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EPA Superfund Record of Decision:

Niagara Mohawk Power Corporation Superfund Site, Saratoga Springs, NY
9/29/1995

RECORD OF DECISION

Niagara Mohawk Power Corporation Site

Town of Saratoga Springs, Saratoga County, New York

September 1995

United States Environmental Protection Agency
Region II
New York, New York

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Niagara Mohawk Power Corporation Site
Town of Saratoga Springs
Saratoga County, New York

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA) selection of the remedial action for the Niagara Mohawk Power Corporation (NMPC) Site (the Site) in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§9601 - 9675 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision document summarizes the factual and legal basis for selecting the remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. A letter of concurrence from the NYSDEC is attached to this document (see Appendix IV).

An administrative record for the Site contains the documents that form the basis for EPA's selection of the remedial action, the index for which is attached as Appendix III.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The primary objectives of this remedy are to minimize the potential for further migration of contaminants from source areas into soils or ground water on the NMPC property; to collect and remove, to the extent possible, any potential dense non-aqueous phase liquid (DNAPL) beneath the NMPC property; and to minimize or eliminate the potential for Site contaminants to be transported to off-site locations, thereby minimizing any health and environmental impacts.

The major components of the selected remedy include the following:

- **Source and Surface Soil Removal**

The purpose of this action is to remove source materials or areas of concentrated coal tar having total PAH concentrations exceeding 1,000 parts per million (ppm), that are accessible and are significant in terms of volume, concentration, and the potential for continued, long-term subsurface impacts; and to remove contaminated surface soils from 0 to 2 feet below ground surface. The source areas include structures known as former Gas Holder Nos. 1, 2, 3, and 5, and several other areas around the NMPC property. During the remedial design phase, additional subsurface sampling will be conducted on the NMPC property, including Holder No. 4 where concentrated tar contamination was visually observed, to determine if additional PAH source areas are present, thereby requiring removal. This soil removal requires the demolition of surface structures in and around the source areas, including the Round House structure over Holder No. 2 and the gas regulator station over Holder No. 1. Approximately 16,700 cubic yards of source material and 3,500 cubic yards of contaminated surface soils will be removed. These volume estimates do not include Holder No. 4.

Excavation of contaminated soil, DNAPL, and associated source material within and around the Holder No. 3, also known as the tar/water separator will be implemented. The Holder structure will remain in place and be filled with a suitable backfill material.

Excavated material that exhibits a hazardous characteristic will be rendered non-hazardous by blending it with coal fines or other suitable material on site prior to transport off site for co-burning in a utility boiler, and/or treatment and disposal at an off-site permitted hazardous waste facility. All non-hazardous material encountered during excavation activities will be disposed of at an off-site solid waste management facility, and contaminated surface soil will be managed in an off-site cold batch asphalt plant to produce asphalt paving for the NMPC property. Recovered DNAPL and coal tar will be managed off site at a tar processing facility. If these materials exhibit a hazardous characteristic, they will be managed as hazardous waste as described above.

As set forth in the Institutional Controls and Monitoring Section below, deed restrictions on the NMPC property will be required.

- **Installation of Subsurface Barriers and Ground Water Management**

The purpose of the installation of subsurface barrier walls is twofold: 1) to contain contaminated ground water on the NMPC property, and 2) to contain and collect DNAPL residing in the vicinity of the subsurface barrier walls. Subsurface barriers will be installed at the southeast and southwest corners of the NMPC property where contaminated ground water and DNAPL can potentially migrate off site. The ground water in the shallow aquifer beneath the NMPC property and the DNAPL residing in the vicinity of the subsurface barrier walls will be collected by using drains installed inside and along the lengths of the barrier walls. The DNAPL and ground water collected will be transferred through a subsurface pipe into a collection sump, then pumped to the on-site water treatment facility.

Construction of an on-site water treatment facility will be required to pretreat contaminated ground water prior to discharge to the local publicly owned wastewater treatment plant (POTW) operated by the Saratoga Sewer District. The treatment process for the contaminated water includes DNAPL/water separation, metals removal by precipitation, and biological treatment.

Ground water upgradient of the NMPC property (which has not been impacted by the NMPC property contaminants) will be collected using a curtain drain and diverted to either the twin box culvert storm sewer system west of the NMPC property or the culverted Village Brook east of the NMPC property. The NMPC property will be capped with asphalt to prevent infiltration of precipitation.

- **Soil Removal from the Skating Rink Area**

The purpose of this action is to remove subsurface soils that exceed cleanup levels in the vicinity of the municipal skating rink. The long-term impact of this subsurface soil contamination potentially could contaminate the skating rink ground water, and this contaminated ground water could potentially migrate off-site. Such contaminant migration could have adverse impacts on downgradient ground water users. Therefore, in order to prevent migration of contaminated ground water beyond the skating rink area, and to restore the ground water by the skating rink area to drinking water standards, all sources of contamination that are contributing to ground water contamination in the vicinity of the skating rink would need to be eliminated.

The contaminated skating rink area subsurface soils will be dewatered and excavated. Approximately 4,200 cubic yards of contaminated subsurface soil will be excavated. Confirmation sampling will be conducted to assure attainment of cleanup levels. The excavated material will be managed as described in the Source and Surface Soil Removal Action Sections.

The remedial design phase will include further subsurface soil investigation in the skating rink area to determine whether additional soils are contaminated. This soil investigation will be performed outside the boundaries of the skating rink structure. Soil sampling beneath the skating rink structure is not feasible while the building is intact. Such soil sampling will be conducted when the soils become accessible. The soils will become accessible if and when the skating rink is both taken out of service and demolished. If sampling identifies contaminated soil at concentrations above the soil cleanup levels, the affected soil will be removed, and additional sampling will be conducted to assure that the removal achieved cleanup levels.

If contaminated soils are currently present beneath the skating rink, they are inaccessible, and any contact with such soils is unlikely. Moreover, the structure serves as a cover that prevents infiltration of precipitation through such soils. Therefore if present, such soils do not pose a risk to human health and the environment.

After the contaminated soil is removed around the skating rink area, and the barriers are erected on the NMPC property, the sources of contamination impacting on the skating rink area will be eliminated. Because the sources of contamination will be eliminated, it is expected that the level of contaminants in the ground water in the vicinity of the skating rink will decline over time, and achieve compliance with the Federal and New York State Drinking Water Standards and New York State Ground Water Quality Standards through natural attenuation. The remedy requires monitoring of the ground water to measure improvement in the ground water quality. If improvement in ground water quality is not observed upon review of the annual ground water monitoring results, a program to evaluate contingency alternatives for ground water remediation in the skating rink area will be initiated and implemented in a timely manner.

As set forth in the <u>Institutional Controls and Monitoring Section</u> below, EPA recommends the imposition of a notice in the property records pertaining to the skating rink property to inform interested parties of the potential presence of contamination underneath the skating rink. This notice should remain in the property records until after the skating rink is taken out of service, demolished, and any contaminated soils removed.

- **Sediment Removal**

The sediment removal action involves the dredging and/or excavation of approximately 1,200 cubic yards of impacted sediments and wetlands soils at the confluence of Loughberry Creek and Village Brook, near the outfall of the concrete box culvert, near the outfall of the brick sewer, and at four locations on the NMPC property. Confirmation sampling to assure attainment of cleanup levels will be conducted. Contaminated sediments will be transported off site for treatment and proper disposal. Appropriate actions will be taken to restore the wetlands.

Remediation of the Sewer Migration Pathway

The purpose of this action is to eliminate the impacts to the wetland surface water or Spring Run from the migration of NMPC property contaminants through the underground brick sewer.

Stormwater flow through the brick sewer and Village Brook upstream of the NMPC property will be diverted to the twin box culvert storm sewer, so no stormwater will flow through the NMPC property. At the southeast corner of the NMPC property, the brick sewer will be disconnected and a water/DNAPL collection sump will be constructed to prevent any ground water which infiltrated the sewer from leaving the property. The downstream section of the sewer from the southeast corner of the NMPC property to the brick sewer outfall, near Interstate 87, will be cleaned. Infiltration spots along the downstream section of the brick sewer, from the point at which it is disconnected to the concrete box culvert, will be sealed to prevent infiltration of impacted ground water into the sewer. The break in the brick sewer near the confluence of Loughberry Creek and Village Brook will be repaired. The materials generated from cleaning the brick sewer will be properly disposed of off site. Control of releases from the brick sewer described above will stop the potential for continuing impacts to sediments in Spring Run.

- **Institutional Controls and Monitoring**

Because contaminants will remain on the NMPC property after implementation of the remedy, deed restrictions to prevent future residential use of the property and notifications to utility companies will be required to limit exposure to the subsurface contaminants that remain on the NMPC property. The implementation of deed restrictions will be the responsibility of NMPC. NMPC has indicated to EPA that it will maintain future ownership of the NMPC property, thereby further restricting the potential for future residential development of the property. EPA recommends the imposition of a notice in the property records pertaining to the skating rink property to inform interested parties of the potential presence of contamination underneath the skating rink. This notice should remain in the property records until after the skating rink is taken out of service, demolished, and any contaminated soils removed. No deed restrictions are necessary on the Spring Run wetland area because the sediment and soil contamination above the cleanup levels will be removed.

A monitoring program will be implemented to assess the effectiveness of the remedial action. Samples for analysis will be obtained from monitoring wells, the Old Red Spring, the diverted ground water upgradient of the NMPC property (which has not been impacted by the NMPC property contaminants), and the discharge from the on-site water treatment system, as required by the Saratoga County Sewer discharge permit.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA §121, 42 U.S.C. §9621, is protective of human health and the environment and is cost-effective. The remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, given the scope of the action, and will permanently reduce the toxicity, mobility, or volume of contaminants at the Site. In addition, the cleanup actions to remediate the NMPC property, the municipal skating rink, the underground sewer, and the contaminated sediments in Spring Run comply with Federal and State requirements that are legally applicable or relevant and appropriate (ARARs) to the remedial action.

Remediation of the NMPC property ground water in the shallow aquifer is considered to be technically impracticable. Therefore, this ROD waives the federal and state drinking water standards and state ground water quality standards for the ground water in the shallow aquifer beneath the NMPC property. The waiver is issued pursuant to Section 121(d)(4)(C) of CERCLA, 42 U.S.C. §9621(d)(4)(C), and §300.430(f)(1)(ii)(C)(3) of the NCP which authorizes EPA to waive applicable or relevant and appropriate requirements for ground water cleanup of the NMPC shallow aquifer based on technical impracticability, from an engineering perspective. There are technical limitations which make it impracticable to recover all the DNAPL from the NMPC property. In order to remove all the DNAPL, approximately 7 acres of contaminated aquifer materials, including soil, silt, peat, and sand, residing above the subsurface clay layer (which begins approximately 20 feet below the surface), would need to be excavated for off-site disposal. In addition, all NMPC's operating facilities would have to be demolished to gain access to the contamination beneath them. Since it is technically impracticable to excavate this large an area, some DNAPL and PAH impacted soil will remain on the NMPC property. Because the DNAPL and residual PAHs contribute to dissolved phase ground water contamination, restoration of ground water on the NMPC property to ground water cleanup levels has been determined to be technically impracticable.

EPA believes that the selected remedy for the ground water in the shallow aquifer beneath the NMPC property remains protective of human health and the environment. Recognizing that ground water restoration in the shallow aquifer beneath the NMPC property is technically impracticable, the goal of this remedial action is to establish hydraulic control of the NMPC contaminated ground water, to prevent ground water and DNAPL from flowing off site by using physical and hydraulic barriers. This action complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action and is cost-effective. In addition, the ground water remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for the Site.

A review of the remedial action, pursuant to CERCLA §121(c), 42 U.S.C. §9621(c), will be conducted no less than each five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment, because this remedy will result in hazardous substances remaining on the NMPC property above health-based levels.

Jeanne M. Fox
Regional Administrator

9/29/95
Date

RECORD OF DECISION
DECISION SUMMARY

Niagara Mohawk Power Corporation Site

Town of Saratoga Springs, Saratoga County, New York

United States Environmental Protection Agency
Region II
New York, New York

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ATTACHMENTS

SITE NAME, LOCATION AND DESCRIPTION

The Niagara Mohawk Power Corporation (NMPC) property is located in the Town of Saratoga Springs, Saratoga County, New York. The NMPC property is approximately 7 acres in size, and is bounded on the north by Route 50, on the south by Excelsior Avenue, on the east by East Avenue and on the west by Spa Steel Corporation. The NMPC Superfund Site (the Site) includes the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the remedial action. Contamination at the Site has been found on property owned by the NMPC, known as the NMPC property, and in nearby areas, including in the vicinity of the municipal skating rink, and on the Spring Run wetland. Figure 1 depicts all of the Site features described below.

The NMPC property was formerly used to manufacture gas. Since 1950, NMPC has owned and operated the NMPC property as a district service center and headquarters for its electric line, natural gas, and tree trimming crews servicing the Saratoga District. A service and maintenance building is centrally located on the western portion of the property with an office trailer located to the north. A two-story brick storage building with an attached electric substation, constructed in 1903, is located east of the service and maintenance building. A brick round house (formerly Gas Holder House No. 2) constructed in 1873 is located toward the northeast corner of the property. A chain-link fence surrounds the NMPC property with access through two gates on Excelsior Avenue.

Extensive subsurface structures are located throughout the NMPC property. Active underground utilities (electric, natural gas, water, surface drainage, and storm and sanitary sewer) along with many inactive conduits associated with past manufactured gas plant operations are present in the subsurface. In addition, a number of subsurface structures and foundations related to past gas plant operations are also present.

A waterway known as the Village Brook-Spring Run system is present at the Site. Village Brook, which flows from west of the NMPC property, was routed through a culvert under the property some time after 1903. It ultimately discharges southeast of the NMPC property to the 84-inch twin box culvert city storm sewer that empties into Spring Run. Village Brook now carries some runoff from the contaminated area northwest of NMPC property. A 36-inch brick underground sewer line also traverses the southern portion of the property. The brick sewer has been in place since 1874, the early days of the manufactured gas plant operations at the NMPC property. This sewer is no longer an active city sewer for stormwater or sanitary flows. The brick sewer line leaves the NMPC property in the southeast corner and runs into the downhill Spring Run wetland. It extends approximately 5,000 feet beyond the NMPC property.

As indicated in the Spring Run detail inset depicted on Figure 1, the Village Brook-Spring Run system begins approximately 700 feet east of the NMPC property and extends eastward approximately 5,000 feet to Interstate 87, where the culverted stream flows underneath the interstate highway. The most significant tributary to Spring Run is Loughberry Creek, a major tributary draining Loughberry Lake to the northeast of the NMPC property. The 36-inch brick sewer mentioned above, which collects drainage from the NMPC property, intersects Loughberry Creek and continues until its outfall, approximately 4,000 feet down stream. A breach exists in the 36-inch sewer at the stream crossing and flow from the sewer enters the creek.

The area surrounding the Spring Run ecosystem is a thickly settled suburb. The ecosystem lies in a steep-sided valley which borders the backyards of numerous residences and some commercial operations. A bottled-water company occupies property down the valley, near the Spring Run Stream. The wetland occupies the nearly flat area on either side of the stream and is commonly 200 to 400 feet wide, and is approximately 5,000 feet long. Village Brook-Spring Run is generally a shallow, low gradient stream with a silty bottom. Village Brook and Spring Run are classified as Class "C" streams. The NYSDEC "C" classification indicates that those waters are suitable for primary and secondary contact recreation as well as fishing and fish propagation. The U.S. Fish and Wildlife Service and the NYSDEC did not identify any potential impacts on endangered, threatened, or special concern wildlife species, rare plant, animal, or natural community occurrences or other significant habitats.

