



**Five-Year Review Report**  
**For the**  
**Niagara Mohawk Power Corporation Superfund Site**  
**Saratoga Springs**  
**Saratoga County, New York**



August 2011

**PREPARED BY:**  
**U.S. Environmental Protection Agency**  
**Region 2**  
**New York, New York**

## **Executive Summary**

This is the second five-year review for the Niagara Mohawk Power Corporation Superfund Site. The Site is located in the City of Saratoga Springs, Saratoga County, New York. The remedy at the Niagara Mohawk Power Corporation Superfund site is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled by the engineered, access and institutional controls that are currently in place. These controls are properly operated, monitored, and maintained.

## Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Niagara Mohawk Power Corporation		
EPA ID (from WasteLAN): NYD980664361		
Region: 2	State: NY	City/County: Saratoga Springs
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input checked="" type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: ___ / ___ / ___	
Are site related properties currently in use? <input type="checkbox"/> YES ALL <input type="checkbox"/> YES SOME <input checked="" type="checkbox"/> NO NONE <input type="checkbox"/> N/A GW		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Maria Jon		
Author title: RPM	Author affiliation: EPA	
Review period:** 05/29/2006 to 05/31/2011		
Date(s) of site inspection: 05/24/2011		
Type of review: <input checked="" type="checkbox"/> Post-SARA Statutory <input type="checkbox"/> Pre-SARA or post-SARA Policy <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> Regional Discretion		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction or RA Start at OU # _____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 08/24/2006		
Does the report include recommendation(s) and follow-up action(s)? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no Is human exposure under control? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> not yet determined Is migration of contaminated groundwater stabilized? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> not yet determined Does the remedy protect the environment? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> not yet determined		
Acres in use or suitable for reuse: None <input type="checkbox"/> restricted <input checked="" type="checkbox"/> unrestricted <input type="checkbox"/>		

\* "OU" refers to operable unit.

\*\*correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

## Five-Year Review Summary Form, cont'd.

### Issues, Recommendations and Follow-up Actions:

The Site has not achieved construction completion status. The newly identified residual coal tar areas in the subsurface soil and groundwater outside of the containment barrier wall, on a portion of Excelsior Avenue, and parcels owned by the City of Saratoga Springs (the Old Red Spring Area) and by the Mill LLC (small area in the parking lot) need to be addressed and a final remedy selected. Table 3b identifies issues or recommends actions at this Site.

### Protectiveness Statement(s):

This is the second five-year review for the Niagara Mohawk Power Corporation Superfund Site. The Site is located in the City of Saratoga Springs, Saratoga County, New York. The remedy at the Niagara Mohawk Power Corporation Superfund site is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled by the engineered, access and institutional controls that are currently in place. These controls are properly operated, monitored, and maintained.

### Other Comments:

None

# Five-Year Review Report

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Figure 1 – Site Location

Figure 2 – former MGP Niagara Mohawk Property

## List of Acronyms

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	Contaminants of Concern
CY	Cubic Yards
DNAPL	Dense Non-aqueous Phase Liquid
ESD	Explanation of Significant Difference
LF	Linear Foot
MGP	Manufactured Gas Plant
MCLs	Maximum Contaminant Levels
MSL	Mean Sea Level
ug/L	Micrograms per Liter
mg/kg	Milligram per kilogram
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NMPC	Niagara Mohawk Power Corporation
NAPL	Non-aqueous Phase Liquid
PAHs	Polynuclear Aromatic Hydrocarbons
PRPs	Potentially Responsible Parties
ROD	Record of Decision
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager
USACE	United States Army Corps of Engineers
EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

## I. Introduction

This five-year review for the Niagara Mohawk Power Corporation Superfund Site (Site), located in the City of Saratoga Springs, NY, Saratoga County, New York, was conducted by the United States Environmental Protection Agency (EPA) Remedial Project Manager Maria Jon. The five-year review was conducted pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §9601 *et seq.* and 40 CFR 300.430(f)(4)(ii), and in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of a five-year review is to assure that implemented remedies protect public health and the environment and function as intended by the decision documents. This report will become part of the administrative record for this Site.

This is the second review for this Site. A five-year review is required at this Site due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. The trigger for this five-year review is the date of the first-five year review report dated August 26, 2006.

## II. Site Chronology

Table 1, attached, summarizes the site-related events from discovery to the present.

## III. Background

### *Site Location*

The Site is located in the City of Saratoga Springs (the City), Saratoga County, New York. The Site consists of an approximate 7-acre parcel (referred to as the Niagara Mohawk property) owned by Niagara Mohawk Power Corporation (NMPC), a subsidiary of National Grid, an approximate 2.3-acre property formerly owned by the City of Saratoga Springs (referred to as the former Skating Rink property), an underground brick storm sewer, and areas of Spring Run Creek. The Niagara Mohawk property, which is a former manufactured gas plant (MGP), is surrounded by chain-link fencing and bounded on the north by New York State Route 50, to the south by Excelsior Avenue, to the east by East Avenue and to the west by the former Spa Steel Corporation or the former Spa Steel property. (See Fig. 1)

Several buildings are located on the Niagara Mohawk property, including a cylindrical, brick storage building (a former gas holder referred to as the brick roundhouse), constructed in 1873, a two-story brick storage building, and an aboveground electrical substation, constructed in 1903.

The former Skating Rink property is located southeast of the Niagara Mohawk property on Excelsior Avenue. At the time that the 1995 ROD was issued, the Excelsior Avenue Skating Rink was in service; it was later taken out of service when the City constructed a



new skating facility at another location. This property is currently owned by National Grid.

To the east of both these areas are Spring Run Creek and a wetlands area. Spring Run Creek flows in an easterly direction from the Niagara Mohawk property toward Interstate 87.

A 36-inch-diameter brick underground storm sewer line traversed the southern portion of the Niagara Mohawk property. The brick sewer was constructed circa 1865, and received runoff from the historic manufactured gas plant operations at the Niagara Mohawk property. This sewer has been abandoned for more than 50 years. The brick sewer leaves the Niagara Mohawk property in the southeast corner and runs into the Spring Run wetland. It extends approximately 4,850 feet beyond the Niagara Mohawk property.

#### *Site Geology and Hydrology:*

The surficial geology beneath the Niagara Mohawk 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 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 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 the Niagara Mohawk property, as well as in all off-site exploratory borings. This clay unit was encountered at depths of around 20 feet. The clay thickness throughout the 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 Niagara Mohawk property. Therefore, the predominant flow direction of ground water exiting the property boundary is to the southeast.

Residents of the City of Saratoga Springs are served by a public water supply which is drawn from Loughberry Lake, located 2,000 feet upgradient of the Site.

#### *Land and Resource Use*

The Niagara Mohawk property, the former Skating Rink property and the former Spa Steel property are currently zoned exclusively for industrial/commercial land use. Adjacent to the Niagara Mohawk property are several properties zoned for residential, light industrial, or planned business use.

#### *History of Contamination:*

Beginning in 1868, town gas was manufactured at the Niagara Mohawk property from coke, coal and petroleum oils for use in lighting and heating. Gas manufacturing operations continued at this location until 1929. The early gas production operations generated coal tars and other waste materials, which were by-products of the gas production processes. These wastes, which contain hazardous substances, were disposed of at various locations on the Niagara Mohawk property. Coal tar contaminants include polynuclear aromatic hydrocarbons (PAHs), some volatile organic compounds (VOCs), trace metals and nitrogen and sulfur compounds. Manufactured gas operations resulted in areas of subsurface soil and groundwater contamination.

Niagara Mohawk has owned and operated the property since 1950 and used the property from 1950 to 1999 as a district service center and headquarters for its electric line, natural gas, and tree trimming crews servicing the Saratoga District.

#### *Initial Response*

In 1982, Niagara Mohawk notified EPA that the Saratoga Springs Site was once the site of a gas manufacturing facility and that previous owners may have deposited coal tars in the property. In February 1990, the Site was placed on the National Priorities List.

