RECORD OF DECISION

Niagara Mohawk (NM) – Hiawatha Boulevard - Syracuse Former MGP Site
Subsite of the Onondaga Lake Site
City of Syracuse, Onondaga County, New York
Site No. 7-34-059

NYSDEC

EPA Region 2

March 2010

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
NEW YORK, NEW YORK

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Niagara Mohawk (NM) – Hiawatha Boulevard - Syracuse Former MGP Site[1]
Subsite of the Onondaga Lake Superfund Site
City of Syracuse, Onondaga County, New York

Superfund Site Identification Number: NYD986913580
Operable Unit 13

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency's (EPA's) selection of a remedy for the NM – Hiawatha Boulevard - Syracuse Former Manufactured Gas Plant site (Site), a subsite of the Onondaga Lake Superfund site. The selected remedy is chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 US Code (USC) §9601, *et seq*., and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations Part 300. This decision document explains the factual and legal basis for selecting the remedy for this Site. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selection of the remedy is based.

The New York State Department of Health was consulted on the proposed remedy in accordance with CERCLA Section 121(f), 42 USC §9621(f), and it concurs with the selected remedy.

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 selected remedy consists of the in-situ solidification (ISS) of an estimated 14,500 cubic yards of contaminated soil, enhanced bioremediation of contaminated groundwater along portions of the New York State Barge Canal and Onondaga Lake, installation of a soil cover system, development of a Site Management Plan, and institutional controls. The selected remedy is expected to reduce the site's contribution to future contamination of the Onondaga Lake Superfund site.

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1 This is also being tracked in EPA's CERCLIS data base as Operable Unit #13 of the Onondaga Lake National Priorities List (NPL) Site.

During the design phase, bench- and pilot-scale treatability studies will be performed to evaluate the effectiveness of various soil stabilization mixtures at reducing the leachability and permeability of the impacted soil, including the Solvay waste, at the Site.

The environmental benefits of the selected remedy may be enhanced by consideration, during remedial design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green policy[2]. This will include consideration of green remediation technologies and practices.

The selected remedy for this Site will result in a long-term reduction in the toxicity, mobility, or volume of the contaminants of concern, namely, volatile organic compounds and polycyclic aromatic hydrocarbons.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 USC §9621, because it: 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants, and contaminants, which attains the legally applicable or relevant and appropriate requirements under federal and state laws; 3) is cost effective; 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable; and 5) satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as their principal element.

Because this remedy will result in contaminants remaining on-Site above levels that would allow for unlimited use and unrestricted exposure to Site media, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional remedial actions may be selected and implemented to remove, treat, or contain the contaminated sediments and soils.

ROD DATA CERTIFICATION CHECKLIST

This ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this Site.

- Contaminants of concern and their respective concentrations (see ROD, pages 8 to 11).
- Baseline risk represented by the contaminants of concern (see ROD, pages 12 to 14).
- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD page 9).
- Manner of addressing source materials constituting principal threats (see ROD, page 28).
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of surface water and groundwater used in the baseline risk assessment and ROD (see ROD, page 11).

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2 See http://epa.gov/region2/superfund/green_remediation.

- Potential land, surface water, and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, page 11).

- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are projected (see ROD, pages 17 to 22).

- Key factors used in selecting the remedy (e.g., how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (see ROD, pages 28 to 32).

AUTHORIZING SIGNATURES

/S/	03/31/2010
Dale A. Desnoyers, Director Division of Environmental Remediation NYSDEC	Date
/S/	03/31/2010
Walter E. Mugdan, Director Emergency and Remedial Response Division EPA, Region 2	Date

RECORD OF DECISION FACT SHEET
EPA REGION 2

Site

Site name:	Niagara Mohawk (NM) – Hiawatha Boulevard - Syracuse Former MGP Site, a Subsite of the Onondaga Lake Superfund Site
Site location:	City of Syracuse, Onondaga County, New York
HRS score:	50
Listed on the NPL:	December 16, 1994

Record of Decision

Date signed:	March 31, 2010
Selected remedy:	In-situ solidification of source areas, enhanced bioremediation of groundwater, soil cover system and institutional controls
Capital cost:	$7,826,000
Operation and maintenance cost:	$151,000 - $207,000 per year
Present-worth cost:	$10,389,000

Lead

NYSDEC

Primary Contact:	Anthony Karwiel, Project Manager, NYSDEC, (518) 402-9662
Secondary Contact:	George Heitzman, Section Chief, NYSDEC, (518) 402-9662

Main PRP

National Grid

Waste

Waste type:	Manufactured gas plant tars, volatile organic compounds (i.e., benzene, toluene, ethylbenzene, xylenes) and semi-volatile organic compounds (i.e., naphthalene, polycyclic aromatic hydrocarbons)
Waste origin:	Discharges from the NM – Hiawatha Boulevard - Syracuse Former MGP Site to soils and groundwater
Contaminated media:	Soil and groundwater

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DECISION SUMMARY

Niagara Mohawk (NM) – Hiawatha Boulevard - Syracuse Former MGP Site
Subsite of the Onondaga Lake Site
City of Syracuse, Onondaga County, New York
Site No. 7-34-059

March 2010

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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LIST OF ACRONYMS AND ABBREVIATIONS USED IN ROD AND RESPONSIVENESS SUMMARY

AMSL	Above Mean Sea Level
ARAR	Applicable or Relevant and Appropriate Requirement
BERA	Baseline Ecological Risk Assessment
bgs	Below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CAMP	Community Air Monitoring Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
cm	centimeter
COPC	Chemical (or Contaminant) of Potential Concern
CSF	Carcinogenic Slope Factor
CWA	Clean Water Act
cy	cubic yard
DO	Dissolved Oxygen
ECL	Environmental Conservation Law
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
ft	feet/foot
GAC	Granular Activated Carbon
gal/min	gallons per minute
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IRM	Interim Remedial Measure
ISS	In-situ Solidification
kg	kilogram
km	kilometer
m	meter
Metro STP	Metropolitan Syracuse Sewage Treatment Plant
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MGP	Manufactured Gas Plant
mi	mile
NAPL	Non-Aqueous-Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NM	Niagara Mohawk
NPL	National Priorities List

NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PRAP	Proposed Remedial Action Plan
PRP	Potentially Responsible Party
PSA	Preliminary Site Assessment
RAO	Remedial Action Objective
RfD	Reference Dose
RG	Remediation Goal
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SVOC	Semi-volatile Organic Compound
TBC	To-Be-Considered
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
µg/kg	micrograms per kilogram
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound

SITE NAME, LOCATION, AND DESCRIPTION

On June 23, 1989, the Onondaga Lake site was added to the New York State Registry of Inactive Hazardous Waste disposal sites. On December 16, 1994, Onondaga Lake and its tributaries and the upland hazardous waste sites which have contributed or are contributing contamination to the lake (subsites) were added to the National Priorities List (NPL). This NPL listing means that the lake system is among the nation's highest priorities for remedial evaluation and response under the federal Superfund law for sites where there have been a release of hazardous substances, pollutants, or contaminants. The Niagara Mohawk (NM) – Hiawatha Boulevard - Syracuse Former Manufactured Gas Plant (MGP) site (Site) was included as a subsite of the Onondaga Lake Superfund site on March 11, 2010.

The Site is located in an industrial area at the southeast end of Onondaga Lake, within the City of Syracuse, Onondaga County, New York (see Figure 1). The former manufactured gas plant (MGP) was located on the northern portion of property currently owned by Onondaga County and occupied by the Metropolitan Sewage Treatment Plant (Metro STP). In the years after gas production ceased, the former MGP structures were razed and the Metro STP used the Site for expansion of the treatment plant. Today, much of the property is covered with structures associated with the treatment plant, including clarifiers, aeration tanks and an ammonia and phosphorus removal facility. The remainder of the Site is primarily covered by driveways, paved parking lots, and a county maintenance building. The existing Site layout and limits of the former MGP are shown on Figure 2. The former MGP is approximately twenty-three acres in area, and is bounded to the north by the barge canal, to the east by Hiawatha Boulevard, to the south by the Metro STP, and to the west by Onondaga Lake.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Site History

Onondaga Lake and the surrounding areas have been significantly altered over the last two centuries through human activities. The lake level was lowered in the early 1800s to drain marsh lands adjacent to the lake in order to accommodate the construction of the Erie Canal and raised in the 1850s to its present day elevation. The salt industry, chemical industry, urban development and transportation corridors have all changed the lake and its shoreline.

The original Site area was the result of filling into low-lying areas associated with the construction of the Erie Canal and the eventual rerouting of Onondaga Creek. In the late 1800s, the Site was used as a fill area for Solvay Process waste[3]. A fertilizer manufacturer, the Syracuse Reduction and Manufacturing Company, operated on this Site in the early 1900s. The dates of operation of the fertilizer plant are not known but the facility is shown on a 1911 Sanborn map.

An MGP is a facility where gas for lighting and heating homes and businesses was produced. Manufactured gas was produced at this Site using both the coal gasification and carburetted water gas processes. In 1924, the facility was operated by the Syracuse Lighting Company and was then, in 1937, consolidated into Niagara Hudson Public Service Corporation. The company was renamed in late 1937, to the Central New York Power Corporation and operated under that name until 1950 when the facility was taken over by the Niagara Mohawk Power Corporation. Coal gas was produced on-Site until 1941, and then carburetted water gas was produced from 1941 to 1953.

Coal gas was produced by heating coal in retorts or beehive ovens, carbonizing the coal in the absence of air. The carburetted water gas process involved the passage of steam through burning coal. This

[3] The Solvay Process waste was a byproduct of the production of soda ash (sodium carbonate).

formed a gaseous mixture (water gas or blue gas) which was then passed through a super heater which had an oil spray. The oil spray would generate additional gas, enhancing the heat and light capacity of the overall gas mixture.

In each process, the gas produced was cooled and purified prior to distribution. During the cooling, an oily liquid known as coal tar would condense from the hot gas and settle in the bottom of gas holders, pipes, and other structures. Typically, these structures were built below the ground surface, and would utilize groundwater as a bottom seal for cooling and pressure purposes. Hence, these structures have a significant potential to introduce byproducts from the coal gasification and carburetted water gas processes directly into the Site groundwater and subsurface soils.

The production of manufactured gas and the generation of related by-products resulted in the release of hazardous substances, including MGP tars and purifier waste into the soil and groundwater at the Site. These wastes contain benzene, toluene, ethylbenzene and xylene (BTEX), as well as a number of polycyclic aromatic hydrocarbons (PAHs) and cyanide.

Remedial History

Investigations and remedial actions were performed at the Site preceding the remedial investigation (RI) and reports were prepared by the various entities that were involved.

A subsurface soil investigation was conducted by O'Brien & Gere Engineers, Inc. from March 1970 to May 1971 on a large, multi-parcel area which included a majority of the Site. The purpose of this investigation was to characterize the area for the pending construction of upgrades to the Metro STP. No environmental sampling or analysis was performed as part of this investigation.

Construction records indicate that during the construction of the treatment plant expansion in the 1970s, the subsurface portions of the former gas distribution holder, the former relief holder, and the former tar separator were removed. The secondary clarifiers extend over the entire tar separator footprint, most of the relief holder footprint, and a portion of the distribution holder footprint. The bottom of the clarifier foundations slope from approximately 10.5 feet below ground surface (bgs) to approximately 23 feet bgs, indicating that the entire subsurface portion of these structures were completely removed. The analytical data from subsequent soil and groundwater sampling investigations support that there are likely no continuous or ongoing sources of impacted soils related to these former MGP structures.

In 1985, a test pit sampling program was conducted as part of the design for a proposed fuel island installation at Niagara Mohawk's service center. Three soil samples were collected from the test pit area. Laboratory analysis indicated low levels of arsenic and selenium which fell within background concentrations for the Eastern United States. In November 1987, EPA conducted a preliminary site assessment at the "Hiawatha Gas Plant," consisting of a site visit and walk-around, but no environmental samples were obtained for analysis.