Residents of the City of Saratoga Springs are served by a public water supply which is drawn from Loughberry Lake, located upgradient of the Site (approximately 1,400 feet northeast). Outside of the City limits, private and public water supply wells provide drinking water. Analytical results from local area private and public supply water wells (Old Red Spring and High Rock Springs) indicate that Site contamination has not impacted these wells.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The NMPC property has been used for industrial purposes since 1868. Prior to 1868, the parcel consisted of vacant land traversed by a small stream. Numerous mergers, sales and consolidations of property ownership have occurred throughout the years. Currently the property is owned and operated by NMPC as a district service center and headquarters for its electric line, natural gas, and tree trimming crews servicing the Saratoga District.

The development history of the NMPC property can be divided into three eras:

- The manufactured gas plant era, 1868 to 1929
- The gas storage/distribution era, 1930 to 1950
- The current NMPC district service center era, 1950 to present.

The manufactured gas plant era was the earliest and longest period. In 1868, the Saratoga Gas Light Company began operations to produce gas by using coal, coke and petroleum oils for illuminating purposes only. Coal gas production continued until 1886 when the process was modified to carburetted water gas production. Electric power generation supplemented gas production briefly, between 1886 and 1903. Gas manufacturing ceased in 1929 and the plant was converted to gas storage and distribution, until the introduction of natural gas service into the region in the 1950s. The early gas production operations left coal tars and other materials, which were by-products of the gas production processes. These wastes, which contain hazardous substances, were disposed of at various locations on the NMPC property; consequently, the NMPC property contains numerous coal tar waste beds. Few details exist regarding the first gas manufacturing process at Saratoga Springs, however from available literature it can be surmised that the gas operations included the use of retorts, a cooling system, a purification system, and gas storage.

A total of six gas holders were formerly used on the NMPC property, including one holder which was used as a tar/water separator. A gas holder house is a structure in which gas was stored after the gas was purified. Gas Holder Nos. 1 and 2 were circular brick structures, built between 1868 and 1873. Both holders had below-grade water seals contained in pits over 20 feet deep, with diameters of approximately 70 feet. Gas Holder 1 and 2 had 50,000 and 60,000 cubic foot capacity, respectively. Holder Nos. 1, 4, 5, and 6, and the original plant buildings used to manufacture gas have been demolished. The circular brick building surrounding Holder No. 2 remains on the NMPC property and is referred to as the Round House. The tar/water separator (Holder No. 3) was apparently decommissioned and filled with inert material. The former substation building also remains on the property and is used as a storage building. A Site Layout Map showing former and current structures on the NMPC property is provided on Figure 1.

In 1982, NMPC notified the U.S. EPA that the Saratoga Springs property was once the location of a gas manufacturing facility and that previous owners may have disposed of coal tars on the property. Between 1965 and 1985 a series of structure-related evaluations were carried out during construction and modification of buildings on the property. In addition, environmental investigations were performed prior to the remedial investigation.

The environmental investigations consisted of soil borings, a geophysical survey, installation of five ground water monitoring wells, soil and ground water sampling and analysis, and sediment sampling and analysis. The results of the investigations indicated the presence of polynuclear aromatic hydrocarbons (PAHs) and some volatile organic compounds (VOCs) in groundwater, soil, and sediment.

Based on the findings of environmental studies conducted between 1965 and 1985, EPA proposed the Site on the National Priorities List (NPL) in June 1988, and subsequently placed it on the NPL in February 1990. In September 1989, EPA entered into a Consent Order requiring NMPC to conduct an RI/FS to determine the nature and extent of contamination at the Site and to evaluate cleanup alternatives.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI report, FS report, and the Proposed Plan for the Site were released to the public for comment on June 19, 1995. These documents were made available to the public in the administrative record file at the EPA Docket Room in Region II, New York and the information repository at the Saratoga Springs Public Library, Saratoga Springs, New York. The notice of availability for the above-referenced documents was published in the Daily Gazette and the Saratogian newspapers on June 19, 1995. A press release announcing the same was issued by EPA on June 8, 1995. The public comment period on these documents was held from June 19, 1995 to July 20, 1995.

On June 22, 1995, EPA conducted a public meeting at the Saratoga Springs City Center, 522 Broadway, Saratoga Springs, New York to inform local officials and interested citizens about the Superfund process, to explain current and planned remedial activities at the Site, and to respond to any questions from area residents and other attendees.

Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

EPA awarded a Technical Assistance Grant (TAG) to the Saratoga Springs Hazardous Waste Coalition, a local environmental group formed in 1990. Under the TAG program, EPA provides grants to citizen groups to obtain assistance in interpreting information related to cleanups at Superfund sites. These grants are used by citizen groups to hire technical advisors to help them understand site-related technical information during site response activities. Members of the Saratoga Springs Hazardous Waste Coalition and their consultants have reviewed the RI/FS and provided comments to EPA.

SCOPE AND ROLE OF RESPONSE ACTION

This ROD addresses the entire NMPC Site and identifies the selected remedy for source areas, contaminated soil, and ground water on the NMPC property; contaminated soil and ground water in the vicinity of the municipal skating rink; contaminated sediments on the NMPC property and in the Spring Run wetland; and elimination of the transport of contaminants to off-site locations via an underground sewer line that traverses the NMPC property.

This is a final remedy which addresses the principal threats posed by the Site and allows for continued industrial use of the NMPC property in the future.

SUMMARY OF SITE INVESTIGATION AND CHARACTERISTICS

Under EPA oversight, NMPC conducted a series of environmental investigations at the Site, collectively referred to as the RI, from 1990 to 1992. The environmental media investigated included surface soils (0 to 2 feet below ground surface), subsurface soils (2 to approximately 20 feet below ground surface), surface water, sewers, sediments, ground water, public and private wells, and air.

Stage IA and IB Cultural Resources Surveys and a Stage II Archeological Data Recovery and Mitigation were performed at the NMPC property as part of the investigation. A review of historic site surveys identified two historic structures, the Round House and a two-story brick storage building. Since the remedial action requires the demolition of the Round House, which will have an adverse effect on this historic artifact, additional documentation regarding the Round House will be required during the remedial design phase to comply with the National Historic Preservation Act and the New York State Historic Preservation Act.

Site Geology and Hydrogeology

The NMPC Site is located within the Village Brook-Spring Run Valley, which is a fairly broad valley trending east-west. The Site is east of the City of Saratoga Springs. The majority of the NMPC Site is relatively level with an average elevation of 270 feet above mean sea level (MSL). The Site is bounded to the north and west by escarpments related to the Saratoga Fault and by surficial construction fill with elevations ranging from 280 to 310 feet above MSL across this area. It is bounded to the east by the steeply-sloped Village Brook-Loughberry Creek Valley wall with elevations from 270 to 300 feet above MSL. The Site is bounded to the south by the southern wall of the Village Brook-Spring Run stream valley which rises to an elevation of 300 feet above MSL.

The surficial geology beneath the NMPC property consists of, in descending order, fill, upper fluvial deposits, peat, lower fluvial deposits, glaciolacustrine clay, and till.

The fill material, which includes fine to medium-grained sand with clay, rock fragment, and construction debris, ranges in thickness from approximately 2 to 22 feet.

The upper fluvial unit is characterized by sediments associated with Village Brook-Spring Run deposition. This unit consists of fine to coarse-grained, poorly sorted sand with silt, clay, and minor organic matter, with a thickness up to 9 feet.

The peat unit is a transitional unit between the upper and lower fluvial units. It is characterized by the presence of highly organic, woody material interbedded with sand lenses. This unit, with thickness up to 6 feet, was found primarily in conjunction with the lower fluvial unit.

The lower fluvial unit is characterized by sorted, medium to coarse-grained sediments associated with postglacial stream deposition. The thickness of this unit ranges up to 11 feet. Because of the well-sorted and coarse nature of this unit, it acts as the primary shallow unconfined aquifer.

The fluvial units described above are underlain by an areally extensive clay associated with glaciolacustrine deposition. The clay unit was identified in every soil boring located on and adjacent to NMPC property, as well as in all off-site exploratory borings. This clay unit was encountered at depths of around 20 feet, except where a significant rise in the clay elevation was noted south of the NMPC property boundary. This rise appears to be controlling both ground water flow direction and contaminant migration. The clay thickness throughout the NMPC property ranges from 27 to 53 feet. The clay unit is underlain by an extensive till unit, with thickness ranging from 35 to 79 feet. The till unit consists of a poorly sorted mix of boulders, cobbles, gravel, sand, silt, and clay; and is generally dry. Bedrock was encountered at a minimum depth of 86 feet and a maximum depth of 135 feet.

A shallow aquifer (ranging from 3 to 20 feet below ground surface) and a deep confined aquifer (bedrock aquifer) were identified during the investigation. The shallow aquifer is within the fill, upper fluvial, peat, and lower fluvial units of the surficial geological materials described above. The shallow and deep aquifers are separated by the clay and till layers. The shallow ground water generally flows from north-to-south, however its gradient is affected by the presence of the storm sewer in combination with the rise of the confining clay layer across Excelsior Avenue from the NMPC property. Ground water is diverted around the clay mound prior to heading south near the 84-inch twin box culvert. Flow measurements in the underground 36-inch brick sewer that crosses the NMPC property indicate that this sewer may have significant hydrologic influence on shallow ground water flow. Therefore, the predominant flow direction of ground water exiting the NMPC property boundary is to the southeast.

Nature and Extent of Contamination

The major conclusions of the RI for the Site are summarized below:

The results of the study indicate that subsurface tar contamination is directly beneath most of the NMPC property, typically at a depth of 15 to 20 feet below ground surface. Dense nonaqueous phase liquid (DNAPL) was identified in several locations (primarily in and around the gas holders) on the NMPC property in the form of concentrated tar-saturated soil. DNAPLs are heavier than water, and have a tendency to sink. A clay confining layer present at approximately 20 feet below ground surface acts as a barrier and prevents further vertical migration of the tar contamination. Coal tar contaminants typically include polynuclear aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs). PAH compounds, which are the principal components of coal tar, are extremely immobile and tend to attach to the aquifer soil particles rather than move with the ground water. The PAHs and VOCs detected in the soil during the investigation are presented in Table 1. The PAHs include anthracene, acenaphthene, acenaphthylene, chrysene, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, fluorene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, naphthalene, phenanthrene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and pyrene. The VOCs include benzene, toluene, ethylbenzene, and xylene, which are collectively known as BTEX. Based on soil analytical data and visual characterization of soil boring and test pit materials, approximately 170,000 cubic yards of soil impacted with tar and PAHs are present on the NMPC property.

The highest levels of soil contamination or areas of concentrated coal tar have been found at the following locations (see Figure 2): inside and around Holder #1 (up to 12,780 ppm total PAHs); Holder #2 (up to 1,706 ppm total PAHs); Holder #5 (up to 1,076 ppm total PAHs); tar/water separator and area south of it (up to 1,974 ppm total PAHs); the SB-7 (up to 33,060 ppm total PAHs) and TP-2 (up to 1,910 ppm total PAHs) areas in the northwest corner of the property; and the SB-13 (up to 4,420 ppm total PAHs) and TP-18 (up to 6,379 ppm total PAHs) areas in the southeast corner of the property. The total estimated volume of the highly contaminated areas (containing PAH concentrations in excess of 1,000 ppm) listed above is 20,455 cubic yards. The highest concentration of tar was observed in soil boring SB06, located in the immediate vicinity of former Holder No. 1, where over 20 feet of the subsurface exhibited evidence of tar. The highest concentration was found at soil boring SB-7 (at 33,060 ppm total PAHs), at the former location of the gas plant. At this location, the following PAHs were found: anthracene at 1,600 ppm, acenaphthene at 640 ppm, acenaphthylene at 3,300 ppm, benzo(a)anthracene at 920 ppm, chrysene at 910 ppm, benzo(a)pyrene at 570 ppm, dibenzofuran at 240 ppm, benzo(b)fluoranthene at 320 ppm, benzo(k)fluoranthene at 160 ppm, fluorene at 1,900 ppm, fluoranthene at 1,600 ppm, pyrene at 3,500 ppm, naphthalene at 6,600 ppm, phenanthrene at 6,200 ppm, and 2-methylnaphthalene at 4,600 ppm.

PAHs also were found in surface soils covering much of the NMPC property ranging from 5.45 to 433 ppm total PAHs. See Table 1 for the PAH constituents and concentrations detected in surface soils.

Analysis of samples taken from several NMPC property monitoring wells revealed levels of VOCs and PAHs which exceeded the Maximum Contaminant Levels (MCLs) promulgated pursuant to the Safe Drinking Water Act (SDWA) and the levels promulgated by the New York State Drinking Water Standards. Table 2 summarizes the results. Significant contamination was detected in samples taken from monitoring wells SB62, MW02, and MW03. Total VOCs of 5,600 parts per billion (ppb) and total PAHs at 9,200 ppb were detected at well MW02, located at the southwest corner of the NMPC property. Ground water sampling from monitoring well MW-03 detected VOCs at 7,600 ppb and PAHs at 6,100 ppb. Samples taken from SB62, located also at the southwest corner of the property, contained 26,900 ppb VOCs and 7,786 ppb total PAHs. These levels exceed MCLs and the New York State drinking water standards. For example, benzene was detected at concentrations as high as 14,000 ppb in the shallow aquifer under the NMPC facility. By comparison, the drinking water standard for benzene is 5 ppb. Similarly, 3,500 ppb of ethylbenzene was detected, as compared to the drinking water standard of 5 ppb; 5,700 ppb of toluene was detected, as compared to the drinking water standard of 5 ppb; 3,700 ppb of xylene was detected, as compared to the drinking water standard of 5 ppb; and 6,400 ppb of naphthalene was detected, as compared to the drinking water standard of 50 ppb. No contamination has been detected in the bedrock aquifer. An extensive clay layer underlies the NMPC property, which prevents the travel of contaminants downward to the bedrock aquifer.

Ground water sampling from off-site wells located south of the NMPC property directly across Excelsior Avenue (SB-3, and SB-4) detected no contamination. However, monitoring well SB-2, which is also located south of the NMPC property, detected benzene at 91 ppb. Ground water samples collected from two off-site wells (SB-10 and SB-11) located across East Avenue to the east of the NMPC facility did not contain PAHs. However, benzene and toluene were detected in SB-11 at 38 ppb and 1 ppb, respectively. VOCs were not detected in monitoring well SB-10. Metals analysis were also conducted and the results are summarized in Table 2.

Analysis of subsurface soil and ground water samples collected in the vicinity of the municipal skating rink, located southeast of the NMPC property, has revealed the presence of subsurface tar contamination. Table 3 summarizes the test results. This subsurface contamination appears to be the result of tar migration along the subsurface conduits, the 36-inch brick sewer and the historic Village Brook. However, the Village Brook culvert is not believed to be a significant potential transport route of contaminants. Ground water contamination was identified adjacent to verified zones of tar-contaminated soils. Most notably, analytical results from soil boring SB01, located immediately west of the public skating rink, detected 7,348 ppm of total PAHs in soil. Ground water analytical results from the monitoring well located at SB01 detected 246 ppb total PAHs. Two types of PAHs were detected at this monitoring well which exceeded drinking water standards; 79 ppb of acenaphthene was detected, as compared to the drinking water standard of 20 ppb, and 71 ppb phenanthrene was detected, as compared to the drinking water standard of 50 ppb. VOCs were detected below drinking water standards at this monitoring well.

Samples were collected from Village Brook, Spring Run, and the brick sewer. Analysis of these samples suggest that NMPC contaminants have infiltrated the brick sewer, which transported the contaminated ground water from the NMPC property to downstream areas. NMPC contaminants have been found in the Spring Run sediments as far as the outfall of the brick sewer (near Interstate 87) and in soils in the associated wetlands (see Table 4). The highest levels were found at three locations in Spring Run, as follows: near a break in the brick sewer, in the vicinity of the confluence of Loughberry Creek and Village Brook, at levels ranging from 516 to 707 ppm total PAHs; near the outfall of the twin box culvert, at levels ranging from 35 to 71 ppm total PAHs; and near the outfall of the 36-inch brick sewer, at levels ranging from 4.7 to 70 ppm total PAHs.

