the location of a former coal gasification plant whose operation has resulted in the on-site disposal of hazardous waste and hazardous s consisting of coal tar and its various constituents. Consequently, soil, groundwater and Hudson River embayment #1 sediments at the site are contaminated with benzene, toluene, ethylbenzene and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs) including non aqueous phase liquids (NAPL). Some of these contaminants were released or have migrated from the site to embayment #1 (see Figure 2) of the Hudson River, where floating product and deposition in the sediments have been observed. These operations resulted in the following potential threat to the public health and significant threat to the environment*:*

- Soil contaminated by NAPL including BTEX and inorganics above Standards, Criteria, and Guidance values (SCGs)/Applicable or Relevant and Appropriate Requirements (ARARs).

- Groundwater contamination resulting from migration of NAPL and other contaminants from the subsurface soil.

- Sediment impacts resulting from migration of contaminants from the site and direct discharge of MGP byproducts including coal tar to an Hudson River embayment and potential migration of NAPL and oil sheen to the sediment and surface water of the Hudson River.

In order to restore the Former Hudson Manufacture Gas Plant Site to pre-disposal conditions to the extent feasible and authorized by law, but at a minimum to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous waste disposed at the site has caused, the following remedy was selected:

- Excavation and removal of approximately 10,000 cubic yards of contaminated soil and coal tar from former gas holders and other locations determined to be source areas, including pipes and bedding materials adjacent to embayment #1 (see Figures 3 and 4).

- Removal of the top 10 feet of contaminated sediments from embayment #1 (see Figure 4). If mobile NAPL impacted materials are visually observed beyond the proposed depth of excavation, these materials would be removed, to the extent feasible.

- Replacement of sediment to pre-removal contours, with the upper 3 feet restored with materials similar to the native materials removed, to provide a suitable habitat for benthic invertebrate colonization. Following the replacement of the sediment, the upper 3 feet of sediment will be sampled to verify and ensure that the replaced sediments have a total PAH value of less that 4 parts per million (ppm).

- Installation of collection wells (if determined necessary) in the areas of the former gas holders for the recovery of any residual mobile DNAPL that may not be removed by excavation.

- Deed restrictions to ensure non-residential use of the property, prevent use of groundwater and provide notification to future site construction workers regarding possible MGP residuals in the subsurface. In addition, a long-term monitoring plan would be implemented.

The selected remedy, discussed in detail in Section 8 of this document, is intended to attain the remediation goals selected for this site which are presented, in Section 6 of this Record of Decision (ROD), in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The site is located on Water Street on the east bank of the Hudson River in the City of Hudson, Columbia County, New York (see Figure 1). The site consists of approximately two acres of land on two lots identified as lots 15 and 16.2 on Figure 2, which are divided by Water Street. The former coal gasification plant was located on the eastern parcel. The site is bounded on the north by a vacant lot, formerly an inactive oil storage facility (Best Oil Terminal), on the east by CSX Transportation, Inc rail lines; on the south by a CSX maintenance yard and on the west by the Hudson River. The former manufactured gas plant (MGP) was operated on the eastern half of the site from approximately 1853 to 1949. This portion of the site, and the former plant building are currently used by SBD Warehouse/Dunn Builders Supply as a warehouse for lumber and building supplies.

Operable Unit No. 1, which is the subject of this PRAP, consists of the former MGP site (lots 15 and 16.2), including embayment #1of the Hudson River. An Operable Unit represents a portion of the site which 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 2, which includes Hudson River and embayment #2 sediments, which are potentially impacted by migration of on-site contaminants resulting from the operation of the former MGP.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The MGP was a facility where gas for lighting and heating homes and businesses was manufactured. The gas was produced either by a process which heated coal, or from a combination of coal, oil and water called the "carburetted water-gas" process. A coal gasification plant was operated on the eastern portion of the former Hudson MGP site from approximately 1853 to 1949.

On-site disposal of MGP by-products, including coal tar, from the operation of the plant has resulted in the contamination of soil and groundwater, as well as the adjacent embayment #1 of the Hudson River. These media were impacted through the combination of leaks from storage and processing facilities, including gas holders, and from direct discharge to embayment #1.

3.2: Remedial History

In July 1986, the Department was notified regarding an oil spill and sheens in embayment #1 on the east bank of the Hudson River, adjacent to the site. In response, the NYSDEC Oil Spill Program excavated and stockpiled approximately 2,000 cubic yards (cy) of impacted soil from the riverbank, embayment #1 and from a former 20,000 cubic-foot brick-lined gas holder foundation located east of Water Street.

The Department subsequently requested that the USEPA conduct a CERCLA removal action at the site in 1993, which lead to the Niagara Mohawk Power Corporation (NMPC) entering into a consent order with EPA in 1995. Under this consent order, NMPC removed and disposed of the stockpiled material. In addition, NMPC deployed and maintained oil absorbent booms near embayment #1. The consent order also required NMPC to conduct a site investigation and evaluate cleanup alternatives for the site. The Department listed the site on the Registry of Inactive Hazardous Waste Sites, as a class 2 site, in 1998. A remedial investigation for a second operable unit (OU 2), to address potential Hudson River sediment impact is currently being performed by NMPC.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the potential threat to the public health and significant threat to the environment posed by the presence of hazardous waste and hazardous substances, NMPC recently conducted a Remedial Investigation/Feasibility Study (RI/FS), the results of which can be found in the January 2001 EE/CA report.

4.1: 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 in four phases. The first phase was conducted in fall of 1995, the second phase between August and September of 1996, the third phase was conducted during the summer of 1997 while the forth phase was conducted during the summer of 1999. A report entitled Site Investigation Summary Report, Hudson (Water Street) Site, Hudson, New York, dated January 2001 has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- Installation of soil borings for collection and analysis of soil samples.
- Installation of sediment borings for sediment sample collection and analysis.
- Installation of monitoring wells for collection and analysis of groundwater samples.
- Installation of test pits for evaluation of physical properties of the soils.

To determine which media (soil, groundwater, sediment) are contaminated at levels of concern, the RI analytical data was compared to Federal ARARs and State SCGs. A detail explanation of these ARARs/SCGs can be found in the January 2001 EE/CA. Groundwater, drinking water and surface water SCGs identified for the former Hudson MGP site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios. In addition, for soils and sediments, site specific background concentration levels can be considered for certain classes of contaminants. Guidance values for evaluating contamination in sediments are provided by the NYSDEC “Technical Guidance for Screening Contaminated Sediments” (January 1999).

Based on the RI results, in comparison to SCGs/ARARs 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 Site Investigation Summary Report and the EE/CA.

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

4.1.1: Site Geology and Hydrogeology

Site investigations identified the site geology as consisting of both fill and
Bedrock has been characterized as a gray weathered shale and identified
from approximately 13.5 to 72 feet below sea-level. On top of the bed r
deposit, up to approximately 15 feet thick. Overlying this unit is a deposit
upper unit consists of coarse grained porous fill materials consisting of sa
varying fractions of debris.

4.1.2: Nature of Contamination

As described in the aforementioned reports, many soil, groundwater and sediment samples were collected at the site to characterize the nature and extent of contamination. The main categories of contaminants which exceed their SCGs/ARARs are polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and inorganics (metals).

The PAHs present at the site include both carcinogenic (cPAHs) and non-carcinogenic compounds. The cPAH contaminants of concern are chrysene, dibenzo(a,h)anthracene, benzo(b)fluoranthene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, and Indeno(1,2,3-cd)pyrene. The VOC contaminants of concern include benzene, toluene, ethylbenzene and xylene (BTEX). Inorganic compounds present at the site include but are not limited to, arsenic, chromium, mercury and zinc.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in soil, groundwater and embayment sediments 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.

