REPORT

Feasibility Study Report
M. Wallace & Son, Inc. Scrapyard
Cobleskill, New York
Site No. 4-48-003

Niagara Mohawk Power Corporation
Syracuse, New York

October 1997

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

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Certification Statement

I, Edward R. Lynch, P.E., as a licensed Professional Engineer in the State of New York, to the best of my knowledge, certify that the Feasibility Study for the M. Wallace & Son, Inc. Scrapyard (Site No. 4-48-003) was completed in general conformance with the January 1994 Consent Order (Case No. 85-CV-219) to be entered into between Niagara Mohawk Power Corporation of Syracuse, New York and the New York State Department of Environmental Conservation. This Feasibility Study Report has been provided to the New York State Department of Environmental Conservation in keeping with the spirit of the January 1994 Consent Order which has not yet been approved or entered by the Court. As specified in an April 27, 1994 letter to Dean S. Sommer, Esq. of the New York State Department of Law from David M. Hehr, Esq. of Stenger & Finnerty, May 1, 1994 is considered to be the "effective date" for purposes of deliverables under the January 1994 Consent Order.

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Executive Summary

Introduction

This Feasibility Study (FS) Report identifies and evaluates remedial alternatives that address the chemicals of interest in environmental media at the M. Wallace & Son, Inc. Scrapyard site in a manner that is appropriate for site-specific conditions and protective of human health and the environment. This FS uses information generated during New York State Department of Environmental Conservation- (NYSDEC-) approved investigation activities to evaluate individual remedial technologies and to develop, evaluate and recommend an appropriate remedial alternative that satisfies remediation objectives cost-effectively. This FS has been conducted in accordance with United States Environmental Protection Agency (USEPA) and NYSDEC guidance, and the Consent Order for the site (Case No. 85-CV-219).

Background

During site salvage activities conducted by the M. Wallace & Son, Inc. site operator prior to the mid 1980's, transformer dielectric fluids containing varying levels of polychlorinated biphenyls (PCBs) may have been released to the ground surface at the site. Sampling conducted in the period from 1983 through 1991 indicated that PCBs were present in the soils, quarry pond and quarry pond outlet channel sediments, and quarry pond surface water at the site. The NYSDEC-approved *Remedial Investigation Report* (RI Report) (BBL 1995, Revised 1996) presented the findings of the two-phase Remedial Investigation (RI) conducted from 1992 to 1995 and characterized the topography, geology, hydrogeology, and the presence and distribution of chemical constituents in site environmental media. The results of the RI include:

- PCBs were detected in surface soil samples collected in the northern portion of the site, in areas west and east of the quarry pond and in the active scrapyard area, and in subsurface soil samples from two locations, at concentrations exceeding the NYSDEC cleanup goals presented in the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 entitled "Determination of Soil Cleanup Objectives and Cleanup Levels" (NYSDEC 1994);

- PCBs were also detected in sediment samples collected from the quarry pond and the quarry pond outlet channel, as well as in sediment samples collected from one area of the storm water drainage system located downstream of the site;

- Inorganic parameters (primarily copper, chromium, iron, lead, nickel and zinc) were detected in soil samples collected from the 0 to 2-foot depth interval in the northern portion of the site and west of the quarry pond, at concentrations exceeding the NYSDEC cleanup goals presented in the NYSDEC TAGM 4046; and

- Light non-aqueous phase liquid (LNAPL), with a maximum PCB concentration of 1,830 parts per million (ppm), was observed/detected on the ground-water surface at monitoring well locations north and west of the quarry pond.

To address the presence of PCBs and other chemical constituents in environmental media at the site, the following interim remedial measures (IRMs) have been conducted since 1991:

- Installed perimeter fence to restrict site access and silt fence to control migration of surface soil;

- Removed and disposed off-site approximately 2,900 cubic yards (cy) of impacted soil from the northern portion of the site and sediment from the quarry pond outlet channel;

- Cleaned and disposed or relocated scrap metal and debris from both the ground surface and the quarry pond;

- Initiated a biweekly program to monitor the presence and extent of LNAPL in the subsurface and to remove, to the extent practicable, LNAPL from the ground-water surface at monitoring wells where it was observed; and

- Installed two water treatment systems to remove PCBs from quarry pond surface water prior to discharging the water into the storm water drainage system.

Subsequent to completion of the RI Report, additional NYSDEC-approved ground-water investigation activities were conducted to determine whether there have been impacts to ground-water quality along and adjacent to the western site boundary since Phase II RI sampling in that area (September 1994). These activities included May 1996 ground-water sampling at on-site bedrock monitoring wells and, based on detections of PCBs in the samples collected from the on-site wells, installation and sampling of three bedrock monitoring wells (C-20, C-21, and C-22) on private property west of the site (see Figure 1-4).

Bedrock monitoring wells C-20, C-21, and C-22 were installed and developed in July and August 1996. No LNAPL or sheen was observed during the installation or development of these wells. Ground-water samples for filtered and unfiltered PCB analysis were collected on September 5 and 6, 1996 from these three monitoring wells and from the four on-site bedrock monitoring wells located along the western site boundary. During the sampling of C-22 (the southernmost monitoring well located west of the site), a slight sheen was noticed after approximately 20 gallons of ground water was purged from this well. Analytical results from the September 5 and 6, 1996 sampling indicated that PCBs were detected at 0.67 ppb and 0.08 ppb in the unfiltered and filtered ground-water samples, respectively, collected at monitoring well C-22. PCBs were not detected at concentrations exceeding the 0.05 ppb detection limit in either the unfiltered or filtered samples collected from the other newly installed monitoring wells (C-20 and C-21). PCBs were detected at concentrations similar to the May 1996 results in the ground-water samples collected from the four on-site bedrock monitoring wells located along the western site boundary.

These same seven monitoring wells (on-site wells C-11, C-15, C-16, and C-18; and off-site wells C-20, C-21, and C-22) were resampled on December 11 and 12, 1996 as part of the NYSDEC-approved initial quarterly PCB sampling program instituted in May 1996. The analytical results for these samples indicate that PCBs were detected in the ground-water samples collected from the on-site wells at concentrations similar to those previously detected. PCBs were not detected in the samples collected from off-site wells C-21 and C-22. PCBs were detected at 0.06 ppb (quantitation limit of 0.05 ppb) in the sample collected from monitoring well C-20. Although this PCB concentration is less than the NYSDEC Class GA Ground-Water Quality Standard of 0.1 ppb, monitoring well C-20 was resampled on December 23, 1996. PCBs were not detected in this sample.

Quarterly sampling was conducted on March 12 and 13, 1997 at on-site monitoring wells C-11, C-15, C-16, and C-18 and off-site wells C-20, C-21, and C-22. The analytical results for these samples indicate that PCBs were detected in the ground-water samples collected from on-site wells C-11 and C-16 at concentrations of 193 ppb and 0.05 ppb, respectively. Sampling results indicated that PCBs were not detected in off-site wells C-20 and C-22. PCBs were detected in an unfiltered water sample collected from off-site well C-21 at a concentration of 0.12 ppb. Monitoring well C-21 was resampled on March 26, 1997. PCBs were not detected in this sample.

On June 11, 1997, the final round of quarterly PCB samples was collected from off-site bedrock monitoring wells C-20, C-21, and C-22. The analytical results for these samples indicate that PCBs were detected in unfiltered ground-water samples collected from off-site well C-22 at concentrations of 0.08 ppb and 0.13 ppb (duplicate sample). PCBs were not detected in water samples collected from off-site wells C-21 and C-22. On this same date, ground-water samples were also collected from the five residential water supply wells for filtered and unfiltered PCB analysis. Analytical results indicate that PCBs were not detected in any of the residential water samples at concentrations exceeding the 0.05 ppb detection limit.

Although PCBs were not detected in any of the ground-water samples collected from residential water supply wells in the area, Niagara Mohawk Power Corporation (NMPC) installed two residential water treatment systems in January 1997, as a precautionary interim measure, to serve the residences/businesses served by the residential water supply wells located near monitoring well C-22.

Additional quarterly ground-water sampling was conducted in March and June 1997. In March 1997, ground-water samples were collected from on-site and off-site bedrock monitoring wells for PCB analysis. Sampling results indicated that PCBs were detected in unfiltered water samples collected from on-site monitoring wells C-11 and C-16. PCBs were also detected in an unfiltered water sample collected from off-site monitoring well C-21. A final round of quarterly ground-water samples were collected from off-site bedrock monitoring wells in June 1997. Sampling results indicated that PCBs were detected in unfiltered water samples collected from off-site monitoring well C-22. PCBs were not detected in water samples collected from off-site monitoring wells C-20 and C-21 in June 1997.

In addition to conducting the ground-water sampling activities after the completion of the RI Report, a NYSDEC-approved LNAPL Extraction Demonstration was conducted during the period from June 1996 through August 1996. The purpose of this program was to evaluate the feasibility of recovering LNAPL from the subsurface at two monitoring well locations where LNAPL had been observed, or from the quarry pond. The conclusions from this demonstration were used in evaluating ground-water and LNAPL remedial technologies and alternatives in the FS.

The conclusions from this demonstration, as well as the data and observations resulting from the NYSDEC-approved investigation and monitoring activities, were used to conduct the FS for the site. The steps of the FS process include:

- Identification of Standards, Criteria, and Guidance (SCGs);
- Development of Remedial Action Objectives (RAOs);
- Identification and Evaluation of Remedial Technologies and Remedial Alternatives; and
- Comparative Analysis and Recommendation of Remedial Alternatives.

Identification of Standards, Criteria, and Guidance (SCGs)

In accordance with NYSDEC guidance, SCGs were progressively identified and applied on a site-specific basis during the progression of the RI/FS and were utilized in the FS to facilitate determination of appropriate remedial actions for the site. "Standards and criteria" are chemical-specific, action-specific or location-specific cleanup standards, standards of control, or other substantive environmental protection requirements, criteria or limitations promulgated under federal or state law. "Guidance" includes non-promulgated criteria and guidance which are determined to be applicable to the site.

Development of Remedial Action Objectives

RAOs are medium-specific goals for protecting human health and the environment. Each potential remedial technology and remedial alternative identified during the FS was evaluated to determine whether implementation of the technology or alternative would achieve the RAOs for the site. The RAOs for the M. Wallace & Son, Inc. Scrapyard site, were originally proposed in the NYSDEC-approved RI Report, and have subsequently been revised as follows:

- To mitigate the migration of PCBs at concentrations greater than 1 ppm in surface soils and individual metals at concentrations exceeding cleanup criteria presented in NYSDEC's TAGM 4046;
- To mitigate the potential migration of PCBs in the subsurface soils to 10 ppm and individual metals to concentrations not exceeding cleanup criteria presented in NYSDEC's TAGM 4046;
- To protect fish and wildlife by mitigating the potential for PCBs to impact the fish and wildlife resources of Cobleskill Creek;
- To remove the LNAPL that has been identified on the bedrock ground-water surface at the site;
- To mitigate the potential for migration of LNAPL and PCBs beyond the monitoring well locations where they have been observed/detected; and
- To provide potable water to the residences/businesses served by residential water supply wells RW-1 and RW-2.

Identification and Evaluation of Remedial Technologies and Remedial Alternatives

Consistent with NYSDEC and USEPA guidance, potential remedial technologies were identified and screened with respect to implementablity (the ability to construct and reliably operate the technology) and effectiveness (the extent to which implementation of the technology will mitigate threats to human health and the environment). The results of this screening indicated that there are no technologies currently available capable of removing LNAPL from the subsurface to the extent of effectively eliminating the need for long-term management at the site. Additionally, because the presence of LNAPL in the subsurface represents a potential continuing source of PCBs entering the quarry, implementation of a technology capable of removing or containing the quarry pond sediments would not be practicable until the results of ground-water and LNAPL monitoring indicate that the PCB concentrations of water entering the quarry pond have been reduced to levels less than the NYSDEC Class GA Ground-Water Quality Standard of 0.1 ppb.

The technologies that were retained based on their expected implementability and effectiveness consisted of three technologies for providing a potable water supply, five technologies for addressing soils and sediments, and seven technologies for addressing ground water/LNAPL. The following three alternatives for providing a potable water supply, along with four comprehensive remedial alternatives, each comprised of one or more of the retained technologies were developed for detailed evaluation.

Alternatives for Providing a Potable Water Supply

Alternative 1 - No-Action

Alternative 2 - Installation and Maintenance of Residential Water Treatment Systems

Alternative 3 - Extension of the Village of Cobleskill Public Water Supply

Comprehensive Remedial Alternatives for Addressing Impacted Environmental Media

Alternative 1 - No Further Action

- Continued Operation of the Quarry Pond Water Treatment System(s).

Alternative 2 - Limited Action

- Continued Operation of the Quarry Pond Water Treatment System(s);
- LNAPL Removal by Pumping, Bailing or Skimming; and
- Long-Term Ground-Water and LNAPL Monitoring.

Alternative 3 - On-Site Capping

- The three ground-water/LNAPL technologies included under Alternative 2 - Limited Action;
- Excavation of quarry pond outlet channel and storm water drainage system impacted sediments and select site soils (an estimated 920 cy of materials);
- Restoration of excavated areas;
- Placement of excavated soil and sediment within the upper portion of the site;
- Installation of a multi-layer vegetated cap in the northern portion of the site and a bituminous asphalt cap in the active scrapyard area and the area west of the quarry pond; and
- Institutional controls to limit access/use of capped areas.

Alternative 4 - Excavation and Off-Site Disposal

- The three ground-water/LNAPL technologies included under Alternative 2 - Limited Action;
- Excavation of impacted on-site soils, quarry pond outlet channel sediments, and storm water drainage system sediments (an estimated 13,920 cy of materials);
- Off-site disposal of excavated materials at an off-site facility capable of accepting them; and
- Restoration of excavated areas.

The three alternatives for providing potable water and the four comprehensive remedial alternatives for addressing impacted environmental media were analyzed with respect to the seven National Oil and Hazardous Substances Pollution Control Plan (NCP) criteria specified in the NYSDEC TAGM 4030 entitled "Selection of Remedial

Actions at Inactive Hazardous Waste Sites". These criteria encompass statutory requirements and include other gauges of the overall feasibility and acceptability of the remedial alternatives. These criteria are as follows:

- Short-Term Effectiveness;
- Long-Term Effectiveness and Permanence;
- Reduction of Toxicity, Mobility, or Volume through Treatment;
- Implementability;
- Compliance with SCGs;
- Overall Protection of Human Health and the Environment; and
- Cost.

Comparative Analysis and Recommendation of Remedial Alternatives

Using the seven NCP evaluation criteria, a comparative analysis of the alternatives was performed to identify the relative advantages and disadvantages of the three potable water alternatives, and of the comprehensive remedial alternatives for addressing impacted environmental media. The results of the comparative analysis were used as the basis for recommending a potable water alternative, and a comprehensive alternative for addressing impacted environmental media. Based on this comparative analysis, the following were determined to be the most effective remedial alternatives for meeting the RAOs established for the site:

Recommended Alternative for Providing Potable Water

- Extension of the Village of Cobleskill Public Water Supply

Recommended Comprehensive Alternative for Addressing Impacted Environmental Media

- On-Site Capping

1. Introduction

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

1. Introduction

1.1 Preface

This Feasibility Study (FS) Report has been prepared at the request of Niagara Mohawk Power Corporation (NMPC) to evaluate potential remedial alternatives that address chemicals of interest in soil, sediment, and ground water at the M. Wallace & Son, Inc. Scrapyard site ("the site") located in Cobleskill, New York. This FS was prepared in accordance with the following documents:

- The Consent Order (Case No. 85-CV-219) for the site;
- The New York State Department of Environmental Conservation- (NYSDEC-) approved *Phase II Remedial Investigation Work Plan, M. Wallace & Son, Inc. Scrapyard (Phase II RI Work Plan),* prepared by Blasland, Bouck & Lee, Inc. (BBL), (BBL 1994);
- The United States Environmental Protection Agency's (USEPA's) document entitled, "Guidelines for Conducting Remedial Investigations and Feasibility Studies Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)" (USEPA 1988);
- Applicable provisions of the National Oil and Hazardous Substances Pollution Control Plan (NCP) regulations contained in 40 CFR Part 300;
- The NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) 4030 entitled "Selection of Remedial Actions at Inactive Hazardous Waste Sites" (NYSDEC 1990); and
- Applicable provisions of the regulations contained in Title 6 of the Codes, Rules, and Regulations of the State of New York (6NYCRR).

The information utilized to prepare this FS Report was generated during the following NYSDEC-approved activities:

- An initial site investigation, conducted by O'Brien and Gere Engineers, Inc. (O'Brien and Gere) during the period from 1987 through 1990;
- The Interim Remedial Measures (IRMs) conducted from 1991 through 1996, including: removing and disposing off site 2,900 cubic yards (cy) of polychlorinated biphenyl- (PCB-) impacted soil from the site; biweekly monitoring of light non-aqueous phase liquid (LNAPL) observed on the ground-water surface in some monitoring wells; and installing a quarry pond water treatment system to prevent the discharge into the storm water drainage system of quarry pond water containing PCBs at concentrations in excess of 65 parts per trillion (ppt);
- The Remedial Investigation (RI), conducted by BBL in two phases during the period from 1992 through 1995 and documented in the NYSDEC-approved *Remedial Investigation Report* (RI Report) (BBL 1995, Revised 1996);

- The LNAPL Extraction Demonstration, conducted by BBL during the period from June 1996 through August 1996 in accordance with the NYSDEC-approved *LNAPL Extraction Demonstration Work Plan* (BBL 1996); and

- Post-RI ground-water investigation activities conducted by BBL during the period from May 1996 through June 1997, including quarterly ground-water sampling in the area along and adjacent to the western site boundary and residential water supply well sampling at the residences located immediately west of the site.

1.2 Purpose and Organization of Report

The purpose of this FS is to identify and evaluate remedial alternatives that address the chemicals of interest in environmental media at the site in a manner that is appropriate for site-specific conditions, protective of human health and the environment, and consistent with applicable New York State Environmental Conservation Law (ECL) and CERCLA regulations. The overall focus of the FS is to recommend an appropriate remedial alternative that satisfies remediation objectives cost-effectively.

This FS Report has been organized into the following seven sections:

Section		Purpose
Section 1.0 -	Introduction	Provides background information and summarizes the results of the RI, Fish and Wildlife Impact Analysis (FWIA), and Human Health Risk Assessment (RA) and post-RI ground-water investigation activities.
Section 2.0 -	Identification of Standards, Criteria, and Guidance (SCGs)	Identifies the SCGs that will govern the development and selection of remedial alternatives.
Section 3.0 -	Remedial Action Objectives (RAOs)	Presents the RAOs for the site that are protective of human health and the environment, and identifies areas and estimated volumes of environmental media that will be addressed in the FS.
Section 4.0 -	Technology Screening Summary and Assembly of Remedial Alternatives	The identification and screening of remedial technologies is presented in this section, as well as the development of alternatives that have the potential to meet the RAOs for the site.
Section 5.0 -	Detailed Analysis of Remedial Alternatives	Presents a detailed description and screening of the remedial alternatives developed to comprehensively address the RAOs.
Section 6.0 -	Comparative Analysis of Remedial Alternatives	Presents a comparative analysis of each of the remedial alternatives using NCP evaluation criteria to identify advantages and disadvantages of each alternative. This section also presents the recommended remedial alternative for the M. Wallace & Son, Inc. Scrapyard site.

Section	Purpose
Section 7.0 - References	Presents a list of references cited in the FS Report.

1.3 Background Information

This section presents a summary of the following background information used to develop the strategy for the RI/FS program:

- General information regarding the site, including site location;
- The history of the site investigation activities conducted prior to the RI, as well as the IRMs implemented;
- The results of the investigation and monitoring.activities conducted to characterize the nature and extent of chemicals of interest for various environmental media;
- The results of the Fish and Wildlife Impact Analysis (FWIA) that was implemented to evaluate potential fish and wildlife concerns associated with the site; and
- The results of the Human Health Risk Assessment (RA) that was performed to characterize potential risks to human health associated with exposure to the identified chemical constituents at the site.

1.3.1 General

The M. Wallace & Son, Inc. Scrapyard is an active salvage business that recovers and resells mechanical parts and materials from various equipment and other items. During the 1950's through the early 1980's, electrical transformers were purchased by the site operator and transported to the scrapyard. Some of these transformers contained varying levels of PCBs. The transformers were disassembled within the electrical equipment gut area to recover copper components which were then resold. During these scrapping operations, transformer dielectric fluid containing PCBs may have been released from the transformers to the ground surface.

The M. Wallace & Son, Inc. Scrapyard is located at the intersection of New York State Route 10 (Elm Street) and West Street in the Village of Cobleskill, Schoharie County, New York, as shown on Figure 1-1. The section of the M. Wallace and Son, Inc. Scrapyard located north of Route 10 is the "site" and encompasses an area of approximately 6.6 acres. The site is bordered by West Street to the west; Route 10 to the south; several apartments and residential housing to the east; and a high school athletic field to the north. The site can be divided into two general areas, as follows:

- The "lower" section of the site consisting of a wood frame barn, a concrete and metal building, a building housing the on-site 100 gallons per minute (gpm) water treatment system, an active scrapyard area (including a leach field area located south of the concrete and metal building), and a pond formed in a former limestone quarry; and
- The "upper" section of the site, consisting of several formerly used scrap metal stockpiles and an area known as the "electrical equipment gut area," where electrical equipment was reportedly disassembled. A site map showing the location of features at the site is presented as Figure 1-2. Off-site locations along the storm-water drainage system are shown on Figure 1-3.

1.3.2 Site History

In June 1983, personnel from the NYSDEC Bureau of Enforcement and Criminal Investigation (BECI) collected samples of soil in the electrical equipment gut area, sediment and water from the quarry pond, and sediment from the quarry pond outlet channel. The analytical results of the samples collected by BECI indicated that PCBs were present in soil, sediment, and surface water at the site. In response to the BECI's investigation, the Schoharie County Department of Health (SCDH) sampled eight residential water supply wells near the site. Results of this ground-water sampling indicated that purgeable aromatics, purgeable hydrocarbons, and PCBs were not detected in the residential water supplies sampled.

Due to the presence of PCBs at the site, as identified by the BECI's sampling, the site is currently listed by the NYSDEC as a Class 2 Inactive Hazardous Waste Site (Site No. 4-48-003). In response to a lawsuit filed by the State of New York Attorney General, NMPC and M. Wallace & Son, Inc., entered into an Interim Consent Order (Case No. 85-CV-219) in December 1987 to address the presence of PCBs and other chemical constituents in environmental media at the site.

In accordance with the Interim Consent Order, an initial site investigation of soil, sediment, surface water, and ground water at the site was performed by O'Brien & Gere between 1987 and 1990. Based on the results of the initial site investigation, NMPC implemented various interim remedial measures between the summer of 1991 and the spring of 1993, including:

- Excavating and disposing off-site approximately 2,900 cy of soil from the electrical equipment gut area;
- Removing and disposing off-site sediment from the quarry pond outlet channel;
- Performing a reconnaissance of the quarry pond sediments and removal of debris from the bottom of the pond;
- Cleaning and disposal or relocation of scrap metal and debris from both the ground surface and the quarry pond;
- Installing a perimeter fence to restrict access to the site and silt fence to control migration of surface soil; and
- Initiating a biweekly monitoring and LNAPL recovery program in June 1993 at the monitoring well locations where LNAPL has been observed. This program consists of determining the absence or presence of LNAPL in on-site monitoring wells, measuring the depth to LNAPL and/or ground water, determining the LNAPL thickness (where present), and removing with dedicated bailers, to the extent practicable, the LNAPL encountered. Monthly measurements of water surface elevations at all accessible monitoring wells are collected as part of this program; data collected as part of this IRM are presented in the monthly progress reports provided to the NYSDEC and have been used on a continuing basis to update the data base for use in this FS. A summary of the LNAPL thickness measurements and estimated volumes of recovered LNAPL (from June 28, 1993 through October 28, 1997) is presented in Table 1-1.

A 400 gpm water treatment system was installed in December 1992 to drain the quarry pond to facilitate removal of debris from the bottom of the quarry pond (one of the above-listed IRMs); subsequently, the NYSDOL and NYSDEC required NMPC to continue operation of the quarry pond water treatment system until the implementation of a final remedy for the site. Because the water treatment system was designed for temporary use, the requirement for continued long-term operation necessitated the design and implementation of a long-term system. This 100 gpm system, known as the "permanent" water treatment system, was installed in March 1994 and is housed in a dedicated structure located in the southwest corner of the property. A 300 gpm upgrade to the permanent water treatment system was installed in March 1995 for temporary use during periods when the recharge rate into the quarry pond exceeds the 100 gpm treatment capacity of the permanent system.

The water treatment system is maintained to prevent discharge of quarry pond water containing PCBs in excess of 65 ppt into the storm water drainage system. During the periods of water treatment system operation, sampling of the process and discharge water for PCB analysis is conducted on a weekly basis. Weekly water treatment system samples for PCB analysis are collected in accordance with NYSDEC-approved protocols (October 19, 1992 letter from the NYSDEC to NMPC and a May 5, 1993 letter from Stenger & Finnerty to the NYSDOL).

Results of the PCB analyses for water treatment system process and discharge samples have been reported since May 1994 in the monthly progress reports for the site and in periodic letters which are provided to Mr. Daniel Lightsey, P.E. of the NYSDEC. These progress reports and deliverables to the NYSDEC, have been provided in keeping with the spirit of the Consent Order which is not yet approved or entered by the Court. As specified in an April 27, 1994 letter to Dean S. Sommer, Esq. of the NYSDOL from David M. Hehr, Esq. of Stenger & Finnerty, May 1, 1994 is considered to be the "effective date" for purposes of deliverables under the Consent Order.

Between 1992 and 1995, NMPC implemented the RI and completed the FWIA and the Human Health RA. A detailed description of these activities and presentation of the results is provided in the NYSDEC-approved RI Report. Subsequent to completion of the RI Report, the NYSDEC approved the implementation of additional ground-water investigation and monitoring activities and an LNAPL Extraction Demonstration. In addition, NMPC continues to operate the quarry pond water treatment system(s) and to monitor and remove LNAPL from the ground-water surface on a biweekly basis. The information obtained from these activities is the basis for the following characterization of the site.

1.3.3 Site Characterization

1.3.3.1 Topography and Drainage

The site is located in the glaciated Mohawk section of the Appalachian Plateau Physiographic Province. United States Geological Survey (USGS) topographic map (Cobleskill 7.5 Minute Quadrangle) indicates that ground surface elevations at the site range between approximately 940 and 980 feet above mean sea level (AMSL). The site is located near the base of a ridge that extends to an elevation of over 1600 feet AMSL and forms the northern boundary of a broad, shallow valley trending towards the northeast.

Figure 1-3 presents the site surface water features and the surface water drainage pathways from the site. The quarry pond and the quarry pond outlet channel are the only surface water features present at the site. Flow sources into the pond include direct precipitation, surface water runoff from the upper section of the site, and ground-water discharge. As described in Section 1.3.2, a water treatment system to control and treat surface water discharge from the approximately 1.3 acre quarry pond was constructed as part of an IRM for the site. The quarry pond formerly overflowed into a small outlet channel which flows into a culvert on the north side of Route 10. Surface water from the quarry pond is presently treated by the water treatment system to prevent discharge of quarry pond water containing PCBs in excess of 65 ppt into the storm water drainage system. The treated water is discharged in a 6-inch high density polyethylene (HDPE) pipe installed in the invert of the small outlet channel. After flowing beneath Route 10, the channel and discharge pipe traverse approximately 75 feet prior to merging with the storm water drainage from the area immediately west of the site and entering a culvert beneath the Delaware and Hudson Railroad track embankment. The outlet channel re-emerges on the south side of the embankment and flows for a short distance prior to entering a below ground culvert where the treated water flow discharges from the pipe and combines with storm water flow from the channel and from a parking lot on a neighboring property. The combined flow discharges into Cobleskill Creek approximately two-thirds of a mile downstream from the site.