Sediment samples on the NMPC property were collected and analyzed at four locations. Contaminated sediments were found in a catch basin where Village Brook originates along the western fence line; in two small areas in the southeast corner; at the northern fence line directly behind the office building; and in the swale along the northern fence line in the northeast corner of the NMPC facility. The samples from these four locations revealed total PAHs ranging from 31 to 364 ppm.

In addition, background sediment samples collected in Loughberry Creek and in the 84-inch twin box culvert indicate the presence of other PAH sources to Spring Run sediments. Results of background sediment samples range from 8.5 to 22 ppm total PAHs.

Analytical results from local area private and public water supply wells (Old Red Spring and High Rock Springs) indicate that Site contamination has not impacted these water wells. No Site-related contaminants were detected above permissible limits in air samples collected during the RI.

SUMMARY OF SITE RISKS

EPA conducted a baseline risk assessment to evaluate the potential risks to human health and the environment associated with the Site in its current condition. The Risk Assessment focused on contaminants in the soil, sediments, air and ground water at the Site, and surface water and sediment contamination in nearby wetlands, which are likely to pose significant risks to human health and the environment. A summary of the contaminants of concern in sampled matrices is provided in Table 5-1 for human health and the environmental receptors.

EPA's baseline risk assessment addressed the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to contaminant releases at the Site under current and future land-use conditions. EPA was concerned that industrial workers and excavators at the NMPC property could be exposed to contaminants in the soils and evaluated these potential exposures in the risk assessment. In addition, adolescents using the wetlands area for recreation could be exposed to contaminants, now and in the future. EPA was also concerned about potential future health risks to adults and children if the Site was ever developed for residential use. Therefore, the baseline risk assessment considered the potential health effects for workers (industrial workers and excavators) that could result from dermal contact or incidental ingestion of contaminated soils and sediments, and inhalation of volatile chemicals from soil vapors. For the residential use scenario, the baseline risk assessment considered potential health effects that could result if future on-site residents (adults and children) came into contact with contaminated soil; accidentally ingested contaminated soil; or drank or showered with ground water from the shallow on-site aquifer.

A total of ten (10) exposure pathways were evaluated under possible on-site current and future land-use conditions. The exposure pathways considered under current and future uses are listed in Table 5-2. The reasonable maximum exposure was evaluated.

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and non-carcinogenic health effects due to exposure to Site chemicals are considered separately. It was assumed that the toxic effects of the Site-related chemicals would be additive. Thus, carcinogenic and non-carcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and non-carcinogens, respectively.

Non-carcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams/kilogram-day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The reference doses for the compounds of concern at the Site are presented in Table 5-3 (see columns identified as chronic). A summary of the non-carcinogenic risks associated with these chemicals across various exposure pathways, for different populations (i.e., workers, residents) is found in Table 5-4.

The hazard index exceeding the threshold of 1, which reflects non-carcinogenic effects, was estimated to be 60 for ingestion of contaminated ground water from the shallow aquifer and 2 for ingestion of on-site contaminated soils by children, both of which exceed the hazard index of 1 (see from Table 5-4). The non-carcinogenic risk for ground water ingestion was attributable primarily to naphthalene and antimony, while the non-carcinogenic risk for ingestion of soil by children was attributable primarily to antimony, iron and arsenic.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor (an Inter-agency workgroup of scientists with expertise in carcinogens) for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Table 5-3 (see columns identified as carcinogenic).

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks in the range of 10^{-4} to 10^{-6} to be acceptable. This level indicates that an individual has not greater than a one in ten thousand to one in a million chance of developing cancer as a result of Site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site (i.e., ingestion of 2 liters of water per day for 350 days per year over 30 years in residence at the Site). Under the current Site conditions, the risks to human health are within EPA's acceptable risk range. Evaluation of risks to on-site employees and excavation workers, as well as children playing in the wetland areas, are within EPA's acceptable range. However, surface soils and ingestion of shallow ground water would pose unacceptable risks to human health if the Site was developed for residential use in the future without remediation (see Table 5-5). In addition, if the Site is not remediated the contaminated ground water on the NMPC property and the skating rink area would continue to migrate and impact off-site ground water. Potential consumption of on-site ground water (from shallow wells) without remediation by a future resident would result in an incremental cancer risk exceeding 1 x 10^{-3}; that is, EPA would expect that among 1,000 people drinking 2 liters (about 8 glasses) of water per day over a 30-year residence period, averaged over the lifetime of 70 years, one person in the population may develop cancer caused by contaminants in the ground water.

The carcinogenic risk for incidental ingestion of soil by future residents (including children) exceeds 1 x 10^{-4} (see Table 5-5); that is, one additional resident in a population of 10,000 exposed to soil daily over a residence time of 30 years, averaged over a lifetime, would be at risk of developing cancer over the lifetime if the Site is not remediated, and later developed for residential use.

The cumulative upper-bound cancer risk for current employees at the Site is 7 x 10^{-5}, including indoor air risk; 9 x 10^{-5} for current workers, including outdoor inhalation risk; and 2 x 10^{-3} for the future resident at the Site. Hence, the risks for carcinogens at the Site for the workers are at the high end of the acceptable risk range of 10^{-4} to 10^{-6}, and risks to future residents are above the risk range at 2 x 10^{-3} (see Table 5-6). The estimated total risks for the future residents are primarily due to benzene and arsenic, which contributed approximately 97 percent and 3 percent, respectively to the carcinogenic risk calculations. The calculations were based on the contaminants detected in on-site monitoring wells, and not the residential wells. It was assumed that in the future, the ground water would be used for residential purposes (i.e., ingestion of ground water and showering). These estimates were developed by taking into account various conservative assumptions about the likelihood of a person being exposed to these media. However, current and future users of public/private wells could be at risk if Site ground water contaminants were to migrate off site.

Ecological Risk Assessment

An ecological assessment was conducted to study the effect of Site Contamination on the Spring Run system and surrounding wetlands. A four-step process is utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario: Problem Formulation -- a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. Exposure Assessment -- a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. Ecological Effects Assessment -- literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors. Risk Characterization -- measurement or estimation of both current and future adverse effects.

Available criteria and guidelines were reviewed for use as benchmark values for evaluating chemical toxicity to Site-specific organisms and habitats. NYSDEC Water Quality Regulations for surface waters, EPA Ambient Water Quality Criteria (AWQC), Ontario Ministry of the Environment (MOE), NYSDEC, and National Oceanic and Atmospheric Administration (NOAA) sediment guidelines were used for comparison to Site surface water and sediment contaminant concentrations.

Potential ecological risks were evaluated for toxic effects to biota by using a hazard index. The hazard index is the ratio of the chemical concentration in a particular medium, to the benchmark concentration for that chemical in that medium. Benchmark concentrations, based on the ecological screening guidance previously discussed, were determined to evaluate both acute and chronic effects. A benchmark concentration is assumed to pose minimal risk; therefore, a hazard index less than 1 indicates that there is a low probability of adverse ecological effects from site contamination. A hazard index greater than one signifies that an effect threshold has been exceeded (i.e., receptor exposure to contamination exceeds known benchmarks) and there is potential risk to the ecological receptor.

The results of the ecological risk assessment indicate that contaminated surface water and sediment may pose a risk to aquatic plants, invertebrates, and vertebrates inhabiting portions of the Spring Run system. Potentially hazardous contaminants to aquatic organisms were assessed by comparing mean and maximum concentrations with AWQC or other appropriate toxicity effect levels. The calculated mean and maximum total acute hazard indices for surface water are 6 and 11, respectively. The estimated high acute hazard indices are primarily due to pyrene, which contributed 67% to the mean and 36% to the maximum risk calculations. Pyrene was detected in two of six surface water samples. The risk to aquatic organisms inhabiting sediment was assessed by comparing mean and maximum sediment concentrations with MOE levels. Total mean and maximum hazard indices based on severe effect level sediment guidelines are 6 and 60, respectively. PAHs comprise 72 percent of the total risk.

The U.S. Fish and Wildlife Service and the NYSDEC did not identify any impacts to Federal and State listed or proposed endangered, threatened, or special concern wildlife species, rare plant, animal, or natural community occurrences or other significant habitats.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals and the availability of toxicity data for all chemicals of concern. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to underestimate actual risks related to the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment Report.

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in the ROD, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as ARARs and risk-based levels established in the risk assessment.

The following remedial action objectives were established:

1) minimize the potential for migration of contaminants from source areas into soils or ground water;

2) minimize or eliminate the potential future migration of contaminated ground water, prevent the potential ingestion of contaminated ground water by future residents or workers, and improve ground water quality;

3) minimize or eliminate the potential for Site contaminants to be transported through the brick sewer; and

4) minimize the potential risk to ecological receptors posed by NMPC-impacted sediments.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified.

This ROD evaluates in detail four remedial alternatives (Alternatives 1, 7, 8, and 9) for addressing the contamination associated with the Site. The other alternatives developed in the FS were eliminated in the alternatives screening process because of limited effectiveness or difficult implementability. The time to implement a remedial alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate with the responsible parties, or procure contracts for design and construction, or conduct operation and maintenance at the Site.

The remedial alternatives are:

Alternative 1 - No Action

Capital Cost:	$0
O & M Present Worth Cost:	$0
Present Worth Cost:	$0
Construction Time:	None

The Superfund program requires that a "no action" alternative be considered as a baseline for comparison of other alternatives. No action would be taken to address Site contamination. In accordance with Section 121 of CERCLA, the Site would be reviewed at least once every five years to assure that the remedial action is protective of human health and the environment.

Alternatives 7 through 9

Alternatives 7 through 9 consist of a combination of actions to address the various contaminated media at the Site (i.e., source areas, surface soil, subsurface soil, surface water, sediments, and ground water). A number of the actions which are common to all three alternatives, including variations for specific alternatives, are described below. Construction of an on-site water treatment system would be required for pretreatment of contaminated ground water and surface water prior to discharge to the local wastewater treatment plant operated by the Saratoga Sewer District. Conceptually, the treatment process for the contaminated water includes DNAPL/water separation, metals removal by precipitation, and biological treatment.

•<u>**Source and Surface Soil Removal**</u>

The purpose of this action is to remove source materials having total PAH concentrations in excess of 1,000 ppm, that are accessible and are significant in terms of volume, concentration, and the potential for continued, long-term subsurface impacts; and to remove surface soils (approximately 3,500 cubic yards) from 0 to 2 feet below ground surface. The source areas include Holder Nos. 1, 2, 3, and 5, and several other areas around the NMPC Property. During the remedial design phase, additional subsurface sampling would be conducted on the NMPC property, including Holder No. 4 where concentrated tar contamination was visually observed, to determine if additional PAH source areas are present, thereby requiring removal. This soil removal requires the demolition of surface structures in and around the source areas, including the Round House structure over Holder No. 2 and the gas regulator station over Holder No. 1. Approximately 16,700 cubic yards of source material would be removed under Alternatives 7 and 8. Alternative 9 would involve less extensive source removal via excavation because subsurface flushing would be used to remediate source areas that are not associated with former gas holder structures. Therefore, approximately 12,000 cubic yards of source material would be excavated under Alternative 9.

Excavation of contaminated soil, DNAPL, and associated source material within and around the Holder No. 3, also known as the tar/water separator would be implemented. The Holder structure will remain in place and be filled with a suitable backfill material.

Excavated material that exhibits a hazardous characteristic would be rendered non-hazardous by blending it with coal fines or other suitable material on NMPC property prior to transport off-site for co-burning in a utility boiler, and/or treatment and disposal at an off-site permitted hazardous waste facility. Most of the non-hazardous material encountered during excavation activities would be disposed of at an off-site solid waste management facility, and some would be managed in an off-site cold batch asphalt plant to produce asphalt paving for the NMPC property. Recovered DNAPL and coal tar would be managed off site at a tar processing facility. If these materials exhibit a hazardous characteristic, they would be managed as hazardous waste as described above.

As set forth in the <u>Institutional Controls and Monitoring Section</u> below, EPA would require deed restrictions on the NMPC property to prevent future residential use of the property, and notifications to other utility companies to limit exposure to the subsurface contaminants that remain on the NMPC property.

•Soil Removal from the Skating Rink Area

The purpose of this action is to remove subsurface soils that exceed cleanup levels in the vicinity of the municipal skating rink. The long-term impact of this subsurface soil contamination potentially could contaminate the skating rink ground water, and this contaminated ground water could potentially migrate off-site. Such contaminant migration could have adverse impacts on downgradient ground water users. Therefore, in order to prevent migration of contaminated ground water beyond the skating rink area, and to restore the ground water by the skating rink area to drinking water standards, all sources of contamination that are contributing to ground water contamination in the vicinity of the skating rink would need to be eliminated.

The skating rink area subsurface contaminated soils would be excavated, and confirmation sampling would be conducted to assure attainment of cleanup levels. Approximately 4,200 cubic yards of contaminated subsurface soil would be excavated. The excavated material would be managed as described in Source and Surface Soil Removal action.

The remedial design phase will include further subsurface soil investigation in the skating rink area to determine whether additional soils are contaminated. This soil investigation will be performed outside the boundaries of the skating rink structure. Soil sampling beneath the skating rink structure is not feasible while the building is intact. Such soil sampling will be conducted when the soils become accessible. The soils will become accessible if and when the skating rink is both taken out of service and demolished. If sampling identifies contaminated soil at concentrations above the soil cleanup levels, the affected soil will be removed, and additional sampling would be conducted to assure that the removal achieved cleanup levels.

If contaminated soils are currently present beneath the skating rink, they are inaccessible, and any contact with such soils is unlikely. Moreover, the structure serves as a cover that prevents infiltration of precipitation through such soils. Therefore if present, such soils do not pose a risk to human health and the environment.

After the contaminated soil is removed around the skating rink area, and the barriers are erected on the NMPC property, the sources of contamination impacting on the skating rink area would be eliminated. Because the sources of contamination would be eliminated, it is expected that the level of contaminants in the ground water in the vicinity of the skating rink would decline over time, and achieve compliance with the Federal and New York State

Drinking Water Standards and New York State Ground Water Quality Standards through natural attenuation.

The remedy requires monitoring of the ground water to measure improvement in the ground water quality. If improvement in ground water quality is not observed upon review of the annual ground water monitoring results, a program to evaluate contingency alternatives for ground water remediation in the skating rink area would be initiated and implemented in a timely manner.

As set forth in the Institutional Controls and Monitoring Section below, EPA would recommend the imposition of a notice on the property records pertaining to this property concerning potential contamination underneath the skating rink. Such notice could be removed after the contamination is removed.

•Remediation of the Sewer Migration Pathway

The purpose of this action is to eliminate the impacts to the wetlands surface water from the migration of NMPC property contaminants through the brick sewer. Stormwater flow through the brick sewer and Village Brook upstream of the NMPC property would be diverted to the twin box culvert storm sewer. At the southeast corner of the NMPC property a brick sewer cutoff and a water/DNAPL collection sump would be constructed. The brick sewer, from the collection sump to the outfall of the brick sewer near Interstate 87, would be cleaned. The walls of the brick sewer, from the collection sump to the concrete box culvert outfall, would be sealed to prevent infiltration of impacted ground water into the sewer. The recovered DNAPL and coal tar would be managed off site as described above.

•Sediment Removal

The sediment removal action involves the dredging and/or excavation of approximately 1,200 cubic yards of impacted sediments and wetlands soils at the confluence of Loughberry Creek and Village Brook, near the outfall of the concrete box culvert, near the outfall of the brick sewer, and at four locations on the NMPC property. Confirmation sampling to assure attainment of cleanup levels would be conducted. Contaminated sediments and soils would be transported off site for treatment and proper disposal. The break in the brick sewer in this area would be repaired, and appropriate actions would be taken to restore the wetlands. Control of releases from the brick sewer described above would stop the potential for continuing impacts to sediments.