Soil

Subsurface Soil

The soil at the former Hudson MGP site is contaminated with the various chemical constituents related to the gas manufacturing processes that took place at the site. Certain areas of the site including the former gas holders contain coal tar and non aqueous phase liquids (NAPL) and are considered the source areas. Coal tar is associated with high concentrations of PAHs and BTEX and is the source of the NAPLs.

Individual cPAHs were observed in the subsurface soil at concentrations ranging from less than one to over 270 ppm and VOCs constituents were detected at concentrations ranging from non detect to 1,300 ppm. NAPL was observed in the areas where former MGP subsurface structures were located in the eastern portion of the site. The NAPL was observed in the gray clay/fill unit generally occurring at a depth of up to 20 feet below the ground surface (bgs). There is no evidence that the NAPL has penetrated through the gray clay unit.

Inorganic constituents at the site in subsurface soil include arsenic, chromium and cyanide, with concentrations ranging from non detect to 1,260 ppm (for lead).

Surface Soil

Surface soil contaminant concentrations were generally low, below levels of concern, with the exception of a location in the southern portion of the site, near the south side of the SBD Warehouse, that exhibit levels of individual carcinogenic PAHs above levels of concern. Concentration of individual cPAHs ranged from non detect to 9.3 ppm for benzo(a)pyrene while concentrations of inorganic constituents ranged from one to 934 ppm for lead.

Groundwater

Shallow groundwater at this site is recharged by precipitation, which forms a localized groundwater mound that is generally centered in the eastern portion of the site, in the area of the former gas holders. With the exception of the location of the former gas holders, no floating oil products or DNAPLs have been observed in site groundwater.

MGP byproducts including BTEX and PAHs have been detected in some monitoring wells at relatively low concentrations. These byproducts were generally detected at the same locations where NAPLs were observed, near the former gas holders. VOCs were detected at concentrations ranging from non detect to 340 ppb while individual PAHs were detected at concentrations ranging from not detected to 2,000 ppb. There is no indication of off-site groundwater impacts based on downgradient monitoring well results.

Sediments

MGP related contaminants have been detected in the sediments at Hudson River embayment #1, which is adjacent to the site and is believed to be the location of direct discharges from the plant during operation. Sediment sample analysis and field visual observations have identified that sediments within embayment #1 are grossly contaminated by extremely high concentrations of PAHs, VOCs and mobile NAPL, present at depth to 10 feet from the surface water/sediment interface. Discharges of coal tar from the sediments have resulted in sheens and visible LNAPLs present in the surface water of the embayment and the Hudson River. This constitutes a contravention of surface water discharge standards. The presence of the mobile NAPL also represents a continues pathway for migration to the sediments of the Hudson River. VOCs were also detected in the sediment of embayment #1 at concentrations ranging from non detect to over 500 ppm. Concentrations of individual PAHs ranged from not detect to over 2,000 ppm with total PAHs of over 6,000 ppm. Inorganics were detected at concentrations ranging from not detect for some constituents to approximately 59 ppm (for chromium).

4.2: Summary of Human Exposure Pathways and Human Health Assessment:

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 health risks can be found in Section 3 of the Site Investigation report dated July 2000.

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

Potential pathways which are known to or may exist at the site include:

- Oral, dermal, and inhalation exposure to surface soil by commercial workers and recreational users.

- Oral, dermal, and inhalation exposure to subsurface soil by on-site construction workers.

Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants. For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a threshold level (measured as an HI of less than 1) exists below

which non-cancer health effects are not expected to occur. The estimated cancer risks for the receptors identified previously are within or below the EPA target range of 10^{-6} to 10^{-4}. In addition, the hazard indices are less than 1.

4.3: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site. The Fish and Wildlife Impact Assessment included in the Site Investigation Report, dated January 2000 presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources. The following pathways for environmental exposure and/or ecological risks have been identified:

Analytical results from sediment samples obtained from the adjacent Hudson river embayment #1 indicate that the embayment and possibly the Hudson River has been, and continues to be, impacted by contamination resulting from the operation of the former Hudson MGP site. Both site soil and groundwater have been impacted due to operation of the former MGP. The criteria-specific analysis which compares the concentrations measured in the site data with numeric criteria provides an assessment of potential impact to sediment dwelling communities.

As discussed previously, impact to the Hudson River will be addressed under Operable Unit 2.

SECTION 5: ENFORCEMENT STATUS

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

As indicated previously, in July 1993, after having discovered an oil sheen at the Hudson River embayment #1, the NYSDEC requested the EPA to conduct a CERCLA Removal Action at the site which lead to NMPC entering into a consent order with USEPA in 1995.

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 and through EPA's removal process. The overall remedial goal is to meet all SCGs/ARARs and be protective of human health and the environment. 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 and hazardous substances disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Eliminate, to the extent practicable, human exposures to the contaminants present at the site.

- Eliminate to the extent practicable, the migration of contaminants from on-site soils and source areas, to the site groundwater and the sediments in the embayment #1.

- Eliminate, to the extent practicable, the exposure of fish and wildlife to contaminants within the embayment #1 and restore embayment sediments.

- Eliminate potential contravention of surface water standards in the embayment and Hudson River resulting from the discharge of LNAPLS and coal tar sheens from the sediments in embayment #1.

- Eliminate to the extent practicable, off-site migration of contaminants of potential concern within the site groundwater.

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 laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the former Hudson MGP site were identified, screened and evaluated in the report entitled EE/CA dated January 2001.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to perform the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Remedial Alternatives

The potential remedies for Operable Unit 1 are intended to address the contaminated soils, groundwater and sediments in embayment #1.

The cost to implement all Alternatives has been estimated using a discount rate of 5% for the initial investment over a 30 year period for site monitoring and maintenance.

Alternative 1: *No Action*

The No Action alternative (which, for this site, is actually a limited action) is developed to be used as a basis for comparison with other alternatives. It would require continued monitoring of existing monitoring wells and surface water within embayment #1. Deed restrictions would be instituted to restrict use of the site to non-residential use and minimize exposure to impacted subsurface soils.

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 upon 30 years of operation and maintenance (O&M) has been estimated as follows:

Present Worth:	*$1,190,000*
Capital Cost:	*$ 22,000*
Annual O&M:	*$ 76,560*

Time to Implement: 3 months

Alternative 2: ***Site Cover, In-situ treatment of sediment in embayment #1 and covering with rip rap.***

Under Alternative 2, a limited amount of contaminated surface materials would be removed while providing an asphalt cover. The sediment would be treated in-place with a solidification/stabilization agent and 2 feet of rip rap cover would be placed in embayment #1.

The components of Alternative 2 would include the following:

- Excavation and removal of the top six-inch layer of surface soil.
- Placement of a six-inch layer of fill material.
- Placement of a four-inch layer of asphalt cover to reduce infiltration.
- In-place solidification/stabilization (s/s) of the top 3 feet of sediment in embayment #1.
- Placement of 2 feet of rip rap cover over the treated sediment.
- Institutional Controls
- Long-term monitoring.

The cost to implement Alternative 2 has been estimated as follows:

Present Worth:	*$2,500,000*
Capital Cost:	*$1,500,000*
Annual O&M:	*$ 66,000*

Time to Implement: 12 to 18 months

Alternative 3: ***Soil and Sediment removal and disposal.***

Under Alternative 3, source areas, where contaminant levels are the highest would be removed. Site investigations indicate that the majority of the source contamination in the subsurface soil is located within and around the areas of former plant subsurface structures including former gas holders. Areas adjacent to embayment #1 also contain source materials.

