Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
NIMO TROY - WATER STREET MGP SITE
Operable Unit No. 1
Area 2 - Former Plant Site
Troy (C), Rensselaer County, New York
Site Number 4-42-029

July 2003

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

DECLARATION STATEMENT - RECORD OF DECISION

NIMO TROY - WATER STREET MGP
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Troy (C), Rensselaer County, New York
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Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the NIMO Troy - Water Street Manufactured Gas Plant (MGP) Site, Operable Unit No. 1 (OU1). 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 OU1 of the NIMO Troy - Water Street Manufactured Gas Plant (MGP) 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 NIMO - Troy Water Street - MGP, Former Plant Site (Area 2) and the criteria identified for evaluation of alternatives, the NYSDEC has selected a combination of soil removal and in-situ chemical oxidation. The components of the remedy are as follows:

- excavation and appropriate off-site disposal of an estimated 17,000 cubic yards of contaminated soil. The former Water Gas Building will be demolished, as needed, to carry out the selected remedy;

- treatment, in-place, of an estimated 23,000 cubic yards of contaminated soil by a chemical oxidation process;

- the removal of the contents of several structures and the structures themselves as necessary;
- the removal and appropriate disposal of an estimated 1,200 cubic yards of purifier waste;
- the placement of an asphalt cap or permeable soil cover over the entire site (approximately 16 acres);
- monitored natural attenuation of groundwater consistent with United States Environmental Protection Agency guidance;
- institutional controls to limit development to nonresidental uses, prohibit groundwater use, require an evaluation of potential soil vapor on indoor air quality in on-site buildings and ensure the integrity of the remedy, including a long-term monitoring program.

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.

JUL - 9 2003

Date

Dale A. Desnoyers, 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 New York State Department of Health (NYSDOH), has selected this remedy for the NIMO Troy - Water Street Manufactured Gas Plant (MGP) Site, Operable Unit No. 1, (OU1). The presence of hazardous waste has created significant threats to human health and the environment that are addressed by this remedy. As more fully described in Sections 3 and 5 of this document, former coal gasification processes have resulted in the disposal of hazardous wastes, including volatile organic compounds, polycyclic aromatic hydrocarbons and cyanide. These wastes have contaminated the soil and groundwater at the site, as well as the adjacent Hudson River sediment, and have resulted in:

- a significant threat to human health associated with the potential exposure to contaminated groundwater and contaminated soil;
- a significant environmental threat associated with the impacts of contaminants to groundwater and soil; and,
- a significant environmental threat associated with the migration of contaminants from this site into the adjacent Hudson River sediment.

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

- excavation and appropriate off-site disposal of approximately 17,000 cubic yards of contaminated soil. The former Water Gas Building will be demolished as needed to carry out the selected remedy;
- treatment in-place of approximately 23,000 cubic yards of contaminated soil by a chemical oxidation process;

- the removal of the contents of several structures and the structures themselves as necessary;

- the removal and appropriate disposal of approximately 1,200 cubic yards of purifier waste;

- an asphalt cap or permeable soil cover would be placed over the entire site (approximately 16 acres);

- monitored natural attenuation of groundwater consistent with United States Environmental Protection Agency guidance;

- institutional controls to limit development to nonresidential uses, prohibit groundwater use, require an evaluation of potential soil vapor on indoor air quality in on-site buildings and ensure the integrity of the remedy, including a long-term monitoring program.

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 NIMO - Troy Water Street - MGP, Former Plant Site (Area 2) is located in the City of Troy, Rensselaer County (see Figure 1). The site encompasses 16 acres in an urban setting along the Hudson River, about 200 yards upstream of the State Route 378 bridge (Menands Bridge).

The site is generally flat except along the bank of the Hudson River, where the elevation drops about twenty feet. The Wynants Kill flows along the northern boundary of the site. The stream also flows through a concrete channel for approximately 300 feet before its discharge to the Hudson River. A number of significant buildings are located at the site. Several of these buildings existed during the active operation of the gas plant and include: former garages (numbers 4 and 5 on Figure 2) the former By-products Building (number 8), the former Water Gas Building (number 9), former office (number 13) and the former Benzol Building (number 14). Some of these buildings are in current use while others are unoccupied. A Warehouse Building constructed in the 1980's (number 1) is situated in the western portion of the site and is used by a courier service. Currently, nearly all of the site has been paved or graded with stone. The current owner, King Service, Inc. (King Fuels), has a Major Oil Storage Facility Permit for the bulk storage of petroleum products at the site. The permit identifies 18 storage tanks in service or temporarily out of service. The site also includes a 0.5 acre natural gas regulator

station which is owned by Niagara Mohawk, A National Grid Company (hereafter, Niagara Mohawk).

Lying northeast of Area 2 is a Voluntary Cleanup Program (VCP) site known as the Former Sperry Warehouse Site. The structures on the VCP site are part of the former Burden Iron Works that used these buildings for warehousing.

As the name suggests, this site is one of four areas into which the former MGP site was subdivided for ease in the investigation, (see Figure 1):

Area 1:	located on the west bank of the Hudson River in the Town of Colonie, across the river from the rest of the site;
Area 2:	location of the former gas plant in Troy (and is the subject of this PRAP);
Area 3:	location of the former Chevron Asphalt terminal, adjacent to Area 2, also in Troy; and,
Area 4:	location of a former disposal area immediately south of Area 3.

Area 4 was used for the disposal of ash, slag, cinders, tar and other wastes from coking and manufactured gas plant operations, as well as allegedly from former iron and steel works. Area 4 has been considered a distinct site, with its own site number, 4-42-029A and is listed on NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 site. A Record of Decision for Area 4, operable unit 1 was issued by the NYSDEC in November 2000. Area 4 straddles the City of Troy and the Town of North Greenbush.

The three remaining areas of the property associated with the former MGP described above are identified as site number 4-42-029 and are not included in the Registry as a Class 2 site. Since the Registry definition of the Area 4 site does not include the Hudson River and since the river is adjacent to all site areas, the Department has established the Hudson River as an operable unit of site 4-42-029 for future reference.

The subject of this PRAP is Area 2 of the Troy Water Street Former Manufactured Gas Plant Site, identified as OU1 of site number 4-42-029.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site was home to iron and steel producing industries as early as 1847. Manufactured gas production evolved at the site to support this industry. A notable expansion of the MGP operations occurred during the 1920's. In this decade the number of coke ovens approximately doubled and gas lines were extended from Troy to Amsterdam and Glens Falls.

Niagara Mohawk's involvement with this site began in 1929 when a Niagara Mohawk predecessor company, Niagara Hudson Power Corporation, first acquired the operating MGP.

During the time of Niagara Mohawk's, or their predecessor companies' involvement, manufactured gas was produced in the coke ovens, known as the main plant, and at two auxiliary plants known as the producer plant and the water gas plant. From information supplied to the NYSDEC, it was concluded that the main plant and producer plant were sold to Republic Steel in 1951 and the coke ovens were scrapped in 1960, ending the need for the producer plant. The water gas plant was retired in 1956 and sold to Republic Steel in 1957. In the 1960's the majority of site acreage was sold to the current owner, King Fuels.

By-products produced from the manufactured gas plant operation included tar, sulfate of ammonia and light oil. These products were further refined at the MGP into salable products. Records of waste disposal are not available. It is not likely that waste disposal occurred at OU1 at predetermined periods. However, as operations required, wastes were removed from the system; the wastes may have been spilled or disposed of on-site. Also, MGP by-products may have been released to the environment through breaks or leaks in plant containment structures or piping.

3.2: Remedial History

In December 1992 Niagara Mohawk entered into a NYSDEC administrative order requiring an environmental investigation and, where necessary, remediation of 21 Former Manufactured Gas Plant (MGP) Sites owned or operated by Niagara Mohawk, or its predecessor companies. Included among the 21 sites is the Troy Water Street Site. The following is a chronology of the remedial history of Area 2:

June 1994 - September 1995:	Preliminary Site Assessment
September 1996 - September 1998:	Remedial Investigation (RI)
September 1998 - 2002:	Supplemental Investigations and Feasibility Study
February 2003:	Proposed Remedial Action Plan

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers. The PRPs for this site, include Niagara Mohawk, as a past owner of the site and operator of the MGP and King Fuels as the present owner of the property.

The NYSDEC and Niagara Mohawk entered into a Consent Order (Index #DO-0001-9210) on December 7, 1992. The Order obligates Niagara Mohawk to implement a full remedial program for this site. The NYSDEC will also contact King Fuels regarding their liability for contamination identified at the site.

SECTION 5: SITE CONTAMINATION

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

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between September 1996 and September 1998, concluding with the *Final Report for Niagara Mohawk Power Corporation Troy (Water Street) Site, Area 2, Remedial Investigation Report*. A Feasibility Study was submitted to the NYSDEC in January 1999. During the review of the Feasibility Study the NYSDEC concluded that additional investigation was needed to complete the study. Subsequently, supplemental investigations were conducted from April 2000 to June 2001. Reports entitled *Supplemental Data Report Troy (Water Street) Site, Area 2* and *Supplemental Phase 2 Data Report* were prepared which describe the field activities and findings of the supplemental investigations in detail. A final Feasibility Study was submitted in March 2002.

The following activities were conducted during the RI and supplemental investigations:

- research of historical information;
- collection and analysis of 19 surface soil samples to determine the level of contaminants, if any, in more readily transportable and contacted soils;
- collection and analysis of nine surface water and nine sediment samples from the Wynants Kill to determine whether the site had a significant impact on this water body;
- visual inspection of former gas holders and, where appropriate, sampling of contents.
- excavation of 12 test pits in targeted areas with sampling of subsurface soils. The test pits were generally targeted at subsurface MGP structures identified on historical plans;
- completion of approximately 36 soil borings and installation of 32 monitoring wells for analysis of soils and groundwater as well as the physical properties of soil and hydrogeologic conditions.

- visual or remote camera inspection of reasonably accessible subsurface structures to provide estimates of their size and the presence of contaminants.

To determine whether the soil, groundwater and Wynants Kill sediment 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."

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 Troy Water Street Site is located on a small delta outwash deposit. The deposit sediments consist primarily of sand and gravel which overlie shale bedrock. The black shale is observed to be nearly 70 feet below ground surface adjacent to the river, but outcrops just a short distance to the north and east of the site.

The results of the investigation indicate that a majority of the soils have been disturbed through filling, excavation and/or grading. The thickness of fill, which consists primarily of slag, cinders, ash, bricks and gravel, ranged from approximately 5 feet to 40 feet. Substantial filling of the former Wynants Kill occurred following the stream's redirection to the north in 1930 accounting for approximately 40 feet of fill in this area (See Figure 3). The Wynants Kill is a tributary to the Hudson River.

Underlying the fill material, glacier processes resulted in a range of interbedded soil from clay to coarse sand and gravel. A thin glacial till exists in some areas. The combined thickness of fill and overburden sediments range from 5 feet to approximately 70 feet. Generally, the thickness of unconsolidated deposits increases from east to west. The unconsolidated deposits are underlain by shale bedrock. Depth to bedrock ranges from 5 feet to approximately 70 feet and generally slopes toward the Hudson River and the former Wynants Kill. A detailed investigation of bedrock underlying the site was not included in the Area 2 investigation because soil contamination, including dense NAPL, was found to be limited vertically to the overburden soils. There was no indication that MGP contaminants had reached the bedrock.

Site groundwater within the overburden is present in the lower portions of the fill and within the glacial deposits. The depth to groundwater at the site varies from approximately 7 feet to 29 feet. Groundwater flow direction is generally west to northwest, toward the Hudson River. Tidal influence on the river at the site affects the groundwater gradient.

Geologic features significant to contaminant movement and the evaluation of remedial alternatives include the movement of groundwater toward the Hudson River; the groundwater provides a mechanism by which contaminants on the site can be transported to this Class C water body. Although vegetation along the shore mitigates erosional transport, future uncontrolled disturbance of the soil would exacerbate the transport. The water table lies below the majority of the contaminant mass. Thus, substantial excavation could occur without extensive dewatering.

5.1.2: Nature of Contamination

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

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

Total PAH concentrations as referred to in this plan are the summation of the individual PAHs listed above. The italicized PAHs are probable human carcinogens. The summation of the italicized PAHs is referred to in this document as total carcinogenic PAHs (cPAHs).

PCBs, pesticides, cyanide and metals were analyzed for in all media and determined not to be of concern.

Typical of former manufactured gas plant sites, two major types of waste materials are present at the site: tars and purifier waste. Tars contain high concentrations of BTEX and total PAHs.

Tars at the site are found in two forms. One form is a reddish brown, oily liquid which does not readily dissolve in water. Material such as this is commonly referred to as a non-aqueous phase

liquid, or NAPL. Although most tars are slightly more dense than water, the difference in density is slight. Consequently, they can either float or sink when in contact with water. Tars were disposed or spilled or leaked from tanks, gas holders, and other structures at the site and have moved laterally away from these locations through the subsurface. The NAPL was found to saturate areas of unconsolidated deposits and/or exist in scattered, discontinuous globules. The other form of tar found was black and highly viscous, with plastic properties.

Purifier waste is a mixture of wood chips and iron filings which was used to remove sulfur and other compounds from the manufactured gas, before the gas was distributed to the public. Purifier waste which no longer was capable of removing the impurities, was often disposed on-site. It contains high concentrations of sulfur and cyanide, has an unpleasant odor and has a characteristic blue color from ferri/ferrocyanides.

As well as being present by themselves, these waste materials are found mixed with site soils and groundwater.

5.1.3: Extent of Contamination

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

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

Table 1 summarizes the degree of contamination for the contaminants of concern in groundwater, surface soil, subsurface soil and sediment 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

Generally, waste materials at the site were found in the former Wynants Kill alignment (see Figure 3 for former alignment location) and within several above or below ground structures. These structures are identified by letter on Figure 3, and described below:

Structure	Description
A	Sump number 1 at the north end of King Fuels former office and garage;
B	Underground air plenums at the former coke ovens;
C	Underground concrete vault east of the south garage;

D Sump number 4 at the north end of the Warehouse Building;

E Underground tar liquor sump, west of the former Water Gas Building; and,

F Above-ground, former oil/water separator tank along the east wall of the former Water Gas Building.

The former air plenums, sump 1, sump 4, subsurface concrete vault and tar-liquor sump (locations shown on Figure 3) contained visual tar or NAPL. Analysis of a sample collected from sump 1 showed a total PAH concentration of 583,000 ppm. Total PAH concentrations of the wastes contained in sump 4 and the air plenums exceeded 50,000 ppm. Total PAH concentrations in the sludge of the former oil/water separator tank exceeded 7,000 ppm. Soil and groundwater data collected in the vicinity of these structures indicate that several of these structures are located in an area of contamination, and/or have released contaminants to the subsurface. For other structures, limited data exists underneath or adjacent to these structures. For these reasons, the proposed remedy requires removal of the structures themselves, unless a thorough investigation of the structure(s) following removal of its contents and its surroundings concludes that such structure removal is not necessary.

Waste materials were also found in a 300,000 cubic foot (cf) gas holder (structure G on Figure 3) and a former lime sump (structure H on Figure 3). These materials were removed as an interim remedial measure (see Section 5.2).

NAPL was found as a measurable separate phase in two monitoring wells. One well, MW-21, is located in the former Wynants Kill alignment. The other well, MW-31, is located west of the southernmost garage of the site. (See Figure 5 for well locations.) The NAPL recovery in each well was less than three inches thickness after at least one month of no disturbance following evacuation of the well. The NAPL did not reappear when MW-31 was re-gauged 10 weeks later.

Purifier waste was found in two areas: on the surface near the former 2 million cf gas holder and on the surface in the former Wynants Kill alignment along the Hudson River bank. See Figure 8 for purifier waste locations.

Surface Soil

Total PAHs were detected in on-site surface soils in concentrations ranging from less than 1ppm to 345 ppm. The surface soil exceeded certain individual PAH SCGs throughout the site and total cPAHs ranged from not detected to 172 ppm on-site.

No BTEX was detected in any of the surface soil samples.

Cyanide in surface soil ranged from not detected to 49.5 ppm. The 49.5 ppm value was found in sample SS-10, located on-site, east of the former King Fuels Office Building and Garage. Cyanide was not detected in 10 of 13 surface soil samples analyzed.

Subsurface Soil

The highest concentrations of total PAHs in subsurface soils were found in the area of the former Wynants Kill alignment, which extends from the eastern channelized portion of the Wynants Kill to the Hudson River, running adjacent to and under the west edge of the former Water Gas Building, and in an area near the former 300,000 cf gas holder, adjacent to the east side of the former Water Gas Building (see Figure 4). There is evidence that these two areas exist as one larger area of visual and/or high PAH concentrations (greater than 500 ppm), however, the presence of the former Water Gas Building prevented the investigation of the soil between these two areas. The evidence includes PAH concentrations as high as 53,000 ppm at monitoring well MW- 27 within 20 feet of the west side of the building. Concentrations of this magnitude are indicative of NAPL in close proximity. Tar and NAPL were observed during the installation of the monitoring well. Tar and NAPL were also observed during the boring of SB-39, within 20 feet of the west side of the building. NAPL was found in monitoring well MW-21, within forty feet of the west side of the building. The presence of NAPL capable of flowing into a well in close proximity to the building supports the likelihood of NAPL migration underneath the building. On the east side of the building, subsurface piping exists between the building and the former holder which may have provided a migration route for the sludge present in the gas holder prior to its IRM removal (see Section 5.2) and which may be providing a source of groundwater contamination. Also, tar was found during the construction of monitoring well MW-6, adjacent to the east side of the building.

Other areas of elevated PAH concentrations include the area in front of the King Fuels current office and the southwest corner of the site. Total PAH concentrations in subsurface soils ranged from not detected to 66,320 ppm. Individual PAH concentrations exceeded the SCGs throughout the fill and unconsolidated deposits, to depths of 54 feet.

Areas of elevated BTEX in subsurface soils generally coincided with the areas of elevated PAH concentrations, except for the area of monitoring wells MW-12 and MW-30. In the vicinity of these wells, BTEX was elevated without a corresponding elevation in PAH concentrations. Site-wide benzene concentrations ranged from not detected to 56 ppm, with concentrations exceeding the TAGM 4046 value in 37 of 234 samples. In those same samples, toluene ranged from not detected to 280 ppm, ethylbenzene ranged from not detected to 62 ppm, and total xylenes ranged from not detected to 300 ppm. See Table 1 for further analytical results of subsurface soil sampling. Areas of visual tar or NAPL were found to coincide with areas of higher (greater than 500 ppm) PAH concentrations.

Concentrations of cyanide in subsurface soil ranged from not detected to 16 ppm. Cyanide was not detected in 69 of 86 surface soil samples analyzed. The highest value was found in the

former Wynants Kill alignment along with elevated PAH concentrations. Analysis of purifier waste revealed cyanide concentrations ranging from less than 1 ppm to 5 ppm.

Sediments

The Wynants Kill as it traverses the site is considered part of Area 2. The Wynants Kill flows through a concrete channel for approximately 300 feet prior to its discharge to the Hudson River at the northwest corner of the site. The Hudson River is to be addressed as a separate operable unit, and thus will not be discussed here.

Wynants Kill sediments adjacent to the site contained total PAHs ranging from 3.9 ppm to 9 ppm, except for one sample collected from the channeled section found to contain 392 ppm. Upstream of the site, total PAHs ranged from 6 to 32 ppm except for one sample collected adjacent to a railroad bridge which contained 1,716 ppm. PAH concentrations in sediment both upstream and adjacent to the site were comparable and are considered to represent background conditions in this historically industrial area through which this reach of stream flows.

No BTEX was detected in Wynants Kill sediments above SCGs and cyanide was also not detected in Wynants Kill sediments.

The NYSDEC has concluded that no MGP impacts require remediation of the Wynants Kill sediment. However, elimination of any contaminant sources to the Wynants Kill is a remedial goal of this PRAP.

Surface Water

No contaminants of concern were found above the SCGs for Wynants Kill surface water.

Groundwater

There are three areas on the site where contaminants of concern in groundwater exceed their respective SCGs. (See Figure 5). Two areas exist in the north, in the vicinity of the former Water Gas Building and in the former Wynants Kill alignment. The groundwater contamination generally exists in the area where tar, NAPL and higher concentrations of contaminated soils are present in the subsurface (compare Figures 4 and 5). Benzene concentrations in these areas were found as high as 910 ppb. PAH concentrations were found as high as 6,740 ppb. The third area of groundwater contamination is located in the southwest quadrant of the site adjacent to the Hudson River, near monitoring wells MW-12 and MW-30. Benzene concentrations in this area were found as high as 2,100 ppb. PAH concentrations were found in this area as high as 1,459 ppb. As discussed in the subsurface soil section, the investigation of this area and upgradient areas did not identify any extensive subsurface soil contamination which could be considered a source for the contaminants of concern. Therefore, it is believed that this contamination may be related to petroleum product storage and/or handling following MGP operations.