•Institutional Controls and Monitoring

Deed restrictions to prevent future residential use of the property and notifications to other utility companies would be required to limit exposure to the subsurface contaminants that remain on the

NMPC property. The implementation of deed restrictions would be the responsibility of NMPC. NMPC has indicated to EPA that it will maintain future ownership of the NMPC property, thereby further restricting the potential for future residential development of the property. EPA would recommend the imposition of a notice in the property records pertaining to the skating rink property to inform interested parties of the potential presence of contamination underneath the skating rink. This notice should remain in the property records until after the skating rink is taken out of service, demolished, and any contaminated soils removed. No deed restrictions would be necessary on the Spring Run wetland because the contaminated sediment and soil would be removed.

A monitoring program would be implemented to assess the effectiveness of the remedial action. Samples for analysis would be obtained from monitoring wells, the Old Red Spring, the diverted flows from the upgradient interceptor trench installed under Alternative 7, and the discharge from the on-site water treatment system as required by the Saratoga County Sewer discharge permit. Because contaminants would remain on NMPC property under each alternative, EPA would review the Site at least once every five years to assure that the remedy selected continues to be protective of human health and the environment. If justified by the review, additional remedial actions may be implemented to remove or treat the wastes.

Alternative 7 - Source Removal and Subsurface Barrier

Capital Cost:	$14,000,000
O & M Present Worth Cost:	$ 1,300,000
Present Worth Cost:	$15,300,000
Construction Time:	2 years

Alternative 7 consists of several remedial actions including: the excavation of source areas and contaminated surface soils on the NMPC property; remediation of the sewer migration pathway; excavation of contaminated soils from the skating rink area; removal of contaminated sediments, and institutional controls and monitoring. In addition this alternative includes installation of subsurface barriers to contain contaminated subsurface soils and ground water on the NMPC property.

The purpose of the installation of subsurface barriers in Alternative 7 is twofold: 1) to contain contaminated ground water on the NMPC property, and 2) to contain and collect DNAPL residing in the vicinity of the subsurface barrier walls. Subsurface barriers would be installed at the southeast and southwest corners of the NMPC property where contaminated ground water and DNAPL can potentially migrate off site. The ground water in the shallow aquifer beneath the NMPC property and the DNAPL residing near the subsurface barriers would be extracted by toe drain and sump systems installed inside the subsurface barriers. The extracted contaminated ground water would be treated on site by a new wastewater treatment facility prior to discharge to the local wastewater treatment plant operated by the Saratoga Sewer District.

Ground water upgradient of the NMPC property (which has not been impacted by the NMPC property contaminants) would be collected using a curtain drain and diverted to either the twin box culvert storm sewer system west of the NMPC property or the culverted Village Brook east of the NMPC property, and the majority of the NMPC property would be capped with asphalt to prevent infiltration of precipitation.

Ground water contamination underneath the skating rink is expected to be reduced over time through natural attenuation because all contaminated soils in the skating rink area would be removed, the shallow aquifer underlying the NMPC property would be nearly eliminated, and the subsurface barriers would prevent migration of the residual ground water contamination from the NMPC property.

Alternative 8 - Source and Extended Soil Removal

Capital Cost:	$47,900,000
O & M Present Worth Cost:	$ 600,000
Present Worth Cost:	$48,500,000
Construction Time:	6 years

Alternative 8 consists of several remedial actions including: the excavation of source areas and contaminated surface soils on the NMPC property; remediation of the sewer migration pathway; excavation of contaminated soils from the skating rink area; removal of contaminated sediments; and institutional controls and monitoring. In addition, Alternative 8 includes more extensive soil removal than is planned in Alternative 7 to address subsurface soil contamination on the NMPC property. The soil cleanup levels established for this alternative are based on a 10^{-6} (1 in one million) excess cancer risk to residential receptors and NYSDEC TAGM HWR-4046, which is a "to be considered" requirement, for the protection of ground water. A large portion of the NMPC property would be excavated to a depth of approximately 20 feet to remove all impacted subsurface soils, excluding the soils which are located directly below the service center and maintenance garage, the storage building, and the fenced area immediately adjacent to the storage building since these structures would not be demolished. Approximately 16,700 cubic yards of source material and 140,000 cubic yards of impacted soil would be excavated as part of this action, followed by confirmation sampling to assure adequate removal. As a result of extended subsurface soil removal, ground water contamination underneath the NMPC property and the skating rink would be reduced over time through natural attenuation because all contaminated soils would be removed.

Alternative 9 - Subsurface Flushing and In Situ Biological Treatment

Capital Cost: $14,600,000
O & M Present Worth Cost $ 3,800,000
Present Worth Cost: $18,400,000
Construction Time: 2 years

Alternative 9 consists of several remedial actions including: the excavation of source areas associated with former gas holder structures and contaminated surface soils on the NMPC property; remediation of the sewer migration pathway; excavation of contaminated soils from the skating rink; removal of contaminated sediments; and institutional controls and monitoring. In addition, Alternative 9 uses physical subsurface flushing to address source areas that are not associated with former gas holder structures, followed by in situ biological treatment of subsurface soils and impacted ground water on the NMPC property.

Alternative 9 includes the construction of a subsurface barrier wall, continuous on the west, south, and east borders of the NMPC property to prevent the flow of contaminated ground water and DNAPL from the NMPC property.

Subsurface flushing would be used to recover DNAPL from the designated source areas by injecting steam or hot water into the subsurface soil to mobilize the DNAPL, which is then removed using ground water extraction wells. An estimated 41,000 gallons of DNAPL would be collected during subsurface flushing over a two-month operating period. Following subsurface flushing, an in situ biological treatment process would be implemented to further reduce subsurface contamination by enhancing the subsurface environment to promote breakdown of contaminants into less toxic compounds by naturally-occurring bacteria. The extracted ground water would be treated on the NMPC property and enriched with nutrients and oxygen before reinjection. In situ biological treatment would continue for a period of approximately ten years. The PAHs that remain in the subsurface following implementation of Alternative 9 would be the heavier PAHs that tend to adsorb onto soil particles and would not readily leach into the ground water. Ground water contamination underneath the skating rink would be reduced over time through natural attenuation because all contaminated soils in the skating rink area would be removed, the shallow aquifer underlying the NMPC property would be nearly eliminated, and the subsurface barriers would prevent migration of the residual ground water contamination from the NMPC property.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR

§300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria must be satisfied by any alternative in order to be eligible for selection:

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with ARARs addresses whether or not a remedy would meet all of the applicable (legally enforceable), or relevant and appropriate (requirements that pertain to situations sufficiently similar to those encountered at a Superfund site such that their use is well suited to the site) requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. Reduction of toxicity, mobility, or volume via treatment refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants at the site.

5. Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital and operation and maintenance costs, and the present-worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. State acceptance indicates whether, based on its review of the RI/FS report and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the preferred alternative.

9. Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community.

A comparative analysis of the remedial alternatives based upon the evaluation criteria noted above follows.

Overall Protection of Human Health and the Environment

The No Action alternative (Alternative 1) is not protective of human health or the environment because the risks to off-site ecological receptors and potential future residents remain unchanged, which is unacceptable. Therefore, the No Action alternative was eliminated from further consideration and will not be discussed further.

All of the other alternatives provide adequate protection of human health and the environment. Alternatives 7, 8 and 9 require the use of institutional controls to prevent future residential use on the NMPC property.

The overall protectiveness of the remedy at the skating rink area to human health and the environment is considered to be equivalent for all three alternatives. The soil removal action included in each of the Alternatives 7, 8 and 9 would protect human health from potential exposure to contaminated soils. Risks to human health from potential exposure to the ground water under the skating rink area would be diminished under Alternatives 7, 8 and 9 by preventing the migration of contaminants into ground water, and eventually the contamination would be eliminated through natural attenuation.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Actions taken at any Superfund site must meet all ARARs of federal and state law or provide grounds for waiving these requirements. All of the alternatives have been designed to comply with the ARARs.

Since the ground water at the skating rink area is a future potential source of drinking water, Federal and New York State Drinking Water Standards and New York State Ground Water Quality Standards are ARARs. These drinking water standards would be achieved over time through natural attenuation. The remedy would require removal of all contaminated soils in the skating rink area; dewatering the soil in areas to be excavated, treatment of this contaminated ground water and discharge to a Publicly Owned Treatment Works (POTW); and containment of residual contaminated soils and ground water on the NMPC property by the subsurface barriers. Upon completion of these actions, all potential sources of ground water contamination in the skating rink area would be eliminated, thus, allowing for natural attenuation of the ground water contamination. For all alternatives, a technical waiver of the above ground water ARARs is invoked by EPA for the NMPC property shallow ground water based on technical impracticability, from an engineering perspective, because of the presence of DNAPL. There are technical limitations to recovering residual DNAPL from the environment.

Sediment removal actions would be conducted in compliance with the Federal Clean Water Act, Federal Executive Order 11990 for the Protection of Wetlands, Federal Fish and Wildlife Coordination Act, New York State Freshwater Wetlands Act, and New York State Water Quality Classification.

Alternatives 7, 8 and 9 would comply with the National Historic Preservation Act and the New York State Historic Preservation Act. Historic and archaeological investigations have already been conducted at the Site and documented in a report. Since source removal actions require the demolition of the Round House, which would have an adverse effect on this historic artifact, additional documentation regarding the Round House would be required during the remedial design phase to comply with ARARs.

The removal and disposition of residuals during implementation of each alternative (except for Alternative 1, No Action) would be done in accordance with federal and New York State solid and hazardous waste regulations. The use of contaminated soil in the cold mix asphalt process would be accomplished in compliance with the Beneficial Use Determination Program of the New York State Solid Waste Management Regulations.

The discharge of water and recovered ground water generated during remediation would be regulated by the Federal Clean Water Act regulations for discharges to a POTW, and the City of Saratoga Sewer Use Ordinance. A sewer discharge permit from the Saratoga County Sewer District may be required for discharge of water to the local wastewater treatment plant under all alternatives (except for Alternative 1, No Action). Permit requirements would be met by treating the water in an on-site water treatment system prior to discharge to the POTW.

During soil and sediment excavation and on-site water treatment, New York State Air Pollution Control Regulations may apply. Air pollution control devices would be included in the design of the on-site water treatment system as appropriate to comply with air regulations. Temporary structures would be used to cover the excavation areas for control of volatile and odor emissions. In addition, ambient air conditions would be monitored during excavation activities to assure acceptable air quality. The ability to meet regulatory requirements for controlling dust, nuisance odors and volatile emissions during the soil excavation would be more difficult to achieve given the volume of soil excavated and handled under Alternative 8 versus Alternatives 7 and 9.

Long-term Effectiveness and Permanence

Alternatives 7, 8 and 9 would provide for the permanent reduction in the migration of the contaminated ground water from the NMPC property into the ground water under the skating rink. Alternatives 7 and 9 use subsurface barriers to contain subsurface contaminated soil and ground water on the NMPC property. In addition, Alternative 7 uses an asphalt cap in combination with upgradient flow diversion and ground water pumping of the shallow aquifer underlying the NMPC property to nearly eliminate the ground water contamination. Alternative 9 uses subsurface flushing and in situ biological treatment to reduce the concentrations of mobile contaminants in the NMPC property subsurface soils and ground water. Alternative 8 removes the majority of the subsurface soil contamination on the NMPC property and would permanently reduce the volume of hazardous constituents remaining at the NMPC property. All three alternatives also remove contaminated subsurface soil from the skating rink area that could contaminate the ground water.

The subsurface barriers under Alternatives 7 and 9 are considered to be reliable over the long-term and easily maintained. The reliability of subsurface flushing and in situ biological treatment under Alternative 9 is considered to be low with respect to this criterion because of the variability of subsurface geologic materials in the shallow ground water aquifer. The efficiency of subsurface flushing and in situ biological treatment would be highly variable with much lower levels of treatment occurring in geological units having lower permeability. In addition, subsurface flushing has not been successfully demonstrated to date at the field scale.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 7 provides significant reduction of contamination on the NMPC property by removing contaminated surface soils, source areas, and any migrating DNAPL. Alternative 9 also provides significant reduction of NMPC property contamination and reduces the mobility of contaminants remaining on the NMPC property using in situ biological treatment. In situ biological treatment biodegrades the lighter PAHs to less toxic compounds, leaving behind primarily the heavier PAHs which tend to adsorb onto soil particles and thus do not readily leach into the ground water. Alternative 8 provides nearly complete removal of PAH constituents from NMPC property soils. Because heavier PAHs would remain adsorbed onto soil particles in source areas after implementation of Alternative 9, Alternative 7 provides greater removal of PAH contaminants in source areas than Alternative 9. All of the alternatives include recycling of impacted soils into asphalt or management through permanent off-site treatment.

Alternatives 7, 8 and 9 provide comparable reduction of ground water contamination in the skating rink area, albeit by different means. By removing the vast majority of the subsurface soil contamination under Alternative 8, the volume of subsurface contaminants available for leaching into the ground water for potential transport beyond the NMPC property boundaries is minimized. Alternatives 7 and 9 use subsurface barrier systems to contain subsurface contamination on the NMPC property, thereby reducing the mobility of contaminants from the NMPC property.

Short-term Effectiveness

Alternatives 7 and 9 are considered to have equivalent short-term effectiveness because they each have relatively few negative impacts to human health and the environment, and the actions that provide the most significant reduction in risk can be implemented within a two year time frame.

Alternative 8 is expected to have significantly greater negative impacts to human health and the environment during implementation and require a significant time period to implement. Approximately six years would be required to excavate and transport the large volume of soils off site. The increased truck traffic associated with the removal of subsurface soils would create some degree of risk to the community.

The sediment removal would impact the quality of the wetland ecosystem. Dredging operations would utilize silt fences and other control techniques to minimize the impact to water quality during dredging operations.

Implementability

Alternative 7 is considered to be readily implementable.

The extended removal of subsurface soils conducted as part of Alternative 8 would require excavation around foundations and below the ground water table. Sheet piling would be required to stabilize foundations during excavation. The excavations would be performed within a temporary structure to minimize releases of volatile emissions, nuisance odors and dust. The extensive excavation of soils under these conditions would lead to more technical delays than normally encountered if extraordinary measures were not necessary.

Although the technologies required to install the subsurface barrier and the injection and recovery wells under Alternative 9 are conventional and readily implementable, the implementation of subsurface flushing and in situ biological treatment is likely to encounter difficulties associated with the variability in permeability of subsurface geologic materials. In addition, subsurface flushing technology has not been successfully proven at the field scale.

Cost

The cost estimates associated with the alternatives are presented above. Alternative 7 is the lowest cost alternative with the present worth of $15.3 million. Alternative 9 (present worth of $18.4 million) has only a slightly higher cost than Alternative 7; however, the costs for Alternative 9 are the most uncertain because the subsurface flushing technology has not been successfully proven at the field scale. Alternative 8 has by far the highest costs with a present worth of $48.5 million. Alternative 8 is approximately three times more costly than the other two alternatives.

State Acceptance

The State of New York concurs with the selected alternative. The letter outlining this concurrence is attached to this ROD as Appendix IV.

Community Acceptance

Community acceptance of the preferred remedy has been assessed in the Responsiveness Summary portion of this ROD following review of all public comments received on the RI/FS report and the Proposed Plan. All comments submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix V). Many of the public's concerns were related to the demolition of the Round House and the removal of all contaminated soils in the vicinity of the skating rink. In general, the public is supportive of EPA's preferred remedy.

SELECTED REMEDY

EPA has determined, after reviewing the alternatives and public comments, that Alternative 7 is the appropriate remedy for the Site, because it best satisfies the requirements of CERCLA and the NCP's nine evaluation criteria for remedial alternatives.

