RECORD OF DECISION

Ludlow Sand & Gravel Site Superfund Site
Operable Unit 2 (OU2)
Town of Paris, Oneida County, New York

March 2003

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Ludlow Sand & Gravel Superfund Site
Town of Paris, Oneida County, New York

Superfund Site Identification Number: NYDO 13468939
Operable Unit 2

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the New York State Department of Environmental Conservation's (NYSDEC) and the U.S. Environmental Protection Agency's (USEPA) selection of a remedy for the Ludlow Sand & Gravel Superfund site (Site), which is chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601 *et seq.*, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for the 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 United States Environmental Protection Agency (USEPA) and New York State Department of Health (NYSDOH) were consulted on the planned remedy and they concur with the selected remedy (see Appendix IV).

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 described in this document addresses PCB-contaminated soil located below the water table. The PCB-contaminated soil will be solidified in-situ. The remedy will ensure that PCB-contaminated soils do not contaminate downgradient groundwater and on-site ground water is restored to NYSDEC groundwater standards.

The major components of the selected remedy include the following:

- Implementing a pre-design delineation sampling program to determine the precise area to be grouted (vertically and horizontally). The results of the required sampling program will be utilized to develop a conceptual design report.

- Performing a remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation, maintenance, and monitoring for the remedial action.

- Implementing soil bench-scale testing to determine the grout characteristics before grouting is implemented.

- Solidifying the area where PCBs concentrations above 10 ppm exist by using pressure grouting technology.

- Performing end-point verification sampling outside the perimeter of the grouted area to ensure that all PCB contaminated soils have been solidified in accordance with the Remedial Action Objectives.

- Performing grout end-point sampling and testing to confirm both that the grout has been injected where the pre-design delineation sampling program determined it to be necessary and that it will be effective in reducing migration.

- Backfilling the North Gravel Pit to its original elevation.

- Covering the area with clean soil working base to raise the surface elevation to its original grade, and applying a vegetative cover to prevent erosion, if necessary.

- Limiting site access and issuing a deed restriction to prohibit groundwater usage and limit the land use to non-residential purposes.

- Installing at least two downgradient deep groundwater monitoring wells.

- Implementing a groundwater monitoring program to ensure that contaminants have remained immobile and are not impacting the groundwater. The groundwater would be sampled on a semiannual basis. If the groundwater data are in compliance with NYS Ambient Groundwater Quality Standards, the program would be discontinued and the groundwater would continue to be subject to the long-term monitoring program as part of the OU1 operation and maintenance plan for the site.

As part of a long-term groundwater monitoring program, groundwater samples will be collected and analyzed quarterly in order to verify that the level and extent of groundwater contaminants (PCBs) are declining and that conditions are protective of human health and the environment.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. §9621, in that 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 at least attains the legally applicable or relevant and appropriate requirements under federal and state laws; 3) is cost-effective; and 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In keeping with the statutory preference for treatment that reduces toxicity, mobility, or volume of contaminated media as a principal element of the remedy, the contaminated soil will be treated in-situ.

This remedy will result in the reduction of the mobility of PCBs in the North Gravel Pit. Residual PCBs levels will require that the site be restricted to non-residential use. A site review may be conducted no less than once every five years after initiation of the remedial action to ensure that the remedy is effectively being protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

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

- Chemicals of concern and their respective concentrations (see ROD, pages 5-7);

- Baseline risk represented by the chemicals of concern (see ROD, pages 8-13);
- Cleanup levels established for chemicals of concern and the basis for these levels (see ROD, Appendix II, Table 7);

- How source materials constituting principal threats are addressed (see ROD, pages 7-8);

- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (see ROD, page 8);

- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, page 36);

- Estimated capital, annual operation and maintenance, and total present-worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (see ROD, pages 38-39); and

- Key factors that led to selecting the remedy (*i.e.*, 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 33-40).

AUTHORIZING SIGNATURE

Dale A. Desnoyers, Director
Division of Environmental Remediation

Date

RECORD OF DECISION FACT SHEET

Site

Site name:	Ludlow Sand & Gravel, OU2
Site location:	Town of Paris, Oneida County, New York
Listed on the NPL:	September 1, 1983

Record of Decision

Date signed:	March 31, 2003
Selected remedy:	In-situ solidification of PCB contaminated sub-surface soil.
Capital cost:	$2,575,925
Operation, Maintenance and Monitoring cost:	$15,500, annually
Present-worth cost:	$2,814,199 (7% discount rate for 15 years)
Lead	NYSDEC
Primary Contact:	Kevin Sarnowicz, NYSDEC Project Manager, (518) 402-9775
Secondary Contact:	Isabel Rodrigues, USEPA Project Manager, (212) 637-4258
Main PRPs	Special Metals, Inc.

Waste

Waste type:	PCBs
Waste origin:	On-Site dumping
Contaminated media:	Soil

DECISION SUMMARY

Ludlow Sand & Gravel Superfund Site
Town of Paris, Oneida County, New York

March 2003

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ATTACHMENTS

SITE NAME, LOCATION, AND DESCRIPTION

The Ludlow Sand and Gravel Site (Site Number 6-33-014) is located in the Town of Paris, Oneida County, New York, approximately six miles south of Utica *(Figure 1)*. The Ludlow Sand and Gravel property encompasses approximately 60 acres with landfill activities confined to approximately 18 acres. The fill area is fenced on the western boundary along Holman City Road. The south and east sides of the landfill are bounded by a designated wetland and an unnamed stream, while on the north, the landfill is bounded by a gravel pit which is also part of the site *(Figure 2).*

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The landfill began receiving municipal refuse from surrounding communities in the 1960's. The landfill also received bulk liquid, including septage, waste oils, coolants, and sludges containing metals. The bulk liquids were disposed of at the landfill by surface application. The on-site gravel pit (currently known as the North Gravel Pit (NGP)), located to the north of the landfill, was also periodically used for the disposal of bulk waste oil loads. Drummed liquid wastes were reportedly not disposed in the landfill. Drummed liquids were bulked using a vacuum truck and were applied to the landfill in a manner similar to the bulk loads previously described. The landfill continued to accept waste until it was shut down by court order in 1988.

As early as 1966, New York State cited the owner/operator, Mr. Ludlow, for improper or illegal waste disposal practices. A variety of legal actions were taken against Mr. Ludlow in response to legal complaints made by the NYS Department of Law.

Preliminary site investigations conducted by New York State in 1982 identified the presence of PCBs in leachate seeps emanating from the landfill. Based on this information, the site was added to the EPA's list of hazardous waste sites known as the Superfund National Priorities List (NPL). In 1984, a draft cooperative agreement was prepared by the State to request funds from EPA to perform an RI/FS at the site. Prior to submission of the cooperative agreement to EPA, the NYS Department of Law and the NYSDEC attempted to negotiate with Mr. Ludlow for site investigation and remedial action.

Although negotiations failed with Mr. Ludlow, Special Metals, Inc. of Utica, New York, a potentially responsible party (PRP), agreed to perform an RI/FS. Special Metals negotiated with the State to perform the work as specified in an Administrative Consent Order which was signed on September 10, 1984. O'Brien and Gere Engineers, Inc. (OBG) was hired to perform the RI/FS. The completed RI/FS which included a

recommendation for landfill closure as the remedy for the Site was submitted to the State in 1986.