The major components of Alternative 3 would include:

- Excavation and removal of approximately 10,000 cubic yards (cy) of contaminated soils.
- Installation of DNAPL collection wells if determined necessary.
- Excavation and removal of the top 10 feet of contaminated sediments in embayment #1.
- Replacement of sediment with clean material to original contours and restoration of the upper 3 feet of sediment with materials similar to the native materials removed, to provide suitable habitat for benthic organisms. The upper 3 feet of sediment will be sampled to determine that the replaced sediments have a total PAH value of less that 4 parts per million (ppm).
- Institutional Controls
- Long-term monitoring.

The cost to implement Alternative 3 has been estimated as follows:

Present Worth:	*$22,400,000*
Capital Cost:	*$21,847,000*
Annual O&M:	*$ 36,000*

Time to Implement: 18 to 24 months

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the EE/CA.

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

1. Compliance with SCGs/ARARs. This criterion addresses whether or not an alternative would meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and requirements or provide grounds for invoking a waiver.

Alternative 1 (Limited Action) would not bring the site into compliance with SCGs/ARARs for soils, groundwater and sediments. The No Action alternative would not address continuous impact to site groundwater from the contaminated materials in the soils, nor would it address contamination in embayment #1.

Alternative 2 would not address the major contaminant sources located below the proposed depth of excavation and therefore would not meet site SCGs/ARARs. Alternative 2 would leave source materials within the embayment #1 sediments with the potential for continuous impact to fish and other benthic organisms.

Alternative 3 also would not bring the site into total compliance with all SCGs/ARARs. While the bulk of the contaminants would be removed by excavating materials from the source areas, residual soil contaminant concentrations above SCGs/ARARs would remain at certain subsurface locations on site. There is however no known potential exposure pathways from residual contaminants that would be left in place at depth. The concentrations of contaminants in groundwater are expected to decrease through natural attenuation mechanisms with a potential to achieve SCGs/ARARs due to source material removal. While the majority of the impacted sediments would be removed from embayment #1, contaminants within the embayment would persist in excess of applicable standards. Removal of the grossly contaminated embayment sediments would eliminate potential contravention of surface water standards currently resulting from the discharge of LNAPLs and coal tar sheens from the sediments to the surface water. In addition, the depth of the material to cap the residual contaminants in place would mitigate continuous impact of the contaminants to benthic organisms.

2. Protection of Human Health and the Environment. This criterion assesses whether the alternatives are protective of human health and the environment. The evaluation focuses on how each alternative achieves adequate protection and describes how the alternative will reduce, control, or eliminate risks at the site through the use of treatment, engineering, or institutional controls.

Alternative 1 would not provide overall protection of human health and the environment. Contaminants within the former gas holders and other source areas would persist and continue to impact the environment. Floating products and other MGP related contaminants in the embayment #1 sediments would remain and continue to impact benthic organisms. Future users of the embayment would potentially be exposed to contaminants at the site.

Alternative 2 would provide protection to human health due to the proposed installation of an asphalt cover over the impacted soil areas. The installation of the asphalt cover would also lessen the migration of contaminants from subsurface soil to groundwater, thereby providing some protection to the environment. However, source area contamination would remain within the gas holders and

other source areas (including the area adjacent to embayment #1) with the potential for migration of contaminants to the environment and embayment.

Alternative 3 would provide protection to both human health and the environment. The excavation and off-site treatment/disposal of impacted materials would result in the improvement of groundwater quality. Removal and disposal of the impacted sediments in embayment #1 would minimize exposure pathways and provide protection to future human users and the current and future benthic organisms.

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. This criterion examines the effectiveness of alternatives in protecting human health and the environment during the construction and implementation period until the cleanup objectives have been met. The following factors are considered: potential for short-term risks to the affected community as a result of the alternative; potential impacts on workers, and the effectiveness and reliability of protective measures that would be taken; potential adverse environmental impacts of the alternative, and the effectiveness and reliability of protective measures that would be taken; and time until protection is achieved.

Alternative 1 would not result in additional short-term impacts to the workers, community and the environment since there is no additional action proposed under this Alternative.

Alternative 2 would have some short-term impacts upon the workers and the community due to limited work required to install an asphalt cover. Solidification/stabilization (s/s) of sediments would be expected to result in some resuspension of sediments within the embayment #1 and oil sheens on surface waters may result.

Alternative 3 may have short-term impacts on workers and the community requiring mitigating controls. Workers would be required to comply with all safety standards and regulations to prevent or minimize exposure to contaminants. Air monitoring would be performed during remedy implementation. If necessary, additional engineering controls such as dust control would be implemented to provide protection to the community and construction workers.

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 controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 would not provide any long-term effectiveness and permanence as there would be no remedial action associated with this alternative. Current impacts to human health and the environment would continue to persist.

Alternative 2 would not provide any long-term effectiveness and permanence as source area contamination in subsurface soil would be left in place. The effectiveness and reliability of the solidification/stabilization process in the long-term and its ability to limit the risks of residual contaminants is not well documented.

Alternative 3 would provide the best long-term effectiveness and permanence by the treatment/disposal of the excavated contaminated soils and sediments. The excavation and removal of contaminated materials under Alternative 3 would remove the bulk of the waste present at the site and reduce the exposure pathway to potential future site users. Under this alternative, residual concentrations of contaminants would not pose a threat to any individual, except to construction workers, and then only if they dig below the replaced materials and conduct work in violation of a site health and safety plan. The technologies proposed for Alternative 3 are proven and used routinely as reliable measures to control MGP-related contaminants.

5. Reduction of Toxicity, Mobility or Volume. This criterion evaluates the anticipated performance of specific treatment technologies. This evaluation addresses the statutory preference for selecting alternatives that employ treatment technologies to permanently and significantly reduce toxicity, mobility, or volume of wastes. Factors that are considered, as appropriate, include: the treatment or recycling processes the alternatives employ and the materials they would treat; the amount of hazardous materials to be destroyed or treated; the degree of reduction expected in toxicity, mobility, or volume; the degree to which the treatment would be irreversible; the type and quantity of residuals that would remain after treatment; and whether the alternative would satisfy the preference for treatment.

Alternative 1 does not incorporate a technology to reduce the toxicity, mobility or volume of the contamination.

Alternative 2 does not involve treatment of soils, sediment nor groundwater, therefore, the toxicity and volume of the contaminants would not be reduced. However, the alternative would provide reduction of mobility for both soils and sediment due to the installation of an asphalt cover over the site and solidification/stabilization of the sediment in embayment #1.

Alternative 3 would provide significant reduction in the toxicity, mobility and volume of contaminants at the site. Approximately 10,000 cubic yards of contaminated soils and approximately 5,000 cubic yards of impacted sediments in embayment #1 would be excavated for off-site treatment and/or disposal.

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

Alternative 1 would be easily implemented since there are no active remedial activities involved.

Alternative 2 would be easily implemented for the soils, but would require an increased level of response compared to Alternative 1. Construction of an asphalt cover over the impacted soil area would be technically feasible and easy to implement. The labor, equipment and materials necessary to construct the cover are readily available. In-situ solidification/stabilization of sediment in embayment #1 may not be technically feasible due to difficulties in mixing solidification/stabilization agents in-situ and containing suspended sediments during mixing (as well as the resulting increase in volume of sediments).