The major components of the selected remedy are as follows:

- **Source and Surface Soil Removal**

The purpose of this action is to remove source materials or areas of concentrated coal tar having total PAH concentrations exceeding 1,000 (ppm), that are accessible and are significant in terms of volume, concentration, and the potential for continued, long-term subsurface impacts; and to remove contaminated surface soils from 0 to 2 feet below ground surface. The source areas include Gas Holder Nos. 1, 2, 3, and 5, and several other areas around the NMPC property. During the remedial design phase, additional subsurface sampling will be conducted on the NMPC property, including Holder No. 4 where concentrated tar contamination was visually observed, to determine if additional PAH source areas are present, thereby requiring removal. This action requires the demolition of surface structures in and around the source areas, including the Round House structure over Holder No. 2 and the gas regulator station over Holder No. 1. Approximately 16,700 cubic yards of source material and 3,500 cubic yards of contaminated surface soils will be removed. These volume estimates do not include Holder No. 4.

Excavation of contaminated soil, DNAPL, and associated source material within and around the Holder No. 3, also known as the tar/water separator will be implemented. The Holder structure will remain in place and be filled with a suitable backfill material.

Excavated material that exhibits a hazardous characteristic will be rendered non-hazardous by blending it with coal fines or other suitable material on site prior to transport off site for co-burning in a utility boiler, and/or treatment and disposal at an off-site permitted hazardous waste facility. All non-hazardous material encountered during excavation activities will be disposed of at an off-site solid waste management facility, and contaminated surface soil will be managed in an off-site cold batch asphalt plant to produce asphalt paving for the NMPC property. Recovered DNAPL and coal tar will be managed off site at a tar processing facility. If these materials exhibit a hazardous characteristic, they will be managed as hazardous waste as described above.

As set forth in the Institutional Controls and Monitoring Section below, deed restrictions on the NMPC property will be required.

- **Installation of Subsurface Barriers and Ground Water Management**

The purpose of the installation of subsurface barrier walls is twofold: 1) to contain contaminated ground water on the NMPC property, and 2) to contain and collect DNAPL residing in the vicinity of the subsurface barrier walls. Subsurface barriers will be installed at the southeast and southwest corners of the NMPC property where contaminated ground water and DNAPL can potentially migrate off site. The ground water in the shallow aquifer beneath the NMPC property and the DNAPL residing in the vicinity of the subsurface barrier walls will be collected by using drains installed inside and along the lengths of the barrier walls. The DNAPL and ground water collected will be transferred through a subsurface pipe into a collection sump, then pumped to the on-site water treatment facility.

Construction of an on-site water treatment facility will be required for pretreatment of contaminated ground water prior to discharge to the local wastewater treatment plant operated by the Saratoga Sewer District. The treatment process for the contaminated water includes DNAPL/water separation, metals removal by precipitation, and biological treatment.

Ground water upgradient of the NMPC property (which has not been impacted by the NMPC property contaminants) will be collected using a curtain drain and diverted to either the twin box culvert storm sewer system west of the NMPC property or the culverted Village Brook east of the NMPC property. The NMPC property will be capped with asphalt to prevent infiltration of precipitation.

- **Soil Removal from the Skating Rink Area**

The purpose of this action is to remove subsurface soils that exceed cleanup levels in the vicinity of the municipal skating rink. The long-term impact of this subsurface soil contamination potentially could contaminate the skating rink ground water, and this contaminated ground water could potentially migrate off-site. Such contaminant migration could have adverse impacts on downgradient ground water users. Therefore, in order to prevent migration of contaminated ground water beyond the skating rink area, and to restore the ground water by the skating rink area to drinking water standards, all sources of contamination that are contributing to ground water contamination in the vicinity of the skating rink would need to be eliminated.

The skating rink area subsurface contaminated soils will be excavated, and confirmation sampling will be conducted to assure attainment of cleanup levels. Approximately 4,200 cubic yards of contaminated subsurface soil will be excavated. The excavated material will be managed as described in Source and Surface Soil Removal Action.

The remedial design phase will include further subsurface soil investigation in the skating rink area to determine whether additional soils are contaminated. This soil investigation will be performed outside the boundaries of the skating rink structure. Soil sampling beneath the skating rink structure is not feasible while the building is intact. Such soil sampling will be conducted when the soils become accessible. The soils will become accessible if and when the skating rink is both taken out of service and demolished. If sampling identifies contaminated soil at concentrations above the soil cleanup levels, the affected soil will be removed, and additional sampling will be conducted to assure that the removal achieved cleanup levels.

If contaminated soils are currently present beneath the skating rink, they are inaccessible, and any contact with such soils is unlikely. Moreover, the structure serves as a cover that prevents infiltration of precipitation through such soils. Therefore if present, such soils do not pose a risk to human health and the environment.

After the contaminated soil is removed around the skating rink area, and the barriers are erected on the NMPC property, the sources of contamination impacting on the skating rink area will be eliminated. Because the sources of contamination will be eliminated, it is expected that the level of contaminants in the ground water in the vicinity of the skating rink will decline over time, and achieve compliance with the Federal and New York State Drinking Water Standards and New York State Ground Water Quality Standards through natural attenuation.

The remedy requires monitoring of the ground water to measure improvement in the ground water quality. If improvement in ground water quality is not observed upon review of the annual ground water monitoring results, a program to evaluate contingency alternatives for ground water remediation in the skating rink area will be initiated and implemented in a timely manner.

As set forth in the Institutional Controls and Monitoring Section below, EPA recommends the imposition of a notice in the property records pertaining to the skating rink property to inform interested parties of the potential presence of contamination underneath the skating rink. This notice should remain in the property records until after the skating rink is taken out of service, demolished, and any contaminated soils removed.

• **Sediment Removal**

The sediment remedial action involves the dredging and/or excavation of approximately 1,200 cubic yards of impacted sediments and wetlands soils at the confluence of Loughberry Creek and Village Brook, near the outfall of the concrete box culvert, near the outfall of the brick sewer, and at four locations on the NMPC property. Confirmation sampling to assure attainment of cleanup levels will be conducted. Contaminated sediments will be transported off site for treatment and proper disposal. Appropriate actions will be taken to restore the wetlands.

- **Remediation of the Sewer Migration Pathway**

The purpose of this action is to eliminate the impacts to the wetland surface water or Spring Run from the migration of NMPC property contaminants through the underground brick sewer.

Stormwater flow through the brick sewer and Village Brook upstream of the NMPC property will be diverted to the twin box culvert storm sewer, so no stormwater will flow through the NMPC property. At the southeast corner of the NMPC property, the brick sewer will be disconnected and a water/DNAPL collection sump will be constructed to prevent any ground water which infiltrated the sewer from leaving the property. The downstream section of the sewer from the southeast corner of the NMPC property to the brick sewer outfall, near Interstate 87, will be cleaned. Infiltration spots along the downstream section of the brick sewer, from the point at which it is disconnected to the concrete box culvert, will be sealed to prevent infiltration of impacted ground water into the sewer. The break in the brick sewer near the confluence of Loughberry Creek and Village Brook will be repaired. The materials generated from cleaning the brick sewer will be disposed of off site properly. Control of releases from the brick sewer described above will stop the potential for continuing impacts to sediments in Spring Run.

- **Institutional Controls and Monitoring**

Because contaminants will remain on the NMPC property after implementation of the remedy, deed restrictions to prevent future residential use of the property and notifications to utility companies will be required to limit exposure to the subsurface contaminants that remain on the NMPC property. The implementation of deed restrictions will be the responsibility of NMPC. NMPC has indicated to EPA that it will maintain future ownership of the NMPC property, thereby further restricting the potential for future residential development of the property. EPA recommends the imposition of a notice in the property records pertaining to the skating rink property to inform interested parties of the potential presence of contamination underneath the skating rink. This notice should remain in the property records until after the skating rink is taken out of service, demolished, and any contaminated soils removed. No deed restrictions are necessary on the Spring Run wetland because the sediment and soil contamination above the cleanup levels will be removed.

A monitoring program will be implemented to assess the effectiveness of the remedial action. Samples for analysis will be obtained from monitoring wells, the Old Red Spring, the diverted flows from the upgradient interceptor trench, and the discharge from the on-site water treatment system as required by the Saratoga County Sewer discharge permit.

Cleanup Goals

EPA has established soil cleanup levels for the skating rink area based on a 10^{-6} (1 in one million) excess cancer risk to residential receptors and NYSDEC TAGM HWR-4046, a "to be considered" requirement, for the protection of ground water. The soil cleanup levels for the skating rink area, which apply to both surface and subsurface soils, are presented in Table 3.

Sediment cleanup levels are based on background concentrations. The cleanup level for the sediments and wetland soils in Spring Run is 22 parts per million (ppm) total PAHs.

Remediation of the NMPC property ground water is considered to be technically impracticable. Therefore, issuance of this ROD waives the federal and state drinking water standards and state ground water quality standards pursuant to Section 121(d)(4)(C) of CERCLA, 42 U.S.C. §9621(d)(4)(C), and §300.430(f)(1)(ii)(C)(3) of the NCP which authorizes EPA to waive applicable or relevant and appropriate requirements for ground water cleanup of the NMPC shallow aquifer based on technical impracticability, from an engineering perspective. EPA's memorandum <u>Guidance for Evaluating the Technical Impracticability of Ground water Remediation</u> (OSWER Directive 9234.2-25, September 1993) recognizes that there are circumstances under which ground water restoration may be technically impracticable. There are technical limitations which make it impracticable to recover all the DNAPL from the property. In order to remove all the DNAPL, approximately 7 acres of contaminated aquifer materials, including soil, silt, peat, and sand, residing above the subsurface clay layer (which begins approximately 20 feet below the surface), would need to be excavated for off-site disposal. In addition, all NMPC's operating facilities would have to be demolished, to gain access to the contamination beneath them. Since it is technically impracticable to excavate this large an area, some DNAPL and PAH impacted soil will remain on the NMPC property. Because the DNAPL and residual PAHs contribute to dissolved phase ground water contamination, restoration of ground water on the NMPC property to ground water cleanup levels has been determined to be technically impracticable. Recognizing that ground water restoration in the shallow aquifer beneath the NMPC property is technically impracticable, the goal of this remedial action is to establish hydraulic control of the NMPC contaminated ground water, specifically to prevent ground water and DNAPL from flowing off site by using physical and hydraulic barriers.

Compliance with Federal and New York State Drinking Water Standards and New York State Ground Water Quality Standards for the ground water underneath the skating rink area will be required following implementation of the selected remedial alternative. These drinking water standards will be achieved over time through natural attenuation. The remedy will require dewatering the soil in areas to be excavated; removal of all contaminated soils; treatment of this contaminated ground water; and prevention of the migration of contaminated ground water from the NMPC property to the skating rink area by the erection of subsurface barriers on the NMPC property. Upon completion of these actions, all potential sources of ground water contamination in the skating rink area will be eliminated, thus, allowing for natural attenuation of the ground water contamination. The remedy will require monitoring of the ground water to measure improvement in the ground water quality. If improvement in ground water quality is not observed upon review of the annual ground water monitoring results, a program to evaluate contingency alternatives for ground water remediation in the skating rink area will be initiated and implemented in a timely manner.

STATUTORY DETERMINATIONS

As previously noted, CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

For the reasons discussed below, EPA has determined that the selected remedy meets the requirements of CERCLA and provides the best balance of trade-offs among alternatives with respect to the evaluation criteria.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. The limited source area removal action will address the most contaminated subsurface zones. Contamination in the NMPC property ground water will be eliminated through effective containment, dewatering, and treatment of this ground water. All potential sources of ground water contamination in the vicinity of the skating rink will be eliminated, thus, allowing for natural attenuation of this ground water contamination. The potential for off site migration of contaminants through the sewer line will be eliminated. The impacted sediments in Spring Run will be removed for off site disposal and treatment using methods to minimize short-term impacts to ecological receptors.

Compliance with ARARs

Action specific ARARs for the selected remedy include the New York State Solid Waste Management Regulations (6 NYCRR Part 360 and 364), the Federal Resource Conservation and Recovery Act and the New York State Hazardous Waste Management Regulations (Identification and Listing of Hazardous Waste - 40 CFR Part 261, Standards for Hazardous Waste Generators - 40 CFR Part 262, Standards for Hazardous Waste Transporters 40 CFR Part 263, Standards for Hazardous Waste Facilities - 40 CFR Parts 264, and Land Disposal Restrictions - 40 CFR Part 268). The use of contaminated soil in the cold mix asphalt process will be accomplished in compliance with the Beneficial Use Determination Program of the New York State Solid Waste Management Regulations. Implementation of institutional controls which will seek to restrict future usage and ground water usage of the NMPC property will be conducted in accordance with the Saratoga Springs Master Plan and the Federal Resource Conservation and Recovery Act (Land Disposal Facility Notice in Deed - 40 CFR §264.116-264.119(b)(1)). Department of Transportation (DOT) Rules for Hazardous Materials Transport (49 CFR Parts 107, 171-177) and Occupational Health and Safety Act (29 U.S.C. §651-678 and 40 CFR §300.38) apply.

The discharge of water and recovered ground water generated during remediation will be regulated by the Federal Clean Water Act regulations for discharges to POTW (40 CFR Part 403), and the City of Saratoga Sewer Use Ordinance. The substantive requirements of a sewer discharge permit from the Saratoga County Sewer District may be required for discharge of water to the local wastewater treatment plant. During soil and sediment excavation and operation of the on-site water treatment facility, the Federal Air Regulations (40 CFR Part 50) and the New York State Air Pollution Control Regulations (6 NYCRR Parts 200, 211, 212, 219, 257 and Air Guide-1) apply.

Location-specific ARARs for the selected remedy include the National Historic Preservation Act and the New York State Historic Preservation Act. Sediment removal actions will be conducted in compliance with the Federal Clean Water Act, the Federal Executive Order 11990 for the Protection of Wetlands, Management Practices (Federal Register/Volume 51, No. 219/Part 330.6), Federal Fish and Wildlife Coordination Act (16 USC 661), New York State Water Quality Classification, and the New York State Freshwater Wetlands Act (6 NYCRR Parts 662-665).

Chemical-specific ARARs for the ground water at the skating rink area include the Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs) (40 CFR Part 141.11-141.16 and Part 141.60-141.63), the New York Public Water Supply Regulations (NYCRR

Title 10, Part 5-1), and New York State Water Classifications and Quality Standards for Class GA Ground Water (NYCRR, Title 6, Parts 701-703). For surface water, Chemical-specific ARARs include the New York State Surface Water Quality Standards (NYCRR, Title 10, Part 5-1 and NYCRR, Title 6, Parts 701-703). The remediation of the NMPC property ground water in the shallow aquifer is considered to be technically impracticable. Therefore, issuance of this ROD waives the federal and state drinking water standards and state ground water quality standards pursuant to Section 121(d)(4)(C) of CERCLA, 42 U.S.C. §9621(d)(4)(C), and §300.430(f)(1)(ii)(C)(3) of the NCP which authorizes EPA to waive applicable or relevant and appropriate requirements for ground water cleanup of the NMPC shallow aquifer based on technical impracticability, from an engineering perspective. There are technical limitations which make it impracticable to recover all the DNAPL from the NMPC property. In order to remove all the DNAPL, approximately 7 acres of contaminated aquifer materials, including soil, silt, peat, and sand, residing above the subsurface clay layer (which begins approximately 20 feet below the surface), would need to be excavated for off-site disposal. In addition, all NMPC's operating facilities would have to be demolished, to gain access to the contamination beneath them. Since it is technically impracticable to excavate this large an area, some DNAPL and PAH impacted soil will remain on the NMPC property. Because the DNAPL and residual PAHs contribute to dissolved phase ground water contamination, restoration of ground water on the NMPC property to ground water cleanup levels has been determined to be technically impracticable.