The Site was the subject of a Preliminary Site Assessment (PSA) conducted between August 1995 and September 1998. The PSA characterized subsurface conditions and the nature and occurrence of chemical contaminants in the soil and groundwater at the Site, as well as near-shore sediments in Onondaga Lake. The study also included a fish and wildlife impact assessment and a preliminary risk assessment to evaluate potential exposure pathways of contaminants detected in soil and groundwater on-Site.

Interim Remedial Measures

Interim remedial measures (IRMs) are conducted at sites when a source of contamination or exposure pathway can be effectively addressed before completion of the RI and feasibility study (RI/FS).

Concurrent with the RI activities at the Site, Onondaga County acquired the Niagara Mohawk property to construct an ammonia removal/stage II phosphorus facility. Work on this project began in September 2001. Preliminary results of the PSA and RI indicated that contaminated soils were located within the proposed limits of the excavation of the foundations for the facility.

Based on the construction schedule required for the County's project, impacted soils in the construction zone required remediation (removal) before the RI/FS for the Site could be completed. Therefore, the removal of these soils was performed as an IRM between September 2001 and May 2002. The IRM included the removal of soils beneath the footprint of the County's facility upgrade and the excavation of trenches for the 72-inch and 84-inch diameter force mains and other piping, such as public water, storm and sanitary sewers, and electric utilities. Soils were excavated to a depth of approximately 15 feet throughout the footprint and to a depth of approximately 20 feet in an area where stained soils and non-aqueous phase liquid (NAPL) lenses and globules were observed in deeper soil samples. More than 100 wood foundation pilings associated with former MGP structures were also removed from the main excavation during the IRM. Approximately 73,000 cubic yards (cy) of contaminated soil was excavated from the Site during the IRM. In February 2003, an additional 325 cy of impacted soil was excavated from the area located adjacent to the northeast corner of the IRM footprint when a water line was connected to the County's administration building. These soils were disposed at permitted solid waste disposal facilities. Between September 2001 and May 2002, approximately 85,000,000 gallons of impacted groundwater was extracted and treated in the on-Site treatment unit prior to discharge under permit to the Metro STP. Dewatering operations continued through February 2003 during the construction phase of the Metro STP upgrade, resulting in the total extraction and treatment of more than 283,000,000 gallons of contaminated groundwater. Figure 3 indicates the IRM soil removal areas as well as historic soil removal activities associated with expansion of the Metro STP.

Remedial Investigation and Feasibility Study

An RI/FS was conducted to determine the nature and extent of the contamination at and emanating from the Site and to identify and evaluate remedial alternatives to address the contamination. The RI was conducted in phases between 2000 and 2006 to accommodate a court-mandated Onondaga County Metro STP expansion, culminating in the completion of an RI report in October 2006. An FS report was completed in October 2009.

Enforcement Status

Potentially Responsible Parties (PRPs) (past or present owners and operators, waste generators, and haulers) may be legally liable for investigating and remediating contamination at Superfund sites. NYSDEC and National Grid/Niagara Mohawk (NiMo), a PRP, entered into multi-site Consent Orders on December 7, 1992 (#D0-0001-9210) and on November 7, 2003 (#A4-0473-0000). These Consent Orders obligate NiMo to investigate and implement a full remedial program for 21 former MGP sites across the State, including the Site.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI and FS reports describe the nature and extent of the contamination at and emanating from the Site and evaluate remedial alternatives to address this contamination. The February 2010 Proposed Remedial Action Plan (PRAP) identified NYSDEC and EPA's preferred remedy and the basis for that preference. These documents were made available to the public in both the Administrative Record and information repositories maintained at the NYSDEC Region 7 Office, 615 Erie Boulevard West, Syracuse, New York; NYSDEC Central Office, 625 Broadway, Albany, New York; and Onondaga County Public Library Syracuse Branch, 447 South Salina Street, Syracuse, New York.

A notice of the commencement of the public comment period related to the preferred remedy, the public meeting date, contact information, and the availability of the above-referenced documents was published in the *Syracuse Post-Standard* on March 3, 2010. The public comment period opened on February 25, 2010. NYSDEC held a public meeting on March 18, 2010 at the NYSDEC Region 7 Office, 615 Erie Boulevard West, Syracuse, New York to present the findings of the RI, FS, and PRAP, and to answer questions from the public about the Site and the remedial alternatives under consideration. Approximately 12 people, including residents and local business people attended the public meeting. The public comment period closed on March 27, 2010.

No comments were received at the public meeting or in writing during the public comment period.

The draft PRAP was provided to the Onondaga Nation for comment, with an offer to meet to discuss such comments. The Onondaga Nation provided written comments to the NYSDEC prior to the public comment period that were incorporated into the final PRAP. The Onondaga Nation's comments and the NYSDEC's written response to these comments are included in the Administrative Record (see Appendix III).

SCOPE AND ROLE OF OPERABLE UNITS

Since Superfund sites are often complex and have multiple contamination problems and/or areas, they are frequently divided into several operable units for the purpose of managing the site-wide response actions. Section 300.5 of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300 (NCP) defines an operable unit as "a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site."

NYSDEC and EPA have, to date, organized the work for the Onondaga Lake NPL site into nine subsites (see Figure 4). These subsites are also considered by EPA to be operable units of the NPL site. The Site is a subsite and an operable unit of the Onondaga Lake NPL site.

Status of Other Onondaga Lake NPL Site Operable Units

The status of the subsites is discussed below.

Onondaga Lake Bottom Subsite

In July 2005, NYSDEC and EPA issued a ROD for the Onondaga Lake Bottom subsite of the Onondaga Lake NPL site. The selected remedy includes dredging an estimated 2.65 million cy of contaminated sediments and isolation capping of an estimated 425 acres in the littoral zone (water depths ranging from 0 to 30 ft), thin-layer capping of an estimated 154 acres in the profundal zone (water depths exceeding 30 ft), an oxygenation pilot study (of the water near the lake bottom) which will be followed by full-scale oxygenation if supported by the pilot study, and monitored natural recovery in the profundal zone. It is anticipated that the most highly contaminated materials would be treated and/or disposed of off-site. The balance of the dredged sediment would be placed in the Sediment Consolidation Area (SCA) at Wastebed 13. Wastewater generated by the dredging/sediment handling processes as a result of dewatering of the sediments at the SCA would be treated prior to being discharged back to the lake. An Explanation of Significant Differences which describes a change to a portion of the remedy required by the Lake Bottom subsite ROD in the southwest portion of the lake was issued by NYSDEC and EPA in December 2006. The change was necessary to ensure the stability of the adjacent causeway and the adjacent area which includes a portion of I-690, and was supported by recent, more extensive sampling of the area which indicates that the pure chemical contamination is significantly less extensive in this area than estimated in the Lake Bottom subsite ROD. In January 2007, Honeywell entered into a consent decree with the State of New York whereby Honeywell committed to implement the remedy at the Onondaga Lake Bottom subsite. Extensive pre-design investigations commenced in September 2005 and are ongoing, along with remedial design activities (Parsons, 2008c). Dredging in the lake is scheduled to begin in May 2012.

LCP Bridge Street Subsite

In September 2000, a ROD was issued for the LCP Bridge Street subsite of the Onondaga Lake NPL site. In March 2002, Honeywell entered into an administrative consent order with NYSDEC (D7-0001-00-12) whereby Honeywell committed to implement the remedy at the LCP Bridge Street subsite. The remediation of the LCP Bridge Street subsite was substantially completed in 2007. Remedial construction included removal of contaminated sediments from the West Flume, on-site ditches, and wetlands; restoration of wetlands; installation of a low-permeability cutoff wall around the site; installation of an interim low-permeability cap[1]; and capture of contaminated groundwater inside the cutoff wall. Remediation of the LCP Bridge Street subsite has controlled discharges of mercury and other contaminants to the West Flume, some of which ultimately migrated to Onondaga Lake through Geddes Brook and Ninemile Creek. Maintenance and monitoring activities are ongoing.

Ley Creek PCB Dredgings

The Ley Creek PCB Dredgings subsite ROD was issued in 1997 and remedial construction activities were completed in 2001.

Semet Residue Ponds

The Semet Residue Ponds subsite ROD was issued in 2002. Construction activities associated with a portion (lakeshore barrier wall/collection system for the shallow and intermediate zones) of the groundwater remedy component were completed in 2007. Design of the remaining portion (groundwater collection system adjacent to Tributary 5A) is underway. NYSDEC and EPA are evaluating a potential modification to the portion of the remedy that addresses the pond residues.

Town of Salina Landfill

The Town of Salina Landfill subsite ROD was issued in 2007. The ROD called for the capping of two individual landfilled areas. During the ongoing design, it was determined that one of the landfills does not contain significant hazardous waste. Therefore, NYSDEC anticipates releasing a Proposed Plan in the near future calling for the excavation and consolidation of one of the landfilled areas on the other landfilled area prior to capping.

1 A temporary cap was installed. It will be replaced with a final cap following the placement of material from the remediation of Geddes Brook and possibly Ninemile Creek.

Geddes Brook/Ninemile Creek

RODs for two portions of the Geddes Brook/Ninemile Creek site were signed in April and October 2009. The selected remedies include the dredging/excavation and removal of an estimated 120,000 cy of contaminated channel sediments and floodplain soils/sediments over approximately 30 acres. Depending on the location, clean materials, consisting of a habitat layer and, if needed, backfill, will be placed in the dredged/excavated areas. Contaminated sediments and soils removed from the stream and floodplains will be disposed of at either the LCP Bridge Street subsite containment system, which was designed and constructed pursuant to the requirements of a September 2000 ROD, or the SCA, which will be constructed at Wastebed 13 as part of the remediation of the Onondaga Lake Bottom subsite pursuant to the requirements of the July 2005 ROD.

Other Subsites and Potential Subsites

RI/FSs are presently being performed at Lower Ley Creek; General Motors: Inland Fisher Guide and Ley Creek Deferred Media, Wastebed B/Harbor Brook, Willis Avenue, and Wastebeds 1-8. It is anticipated that the RI/FSs for these sites will be completed in the next few years.

SUMMARY OF SITE CHARACTERISTICS

Results of the Remedial Investigation

The RI further characterized Site geology/hydrogeology and the extent of MGP-related impacts to the soil and groundwater. A baseline human health risk assessment and screening level ecological risk assessment were also completed as part of the RI.

To determine the extent of the contamination, the RI utilized knowledge of the gas manufacturing process, historic plans and information gained through previous preliminary investigations (including the PSA/IRM) to target probable areas of the Site where MGP wastes could have been generated disposed or released. From that information, areas of the Site were tested for the presence of MGP wastes.

The RI, which was completed in October 2006, included:

- Installation of 64 groundwater monitoring wells;
- Collection of 385 subsurface soil samples from 50 soil borings, 2 test pits, 16 monitoring wells, and 14 bottom and 20 sidewall IRM verification soil sampling locations which were analyzed for organic compounds associated with former MGP residues particularly BTEX, PAHs, metals, cyanide, pesticides, and PCBs;
- Collection of several rounds of groundwater samples and analysis for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and total cyanide;
- Collection of sediment samples from seven off-Site near-shore sampling locations in Onondaga Lake;
- A survey of public and private water supply wells in the area around the Site; and

- A soil vapor investigation to evaluate the presence, concentration and distribution of MGP- and non-MGP-related VOCs in on-Site soil vapor and to evaluate the potential for vapor intrusion into existing on-Site buildings.

Standards, Criteria and Guidance

To determine whether the soil and groundwater on and off-Site contain contamination at levels of concern, data from the RI were compared to the following Standards, Criteria and Guidance (SCGs):

Groundwater, drinking water, and surface water SCGs are based on NYSDEC's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

Soil Cleanup Objectives (SCOs) are based on NYSDEC's 6NYCRR Subpart 375-6.8 Remedial Program Soil Cleanup Objectives.

Concentrations of VOCs in air were evaluated using the air guidelines provided in NYSDOH's guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006.