The FS presented by OBG recommended remedial alternatives for remediating the landfill which were less stringent than Federal and State requirements. Subsequently, Mr. Ludlow's attorney engaged Dunn Geoscience Corporation (DGC) to perform additional investigations to supplement OBG's investigation and prepare a closure plan. A second investigation report with a final closure plan was submitted to the State for review. In July 1987, a Federal District Court Judge ordered the landfill to close by February 15, 1988 pursuant to Federal and State regulation and ordered the partial payment of response costs to the State. Concurrent with the PRP's additional investigations, EPA tasked Camp, Dresser and McKee, Inc. (CDM) to perform a supplemental RI/FS in response to the State's request for assistance in evaluating the cost of the alternatives. The supplemental RI/FS performed by CDM was released to the public for comment in August 1988.

EPA signed a Record of Decision (ROD) on September 30, 1988. In the ROD, EPA, in consultation with the State, divided the Site into two operable units. OU1 addressed the landfill proper and OU2 was to address contamination in off-site groundwater, the on-site wetlands, and the NGP. The 1988 ROD specified the selected remedial action for OU1 As summarized below:

- Consolidate, into the landfill, contaminated soil and sediments located adjacent to the landfill;
- Cap the landfill with an impermeable cover;
- Collect and treat leachate seeps;
- Dewater the landfill;
- Implement upgradient groundwater controls to lower and maintain the ground water table from being in contact with the waste material;
- Install a perimeter fence;
- Recommend that institutional controls be established in the form of deed restrictions on future uses of the site; and
- Perform long-term groundwater quality monitoring.

The ROD also called for implementation of a soil/sediment sampling program to fully define the extent of soils to be consolidated under the cap.

All of the work associated with implementation of the 1988 OU1 ROD was completed between 1990 and 1991. In addition, during the process of landfill closure, the soil contamination in the wetland areas and the NGP were delineated. Sediment from the wetlands was excavated to the NYS remedial cleanup guidance value of 1 ppm of PCBs and consolidated into the landfill prior to the cap completion. Sediment with PCB concentrations greater than 500 ppm (approximately 40 cubic yards) was disposed of off-site. In addition, approximately 60,000 cubic yards of soil were excavated from the NGP. Approximately 40,000 cubic yards were found to be contaminated with PCBs and were consolidated into the landfill prior to completion of the cap. The other 20,000 cubic yards had non-detectable levels of PCBs and were placed on the bank of the NGP. The total amount of soil that was excavated from the NGP was greater than anticipated and the excavation using conventional excavation equipment became difficult when groundwater was encountered. It was decided to end the NGP excavation efforts and to reassess the extent of contamination in the pit area and develop other alternatives for addressing the remaining contamination.

Sediment sampling conducted after excavation of the wetland confirmed that no contamination remained above NYSDEC TAGM 4046 surface soil guidance value of 1 ppm of PCBs. It was determined that no further remedial action was necessary for the wetland areas. Therefore, it was not necessary to include investigation of the wetland as part of the OU2 remedial investigation.

In 1994, OBG, on behalf of the PRP, proposed a work plan for a supplemental RI/FS to address OU2. The PRP believed that sufficient work was done to address the contamination at the NGP and that any further remedial action was unnecessary. EPA and NYSDEC disagreed and the dispute was taken to court. Subsequently, the work plan was approved for implementation under a Consent Judgment, by order of the court, dated August 3, 1996.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan for the Site was made available to the public in both the Administrative Record and information repositories maintained at two local information repositories: The Town of Paris Town Hall, 2580 Sulphur Springs Road, Sauquoit, New York and the NYSDEC Region 6 sub-office, State Office Building, 207 Genessee Street, Utica, New York. A public comment period was held from February 15, 2003 to March 16, 2003. On March 6, 2003, NYSDEC conducted a public meeting at the Town of Paris Town Hall,2580 Sulphur Springs Road, Sauquoit, New York, to present the findings of the RI/FS and answer questions from the public about the NGP

Site and the remedial alternatives under consideration including the preferred alternative.

The public generally supports the selected remedy. Comments at the public meeting were related to Site contaminants, the threat to public and private water supplies, the risks posed by the Site, the selected remedy, and the financing of the project. Written comments objecting to the selected remedy were submitted by Special Metals, Inc. Responses to the comments received at the public meeting(no written comments were received) and the written comments from Special Metals, Inc. are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF OPERABLE UNIT

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Section 300.5, 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 an initial phase 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.

EPA, in consultation with the State, divided the Site into two operable units in 1988. OU1 addressed the landfill and OU2 was to address contamination in off-site groundwater, the on-site wetlands, and the North Gravel Pit (NGP).

During the implementation of the Record of Decision for OU1, portions of OU2 were remediated (wetlands, off-site groundwater and the majority of the NGP). Operable Unit (OU2), which is the subject of this Proposed Plan, addresses the residual PCB contamination remaining below the water table in the NGP.

The remedial goal for the selected remedy for the NGP will remediate all sub-surface soil contaminated with PCBs to NYSDEC TAGM No 94-HWR-4046 soil guidance values (10 ppm). Because of the technical complexities that can be encountered in solidifying soils within the water table at a depth of 30 feet below grade, the remedial action goal may not be achieved in all areas. Consequently, groundwater monitoring would be required to ensure that contaminants have remained immobile and are not impacting the groundwater.

The primary objectives of this action are to control the source of PCB contamination at the Site, to prevent the potential migration of PCBs, to minimize any potential future health and environmental impacts, and to protect the downgradient public water supply wells from becoming contaminated.

SUMMARY OF SITE CHARACTERISTICS

The purpose of the supplemental remedial investigation (RI) was to further characterize the extent of groundwater contamination and to define the nature and extent of residual contamination at the NGP.

The supplemental RI was conducted between November 1996 and January 1998. A report entitled "Ludlow North Gravel Pit Supplemental Remedial Investigation/ Feasibility Study" has been prepared which describes the field activities and findings of the RI in detail.

The supplemental RI included the following activities:

- Soil investigation, including shallow soil cores, deep soil borings, and sampling within the NGP.

- Groundwater investigation, including monitoring well installation hydraulically downgradient of the NGP, monitoring well development and groundwater sampling.

- Sampling of the standing (ponded) water in the gravel pit.

To determine which environmental media (e.g.,soil and groundwater, etc.) are contaminated at levels of concern, the RI analytical data were compared to environmental standards, criteria, and guidance values (SCGs). Groundwater, drinking water and surface water SCG values identified for the Ludlow Sand & Gravel site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of the New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios. In addition, site-specific background concentration levels for soils can be considered for certain classes of contaminants.

Based on the supplemental RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the supplemental RI Report.

Chemical concentrations are reported in parts per billion (ppb), micrograms per liter (Fg/L), parts per million (ppm), and milligrams per kilogram (mg/Kg). For comparison purposes, where applicable, SCGs are provided for each medium.

Geology

The geology in the vicinity of the NGP is characterized by a complex sequence of glacial deposits, overlying Silurian age bedrock, that dip to the south at one to two degrees. The unconsolidated sediments vary in composition, are highly variable in texture, and increase in thickness to the west. To the east, the bedrock is exposed at the land surface; to the west, the bedrock is overlain by at least 150 feet of unconsolidated sediments.