Alternative 3 could be implemented but would require a greater level of effort than Alternatives 1 and 2. Excavation and removal of impacted soils and sediments including installation of sheet pile to separate the river from embayment #1 are technically feasible remedial construction activities. Permits (or permit equivalencies) would be required to accomplish this alternative, for activities such as dredging and filling in navigable waters and for coastal zone erosion management. The labor, equipment and materials necessary to accomplish this remedy are readily available.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2. This table illustrates that, in terms of both capital cost and present worth, Alternative 3 is the most costly alternative while Alternative 1 is the least costly.

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 Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised. In general, the public comments received were supportive of the selected remedy.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based upon the evaluation of the various alternatives presented in Section 7, the NYSDEC in consultation with the USEPA and the NYSDOH are selecting Alternative 3, contaminated soil and sediment removal and disposal as the remedy for this site.

Alternative 3 will eliminate or mitigate, through the proper application of scientific and engineering principles, all significant threats to public health and the environment presented by the hazardous waste and hazardous substances disposed at the site. The remedy will essentially eliminate the threat of exposure to site related contamination.

This selection is based on the evaluation of the three alternatives developed for this site, which demonstrates the advantages discussed below, that Alternative 3 has over the other evaluated plans in meeting the remedial action objectives.

Alternative 1 would fail to meet remedial action objectives as it does not include any actions to address contamination in the soils and the sediments in embayment #1. Alternative 2, which includes capping over the contaminated soil and in-situ solidification/stabilization of sediments in embayment #1 would also not meet remedial action objectives. Contaminated soil would continue to pose a significant threat to the environment as source area contaminants would be left in place untreated. Although Alternative 2 is proposing in-situ mixing of solidification/stabilization agents with the top 3 feet of impacted sediments, the effectiveness of this technology to provide adequate controls to limit the risks of residual contaminants to benthic organisms and the environment is questionable in this application. In addition, solidification/stabilization of the sediment would not allow reestablishment of the benthic community. Based on the foregoing, Alternatives 1 and 2 would be removed from further consideration.

Alternative 3 will meet remediation goals and provide the most protection to human health and the environment. Alternative 3 will remove the most significant sources of contamination from both soils and sediments leaving only residual contaminants in the environment. Alternative 3 will eliminate or minimize exposure pathways by the excavation of contaminated soils of up to 20 feet below ground surface and placement of 6 inches of gravel over the backfilled excavated areas. Sediment sample analysis and field visual observations have identified that sediments within embayment #1 are grossly contaminated by extremely high concentrations of PAHs, VOCs and mobile NAPL down to 10 feet from surface water/sediment interface. The top 10 feet of contaminated sediments in embayment #1 will be removed and replaced with similar clean materials. The 10 feet of sediment removal will be necessary to ensure that the mobile NAPL does not continue to migrate from the sediment to the waters and sediments of the Hudson River. In addition, the removal will result in a profound positive effect on the environment and provide a suitable habitat for benthic invertebrate colonization.

Although Alternative 3 will be the most costly alternative evaluated, it will provide the greatest long-term effectiveness and reduction of the toxicity, mobility and volume of contaminants.

The estimated present worth cost to implement the remedy is $22,400,000. The cost to construct the remedy is estimated to be $21,847,000 and the estimated average annual operation and maintenance cost for a period of 30 years is $36,000.

The elements of the selected remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS including whether there is off site impact beyond the site boundaries, specifically in the area east of the site will be resolved.

2. Excavation and removal of approximately 10,000 cubic yards (cy) of contaminated soils from the site as shown on Figures 3 and 4. Aggressive dewatering efforts in the areas of the former gas holders will be implemented, when determined necessary based on site conditions, to assist in removing mobile NAPL from the excavations.

3. Off-site treatment and/or disposal of the contaminated soils excavated.

4. Backfill of excavated soil areas with select clean fill materials to within 6 inches of the original ground surface and placement of 6 inches of gravel on the backfilled areas.

5. Installation of collection wells (if determined necessary) in the areas of the former gas holders for the recovery of any residual DNAPL that may not be removed by excavation.

6. Temporary placement of sheet piling to facilitate sediment removal and excavation and removal of the top 10 feet of sediments from embayment #1. The volume of contaminated sediments removed will be approximately 5,000 cubic yards. It should be noted that additional embayment materials will be removed if determined necessary based on visual observation of mobile NAPL.

7. Replacement of sediment to pre-removal contours, with the upper 3 feet restored with materials similar to the native materials removed, to provide a suitable habitat for benthic invertebrate colonization. The upper 3 feet sediment stratum will be sampled to verify and ensure that the replaced sediments have a total PAH value of less that 4 parts per million (ppm). Embayment restorations will meet all substantive regulatory requirements including 6 NYCRR Part 608, Use and Protection of Waters.

8. Since the remedy results in some untreated hazardous waste and hazardous substances remaining at the site, deed restrictions and a long term monitoring program will be instituted. The site will be restricted to preclude the use of the site groundwater and to allow only non-residential uses as well as notice to future site workers regarding possible MGP residuals.

The remedy will include implementation of groundwater and, if necessary, a DNAPL monitoring program to monitor the effectiveness of the proposed remedy. The effectiveness of the remedy will be evaluated at the end of a five-year monitoring period.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

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

A repository for documents pertaining to the site was established.

A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.

Fact sheets were prepared and sent to the mailing list in January 2001.

A public meeting was held in February 2001.

A Responsiveness Summary was prepared in March 2001 and appended to the ROD.

Table 1
Nature and Extent of Contamination

MEDIA	CLASS	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppm)	FREQUENCY of EXCEEDING	SCGs (ppm)
Subsurface Soil	VOCs	Benzene	ND to 1,000	42 of 147	0.06
		Toluene	ND to 1,300	7 of 147	1.5
		Ethylbenzene	ND to 500	26 of 138	5.5
		Xylene	ND to 830	38 of 139	1.2
	cPAHs	Chrysene	ND to 250	62 of 114	0.4
		Dibenzo(a,h)anthracene	ND to 7.8	7 of 114	0.014
		Indeno(1,2,3-cd)pyrene	ND to 79	29 of 115	3.2
		Benzo(b)fluoranthene	ND to 140	47 of 115	1.1
		Benzo(a)pyrene	ND to 250	48 of 115	0.061
		Benzo(a)anthracene	ND to 270	52 of 115	0.224
		Benzo (k)fluoranthene	ND to 160	75 of 115	1.1
	Inorganics	Arsenic	ND to 28	19 of 75	7.5
		Chromium	ND to 79	69 of 75	10
		Mercury	ND to 3.1	28 of 75	0.1
Surface Soil	cPAHs	Lead	ND to 1,260	74 of 75	20
		Chrysene	0.33 to 5.60	24 of 39	0.4
		Dibenzo(a,h) anthracene	0.33 to 2.5	11 of 36	0.014
	Inorganics	Arsenic	1.0 to 25	19 of 32	7.5
		Chromium	5 to 39	27 of 32	10
		Lead	7 to 1,370	2 of 32	500