Site groundwater did not exceed the groundwater standard for cyanide.

Air

As part of the initial investigation of the site, Niagara Mohawk was to have conducted an indoor air monitoring program to evaluate the indoor air quality in on-site buildings. However, during the development of the work plan, the NYSDEC relieved Niagara Mohawk from conducting the air monitoring program provided the remedy eliminates, to the maximum extent practicable, all human health and environmental hazards. This determination was made in light of the current uses of the site, which include vehicle fueling, indoor vehicle loading and indoor vehicle maintenance, which could interfere with the determination of the contribution from former MGP contaminants, if any. While the selected remedy eliminates to the maximum extent practicable, human health and environmental threats, residual contamination will remain following the remedy.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

From December 1997 to March 1998 the contents were removed from two former MGP structures as an IRM. Both of these structures contained hazardous waste residues which were a source of groundwater contamination. One structure was an underground concrete former lime sump containing tar; the other structure was a former above-grade gas holder containing over 100,000 gallons of supernatant water and over 400,000 gallons of sludge. The IRM for both structures included removing the contents for off-site disposal. The former 300,000 cubic foot telescoping steel gas holder was dismantled, with the steel being decontaminated prior to shipment off-site. Although subsurface data indicated contamination was present beneath the holder foundation, it was determinated that removal of the foundation and subsurface contamination was beyond the scope of the IRM and would be addressed during the remediation of the site. Following removal of the contents of the former lime sump structure, the structure walls and bottom were inspected. Several pipes, eight-inch diameter or less, penetrated the walls; the pipes were subsequently plugged. The walls and bottom were found to be intact, however, a minor crack which contained some tar was found in the wall. The IRM could not conclude whether the crack existed through the full thickness of the wall. Under the selected remedy, the outside of the lime sump will be investigated to determine if the soils meet the criteria for removal as described in Section 8.

5.3: Summary of Human Exposure Pathways

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 5.0 of the Final Remedial Investigation 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 are documented. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Exposure Pathways

- On-site workers and construction workers involved in subsurface excavations can come into direct contact with MGP contaminated soils and waste materials, and may also inhale vapors and airborne particulates emanating from these materials.

- Workers in on-site buildings could be exposed to MGP associated soil vapors accumulating in indoor air. However, existing site uses, which include indoor vehicle fueling, loading and maintenance would likely impact indoor air quality and therefore it would be difficult to distinguish MGP vapor impacts from the impacts due to the current use of the buildings. In the event that the future use of the onsite buildings changes, indoor air sampling and/or soil vapor testing will be necessary to evaluate the potential for exposure of building occupants to MGP associated vapors.

- The potential for future exposures to contaminants in on-site groundwater is unlikely due to the on-site availability of a public water supply. However, exposures to contaminated groundwater could occur in the future if a drinking water well is installed on-site.

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 following environmental exposure pathways and ecological risks have been identified:

- Exposure of benthic organisms to elevated concentrations of contaminants which migrate from the site to the adjacent Hudson River sediments from storm water erosion, NAPL migration and groundwater discharge.

- Site contamination has also impacted the groundwater resource in the unconsolidated aquifer. This contamination has rendered the aquifer at the site unusable as a potable water supply. In the absence of this contamination, the aquifer would be usable.

- The presence of contaminants of concern in excess of their respective SCGs in groundwater in an otherwise usable aquifer threaten the resource of that aquifer. The uncontrolled discharge of this groundwater to the Hudson River threatens the quality of the river. Further, the potential exists for site contaminated soils to be transported to the river through man-made disturbances and runoff. These soils, if precipitated in the river as sediment, would exceed sediment SCGs.

- The migration of tar and/or NAPL from the site, particularly from the former Wynants Kill alignment, which has adversely impacted sediment quality in the Hudson River.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

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

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

- exposures of persons at or around the site to contaminants in soil, waste material and groundwater;

- environmental exposures of flora or fauna to contaminants in soil and waste material;

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

- the release of contaminants from soil and waste material into surface water and sediment through storm water erosion, NAPL migration and groundwater discharge to the river.

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

- NYSDEC groundwater quality standards; and,

- NYSDEC's recommended soil cleanup objectives as identified in TAGM 4046 for the contaminants of concern.

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 NIMO - Troy Water Street - MGP Former Plant Site (Area 2) were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that 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 groundwater and soil at the site. The alternatives are numbered in the same sequence as they are presented in the FS report. However, a new alternative was developed for this ROD in response to public comment on the PRAP. The new alternative is identified as Alternative 7B. The PRAP Alternative 7 is now identified as Alternative 7A.

Alternative 1: No Further Action

Present Worth:	$460,000
Capital Cost:	$0
Annual O&M:	$27,000

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

Under this alternative, no additional action beyond the completed IRM would be taken to address the remedial action objectives presented in Section 6.

Alternative 2: Grout Curtain, Soil Containment with Reactive Treatment Wall, Closure of Structures, Removal of Purifier Waste, Cap/Cover

Present Worth:	$11 million
Capital Cost:	$7.9 million
Annual O&M:	$ 250,000

The salient features of this alternative are containment of areas of high PAH concentrations and downgradient in-situ treatment of contaminated groundwater (see Figure 6). The containment would be accomplished by installing vertical grout curtains around the perimeter of two areas where site soils exceed 500 ppm total PAHs. Grout curtain design and installation would need to consider obstructions, buildings and underground utilities and would be extended to the bedrock surface. Contaminated groundwater migrating off-site would be addressed by the placement of two reactive treatment walls. To minimize potential human health exposures to contaminants, an asphalt cap would be placed over the site with certain areas having the option of a permeable soil cover.

The elements of this alternative include:

1. Two grout curtains for the containment of highly contaminated subsurface soils and groundwater would be installed. The grout would be injected under pressure into the soils, filling the void spaces and reducing the groundwater migration. One grout curtain would encircle all of the former Wynants Kill alignment and include the area of the former 300,000 cubic foot gas holder (approximately 2,000 linear feet). The former Water Gas Building would be razed to enable construction of the curtain. The other curtain would encircle a half-acre hot-spot area located west of the King Fuels former office and garage. The curtains would extend to bedrock and would be a minimum thickness of three feet. Groundwater would be extracted from within the curtains to maintain an inward hydraulic gradient and disposed in accordance with appropriate regulations.

2. Approximately 1,500 cy of soil in outlying areas of the site that exceed 500 ppm total PAHs, such as in the vicinity of monitoring well MW-5 and test pit TP-10 location, would be excavated and disposed of off-site in accordance with applicable regulations.

3. For contaminated groundwater that is not contained, two reactive treatment walls would be installed to treat, in-situ, the groundwater migrating to the Hudson River and Wynants Kill. The walls would not be a physical wall, but rather a series of oxygen release compound (ORC) injection points. One series of injection points would be placed adjacent to the Hudson River shoreline from the Niagara Mohawk regulator station to the Chevron property line (approximately 1,100 feet). A second series of injection points would be placed along the Wynants Kill upstream of the channeled section.

4. To eliminate contact exposure, reduce erosion and wind transport of contaminants, as well as reduce the volume of infiltrating water, an asphalt cap would be placed over those areas encircled by the grout curtains. The thickness of the cap would be determined during the design phase.

5. To minimize contact exposure, reduce erosion and wind transport of contaminants, an asphalt cap or permeable soil cover would be placed over the entire site except for those areas encircled by the grout curtains. Building footprints would be excluded from this requirement. The permeable soil cover would be a minimum of two-feet thick.

6. To eliminate certain sources of groundwater contamination, the contents (approximately 1,500 cubic yards (cy) of tar and contaminated soil and debris, and approximately 5,000 gallons of liquid wastes) of the structures identified in subsection 5.1.3 would be removed. Following removal, the interior surfaces of the structures would be cleaned. The structures would then be inspected for structural integrity. If the inspection concludes that no contaminants were released from the structure(s), then the structure(s) would be backfilled with an appropriate material and left in place. If the inspection reveals that the structure(s) may have released contaminants or the inspection is inconclusive, then the structure(s) itself would be removed. Removed materials would be disposed off-site at a permitted disposal facility.

7. To eliminate exposure to purifier waste, approximately 1,200 cubic yards of purifier waste (including off-site purifier waste identified north of the Wynants Kill) would be removed and disposed of off-site at a permitted disposal facility.

8. Institutional controls would be established to; (a) protect engineering controls which are part of the remedy; (b) restrict on-site groundwater use; (c) prohibit the site from being used for purposes other than appropriate recreational, industrial or commercial uses, as explained below, without the express written waiver of such prohibition by the NYSDEC and the NYSDOH; and (d) require an evaluation of potential MGP impact on indoor air in on-site buildings should changes from the current use occur in the future. Appropriate industrial or commercial uses of the property would have to be consistent with any applicable zoning ordinances, but would not include any enterprises that draw susceptible portions of the community to the properties for activities that may lead to exposures to residual site contamination (e.g. day care, child care). An annual certification would be required to ensure the effectiveness of the institutional and engineering controls.

9. The operation of the reactive treatment wall component of the remedy would continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

10. Groundwater quality would be monitored annually to verify the effectiveness of the containment and wall systems. For cost estimating purposes a 30 year time span is assumed.

This alternative would take approximately 6 months to implement, starting from the point of construction mobilization, and not including long term monitoring.

Alternative 3: Soil Cover, Limited Soil Removal, Closure of Structures, Removal of Purifier Waste

Capital Cost:	$ 5.4 million
Annual O&M:	$ 43,000
Present Worth:	$ 6.2 million

This alternative was developed to evaluate and compare a soil cover remedy against other alternatives, including alternatives which would provide for a more aggressive removal of contaminants. Under this alternative some of the most concentrated waste at the site at and near the surface would be removed and backfilled to provide for an appropriate contour. The entire site would be covered with a minimum of a two-foot thick permeable soil cover or asphalt cap. A long-term groundwater monitoring program would be implemented.

Elements of this alternative include:

1. The components of paragraphs 6 thru 8 inclusive described in Alternative 2.

2. Excavation and off-site treatment and/or disposal at a permitted facility of approximately 3,000 cubic yards of soil in site areas found to contain the highest concentrations of contaminants within 15 feet of the surface. The areas that would be targeted for removal are shown on Figure 7. Excavated areas would be backfilled to an appropriate grade.

This alternative would take approximately 6 months to implement, starting from the point of construction mobilization, and not including long term monitoring.

Alternative 4: In-situ Stabilization of Soil Greater Than 500 ppm Total PAHs, Closure of Structures, Removal of Purifier Waste, Cover

Capital Cost:	$ 5.4 million- 7.8 million
Annual O&M:	$ 43,000
Present Worth:	$ 6.2 million - 8.6 million

This alternative was developed to provide an in-situ alternative which would reduce the mobility of the contaminants in the soil. The main features of this alternative include in-situ cement stabilization of soils containing greater than 500 ppm total PAHs. Niagara Mohawk's FS uses different criteria for which soils would be stabilized, such as specific individual PAH concentrations, and a depth limit to stabilization. However, in order to compare this alternative to the other alternatives, particularly the removal alternatives, it is necessary to apply the same criteria.

Following stabilization, the entire site would be covered with a minimum of a two-foot thick permeable soil cover or asphalt cap. A monitored natural attenuation of groundwater program would be implemented, consistent with federal and state guidance.

Elements of this alternative include:

1. The components of paragraphs 6 thru 8 inclusive described in Alternative 2.

2. To reduce the mobility of contaminants in the soil, soil containing greater than 500 ppm total PAHs or visual tar or visual NAPL would be stabilized in-situ with cement/bentonite additives. Niagara Mohawk estimates 15,000 cubic yards of soil at the site exceeds 500

ppm total PAHs. The NYSDEC believes approximately 40,000 cubic yards of soil at the site may exceed 500 ppm total PAHs, as best can be determined from the RI/FS data. Therefore, a range of costs is presented to represent the range of volume that could require stabilization. The soil would be stabilized at depths up to 45 feet below ground surface. Cement stabilization involves the injection and mixing of cement/bentonite additives in a slurried state using large diameter augers. The augers slice and mix the soil with the slurry to create a uniformly mixed fill material. The resultant mix creates a subsurface of low permeability which immobilizes the contaminants.

This alternative would take approximately 1 year to implement, starting from the point of construction mobilization, not including long term monitoring.

Alternative 5: Soil Cover, Limited Soil Removal, Closure of Structures, Removal of Purifier Waste

Capital Cost:	$ 5.6 million
Annual O&M:	$ 43,000
Present Worth:	$ 6.4 million

This alternative is identical to Alternative 3 except that it would specify low temperature thermal desorption as the off-site disposal method.

Alternative 6: Remove Soil Containing Contaminants Greater Than Individual TAGM 4046 Values, Closure of Structures

Capital Cost:	$ 80 million
Annual O&M:	$ 30,000
Present Worth:	$ 80 million

This alternative was developed to evaluate the removal of all contaminants in soil exceeding their individual TAGM 4046 cleanup objective. By removing soils exceeding their individual cleanup objective, the source of groundwater contamination would be removed, although groundwater itself would remain contaminated immediately following soil removal. Thus, a monitored natural attenuation program, with contingencies for active treatment would be established for groundwater. Institutional controls would be implemented to eliminate potential human exposure to residual groundwater contamination.

Elements of this alternative include:

1. Paragraph number 6 of Alternative 2 regarding existing structures.

2. An estimated 800,000 cubic yards of soil containing BTEX or total PAHs concentrations in excess of individual TAGM 4046 values would be removed. Removal would occur over approximately 16 acres to depths up to 54 feet. Removal would also include all purifier

waste, coal tar or NAPL deposits. All removed material would be treated and/or disposed of off-site at a permitted facility.

Following removal, the site would be returned to its pre-excavation grade. Thermally treated soil which originated from the site and satisfied TAGM 4046 for individual VOCs and SVOCs could be used as backfill material. Treated soils could only be substituted for topsoil if amended to sustain a vegetative cover.

This alternative would take approximately 7 years to implement, starting from the point of construction mobilization.

Alternative 7A: Removal of Soil Greater Than 500 ppm Total PAHs for Off-Site Disposal, Closure of Structures, Removal of Purifier Waste, Soil Cover

Capital Cost:	$7.0 million - 10 million
Annual O&M:	$43,000
Present Worth:	$7.8 million - 11 million

This alternative was developed to evaluate the removal of the contaminants of concern in soil in concentrations greater than the TAGM 4046 cleanup objective of less than 500 ppm total semivolatile compounds. Since the specific semivolatile contaminants of concern are PAHs, satisfying a cleanup objective of less than 500 ppm total PAHs would also satisfy the TAGM total semivolatile compound objective. By removing soils greater than 500 ppm total PAHs, removing tar and removing NAPL contaminated soils, the source of groundwater contamination would be removed, although groundwater itself would remain contaminated immediately following soil removal. Thus, a monitored natural attenuation program, with contingencies for active treatment would be established for groundwater. Institutional controls would be implemented to eliminate potential human exposure to any residual contamination. Excavated areas would be backfilled to provide for an appropriate contour. The entire site would be covered with a minimum of a two-foot thick permeable soil cover or asphalt cap. A monitored natural attenuation groundwater program would be implemented, consistent with federal and state guidance, at each of the three groundwater contaminated areas identified on Figure 5.

Elements of this alternative include:

1. The components of paragraphs 6 thru 8 inclusive described in Alternative 2.

2. To mitigate exposure and remove groundwater contaminant sources to the extent feasible, surface or subsurface soil containing total PAHs greater than 500 ppm or visual tar or NAPL would be removed. Niagara Mohawk estimates 15,000 cubic yards of soil at the site exceeds 500 ppm total PAHs. The NYSDEC believes approximately 40,000 cubic yards of soil at the site exceeds 500 ppm total PAHs, as best can be determined from the RI/FS data. Therefore, a range of estimated costs is presented to represent the range of volume that could require removal. The surface weeps observed on the Wynants Kill channel would be

considered surface tar. Visual tar or NAPL, would be soil found to be saturated with NAPL, or have visually observable separate phase product. Soils exhibiting odors, staining and/or sheens would not be considered for removal as visual tar or NAPL. Soils exhibiting odors, staining and/or sheens would however be removed if found to exceed the 500 ppm PAH criteria. Removed soil would be disposed off-site in accordance with applicable NYSDEC regulations. Soil with no visual indication of NAPL or tar and containing less than 500 ppm total PAHs, located above areas meeting the removal criteria, may be stripped, stockpiled and backfilled within the excavation.

As identified in Section 5.1.3, soil containing total PAHs greater than 500 ppm or visual tar or NAPL likely exists under the former Water Gas Building. Therefore the former Water Gas Building would be demolished in order to delineate and remove the impacted area.

This alternative would take approximately 1 year to implement, starting from the point of construction mobilization, not including long term monitoring.

Alternative 7B: Removal and In-Situ Treatment of Soil Greater Than 500 ppm Total PAHs, Closure of Structures, Removal of Purifier Waste, Soil Cover

Capital Cost:	$ 7.3 million - 7.8 million
Annual O&M (first 2 years):	$ 140,000
Annual O&M (years 3 - 30):	$ 45,000
Present Worth:	$ 8.3 million - 8.7 million

This alternative is identical to Alternative 7A for the closure of structures, removal of purifier waste and provision of a soil cover. However, in this alternative in-situ chemical oxidation would be applied to soils deeper than 18 feet below the ground surface (bgs) containing total PAHs greater than 500 ppm or visual tar or NAPL in lieu of removal. Removal would be required following the same criteria as presented in Alternative 7A to a depth of 18 feet bgs. The 18-foot depth limit of excavation was selected considering four factors: 1) Excavation below this depth would likely require a double movement of soils prior to staging or direct loadout, 2) Viscous tars were generally reported above this depth while lower viscosity NAPL was generally reported below this depth, which would be more conducive to in-situ treatment, 3) At the MW-5 monitoring well location, PAHs greater than 500 ppm and visual contamination were found only in a thin lens from 18 to 20 feet bgs and from 24 to 26 feet bgs. The 18-foot depth limit to removal would thus eliminate excavation stockpiling and backfill of approximately 18 vertical feet of soil in this area, otherwise needed to access and remove the lenses. 4) Excavations at depths below 18 feet would be near or below the elevation of the Hudson River, causing substantially greater infiltration rates into excavation areas. The presence of the groundwater table would not preclude excavation to the 18-foot depth; dewatering and sub-groundwater table excavation above 18 feet bgs would be required as necessary.

In-situ treatment, consisting of a chemical oxidation process, using either ozone or Fenton's Reagent, would be used to treat the soils deeper than 18 feet bgs containing total PAHs greater than

500 ppm or visual tar or NAPL. Because of the ability of some in-situ treatments to enhance NAPL mobility, a NAPL collection system would be considered.

Approximately 11,000 cy (Niagara Mohawk estimate) to 17,000 cy (NYSDEC estimate) of contaminated soil would be excavated.

This alternative would take approximately 1 year to implement, starting from the point of construction mobilization, not including long term monitoring. It is estimated in-situ chemical oxidation would require approximately two years of treatment.

Alternative 8: Removal of Soil Greater Than 500 ppm Total PAHs for On-Site LTTD, Closure of Structures, Removal of Purifier Waste, Cover

Capital Cost:	$ 7.6 - 10.5 million
Annual O&M:	$ 43,000
Present Worth:	$8.3 - 11.3 million

This alternative would be identical to Alternative 7A with the exception of conducting on-site low temperature thermal desorption (LTTD) treatment of excavated soils, tar, and/or NAPL rather than treating or disposing of the excavated soils off-site.

The excavated materials would be treated on-site by a low temperature thermal desorption unit. Viscous tars and the purifier waste may not be amenable to on-site thermal treatment, thus they would require off-site disposal. The thermal desorption unit operating parameters would be determined, based on trial burns of representative site related contaminated media. These parameters would be set so that the treated soil would be expected to achieve TAGM 4046 limits, with the exception of benzene, which would be 0.1 ppm. Once the operating parameters are determined, the system would be operated at these parameters at all times. During actual operation if treated soil would not achieve these limits, but is below 10 ppm total cPAHs and 0.1 ppm benzene, it could be utilized for backfill in areas which would be covered with the two foot soil cover or asphalt cap.

Treated soils which achieve TAGM 4046 levels or 0.1 ppm benzene could be used as backfill and as cover material in the two foot soil cover. The upper six inches of the soil cover would have to be of sufficient quality to support vegetation. Material imported for use as a backfill or as soil cover material would also need to satisfy the above criteria.

