PROPOSED REMEDIAL ACTION PLAN

Saranac Lake Gas Co. Inc.
Operable Unit Number 01: Former Gas Plant Property
State Superfund Project
Saranac Lake, Essex County
Site No. 516008
February 2017

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

OU01 Saranac Lake Gas Co. Inc.
Saranac Lake, Essex County
Site No. 516008
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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document repositories identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repositories:

NYSDEC Region 5
Attn: Michael P. McLean
1115 Route 86 - PO Box 296
Ray Brook, NY 12977
Phone: 518-897-1241

Saranac Lake Free Library
100 Main Street
Saranac Lake, NY 12983
Phone: 518-891-4190

A public comment period has been set from: February 24, 2017 to March 27, 2017

A public meeting is scheduled for the following date: Wednesday March 8, 2017 at 6pm

Public meeting location: Ray Brook Regional Office
1115 NYS Route 86
Ray Brook, NY 12977

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent to:

Michael McLean
NYS Department of Environmental Conservation
Division of Environmental Remediation
1115 State Route 86 PO Box 296
Ray Brook, NY 12977-0296
mike.mclean@dec.ny.gov

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy identified herein. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

Receive Site Citizen Participation Information by Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Saranac Lake Gas Company site, a vacant and abandoned former manufactured gas plant (MGP) facility, is located in a residential setting on Payeville Road in the Village of Saranac Lake, Essex County. The site is approximately 4.5 acres in size and lies east of and adjacent to the Remsen Lake Placid Travel Corridor (railway). Residential properties border the site to the north and east, and a college recreational facility and playing field borders to the south.

Site Features: Currently the main site feature is a fenced storage yard and small open sided building; this fenced area does not reflect the site property line except for a small portion on the west along the railway. The manufactured gas plant was predominantly located within the fenced area. Other site features include Brandy Brook, a wooded area, and an access road on the northern portions of the property and woods and equipment storage on the southern portions.

Current zoning/use: The site is zoned commercial and is currently unoccupied.

Past Use of the Site: From the late 1800s to approximately the 1940s, the site was used for manufacturing lighting gas via coal gasification for the Village of Saranac Lake. The operations consisted of two gas holders, a purifier, retort operations, along with coal storage areas and offices. No original MGP structures exist on site today with the exception of a raised concrete storage pad and concrete foundation for one of the gas holders. The past activities at the site have resulted in contamination, both on and off-site.

Operable Units (OU): An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. There are three OUs associated with this site. OU1 is the former gasification plant property. The others are Brandy Brook, running from the site to Pontiac Bay of Lake Flower (OU02), and Pontiac Bay/Lake Flower (OU03). OU02 and OU03 are considered off-site areas.

Site Geology and Hydrogeology: Surficial geology at the Site is predominantly medium to fine sands with some silt. Borings were conducted to as much as 56 feet below ground surface and bedrock was not encountered. Groundwater is very shallow at the site (less than five feet) and generally flows to the south; a small brook (Brandy Brook) runs through the northern portions the site. Brandy Brook discharges into Lake Flower approximately 2,000 feet downstream of the site. Sediments in Brandy Brook and Lake Flower are a silty-fine sand, fine sandy silt with traces of clay and gravel.

Operable Unit (OU) Number 01 is the subject of this document. All future references to “site” in this document will be referring to OU01.

A Record of Decision was issued previously for OU03 (Pontiac Bay) and OU02 (Brandy Brook).

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives that restrict the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) are being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

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

The PRPs for the site, documented to date, include: **Saranac Lake Gas Company**

The PRPs for the site declined to implement a remedial program when requested by the Department. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the Department will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- Soil
- Groundwater

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: <u>RI Results</u>

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified for this Operable Unit at this site is/are:

- Coal Tar
- Benzene
- (PAHs), total
- Ethylbenzene
- Xylene (mixed)
- Toluene
- Arsenic
- Cyanides (soluble cyanide salts)

As illustrated in Exhibit A, the contaminants of concern exceed the applicable SCGs for:

- Groundwater
- Soil

6.2: <u>Interim Remedial Measures</u>

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

There were no IRMs performed at this site during the RI.

6.3: <u>Summary of Environmental Assessment</u>

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

Manufactured gas was cooled and purified prior to distribution. Two principal waste materials were produced in this process: coal tar and purifier waste. Coal tar is a reddish brown oily liquid by-product which formed as a condensate as the gas cooled. Purifier waste is a mixture of wood chips and iron filings which was used to remove sulfur and other compounds from the manufactured gas before the gas was distributed to the public. Purifier waste which was no longer capable of removing the impurities was often disposed of on site. Both coal tar and purifier wastes are present at the Site.

Coal tar does not readily dissolve in water. Materials such as this are commonly referred to as non-aqueous phase liquids, or NAPLs. Although most coal tars are slightly denser than water, the difference in density is slight. Consequently, they can either float or sink when in contact with water. Specific volatile organic compounds (VOCs) of concern with coal tar are benzene, toluene, ethylbenzene and xylenes. Specific semi-volatile organic compounds of concern with coal tar are numerous polycyclic aromatic hydrocarbons (PAHs).

The Fish & Wildlife Resources Impact Analysis (FWRIA) for the site is included in the RI report and identified resources at the site and contaminant exposure pathways.

Soil and Groundwater Contamination: The site investigation detected coal tar and purifier wastes along with significantly elevated levels of manufactured gas plant (MGP) contaminants above NYS standards, criteria, and guidance (SCGs) in the soil and groundwater. Dense non-aqueous phase liquid (DNAPL) in the form of coal tar was present in 27 of the 54 borings advanced at the site. The majority of the coal tar source area is located within the fenced perimeter of the site, with a portion extending beyond the fence predominantly to the south. The site investigation indicated the greatest extent of MGP-impacted soil was generally present between 8 feet and 20 feet below ground surface.

Depth to groundwater at the Site ranges from five to ten feet below ground surface. Sixteen groundwater samples were collected from monitoring wells within OU01. Naphthalene was detected at concentrations exceeding the SCG in seven of the sixteen monitoring wells and one or more BTEX compounds were detected at concentrations exceeding the SCG in nine of the sixteen monitoring wells.

Coal tars contain high levels of PAH compounds. Tars sampled at the site contained levels of benzene of up to 100 ppm which exceeds the SCG by several orders of magnitude. Other VOC contaminants also exceeded the SCGs by similar amounts. Inorganics (metals) were also identified in the soil above SCGs at four discrete locations and within the areas of MGP waste. Cyanide exceeded SCGs at two locations and arsenic at two others. Cyanide was the only inorganic detected in both the soil and groundwater at one location within the MGP waste area.

Coal tar and significantly elevated levels of MGP-related contaminants are also evident in the sediments of Brandy Brook and Pontiac Bay of Lake Flower. Lake Flower is a Class AA waterbody. The site presents a significant environmental threat due to the numerous media impacted, the ongoing releases from impacted sediment, and soil source areas.

6.4: <u>Summary of Human Exposure Pathways</u>

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

The former gasification plant is completely fenced, which restricts public access. However, persons who enter the former gasification plant could contact contaminants in the soil by walking on the site, digging or otherwise disturbing the soil. Contaminated groundwater at the former gasification plant is not used for drinking or other purposes and the surrounding area is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in the groundwater or soil may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality.