Geology

Subsurface investigations have identified four principle geologic units at the Site: fill (the 2 to 5 foot deep surficial unit, which varies in composition and texture throughout the Site and consists of poorly sorted clay, sand, silt, gravel, brick, wood, ash, cobbles, and chunks of concrete); Solvay process waste (2 to 12 feet thick white to pink or gray in color and consists predominantly of silt and fine sand sized material with a chalky consistency; sand unit (30 to 50 feet native silty fine to coarse sand gray to brown with varying amounts of shells. The silt content increases significantly with depth); and silt/clay unit (in the few borings that extended through the sand unit, a silt and clay unit was encountered below the sand. The surface of this unit is generally encountered between 40 and greater than 50 feet bgs. This unit "fines" downward in that the clay content of the unit generally increases with increased depth however the transition to an increased clay content is variable across the Site.) Based on several geotechnical borings completed as part of the mid-1970s expansion of the Metro STP (which were generally completed to depths of 230 feet to 270 feet bgs), the depth at which clay was first observed (identified as "little clay" or "some clay") was variable, and was as shallow as 35 feet bgs at a location in the western portion of the Site and as deep as 130 feet bgs at a location in the eastern portion of the Site.

Hydrogeology

The major hydrologic features near the Site are the Onondaga Lake and the Barge Canal, which discharges into the lake. The Barge Canal receives its flow from Onondaga Creek, which drains highly developed, heavily commercialized and industrialized landscapes as it passes south to north through the city. Onondaga Creek, like the Barge Canal, is classified by the NYSDEC as a Class C water body.

As identified during the previous investigations, saturated conditions are first encountered within the fill or Solvay waste layer. The water-level data indicate that the water table beneath the Site generally occurs at a depth of approximately 5 to 10 feet bgs. Groundwater and surface water elevation data indicate that the horizontal direction of groundwater flow is from the southeastern corner of the Site to the northeast and to the northwest. The flow directions diverge along a groundwater divide that trends northwest-southeast through the Site. These elevation data also indicate that the Barge Canal in the vicinity of the Site acts as a gaining stream, meaning that groundwater flows from beneath the Site into the canal. Across most of the Site, the elevation of the potentiometric surface for the sand unit was generally lower than the water table, indicating a slight downward vertical component of flow across the Solvay waste layer to the underlying sand unit. In general, the groundwater levels at each well cluster were higher than the adjacent surface water elevation indicating a component of groundwater flow from the fill/Solvay waste layer and upper sand unit to the Barge Canal. Within the sand unit, an upward component of flow is indicated by the presence of an upward vertical gradient

NATURE AND EXTENT OF CONTAMINATION

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

As described in the RI report, numerous soil and groundwater samples were collected to characterize the nature and extent of contamination. The main categories of contaminants that exceed their SCGs are VOCs and SVOCs. Figure 7 illustrates the approximate extent of MGP-related source material and groundwater impacts.

Coal tar is a reddish‑brown to black oily liquid by-product which formed as a condensate as the gas cooled and which does not readily dissolve in water. Materials such as coal tar are commonly referred to as NAPLs. The terms NAPL and coal tar are used interchangeably in this document. Although most coal tars are slightly denser than water, the difference in density is minimal. Consequently, this tar can either float or sink when in contact with water. Coal tar was found on-Site during the RI. Tars typically contain high levels of PAH compounds which often approach percent levels. Tars also typically exceed SCGs for BTEX by several orders of magnitude. In certain tar samples, enough benzene may be present to require the material to be managed as hazardous waste.

Waste Materials

The RI data indicate that coal tar is the major waste present at the Site. Tars generated at the MGP were disposed, spilled or leaked from the former relief holders and/or the tar and ammonia tanks and associated piping and possibly other structures, at various locations throughout the Site.

Visual observations of sheens or NAPL in the subsurface were identified within thin lenses located in the lower portion of the Solvay waste layer and upper part of the sand unit, generally 8 to 28 feet bgs. The NAPL observed was generally brownish-black in color. Figure 3 depicts the locations where NAPL was observed within the subsurface. The greatest NAPL impacts observed were in several soil borings and monitoring well borings, primarily located in the eastern portion of the Site. Soil and NAPL at several of these locations were removed during the previously-described IRM. Remaining soil exhibiting NAPL was generally found to the east and northeast of the soil/groundwater removal IRM excavation area, near MW-7, MW-8 and SB-50 (see Figure 5 for specific sampling locations).

Dense non-aqueous phase liquid (DNAPL), oil-like/tar-like liquid heavier than water, was previously identified in two wells located in the eastern portion of the Site (MW-7D and MW-8D). The DNAPL measured in these wells was approximately 1.6 to 1.9 feet thick. Monitoring well MW-7D was damaged during the soil/groundwater removal IRM and replaced during the RI. DNAPL was not encountered in the MW-7D replacement well in the 9 monitoring events completed since the well was installed. DNAPL was removed from well MW-8D in May 2006 and has not been identified in the well in the 5 monitoring events thereafter. While NAPL may no longer be accumulating in these wells, it is still dissolving into the groundwater.

Historic filling that preceded the MGP activities disposed large volumes of Solvay Process waste to create land in low-lying areas. This Solvay waste ranges in thickness from 2 to 12 feet thick, and was identified in each soil boring and nearly every monitoring well boring completed at the Site. Solvay waste is primarily composed of calcium chloride, which increases salinity and raises the pH of groundwater present within these fill areas.

Surface Soil

The surface soils, generally sampled at 0 to 2 inches bgs and most likely to be contacted during the use of the Site, are not significantly impacted by the former MGP operation. Composite surface soil samples were collected from five on-Site and four off-Site sample locations, and concentrations identified were less than, or generally consistent with, the unrestricted use SCOs presented in 6 NYCRR Part 375-6.8.

Subsurface Soil

The analytical results for subsurface and saturated zone soil samples (see Table 1) confirmed the general understanding of the nature and extent of impacts based on the visual observation of NAPL. The occurrence of soils exceeding NYSDEC's recommended subsurface soil cleanup level of 500 milligrams per kilogram (mg/kg) for total PAHs, as well as the distribution of NAPL, was generally found to the east and northeast of the soil/groundwater removal IRM excavation area, near MW-7, MW-8 and SB-50 (see Figure 3 for the extent of NAPL and Figure 5 for specific sampling locations). These soils were found at depths generally 8 to 28 feet bgs. The analytical results indicate that VOCs including BTEX and SVOCs (specifically PAHs) are the contaminants of concern.

The subsurface soil contaminant concentrations for total VOCs range from 0.0022 mg/kg to 370 mg/kg. The elevated VOCs are associated with the occurrence of NAPL. Total SVOCs range from 0.025 mg/kg to 18,000 mg/kg, and consist almost entirely of PAHs. This includes benzene levels as high as 30 mg/kg for the VOCs and naphthalene as high as 2,800 mg/kg for SVOCs in sub-surface soils.

Evidence of coal tar NAPL, in the form of sheens and thin lenses and consisting predominantly of PAHs and BTEX, was observed in the subsurface soil, located primarily in the eastern portion of the Site.

Groundwater

Subsurface soil contamination has negatively impacted the groundwater in the unconsolidated geologic units beneath the Site. The impacted soil has been an ongoing source of contamination resulting in the downgradient migration of contamination into the groundwater. Dissolved groundwater contamination from the Site has historically and is potentially currently migrating to the barge canal.

Groundwater at the Site has been impacted by dissolved-phase BTEX compounds, PAHs and cyanide related to MGP residuals in the subsurface soil at the Site. The nature and extent of groundwater contamination at the Site is shown on Figure 6. During the RI, groundwater was observed at depths ranging from 5-10 feet bgs. The shallow groundwater is found within the fill and Solvay units, which range in thickness from 2-5 feet and 2-12 feet, respectively. The highest BTEX and PAH concentrations remaining in this unit are generally in the northeast portion of the Site, near MW-11S, MW-12S, MW-23S, and MW-24S. The highest BTEX and PAH concentrations overall were identified in the sand unit, which ranges in thickness from 30 - 50 feet and is beneath the fill and Solvay units. The horizontal direction of groundwater flow is from the southeastern corner of the Site to the northeast and the northwest. The flow directions diverge along a groundwater divide that trends northwest-southeast through the Site from the area of well MW-6 to the area of well MW-22.

Total VOC concentrations in the groundwater range from not detected to 14,000 micrograms per liter (µg/l), which includes individual benzene concentrations as high as 2,400 µg/l. Total SVOC concentrations in the groundwater range from not detected to 20,000 µg/l, which includes naphthalene concentrations as high as 17,000 µg/l.

Total cyanide groundwater concentrations were found as high as 1,650 µg/l in the vicinity of the former MGP structures. Historic MGP structure information indicates that purifying boxes were located in close proximity to the current county maintenance building. Groundwater monitoring data suggests the potential for a source area of purifier waste based on elevated levels of cyanide in downgradient monitoring well clusters MW12, MW23, MW31 and MW32. Arsenic and thallium were also detected in the groundwater.

Groundwater is also impacted by the Solvay waste that was placed at the Site before the MGP was constructed. The primary Solvay waste product, calcium chloride, has increased the salinity of groundwater beneath the Site, particularly in deeper groundwater. Salinity, as represented by chloride concentration, ranges from 0.017 to 7.04 nanograms/liter (ng/l) in shallow groundwater, and from 0.083 to 95 ng/l in deep groundwater. The ambient water quality standard for chloride in fresh groundwater is 0.25 ng/l. Groundwater in both shallow and deep wells is also highly alkaline, with pH exceeding 12 in several locations.

Groundwater geochemical data was collected during the RI to evaluate the degree of microbial activity within the contaminated area. The presence of reducing conditions, in which naturally-occurring microbes use electron acceptors from various compounds to degrade contaminants, is a strong indicator of natural microbial activity. In the fill/Solvay unit, nitrate and small amounts of nitrite are present, indicating that nitrate reduction is occurring, but is not complete. In the sand unit, both nitrate and nitrite are below the laboratory detection limit, indicating that nitrate has been exhausted as an electron acceptor. Similar patterns of reducing conditions were measured for other geochemical indicators such as iron, manganese, sulfate, sulfite and methane. These data indicate that the fill and Solvay units are mildly reducing environments, while the underlying sand unit is strongly reducing, with a corresponding level of microbial degradation activity.

Surface Water

No Site-related surface water contamination was identified during the RI.

Sediments

As a part of the PSA field investigation, sediment samples were collected from 7 nearshore sampling locations in Onondaga Lake west of the Site. Chemicals detected in the samples included PAHs and dichlorobenzenes, which have been found elsewhere in Onondaga Lake. In addition, certain metals were found that were not detected in groundwater samples collected from monitoring wells along Onondaga Lake or at the Site.

Sediment samples were also collected by the U.S. Army Corps of Engineers in 1994 from several sampling locations in the Barge Canal. Organic compounds, metals and total petroleum hydrocarbons were identified at each sediment sampling location. Based on the concentrations and distribution of chemical contaminants, which were typical of upstream/background conditions, no Site-related sediment contamination of concern was identified in the Barge Canal during the RI.

Soil Gas

In May 2008, a soil vapor investigation was undertaken to evaluate the potential presence, concentration, and distribution of MGP-related VOCs and non-MGP related VOCs in on-Site soil vapor and to evaluate the potential for vapor intrusion into existing on-Site buildings. A soil vapor investigation was performed in the area of the county maintenance building within the footprint of the former MGP facility. The objective of the investigation was to determine whether actions are needed to address exposures to Site-related contaminants, which may move from contaminated groundwater into the indoor air of a building through a process referred to as soil vapor intrusion.

One or more VOC contaminants were identified in the soil vapor samples collected at each sampling location. Some of the VOCs identified in the soil vapor samples were unrelated to or not necessarily related to former MGP operations.