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. The City of Troy and Niagara Mohawk expressed that in their view the proposed remedy's excavation requirements were too extensive and suggested in-place treatment of certain contaminated soils. Some neighboring residents expressed that in their view the selected remedy should require more excavation than that proposed.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

The NYSDEC is selecting **Alternative 7B: Removal and In-Situ Treatment of Soil Greater Than 500 ppm Total PAHs, Closure of Structures, Removal of Purifier Waste, Soil Cover**, 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, the evaluation of alternatives presented in the FS and comments on the PRAP.

Alternative 7B is being selected because, as described below, it would best satisfy the threshold criteria of protection of human health and the environment and would also be the most cost-effective approach to satisfying the threshold criteria of compliance with SCGs. In addition, Alternative 7B provides the best balance of the primary balancing criteria described in Section 7.2 and is cost effective. It will achieve the remediation goals for the site by removing or treating the soils that create the most significant threat to public health and the environment, it will greatly reduce the source of contamination to groundwater and it will (create the conditions needed to) restore groundwater quality to the extent practicable. As described in Niagara Mohawk's FS, none of the alternatives presented would be able to completely satisfy the threshold criteria of compliance with SCGs. Alternative 6, would satisfy soil SCGs, but groundwater at the site would be expected to continue to exceed groundwater SCGs at least initially. Alternative 6 is also not cost effective: the $80 million estimated cost to excavate and treat 800,000 cy of contaminated soil would not be proportional to the protectiveness of human health and the environment it would provide. After rejecting Alternative 6 since it is not cost effective, Alternatives 7A, 7B and 8 would be equivalent in satisfying the SCGs. Alternatives 7A and 8 would immediately satisfy the soil SCG of 500 ppm for total semivolatile compounds. Alternative 7B will be expected to satisfy the soil SCG of 500 ppm for total semivolatile compounds following in-situ treatment.

In addition to the threshold criteria, application of the balancing criteria support Alternative 7B as the proposed alternative. Long-term effectiveness would be best accomplished at this site by excavation and removal of the majority of the accessible contaminated overburden soils and treatment of the remaining contaminated soils to the maximum extent practicable. Contaminated soils that are not removed nor treated, and that would otherwise remain on-site must rely on the long-term integrity and long-term maintenance of the remedy, such as Alternatives 2 and 4, in order to be effective in the long-term. Alternatives 7A, 7B and 8 would remove or treat these soils to the extent practicable and thus these alternatives best satisfy the long-term effectiveness criteria. Alternative 3 falls short of reaching extent practicable, since contaminated soil at depths greater than

15 feet and greater than 3,000 cy in volume can be feasibly removed at this site. The lack of established long term groundwater data for in-situ stabilization of MGP wastes and the potential for increased permeability of the stabilized mass over time (Alternative 4) calls into question its long-term effectiveness.

The removal of soil containing greater than 500 ppm total PAHs or tar and NAPL to a depth of 18 feet for off-site disposal under Alternative 7B, which includes the removal of the contents of the identified structures and purifier waste, will reduce the volume of contaminants remaining on-site by approximately 13,700 cubic yards (NYSDEC estimate 19,700 cy) of solid/waste and 5,000 gallons of liquid material. Alternative 7B will remove the majority of contamination which is generally above the water table, and remove or treat areas of higher concentrations of contaminants below the water table. Alternative 7B will remove or treat an estimated 64% of the on-site soil contaminant mass. Only an estimated 44% of the on-site soil contaminant mass would be removed under Alternatives 3 and 5. Since there will be a remaining contaminant mass under the proposed alternative, restrictions on the use of property will be needed.

Alternative 2 would reduce the mobility of contaminants but this reduction is dependent upon the long-term maintenance of the containment system, and contaminant movement would still occur within the system, that is, within the site. Alternative 4 would also reduce the mobility of contaminants by reducing permeability through stabilization, however, this reduction would be dependent upon thorough mixing of the stabilizing agent and long-term integrity of the stabilized soil. Alternative 3 would remove some volume (approximately 5,700 cy of contaminated soil/waste and 5,000 gallons of liquid waste) of the highly concentrated waste on site, and in doing so would also reduce toxicity and mobility. However, Alternatives 7A, 7B and 8 would accomplish components of Alternative 3 plus an additional amount of contaminated soil, tar and NAPL removal. All alternatives have manageable short-term impacts which could be controlled by existing technology. The time needed to achieve the remediation goals, through a cost-effective alternative, would be shortest for Alternatives 7A, 7B and 8.

The cost of the alternatives varies significantly. Although capping/covering with limited source removal (Alternative 3) is less expensive than excavation (Alternatives 7A, 7B and 8), stabilization (Alternative 4), or containment (Alternative 2), it would not satisfy to the extent feasible compliance with the SCGs, nor the preference for remedies that reduce toxicity, mobility and volume as a principle element to the extent feasible. Removing all contaminated soil to NYSDEC guidance values (Alternative 6) would be approximately eight to ten times the cost of Alternative 7 yet would result in little additional protectiveness of public health and the environment. Alternatives 7A, 7B and 8 would be very favorable because they would be a permanent remedy to the extent feasible that would eliminate most of a continuing source of groundwater contamination at the site. Designing the remedy, mobilizing the equipment, preparing the site, and construction management are substantial costs associated with each of these remedies which would not change appreciably with the increase in contaminated soil proposed to be excavated as compared to Alternative 3.

Alternatives 7A, 7B and 8 all employ an active remedial measure to the same volume of contaminated soil, and all three alternatives are considered comparable in their ability to achieve

the remedial goals identified in Section 6. Alternative 7B will require an estimated additional year for treatment, but human health protection goals and groundwater restoration goals would be expected to be achieved in approximately the same time period. All three alternatives are approximately the same cost. Alternatives 7B removes less contaminated soil from the site, but the same volume of soil will be treated in-situ. The in-situ treatment has the implementability advantage of not having to establish a large deep excavation and move soil and substantial amounts of contaminated groundwater out of that excavation. In-situ treatment will allow the Warehouse Building to remain and be usable. In addition, because less contaminated soil will be removed from the site and less backfill will be needed, Alternative 7B will require fewer truck trips into and out of the site and a shorter excavation period as compared to Alternatives 7A and 8, and thus short term impacts from construction will be less. On-site thermal treatment (Alternative 8) would require areas to screen, process and treat the materials. Thus, Alternative 8 would require a greater degree of coordination with the property owner in order to facilitate on-site LTTD treatment.

The estimated present worth cost to implement the remedy ranges from $8.2 million to $8.7 million. The cost to construct the remedy is estimated to range from $7.3 million to $7.8 million. Estimated average annual operation, maintenance, and monitoring costs for the first two years is 140,000. Estimated average annual operation, maintenance, and monitoring costs for years 3 through 30 is $45,000. As indicated in the FS, these estimates are assumed to be +50% to -30% accurate in year 2000 dollars.

The elements of the selected remedy are as follows (see Figure 8):

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 will be resolved. These uncertainties include but are not limited to:

   a) whether contaminants exist in pipes, tanks or other structures observed yet not investigated. These structures (shown on Figure 9) include but are not limited to:

      1. pipes traversing the Wynants Kill;
      2. tank existing in the former benzol building;
      3. piping and structures present in the former Water Gas Building;
      4. “tar collecting and flushing liquor tanks” shown east of the 55 oven battery on “General Arrangement, Hudson Valley Fuel Corp & Republic Steel Corp. Plants” Initial Submittal Figure;

   b) whether contamination exists adjacent to the lime sump;

   c) the extent of PAH and BTEX contamination under the Warehouse and former Water Gas Buildings;

d) an evaluation of whether there is the potential for exposure to residual contamination, including air contaminants of MGP origin, that will remain at the site following the implementation of the proposed remedy for building occupants; and,
e) a pilot study to determine the type and operating parameters of the in-situ chemical oxidation treatment.

2. Surface or subsurface soil containing total PAHs greater than 500 ppm or visual tar or NAPL will be removed to a depth of 18 feet below the existing ground surface (bgs) in the areas shown on Figure 8. Niagara Mohawk estimates 11,000 cy of soil will meet this removal requirement; the NYSDEC however, estimates 17,000 cy will meet this requirement. The limits of removal will be defined during a pre-design investigation. The former Water Gas Building will be demolished in order to determine the limit of removal. Soil under the Water Gas Building floor containing total PAHs greater than 500 ppm or visual tar or NAPL will be removed to a depth of 18 feet bgs. Surface weeps observed on the Wynants Kill channel will be considered surface tar.

   Visual tar or NAPL, will be soil found to be saturated with NAPL, or have visually observable separate phase product. Soils exhibiting odors, staining and/or sheens will not be considered for removal as visual tar or NAPL. Soils exhibiting odors, staining and/or sheens will however be removed if found to exceed the 500 ppm PAH criteria. Removed soil will be disposed off-site in accordance with applicable NYSDEC regulations. Soil with no visual indication of NAPL or tar and containing less than 500 ppm total PAHs, located above areas meeting the removal criteria, may be stripped, stockpiled and backfilled within the excavation.

3. The area of soil containing total PAHs greater than 500 ppm or visual tar or NAPL deeper than 18 feet bgs, estimated volume of 23,000 cy, will be delineated and treated in place by a chemical oxidation process, using either ozone or Fentons Reagent. This treatment will occur in the areas of monitoring well MW-5, soil boring SB-28 and the former Wynants Kill alignment (see Figures 3 and 8). The treatment will operate until groundwater concentrations achieve standards for benzene, ethylbenzene, toluene and individual xylenes, or until the NYSDEC determines groundwater concentrations have achieved asymptotic levels for a sustained period of time and continued treatment would not result in significant mass removal of contaminants. A NAPL collection system will also be installed in the treatment areas.

4. The contents, an estimated 1,500 cubic yards of tar and contaminated soil and debris, and an estimated 5,000 gallons of liquid wastes, of the following structures will be removed:

   a. Sump number 1 at the north end of King Fuels' former office and garage;
   b. Underground air plenums at the former coke ovens;
   c. Underground concrete vault east of the south garage;
   d. Sump number 4 at the north end of the Warehouse Building;
   e. An underground tar liquor sump, west of the former Water Gas Building; and,

f. An above-ground, former oil/water separator tank along the east wall of the former Water Gas Building.

Following removal, the interior surfaces of the structures will be cleaned. The structures will then be inspected for structural integrity. If the inspection concludes that no contaminants were released from the structure(s), then the structure(s) will be backfilled with an appropriate material and left in place. If the inspection reveals that the structure(s) may have released contaminants or the inspection is inconclusive, then the structure(s) itself will be removed. Removed materials will be disposed off-site at a permitted disposal facility.

5. An estimated 1,200 cubic yards of purifier waste (including off-site purifier waste identified north of the Wynants Kill) will be removed and disposed of off-site at a permitted disposal facility.

6. An asphalt cap or permeable soil cover will be placed over the entire site. Building footprints will be excluded from this requirement. The permeable soil cover will be a minimum of two-feet thick and include a demarcation layer.

7. Monitored natural attenuation of groundwater consistent with the United States Environmental Protection Agency's April 21, 1999 Memorandum: Final OSWER Directive "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action and Underground Storage Tank Sites". Monitored natural attenuation in accordance with USEPA guidance will be applied at each of the three groundwater contaminated areas identified on Figure 5. Performance of the natural attenuation processes will be evaluated by monitoring the relative difference of electron acceptor concentrations or metabolic by-products within and outside the contaminated groundwater areas. Groundwater quality parameters will include, but not necessarily limited to dissolved oxygen, nitrate, redox potential, pH, and individual BTEX and PAH compounds. Concentrations of contaminants in groundwater will be compared with the predicted decay rates and SCGs. If monitoring demonstrates that the attenuation rate is not sufficient, air sparging, and/or addition of oxygen and/or addition of another electron acceptor such as sulfate, will be implemented. The performance goals will include compliance with groundwater quality standards and guidance.

8. Institutional controls will be established to; (a) protect engineering controls which are part of the remedy; (b) restrict on-site groundwater use; (c) prohibit the site from being used for purposes other than appropriate recreational, industrial or commercial uses, as explained below, without the express written waiver of such prohibition by the NYSDEC and the NYSDOH; and (d) require an evaluation of potential soil vapor on indoor air quality in on-site buildings, should changes from the current use occur in the future. Appropriate industrial or commercial uses of the property will have to be consistent with any applicable zoning ordinances, but will not include any enterprises that draw susceptible portions of the community to the properties for activities that may lead to exposures to residual site

contamination (e.g. day care, child care). An annual certification will be required to ensure the effectiveness of the institutional and engineering controls.

9. Since the remedy results in untreated hazardous waste remaining at the site, a long term monitoring program will be instituted. This program will include groundwater quality monitoring to evaluate the effectiveness natural attenuation, and soil and/or asphalt cover monitoring to evaluate its integrity as an exposure and surface migration barrier. This program will 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;
- In December 1992, the NYSDEC issued a press release announcing the investigation and remediation, if necessary, of certain former MGP sites, including the Troy (Water Street) Site;
- On April 8, 1996, Niagara Mohawk issued a fact sheet discussing the preliminary site assessment results;
- On September 9, 1996, Niagara Mohawk held a public information meeting announcing the findings of the preliminary site assessment;
- In February 2003, the PRAP was released for public comment and a fact sheet was sent to the site mailing list summarizing the PRAP, identifying the public comment period start and providing the date of a public meeting to present the PRAP;
- A public meeting was held on March 4, 2003 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

WASTE (Note 1)	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND - 160	0.06	Note 2
	Toluene	ND - 400	1.5	Note 2
	Ethylbenzene	ND - 65	5.5	Note 2
	Total Xylenes	0.01 - 480	1.2	Note 2
Semivolatile Organic Compounds (VOCs)	Total PAHs	969 - 583,000	500	Note 2
Cyanide		ND - 199	NA	-

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
VOCs	Benzene	ND	0.06	0 of 27
	Ethylbenzene	ND	5.5	0 of 27
	Toluene	ND	1.5	0 of 27
	Total Xylenes	ND	1.2	0 of 27
SVOCs	Total PAHs	ND - 345	500	0 of 27
	Total cPAHs	ND - 172	NA	-
Cyanide		ND - 49.5	NA	-

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
VOCs	Benzene	ND - 56	0.06	37 of 234
	Ethylbenzene	ND - 62	5.5	11 of 234
	Toluene	ND - 280	1.5	9 of 234
	Total Xylenes	ND - 300	1.2	22 of 234
SVOCs	Total PAHs	ND - 66,320	500	24 of 234
Cyanide		ND - 16	NA	-

TABLE 1
Nature and Extent of Contamination (continued)

SEDIMENTS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Wynants Kill Upstream	Total PAHs	6 - 1,716	ERL: 4	4 of 4
			ERM: 35	1 of 4
Wynants Kill Adjacent to Site	Total PAHs	3.9 - 392	ERL: 4	4 of 5
			ERM: 35	1 of 5

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
VOCs	Benzene	ND - 2,100	1	22 of 75
	Ethylbenzene	ND - 54	5	12 of 75
	Toluene	ND - 1,700	5	16 of 75
	Total Xylenes	ND - 2,100	5	22 of 75
SVOCs)	Total PAHs	ND - 6,470	NA	-
Cyanide		200<	200	0 of 70

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

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

[c] ERL = Effects Range - Low and ERM = Effects Range - Moderate.

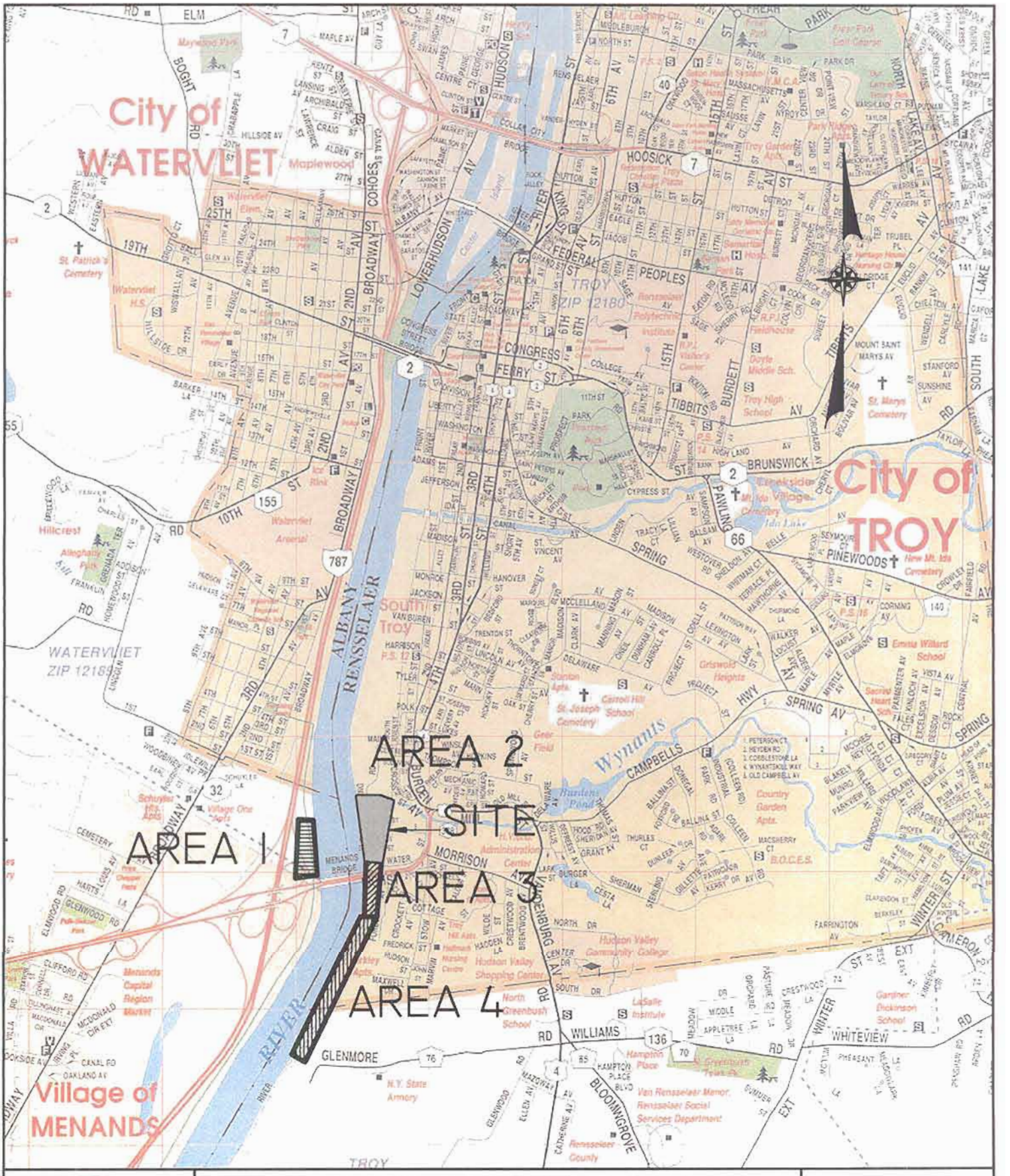
Note 1: Wastes removed during IRM not included.
Note 2: Not Determined

ND: compound not detected
MDL: method detection limit
NA: None Available
cPAHs: Probable carcinogenic PAHs identified in Section 5.1.2