Hydrogeology

Groundwater elevation data indicate that the depth to groundwater varies across the site from approximately 3 to 40 feet. This variability is largely due to topographic changes across the site. Groundwater elevations indicate a north-northwest shallow groundwater flow direction. The topography in the vicinity of the pit indicates that surface water runoff from surrounding areas drains to the bottom of the pit. The standing water at the bottom of the pit indicates that the pit intersects groundwater. Therefore, surface water recharge may potentially impact shallow groundwater flow in the vicinity of the NGP.

Nature of Contamination

The main contaminants of concern are PCBs from waste oils. These oils were discarded onto the ground's surface and have traveled vertically downward through the soil to the groundwater. Exposure routes of direct contact and ingestion exist for both human and wildlife receptors.

Many soil and groundwater samples were collected at the Site to characterize the nature and extent of contamination as part of the supplemental RI. These and other data indicate that the category of contamination which exceeds NYSDEC SCGs are PCBs. In addition, low levels of volatile organic compounds (VOCs) and inorganic compounds (metals) were also detected in soil and groundwater samples on a limited basis.

Groundwater

Groundwater samples were collected in November 1996, February 1997, and June 1997 from five monitoring wells. These wells are located around the perimeter of the NGP encircling an area of approximately 20,000 square feet. PCB concentrations from unfiltered samples were detected near the NYS Class GA groundwater standard of 0.1 ppb in the November 1996 groundwater samples. The concentrations for PCBs ranged from 0.078 to 0.39 ppb.

Analyses of filtered samples did not detect PCBs. These data indicate that PCB concentrations may be a function of the turbidity of the samples and suggest the PCB contamination may be attributed to the contaminated solids in the vicinity of the NGP, rather than dissolved PCBs in the groundwater.

The February and June 1997 samples did not detect PCBs in either filtered or unfiltered groundwater samples.

Quarterly sampling has been conducted from September 1997 until March 1999 for a total of seven sampling events. Monitoring well MW11-R had detectable concentrations of PCBs (0.13 ppb and 0.24 ppb) in the unfiltered samples during two of the seven sampling events (September 1997 and June 1998). All other wells sampled and all filtered samples did not contain detectable concentrations. This indicates that PCB contamination is not migrating in groundwater and is confined to the pit area. All other samples did not detect PCBs. Based upon these data, it was determined that no further remedial action was necessary for the groundwater at this time.

Ponded Water

Ponded water samples were collected from two locations in the NGP for analysis of PCBs. These samples indicated concentrations of PCBs in the ponded water of 2.49 ppb and 3.5 ppb of total PCBs. Both of these samples were above the NYSDEC groundwater standard of 0.1 ppb for PCBs. However, these elevated levels of PCB concentrations are confined to the ponded groundwater in the pit and are not migrating with groundwater based on downgradient monitoring well data. As part of all proposed alternatives presented in this document except the no further action alternative, the direct exposure to the contaminated ponded groundwater would be eliminated by removing the ponded water and backfilling the pit to its original grade.

Surface and Subsurface Soil

Sixty samples were collected after the 60, 000 cubic yards of material was removed from the pit in 1991.

Of the 60 samples collected, 26 surface soil samples were collected from the bottom of the NGP in 1991. Concentrations of the PCBs ranged from 2 to 2,000 ppm. Five samples had PCB concentrations above 500 ppm. Two samples were between 200 and 500 ppm, five samples between 25 and 200 ppm, six samples between 10 ppm and 25 ppm and eight samples were below 10 ppm.

In 1997, 40 additional samples were collected from nine borings. In eight of the borings, all subsurface samples were below 10 ppm. One boring (B-9) had three samples above 500 ppm, the highest was 1,800 ppm at 4-6 feet. An area of approximately 20,000 square feet has PCB concentrations above 10 ppm to a depth of two feet. Within this area, a smaller area of approximately 7,850 square feet has PCB concentrations above 500 ppm to a depth of 10 feet. *(Figure3)*.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The Ludlow Sand & Gravel Site, which had been used as a municipal landfill in the 1960's, is presently zoned non-residential; Deed Restrictions will be put in place to limit the land use to Non-residential in the future.

The NGP is located approximately 700 feet from the Town of Saquoit's water supply wells[1]. The groundwater at NGP is contaminated with low levels of PCB contamination. Although there are no ground water wells used as a source of water on site, deed restrictions will be implemented to prohibit the use of on-site ground water in the future.

SUMMARY OF SITE RISKS

Based upon the results of the RI, human health and ecological baseline risk assessments were conducted to estimate the risks associated with current and future site conditions. The baseline risk assessments estimate the human health and ecological risk which could result from the contamination at the Site, if no remedial action were taken.

Human Health Risk Assessment

Human health risks were evaluated for current and future potential exposure scenarios. The contaminant of concern at the Site is Aroclor 1254, a commercial mixture of PCBs. Based on animal studies and suggestive evidence from human studies PCBs are probable human carcinogens. In addition, PCBs are associated with non-cancer health effects in animals including effects on the immune system. The following receptors were evaluated for the contaminant of concern: the on-site worker who may be exposed to surface soil and through ingestion of groundwater, the maintenance worker who may be exposed to surface

[1] Although the Town of Saquoit's water supply wells were never contaminated in the past, they are hydraulically downgradient of the NGP with the potential to be contaminated.

soil, the adolescent trespasser who may be exposed to either surface or shallow soils, and the construction worker who may be exposed to soils deeper than 2 feet during future construction at the site. Reasonable Maximum Exposure (RME) assumptions were used in calculating the risk values presented below.

Under a current/future land use scenario (industrial), the cumulative carcinogenic risk estimated for exposure to surface soil for the on-site worker was 7.4 x 10E-4. The cancer risk to the individual exceeds the acceptable risk range of 10E-4 to 10E-6. The cancer risk to the on-site worker exposed to shallow core samples was 5.4 x 10E-4. This exceeds the acceptable risk range. The cancer risk to an adolescent trespasser exposed to surface soil was 1.1 x 10E-4 which is within the acceptable risk range. The cancer risk to an adolescent trespasser exposed to the shallow soil was 7.8 x 10E-5 which is also within the acceptable risk range. The cancer risk to the construction worker under the future scenario was 5.2 x 10E-5 which is within the acceptable risk range.

The evaluation of non-cancer human health hazards for all scenarios evaluated exceeded EPA's target Hazard Quotient (HQ) of 1. The following HQs were calculated: an HQ of 52 for the industrial on-site worker; an HQ of 37 for the on-site worker exposed to shallow soils; an HQ of 16 for the adolescent trespasser exposed to surface soil; an HQ of 11 for the adolescent trespasser exposed to shallow soil; and an HQ of 92 for the construction worker.

Evaluation of cancer risks from ingestion of groundwater on-site indicates a risk to a worker of 2.1 x 10E-7 based on exposure to Aroclor 1242. The HQ was less than 1. This does not pose an unacceptable cancer risk or non-cancer HQ to the worker.

In summary, Aroclor 1254 in surface soil, shallow core samples, and subsurface soil is the main cancer risk and non-cancer health hazard driver for the industrial/commercial worker, the trespasser (for non-cancer only), and construction worker (for non-cancer only).