#### *Basis for Taking Action:*

A remedial investigation and feasibility study (RI/FS) was conducted to define the nature and extent of contamination at the Site. The RI/FS revealed that the Niagara Mohawk property, former Skating Rink property, the underground brick sewer line, and sediments in portions of the creek were contaminated with PAHs and VOCs. The PAHs or contaminant of concern (COCs) included anthracene, acenaphthene, acenaphthylene,

chrysene, benzo(a)pyrene, benzo(a)anthracene, fluorene, dibenzo(a,h)anthracene, fluoranthene, naphthalene, phenanthrene, indeno(1,2,3-cd)pyrene, and pyrene. The VOCs included benzene, toluene, ethylbenzene, and xylenes. Some of the highest concentrations of PAHs detected in the subsurface soil beneath the Niagara Mohawk property, at the former location of the gas plant, were anthracene at 1,600 ppm, acenaphthene at 640 ppm, acenaphthylene at 3,300 ppm, benzo(a)anthracene at 920 ppm, chrysene at 910 ppm, , ppm, pyrene at 3,500 ppm, naphthalene at 6,600 ppm, and phenanthrene at 6,200 ppm. Groundwater samples collected in the shallow aquifer under the Niagara Mohawk property detected benzene at 14,000 ppb, ethylbenzene at 3,500 ppb, toluene at 5,700 ppb, and naphthalene at 6,400 ppb.

Based on the results of the remedial investigations, 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. EPA determined from the risk assessment that the contaminants at the Site are likely to pose significant risks to human health and the environment if not addressed. Therefore, EPA selected remedies to address the contaminated soil, sediments, and groundwater in a Record of Decision (ROD) signed on September 29, 1995, and an Explanation of Significant Differences (ESD) signed in September 2001, which described changes to two components of the September 1995 ROD.

#### **IV. Remedial Actions**

##### *Remedy Selection*

Based on the results of the RI/FS, EPA signed a Record of Decision on September 29, 1995. The following remedial action objectives (RAOs) 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 impacted sediments on the NMPC property.

The major components of the selected remedy are:

- Excavation and off-Site disposal of highly contaminated soil and source areas

containing coal tar waste found on the Niagara Mohawk property; installation of subsurface barriers and drains, with dense non-aqueous phase liquid (DNAPL) and groundwater collection sumps to contain contaminated groundwater on the Niagara Mohawk property; installation of an asphalt cap to minimize infiltration by precipitation; institutional controls to prevent future residential use of the property; and long-term monitoring.

- Excavation and disposal of contaminated soil in the vicinity of the former Excelsior Avenue Skating Rink that exceed cleanup levels established for the protection of groundwater quality and residential use of this property.
- Monitoring of the groundwater in the vicinity of the Skating Rink property to measure improvement in the groundwater quality. Groundwater contamination on this property is expected to be reduced over time through natural attenuation because all contaminated soil on this property would be removed and the subsurface barriers around the Niagara Mohawk property would prevent any migration of groundwater contamination. If improvement in groundwater quality is not observed upon review of groundwater data, a program to evaluate contingency alternatives for groundwater remediation will be initiated.
- Removal of contaminated sediments on the Niagara Mohawk property and in Spring Run Creek.
- Elimination of the transport of contaminants via the underground storm sewer by 1) diverting storm water flow through the brick sewer upstream of the Niagara Mohawk property to the twin box culvert storm sewer, so no storm water will flow through the Niagara Mohawk property; 2) disconnecting the storm sewer at the southeast corner of the NMPC property and constructing a collection sump at this location to prevent any groundwater which infiltrated the sewer from leaving the property; 3) cleaning the downstream section of the sewer from the southeast corner of the Niagara Mohawk property to the storm sewer outfall, near Interstate 87; 4) sealing infiltration spots along a section of the brick storm sewer, downstream of the southeast corner of the Niagara Mohawk property where it is disconnected from the concrete box culvert; and 5) repairing the break in the brick sewer near the confluence of Loughberry Creek and Village Brook. The materials generated from cleaning the brick sewer would be disposed of properly off-Site.

The ROD identified the remediation of the Niagara Mohawk property shallow groundwater as technically impracticable from an engineering perspective. 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 Niagara Mohawk property.

In September 2001, an ESD was signed, which described changes to two components of the September 1995 ROD. The first change modified the selected remedy for the former Skating Rink property. The original remedy for this property called for the excavation

and off-site disposal of contaminated soil exceeding the specific cleanup levels established in the 1995 ROD, which would allow for the unrestricted use of the property. The modified remedy entailed: 1) excavation and off-site disposal of two feet of surface soil across the entire 2.3-acre property and backfill with clean soil; 2) excavation and off-site disposal of deep soil exceeding groundwater protection levels for industrial/commercial use of the property and backfill with clean soil; and 3) imposition of institutional controls in the form of deed restrictions to prevent future residential use of the Skating Rink property. The soil cleanup levels identified for the former Skating Rink property for indicator COCs were:

Constituents	Cleanup Levels in 1995 ROD (ppm)	New Cleanup Levels for Groundwater Protection (ppm)
<b>VOCs</b>		
Benzene	0.06	0.06
Ethylbenzene	5.5	5.5
Toluene	1.5	1.5
Xylenes	1.2	1.2
<b>PAHs</b>		
Acenaphthene	50	90
Acenaphthylene	41	41
Anthracene	50	50
Benzo (a) anthracene	0.224 or MDL	3
Benzo (b) fluoranthene	1.1	1.1
Benzo (k) fluoranthene	1.1	1.1
Benzo (a) pyrene	0.061 or MDL	11
Chrysene	0.4	0.4
Dibenzo (a,h) anthracene	0.014 or MDL	0.29
Dibenzofuran	6.2	6.2
Fluoranthene	50	1900
Indeno (1,2,3-cd) pyrene	3.2	3.2
2-Methylnaphthalene	36.4	36.4
Naphthalene	13	13
Phenanthrene	50	220
Pyrene	50	665
<b>INORGANICS</b>		
Antimony	28	28
Lead	400	400
Mercury	0.1	0.1

The second change modified the selected cleanup approach for the portion of the abandoned 36-inch-diameter brick storm sewer that extends from the confluence of Loughberry Creek and Spring Run Creek to its discharge near Interstate 87. The original

remedy called for cleaning sediments and debris from this portion of the sewer. The modified approach involved decommissioning this portion of the sewer by injection of a grout mixture. This mixture, consisting of bentonite and Portland cement, was used to solidify and encapsulate the sediments, immobilize any materials located within the sewer, and prevent discharge of sewer sediments into Spring Run surface waters.

In addition, the ESD indicated that the historic Round House, originally slated for demolition in order to remove contaminated soil beneath it, would be moved intact to another location on the Niagara Mohawk property. This change was made as a result of public interest and the willingness of NMPC to pay for the cost of moving the building.

#### *Remedial Action (RA) Implementation:*

The PRPs' contractor, Blasland, Bouck & Lee, Inc., (BBL), prepared remedial design plans and specifications, which EPA approved on September 22, 2000. In March 2001, EPA approved the Remedial Action Work Plan and the PRPs selection of BBL as the remedial action contractor; Williams Environmental Services, Inc., (WESI) as the contractor for construction and excavation activities; Upstate Lab, Inc., as the independent quality assurance contractor; and Earth Tech, Inc., as the subcontractor for the inspection and certification of the perimeter sheetpile barrier wall on the Niagara Mohawk property. Following on-site mobilization in May 2001, clearing and grubbing, perimeter fence installation, and surveying were conducted. NYSDEC and US Army Corps of Engineers representatives provided field oversight of all remedial activities.

#### *Niagara Mohawk Property*

WESI initiated the deep soil excavation and off-site treatment and disposal component of the remedy. Over 50,000 cubic yards of contaminated soil were excavated and transported to ESMI's facilities in Fort Edward, NY for thermal treatment. Small quantity of NAPL material (46.5 gallons) was collected during the excavation and was manifested to Environmental Products and Services of Vermont Inc., for disposal. Both surficial and subsurface excavated areas were backfilled with imported clean fill. A temporary groundwater treatment facility was constructed in August 2001, which treated over 7,000,000 gallons of water during construction activities.

At the request of the Saratoga County Historical Society, the PRP agreed to preserve a brick roundhouse that was located on the Niagara Mohawk property. This brick roundhouse dated from 1873 is 70 feet in diameter and 50 feet in height, and it is reportedly one of only several brick roundhouses of this type remaining in the United States. International Chimney, Inc., was hired to relocate the roundhouse. It was moved 120 feet to the northeast corner of the property to facilitate the excavation of MGP-related material located immediately beneath the original location of the brick roundhouse's floor. Upon relocation of the brick roundhouse, the material from former Holder #2 was excavated. The brick roundhouse is located currently on a new foundation in the northeast corner of the Niagara Mohawk property.