Table 2
Remedial Alternative Costs

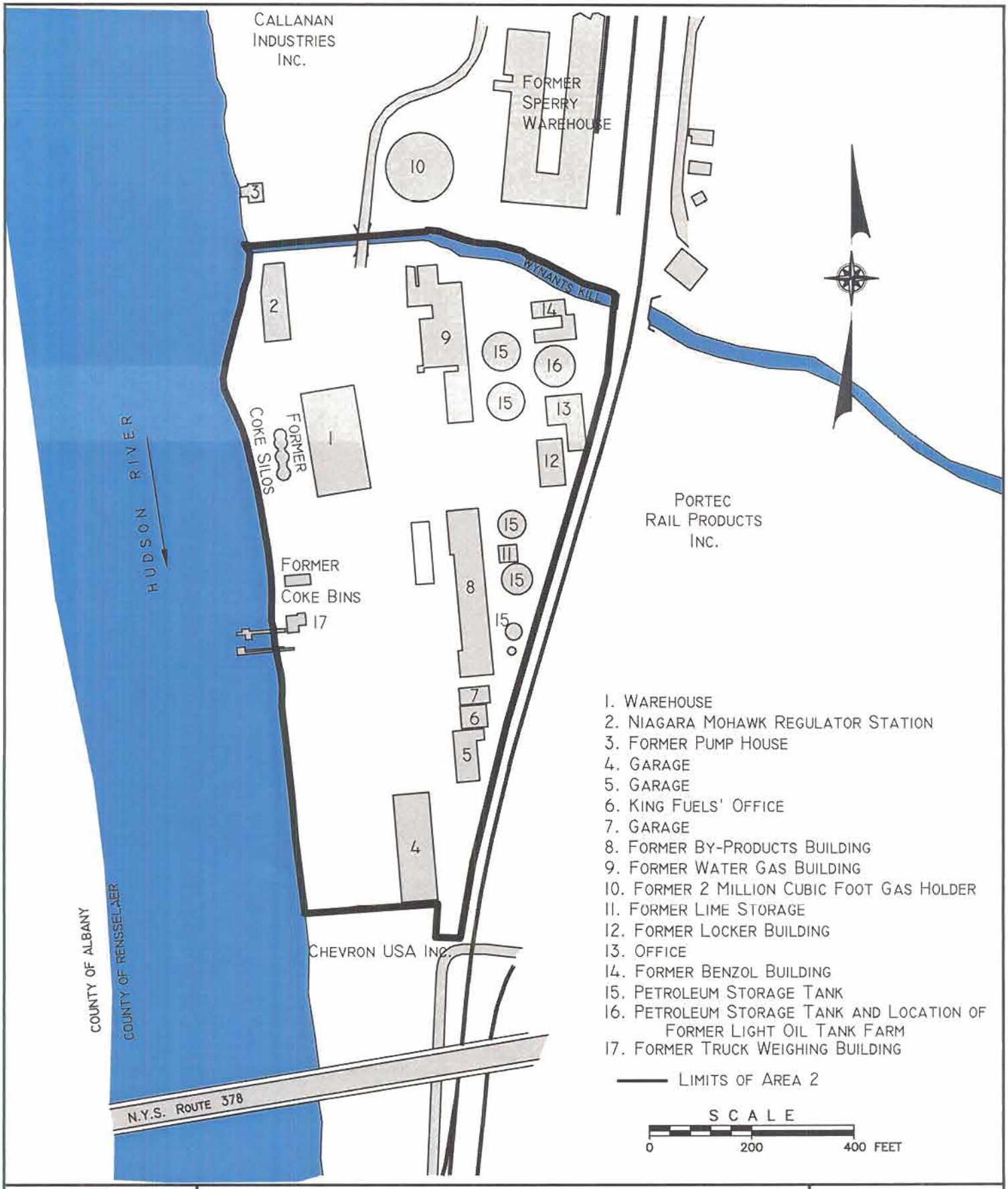
Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
1 - No Action	$ 0	$27,000	$460,000
2 - Grout Curtain	$7.9 million	$250,000	$11 million
3 - Limited Removal	$5.4 million	$43,000	$6.2 million
4 - Stabilization	$5.4 - 7.8 million[1]	$43,000	$6.2 - 8.6 million[1]
5 - Limited Removal, Off-site LTTD	$5.6 million	$43,000	$6.4 million
6 - Remove > individual SCGs	$80 million	$30,000	$80 million
7A - Remove >500 ppm PAHs, Off-site treatment/disposal	$7.0 - 10 million[1]	$30,000	$7.8 - 11 million[1]
7B - Remove or Treat >500 ppm PAHs	$7.3 - 7.8 million[1]	$140,000 years 1,2 $45,000 years 3-30	$8.3 - 8.7 million[1]
8 - Remove >500 ppm PAHs, On-site LTTD	$7.6 - 10.5 million[1]	$43,000	$8.3 - 11.3 million[1]

[1] The range of costs presented reflects a difference between Niagara Mohawk's FS estimate of volume of soil that would be addressed by the alternative and DEC's estimate. See also Section 7.1.



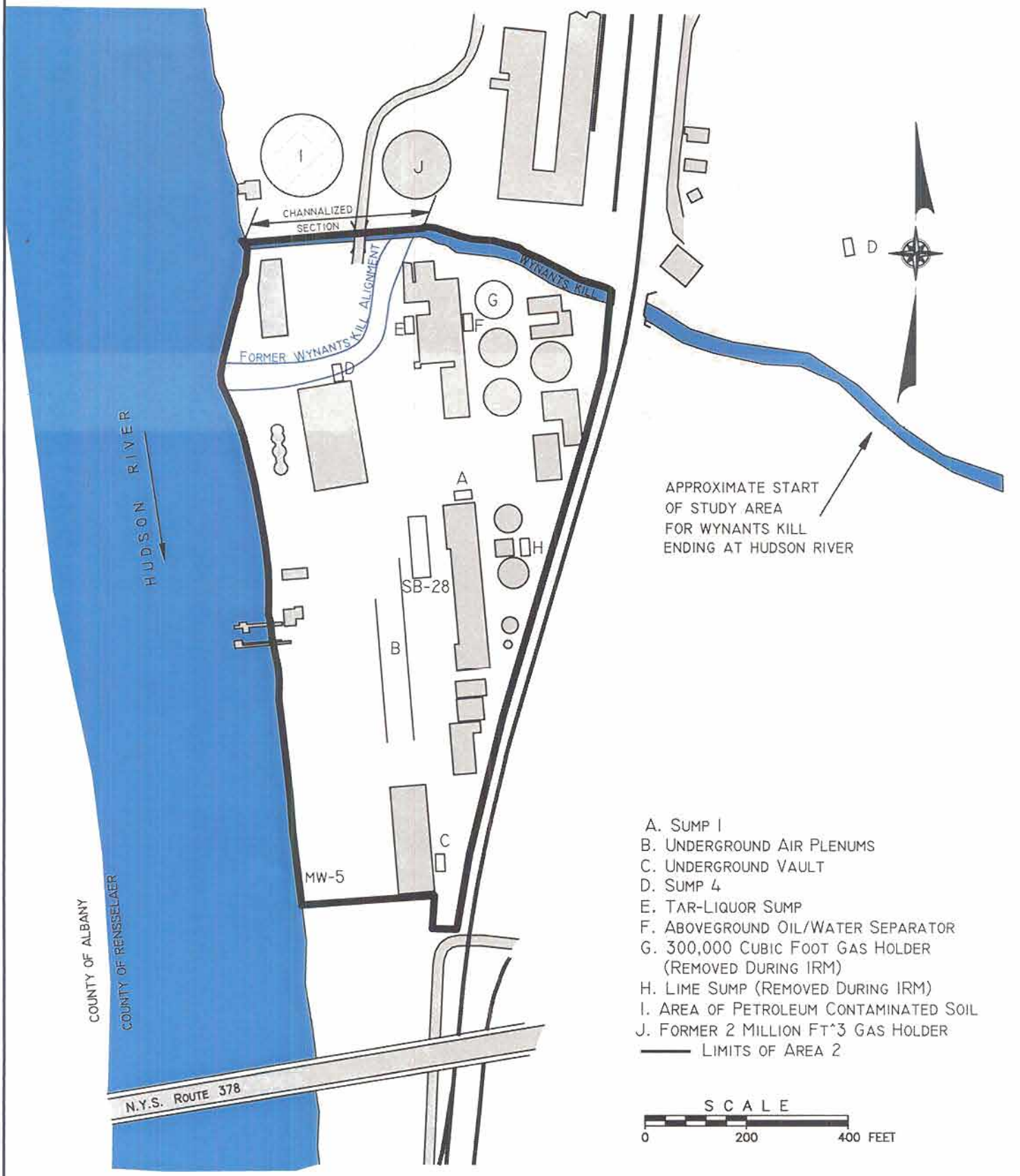
NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK
GENERAL LOCATION MAP

FIGURE 1



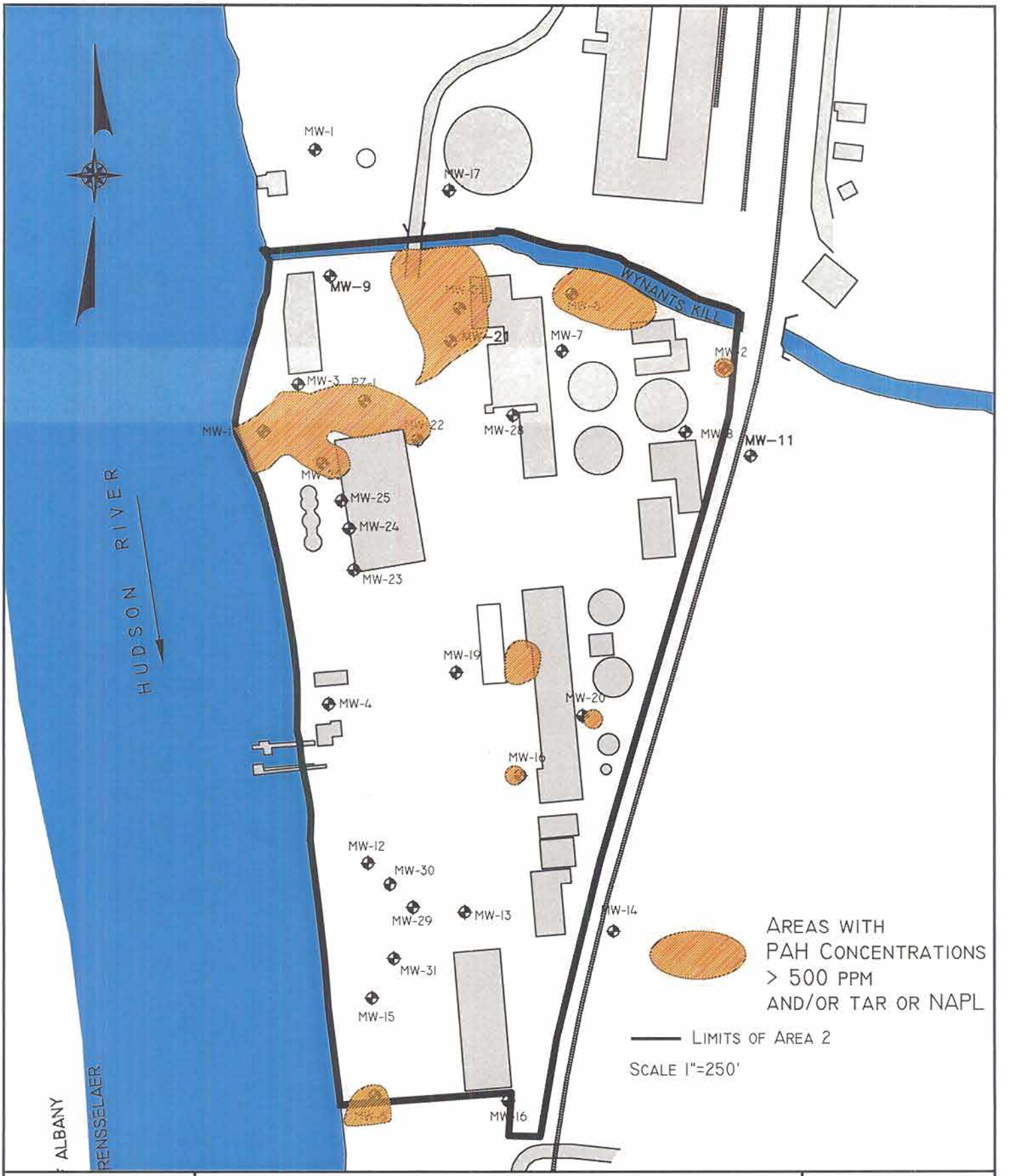
NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK
SITE MAP

FIGURE 2



NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK
STRUCTURES OF INTEREST

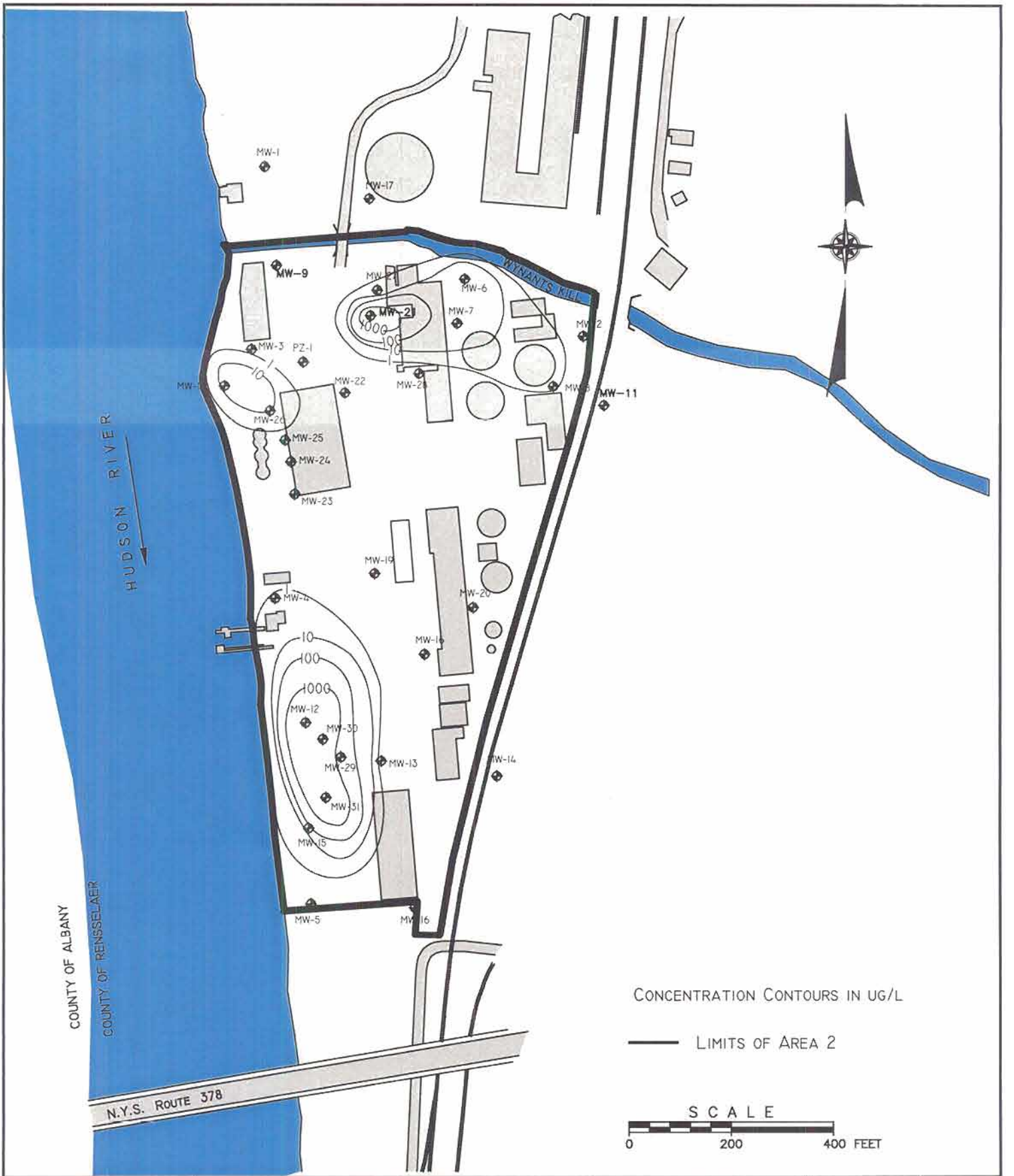
FIGURE 3



NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK

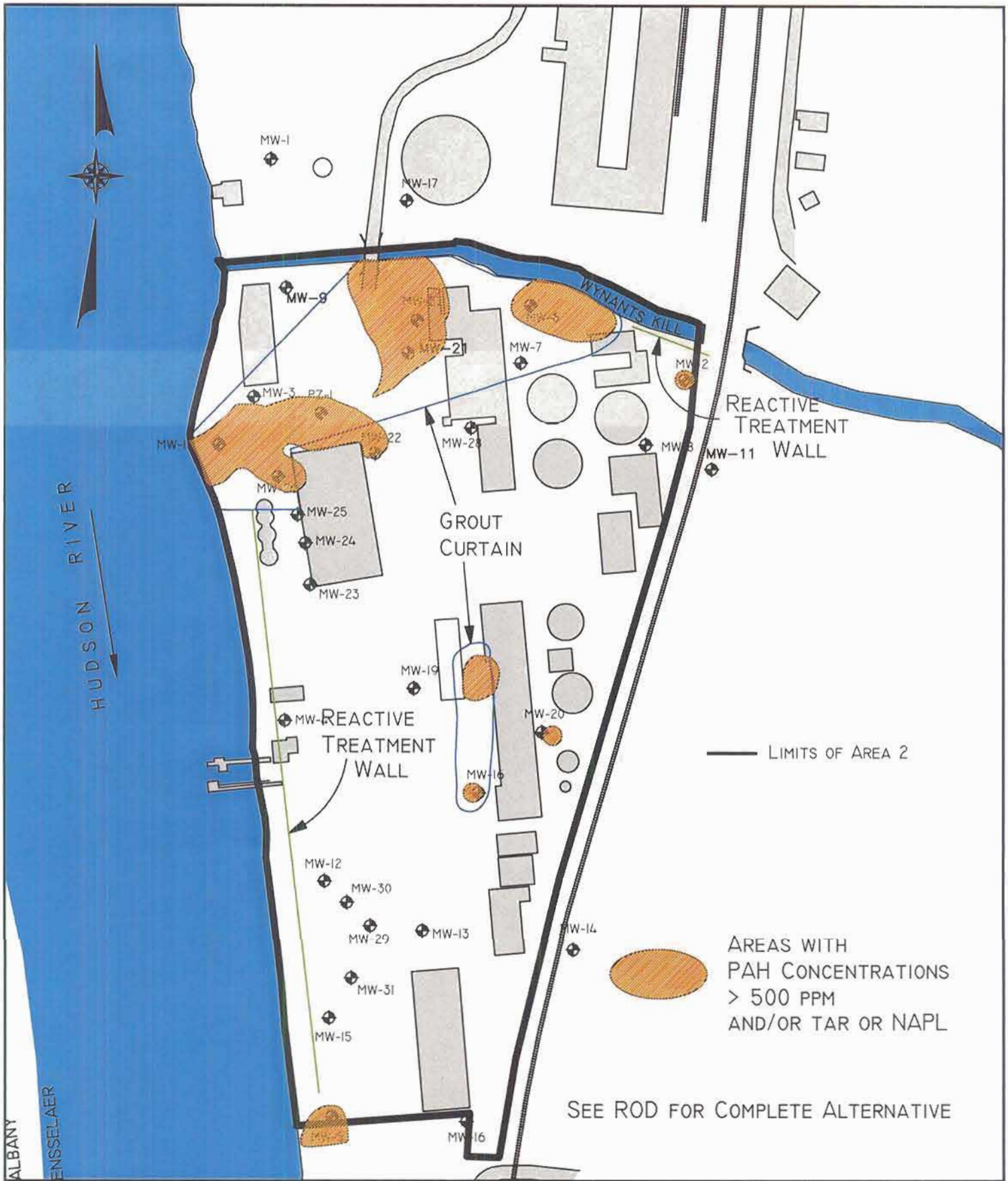
AREAS WITH SOIL CONC > 500 PPM PAHS, VISUAL TAR, OR NAPL

FIGURE 4



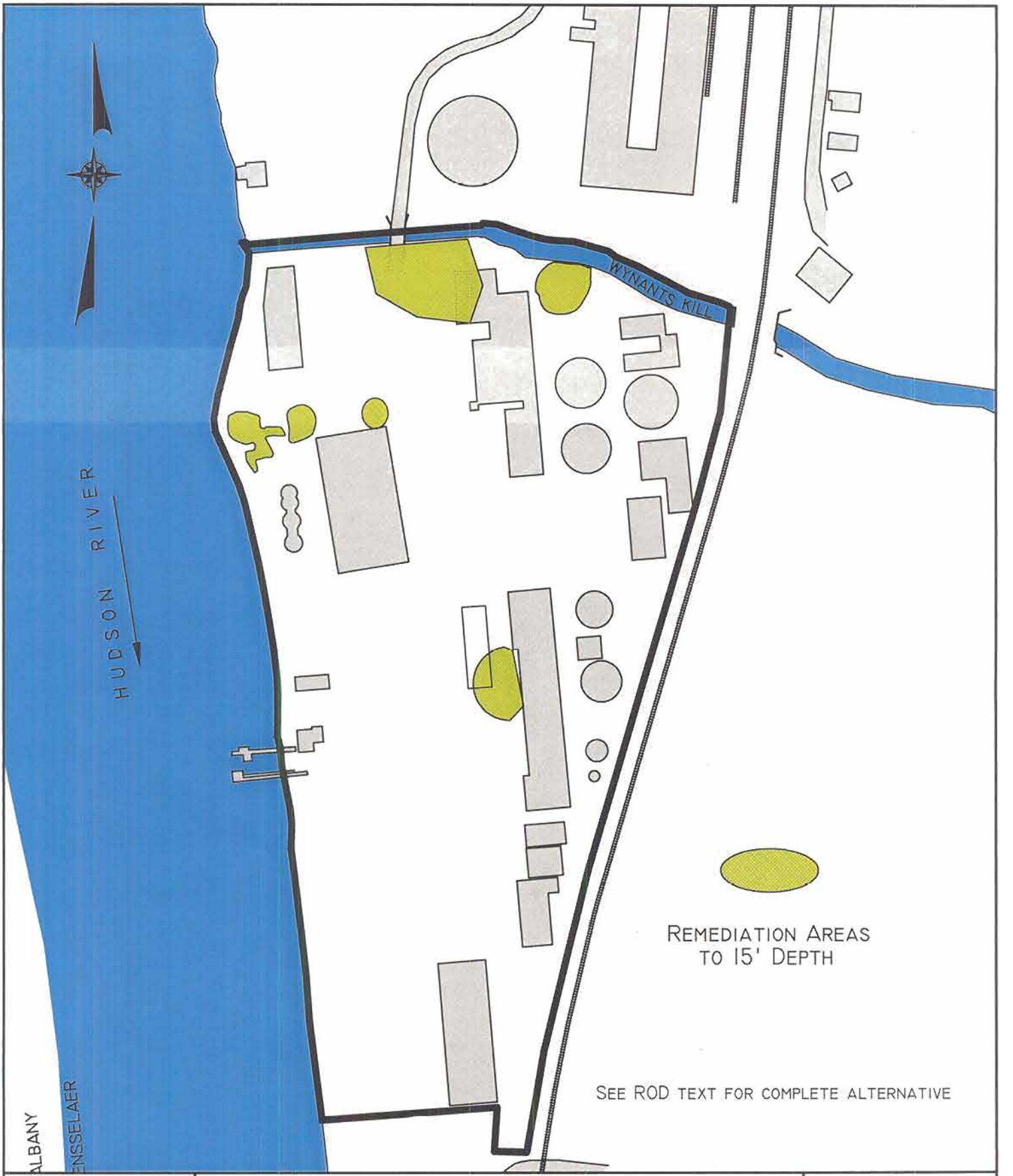
NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK
BTEX IN GROUNDWATER