1.3.3.2 Geology and Hydrogeology

The site is located near the northeast limits of the Allegheny Plateau which is characterized by a series of terraces composed of resistant bedrock (Kastning 1975). The bedrock immediately beneath the site consists of the Onondaga Formation, comprised of limestones. East of the site lie the limestones of the Helderberg Group and the Oriskany Sandstone, while west and north at higher elevations than the site lie shales, siltstones, and sandstones of the Hamilton Group (Fisher, Isachsen, and Rickard 1970).

Unconsolidated glacial and alluvial deposits lie above the bedrock and are generally thicker within the creek valley. The glacial deposits consist of stratified sands and gravels, lacustrine silts and clays, and lodgement and drumlin tills. The alluvial deposits consist of reworked glacial deposits associated with Cobleskill Creek and its tributaries.

Ground water is present both in the bedrock and unconsolidated deposits. Within the bedrock, ground water is present primarily in structural features such as bedding planes and joints. Solution enlargement of these features, caused by acid/base reactions between water and limestone, results in the formation of conduit and cave systems. The lacustrine silt and clay, and the lodgement and drumlin till deposits are poor water-bearing formations; however, the confined glaciofluvial sand and gravel deposits beneath the till and clay beds are reportedly water-bearing.

More detailed information regarding the geologic and hydrogeologic setting of the site is presented in Section 1.2.2.2 of the RI Report.

1.3.3.3 Ground Water Usage Within the Vicinity of the Site

As discussed in Section 3.2 of the RI Report, the SCDH was contacted for information pertaining to residential water supply wells in the vicinity of the site. Based on BBL's review of this information provided by the SCDH, the apartments, schools, and residences to the east of the site are supplied by public water. The public water supply system does not extend west of West Street. The residences and businesses to the west of West Street are supplied by private water supply wells.

1.3.3.4 Presence and Extent of Chemical Constituents in Environmental Media

This section summarizes the findings of the NYSDEC-approved investigations and monitoring activities associated with site that have been conducted to assess the presence, extent, and migration (where applicable) of chemical constituents in the various environmental media. The following is a summary of the data and observations resulting from these activities, which are relevant to the identification and evaluation of remedial technologies and alternatives, and is organized as follows:

- Surface and Subsurface Soils;
- Sediments;
- Ground Water; and
- LNAPL.

The results of the RI, the FWIA, and the Human Health RA were detailed in the RI Report. The on-site RI sampling locations and monitoring well locations are presented on Figure 1-4. Data collected as part of the biweekly LNAPL monitoring are reported to the NYSDEC in monthly progress reports and are summarized in Table 1-1. A summary of the activities and results of the LNAPL Extraction Demonstration is presented in Appendix A. Ground-water PCB results generated as a result of post-RI sampling activities have been reported in letters to the NYSDEC and NYSDOH and are summarized in Table 1-2. PCB and VOC analytical results for ground-water samples collected from residential water supply wells during and after the RI are presented in Tables 1-3 and 1-4. Based upon the activities performed and the analytical data collected, the highlights of the findings for each media are provided below, followed by a summary of the results of the FWIA and Human Health RA.

__Surface and Subsurface Soils__

During the RI, soil investigation activities were conducted to determine the presence, extent and distribution of chemical constituents in site soils. These activities included collecting surface and/or subsurface soil samples, in accordance with the NYSDEC-approved Work Plan(s), from sampling locations S-1 through S-68 and from soil boring TPC-12A (see Figure 1-4 for sampling locations) and analyzing them for one or more of the following: PCBs, Target Compound List (TCL) volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), Target Analyte List (TAL) inorganics, and EP Toxic metals analysis. A summary of the analytical results generated from RI soil samples is presented below, more detailed information is presented in Sections 2 and 3 of the RI Report.

- The results of the PCB analyses ranged from not detected to 164 parts per million (ppm) in the surface soil sample collected at S-4 in the upper (northern) portion of the site. Table 1-5 presents the surface soil PCB analytical results.

- PCBs in surface soils at concentrations greater than NYSDEC cleanup objective of 1 ppm (as listed in the NYSDEC TAGM 4046), were detected in the surface soil samples collected from the upper section of the site and from the active scrapyard area. Detections of PCBs were below 1 ppm from sampling locations outside the site fence to the north (in the Cobleskill High School athletic field) and east (within the site boundary near the apartment building complex).

- PCBs in subsurface soils were detected at concentrations in excess of the NYSDEC cleanup objective of 10 ppm in the subsurface soil samples collected from only two locations. These two locations are S-13 and S-19 in the upper section of the site and the samples were collected from the 0-2 foot and 2-4 foot depth intervals, respectively. PCBs were detected in these samples at concentrations of 15.99 ppm (TP-13S) and 13 ppm (TP-19S). Table 1-6 presents the subsurface soil PCB analytical results.

- Several SVOCs, primarily polycyclic aromatic hydrocarbons (PAHs), were detected in some surface and subsurface soils at levels exceeding NYSDEC cleanup objectives. These SVOC detections generally occurred in the same areas where PCBs were detected, but were less frequently detected at concentrations exceeding the NYSDEC cleanup objectives. Tables 1-7 and 1-8 present the SVOC analytical results for surface and subsurface soils, respectively.

- Inorganic parameters including arsenic, cadmium, copper, lead, and zinc were detected at levels exceeding NYSDEC cleanup objectives at surface and subsurface soil sampling locations in the upper section of the site and in the active scrapyard area. The locations where inorganics were detected at concentrations exceeding cleanup objectives were generally the same locations where PCBs were detected. Tables 1-9 and 1-10 present the inorganic parameters results for surface and subsurface soils, respectively.

- Eight surface soil and two subsurface soil RI sampling locations where the total concentrations of the eight EP toxic metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) exceeded 1,000 ppm were sampled for EP Toxic metals analysis, in accordance with a request from the NYSDEC (June 3, 1994 letter from Mr. Daniel Lightsey, P.E. of the NYSDEC to Mr. James F. Morgan of NMPC). The extract from surface and subsurface samples collected at sampling location S-28 contained lead at concentrations of 7.3 ppm and 44 ppm, respectively. These concentrations are greater than the 5 ppm regulatory level at which a solid waste is considered a hazardous waste based on concentration of lead in the EP Toxic extract [as outlined in 6NYCRR 371.31(e)]. There were no other detections in the extracts obtained from the soil samples that exceeded the regulatory levels for the eight EP toxic metals. Table 1-11 presents the EP toxic metals results for surface and subsurface soil samples.

<u>Sediments</u>

Sediment investigation activities were conducted within the quarry pond and outlet channel, the storm water drainage system and Cobleskill Creek. The sediment investigation activities consisted of sediment probing, coring, and sampling performed to: estimate the depth and distribution of sediments and to determine the presence and extent of chemical constituents. The results of these activities were presented in the RI Report and are summarized below:

- Results of the sediment probing activities conducted in 1991 (as part of an IRM) indicated that the depth of the sediments in the quarry pond ranged from 1 to 4 feet and that the estimated total volume of these sediments was approximately 5,000 cy (2,900 cy of heavy mud and 2,100 cy of fine silt). PCB results from the 44 quarry pond sediment samples collected in 1991 ranged from not detected to 100 ppm.

- Thirty-two quarry pond and three outlet channel locations were probed and sampled during the RI (see Figure 1-4 for RI quarry pond and outlet channel sediment sampling locations). Analytical results indicate PCBs were detected at concentrations ranging from 0.17 ppm to 63 ppm, with total organic carbon (TOC) ranging from 0.4% to 13.1%. The highest concentration of PCBs (64 ppm) was detected in sediment sample SD-23S collected from the quarry pond. The PCBs concentrations detected in the three samples (SD-35S, SD-36S and SD-37S) collected from the outlet channel ranged from 0.84 ppm to 8.2 ppm. Table 1-12 presents the PCB analytical results for the sediment samples collected from the quarry pond during the RI.

- Sediment samples were collected during the RI from 11 locations within the storm water drainage system and from seven locations within Cobleskill Creek. These locations are shown on Figure 1-5. PCBs were detected in the samples collected from the storm water drainage system at concentrations ranging from not detected to 4.3 ppm (sample WS-CC-2). PCB concentrations greater than one ppm were only detected in one other sediment sample (WS-CC-1) collected from the storm water drainage system. These two sediment samples (WS-CC-1, and WS-CC-2) were collected in 1992 from the 0- to 6-inch depth interval of a sediment depositional area, in accordance with a request from the NYSDEC. PCBs were not detected in eight of the nine sediment samples collected from Cobleskill Creek. The only detectable PCB concentration (0.18 ppm) was found at the sediment sampling location closest to the storm water drainage system confluence with Cobleskill Creek (SD-50A). PCB analytical results for sediment samples collected from the quarry pond outlet channel, storm water drainage system, and Cobleskill Creek are presented in Table 1-12.

Surface Water

Surface water investigation activities were conducted to determine the presence, concentration, and spatial distribution of chemical constituents in the quarry pond and in the storm water drainage ditch south of the quarry pond outlet channel, and to aid in the determination of the extent to which surface water acts as a migration pathway for chemical constituents associated with the site. The results of the surface water investigation activities were presented in detail in the RI Report and are summarized below:

- PCBs have been detected in unfiltered quarry pond surface water samples at concentrations ranging from 0.12 parts per billion (ppb) to 0.72 ppb; in filtered samples the concentrations ranged from not detected at 0.05 ppb to 0.07 ppb. Since December 1992, the quarry pond water treatment system has been operating to prevent discharge (into the storm water drainage system) of quarry pond surface water containing PCBs in excess of 0.065 ppb.

- PCBs were not detected in the six surface water samples collected from the storm water drainage system. Four of these samples were collected in May 1993 during the RI, and two were collected in November 1992 in accordance with a request from the NYSDEC.

Ground Water

Ground-water investigation and monitoring activities have been conducted to generate hydrogeologic and ground-water quality data to support:

- The dynamics of the ground-water systems at the site (e.g., hydraulic characteristics of the overburden and bedrock and the ground-water flow patterns in the overburden and bedrock);

- The lateral and vertical extent of chemical constituents in the ground-water flow system(s) at the site and immediately west of the site, to assist in determining whether ground-water quality at these locations has been impacted by site conditions; and

- The geologic characteristics of the subsurface soil and bedrock (e.g., secondary permeability features such as fractures, bedding planes, and joints) that may affect migration of chemical constituents at the site.

The ground-water investigation associated with the M. Wallace & Son, Inc. site has included the following activities:

- Performing a reconnaissance of regional and site-specific geological features;

- Installing five overburden monitoring wells and 28 bedrock corehole monitoring wells at the locations shown on Figure 1-4. The bedrock installations, referred to herein as either coreholes or bedrock monitoring wells, were all constructed and developed as open corehole bedrock monitoring wells;

- Collecting ground-water samples from monitoring wells and from five residential water supply wells located west of the site;

- Implementing a biweekly LNAPL monitoring and removal program; and

- Obtaining ground-water and quarry pond surface water elevation data, as part of: the biweekly/monthly ground water and LNAPL monitoring program that was initiated in August 1993; a period in April 1995 when the permanent 100 gpm quarry pond water treatment system and the temporary 300 gpm water treatment system upgrade were in operation; and a period from June 1996 through August 1996 during the LNAPL Extraction Demonstration.

Most of the aforementioned ground-water monitoring and investigation activities were associated with the RI, and therefore the results were presented in the RI Report. The results of the activities conducted subsequent to completing the RI Report have been provided to the NYSDEC in monthly progress reports and letters as the results became available, with the exception of the results obtained from the LNAPL Extraction Demonstration. Those results, as specified in the NYSDEC-approved LNAPL Extraction Demonstration Work Plan are provided in this FS Report, summarized in the following paragraphs, and presented in detail in Appendix A.

A summary of the results of the ground-water investigation and monitoring activities which are pertinent to the identification and evaluation of remedial technologies/alternatives, is provided in following paragraphs.

The general ground-water flow direction in the overburden immediately south of New York State Route 10 and east of the quarry pond, is toward the north-northwest and appears to be influenced by the pumping of the quarry pond. Prior to the December 1992 installation of the quarry pond water treatment system, which reduced the quarry pond water level, the general ground-water flow direction was likely towards the south-southeast in the direction of regional ground-water discharge, Cobleskill Creek, which is located south of the site.

The ground water beneath the site also occurs in the Onondaga Limestone bedrock, primarily within bedding planes, joints, and fractures. The RI bedrock coring activities and the reconnaissance of the quarry pond, revealed the presence of multiple horizontal and vertical fractures, joints, and bedding planes with varying degrees of solution enlargement. Hydraulic conductivity values within the bedrock vary by four orders of magnitude, based on RI packer test data. The hydraulic conductivity of the bedrock at the site is likely controlled by the spacing, degree of weathering (solution enlargement) and relative interconnectivity of fractures, joints and bedding planes.

Ground-water flow paths through the fractured bedrock beneath the site are almost exclusively determined by the interconnectivity of the fractures: therefore, ground-water elevation contour maps with flow lines (perpendicular to the ground-water elevation contours) indicating ground water flow paths and directions may not be representative of actual ground water flow within the fractured bedrock system beneath and in the vicinity of the site. Ground water elevation contour maps can be used to represent the generalized ground-water flow directions, but not the specific pathways which are more tortuous and dependent on the orientation/interconnections of the fractures and joints. As discussed in Section 3.6.2 of the RI Report, the generalized ground-water flow directions are towards the quarry pond. The operation of the quarry pond water treatment system(s) lowers the quarry pond water surface elevation, thereby inducing flow from the bedrock (as well as the overburden) ground-water flow systems into the quarry pond.

As discussed in Section 3.6.2.2 of the RI Report, a definite hydraulic connection between the quarry pond and the surrounding site ground water was indicated based on the ground-water and surface water elevation data obtained from April 10 to 26, 1995 prior to and during a period when both the 100 gpm water treatment system and 300 gpm water treatment system upgrade were in operation. As the water level in the quarry pond decreased due to the operation of the water treatment systems, a corresponding decrease in the ground-water levels at most site monitoring wells/coreholes occurred, indicating that a definite hydraulic connection exists between the quarry pond and the surrounding site ground water. Furthermore, the monitoring wells that historically contained LNAPL on more than one occasion or currently contained LNAPL (MW-5, C-3/MW-8, C-10, C-11, C-13, and C-14) experienced a decrease in ground-water levels associated with the increased pumping of the quarry pond.

The monitoring wells/coreholes determined to be the most responsive to the pumping of the quarry pond are located adjacent to the quarry pond and/or orientated in an east-west direction (i.e., from corehole C-19 to monitoring well MW-6), based on the decreases in ground-water levels associated with lowering the surface water level of the quarry pond during the aforementioned period from April 10 to 26, 1995. This east-west orientation likely represents an area of preferentially higher hydraulic conductivity that is hydraulically connected to the quarry pond. Thus, ground-water flow would be directed towards this east-west orientated area of higher hydraulic conductivity (which would act as a subsurface drain) with ground-water flow direction and subsequent discharge to and into the quarry pond.

During the period from April 10 to 26, 1995 when continuous water levels were obtained while the quarry pond water treatment system and water treatment system upgrade were in operation, precipitation data obtained from the Northeast Regional Climate Center correlated with a rise in ground-water levels measured in onsite wells; therefore, as presented in the RI Report, precipitation is a source of ground-water recharge. Although transient increases in ground-water elevations were observed, the hydraulic potential still indicates that the generalized direction of ground-water flow would be toward the east-west oriented area of higher hydraulic conductivity and ultimately the quarry pond (reference Section 3.6.2.2 of the RI Report).

During the LNAPL Extraction Demonstration (June 24 through August 9, 1996) continuous ground-water level measurements were obtained from six on-site coreholes: C-3, C-4, C-11, C-13, C-15, and C-16. The changes in the water levels measured in these six coreholes during storm events on July 13, 14, and 26, 1996 were generally comparable to the magnitude of ground-water level changes observed during the storm events on April 13 and 19, 1995 and reported in Section 3 of the RI Report. However, the peak ground-water elevations measured during the 1996 storm events were generally higher than the peak elevations measured during the 1995 storm events by 2 to 3 feet, except at C-13 and C-15, where peak water elevations were 6 to 10 feet higher. The highest ground-water elevations measured during the January 1996 thaw (although not continuous measurements) were generally similar to the peak elevations observed during the April 1995 storm events, except at C-15 where the highest elevations were over 10 feet greater.

Ground-water samples were collected from monitoring wells during both phases of the RI, between June 1993 and April 1995. PCBs were detected at concentrations of 0.72 ppb and 0.10 ppb in the unfiltered RI ground-water samples collected at bedrock coreholes (constructed and developed as monitoring wells) C-9 and C-16, respectively. As presented in the NYSDEC-approved RI Report, the detection of PCBs in C-9 appeared to be related to sediments that were flushed into the corehole from surface water runoff. PCBs were not detected in subsequent samples collected from bedrock coreholes (monitoring wells) C-9 and C-16 during the RI (i.e., prior to May 1996). PCBs were not detected in any of the other ground water samples collected during the RI from site monitoring wells.

Results of RI ground-water sampling indicated that TCL volatile organic compounds were detected at levels exceeding the NYSDEC Class GA Ground-Water Quality Standards only in ground-water samples collected in the leachfield area. These detections are not related to the scope of this FS; based on a February 14, 1997 telephone conversation between Mr. Daniel Lightsey, P.E. of the NYSDEC and Mr. James F. Morgan of NMPC, oversight of additional activities (if any) in the leachfield area has been transferred to NYSDEC's Spill Response Division.

In addition to collecting ground water samples from monitoring wells, five residential water supply wells adjacent to the site were sampled during the RI (July/August 1993 and September 1994) to assist in determining whether ground-water quality at these locations has been impacted by site conditions. These wells are located to the west of the site, between approximately 150 feet and 600 feet from the site boundary, as shown on Figure 1-4.

As presented in the NYSDEC-approved RI Report and summarized in Tables 1-3 and 1-4, the analytical results from the five residential wells sampled indicate that PCBs were not detected in any of these samples and that the following five organic compounds detected were not likely to be site related:

- Acetone - the only volatile organic compound detected (and a common laboratory contaminant) in the residential water supply samples collected in July/August 1993 (14 ppb in one of the five samples collected); and

- Carbon disulfide, carbazole, naphthalene, and N-nitrodiphenylamine were detected in some of the samples collected, the highest concentration was one ppb.

Subsequent to completion of the RI Report, additional ground-water investigation activities were conducted to determine whether there had been impacts to ground-water quality along the western site boundary since the Phase II RI sampling in this area of the site (April 1994). On May 9, 1996 ground-water samples were collected for PCB analysis from four bedrock monitoring wells (C-11, C-15, C-16, and C-18) located along the western site boundary. During the May 9, 1996 sampling, LNAPL was observed coating the bailer at bedrock monitoring well C-11 and light sheens were observed on the surface of the purge water collected from monitoring wells C-15 and C-16. Based on these observations, and on the detections of PCBs in each of the unfiltered samples collected from these four on-site monitoring wells (concentrations ranged from 0.16 ppb [C-18] to 52 ppb [C-11]), a confirmatory round of ground-water sampling at these four bedrock monitoring wells was conducted on May 24, 1996. On this same date, ground-water samples were also collected from the five residential water supply wells located west of the site. Results of the May 24, 1996 sampling indicated that PCBs were detected at concentrations similar to the May 9, 1996 results at the four on-site bedrock monitoring wells but were not detected at the 0.05 ppb quantitation limit in either the filtered or unfiltered samples collected from any of the residential water supply wells.

Based on the results of the May 1996 sampling indicating the presence of PCBs in the ground water samples collected along the western site boundary, three bedrock monitoring wells (C-20, C-21, and C-22) were installed on private property on the west side of West Street and an initial quarterly PCB sampling program was instituted for these three wells and the four on-site bedrock monitoring wells (C-11, C-15, C-16, and C-18) sampled in May 1996 and located along the western site boundary. The locations of these monitoring wells are shown on Figure 1-4. A detailed description of these additional ground-water investigation and monitoring activities was presented in a June 21, 1996 letter from Mr. James F. Morgan of NMPC to Mr. Daniel Lightsey, P.E. of the NYSDEC. The NYSDEC provided approval of the information presented in this letter during a June 24, 1996 telephone conversation between Mr. Daniel Lightsey, P.E. of the NYSDEC and Mr. James F. Morgan of NMPC.

Bedrock monitoring wells C-20, C-21, and C-22 were installed and developed in July and August 1996. No LNAPL or sheen was observed during the installation or development of these wells. Ground-water samples for filtered and unfiltered PCB analysis were collected on September 5 and 6, 1996 from these three monitoring wells and from the four on-site bedrock monitoring wells located along the western site boundary. During the sampling of C-22 (the southernmost monitoring well located west of the site), a slight sheen was noticed after approximately 20 gallons of ground water was purged from this well. Analytical results from the September 5 and 6, 1996 sampling indicated that PCBs were detected at 0.67 ppb and 0.08 ppb in the unfiltered and filtered ground-water samples, respectively, collected at monitoring well C-22. PCBs were not detected at concentrations exceeding the 0.05 ppb detection limit in either the unfiltered or filtered samples collected from the other newly installed monitoring wells (C-20 and C-21). PCBs were detected at concentrations similar to the May 1996 results in the ground-water samples collected from the four on-site bedrock monitoring wells located along the western site boundary.

These same seven monitoring wells (on-site wells C-11, C-15, C-16, and C-18; and off-site wells C-20, C-21, and C-22) were resampled on December 11 and 12, 1996 as part of the NYSDEC-approved initial quarterly PCB sampling program instituted in May 1996. The analytical results for these samples indicate that PCBs were detected in the ground-water samples collected from the on-site wells at concentrations similar to those previously detected. PCBs were not detected in the samples collected from off-site wells C-21 and C-22. PCBs were detected at 0.06 ppb (quantitation limit of 0.05 ppb) in the sample collected from monitoring well C-20. Although this PCB concentration is less than the NYSDEC Class GA Ground-Water Quality Standard of 0.1 ppb, monitoring well C-20 was resampled on December 23, 1996. PCBs were not detected in this sample.

Quarterly sampling was conducted on March 12 and 13, 1997 at on-site monitoring wells C-11, C-15, C-16, and C-18 and off-site wells C-20, C-21, and C-22. The analytical results for these samples indicate that PCBs were detected in the ground-water samples collected from on-site wells C-11 and C-16 at concentrations of 193 ppb and 0.05 ppb, respectively. Sampling results indicated that PCBs were not detected in off-site wells C-20 and C-22. PCBs were detected in an unfiltered water sample collected from off-site well C-21 at a concentration of 0.12 ppb. Monitoring well C-21 was resampled on March 26, 1997. PCBs were not detected in this sample.

On June 11, 1997, the final round of quarterly PCB samples was collected from off-site bedrock monitoring wells C-20, C-21, and C-22. The analytical results for these samples indicate that PCBs were detected in unfiltered ground-water samples collected from off-site well C-22 at concentrations of 0.08 ppb and 0.13 ppb (duplicate sample). PCBs were not detected in water samples collected from off-site wells C-21 and C-22. On this same date, ground-water samples were also collected from the five residential water supply wells for filtered and unfiltered PCB analysis. Analytical results indicate that PCBs were not detected in any of the residential water samples at concentrations exceeding the 0.05 ppb detection limit. PCB analytical results for the ground-water samples collected from bedrock monitoring wells during the period from May 1996 through June 1997 are presented in Table 1-2. Analytical results for residential water supply well samples are presented in Tables 1-3 and 1-4.

Although PCBs have not been detected in any of the residential water supply samples, NMPC proposed, and the NYSDEC and NYSDOH approved, the precautionary measure of installing household activated carbon water treatment systems for the two residential water supply wells (RW-1 and RW-2) located closest to C-22 (see Figure 1-4). The household water treatment systems were installed in January 1997 and are being maintained and periodically sampled in accordance with the requirements specified in the NYSDEC-approved December 6, 1996 letter from Mr. James F. Morgan of NMPC to Mr. Daniel Lightsey, P.E. of the NYSDEC. In accordance with this letter, one water sample is collected from between the carbon units in each water treatment system for PCB analysis by Method 8080 on a quarterly basis. One sample of treated water from each system is also collected for analysis for total dissolved solids, total plate count, and total coliform (including E. Coli Screen). The analytical results of the quarterly household water treatment system sampling events are provided to the NYSDEC in monthly progress reports for the site.

LNAPL

During the course of the above-summarized ground-water investigation and monitoring activities, LNAPL has been observed on the bedrock ground-water surface in some monitoring wells. Efforts to characterize the presence and distribution of LNAPL at the site have been implemented in association with the following programs:

- The RI;
- Biweekly monitoring instituted in June 1993 as part of an IRM; and
- The LNAPL Extraction Demonstration.

The following paragraphs present a summary of the observations and data compiled during these efforts, followed by the conclusions regarding LNAPL characterization at the site.

1.3.4 LNAPL Data and Characterization

LNAPL has been observed and subsequently monitored at nine bedrock monitoring wells located north and west of the quarry pond. Table 1-1 presents the LNAPL thicknesses measured and the estimated quantities of LNAPL/water bailed since monitoring was initiated in May 1993 from the six wells (MW-5, C-3/MW-8, C-4, C-10, C-13, and C-14) where LNAPL was first observed. Prior to January 18, 1996, LNAPL observed in a monitoring well at a thickness greater than 0.30 feet was bailed from the well and containerized for off-site disposal. To provide additional information regarding LNAPL recharge, this protocol was revised so that, during monitoring events conducted after January 18, 1996, any measurable LNAPL thickness which could be practically removed was bailed from the well. The location of each site monitoring well is shown on Figure 1-4; the monitoring wells where LNAPL has been observed are shaded on this figure.

Since implementation of the biweekly LNAPL monitoring and removal program, the amounts of LNAPL measured and removed have decreased. The total volume of LNAPL/water bailed from the period between June 28, 1993 and October 28, 1997 was approximately 180 gallons; approximately 50% of this volume was removed during the first six months of the monitoring and LNAPL removal program (i.e., from June 28, 1993 through December 28, 1993) and 30% was removed during 1994. Thus only 20% of the volume or approximately 40 gallons of LNAPL/water have been removed since December 1994. Furthermore, LNAPL was removed from corehole C-10 and C-14 only during a several month period in 1993 (see Table 1-1). These data obtained from over four years of biweekly LNAPL monitoring and bailing activities indicate LNAPL depletion in the vicinity of the wells where LNAPL has been observed. The following table presents a summary of the observations at the six wells where LNAPL was first observed during 1993 (MW-5, C-3/MW-8, C-4, C-10, C-13, and C-14) and at the three additional wells (C-7, C-8, and C-11) where LNAPL was first observed during May 1996.

Location	First LNAPL Observation	Range of LNAPL Thicknesses Measured (feet)	Comments/Observations
MW-5	May 1993 - during well installation and development	NM - 2	No measurable LNAPL observed from May 1994 to September 1995.