A subcontractor to WESI, C.D. Perry and Sons, installed approximately 2,350 linear feet of heavy-duty watertight steel sheeting around the perimeter of the Niagara Mohawk property. The steel sheeting was keyed into the subsurface clay horizon located approximately 20 feet below grade. An independent third party, Earth Tech, Inc., provided oversight during construction and issued written verification regarding the integrity of the watertight system. A perimeter groundwater drainage system outside the upgradient portion of the barrier wall system to control upgradient groundwater was installed. This perimeter drainage system was installed along the northern, western and eastern portions of the Niagara Mohawk property. Collected unimpacted groundwater is ultimately discharged to Spring Run Creek.

WESI constructed a water extraction and treatment system to maintain hydraulic control within the limits of the barrier wall system at the Niagara Mohawk property. Four extraction wells remove contaminated groundwater and six others were designed to collect and extract DNAPL. After treatment of the extracted groundwater by the treatment system, the water is discharged to the Saratoga County Sewer District # 1 for final disposal. In late 2004, after a year of operation, NMPC conducted an evaluation to optimize the treatment plant. Based on this evaluation the system was reconstructed in the spring of 2005 and has been operating in batch mode. The system consists of four submersible pumping wells within the MGP containment area, 1-2 inch diameter below ground piping to the system building, an oil/water separator, bag filters, granular activated carbon, and two 2,500 gallon holding tanks. Approximately 5,000 gallons of water are treated and discharged to the Saratoga County sewer system per month following successful sampling/analysis. Saratoga County recently conducted their annual inspection and discharge confirmatory sampling event.

The primary purpose of the groundwater extraction system is to maintain an inward hydraulic gradient (to ensure that the water table inside the containment wall is lower than the water table outside the containment wall). The paving of the 7-acre Niagara Mohawk property with asphalt was completed on October 8, 2002.

#### *Former Skating Rink Area Soil Excavation*

National Grid purchased the former Skating Rink property from the City of Saratoga Springs to facilitate the remedial effort. In accordance with the ROD, contaminated surface and subsurface soil was excavated and treated off-site at a thermal treatment facility. The surface soil removal effort consisted of the removal of the 0 to 2 foot soil horizon across the entire 2.3 acre former Skating Rink Area. This excavation effort generated approximately 7,470 cy of soil. The subsurface soil removal effort consisted of removal of soil from seven areas that were identified in the ROD. Subsurface soil excavation ranged from 5 to 28 feet below ground surface. Confirmatory soil sampling was provided at the identified excavation depth termination point. All subsurface soil excavations were backfilled, and the backfill materials were properly compacted. The surface of the entire 2.3-acre property was backfilled with 6 inches of topsoil and seeded.

### *Spring Run Creek Sediment Excavation and Removal and Wetlands Mitigation*

Spring Run Creek was apportioned into three areas for the purpose of sediment removal (Area 1, Area 2 and Area 3). Area 1 extended from the twin 86-inch box culverts, for an approximate distance of 210 linear feet (lf). WESI excavated an area of 4,200 sf to a depth of 1 to 3 feet. At the request of NYSDEC, a 20-foot-long section of this area was excavated an additional 2 feet, for a total excavation depth of 5 feet. In addition, at the request of EPA, additional sampling efforts were conducted immediately downgradient of this area. As a result of the additional sediment sampling, an additional 230 lf was identified for excavation, expanding the length of Area 1 to approximately 440 lf. Sediments in this area were excavated to a depth of 3 ft. Following verification sampling, this area was backfilled with similar native material (sand). During the excavation effort, check dams were installed immediately upgradient and downgradient of Area 1 to facilitate diversionary pumping around Area 1.

Area 2 was approximately 800 lf in length and was located downstream of Area 1. This area was excavated in a similar fashion as Area 1, with bypass piping and diversionary pumping. This area was where the original break in the storm sewer occurred and MGP constituents were detected at greater depths than previous investigation efforts indicated. The original design was to excavate to approximately 7 feet in depth, but the final excavation depth was approximately 11 feet over an area of about 1,350 sf due to the presence of additional MGP-containing materials. At the completion of the excavation, this area was backfilled with clay to within 3 feet of original grade, and then the area was restored with native sand.

Area 3 is located downstream of Areas 1 and 2, in a wetland area near Interstate 87. Of all three areas, Area 3 contained the largest volume of material requiring excavation and also required the construction of a unique haul road to support the heavy construction equipment necessary to facilitate excavation. The contractor excavated 1,500 cubic yards of sediments along approximately 700 lf of creek. In several areas, an additional 2 feet of sediment was excavated since verification sampling of the 3-foot horizon indicated that additional removal was necessary. The excavated areas were backfilled with low-permeability material and sand.

One modification from the Wetlands Mitigation Plan occurred during construction. The Saratoga Open Space Committee requested that a portion of the construction haul road for Areas 1 and 2 remain in place (the original mitigation plan identified this area be restored) as a component of a future bike trail. This request was approved by NYSDEC and EPA, in consultation with NMPC. In November 2010, construction of the 1.2 mile Spring Run Trail was completed and was officially opened by city officials and local conservation advocates.

### *36-Inch-Diameter Brick Storm Sewer*

The storm sewer cleaning was performed within an 800 lf section of the sewer. The



cleaning involved the use of pressurized-jet cleaning equipment to remove the accumulated debris. Both the upgradient and downgradient portions of the 800-foot reach of the 36-inch-diameter brick storm sewer were filled with grout. The grouting effort filled the various structural failures and accessible manholes to existing grade over a length of approximately 5,500 lf.

The total amount of contaminated waste material remediated was over 86,740 tons. The categories of waste types and total volumes disposed are summarized as follows:

- Contaminated soil for thermal treatment.....68,365 tons
- Contaminated sediments for thermal treatment.....16,671 tons
- Nonhazardous waste to RCRA Subtitle D Landfill.....1,704 tons
- NAPL for thermal treatment.....46.5 gallons

#### *Additional Areas of Residual Coal Tar Contamination*

The Site has not yet achieved construction completion status because of the newly identified residual coal tar areas of contamination that were not identified during the RI/FS. These areas are in the subsurface soil outside of the west side of the containment barrier wall and on the Niagara Mohawk Power Corporation property; on a portion of the adjacent former Spa Steel property; and downgradient areas, including a portion of Excelsior Avenue, and parcels owned by the City of Saratoga Springs (the Old Red Spring Area) and by Mill LLC (a former NYSDEC inactive hazardous waste site).

The following is a discussion on the status and activities conducted at these newly identified areas:

#### *Former Spa Steel Property*

The former Spa Steel property is located on Excelsior Avenue in Saratoga Springs, New York, and consists of approximately four acres. In July 2006, additional subsurface soil and groundwater contaminated with residual coal tar was identified outside of the NMPC property barrier wall and the adjacent former Spa Steel property. Subsurface soil impacted with residual coal tar was identified only in a small portion of the Spa Steel property, approximately 0.35 acres. Naphthalene was detected in the subsurface soil at 5,430 mg/kg, benzo(a)pyrene at 116 mg/kg. Benzene was detected in the groundwater at 5,800 ug/L and xylenes at 690 ug/L.

This portion is located immediately adjacent to the former Niagara Mohawk property. The Spa Steel property subsurface soil contamination is contiguous to the Niagara Mohawk Property. This newly identified contamination is believed to have previously existed and not migrated through the barrier wall at the main portion of the Site, since monitoring wells immediately outside of the containment wall do not show any DNAPL or dissolved constituents.

In the spring of 2008, and in accordance with the ROD issued on September 29, 1995 and the Consent Decree dated September 27, 1996, RA activities were performed as an extension of the remedial actions completed at the NMPC property in 2002. The remedial actions address the area outside on the west side of the NMPC barrier wall and the 0.35-acre subsurface soil impacted portion of the former Spa Steel property. The RA activities include the following components:

- A vertical containment barrier wall.
- Impermeable surface cap.
- Groundwater extraction and treatment.
- Post-remedy monitoring.
- Deed restrictions.