FIGURE 5



NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK
ALTERNATIVE 2: GROUT CURTAIN, REACTIVE TREATMENT WALL

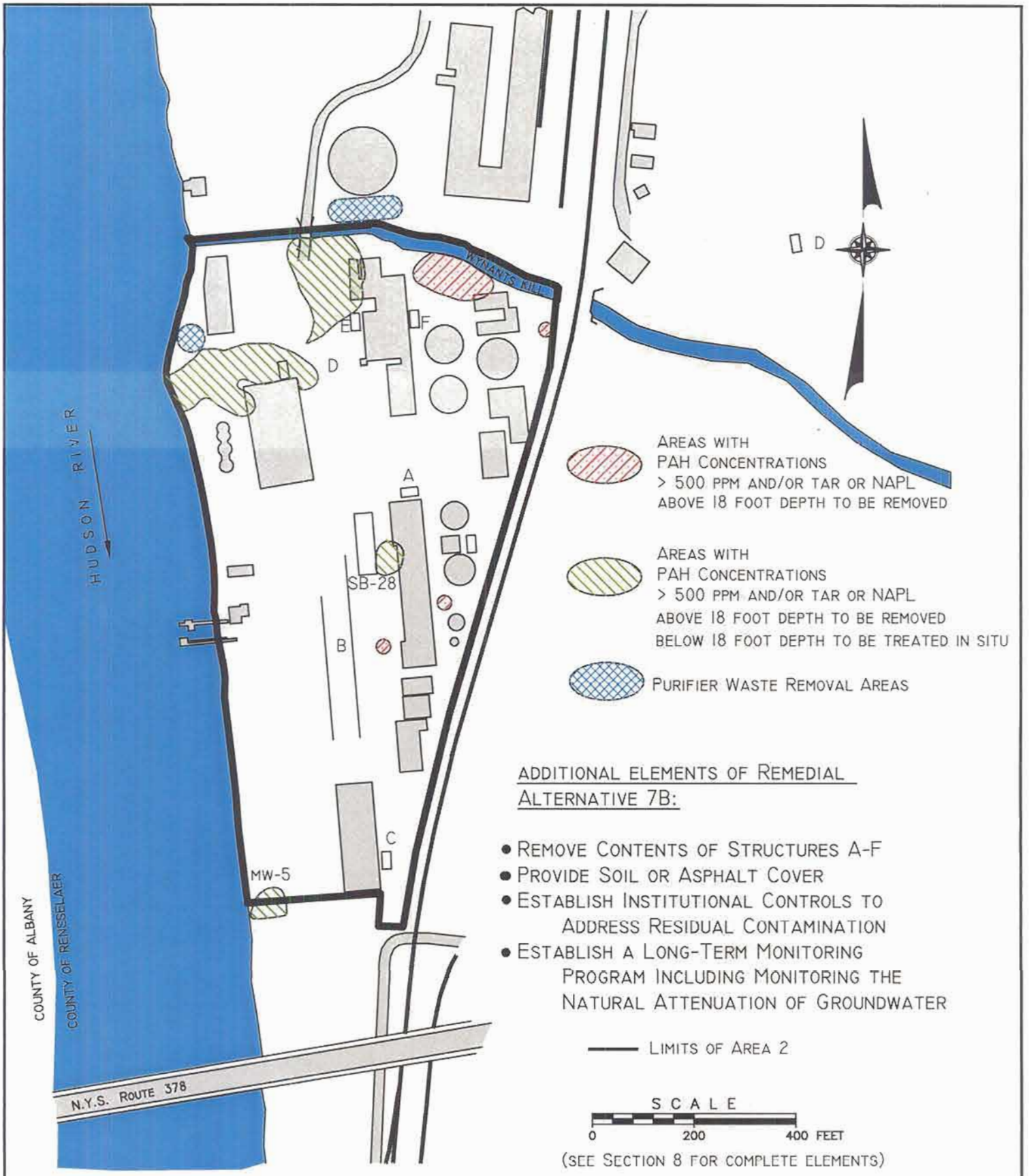
FIGURE 6



NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK

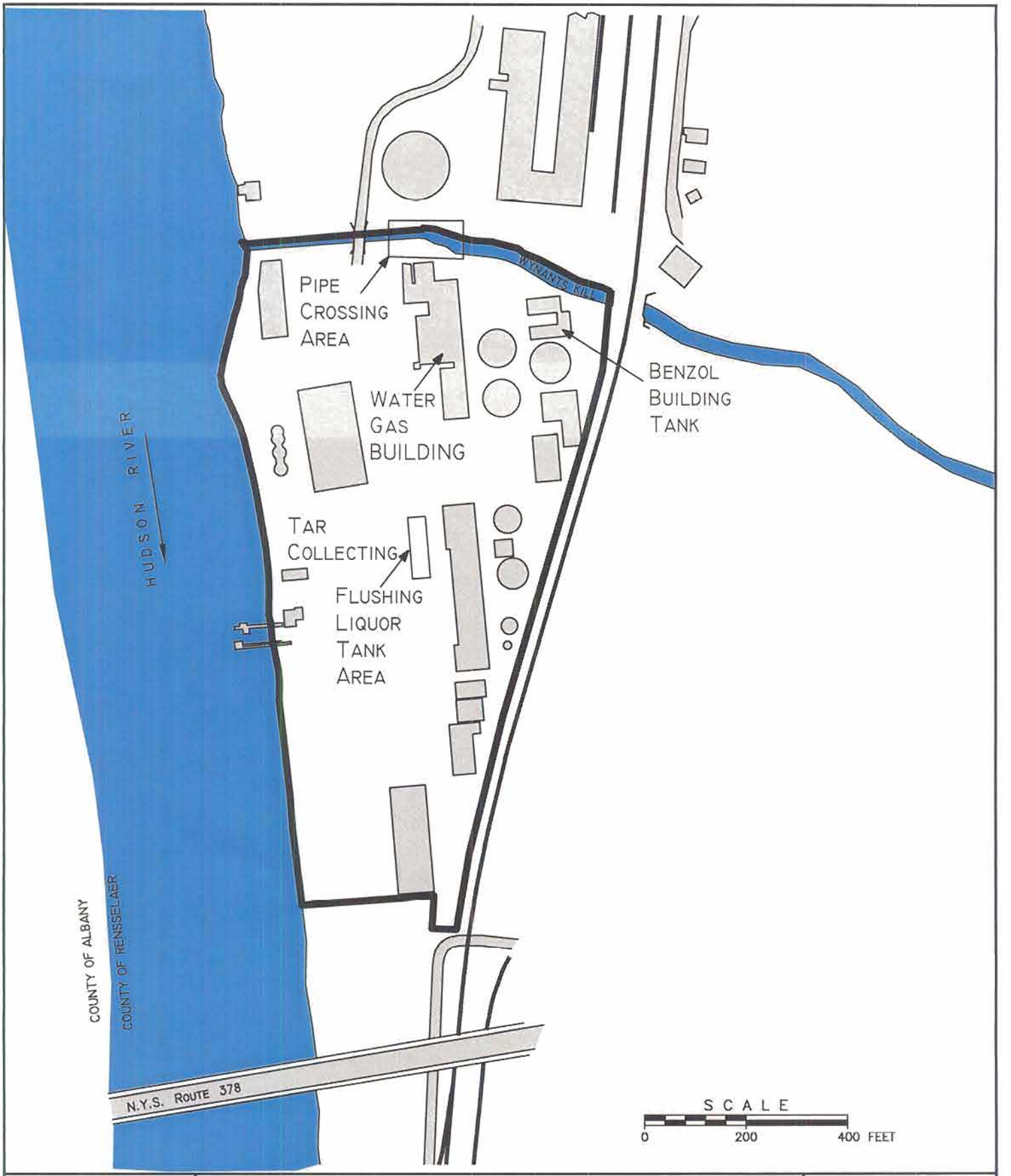
ALTERNATIVE 3 - REMOVAL AREAS

FIGURE 7



NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK
SELECTED REMEDY COMPONENTS

FIGURE 8



NMPC TROY (WATER ST) AREA 2 SITE
TROY, RENSSELAER COUNTY, NEW YORK
AREAS TO BE INVESTIGATED (SECTION 8, PARAGRAPH 1)

FIGURE 9

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

NIMO TROY - WATER STREET MGP
OPERABLE UNIT No. 1: AREA 2 - FORMER PLANT SITE
Troy (C), Rensselaer County, New York
Site No. 4-42-029

July 2003

The Proposed Remedial Action Plan (PRAP) for the NIMO Troy - Water Street Manufactured Gas Plant (MGP) Site, Operable Unit No. 1, was prepared by the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 7, 2003. The PRAP outlined the remedial measure proposed for the contaminated soil, groundwater and sediment at the NIMO Troy - Water Street Manufactured Gas Plant (MGP) Site, Operable Unit No. 1, (OU1).

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 March 4, 2003, which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period was to have ended on March 13, 2003, however it was extended through March 27, 2003, at the request of the public.

This responsiveness summary responds to all questions and comments raised during the public comment period, and written comments received from the City of Troy, Niagara Mohawk/A National Grid Company, and Powers & Santola, LLP, a law firm representing Chevron U.S.A. Inc. The following are the comments received, with the NYSDEC's responses:

COMMENT 1: What is going to be done to reduce truck traffic through the neighborhood? Can you select Alternative 8 so that there will be less truck traffic? Would traffic be limited to daytime hours?

RESPONSE 1: There will be less truck traffic in implementing the selected remedy, as compared to the PRAP proposal. Truck traffic is a short term impact of the remedy, however, the design will require actions to mitigate the impact of truck traffic on the neighborhood by

designating traffic routes and restricting hours. The Department expects that the number of truck arrivals/departures for the selected remedy would be similar to that Niagara Mohawk estimated for the remediation of Area 4 of the NIMO Troy Water Street MGP Site. For Area 4, under the most conservative scenario (or that which would result in the maximum traffic increase) about 160 trucks per day or 16 trucks per hour could be expected. These rates assume maximum production over the minimum time to complete the project and will likely be lower based on typical construction site variables, such as vehicle availability, weather and excavation/handling rates.

To put the above numbers into perspective, NYS Department of Transportation traffic volume records indicate that on average 12,400 vehicles per day travel Route 4 at Route 378 (year 2000 count). Thus, an increase of 160 vehicles per day will result in an increase in traffic volume of approximately one percent, and this maximum will only be for the one month period when clean fill or asphalt for the cover/cap is being brought to the site. During the movement of the excavated soil from the site these numbers will be significantly lower, with a maximum of 32 trucks/day estimated, over a four or five month period.

As the commentor concludes, less remedial construction truck traffic would be expected with on-site thermal treatment of contaminants (Alternative 8) as compared to the off-site treatment/disposal of contaminants featured in the PRAP's Alternative 7. However, in selecting the remedy, the Department must evaluate the short-term impact of truck traffic along with other regulatory-established criteria as described in Section 7, including the ability to implement on-site thermal treatment. As described in Section 8, on-site thermal treatment would require areas to screen, process and treat the contaminated materials. Thus, Alternative 8 would require a greater degree of coordination with the property owner in order to facilitate on-site thermal treatment. Also, the selected remedy has been modified from the remedy proposed in the PRAP to eliminate the removal of contaminated soil from a depth greater than 18 feet below ground surface. The selected remedy will reduce the volume of contaminated soil being hauled away from the site and reduce the amount of clean backfill needed as compared to the PRAP proposal.

COMMENT 2: Could the river be used to transport material off-site? River dredging that will use river barges may coincide with this remedy and should be considered.

RESPONSE 2: Conceptually, the Hudson River could be used to transport material, and this method of transport should be evaluated in the design. Barge transport would require an off-loading area and subsequent truck transport, however, which would make implementation more difficult. The observation of using existing barges that may be present is noted, however implementation would require logistical plans, distinct off-loading areas and coordination with barge operations, adding to implementation difficulty.

COMMENT 3: Where is contaminated soil going? Will it be disposed off-site and/or treated off-site?

RESPONSE 3: The ROD does not specify the disposal facility. The soil and wastes to be removed, in accordance with the ROD, could either be disposed untreated off-site, or treated off-site or a combination of both. The disposal and/or treatment must conform to NYSDEC regulations for any disposal facility or method to be determined appropriate. The disposal and/or treatment facilities will be identified prior to the NYSDEC's approval to begin the removal of contaminated soil.

COMMENT 4: What is the time frame to start the clean up? How long will it take to clean up the site?

RESPONSE 4: The Department estimates that remedial construction (clean up) will start in the third quarter of 2004, with one year for completion of the construction.

COMMENT 5: Under a recreational scenario, what is going to be left on the ground? Could the area be a park?

RESPONSE 5: The New York State Department of Health (NYSDOH) has determined that the selected remedy will allow a recreational use scenario, including a public park as long as the soil cover or asphalt cap is in place and maintained. As the NYSDEC concluded that the removal of all contamination is not feasible at the site, some soil and groundwater contamination will remain in the subsurface following remediation. The soil cover or asphalt cap will eliminate exposure to contaminants remaining following the remediation.

COMMENT 6: Will historic buildings, such as [the former Water Gas Building], be taken down as part of the remedy? If buildings could be saved as an historic tourist attraction/preservation site, this should be done.

RESPONSE 6: Sources of groundwater contamination exist adjacent to the former Water Gas Building as evidenced by the finding of soil PAH concentrations as high as 53,000 ppm at monitoring well location MW- 27 within 20 feet of the building. Concentrations of this magnitude are indicative of NAPL in close proximity and tar and NAPL were observed during the installation of the monitoring well. Tar and NAPL were also observed during the boring of SB-39. NAPL was found in monitoring well MW-21, within forty feet of the building. The presence of NAPL capable of flowing into a well in close proximity to the building supports the conclusion of NAPL migration underneath the building. The building has had at least one addition which was constructed after the 1936 Wynants Kill realignment and encroaches on the former Wynants Kill alignment. From this information the NYSDEC believes that significant soil contamination, including NAPL-saturated soil, which contributes to groundwater contamination, exists under at least a portion of the building. Therefore demolition of the building and removal of its floor and foundation will be required in order to delineate and remove the source contaminants under it. The demolition will be expected to comply with all applicable rules and regulations regarding such demolition. Niagara Mohawk will be expected to comply with the State Historic Preservation Act as it may apply to this building. Other

buildings at the site are not expected to be significantly disturbed in implementing the selected remedy.

COMMENT 7: Will Niagara Mohawk be 100% responsible for cost of clean up?

RESPONSE 7: The share of responsibility for the cost of the remediation has not been determined at this time. Niagara Mohawk is obligated through the Order on Consent to remediate contamination attributable to their predecessor companies. However, Niagara Mohawk may seek other parties to contribute to the remedial cost as allowed under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act).

COMMENT 8: Is there a cap on what they will spend?

RESPONSE 8: The Order on Consent for this site does not cap remedial costs.

COMMENT 9: What are the reasons why the more costly alternative is not being selected?

RESPONSE 9: Subsection 7.2 and Section 8 identify the criteria used and the rationale for not selecting the most-costly alternative, Alternative 6. Alternative 6 would require excavation and backfill of approximately 800,000 cubic yards of contaminated soil, tar and NAPL over 16 acres to depths up to 54 feet. This excavation, along with other items would cost approximately $80 million and would remove greater than 99% of the contaminant mass. In comparison, Alternative 7B, at an estimated present worth cost of $8.3 to 8.7 million, removes or treats approximately 64% of the contaminant mass, and satisfies a soil SCG of 500 ppm total SVOCs. Both alternatives satisfy the threshold criteria. The NYSDEC determined that Alternative 7B more closely satisfied the balancing criteria than Alternative 6. While Alternative 6 would provide greater reduction of toxicity, mobility and volume of the contaminants, the implementability of the excavation would be more difficult. Marginal additional protection of public health and the environment would be achieved by Alternative 6, yet would cost nearly ten times more than the selected alternative.

COMMENT 10: Will you be excavating most of the former Wynants Kill? What about underground structures?

RESPONSE 10: Soil containing total PAHs greater than 500 ppm or visual tar or NAPL was found in the former Wynants Kill alignment. Therefore, removal of these materials to a depth of 18 feet will be a component of the remedy. The remedial design may find some localized soil volumes which do not meet the removal criteria and therefore may remain in place. The underground structures identified on Figure 3 that have been associated with MGP contamination will be removed in accordance with Section 8, paragraph 6.

COMMENT 11: Is there a limit on depth of removal below ground?

RESPONSE 11: The ROD was modified from the PRAP to limit removal of contaminated soil, visual tar and NAPL to 18 feet below the ground surface. Soil deeper than 18 feet below the ground surface will be treated in-place by an in-situ chemical oxidation remedy.

COMMENT 12: Is there any groundwater containment?

RESPONSE 12: The selected remedy does not include any groundwater containment. Contaminated groundwater will be addressed through a combination of source removal or treatment of the source of groundwater contamination and monitored natural attenuation, with contingency actions in accordance with USEPA's April 21, 1999 directive on the use of monitored natural attenuation.

COMMENT 13: Will there be a cap on [the] banks?

RESPONSE 13: The bank of the Hudson River adjacent to the site will be covered with a minimum of two feet of clean soil and likely armored in the tidal and floodplain zones to protect the cover from scour. The south bank of the Wynants Kill will also be covered with a minimum of two feet of clean soil and armored as needed. The open channeled portion of the Wynants Kill is expected to remain channeled.

COMMENT 14: Has the Area 2 site impacted the Hudson River?

RESPONSE 14: Among other areas, the remedial investigation found elevated PAH and BTEX contamination (up to 66,320 ppm total PAHs, and up to 398 ppm total BTEX) including coal tar and NAPL in the former Wynants Kill alignment fill extending to the former stream's confluence with the Hudson River. PAH concentrations in Hudson River sediment adjacent to the Area 2 site and downstream for a distance of over 6,000 feet are elevated in comparison to PAH concentrations upstream of the site. Area 4 and potentially Area 3 contribute to the elevated levels. The groundwater flow direction is generally towards the west to northwest, towards the Hudson River. Niagara Mohawk's *Phase II Hudson River Sediment Investigation Report, March 2003*, concludes that elevated PAH concentrations in sediment are clustered near the former Wynants Kill outlet area and the upstream side of the Troy-Menands Bridge, among other areas. For these reasons, the NYSDEC concludes that the site has adversely impacted and continues to adversely impact the river.

COMMENT 15: How [are impacts to the Hudson River] being addressed?

RESPONSE 15: Impacts to the Hudson River from Area 2 are being addressed by: 1) removing or treating the origin of the contamination which will eliminate or mitigate contaminant migration to the river from the MGP site and 2) addressing the river contamination itself. Item 1 is addressed by this ROD as well as the ROD for Area 4 (Record of Decision, Niagara Mohawk Troy - Water Street Former Manufactured Gas Plant Site, Area 4 - Upland Disposal, November 2000). Area 3 will be investigated in the future. Niagara Mohawk is currently evaluating

various remedial alternatives to address the contamination in the Hudson River (a separate operable unit) attributable to the Water Street MGP operations to address Item 2. A FS report for the Hudsn River was received by the NYSDEC in June, 2003.