Location	First LNAPL Observation	Range of LNAPL Thicknesses Measured (feet)	Comments/Observations
C-3/MW-8	May 1993 - during well installation and development	NM - 10.01	Monitoring well with the most consistent LNAPL observations and the greatest thicknesses - used as a test well during the LNAPL Extraction Demonstration.
C- 4	June 1993 - during packer testing LNAPL was observed entering the quarry pond	NM - 0.30	Measurable LNAPL first detected in April 1994 - used as a test well during the LNAPL Extraction Demonstration.
C-10	July 1993 - during well development (after 30 gallons of water were pumped from well)	NM - 1.1	No LNAPL has been removed from this well since November 1993. The only measurable thickness of LNAPL detected since November 1993 was 0.02 feet on February 22, 1996.
C-13	August 1993 - LNAPL observed coating water level probe prior to well development	NM - 0.39	Consistent measurable quantities throughout most of monitoring period, thicknesses typically less than 0.30 ft. Used as a test well during the LNAPL Extraction Demonstration.
C-14	August 1993 - LNAPL observed on top of the ground-water column after removal of packer testing equipment	NM-1.5	No LNAPL has been removed from this well since October 1993. The only measurable thickness of LNAPL detected since February 1995 was 0.06 feet on October 11, 1995.
C-11	May 1996 - LNAPL observed coating bailer during ground-water sampling	NM - 0.01	Measurable quantity of LNAPL detected on only one occasion (October 16, 1996) since May 1996. No LNAPL has been recovered from this well.
C-7 and C-8	May 1996 - LNAPL observed coating water level probe during monthly water level measurements	NM	No observations of LNAPL at either of these locations since the first observance in May 1996.

Note: NM = LNAPL thickness on ground-water surface was not measurable

During the Phase I RI, several LNAPL samples were collected for laboratory analysis of one or more of the following parameters: PCBs, oil fingerprinting, specific gravity, TCL volatile organic compounds and semivolatile organic compounds (VOCs and SVOCs), and TAL inorganic parameters. Results of these analyses indicate that the LNAPL samples consisted of approximately 90% transformer oil with a density of 0.89 grams per centimeter and PCB concentrations ranging from 1,780 to 2,230 ppm.

LNAPL Extraction Demonstration

A LNAPL Extraction Demonstration was implemented at the site, in accordance with the NYSDEC-approved LNAPL Extraction Demonstration Work Plan, during the period from June 24, 1996 to August 9, 1996. The work plan described the project scope and objectives and provided the technical basis of design for the demonstration program.

The purpose of this demonstration was to evaluate the feasibility of recovering LNAPL from the subsurface at two or more of the monitoring well locations, or from the quarry pond, where LNAPL had been observed during the RI and IRM activities. The demonstration was conducted in the three phases identified below:

Phase 1 - LNAPL skimming was performed using a belt skimmer and an electric, product-only skimmer pump at monitoring wells C-13 and C-3/MW-8, respectively. Data regarding the volume of LNAPL skimmed from these two wells during baseline (i.e., no hydraulic manipulation) conditions were obtained between June 26, 1996 and July 2, 1996.

Phase 2 - LNAPL skimming was performed (as described above) concurrent with ground-water pumping at monitoring wells C-13 and C-3/MW-8. In addition, the on-site combined water treatment systems (i.e., the 100 gpm and 300 gpm on-site treatment systems) were used to lower the quarry pond water level. LNAPL skimming data, ground-water elevation data, and field observations (e.g., observing the fractures and bedding planes along the north and west wall of the quarry pond for LNAPL seeps) were recorded during this phase of the demonstration designed to mobilize LNAPL by creating hydraulic gradients towards monitoring wells C-13 and C-3/MW-8 and the quarry pond. Phase 2 activities were conducted between July 10, 1996 and August 6, 1996.

Phase 3 - Treated water from the on-site 100 gpm treatment system was injected at monitoring well C-4, concurrent with continued LNAPL recovery at C-13 and C-3/MW-8 and monitoring of the quarry pond for LNAPL seeps. LNAPL skimming data, ground-water elevation data, and field observations were recorded during this phase of the demonstration designed to mobilize LNAPL by enhancing existing hydraulic gradients north of the quarry pond. Phase 3 activities were conducted between August 6, 1996 and August 9, 1996. Floating oil booms were installed in the quarry pond to contain LNAPL (if any) mobilized into the pond as a result of the injection.

A summary of the field activities and the data generated during the LNAPL Extraction Demonstration is presented in Appendix A. Results and conclusions of the demonstration are presented below, followed by conclusions regarding LNAPL characterization at the site.

LNAPL Extraction Demonstration Results and Conclusions

- The LNAPL recovery techniques (belt skimming and product only electric pumping) used during the demonstration did remove LNAPL from the ground-water surface; however, the volume of LNAPL recovered from monitoring wells C-3/MW-8 and C-13 declined to 0.025 and 0.00 gallons per day, respectively, by the third day of Phase 1 (no hydraulic manipulation) LNAPL collection. The total volume of LNAPL recovered during all three phases of the demonstration program was less one gallon.

- Modifying the hydraulic gradient by pumping ground water from monitoring wells C-3/MW-8 and C-13 resulted in a minimal initial increase of LNAPL volume over the volumes recovered at the end of Phase

1; continued ground-water pumping and LNAPL recovery during Phase 2 appeared to temporarily deplete LNAPL in these areas.

- Ground-water pumping at a rate of greater that 6 gpm from C-3/MW-8 resulted in a maximum drawdown of approximately 3.5 feet, while pumping rates ranging from 0.018 to 0.033 gpm in C-13 resulted in 12 to 17 foot drawdowns; indicating that the quantity of water (or LNAPL) at each well depends on the chance that the well intersects water (or LNAPL) bearing fractures .

- Short-term (less than 1,000 minutes) ground-water pumping of the test wells (C-3/MW-8 and C-13) did not produce observable drawdown of the water table at nearby monitoring wells; however, long-term ground-water pumping (greater than 1,000 minutes) at monitoring wells C-3/MW-8 and C-13 did appear to cause a drawdown of the water table at monitoring wells C-4, C-11, C-15, and C-16. These data provide quantitative evidence of the interconnectivity between these locations, which is controlled by the structural features of the bedrock (i.e., fractures, joints and bedding planes). The heterogeneous nature of the bedrock beneath the site precludes the use of "capture zone" analysis (which depends on flow in a homogeneous, or pseudo-homogeneous aquifer) .

- Pumping at the quarry pond did not increase the volume of measurable LNAPL in either the quarry pond or at on-site monitoring wells: however, ground-water seepage was observed along a horizontal bedding plane in the rock ledge of the quarry pond and a LNAPL sheen was observed on the quarry pond surface when water was injected into corehole C-4 (Phase 3 of the LNAPL Extraction Demonstration) .

<u>Conclusions Regarding LNAPL Characterization</u>

The following characterization of the presence and distribution of LNAPL at the site is based on the observations made during the RI, the IRMs and the LNAPL Extraction Demonstration.

- LNAPL has been observed in nine monitoring wells/coreholes: MW-5, C-3/MW-8, C-4, C-7, C-8, C-10, C-11, C-13, and C-14. These monitoring wells/coreholes are located on-site and west-northwest of the quarry pond, as shown on Figure 1-4. The amount of LNAPL observed at MW-5, C-10, C-13, and C-14 has decreased to not-measurable amounts (less than 0.01 feet). LNAPL has consistently been observed at C-3/MW-8 and C-4 in measurable thicknesses. At the remaining three locations, LNAPL has only been observed on one occasion at coreholes C-7 and C-8; and the LNAPL observed in C-11 has been minimal (the thickness has not been measurable with a Keck probe, indicating that the LNAPL thickness is less than 0.01 feet).

- The LNAPL recovered during the LNAPL Extraction Demonstration was minimal (less than one gallon). The volume of LNAPL/water recovered in the past year (November 1996 through October 1997) during the biweekly LNAPL monitoring and removal program was also minimal (approximately 14.25 gallons), compared to the volume removed during the first year (120 gallons).

- LNAPL has infiltrated the fractured and jointed bedrock at the site where it appears to exist in discrete quantities, adhered to rock surfaces by surface tension forces, or sorbed to sediment within the fractures as observed during the RI coring activities. Fluctuations in the water table, caused by seasonal variations or hydraulic manipulations, would be expected to increase the fraction of residual LNAPL by increasing the surface area that free LNAPL (if present) would be exposed.

- The bedrock at the site is characterized by multiple horizontal and vertical fractures, joints, and bedding planes with varying degrees of solution enlargement. Characterizing and predicting the volume and distribution of LNAPL in this system is technically impracticable due to complex factors regarding LNAPL migration, including, but not limited to, the lack of economical and feasible characterization technologies for defining the degree of fracture interconnectivity ("EPA Ground Water Issue - Light Non-Aqueous Phase Liquids") (USEPA 1995).

The declining LNAPL quantities and thicknesses of LNAPL observed at individual monitoring locations over the (approximately four year) period of LNAPL monitoring may be due to:

- LNAPL removal (by bailing/skimming) associated with the ongoing IRM or the LNAPL Extraction Demonstration;
- LNAPL discharge into the quarry pond;
- An increase, over time, in the fraction of residual LNAPL; and/or
- LNAPL migration.

There have been no known surface releases of LNAPL since the initiation of the site investigations (approximately 1983). Based on this information, the observations of declining LNAPL quantities in monitoring wells/coreholes, and continued operation of the quarry pond water treatment system(s), future migration of LNAPL would be expected to be limited.

1.3.5 FWIA and Human Health RA

In addition to the data summarized above regarding the presence and extent of chemicals of interest and the hydrogeologic characterization of the site, a FWIA and the Human Health RA were completed during the RI to provide insight into the potential environmental and human health risks associated with the chemical constituents at the site. A detailed description of the Human Health RA and the FWIA and the corresponding results were presented in Sections 4 and 5 of the RI Report, respectively. The results are briefly summarized below.

The results of the FWIA indicate no obvious impacts to the fish and wildlife resources of the storm water drainage system or Cobleskill Creek. PCBs were detected at a concentration of 0.18 mg/kg in one of the nine sediment samples collected from Cobleskill Creek. Because this detection was above the 0.01 mg/kg site-specific PCB sediment quality criteria determined by the NYSDEC methodology, fish sampling and analysis activities were completed. The purpose of these activities was to assess the potential for site-related impacts on resident sport fish and forage fish populations present in the storm water drainage system and also in Cobleskill Creek, downstream of the confluence with the storm water drainage system. The PCB concentrations in all fish samples analyzed as part of the RI were below the NYSDEC/NYSDOH fish tissue PCB criterion for the protection of human health.

The results of the baseline Human Health RA indicate that the risk estimates for on-site workers or trespassers and off-site residents and recreationists exposed to chemical constituents detected during the RI are within the USEPA's acceptable range for both carcinogenic and non-carcinogenic risks. Risk estimates for hypothetical future ground water use suggest that both cancer and non-cancer risks would be unacceptable if untreated on-site ground water were used as a potable water supply. However, based on current site use and the extent of the public water supply, potable use of on-site ground water in its current condition is unlikely.

2. Identification of Standards, Criteria, and Guidance (SCGs)

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

2. Identification of Standards, Criteria, and Guidance (SCGs)

2.1 General

This FS was prepared in conformance with the applicable guidelines, criteria, and considerations set forth in the NYSDEC TAGM No. 4025 entitled, "Guidelines for Remedial Investigations/Feasibility Studies" (NYSDEC 1989), the NCP, and the NYSDEC's Inactive Hazardous Waste Disposal Site Remedial Program (6 NYCRR Part 375). Applicable provisions of these regulations require that remedial actions comply with SCGs unless "good cause exists", as defined in 6 NYCRR Part 375-1.10(c)(1)(i). The potential SCGs that have been identified for the M. Wallace and Son, Inc. Scrapyard site are presented in this section.

2.1.1 Definition of SCGs

"Standards and Criteria" are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances.

"Guidance" includes non-promulgated criteria and guidance that are not legal requirements; however, the site's remedial program should be designed with consideration given to guidelines that, based on professional judgment, are determined to be applicable to the site [6NYCRR 375-1.10(c)(1)(ii)].

The NYSDEC has also identified certain guidance as "to-be-considered" (TBC) material. TBC materials are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential SCGs.

2.1.2 Types of SCGs

The NYSDEC has provided guidance on the application of the SCGs concept into the RI/FS process. SCGs are to be progressively identified and applied on a site-specific basis as the RI/FS proceeds. The potential SCGs considered for the potential remedial actions identified during the FS were categorized into the following NYSDEC-recommended classifications:

- ***Chemical-Specific SCGs*** - These SCGs are usually health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values for each chemical of interest. These values establish the acceptable amount or concentration of a chemical that may be found in or discharged to the ambient environment;

- ***Location-Specific SCGs*** - These SCGs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in specific locations; and

- ***Action-Specific SCGs*** - These SCGs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous waste management and site cleanup.

2.2 SCGs and TBCs

The identification of federal and state SCGs and TBCs for the evaluation of remedial alternatives at the site was a multi-step process which included the FWIA and Human Health RA. The SCGs and TBCs that have been identified for the M. Wallace and Son, Inc. Scrapyard site are presented below.

2.2.1 Chemical-Specific SCGs

One set of chemical-specific SCGs that may apply to the impacted site soils, and sediments are the NYSDEC-regulated levels for the Toxic Characteristics Leaching Procedure (TCLP) constituents, as outlined in 6NYCRR 371. The regulated levels for TCLP constituents are a set of numerical criteria at which a solid waste is considered a hazardous waste by the characteristic of toxicity. Chemical-specific SCGs may also include the Toxic Substances Control Act (TSCA) regulations (40 CFR 761), which regulate the handling and disposal of PCB-containing waste materials. Soils, sediments, or LNAPLs that contain PCBs at concentrations greater than 50 ppm would be considered TSCA-regulated waste. In addition, New York State considers waste materials containing PCBs at concentrations greater than 50 ppm to be hazardous wastes. Thus, these waste materials would not only be regulated under the TSCA regulations, but would also need to comply with the New York State hazardous waste regulations contained in 6NYCRR Parts 370-373 and 376 for handling, transporting, and disposing of hazardous materials.

Ground water beneath and in the vicinity of the M. Wallace & Son, Inc. Scrapyard site (both the ground-water within the overburden and within the bedrock) is classified as Class GA and, as such, the New York State Class GA Ground-Water Quality Standards (6NYCRR Parts 700-705) are applicable chemical-specific standards. These standards identify acceptable levels of chemical constituents in ground water. PCBs have been detected in ground water collected from several monitoring wells at levels exceeding the Class GA Ground-Water Quality Standard of 0.1 ppb. Target Compound List (TCL) chemicals were detected at levels exceeding the Class GA standards only in ground-water samples collected in the leachfield area. These detections are unrelated to the scope of this FS.

2.2.2 Location-Specific SCGs

Examples of potential location-specific SCGs include floodplain and wetland regulations, and regulations promulgated under the National Historic Preservation Act, Endangered Species Act, and other federal acts. Location-specific SCGs also include local building permit conditions for facilities constructed on-site.

Based on a review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Cobleskill (Community Panel No. 360743 0002), effective February 16, 1983, the site is not located within the 100-year floodplain. In addition, review of the NYSDEC Archeological Sites Location Map (revised March 1992) indicated that no historic archeological sites are located within a one mile radius of the site. Therefore, floodplain regulations, as well as the National Historic Preservation Act, are not location-specific standards for the site.

Review of the NYSDEC Freshwater Wetland Inventory Maps indicates there are no NYSDEC- designated wetlands in the area of the site.

No endangered species were identified as a result of the FWIA conducted for the site; therefore, the Endangered Species Act is not a location-specific standard. No other location-specific SCGs were identified.

2.2.3 Action-Specific SCGs

The potential action-specific SCGs for this site are summarized in Table 2-1. The action-specific SCGs have been divided into the following two categories:

1. Action-specific SCGs potentially common to all remedial technologies; and
2. Action-specific SCGs potentially applicable to specific remedial technologies.

The first category includes general health and safety requirements, and general requirements regarding RCRA hazardous waste facilities (including transportation and disposal facilities). The second category includes SCGs that apply to specific remedial technologies.

Table 2-2 presents a list of the potential action-specific SCGs that have been identified for the remedial technologies being evaluated.

2.2.4 Other Federal and State Criteria, Advisories, and Guidance

The NYSDEC's TAGM 4046, is a guidance document that presents the NYSDEC's recommended soil cleanup levels for organic and inorganic chemical constituents. The NYSDEC's "Technical Guidance for Screening Contaminated Sediments" (NYSDEC 1993) is a technical guidance document that presents guidance for identifying sediment concentrations of specific constituents in sediments that may impact aquatic ecosystems. These two TAGMs are TBCs for the M. Wallace & Son, Inc. Scrapyard site.

3. Remedial Action Objectives (RAOs)

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3. Remedial Action Objectives (RAOs)

3.1 General

RAOs are medium-specific goals for protecting human health and the environment. These objectives are, in general, developed by considering the results of the FWIA and the Human Health RA, and/or the SCGs identified for the site. RAOs for this site were originally proposed in Section 6.0 of the RI Report which was approved by the NYSDEC in a letter dated March 19, 1996. Since completion of the RI Report, additional ground-water characterization information has been obtained, requiring a slight modification to the ground-water RAOs for the protection of human health and the environment. This additional information is the detections of PCBs in ground-water samples collected from monitoring wells located along the western site boundary and monitoring well C-22, located on private property on the west side of West Street, at concentrations in excess of the NYSDEC Class GA Ground-Water Quality Standard of 0.1 ppb. In addition, pursuant to a February 11, 1997 letter from Mr. Daniel Lightsey, P.E. of the NYSDEC, the RAO for subsurface soil has been revised.

This section presents the RAOs for soil and sediment, as introduced in the RI Report, as well as the modified ground-water RAOs resulting from the post-RI ground-water investigation activities conducted along and adjacent to the western site boundary.

3.2 RA Summary

A two component baseline RA was conducted in conjunction with the RI. These components consisted of a baseline FWIA and a Human Health RA. The objective of the baseline RA was to assess potential risks to ecological and human receptors that may result from exposure to chemicals of interest detected in environmental media under existing conditions. The results of each component of the baseline RA are briefly presented below.

3.2.1 FWIA

The results of the FWIA indicate no obvious impacts to the fish and wildlife resources of the storm water drainage system or Cobleskill Creek. PCBs were detected at a concentration of 0.18 mg/kg in one of the nine sediment samples collected from Cobleskill Creek. Because this was above the 0.01 mg/kg site-specific PCB sediment quality criteria determined by the NYSDEC methodology, fish sampling and analysis activities were completed. The purpose of these activities was to assess the potential for site-related impacts on resident sport fish and forage fish populations present in the storm water drainage system and also in Cobleskill Creek, downstream of the confluence with the storm water drainage system. The PCB concentrations in all fish samples analyzed as part of the RI were below the NYSDEC/NYSDOH fish tissue PCB criterion for the protection of human health.

3.2.2 Human Health RA

The results of the baseline Human Health RA indicate that the risk estimates for on-site workers or trespassers and off-site residents and recreationists exposed to chemical constituents detected during the RI are within the USEPA's acceptable range for both carcinogenic and non-carcinogenic risks. Risk estimates for hypothetical future ground water use suggest that both cancer and non-cancer risks would be unacceptable if untreated on-site ground water were used as a potable water supply. However, based on current site use and the extent of the public water supply, potable use of on-site ground water in its current condition is unlikely.

3.3 RAOs

The RAOs identified for soil, sediment, and ground water are presented in the following paragraphs.

3.3.1 Soil

No unacceptable human health risks were estimated to occur as a result of exposure to site-related chemicals of interest present in soils. Therefore, proposed RAOs for site soils focus on protection of the environment.

In the active scrapyard area, surface soils are generally covered with a layer of packed gravel. This layer of gravel may limit the migration of chemicals of interest in the surface soils (i.e., the top 6 inches of soil beneath the gravel). Over the majority of the site, the surface soils are exposed or covered with varying amounts of herbaceous vegetation or trees. The potential exists for migration of the chemicals of interest present in surface soil via the following mechanisms:

- Infiltration of water through the surface soil may cause the chemicals of interest to leach and impact subsurface soils and ground water; and

- Transport of surface soils via storm water runoff may cause the chemicals of interest in the surface soils to impact downgradient locations.

PCBs were detected in surface soils within the upper section of the site, as well as at location S-28 and in the active scrapyard area, at concentrations that exceed the NYSDEC/NYSDOH cleanup goals presented in NYSDEC TAGM 4046. Because these chemicals in the surface soils may impact subsurface soils and/or downgradient locations, the RAO for surface soils is to mitigate the migration of PCBs at concentrations greater than 1 ppm in surface soils. At locations in the upper section of the site, as well as at location S-28, inorganic and SVOC constituents of interest were also detected in surface soil samples at concentrations exceeding the NYSDEC/NYSDOH cleanup goals presented in the NYSDEC TAGM 4046. However, actions taken to achieve the RAO of mitigating the migration of PCBs in these areas would also address the possible migration of the SVOC and inorganic constituents of interest co-located in these surface soils.

With respect to subsurface soils, PCBs were detected in two of the subsurface soil samples (TP-13S and TP-19S) collected within the upper section of the site at concentrations that may impact ground-water quality (i.e., result in PCB concentrations in ground water that are in excess of the NYSDEC Class GA Ground-Water Quality Standard of 0.1 ppb). Therefore, an RAO for subsurface soils is to mitigate the potential for migration of PCBs in subsurface soils at concentrations greater than the NYSDEC cleanup goal of 10 ppm presented in TAGM 4046.

Another RAO for subsurface soils is to mitigate the potential migration of metals at concentrations in excess of the cleanup goals presented in NYSDEC's TAGM 4046. Concentrations of metals in excess of these cleanup goals were detected in subsurface soil samples collected from the northern (upper) portion of the site, as well as in the sample collected from test pit S-28, located between the quarry pond and the active scrapyard area (see Figure 1-4). The metals detected in excess of the NYSDEC cleanup goals (in the subsurface soil samples collected from these areas) were primarily limited to chromium, copper, iron, lead, nickel, and zinc; and were generally limited to the samples collected from the 0 to 2-foot depth interval.

As discussed above, exceedances of NYSDEC's cleanup goals for metals were also detected in the surface soil samples collected from these same areas. The concentrations of metals detected in the surface soil samples, however, were typically greater than those detected in samples collected from the subsurface soils, as shown by the following example that compares the metals concentrations detected in the surface and subsurface soils samples collected from test pit S-4:

Metals	Surface Soil Sample SS-4S (0-6 inches) Analytical Results	Subsurface Soil Sample TP-4S (0-2 feet) Analytical Results
Chromium	67.5	11.4
Copper	1,300	101
Iron	94,000	18,100
Lead	5,060	110
Nickel	137	21.6
Zinc	6,750	242

Notes:
1. Concentrations are presented in ppm.
2. Surface soil sample SS-4S and subsurface soil sample TP-4S were collected from the same sampling location: S-4.

Because the subsurface soil sampling interval of 0 to 2 feet includes the surface soils and the higher concentrations of metals were generally detected in the surface soil samples, it is likely that the subsurface soil sampling data for metals is partially reflective of the concentrations present in the surface soils.

Based on the RAOs identified above, the estimated areas of surface and subsurface soil to be addressed during the FS process are defined as follows:

- Surface soils to be addressed (impacted surface soils) include the top 6 inches of soil (beneath any gravel layer) within the upper section of the site and in the active scrapyard area. The estimated area of impacted surface soil is shown on Figure 3-1.

- Subsurface soils to be addressed are those that contain PCBs at concentrations greater than or equal to 10 ppm, as well as those that contain metals at concentrations greater than the cleanup goals presented in NYSDEC's TAGM 4046. Subsurface soil samples that contained PCBs at concentrations greater than or equal to 10 ppm were limited to two samples collected from the upper section of the site (TP-13S and TP-19S). Concentrations of metals in excess of the NYSDEC's cleanup goals were detected in subsurface soil samples collected from the northern (upper) portion of the site, as well as in the sample collected from test pit S-28. The metals detected in excess of the NYSDEC cleanup goals in the subsurface soil samples were primarily limited to chromium, copper, iron, lead, nickel, and zinc; and were generally limited to the samples collected from the 0-2 foot depth interval. Based on these analytical results obtained during the RI, the estimated areal extent of subsurface soils containing PCBs at concentrations greater than 10 ppm or the metals at concentrations in excess of the NYSDEC's cleanup goals is shown on Figure 3-1, and the vertical extent is estimated to extend to a depth of up to 4 feet below ground surface for the PCB impacted areas (TP-13S and TP-19S) and to a depth of 2 feet below ground surface for the metals impacted areas. The actual limits of impacted subsurface soil may vary depending upon verification sampling, which would be conducted during implementation of subsurface soil removal activities (if any) associated with the recommended remedial action.

3.3.2 Sediment

No unacceptable human health risks were estimated to occur as a result of exposure to site-related chemicals of interest in on- or off-site sediments. With respect to potential ecological impacts, the results of the FWIA (as presented in detail in the NYSDEC-approved RI Report) indicate no obvious impacts to the fish and wildlife resources of the storm water drainage system or Cobleskill Creek.

Analytical results for the sediment samples collected from the quarry pond, indicate PCB concentrations ranging from 0.17 ppm to 63 ppm. PCBs have been detected in unfiltered quarry pond surface water samples at concentrations ranging from 0.12 ppb to 0.72 ppb; in filtered samples the concentrations ranged from not detected at 0.05 ppb to 0.07 ppb. As presented in the NYSDEC-approved RI Report, human activity and noise associated with the active scrapyard operations, Route 10 traffic, the quarry pond water treatment system(s), and the apartments to the east, likely discourages the use of the quarry pond by aquatic birds.

The RAO for sediments is to protect fish and wildlife by mitigating the potential for PCBs to impact the fish and wildlife resources of Cobleskill Creek. Although the results of the FWIA indicate that there has been no obvious impact to fish and wildlife resources due to the presence of PCBs in some sediment within the storm water drainage system and Cobleskill Creek, NMPC proposes to address the two portions of the storm water drainage system where PCBs were detected at the highest concentrations. The locations within the quarry pond outlet channel and the storm water drainage system are: SD-35S (8.2 ppm), SD-36S (4.2 ppm), WS-CC-1 (2.2 ppm), and WS-CC-2 (4.3 ppm). Samples SD-35S and SD-36S were collected within the quarry pond outlet channel (see Figure 1-4). Samples WS-CC-1 and WS-CC-2 were collected downstream, in an area of sediment deposition on the State University of New York Campus (see Figure 1-5). Figures 3-1 and 3-2 present the estimated horizontal limits of impacted sediments in the quarry pond outlet channel and the storm water drainage system, respectively. Based on analytical results, PCBs have been detected in sediment at a depth of 6 inches. Therefore, sediment will be addressed to a depth of 12 inches or refusal (if less than 12 inches of sediment exist).

With regard to the quarry pond sediments, the quarry pond water treatment system has been operating since December 1992 to prevent discharge (into the storm water drainage system) of quarry pond surface water/sediment containing PCBs in excess of 0.065 ppb. Although this mitigates the potential for these sediments to impact the fish and wildlife resources of Cobleskill Creek, potential remedial options for these sediments are identified and evaluated in Section 4 of this FS Report.

3.3.3 Ground Water

Ground water at the site is currently not used as a potable water source. The residents to the east and south of the site obtain water from a municipal water supply. Analytical results for ground-water samples collected at the five residential wells to the west of the site indicate that no site-related chemicals of interest are present at these locations. However, LNAPL has been observed at the following monitoring well/corehole locations: MW-5, C-3/MW-8, C-4, C-7, C-8, C-10, C-11, C-13, and C-14. The PCB analytical results of the LNAPL samples obtained from coreholes C-3/MW-8 and C-10 were 1,780 ppm and 1,830 ppm, respectively. Furthermore, PCBs were detected, on two occasions, and at concentrations exceeding the NYSDEC Class GA Ground-Water Quality Standard (0.1 ppb) in unfiltered ground-water samples collected from off-site monitoring well C-22, located approximately 150 feet east of residential water supply well RW-1. The proposed RAOs for ground water include the following:

- Remove the LNAPL that has been identified on the bedrock ground-water surface at the site;

- Mitigate the potential for migration of LNAPL and PCBs beyond the monitoring well locations where they have been observed/detected; and

- Provide potable water to the residences/businesses that use residential water supply wells RW-1 and RW-2 as their water supply source.