The sample results indicate the presence of BTEX and other VOCs at low levels in soil vapor. These compounds are typically associated with MGP sites, but are also commonly found in products stored in the maintenance facility. The NYSDEC and NYSDOH reviewed the sample results for this structure and determined that no further actions for soil vapor intrusion are needed at this time.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The State of New York, Onondaga County, and the City of Syracuse have jointly sponsored the preparation of a land-use master plan to guide future development of the Onondaga Lake area (Syracuse-Onondaga County Planning Agency, 1998).The primary objective of land-use planning efforts is to enhance the quality of the Onondaga Lake area for recreational and commercial uses. Anticipated recreational uses of the lake include fishing without consumption restrictions and swimming.

Land Use

In general, the southeast upland of the lake, which includes the Site area, is primarily commercial and industrial. Land around much of the rest of the lake is recreational, providing hiking and biking trails, picnicing, sports, and other recreational activities.

The Site is located in an industrial area at the southeast end of Onondaga Lake. The MGP was located on the northern portion of property which is currently occupied by the Metro STP. Much of the property is covered with structures associated with the treatment plant, including clarifiers, aeration tanks and an ammonia and phosphorus removal facility. The remainder of the Site is primarily covered by driveways, paved parking lots, and a county maintenance building.

Surface Water Use

The southern third of Onondaga Lake and the area at the mouth of the New York State Barge Canal are classified as Class C water[4]. Onondaga Creek is also a Class C stream where it discharges into the Barge Canal. The Barge Canal upstream of the Site has been affected by several former petroleum bulk storage facilities and by combined sewer overflow discharges to Onondaga Creek.

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[4] Best usage is defined as "fishing (these waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes" [6 NYCRR Part 701. 8]).

While fishing occurs, NYSDOH has a specific, restrictive consumption advisory for Onondaga Lake including its tributaries which warns against eating walleye (*Stizostedion vitreum*), largemouth bass (*Micropterus salmoides*), and smallmouth bass (*Micropterus dolomieui*) larger than 15 inches, with consumption of all other species limited to no more than once per month (NYSDOH, 2008). The specific advisory also stipulates that infants, children under 15, and women of childbearing age should eat no fish from the lake and its tributaries. The more general, statewide advisory for the state's fresh waters advises that consumption be limited to no more than one meal per week. Onondaga Lake and the associated tributaries do not serve as potable-water sources (Syracuse Department of Water, 2000).

SUMMARY OF SITE RISKS

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future property conditions. A baseline risk assessment is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate these under current and reasonably anticipated future land uses.

The human health estimates summarized below are based on current reasonable maximum exposure scenarios and were developed by taking into account various conservative estimates about the frequency and duration of an individual's exposure to the contaminants of concern, as well as the toxicity of these contaminants.

While a screening of ecological considerations lead to the conclusion that property conditions do not necessitate a quantitative ecological risk assessment, a qualitative discussion is included below.

Exposure Assessment

This section describes the types of human exposures that may present added health risks to persons at or around the Site. A more detailed discussion of the human exposure pathways can be found in Section 7.0 of the Final Supplemental Remedial Investigation Report (October 2006) and the Human Health Risk Assessment Report (September 2009). These documents are available for review at the document repositories.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a Site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or dermal contact). The receptor population is the people who are currently, or may potentially be in the future, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

No completed exposure pathways currently exist at the site for groundwater and soils. The area is served by public water, public access to the site is limited and the NYSDOH has determined that no actions are currently necessary to address exposures to site-related contaminants due to soil vapor intrusion. The only current exposure pathway that is complete is for recreational wading in the sediments. However, due to the widespread presence of PAHs in Onondaga Lake, it is not clear if this exposure is site-related.

In the future, potential exposures exist for construction and utility workers performing intrusive work at the site, through dermal contact with or incidental ingestion of contaminated subsurface soils. The majority of the Site is paved and public access is limited by fencing; therefore, exposure to contaminated surface soil is not likely.

Since groundwater is classified by the State as a potable drinking water, this pathway is also evaluated as a complete exposure under a hypothetical future use, although due to natural saline conditions, it is highly unlikely that groundwater would be used for this purpose.

Human Health Risk Assessment

A baseline risk assessment was conducted to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land, groundwater, and sediment use. The baseline risk assessment includes a human health risk assessment (HHRA) and an environmental (ecological) risk assessment.

The cancer risk and non-cancer health hazard estimates in the HHRA are based on current reasonable maximum exposure scenarios and were developed by taking into account various health protective estimates about the frequency and duration of an individual's exposure to chemicals selected as chemicals of potential concern (COPCs), as well as the toxicity of these contaminants. Cancer risks and non-cancer health hazard index values (HIs) are summarized below.

The Site is currently occupied by industrial facilities, and future land use is expected to remain the same. The baseline risk assessment began by selecting COPCs in the various media that would be representative of Site risks. Based on the nature and extent of contamination, the HHRA focused on exposure to sediments, subsurface soils, and groundwater. The chemicals of concern are primarily PAHs (specifically benzo(a)pyrene), benzene, naphthalene, and arsenic).

The baseline risk assessment evaluated health effects that could result from exposure though direct contact with contaminated media. Based on the current and anticipated future use, the risk assessment focused on a variety of possible receptors, including current/future adult, adolescent, and child waders with access to the sediments, and future construction and utility workers with exposure to subsurface soils and shallow groundwater. Although the area is serviced by public water, since groundwater is designated by the State as a potable water supply, groundwater was evaluated as a potential future source of drinking water to adult and child residents.

Summary of Risks to Current/Future Waders: Cancer risks estimated for adults, adolescents, and children exposed to sediments are 4 x 10^{-6}, 2 x 10^{-4}, and 4 x 10^{-5}, respectively, with PAHs, primarily benzo(a)pyrene as the risk driver. Due to a lack of noncarinogenic toxicity values for PAHs, noncancer hazard index values could not be calculated.

Summary of Risks to Future Construction and Utility Workers: Cancer risks estimated for future construction and utility workers exposed to subsurface soils 2 x 10^{-5} and 8 x 10^{-5}, respectively, with PAHs, primarily benzo(a)pyrene as the risk driver. Due to a lack of noncarinogenic toxicity values for PAHs, noncancer hazard index values could not be calculated.

Cancer risks and noncancer hazards were estimated for exposure to groundwater contacted through intrusive activities. For the construction worker and the utility worker, the cancer risks were 7 x 10^{-5} and 4 x 10^{-4}, while the noncancer hazard index values are 70 and 18, respectively. The risk drivers are PAHs, specifically benzo(a)pyrene, benzene, naphthalene, and arsenic.

Summary of Risks to Residents: Cancer risks and non-cancer health hazards were evaluated for adult and child residents hypothetically exposed to groundwater used as drinking water in the future. The excess lifetime cancer risk estimate is 5 x 10^{-3} and 3 x 10^{-3}, respectively, while the noncancer hazard index values are 150 and 300, respectively. The risk drivers are PAHs, specifically benzo(a)pyrene, benzene, naphthalene, arsenic and thallium.

These cancer risks and non-cancer health hazards indicate that there is significant potential risk to potentially exposed populations from direct exposure to sediment, subsurface soils, and groundwater. For these receptors, exposure to these media results in either an excess lifetime cancer risk that exceeds EPA's target risk range of 10^{-4} to 10^{-6} or an HI above the acceptable level of 1, or both. The chemicals in sediment, subsurface soil, and groundwater that contribute most significantly to the cancer risk and non-cancer hazard are PAHs, specifically benzo(a)pyrene, benzene, naphthalene, and arsenic. It is the lead agency's current judgment that the selected remedy is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Tables 2 thru 11 included in Appendix II provide a summary of the HHRA data.

Ecological Risk Assessment

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.

An ecological risk characterization was performed for the Site in 2003. The Site is located in an urban setting, including industrial and commercial properties which are associated with large paved parking lots.

Surface soil was not evaluated in the screening level ecological risk assessment because impacted surface soils were removed and/or built over as part of the expansion of Metro STP. Further, suitable habitat is absent from the area encompassing the Site. Future land use of this area is likely to remain under industrial use for the foreseeable future. Due to the industrial nature of this Site there is a lack of adequate habitat and, thus, there are no complete terrestrial exposure pathways to ecological receptors.

Basis for Action

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.

The documents that form the basis of NYSDEC and EPA's selection of a remedy are included in the Administrative Record Index (see Appendix III) and include the Hiawatha Boulevard Former MGP Site RI Report (dated October 2006), the Hiawatha Boulevard Former MGP Subsite HHRA (dated November 2009), the Hiawatha Boulevard Former MGP Site FS Report (dated October 2009), the Proposed Remedial Action Plan (dated February 2010), the comments on the above documents received from the public during the comment period, and this ROD (which includes the Responsiveness Summary).

REMEDIAL ACTION OBJECTIVES AND REMEDIAL GOALS

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered guidance (TBCs), and site-specific risk-based levels.

The following remedial action objectives (RAOs) were established for the Site:

RAO 1: Prevent ingestion/direct contact with contaminated subsurface soil;

RAO 2: Prevent migration of contaminants that would result in groundwater or surface water contamination;

RAO 3: Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards;

RAO 4: Prevent contact with contaminated groundwater; and

RAO 5: Prevent discharge of contaminated groundwater to surface water.

In order to achieve these RAOs, remediation goals (RGs) were established to provide additional information with which remedial alternatives can be developed and selected. The Site contains two primary media that have been impacted by COPCs: soils and groundwater. The following two RGs have been developed to address each of the affected media:

RG 1: Contain and control, to the extent practicable, the amount of COPCs in Site soils that come in contact with groundwater.

RG 2: Restore groundwater quality to levels which meet state and federal drinking-water standards.

SUMMARY OF REMEDIAL ALTERNATIVES

General

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies and resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report, which is available at the document repositories established for this Site.

A summary of the remedial alternatives that were considered for this Site are discussed below. The present-worth cost represents the amount of money invested in the current year that would be sufficient to cover all present and future remedial action and operation, maintenance, and monitoring costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved at that time.

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives 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 pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4) (see the nine evaluation criteria listed below in the "Comparative Analysis of Remedial Alternatives" section of this ROD).

The PRAP included Alternative SM2, institutional controls, as an alternative to address the soil contamination. Since this alternative did not address RAO 2 (prevent migration of contaminants that would result in groundwater or surface water contamination), it has been eliminated from further consideration.

Groundwater extraction and treatment to recover dissolved phase constituents from the groundwater was considered, but for the forgoing reasons, it was screened out. Since the complete dissolution of NAPL would take many years (despite extensive dewatering performed as part of the 2001-2003 IRM, post-IRM groundwater monitoring indicated that there was little to no decrease in groundwater concentrations hydraulically downgradient from the excavation area), groundwater extraction and treatment would be anticipated to have limited effectiveness in reducing the concentrations of constituents in groundwater or reducing the size of the impacted groundwater area. In addition, due to the close proximity of the Site to surface water bodies, to prevent extremely high groundwater extraction rates, a containment barrier would need to be installed. However, due to the potentially excessive depth of a suitable lower hydraulic conductivity layer unit for the installation of such a barrier, its installation would be extremely costly.

The following potential remedies were considered to address the contaminated source material in soils and groundwater through various remedial methods.

Soil Alternatives

Alternative SM1: No Further Action

This alternative would involve no further action beyond the extensive removal activities performed as part of the soil/groundwater removal IRM, in which 110,000 tons of soil were excavated and transported for off-Site disposal and 283 million gallons of water were pumped and treated on-Site prior to discharge to the Metro STP. Alternative SM1 serves as the baseline for comparison of the overall effectiveness of the other remedial alternatives. The Site would be allowed to remain in its current condition. The existing cover material (i.e., grass/vegetation, asphalt, and Metro STP structures) and fencing on the former MGP property would be maintained only as associated with the operation of the STP. This alternative could be implemented immediately and there are no costs associated with this alternative.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Since Alternative SM2: Institutional Controls does not meet the remedial action objectives, it was eliminated.