Table 1 (cont'd)
Nature and Extent of Contamination

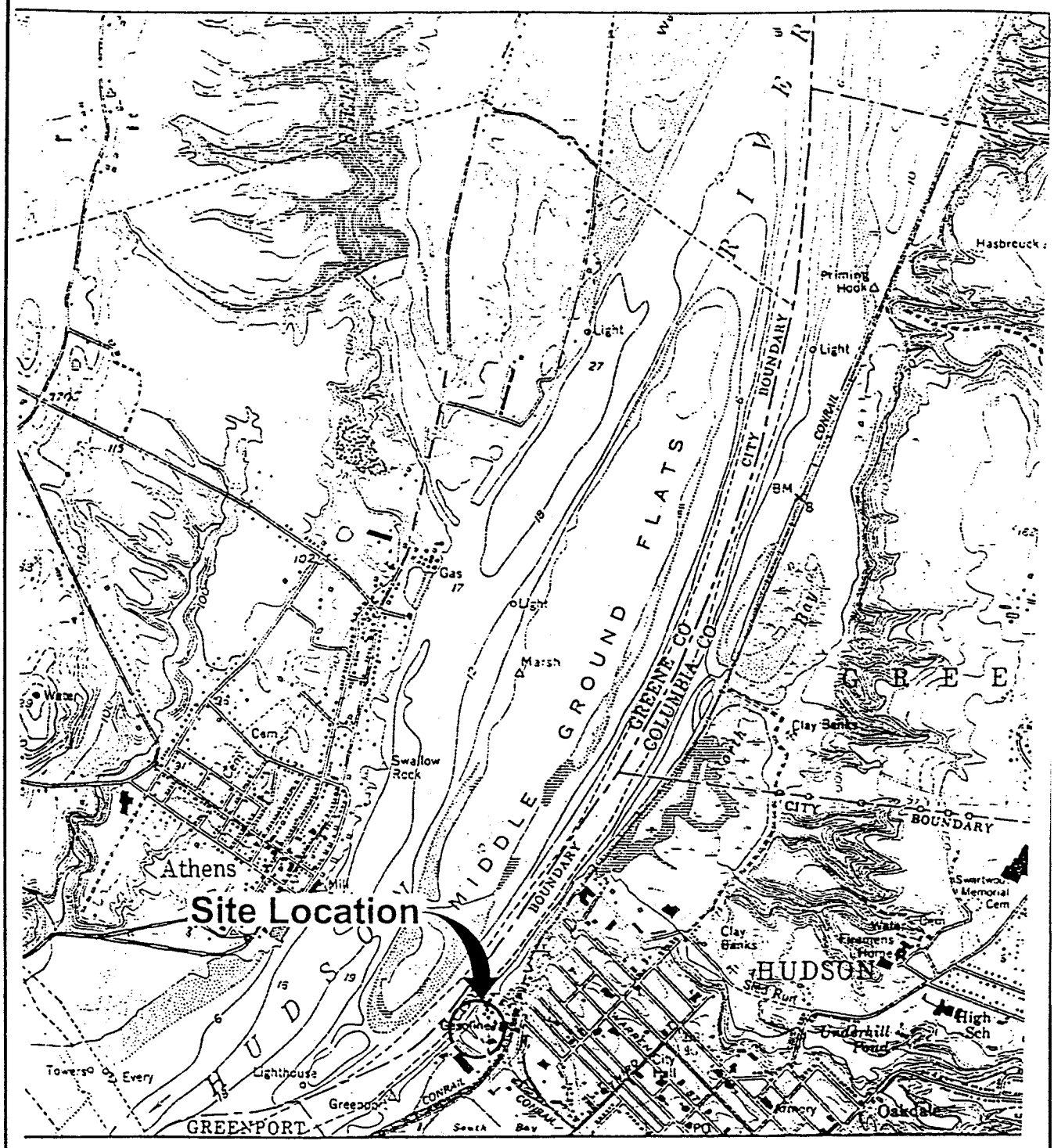
MEDIA	CLASS	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)	FREQUENCY of EXCEEDING SCG	SCGs (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	Benzene Ethylbenzene Toluene Xylene	ND to 170 ND to 27 ND to 17 ND to 340	9 of 35 4 of 35 3 of 35 10 of 35	0.7 5 5 5
	PAHs	Naphthalene	ND to 2,000	12 of 35	10

MEDIA	CLASS	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (mg/kg sediment)	FREQUENCY of EXCEEDING SCGs	SCGs ug/g of organic carbon
Sediment	Volatile Organic Compounds (VOCs)	Benzene Ethylbenzene Toluene Xylene	ND to 310 ND to 200 ND to 410 ND to 510	10 of 39 12 of 39 9 of 39 14 of 39	28 24 49 92
	PAHs	Naphthalene total PAHs	ND to 2,000 ND to 6,600	17 of 39 39 of 39	30 4a
	Inorganics	Chromium	14 to 59	2 of 5	26a

Note: a - mg/kg sediment

Table 2
Remedial Alternative Costs (Rounded)

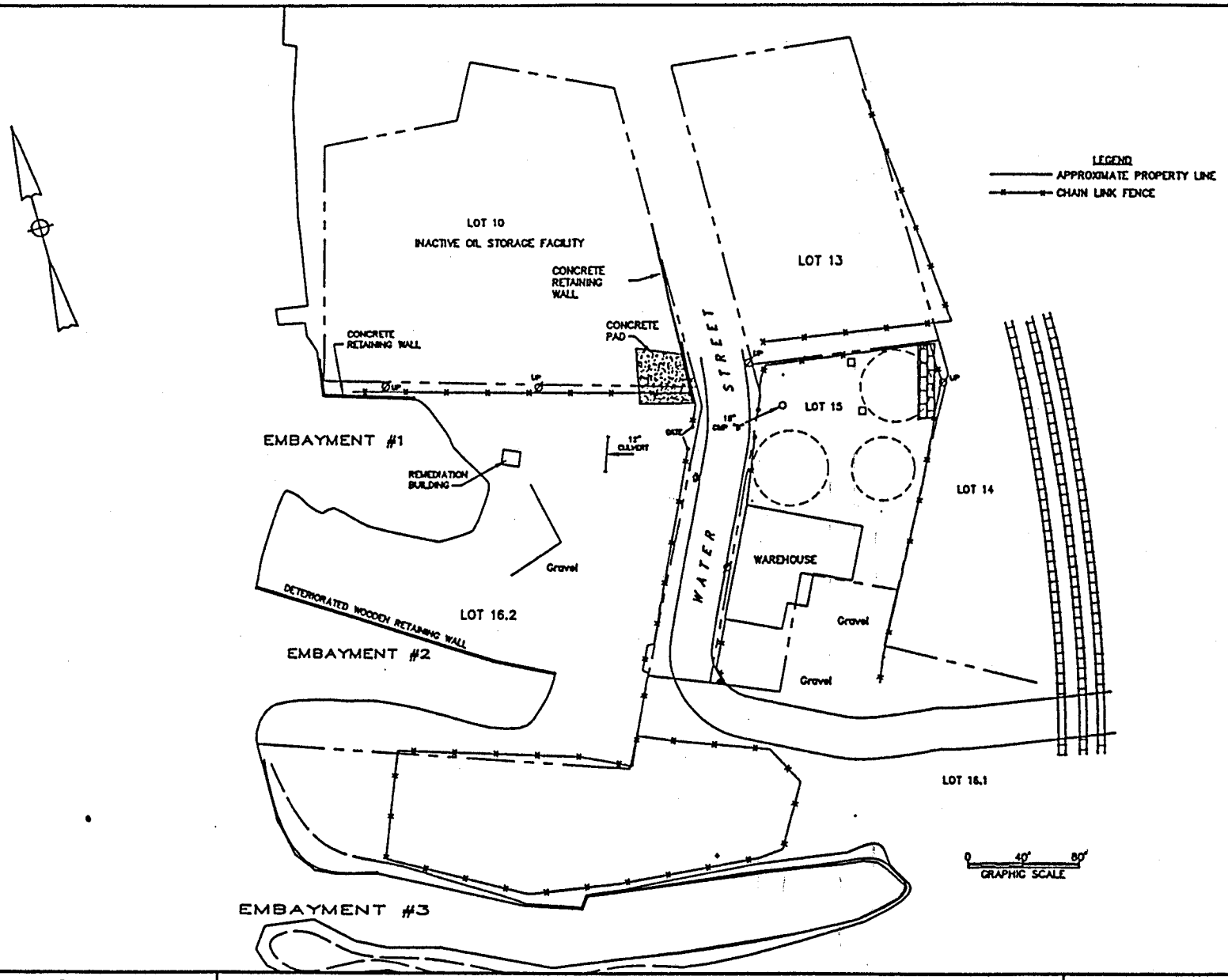
Remedial Alternative	Capital Cost	Annual O&M Cost	Total Present Worth
Alternative 1, No Action	$22,000	$76,500	$1,190,000
Alternative 2, Site Cover, In-situ treatment of sediment in embayment #1 and covering with rip rap.	$1,500,000	$66,000	$2,500,000
Alternative 3, Soil and Sediment removal and disposal.	$21,847,000	$36,000	$22,400,000