Ecological Risk Assessment

Complete exposure pathways to the NGP contaminants exist for aquatic invertebrates, aquatic vertebrates such as amphibians, and terrestrial and aquatic wildlife utilizing the quarry pond through direct contact and incidental ingestion. Additional potential receptors include small mammals able to burrow under or traverse the fence surrounding the site and birdlife potentially frequenting the ponded area. However, the surface water at the NGP is actually ponded groundwater created by the previous remedial action conducted in 1990-1991. As part of all of the proposed alternatives, except the no further action alternative, the direct exposure to contaminants in the ponded water will be eliminated by backfilling the pit to the original grade.

There is no surface discharge from the NGP. Groundwater flows to the north-northwest towards off-site wetlands and surface waters. Although analytical results from on-site downgradient groundwater samples indicate PCB concentrations marginally above NYS GA standards, PCBs tend to adsorb to soil particles and do not readily migrate. Water samples taken from the groundwater surrounding the NGP indicate that PCB contamination in groundwater is localized to the pit area and is not migrating to off-site wetlands or surface waters. NYSDEC and EPA believe that addressing contamination in subsurface soils below the bottom of the pit and in the ponded water (as necessary if present) would mitigate any exposure to ecological receptors.

Basis for Action

Based upon the human health and ecological risk assessments, NYSDEC has determined that the response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances from the Site into the environment.

REMEDIAL ACTION OBJECTIVES

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

The following remedial action objectives were established for the site:

- Minimize the potential for PCBs to migrate from soils into groundwater;

- Eliminate any direct contact, ingestion, or inhalation threat associated with contaminated soil.

Soil cleanup objectives are those established pursuant to the New York Technical and Administrative Guidance Memorandum No. 94-HWR-4046 (TAGM 4046). NYSDEC's remedial action objective for subsurface PCB contamination in the NGP is 10 ppm. These objectives are based on the criterion that produces the most stringent cleanup level for a human health protection value based on protection of groundwater.

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) states that EPA expects to use treatment to address the principal threat wastes posed by a site whenever practicable.

Most of the PCB-contaminated soil has previously been removed from the NGP and placed under the landfill cap. EPA considers soil containing PCB concentrations in excess of 500 ppm to be a principal threat waste[2]. The remaining PCB contamination appears to be residual contamination and confined to a limited area of the NGP.

The previous excavation increased the depth of the North Gravel Pit to approximately 16 feet below the original grade and created steep slopes on the south and east sides of the pit. This excavation penetrated the water table creating a standing pond of groundwater and surface run-off in the bottom of the pit.

There are two locations at the bottom of the NGP (which is 16 feet below the former grade) that contain residual levels of PCBs greater than 10 ppm. One consists of an area that is approximately 20,000 square feet and about two feet under the water table. Within this area, there is a second area of approximately 7,850 square feet with PCB concentrations above 500 ppm to a depth of 10 feet. Soils located below this depth (which is approximately 31 feet below the former grade) contain non-detectable or low residual levels of PCBs (10 ppm or less).

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[2] 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 remedial action goal for the NGP portion of the Ludlow site would be to remediate the PCB-contaminated soils above 10ppm. Because of the technical complexities that can be encountered in solidifying soils within the water table at a depth of 30 feet below grade, the remedial action goal may not be achieved in all areas. Consequently, groundwater monitoring would be required to ensure that contaminants have remained immobile and are not impacting the groundwater.

DESCRIPTION OF ALTERNATIVES

CERCLA and 6 NYCRR Part 375 require that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, CERCLA includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the site can be found in the FS report. The FS report presents numerous remedial alternatives to address the contaminated soil. To facilitate the presentation and evaluation of these alternatives, the FS report's alternatives have been consolidated into the remedial alternatives discussed below.

Excavation of hot-spots using caisson technology was among the remedial alternatives originally considered in the FS report. However, it would be technically difficult to excavate the same areas of contamination that are addressed by the solidification and conventional excavation alternatives. Therefore, the caisson technology alternative as a remedy was not considered further.

The present-worth costs for the alternatives discussed below are calculated using a discount rate of 7 percent and a 30-year time interval. The time to implement reflects only the time required to construct and implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with the potentially responsible party, or procure contracts for design and construction.

Components Common to all Action Alternatives

During the implementation of the remedy for OU1 during 1990 -1991, 60,000 cubic yards of material were excavated from the NGP to the water table. 40,000 cubic yards of material were found contaminated with PCBs

and placed in the landfill. This excavation accounted for most of the PCB contamination in the NGP. The remedial alternatives developed would address the remaining contamination to the extent technically and economically practicable to be protective of human health and the environment.

Each combination of remedial action alternatives assumes that a deed restriction would be placed on the facility to restrict future groundwater use and maintain the site as an industrial property by restricting unacceptable future use of the site. Except for the no further action alternative, the pit would be backfilled to original grade for each alternative to eliminate the ponded water and direct exposure route to contamination.

The remedial alternatives are:

Alternative 1: No Further Action

Capital Cost:	$0
Annual Operation and Maintenance Cost:	$19,500
Present-Worth Cost:	$299,764
Construction Time:	n/a

The Superfund program requires that the "no action" alternative be considered as a baseline for comparison with the other alternatives. The “no further action remedial alternative” does not include any further physical remedial measures that address the contaminated soil. This alternative would, however, include annual, long-term monitoring of contaminant levels in the groundwater as set forth under the Consent Judgement.

This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2: Construction of an Impermeable Cap

Capital Cost:	$991,519
Annual Operation and Maintenance Cost:	$30,500
Present-Worth Cost:	$1,460,380
Construction Time:	6 months

This Alternative would consist of mounding approximately 26,000 cubic yards of soil directly above the impacted soil and the placement of an artificial, impermeable membrane to minimize the vertical flow of water through the pit. If standing water were present in the pit during construction, it would have to be sampled to determine if treatment would be required prior to dewatering. Additional clean fill would be placed on top of the membrane to raise the surface elevation to its original grade, and a vegetative cover would be established to minimize erosion. This would allow any surface drainage in the area to drain through an existing culvert under the sand and gravel access road. An additional swale and culvert would be placed northeast of the pit to divert surface flow to the existing drainage ditch which flows to the north. If necessary, a retention basin would be constructed to regulate this drainage. Groundwater monitoring would continue under the existing off-site groundwater remedy set forth under the Consent Judgement, but would require the installation of additional downgradient groundwater monitoring wells.