COMMENT 16: What does the acronym FS stand for?

RESPONSE 16: Feasibility Study. Specifically for this ROD, the Final Feasibility Report, Troy (Water Street), Area 2, IT Engineering of New York, P.C., March 15, 2002.

COMMENT 17: What about traffic over the bridge? Is the bridge able to handle traffic as it is an old bridge? Will there be any restrictions?

RESPONSE 17: As indicated in RESPONSE 1, the NYSDEC expects that the remediation will contribute only one percent additional traffic. Truck routes and hours will be designated prior to the start of construction. Trucks are expected to follow all vehicle and traffic laws, including allowable weight limits.

COMMENT 18: Will a cap be in place to prevent infiltration from Area 3 until site is cleaned up?

RESPONSE 18: The ROD does not require a low permeability cap to prevent infiltration. Infiltration of precipitation is not a concern at Area 2 due to the degree of removal or treatment of contaminants (removal or treatment to the NYSDEC guidance value for total PAHs in soil) which would otherwise leach contaminants to the groundwater. From the limited groundwater data available, NYSDEC concludes that Area 3 is not significantly impacting Area 2 groundwater quality.

COMMENT 19: Should have a tape recorder to record comments from this meeting.

RESPONSE 19: Comment noted.

COMMENT 20: I am complaining that there are two PRAP meetings tonight seven miles apart in Rensselaer County.

RESPONSE 20: Prior to the meeting, the NYSDEC fielded calls from other stakeholders who indicated good and bad days for a public meeting. Unfortunately, it is difficult to establish a meeting date which accommodates everyone. Attendance at the meeting is not a prerequisite for providing comment, however. The NYSDEC believes it has made sufficient effort to notify the public, provide the public with the opportunity to review its proposal and provide the public with sufficient time to comment on the PRAP.

COMMENT 21: Can another alternative be considered to bring tax revenue to the site such as a nursing home, school, office building? Are taxpayers going to pay for clean up? What other

uses?

RESPONSE 21: Consistent with the November 2000 publication: *Draft Preferred Redevelopment Plan, South Troy Working Waterfront Revitalization Plan*, the selected remedy will allow for commercial and industrial use of the site as well as a green space buffer, with certain exceptions as identified in paragraph 8 of Section 8. Upon completion of the remedy, office buildings could be constructed on the site that would be consistent with the commercial or industrial use restrictions. A school or nursing home would be exceptions, and thus could not be constructed on the site following remediation. Specifically providing sources of tax revenue is beyond the scope of the ROD. Niagara Mohawk has consented to a NYSDEC Order to fund the remediation (see also RESPONSE 7).

COMMENT 22: If you take additional soil under the more conservative option [Alternative 6], you will have Hudson River influence [on the ability to remove soil].

RESPONSE 22: Agree. Excavations which would proceed significantly below the elevation of the Hudson River would be expected to require greater dewatering rates due to the presence of the river.

COMMENT 23: Will the Wynants Kill be excavated to 40 feet?

RESPONSE 23: The area of the former Wynants Kill alignment (see Figure 3), which was filled in and the flow redirected to the north in 1930, is a target for much of the site contamination to be removed. In this area excavation to 18 feet is expected.

COMMENT 24: Could office buildings be put on site?

RESPONSE 24: See RESPONSE 21.

COMMENT 25:. Will there be air sampling if site building uses change or new buildings are constructed? How long will sampling be conducted in these buildings?

RESPONSE 25: The ROD requires an evaluation of potential MGP impact on indoor air in on-site buildings if the current use changes (Section 8, paragraph 8). The institutional controls to be established under the ROD (Section 8, paragraph 8) will require NYSDEC and NYSDOH review of any construction project which could affect the remedy or site use. Since a new building would likely affect the remedy, the NYSDOH would evaluate the potential for MGP impacts on indoor air quality. This may or may not include the need for subslab soil gas sampling and indoor air sampling. If air sampling is conducted, the expected duration would be quarterly for one year to evaluate potential seasonal variation.

COMMENT 26: Who has the ultimate say in approving the plan: DEC, DOH, USEPA? Are there any disagreements between the agencies?

RESPONSE 26: The selected remedy is approved by the NYSDEC. Prior to approval of the ROD, the NYSDEC obtains the concurrence of the NYSDOH. There are no disagreements between these state agencies regarding the selected remedy for this site. The United States Environmental Protection Agency is not involved in the project.

COMMENT 27: Has cost of asbestos in building removal been taken into consideration?

RESPONSE 27: The FS and Niagara Mohawk December 19, 2001 letter, which were the basis of the estimated cost for the selected remedy, included $80,000 for building demolition in the cost estimate. It is not known whether this value includes asbestos removal.

COMMENT 28: How does Area 4 removal of tar compare to Area 2 tar?

RESPONSE 28: The NYSDEC would expect the means of removal, that is, excavation with conventional equipment, to be comparable between Area 2 and Area 4.

COMMENT 29: Can you identify buildings that will be removed? What about King Fuel tanks/white on photo.

RESPONSE 29: The former Water Gas Building will be removed. The Warehouse and former By-products Building will be evaluated in the remedial design. The NYSDEC will take into consideration the current active use of the Warehouse and former By-products Building. Removal of King Fuels' storage tanks will not be necessary to implement the remedy, based on the existing information regarding the site. These structures are identified on Figure 2.

COMMENT 30: What about the Winking Eye tank, will this be taken down?

RESPONSE 30: The selected remedy does not require the Winking Eye tank to be taken down. The tank, identified as the former two million cubic foot gas holder on Figure 2, is located north of Area 2, and thus outside of the area of the selected remedy.

COMMENT 31: How about purifier waste between buildings, will that be removed?

RESPONSE 31: Based on the RI information, purifier waste deposits are limited to an area on the Hudson River bank and an area on the north bank of the Wynants Kill (see Figure 8). The waste will be addressed in accordance with Section 8, paragraph 5 of the ROD.

COMMENT 32: What about sediments in the Hudson River?

RESPONSE 32: See RESPONSES 14 and 15.

COMMENT 33: What is appropriate recreational use?

RESPONSE 33: Appropriate recreational uses include parks and playing fields (e.g. baseball diamond, soccer field). Generally, any recreational use which would not jeopardize the protective cover is acceptable. The NYSDEC and NYSDOH would make the final determination regarding plans for a particular recreational use.

COMMENT 34: What [level of contamination] would be left [following remediation]?

RESPONSE 34: As the NYSDEC concluded that the removal of all contamination is not feasible at the site, some soil and groundwater contamination will remain in the subsurface following remediation. The soil cover or asphalt cap will eliminate exposure to contaminants remaining following the remediation. Soil beneath the cover to a depth of 18 feet will have less than 500 ppm PAHs. Any areas of the site with soil concentrations greater than 500 ppm PAH, or visual tar or NAPL at depths greater than 18 feet will remain and be treated in place (areas noted on Figure 8). Groundwater is expected to initially have contaminant concentrations similar to pre-remediation levels (see Figure 5), but the concentrations are expected to decrease in response to the removal and treatment actions.

COMMENT 35: What are the specific deed restrictions?

RESPONSE 35: Institutional controls are non-physical actions which restrict the use of groundwater, limit human, animal, or environmental exposure, ensure non-interference with performance, operation and maintenance of response actions at or pertaining to the site and ensure the effectiveness of response actions at or pertaining to the site. Institutional controls apply when contaminants remain at a site at levels that would not allow for unrestricted human use of the property. The selected remedy for this site will significantly reduce the volume and mobility of the contaminants, but contaminants will remain at levels that would preclude residential development. Therefore, institutional controls will be established at this site to; (a) protect engineering controls which are part of the remedy; (b) restrict on-site groundwater use; and, (c) prohibit the site from being used for purposes other than appropriate recreational, industrial or commercial uses, without the express written waiver of such prohibition by the NYSDEC and the NYSDOH. In addition, an evaluation of potential MGP impact on indoor air in on-site buildings will be required should changes from the current industrial use occur in the future.

COMMENT 36: Is there any off-site contamination?

RESPONSE 36: Contamination of Hudson River sediments exists adjacent to and downstream of the site - See RESPONSE 14. Studies on the upland areas north and south of Area 2 are on-going or planned. Based on the RI information, the NYSDEC concludes that there is no significant contamination attributable to the former MGP operations located east of the site.

Ms. Kathy Tremblay submitted a letter dated March 11, 2003 which included the following comments. A copy of the letter is included in the Administrative Record.

COMMENT 37: The public process was hurried, without much consideration to those of us that will be the most impacted. Also, the close for the public comment period was rushed.

RESPONSE 37: The public comment period was extended an additional two weeks, to allow a total of 45 days for comments. The NYSDEC believes that the public comment period provided was appropriate. The steps taken to ensure public involvement were consistent with its guidance regarding citizen participation in the Inactive Hazardous Waste Disposal Site Remediation Program.

COMMENT 38: The area with its waterfront access, we believe could be redeveloped to the same zoning as downtown [Troy] and northern Troy. It is a major gateway with close proximity to neighboring cities. It is highly visible to the community as well as the 'other' side of the river. It is the site for a proposed greenway development and a bike trail. There is a strong college environment that could foster economic development.

RESPONSE 38: Zoning is determined at the local government level. The selected remedy will provide opportunity for many redevelopment scenarios, utilizing the resources and infrastructure of the area. Greenways, trails, commercial uses and industrial uses could be implemented concurrently with the remedy or following the completion of the remedy. The NYSDEC evaluated remediation of the site to a level which would allow unrestricted residential use but determined that the alternative (Alternative 6) was not cost effective. The selected remedy is consistent with the City of Troy Masterplan for site use and current zoning. See also RESPONSE 9.

COMMENT 39: According to the Brownfield Remediation Pilot Program, this area faces limitations for redevelopment. We argue that this is not a fair or accurate assessment of its potential. The proposed rezoning has not been approved or finalized. The South Troy Working Waterfront has not been adopted.

RESPONSE 39: The selected remedy was not based on current or potential zoning. The selected remedy was based upon the Department's regulations regarding remedy selection. The remedial alternatives were evaluated using the eight regulatory criteria identified in Section 7.2, which includes community acceptance. The NYSDEC considered that since the selected remedy would be consistent with the *Draft Preferred Redevelopment Plan, South Troy Working Waterfront Revitalization Plan*, this should constitute community acceptance.

COMMENT 40: To limit the remediation not only limits the extent of the clean-up, but limits the future land use for South Troy and the city as a whole. This site will set a precedent for all future remediation. We are counting on Niagara Mohawk to continue its promise for environmental stewardship and economic development.

RESPONSE 40: Regarding a limit on the remediation, please refer to RESPONSE 9. The institutional controls established by the selected remedy apply only to the Area 2 Site, as defined

in Section 2. The remedy selection process is applied individually to every site that requires remedial action; A precedent is not established by this ROD.

COMMENT 41: It was disheartening that with all the options present at the public meeting, there was no middle ground. The plans ranged in cost from $6-10 million. The majority of the plans were deemed insufficient. It is illogical to believe that Alternative 7/8 at the cost of $7-10 million would be adequate. It is more unreasonable to believe that there is no alternative costing between $10-80 million that would not limit future land use.

RESPONSE 41: An alternative which does not reduce contaminants in the soil to unrestricted concentration levels, nor provides groundwater of water quality standards, must include restrictions on land and groundwater use, including residential development. Thus, any alternative which does not satisfy the requirements for unrestricted use would require land and/or groundwater use restrictions, to eliminate human exposures (first bullet in Section 6). There would be little further benefit from selecting a more costly alternative which would still require land and groundwater use restrictions. For achieving environmental protection goals, (the remaining bullets of Section 6), a more costly alternative as compared to the selected remedy, such as an alternative that removes contaminated soil containing concentrations less than 500 ppm PAHs but greater than individual TAGM values, and/or actively treats contaminated groundwater, would be expected to achieve groundwater quality more quickly than the selected remedy, but the final groundwater quality would be similar in quality to that expected of the selected remedy upon its completion. Note that the selected remedy also requires active groundwater treatment if source removal and monitored natural attenuation (in accordance with USEPA's April 21, 1999 directive on the use of monitored natural attenuation) are not improving groundwater quality in accordance with an established schedule.

COMMENT 42: We [signatures of 87 individuals included with comment letter favoring Alternative 6] are asking for the highest level of clean-up: Alternative 6. This plan would exceed NYSDEC guidelines; more in keeping with EPA standards, and not limit future land use.

RESPONSE 42: As described in RESPONSE 9, the NYSDEC did not select Alternative 6. The remedy selected for this site is consistent with NYSDEC regulations and guidance and is protective of human health and the environment.

Hon. Mark P. Pattison, Mayor, City of Troy submitted a letter dated March 26, 2003 which included the following comments. A copy of the letter is included in the Administrative Record.

COMMENT 43: The City has numerous concerns and interests with respect to the remedial plan ultimately chosen for Area 2. These concerns are embodied in the comments set forth below. You will note that the comments are divided into three distinct sections: (A) Comments applicable to a currently proposed, specific reuse plan for the site; (B) Comments applicable if this proposed reuse plan does not come to fruition; and (C) Comments applicable to Area 2

irrespective of any future reuse plan for the site.

The City has very recently been trying to facilitate the relocation of a heavy industrial use in the Northern Redevelopment District, Callanan Industries, Inc (Callanan) concrete operations, to Area 2 in the Southern District. The City, Callanan and NIMO have recently been engaged in discussions regarding a conceptual plan for the redevelopment of Area 2. These discussions have so far focused on Callanan's specific infrastructure and building requirements as well as possible modifications to the proposed remedial action plan in order to address these needs.

If this relocation/reuse proposal were to come to fruition, the City proposes modest changes to the recommended remedial action plan (Alternative 7). These proposed changes would still be equally protective of the public health and the environment but allow for a highly desired productive end-use that is compatible with South Troy Working Waterfront Plan.
Concerning Element 2 of Alternative 7, the City has several comments:
1. Buildings that have no productive use in the site development plan of Callanan Industries, Inc., such as the building labeled "9. Former Water Gas Building" on Figure 2 in the PRAP, and that are proximate to contamination that may extend beneath them, should be properly demolished in their entirety. This demolition will make those soils accessible for excavation. In the case of the "Former Water Gas Building" such demolition will also require asbestos abatement efforts to be undertaken in concert with the demolition;

RESPONSE 43: As discussed in RESPONSE 6, it will be necessary to remove the former Water Gas Building to remove contamination beneath it. The removal will include the proper handling and disposal of asbestos.

COMMENT 44: [If this relocation/reuse proposal were to come to fruition], contamination in soils below or adjacent to "Coors" Building, which is labeled "1. Warehouse" on Figure 2 in the PRAP, should remain in place to the degree necessary to allow continued occupation and use of the building. This action is justified because the building is presently in productive use and is planned for productive use in the site development plan of Callanan Industries, Inc. This building should be evaluated to determine if a sub-floor vapor extraction and venting system is necessary to protect the health of occupants;

RESPONSE 44: The present data show contamination existing in the subsurface adjacent to the Warehouse on the north and northeast/northwest corners of the Warehouse. Groundwater downgradient of the southern portion of the building does not exceed standards for MGP contaminants. Additional delineation of the contamination under the building, particularly under the northern portion is necessary to determine the extent of that contamination. From that delineation it will be determined whether additional active measures are necessary. The ROD's components of in-situ treatment and evaluation of air contaminants will address contamination under the Warehouse and allow for its productive use.

COMMENT 45: [If this relocation/reuse proposal were to come to fruition], contamination

necessarily will be left under the "Coors" building, and the presumably small pockets of contamination in the vicinity of the building that is labeled "8. Former By-Products Building" on Figure 2 in the PRAP do not need to be investigated and removed, as these will be under a cover that is similar to the protection provided by the "Coors" building and the cover that will be placed around the "Coors" building. Also, these presumably small pockets are relatively distant from the Hudson River;

RESPONSE 45: Regarding the "Coors" building, see RESPONSE 44. Regarding contamination at the former By-products Building, it will be necessary to further delineate the west wall area during the design to define the limits of excavation at the soil borings SB-28 and SB-18 areas. From the information available, the NYSDEC does not believe that there is significant contamination under the former By-products Building, since only low levels of soil contamination (up to 12 ppm PAHs in borings SB-17 and MW-20) were found adjacent to the building on the east side, and groundwater did not exceed standards for the contaminants of concern in the vicinity of the building.

COMMENT 46: [If this relocation/reuse proposal were to come to fruition], the future use by Callanan and the removals that will be occurring as outlined above, the removal of contaminated soils, containing greater than 500 ppm of PAHs and/or tar or NAPL, below the groundwater table does not appear to be necessary, except along the shoreline of the Hudson (see, Section C, below). Contaminated soils at the depth of more than 18 feet below ground surface do not appear to represent a threat via subsurface gas movement, given the intended use and care of the site by Callanan. Such soils represent a continuing groundwater contamination threat. There does not appear to be a credible groundwater exposure pathway, given the intended use and care of the site, except by the emergence of the groundwater in the Hudson River or the Wynants Kill. Therefore, the City recommends that a reactive treatment wall or other means installed downgradient of the areas with PAH concentrations greater than 500 ppm and/or tar or NAPL occur below the water table would appear to offer sufficient protection against such contamination below the groundwater table, given the intended use and care of the site.

RESPONSE 46: To achieve the remediation goals (presented in Section 6), the selected remedy must not only eliminate or reduce to the extent practicable environmental and human exposure pathways to contaminated groundwater, the remedy must also attain groundwater quality standards to the extent practicable. Thus, in addition to eliminating exposure pathways, it is necessary to actively address the soil containing greater than 500 ppm PAHs and/or tar or NAPL below the groundwater table in all areas of the site as this soil, tar and NAPL provide a continuing source of contaminants to groundwater resulting in a contravention of groundwater standards. Therefore, the active treatment of soil and/or groundwater will be required at these sources of groundwater contamination.

The Department expressed its concern regarding full excavation in commenting on the FS, and requested that Niagara Mohawk evaluate a combination of excavation and in-situ treatment. Niagara Mohawk evaluated an additional alternative consisting of partial source removal coupled with in-situ treatment and subsequently recommended the original excavation remedy of

Alternative 7 (Ahrens to Spellman, December 19, 2001). In light of the comments received by both the city and Niagara Mohawk, the NYSDEC re-reviewed Niagara Mohawk's conclusions regarding the combination of excavation and in-situ treatment. The NYSDEC has determined that in-situ treatment of soils greater than 18 feet below ground surface for this site to the west of the former Water Gas Building more closely satisfies the threshold and balancing criteria than excavation of the same soils (see Section 8 of ROD for this analysis). The selected remedy has been modified from the proposed remedy as follows:

The ROD's selected remedy is identical to Alternative 7A except that an in-situ chemical oxidation treatment remedy would be applied to soils deeper than 18 feet below the existing ground surface (bgs) containing total PAHs greater than 500 ppm or visual tar or NAPL. Removal would be required following the same criteria as presented in Alternative 7A to a depth of 18 feet bgs. Soils containing total PAHs greater than 500 ppm or visual tar or NAPL deeper than 18 feet would be in-situ treated. The 18-foot limit to excavation was selected considering four factors: 1) Excavation below this depth would likely require a double movement of soils prior to staging or direct loadout, 2) Viscous tars were generally reported above this depth while lower viscosity NAPL was generally reported below this depth, which would be more conducive to in-situ treatment, 3) At the isolated MW-5 monitoring well location, PAHs greater than 500 ppm and visual contamination were found in a thin lens from 18 to 20 feet bgs and from 24 to 26 feet bgs. The 18-foot limit would eliminate the need for excavation and backfill of approximately 18 vertical feet of soil in this area. 4) Excavations at depths below 18 feet would be near or below the elevation of the Hudson River, causing substantially greater infiltration rates into excavation areas. The presence of the groundwater table would not preclude excavation to the 18-foot depth; dewatering and sub-groundwater table excavation above 18 feet bgs would be required as necessary. The in-situ treatment would consist of a chemical oxidation technology, such as ozone or Fentons Reagent. Because of the ability of in-situ treatment to enhance NAPL mobility, a NAPL collection system would be installed. Approximately 11,000 cy (Niagara Mohawk estimate) to 17,000 cy (NYSDEC estimate) of contaminated soil would be excavated.

This alternative would take approximately 1 year to implement, starting from the point of construction mobilization, not including long term monitoring. It is estimated chemical oxidation would require approximately two years of treatment.