This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. The inhalation of site-related contaminants due to soil vapor intrusion does not represent a current concern because there are no occupied buildings on the site. Furthermore, environmental sampling indicates soil vapor intrusion is not a concern for off-site buildings. People using Pontiac Bay (OU03) for recreational purposes such as swimming and boating may come into direct contact with site-related contaminants in sediment. People may come in contact with contaminants present in the soils and sediments along Brandy Brook (OU02) while entering or exiting the shallow creek during recreational activities.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the site.

SECTION 7: SUMMARY OF THE PROPOSED REMEDY

To be selected, the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's proposed remedy is set forth at Exhibit D.

The proposed remedy is referred to as Excavation of Purifier Waste and In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls remedy.

The estimated present worth cost to implement the remedy is $14,648,000. The cost to construct the remedy is estimated to be $13,851,000 and the estimated average annual cost is $42,000.

The elements of the proposed remedy are as follows:

1. Remedial Design: A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;

- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. In-Situ Solidification: In-situ solidification (ISS) of soils will be implemented in a 1.37 acre area (59,500 square feet) where source material exists or total polycyclic aromatic hydrocarbon (PAHs) concentrations exceed 500 ppm. Approximately 24,500 cubic yards of soil will be solidified. The treatment zone will generally extend from approximately five feet below present grade to twenty feet below present grade. The actual contamination depth varies throughout the site so the depth of ISS will vary accordingly. ISS is a process that binds the soil particles in place creating a low permeability mass. The contaminated soil will be mixed in place together with solidifying agents (typically portland cement) or other binding agents using an excavator or augers. The soil and binding agents are mixed to produce a solidified mass resulting in a low permeability monolith. The resulting solid matrix reduces or eliminates mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination. An estimated six foot pre-excavation will be required to allow for the swelling of the solidified soil during mixing. Of this excavated material, any MGP waste, coal tar, purifier waste, or contaminated soil meeting one or more of the following criteria: visible tar or oil; the presence of sheen or odors with total PAHs over 500 ppm; or total BTEX concentrations of 10 ppm or above, encountered will be disposed of at an off-site treatment or disposal facility. Excavated materials which are below the criteria will be stockpiled and evaluated for use as backfill.

Should the predesign investigation identify any contamination exceeding residential soil cleanup objectives offsite, this material will be consolidated into the onsite area at depth and solidified.

3. Site Cover: A site cover will be required to allow for commercial use of the site, and to protect the ISS component of the remedy. The cover will consist either of the structures such as buildings, pavement, or sidewalks comprising site development, or a site cover in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). In the ISS area, the function of this cover will be to provide sufficient thermal protection of the solidified mass from seasonal freeze/thaw cycles, and to protect the ISS mass from deep root penetration while still allowing re-establishment of an appropriate vegetative cover. To provide this protection, four feet of soil will be established between the solidified matrix and the finished ground surface. Excavated soil below the disposal criteria identified in Element 2 above may be used as backfill with the upper one foot, as well as any fill material brought to the site, meeting the requirements for commercial site use as set forth in 6 NYCRR Part 375-6.7(d).

In areas outside ISS treatment area, a one foot cover will be installed where contamination concentrations are between the commercial SCOs and 500 ppm total PAHs; the imported soil will be placed over a demarcation layer. The upper six inches of the soil in all cover areas will be of sufficient quality to maintain a vegetation layer.

4. Institutional Control: Imposition of an institutional control in the form of environmental easement for the controlled property that:

- Requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- Allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- Restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- Requires compliance with the Department approved Site Management Plan.

5. Site Management Plan: A Site Management Plan is required, which includes the following:

a. An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and any off-site impacts, and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 4 above.

Engineering Controls: The solidified soil discussed in Paragraph 2 above, and the site cover system as discussed in Paragraph 3 above. This plan includes, but may not be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- Descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- A provision for evaluation of the potential for soil vapor intrusion for any existing buildings to be reoccupied or any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification; and
- 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 includes, but may not be limited to:

- Monitoring of groundwater to assess the performance and effectiveness of the remedy;
- A contingency for in-situ groundwater treatment, such as enhanced bioremediation, to address downgradient groundwater contamination;
- A schedule of monitoring and frequency of submittals to the Department; and
- Monitoring for vapor intrusion for any buildings, as may be required by the Institutional and Engineering Control Plan discussed above.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into 4 categories; volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), inorganics (metals and cyanide), and PCBs/pesticides. For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Groundwater

Numerous groundwater samples were collected from monitoring wells within the site as part of the Remedial Investigation. Naphthalene was detected at concentrations exceeding its groundwater standard in seven of the sixteen monitoring wells and numerous VOCs and SVOCs were detected at concentrations exceeding SCGs in nine of the sixteen monitoring wells.

Benzene and naphthalene groundwater concentrations suggest that MGP-related contamination is migrating southward from the site source area. Groundwater contamination to the south of the site (off-site) is observed at depths of fifteen to twenty five feet below ground surface within the aquifer in monitoring wells MW-205D and MW-205S. Naphthalene was detected at a concentration greater than ten percent of its solubility approximately 300 feet south of the site at a depth of approximately twenty five feet below ground surface at 2,200 parts per billion (ppb) at MW-205D. Naphthalene was also detected below the SCG in the shallow groundwater (approximately fifteen feet below ground surface) at the same location (MW-205S) at 2.9 ppb, indicating a layer of relatively clean water overlying the deeper contaminated zone. Of note is that groundwater flow is in a southerly direction away from Brandy Brook.

Cyanide was the only site-related inorganic contaminant of concern detected in groundwater that exceeded its groundwater standard. This exceedance was at monitoring well GW-02 located within the source area. Cyanide concentrations are highest within the interpreted site source area and show limited migration, with concentrations decreasing with distance from the source area. Lead was detected above its standard in two monitoring wells (GW2 and GW6) within the source area. Lead was not detected in soil samples above commercial SCG and is also not considered a contaminant of concern. Iron and manganese were also detected in groundwater at concentrations exceeding their SCGs. However, iron and manganese are naturally occurring in the environment, are not contaminants associated with the MGP process, and are not present in site soils above the SCGs. Therefore, these two metals are not considered COCs for this site. Four pesticides were detected and are also not associated with the MGP process and not considered to be contaminants of concern for this site. Refer to Table 1.

Based on the findings of the RI, the presence of MGP wastes has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are benzene and naphthalene.