4. Technology Screening Summary and Assembly of Remedial Alternatives

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4. Technology Screening Summary and Assembly of Remedial Alternatives

4.1 General

This section of the FS Report summarizes the potential remedial technologies identified to address the impacted soils, sediments, and ground water at the site, as defined in Section 3 of this report. Each identified remedial technology is briefly described and evaluated against the screening criteria presented by the NYSDEC in TAGM No. 4030 entitled, "Selection of Remedial Actions at Inactive Hazardous Waste Sites" and the USEPA's "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA."

The criteria by which the technologies were screened are:

- Effectiveness - Each technology was evaluated as to the extent to which it will mitigate threats to public health and the environment through the reductions in toxicity, mobility, and volume of the constituents of interest present in the impacted environmental media. This evaluation focused on how proven and reliable a technology is with respect to addressing the impacted environmental media associated with the site. Both the short-term and long-term effectiveness were evaluated.

- Implementability - Each technology was evaluated as to the ability to construct, reliably operate and meet technical specifications or criteria, and the availability of specific equipment and technical specialists to operate the equipment. This evaluation also includes consideration of the operation and maintenance required into the future, after remedial construction is complete.

This approach is used to determine if a particular technology had the potential to meet the RAOs for soils, sediments and ground water. Based on the results of this screening, remedial technologies were eliminated, or retained and subsequently combined into remedial alternatives for further evaluation in the detailed analysis of remedial alternatives.

4.2 Summary of Identified Remedial Technologies

The identification of remedial technologies involved a focused review of available literature, including the following NYSDEC and USEPA documents:

- NYSDEC TAGM 4030 entitled "Selection of Remedial Actions at Inactive Hazardous Waste Sites" (NYSDEC 1990);

- "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA, 1988);

- "Guidance on Remedial Actions for Superfund Sites with PCB Contamination" (USEPA 1990);

- "Technology Alternatives for the Remediation of PCB-Contaminated Soil and Sediment" (USEPA 1993b);

- "Technology Briefs" (USEPA various dates);

- "Treatment Technologies" (USEPA 1991);

- "EPA Ground Water Issue - Light Non-Aqueous Phase Liquids" (USEPA 1995); and

- "Guidance for Evaluating the Technical Impracticability of Ground Water Restoration" (USEPA 1993a).

These documents, along with remedial technology vendor information, were reviewed to identify technologies that are potentially applicable for addressing the impacted media at the site.

In accordance with the NCP, the no-action technology was identified for each of the impacted media at the site. The additional identified remedial technologies for potentially addressing the impacted soil and sediment, and ground water are as follows:

Soil and Sediment

- No Further Action;
- Institutional Controls;
- Capping;
- Excavation with Off-Site Disposal;
- Excavation with On-Site Low-Temperature Thermal Desorption (LTTD) Treatment;
- Excavation with Off-Site Incineration;
- Excavation with On-Site Electrochemical Peroxidation (ECP) Treatment; and
- Solidification/Stabilization.

Ground Water/LNAPL

- No Further Action;
- Institutional Controls;
- LNAPL Removal by Bailing, Pumping or Skimming;
- Hydraulic Gradient Manipulation;
- Hot Water or Steam Injection;
- Horizontal Extraction Wells or Extraction/Diversion Trenches;
- Ground-Water Removal and Treatment;
- Quarrying and Disposing of LNAPL-Impacted Bedrock; and
- Long-Term Ground-Water and LNAPL Monitoring.

In addition to the aforementioned technologies identified to address the impacted environmental media, potential technologies have also been identified to provide a potable water supply to the residences and business served by residential water supply wells RW-1 and RW-2. These wells are located in proximity to monitoring well C-22, where PCBs have been detected in unfiltered ground water samples at concentrations which slightly exceed the NYSDEC Class GA Ground-Water Quality Standard of 0.1 ppb. The potential remedial technologies identified for providing a potable water supply are as follows:

Potable Water Supply

- No Action;
- Installation and Maintenance of Residential Water Treatment Systems; and
- Extension of the Village of Cobleskill Public Water Supply.

4.3 Screening of Potential Remedial Technologies

Each of the above-listed potential remedial technologies was screened based on its expected effectiveness and implementability. The effectiveness of a remedial technology refers to the degree to which the remedial technology would provide adequate protection of human health and the environment. The implementability of the technology refers to the probability that the remedial technology could be constructed and reliably implemented. This screening, as well as a brief technical description of the potential remedial technologies identified above, is presented in the following paragraphs.

4.3.1 Soil and Sediment Remedial Technologies

A. No Further Action

Technical Description

This technology would not involve the implementation of any activities to address the impacted soils or sediments. This technology would involve the continued operation of the quarry pond water treatment system(s). This technology is further screened in Section 4.3.2 as a ground-water/LNAPL remedial technology.

Implementability

The no further action technology would not include implementation of any remedial activities except for the continued operation of the quarry pond water treatment system(s); therefore, implementation of this technology is technically feasible.

Effectiveness

This technology would not treat, remove, or mitigate the migration of the impacted soils or sediment; therefore, it would not achieve the RAOs established for soil and/or sediment.

Screening Results

As required by the NCP, this technology will be retained for further evaluation. This technology will serve as the baseline for comparing the overall effectiveness of the other soil and sediment remedial technologies.

B. Institutional Controls

Technical Description

Institutional controls are minimal actions taken to reduce the potential for exposure to the impacted soil/sediment or to mitigate the potential for future activities to compromise the effectiveness of a selected remedy. Institutional controls may include, for example, installation of additional site fence or implementation of deed restrictions.

Implementability

Implementation of institutional controls is technically feasible; however, it may depend upon legal requirements.

Effectiveness

This technology would not treat, contain or remove any of the impacted soils or sediments; therefore, institutional controls alone would not achieve the RAOs established for these media. However, this technology could be effective when implemented in combination with other technologies.

Screening Results

This technology alone would not meet the RAOs for site soils and sediments. This technology will, however, be retained for further evaluation in combination with other technologies.

C. Capping

Technical Description

This technology would consist of excavating the impacted off-site sediments (those within the quarry pond outlet channel and the storm water drainage system) and transporting them to the upper portion of the site. On-site impacted soils from steep, inaccessible, or high-traffic areas (generally, those areas near and west of the quarry pond) would also be excavated, and the excavated materials transported to the upper portion of the site. The excavated on-site and off-site areas would be properly restored. A low-permeability cap would be installed to cover the impacted soil/sediments in the upper portion of the site. The active scrapyard area would be capped using bituminous asphalt, concrete, or a similar low-permeability and durable material capable of withstanding the traffic in that area.

Another capping option for the site involves capping the quarry pond sediments. This process could involve sealing water bearing zone(s) within the quarry pond, dewatering and compacting the sediments present within the pond, and installing a low-permeability cap to cover these sediments.

Implementability

The placement of a cap over the impacted soils and off-site sediments consolidated on-site is technically feasible and easily implemented. The type of cap selected would need to be compatible with activities anticipated to be conducted within that area of the site to be capped.

Capping of the quarry pond sediments is also technically feasible but implementation could be complicated by issues associated with the following:

- Removing and possibly temporarily staging sediment within the quarry pond to facilitate sealing the quarry pond;
- Sealing the quarry pond to facilitate installation of the cap and to minimize the potential for upward ground water flow from the bedrock to compromise the integrity of the cap; and
- Long-term maintenance of the cap.

Effectiveness

A cap installed to cover the impacted soils and off-site sediments consolidated on site would achieve RAOs for these media by removing the impacted sediment from the off-site locations, mitigating overland transport of impacted on-site soils/sediments and reducing surface water infiltration. To remain effective, the cap would require long-term maintenance and restrictions regarding future use at the site.

The effectiveness of a cap over the quarry pond sediments would be limited because the LNAPL present on the ground-water surface represents a continuing source for PCBs to enter the quarry pond. Currently, operation of the quarry pond water treatment system(s) prevents discharge from the quarry pond of PCBs at concentrations greater than 65 ppt. The effectiveness of this technology may also be limited by the technical practicability of sealing the quarry pond.

Screening Results

Because this technology would achieve the RAOs presented in Section 3 for surface soils and off-site sediments, it will be retained for further evaluation for impacted soils and off-site sediments.

Capping of the quarry pond sediments will be retained for further evaluation; however, the appropriateness of selecting this technology is dependent upon the technology(ies) selected to achieve the RAOs identified for ground water/LNAPL.

D. Excavation With Off-Site Disposal

Technical Description

This technology would consist of excavating and disposing the impacted soil and sediment at an off-site facility capable of accepting these materials. The excavated areas would then be restored, as appropriate. Pretreatment (e.g., solidification) at the disposal facility, prior to landfilling, may be necessary to meet NYSDEC Land Disposal Restrictions (6NYCRR Part 376) for TCLP List inorganic constituents.

Implementability

Excavation and off-site disposal is a common technology which can be generally implemented with typical excavation equipment, such as backhoes, excavators, loaders, etc; therefore, this technology is technically feasible. This technology may require the implementation of ground-water control and/or dewatering activities.

Effectiveness

Excavation and off-site disposal would permanently remove the impacted soil and sediment from the site and from the impacted off-site areas within the quarry pond outlet channel and the storm water drainage system, thereby meeting the RAOs established for these media.

The effectiveness of excavating the quarry pond sediments would be limited because the LNAPL present in the subsurface areas upgradient of the quarry pond represents a continuing source for impacts to materials remaining after excavation.

Screening Results

Because this technology would result in the off-site disposal of the impacted media from the site, this technology would achieve the RAOs for the impacted soils and off-site sediments associated with the site. Therefore, this technology will be retained for further evaluation.

Excavating and disposing of the quarry pond sediments will be retained for further evaluation; however, the appropriateness of selecting this technology for addressing the impacted quarry pond sediments is dependent upon the technology(ies) selected to achieve the RAOs identified for ground water/LNAPL.

E. Excavation With On-Site Low Temperature Thermal Desorption (LTTD) Treatment

Technical Description

This technology would consist of excavating and treating impacted soil/sediment using an on-site LTTD unit. The thermally treated materials would be sampled and analyzed to determine if cleanup objectives have been achieved. Soils that met the clean-up levels would be backfilled on-site. Soils not meeting the clean-up levels would either be retreated (if the non-compliance is related to an organic constituent) or disposed of off-site (if non-compliance is related to an inorganic constituent). Additional clean fill materials would be used for backfill, as necessary.

Implementability

LTTD treatment is generally capable of treating organic compounds, such as PCBs and PAHs, present within impacted soil and sediment. Screening of the soils would likely be required prior to treatment using LTTD to remove debris and larger diameter materials (e.g., rocks) potentially present within the impacted soils and sediments.

A LTTD unit may require approximately 3 acres of land to operate. This amount of property may be available in the northern portion of the site. In addition, offgas from the LTTD unit would likely require treatment prior to discharge into the atmosphere to comply with applicable air quality regulations.

Effectiveness

LTTD treatment would permanently remove organic compounds of interest from the impacted soil/sediment at the site; however, this technology would be ineffective at treating the inorganic constituents of interest (e.g., lead) present within some soils.

Furthermore, the effectiveness of this technology to treat the organic constituents of interest may need to be determined through treatability testing.

Screening Results

This technology may reduce the toxicity, mobility, and volume of the organic chemicals of interest present in soil and sediment. However, this technology would be ineffective at addressing the inorganic constituents of interest which are co-located with the organic constituents in a significant fraction of the impacted soils. Therefore, this technology will not be retained for further evaluation.

F. Excavation with Off-Site Incineration

Technical Description

This technology would consist of excavation and off-site incineration of the impacted soil/sediment at a commercial facility capable of accepting these materials. The excavated areas would then be properly restored.

Implementability

Excavation is a common technology which can generally be implemented with typical excavation equipment. For commercial incineration facilities, adequate treatment capacity is available for the PCB-impacted soil/sediment at the site. However, based on the PCB soil and sediment analytical data obtained during the RI and the NYSDEC Land Disposal Regulations (6NYCRR Part 376), the impacted soil/sediment at the site would not require incineration. Rather, the impacted soil/sediment could be disposed of in an off-site landfill capable of accepting these materials.

Effectiveness

Excavation and off-site incineration would permanently remove the impacted soil/sediment from the site, thereby meeting the RAOs identified for these media. Incineration is a reliable and well-demonstrated technology for removal of the organic chemicals of interest detected in the soil/sediment. Incineration would be ineffective at addressing the inorganic constituents of interest detected in the soils.

Screening Results

Because the soils/sediments are expected to meet the regulatory criteria for organic chemicals of interest for disposal at a RCRA Subtitle C disposal facility, incineration would not be required. In addition, this technology would not be effective at addressing inorganic constituents of interest. Therefore, this technology has not been retained for further evaluation.

G. Excavation with On-Site Electrochemical Peroxidation (ECP) Treatment

Technical Description

This technology has been used in bench and pilot scale studies to spontaneously oxidize organic compounds (including PCBs). Hydroxyl radicals are created from hydrogen peroxide in an acidified soil slurry (pH of 2.5). Several methods, including the use of heat, iron redox reactions, photocatalysts, and electric current, have been utilized in these studies to promote the reactions. In a field scale operation, the slurry could be pumped to a stationary treatment facility or one or more mobile treatment cells could be utilized.

Implementability

This technology has not been implemented for soil/sediment remediation on a field scale basis; therefore, while the components of such a system (such as sludge pumps, mixers, additive delivery units, and electrodes) are available, the system would have to be custom built and extensively tested.

Implementation would require addressing material handling issues associated with mixing the impacted materials into an acidified soil slurry with a pH of 2.5, and subsequently associated with post-treatment of the acidified soil/sediment slurry.

Effectiveness

Bench scale experiments using ECP on PCB-impacted sediments at an initial concentration of 65 ppm reduced the total PCBs by as much as 80% after a treatment time of one minute. Whether these results could be achieved in the field is unknown. Experimental data suggests that trace metals sorbed to particulates may be solubilized during ECP treatment (due to acidification of the slurry); perhaps requiring further treatment.

Screening Results

Based on bench scale and pilot study test results, this technology could remove PCBs from a soil/sediment slurry. However, this technology will not be retained for further evaluation because these results have not been demonstrated or tested in a field scale operation; the fate of inorganic constituents has only been evaluated to date based on experimental data; and the material handling issues associated with lowering the pH of the impacted material to the required value of 2.5.

H. Solidification/Stabilization

Technical Description

This technology is a physical treatment process by which solidification/stabilization agents are mixed with sediments and soils to alter the physical and/or chemical state of the chemicals of interest present in the material. Solidification can be accomplished by in-situ or ex-situ techniques.

For ex-situ solidification, the impacted soil/sediment would be excavated and fed through a pug-mill-type treatment system where the stabilization agents would be mixed with the soil/sediment. Ex-situ solidification could be performed on- or off-site, depending upon the results of analytical testing of the solidified materials, regulatory requirements, and the final disposition of the solidified material.

For in-situ solidification, the impacted soil/sediment would be solidified in place using mixing blades or augers to blend the stabilization agents with the soil/sediment.

Implementability

This technology is technically feasible and could be implemented at the site. Additionally, several off-site treatment, storage, or disposal facilities (TSDFs) offer solidification services. On-site areas for final disposition of ex-situ solidified materials may be limited due to the relatively shallow depth to top of bedrock at the site, and the presence of ground water in portions of the site where the overburden thickness is greater.

Effectiveness

In-situ and ex-situ solidification techniques have been proven effective at reducing the mobility and/or toxicity of inorganic constituents and select organic constituents in soil/sediment. However, the long-term effectiveness of this technology is not known. With respect to solidification at an off-site TSDF, this would be implemented, if necessary, to meet the NYSDEC Land Disposal Restrictions (6NYCRR Part 376) for TCLP inorganic constituents. The effectiveness of this technology may need to be determined through treatability testing.

Screening Results

This technology has been successful at reducing the mobility of inorganic constituents, however, the ability to reduce the mobility of organic constituents is not well documented. This technology will be retained for further evaluation as a secondary treatment technology, required to meet the RCRA Land Disposal Restrictions prior to off-site disposal of impacted soils and sediments.

4.3.2 Ground-Water/LNAPL Remedial Technologies

A. No Further Action

Technical Description

This technology consists of continuing to operate the on-site quarry pond water treatment system(s) to maintain PCB concentrations of less than 0.065 ppb in surface water discharged from the quarry pond and to induce the flow of surrounding ground water/LNAPL into the quarry pond. The on-site water treatment system(s) would continue to be operated at least until the PCB LNAPL observed on top of the bedrock ground-water surface is not detected in any of the existing coreholes or monitoring wells on two consecutive sampling events and the RAO of mitigating LNAPL/PCB migration has been achieved. At that time, NMPC (in cooperation with the NYSDEC) would evaluate the effectiveness and feasibility of continuing to operate the on-site water treatment system(s).

Implementability

Continued operation of the water treatment system(s) is technically feasible and easily implementable.

Effectiveness

This technology has been shown to be an effective way to maintain PCB concentrations of less than 0.065 ppb in surface water discharged off site from the quarry pond and to induce flow of surrounding ground water into the pond.

Screening Results

This technology achieves the RAOs for ground water of mitigating the potential for migration of LNAPL and PCBs from the areas where they have been observed/detected; and removing LNAPL from the bedrock ground-water surface. This technology will be retained for further evaluation.

B. Institutional Controls

Technical Description

Institutional controls are minimal actions taken to reduce the potential for exposure of impacted ground water, or to mitigate the potential for future activities to comprise the effectiveness of the selected remedy. Institutional controls may include, for example, deed restrictions to prevent usage of site ground water or to prevent off-site extraction of ground water, if extraction could present a risk to human health or the environment or impact the ground-water flow patterns at the site.

Implementability

Implementation of institutional controls associated with the site remedy is technically feasible but would be dependent on legal requirements.

Effectiveness

This technology does not involve treatment, control or removal of site ground water; therefore, this technology alone would not achieve RAOs. However, this technology could be effective when implemented in combination with other technologies.

Screening Results

This technology alone would not meet the RAOs established for ground water. This technology will, however, be retained for further evaluation in combination with other technologies.

C. LNAPL Removal by Bailing, Pumping or Skimming

Technical Description

This technology consists of periodic hand-bailing or installing pumps or skimming devices in one or more ground-water monitoring wells to collect LNAPL that has been identified in the subsurface at these locations. The collected LNAPL would be containerized and disposed of off-site in accordance with applicable regulations. LNAPL removal would continue until no LNAPL is detected in any of the existing coreholes or monitoring wells on two consecutive sampling events. At this time, NMPC (in cooperation with the NYSDEC) will begin to evaluate the effectiveness and feasibility of continuing to remove LNAPL.

Implementability

The bailing, pumping or skimming of LNAPL from ground-water wells is technically feasible and easily implementable.

Effectiveness

This technology would provide for removal of LNAPL and would mitigate the potential for migration of LNAPL and PCBs. However, recoverable LNAPL would primarily be limited to that portion which is mobile. LNAPL adhered to rock surfaces or sorbed to sediments within the fractures (as observed during RI bedrock coring activities) would generally not be recovered. Therefore, implementation of a ground-water and LNAPL monitoring program and continuation of the quarry pond water treatment program would be required.

Screening Results

Based on the results of the LNAPL Extraction Demonstration and on the characterization of LNAPL distribution within the fractured and jointed bedrock, implementation of this technology would not be expected to recover the majority of LNAPL. This technology would, however, limit the migration of LNAPL by removing LNAPL from the bedrock ground-water surface at the site. This technology will be retained for further evaluation as part of the ground-water remedy for the site.

D. Hydraulic Gradient Manipulation

Technical Description

This technology consists of pumping water or applying vacuum or air pressure to increase the gradient between an LNAPL-bearing area and a collection area, in an attempt to enhance mobilization of LNAPL toward the collection area. A description of the hydraulic manipulations implemented as part of the LNAPL Extraction Demonstration at the site is presented in Appendix A and summarized in Section 1.3.4.

Implementability

The methods of manipulating hydraulic gradient to enhance LNAPL removal are technically feasible and could be implemented at the site.

Effectiveness

The results of the LNAPL Extraction Demonstration indicated an initial slight increase in the minimal volume of LNAPL recovered (approximately 0.32 gallons) as a result of manipulating the hydraulic gradient by pumping water from the test monitoring wells. However, this increased recovery was only observed during the initiation of hydraulic manipulation; monitoring of the test monitoring wells in the months after the demonstration program indicated minimal or no measurable thickness of LNAPL at these locations. LNAPL adhered to rock surfaces or sorbed to sediments within the fractures (as observed during RI bedrock coring activities) would generally not be mobilized by hydraulic manipulation. The heterogeneous and complex subsurface conditions at the site, as well as the distribution of LNAPL within the subsurface, preclude the recovery of the majority of the LNAPL. Thus, implementation of a ground-water and LNAPL monitoring program and continuation of the quarry pond water treatment program would be required.

Screening Results

This technology would meet the RAOs of removing LNAPL from the ground-water surface and mitigating the potential for migration of LNAPL. Heterogeneous subsurface conditions and the distribution of LNAPL at the site preclude recovery of the majority of LNAPL; however, these technologies will be retained for consideration as part of the ground-water remedy for the site.

E. Hot Water or Steam Injection

Technical Description

This technology consists of injecting hot water or steam into monitoring wells or extraction wells to decrease the viscosity of the LNAPL and enhance recovery.

Implementability

The methods for injecting hot water or steam are technically feasible and could be implemented at the site. The LNAPL exposed to hot water or steam could become emulsified, requiring a physical separation process prior to treating the water in the on-site quarry pond water treatment system(s) and storing the oil for off-site incineration at an appropriate facility.

Effectiveness

This technology may provide enhanced LNAPL recovery for a short period of time, similar to the minimal increases observed during the hydraulic manipulation conducted during the LNAPL Extraction Demonstration. The steam or hot water would tend to travel along the preferential migration pathways in the bedrock fractures; by lowering LNAPL viscosity, the LNAPL could be spread to additional fractures or bedrock interstitial pore spaces and not be recovered.

Screening Results

This technology would meet the RAO of removing LNAPL from the ground-water surface, but could have an unpredictable effect on LNAPL migration. This technology will not be retained for further consideration.

F. Horizontal Extraction Wells or Extraction/Diversion Trenches

Technical Description

This technology consists of drilling horizontal bedrock wells or digging trenches into the bedrock to access LNAPL, create preferential pathways to promote controlled migration of LNAPL prior to recovery, or divert ground water prior to its entry into the site subsurface system. Flexible casings can be installed in horizontal wells, which can be perforated in place to create a screened interval in a selected subsurface location. These technologies have typically been implemented at sites characterized by homogeneous subsurface conditions, where the locations of zones bearing water or constituents of interest could be determined with relative certainty.

Implementability

Horizontal drilling techniques with sufficiently small build angle radii for implementation in shallow bedrock situations have been developed. There are specialized drilling and excavation companies that can install trenches or horizontal wells such as those that would be required to implement these technologies at the site.

Effectiveness

The overall effectiveness of this technology requires a high degree of certainty regarding subsurface conditions as well as the quantity and distribution of LNAPL. Because of the complex and heterogeneous subsurface conditions at the site, the ground-water inflow into a horizontal well or trench would be unpredictable and potentially difficult to manage. Determination of the optimum screened interval for a horizontal well installed in the heterogeneous subsurface conditions would not be possible. Also, recoverable LNAPL would primarily be limited to that portion which is mobile. LNAPL adhered to rock surfaces or sorbed to sediments within the fractures (as observed during RI bedrock coring activities) would generally not be mobilized and recovered using these technologies. Under optimum circumstances (e.g., a homogeneous subsurface), well, trench, and drain systems may remove less than 50% of the total LNAPL volume in the subsurface; and the remaining LNAPL is sufficient to result in continued ground water impacts (USEPA 1995). Thus, implementation of a ground-water and LNAPL monitoring program and continuation of the quarry pond water treatment program would be required.

Screening Results

The complex and heterogeneous subsurface conditions and the LNAPL distribution at the site indicate that the success of these technologies (i.e., horizontal extraction wells or extraction/diversion trenches) at accessing or mobilizing meaningful quantities of LNAPL would be limited. For this reason, these technologies will not be retained for further consideration.

G. Ground-Water Removal and Treatment

Technical Description

This technology would consist of the installation of one or more extraction wells from which LNAPL and/or ground-water would be collected. The collected LNAPL and/or ground-water would be separated, treated and disposed of in accordance with applicable regulations.

Implementability

The installation of extraction wells, and pumping/treatment systems is technically feasible and is a common remedial technology that could be implemented at the site.

Effectiveness

This technology could remove LNAPL present on the ground-water surface and could be used to enhance hydraulic control in the area where removal is implemented. Similar to the results of hydraulic manipulation implemented during the LNAPL Extraction Demonstration, this technology would be expected to mobilize LNAPL during the initial pumping at a location where mobile LNAPL is present. However, LNAPL adhered to rock surfaces or sorbed to sediments within the fractures (as observed during RI bedrock coring activities) would typically not be mobilized by pumping. The heterogeneous and complex subsurface conditions at the site preclude the recovery of the majority of the LNAPL. Therefore, implementation of a ground-water and LNAPL monitoring program and continuation of the quarry pond water treatment program would be required.

Screening Results

This technology would meet the RAOs of removing LNAPL from the ground-water surface and mitigating the potential for migration of LNAPL; therefore, this technology will be retained for further evaluation.

H. Quarrying and Disposing of LNAPL-Impacted Bedrock

Technical Description

This technology would consist of removing the overburden and the bedrock throughout the areas of LNAPL impact and properly disposing the material, based on visual and/or analytical characterization.

Implementability

Excavation of bedrock to depths of 20 to 30 feet over an estimated 55,000 square feet area of LNAPL-impacted bedrock, by methods such as blasting and impact hammering, could be implemented at the site. Implementation of this technology would require an extended period of time because of the large quantity of materials (approximately 60,000 cy) that would need to be removed and because of numerous ancillary concerns such as water management, segregation of impacted and non-impacted materials, removal of LNAPL from the bedrock rubble, and implementation of measures (such as noise and dust control) to protect workers and the public.

In addition, implementation of this technology would likely be cost prohibitive due to, but not limited to, the above-listed implementation issues, as well as the effectiveness issues identified below.

Effectiveness

The bedrock at the site is heterogeneous and characterized by multiple horizontal and vertical fractures and bedding planes with varying degrees of solution enlargement; ground water and LNAPL flow within the bedrock is controlled by the interconnectivity and geometry of these features. Characterizing and predicting the volume and distribution of LNAPL, or LNAPL impacted bedrock, in this system is technically impracticable, due to the lack of economical and feasible characterization technologies for defining the degree of fracture interconnectivity (USEPA 1995). Because of the characteristics of the bedrock beneath the site, through which LNAPL migration has occurred, the removal of LNAPL-impacted bedrock from the areas where LNAPL has been observed (nine monitoring well locations and the quarry pond) would not provide assurance of removal of all impacted materials. Therefore, implementation of a ground-water and LNAPL monitoring program and continuation of the quarry pond water treatment program would likely be required to confirm whether such a removal effort was successful at remediating the bedrock groundwater system at the site.

Additionally, when blasting to loosen the bedrock, there would be a possibility of opening fractures which could serve as conduits for the transport of LNAPL to areas where it does not presently exist. Blasting could also create unstable conditions which could affect buildings or roadways in the area. Water management could become a difficult problem if a major water bearing fracture, such as the fracture which originally flooded the quarry and caused quarrying operations to cease, were encountered, or if excavation were to be required to a depth below the prevailing quarry pond water surface elevation.

Screening Results

Implementation of this technology would meet the RAO of removing LNAPL from the ground-water surface; however, the implementation of this technology involves such a great number of potential hazards that the post-remediation condition of the site would be difficult to predict. Therefore, this technology will not be retained for further consideration.