COMMENT 47: There are numerous environmental and public health benefits which will result from the implementation of this proposed reuse/remediation plan for NIMO Area 2. Such benefits are as follows:
1 . Under the proposal, the City would obtain ownership of the King Fuels site. Municipal land ownership by the City will allow for efficient implementation of institutional controls, such as specific deed restrictions;
2. Callanan's lease of the site from the City would also ensure the maintenance of any institutional/engineering controls such as long-term cap maintenance. Callanan would have a vested interest in maintaining the cap (e.g., parking areas) and its right to lease the property;
3. Reuse of the "Coors" building will ensure that this contaminated portion of the site will

remain capped-, and
4. Under the proposal, there would be no groundwater use at the property.

RESPONSE 47: Establishment of institutional controls to ensure maintenance of engineering controls comprising a remedy is a requirement at all sites where engineering controls are employed. The presence or absence of Callanan will not alter the remedy.

COMMENT 48: The City is committed to working closely with Callanan and NIMO to finalize some sort of relocation/remediation agreement. NYSDEC will necessarily be involved in the fashioning and approval of any remedial plan, which must address environmental protection and site reuse considerations. The City recognizes, however, that such attempt will need to be time limited and understands that if no specific plan is agreed to by the parties in the near future, the NYSDEC will simply issue the final remedial requirements for this site.

RESPONSE 48: The NYSDEC and NYSDOH appreciate the City's concern for public health, environmental protection and site reuse.

COMMENT 49: If [the] plan to relocate Callanan's operations to Area 2 cannot be achieved, then the City would not support the above-proposed modifications to the PRAP. Instead, the City believes under such circumstances, a remedial plan which enables and optimizes numerous future and varied reuses for the site should be required of NIMO.

Under such circumstances, the City comments on the PRAP are as follows:
1. The City opposes all of the alternatives presented in the PRAP as presently written, because the City seeks a cleanup which most approximates a return to pre-release conditions;
2. The City therefore recommends, at a minimum, implementation of Alternative 6; and
3. The City would not agree to the imposition of institutional controls such as deed restrictions.

RESPONSE 49: The City's agreement with Callanan, or lack thereof, is an insufficient cause for modifying the remedy. The NYSDEC did not select Alternative 6, as described in RESPONSE 9. Institutional controls are necessary to provide protective measures for the remaining residual contamination which cannot be feasibly removed or treated in-situ. The institutional controls are consistent with the land use plans currently proposed for this area of the City. Niagara Mohawk will need to work with the landowner to satisfy the institutional control requirements of the ROD.

COMMENT 50: Irrespective of the reuse plan for or of the future tenancy status at Area 2, the City believes the following remedial actions should be required of NIMO within 50 feet east of the top of the river bank:
i. The City considers that the surface soils should be suitable for park use, as this area is intended to become at a minimum a bike path, and may become public green space;
ii. The City recommends that the shoreline and its shallows be made suitable for boat launching,

wading, and swimming by the public. This suitability should be accomplished by exclusion of contamination and with respect to construction efforts and improvements. This appears to affect Element 2 of Altemative7 in the PRAP.

RESPONSE 50: The selected remedy will allow for construction of a bicycle path, boat launch and/or recreational activities akin to a public park. While future wading or swimming decisions are beyond the scope of this ROD, any inputs to sediments adjacent to the site will be addressed in a ROD for the Hudson River sediments operable unit.

COMMENT 51: Irrespective of the reuse plan for or of the future tenancy status at Area 2,use of monitored natural attenuation treatment for groundwater, as recommended in Element 7 of Alternative 7:
i. The City of Troy places a high priority on the health and cleanliness of the Hudson River, as the use and enjoyment of this river is a high priority of the City and its residents;
ii. Use of monitored natural attenuation treatment of groundwater appears to be sufficient at this time;
iii. The City recommends that, if required at a future time, as indicated by monitoring, action be taken to protect groundwater that may enter the Hudson River; and
iv. The City recommends that the known contamination of the sediments of the Hudson River by the coal tar wastes, which are known to exist in the sediments, be addressed as soon as possible. (Please note that the City realizes that this comment does not pertain directly to the PRAP and does not wish this comment to delay the issuance of the ROD for Area 2. Instead, this comment is directed at guiding the NYSDEC at setting the priority for future river sediment investigation and cleanup.)

RESPONSE 51: The NYSDEC appreciates the city's support for the selected remedy's approach to groundwater, with a contingency for active measures. Monitored natural attenuation in accordance with USEPA guidance will be applied at each of the three groundwater contaminated areas identified on Figure 5. See RESPONSE 15 regarding the Hudson River.

COMMENT 52: Again with regards to Element 2 of Alternative 7, other field or infrastructure improvement projects that require or might require excavation within Area 2 should be conducted prior to or in concert with the remediation of the site. Specifically, there are City and County-owned sewer utilities within Area 2. Both are slated for improvement by the Troy Public Utility Bureau. Niagara Mohawk should be required to coordinate the sewer improvement efforts with the Area 2 remedial efforts so that the cover does not have to be breached at a time after the remediation;

RESPONSE 52: The NYSDEC agrees.

COMMENT 53: Element 1 of the proposed remedy (a remedial design program) is supported by the City; as proposed in Element 3, structures A-F should be addressed as identified in Alternative 7; as proposed in Element 4, Purifier Waste areas should be addressed as identified

in Alternative 7; as proposed in Element 5, an asphalt cap or permeable soil cover should be placed over the entire site south of the Wynants Kill, as identified in Alternative 7, except that consideration should be given to using low permeability soils or other barriers or thicker soil layers in the vicinity of the Hudson River, in order to comply with the recommendations in [COMMENT 50]; and, as proposed in Element 8, a long term monitoring program should be required at the site, as identified in Alternative 7.

RESPONSE 53: Support by the city for the selected remedy elements is noted. Since the sources of groundwater contamination will either be removed or treated in-situ, infiltration of precipitation is not a significant concern. The primary purpose of the soil cover is to prevent human contact with the residual contamination. Permeability of the soil cover is not critical to the remedy's protection of human health and the environment. The design will address the potential for erosion and scour of the cover in the vicinity of the Hudson River, and it may be determined that a thicker cover and/or armoring may be necessary in this area, See Also RESPONSE 13.

Charles F. Willard, representing Niagara Mohawk, A National Grid Company, submitted a letter dated March 26, 2003 which included the following comments. A copy of the letter is included in the Administrative Record.

COMMENT 54: Section 1, page 1, first paragraph: The third sentence should be revised to reflect that coal gasification processes and other activities have resulted in the disposal of hazardous waste at the site.

RESPONSE 54: The RI has only established that former coal gasification processes have resulted in the disposal of hazardous waste.

COMMENT 55: Section 4, page 4, first paragraph: NYSDEC's PRAP identifies Niagara Mohawk and King Fuels as responsible parties. Although Niagara Mohawk is the only party that entered into a Consent Order with NYSDEC to responsibly address this site, the PRPs associated with the Troy Water Street site include a number of additional parties. As NYSDEC is aware, and as contemplated in paragraph XVII. F of the Consent Order, Niagara Mohawk has commenced an action in the United States District Court for the Northern District of New York, seeking contribution from many PRPS, including King Fuels. NYSDEC's Record of Decision should note that the PRPs for the Troy Water Street Site include, but are not limited to, Niagara Mohawk and King Fuels.

RESPONSE 55: The ROD notes that the PRPs for the site include Niagara Mohawk and King Fuels.

COMMENT 56: Section 5. 1. 1, page 5, end of second paragraph: NYSDEC should note that the Wynants Kill was utilized by many upgradient industries in their operation.

RESPONSE 56: The NYSDEC believes the comment is addressed by the ROD in Section 5.1.3 which states: *PAH concentrations in sediment both upstream and adjacent to the site were comparable and are considered to represent background conditions in this historically industrial area through which this reach of stream flows*.

COMMENT 57: Section 5.1.1, page 6, first full paragraph: The third sentence should be revised to state that the groundwater flow is generally west to northwest.

RESPONSE 57: The ROD reflects this comment.

COMMENT 58: Section 5.2, page 9, second paragraph: In a January 30, 1996 letter to King Fuels' counsel, NYSDEC noted that the sludge contained in the former holder exceeded TCLP for metals (lead, mercury and barium) and requested that King Fuels explain the presence of such metals.

RESPONSE 58: The comment regarding NYSDEC's letter is accurate; however, no explanation was received from King Fuels. The NYSDEC believes additional analysis of the sludge may have been conducted by Niagara Mohawk for IRM disposal but no analysis was provided to the NYSDEC. Regardless, the NYSDEC considers the sludge to be, at least in part, of MGP origin. See also RESPONSE 55.

COMMENT 59: Section 5.3, Exposure Pathways: In the first bullet, NYSDEC should strike "MGP". In the second bullet, NYSDEC should strike "MGP associated" and also strike the second and third "MGP" reference and replace it with "soil".

RESPONSE 59: The NYSDEC and NYSDOH consider the statements made in the PRAP and ROD to be accurate.

COMMENT 60: Page 20, paragraph no. 1.d: NYSDEC should strike "of MGP origin".

RESPONSE 60: By letter of October 15, 1998, Niagara Mohawk recommended an indoor air evaluation be conducted during the remediation, if certain source areas of MGP contamination proved to be technically impossible or impracticable to remove. The NYSDEC and NYSDOH consider an evaluation of the potential for exposure to residual contamination, including air contaminants of MGP origin that would remain at the site following the implementation of the proposed remedy for building occupants, to be a necessary component of the ROD. Therefore no change will be made to the text.

COMMENT 61: Page 21, paragraph no. 6: NYSDEC should strike "potential MGP" and replace it with "soil vapor".

RESPONSE 61: The ROD reflects this comment.

COMMENT 62: The proposed remedy includes excavation and off-site thermal desorption treatment of soil containing greater than 500 ppm total PAHs or visual tar or non-aqueous phase liquid (NAPL). NYSDEC's Record of Decision should differentiate between accessible and inaccessible soils. Inaccessible soils should include:

- saturated soils deeper than one foot below the water table;
- soils underneath or adjacent to buildings not planned to be demolished; and
- soils in close proximity to high pressure gas lines.

Excavation should be limited to accessible soils. Saturated soils deeper than one foot below the water table would not be accessible due to the technical difficulty in construction requirements for sheeting and dewatering the areas to be excavated. The Department has made this determination for the BASF Manufacturing Plant, Operable Unit No. 1, On Site Contamination, Rensselaer, Rensselaer County, New York, Site No. 4-42-027 in the PRAP dated February 2003.

There is no technical basis to require the removal of buildings from the site. Structures, at present, serve as a cap over areas of possible soil impacts and fulfill the function of a cap to both preclude exposure to the soil and minimize the infiltration of precipitation through the soil. Niagara Mohawk is not responsible for demolishing buildings or for asbestos abatement, which may be required prior to the demolition of buildings.

The Feasibility Study (FS) demonstrated, and the PRAP acknowledges, that it is not feasible to remove all contaminants at the site to standards, criteria and guidance (SCGS) or risk based levels (RBLs). Therefore, the proposed remedy includes engineering and institutional controls to prevent exposure to impacts in soil and groundwater. Those same engineering and institutional controls will also address inaccessible soil that would otherwise meet the criteria for excavation.

RESPONSE 62: Based on its experience in remediating other hazardous waste sites in the State, the NYSDEC concludes that soil deeper than one-foot below the groundwater table and/or soil adjacent to a high pressure gas line is accessible. Niagara Mohawk's interpretation of the BASF Manufacturing Plant, Operable Unit No. 1 Proposed Remedial Action Plan is taken out of context since there were multiple site-specific factors (areal size, number of foundations, proximity to Hudson River) which lead to the conclusion that excavation to that depth at that site is not feasible. At Area 2, a significant portion of the source of groundwater contamination including tar and flowable NAPL lies directly adjacent to and therefore likely under the former Water Gas Building (see RESPONSE 6). Monitored natural attenuation in accordance with USEPA's April 21, 1999 directive on the use of monitored natural attenuation cannot be effectively implemented if there is a continuing source of groundwater contamination. In addition, the former Water Gas Building is in an abandoned and derelict condition, with no reasonably anticipated productive use. Demolition of the building is feasible and the most effective way to delineate and remove the source contaminants under it.

COMMENT 63: Based on the soil volume estimates presented in the FS, approximately 36 percent of the soil exceeding 500 ppm total PAHs is below the water table. It should be noted that the NYSDEC's proposal to excavate soil containing greater than 500 ppm total PAHs is based, in part, on the "knee of the curve" analysis presented in Appendix D of the FS. However,

that analysis considered only soil located above the water table and, therefore, does not reflect the technical impracticalities and dramatically increased costs associated with excavation of saturated soils.

RESPONSE 63: NYSDEC's proposal and subsequent selection to excavate soil containing greater than 500 ppm total PAHs or visual tar or NAPL was based on the remedial goal of attaining to the extent practicable NYSDEC's recommended soil cleanup objectives for total SVOCs as identified in TAGM 4046 for the contaminants of concern (see Section 6). By letter of December 19, 2001 Niagara Mohawk informed NYSDEC that it had accounted for shoring and dewatering in its recommendation to excavate all soil greater than 500 ppm PAHs. Niagara Mohawk's FS recommended the excavation of saturated soils as well as unsaturated soils containing greater than 500 ppm PAHs (and in doing so implied the removal of visual tar or NAPL as these wastes contain greater than 500 ppm PAHs).

COMMENT 64: The costs developed in the FS and presented in the PRAP likely underestimate the actual costs associated with excavation below the water table. For example, the same excavation unit cost is used for saturated and unsaturated soils. Although costs for shoring and stabilization are included separately, the unit cost should be adjusted to reflect slower production rates and other complexities associated with deeper excavation below the water. The estimated costs for dewatering also appear low, especially considering the close proximity to the river and the transmissivity of the fill materials.

RESPONSE 64: As indicated in RESPONSE 63, by letter of December 19, 2001 Niagara Mohawk informed NYSDEC that it had accounted for shoring and dewatering in its recommendation to excavate all soil greater than 500 ppm PAHs. Niagara Mohawk's FS, including the December letter, affirms the ability to dewater and remove soil substantially below the groundwater table at this site and other sites. As Niagara Mohawk prepared and submitted the FS, failure to accurately cost this item is the responsibility of Niagara Mohawk. Also, FS cost estimates carry the disclaimer of being accurate from -30% to +50%. The NYSDEC believes that the cost estimate is within acceptable tolerances.

COMMENT 65: There is a large discrepancy in the soil volume estimates developed by the NYSDEC in comparison to the estimates presented in the FS. Per the FS, the estimated volume of soil which exceeds 500 ppm total PAHs is 15,000 cubic yards. In the PRAP, the NYSDEC estimates that 40,000 cubic yards exceeds 500 ppm total PAHs, which is 2.7 times the FS estimate. No explanation of this disparity is provided in the PRAP. This large disparity in soil volumes should be explained and resolved prior to selecting a remedial alternative for the site rather than addressing it in a pre-design investigation. In light of the FS, the NYSDEC should fully explain the technical and scientific foundation for the extraordinary increase in the estimated volumes of soil for excavation and off-site treatment. The increase in soil volume removal has significant collateral impacts, such as truck traffic, noise and air emissions, that should be assessed before such a dramatic increase is authorized in a Record of Decision. The public should be provided with an opportunity to understand the consequence of almost tripling

the amount of soil to be removed and transported for treatment.

RESPONSE 65: By letter of October 24, 2001, the NYSDEC identified a volume discrepancy in its review of the 2001 draft FS for the site as compared to a Niagara Mohawk 1999 report. Niagara Mohawk explained, by letter of December 11, 2001, that the three-fold difference in volume was due to both a change from the triangulation method, used for the 1999 report, to a computer-generated model used for the draft FS, and additional data received in the interim. Despite the NYSDEC's acceptance of the computer-generated model, Niagara Mohawk continued to report a discrepancy in its final FS issued in 2002. In the 2002 FS, Niagara Mohawk reports a volume of 15,000 cubic yards of soil exceeding 500 ppm PAHs for Alternative 7 (now Alternative 7A of ROD) in Section 4.2.7.1, but reports a volume of 90,000 cubic yards on Figure 4-6. Presenting both Niagara Mohawk's volume estimate and the NYSDEC's volume estimate is therefore appropriate.

COMMENT 66: The cost estimate for the proposed remedy (Alternative 7) in the PRAP is $7.9 million to $11 million. The lower cost corresponds to the cost estimate presented in the FS, which is based on a soil volume estimate of 15,000 cubic yards. An addition error has been identified in the FS cost estimate (Appendix 1, Exhibit 7). The correct total cost for Alternative 7 is $9.0 million instead of $7.9 million. The upper cost corresponds to the NYSDEC's soil volume estimate of 40,000 cubic yards. The cost estimated for only the excavation and off-site thermal desorption element of Alternative 7 in the FS is $4.2 million. The NYSDEC has estimated a cost of $3.1 million for excavation and off-site thermal treatment of an additional 25,000 cubic yards. This estimated cost appears to be low. No calculations or explanation of how this cost was estimated is provided in the PRAP. The NYSDEC must specify how its cost calculations were arrived at so that a sound cost comparison of alternatives can be developed in accordance with the cost- effectiveness review required by the NCP.

RESPONSE 66: The FS addition error is the failure to include the $1.07 million contingency line item. However, the FS estimate includes a $1.35 million line item for the transportation and incineration of 1,500 cubic yards of hazardous waste at $900/cubic yard. The waste is hazardous for TCLP benzene only, and thus could be thermally treated in accordance with TAGM 4061 at the FS recommended cost of $71/cubic yard. The net result is that the addition error has no significant effect on the alternative's cost estimate. The ROD reflects the revised cost estimate.

COMMENT 67: The PRAP states that the costs associated with designing the proposed remedy (Alternative 7) and construction management "would not change appreciably with the increase in contaminated soil proposed to be excavated as compared to Alternative 3." Increases in excavation volume would significantly increase both of these costs, especially the construction management cost which is directly related to the time to implement the remedy. Further, with the dramatic increase in soil volume removal, the collateral risks and impacts to the community, such as truck traffic and noise, should be fully assessed and provided to the public for comment before a ROD is issued.

RESPONSE 67: The statement is taken out of context since the entire statement is as follows: *Designing the remedy, mobilizing the equipment, preparing the site, and construction management are substantial costs associated with each of these remedies which would not change appreciably with the increase in contaminated soil proposed to be excavated as compared to Alternative 3*. The salient construction difference between Alternatives 7A, 7B and Alternative 3 is the size of the excavation. In that regard, the design concept needed to implement the Alternative 7B would not vary substantially from Alternative 3. Also, equipment and site preparation would be essentially the same in implementing either Alternative 7B or Alternative 3. Construction management would also involve fixed costs which would remain the same regardless of the volume excavated. The NYSDEC would agree, however, that a larger excavation would take a longer construction period; the ROD was modified to reflect this. The impacts of remedial construction of Alternative 3 as compared to Alternatives 7A and 7B were assessed as described in Section 8; also, this assessment was specifically presented by the Department during the public meeting. The public has expressed comment regarding truck traffic, see RESPONSE 1.

COMMENT 68: The term "visual tar or NAPL" is further defined in the PRAP as follows: "Visual tar or NAPL, would be soil found to be saturated with NAPL, or have visually observable separate phase product. Soils exhibiting odors, staining and/or sheens would not be considered for removal as visual tar or NAPL." This definition is inherently subjective and precludes a reliable comparison of alternatives. The extent of soil removal must be clearly defined and not left to a subjective 'in the field' determination. Remedial action must be consistent with the NCP and not simply the result of an individual subjective judgment. The criteria for removal should include the following:

- Visual tar or NAPL and (rather than or) concentrations greater than 500 ppm total PAHs.
- Visual tar or NAPL should be defined based on a 3-inch thick seam extending at least 10 feet beyond the excavation and exceeding a volume of 10 cubic yards.

RESPONSE 68: The Supreme Court of New York has upheld the use of visual determinations of tar and NAPL. Further, the ROD reflects the definition suggested by Niagara Mohawk for removal at its Rome - Kingsley Avenue MGP Site. No qualification of the extent of visible tar or NAPL, such as a "3-inch thick seam extending at least 10 feet beyond the excavation and exceeding a volume of 10 cubic yards", will be considered. The lateral limits of the excavation will be defined during the remedial design. As the commentor is not specific regarding consistency with the NCP, a specific response cannot be provided.

COMMENT 69: The PRAP notes that former MGP structures may remain in place if after removal of their contents a thorough inspection concludes that removal is not necessary. There is no technical basis to require the removal of structures from the site. Structures, at present, serve as a cap over areas of possible soil impacts and fulfill the function of a cap to both preclude exposure to the soil and minimize the infiltration of precipitation through the soil. However, in the event a structure needs to be removed to access the underlying soil for sampling and/or excavation, the ROD should note that the structure may be broken up and used to fill excavations or low lying areas on the site.