FORMER HUDSON MANUFACTURED GAS PLANT SITE
HUDSON (C), COLUMBIA COUNTY, NEW YORK, SITE NO. 4-11-005

SITE LOCATION MAP

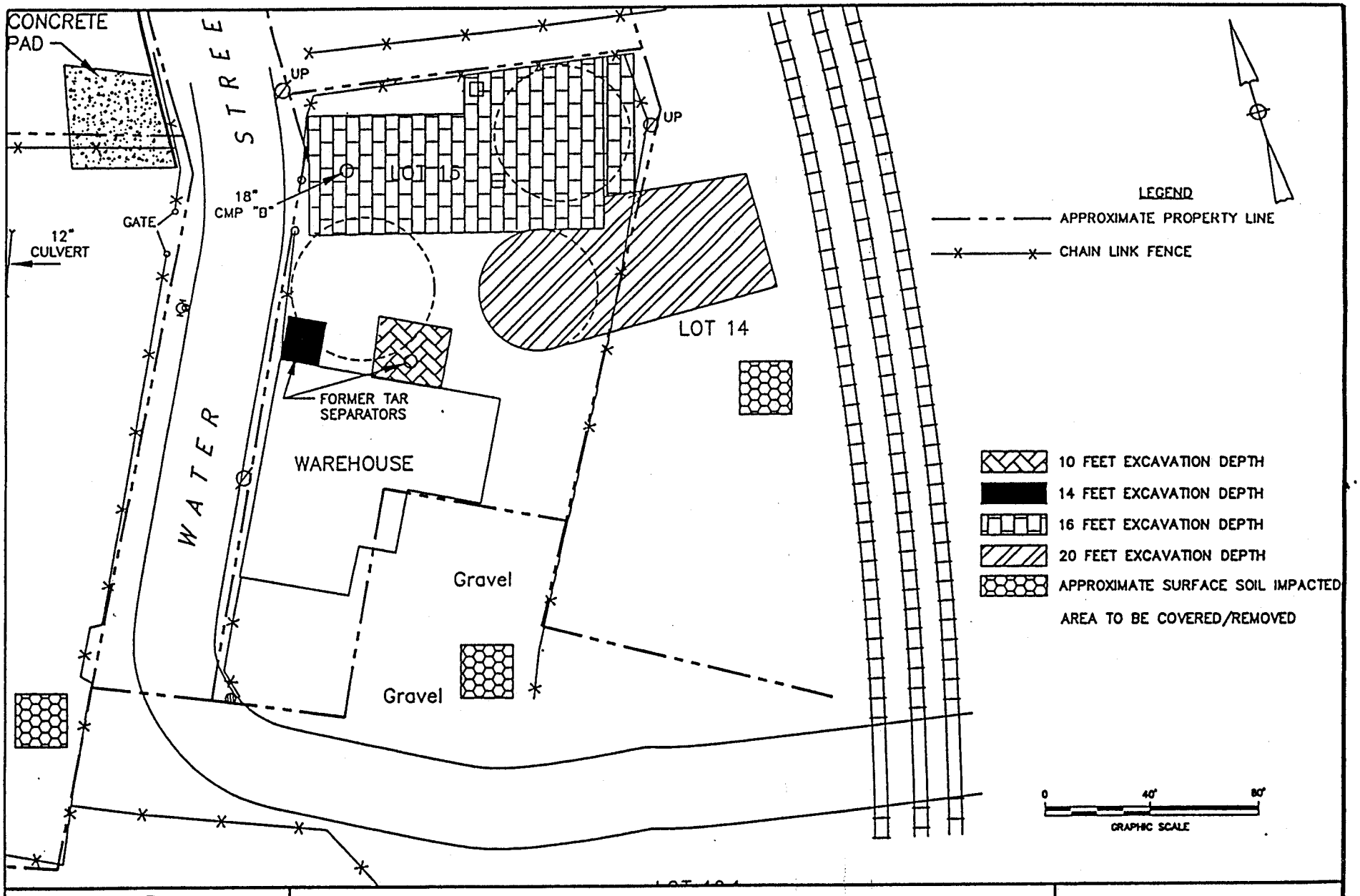
FIGURE 1



FORMER HUDSON MANUFACTURED GAS PLANT SITE
HUDSON (C), COLUMBIA COUNTY, NEW YORK, SITE NO. 4-11-005

SITE PLAN

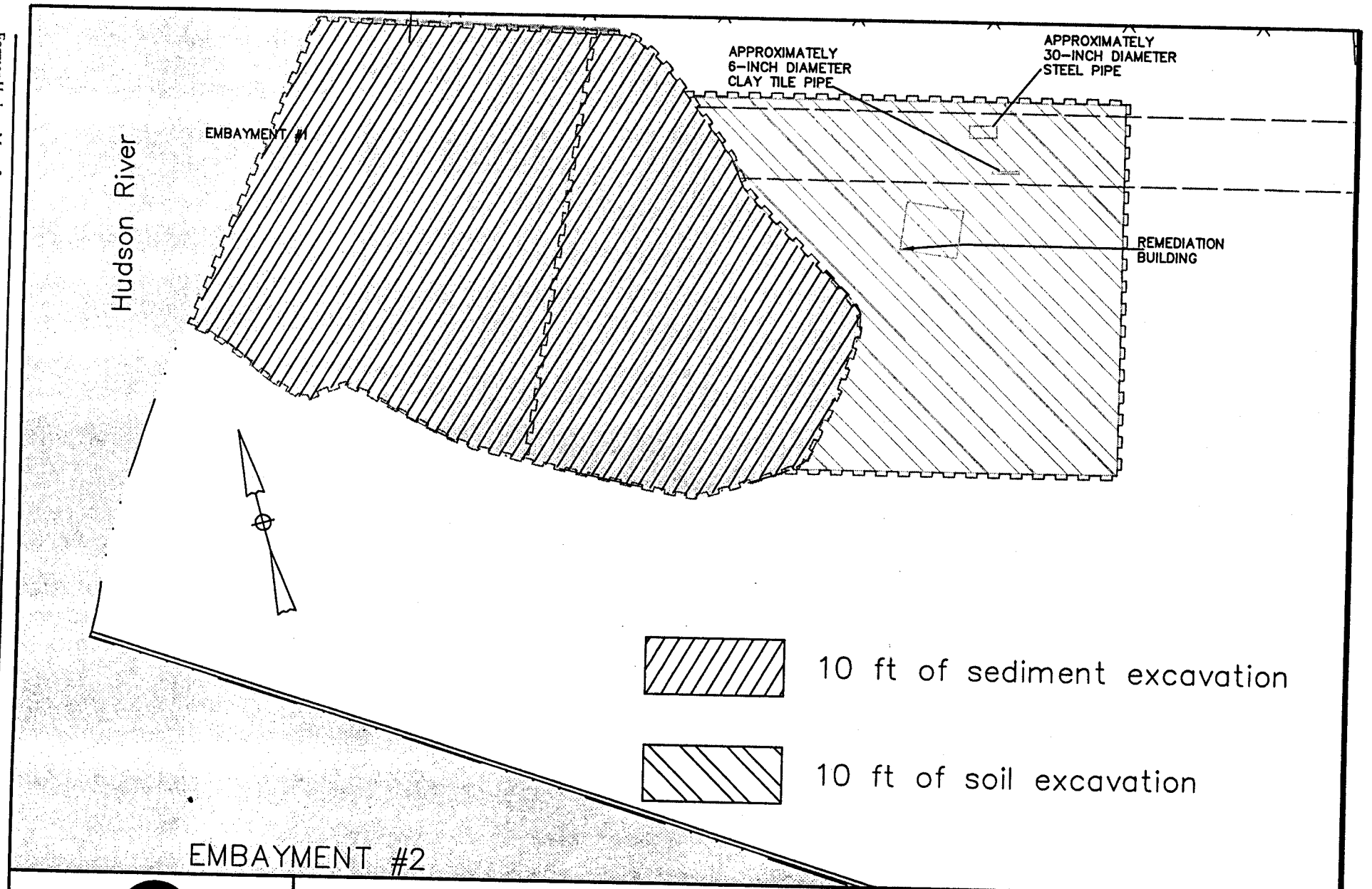
FIGURE 2



FORMER HUDSON MANUFACTURED GAS PLANT SITE
HUDSON (C), COLUMBIA COUNTY, NEW YORK, SITE NO. 4-11-005

SOIL REMOVAL AREAS

FIGURE 3



FORMER HUDSON MANUFACTURED GAS PLANT SITE
HUDSON (C), COLUMBIA COUNTY, NEW YORK, SITE No. 4-11-005

SEDIMENT AND EAST BANK SOIL REMOVAL AREAS

FIGURE 4

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Former Hudson Manufactured Gas Plant Site
Operable Unit 1
Proposed Remedial Action Plan
City of Hudson, Columbia County, New York
Site No. 4-11-005

The Proposed Remedial Action Plan (PRAP) for the Former Hudson Manufactured Gas Plant Site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) and issued to the local document repository on January 31, 2001. This PRAP outlined the preferred remedial measure proposed for the remediation of the contaminated soil and sediment at the Former Hudson Manufactured Gas Plant Site. The preferred remedy is source area removal including soil, contents of the former gas holders and sediment excavation for treatment and/or disposal. The excavated areas will be backfilled with clean materials and deed restrictions will be instituted to preclude the use of the site groundwater and to allow only non-residential uses as well as notice to future site workers regarding possible MGP residuals. The remedy will also include a long-term monitoring program.

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

A public meeting was held on February 13, 2001 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. Written comments were received from Niagara Mohawk Power Corporation. The public comment period for the PRAP ended on March 2, 2001.

This Responsiveness Summary responds to all questions and comments raised at the February 13, 2001 public meeting attended by the NYSDEC, USEPA and NYSDOH and to the written comments received.

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

COMMENT 1: Is the contamination within the Embayment #1 deeper than 10 feet and if so, why not excavate beyond the proposed 10 feet depth?

RESPONSE 1: The site investigation revealed that the majority of the contamination is located within the top 10 feet of sediment in embayment #1. There is some evidence that mobile material (NAPL) may extend slightly deeper in limited areas. To account for these limited areas, the remedy provides for excavating beyond the identified 10 foot depth, if determined necessary based on visual observation of NAPL. The replacement of the

removed sediment with clean materials to pre-removal contours will provide a 10 foot buffer zone to shield benthic organisms from any residual contamination which may not be removed.

COMMENT 2: Are wildlife (i.e., ducks and fish) contaminated as a result of contamination from the operation of the MGP at the site?

RESPONSE 2: Benthic organisms within the embayment #1 are impacted as a result of contamination from the operation of the former MGP. The effect of the site contamination on Hudson River sediment, fish and wildlife will be the subject of the next phase of investigation to be conducted under operable unit 2.

COMMENT 3: How will the contamination under the warehouse be cleaned up?

RESPONSE 3: Soil samples obtained from the boring placed inside the warehouse did not indicate any significant levels of site related contaminants.

COMMENT 4: Did contamination in the river originate from the location of the gas holders?