Table 1 – Groundwater

Detected Constituent	Range of Detected Concentrations (ppb)[a]			SCG[b] (ppb)	Frequency Exceeding SCG		
Volatile Organic Compounds							
1,2,4-Trimethylbenzene	4	-	200	5	7	/	16
1,2-Dibromo-3-chloropropane	9.4	-	9.4	0.04	1	/	30
1,3,5-Trimethylbenzene	2	-	64	5	6	/	16
4-iso-Propyltoluene	4	-	7	5	2	/	16
Benzene	0.52	-	2500	1	17	/	30
Ethyl benzene	3	-	2900	5	16	/	30
Isopropylbenzene	1.3	-	56	5	8	/	30
Naphthalene	2	-	6400	10	8	/	13
n-Butylbenzene	6	-	7	5	2	/	16
Propylbenzene	2	-	20	5	2	/	16
Styrene	8	-	860	5	12	/	30
Toluene	0.58	-	5200	5	16	/	30
Xylenes (mixed)	1	-	500	5	6	/	13
Semivolatile Organic Compounds							
2,4-Dimethylphenol	1.2	-	3.7	1	3	/	29
Acenaphthene	0.42	-	580	20	11	/	29
Anthracene	0.41	-	1900	50	2	/	29
Benzo(a)anthracene	0.83	-	1300	0.002	6	/	29
Benzo(b)fluoranthene	0.7	-	1000	0.002	7	/	29
Benzo(k)fluoranthene	5	-	430	0.002	3	/	29
Biphenyl	0.69	-	1400	5	7	/	17
Chrysene	0.93	-	1000	0.002	7	/	29
Fluoranthene	0.44	-	4300	50	3	/	29
Fluorene	0.4	-	3000	50	6	/	29
Indeno(1,2,3-cd)pyrene	1.7	-	190	0.002	5	/	29
Naphthalene	2.9	-	29000	10	14	/	29
Phenanthrene	0.53	-	9500	50	6	/	29
Phenol	0.4	-	3	1	2	/	29
Pyrene	0.38	-	4700	50	4	/	29
Inorganics							
Arsenic	17.5	-	47	25	1	/	18
Beryllium	0.16	-	8.8	3	1	/	18
Copper	1.9	-	2000	200	1	/	18
Cyanide, Total	24	-	540	200	1	/	14
Iron	400	-	257000	300	18	/	18
Lead	0.64	-	580	25	2	/	18
Manganese	21	-	918	300	6	/	18
Selenium	2.7	-	10.4	10	1	/	18
Thallium	3.6	-	3.6	0.5	1	/	18
Pesticides/PCBs							
4,4'-DDD	0.53	-	0.53	0.3	1	/	8
4,4'-DDT	0.2	-	0.2	0.2	1	/	8
Alpha-BHC	1.3	-	3.2	0.01	3	/	7
Gamma-BHC/Lindane	0.052	-	0.074	0.05	2	/	8

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

Soil

Subsurface soils throughout the site show evidence of impact from MGP-related contamination. Soil contamination was evaluated primarily based on field observations (visual, olfactory and PID readings). A subset of these samples, both with and without observed impacts, were submitted for laboratory analysis. The analytical data collected supports the field observations and confirms either the presence or absence of MGP-related waste. For example, at location D-5, field observations indicated MGP-impacts by visual (observable DNAPL), olfactory (distinctive odor), and field instrument readings and subsequent analytical results confirmed the field observations with a total PAH contaminant concentration of 1,163,700 parts per million (ppm). MGP-impacted soil and contaminant concentrations throughout the site exceed unrestricted, residential, commercial and industrial use SCGs for many BTEX and PAH compounds. DNAPL in the form of coal tar was present in twenty seven of the fifty four borings advanced during the remedial investigation. The extent of impacted soil (i.e., source area) is estimated to be approximately 38,500 cubic yards. Purifier box wastes (typically wood chips and/or blue cyanide staining) were observed in soil profiles. The majority of the source area is located within the fenced interior perimeter of the site, with a portion extending beyond the fence to the north and south. Field screening indicated the greatest extent of MGP-impact was generally present between eight feet and twenty feet below ground surface. A three-dimensional interpretation of the volume of MGP-impacted soil is shown in Figure 2.

Inorganic subsurface soil results exceeded the commercial use SCOs for cyanide at two locations (E-4 and TP-04) and arsenic at two locations (E-6 and TP-05). All locations are within the MGP-impacted soil area. No other inorganics or pesticide results exceeded commercial SCGs. Refer to Table 2.

Surface soil samples were collected during Site Characterization and did not identify contamination above unrestricted SCOs.

Table 2 - Subsurface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]			Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG			Commercial Use SCG[c]	Frequency Exceeding Commercial SCG		
Volatile Organic Compounds											
1,2,4-Trimethylbenzene	0.001	-	60	3.6	4	/	28	190	0	/	28
1,3,5-Trimethylbenzene	0.001	-	9.8	8.4	1	/	28	190	0	/	28
Acetone	0.014	-	0.068	0.05	1	/	40	500	0	/	40
Benzene	0.004	-	100	0.06	12	/	53	44	4	/	53
Ethyl benzene	0.0008	-	210	1	17	/	53	390	0	/	53
Methylene chloride	0.001	-	4.4	0.05	7	/	53	500	0	/	53
Naphthalene	0.002	-	3300	12	4	/	24	500	3	/	24
Toluene	0.001	-	380	0.7	15	/	53	500	0	/	53
Xylenes (mixed)	0.002	-	100	0.26	5	/	23	500	0	/	23
Semivolatile Organic Compounds											
Acenaphthene	0.0042	-	870	20	15	/	52	500	1	/	52
Acenaphthylene	0.0041	-	690	100	11	/	52	500	3	/	52

Detected Constituents	Concentration Range Detected (ppm)[a]			Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG			Commercial Use SCG[c]	Frequency Exceeding Commercial SCG		
Semivolatile Organic Compounds (cont.)											
Anthracene	0.0063	-	740	100	8	/	52	500	1	/	52
Benzo(a)anthracene	0.0051	-	470	1	29	/	52	5.6	1	/	52
Benzo(a)pyrene	0.01	-	420	1	29	/	52	1	29	/	52
Benzo(b)fluoranthene	0.0091	-	340	1	29	/	52	5.6	27	/	52
Benzo(ghi)perylene	0.064	-	300	100	2	/	52	500	0	/	52
Benzo(k)fluoranthene	0.0046	-	120	0.8	29	/	52	56	2	/	52
Chrysene	0.01	-	430	1	29	/	52	56	10	/	52
Dibenz(a,h)anthracene	0.077	-	26	0.33	18	/	52	0.56	16	/	52
Fluoranthene	0.0048	-	1100	100	12	/	52	500	1	/	52
Fluorene	0.0054	-	820	30	16	/	52	500	1	/	52
Indeno(1,2,3-cd)pyrene	0.09	-	190	0.5	26	/	52	5.6	16	/	52
Naphthalene	0.004	-	6000	12	24	/	52	500	9	/	52
Phenanthrene	0.0088	-	3000	100	16	/	52	500	5	/	52
Pyrene	0.0044	-	1500	100	13	/	52	500	2	/	52
Inorganics											
Arsenic	0.42	-	45.6	13	2	/	31	16	2	/	31
Chromium	1.3	-	21.9	1	31	/	31	400	0	/	31
Copper	0.37	-	57.6	50	1	/	31	270	0	/	31
Lead	0.45	-	639	63	3	/	31	1000	0	/	31
Mercury	0.013	-	0.53	0.18	2	/	31	2.8	0	/	31
Selenium	0.53	-	10.5	3.9	2	/	31	1500	0	/	31
Silver	0.73	-	8.3	2	4	/	31	1500	0	/	31
Zinc	6.4	-	395	109	3	/	31	10,000	0	/	31
Cyanide, Total	0.99	-	423	27	2	/	31	27	2	/	30
Pesticides											
4,4'-DDD	0.019	-	0.18	0.0033	3	/	11	92	0	/	11
4,4'-DDE	0.02	-	0.036	0.0033	2	/	11	62	0	/	10
4,4'-DDT	0.071	-	0.2	0.0033	3	/	11	47	0	/	11
Alpha-BHC	0.36	-	0.36	0.02	1	/	11	3.4	0	/	11
Beta-BHC	0.018	-	0.057	0.036	1	/	11	3	0	/	11
Dieldrin	0.052	-	0.052	0.005	1	/	11	1.4	0	/	11
Endrin	0.019	-	0.28	0.014	2	/	11	89	0	/	11

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives;
c - SCG: Part 375-6.8(b) Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.