The new barrier wall consisted of approximately 300 linear feet of water-tight steel sheeting. The sheeting was installed to an average depth of approximately 28-feet below ground surface, extending approximately 5 feet into the clay confining unit, was installed on the NMPC property and the impacted 0.35-acre Spa Steel property. To facilitate the installation of the impermeable surface cap, as well as future redevelopment activities by the property owner (owner plans to use the 0.35-acre property as a parking area), the final elevation of the top of the containment barrier wall was approximately 2-feet below the proposed final surface grade and a 2-foot by 2-foot flowable fill pile cap was installed along the alignment of the new sheeting. The new sheeting was connected to the existing sheeting (installed as part of the NMPC property remedy) sheeting using a column of grout to "bridge" the new and existing sheeting. The new water-tight steel sheeting was installed through the grout column to create a water-tight seal. The southern edge of the new barrier wall was installed in an alignment that was generally parallel to Excelsior Ave. The northern and western sections of the barrier wall system were aligned to enclose the coal tar residuals in the subsurface materials. The eastern portion of the barrier wall system was provided by the existing barrier wall that currently surrounds the NMPC property. A perimeter groundwater drainage system along the outside of the barrier wall system to control upgradient groundwater was installed, in addition of a storm water manhole. An impermeable surface cover was constructed within the containment barrier wall. The cover includes an 8-inch thick layer of clean fill (sand) as a bedding material, a non-woven geotextile fabric, overlain with a 30-mil PVC liner, a geosynthetic drainage composite covered with 12-inches of clean fill, an orange woven demarcation geotextile, 9-inches of run-of crusher stones, and an asphalt cover.

During the construction of the Spa Steel barrier wall three existing monitoring wells were protected, and five wells were decommissioned. Monitoring wells LTMW-07, LTMW-7A, SS-01, SS-02, and SS-04 were decommissioned on November 29, 2007. These wells were located within the area of contamination, which is currently contained by the newly constructed barrier wall in the Spa Steel area. Construction of Spa Steel monitoring wells (LTMW-11, LTMW-12, LTMP-12, LTMP-13) and a new extraction well (PW-5) in the Spa Steel area were completed in April 2009. The groundwater extraction well was installed to support the withdrawal of groundwater to lower the water table elevation within the containment area and induce an inward gradient. Groundwater extracted from

this well is treated at the existing groundwater treatment facility located on the adjacent NMPC property.

The installation of additional groundwater monitoring wells outside of the Spa Steel containment wall and the final paving of the area with asphalt has not been completed, due to the ongoing construction of a parking area on the Spa Steel property. The owner of the Spa Steel property is currently constructing a parking area on the 0.35-acre property impacted by the contamination. The groundwater monitoring well installation is currently on hold to avoid well damage during the construction of the parking lot. Once the parking area is completed, the remaining RA activities will be completed.

*A portion of Excelsior Avenue, and parcels owned by the City of Saratoga Springs (the Old Red Spring Area) and by Mill LLC.*

In July 2006, EPA Environmental Response Team (EPA-ERT) conducted a supplemental investigation to determine the extent of the soil and groundwater contamination beyond the former Spa Steel property. The data indicate that residual coal tar was identified south of the former Spa Steel property, on and south of Excelsior Avenue. In February/March 2008, May 2009, and October/November 2009, National Grid conducted additional soil and groundwater investigations to further define the nature and extent of residual coal tar impacts to the south and southwest of the site. The data identified a portion of Excelsior Avenue, a paved parking lot for a commercial business owned by the Mill LLC, and a small green space that includes the Old Red Spring and associated pavilion. The Old Red Spring represents one of Saratoga Springs's mineral springs that is available for consumption to local residents and tourists via a fountain located within the pavilion. The Old Red Spring extracts groundwater under artesian conditions from the deep bedrock aquifer located within shale bedrock at depths greater than 150 feet bgs. This bedrock zone is separated from the overburden groundwater zone by a thick clay confining layer. This clay layer is over 50 ft thick. Results of periodic groundwater sampling collected at the Old Red Spring continually confirm that COCs are not detected in the groundwater from this well. Current local zoning at the Site restricts the use of groundwater from the overburden as a potable source.

DNAPL in the form of coal tar above the clay confining unit was identified in a few areas approximately 15 to 23 feet below grade. DNAPL has not been observed within the top 15 to 20 feet of soil in the project area. The extent and nature of the soil and groundwater contamination have been fully characterized and delineated. The results of most recent groundwater sampling data collected in May 2009, indicate the presence of dissolved phase contamination in shallow overburden groundwater. Monitoring wells contained one or more COCs at concentrations that exceeded the NYSDEC standards and/or MCLs. Ethylbenzene was detected in this area at 920 micrograms per liter (ug/L), xylene at 1100 ug/L, toluene at 460 ug/L, benzo(a)anthracene at 690 ug/L, naphthalene at 9600 ug/L. The extent of the groundwater plume coincides with the locations where DNAPL was observed in the subsurface. Groundwater contamination has not been detected in groundwater samples collected from monitoring wells located downgradient from this area, at monitoring wells MW-EPA-09 and MW-EPA-10. This newly identified

contamination is believed to have existed previously and not migrated through the barrier wall at the main portion of the Site, since monitoring wells immediately outside of the containment wall do not show any DNAPL or dissolved constituents.

In January 2010, the NYSDEC and NYSDOH completed the review of the recent site investigation data and concluded that soil vapor intrusion south of Excelsior Avenue is not a current exposure concern. If the area near the Old Red Spring is developed in the future, additional soil vapor intrusion evaluation should be conducted. National Grid has prepared a FS to identify and evaluate potential remedial alternatives to address environmental impacts associated with these areas. The FS report is currently under review by EPA and NYSDEC.

*Institutional Controls Implementation:*

As required in the ROD and ESD, two Environmental Protection Declarations of Covenants and Restrictions were filed with the Saratoga County Clerk's office covering the Niagara Mohawk property and the former Skating Rink property. The Declarations of Covenants and Restrictions were filed on July 14, 1999, and June 25, 2004, for the Niagara Mohawk property and the former Skating Rink property, respectively. Both Declarations of Covenants and Restrictions allow the properties to be used only for industrial or commercial purposes, and prohibit the residential use of these properties as long as hazardous substances remain on the properties; restrict the extraction consumption, exposure, and use of the groundwater (except as approved by EPA); prohibit the installation of groundwater wells (except as approved by EPA); and prohibit the disturbance of the of surface and subsurface of the land in any manner (except as approved by EPA). Regarding the impacted former Spa Steel property, On September 2006, an Agreement and Declaration of Covenants and Restrictions was signed by the owner of the Spa Steel property and Niagara Mohawk Power Corporation. The Agreement and Declaration of Covenants and Restrictions prohibits, among other restrictions, Spa Steel owner and any subsequent owner of the property from ever being used for purposes other than for commercial and/or industrial uses; prohibits the use of the groundwater underlying the property for drinking water and any other use without treatment; prohibits the disturbance of the implementation and maintenance of the remedial action.

*Operation, Maintenance and Monitoring (O, M &M):*

Site O, M &M activities are required for the Niagara Mohawk property, the former Skating Rink Area, the former Spa Steel property, and the disturbed wetlands areas in Spring Run Creek.

*Niagara Mohawk Property:*

Nine monitoring wells and piezometers were installed within and immediately surrounding the Niagara Mohawk property to facilitate the monitoring of groundwater quality both upgradient and downgradient of the property as well as to provide

groundwater elevations within the limits of the barrier wall system to verify an inward gradient is being maintained. Also, six DNAPL recovery wells were installed within the limits of the barrier wall system to facilitate the measurement and passive recovery of accumulated NAPL and DNAPL. These wells are sampled on a quarterly basis. Old Red Spring, located across the street from the Niagara Mohawk property, is also sampled on a quarterly basis. Other maintenance activities include site security fence, storm sewer drainage and asphalt cap.

*Skating Rink Property:*

Five monitoring wells were installed on the former Skating Rink property to facilitate the monitoring of groundwater quality both upgradient and downgradient. These wells were monitored on a quarterly basis from January 2003 to October 2005. Currently, these wells are monitored on a semiannual basis. Routine maintenance of the grass-covered area is performed on this property.

*Spring Run Creek Wetlands Areas:*

Approximately 2 acres of emergent, scrub-shrub, and forested wetlands adjacent to wetland areas in Spring Run Creek were disturbed by the temporary access roads and the sediment excavation. These impacted areas were restored in summer 2002. In accordance with the approved Wetlands Monitoring Plan, the restored wetlands are to be monitored and inspected annually for the first five growing seasons after the initial planting of vegetation. The annual monitoring consists of a qualitative inspection in the spring and quantitative vegetation monitoring in the summer each year. The spring inspection evaluates the condition of the wetland following the winter season and evaluates the need for maintenance activities to keep the wetland on track to meet the performance standards specified in the approved Wetlands Monitoring Plan.