RESPONSE 4: There is no evidence based on the site investigation that contamination found in the embayment #1 migrated through the soil from the location of the gas holders. However, a pipe leading from the plant site was identified adjacent to the embayment and is believed to be the source of direct discharge of MGP byproducts to embayment #1.

COMMENT 5: Has testing been performed south of the site (toward Embayment #3)?

RESPONSE 5: Several borings and test pits for collection of soil samples and evaluation of physical soil properties were placed south of the site to determine the nature and extent of site contamination. The sampling analysis indicated that contamination has not extended toward embayment #3.

COMMENT 6: How can a no-action alternative be considered if contamination is present?

RESPONSE 6: The no-action alternation is a procedural requirement and is developed to be used as a basis for comparison with other alternatives.

COMMENT 7: What is the direction of groundwater flow in the vicinity of the gas holders ?

RESPONSE 7: Shallow groundwater in the vicinity of the gas holders is a result of rain falling on the site. This rainfall forms a localized groundwater mound centered in the areas of the former gas holders. The groundwater flows radially outward from the center of the

groundwater mound through permeable pathways within the fill material. The general site-wide groundwater flow is towards the Hudson River.

Comment 8: Why does the soil contamination near and within the gas holders extend in the opposite direction of groundwater flow?

RESPONSE 8: As stated in response 7 above, groundwater flows radially outward around the gas holders due to a groundwater mounding effect. The contamination in and around the holders tends to move in the same direction as groundwater flow.

COMMENT 9: Are the Lockwood and CSX property clean?

RESPONSE 9: Site investigations indicate that most of the MGP contamination is located in areas around the gas holders at the plant site and adjacent the embayment #1, on a portion of the Lockwood property. Sampling south of the site, including CSX Transportation property and the western half of the Lockwood property has not indicated direct impacts due to site related contaminants. An independent investigation of the CSX property carried by the NYSDEC utilizing EPA brown fields funding identified some low levels of contaminants.

COMMENT 10: Will long-term monitoring prohibit development?

RESPONSE 10: No, the proposed long-term monitoring will be designed to minimize impacts to site redevelopment.

COMMENT 11: Will there be deed restrictions?

RESPONSE 11: Yes, deed restrictions will be instituted to allow only non-residential uses of the site and to notify any future site developer/workers of possible MGP residual contaminants in subsurface soil.

COMMENT 12: How many locations on the Lockwood Property need to be cleaned up?

RESPONSE 12: Impacted soils in the area adjacent to embayment #1 will be excavated for off site disposal/treatment. See Figures 3 and 4.

COMMENT 13: Once remediation is completed, will Niagara Mohawk be relieved of future liability?

RESPONSE 13: Niagara Mohawk Power Corporation will be responsible for the operation and maintenance of the proposed remedy and will continue to be liable for any future incidents regarding residual contamination resulting from the operation of MGP at the site.

COMMENT 14: What agency (USEPA or NYSDEC) will be the lead agency for the cleanup? The City of Hudson would like to see the NYSDEC as the lead agency.

RESPONSE 14: Currently both the USEPA and NYSDEC are working cooperatively to address the site cleanup. A letter was recently sent the USEPA requesting they allow NYSDEC to assume the lead for the project, adding it to an existing consent order with the NMPC to address 21 other MGP sites around the State.