Based on the findings of the Remedial Investigation, the presence of coal tar and MGP and purifier wastes has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are total PAHs, VOCs, arsenic and cyanide.

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: Capping & Vertical Barrier

This alternative will include the installation of a low-permeability vertical barrier wall and low-permeability surface cap over the soil with visual MGP impacts. This alternative will result in eliminating the potential for direct exposure to impacted soil and reduced mobility of contamination by controlling the source of groundwater contamination. Continued site monitoring with a contingency for groundwater treatment will be used to address downgradient groundwater.

Alternative 2 consists of the following components: pre-design investigation, pre-remediation pumping/reduction of DNAPL, mobilization of temporary facilities and controls, clearing and grubbing, rough grading on site and removal of large building remnants to establish an even surface for applying the soil cap and vertical barrier, installation of the vertical barrier wall, placement of an impermeable soil cap, continued site monitoring with biological enhancement (if determined necessary), institutional controls, and long-term monitoring and reporting.

The vertical barrier will be designed and constructed along the perimeter of the impacted soil and will be approximately 1,300 linear feet. The barrier will consist of a either a sheet-pile wall or low permeability soil bentonite or cement bentonite slurry. The depth of the slurry wall will extend from near ground surface to approximately forty feet below grade, which is about twice as deep as the average depth of observed MGP impacts. However, if a low permeability layer is identified during the pre-design investigations, the depth may extend to key into this layer. This will be determined during the design phase of the project.

For the placement of the cap the existing 1-story building and concrete pads will be demolished and transported off-site for disposal or re-use. Existing soils and spoils from the vertical wall installation will be graded to provide a smooth area for the surface cap so storm water drains freely off of the cap. The impermeable cap will be composed of a twenty four inch low-permeability layer which will promote surface runoff, thereby limiting infiltration that could impact groundwater quality. The cap will consist of a geocomposite clay layer followed by a clean clay/silt layer compacted to a permeability of approximately 10^{-7}centimeters/second overlain by at least six inches of topsoil. Placement of the cap will cover an approximate 100,500 square-foot area, which will extend approximately five feet beyond the vertical barrier. The capped area will be seeded and erosion control blankets will be installed on sloped areas as needed.

Long term site monitoring will be performed to ensure the effectiveness of the remedy. Semi-annual monitoring will include a visual inspection of the capped area, and groundwater samples will be collected to evaluate potential ongoing impacts to groundwater. It is assumed that sampling frequency will be reduced to annually after the first two years. Monitoring results will be presented in an annual report. Bio-enhancement, most likely using a controlled oxygen release technology, may be considered to increase aerobic biodegradation of contamination outside the capped area. In addition to monitoring, the capped area will be mowed semiannually to prevent woody vegetation from growing and impacting the cap. Institutional and engineering controls include groundwater use restrictions and soil vapor intrusion evaluation for future site development.

It is estimated it would take one construction season to implement this alternative.

Present Worth: *$3,822,000*
Capital Cost: *$2,612,000*
Annual Costs: *$52,000*

Alternative 3A: In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls

In-Situ Solidification (ISS) will involve mixing the source material soil with solidifying or binding agents, such as Portland cement, using an excavator or augers. The soil and binding agents produce a solidified mass resulting in a low permeability solid matrix that reduces or eliminates mobility of contamination by controlling the source of groundwater contamination.

This alternative would include: pre-design investigation and studies, mobilization and temporary facilities and controls, set-up of staging areas, performance of in-situ solidification within designated OU01 areas, continued site monitoring with biological enhancement, restoration, and long term monitoring.

Prior to conducting ISS, the existing surface cover materials, subsurface obstructions, and several feet of soil (to the top of the groundwater table estimated at five feet) will be removed using the following criteria: visible tar or oil; the presence of sheen or odors with total PAHs over 500 ppm; or total BTEX concentrations of 10 ppm or above and stockpiled. Samples will be collected from the stockpiled material to evaluate if the soil can be reused onsite. Material not suitable for reuse, and purifier waste that is not amenable to the ISS technology will be properly disposed of. It is estimated that approximately 40% of the excavated soil will be reused as backfill after solidification is complete, and the remaining excavated soil will be transported off-site for disposal.

ISS will be performed by mixing a fluid cement/grout into a column of soil without excavating or removing the soil. The design mix of the cement/grout will be based on results of the pilot test. ISS will likely use a large crane or excavator-mounted auger to mix the soil while cement-bentonite grout is pumped through the auger and mixed into the soil. The resulting material is generally a homogeneous mixture of soil and grout that hardens to become a weakly-cemented material. The mixing auger may be six to twelve feet in diameter and the columns of mixed soil and cement will be overlapped to provide continuity. The result will be a significant reduction in leaching and mobility of the contaminants in the soil by reducing the free liquids and hydraulic conductivity of the soil. It is anticipated that the solidification of the soil will increase the overall volume of the treated area by approximately twenty percent.

ISS will be applied to the estimated extent of MGP-impacted soils/source area as shown in Figure 2. ISS will be performed on average from eight to twenty feet below ground surface, depending on location, within an approximately 94,000 square feet area. A soil cover consisting of approximately three feet of re-usable soil from the ISS excavation, overlain by one foot of clean, imported fill and topsoil will be installed for a total of four feet of fill over the solidified soil. The soil cover will be higher than current grades due to the swelling of the soil during the solidification process and will be graded as a gentle mound. Grass seed will be planted on the soil cover.

Long term site monitoring will be performed to ensure the effectiveness of the remedy. Groundwater samples will be collected semi-annually the first two years and annually for the next three to evaluate ongoing impacts to groundwater. Monitoring results will be presented in an annual report. A five year review report is expected to determine if bio-enhancement is required to address on-site and off-site residual groundwater contamination. It has been assumed that sampling frequency will be reduced to annually after five years. Bio-enhancement, most likely using a controlled release oxygen technology, may be considered to increase aerobic biodegradation of contamination outside the ISS treated area. Soil cover inspections will also be conducted on an annual basis. Institutional and engineering controls include groundwater use restrictions and soil vapor intrusion evaluation for future site development.

It is estimated it would take one construction season to implement this alternative.