I. Long-Term Ground-Water and LNAPL Monitoring

Technical Description

This technology consists of collecting monthly ground-water elevations at site monitoring wells, inspecting the wells for LNAPL and, if LNAPL is present, measuring LNAPL thicknesses in the wells. This technology also includes collecting periodic ground-water samples from select wells to document bedrock ground-water quality.

Implementability

Ground-water monitoring and sampling at monitoring well locations are common activities and could be easily implemented.

Effectiveness

This technology would not meet the RAOs for ground water and LNAPL at the site. However, this technology could be effective when implemented in combination with other technologies.

Screening Results

Although these activities do not achieve that RAOs for ground water and LNAPL at the site, they offer a means to document ground-water quality and the presence and distribution of LNAPL in the bedrock ground-water system at the site. Therefore, this technology will be retained for further evaluation with other technologies.

4.3.3 Potable Water Supply Remedial Technologies

A. No Action

Technical Description

This technology would consist of no-action with respect to providing a potable water supply to the residences and business currently utilizing the water pumped from residential water supply wells RW-1 and RW-2. The residential water treatment systems that were installed as a precautionary interim measure in January 1997 would be removed. The only action performed under this alternative would be periodic monitoring of ground water in the area of RW-1 and RW-2.

Implementability

This technology would not include implementation of any remedial actions except for ground-water monitoring; therefore, implementation of this technology is technically feasible.

Effectiveness

This technology would not address the potential for PCBs to impact the ground water pumped from residential water supply wells RW-1 and RW-2.

Screening Results

As required by the NCP, this technology will be retained for further evaluation and will be used as the baseline for comparing the overall effectiveness of the other potable water supply technologies.

B. Installation and Maintenance of Residential Water Treatment Systems

Technical Description

This technology consists of installing and maintaining two residential water treatment systems capable of removing PCBs (if present) from the ground water pumped from residential water supply wells RW-1 and RW-2. Each of these systems would consist of a depth filtration unit, two granular activated carbon units installed in series, a water softener, and an ultraviolet (UV) disinfection unit. These systems were installed at these locations as a precautionary interim measure in January 1997; therefore, implementation of this technology would consist of maintaining the systems installed.

Implementability

Residential water treatment systems are readily available. Installation and maintenance of these systems is straightforward.

Effectiveness

The installation and maintenance of residential water treatment systems meets the established RAO of providing a potable water supply. Implementation of a long-term monitoring program would be required to monitor the effectiveness of these water treatment systems.

Screening Results

This technology would provide a potable supply to the residences and business currently utilizing water pumped from residential water supply wells RW-1 and RW-2. This technology will be retained for further evaluation.

C. Extension of the Village of Cobleskill Public Water Supply

Technical Description

This technology would consist of designing, installing and pressure testing an extension of the Village of Cobleskill Public Water Supply to serve the properties using the water pumped from residential water supply wells RW-1 and RW-2.

Implementability

Implementation of this technology would be dependent upon obtaining the necessary approvals and/or permits from the Cobleskill Village Board of Supervisors, the Schoharie County Health Department, and the New York State Department of Transportation (for work done along the NYS Route 10 right-of-way).

Effectiveness

This technology would be effective at meeting the RAO of providing a potable water supply to the properties currently using the water pumped from residential water supply wells RW-1 and RW-2.

Screening Results

This technology will be retained for further evaluation.

4.4 Assembly of Remedial Technologies into Remedial Alternatives

Based on the results of the technology screening, the remedial technologies listed below were retained based on their expected implementability and effectiveness for assembly into remedial alternatives.

Soil and Sediment

- No Further Action
- Institutional Controls
- Capping
- Excavation with Off-Site Disposal
- Stabilization/Solidification

Ground Water/LNAPL

- No Further Action
- Institutional Controls

- LNAPL Removal by Bailing, Pumping or Skimming
- Hydraulic Gradient Manipulation
- Ground-Water Removal and Treatment
- Long-Term Ground-Water and LNAPL Monitoring

Potable Water Supply

- No-Action
- Installation and Maintenance of Residential Water Treatment Systems
- Extension of the Village of Cobleskill Public Water Supply

The three above-listed technologies for providing a potable water supply are analyzed in detail in Section 5. The potential remedial technologies listed above for soil and sediment, and for ground water/LNAPL have been combined as appropriate to form comprehensive remedial alternatives capable of addressing the impacted environmental media at the site. Consistent with the NCP (40 CFR 300.430), the following range of alternatives to address the impacted environmental media was developed to the extent practicable:

- The no further action alternative;
- Alternatives that remove chemicals of interest to the maximum extent possible, thereby eliminating or minimizing the need for long-term management;
- Alternatives that treat the chemicals of interest but vary in the degree of treatment employed and long-term management needed; and
- Alternatives that involve little or no treatment but provide protection of human health and the environment by preventing or minimizing exposure to the chemicals of interest through the use of containment options and/or institutional controls.

As set forth in the remedial technology screening (Section 4.3), there are no technologies currently available that are capable of removing LNAPL to the extent of effectively eliminating the need for long-term management at the site. Therefore, to address the ground water RAOs for removing LNAPL and mitigating the potential for LNAPL/PCB migration within the bedrock ground-water flow system, each comprehensive remedial alternative (with the exception of the no further action alternative) includes the three components listed below:

- Continued operation of the quarry pond water treatment system(s);
- LNAPL removal by pumping, bailing or skimming, and

- Long-term ground-water and LNAPL monitoring.

The no further action alternative involves only the continued operation of the quarry pond water treatment system(s).

The long-term presence of LNAPL in the bedrock ground-water system represents a potential continuing source for PCBs to enter the quarry pond. Thus, implementation of the removal or containment technologies identified in Section 4.3 to address the PCB impacted quarry pond sediments would not be practicable until the results of ground-water and LNAPL monitoring indicate that the PCB concentrations of water entering the quarry pond have been reduced to levels less than the NYSDEC Class GA Ground-Water Quality Standard of 0.1 ppb. Due to long-term presence of a potential continuing source of PCBs into the quarry pond, no components have been included in the comprehensive remedial alternatives to specifically address the quarry pond sediments. The continued operation of the quarry pond water treatment system(s) will, however, prevent the discharge of PCBs (at concentrations greater than 0.065 ppb) into the storm water drainage system from the quarry pond.

A total of four comprehensive remedial alternatives have been developed to address the impacted environmental media at the M. Wallace & Son, Inc. Scrapyard site. These four remedial alternatives are:

Alternative 1 - No Further Action

- Continued operation of the quarry pond water treatment system(s).

Alternative 2 - Limited Action

- Continued operation of the quarry pond water treatment system(s);
- LNAPL removal by bailing, pumping or skimming; and
- Long-term ground-water and LNAPL monitoring.

Alternative 3 - On-site Capping

- Excavation of impacted sediments from quarry pond outlet channel and storm-water drainage system and placement of these materials within the fenced portion of the site. The estimated limits of the sediments to be removed are identified in Section 3.3; Figures 3-1 and 3-2 show the estimated limits of impacted sediments within the quarry pond outlet channel and the storm water drainage system, respectively;
- Restoration of the excavated sediment areas in the quarry pond outlet channel and the storm-water drainage system;
- Installation of a low-permeability cap within the site to cover the impacted soil and sediment. The capping method and material used would be compatible, to the extent possible, with anticipated activities in the area

to be capped (e.g., a multilayer vegetative cap within the fenced portion of the site and an asphalt cap in the active scrapyard area);

- Restricted use/access in the capped areas;
- Continued operation of the quarry pond water treatment system(s);
- LNAPL removal by bailing, pumping or skimming;
- No action at this time regarding the quarry pond sediments; and
- Long-term ground-water and LNAPL monitoring.

Alternative 4 - Excavation and Off-Site Disposal

- Excavation of impacted on-site soils and off-site sediments from the quarry pond outlet channel and storm water drainage system to the limits identified in Section 3.3 and shown on Figures 3-1 and 3-2;
- Off-site disposal of excavated materials at a disposal facility capable of accepting them;
- Restoration of the excavated areas;
- Continued operation of the quarry pond water treatment system(s);
- LNAPL removal by bailing, pumping or skimming;
- No action at this time regarding the quarry pond sediments; and
- Long-term ground-water and LNAPL monitoring;

Detailed descriptions and analysis of the three potable water supply alternatives and the four comprehensive environmental media alternatives are provided in Section 5.

5. Detailed Analysis of Remedial Alternatives

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5. Detailed Analysis of Remedial Alternatives

5.1 General

This section presents information relevant to the selection of a remedial alternative. The remedial alternatives developed in Section 4 are described in detail and are evaluated with respect to the seven NCP criteria specified in the NYSDEC TAGM 4030 entitled "Selection of Remedial Actions at Inactive Hazardous Waste Sites". These criteria encompass statutory requirements and include other gauges of overall feasibility and acceptability of remedial alternatives.

The criteria by which the remedial alternatives are assessed include:

- Short-Term Effectiveness;
- Long-Term Effectiveness and Permanence;
- Reduction of Toxicity, Mobility, or Volume Through Treatment;
- Implementability;
- Compliance with SCGs;
- Overall Protection of Human Health and the Environment; and
- Cost.

Section 5.2 presents descriptions of the evaluation criteria used in the detailed analysis of the remedial alternatives.

5.2 Description of Evaluation Criteria

5.2.1 Short-Term Effectiveness

The short-term effectiveness of the remedial alternative is evaluated relative to its effect on human health and the environment during implementation of the alternative. The evaluation of each alternative with respect to its short-term effectiveness will consider the following:

- Short-term impacts to which the community may be exposed during implementation of the alternative;
- Potential impacts to workers during implementation of the remedial actions, and the effectiveness and reliability of protective measures;
- Potential environmental impacts of the remedial action and the effectiveness of mitigative measures to be used during implementation; and
- Amount of time until protection is achieved.

5.2.2 Long-Term Effectiveness and Permanence

The evaluation of each remedial alternative relative to its long-term effectiveness and permanence is made by considering the risks that may remain following completion of the remedial alternative. The following factors will be assessed in the evaluation of the alternatives' long-term effectiveness and permanence:

- Environmental impacts from untreated waste or treatment residuals remaining at the completion of the remedial alternative;
- The adequacy and reliability of controls (if any) that will be used to manage treatment residuals or remaining untreated waste; and
- The alternative's ability to meet RAOs established for the site (Section 3).

5.2.3 Reduction of Toxicity, Mobility, or Volume Through Treatment

This evaluation criterion addresses the degree to which remedial actions will permanently and significantly reduce the toxicity, mobility, or volume of the chemical constituents present in site media through treatment. The evaluation focuses on the following factors:

- The treatment process and the amount of materials to be treated;
- The anticipated ability of the treatment process to reduce the toxicity, mobility, or volume of chemical constituents of interest;
- The nature and quantity of treatment residuals that will remain after treatment;
- The relative amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled; and
- The degree to which the treatment is irreversible.

5.2.4 Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing the remedial alternative, including the availability of the various services and materials required for implementation. The following factors are considered during the implementability evaluation:

- ***Technical Feasibility*** - This factor refers to the relative ease of implementing or completing the remedial alternative based on site-specific constraints. In addition, the remedial alternative's constructability and operational reliability are considered, as well as the ability to monitor the effectiveness of the remedial alternative.

- *Administrative Feasibility* - This factor refers to the feasibility of acquiring, and the time required to obtain any necessary approvals and permits.

5.2.5 Compliance with SCGs

This evaluation criterion evaluates the remedial alternative's ability to comply with SCGs. The following items are considered during the evaluation of the remedial alternative:

- Compliance with chemical-specific SCGs;

- Compliance with location-specific SCGs; and

- Compliance with action-specific SCGs.

This evaluation criterion also addresses whether or not the remedial alternative would be in compliance with other appropriate federal and state criteria, advisories, and guidance (TBCs).

5.2.6 Overall Protection of Human Health and the Environment

This evaluation of the remedial alternative addresses whether the alternative provides adequate protection of human health and the environment. This evaluation relies on the assessments conducted for other evaluation criteria, including long-term and short-term effectiveness, and compliance with SCGs.

5.2.7 Cost

This criterion refers to the total cost to implement the remedial alternative. The total cost of each alternative represents the sum of the direct capital costs (materials, equipment, and labor), indirect capital costs (engineering, licenses or permits, and the contingency allowances), and operation and maintenance (O&M) costs. O&M may include operating labor, energy, chemicals, and sampling and analysis. These costs, which are developed to allow the comparison of the remedial alternatives, are estimated with expected accuracies of -30 to +50 percent, in accordance with USEPA's "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA." A 20 percent contingency factor is included to cover unforeseen costs incurred during implementation. Present worth costs are calculated for alternatives expected to last more than two years. In accordance with USEPA guidance (OSWER Directive 9355.2-01), a 7 percent discount rate (before taxes and after inflation) is used to determine the present worth factor.

5.3 Detailed Analysis of Remedial Alternatives

This section presents the detailed analysis of each remedial alternative identified in Section 4. Each alternative is evaluated against the seven NCP criteria described in Section 5.2. A detailed analysis of the alternatives for providing a potable water supply to the residents located immediately west of the active scrapyard area is presented below, followed by a detailed analysis of the alternatives to address the impacted environmental media (soil, sediment, and ground water/LNAPL).

5.3.1 Alternatives For Providing Potable Water

The following paragraphs present a detailed analysis of the alternatives for providing a potable water supply to the properties located immediately west of the active scrapyard area (the properties presently served by residential water supply wells RW-1 and RW-2). As presented in Section 1, activated carbon water treatment systems were installed in January 1997 as a NYSDEC-approved precautionary interim measure to treat the water pumped from these two wells. The detailed analysis presented below includes:

- No Action - an analysis of conditions which would exist in the absence of any action to provide potable water;

- Installation and Maintenance of Residential Water Treatment Systems - an analysis of the installation and long-term maintenance of the two activated carbon water treatment systems; and

- Extension of the Village of Cobleskill Public Water Supply - an analysis of the installation of a public water line extension to serve the residences/businesses presently served by RW-1 and RW-2.

5.3.1.1 Potable Water Alternative 1 - No Action

Technical Description

The no-action alternative serves as the baseline for comparison of the overall effectiveness of the other remedial alternatives. The no-action alternative would not involve the implementation of any remedial activities to provide potable water to the residences/businesses located immediately west of the active scrapyard area, that are currently utilizing water pumped from residential water supply wells RW-1 and RW-2 as their water supply source. These two water supply wells are located in proximity to monitoring well C-22 (see Figure 1-4), where ground-water samples (unfiltered) have been collected that contain concentrations of PCBs in excess of the NYSDEC Class GA Ground-Water Quality Standard of 0.1 ppb.

Under this alternative, the residences and businesses utilizing residential water supply wells RW-1 and RW-2 would obtain their water from these wells and no effort would be made to change the untreated conditions. Because residential water treatment systems were installed at RW-1 and RW-2 as a precautionary interim measure in January 1997, implementation of the no-action alternative would require removing these systems. The only remedial action that would be performed as part of this alternative would be the implementation of a periodic ground-water monitoring program to document ground-water quality in the area of these two wells. The actual scope and frequency of this monitoring program would be determined in conjunction with the NYSDEC and the NYSDOH.

Short-Term Effectiveness

Because no actions would be implemented under this alternative, and no chemicals of interest have been detected in residential well water samples collected, there would be no short-term impacts posed to the community. However, the detections of PCBs at monitoring well C-22, located between the site and the residential wells RW-1 and RW-2, indicates the potential for PCBs to be present in these residential wells.

Long-Term Effectiveness and Permanence

Although a long-term ground-water monitoring program would be implemented, the potential would exist under this alternative for PCBs to be intermittently present in the residential water supply wells RW-1 and RW-2, and therefore not be detected during the monitoring program. As a result, this alternative may not meet the RAO of providing potable water for the residents and businesses currently utilizing the water pumped from wells RW-1 and RW-2.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Under the no-action alternative, potentially impacted ground water would not be treated, recycled, or destroyed. Therefore, the toxicity, mobility, and volume of PCBs (if present) would not be reduced.

Implementability

The no-action alternative does not require the implementation of any remedial activities. Therefore, this alternative is technically feasible and could be implemented.

Compliance with SCGs

- *Chemical-Specific SCGs*

  Chemical-specific SCGs that apply to this alternative are associated with site ground water. These SCGs include the New York State Class GA Ground-Water Quality Standards (6NYCRR Parts 700-705), which identify acceptable chemical constituent levels in ground water. This alternative does not mitigate the potential for PCBs to be present in the water pumped from RW-1 and RW-2 at concentrations in excess of the Class GA Ground-Water Quality Standard (0.1 ppb).

- *Location-Specific SCGs*

  No location-specific SCGs were identified for this alternative.

- *Action-Specific SCGs*

  The following SCGs have been identified for the implementation of ground-water monitoring activities associated with this alternative:

  a. Occupational Safety and Health Administration (OSHA) - General Industry Standards (29 CFR 1910), which include personal protection and training requirements for workers at hazardous waste sites;

  b. OSHA - Safety and Health Standards (29 CFR 1926), which include safety procedures for work activities performed at hazardous waste sites; and

c. OSHA - Recordkeeping, Reporting and Related Regulations (29 CFR 1904).

The periodic ground-water monitoring activities can be conducted in compliance with these SCGs.

Overall Protection of Human Health and the Environment

Because this alternative does not include any actions to address the potential for PCBs to impact the ground water pumped from RW-1 and RW-2 and used as a potable water supply, this alternative would not meet the RAO of providing potable water to these residences/businesses.

Cost

There are no capital costs associated with this alternative. The operation and maintenance (O&M) costs associated with this alternative are associated with conducting a periodic ground-water monitoring program. The estimated annual cost of O&M for this alternative is $3,000 and includes conducting semi-annual ground-water sampling at residential water supply wells RW-1 and RW-2. The ground-water samples collected would be analyzed for PCBs, in accordance with NYSDEC 1991 ASP. Due to the estimated implementation period of this alternative (greater than 30 years), the costs associated with this alternative were subjected to a present worth analysis for a 30-year time period. The estimated present worth cost of this alternative, including a 20% contingency factor, is $44,700.

5.3.1.2 Potable Water Alternative 2 - Installation and Maintenance of Residential Water Treatment Systems

Technical Description

This alternative involves the installation and maintenance of residential water treatment systems capable of removing PCBs from the ground water prior to the use of this water as a potable water supply. In January 1997, NYSDEC-approved activated carbon water treatment systems were installed as a precautionary interim measure to serve the two residential water supply wells (RW-1 and RW-2 shown on Figure 1-4) located closest to monitoring well C-22. These systems, installed in accordance with NYSDEC-approved plans (presented in a December 6, 1996 letter to Mr. Daniel Lightsey, P.E. of the NYSDEC from Mr. James F. Morgan of NMPC), include the following components:

- Depth filtration for particulate removal to 10 microns;
- Two granular activated carbon (GAC) filter canisters, installed in series, capable of removing PCBs;
- UV disinfection; and
- Water softening as required for operation of the UV disinfection system.

This alternative includes the activities and costs associated with purchasing, installing and maintaining these systems and for periodic monitoring of the systems, over a 30 year period. Another component of this alternative would be the implementation of institutional controls to preclude the installation of additional water supply wells at the properties served by the residential water treatment systems, except as replacement wells for RW-1 or RW-2.

Short-Term Effectiveness

The installation of these systems does not present a risk of environmental impacts or impacts to workers during installation and start-up because the systems were installed as a precautionary measure, at a time when there have been no detections of PCBs in the area. In the future, if PCBs were removed from the ground water by these systems, the potential would exist for worker or environmental exposure to PCBs during system maintenance activities (e.g., depth filter or carbon filter rebeddings). The risks posed by such exposure would be mitigated by instituting a Work Plan (including a Health and Safety Plan [HASP]) that would specify:

- Worker personal protective equipment (PPE) and protocols for handling materials;
- Transportation of waste materials by a properly licensed waste transporter; and
- Disposal of waste materials at a properly licensed disposal facility.

Long-Term Effectiveness and Permanence

Implementing this alternative would protect the people who use the ground water from residential water supply wells RW-1 and RW-2 as a potable water supply. Institutional controls to preclude the installation of water supply wells at the properties served by the systems would mitigate use of area ground water for potable purposes. As stated above, a Work Plan (including a HASP) would be required to mitigate risks posed by exposure to PCBs present (if any) in bedding materials removed during system maintenance by specifying worker PPE and waste material handling/disposal requirements.

Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative would effectively treat the ground water used by the residences/businesses served by the treatment systems. This alternative presents an irreversible process, because impacted materials (spent bedding materials) would be permanently removed.

Implementability

GAC water treatment systems are readily available and the installation of these systems is easily implemented. In January 1997, NYSDEC-approved activated carbon water treatment systems were installed as a precautionary interim measure to serve the two residential water supply wells (RW-1 and RW-2 shown on Figure 1-4) located closest to monitoring well C-22. These systems were installed in accordance with

NYSDEC-approved plans (presented in a December 6, 1996 letter to Mr. Daniel Lightsey, P.E. of the NYSDEC from Mr. James F. Morgan of NMPC).

Compliance with SCGs

- *Chemical-Specific SCGs*

  Chemical-specific SCGs identified for this alternative include NYSDEC Class GA Ground-Water Quality Standards (6NYCRR Parts 700-705). Monitoring of the water treatment systems would be conducted to confirm that the PCB concentrations in the treated water do not exceed the NYSDEC Class GA Ground-Water Quality Standard. Additional SCGs that could apply to the collection, storage, and disposal of spent bedding materials are the TSCA regulations outlined in 40 CFR 761, which regulate the handling, storage, and disposal requirements for materials containing PCBs at concentrations in excess of 50 ppm.

- *Location-Specific SCGs*

  There are no location-specific SCGs that have been identified which would pertain to this alternative.

- *Action-Specific SCGs*

  Action-specific SCGs that apply to this alternative include health and safety requirements associated with excavation, handling, and grading the impacted soils or sediments. Workers and worker activities associated with implementation of this alternative must comply with OSHA requirements for training, safety equipment, procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904.

  In addition, New York State regulations pertaining to identifying, listing, and managing hazardous wastes (contained in 6NYCRR Parts 370 and 371), and TSCA regulations pertaining to materials containing PCBs at concentrations greater than 50 ppm, may also apply. Compliance with these SCGs would be accomplished by adhering to a NYSDEC-approved Remedial Design/Remedial Action (RD/RA) Work Plan and site-specific HASP.

Overall Protection of Human Health and the Environment

The installation, maintenance and monitoring of residential water treatment systems would achieve the RAO of providing a potable water supply to residences and businesses currently served by residential water supply wells RW-1 and RW-2, located in the area immediately west of the active scrapyard area.

Cost

The capital costs associated with this alternative include the capital costs associated with the purchase, installation and start-up of the two activated carbon residential water treatment systems. The present worth cost has been calculated assuming all maintenance and monitoring activities will be continued for a period of thirty years. The estimated present worth of this alternative is approximately $190,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-1.

5.3.1.3 Potable Water Alternative 3 - Extension of the Village of Cobleskill Public Water Supply

Technical Description

This alternative would consist of designing, installing, and testing an extension of the Village of Cobleskill Public Water Supply to serve the properties located immediately west of the active scrapyard area (i.e., the properties served by RW-1 and RW-2). Potential points from which to extend the village system exist both north and south of NY State Route 10 approximately 1000 feet east of the properties; the choice of routes for the extension would depend on a pre-design economic analysis and environmental impact evaluation (i.e., evaluate potential impacts associated with extending the water line near the M. Wallace and Son, Inc. leachfield located in the southwest corner of the property, near the intersection of West Street and NY Route 10).

The materials and construction of the water line extension would be specified in accordance with American Water Works Association Standards and the design would need to be approved by the Village Board of Supervisors, the Schoharie County Health Department, and the New York State Department of Transportation (work done within the Route 10 right-of-way). Obtaining Village and Health Department approval is not expected to be difficult, because the current village water use rate (based on information obtained in January 1997) is less than 50% of the village water treatment plant's potential. Following installation of the water lines and backfilling of the excavated trenches, the disturbed areas would be restored to pre-excavation grade and condition.

Another component of this alternative would be the implementation of institutional controls to preclude the use of existing water supply wells or the installation of additional water supply wells at the properties served by the public water line extension (the properties currently being served by RW-1 and RW-2).

Short-Term Effectiveness

The implementation of this alternative would not be expected to pose any risk associated with exposure to chemicals of interest because the activities will be conducted in areas where no site-related chemicals of interest would be expected to be encountered.

Long-Term Effectiveness and Permanence

Implementation of this alternative would result in the provision of a potable water supply to the properties now being served by residential water supply wells RW-1 and RW-2, and would provide institutional controls to mitigate the use of ground water in the area.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Implementation of this alternative would not provide treatment to reduce the toxicity, mobility, or volume of impacted materials. However, the implementation of this alternative does provide a potable water supply to the properties and implementation of institutional controls would mitigate the use of ground-water in the areas near RW-1 and RW-2.

Implementability

Installation of subsurface water supply lines, and connecting these lines to both residences and an existing water supply system, is a common technology which can be easily implemented. Prior to implementation, approvals/permits would be required from the Village Board of Supervisors, the Schoharie County Health Department, and the New York State Department of Transportation (for work done within the Route 10 right-of-way).

Compliance with SCGs

- *Chemical-Specific SCGs*

  There are no chemical-specific SCGs that have been identified which would pertain to the installation of the public water line extension.

- *Location-Specific SCGs*

  Location-specific SCGs that have been identified which would pertain to the water line extension are the aforementioned approvals which would have to be received prior to construction activities. The Village Board of Supervisors, Schoharie County Health Department, and NYSDOT would be consulted (as necessary) during the design process to mitigate delays or problems with obtaining these approvals.

- *Action-Specific SCGs*

  Action-specific SCGs that apply to this alternative include general health and safety requirements associated with excavation, handling, and grading activities. Workers and worker activities associated with implementation of this alternative must comply with OSHA requirements for training, safety equipment, procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904.

  In addition, American Water Works Association Standards would be followed during the design of the water line extension.

Overall Protection of Human Health and the Environment

This alternative provides overall protection of human health and the environment by providing a potable water supply for the properties now served by residential water supply wells RW-1 and RW-2 and by mitigating use of the ground water in the area.

Cost

The estimated capital costs associated with designing, installing, and testing the Village of Cobleskill public water supply extension to the properties immediately west of the active scrapyard area are $160,000. There are no O&M costs associated with the water line extension. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-2.

5.3.2 Alternatives for Addressing Impacted Environmental Media

The following paragraphs present a detailed analysis of the alternatives listed below for addressing the impacted environmental media (soil, sediment, ground water/LNAPL) at the site.

- Alternative 1 - No Further Action
- Alternative 2 - Limited Action
- Alternative 3 - On-Site Capping
- Alternative 4 - Excavation and Off-Site Disposal

As set forth in Section 4.4, each of the above-listed alternatives include the continued operation of the quarry pond water treatment system(s). Alternatives 2, 3, and 4 also include LNAPL removal by pumping, bailing or skimming, and long-term ground-water and LNAPL monitoring.

A detailed description and analysis of these common components, as well as the alternative-specific components, follows for the alternatives developed to address the impacted environmental media.

5.3.2.1 Alternative 1 - No Further Action

Technical Description

The no further action alternative serves as the baseline for comparison of the overall effectiveness of the other remedial alternatives. The no further action alternative would not involve the implementation of any remedial activities to address the chemicals of interest present in the soils and sediments at the site. The site would be allowed to remain in its current condition and no effort would be made to change the current site conditions or uses. The no further action alternative would, however, include the continued operation of the quarry pond water treatment system(s) to prevent the discharge into the storm water drainage system of PCBs at concentrations in excess of 65 ppt and to induce the flow of impacted ground water into the quarry pond.