Alternative SM3 – In-Situ Solidification and Institutional Controls

This alternative would involve treating contaminated soil from the northeastern portion of the Site where NAPL has been identified in lenses and where PAHs were identified at concentrations greater than 500 mg/kg using an in-situ solidification (ISS) process. The approximate extent of the area that would be treated by ISS under this alternative is shown on Figure 8. ISS of the MGP-impacted zone would be performed to depths of approximately 22 to 24 feet below grade within an approximate 20,600 square foot area.

ISS would be performed by mixing a fluid cement grout into a column of soil without excavating or removing the soil. ISS treatment would limit potential future impacts from soil to groundwater by: (1) reducing the leaching/mobility of contaminants in soil; (2) minimizing the amount of free liquids in the soil pore space; and (3) reducing the hydraulic conductivity of the soil. With less soil pore space and reduced conductivity, the potential mobility of pore-filling liquids (water, NAPL) would be reduced in the treated area. There are several methods for implementing ISS, including large diameter auger mixing and jet grouting.

Spoils consisting of a mixture of soil, groundwater, and grout would be generated by the ISS process. These spoils would be excavated, stockpiled and sampled prior to transportation for off-Site disposal.

During the design phase, bench- and pilot-scale treatability studies would be performed to evaluate the effectiveness of various cement-bentonite mixtures (i.e., soil stabilization mixtures) at reducing the leachability and permeability of the impacted soil, including the Solvay waste, at the Site. Solidification mixtures would be evaluated for compatibility with the contaminants of concern and tested for density, permeability, strength, and leachability of VOCs and SVOCs.

As an initial step in full-scale application of ISS, the surface cover material (asphalt pavement) and upper few feet of soil would be removed, characterized, and either transported for off-Site disposal or stockpiled for re-use as backfill on the Site. The soil removal would allow room for the increase in soil volume that would occur when stabilizing agents are added, and for placement of backfill and replacement of clean cover materials. Specific design details would be addressed as part of the remedial design. Utilities may be relocated and obstacles would be removed prior to ISS implementation. Utilities and obstacles that cannot be removed would be surrounded by soil stabilization mixtures through jet grouting. Targeted areas that are restricted by significant underground utilities would be individually jet grouted, or would be surrounded by the remainder of the stabilized area, which would serve as a containment barrier. The solidified area would be covered by backfilled soils to a sufficient depth to prevent damage to the solidified material by cycles of freezing and thawing.

Due to elevated levels of cyanide in the groundwater at the northeastern corner of the Site, further investigation, delineation and removal (to the extent feasible) of suspected purifier waste source areas would be conducted.

A foam spray or other vapor control measures would be used as necessary to suppress odors and volatile organic vapors originating from the initial excavation and the solidification process. A Community Air Monitoring Plan (CAMP) would be followed throughout remediation activities to ensure that airborne particulate and volatile organic vapor concentrations surrounding the excavation area are acceptable.

This alternative would also include institutional controls to prevent exposure to subsurface soils that exceed the SCOs for industrial use. Specifically, the institutional controls would limit the disturbance of the ground cover materials and place health and safety/excavation management requirements on subsurface activities. The institutional controls would include a land use restriction in the form of an environmental easement. This alternative would also include the development of a Site Management Plan (SMP). The SMP would: (1) identify known locations of MGP-impacted soil at the Site; (2) establish appropriate controls for future disturbances of Site soil; and (3) set forth the inspection and maintenance activities for the perimeter fencing and vegetation/cover materials.

The land use restriction would: (1) restrict future use of the Site to industrial activities; (2) notify future property owners of the presence of MGP-related contaminants in soil at the Site; and (3) notify future property owners of the existence of the SMP. The SMP would be a means to address potential future soil excavation, including a possible future expansion to the Metro STP. The SMP would provide for advance notification of any proposed excavation, including the excavation limits, expected environmental conditions and schedule. The SMP would also include an excavation work plan that would detail the procedures for any soil removal (e.g., waste characterization sampling, verification sampling, excavation sidewall support, off-Site transportation and disposal, dewatering, backfilling, etc.). Costs for potential excavations pursuant to the SMP are not included in the cost estimate for this alternative.

Long-term monitoring would be performed to evaluate the expected reductions in groundwater contaminant concentrations downgradient of the ISS treatment areas. Cores would be periodically collected from the solidified material to assess the integrity of the material.

This alternative would require approximately one year to implement, at which time the remedial goals for soil would be met.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years.

If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Present-Worth Cost:	$6,730,000
Capital Cost:	$6,490,000
Annual Costs:	$16,000

Alternative SM4 - Focused Soil Excavation and Institutional Controls

This alternative would involve the removal of contaminated soil from the northeastern portion of the Site where NAPL has been identified in lenses and where PAHs were identified at concentrations greater than 500 mg/kg. Soil would be removed from an area approximately 20,600 square feet to a depth of 22 to 24 feet, as shown on Figure 8.

The estimated volume of soil that would be removed is 17,410 cy. Prior to excavation, pre-excavation soil sampling and waste characterization sampling would be conducted. A temporary sheet pile wall would be installed around the perimeter of the proposed excavation area to stabilize excavation sidewalls (and to comply with Occupational Safety and Health Administration requirements), control groundwater and permit soil removal to the targeted depths. Underground utilities in the area (including natural gas and water lines) would need to be temporarily relocated during installation of the sheet pile wall.

The majority of the soil removed under this alternative would be from beneath the water table. Therefore it would be necessary to dewater the excavation. A temporary on-Site wastewater treatment system would provide pre-treatment of the groundwater recovered during de-watering, and the treated effluent would be discharged to the Metro STP. Details concerning the water treatment, handling, and discharge would be determined during remedial design.

Due to space constraints at the Site, soil removed from the excavation would be direct-loaded for off-Site disposal to the extent possible. Alternatively, the soil would be stockpiled in a lined material staging area (or portion of the excavation area) for stabilization, if needed, prior to off-Site disposal. Upon reaching target depths, verification soil samples would be collected from the bottom of the excavation for visual characterization and/or laboratory analysis. Following receipt of results indicating that the cleanup objectives have been achieved, the excavated areas would be backfilled, compacted and restored to grade. The paved parking lots and driveways in the area would then be restored.

Due to elevated levels of cyanide in groundwater at the northeastern corner of the Site, further investigation, delineation and removal (to the extent feasible) of suspected purifier waste source areas would be conducted.

A foam spray or other vapor control measures would be used to suppress odors and volatile organic vapors originating from the excavation and the excavated soil, as needed. A CAMP would be followed throughout remediation activities to ensure that airborne particulate and volatile organic vapor concentrations surrounding the excavation area are acceptable.

This alternative would also include the same institutional controls and SMP development provided for under Alternative SM3.

This alternative would require approximately one year to implement, at which time the remedial goals for soil would be met.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Present-Worth Cost:	$18,800,000
Capital Cost:	$18,500,000
Annual Costs:	$16,000

Alternative SM5 - Soil Excavation and Institutional Controls

This alternative would involve the removal of contaminated soil from the northeastern portion of the Site where NAPL has been identified in lenses and where PAHs were identified at concentrations greater than 500 mg/kg. This alternative would also involve the excavation of soils that have contaminants at concentrations exceeding the SCOs for industrial use.

Under this alternative, soil would be removed from within an estimated 85,000 square foot area, extending to depths ranging from approximately 5 to 30 feet (see Figure 9). The volume of soil that would be removed under this alternative would be approximately 60,900 cy. Although soil under a portion of the Main Building Complex contains contamination that exceeds the industrial use SCOs, that soil is not accessible and would not be excavated under this alternative.

This alternative would involve the same elements included under Alternative SM4, including pre-excavation soil sampling, waste characterization sampling, utility relocation, a pre-design test boring program, installation of excavation support, excavation, air monitoring/vapor control, off-Site transportation and disposal, excavation de-watering and water treatment, backfilling, and restoration. However, the excavation under this alternative would cover a larger area and extend to greater depths than under Alternative SM4. As shown on Figure 9, the excavation area for Alternative SM5 would encompass the majority of the parking lots in the eastern portion of the Site, extends around the county maintenance building, and extends up to the edge of the main building complex in several places.

Based on the larger size and areas affected by this alternative, this alternative would require: (1) additional relocation of underground utilities (particularly near the main building complex); (2) installation of more sheet pile for excavation sidewall support; (3) more soil handling and off-Site disposal; (4) more dewatering and water treatment; and (5) more waste characterization and verification sampling, as compared to Alternative SM4.

Due to elevated levels of cyanide in groundwater at the northeastern corner of the Site, further investigation, delineation and removal (to the extent feasible) of suspected purifier waste source areas would be conducted.

A foam spray or other vapor control measures would be used to suppress odors and volatile organic vapors originating from the excavation and the excavated soil, as needed. A CAMP would be followed throughout remediation activities to ensure that airborne particulate and volatile organic vapor concentrations surrounding the excavation area are acceptable.

This alternative would also include the same institutional controls and SMP development provided under Alternative SM3 because certain soil at the Site would still contain chemical contaminants at concentrations exceeding unrestricted use soil cleanup objectives.

This alternative would require approximately two years to implement, at which time the remedial goals for soil would be met.

Present-Worth Cost:	$54,700,000
Capital Cost:	$54,500,000
Annual Costs:	$16,000

Groundwater Alternatives

Alternative GW1 - No Further Action

This alternative would involve no further action to address groundwater contamination beyond the extensive de-watering and treatment performed as part of the IRM, in which 283 million gallons of water were pumped and treated. This alternative serves as the baseline for comparison of the overall effectiveness of the groundwater remedies.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative GW2 -Institutional Controls and Monitored Natural Attenuation

This alternative would consist of institutional controls to restrict groundwater use in the form of an environmental easement, development of an SMP, natural attenuation[1] to reduce concentrations of contaminants of concern in groundwater and groundwater monitoring to evaluate changes in groundwater conditions. The environmental easement would notify future property owners of the presence of MGP-related contaminants in the groundwater at the Site, restrict the use of on-Site groundwater, and notify the owners of the applicability of an SMP. Existing groundwater use laws [10 NYCRR 5-1.31(b)], which prohibit the installation of private wells where a public supply is available (unless approval is expressly granted by the public water authority), would continue to minimize potential human exposure to contaminants in groundwater at concentrations exceeding the groundwater quality standards/guidance values.

An SMP would be prepared under this alternative to identify areas of impacted groundwater associated with the Site and manage possible future intrusive activities that could result in the potential for contact with contaminated groundwater. Long-term monitoring would be performed under this alternative to evaluate the effectiveness of the attenuation. Groundwater sampling labor and expenses are based on semiannual sampling events within the first five year period. Sampling after that period would be conducted annually.

This alternative would require approximately 3 months to implement, but the remedial goals for groundwater are not expected to be achieved for at least 30 years.

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1 Natural attenuation is a variety of physical, chemical and biological processes which, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil and groundwater. These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction.

Because under this alternative it would take more than five years to attain cleanup levels in the groundwater, CERCLA requires that the Site be reviewed at least once every five years.

Present Worth Cost:	$1,060,000
Capital Cost:	$97,500
Annual Costs (years 1-5):	$90,000
Annual Costs (years 6-30):	$52,200

Alternative GW3 - Enhanced Bioremediation and Institutional Controls

This alternative involves treating the impacted groundwater by enhancing microbial degradation. This alternative would also involve the monitoring and institutional controls described for Alternative GW2.

The treatment provided by this alternative would focus on the northern property boundary, upgradient of the Barge Canal and in the two areas where the highest concentrations of BTEX and PAHs were found in groundwater. Treatment would be performed in these two separate areas, as shown on Figure 8. Remaining areas of lower groundwater concentrations would be allowed to attenuate naturally.

Enhanced bioremediation would involve the addition of nutrients, sources of oxygen, and/or other amendments to improve the conditions for naturally-occurring bacteria to degrade MGP-related contaminants in groundwater, thereby reducing the discharge of contaminants from Site groundwater to off-Site groundwater and the Barge Canal. Groundwater monitoring would be performed under this alternative to evaluate changes in groundwater conditions and to optimize the addition of oxygen and nutrients. Modifications to the enhanced bioremediation treatment would be made, as needed, based on monitoring results. Groundwater sampling labor and expenses are based on semi-annual sampling events within the first five-year period. Sampling after that period would be conducted annually.