Present Worth:... *$11,701,000*
Capital Cost:... *$10,904,000*
Annual Costs:... *$42,000*

Alternative 3B: Partial In-situ Solidification of MGP Source Materials, NAPL Collection, Site Cover, and Institutional Controls

Alternative 3B is similar to 3A with two significant differences. First, ISS will only be applied to the most concentrated area of MGP-impacted soil located near the purifier waste area. ISS in this area will be performed on average from five to twenty feet below ground surface over an approximate 34,500 square feet area. Secondly, this alternative will also include the installation of a non-aqueous phase liquid (NAPL) collection system at the southern portion of OU01, consisting of a stone-filled trench holding three extraction wells with NAPL pumps, solar powered control panels and an enclosed NAPL tank. Extracted NAPL will be transported off-site for disposal.

As with Alternative 3A long term site monitoring will be carried out for a total of up to 30 years and be similar in sampling frequency and potential bio-enhancement. At a minimum, monthly inspections will occur to maintain the NAPL collection system. Site cover inspections will also be conducted on an annual basis. Institutional and engineering controls include groundwater use restrictions and soil vapor intrusion evaluation for future site development.

It is estimated it would take one construction season to implement this alternative, NAPL collection will likely continue to several years.

Present Worth:... *$10,760,000*
Capital Cost:... *$7,914,000*
Annual Costs:... *$152,000*

Alternative 4A: Excavation of MGP Source Materials Area to Meet Commercial SCGs with Site Monitoring

Excavation of impacted soil will involve excavation support, dewatering, excavation, transportation and disposal of soil, backfilling and site restoration. Prior to excavation of MGP impacted soil, the existing surface cover materials and upper several feet of soil from above the impacted area will be removed, characterized, and temporarily stockpiled for re-use as backfill in the excavation.

A steel sheet pile wall will be advanced around the perimeter of the excavation area and will extend to a depth of approximately forty feet, more than twice the average depth of the excavation. Dewatering will be required while excavating. Groundwater removed from the excavation will be treated through a temporary onsite treatment system and will be discharged to Brandy Brook after sampling. Confirmation samples will be collected from the bottom of the excavation after visually impacted soil has been removed. The depth of the excavation will extend as required based on analytical results. Odor controls will be required during excavation, which may include phased excavation within a temporary tent-like structure. Excavated soil will be temporarily stockpiled, sampled and ultimately transported off-site for disposal.

For Alternative 4A, the excavation will occur within the area of MGP-impacted soil in excess of the commercial SCOs. Soil will be excavated for off-site disposal on average from eight to twenty feet below ground surface within an approximately 94,000 square feet area. The excavations will be backfilled with the reusable soil from the upper several feet, and with soil and topsoil meeting the SCOs for commercial use. The final grade of the surface cover will promote surface runoff, thereby limiting infiltration that could impact groundwater quality.

The alternative will also include long term site monitoring and a contingency for enhanced bioremediation of groundwater to increase aerobic biodegradation of contamination outside of the excavated area. Site cover inspections and groundwater monitoring and reporting will be conducted. Institutional and engineering controls include groundwater use restrictions and soil vapor intrusion evaluation for future site development.

It is estimated it would take one construction season to implement this alternative.

Present Worth:..*$21,189,000*
Capital Cost:..*$20,392,000*
Annual Costs:..*$42,000*

Alternative 4B: Partial Excavation of MGP Source Materials with NAPL Collection, Site Cover, and Institutional Controls

Excavation will occur as described in the first two paragraphs of Alternative 4A. For Alternative 4B the excavation process will remove soil from the most concentrated area of MGP-impacts located in the vicinity of the area of the purifier waste material. The average thickness of the excavation in this area will be from five to twenty feet below ground surface over an approximate 34,500 square feet area. This alternative will also include the installation of a NAPL collection system at the southern border of the site, consisting of a stone-filled trench holding extraction wells with NAPL pumps and an enclosed treatment system. Extracted NAPL will be transported off-site for disposal.

Additionally, the top foot of soil outside of the excavation area, but within the MGP-impacted zone will also be removed and used as backfill within the excavation to allow placement of soil and topsoil meeting the SCOs for commercial use in the upper foot. The remaining excavation area will also be backfilled with soil and topsoil meeting the SCOs for commercial use. The final grade of the surface cover will promote surface runoff, thereby limiting infiltration that could impact groundwater quality.

The alternative will also include long term site monitoring, remedial system operation and maintenance, and a contingency for enhanced bioremediation of groundwater to increase aerobic biodegradation of contamination outside of the excavated area. Site cover inspections, groundwater monitoring and treatment system reporting will be conducted. Institutional and engineering controls include groundwater use restrictions and soil vapor intrusion evaluation for future site development.

It is estimated it would take one construction season to implement this alternative, NAPL collection will likely continue to several years.

Present Worth: *$15,278,000*
Capital Cost: *$12,432,000*
Annual Costs: *$152,000*

Alternative 4C: Excavation to Meet Pre-Disposal Conditions with Site Monitoring

Excavation will occur similar in manner described in the first two paragraphs of Alternative 4A. Alternative 4C will include excavation of all MGP-contaminated soils to meet pre-disposal conditions, and will remove soils with site-related contaminant concentrations exceeding the SCOs for unrestricted use. The extent of contamination is currently estimated based on visual/olfactory evidence of MGP waste, but will be refined based on the unrestricted SCOs. The excavation is estimated to occur within a 224,000 square feet area. It is assumed that soil will be excavated for off-site disposal on average from five to twenty feet below ground surface within the 224,000 square feet area.

The excavation will be backfilled with the reusable soil from the upper several feet, and with soil and topsoil meeting the SCOs for unrestricted use. The final grade of the surface cover will promote surface runoff.

The alternative will also include long term site monitoring and a contingency for enhanced bioremediation of groundwater to increase aerobic biodegradation of contamination outside of the excavated area.to increase aerobic biodegradation of contamination outside of the excavated area. Groundwater impacts continue quite distant and deep from the soil impact area. Site cover inspections and groundwater monitoring and reporting will be conducted.

It is estimated it would take two construction seasons to implement this alternative.

Present Worth: *$58,903,000*
Capital Cost: *$58,106,000*
Annual Costs: *$42,000*

Alternative 5: Excavation of Purifier Waste and In-Situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls

This alternative will combine purifier waste area excavation with in-situ solidification of the remaining impacted areas. Purifier waste typically contains complex cyanides and is typically highly acidic and not compatible to ISS treatment.

As with Alternative 3A and 3B in-situ solidification will involve mixing the source material soil with solidifying or binding agents, such as Portland cement, using an excavator or augers. The soil and binding agents produce a solidified mass resulting in a low permeability solid matrix that reduces or eliminates mobility of contamination by controlling the source of groundwater contamination.

This alternative would include: pre-design investigation and studies, mobilization and temporary facilities and controls, set-up of staging areas, excavation followed by performance of in-situ solidification within designated OU01 areas, continued site monitoring with biological enhancement, restoration, and long term monitoring.