COMMENT 15: Who owns the properties which will be remediated?

RESPONSE 15: The properties are owned by various entities including Lockwood Properties and Dunn Builders Supply.

COMMENT 16: What remedy is being proposed?

RESPONSE 16: The NYSDEC and USEPA are proposing Alternative 3 which calls for source area removal including contaminated soil and sediment excavation for off-site disposal and/or treatment.

COMMENT 17: What are the depths of the three subsurface gas holders?

RESPONSE 17: The holder closer to Water Street is at grade, while the depths of the other two range from 12 to 16 feet below grade.

A letter dated February 27, 2001 was received from Mr. Charles Willard of the Niagara Mohawk Power Corporation (NMPC), which transmitted the following comments.

COMMENT 18: Section 1 - Summary and Purpose of the Proposed Plan, Paragraphs 1 and 2. The use in the PRAP of such language as "significant threat" and "...have caused significant environmental damage to the embayment resulting in significant acute or chronic adverse effects to fish, shellfish, crustacea and wildlife..." is misleading.

RESPONSE 18: We disagree that the use of such language is misleading. The releases of hazardous waste and substances into the environment from this site was determined to constitute a significant threat to the environment. Embayment #1 has suffered environmental damage due to the release of hazardous waste and substances from the site, as evidenced by the oil sheens and the extremely high concentrations of PAHs in the sediment. While the Fish and Wildlife Impact Analysis did not include biomonitoring of fish, shellfish, crustacea and wildlife, there is certainly the potential for significant acute or chronic adverse effects to these organisms.

COMMENT 19: Section 1 - Summary and Purpose of the Proposed Plan, Paragraph 3 (2nd bullet), Sentence 2. The PRAP discusses the removal of impacted materials visually observed beyond the proposed depth of excavation; however, the material to be removed is actually mobile NAPL.

RESPONSE 19: The term *impacted materials* will be replaced with *mobile NAPL impacted materials*.

COMMENT 20: Section 1 - Summary and Purpose of the Proposed Plan, Paragraph 3 (3rd bullet). Sentence 2. The PRAP states that the upper 3 feet of sediment stratum will be sampled to verify and ensure that the replaced sediments have a total PAH value of less than 4 parts per million; however, the phrase "and ensure" is not necessary.

RESPONSE 20: Since sampling will be performed to verify that PAH values are less than 4 ppm, we do not understand NMPC's concern with the use of the phrase "and ensure". EPA and NYSDEC maintain that the purpose of the verification sampling is to ensure that the PAH levels in the clean backfill are less than 4 ppm. If the sampling reveals that the 4 ppm concentration level cannot be achieved, then an appropriate contingency will need to be implemented. The underlying requirement is to ensure that sediments within the upper 3 feet of embayment #1do not exceed 4 ppm PAHs after restoration. The 4 ppm is not intended to represent a cleanup value for the embayment sediments.

COMMENT 21: Section 1 - Summary and Purpose of the Proposed Plan, Paragraph 3 (4th bullet). The PRAP discusses the installation of collection wells to recover residual DNAPL. However, residual DNAPL does not flow and by definition is not recoverable by a collection well.

RESPONSE 21: Residual DNAPL, as used in this context is meant to mean remaining DNAPL which is not removed through excavation but can still be removed through collection wells. However, the term *"residual DNAPL"* will be replaced with *"residual mobile DNAPL"*.

COMMENT 22: Section 3.2 - Remedial History, Paragraph 2, Sentence 5. The PRAP states that "A remedial investigation for a second operable unit (OU2), to address potential Hudson River sediment impact is currently being performed by NMPC". However, the remedial investigation for OU2 is not currently being performed.

RESPONSE 22: In an effort to facilitate completion of the on-site and Embayment #1 clean up, response activities associated with the potential impacts to the Hudson River were segregated into Operable Unit 2. Neither EPA nor NYSDEC have formally conveyed to NMPC that the investigatory activities associated with Operable Unit 2 are complete. Until that time, we are considering the remedial investigation to be an on-going activity.

COMMENT 23: Section 4.1.2 - Nature of Contamination, Paragraph 2, Sentence 4. It is unclear why Arsenic, Chromium, Mercury and Zinc are specifically referenced in the text.

RESPONSE 23: The intent of the text is to provide examples of the inorganic compounds present at the site. Since the text is factually correct (i.e., these compounds were actually found on the site), no further response to this comment is considered necessary.

COMMENT 24: Section 4.1.3 - Extent of Contamination, Paragraph 4, Sentence 1. NMPC commented on the identification of arsenic, chromium, lead and cyanide as inorganic constituents of concern.

RESPONSE 24: The text of the ROD will refer to these compounds as being "inorganic constituents" instead of "inorganic constituents of concern".

COMMENT 25: Section 4.1.3 - Extent of Contamination, Paragraph 5, Sentence 2. The PRAP states that "Concentration of individual cPAHs ranged from non detect to 5.6 ppm for chrysene while concentrations of inorganic constituents ranged from one to 1,370 ppm for lead". The lead concentration is actually from a background sample location.

RESPONSE 25: The ROD will reference the actual maximum lead concentration from the site, and will reflect the individual cPAH concentration range as determined from the data presented in the January 2001 EE/CA.

COMMENT 26: Section 6 - Summary of Remediation Goals, Paragraph 2 (1st bullet) and Section 6, Paragraph 2 (3rd bullet). The NYSDEC/EPA remediation goals are different than the Removal Action Goals presented in Section 4 of the EE/CA.

RESPONSE 26: While the goals presented in Section 6 of the PRAP were not presented verbatim from the text presented in Section 4 of the EE/CA, they are not inconsistent. As discussed in the EE/CA, the general removal action goal for the site is to minimize future potential impacts to the environment caused by the presence of impacted soils and embayment sediments. The NYSDEC do not believe that the 1st and 3rd bullets of Section 6 of the PRAP are inconsistent with the removal action goals in the EE/CA.

COMMENT 27: Section 8 - Summary of the Proposed Remedy, Paragraph 8, Number 1, Sentence 2. The PRAP states that any uncertainties identified during the RI/FS (including off-site impacts beyond site boundaries, specifically east of the site) would be resolved. Statements inferring that additional investigations east of the site should not be discussed in the ROD.

RESPONSE 27: The intent of the text is to reinforce the idea that the proposed remedy is conceptual in nature, and that a detailed design must be prepared in order to perform the actual construction. Since the proposed remedy is conceptual, there may still be unresolved

issues from the RI/FS, which would be addressed during the remedial design. One of these issues is the actual extent of off-site migration of the contamination. It should be noted that the identification of this issue in the text does not impose a requirement for NMPC to continue further investigations. Rather, the text merely provides an example of an issue which must be resolved to the satisfaction of all parties.

APPENDIX B

Administrative Record

1. Work Plan for a Removal Action and Site Investigation (Parsons, June 1995)
2. Site Investigation Data Report (BBL 1996)
3. Phase II Site Investigation Report (BBL, 1997)
4. Site Investigation Report (BBL, 1998)
5. Phase IV Site Investigation Data Report (BBL, 1999)
6. Sediment Pre-design Investigation Data Report (BBL)
7. Site Investigation Summary Report (BBL, 2000)
8. Engineering Evaluation/Cost Analysis (EE/CA) for Operable Unit 1 (BBL, January 2001)
9. Proposed Remedial Action Plan (NYSDEC and USEPA, January 2001)
10. Niagara Mohawk Power Corporation's comments letter, dated February 26, 2001.