This alternative would require approximately 1 year to implement, and an estimated 10 years to achieve the remedial goals for groundwater.

Because under this alternative it would take more than five years to attain cleanup levels in the groundwater, CERCLA requires that the Site be reviewed at least once every five years.

Present-Worth Cost:	$3,660,000
Capital Cost:	$1,340,000
Annual Costs (years 1-5):	$191,000
Annual Costs (years 6-30):	$135,000

COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with ARARs and TBCs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

The first two evaluation criteria are termed **"threshold criteria"** and must be satisfied in order for an alternative to be considered 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 Applicable or Relevant and Appropriate Requirements** addresses whether or not a remedy would meet all of the ARARs of federal and state environmental statutes and requirements or provide grounds for invoking a waiver. Other federal or state advisories, criteria, or guidance are TBCs. Compliance with TBCs is not required by the NCP, but may be useful in determining what is protective of a site or how to carry out certain actions or requirements.

The next five **"primary balancing criteria"** are used to compare the positive and negative aspects of each of the remedial strategies.

3. **Short-term Effectiveness** addresses the potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during construction and/or implementation. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. **Long-term Effectiveness and Permanence** evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. **Reduction of Toxicity, Mobility or Volume through Treatment** is the anticipated performance of the treatment technologies, with respect to these parameters, that a remedy may employ. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. **Implementability** addresses the technical and administrative feasibility of implementing each alternative. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. **Cost** includes estimated capital, operation, maintenance, and monitoring, and net present-worth costs. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The following **"modifying criteria"** are used in the final evaluation of the remedial alternatives after the formal comment period, and may prompt modification of the preferred remedy that was presented in the Proposed Plan:

8. **Support Agency Acceptance** indicates whether, based on its review of the RI/FS, PRAP, and ROD, NYSDOH (the support agency for NYSDEC) concurs with, opposes, or has no comment on the selected remedy at the present time.

9. **Community Acceptance** refers to the public's general response to the alternatives described in the RI/FS reports and PRAP.

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

Overall Protection of Human Health and the Environment

Alternative SM1, no further action, would not be protective of human health and the environment, since it would not actively address the contaminated subsurface soils which present unacceptable human health risks and the soils would continue to release contaminants to on-Site and off-Site groundwater.

Alternatives SM3 (in-situ solidification and institutional controls), SM4 (focused soil excavation and institutional controls), and SM5 (soil excavation and institutional controls), on the other hand, would be protective of human health and the environment , since each alternative relies upon a remedial strategy and/or treatment technology capable of eliminating exposure in combination with institutional controls and an SMP.

Since Alternatives GW1 (no further action) and GW2 (institutional controls and monitored natural attenuation) would rely upon natural attenuation (which has not been demonstrated to be occurring at the Site) to restore groundwater quality to drinking water standards, they would not be as protective as Alternative GW3 (enhanced bioremediation and institutional controls), which would include actively address the contaminated groundwater. The institutional controls and SMP under Alternatives GW2 and GW3 would provide protection to construction workers performing intrusive activities below the water table, such as activities to repair existing, or install new, subsurface utilities/facilities. The SMP would identify requirements for use of personal protective equipment and proper management of impacted groundwater that may be encountered.

Compliance with ARARs

New York State has issued soil cleanup objectives for remedial programs (6 NYCRR Part 375.6).

Since the contaminated soils would not be addressed under Alternative SM1, this alternative would not achieve the soil cleanup objectives. Alternatives SM3, SM4, and SM5 would achieve the soil cleanup objectives.

Since Alternatives SM4 and SM5 would involve the excavation of contaminated soils, they would require compliance with fugitive dust regulations. Since the excavated soils under these two alternatives would be transported off-Site, they would also be subject to New York State and federal regulations related to the off-Site transportation of wastes.

EPA and NYSDOH have promulgated health-based protective MCLs (40 CFR Part 141, and 10 NYCRR, Chapter 1), which are enforceable standards for various drinking water contaminants (chemical-specific ARARs). Although the groundwater at the Site is not presently being utilized as a potable water source, achieving MCLs in the groundwater is an applicable standard, because area groundwater is a potential source of drinking water. Alternatives GW1 and GW2 would not provide for any direct remediation of groundwater and would, therefore, rely upon natural processes (which have not been demonstrated to be occurring at the Site) to achieve chemical-specific ARARs. Alternative GW3 would be the most effective in reducing groundwater contaminant concentrations below MCLs, since it would include treatment

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The provisions of New York State Environmental Conservation Law Section 27-1318, Institutional and Engineering Controls, may be applicable to the environmental easements in Alternatives SM3, SM4, SM5, GW2, and GW3.

A full list of potential chemical-specific, action-specific and location-specific ARARs appears in Table 12 of Appendix II.

Short-Term Effectiveness

Since Alternative SM1 does not include any physical construction measures in any areas of contamination it would not present any potential adverse impacts to remediation workers or the community as a result of its implementation. Alternative SM3 would have moderate short-term impacts, primarily related to coordination with the operation of the Metro STP during the solidification process. Activities in the affected area, primarily parking and access would be disrupted during the remediation, and utilities would be relocated or protected. Soils excavated from the upper few feet would require staging and temporary stockpiling, which would require additional space. Alternatives SM4 and SM5 would have greater short-term impacts on the Metro STP operations, as increasing volumes of excavated soil would require staging and transport off the Site. Excavation shoring would significantly impact Site utilities. Alternatives SM4 and SM5 would have greater impacts to the surrounding community due to increased truck traffic and potential odors associated with the excavation and handling of NAPL-contaminated soils. Excavations required under Alternative SM5 could affect critical infrastructure such as buildings, treatment units and support buildings, and may have significant short-term impacts to the Metro STP, such as accidental damage to infrastructure and potential temporary shut-downs. Alternatives SM4 and SM5 could present some limited adverse impacts to remediation workers through dermal contact and inhalation related to excavation activities. Noise from the excavation work associated with Alternatives SM4 and SM5 could present some limited adverse impacts to remediation workers and nearby residents. In addition, post-remediation soil sampling activities would pose some risk. The risks to remediation workers and nearby residents under all of the alternatives could, however, be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment. Under Alternatives SM4 and SM5, substantial disturbance of the land during excavation activities could affect the surface water hydrology of the areas being excavated. For these alternatives, there is a potential for increased stormwater runoff and erosion during excavation activities that would have to be properly managed to prevent or minimize any adverse impacts. For these alternatives, appropriate measures would have to be taken during excavation activities to prevent the transport of fugitive dust.

Since no actions would be performed under Alternative SM1, there would be no implementation time. Alternatives SM3, SM4, and SM5 would require an estimated 12 months, 12 months, and 24 months, respectively, to implement.

Alternatives GW1 and GW2 would have no short-term impact to workers or the community and would have no adverse environmental impacts, since no actions would be taken. Alternatives GW2 and GW3 might present some limited risk to remediation workers through dermal contact and inhalation related to groundwater sampling activities. The risks to on-Site workers could, however, be minimized by utilizing proper protective equipment.

Since no actions would be performed under Alternative GW1, there would be no implementation time. Alternative GW2 would require an estimated 2 months to implement and Alternative GW3 would require an estimated 12 months to implement.

Long-Term Effectiveness and Permanence

Since alternative SM1 would involve no active remedial measures, it would not be effective in eliminating the continued release of contaminants to the environment. Alternative SM3 would have a high degree of long-term effectiveness in eliminating the continued release of contaminants to the environment. Although treated residuals would remain at the Site, the engineering and institutional controls necessary to maintain the protectiveness of the remedy are highly reliable. Alternative SM4 would have a somewhat higher degree of long-term effectiveness than Alternative SM3, because contaminated soils would be removed from the Site and there would be no treated materials requiring long-term management. Alternative SM5 would provide a high degree of long-term effectiveness.

Alternatives GW1 and GW2 would be expected to have minimal long-term effectiveness, since they both would rely upon natural attenuation to restore groundwater quality. Natural attenuation has not, however, been proven to be occurring at this Site. The bioremediation under Alternative GW3 would be more effective in achieving groundwater standards than Alternatives GW1 and GW3.

Reduction in Toxicity, Mobility, or Volume Through Treatment

Alternative SM1 would not provide any reduction in toxicity, mobility or volume through treatment. Alternatives SM3 and SM4 would provide the same level of reduction because the same areas of contamination would be targeted. Treatment would be performed on-Site for Alternative SM3 and off-Site for SM4. Alternative SM5 would provide a greater reduction since a larger volume of soils would be treated off-Site.

Alternatives GW1 and GW2 would not effectively reduce the toxicity, mobility, or volume of contaminants in the groundwater, as these alternatives involve no active remedial measures. These alternatives would rely on natural attenuation to reduce the levels of contaminants, a process that has not been demonstrated to be occurring at this Site. Under Alternative GW3, enhanced bioremediation would be expected to reduce the toxicity and volume of MGP-related contaminants in groundwater through treatment to a greater degree in a shorter time frame.

Implementability

Alternative SM1 would be the easiest to implement, as there are no activities to undertake. While solidification is a readily available technology that is proven and reliable in immobilizing contaminants in soils, Alternative SM3 would be moderately difficult to implement due to the presence of several utility lines in the treatment area and the coordination required with the Metro STP operations. Alternative SM3 would also require design-phase testing to determine the proper solidification mixture for the soils. Alternative SM4 would be more difficult to implement due to the need to relocate critical utilities in order to construct excavation shoring and perform the excavation. The space needed for the excavation, support activities and stockpiled soils and backfill materials would present significant difficulties in coordinating with the Metro STP operations. Alternative SM5 could disrupt several critical activities of the Metro STP operations, and may not be technically or administratively feasible.

Solidification is a readily available technology that is proven and reliable in immobilizing contaminants in soils. Equipment, services, and materials needed for all of the soil action alternatives are readily available and the actions under these alternatives would be administratively feasible. Sufficient facilities are available for the off-Site treatment/disposal of the excavated materials under Alternatives SM4 and SM5. Under Alternatives SM4 and SM5, determining the extent of the excavation could be easily accomplished through post-excavation soil sampling and analysis. Monitoring the effectiveness of the solidification process under Alternative SM3 would be easily accomplished through groundwater monitoring. The implementation of institutional controls and the development of an SMP would be relatively easy to implement under Alternatives SM3, SM4, and SM5.

Alternative GW1 would be the easiest to implement, since it would not entail the performance of any activities. With the implementation of institutional controls and the development of an SMP, while easily implementable, Alternative GW2 would be slightly more difficult to implement than Alternative GW1. Alternative GW3 would be slightly more difficult due to the need to optimize the rate of natural degradation processes in the unique groundwater conditions associated with the high pH (elevated by Solvay waste) and naturally-occurring high salinity. Alternative GW3 would have minor short-term impacts, and these would be primarily due to remedial workers handling injected chemicals.

Alternatives GW2 and GW3 would be easy to implement technically with little or no administrative problems.

Equipment, services, and materials needed for Alternative GW3 are readily available and the actions under these alternatives would be administratively feasible.

The implementation of institutional controls and the development of an SMP would be relatively easy to implement under Alternatives GW2 and GW3.

Cost

The capital, annual, and present-worth costs are summarized in Table 13, which appears in Appendix II.

As shown on Table 13, Alternative SM1 has limited costs. Alternative SM3 has moderate total costs ($6.7 million), with a somewhat higher proportion of annual costs associated with long-term monitoring of the solidified soil. The cost of Alternative SM4 ($18.8 million) is more than double the cost of SM3, even though it addresses that same area of soil contamination. Alternative SM5 would cost an additional $36 million ($54.7 million), due to the need to remove a much larger volume of less contaminated soil in close proximity to critical Metro STP infrastructure.

The least costly groundwater remedy is Alternative GW1 at $0. Alternative GW3 is the most costly groundwater alternative at an estimated present-worth cost of $3.7 million.