Estimated annual O, M & M costs from April 1, 2006 to March 31, 2011 are presented below.

Category	Period of Service					5-Year Total
	4/1/06-3/31/07	4/1/07-3/31/08	4/1/08-3/31/09	4/1/09-3/31/10	4/1/10-3/31/11	
Labor/Travel Expenses	\$75,500	\$98,000	\$105,000	\$93,500	\$54,000	\$426,000
Equipment	\$14,500	\$19,000	\$24,500	\$17,500	\$7,000	\$82,500
Materials	\$10,500	\$17,500	\$25,500	\$17,500	\$10,500	\$81,500
Laboratory/Other Subcontractors	\$24,500	\$35,500	\$37,000	\$17,500	\$17,500	\$132,000
Utilities	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$10,500
Disposal Fees	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$12,500
USEPA	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$55,000
<b>Total Saratoga OM&amp;M Costs</b>	<b>\$140,500</b>	<b>\$185,500</b>	<b>\$207,500</b>	<b>\$161,500</b>	<b>\$104,500</b>	<b>\$799,500</b>

## V. Progress since the Last Five-Year Review

In the spring of 2008, RA activities were performed as an extension of the remedial actions completed at the NMPC property in 2002. The remedial actions address the area outside on the west side of the NMPC barrier wall and the 0.35-acre subsurface soil impacted portion of the former Spa Steel property. The RA activities include the following components:

- A vertical containment barrier wall.
- Impermeable surface cap.
- Groundwater extraction and treatment.
- Post-remedy monitoring.
- Deed restrictions.

The new barrier wall consisted of approximately 300 linear feet (LF) of water-tight steel sheeting. The sheeting was installed to an average depth of approximately 28-feet below ground surface, extending approximately 5 feet into the clay confining unit, was installed on the NMPC property and the impacted 0.35-acre Spa Steel property. Construction of Spa Steel monitoring wells (LTMW-11, LTMW-12, LTMP-12, LTMP-13) and a new extraction well (PW-5) in the Spa Steel area were completed in April 2009.

The last five-year review for this Site made some recommendations and identified several follow-up actions. The recommendations and follow-up actions, as well as their implementation status, are summarized in Table 3 (attached).

## VI. Five-Year Review Process

### *Community Notification and Involvement*

The EPA Community Involvement Coordinator for this Site, arranged for a notice to be published in a local newspaper, *The Saratogian* on March 9, 2011. This notice indicated that a five-year remedy review would be completed and comments on the remedy or the Site were welcome. The notice also identified the local information repositories.

### *Document Review*

The relevant documents and reports which were reviewed in the process of completing this five-year remedy review are included in Table 2.

### *Data Review*

Part of the remedy for the former NMPC site included a watertight sheet pile containment wall and a low permeability asphalt cap to minimize or eliminate the migration of potentially contaminated groundwater off the site. The sheet pile wall was installed to create a no flow boundary. The groundwater collection/treatment system was installed to create and maintain an inward gradient. The barrier wall has well pairs (one inside and one outside) that have been positioned to monitor the water levels

inside and outside the wall to ensure that a no flow boundary and inward gradient conditions are maintained. The property water table within the containment wall is lowered by the use of the five extraction wells. Hydraulic head elevations inside the containment wall are compared with the top of sheetpile elevations. Based on empirical water level measurements for the past five years, groundwater inside the containment area has never overtopped the containment wall. Chemical data collected from the wells outside the wall indicate that no contaminated groundwater is leaking through the containment wall.

In January 2003, National Grid initiated a post remedial groundwater monitoring program for both the Niagara Mohawk property and the former Skating Rink property. Groundwater monitoring has been conducted at these two areas to determine the effectiveness of the remedial action implemented at these areas.

In September 2008, seven new monitoring wells and piezometers were installed to provide additional information along the eastern wall of the NMPC barrier wall. The new wells are LTMW-14/LTMP-14/LTMP-14A (well cluster #14), LTMW-15/LTMP-15/LTMP-15A (well cluster #15) and LTMP-06A (a piezometer installed as part of well cluster #6).

Groundwater level measurements are conducted at all monitoring wells, piezometers, pumping wells and dry wells prior to sampling. Groundwater elevation data collected during this review period indicate that in general the elevations outside the wall were higher than inside the wall or an inward hydraulic gradient has been maintained within the sheet pile perimeter at the Niagara Mohawk property, with the exception of one well pair - LTMP-15 and LTMW-15. At this well groundwater elevations were higher inside the wall for six consecutive months (4-12-09 to 9-1-09). The chemical sampling data from the outside well, LTMW-15; however show no detections of site contaminants, and water from within the containment area does not overtop the barrier wall.

All the monitoring wells immediately outside the containment wall had no detectable levels of VOCs or PAHs with the exception of well LTMW-04 that had detections of 0.2 ug/l, phenanthrene in the January 5, 2009 sampling event; well LTMW-6A with detections of 0.6 ug/l naphthalene in the April 22-23, 2007 and July 9-10, 2007 sampling events; and well LTMW-7A that had a concentration of 0.3 ug/l of pyrene in the April 22-23, 2007 and July 9-10, 2007 sampling events. The October 7 2007 sampling event had no detectable levels of VOCs or PAHs above the detection limits. These detectable concentrations do not exceed MCLs. LTMW-7A is located within the Spa Steel property barrier wall and was decommissioned during the construction of the Spa Steel containment wall, in November 2007. The January 2011 and April 2011 sampling events had no detectable levels of VOCs or PAHs above the detection limits in all the monitoring wells surrounding the barrier wall.

Groundwater data from January 2006 to April 2011, from monitoring wells on the former Skating Rink property, and Old Red Spring (directly from the fountain) indicate that no concentrations of contaminants of concern have been detected above detection limits.

Restored wetlands at the Creek were monitored in May and August 2005, and in May and September 2006 and 2007. The vegetation was initially planted in summer 2002. The tree and shrub survival observed in spring 2007 in the mitigation area is slightly above the performance standard of 85%, and the 85% benchmark for herbaceous groundcover has also been exceeded. All restored wetlands have met their survival performance standards.

### *Site Inspection*

A site inspection was conducted on May 24, 2011, by EPA, the State, and NYSDOH. The following representatives of the review team were present:

Maria Jon, EPA	Diana Cutt, EPA
Larisa Romanowski, EPA	Marian Olsen, EPA
Scarlett Messier, NYSDOH	David Crosby, NYSDEC

Also present were National Grid representatives and its consultants:

Steven Stucker, National Grid	Matt Millias, CDM (PRP's consultant)
Bill Jones, National Grid	Tim Beaumont, CDM (PRP's consultant)

During the site inspection, no problems or issues with the ongoing remedial activities were noted.

### *Interviews*

No interviews were conducted during this five-year remedy review.

### *Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls*

Table 3 summarizes several observations and offers suggestions to resolve the issues.

## **VII. Technical Assessment**

### ***Question A: Is the remedy functioning as intended by the decision documents?***

The selected remedy entailed

- excavation and off-site disposal of highly contaminated soil and source areas containing coal tar waste on the Niagara Mohawk property;
- installation of subsurface barriers and drains, with DNAPL and groundwater collection sumps to contain contaminated subsurface soils and groundwater on the Niagara Mohawk property;
- installation of an asphalt cap to minimize infiltration by precipitation; and
- institutional controls and long-term monitoring.



The selected remedy also required excavation and off-site disposal of contaminated soils at the former Skating Rink property; and removal of contaminated sediments in Spring Run. The groundwater remedy for the Niagara Mohawk property consisted of hydraulic containment with sheet piling and a groundwater extraction system, and monitored natural attenuation in the former Skating Rink Area.

The data indicate that, at least in one instance, outward gradients (a higher gradient inside the sheet piling) occurred at three well-pair location at the Niagara Mohawk property. Except for the western portion of the Niagara Mohawk property, the groundwater outside the containment area has no indication of contaminants above the detection limits.