Prior to conducting ISS, the existing surface cover materials and several feet of soil will be removed and segregated based of the following criteria: visible tar or oil; the presence of sheen or odors with total PAHs over 500 ppm; or total BTEX concentrations of 10 ppm or above, and stockpiled. The area of purifier waste and existing concrete slabs will be removed and disposed of off-site at this time. Samples will be collected from the stockpiled material to evaluate if the soil can be reused onsite. Material not suitable for reuse will be properly disposed of. It is estimated that approximately forty percent of the excavated soil will be reused as backfill after solidification is complete, and the remaining excavated soil will be transported off-site for disposal. It is anticipated that the solidification of the soil will increase the overall volume of the treated area by approximately twenty percent.

ISS will be applied to the estimated extent of visual MGP-impacted soils/source area as shown in Figure 3. ISS will be performed on average from eight to twenty feet below ground surface, depending on location, within an approximately 59,500 square feet area. A soil cover consisting of approximately three feet of re-usable soil from the ISS excavation, overlain by one foot of soil and topsoil meeting the SCOs for commercial use will be installed, for a total of four feet of clean fill over the solidified soil. The soil cover will be higher than current grades due to the swelling of the soil during the solidification process and will be graded as a gentle mound. Grass seed will be planted on the soil cover.

The alternative will also include long term site monitoring and a contingency for enhanced bioremediation of groundwater to increase aerobic biodegradation of contamination outside of the excavated area. Site cover inspections and groundwater monitoring and reporting will be conducted. Institutional and engineering controls include groundwater use restrictions and soil vapor intrusion evaluation for future site development.

It is estimated it would take one construction season to implement this alternative.

Present Worth:..*$14,648,000*
Capital Cost:..*$13,851,000*
Annual Costs:..*$42,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs($)	Total Present Worth ($)
Alternative 1: No Action	0	0	0
Alternative 2: Capping & Vertical Barrier	2,469,000	42,000	3,266,000
Alternative 3A: In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls	10,904,000	42,000	11,701,000
Alternative 3B: Partial In-situ Solidification of MGP Source Materials, NAPL Collection, Site Cover, and Institutional Controls.	7,914,000	152,000	10,760,000
Alternative 4A: Excavation of MGP Source Materials Area to Meet Commercial SCGs, Site Cover, and Institution Controls	20,392,000	42,000	21,189,000
Alternative 4B: Partial Excavation of MGP Source Materials Area with NAPL Collection, Site Cover, and Institution Controls	12,432,000	152,000	15,278,000
Alternative 4C: Excavation to Meet Pre-Disposal Conditions with Site Monitoring	58,903,000	42,000	58,903,000
Alternative 5: Combined Excavation of Purifier Waste and In-Situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls	13,851,000	42,000	14,648,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 5: Excavation of Purifier Waste and In-Situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls as the remedy for this site. Alternative 5 would achieve the remediation goals for the site by removing the purifier waste and providing treatment of the source area by in-situ solidification and the establishment and implementation of institutional and engineering controls which includes a site cover system, potential exposure mitigation, and groundwater monitoring to determine the effectiveness of the remedy. The elements of this remedy are described in Section 7. The proposed remedy is depicted in Figure 3.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

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

1. <u>Protection of Human Health and the Environment.</u> This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The selected remedy satisfies this criterion by eliminating the potential for direct contact with contaminated surface soil and immobilizing source material and contaminants of concern by solidification of the subsurface soils, thereby eliminating the potential ongoing release of contaminants into groundwater. Impacts to groundwater are presently minor and are addressed by restricting groundwater use via institutional controls, in combination with groundwater monitoring and potential biological enhancement to verify the effectiveness of the remedy. Soil vapor intrusion will be evaluated with any future site development.

Alternative 1 (No Action) does not address site contamination and does not provide any additional protection to public health and the environment and will not be evaluated further. Alternative 2 (Capping and Vertical Barrier) eliminates direct contact with any contaminated soil, but poses a continued concern for the presence of coal tar in the soil matrix and also creates the potential for ongoing release of contaminants into groundwater. Alternative 3B (Partial ISS of Source Materials, NAPL Collection, Site Cover, and Institutional Controls) and 4B (Partial Excavation with NAPL Collection and Site Monitoring) mitigates the most impacted MGP and purifier waste areas and would extract NAPL, reducing contaminant migration, but the potential for the ongoing release of contamination to groundwater remains. Alternative 3A (In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls), Alternative 4A (Excavation of MGP Source Materials Area, Site Cover, and Institutional Controls) and Alternative 5 also satisfies this criterion by eliminating direct contact with contaminated subsurface soils through removal and eliminates the potential ongoing release of contaminants into groundwater. All the alternatives rely on a restriction of groundwater use at the site via institutional controls to protect human health until the treatment or removal of the contaminant source results in compliance with groundwater quality standards. Alternatives 3B and 4B would require this restriction in the long term. Alternative 4C, (Excavation to Meet Pre-Disposal Conditions**)** meets this threshold criterion by removal of all contaminated soils and long-term groundwater monitoring to confirm that stopping the release of coal tar from the soil matrix has resulted in the restoration of groundwater quality. Soil vapor intrusion will be evaluated with any future site development except for Alternative 4C.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

All the retained Alternatives, 2 through 5, comply with SCGs, but do so to different degrees over different time scales. Alternative 2 (Capping and Vertical Barrier) will meet chemical specific SCGs by capping soil contamination in the top two feet of soil and minimize contaminant migration by installation of an impermeable barrier. Alternative 3A (In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls) and Alternatives 4A (Excavation of MGP Source Materials Area to Meet Commercial SCGs, Site Cover, and Institution Controls) satisfy the threshold criteria for commercial SCGs. Alternative 3B (Partial ISS of Source Materials, NAPL Collection, Site Cover, and Institutional Controls) and 4B (Partial Excavation with NAPL Collection and Site Monitoring) may contribute to the ongoing release of contaminants into groundwater and may take decades for NAPL recovery to be completed. Alternative 4C (Excavation to Meet Pre-Disposal Conditions**)** complies with SGCs through removal or treatment of soils with any level of PAHs. Alternative 5 also complies with SGCs to the extent practicable. It addresses source areas of contamination to the groundwater and achieves the commercial use cleanup objectives at the surface through construction of a site cover. It also creates the conditions necessary to restore groundwater quality to the extent practicable by solidifying contaminants in subsurface soils and preventing their migration and release into groundwater. The remaining criteria are particularly important in selecting a final remedy for the site

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

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

Long-term effectiveness is best accomplished by those alternatives involving excavation of the contaminated subsurface soils (Alternatives 4A, 4B, 4C, and 5). Alternative 4A (Excavation of MGP Source Materials Area to Meet Commercial SCGs, Site Cover, and Institution Controls) would remove soils above commercial SCGs but not to unrestricted conditions; institutional controls such as groundwater and land use restrictions and monitoring will address any remaining contamination. Alternative 4C (Excavation to Meet Pre-Disposal Conditions) would meet unrestricted SCGs. Alternative 4B (Partial Excavation with NAPL Collection and Site Monitoring) would only remove the most contaminated soils and leave soil above commercial SCGs. Alternative 5 excavates the area of purifier waste to the extent practical. Since Alternative 5 solidifies the remaining impacted subsurface soils rather than removing them, some level of long-term management of coal tar and contaminants of concern in the in-situ solidified mass will be necessary. However, the potential for direct contact and the leaching of contaminants in the in-situ solidified mass to groundwater will be greatly reduced. The contaminants remaining in the in-situ solidified mass will be addressed by institutional controls such as groundwater and land use restrictions and groundwater monitoring and potential bio-enhancement. The institutional controls required for the Alternative 5 and Alternative 3A (In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls) are effective methods of control in the long-term. Alternative 3B (Partial ISS of Source Materials, NAPL Collection, Site Cover, and Institutional Controls) would only treat the most contaminated soils and also leave soil above commercial SCGs. All Alternatives except Alternative 4C will require mowing, inspections, and maintenance to ensure the cap remains effective.

4. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative 2 (Capping and Vertical Barrier) would leave the majority of the contaminants on site beneath the cap and within the limits of the barrier wall. Alternative 3B (Partial ISS of Source Materials, NAPL Collection, Site Cover, and Institutional Controls) and 4B (Partial Excavation with NAPL Collection and Site Monitoring) would only remove or treat the most concentrated area of MGP-impacted soil located in the purifier waste area. Alternatives 4A (Excavation of MGP Source Materials Area to Meet Commercial SCGs, Site Cover, and Institution Controls) and 4C (Excavation to Meet Pre-Disposal Conditions) will reduce the volume of contamination present at the site by the removal of impacted soil and source material. This soil and source removal under Alternatives 4A and 4C also reduces the mobility of contaminants. Both Alternative 5 and Alternative 3A (In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls) will partially reduce the volume of contamination by excavation for the ISS expansion, however much of the volume of contamination will remain in the solidified mass. Alternative 5 will directly reduce the mobility of coal-tar and contaminants of concern in soils by excavation of the purifier waste and the physical solidification of the MGP impacted soil. Groundwater monitoring and site management are required for Alternatives 2, 3A, 3B, 4A 4B, and 5 and to a lesser degree with Alternative 4C. Alternative 4C provides the greatest reduction in mobility and volume of contamination.

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

Alternative 2 (Capping and Vertical Barrier) would be the quickest to implement. Alternative 3A (In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls), Alternative 3B (Partial ISS of Source Materials, NAPL Collection, Site Cover, and Institutional Controls) and Alternative 5 have similar short-term impacts resulting from the implementation of ISS and removal of the building foundations and associated debris, and excavation and restoration of soils. The methods available to control these impacts are available and reliable. Alternatives 4A (Excavation of MGP Source Materials Area to Meet Commercial SCGs, Site Cover, and Institution Controls) and 4B (Partial Excavation with NAPL Collection and Site Monitoring) would have additional negative short term impacts due to contaminant excavation, off-site trucking, and off-site disposal. Alternative 4C (Excavation to Meet Pre-Disposal Conditions) will involve the greatest excavation quantities and depths, resulting in the greatest and significant negative short-term impacts with a high level of disruption due to the removal and replacement and the largest truck traffic volume.

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

Alternative 2 (Capping and Vertical Barrier) will have technical concerns with implementing associated primarily with the size of the equipment required to install the barrier wall and will be contingent upon cooperation of the community and land owners surrounding the site as portions of the barrier wall and monitoring wells will likely require installation on adjacent parcels. Additionally, Alternative 3A (In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls) and Alternative 3B (Partial ISS of Source Materials, NAPL Collection, Site Cover, and Institutional Controls) involves ISS of purifier waste; purifier waste typically contains complexed cyanides and is highly acidic and typically not amenable to ISS treatment. Alternative 4A (Excavation of MGP Source Materials Area to Meet Commercial SCGs, Site Cover, and Institution Controls), 4B (Partial Excavation with NAPL Collection and Site Monitoring) and 4C (Excavation to Meet Pre-Disposal Conditions) would be less implementable because deep excavation would require greater structural controls and water management. Alternative 4C would be least implementable due to the size of the proposed excavation area, volume of excavated soils and required backfill, and need for extensive dewatering and associated water treatment. Alternative 5 is the most implementable because ISS poses a lower level of difficulty for implementation in the geological conditions identified at the site.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The costs of the alternatives vary significantly. Alternative 2 (Capping and Vertical Barrier) costs the least. Alternative 3A (In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls) and Alternative 3B (Partial ISS of Source Materials, NAPL Collection, Site Cover, and Institutional Controls) costs are the next most cost-effective option but concern regarding the effectiveness of ISS in purifier waste areas remain. Alternative 5 is the next most cost-effective option and provides for the current and future land use, addresses source areas and purifier waste areas and possible future groundwater impacts via source material solidification. The excavation alternatives: Alternative 4A (Excavation of MGP Source Materials Area to Meet Commercial SCGs, Site Cover, and Institution Controls), 4B (Partial Excavation with NAPL Collection and Site Monitoring) and Alternative 4C (Excavation to Meet Pre-Disposal Conditions) cost the most. Alternative 4C (Excavation to Meet Pre-Disposal Conditions) is the least cost effective as its high cost will not lead to a comparatively higher value in added environmental protection or increase in actual land use in addition to the current and future planned land use.

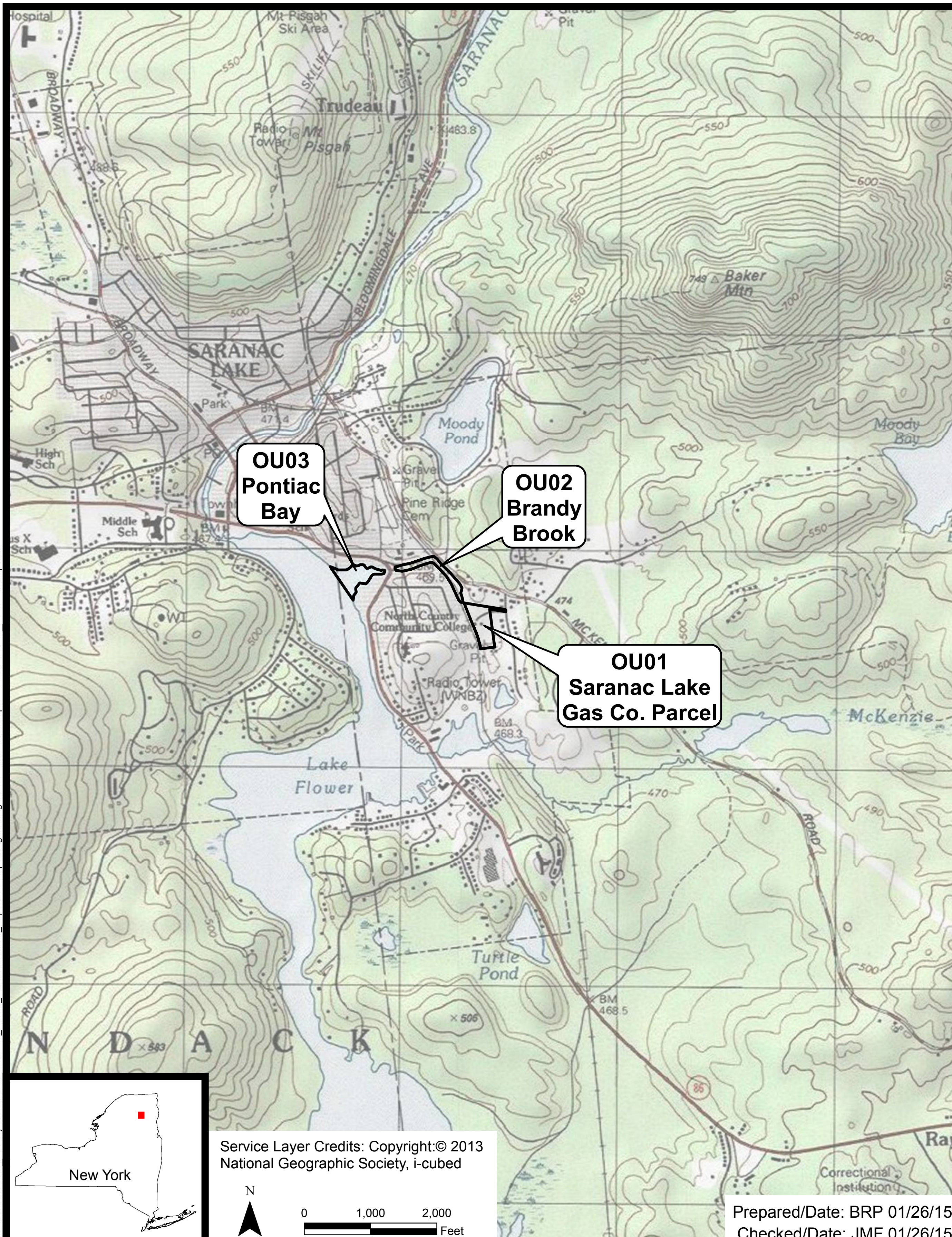
8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