Support Agency Acceptance

NYSDOH (the support agency for NYSDEC) concurs with the selected remedy.

Community Acceptance

Comments received during the public comment period indicate that the public generally supports the selected remedy. The public's comments are summarized and addressed in the Responsiveness Summary, which is attached as Appendix IV to this document.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund Site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat principal threat wastes is made as provided in the Principal Threat Waste Guidance, OSWER Directive No. 9380.3-06FS,"A Guide to Principal Threat and Low Level Threat Wastes" and additionally pursuant to Site-specific concerns. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Coal tar, BTEX and PAHs are present in soil at the Site at levels that have caused significant groundwater contamination. These waste materials and hazardous substances would also present a significant risk to human health or the environment should exposure occur. Therefore, these waste materials and highly contaminated soils constitute a principal threat waste.

Alternative SM3 would address source materials constituting principal threats by treating them in place to immobilize contaminants and reduce the flux of groundwater through the treated area. Alternatives SM4 and SM5 would address source materials constituting principal threats by excavating contaminated soils and transporting them off-Site for thermal treatment. Therefore, Alternatives SM3, SM4, and SM5 would satisfy the preference for treatment to the extent practicable. With regard to the groundwater alternatives, only Alternative GW3 involves the in-place treatment of the contaminated groundwater, thereby satisfying the preference for treatment.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, NYSDEC and EPA have determined that Alternatives SM3 for soil, in-situ solidification of contaminated soils and GW3 for groundwater, enhanced bioremediation of contaminated groundwater, best satisfy the requirements of CERCLA Section 121, 42 USC §9621, and provide the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR Section 300.430(e)(9).

Alternative SM3 addresses the RAOs, RGs and cleanup levels for BTEX, PAHs and other COPCs and will result in a long-term reduction in the mobility of these contaminants. Alternative SM3 is preferred over Alternatives SM4 and SM5 because it provides the same overall protection of human health and the environment and compliance with ARARs as Alternatives SM4 and SM5, but at significantly less cost ($6.7 million versus $18.8 million and $54.5 million, respectively), presents less short-term impacts, and is more implementable than Alternatives SM4 and SM5.

Alternative SM3 will protect human health primarily through institutional controls. Alternative SM3 will protect groundwater resources by incorporating contaminated soils into a solidified matrix that will break the soil to groundwater migration pathway.

Alternative GW3 addresses the RAOs, RGs and cleanup levels for BTEX, PAHs and other COPCs and will result in a long-term reduction in the volume of these contaminants. Alternative GW3 is preferred over Alternatives GW1 and GW2 because it will reduce the volume of COPCs to a greater degree in a shorter time frame. Although GW3 will be more difficult and costly to implement ($3.7 million versus $0 and $1.02 million, respectively), it will provide a higher degree of environmental protection.

The selected remedy is believed to provide the greatest protection of human health and the environment, provide the greatest long-term effectiveness, be able to achieve the ARARs more quickly, or as quickly, as the other alternatives, and is cost-effective. Therefore, the selected remedy would provide the best balance of tradeoffs among alternatives with respect to the evaluation criteria. EPA and NYSDEC believe that the selected remedy would treat principal threats, be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The selected remedy also would meet the statutory preference for the use of treatment as a principal element.

Description of the Selected Remedy

Based upon an evaluation of the various alternatives, NYSDEC and EPA select Alternative SM3 (in-situ solidification and institutional controls) and Alternative GW3 enhanced bioremediation and institutional controls) as the remedy for the soil and groundwater, respectively. Specifically, this will involve the following:

1. A remedial design program, including a pre-design investigation and bench- and pilot-scale treatability studies, will be performed to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. The bench- and pilot-scale treatability studies will be performed to evaluate the effectiveness of various cement-bentonite mixtures (i.e., soil solidification mixtures) at reducing the leachability and permeability of the impacted soil, including the Solvay waste, at the Site. Solidification mixtures will be evaluated for compatibility with the contaminants of concern and tested for density, permeability, strength, and leachability of VOCs and SVOCs.

2. Subsurface soils from the northeastern portion of the Site where NAPL has been identified in lenses and where PAHs were identified at concentrations greater than 500 mg/kg will be treated using ISS. The approximate extent of the area that will be treated by ISS under this alternative is shown on Figure 8. ISS of the MGP-impacted zone will be performed to depths ranging to a depth of 22 to 24 feet below grade within an approximate 20,600 square foot area. Soils exhibiting odors, staining or sheens will not be treated unless they exceed the 500 mg/kg PAH criterion. Areas restricted by underground utilities that cannot be relocated will be jet grouted and/or surrounded by a solidified area that is sufficient to limit groundwater migration through them. The solidification mixture will be designed to account for the potential future use of this area, including expansions to the Metro STP, if any. To account for the volume expansion associated with ISS, approximately 4-6 feet of shallow soils will be removed prior to the ISS process. Of this excavated material, any MGP waste, coal tar or contaminated soils meeting one or more of the following criteria: visible tar or oil; the presence of sheens or odors with total PAHs over 500 mg/kg; or total BTEX concentration above 10 mg/kg, will be disposed of at an off-Site treatment or disposal facility. Excavated materials which are below these criteria may be stockpiled and evaluated for reuse as backfill on-Site. This removal of shallow soils will also include potential underground structures and obstructions that could impede the ISS process.

3. Further investigation, delineation and removal (to the extent feasible) of suspected purifier waste source areas will be conducted to the northeast of the county maintenance building.

4. Enhanced biodegradation of dissolved phase contaminants through the injection of nutrients, sources of oxygen, and/or other amendments. This will occur along the northern property boundary between the Barge Canal and areas where the highest concentrations of BTEX and PAHs were found in groundwater. Modifications to the enhanced bioremediation treatment will be made, as needed, based on monitoring results. Residual groundwater contamination outside of these areas will be allowed to attenuate naturally.

5. Exposed surface soil will be covered with either a one-foot thick soil cover consisting of clean soil underlain by a demarcation layer; or buildings, treatment structures, pavement, etc. The cover soil may be from any re-used stockpiled soil that meets the criteria for clean cover soils. In vegetated areas, the top six inches of soil will be of sufficient quality to support vegetation. Clean soil will constitute soil that meets the Division of Environmental Remediation's criteria for backfill pursuant to 6NYCRR 375-6.7(d) or local Site background. Non-vegetated areas (buildings, roadways, parking lots, etc.) will be covered by a paving system or concrete at least 6 inches thick.

6. Development of an institutional control in the form of an environmental easement that will require; (a) limiting the use and development of the property to industrial use; (b) compliance with the approved SMP; (c) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) completion and submittal to NYSDEC a periodic certification of institutional and engineering controls.

7. Since the remedy results in contamination remaining at the site that does not allow for unrestricted use, a Site Management Plan will be developed which includes the following:

   (a) An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to assure the following institutional and/or engineering controls remain in place and effective:

   Institutional Controls: The Environmental Easement discussed in Paragraph 6 above

   Engineering Controls: The solidified soil material discussed in Paragraph 2 above and the soil cover discussed in Paragraph 5 above

   This plan will include, but may not be limited to:

   (i) a Soil Management Plan which identifies known locations of MGP-impacted soil at the Site and details the provisions for management of future excavations in areas of remaining contamination;
   (ii) descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
   (iii) provisions for the management, inspection and maintenance of the identified engineering controls, including perimeter fencing and vegetation/cover materials;
   (iv) maintaining site access controls and NYSDEC notification; and
   (v) the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

(b) A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan will include, but not be limited to:

(i) monitoring of groundwater to assess the performance and effectiveness of the remedy;
(ii) a schedule of monitoring and frequency of submittals to NYSDEC;
(iii) a provision to evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified;
(iv) a provision to evaluate the potential for soil vapor intrusion for existing buildings if building use changes significantly or if a vacant building becomes occupied.

8. At a frequency not exceeding five years, a periodic review will be performed, including provision of a certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to NYSDEC, until NYSDEC provides notification in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with NYSDEC-approved modifications; (b) allow the NYSDEC access to the Site; and (c) state that nothing has occurred that will impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the SMP unless otherwise approved by NYSDEC.

9. To maximize the net environmental benefit, green remediation and sustainability efforts will be considered in the design and implementation of the remedy to the extent practicable, including:

- Using renewable energy sources
- Reducing greenhouse gas emissions
- Encouraging low carbon technologies
- Increase recycling and reuse of clean materials

The environmental benefits of the selected remedy may be enhanced by consideration, during the remedial design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green policy[2]. This will include consideration of green remediation technologies and practices.

Because this remedy will result in contaminants remaining on-Site above levels that would allow for unlimited use and unrestricted exposure to Site media, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional remedial actions may be selected and implemented to remove, treat, or contain the contaminated sediments and soils.

Summary of the Estimated Remedy Costs

The estimated cost of the selected remedy for the Site is $10,389,000. This total cost estimate is comprised of a capital cost of $7,826,000 and annual Site management cost ranging from $151,000 to $207,000 (or $2,563,000 in present worth cost).

The cost estimates in this ROD are based on capital (construction) costs and the present worth of the annual Site management costs calculated using a discount rate of 7 percent and a 30-year time

2 See http://epa.gov/region2/superfund/green_remediation.

interval. The actual costs may vary depending on the specifications contained in the detailed remedial design. Further, the actual costs will also vary because the cost estimates provided are developed conservatively and have an accuracy of +50 percent to -30 percent, to comply with the 1988 EPA guidance document, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA."

Table 13 provides details of the estimated cost of the remedial alternatives including the selected remedy.

Expected Outcomes of the Selected Remedy

The results of the HHRA indicate that the Site, if left unremediated, presents an unacceptable noncancer hazard and an increased cancer risk to future construction and utility workers.

Under the selected remedy, it is estimated that concentrations of contaminants in groundwater will be reduced following completion of remedial activities. Potential risks to humans who come in contact with contaminated groundwater will be eliminated or reduced as contaminant levels fall. Groundwater monitoring data from post-remedial monitoring can be used to document improvements in water quality.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, remedies must be selected that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are 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.

For the reasons discussed below, NYSDEC and EPA have determined that the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy will be protective of human health and the environment in that all RAOs, RGs, and cleanup levels will be met through the implementation of this remedy. The predicted reductions of BTEX, PAHs and other hazardous substances are expected to reduce the exposures of humans to these hazardous substances in soil and groundwater. The bioremediation remedy is expected to significantly reduce concentrations of hazardous substances in groundwater within a reasonable timeframe and restore groundwater to drinking water standards.

The implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts that cannot possibly be mitigated.

Compliance with ARARs and Other Environmental Criteria

A summary of action-specific, chemical-specific, and location-specific ARARs, as well as TBCs, which will be complied with during implementation of the selected remedy, is presented below.

Action-Specific ARARs:

- National Emissions Standards for Hazardous Air Pollutants (40 CFR Parts 51, 52, and 60)
- 6 NYCRR Part 257, Air Quality Standards
- 6 NYCRR Part 200, New York State Regulations for Prevention and Control of Air Contamination and Air Pollution
- 6 NYCRR Part 375-1,-2, Environmental Remediation Programs
- 6 NYCRR Part 376, Land Disposal Restrictions
- Resource Conservation and Recovery Act (42 U.S.C. § 6901, *et seq.*)
- 29 CFR 1910, Occupational Safety and Health Standards

Chemical-Specific ARARs:

- Safe Drinking Water Act (SDWA) MCLs and nonzero MCL Goals (40 CFR Part 141)
- 6 NYCRR Parts 700-705 Groundwater and Surface Water Quality Regulations
- 6 NYCRR Part 703, New York State Surface Water Quality Standards

Location-Specific ARARs:

- Fish and Wildlife Coordination Act, 16 U.S.C. 661
- New York State Environmental Conservation Law, Article 24, Freshwater Wetlands
- 6 NYCRR Part 663, Freshwater Wetlands Permit Requirements Regulations
- New York State Environmental Conservation Law, Article 15, Use and Protection of Waters
- 6 NYCRR Part 608, Use and Protection of Waters
- National Historic Preservation Act

Other Criteria, Advisories, or Guidance TBCs:

- New York Guidelines for Soil Erosion and Sediment Control
- New York State Air Cleanup Criteria, January 1990
- SDWA Proposed MCLs and nonzero MCL Goals
- NYSDEC DER Program Policy DER-4 “Management of Coal Tar Waste & Coal Tar Contaminated Soils from Manufactured Gas Plants”
- NYSDEC Technical and Operational Guidance Series 1.1.1, June 1998
- NYSDEC Guidelines for the Control of Toxic Ambient Air Contaminants, DAR-1, November 12, 1997
- NYSDEC Technical Guidance for Screening Contaminated Sediments, January 1999
- EPA Region 2's Clean and Green Policy, March 2009
- EPA’s 1985 Policy on Floodplains and Wetland Assessments for CERCLA Actions
- EPA’s Protection of Wetlands Executive Order 11990
- EPA’s Floodplain Management Executive Order 11988

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP §300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness (discussed above) to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective in that for a reasonable increase in cost, it affords a greater degree of permanence and reliability than does the lower-cost action alternatives, and it will achieve the remediation goals in a reasonable time frame.