As indicated earlier, all the monitoring wells immediately outside the containment wall had no detectable levels of VOCs or PAHs with the exception of well LTMW-04 that had detections of: 0.2 ug/l (J) phenanthrene in the January 5, 2009 sampling event; well LTMW-6A with detections of 0.6 ug/l naphthalene in the April 22-23, 2007 and July 9-10, 2007 sampling events; and well LTMW-7A that had a concentration of 0.3 ug/l of pyrene in the April 22-23, 2007 and July 9-10, 2007 sampling events, and the October 7 2007, sampling event had no detectable levels of VOCs or PAHs. These detectable concentrations do not exceed MCLs and the concentrations in these wells were not detected in the previous sampling event. LTMW-7A is located within the Spa Steel property barrier wall and was decommissioned during the construction of the Spa Steel containment wall, in November 2007.

In general, the remedy is acting as intended in the original decision documents. Also, the containment wall is acting as envisioned with only minor detections of phenanthrene, naphthalene and pyrene in wells LTMW-04, LTMW-6A and LTMW-7A, but these detections are not above their respective MCLs. Hydraulic head elevations inside the containment wall are compared with the top of sheetpile elevations. Based on water level measurements for the past five years, groundwater inside the containment area has never overtopped the containment wall.

The ROD and ESD identified the need for establishment of Institutional Controls and ongoing monitoring at these properties. Institutional controls and deed restrictions are in place for the NMCP, the Skating Rink, and former Spa Steel properties.

Drinking water is currently supplied to residents in Saratoga Springs from Loughberry Lake, which is located approximately 2,000 feet upgradient of the Site. The Old Red Spring extracts groundwater under artesian conditions from the deep bedrock aquifer located within shale bedrock at depths greater than 150 feet bgs. This bedrock zone is separated from the overburden groundwater zone by a thick clay confining layer. This clay layer is over 50 ft thick. Results of periodic groundwater sampling collected at the Old Red Spring continually confirm that COCs are not detected in the groundwater from this well. Current local zoning at the Site restricts the use of groundwater from the overburden as a potable source. Furthermore, the New York Sanitary Code (Title 10 of the New York Code of Rules and Regulations Section 5-2.4) states that "No person shall construct or abandon any water well unless a permit has first been secured from the

permit issuing official.” Based on these statutory controls, it is likely that most potable uses of the Site groundwater would not be permitted while remediation is on-going at the Site.

***Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?***

The 1995 site-specific risk assessment, conducted in the absence of remedial action, found risks above the risk range for industrial workers and excavators at the Niagara Mohawk property through exposures to contaminants in soils. Risks were also identified for adolescents using the wetlands area for recreation; and future risks were identified for area residents from exposures through ingestion of groundwater from the shallow aquifer. The primary contaminants of concern in soil were antimony, iron and arsenic. The primary contaminants of concern in groundwater were VOCs and PAHs.

The Site includes several distinct sections: 1) the Niagara Mohawk property, 2) the former Skating Ring property, 3) three sections of the Spring Run Creek, 4) a portion of the former Spa Steel property, and 5) newly identified areas on and south of Excelsior Avenue (These areas are not part of the 1995 ROD).

The fence surrounding the Niagara Mohawk property limits access to the property and the asphalt cover on the property prevents direct contact with contaminated soil and the contaminated groundwater remaining beneath the cap. At the former Skating Rink Area, the area is not fenced but the removal of subsurface contaminated soil to industrial/commercial and groundwater protection cleanup levels was completed, and coverage with clean soil serves as a barrier to direct contact and ingestion of contaminated soil. The former Spa Steel property has an impermeable surface cover which prevents exposure to the contaminants while the construction of the parking lot continues. Institutional controls, including Deed Restrictions are in place.

Residents in the area of the Site receive their drinking water from public drinking water supplies, so exposure to contaminated on-site shallow groundwater is not occurring. The contaminants under the Niagara Mohawk property and the former Spa Steel property are generally contained within a sheet pile barrier wall and an inward hydraulic gradient is maintained so that the contaminated groundwater does not migrate off-site except as noted above. Old Red Spring, the drinking water fountain across the street from the Niagara Mohawk property that draws water from the aquifer below the clay unit, is tested by National Grid on an on-going basis and concentrations of contaminants of concern associated with the Site have not been detected above detection limits.

Soil and groundwater use at the Site are not expected to change during the next five years, the period of time considered in this review. The land use considerations and potential exposure pathways considered in the baseline human health risk assessment are consistent with the current land use.

The ROD established the MCLs as the cleanup criteria for the groundwater contaminants of concern identified in the Skating Rink Area. The MCLs are protective of public health. Federal and state MCLs were waived for the Niagara Mohawk property groundwater in the shallow aquifer based on technical impracticability. The area with the technical impracticability waiver is being contained through maintaining an inward hydraulic gradient within the limits of the barrier wall surrounding the Niagara Mohawk property.

The exposure assumptions used in the original risk assessment are consistent with current guidance. Table 4 provides a comparison of the Cleanup Goals identified in the ESD for the Skating Rink property with Preliminary Remediation Goals from the Regional Screening Levels for industrial land use (Regional Screening Levels are available at: [http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\\_table/Generic\\_Tables/pdf/indsoil\\_sl\\_table\\_run\\_JUN2011.pdf](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/indsoil_sl_table_run_JUN2011.pdf)). All of the cleanup goals for the former Skating Rink are within EPA's cancer risk range and non-cancer health hazards assuming an industrial/commercial use.

Vapor Intrusion involves volatile organic compounds in the groundwater moving into the *soil vapor (air spaces within the soil)*, which in turn may move into overlying buildings and affect the indoor air quality. There are no buildings in the affected area south of Excelsior Avenue. The area south of Excelsior Avenue was evaluated for soil vapor intrusion by NYSDOH. NYSDOH reviewed groundwater concentrations, location of DNAPL, and hydrogeologic conditions in the area to evaluate how residual contaminants could move in the groundwater, and potentially affect indoor air. NYSDOH found that the contamination was stable and not moving under present conditions. These current conditions make soil vapor intrusion unlikely in this area and no sampling is needed. Environmental sampling further indicates that vapor intrusion is not a concern south of Excelsior Avenue. The NYSDOH recommends that in the event that any buildings are constructed in the future in areas on or around the site where DNAPL or groundwater contamination is observed, a separate soil vapor intrusion evaluation be conducted at that time to determine the potential need for mitigation.

Soil vapor intrusion was evaluated based on the highest groundwater concentrations found at two wells located in the former Spa Steel property. Table 5 provides a comparison of the highest concentrations found in wells SS-1 and SS-2 (these monitoring wells were located within the Spa Steel property barrier wall and were decommissioned during the construction of the Spa Steel containment wall, in November 2007) during the July 9-10, 2007 and April 22-23, 2007 sampling events, respectively. These highest values were compared to the residential values identified in the OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway for Groundwater and Soil (values available at: <http://www.epa.gov/osw/hazard/correctiveaction/eis/vapor/tables.pdf>). The comparison values were exceeded for benzene, ethylbenzene and naphthalene. These results indicate that further evaluation of potential vapor intrusion may be necessary in the event of construction of a building in the area above the residual coal tar.

The toxicity values for several of the contaminants of concern were updated through the Agency's Integrated Risk Information System (IRIS) that contains the Agency's consensus toxicity values. Chemical toxicity values updated since the original risk assessment include: benzene, toluene, xylenes, 2-methylnaphthalene, and naphthalene. At the current time, updates to the toxicity values for PAH mixtures and benzo(a)pyrene are underway through the Agency's IRIS process (full list available at [www.epa.gov/iris](http://www.epa.gov/iris)). The updates to toxicity information for these chemicals should be evaluated at the next five-year review.

Overall, based on the past remedial action and ongoing monitoring at the Site, the remedy remains protective while remediation is on-going at the Site.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?***

No. There are no newly identified ecological risk identified and no other information that could affect the protectiveness of the remedy.

***Technical Assessment Summary***

This five-year review finds that:

- The asphalt cap is intact and in good condition;
- Monitoring wells are functional;
- A fence around the site is intact and in good repair;
- Access controls appear to be preventing trespassing and vandalism;
- No one is drinking groundwater with Site related contamination above drinking water standards;
- Institutional controls prevent groundwater withdrawals which would affect the remedy;
- The treatment system is being maintained and operated properly; and
- Wetlands and upland forested areas have sustained plant life

**VIII. Issues, Recommendations and Follow-up Actions**

Table 3b identifies issues or recommends actions at this Site. The Site has not achieved construction completion status. The newly identified residual coal tar areas in the subsurface soil and groundwater outside of the containment barrier wall, on a portion of Excelsior Avenue, and parcels owned by the City of Saratoga Springs (the Old Red Spring Area) and by the Mill LLC (small area in the parking lot) need to be addressed and a final remedy selected.