All Alternatives 2 thru Alternative 5 are consistent with the reasonably-anticipated commercial land use of the site. Alternative 4A (Excavation of MGP Source Materials Area to Meet Commercial SCGs, Site Cover, and Institution Controls) and 4C (Excavation to Meet Pre-Disposal Conditions) will remove contaminants of concern while allowing for current and planned land use. Alternative 5 and 3A (In-situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls) will allow for the current and future planned land use with some contaminants remaining in the solidified mass. Finally, Alternative 4C (Excavation to Meet Pre-Disposal Conditions) would allow for any future land use. The site currently is a 4.5 acre vacant lot zoned for commercial use.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes

Alternative 5: Excavation of Purifier Waste and In-Situ Solidification of MGP Source Materials, Site Cover, and Institutional Controls is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.



NYSDEC Site # 516008
Saranac Lake Gas Co., Inc.
Saranac Lake, New York

MACTEC

Site Location Map

Project 3612132271 Figure 1

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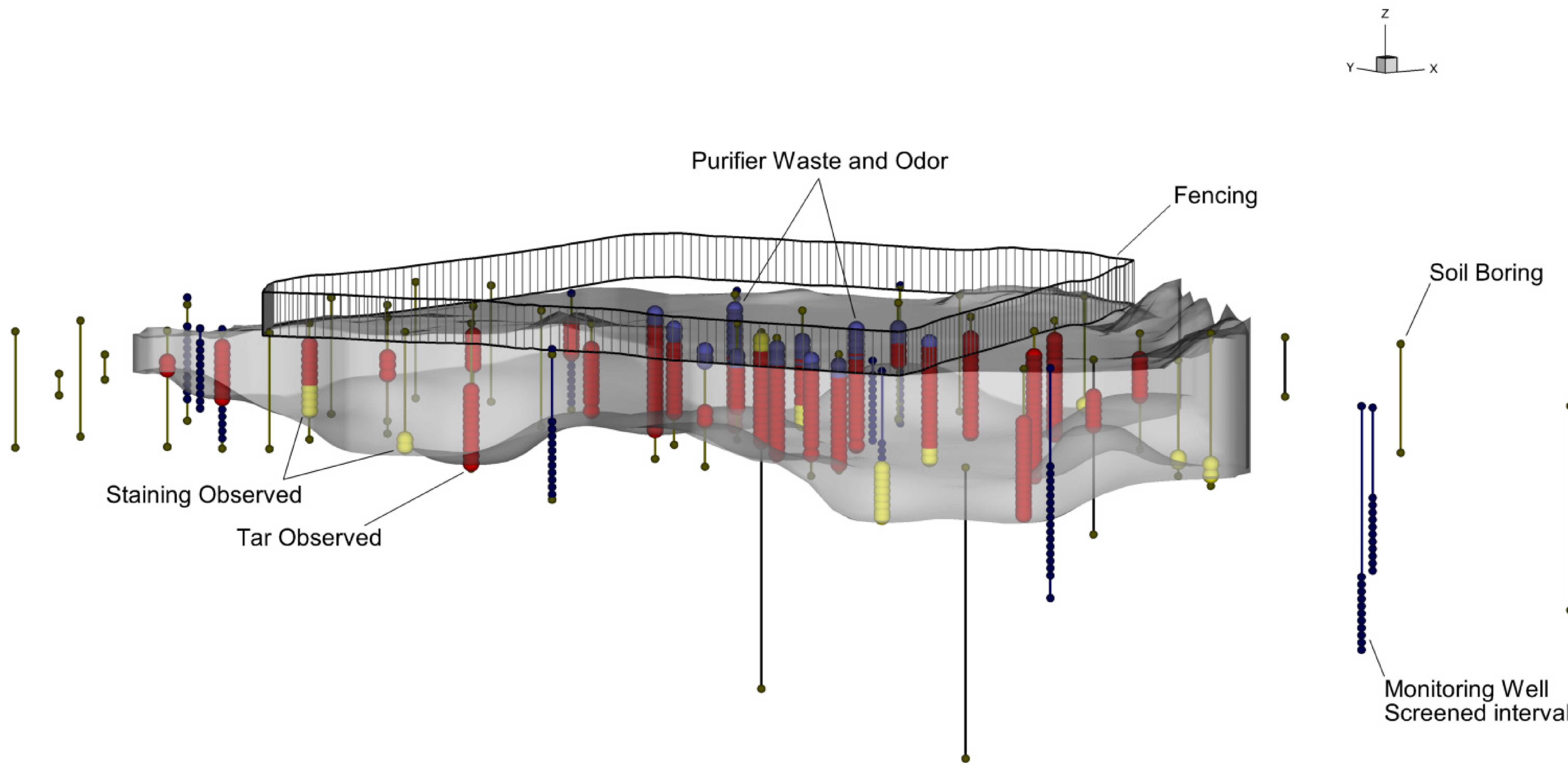

Interpreted extent of MGP-impacted soil, OU1 volume estimated at 38,500 cubic yds

- Tar Saturated
- Staining, Odor
- Purifier Waste and Odor

NYSDEC – Site # 516008 Saranac Lake Gas Company Saranac Lake, New York	MACTEC	Interpretation of the Volume of MGP-Impacted Soil from OU01 (showing translucency) Project 3612132271 Figure 2

NYSDEC Site # 516008
Saranac Lake Gas Co., Inc.
Saranac Lake, New York

MACTEC

Alternative 5 with Contaminants Detected in Soils and Groundwater
Project 3612132271 Figure 3

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