Short-Term Effectiveness

No short term environmental impacts or risks would be posed to the community by continuing to operate the quarry pond water treatment system(s). As described in Section 1.3.1, the quarry pond water treatment system has been operating since December 1992. The permanent 100 gpm system is equipped with contingency measures including secondary containment and high building water level automatic shut-off to mitigate risk of public exposure to untreated water. The temporary 300 gpm water treatment system upgrade is staffed by trained personnel during all periods of operation.

Long-Term Effectiveness and Permanence

Under the no further action alternative, the chemicals of interest present in the soils and sediments would not be addressed. As a result, this alternative would not meet the RAOs identified for soils and sediments at the site. With regard to ground water, continued operation of the quarry pond water treatment system(s) mitigates the potential for the migration of PCBs beyond areas where they have been observed. In addition, this alternative would result in the removal of LNAPL in ground-water which has been induced into the quarry pond, however, LNAPL present on the ground-water surface within the bedrock beneath the site would not be actively removed. Therefore, this alternative may not meet the ground-water RAOs for the site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Under the no further action alternative, impacted soils and sediments would not be treated, recycled, or destroyed. Therefore, the toxicity, mobility, and volume of the chemicals of interest present in these impacted soil and sediment at the site would not be actively reduced. The mobility and volume of PCBs present in the quarry pond water would be reduced by treating this water to remove PCBs prior to its discharge into the storm water drainage system. Furthermore, operation of the quarry pond water treatment system(s) and the resulting reduction in the quarry pond water level would induce ground-water (and potentially LNAPL) flow towards the quarry pond. Implementation of this alternative would not actively reduce the volume of LNAPL present on the ground-water surface within the bedrock beneath the site.

Implementability

The no further action alternative does not include the implementation of any remedial activities except continued operation of the quarry pond water treatment system(s). Therefore, this alternative is technically feasible and could be implemented at the site.

Compliance with SCGs

- *Chemical-Specific SCGs*

  Chemical-specific SCGs that apply to this alternative are associated with site ground water and surface water within the storm water drainage system. These SCGs include the New York State Ground-Water and Surface Water Quality Standards (6NYCRR Parts 700-705), which identify acceptable chemical constituent levels in ground water and surface water. Operation of the quarry pond water treatment system(s) would prevent discharge into the storm water drainage system of PCBs from the quarry pond at concentrations greater than 65 ppt. However, this alternative does not actively address LNAPL present on the ground-water surface in bedrock beneath the site, therefore compliance with ground-water SCGs may not be attained.

- *Location-Specific SCGs*

  No location-specific SCGs for this alternative have been identified.

- *Action-Specific SCGs*

  The following SCGs have been identified for the continued operation of the quarry pond water treatment system(s):

  a. Occupational Safety and Health Administration (OSHA) - General Industry standards (29 CFR 1910), which includes respiratory protection and training requirements for workers at hazardous waste sites;

  b. OSHA - Safety and Health Standards (29 CFR 1926), which includes safety procedures for work activities performed at hazardous waste sites;

  c. OSHA - Recordkeeping, Reporting and Related Regulations (29 CFR 1904).

  The water treatment system operation activities would be conducted in compliance with these SCGs, as appropriate.

Overall Protection of Human Health and the Environment

This alternative would not meet the site-specific RAOs established for impacted soils and off-site sediments; and may not meet the RAOs established for ground water. The no further action alternative would not address the off-site areas of impacted sediment: the quarry pond outlet channel and the one location in the storm water drainage system (see Figure 3-2). This alternative does not actively address the removal of the LNAPL observed on the ground-water surface in bedrock beneath the site. In addition, this alternative does not address the potential for migration of the chemicals of interest present in the surface and subsurface soils, which may impact ground-water quality beneath the site or locations downgradient from the site. Therefore, the no further action alternative would not provide protection of human health and the environment.

Cost

The estimated capital cost associated with this alternative is $225,000 for the purchase of the permanent 100 gpm water treatment system. The operation and maintenance (O&M) costs associated with this alternative are associated with continuing water treatment system(s) operation and monitoring. The estimated annual O&M cost for this alternative is approximately $225,000. Due to the implementation period of this alternative (greater than 30 years), the cost associated with this alternative were subjected to present worth analysis for a 30-year time period. The estimated present worth cost of this alternative is $3,000,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-3.

5.3.2.2 Alternative 2 - Limited Action

Technical Description

The limited action alternative would not involve the implementation of any remedial activities to address the chemicals of interest present in the impacted soils or off-site sediments. The site would be allowed to remain in its current condition and no effort would be made to change the current site conditions. Actions performed as part of this alternative are listed below.

- Continued operation of the quarry pond water treatment system(s) to prevent the discharge into the storm water drainage system of PCBs at concentrations in excess of 65 ppt and to induce the flow of impacted ground water into the quarry pond. The on-site water treatment system(s) would continue to be operated at least until the PCB LNAPL observed on top of the bedrock ground-water surface is not detected in any of the existing coreholes or monitoring wells on two consecutive sampling events and the RAO of mitigating LNAPL/PCB migration has been achieved. At that time, NMPC (in cooperation with the NYSDEC) would evaluate the effectiveness and feasibility of continuing to operate the on-site water treatment system(s).

- Continued implementation of the LNAPL collection and monitoring program to remove the LNAPL observed on the ground water surface in on-site monitoring wells. This alternative includes utilizing automatic product only skimmer pumps in select site wells, as opposed to the bailing of LNAPL which has been conducted as part of the ongoing IRM at the site. For FS cost estimating purposes, it has been assumed that a 6-inch recovery well will be installed at the locations of bedrock coreholes C-4 and C-3/MW-8. Determination of whether to install the recovery wells and the location and depth of the installation (if any), will be based on analysis of ground-water/LNAPL data collected during the bi-weekly LNAPL monitoring conducted as an ongoing IRM since being initiated in June 1993. This analysis will be conducted during pre-design activities and in conjunction with the NYSDEC.

- Implementation of a monthly LNAPL/ground-water monitoring program and a semiannual ground water sampling program to document ground water quality and the distribution of observed LNAPL.

Short-Term Effectiveness

No short-term environmental impacts or risks would be posed to the community by continuing to operate the quarry pond water treatment system(s) or implementing a LNAPL collection and monitoring program. As described in Section 1.3.1, the quarry pond water treatment system has been operating since December 1992. The permanent 100 gpm system is equipped with contingency measures including secondary containment and high building water level automatic shut-off to mitigate risk of public exposure to untreated water. The temporary 300 gpm system upgrade is staffed by trained personnel during all periods of operation.

The LNAPL collection system would be installed on skid-mounted pallets and would have secondary containment and automatic float actuated pump shutoffs installed in the collection drums to mitigate the possibility of exposure to LNAPL. The workers would be required to wear appropriate protective clothing and gloves when handling LNAPL.

Long-Term Effectiveness and Permanence

Under the limited action alternative, the chemicals of interest present in the soils and sediments would not be addressed. As a result, this alternative would not meet the RAOs identified for soils and sediments for the site. With regard to ground water, continued operation of the quarry pond water treatment system(s) meets the site ground-water RAO of mitigating the potential for migration of LNAPL and PCBs beyond areas where they have been observed. Collection of LNAPL meets the RAO of removing the LNAPL present on the ground water surface within the bedrock beneath the site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Under the limited action alternative, impacted soils and sediments would not be treated, recycled, or destroyed. Therefore, the toxicity, mobility, and volume of the chemicals of interest present in these impacted media at the site would not be actively reduced. The mobility and volume of PCBs present in the quarry pond water would be reduced by treating this water to remove PCBs prior to its discharge into the storm-water drainage system. Furthermore, operation of the quarry pond water treatment system(s) and the resulting reduction in the quarry pond water level would induce ground-water flow towards the quarry pond and reduce the mobility of LNAPL in the area to the north and west of the quarry pond. Collection of LNAPL would decrease the volume of LNAPL present in the bedrock.

Implementability

The limited action alternative does not include the implementation of any remedial activities except continued operation of the quarry pond water treatment system(s), implementation of the LNAPL collection/monitoring program and implementation of a ground-water monitoring program. These activities would be easily accomplished. Therefore, this alternative is technically feasible and could be implemented at the site.

Compliance with SCGs

- *Chemical-Specific SCGs*

  Chemical-specific SCGs that apply to this alternative are associated with site ground water and surface water within the storm water drainage system. These SCGs include the New York State Ground-Water and Surface Water Quality Standards (6NYCRR Parts 700-705), which identify acceptable chemical constituent levels in ground water and surface water. Operation of the quarry pond water treatment system(s) would prevent discharge into the storm water drainage system of PCBs from the quarry pond at concentrations greater than 65 ppt. Removal of the LNAPL would facilitate remediation of the ground water, however due to presence of LNAPL in the heterogeneous fractured and jointed bedrock beneath the site, ground water restoration (i.e., compliance with SCGs) would be technically impracticable. Additional SCGs that would apply to the collection, storage, and disposal of LNAPL are the TSCA regulations outlined in 40 CFR 761, which regulate the handling, storage, and disposal requirements for materials containing PCBs at concentrations in excess of 50 ppm. Procedures instituted during the IRMs to comply with these regulations would be continued during the remediation.

- *Location-Specific SCGs*

  No location-specific SCGs for this alternative have been identified.

- *Action-Specific SCGs*

  The following SCGs have been identified for the continued operation of the quarry pond water treatment system(s), for implementation of the LNAPL monitoring/removal activities, and for implementation of a ground water monitoring program:

  a. OSHA - General Industry Standards (29 CFR 1910), which include respiratory protection and training requirements for workers at hazardous waste sites;

  b. OSHA - Safety and Health Standards (29 CFR 1926), which include safety procedures for work activities performed at hazardous waste sites; and

  c. OSHA - Recordkeeping, Reporting and Related Regulations (29 CFR 1904).

The water treatment system operation, LNAPL removal, and periodic ground-water monitoring activities would be conducted in compliance with these SCGs, as appropriate.

In addition, New York State regulations pertaining to identifying, listing, and managing hazardous wastes (contained in 6NYCRR Parts 370 and 371), and TSCA regulations pertaining to materials containing PCBs at concentrations greater than 50 ppm, may also apply. Compliance with these SCGs would be accomplished by adhering to a NYSDEC-approved Remedial Design/Remedial Action (RD/RA) Work Plan and site-specific HASP.

Overall Protection of Human Health and the Environment

This alternative would not meet the RAOs established for the impacted soil and off-site sediment. In addition, this alternative does not address the potential for migration of the chemicals of interest present in the surface and subsurface soils, which may impact ground-water quality beneath the site and/or locations downgradient from the site.

Cost

The estimated capital cost associated with this alternative is approximately $255,000 which includes the purchase of the permanent 100 gpm water treatment system and installation of a LNAPL collection system. The O&M costs associated with this alternative are associated with continuing water treatment system operation and monitoring, as well as conducting a periodic ground-water monitoring program and a LNAPL monitoring/removal program. The estimated annual O&M for this alternative is approximately $240,000. This cost includes conducting semi-annual ground-water sampling at up to five existing monitoring wells and analyzing the samples for PCBs. Also included are costs for disposing up to 30 gallons of LNAPL every two years at an off-site incineration facility permitted to accept this material. Due to the implementation period of this alternative (greater than 30 years), the costs associated with this alternative were subjected to a present worth analysis for a 30-year time period. The estimated present worth cost of this alternative is $3,200,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-4.

5.3.2.3 Alternative 3 - On-Site Capping

Technical Description

This alternative involves the construction of low permeability caps over the following site areas:

- The upper portion of the site. This cap, consisting of a multilayer vegetated barrier, would cover the upper portion of the site, inside the boundary fence Figure 5-1 shows the estimated areas of the site to be capped under this alternative; and

- The active scrapyard area, as well as the area between the active scrapyard and the quarry pond (see Figure 5-1). The cap over this area would consist of a bituminous asphalt barrier.

Installation of caps in the aforementioned areas would mitigate both the potential exposure of humans and wildlife to the underlying impacted materials and the potential migration via overland transport of these materials. Different types of caps would be used in these two areas because of the anticipated different uses for the two areas. Access to the upper portion of the site is expected to remain restricted in the future due to the continued operation of the water treatment system(s). Activities in the upper portion of the site would be limited to periodic cap maintenance or ground-water monitoring activities. If the scrapyard remains in operation in the present active scrapyard area, an asphalt cap over that area would provide a barrier capable of withstanding the heavy traffic associated with this use. Restricted use/access in the areas covered with the multi-layer cap and the asphalt cap would be required for this alternative to remain effective and reliable.

Capping of these areas would be part of an overall remedial plan which would include the same components described under the Limited Action Alternative: continued operation of the quarry pond water treatment system(s), LNAPL removal and monitoring, and long-term ground-water monitoring (see Section 5.3.2.2). Provided below is a description of the activities that would be implemented to address the impacted soil and sediment.

Multi-Layered Vegetative Cap

After clearing, grubbing and rough grading the area to be capped, soils and sediments from the following areas would be excavated and distributed within the area to be capped:

- Sediments to a depth of 12 inches or refusal (if less than 12 inches of sediment exist) from the quarry pond outlet channel and one location within the storm water drainage system (shown on Figures 3-1 and 3-2). Erosion control measures would be implemented in these areas and would remain in place until post-remedial revegetation of these areas is complete; and

- Soil piles presently located in the northwestern corner of the site (this soil has been stock-piled on site since excavation for the water treatment building in 1994);

- Impacted on-site surface soils from the area north and east of the quarry pond that will not be capped (see Figure 5-1). Cap construction in this area would be limited by proximity to steep and potentially unstable bedrock ledges near the quarry pond.

For FS cost estimating purposes, the construction of an interceptor trench along the northern (upgrade) edge of the cap has been included. The purpose of the trench would be to direct surface water flowing down the hill (from above the site) towards the ditch along the east side of West Street. Costs have also been included for deepening this ditch and installing culverts under access roads, as this ditch has been observed to be unable to contain storm water flow from areas north of the site during heavy precipitation events. A drainage trench along the southern (downgrade) edge of the cap has also been included to direct surface runoff from the capped area towards the quarry pond. The actual measures implemented to address surface water management associated with construction of the caps would be evaluated and designed during the RD/RA phase of the project.

The excavated soil and off-site sediments to be placed within the capped area (approximately 800 cy) would be distributed in the area to be capped and graded to a uniform slope. At present, the slope in this area varies from less than 2% to approximately 8%. Grading to a uniform slope would decrease the potential for unacceptable erosion or sliding along the interfaces of the cap layers. The capped area would cover approximately 3 acres (see Figure 5-1) and would consist of a multilayered barrier as follows:

- A low-permeability soil barrier layer spread and compacted to a total depth of at least 24 inches;

- A low-permeability geomembrane with overlying protective geotextile. The geomembrane and geotextile layers would be installed to run in the uphill to down hill direction to reduce seam stress;

- A drainage layer of coarse, granular material overlain by permeable protective geotextile;

- A six-inch layer of fill and a six-inch layer of topsoil, lightly compacted; and

- Vegetative cover.

Asphalt Cap

In the active scrapyard area, as well as in the area between the active scrapyard and the quarry pond, a bituminous asphalt cap consisting of approximately two inches of binder, and one inch of sealant would be installed over the compacted gravel surface. The scrap piles in the active scrapyard areas north of Elm Street (NY Route 10) would be need to be removed and the stone present in the area would need to be graded, amended as required, and compacted to provide a uniform six-inch layer. Prior to installing the asphalt cap, the existing culvert which conveys storm water under West Street to the drainage ditch on the west side of West Street would be extended up the east side of the street to accommodate the water from above the site conveyed by the interceptor trench upgrade of the vegetated cap. The asphalt cap would cover all areas of the active scrapyard not inside an existing structure, and the area between the active scrapyard and the quarry pond (see Figure 5-1). Surface drainage of the asphalt capped areas would be provided by grading towards the culvert inlets and installing additional subsurface drains to the off-site storm water drainage system, as needed. As previously discussed, the actual measures implemented to address surface water management associated with construction of the caps would be evaluated and designed during the RD/RA phase of the project.

Short-Term Effectiveness

Dust may be generated during excavation, materials handling, or surface preparation activities associated with installation of the caps. A site-specific Health and Safety Plan (HASP) would be developed during the remedial design which would identify acceptable dust levels necessary to protect workers and the community from exposure, via inhalation, ingestion, or dermal contact, to chemicals of interest which may be present in the materials. An air monitoring plan would be instituted during implementation of the remedial alternative. Detection of dust at levels in excess of acceptable levels would indicate the need for additional measures to protect workers and the community from exposure. These additional measures could include, but may not be limited to:

- The use of personal protective equipment (PPE);

- The use of dust suppressants (e.g., water sprays); and

- Modifying the rate of construction.

Long-Term Effectiveness and Permanence

Implementing this alternative would meet the RAOs established for environmental media. The caps would reduce the mobility (via overland transport and leaching through the subsurface) of the chemicals of interest and would mitigate direct exposure to these materials. Long-term cap maintenance and restricted use in the areas covered with the multi-layer cap and the asphalt cap would be required for this alternative to remain effective and reliable.

This alternative would be instituted along with measures identified under the limited action alternative to address the ground water RAOs for the site (i.e.,continued operation of the quarry pond water treatment system(s), removal of LNAPL, and implementation of a ground-water/LNAPL monitoring program).

Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative does not involve treatment of impacted soils or sediments to reduce the toxicity, mobility, or volume of the chemicals of interest present in these media. LNAPL recovery and off-site disposal and quarry pond water treatment, presently being performed as site IRMs, would be continued during this alternative to reduce the volume of chemicals of interest in the ground water and the surface water discharged from the quarry pond.

Implementability

Excavation of impacted off-site sediments and soils for placement under the multi-layer, vegetated cap, as well as construction of both the vegetated cap and the asphalt cap, are technically feasible and could be implemented in less than one year. The equipment and materials required to construct these caps are readily available. No special permits would be required to conduct this work.

Compliance with SCGs

- *Chemical-Specific SCGs*

  The chemical-specific SCGs identified for this alternative include the clean-up objectives for PCBs and metals in subsurface soils, as set forth in the NYSDEC TAGM 4046. Verification sampling of on-site areas from which excavated materials were placed under the cap may be required prior to renovation of these areas. Additional SCGs that would apply to the collection, storage, and disposal of LNAPL are the TSCA regulations outlined in 40 CFR 761, which regulate the handling, storage, and disposal requirements for materials containing PCBs at concentrations in excess of 50 ppm. Procedures instituted during the IRMs to comply with these regulations would be continued during the remediation. Finally, attaining NYSDEC Class GA Ground-Water Quality Standards (6NYCRR Parts 700-705) is a RAO for ground water at the site; therefore, a long-term monitoring program would be implemented to monitor LNAPL and ground-water quality.

- *Location-Specific SCGs*

  There are no location-specific SCGs that have been identified which would pertain to excavation or capping activities at the site.

- *Action-Specific SCGs*

  Action-specific SCGs that apply to this alternative include health and safety requirements associated with excavation, handling, and grading the impacted soils or sediments. Workers and worker activities that occur during implementation of this alternative must comply with OSHA requirements for training, safety equipment, procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904.

  In addition, New York State regulations pertaining to identifying, listing, and managing hazardous wastes (contained in 6NYCRR Parts 370 and 371), and TSCA regulations pertaining to materials containing PCBs at concentrations greater than 50 ppm, may also apply. Compliance with these SCGs would be accomplished by adhering to a NYSDEC-approved RD/RA Work Plan and site-specific HASP.

Overall Protection of Human Health and the Environment

The installation of a multi-layer vegetated cap and an asphalt cap, would reduce the mobility of the chemicals of interest, as well as limit the potential for humans and wildlife to contact these materials. In addition, the removal and placement under the cap of impacted sediments from the quarry pond outlet channel and the storm water drainage system, as well as impacted materials from on-site areas south of the capped area, would achieve the RAOs established for these materials. Finally, continued operation of the quarry pond water treatment system(s), along with LNAPL removal from site monitoring wells, would meet the ground water RAOs.

Cost

The estimated capital costs associated with the on-site capping alternative is approximately $1,455,000. Capital costs include site preparation, excavation of impacted sediments and soils and placement of these materials in the area to be capped, cap construction, and restoration of excavated areas. Future site maintenance and monitoring activities would include costs associated with operation of the quarry pond water treatment system(s), cap maintenance, ground-water monitoring and LNAPL monitoring and removal. Annual O&M costs for this alternative are estimated to be approximately $250,000. The present worth cost has been calculated assuming maintenance and monitoring activities will be continued for a period of thirty years. The estimated present worth of this alternative is approximately $4,600,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-5.

5.3.2.4 Alternative 4 - Excavation and Off-Site Disposal

Technical Description

This alternative would consist of excavating the impacted surface soils, subsurface soils, and sediments and disposing of these materials off-site. The limits of these impacted materials were discussed in Section 3 and are shown on Figures 3-1 and 3-2. Prior to transporting the materials off-site, representative samples could be collected for analysis to determine whether the materials meet the criteria for classification as a hazardous waste. If the materials are characterized as a hazardous waste (i.e., if they contain PCBs at a concentration exceeding 50 ppm and/or they exhibit the hazardous characteristic of toxicity for metals), they would be disposed at a TSCA- and/or RCRA-permitted landfill; otherwise, they could be disposed at a municipal landfill capable of accepting the material. The final disposition of the impacted materials will be in compliance with applicable rules and regulations and would be determined based on a number of considerations including the results and economic feasibility of characterization soil sampling and analysis and disposal requirements of the candidate landfill(s).

Excavation of the impacted materials would generally be implemented using conventional construction equipment, such as bulldozers, trackhoes, dump trucks, etc. In areas where bedrock occurs at or near the surface, a rotary brush (similar to a street sweeper) and a power vacuum could be used to loosen and collect impacted materials near the surface which could not be picked up by a hoe or bucket. None of the materials designated for excavation occur below the water table, therefore dewatering and other water management issues would not be anticipated. However, erosion and sedimentation controls (e.g., hay bales and/or silt fences) would be required for excavations in steep on-site areas and in the sediment excavation areas in the quarry pond outlet channel and storm water drainage system.

Excavation and off-site disposal would be implemented as part of an overall remediation which would include the activities identified under the limited action alternative to address the site ground-water RAOs. These activities, which include continued operation of the quarry pond water treatment, LNAPL collection, and ground-water monitoring, were outlined in Section 5.3.2.2.

Soil verification sampling of on-site areas would be necessary to confirm that the PCB concentration of materials remaining after excavation is not greater than 10 ppm and that metals concentrations meet the NYSDEC cleanup goals. Verification sampling frequency and procedures would be defined as part of the remedial design process to be reviewed and approved by the NYSDEC.

Sediments excavated from the quarry pond outlet channel and the one location from the storm water drainage system (see Figure 3-2) would likely be loaded directly onto trailers for off-site disposal. The depth of sediment excavation in these areas will be 12 inches or to refusal if less than 12 inches of sediment exist. Site soils could be stockpiled in a bermed, HDPE-lined soil staging area and subsequently loaded into trailers for off-site disposal at an appropriate facility. Final disposition of the impacted materials would be determined based on a number of considerations including the results and economic feasibility of characterization soil sampling and analysis and disposal requirements of candidate landfill(s). Staged soils would be covered with polyethylene sheeting during inactive periods. The soil staging area would be sloped so that precipitation that falls on the staging area would flow to a collection sump. From the collection sump, this water could be conveyed to the quarry pond where it could be treated in the quarry pond water treatment system(s) prior to discharge.

Restoration methods at each excavated area would be dictated by the anticipated future uses of the area. The majority of the upper portion of the site would be backfilled to original grade, graded, lightly compacted, and seeded. The higher traffic areas in the lower portion of the site, including the active scrapyard area, would be backfilled, graded, compacted, and covered appropriately (e.g., a permeable geotextile and approximately six inches of crushed stone). Subsurface drainage would be installed to convey excess surface runoff towards either the quarry pond or the storm water drainage ditch along West Street, as appropriate. Temporary erosion and sedimentation controls would remain in place until restoration measures are complete.

Short-Term Effectiveness

Dust may be generated during excavation, materials handling, or site preparation activities associated with this remedial alternative. A site-specific HASP would be developed during the remedial design which would identify acceptable dust levels necessary to protect workers and the community from exposure, via inhalation, ingestion, or dermal contact, to chemicals of interest which may be present in the materials. An air monitoring plan would be instituted during implementation of the remedial alternative. Detection of dust at levels in excess of acceptable levels would indicate the need for additional measures to protect workers and the community from exposure. These additional measures could include, but may not be limited to:

- The worker's use of PPE;
- The use of dust suppressants (e.g., water sprays); and
- Modifying the rate of construction.

Long-Term Effectiveness and Permanence

Implementation of this alternative would result in off-site disposal of the impacted media and would thus achieve the RAOs established for soil and off-site sediments. This alternative would be part of an overall remediation which would include measures to address the ground water RAOs for the site (e.g., continued operation of the quarry pond water treatment system(s), LNAPL removal from site monitoring wells, and long-term monitoring of ground-water quality). These measures provide a means to meet the RAOs for ground water.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Implementation of this alternative would not provide treatment to reduce the toxicity, mobility, or volume of the impacted materials. However, the implementation of this alternative does provide an essentially irreversible process, physical removal from the site, which reduces the toxicity, mobility, and volume of chemicals of interest which have been identified in site media. LNAPL recovery and quarry pond water treatment, presently being performed as site IRMs, would be continued during this alternative, reducing the volume of PCBs in the ground water and the surface water discharged from the quarry pond.

Implementability

Excavation and off-site disposal are common technologies which use readily available equipment and could be implemented within a reasonable time frame at the site.

Compliance with SCGs

- *Chemical-Specific SCGs*

  The chemical-specific SCGs identified for this alternative include the 10 ppm clean-up objective for PCBs and the cleanup objectives for individual metals in subsurface soils set forth in the NYSDEC TAGM 4046. Verification sampling of on-site areas from which excavated materials were removed would be required prior to renovation of these areas. The RCRA-regulated levels for TCLP constituents, outlined in 40 CFR 261, are a set of numerical criteria by which solid waste is determined to be hazardous by the characteristic of toxicity. Additionally, SCGs that would apply to the collection, storage, and disposal of materials containing PCBs at concentrations in excess of 50 ppm are the TSCA regulations outlined in 40 CFR 761. Sampling procedures would be instituted as part of the remedial design to comply with applicable RCRA or TSCA regulations during the remediation. Finally, attaining NYSDEC Class GA Ground-Water Quality Standards (6NYCRR Parts 700-705) is a RAO for ground water at the site; therefore, a long-term monitoring program would be implemented to monitor LNAPL and ground water quality.

- *Location-Specific SCGs*

  There are no location-specific SCGs that have been identified which would pertain to excavation or materials handling activities at the site.

- *Action-Specific SCGs*

  Action-specific SCGs that apply to this alternative include health and safety requirements associated with excavation, handling, and grading the impacted soils or sediments. Workers and worker activities that occur during implementation of this alternative must comply with OSHA requirements for training, safety equipment, procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904.

  In addition, New York State regulations pertaining to identifying, listing, and managing hazardous wastes (contained in 6NYCRR Parts 370 and 371), and TSCA regulations pertaining to materials containing PCBs at concentrations greater than 50 ppm, may also apply. Compliance with these SCGs would be accomplished by adhering to a NYSDEC-approved Remedial Design/Remedial Action (RD/RA) Work Plan and site-specific HASP.

The RCRA, TSCA, and United States Department of transportation (USDOT) requirements for the packaging, labeling, transportation and disposal of hazardous or regulated materials may also be applicable to this alternative. Compliance with these SCGs will be achieved by using a licensed hazardous waste transporter and a properly permitted disposal facility.

Overall Protection of Human Health and the Environment

The excavation and off-site disposal of impacted soils and off-site sediments would meet the RAOs for these materials. Along with the measures included to address the ground-water RAOs, this alternative provides overall protection of human health and the environment.