Recognizing that ground water restoration in the shallow aquifer beneath the NMPC property is technically impracticable, the goal of this action is to establish hydraulic control of the NMPC contaminated ground water, specifically to prevent ground water and DNAPL from flowing off the NMPC property by using physical and hydraulic barriers. This action complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, where possible.

Cost-Effectiveness

The selected remedy is cost-effective because it has been demonstrated to provide overall effectiveness proportional to its costs. The selected remedy is technically and administratively implementable and represents the lowest cost of the alternatives considered. The present worth of the selected alternative is $15,300,000.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy addresses all of the media of concern and utilizes permanent solutions and treatment technologies to the maximum extent practicable. In addition, the selected remedy provides the best balance of trade-offs among the alternatives with respect to the evaluation criteria.

The selected remedy will reduce the toxicity and volume of source areas and highly contaminated soils at the NMPC property by their excavation and off-site treatment and disposal, and the off-site treatment and disposal of sediments with total PAHs greater than 22 ppm. This will significantly reduce the toxicity, mobility and volume of the contaminants at the Site, and offers a permanent solution to the risks posed by these wastes. In addition, the selected remedy will eliminate ground water contamination. Contamination in the NMPC property ground water will be eliminated through effective containment, dewatering, and treatment of this ground water. All potential sources of ground water contamination in the vicinity of the skating rink will be excavated and disposed of off site, allowing for natural attenuation of this ground water contamination. This approach is the most reliable and implementable solution to management and treatment of ground water, given the heterogeneity of the shallow ground water aquifer and the technical impracticability of remediating an aquifer impacted by DNAPL.

Preference for Treatment as a Principal Element

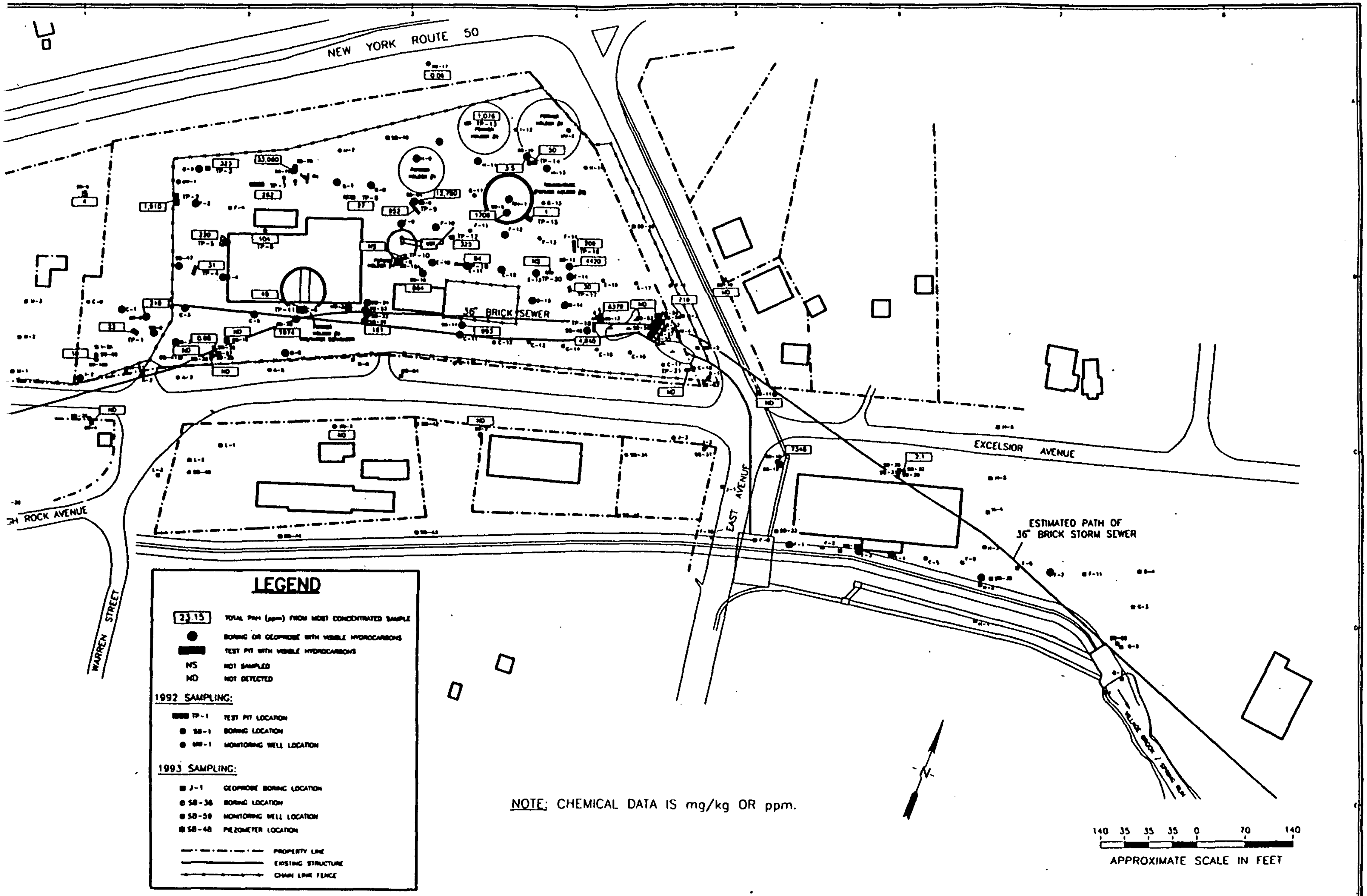
In keeping with the statutory preference for treatment as a principal element of the remedy, the remedy provides for the treatment of all hazardous soils, contaminated ground water and sediments at the Site. By treating the hazardous portion of the contaminated soils, rendering them nonhazardous for co-burning in a utility boiler; and, by excavating contaminated sediments for off-site treatment and disposal, which pose the primary threat at the Site, all exposure pathways will be eliminated. Contaminated ground water will be treated and will also satisfy the preference for treatment as a principal element.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred alternative presented in the Proposed Plan. However, the Proposed Plan did not specify the time frame for removing contaminated soils under the skating rink. The ROD specifies that contaminated soils under the skating rink will be removed when the skating rink is taken out of service and demolished. In addition, EPA's recommendation to impose a notice on the property records pertaining to the property of the skating rink to inform interested parties of the potential presence of contamination, and that such notice should remain in the property records until after the skating rink is taken out of service, demolished, and any contaminated soils removed was not presented in the Proposed Plan.

APPENDIX I

FIGURES



NIAGARA MOHAWK POWER CORPORATION

3-0522-999

FIGURE 2
TOTAL PAH AND VISUAL HYDROCARBONS
IN BORINGS AND TEST PITS
SARATOGA SPRINGS, NEW YORK

RETEC

522-S195 0

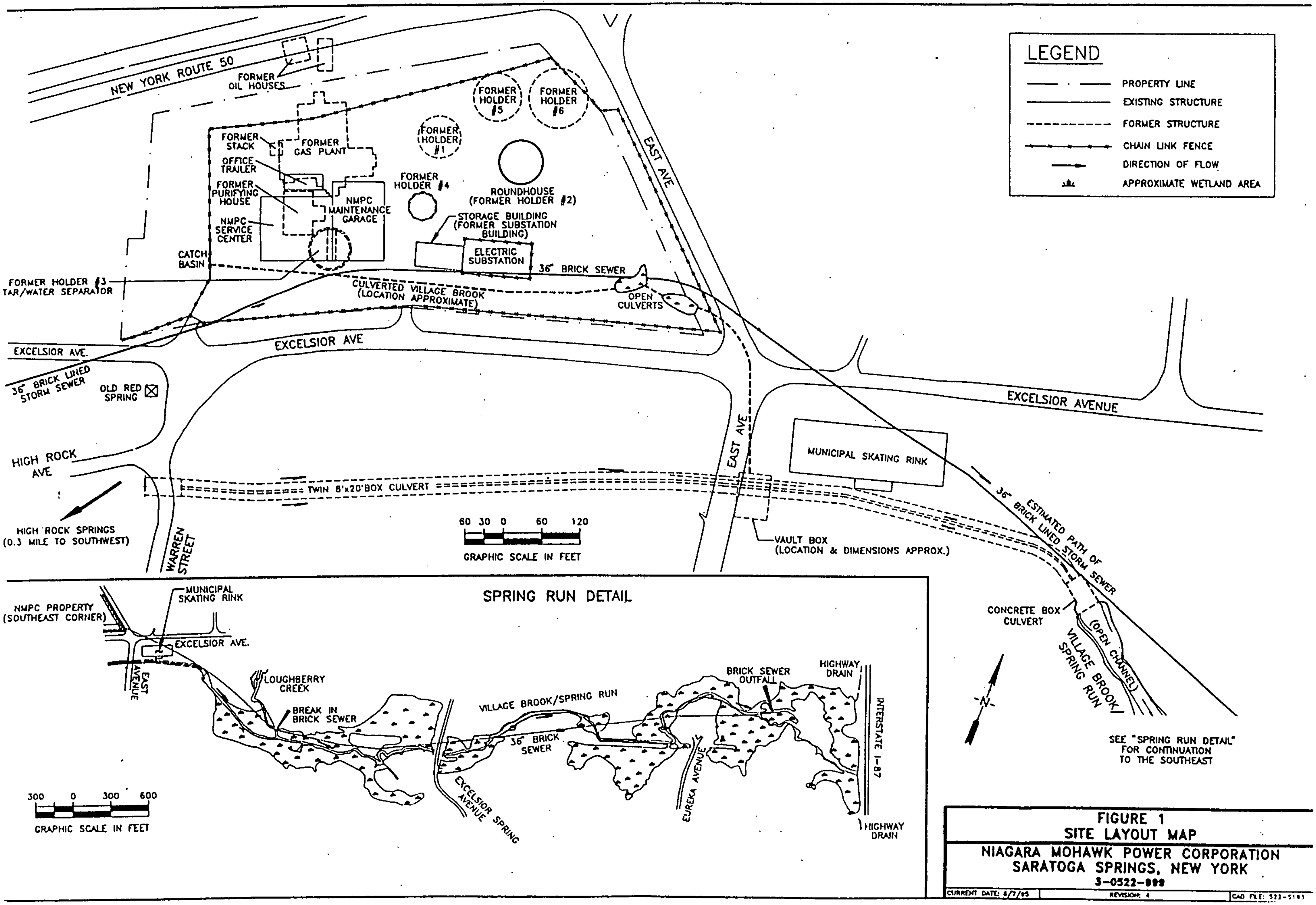
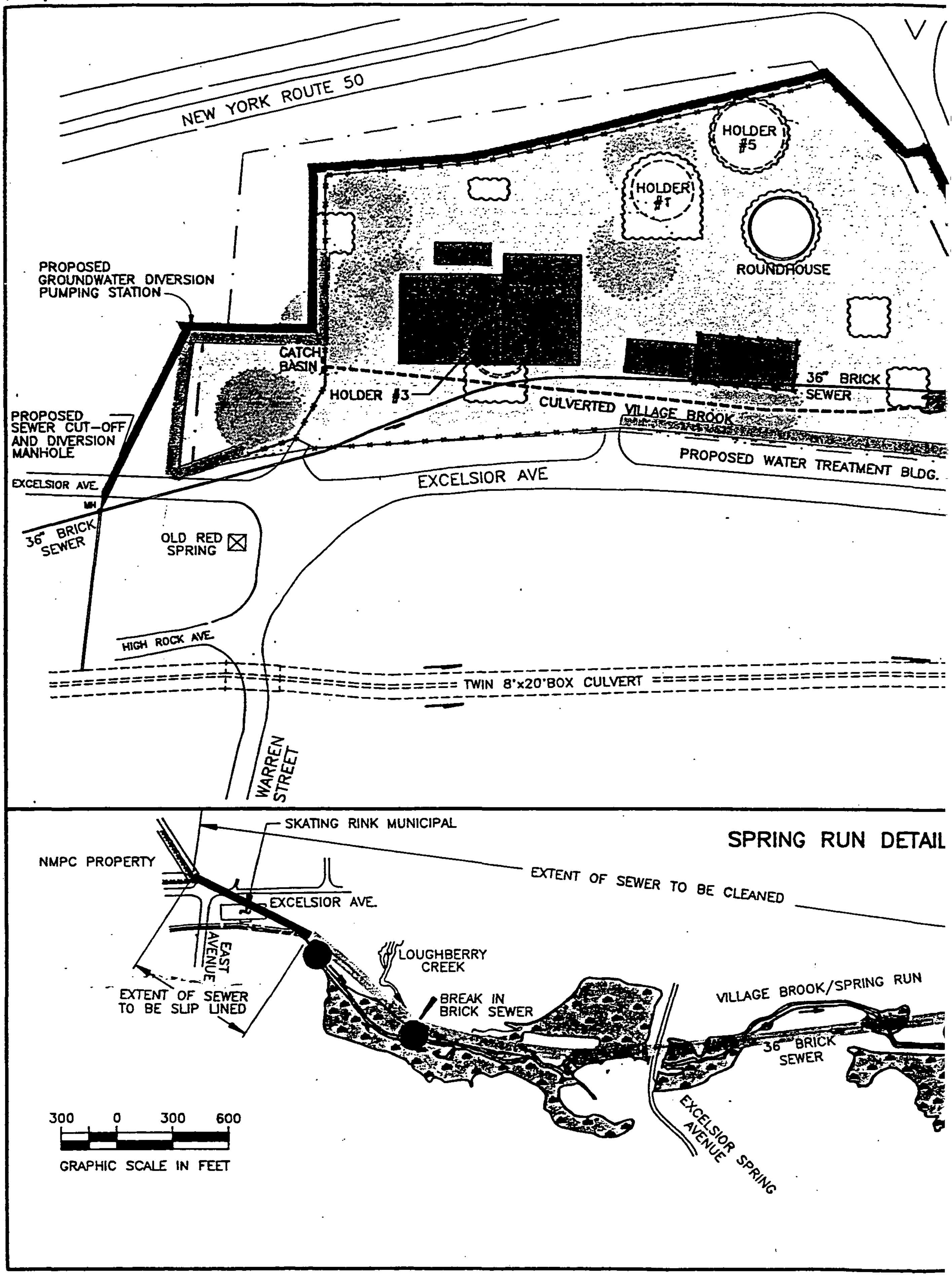
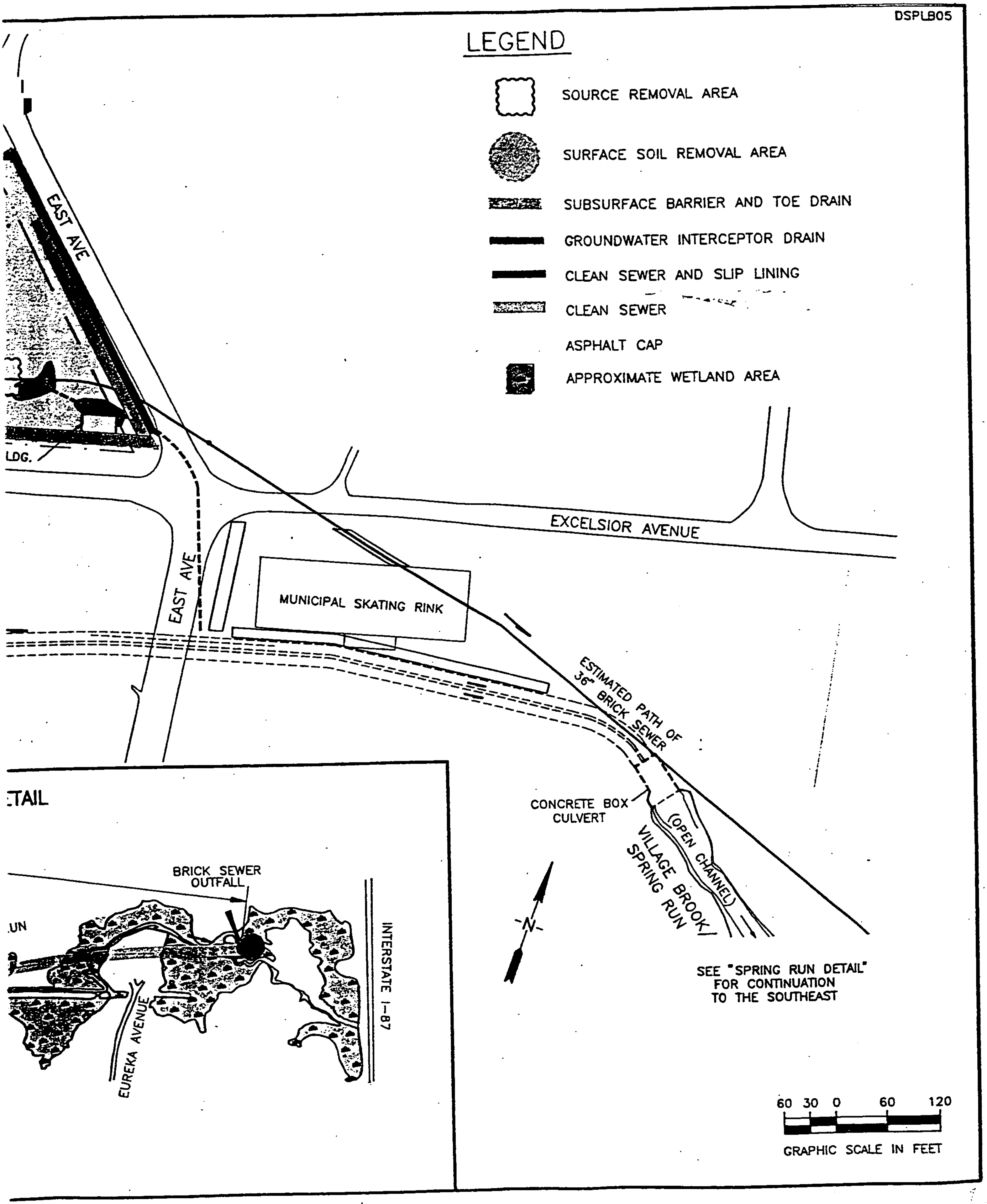