RESPONSE 69: NYSDEC has witnessed MGP structures being removed and has concluded that significant contamination can exist under such structures, although investigations of the structures concluded that significant contamination did not exist. Examples of where this has occurred include the Niagara Mohawk Schenectady Seneca Street Site, the Niagara Mohawk Amsterdam MGP Site, the New York State Electric and Gas (NYSEG) Binghamton Court Street MGP Site and the NYSEG Plattsburgh Bridge Street MGP Site. The structures do not minimize infiltration of precipitation given their small size, lack of perimeter drainage features and likely leakage. Clean structures may be broken up to a screen size to be determined in design and used as grading material below the soil cover or asphalt cap.

COMMENT 70: The PRAP notes that purifier waste was found in two areas and the proposed remedy includes removal and off-site disposal of approximately 1,200 cubic yards of this material. The ROD should acknowledge that purifier waste is not a regulated material and there are no SCGs for purifier waste. Niagara Mohawk may elect to remove this material at its own discretion, but its removal cannot be a statutory or regulatory requirement of the proposed remedy unless the material meets the criteria for excavation.

RESPONSE 70: As a solid waste which has been disposed of, the purifier waste is a solid waste subject to regulation. In addition, in some instances, purifier waste has met the definition of a characteristic hazardous waste. Purifier waste has also been demonstrated to be a source of cyanide in groundwater. Purifier waste exists at the site as an improperly disposed solid waste.

COMMENT 71: The proposed remedy includes monitored natural attenuation (MNA) for groundwater. The PRAP states that performance goals would include compliance with groundwater quality standards and guidance. In establishing performance goals the following information, presented in Section 2.2.3 of the FS, should be recognized:
a. Given the background water quality at the site, which includes elevated metals and chlorinated hydrocarbons attributed to spills upgradient of the site, and the nature of the fill materials used at the site, it will not be feasible in the foreseeable future to meet SCGs for groundwater on site.
b. No direct exposure pathways for groundwater to humans have been identified.
c. The discharge of groundwater to its primary receptor (the Hudson River, a Class C water body) was modeled and did not indicate a significant potential for unacceptable degradation of the river associated with the potential constituents of concern (COCS) in groundwater.

d. The lack of impacts to the Hudson River was confirmed through sampling, which did not detect any significant levels of COCS.
The performance objectives for MNA should be consistent with the remedial action objective (RAO) presented in Section 2.2.3 of the FS which would protect further impacts to regional groundwater quality, particularly with respect to levels of BTEX and PAHS. The effective point for evaluation of compliance with this RAO should be the downgradient portion of the site, adjacent to the Hudson River, as discussed in the FS.

RESPONSE 71: The Feasibility Study's recommendation for monitored natural attenuation was the origin of the PRAP's component of monitored natural attenuation in accordance with USEPA's April 21, 1999 directive on the use of monitored natural attenuation. The performance goals will include compliance with groundwater standards and guidance, but will also account for background conditions. Chlorinated hydrocarbons were found in one on-site well which suggests a localized condition rather than a prevalent problem.
The model underestimates the site's impact to the Hudson River because it does not account for any NAPL migration into the river and it factors dilution of the river. Regardless, a remedial goal of this ROD is the elimination or the reduction to the extent practicable of the release of contaminants from soil and waste material into surface water and sediment through storm water erosion, NAPL migration and groundwater discharge to the river. The commentor's conclusion of a lack of impacts to the Hudson River conflicts with the commentor's own report regarding the Hudson River. Niagara Mohawk's *Phase II Hudson River Sediment Investigation Report, March 2003*, concludes that elevated PAH concentrations in sediment are clustered near the former Wynants Kill outlet area and the upstream side of the Troy-Menands Bridge, among other areas (see RESPONSE 14). The report recommends that concurrence be obtained from the NYSDEC on a list of active remedial alternatives to be evaluated in the forthcoming Hudson River FS. Further, another remedial goal of the ROD is attaining to the extent practicable NYSDEC groundwater quality standards for the site. Therefore, the point of compliance is the site itself, not the downgradient boundary.

COMMENT 72: The PRAP states that "untreated hazardous waste" will remain at the site after implementation of the proposed remedy. Contaminated media is not hazardous waste unless it is actively managed. It is anticipated that a small percentage of the soil that will be excavated for off-site treatment would be characterized as hazardous waste. It is unlikely that the remaining soil at the site would exhibit a hazardous waste characteristic.

RESPONSE 72: Site tar and NAPL has met the definition of a characteristic hazardous waste. Since the remedy will leave pockets of tar or NAPL in the subsurface to be in-situ treated, the statement is appropriate.

COMMENT 73: Niagara Mohawk considers the impacts in the area including, and downgradient from, the former USTs to be directly related to the USTs. Fingerprinting analysis conducted on soil samples from the area indicated that the parent products of the impacts were petroleum in nature (diesel fuel, fuel oil and gasoline) with an age more recent than 1975. Thus, Niagara Mohawk is not obligated under the Consent Order to address these impacts.

RESPONSE 73: The ROD is not intended to assign responsibility, but rather to identify a remedy to address conditions which threaten human health and the environment.

COMMENT 74: In selecting the remedy for the site, the NYSDEC should give due consideration to the following:

- The site is zoned industrial and is surrounded by industrial uses;

- The site is serviced by municipal water;
- The majority of the contaminant mass lies above the water table;
- Groundwater impacts are not widespread, but rather are localized in defined areas of the site within the overburden;
- Bedrock groundwater quality is not adversely impacted by constituents of concern;
- Surface water quality in the Wynants Kill and in the Hudson River is not adversely impacted by constituents of concern;
- Sediments in the Wynants Kill do not require remediation (substances were present but were attributed to upstream sources);
- Structures and pavement are present over the substantial majority of the site, which, in effect, serve as constructed caps over possible impacted soil; and
- The site will be subject to institutional controls such that future uses will remain industrial/commercial, caps will be maintained where required, and site groundwater will not be extracted for potable use.

In light of the above, the remediation of the site should be focused upon the contemplated use of the property so that the property can be re-used in a timely and productive manner.

RESPONSE 74: The ROD did give consideration to those items, and the selected remedy allows for the future use of the site. Additional explanation is needed regarding a few of the bullets above:

- There is a contaminant loading to the adjacent waterbodies from the site. Water analysis from the waterbodies does not support a "not adversely impacted" conclusion, see RESPONSE 71.
- Removal of contaminant sources is a requisite for monitored natural attenuation of groundwater, see RESPONSE 62. Where removal is not feasible, treatment must be evaluated. The selected remedy requires removal or treatment of contaminant sources prior to placement of a soil cover or asphalt cap. Where asphalt concrete pavement currently exists at Area 2, it has not been maintained, as evidenced by potholes, subsidence and cracks.
- The groundwater resource at the site has been damaged by the site's contamination. While site use is considered, this consideration is for addressing protection of human health. The source of groundwater contamination must be removed to the extent feasible for groundwater protection. The requirement for groundwater protection, as is the case here for subsurface soils, is a measure to protect the environment.

COMMENT 75: Prior to selecting the remedy for the site, the NYSDEC should evaluate a modified alternative incorporating the use of in situ treatment and reasonable and appropriate excavation, as described further below. The modified alternative can most readily be explained through a comparison between Alternatives 3 and 7. Alternatives 3 and 7, as described in the FS, both include the following components:

- Asphalt cap to prevent exposures to surface soils above SCGs;
- Excavation, preparation and off-site treatment or disposal of subsurface soils above risk-based levels (Alt. 3) or 500 mg/kg total PAHs (Alt. 7);
- Closure of containment structures including removal of source materials for off-site

incineration;
- Removal and off-site disposal of purifier wastes;
- Institutional controls (deed restrictions, new fencing, posted signs); and
- Monitored natural attenuation for groundwater.

The difference between the two alternatives is that Alt. 7 includes additional excavation to 500 mg/kg total PAHs. Based on the soil volume estimates presented in the FS, the volume of soil that would be excavated and treated off site in Alt. 7 is 15,000 cubic yards whereas the volume of soil that would be excavated and disposed off site in Alternative 3 is approximately 3,000 cubic yards. However, the NYSDEC notes in the PRAP that the soil volume meeting the criteria for excavation and off-site treatment under Alt. 7 may be as high as 40,000 cubic yards. A pre-design investigation is planned to further delineate the extent of soil requiring excavation.

The PRAP considers a number of alternatives involving differing amounts of excavation and several alternatives involving in situ treatment. However, no alternatives combining excavation and in situ treatment are considered. Excavation of subsurface soils would be conducted to the limits established in Alt. 3 and in situ treatment would be utilized to address remaining soil contamination above 500 mg/kg total PAHs. The excavation limits established in Alt. 3 include the subsurface soils containing contaminants above the risk-based levels (RBLs) that were developed as protective of potential future on-site commercial/industrial workers and construction workers. In situ treatment may include passive NAPL collection, stabilization, chemical oxidation, soil vapor extraction and/or air sparging. The pre-design study would include the necessary activities (i.e., technology evaluation and pilot study, if necessary) to select the most effective technology or combination of technologies prior to full scale design.

RESPONSE 75: see RESPONSE 46.

COMMENT 76: The [Niagara Mohawk] modified alternative compares favorably to the alternative proposed in the PRAP, as described below.
- Excavation to the limits established in Alt. 3 does not require that the excavation extend below the groundwater table. Excavation to the limits established in Alt. 7 will require extensive shoring and dewatering, and excavation below the water table is generally considered to be technically impracticable. Thus, Alt. 7 will be significantly more difficult to implement than Alt. 3.
- The use of in situ treatment methods in conjunction with excavation to the limits established in Alt. 3 will allow for treatment of soils that are inaccessible to excavation (i.e., soils beneath buildings to remain or surrounding utilities).
- The PRAP acknowledges that Alt. 7 would remove only 20% more contaminant mass than Alt. 3 (64% vs. 44/o) yet it is 33% to 82% more costly than Alt. 3 (and the high range cost of Alt. 7 appears to be underestimated). An additional 20% of the contaminant mass can be treated or immobilized at significantly lower cost than the costs associated with Alt. 7.
- In describing the basis for the selection of Alt. 7, the PRAP states that it is "the most

cost-effective approach to satisfying the threshold criteria of compliance with SCGS." However, it is acknowledged that none of the alternatives would be able to satisfy this criterion as individual PAHs exceed their SCGs across most of the site and to depths of 54 feet. Excavation to the 500 mg/kg total PAHs limit does not obviate the need for engineering and institutional controls to protect public health and the environment, which are components of Alt. 3 as well as Alt. 7.

The PRAP states that removal of soil to the 500 mg/kg total PAHs limit would "greatly reduce the source of contamination to groundwater" and would "create the conditions needed to restore groundwater quality to the extent practicable." The same statement holds true for to the criteria established in Alt. 3. The incremental benefit to groundwater quality from soil removal to 500 mg/kg total PAHs will be small in comparison to the magnitude of the additional excavation and the associated additional cost. In situ treatment methods will have an equal or greater benefit to groundwater quality than additional excavation that will remove only a relatively small percentage of the overall contaminant mass.

RESPONSE 76: The NYSDEC agrees with several of the ideas presented in this comment since the NYSDEC previously suggested the alternative to Niagara Mohawk, which was subsequently rejected by Niagara Mohawk. The ROD's selected remedy is similar to the commentor's modified alternative. However, Alternative 3 excavation limits must be rejected since the limits identified in the alternative will not address restoration of the groundwater resource to the extent practicable, nor the remedial goal of attaining to the extent practicable NYSDEC's recommended soil cleanup objectives as identified in TAGM 4046 for the contaminants of concern.

Patrick J. Higgins, Esq. of Powers & Santola, LLP, submitted a letter dated March 21, 2003 which included the following comments. A copy of the letter is included in the Administrative Record.

COMMENT 77: Certain drawings, documents, and material filed with the PRAP show contamination isomers extending into Area 3. However, the documents, testing, sampling, or other data filed with the PRAP do not indicate that the depicted concentration in Area 2 extends onto Area 3, or relates to Area 3. During discussions with John Spellman on March 21, 2003, it was confirmed that this was an inadvertent mistake. Area 3 contamination isomers on PRAP documents should not exist. These isomers should be limited to Area 2 in the documentation. Chevron therefore requests that the PRAP, all associated records, and the Area 2 Record of Decision ("ROD") delete existing contamination isomer lines on Area 3. Please also correct and amend any similar text.

RESPONSE 77: The contamination isomers (i.e. shaded area) are shown extending slightly past the southern limit of Area 2, onto Chevron USA Inc. (Chevron) property on Figures 4, 5 and 7 in the vicinity of monitoring well MW-5 on Area 2. A portion of the hot-spot contamination at MW-5 is shown on Chevron property because of the proximity of MW-5 to the property line. No correction to the figures will be made.

COMMENT 78: NYSDEC has no current plans to enter Area 3 in conjunction with the Area 2 PRAP and ROD. Should that position change, Chevron would expect notice from the NYSDEC. It would also object under the circumstances presented. The Area 2 PRAP and the existing NYSDEC directives and orders do not allow for such entry and would require substantial modification. As no plans for Area 3 entry now exist, we defer further comment, other than to note Chevron's position as set forth here.

RESPONSE 78: Entry onto a portion of Area 3 near Area 2's monitoring well MW-5 location may be needed during remedial design to further define the hot-spot contamination found at that well (see RESPONSE 77). The NYSDEC believes the Environmental Conservation Law explicitly allows for entry. As RESPONSE 15 indicates, a future investigation of Area 3 will be needed; however, a schedule has not been prepared. The landowner will be notified prior to entry, in accordance with Environmental Conservation Law 27-1309.

COMMENT 79: The PRAP understates Niagara Mohawk's contamination of the Troy Water Street Site. Mr. William Sherman testified that Niagara Mohawk and its predecessors in interest have been contaminating Area 2 since 1925:

> The Hudson Valley Fuel Corporation filled in the Wynants Kill in 1930 when it owned or operated the manufactured gas plant. (Id. at 275.) Tunnels filled with coal tar also existed in Area 2. (Id. at 278.) This was the air plenum tunnel associated with the stack at the gas works. (Id. at 282.)
>
> A large amount of Area 2 is contaminated with coal tar and MGP residuals. (Id. at 289.) These would include sulfates, ammonium sulfate, and purifier box waste. (Id. at 289.) Roughly 75% of the groundwater and acreage of Area 2 is contaminated with coal tar and MGP residuals and petroleum. (Id. at 290.) As of 1950, coal tar was coming into contact with the Hudson River in Areas 2 and 4. (Id. at 319.)
>
> The MGP plant operated three sets of purifier boxes. They were cleaned several times a year and the material was spread on the ground, allowed to dry, and then reused. When saturated, they would dispose of the material in the boxes. (Id. at 315.) Purifier Box waste exists along the shoreline of the river. The only source was the MGP plant. (Id. at 292.) Plaintiff also noticed oily sheens coming right out of the Wynantskill in 1986. (Id. at 339.) These were also present in a 1930 photograph, and that came from the plant. (Id. at 341.) These materials continued to discharge from the old Wynantskill after it was filled. (Id. at 341.)

We also include the report of James Smith describing Niagara Mohawk's contamination of the Troy Water Street Site. Please make the report part of the record. Please also incorporate Mr. Smith's numbers and contamination levels in the Area 2 ROD to fairly describe Niagara Mohawk's contamination at the Troy Water Street Site.

We also include the deposition transcript of George Bayly, who testified as a former employee of

the Hudson Valley Fuel Corporation. Mr. Bayly cleaned up purifier oxide boxes and shoveled out coal tar from the MGP plant collecting boxes. He also testified about the dumping of coal tar wastes and purifier box wastes. Hudson Valley Fuel Corporation is now Niagara Mohawk.

RESPONSE 79: Regarding "Niagara Mohawk and its predecessors in interest have been contaminating Area 2 since 1925...", the NYSDEC is presented with two apparently conflicting pieces of information: the Sherman deposition provided by the commentor, and John Parkinson's June 11, 2002 letter. Mr. Parkinson, Attorney at Law, Niagara Mohawk, reported to the NYSDEC that Niagara Mohawk predecessors first acquired property on the site in 1929. The NYSDEC will rely on the information provided directly to it in writing; thus no correction will be made. Regarding the remainder of the comment, the ROD's selected remedy is based on contemporary empirical field data which was gathered in accordance with NYSDEC guidance. The NYSDEC believes the field data identified in the PRAP provide an accurate representation of the nature and extent of contamination at the site, which gives rise to the significant human health and environmental threat.

COMMENT 80: The PRAP also states that Niagara Mohawk and its predecessors operated the Troy Water Street Site since 1929. This is incorrect. Mr. Sherman confirmed that Niagara Mohawk, through its predecessors, operated the Manufactured Gas Plant site from 1925 - not 1929. (Dep. of William Sherman 6/21/00-6/23/00 at 225-280). Please therefore correct or delete the inaccurate reference to 1929.

RESPONSE 80: See RESPONSE 79.

APPENDIX B

Administrative Record

Administrative Record

NIMO TROY - WATER STREET MGP
OPERABLE UNIT No. 1: AREA 2 - FORMER PLANT SITE
Troy (C), Rensselaer County, New York
Site No. 4-42-029

1. Order on Consent, Index No.DO-0001-9210, between NYSDEC and Niagara Mohawk Power Corporation, executed on December 7, 1992

2. Initial Submittal, Troy (Water Street) MGP Site, Troy, New York, January 15, 1994

3. Final Preliminary Site Assessment/Interim Remedial Measures Study for Troy (Water Street) New York (Area 2), October 12, 1995, Groundwater Technology, Inc.

4. Letter, John Spellman, NYSDEC to David H. King, Niagara Mohawk, December 26, 1995

5. Inspector's Daily Report, Troy Water Street Area 2, December 8, 1997, NYSDEC

6. Inspector's Daily Report, Troy Water Street Area 2, December 12, 1997, NYSDEC

7. Inspector's Daily Report, Troy Water Street Area 2, January 7, 1998, NYSDEC

8. Letter, John Spellman, NYSDEC to William R. Jones, Niagara Mohawk, September 14, 1998

9. Remedial Investigation Report for Troy (Water Street) Site, Area 2, October 14, 1998, Fluor Daniel GTI, Inc.

10. Letter, William R. Jones, Niagara Mohawk to John Spellman, P.E., NYSDEC, October 15, 1998

11. Letter, John Spellman, NYSDEC to Scott N. Fein, Esq. November 10, 1998

12. Letter, John Spellman, NYSDEC to William R. Jones, Niagara Mohawk, November 10, 1998

13. Letter, William R. Jones, Niagara Mohawk to John Spellman, NYSDEC, March 8, 2000

14. Troy Water Street Area 2, Supplemental Data Report, IT Corp., September 28, 2000

15. Letter, William R. Jones, Niagara Mohawk to John Spellman, NYSDEC, October 11, 2000

16. Letter, John Spellman, NYSDEC to William R. Jones, Niagara Mohawk, October 24, 2001

17. Letter, John Spellman, NYSDEC to William R. Jones, Niagara Mohawk, November 2, 2001

18. Letter, William R. Jones, Niagara Mohawk to John Spellman, NYSDEC, December 11, 2001

19. Letter, Bruce W. Ahrens, IT Corporation to John Spellman, NYSDEC, December 19, 2001

20. Letter, John Spellman, NYSDEC to William R. Jones, Niagara Mohawk, February 11, 2002

21. Final Feasibility Study Report, Troy (Water Street), Area 2, March 15, 2002, IT Engineering of New York, P.C.

22. Supplemental Phase II Data Report, Troy Water Street Area 2, IT Corp., March 15, 2002

23. Letter, John T. Parkinson, Esq. Niagara Mohawk to John Spellman, NYSDEC, June 11, 2002

24. Letter, Gary A. Litwin, NYSDOH to Dale A. Desnoyers, NYSDEC, January 21, 2003

25. Letter, Anthony B. Quartararo, NYSDEC to Richard B. Slote, The King Service Inc., February 10, 2003

26. Proposed Remedial Action Plan, NIMO Troy - Water Street MGP, Operable Unit No. 1, Area 2 - Former Plant Site, February 2003, prepared by the NYSDEC.

27. Phase II Hudson River Sediment Investigation Report, Blasland, Bouck & Lee, March 2003

28. Letter, Mrs. Kathy Tremblay to John Spellman, NYSDEC, March 11, 2003

29. Letter, Patrick J. Higgins, Esq. of Powers & Santola, LLP, to John Spellman, NYSDEC, March 21, 2003

30. Letter, Hon. Mark P. Pattison, Mayor, City of Troy to John Spellman, NYSDEC, March 26, 2003

31. Letter, Charles F. Willard, Niagara Mohawk, A National Grid Company, to John Spellman, NYSDEC, March 26, 2003

32. Letter, Gary A. Litwin, NYSDOH to Dale Desnoyers, NYSDEC, July 7, 2003