Cost

The estimated capital cost associated with this alternative is approximately $5,815,000. Capital costs include site preparation, excavation and handling of impacted sediments and soils, transportation and off-site disposal, and restoration of excavated areas. Future site maintenance and monitoring activities would include costs associated with operation of the quarry pond water treatment system, ground-water monitoring and LNAPL monitoring and removal. Annual O&M costs for this alternative are estimated to be approximately $240,000. The present worth cost has been calculated assuming maintenance and monitoring activities will be continued for a period of thirty years. The estimated present worth of this alternative is approximately $8,800,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-6.

6. Comparative Analysis of Remedial Alternatives

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

6. Comparative Analysis of Remedial Alternatives

6.1 Comparative Analysis

This section presents the comparative analysis of the two sets of remedial alternatives developed to meet the RAOs established for the site:

- Alternatives to provide a potable water supply to the residences/businesses currently served by residential wells RW-1 and RW-2; and

- Alternatives developed to address the impacted environmental media associated with the M. Wallace & Son, Inc. Scrapyard site.

The comparative analysis for each of these sets of alternatives was completed using the seven NCP criteria identified in Section 5. The comparative analysis identifies the advantages and disadvantages of alternatives within a set to highlight the differences. The results of the comparative analysis for each set of alternatives were used as the basis for recommending a remedial alternative to provide a potable water supply and a remedial alternative to address the impacted environmental media.

The results of the comparative analysis of the alternatives for providing potable water is presented below, followed by the results for the comparative analysis of the alternatives for addressing the impacted environmental media.

6.2 Comparative Analysis of Alternatives for Providing Potable Water

Three alternatives for providing potable water to the properties currently using residential water supply wells RW-1 and RW-2 their water supply sources were developed and analyzed in detail in Section 5. These alternatives include:

- Alternative 1 - No-Action;

- Alternative 2 - Installation and Maintenance of Residential Water Treatment Systems; and

- Alternative 3 - Extension of the Village of Cobleskill Public Water Supply.

A comparative analysis of these three alternatives is provided below, as well as the selection of the recommended alternative for providing potable water.

<u>**Short-Term Effectiveness**</u>

There would be no short term impacts associated with implementation of the no-action alternative because this alternative only involves removing the activated carbon water treatment systems installed in January 1997 as a precautionary interim measure to serve the two residential water supply wells RW-1 and RW-2. Potential short term impacts associated with maintaining these residential water treatment systems currently in-place may include exposure to PCBs (if present) during maintenance activities (e.g., replacing depth filter bedding material). The potential for exposure to PCBs (if present) would be mitigated through the use of protective equipment, as appropriate. To date, PCBs have not been detected in any of the ground-water samples collected from residential water supply wells RW-1 and RW-2. Short-term impacts associated with extension of the Village of Cobleskill Public Water Supply Line would be expected to be related to performing construction activities along traffic routes; these impacts would be mitigated by implementation of a traffic control plan.

Long-Term Effectiveness and Permanence

Only the no-action alternative would not meet the RAO of providing a potable water supply to the residences/ businesses currently utilizing the water pumped from residential water supply wells RW-1 and RW-2. In order for Potable Water Supply Alternative 2 to remain effective over the long term, maintenance, monitoring, and sampling of the activated carbon water treatment systems would be required. Alternative 3, Extension of the Village of Cobleskill Public Water Supply would be effective over the long term.

Reduction of Toxicity, Mobility or Volume Through Treatment

No site-related chemicals of interest have been detected in the ground-water samples collected from residential water supply wells RW-1 and RW-2. Alternative 1 (no-action) does not include any remedial actions and therefore, would not meet this criteria. Potable Water Supply Alternative 2 (installation and maintenance of residential water treatment systems) would treat the water pumped from these two residential well and remove PCBs, if present. Alternative 3 would not meet this criteria, but would provide an alternate and public water supply source for the businesses/residences utilizing the water pumped from wells RW-1 and RW-2.

Implementability

All three of the potable water supply alternatives are technically feasible and could be implemented.

Compliance with SCGs

All of the potable water supply alternatives would be designed and implemented to comply with action-specific SCGs.

Overall Protection of Human Health and the Environment

All of the potable water supply alternatives, except the no-action alternative, provide protection of human health and meet the RAO of providing a potable water supply to the residences/businesses utilizing wells RW-1 and RW-2.

Cost

A summary of the present worth cost for each of the potable water supply alternatives is presented below (detailed cost estimates for Potable Water Supply Alternatives 2 and 3 are provided in Tables 5-1 and 5-2, respectively):

Potable Water Supply Alternative	Estimated Total Present Worth Cost of the Alternative
Alternative 1 - No Action	$44,700
Alternative 2 - Installation and Maintenance of Residential Water Treatment Systems	$190,000
Alternative 3 - Extension of the Village of Cobleskill Public Water Supply	$160,000

Recommendation

Based on the comparative analysis, extension of the Village of Cobleskill public water supply (Potable Water Supply Alternative 3) is the most effective remedial alternative capable of meeting the RAO of providing a potable water supply to the residences/businesses utilizing residential water supply wells RW-1 and RW-2.

6.3 Comparative Analysis of Alternatives for Addressing Impacted Environmental Media

Four comprehensive remedial alternatives for addressing impacted environmental media were developed and analyzed in detail in Section 5. These alternatives are as follows:

- Alternative 1 - No Further Action;
- Alternative 2 - Limited Action;
- Alternative 3 - On-Site Capping; and
- Alternative 4 - Excavation and Off-Site Disposal.

A comparative analysis of these four alternatives is provided below, as well as the selection of the recommended alternative for addressing the impacted environmental media associated with the M. Wallace & Son, Inc. Scrapyard site.

Short-Term Effectiveness

Each of the other impacted environmental media alternatives involve removal/monitoring of LNAPL and continued operation of the quarry pond water treatment system(s). All of the impacted environmental media alternatives (except for the no further action alternative) also involve the removal and monitoring of LNAPL. Short-term risks to on-site workers that may associated with these activities would be mitigated by using protective equipment, as appropriate.

On-site capping (Impacted Environmental Media Alternative 3) and excavation and off-site disposal (Impacted Environmental Media Alternative 4) involve excavation and handling of impacted soils and sediments;

however, the excavation activities that would be implemented under Alternative 4 are much more extensive and present a higher potential for short term risks to on-site workers and the community during implementation. A greater number of mitigative measures would need to be implemented to control potential short-term environmental impacts to ambient air quality associated with off-site dust migration during the implementation of Alternative 4 - Excavation and Off-Site Disposal.

Long-Term Effectiveness and Permanence

The no further action alternative would reduce the quarry pond level and induce ground-water flow (and potentially LNAPL flow) towards the quarry pond. However, the no further action alternative does not actively reduce the volume of LNAPL present on the ground-water surface within the bedrock beneath the site, and therefore may not meet the ground-water RAOs established for the site. All of the remaining impacted environmental media alternatives include implementation of the following three components to meet the ground-water RAOs established for the site:

- Continued operation of the quarry pond water treatment system(s);
- LNAPL removal by pumping, bailing or skimming, and
- Long-term ground-water and LNAPL monitoring.

The no further action and limited action alternatives would not meet the RAOs established for impacted soils and off-site sediments because these alternatives do not include any provisions to address these impacted media. The remaining two alternatives, on-site capping and excavation and off-site disposal, would meet the RAOs established for the impacted soils and off-site sediments.

Reduction of Toxicity, Mobility or Volume Through Treatment

All of the alternatives, would reduce the volume of PCBs in ground water through continued operation of the quarry pond water treatment system(s). Alternatives 2, 3, and 4 would also reduce the volume of LNAPL present in the bedrock ground-water system through implementation of the LNAPL removal program. In addition, Alternative 3 would reduce the mobility of chemical of interest in soils and off-site sediment by mitigating the migration of these constituents; Alternative 4 reduces the volume of these constituents by removing them from the site.

Implementability

All four of the impacted environmental media alternatives are technically feasible and could be implemented.

Compliance with SCGs

All of the impacted environmental media alternatives would be designed and implemented to comply with action-specific SCGs.

Overall Protection of Human Health and the Environment

All of the impacted environmental media alternatives, provide protection of human health and the environment with respect to impacted ground water. Implementation of the no further action and limited action alternatives would not achieve the RAOs established for impacted off-site sediments and soils. The on-site capping and off-site disposal alternatives, if implemented, would achieve all of the RAOs and would provide overall protection of human health and the environment.

Cost

A summary of the present worth cost for each of the impacted environmental media alternatives is provided below (detailed cost estimates for Impacted Environmental Media Alternatives 1, 2, 3 and 4 are provided in Tables 5-3, 5-4 and 5-5, and 5-6, respectively):

Impacted Environmental Media Alternative	Estimated Total Present Worth Cost of the Alternative
Alternative 1 - No Further Action	$3,000,000
Alternative 2 - Limited Action	$3,200,000
Alternative 3 - On-Site Capping	$4,600,000
Alternative 4 - Excavation and Off-Site Disposal	$8,800,000

Recommendation

Based on the comparative analysis of the four alternative developed to address the impacted environmental media, on-site capping (Impacted Environmental Media Alternative 3) is the most effective remedial alternative capable of meeting the RAOs established for the impacted environmental media associated with the M. Wallace & Son, Inc. Scrapyard site.

6.4 Conclusion

Based on the comparative analyses for the potable water supply alternatives and the impacted environmental media alternatives, extension of the Village of Cobleskill public water supply (Potable Water Supply Alternative 3) and on-site capping (Impacted Environmental Media Alternative 3) are the most effective remedial alternatives capable of meeting the RAOs established for the site. The total estimated present worth cost for implementation of these two alternatives is $4,760,000.

7. References

7. References

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Tables

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Table 1-1

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of LNAPL Measurements and Estimated Volumes of Bailed Product

Date	LNAPL Thickness (feet)						Approx. Volume of Water and LNAPL Removed (gallons)					
	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14
6/28/93	0.015	2	NM	NM	NM	NM	1	2	--	--	--	--
6/29/93	0.01	0.46	NM	NM	NM	NM	0.53	1	--	--	--	--
6/30/93	<0.01	NM	NM	NM	NM	NM	0.26	--	--	--	--	--
7/1/93	<0.01	NM	NM	NM	NM	NM	0.26	--	--	--	--	--
7/16/93	0.01	0.01	NM	NM	NM	NM	2	1	--	--	--	--
8/6/93	0.03	0.03	NM	1.1	NM	NM	2.5	2	--	1	--	--
8/20/93	0.02	<0.01	NM	0.66	<0.01	1.5	0.42	0.42	--	2	0.42	4
8/27/93	0.04	<0.01	NM	0.15	<0.01	0.15	0.49	0.014	--	2	0.014	4
9/3/93	0.01	0.6	NM	0.1	NM	0.06	1	2.32	--	2	--	1.5
9/8/93	0.01	0.3	NM	0.08	NM	0.1	0.5	5.02	--	1.48	--	1.48
9/17/93	0.07	0.49	NM	0.11	0.17	0.58	2	3.9	--	2	2	1.9
9/24/93	0.06	0.08	NM	0.03	0.14	0.08	0.13	0.5	--	0.35	0.35	0.13
9/30/93	0.04	0.04	NM	NM	0.10	0.04	0.13	0.13	--	--	0.5	0.25
10/7/93	0.03	0.05	NM	NM	0.06	0.25	0.5	0.13	--	--	0.13	1.25
10/15/93	0.05	0.03	NM	NM	0.02	0.13	0.13	--	--	--	0.04	0.5
10/22/93	0.02	<0.01	NM	NM	0.06	0.15	0.13	--	--	--	1	1
10/29/93	0.04	0.01	NM	NM	0.03	0.04	0.25	--	--	--	0.25	0.25
11/12/93	0.4	0.02	NM	0.01	0.03	NM	2	--	--	--	--	--
12/1/93	10.01	0.01	NM	NM	0.03	NM	10	--	--	--	--	--
12/8/93	9.02	NM	NM	NM	0.02	NM	10	--	--	--	--	--
12/28/93	0.41	NM	NM	NM	NA	NM	1.5	--	--	--	--	--
1/5/94	NA	NM	NM	NM	NA	NM	--	--	--	--	--	--
1/24/94	0.48	NM	NM	NM	NA	NM	0.6	--	--	--	--	--
1/31/94	5.52	NM	NM	NM	NA	NM	4.5	--	--	--	--	--
2/18/94	0.67	NM	NM	NM	NA	NM	2	--	--	--	--	--
3/7/94	4.18	NM	NM	NM	NA	NM	7	--	--	--	--	--

Table 1-1
(Cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of LNAPL Thickness Measurements and Estimated Volumes of Bailed Product

Date	LNAPL Thickness (feet)						Approx. Volume of Water and LNAPL Removed (gallons)					
	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14
3/21/94	2.9	NM	NM	NM	NA	NM	5	--	--	--	--	--
4/4/94	0.6	NM	0.30	NM	0.30	NM	1.5	--	0.5	--	0.5	--
4/19/94	0.3	NM	NM	NM	NM	NM	0.5	--	--	--	--	--
5/3/94	0.33	0.01	NM	NM	NM	NM	1	--	--	--	--	--
5/17/94	0.13	NM	NM	NM	NM	NM	--	--	--	--	--	--
5/31/94	2.49	NM	NM	NM	NM	NM	5	--	--	--	--	--
6/15/94	2.55	NM	0.22	NM	0.23	NM	5	--	--	--	--	--
6/29/94	1.5	NM	0.2	NM	0.25	NM	2	--	--	--	--	--
7/14/94	1.25	NM	0.22	NM	0.23	NM	2.5	--	--	--	--	--
7/29/94	2.03	NM	0.24	NM	0.23	0.05	2.5	--	--	--	--	--
8/10/94	2.14	NM	0.23	NM	0.23	0.03	3	--	--	--	--	--
8/23/94	0.88	NM	0.24	NM	0.23	NM	1	--	--	--	--	--
9/12/94	1.75	NM	0.20	NM	0.25	NM	2	--	--	--	--	--
9/20/94	0.30	NM	0.20	NM	NM	NM	--	--	--	--	--	--
10/5/94	0.25	NM	0.20	NM	0.20	0.25	--	--	--	--	--	--
10/31/94	0.45	NM	0.20	NM	0.20	0.20	0.5	--	--	--	--	--
11/18/94	1.59	NM	0.24	NM	0.30	0.26	1.5	--	--	--	--	--
12/8/94	2.08	NM	0.21	NM	0.36	NM	3	--	--	--	--	--
12/19/94	1.49	NM	0.23	NM	0.39	0.01	3	--	--	--	0.5	--
1/5/95	0.63	NM	0.22	NM	0.25	NM	1	--	--	--	--	--
1/17/95	0.34	NM	0.20	NM	0.29	NM	0.5	--	--	--	--	--
1/31/95	0.28	NM	0.29	NM	0.25	0.04	--	--	--	--	--	--
2/16/95	0.45	NM	0.22	NM	0.26	NM	1	--	--	--	--	--
3/1/95	1.04	NM	0.25	NM	0.22	NM	1	--	--	--	--	--
3/14/95	0.37	NM	0.30	NM	0.15	NM	0.5	--	--	--	--	--

Table 1-1
(Cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of LNAPL Thickness Measurements and Estimated Volumes of Bailed Product

Date	LNAPL Thickness (feet)						Approx. Volume of Water and LNAPL Removed (gallons)					
	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14
3/29/95	0.15	NM	0.26	NM	0.26	NM	--	--	--	--	--	--
4/18/95	0.31	NM	0.21	NM	0.15	NM	--	--	--	--	--	--
5/9/95	0.84	NM	0.12	NM	0.15	NM	1.0	--	--	--	--	--
5/25/95	0.41	NM	0.14	NM	0.16	NM	0.5	--	--	--	--	--
6/4/95	0.21	NM	0.11	NM	0.11	NM	--	--	--	--	--	--
6/22/95	0.27	NM	0.14	NM	0.15	NM	--	--	--	--	--	--
7/6/95	0.28	NM	0.14	NM	0.18	NM	--	--	--	--	--	--
7/20/95	1.08	NM	0.12	NM	0.15	NM	1.5	--	--	--	--	--
8/1/95	0.23	NM	0.13	NM	0.21	NM	0.5	--	--	--	--	--
8/15/95	0.17	NM	0.07	NM	0.18	NM	--	--	--	--	--	--
8/31/95	0.28	NM	0.10	NM	0.19	NM	--	--	--	--	--	--
9/13/95	0.31	NM	0.11	NM	0.18	NM	1.0	--	--	--	--	--
9/27/95	0.29	0.21	0.12	NM	0.19	NM	0.5	--	--	--	--	--
10/11/95	0.69	0.37	0.11	NM	0.23	0.06	1.0	1.0	--	--	--	--
10/25/95	1.12	0.22	0.13	NM	0.21	NM	1.5	--	--	--	--	--
11/08/95	0.38	0.19	0.16	NM	0.24	NM	1.0	--	--	--	--	--
11/21/95	0.36	0.21	0.21	NM	0.09	NM	1.0	--	--	--	--	--
12/06/95	0.17	0.21	0.17	NM	0.20	NM	--	--	--	--	--	--
12/20/95	0.17	0.18	0.20	NM	0.21	NM	--	--	--	--	--	--
01/05/96	0.15	0.20	0.18	NM	0.19	NM	--	--	--	--	--	--
*01/18/96	0.16	0.21	0.18	NM	0.11	NM	0.25	0.25	0.25	--	0.25	--
01/29/96	0.35	0.14	0.27	NM	0.13	NM	0.5	0.5	0.5	--	0.5	--
02/12/96	1.09	0.06	0.13	NM	0.09	NM	0.75	0.25	0.25	--	0.25	--
02/22/96	0.58	0.07	0.15	0.02	0.02	NM	0.5	0.25	0.25	--	--	--
03/06/96	0.48	0.02	0.05	NM	0.09	NM	0.75	--	--	--	0.25	--

Table 1-1
(Cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of LNAPL Thickness Measurements and Estimated Volumes of Bailed Product

Date	LNAPL Thickness (feet)						Approx. Volume of Water and LNAPL Removed (gallons)					
	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14
03/20/96	0.93	0.03	0.10	NM	0.08	NM	1.5	--	0.5	--	--	--
04/04/96	0.21	0.04	0.12	NM	0.04	NM	0.25	--	0.25	--	--	--
04/15/96	0.16	0.04	0.08	NM	0.01	NM	0.5	--	--	--	--	--
05/17/96	0.03	NM	0.12	NM	0.01	NM	--	--	--	--	--	--
05/29/96	0.06	0.02	0.10	NM	0.03	NM	--	--	0.25	--	--	--
06/12/96	0.95	0.01	0.13	NM	0.01	NM	1.0	--	--	--	--	--
06/27/96	0.11+	0.03	0.12	NM	NM+	NM	--	--	--	--	--	--
07/12/96	NM+	NM	0.20	NM	NM+	NM	--	--	0.5	--	--	--
08/16/96	0.03	0.01	0.05	NM	0.01	NM	--	--	--	--	--	--
08/29/96	0.01	NM	0.01	NM	NM	NM	--	--	--	--	--	--
09/10/96	0.06	NM	0.01	NM	NM	NM	--	--	--	--	--	--
09/25/96	0.08	NM	0.04	NM	NM	NM	--	--	--	--	--	--
10/16/96	0.50	NM	0.02	NM	NM	NM	0.25	--	--	--	--	--
10/30/96	0.17	NM	0.01	NM	NM	NM	--	--	--	--	--	--
11/14/96	0.43	NM	0.14	NM	NM	NM	0.25	--	--	--	--	--
11/30/96	0.30	NM	0.24	NM	NM	NM	0.25	--	0.25	--	--	--
12/11/96	0.05	0.03	0.20	0.02	0.04	0.01	--	--	--	--	--	--
12/31/96	0.01	NM	0.11	NM	0.01	NM	--	--	--	--	--	--
01/14/97	0.19	0.01	0.30	NM	0.01	NM	--	--	0.25	--	--	--
01/29/97	1.71	0.01	0.06	NM	0.02	NM	2.5	--	--	--	--	--
02/18/97	0.41	0.01	0.23	NM	NA	NM	0.25	--	0.25	--	--	--
3/6/97	0.27	NM	0.26	NM	NM	NM	0.25	--	0.25	--	--	--
3/20/97	0.41	NM	0.31	NM	0.01	NM	0.25	--	0.25	--	--	--
4/2/97	0.07	NM	0.17	NM	NM	NM	--	--	0.25	--	--	--
4/16/97	0.15	NM	0.16	NM	NM	NM	0.25	--	0.25	--	--	--

Table 1-1
(Cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of LNAPL Thickness Measurements and Estimated Volumes of Bailed Product

Date	LNAPL Thickness (feet)						Approx. Volume of Water and LNAPL Removed (gallons)					
	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14	C-3/MW-8	MW-5	C-4	C-10	C-13	C-14
5/8/97	0.38	NM	0.20	NM	NM	NM	0.75	--	0.25	--	--	--
5/20/97	1.02	NM	0.23	NM	NM	NM	0.50	--	0.25	--	--	--
6/11/97	0.85	NM	0.27	NM	NM	NM	0.75	--	0.25	--	--	--
6/24/97	0.82	NM	0.29	NM	NM	NM	0.75	--	0.25	--	--	--
7/10/97	0.76	NM	0.18	NM	NM	NM	0.50	--	0.25	--	--	--
7/22/97	0.13	NM	0.16	NM	NM	NM	0.25	--	0.25	--	--	--
8/5/97	0.17	NM	0.17	NM	NM	NM	0.25	--	0.25	--	--	--
8/21/97	0.21	NM	0.19	NM	NM	NM	0.25	--	0.25	--	--	--
9/3/97	0.28	NM	0.19	NM	NM	NM	0.25	--	0.25	--	--	--
9/19/97	0.28	NM	0.15	NM	NM	NM	0.25	--	0.25	--	--	--
9/30/97	0.19	NM	0.21	NM	NM	NM	0.25	--	0.25	--	--	--
10/17/97	0.19	NM	0.21	NM	NM	NM	0.25	--	0.25	--	--	--
10/28/97	0.23	NM	0.20	NM	NM	NM	0.25	--	0.25	--	--	--
Total (Approximate) Volume of Water and LNAPL Removed (gallons)							117.8	20.7	8.3	10.8	7.0	16.3
Total LNAPL/ Water Removed Through 12/94							88.8	18.4	0.5	10.8	5.7	16.3
Total Product Bailed as of 10/28/97 (Rounded)											180	

Notes:

1. LNAPL = Light Non-Aqueous Phase Liquid.
2. Measurements to oil and water surfaces were made with a Teflon bailer from June 28, 1993 to September 8, 1993. After September 8, 1993, measurements were made with a Keck oil/water interface probe.
3. NM = LNAPL on water surface was not measurable.
4. -- = was not bailed.
5. NA = monitoring well/corehole was not accessible.
6. * = On January 18, 1996 the field protocol for bailing LNAPL from monitoring was altered so that any measurable thickness of LNAPL which could practically be removed was bailed. Before January 18, 1996 field personnel were instructed to bail LNAPL where the thickness was greater than 0.3 feet.
7. + = Measurement was collected during LNAPL Extraction Demonstration skimming of LNAPL at this location

Table 1-2

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Post RI PCB Ground-Water Analytical Results

Sample I.D.	Total PCB Concentration (ppb)
May 9, 1996 Samples From Western Site Boundary Monitoring Wells	
C-11	52 D
C-11F	0.20
C-15	1.85
C-15F	0.23
C-16	1.38
C-16F	0.25 J
C-16D	1.33
C-16DF	0.22
C-18	0.16 J
C-18F	0.05
May 24, 1996 Samples From Western Site Boundary Monitoring Wells	
C-11	24 D
C-11F	2.3 DJ
C-15	<0.05
C-15F	<0.05
C-16	0.36 J
C-16F	0.085
C-16D	0.71 J
C-16DF	0.11
C-18	<0.05
C-18F	<0.05

Table 1-2 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Post RI PCB Ground-Water Analytical Results

Sample I.D.	Total PCB Concentration (ppb)
August 8, 1996 Samples From Off-Site Bedrock Monitoring Wells	
C-20	<0.05
C-20F	<0.05
C-21	<0.05
C-21F	<0.05
C-22	<0.05
C-22F	<0.05
C-22D	<0.05
C-22DF	<0.05
September 5 and 6, 1996 Samples From Western Site Boundary Monitoring Wells	
C-11	31 D
C-11F	0.24 J
C-11D	40 D
C-11DF	0.72 J
C-15	<0.05
C-15F	<0.05 J
C-16	0.09
C-16F	<0.05 J
C-18	<0.05
C-18F	0.05 J
September 5 and 6, 1996 Samples From Off-Site Bedrock Monitoring Wells	
C-20	<0.05
C-20F	<0.05 J

Table 1-2 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Post RI PCB Ground-Water Analytical Results

Sample I.D.	Total PCB Concentration (ppb)
September 5 and 6, 1996 Samples From Off-Site Bedrock Monitoring Wells (cont'd)	
C-21	<0.05
C-21F	<0.05 J
C-22	0.67 J
C-22F	0.08 J
December 11 and 12, 1996 Samples From On-Site Bedrock Monitoring Wells	
C-11	40 D
C-11F	0.15
C-15	<0.05
C-15F	<0.05
C-16	0.12 J
C-16F	<0.05
C-18	<0.05
C-18F	0.05
December 11 and 12, 1996 Samples From Off-Site Bedrock Monitoring Wells	
C-20	0.06
C-20F	<0.05
C-21	<0.05
C-21F	<0.05
C-22	<0.05
C-22F	<0.05
C-22D	<0.05
C-22FD	<0.05

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Post RI PCB Ground-Water Analytical Results

Sample I.D.	Total PCB Concentration (ppb)
December 23, 1996 Samples From Off-Site Bedrock Monitoring Well C-22	
C-22	<0.05
C-22D	<0.05
March 12 and 13, 1997 Samples from Western Site Boundary Monitoring Wells	
C-11	193JD
C-11F	R
C-15	<0.05
C-15F	<0.05
C-16	0.05
C-16F	R
C-18	<0.05
C-18F	R
March 12 and 13, 1997 Samples from Off-Site Bedrock Monitoring Wells	
C-20	<0.05
C-20F	R
C-21	0.12JN
C-21F	R
C-22	<0.05
C-22F	<0.05
C-22D	<0.05
C-22DF	<0.05
March 26, 1997 Samples from Off-Site Bedrock Monitoring Well C-21	
C-21	<0.05
C-21D	<0.05

Table 1-2 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Post RI PCB Ground-Water Analytical Results

Sample I.D.	Total PCB Concentration (ppb)
June 11, 1997 Samples from Off-Site Bedrock Monitoring Wells	
C-20	<0.05
C-20F	<0.05
C-21	<0.05
C-21F	<0.05
C-22	0.08
C-22D	0.13
C-22F	<0.05
C-22FD	<0.05
NYSDEC Class GA Ground-Water Quality Standard	**0.1**
USEPA Maximum Contaminant Level	**0.5**

Notes:

1. Concentrations presented in parts per billion (ppb) or micrograms per liter (μg/l).
2. < = each PCB aroclor analyzed was not detected at the listed concentration.
3. D = Concentration based on a diluted sample analysis.
4. J = Concentration or quantitation limit is estimated.
5. R = Results was rejected due to laboratory PCB contamination.
6. N = The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification.
7. Samples collected by Blasland, Bouck & Lee, Inc. and submitted to Galson Laboratories for PCB analysis using Method 8080.
8. Results presented are validated except for the August 8, 1996 results. The August 8, 1996 analyses were conducted by Galson Laboratories during a period in which the laboratory's NYSDOH certification for CLP PCB analyses was (temporarily) revoked. Therefore, these data can not be validated.
9. USEPA Maximum Contaminant Level = maximum permissible level of a contaminant in water which is delivered to any user of a public water system.
10. Sample designations include the following: C = bedrock corehole monitoring well sample; D = duplicate sample; F = filtered sample.