Alternative 3: Solidification by Grouting

Capital Cost:	$2,575,925
Annual Operation and Maintenance Cost:	$15,500
Present-Worth Cost:	$2,814,199
Construction Time:	6-8 months

Under this alternative, pressure grouting would be used to solidify residual PCB-impacted soils to reduce their permeability and consolidate them into a stable mass. This technology is used in the construction of dams and tunnels to solidify and dry out wet soils. If standing water were present in the pit during construction, it would have to be sampled to

determine if treatment would be required prior to dewatering. Approximately 3,500 cubic yards of clean fill would be placed in the pit to construct a working platform. To solidify the soil mass, pressurized grout would be injected into the bottom of the NGP where the highest residual concentrations of PCB contamination exist *(Figure 3)*. An area of 20,000 square feet will be grouted to a depth of 3 feet. Within this 20,000 square foot area, 7,850 square feet will be grouted to a depth of 15 feet where the higher concentrations of PCB contamination exist at a greater depth. A pre-design delineation sampling program would be implemented to determine the extent of the area to be grouted (vertically and horizontally). The bottom of the NGP would be remediated by first grouting the outside diameter of the area and working toward the center. This will ensure that any PCBs greater than 10 ppm that may be loosely bonded to the soil are not pushed to the outside of the grout mass and not solidified. For verification sampling, several samples of grouted material would be collected and tested to confirm that the grout has been injected into the area determined by the pre-design delineation sampling program and will be effective in reducing migration. End point confirmation soil samples will also be collected along the outside perimeter of the grouted area to confirm that PCB concentrations are no higher than 10 ppm. Additional clean fill would be placed on the platform to bring the area back to its original elevation. A clean soil base, vegetative cover, culverts, swale, and retention basin would be constructed as explained in Alternative 2. Groundwater monitoring would continue under the existing off-site groundwater remedy set forth under the Consent Judgement, but would require the installation of additional downgradient groundwater monitoring wells.

Alternative 4: Excavation and Off-site Disposal

Capital Cost:	$4,461,186
Annual Operation and Maintenance Cost:	$15,500
Present-Worth Cost:	$4,699,460
Construction Time:	6-8 months

Under this alternative, excavation would be used to remediate the remaining PCB-contaminated soil in the bottom of the NGP where the highest remaining residual concentrations of PCBs exist. This alternative would require sheet piling to be driven into the pit approximately 48 feet below the water table to keep the sidewall from failing. Groundwater would have to be pumped and treated. Approximately 6,000 cubic yards of material would need to be excavated and transported off-site for

disposal. For verification sampling, end point samples would be collected on a 25 foot grid. Additional clean fill would be placed in the pit to bring the area back to its original elevation. A clean soil base, vegetative cover, culverts, swale, and retention basin would be constructed as explained in Alternative 2. Groundwater monitoring would continue under the existing off-site groundwater remedy set forth under the Consent Judgement, but would require the installation of additional downgradient groundwater monitoring wells.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, NYSDEC considered the factors set out in CERCLA Section 121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01 (*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA: Interim Final*, October 1988). The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria are the most important and must be satisfied by any alternative in order to be eligible for selection:

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

2. Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver. Other federal or state advisories, criteria, or guidance are To-Be-Considered (TBCs). TBCs are not required by the NCP, but may be very useful in determining what is protective of a Site or how to carry out certain actions or requirements.

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

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

4. *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

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

6. *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. *Cost* includes estimated capital and O&M costs, and net present-worth costs.

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 reports and Proposed Plan, EPA concurs with, opposes, or has no comments on the selected remedy.

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

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

<u>Overall Protection of Human Health and the Environment</u>

Alternative 1 would not actively address the potential ecological and human health risk posed by soil in the NGP. Alternatives 2, 3, and 4 would protect potential site workers and trespassers and local wildlife from direct contact with contaminated soils. Alternative 2 would also reduce the infiltration of rainwater through contaminated soils and reduce further leaching of PCBs into the groundwater. Alternative 3 would be

protective of human health and the environment by solidifying the main source of the contamination and preventing it from leaching into the groundwater. Alternative 4 would be protective of human health and the environment by excavating the main source area of contamination.

Compliance with ARARs

There are currently no federal or state promulgated standards for contaminant levels in soils. In the absence of ARARs, the cleanup goal for this Proposed Plan is 10 ppm of PCBs which is derived from the NYSDEC TAGM (refer to pages 6 and 7 of this Proposed Plan).

Alternatives 3 and 4 would meet the cleanup goal derived from TAGM HWR-94-4046. Alternative 3 would solidify soil with concentrations of PCBs greater than 10 ppm. Alternative 4 would meet the cleanup goal by removing the soil area with concentrations of PCBs greater than 10 ppm. Alternative 2 would be designed to mitigate the effects of soil contamination on the groundwater by reducing infiltration into the NGP, but it would not meet the cleanup goal since it would not address soils with high concentrations of PCBs. Alternative 1 also would not meet this cleanup goal.

Long-Term Effectiveness and Permanence

Alternative 1 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential for exposure to contaminants in the NGP. Alternative 2, 3 and 4 would be effective over the long term by preventing contaminated materials from coming into contact with human and ecological receptors. Alternative 2 would reduce the infiltration of rainwater which would leach contaminants. The vegetative cover to be placed over the synthetic membrane would require routine inspection and maintenance to ensure long-term effectiveness and permanence. Routine maintenance would include mowing, fertilizing, reseeding and repairing any potential erosion or damage. During the solidification process in Alternative 3, the contaminated soils would be solidified over the long term so that contaminants would not leach into the groundwater. The soil contaminated above 10 ppm would be removed under Alternative 4 to prevent the PCBs from leaching into the groundwater. Groundwater monitoring would be used to evaluate the long-term effectiveness and permanence of Alternatives 2, 3, and 4.

Reduction in Toxicity, Mobility, or Volume Through Treatment

Alternative 1 would not reduce the toxicity, mobility, or volume of the PCB contamination. While Alternative 2 would prevent potential exposure to contaminated materials, and would reduce the infiltration of rainwater into the NGP and the associated leaching of contaminants, there would be no treatment or reduction in the toxicity and volume of contaminants.

Alternative 3 would eliminate or reduce the mobility of the PCB contamination in the area of concern through solidification of the contaminated soils which would immobilize the contaminants. This would include the treatment of the principal threat waste (i.e., PCBs with concentrations above 500 ppm). Alternative 4 would not involve treatment but would eliminate or reduce the mobility and volume of the PCB contamination in the area of concern by excavating the contaminated soil.

Short-Term Effectiveness

Alternative 1 does not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to on-site workers as a result of its implementation. During the placement of clean soil above the contaminated soil in Alternative 2, the solidification of contaminated soils under Alternative 3 below the water table and, the excavation of contaminated soils for Alternative 4 below the water table, potential exposure to contaminants could occur for site workers. Such impacts would be minimized through worker health and safety protective measures. None of the alternatives would result in exposure to the community during implementation of the remedial action.

Alternative 1 would not require any time to implement since no remedial measures would be performed. Alternative 2 is estimated to take approximately six months to complete construction. It is anticipated that Alternatives 3 and 4 would be completed in approximately six to eight months.

Implementability

Alternative 1 would be the easiest alternative to implement as no construction work is required. The technologies, equipment and personnel to implement Alternatives 2, 3, and 4 are readily available. However, because Alternative 3 would involve the use of subsurface grouting below the water table, bench-scale pilot tests would be required prior to implementation to determine appropriate grout consistency. Also, because the soils are located within the water table to a depth of 30 feet below grade, it may be difficult to completely solidify all PCB-contaminated soils above 10 ppm and verify that the cleanup goal was achieved.

Even though the technologies are readily available to implement Alternative 4, implementation of this alternative may fail due to site-specific conditions. The previous excavation of the North Gravel Pit increased its depth by 16 feet below the former grade and had created steep slopes on the south and east sides of the pit. This excavation

penetrated the water table creating a standing pond of groundwater and surface runoff in the bottom of the pit that exists most of the time. The areas at the NGP where the highest concentrations of PCB-impacted soils are located are at a considerable depth (approximately between 16 and 26 feet below the original grade), located in very unstable sandy soils either on the side of the embankment with a steep slope or at the bottom of the pit.