FIGURE 1
SITE LAYOUT MAP

NIAGARA MOHAWK POWER CORPORATION
SARATOGA SPRINGS, NEW YORK
3-0522-999

CURRENT DATE: 6/7/95 | REVISION: 4 | CAD FILE: 522-5191


NEW YORK ROUTE 50
HOLDER #5
HOLDER #1
ROUNDHOUSE
PROPOSED GROUNDWATER DIVERSION PUMPING STATION
CATCH BASIN
HOLDER #3
36" BRICK SEWER
CULVERTED VILLAGE BROOK
PROPOSED SEWER CUT-OFF AND DIVERSION MANHOLE
PROPOSED WATER TREATMENT BLDG.
EXCELSIOR AVE.
MH
EXCELSIOR AVE
36" BRICK SEWER
OLD RED SPRING
HIGH ROCK AVE.
TWIN 8'x20' BOX CULVERT
WARREN STREET
SKATING RINK MUNICIPAL
SPRING RUN DETAIL
NMPC PROPERTY
EXTENT OF SEWER TO BE CLEANED
EXCELSIOR AVE.
EAST AVENUE
LOUGHBERRY CREEK
EXTENT OF SEWER TO BE SLIP LINED
BREAK IN BRICK SEWER
VILLAGE BROOK/SPRING RUN
36" BRICK SEWER
EXCELSIOR SPRING AVENUE
300 0 300 600
GRAPHIC SCALE IN FEET



DSPLB05
LEGEND
SOURCE REMOVAL AREA
SURFACE SOIL REMOVAL AREA
SUBSURFACE BARRIER AND TOE DRAIN
GROUNDWATER INTERCEPTOR DRAIN
CLEAN SEWER AND SLIP LINING
CLEAN SEWER
ASPHALT CAP
APPROXIMATE WETLAND AREA
EAST AVE
LDG.
EXCELSIOR AVENUE
EAST AVE
MUNICIPAL SKATING RINK
ESTIMATED PATH OF 36" BRICK SEWER
CONCRETE BOX CULVERT
(OPEN CHANNEL)
VILLAGE BROOK/ SPRING RUN
N
SEE "SPRING RUN DETAIL" FOR CONTINUATION TO THE SOUTHEAST
TAIL
BRICK SEWER OUTFALL
UN
EUREKA AVENUE
INTERSTATE I-87
60 30 0 60 120
GRAPHIC SCALE IN FEET

APPENDIX II

TABLES

TA[illegible]1
PRIMARY CONSTITUENTS OF CONCERN DETECTED IN SOILS ON NIAGARA MOHAWK PROPERTY
NIAGARA MOHAWK SITE, SARATOGA SPRINGS, NEW YORK

Constituent	Soil Standard (ppm)	Surface Soils				Subsurface Soils & Test Pits			
		Minimum Concentration Detected (ppm)	Maximum Concentration Detected (ppm)	No. of Samples	No. of Exceedances	Minimum Concentration Detected (ppm)	Maximum Concentration Detected (ppm)	No. of Samples	No. of Exceedances
Benzene	0.06	<0.005	<0.007 J	16	0	<0.006	1,000	48	9
Ethylbenzene	5.5	<0.005	<0.007 J	16	0	<0.006	330	48	14
Toluene	1.5	<0.005	<0.007 J	16	0	<0.006	1,700	48	3
Xylenes	1.2	<0.005	<0.007 J	16	0	<0.006	1,200	47	11
Acenaphthene	50	<0.35	1.7	16	0	<0.40	740	49	14
Acenaphthylene	41	<0.35	1:1 J	16	0	<0.40	3,300	48	4
Anthracene	50	<0.35	30	16	0	<0.40	1,600	48	11
Benzo(a)anthracene	0.224 or MDL	<0.34	31	16	12	<0.40	920	47	38
Benzo(b)fluoranthene	1.1	<0.35	41	16	8	<0.39 J	320	49	24
Benzo(k)fluoranthene	1.1	<0.35	41	16	8	<0.39 J	160	45	20
Benzo(a)pyrene	0.061 or MDL	<0.35	60	16	12	<0.40	570.0 J	48	33
Chrysene	0.4	<0.40	35	16	11	<0.41	910	49	35
Dibenzo(a,h)anthracene	0.014 or MDL	<0.34	6.9	16	8	<0.39 J	24	49	21
Dibenzofuran	6.2	<0.34	0.37 J	16	0	<0.40	240.0 J	48	8
Fluoranthene	50	<0.35	40	16	0	<0.40	1,600	48	9
Fluorene	50	<0.34	1.0 J	16	0	<0.40	1,900	48	11
Indeno(1,2,3-cd)pyrene	3.2	<0.35	38	16	8	<0.40	94	49	24
2-Methylnaphthalene	36.4	<0.35	0.87 J	16	0	<0.40	4,600	49	16
Naphthalene	13	<0.35	1.5	16	0	<0.40 J	6,600	49	19
Phenanthrene	50	<0.35	11	16	0	<0.40	6,200	47	14
Pyrene	50	<0.35	57	16	1	<0.40	3,500	49	13
Antimony	28	<3.3	18.0 J	16	0	<3.1	4.3	44	0
Lead	400	7.6	999	16	2	1.7	502.0 J	42	2
Mercury	0.1	<0.08	5.0	16	11	<0.08	3.6	48	12

KEY:

MDL method detection limit
ppm parts per million (mg/kg)
J laboratory estimated value

Note: Remedial Action for the NMPC Property soils is to remove source materials or areas of concentrated coal tar as described in Source and Surface Soil Removal section of this ROD.

TABLE 2
PRIMARY CONSTITUENTS OF CONCERN DETECTED IN GROUNDWATER
NIAGARA MOHAWK SITE, SARATOGA SPRINGS, NEW YORK

Constituent	Standard (ppb)	NMPC Property Groundwater				Skating Rink Area Groundwater			
		Minimum Concentration Detected (ppb)	Maximum Concentration Detected (ppb)	No. of Samples	No. of Exceedances	Minimum Concentration Detected (ppb)	Maximum Concentration Detected (ppb)	No. of Samples	No. of Exceedances
Benzene	0.7[a]	<1.0	14,000	19	7	<1.0	**91.0 J**	20	4
Toluene	5[a,c]	<1.0	5,700	19	6	<1.0	1.0 J	20	0
Ethylbenzene	5[a,c]	<1.0	3,500	19	5	<1.0	1.0	20	0
Xylenes	5[a,c]	<1.0	3,700	19	7	<1.0	1.0 J	20	0
1,1-Dichloroethene	5[a,c]	<1.0	<1,000	19	0	<1.0	<10	20	0
1,1-Dichloroethane	5[a,c]	<1.0	<1,000	19	0	<1.0	0.9 J	20	0
Chloroform	7[a]	<1.0	3.0 J	19	0	<1.0	10	20	2
Methylene Chloride	5[a,c]	<2.0	52.0 J	19	1	<2.0	<10	20	0
Naphthalene	10[b]	<10	8,200	19	8	<10.0	**19.0**	20	1
2-Methylnaphthalene	50[c]	<10	1,100.0 J	19	8	<10.0	17.0	20	0
Acenaphthylene	50[c]	<10	360	19	2	<10.0	<10.0	20	0
Dibenzofuran	20[b]	<10	13	19	1	<10.0	9.0 J	20	0
Acenaphthene	20[b]	<10	30.0 J	19	8	<10.0	**87.0**	20	2
Fluorene	50[b,c]	<10	90.0 J	19	8	<10.0	33.0	20	0
Phenanthrene	50[b,c]	<10	110	19	8	<10.0	**71.0**	20	1
Anthracene	50[b,c]	<10	500.0 J	19	1	<10.0	9.0 J	20	0
Fluoranthene	50[b,c]	<10	8.0 J	19	0	<10.0	16.0	20	0
Pyrene	50[b,c]	<10	8.0 J	19	0	<10.0	10.0	20	0

KEY:
[a] NYSDEC Groundwater Quality Standards
[b] NYSDEC Groundwater Quality Guidance Value
[c] NYSDOH MCLs for Public Drinking Water Sources
[d] USEPA MCLs for Drinking Water
[e] USEPA Lifetime Advisories for Drinking Water

(ppb) parts per billion (μg/l)
J laboratory estimated value

TABLE 2 (Continued)
PRIMARY CONSTITUENTS OF CONCERN DETECTED IN GROUNDWATER
NIAGARA MOHAWK SITE, SARATOGA SPRINGS, NEW YORK

Constituent	Standard (ppb)	NMPC Property Groundwater				Skating Rink Area Groundwater			
		Minimum Concentration Detected (ppb)	Maximum Concentration Detected (ppb)	No. of Samples	No. of Exceedances	Minimum Concentration Detected (ppb)	Maximum Concentration Detected (ppb)	No. of Samples	No. of Exceedances
Phenol	1[a]	<10	31	19	2	<10.0	25.0	20	3
Benzyl Alcohol	50[c]	<10	<200	16	0	<10.0	3.0 J	20	0
2-Methylphenol	1[a]	<10	8.0 J	19	2	<10.0	<10.0	20	0
4-Methylphenol	1[a]	<10	15	19	2	<10.0	<10.0	20	0
2,4-Dimethylphenol	1[a]	<10	<500	19	3	<10.0	<10.0	20	0
Benzoic Acid	50[c]	<50	<1,000	16	0	<50.0	4.0 J	20	0
2,4-Dinitrophenol	1[a]	<25	<1,200	19	0	<50.0	<50.0	20	0
Dimethylphthalate	50[b,c]	<10	<500	19	0	<10.0	2.0 J	20	0
Di-n-butylpthalate	50[a,c]	<10	1.0 J	19	0	<10.0	<10.0	20	0
Bis(2-ethylhexyl)pthalate	50[a,c]	<10	26	19	0	<10.0	<10.0	20	0
Di-n-octylpthalate	50[b,c]	<10	<500	19	0	<10.0	19.0	20	0
Pentachlorophenol	1[a,d]	<10	1.0 J	19	0	<50.0	<50.0	20	0
Carbazole	50[c]	30	30	1	0				
Methoxychlor	35[a]	<0.5	<0.6	17	0	<0.52	<0.60	15	0
Heptachlor	0.4[d]	<0.05	<0.06	17	0	<0.052	<0.06	15	0

KEY:
[a] NYSDEC Groundwater Quality Standards
[b] NYSDEC Groundwater Quality Guidance Value
[c] NYSDOH MCLs for Public Drinking Water Sources
[d] USEPA MCLs for Drinking Water
[e] USEPA Lifetime Advisories for Drinking Water

(ppb) parts per billion (μg/l)
J laboratory estimated value

TABLE 2 (Continued)
PRIMARY CONSTITUENTS OF CONCERN DETECTED IN GROUNDWATER
NIAGARA MOHAWK SITE, SARATOGA SPRINGS, NEW YORK

Constituent	Standard (ppb)	NMPC Property Groundwater				Skating Rink Area Groundwater			
		Minimum Concentration Detected (ppb)	Maximum Concentration Detected (ppb)	No. of Samples	No. of Exceedances	Minimum Concentration Detected (ppb)	Maximum Concentration Detected (ppb)	No. of Samples	No. of Exceedances
Antimony	3[b,e]	<20	40.0 J	17	0	<20.0	<30.0 J	16	0
Arsenic	25[a]	<2.0	9.6 J	17	0	<2.0	<3.0	16	0
Barium	1,000[a]	<50	3,200.0 J	17	4	<50.0	**4,260**	16	4
Beryllium	3[b]	<1.0	<3.0	17	0	<1.0	<3.0	16	0
Cadmium	5[c,d,e]	<3.0	7.5	17	1	<3.0	**17.5**	16	1
Chromium	50[a]	<5.0	113	17	1	<5.0	**62.9 J**	16	2
Copper	200[a]	<3.0	<6.0	17	0	<3.0	29.6 J	16	0
Iron	300[a]	<35	11,300	17	13	<35.0	**16,400**	16	14
Lead	15[d]	<2.0	4.3 J	15	0	<2.0	<10.0	14	0
Magnesium	35,000[b]	15,100	99,800	17	2	12,100	**79,900**	16	3
Manganese	300[a]	19.0	858	17	9	<9.0	**639**	16	7
Mercury	2[a,c,d,e]	<0.2	<0.2	17	0	<0.20	<0.20	16	0
Nickel	100[d,e]	<5.0	28.0 J	17	0	<5.0	**137**	16	1
Selenium	10[a,c]	<1.0	2.4 J	17	0	<1.0	<3.0	16	0
Silver	50[a,c]	<3.0	<7.0	17	0	<3.0	<7.0	16	0
Sodium	20,000[a]	15,400	672,000	17	15	**40,400**	**614,000**	16	16
Thallium	0.4[e]	<2.0	<15.0 J	17	0	<2.0	<15.0	16	0
Zinc	300[a]	21.2	35.9	11	0	80.4 J	117	6	0
Cyanide	100[a]	<5.0 J	195.0 J	17	1	<5.0	<10.0	16	0

<u>KEY</u>:
[a] NYSDEC Groundwater Quality Standards
[b] NYSDEC Groundwater Quality Guidance Value
[c] NYSDOH MCLs for Public Drinking Water Sources
[d] USEPA MCLs for Drinking Water
[e] USEPA Lifetime Advisories for Drinking Water

(ppb) parts per billion (μg/l)
J laboratory estimated value

TABLE 3
PRIMARY CONSTITUENTS OF CONCERN DETECTED IN SOILS BY THE SKATING RINK AREA
NIAGARA MOHAWK SITE, SARATOGA SPRINGS, NEW YORK