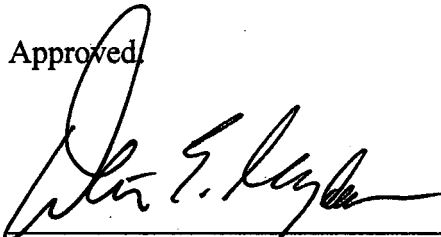
**IX. Protectiveness Statement(s)**

This is the second five-year review for the Niagara Mohawk Power Corporation Superfund Site. The remedy at the Niagara Mohawk Power Corporation Superfund site is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled by the engineered, access and institutional controls that are currently in place. These controls are properly operated, monitored, and maintained.

**X. Next Review**

The next five-year review for the Niagara Mohawk Power Corporation Superfund Site should be completed before August 2016, which is five years from this report's approval date.

Approved



\_\_\_\_\_  
Walter E. Mugdan, Director  
Emergency and Remedial Response Division

8/24/2011  
Date

<b>Table 1: Chronology of Site Events</b>	
<b>Event</b>	<b>Date</b>
Initial discovery of problem or contamination	1982
NPL listing	1990
Remedial Investigation/Feasibility Study complete	1995
ROD signature	1995
ESD	2001
Consent Decree for Remedial Design and Remedial Action	1996
Remedial design complete	2000
Actual remedial action start for remedy described in 1995 ROD	2001
Discovery of additional areas of residual coal tar contamination	2006 - 2007
Remedial Investigation/Feasibility Study for newly discovered areas of soil contamination	2009- 2011

<b>Table 2: Documents, Data, and Information Reviewed in Completing the Five-Year Review</b>	
<b>Document Title, Author</b>	<b>Submittal Date</b>
Remedial Investigation/Feasibility Study, RETEC/Atlantic	1992/1995
Record of Decision, EPA	1995
Explanation of Significant Differences, EPA	2001
Final Design Report, BBL	2001
Draft Remedial Action Close-Out Report, BBL	2004
Quarterly Groundwater Monitoring Reports, 2007 Sampling Events	March 2007 August 2007 November 2007 January 2008
Quarterly Groundwater Monitoring Reports, 2008 Sampling Events	March 2008 August 2008 November 2008 February 2009
Quarterly Groundwater Monitoring Reports, 2009 Sampling Events	April 2009 August 2009 November 2009 January 2010
Quarterly Groundwater Monitoring Reports, 2010 Sampling Events	April 2010 August 2010 November 2010 January 2011
Quarterly Groundwater Monitoring Reports, 2011 Sampling Event	April 2011

**Table 3a Recommendations and Follow-up Actions from the 2006 Five-Year Review**

Issue	Recommendations and Follow-up Actions	Status
An inward hydraulic gradient within the limits of the barrier wall around the Niagara Mohawk property should always be maintained	EPA will continue to assess the performance of the remedy with the existing groundwater monitoring network.	On-going
Modify the O & M report to include DNAPL detection and recovery data (i.e., thickness, amount recovered).	EPA will review the change in the reporting requirement.	Implemented. DNAPL detection and recovery data are reported.
Revisit the monitoring well sampling frequency and parameters for the former Skating Rink Property. It is likely that the sampling frequency can be reduced from semi-annual to annually	EPA will notify National Grid of this reduction in sampling frequency.	Not approved at this time.
Given the groundwater contamination that has been discovered in the area adjacent to the western side of the Niagara Mohawk property containment wall (i.e., Spa Steel property), it is possible that the perimeter groundwater drainage system located outside the containment wall in the MGP area may be collecting contaminated groundwater along the western portion of the Site and ultimately discharging it to Spring Run Creek. This drainage pipe is situated above the groundwater elevation in the vicinity of the Spa Steel property; however, during heavy rain the water table might be high. Inspections of the drainage system conducted on 5/16/06, 6/6/06 (after a rainfall event) and 6/10-12/06 indicated that the drainage pipe did not have any water.	The western section of the drainage pipe located adjacent to the Spa Steel property should be inspected on a routine basis until the new containment barrier wall around a portion of the Spa Steel property is in place. The new extension of the barrier wall will preclude any contaminated groundwater from entering the drainage system.	Implemented. The extension of the barrier wall around the 0.35-acre Spa Steel property has been constructed.



**Table 3b Recommendations and Follow-up Actions**

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Eliminate the monitored natural attenuation parameters on the Skating rink.	Based on the results of the groundwater data for the last 5 years (no detection of contaminants), the monitoring of natural attenuation parameters may be eliminated.	PRP	EPA	Next monitoring event	N	N
Improve the DNAPL extraction efficiency within the containment area pursuant to the remedy outlined in the ROD which includes the collection and removal, to the extent possible, any potential DNAPL beneath the NMPC property.	DNAPL within the containment area does not readily enter the passive DNAPL collection wells. DNAPL has been removed from the groundwater extraction wells. EPA has requested to install a DNAPL passive well near the pumping well 5 (PW-5). EPA will continue discussions with National Grid on this issue.	PRP	EPA		N	N
Complete the remaining RA activities (installation of monitoring wells and final paving) on the former Spa Steel area.	National Grid should complete the remaining RA activities on the Spa Steel area as soon as the parking lot construction is complete	PRP	EPA	2012	N	N
Select remedy for the newly identified areas of contamination	FS should be completed. Select and implement the selected remedy	PRP/EPA	EPA/DEC	2013/2014	Y	Y

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Improve the reporting of the water elevation measurements from the well pairs inside and outside of the containment wall by organizing the data in a side-by-side fashion for each pair.	EPA will review the change in the reporting requirement.	PRP	EPA	Next reporting period	N	N

**Table 4.** Comparison of Remedial Action Goals for the former Skating Rink Soils to Industrial Risk Based Cleanup Goals based on the Regional Screening Level Tables ([http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\\_table/Generic\\_Tables/pdf/indsoil\\_sl\\_table\\_run\\_JUN2011.pdf](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/indsoil_sl_table_run_JUN2011.pdf)).

Chemical	Cleanup Goals Based on Impact to Groundwater Values from 2001 Explanation of Significant Differences	Cleanup Goals Based on Industrial Direct Contact/Ingestion Associated with Risk of $10^{-6}$ (one in a Million)	Cleanup Goals Based on Industrial Direct Contact/Ingestion Associated with a non-cancer Hazard Quotient (HQ = 1).
<b>Volatile Organic Compounds (ppm)</b>			
Benzene	0.06	5.4	450
Ethylbenzene	5.5	27	2.1E+4
Toluene	1.5		4.5E+4
Xylenes	1.2		2.7E+3
<b>Polycyclic Aromatic Hydrocarbons (ppm)</b>			
Acenaphthene	90		3.3E+4
Acenaphthylene	41		3.3E+4
Anthracene	50		1.7E+5
Benzo(a)anthracene	3	2.1	
Benzo(b)fluoranthene	1.1	2.1	
Benzo(k)fluoranthene	1.1	21	
Benzo(a)pyrene	11	0.21	
Chrysene	0.4	210	
Dibenzo(a,h)anthracene	0.29	0.21	
Dibenzofuran	6.2		1E+3
Fluoranthene	1900		2.2E+4
Indeno(1,2,3-cd)pyrene	3.2	2.1	
2-methyl naphthalene	36.4		4.1E+3
Naphthenele	13	18	6.2E+2
Phenanthrene	220	RSL not available.	
Pyrene	665		1.7E+4
<b>Inorganics (ppm)</b>			
Antimony	28		410
Lead	400		400 (value based on blood lead level)
Mercury	0.1		43

**Table 5.** Comparison of Groundwater Contamination from Well SS-02 and SS-01 (where noted) at the former Spa Steel Area to Soil Vapor Intrusion Values from the 2001 Draft Guidance on Soil Vapor Intrusion (<http://www.epa.gov/osw/hazard/correctiveaction/eis/vapor/tables.pdf>).