Technologies using conventional heavy construction equipment would be used to reach the contaminated soils. Sheet piling would be required to provide stabilization for the sides of the excavation. However, the gravel is loose unstable material with a relatively high hydraulic head pushing up from the bottom of the pit. This hydraulic head could cause the sheet piling to fail during excavation.

Cost

The estimated capital, operation, maintenance, and monitoring (OM&M), and present-worth costs for each of the alternatives are presented below.

Alternative	Capital Cost	Annual OM&M Cost	Present-Worth Cost
1	$0	$19,500	$299,764
2	$991,519	$30,500	$1,460,380
3	$2,575,925	$15,500	$2,814,199
4	$4,461,186	$15,500	$4,699,460

The costs ranged from $299,764 to $4,699,460. The high capital cost of Alternative 4 is due to the excavation depth and complications associated with excavating sandy soil beneath the water table.

Support Agency Acceptance

USEPA and NYSDOH concur with the preferred remedy.

Community Acceptance

Comments received during the public comment period indicate that the public generally supports the selected remedy.

Comments received during the public comment period are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon an evaluation of the various alternatives, NYSDEC recommends Alternative 3 (solidification of soils contaminated with PCBs) by using pressure grouting, filling the NGP to grade with clean fill, installation of two groundwater monitoring wells, implementation of a groundwater monitoring program, and a deed restriction for the site.

NYSDEC believes that the preferred remedy would be protective of human health and the environment, and would comply with all SCGs and ARARs.

Source control remediation under Alternative 3 would eliminate the mobility of contamination in the water table where the greatest concentrations of PCBs exist. Filling the pit with clean fill and restoring it to grade it would reduce the infiltration of precipitation into the water table.

Alternative 3 is preferred over Alternative 2 (construction of an impermeable cap) because Alternative 3 would rely on solidification to remediate the PCB-contaminated soils above 10 ppm. This action would also be consistent with EPA's policy of treating principal threat waste i.e. PCBs greater than 500 ppm.

Alternative 3 was selected because:

- It would eliminate or significantly reduce the mobility of contamination located in the soil below the water table.

- It is implementable and would be effective in the short and long term.

- It is a cost-effective alternative that meets the remediation goals for the site.

Description of the Selected Remedy
The selected remedy involves:

- Implementing a pre-design delineation sampling program to determine the precise area to be grouted (vertically and horizontally). The results of the required sampling program will be utilized to develop a conceptual design report.

- Performing a remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation, maintenance, and monitoring for the remedial action.

- Implementing soil bench-scale testing to determine the grout characteristics before grouting is implemented.

- Solidifying the area where PCBs concentrations above 10 ppm exist by using pressure grouting technology.

- Performing end-point verification sampling outside the perimeter of the grouted area to ensure that all PCB contaminated soils have been solidified in accordance with the Remedial Action Objectives.

- Performing grout end-point sampling and testing to confirm both that the grout has been injected where the pre-design delineation sampling program determined it to be necessary and that it will be effective in reducing migration.

- Backfilling the NGP to its original elevation.

- Covering the area with clean soil base to raise the surface elevation to its original grade, and applying a vegetative cover to prevent erosion, if necessary.

- Limiting site access and issuing a deed restriction to prohibit groundwater usage and limit the land use to non-residential purposes.

- Installing at least two downgradient deep groundwater monitoring wells.

- Implementing a groundwater monitoring program to ensure that contaminants have remained immobile and are not impacting the groundwater. The groundwater would be sampled on a semiannual basis. If the groundwater data are in compliance with NYS Ambient Groundwater Quality Standards, the program would be discontinued and the groundwater would continue to be subject to the long-term monitoring program as part of the OU1 operation and maintenance plan for the site.

In summary, NYSDEC has determined that Alternative 3 would provide the best balance of trade-offs among alternatives with respect to the

evaluation criteria. NYSDEC and EPA believe that the preferred remedy would 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 preferred alternative would meet the statutory preference for the use of treatment as a principal element.

Expected Outcomes of the Selected Remedy

Based upon the human health and ecological risk assessments, NYSDEC has determined that threatened releases of hazardous substances from the Site, if not addressed by the selected alternative or one of the other active measures considered, present a potential threat to public health or the environment.

Specifically, it has been concluded that: (1) on-site workers, maintenance workers, trespassers, and wildlife could come in contact with exposed soils; (2) aquatic invertebrates, aquatic vertebrates such as amphibians, birdlife, and terrestrial and aquatic wildlife utilizing the quarry pond through direct contact and incidental ingestion.

The selected alternative will solidify the PCB contaminated soil beneath the water table, prevent potential ground water contamination, and eliminate exposure to humans and the environment. The selected remedy will prevent the potential migration of PCB contamination to the Town of Saquoit's public water supply wells by reducing or eliminating the mobility of PCB contamination.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies 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 has determined that the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy will be protective of the environment in that the treatment of contaminated soil will eliminate contaminant-related concerns related to ecological receptors and will eliminate the source of the groundwater contamination. The selected remedy will reduce exposure levels to protective ARAR levels or to within EPA's generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogenic risk and below the HI of 1 for noncarcinogens in the groundwater. The implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts that cannot possibly be mitigated. The selected remedy will also provide overall protection by reducing the toxicity, mobility, and volume of contamination through the treatment of the contaminated soils.

Compliance with Applicable or Relevant and Appropriate Requirements of Environmental Laws

While there are no federal or New York State soil ARARs, one of the remedial action goals is to meet NYSDEC soil cleanup objectives as TBCs. A summary of action-specific, chemical-specific, and location-specific ARARs 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 Part 61)
- 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 376, Land Disposal Restrictions
- 40 CFR 50, Air Quality Standards
- New York State Pollutant Discharge Elimination System (6 NYCRR Parts 750-758)
- Resource Conservation and Recovery Act (42 U.S.C. § 6901 *et seq.*)

Chemical-specific ARARs:

- Safe Drinking Water Act (SDWA) MCLs and nonzero MCLGs (40 CFR Part 141)
- 6 NYCRR Parts 700-705 Groundwater and Surface Water Quality Regulations

- 10 NYCRR Part 5 State Sanitary Code

Location-specific ARARs:
- Fish and Wildlife Coordination Act, 16 U.S.C. 661

Other Criteria, Advisories, or Guidance To-Be-Considereds (TBCs):
- New York State Air Guide—1 for the Control of Toxic Ambient Air Emission

- 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 Technical and Operational Guidance Series 1.1.1, November 1991

- Soil cleanup objectives specified in NYSDEC Technical Administrative Guidance Memorandum No. 94-HWR-4046

Cost-Effectiveness

For the foregoing reasons, it has been determined that the selected remedy provides for overall effectiveness in proportion to its cost. The estimated present-worth cost of Alternative 3 is $2,814,199.

Only Alternatives 3 and 4 would effectively achieve the soil cleanup levels. Alternative 4 would be considerably more expensive than Alternative 3, the selected alternative; and Alternative 4 would not require treatment of contaminated soils and may be more difficult to implement than the selected alternative. Therefore, NYSDEC believes that Alternative 3 will effectuate the soil cleanup levels while providing the best balance of tradeoffs among the alternatives with respect to the evaluating criteria.