Constituent	Cleanup Level (ppm)	Minimum Concentration Detected (ppm)	Maximum Concentration Detected (ppm)	No. of Samples	No. of Exceedances
Benzene	0.06	<0.005 J	**0.25**	15	1
Ethylbenzene	5.5	<0.005 J	0.63	15	0
Toluene	1.5	<0.005 J	0.01	15	0
Xylenes	1.2	<0.005 J	0.76	15	0
Acenaphthene	50	<0.36	**580.0 J**	15	2
Acenaphthylene	41	<0.37	35.0 J	15	0
Anthracene	50	<0.37	**510.0 J**	15	2
Benzo(a)anthracene	0.224 or MDL	<0.37	**340.0 J**	15	3
Benzo(b)fluoranthene	1.1	<0.37	**290.0 J**	15	2
Benzo(k)fluoranthene	1.1	<0.37	**180.0 J**	15	2
Benzo(a)pyrene	0.061 or MDL	<0.37	**340.0 J**	15	3
Chrysene	0.4	<0.37	**320.0 J**	15	3
Dibenzo(a,h)anthracene	0.014 or MDL	<0.36	**32.0 J**	15	1
Dibenzofuran	6.2	<0.36	**300.0 J**	15	2
Fluoranthene	50	<0.37	**870.0 J**	15	2
Fluorene	50	<0.36	**400.0 J**	15	2
Indeno(1,2,3-cd)pyrene	3.2	<0.37	**180.0 J**	15	2
2-Methylnaphthalene	36.4	<0.37	**370.0 J**	15	2
Naphthalene	13	<0.36	**960.0 J**	15	2
Phenanthrene	50	<0.37	**1,400.0 J**	15	2
Pyrene	50	<0.37	**890.0 J**	15	2
Antimony	28	<4.8 J	<6.6 J	9	0
Lead	400	1.3	329	13	0
Mercury	0.1	<0.10	**2.2**	15	3

<u>KEY:</u>
MDL method detection limit
ppm parts per million (mg/kg)
J laboratory estimated value

TABLE 4
PRIMARY CONSTITUENTS OF CONCERN DETECTED IN SEDIMENTS IN SPRING RUN WETLANDS
NIAGARA MOHAWK SITE, SARATOGA SPRINGS, NEW YORK

Constituent	Minimum Concentration Detected (ppm)	Maximum Concentration Detected (ppm)	No. of Samples
Benzene	<0.006	<0.081	22
Ethylbenzene	<0.006	0.006 J	22
Toluene	<0.006	0.22 J	22
Xylenes	<0.006	<0.081	22
Acenaphthene	0.20	14.0 J	33
Acenaphthylene	0.06	37	33
Anthracene	<0.40	39	33
Benzo(a)anthracene	<0.80	69	33
Benzo(b)fluoranthene	0.42	55	33
Benzo(k)fluoranthene	0.68	38	33
Benzo(a)pyrene	0.62	67	33
Chrysene	0.093 J	84	33
Dibenzo(a,h)anthracene	0.30	5.2 J	33
Dibenzofuran	0.10	0.54 J	22
Fluoranthene	0.13 J	130	33
Fluorene	<0.30	6.9 J	33
Indeno(1,2,3-cd)pyrene	<0.44	23	33
2-Methylnaphthalene	<0.05	4.0 J	22
Naphthalene	<0.05	0.40	33
Phenanthrene	0.45	88	33
Pyrene	0.40	190	33
Antimony	<0.71	<20.8 J	26
Lead	17.4	352.0 J	21
Mercury	<0.06	4.3	27

KEY:

ppm parts per million (mg/kg)
J laboratory estimated value

Note: The cleanup level for the sediments and wetland soils in Spring Run is 22 parts per million (ppm) total PAHs.

TABLE 5-1 NIAGARA MOHAWK SITE: CONTAMINANTS OF CONCERN										
	Ground Water	**Surface Soil**	**Subsurface Soil/Onsite Sediments**	**Drainage System Sediments**	**Downgradient Sediments**	**Onsite Surface Water**	**Drainage System Surface Water**	**Downgradient Surface Water**	**Indoor Air**	**Outdoor Air**
Volatiles										
Acetone	X		X	X	X				X	X
Benzene	X		X			X	X	X	X	X
2-Butanone	X		X	X	X				X	X
Carbon Disulfide									X	X
Carbon Tetrachloride										X
Chloroform	X					X	X	X		X
1,1-Dichloroethane										
1,2-Dichloroethane		X		X	X					
trans-1,3-Dichloropropene										X
Ethylbenzene	X		X			X	X	X	X	X
Methylene Chloride			X						X	X
Styrene										X
Tetrachloroethylene									X	X
Toluene	X		X	X	X	X	X	X	X	X
1,1,1-Trichloroethane		X							X	X
Trichloroethylene									X	X
Total Xylenes	X		X	X	X	X	X	X		

TABLE 5-1 (CONTINUED)										
	Ground Water	Surface Soil	Subsurface Soil/Onsite Sediments	Drainage System Sediments	Downgradient Sediments	Onsite Surface Water	Drainage System Surface Water	Downgradient Surface Water	Indoor Air	Outdoor Air
m,p-xylene									X	X
o-xylene									X	X
BNAs										
Acenaphthene	X	X	X	X	X	X	X	X		X
Acenaphthylene	X	X	X	X	X	X	X	X		X
Anthracene	X	X	X	X	X	X	X	X		
Benzo(a)anthracene		X	X	X	X	X	X			
Benzo(a)pyrene		X	X	X	X	X	X			
Benzo(b)fluoranthene		X	X	X	X	X	X			
Benzo(g,h,i)perylene		X	X	X	X	X	X			
Benzo(k)fluoranthene		X	X	X	X	X	X			
Benzylbutylphthalate				X	X					
Benzoic Acid			X	X	X					
Bis(2-ethylhexyl)phthalate			X	X	X	X	X	X		
Carbazole			X	X	X	X	X	X		
Chrysene		X	X	X	X	X	X			
Dibenzofuran	X	X	X	X	X	X	X			
Dibenz(a,h)anthracene		X	X	X	X	X	X			

TABLE 5-1 (CONTINUED)										
	Ground Water	Surface Soil	Subsurface Soil/Onsite Sediments	Drainage System Sediments	Downgradient Sediments	Onsite Surface Water	Drainage System Surface Water	Downgradient Surface Water	Indoor Air	Outdoor Air
Di-n-butylphthalate			X							
Di-n-octylphthalate				X	X					
Fluoranthene	X	X	X	X	X	X	X	X		
Fluorene	X	X	X	X	X	X	X	X		X
Indeno(1,2,3-cd)pyrene		X	X	X	X	X	X			
2-Methylnaphthalene	X	X	X	X	X	X	X			X
4-Methylphenol				X	X	X	X			
Naphthalene	X	X	X	X	X	X	X			X
Pentachlorophenol				X	X					
Phenanthrene	X	X	X	X	X	X	X			X
Phenol	X					X	X			
Pyrene	X	X	X	X	X	X	X	X		
Pesticides										
Aldrin				X						
gamma-Chlordane		X		X		X	X			
Aroclor-1254		X								
4,4-DDD		X	X	X	X					

TABLE 5-1 (CONTINUED)

	Ground Water	Surface Soil	Subsurface Soil/Onsite Sediments	Drainage System Sediments	Downgradient Sediments	Onsite Surface Water	Drainage System Surface Water	Downgradient Surface Water	Indoor Air	Outdoor Air
4,4'-DDE		X	X	X	X	X	X			
4,4'-DDT		X	X	X	X	X	X			
delta-BHC							X	X		
Dieldrin		X	X	X	X					
Endosulfan II										
Endosulfan Sulfate				X	X	X	X			
Endrin			X	X	X					
Endrin Ketone			X	X						
gamma-BHC (lindane)				X	X					
Heptachlor				X	X					
Heptachlor epoxide						X	X	X		
Inorganics										
Aluminum	X	X	X	X	X	X	X	X		
Antimony	X	X	X	X	X	X	X	X		
Arsenic	X	X	X	X	X	X	X	X		
Barium	X	X	X	X	X	X	X	X		
Beryllium			X	X	X					
Cadmium	X	X	X	X	X	X	X	X		

TABLE 5-1 (CONTINUED)										
	Ground Water	Surface Soil	Subsurface Soil/Onsite Sediments	Drainage System Sediments	Downgradient Sediments	Onsite Surface Water	Drainage System Surface Water	Downgradient Surface Water	Indoor Air	Outdoor Air
Chromium	X	X	X	X	X	X	X	X		
Cobalt	X	X	X	X	X					
Copper	X	X	X	X	X	X	X	X		
Cyanide	X		X	X	X	X	X	X		
Iron	X	X	X	X	X	X	X	X		
Lead	X	X	X	X	X	X	X	X		
Manganese	X	X	X	X	X	X	X	X		
Mercury		X	X	X	X					
Nickel	X	X	X	X	X					
Selenium	X		X	X	X	X	X	X		
Silver	X	X		X	X	X	X	X		
Thallium						X	X			
Vanadium		X	X	X	X	X	X	X		
Zinc	X	X	X	X	X	X	X	X		

		Time-Frame Evaluated		Degree of Assessment			
Pathway	Receptor	Present	Future	Quant.	Qual.	Rationale for Selection or Exclusion	Data Grouping
Ground Water							
Ingestion of Ground Water	Resident	No	Yes	X	X	Adjacent areas are zoned residential. Although residents currently rely on municipal water, ground water is potable. Public/private/commercial wells exist within 1 mile of site.	All overburden ground water samples. (Data on ground water quality in bedrock aquifer and local public/private wells will be evaluated qualitatively.)
Inhalation of Ground Water Contaminants During Showers	Resident	No	Yes	X	X	Concentrations of volatiles in overburden ground water are high.	All overburden ground water samples. (Data on ground water quality in bedrock aquifer and local public/private wells will be evaluated qualitatively.)
Inhalation of Contaminants that Volatilize from Ground Water and Seep into Basements	Resident	--	--			See air pathways.	
	Employee	--	--				
Dermal Contact with Ground Water	Resident	No	No			Considered insignificant compared to other ground water exposures.	
Surface Soils							
Incidental Ingestion of Onsite Surface Soils	Employee	Yes	Yes	X		Site is active facility. Future residential development may occur.	All surface soils (0 - 2') except SS-12.
	Resident	No	Yes	X			
Dermal Contact with Onsite Surface Soils**	Employee	Yes	Yes	X		Site is active facility. Future residential development may occur.	All surface soils (0 - 2') except SS-12.
	Resident	No	Yes	X			
Subsurface Soils							
Incidental Ingestion of Onsite Subsurface Soils (*see sediments*)	Excavation Worker	No	Yes	X		Exposure to subsurface soils (2-15') may occur during excavations for utility and facility maintenance or future site remediation/development.	All subsurface soils 2-15', and on site sediments.
Dermal Contact with Onsite Subsurface Soils**	Excavation Worker	No	Yes	X		Exposure to subsurface soils (2-15') may occur during excavations for utility and facility maintenance or future site remediation/development.	All subsurface soils 2-15', and on site sediments.

Pathway	Receptor	Time-Frame Evaluated		[illegible]e of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Sediments							
Incidental Ingestion of Drainage System Sediments	Recreational User	Yes	Yes	X		Youths have been observed in downgradient wetland areas.	Downgradient sediments for present exposure. All sediment samples for future exposure.
	Excavation Worker	No	Yes (see subsurface soils above)	X		Combined with subsurface soils.	
Dermal Contact with Drainage System Sediments***	Recreational User	Yes	Yes	X		Youths have been observed in downgradient wetland areas.	Downgradient sediments for present exposure. All sediment samples for future exposure.
	Excavation Worker	No	Yes (see subsurface soils above)	X		Combined with subsurface soils.	
Surface Water							
Incidental Ingestion of Surface Water	Recreational User	No	No			Anticipated activities involve negligible exposure via the oral route.	
	Excavation Worker	No	No				
Dermal Contact with Surface Water	Recreational User	Yes	Yes		X	Anticipated activities involve minimal exposure due to low contaminant concentrations.	
	Excavation Worker	Yes	Yes		X		
Air							
Inhalation of Emissions and Particulates from Soils	Employee	Yes	Yes	X		Significant contaminant concentrations in soils. Daily activity at site involves physical disturbance of surface soils. Airborne contaminants detected.	Available outdoor air data.
	Resident	No	No			Anticipated exposure is minimal due to most surfaces being covered (e.g., paved roads, lawns).	
	Excavation Worker	No	Yes		X	Significant contaminant concentrations in soils. Airborne contaminants detected.	

		Time-Frame Evaluated		D[illegible] of Assessment			
Pathway	Receptor	Present	Future	Quant.	Qual.	Rationale for Selection or Exclusion	Data Grouping
Inhalation of Indoor Air	Employee	Yes	Yes	X		Employee may be exposed to measurable contaminant levels.	Available indoor air data.
	Resident	No	Yes		X	Contaminants from ground water may volatilize and seep into basements. Airborne contaminants detected.	

**cadmium and Aroclor-1254 only.
***cadmium only.

TABLE 5-3 TOXICITY VALUES FOR CONTAMINANTS OF CONCERN AT THE NIAGARA MOHAWK SITE.

Chemical	CARCINOGENIC Weight of Evidence Classification	Oral Slope Factor (mg/kg/day)-1	Inhal. Slope Factor (mg/kg/day)-1	CHRONIC Chronic Oral RfD (mg/kg/day)	Chronic Inhal. RfD (mg/kg/day)
Volatiles					
Acetone	D a			1.00E-01 a	
Benzene	A a	2.90E-02 a	2.90E-02 a		
2-Butanone (MEK)	D a			5.00E-02 b	9.00E-02 b
Carbon Disulfide	-- a			1.00E-01 a	2.86E-03 b,g
Carbon Tetrachloride	B2 a	1.30E-01 a	5.25E-02 a,f	7.00E-04 a	
Chloroform	B2 a	6.10E-03 a	8.05E-02 a,f	1.00E-02 a	
1,1-Dichloroethane	C a			1.00E-01 b	1.00E-01 b
1,2-Dichloroethane	B2 a	9.10E-02 a	9.10E-02 a	3.00E-01 d	
t-1,3-Dichloropropene (s)	B2 a	1.80E-01 b	1.30E-01 b	3.00E-04 a	5.71E-03 a,g
Ethylbenzene	D a			1.00E-01 a	2.86E-01 a,g
Methylene chloride	B2 a	7.50E-03 a	a,j	6.00E-02 a	8.57E-01 b,g
Styrene	B2 b	3.00E-02 b	2.00E-03 b	2.00E-01 a	
Tetrachloroethylene	B2 b	5.10E-02 b	1.82E-03 b,f	1.00E-02 a	
Toluene	D a			2.00E-01 b	5.71E-01 b,g
1,1,1-Trichloroethane	D a			9.00E-02 b	3.00E-01 b
Trichloroethylene	B2 b	1.10E-02 b	1.70E-02 b	6.00E-03 d	
Xylenes	D a			2.00E+00 a	8.57E-02 b,g
BNAs					
Acenaphthene	-- a			6.00E-02 a	
Acenaphthylene	D a				
Anthracene	D a			3.00E-01 a	
Benzoic acid	D a			4.00E+00 a	
Benzo(a)anthracene	B2 a	5.79E-01 e			
Benzo(a)pyrene	B2 a	5.79E+00 a	d		
Benzo(b)fluoranthene	B2 a	5.79E-01 e			
Benzo(g,h,i)perylene	D a				
Benzo(k)fluoranthene	B2 a	5.79E-01 e			
Benzylbutylphthalate	C a			2.00E-01 a	
Bis([illegible]hexyl)phthalate	B2 a	1.40E-02 a		2.00E-02 a	