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital and annual O&M costs have been estimated and used to develop present-worth costs. The cost estimates presented in this ROD are based upon capital (construction) costs and the present-worth of the annual O&M costs calculated using a discount rate of 7 percent and a 30-year time interval.

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

NYSDEC and EPA have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. Of the alternatives that are protective of human health and the environment and comply with ARARs, NYSDEC and EPA have determined that the selected remedy provides the best balance of tradeoffs in terms of the five balancing criteria set forth in NCP §300.430(f)(1)(i)(B), while also considering the statutory preference for treatment as a principal element and the bias against off-Site disposal without treatment and further considering support agency and community acceptance.

Implementation of the selected remedy will utilize a permanent and alternative treatment technology (ISS) to immobilize contaminated soils to reduce the mass flux of BTEX, PAHs and other COPCs into groundwater. A permanent and alternative treatment technology (enhanced bioremediation) will also be used to treat groundwater. As a result, the statutory preference for permanent and alternative treatment technologies is satisfied.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied under the selected remedy in that principal threat waste coal tar and contaminated soils will be treated in place using ISS to reduce contaminant mobility.

Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure to Site media, a statutory review will be conducted within five years after initiation of remedial action. The five-year review will evaluate the results from monitoring programs established as part of this remedy to ensure that the remedy remains protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The PRAP identified Alternatives SM3 (ISS) and GW3 (Enhanced Bioremediation) as the preferred remedy. NYSDEC and EPA have determined that no significant changes to the remedy, as originally identified in the PRAP, were necessary or appropriate.

APPENDIX I

FIGURES

APPENDIX II

TABLES

Table 13: Remedial Alternative Costs

Subsurface Soil Alternative	Capital Cost ($)	Annual Cost ($)	Present-Worth Cost ($)
Alternative SM1 - No Further Action	$0	$0	$0
Alternative SM3- In-Situ Soil Stabilization and ICs	$6,490,000	$16,000	$6,730,000
Alternative SM4- Focused Soil Excavation and ICs	$18,500,000	$16,000	$18,800,000
Alternative SM5- Soil Excavation to SCOs and ICs	$54,500,000	$16,000	$54,700,000
Groundwater Alternative	**Capital Cost ($)**	**Annual Cost ($)**	**Present-Worth Cost ($)**
Alternative GW1- No Further Action	$0	$0	$0
Alternative GW2- Institutional Controls (ICs)	$97,000	$90,000-$52,000	$1,060,000
Alternative GW3- Enhanced Bioremediation and ICs	$1,300,000	$191,000 $135,000	$3,700,000
Selected Remedy	**Capital Cost ($)**	**Annual Cost ($)**	**Present-Worth Cost ($)**
Alternative SM3- In-Situ Soil Stabilization and ICs and	$6,490,000	$16,000	$6,700,000
Alternative GW3- Enhanced Bioremediation and ICs	$1,340,000	$191,000 $135,000	$3,700,000

APPENDIX III

Administrative Record

Administrative Record

NM – Syracuse, Hiawatha Boulevard
Former MGP Site
Syracuse, Onondaga County New York
Site No. 7-34-059

1. Preliminary Subsurface Investigation for Proposed Onondaga County STP (O'Brien & Gere Engineers, Inc. 1971 and 1972)

2. Niagara Mohawk Substrate Sampling and Analysis (Niagara Mohawk Power Corp. 1985)

3. USEPA Preliminary Site Assessment (PSA), (NUS Corporation 1987)

4. Order on Consent, Index No. D0-0001-9210 between NYSDEC and Niagara Mohawk Power Corp., executed on November 16, 1992.

5. Sediment Sampling and Testing in the Barge Canal (USACE 1994)

6. PSA/IRM Work Plan (June 1995)

7. Preliminary Site Assessment/Interim Remedial Measures (PSA/IRM) Study (ARCADIS between 1995 and 1998)

8. Remedial Investigation and Feasibility Study Work Plan (ARCADIS March 29, 2000)

9. Pathway Analysis Report (ARCADIS June 23, 2000)

10. Preliminary Soils Data Report (ARCADIS September 2000)

11. Soil Excavation and Removal IRM Site Management Plan (Niagara Mohawk Power Corp March 16, 2001)

12. Fact Sheet, July 2001, announcing start of the Soil Removal IRM

13. Soil Removal IRM In-Situ Waste Profiling (ARCADIS August 2001)

14. Construction Completion Report for Soil Removal IRM (ARCADIS October 2002)

15. Order on Consent, Index No. A4-0473-0000, between NYSDEC and Niagara Mohawk Power Corp., executed on October 23, 2003.

16. Remedial Investigation (RI) Report (ARCADIS July 2003)

17. Supplemental Remedial Investigation (SRI) Report (ARCADIS October 2006)

18. Pre-FS Additional Investigation Report (ARCADIS March 2008)

19. Groundwater Monitoring Summary & Mass Flux Evaluation Report (ARCADIS March 2008)

20. Soil Vapor Investigation (SVI) Report (ARCADIS May 2008)

21. Human Health Risk Assessment Report (USEPA September 2009)

22. Feasibility Study Report (ARCADIS October 2009)

23. Email from NYSDEC to Onondaga Nation providing EPA's HHRA for review and comment, December 14, 2009.

24. Email – NYSDEC to NYSDOH provided EPA's HHRA for review and comment, December 31, 2009.

25. Email from NYSDEC to Onondaga Nation providing Draft PRAP for review and comment, January 15, 2010.

26. Email from Onondaga Nation to NYSDEC HHRA review comments, January 27, 2010.

27. Letter – EPA PRAP comments, February 16, 2010.

28. Email from Onondaga Nation to NYSDEC PRAP review comments, February 17, 2010.

29. Proposed Remedial Action Plan for the Hiawatha Blvd. former MGP Site (NYSDEC February 2010)

30. Letter – NYSDOH PRAP concurrence, February 23, 2010.

31. Letter - NYSDEC to Onondaga Nation response to PRAP comments, March 3, 2010.

32. Public Notice of Comment Period and Public Meeting, published in the Post Standard, March 3, 2010

33. Letter – EPA Subsite Determination, March 11, 2010.

34. Fact Sheet, March 2010, announcing PRAP public meeting comment period.

35. Documentation and Transcript of March 18, 2010 Public Meeting (Attached to the Record of Decision as Appendix).

36. Letter – NYSDOH ROD Concurrence, March 31, 2010.

APPENDIX IV

RESPONSIVENESS SUMMARY

NIAGARA MOHAWK (NM) - HIAWATHA BOULEVARD - SYRACUSE FORMER MGP SITE SUBSITE OF ONONDAGA LAKE SITE CITY OF SYRACUSE, ONONDAGA COUNTY RESPONSIVENESS SUMMARY

Table of Contents

Please note that a list of acronyms/abbreviations are contained on page xv of this Record of Decision.

NIAGARA MOHAWK (NM) - HIAWATHA BOULEVARD - SYRACUSE FORMER MGP SITE
SUBSITE OF ONONDAGA LAKE SITE
CITY OF SYRACUSE, ONONDAGA COUNTY
REMEDIAL INVESTIGATION/FEASIBILITY STUDY AND PROPOSED PLAN
RESPONSIVENESS SUMMARY

INTRODUCTION

This Responsiveness Summary (RS) provides a summary of comments and concerns received during the public comment period related to the NM - Hiawatha Boulevard Former MGP Site remedial investigation and feasibility study (RI/FS) reports and Proposed Remedial Action Plan (PRAP), and provides responses of the New York State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (EPA) to those comments and concerns. The RI/FS reports (ARCADIS 2000-2003, 2009) describe the nature and extent of the contamination at the site and evaluate remedial alternatives to address this contamination. The Proposed Remedial Action Plan (NYSDEC 2010) identifies NYSDEC and EPA's preferred remedy and the basis for that preference.

Public involvement in the review of Proposed Plans is stipulated in Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, and Sections 300.430(f)(3)(i)(F) and 300.430(f)(5)(iii)(B) of the National Oil and Hazardous Substances Pollution Contingency Plan. These regulations provide for active solicitation of public comment.

All public comments received are addressed in this RS, which was prepared following guidance provided by EPA in EPA 540-R-92-009 and OSWER[1] Directive 9836.0-1A. No public comments were received concerning NYSDEC and EPA's final decision in the selection of a remedy to address the contamination at the NM - Hiawatha Boulevard Former MGP Site .

PUBLIC REVIEW

NYSDEC and EPA rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the PRAP for the NM - Hiawatha Boulevard Former MGP Site was made available to the public on February 25, 2010. A fact sheet was released with the PRAP and both documents are available at NYSDEC's website (http://www.dec.ny.gov/chemical/37558.html).

The complete Administrative Record file, which contains the information (including the RI and Supplemental RI, Human Health Risk Assessment [HHRA] and FS) upon which the selection of the remedy has been based, is available at the locations listed in the text box below.

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[1] Office of Solid Waste and Emergency Response.

Information Repositories for the NM - Hiawatha Boulevard Former MGP Site Administrative Record

NYSDEC, Region 7 Office
615 Erie Boulevard West
Syracuse, NY 13204-2400
(315) 426-7400
Hours: M – F, 8:30 a.m. – 4:45 p.m.
Please call for an appointment

Onondaga County Public Library
447 South Salina Street
Syracuse, NY 13201
Hours: M, Th, F, Sat, 11:00 a.m. – 4:50 p.m.;
Tu, W, 11:00 a.m. – 7:20 p.m.
Phone: (315) 435-1800

NYSDEC Central Office
625 Broadway
Albany, NY 12233-7014
(518) 402-9662
Hours: M – F, 8:30 a.m. – 4:45 p.m.
Please call for an appointment

PUBLIC COMMENT PERIOD AND PUBLIC MEETING

The public comment period is intended to gather information about the views of the public regarding both the remedial alternatives and general concerns about the site. A notice of the commencement of the public comment period, the public meeting date, the preferred remedy, contact information, and the availability of above-referenced documents was provided in a fact sheet distributed to the public on February 25, 2010 and published in the *Syracuse Post-Standard* on March 3, 2010.

The public comment period for the NM - Hiawatha Boulevard Former MGP Site PRAP commenced on February 25, 2010 and continued until March 27, 2010. During that period, a public meeting was held on March 18, 2010 at the NYSDEC Region 7 Office in Syracuse, New York. Exactly 12 people, including one resident, local business people and state and federal government officials, attended the public meeting. A question-and-answer session followed the formal presentation at the public meeting. A complete transcript of the public meeting can be found in Appendix VI of this ROD.

RECEIPT AND IDENTIFICATION OF COMMENTS

No public comments on the RI/FS and the PRAP were received in any form, including:

- No written comments submitted to NYSDEC via e-mail.
- No written comments mailed to NYSDEC.
- No oral comments made at the public meeting.