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

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the five balancing criteria set forth in NCP §300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site.

The selected remedy will employ an alternative treatment technology (grouting) to solidify the mass of contaminated soils. Since site-specific

conditions might result in remedy failure if Alternative 4 had been selected, Alternative 3, the selected alternative, is the only alternative that reliably provides a permanent means of reducing the mobility of contaminants in the soil.

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 contaminated soils will be treated in-situ.

Five-Year Review Requirements

The selected remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure. Consequently, a review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

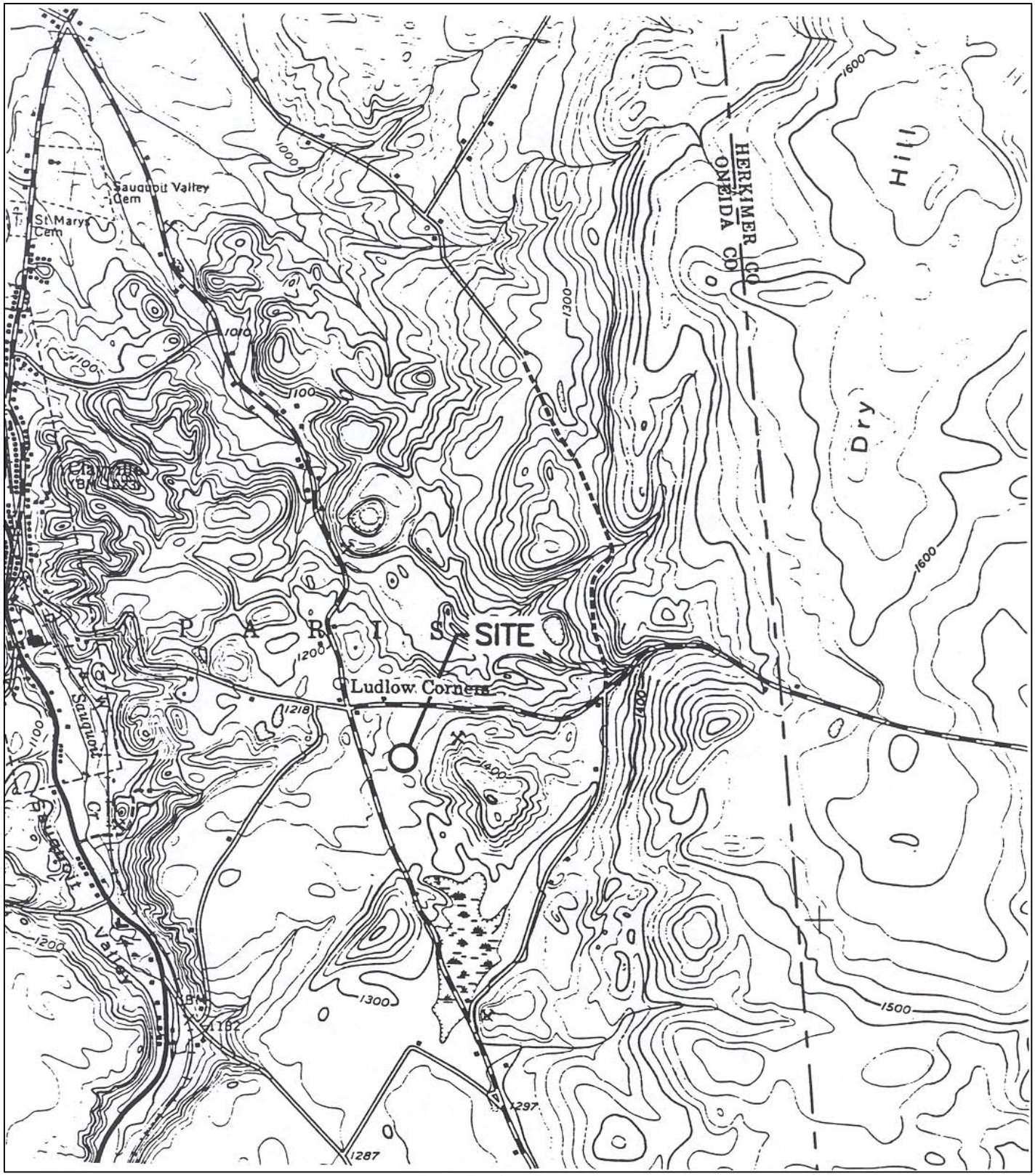
DOCUMENTATION OF SIGNIFICANT CHANGES

NYSDEC determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

APPENDIX I

Figures

FIGURE 1
LUDLOW SAND & GRAVEL SITE (NORTH GRAVEL PIT)
SITE LOCATION MAP



SOURCE: USFWS West Winfield, NY Quadrangle.