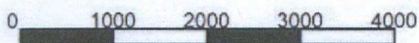
Chemical	Maximum Groundwater Concentration (ug/l)	Well Location	Cleanup Goals Based on Industrial Direct Contact/Ingestion Associated with Risk of $10^{-6}$ (one in a Million)	Cleanup Goals Based on Industrial Direct Contact/Ingestion Associated with a Hazard Quotient = 1 (HQ = 1)	Result of Comparison
<b>Benzene</b>	<b>11000</b>	<b>SS-02</b>	<b>140</b>		<b>Exceeds Risk Range</b>
Toluene	750	SS-02		1500	Less than risk range.
<b>Ethylbenzene</b>	<b>2300</b>	<b>SS-02</b>			<b>700 ug/l listed as MCL in guidance documents. Concentration is greater than guidance value.</b>
Xylene	1800	SS-02		22000	Less than risk range.
Acenaphthene	190	SS-02	Target soil gas concentration exceeds maximum possible vapor concentrations (pathway incomplete)		
Acenaphthylene	10	SS-01	Target soil gas concentration exceeds maximum possible vapor concentration (pathway incomplete)		
Anthracene	6	SS-02	Chemical listed as not sufficiently toxic to be considered for vapor intrusion		
Fluorene	39	SS-02	Target soil gas concentration exceeds maximum possible vapor concentrations (pathway incomplete)		
2-methyl naphthalene	620	SS-02		3300	Less than risk range
<b>Naphthalene</b>	<b>4900</b>	<b>SS-02</b>		<b>150</b>	<b>Greater than risk range.</b>
Phenanthrene	32	SS-02	No values provided in guidance document.		



Notes:

Saratoga Springs, NY, United States

USGS Topo. Quads. 1967



APPROXIMATE SCALE



QUADRANGLE LOCATION

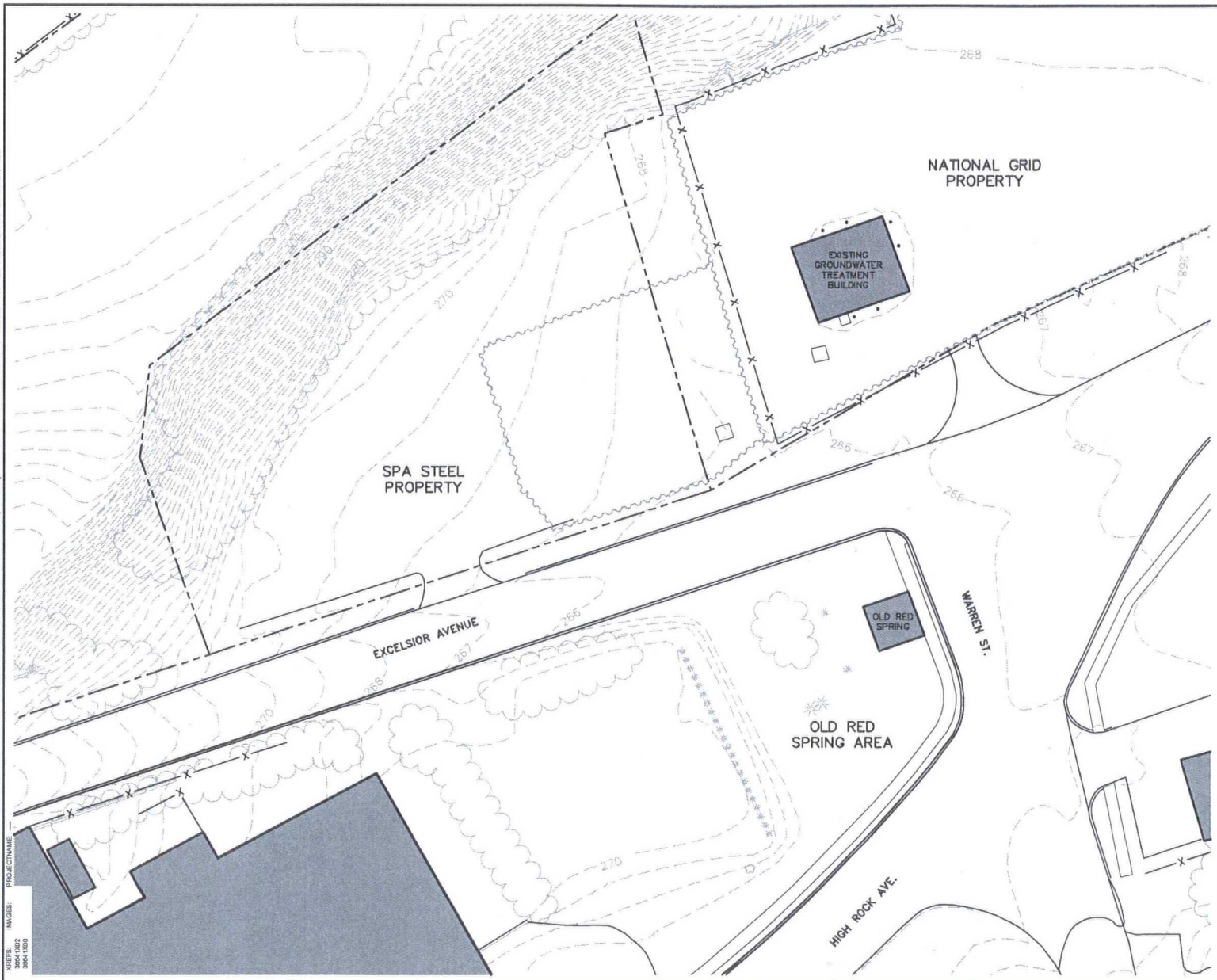
NATIONAL GRID  
FORMER SARATOGA SPRINGS MGP  
SARATOGA SPRINGS, NEW YORK

SITE LOCATION MAP

Figure

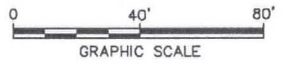
1

CITY: SARASOTA DIV: GROUP: ENV: CAD: DR: R: BASSETT, L: FORNER, D: WIDARCZYK, LD: RIC: J: NEISS, RM: K: CROWLEY, TM: K: CROWLEY, LYR: OM: "OFF"-"REP"  
 C:\ENVCAD\SRV\PROJECT\1000000000\DWG\DWG\COUSE\DWG\1000000000.DWG LAYOUT: 2 SAVER: 7/29/2009 10:52 AM ACADVER: 17.08 (LMS TECH) PAPERSETUP  
 PROJECT NAME: SARASOTA  
 IMAGES: 39641202



- LEGEND:**
- PROPERTY LINE (APPROXIMATE)
  - X- CHAINLINK FENCE
  - - - GROUND SURFACE CONTOUR (ONE-FOOT INTERVAL)
  - ~~~~~ EXISTING SUBGRADE SHEET PILE BARRIER WALL
  - ~~~~~ TREE/BRUSH LINE
  - \* \* \* \* \* TREE/BRUSH
  - BUILDING/STRUCTURE

- NOTES:**
1. BASE MAPPING WAS COMPILED FROM A COMBINATION OF STEREOPHOTODIAGRAMMETRIC METHODS, AERIAL PHOTOGRAPHY FLOWN ON 8/88 AND 11/88 BY LOCKWOOD MAPPING COMPANY; AS-BUILT RECORD DRAWINGS FOR COMPLETED REMEDIATION ACTIVITIES AT THE SPA STEEL PRODUCTS PROPERTY; AND FIELD SURVEY METHODS ON 5/98, PROVIDED BY NIAGARA MOHAWK, SURVEY REFERENCE FILE NO. 3435, FILE INDEX 21.0-SZ18-1449, AND A NEW SURVEY FILE NO. 01135-1.DWG RECEIVED 8/19/02.
  2. PROPERTY INFORMATION TAKEN FROM "CITY OF SARATOGA SPRINGS, SARATOGA COUNTY, N.Y. TAX MAPS" NUMBERED 153.00(00), 166.00(00), 165.39(00), 166.00(00), 166.05(00), 166.11(00), 166.21(00), 166.22(00), 166.30(00), 166.31(00), 166.37(00), 166.38(00), AND 166.39(00).
  3. ELEVATIONS ARE BASED ON NAVD 86 USING STATION G396, ELEVATION 306.010 FEET.



NATIONAL GRID  
 OLD RED SPRING AREA  
 SARATOGA SPRINGS FORMER MANUFACTURED GAS PLANT (MGP) SITE  
**FOCUSED FEASIBILITY STUDY REPORT**

**SITE AND SURROUNDING AREAS**



Areal Photo – Niagara Mohawk Power Corporation, Former Saratoga Springs, NY MGP