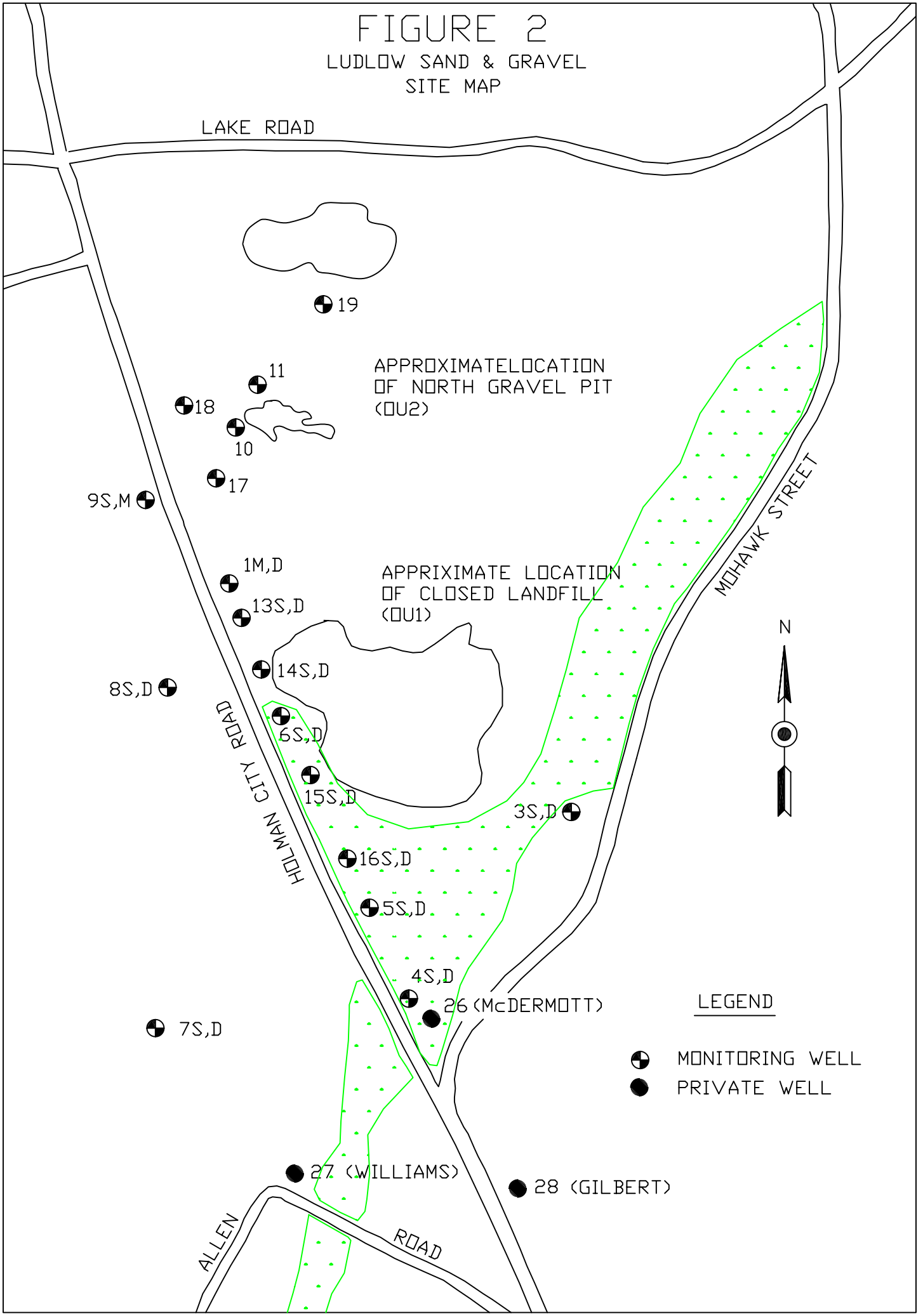
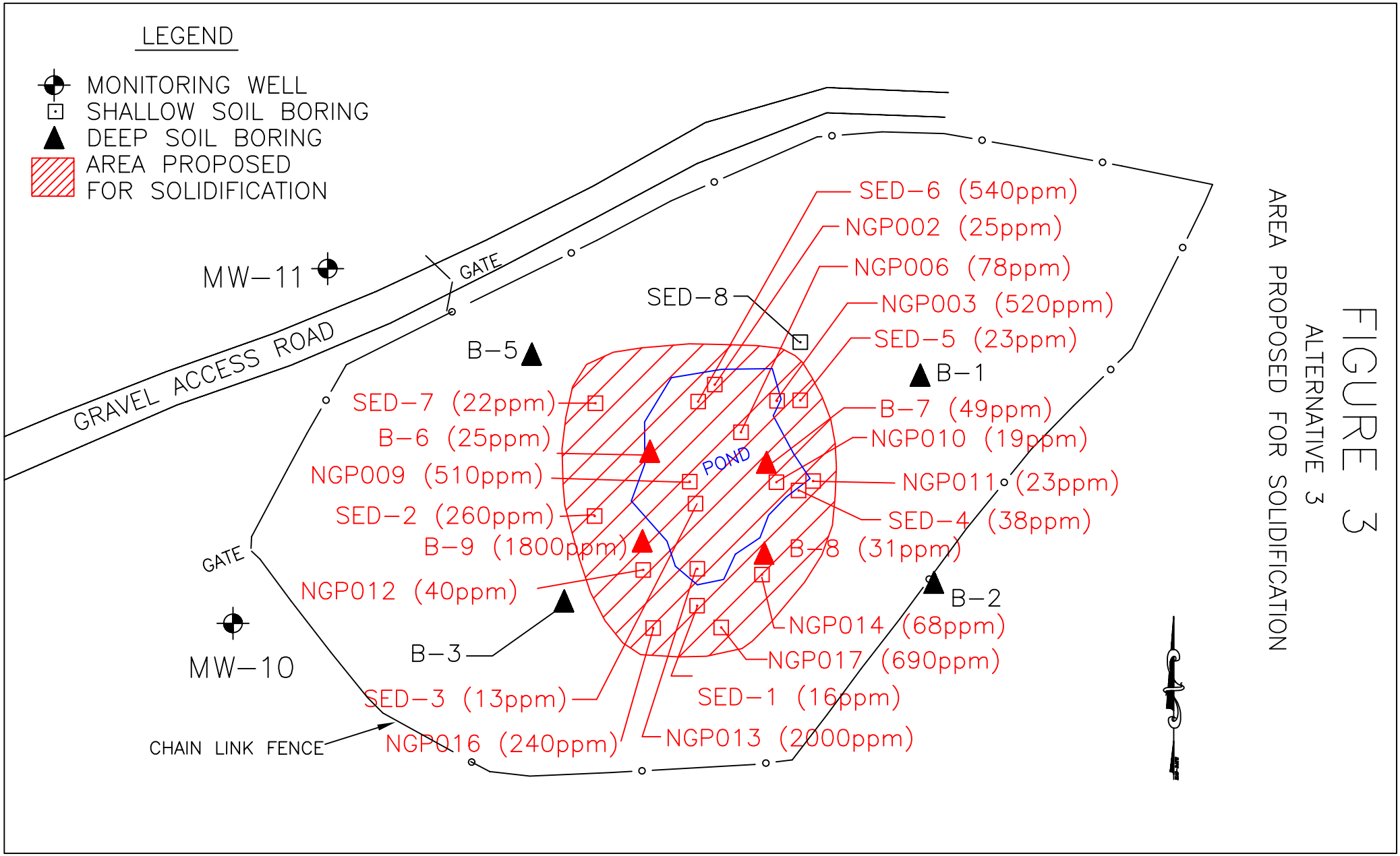


FIGURE 2
LUDLOW SAND & GRAVEL
SITE MAP
LAKE ROAD
19
11
18
10
17
9S,M
1M,D
13S,D
14S,D
8S,D
6S,D
15S,D
3S,D
16S,D
5S,D
4S,D
26 (McDERMOTT)
7S,D
27 (WILLIAMS)
28 (GILBERT)
APPROXIMATELOCATION
OF NORTH GRAVEL PIT
(OU2)
APPRIXIMATE LOCATION
OF CLOSED LANDFILL
(OU1)
HOLLMAN CITY ROAD
MOHAWK STREET
ALLEN
ROAD
N
LEGEND
MONITORING WELL
PRIVATE WELL


LEGEND
MONITORING WELL
SHALLOW SOIL BORING
DEEP SOIL BORING
AREA PROPOSED FOR SOLIDIFICATION
MW-11
GATE
GRAVEL ACCESS ROAD
SED-8
B-5
B-1
SED-6 (540ppm)
NGP002 (25ppm)
NGP006 (78ppm)
NGP003 (520ppm)
SED-5 (23ppm)
SED-7 (22ppm)
B-7 (49ppm)
B-6 (25ppm)
NGP010 (19ppm)
POND
NGP009 (510ppm)
NGP011 (23ppm)
SED-2 (260ppm)
SED-4 (38ppm)
B-9 (1800ppm)
B-8 (31ppm)
GATE
NGP012 (40ppm)
B-2
NGP014 (68ppm)
MW-10
B-3
NGP017 (690ppm)
SED-3 (13ppm)
SED-1 (16ppm)
CHAIN LINK FENCE
NGP016 (240ppm)
NGP013 (2000ppm)
FIGURE 3
ALTERNATIVE 3
AREA PROPOSED FOR SOLIDIFICATION

APPENDIX II

Tables

APPENDIX III

Administrative Record Index

APPENDIX IV

NYSDOH & USEPA Letters of Concurrence

APPENDIX V

Responsiveness Summary