Table 1-3

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of PCB Analytical Results for Ground-Water Samples Collected from Residential Water Supply Wells

Sample I.D.	Total PCB Concentration (ppb)
Phase I RI Samples	
CONFIDENTIAL	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
Phase II RI Samples	
CONFIDENTIAL	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
Post- RI Samples	
May 1996	
CONFIDENTIAL	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05

Table 1-3
(Continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of PCB Analytical Results for Ground-Water Samples Collected from Residential Water Supply Wells

Sample I.D.	Total PCB Concentration (ppb)
CONFIDENTIAL	<0.05
	<0.05
June 1997	
CONFIDENTIAL	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
	<0.05
NYSDEC Ground-Water Quality Standard (Class GA) (ppb)	0.1

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. during July and August 1993 (Phase I RI); September 1994 (Phase II RI); and May 1996 and June 1997 (Post RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods.
3. < = each aroclor analyzed was not detected at the concentration presented.
4. Concentrations reported in parts per billion (ppb) or micrograms per liter (ug/l).
5. F = filtered sample.

Table 1-4

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Residential Wells Analytical Results for Detected TCL Volatile and Semi-Volatile Organic Compounds

	Phase I RI Residential Well Samples and Analytical Results (ppb)					
	CONFIDENTIAL					
Volatile Organic Compounds						
Acetone	<10	<10	<10	14 J	<12	<10
Total TICs	NTD	NTD	NTD	NTD	NTD	NTD
Semi-Volatile Organic Compounds						
Total TICs	NTD	42 JX	79 JX	8 JX	6 JX	NA
	Phase II RI Residential Well Samples and Analytical Results (ppb)					
	CONFIDENTIAL					
Volatile Organic Compounds (USEPA Method 524.2)						
Carbon Disulfide	<0.5	0.2 J	<0.5	<0.5	<0.5	<0.5
Chloroform	<10	<2	<3	<18	<2	3
m- & p-Xylene	<0.4	<0.5	<0.3	<0.2	<0.5	0.6
Naphthalene	<0.5	<0.5	1	<0.5	<0.5	<0.5
Xylene (total)	<0.6	<0.5	<0.5	<0.5	<0.5	0.9
Total TICs	NTD	NTD	NTD	NTD	NTD	NTD
Semi-Volatile Organic Compounds						
Naphthalene	<10	NA	1 J	<10	<10	NA
Carbazole	<10	NA	0.6 J	<10	<10	NA
N-nitrosodiphenylamine(1)	<10	NA	<10	<10	0.4 J	NA
Total TICs	10 NJ	NA	NTD	NTD	NTD	NA

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. during July and August 1993 (Phase I RI) and September 1994 (Phase II RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods.
3. Concentrations reported in parts per billion (ppb) or micrograms per liter (ug/l).
4. J = estimated value.
5. < = below detection limit.
6. NA = not analyzed.
7. TICs = tentatively identified compounds.
8. NTD = no TICs detected.

Table 1-4
(Continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Residential Wells Analytical Results for Detected TCL Volatile and Semi-Volatile Organic Compounds

Notes (continued):

9. X = Result was manually entered into data file due to software limitations.
10. No trip blank was provided by Aquatec when Phase I R CONFIDENTIAL collected. TB-4 is associated with the Phase I RI samp... only.
11. NJ = compound was tentatively identified at an estimated concentration.
12. Sample designations indicate the following: A = duplicate sample; TB = trip blank.

Table 1-5

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

<u>Summary of Surface Soil Analytical Results for Total PCBs</u>

Sample I.D.	Total PCB Concentration (ppm)
SS-1S	0.95 NJ
SS-2S	18.9 D
SS-3S	38.3 D
SS-4S	164
SS-5S	0.04
SS-6S	0.65
SS-7S	38.1 D
SS-8S	23.1 D
SS-9S	5.9 NJ
SS-10S	4.4 NJ
SS-11S	3.3 NJ
SS-12S	6.3 NJ
SS-13S	57.4D
SS-14S	28 D
SS-15S	28.5 D
SS-16S	7.6
SS-17S	0.24 NJ
SS-18S	2.0
SS-19S	38.2 D
SS-20S	5.1 NJ
SS-21S	31.1
SS-22S	0.48
SS-23S	52.1

Table 1-5
(Continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Total PCBs

Sample I.D.	Total PCB Concentration (ppm)
SS-24S	35.4
SS-25S	1.4
SS-25S Dup.	1.5
SS-26S	1.3
SS-27S	0.34
SS-28S	115.9
SS-29S	<0.04
SS-30S	0.04
SS-31S	<0.04
SS-32S	0.05
SS-33S	<0.04
SS-33S Dup.	<0.04
SS-34S	0.04
SS-35S	0.35
SS-36S	3.4
SS-37S	3.3
SS-37S Dup.	3.1
SS-38S	26.0
SS-39S	15.0
SS-40S	<0.02
SS-41S	<0.02
SS-42S	0.07

Table 1-5
(Continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Total PCBs

Sample I.D.	Total PCB Concentration (ppm)
SS-43S	0.03 J
SS-44S	0.02 J
SS-45S	0.02 J
SS-45S Dup.	0.01 J
SS-46S	<0.021
SS-47S	0.04 J
SS-48S	0.03 J
SS-49S	0.01 J
SS-50S	<0.022
SS-51S	0.04
SS-52S	19.0
SS-53S	2.02
SS-54S	10.3
SS-55S	11.6
SS-56S	2.8 J
SS-57S	1.6 J
SS-60	1.1
SS-61	0.57
SS-62	0.03 J
SS-62D	0.03 J
SS-63	0.02
SS-64	0.02 J

Table 1-5
(Continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Total PCBs

Sample I.D.	Total PCB Concentration (ppm)
SS-65	0.23
SS-66	0.04 J
SS-67	0.06
SS-68	0.02 J
NYSDEC-Recommended Soil Cleanup Objective	1.0

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. during May, August, and September 1993 (Phase I RI) and September 1994 (Phase II RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods.
3. Concentrations reported in parts per million (ppm) or milligrams per kilogram (mg/kg).
4. Sample designations include the following: SS = surface soil sample; S = discrete samples, and Dup = duplicate sample.
5. < = each aroclor analyzed was not detected at the concentration presented.
6. J = estimated value.
7. NJ = tentatively identified at an estimated concentration.
8. D = diluted surface soil sample analyzed.
9. NYSDEC-recommended soil cleanup objective is based on the NYSDEC Technical and Administrative Guidance Memorandum: "Determination of Soil Cleanup Objectives and Cleanup Levels" (January 1994). Concentrations above this cleanup objective are highlighted on this table.

Table 1-6

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for Total PCBs

Sample I.D.	Total PCB Concentration (ppm)
TP-1S (10-18")	<0.037
TP- 2S (6-18")	<0.036
TP-3S (2-4')	0.1
TP-4S (0-2')	0.55
TP-5S (6-18")	<0.037
TP-6S (0-2')	0.5
TP-7S (6-18")	3.6
TP-8S (0-2')	0.29
TP-9S (0-2')	0.91
TP-10S (0-2')	0.47
TP-11S (6-18")	0.16
TP-12S (6-18")	0.28 NJ
TP-13S (0-2')	15.99 DJ
TP-14S (0-2')	6.1 NJ
TP-15S (0-2')	0.07
TP-16S (6-18")	4.4
TP-17S (6-18")	<0.036
TP-18S (6-18")	<0.036
TP-19S (2-4')	13 D
TP-20S (6-18")	0.3
TP-21S (6-18")	0.84
TP-21S (6-18") Dup	0.93
TP-22S (6-18")	0.09

Table 1-6
(Continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for Total PCBs

Sample I.D.	Total PCB Concentration (ppm)
TP-23S (6-18")	0.09
TP-24S (6-18")	0.32
TP-25S (6-18")	0.23
TP-26S (6-18")	<0.037
TP-27S (6-18")	<0.036
TP-28S (0-2')	0.53 NJ
TP-28S (0-2') Dup.	0.32
TP-29S (6-18")	<0.035
TP-30S (6-18")	<0.036
TP-31S (0-2')	<0.035
TP-34S (6-18")	<0.037
TP-52S (2-3')	0.01 J
TP-53S (4-6')	0.03
TP-54S (2-4')	<0.018
TP-54S (2-4') Dup.	<0.018
TP-55S (2-4')	0.01 J
TP-55R*	<0.083
SS-60 (18-30")	<0.02
SS-60 (36-48")	<0.02
SS-61 (18-30")	1.3 J
SS-61 (36-48")	0.34

Table 1-6
(Continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for Total PCBs

Sample I.D.	Total PCB Concentration (ppm)
NYSDEC-Recommended Soil Cleanup Objective (ppm)	10

Notes:

1. Samples collected by Blasland & Bouck & Lee, Inc. in May, July, and August 1993 (Phase I RI); and September 1994 (Phase II RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods.
3. Concentrations reported in parts per million (ppm) or milligrams per kilogram (mg/kg).
4. Sample designations include the following: TP = subsurface soil sample; S = discrete samples, Dup = duplicate sample; and R = rinse blank.
5. J = estimated value.
6. NJ = tentatively identified at an estimated concentration.
7. < = each aroclor analyzed was not detected at the concentration presented.
8. * = aqueous result reported in parts per billion (ppb) or micrograms per liter (ug/l).
9. NYSDEC-recommended soil cleanup objective is based on the NYSDEC Technical and Administrative Guidance Memorandum: "Determination of Soil Cleanup Objectives and Cleanup Levels" (January 1994). Concentrations above this cleanup objective are highlighted on this table.

Table 1-7

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Detected TCL Semi-Volatile Organic Compounds

Semi-Volatile Organic Compounds	Soil Samples and Analytical Results (ppm)						
	SS-1S	SS-2S	SS-3S	SS-4S	SS-5S	SS-6S	SS-7S
Phenol	<0.44	<3.5	<2.9	<4.3	<0.44	<8.1	<0.77
2-Methylphenol	<0.44	<3.5	<2.9	<4.3	<0.44	<8.1	<0.77
4-Methylphenol	<0.44	<3.5	<2.9	<4.3	<0.44	<8.1	<0.77
1,2,4-Trichlorobenzene	<0.44	<3.5	<2.9	<4.3	<0.44	<8.1	<0.77
Naphthalene	0.19 J	1.5 J	<2.9	<4.3	<0.44	<8.1	<0.77
2-Methylnaphthalene	0.07 J	0.57 J	<2.9	<4.3	<0.44	<8.1	<0.77
Acenaphthylene	<0.44	<3.5	<2.9	<4.3	<0.44	<8.1	<0.77
Acenaphthene	0.53	4	<2.9	<4.3	<0.44	<8.1	0.15 J
Dibenzofuran	0.24 J	1.6 J	<2.9	<4.3	<0.44	<8.1	0.044 J
Fluorene	0.38 J	2.8 J	<2.9	<4.3	0.023 J	<8.1	0.12 J
Pentachlorophenol	<1.1	<8.4	<7	<10	<1.1	<20	<1.9
Phenanthrene	2.3	18	0.29 J	1.6 J	0.22 J	<8.1	0.73 J
Anthracene	0.68	4.7	<2.9	0.29 J	<0.44	<8.1	0.14 J
Carbazole	0.4 J	3.3 J	<2.9	<4.3	<0.44	<8.1	0.085 J
Di-n-Butylphthalate	<0.44	<3.5	<2.9	<4.3	<0.44	<8.1	<0.77
Fluoranthene	2.3	22	0.6 J	1.8 J	0.19 J	0.52 J	0.99
Pyrene	2	20	0.89 J	2.4 J	0.17 J	0.89 J	0.97
Benzo(a)anthracene	1.3	10	0.99 J	2.4 J	0.09 J	<8.1	0.76 J
Chrysene	1.3	10	1.1 J	2.5 J	0.1 J	<8.1	0.77 J
bis(2-ethylhexyl)phthalate	<0.44	<3.5	<2.9	<4.3	<0.44	<8.1	<0.77
Benzo(b)fluoranthene	1.2	7.5	1.7 J	3.3 J	0.086 J	<8.1	0.77 J
Benzo(k)fluoranthene	0.93	6.4	0.64 J	2.3 J	0.064 J	<8.1	0.51 J
Benzo(a)pyrene	1.1	7.5	1.2 J	2.7 J	0.074 J	<8.1	0.58 J
Indeno (1,2,3-cd) Pyrene	0.43 J	4.1	0.93 J	2.2 J	<0.44	<8.1	0.36 J
Dibenzo(a,h)anthracene	0.19 J	2.1 J	<2.9	1 J	<0.44	<8.1	0.22 J
Benzo(g,h,i)perylene	0.24 J	3 J	0.78 J	1.5 J	0.096 J	<8.1	0.24 J
Total TICs	10.6 JX	69 JX	141 JX	88.5 JX	15.9 JX	52.6 JX	24.6 JX

Table 1-7 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Detected TCL Semi-Volatile Organic Compounds

Semi-Volatile Organic Compounds	Soil Samples and Analytical Results (ppm)				
	SS-8S	SS-9S	SS-10S	SS-11S	SS-12S
Phenol	0.29 J	<0.76	<0.76	<7.6	<3.9
2-Methylphenol	0.092 J	<0.76	<0.76	<7.6	<3.9
4-Methylphenol	0.38 J	<0.76	<0.76	<7.6	<3.9
1,2,4-Trichlorobenzene	<1.6	<0.76	<0.76	<7.6	<3.9
Naphthalene	0.29 J	<0.76	<0.76	<7.6	1.1 J
2-Methylnaphthalene	<1.6	<0.76	<0.76	<7.6	0.36 J
Acenaphthylene	<1.6	<0.76	<0.76	<7.6	<3.9
Acenaphthene	0.2 J	<0.76	<0.76	<7.6	2.5 J
Dibenzofuran	<1.6	<0.76	<0.76	<7.6	1.2 J
Fluorene	0.17 J	<0.76	<0.76	<7.6	1.8 J
Pentachlorophenol	<4	<1.8	<1.8	<18	<9.4
Phenanthrene	1.7	0.13 J	0.3 J	0.72 J	19
Anthracene	0.49 J	<0.76	0.045 J	<7.6	4.5
Carbazole	0.43 J	<0.76	0.045 J	<7.6	2.4 J
Di-n-Butylphthalate	<1.6	<0.76	<0.76	<7.6	<3.9
Fluoranthene	4.1	0.33 J	0.7 J	2.4 J	22
Pyrene	3.8	0.26 J	0.75 J	2 J	18
Benzo(a)anthracene	2.6	0.16 J	0.3 J	1.5 J	8.3
Chrysene	2.3	0.17 J	0.33 J	1.4 J	7.5
bis(2-ethylhexyl)phthalate	<1.6	4.5 B	<0.76	<7.6	<3.9
Benzo(b)fluoranthene	1.9	0.21 J	0.29 J	1.8 J	5.4
Benzo(k)fluoranthene	1.9	0.17 J	0.23 J	1.5 J	5.8
Benzo(a)pyrene	2.1	0.18 J	0.25 J	1.4 J	6.2
Indeno (1,2,3-cd) Pyrene	0.97 J	0.18 J	0.19 J	1.7 J	3.1 J
Dibenzo(a,h)anthracene	0.43 J	0.081 J	0.098 J	0.61 J	1.2 J
Benzo(g,h,i)perylene	0.49 J	0.17 J	0.16 J	0.96 J	1.4 J
Total TICs	32.6 JX	10.1 JX	13.5 JX	45.8 JX	39 JX

Table 1-7 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Detected TCL Semi-Volatile Organic Compounds

Semi-Volatile Organic Compounds	Soil Samples and Analytical Results (ppm)				
	SS-13S	SS-14S	SS-15S	SS-16S	SS-17S
Phenol	<3.9	<1.5	<3.7	<3.8	<0.44
2-Methylphenol	<3.9	<1.5	<3.7	<3.8	<0.44
4-Methylphenol	<3.9	<1.5	<3.7	<3.8	<0.44
1,2,4-Trichlorobenzene	<3.9	<1.5	<3.7	<3.8	<0.44
Naphthalene	<3.9	<1.5	<3.7	<3.8	<0.44
2-Methylnaphthalene	<3.9	<1.5	<3.7	<3.8	0.029 J
Acenaphthylene	<3.9	<1.5	<3.7	<3.8	0.033 J
Acenaphthene	<3.9	<1.5	<3.7	<3.8	0.022 J
Dibenzofuran	<3.9	<1.5	<3.7	<3.8	<0.44
Fluorene	<3.9	<1.5	<3.7	<3.8	0.061 J
Pentachlorophenol	<9.4	<3.7	<8.9	<9.2	<1.1
Phenanthrene	0.6 J	0.34 J	0.97 J	0.57 J	0.72
Anthracene	<3.9	0.079 J	0.21 J	<3.8	0.096 J
Carbazole	<3.9	<1.5	0.21 J	<3.8	0.044 J
Di-n-Butylphthalate	<0.39	<1.5	<3.7	<3.8	<0.44
Fluoranthene	1.5 J	0.75 J	2.4 J	0.91 J	0.84
Pyrene	1.3 J	0.61 J	1.9 J	0.73 J	0.92
Benzo(a)anthracene	0.61 J	0.27 J	1 J	0.26 J	0.44 J
Chrysene	0.57 J	0.26 J	0.98 J	0.22 J	0.49
bis(2-ethylhexyl)phthalate	<3.9	<1.5	<3.7	<3.8	<0.44
Benzo(b)fluoranthene	0.57 J	0.28 J	0.94 J	0.26 J	0.37 J
Benzo(k)fluoranthene	0.43 J	0.23 J	0.77 J	0.19 J	0.28 J
Benzo(a)pyrene	0.43 J	0.22 J	0.81 J	0.2 J	0.35 J
Indeno(1,2,3-cd)pyrene	0.33 J	0.19 J	0.48 J	<3.8	0.18 J
Dibenzo(a,h)anthracene	<3.9	0.091 J	<3.7	<3.8	0.093 J
Benzo(g,h,i)perylene	0.26 J	0.11 J	0.24 J	<3.8	0.15 J
Total TICs	36.1 JX	20.2 JX	37.8 JX	11.4 JX	20.5 JX

Table 1-7 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Detected TCL Semi-Volatile Organic Compounds

Semi-Volatile Organic Compounds	Soil Samples and Analytical Results (ppm)					
	SS-18S	SS-19S	SS-20S	SS-21S	SS-22S	SS-23S
Phenol	<0.37	<13	<12	<29	<0.4	<0.4
2-Methylphenol	<0.37	<13	<12	<29	<0.4	<0.4
4-Methylphenol	<0.37	<13	<12	<29	<0.4	<0.4
1,2,4-Trichlorobenzene	<0.37	<13	<12	<29	<0.4	<0.4
Naphthalene	<0.37	<13	<12	<29	<0.4	<0.4
2-Methylnaphthalene	<0.37	<13	<12	<29	<0.4	<0.4
Acenaphthylene	<0.37	<13	<12	<29	<0.4	<0.4
Acenaphthene	<0.37	<13	<12	<29	<0.4	<0.4
Dibenzofuran	<0.37	<13	<12	<29	<0.4	<0.4
Fluorene	<0.37	<13	<12	<29	<0.4	<0.4
Pentachlorophenol	<0.91	<31	<30	<71	<0.96	<0.98
Phenanthrene	0.15 J	<13	<12	<29	0.044 J	0.12 J
Anthracene	0.035 J	<13	<12	<29	<0.4	<0.4
Carbazole	0.025 J	<13	<12	<29	<0.4	<0.4
Di-n-Butylphthalate	<0.37	<13	<12	<29	0.11 BJ	<0.4
Fluoranthene	0.27 J	<13	<12	<29	0.06 J	0.17 J
Pyrene	0.25 J	0.68 J	<12	<29	0.079 J	0.13 J
Benzo(a)anthracene	0.12 J	<13	<12	<29	<0.4	0.092 J
Chrysene	0.12 J	<13	<12	<29	<0.4	0.1 J
bis(2-ethylhexyl)phthalate	<0.37	<13	<12	<29	<0.4	0.13 BJ
Benzo(b)fluoranthene	0.1 J	<13	<12	<29	<0.4	0.12 J
Benzo(k)fluoranthene	0.093 J	<13	<12	<29	<0.4	0.057 J
Benzo(a)pyrene	0.12 J	<13	<12	<29	<0.4	0.072 J
Indeno(1,2,3-cd)pyrene	0.053 J	<13	<12	<29	<0.4	0.081 J
Dibenzo(a,h)anthracene	0.022 J	<13	<12	<29	<0.4	0.042 J
Benzo(g,h,i)perylene	0.11 J	<13	<12	<29	<0.4	0.064 J
Total TICs	7 JX	184.7 JX	64.7 JX	555 JX	11.3 JX	56.0 JX

Table 1-7 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Detected TCL Semi-Volatile Organic Compounds

Semi-Volatile Organic Compounds	Soil Samples and Analytical Results (ppm)				
	SS-24S	SS-25S	SS-25SD	SS-26S	SS-27S
Phenol	<0.76	<0.41	<0.41	<0.39	<0.39
2-Methylphenol	<0.76	<0.41	<0.41	<0.39	<0.39
4-Methylphenol	<0.76	<0.41	<0.41	<0.39	<0.39
1,2,4-Trichlorobenzene	0.057 J	<0.41	<0.41	<0.39	<0.39
Naphthalene	0.043 J	<0.41	<0.41	0.02 J	<0.39
2-Methylnaphthalene	<0.76	<0.41	<0.41	<0.39	<0.39
Acenaphthylene	<0.76	<0.41	<0.41	<0.39	<0.39
Acenaphthene	<0.76	<0.41	<0.41	<0.39	<0.39
Dibenzofuran	<0.76	<0.41	<0.41	<0.39	<0.39
Fluorene	<0.76	<0.41	<0.41	<0.39	<0.39
Pentachlorophenol	<1.8	<0.98	<0.98	<0.95	<0.95
Phenanthrene	0.21 J	0.047 J	0.051 J	0.12 J	0.096 J
Anthracene	<0.76	<0.41	<0.41	<0.39	<0.39
Carbazole	<0.76	<0.41	<0.41	<0.39	<0.39
Di-n-Butylphthalate	<0.76	<0.41	0.04 BJ	0.11 BJ	0.15 J
Fluoranthene	0.35 J	0.07 J	0.079 J	0.21 J	0.12 J
Pyrene	0.23 J	0.072 J	0.09 J	0.14 J	0.13 J
Benzo(a)anthracene	0.19 J	<0.41	<0.41	0.1 J	0.049 J
Chrysene	0.23 J	<0.41	<0.41	0.075 J	0.07 J
bis(2-ethylhexyl)phthalate	0.49 BJ	<0.41	<0.41	0.077 BJ	0.084 J
Benzo(b)fluoranthene	0.36 J	<0.41	<0.41	0.11 J	0.058 J
Benzo(k)fluoranthene	0.16 J	<0.41	<0.41	0.071 J	0.061 J
Benzo(a)pyrene	0.17 J	<0.41	<0.41	0.058 J	0.045 J
Indeno(1,2,3-cd)pyrene	0.2 J	<0.41	<0.41	<0.39	<0.39
Dibenzo(a,h)anthracene	0.13 J	<0.41	<0.41	<0.39	<0.39
Benzo(g,h,i)perylene	0.18 J	0.14 J	<0.41	<0.39	<0.39
Total TICs	22.6 JX	12.7 JX	14.1 JX	8.1 JX	24.7 JX

Table 1-7 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Detected TCL Semi-Volatile Organic Compounds

Semi-Volatile Organic Compounds	Soil Samples and Analytical Results (ppm)				
	SS-28S	SS-29S	SS-30S	SS-31S	SS-32S
Phenol	<2.5	<0.39	<0.38	<0.4	<0.42
2-Methylphenol	<2.5	<0.39	<0.38	<0.4	<0.42
4-Methylphenol	<2.5	<0.39	<0.38	<0.4	<0.42
1,2,4-Trichlorobenzene	<2.5	<0.39	<0.38	<0.4	<0.42
Naphthalene	<2.5	<0.39	<0.38	<0.4	<0.42
2-Methylnaphthalene	<2.5	<0.39	<0.38	<0.4	0.022 J
Acenaphthylene	<2.5	<0.39	<0.38	<0.4	0.03 J
Acenaphthene	<2.5	<0.39	<0.38	<0.4	<0.42
Dibenzofuran	<2.5	<0.39	<0.38	<0.4	<0.42
Fluorene	<2.5	<0.39	<0.38	<0.4	0.037 J
Pentachlorophenol	<6	<0.94	<0.93	<0.98	<1
Phenanthrene	<2.5	0.058 J	0.1 J	0.082 J	0.46
Anthracene	<2.5	<0.39	<0.38	<0.4	0.029 J
Carbazole	<2.5	<0.39	<0.38	<0.4	0.051 J
Di-n-Butylphthalate	<2.5	0.05 J	0.058 J	<0.4	<0.42
Fluoranthene	0.95 J	0.062 J	0.12 J	0.1 J	0.6
Pyrene	1.2 J	0.069 J	0.13 J	0.11 J	0.56
Benzo(a)anthracene	0.69 J	<0.39	0.051 J	0.041 J	0.23 J
Chrysene	0.82 J	0.044 J	0.07 J	0.058 J	0.31 J
bis(2-ethylhexyl)phthalate	2.1 J	<0.39	<0.38	0.031 J	<0.42
Benzo(b)fluoranthene	0.82 J	<0.39	0.068 J	0.088 J	0.39 J
Benzo(k)fluoranthene	0.71 J	<0.39	0.05 J	<0.4	0.17 J
Benzo(a)pyrene	0.66 J	<0.39	0.057 J	0.043 J	0.28 J
Indeno(1,2,3-cd)pyrene	0.44 J	<0.39	<0.38	0.026 J	0.15 J
Dibenzo(a,h)anthracene	<2.5	<0.39	<0.38	<0.4	0.092 J
Benzo(g,h,i)perylene	<2.5	<0.39	<0.38	0.025 J	0.12 J
Total TICs	69.6 JX	24.9 JX	26.7 JX	21.9 JX	35.3 JX

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Detected TCL Semi-Volatile Organic Compounds

Semi-Volatile Organic Compounds	Soil Samples and Analytical Results (ppm)				NYSDEC-RecommendedSoil Cleanup Objective (ppm)
	SS-33S	SS-33SD	SS-34S	SS-35S	
Phenol	<0.4	<0.38	<0.4	<0.37	0.03*
2-Methylphenol	<0.4	<0.38	<0.4	<0.37	0.10*
4-Methylphenol	<0.4	<0.38	<0.4	<0.37	0.9
1,2,4-Trichlorobenzene	<0.4	<0.38	<0.4	<0.37	3.4
Naphthalene	<0.4	<0.38	<0.4	0.047 J	13.0
2-Methylnaphthalene	<0.4	<0.38	<0.4	0.054 J	36.4
Acenaphthylene	<0.4	<0.38	<0.4	0.23 J	41
Acenaphthene	<0.4	<0.38	<0.4	0.038 J	50
Dibenzofuran	<0.4	<0.38	<0.4	0.039 J	6.2
Fluorene	<0.4	<0.38	<0.4	0.15 J	50
Pentachlorophenol	<0.96	<0.92	<0.96	<0.91	1.0*
Phenanthrene	0.036 J	0.027 J	0.066 J	1.7	50
Anthracene	<0.4	<0.38	<0.4	0.15 J	50
Carbazole	<0.4	<0.38	<0.4	0.14 J	N/A
Di-n-Butylphthalate	<0.4	<0.38	<0.4	<0.37	8.1
Fluoranthene	0.049 J	0.037 J	0.12 J	3	50
Pyrene	0.052 J	0.038 J	0.11 J	2.6	50
Benzo(a)anthracene	0.024 J	<0.38	0.047 J	1.6	0.224*
Chrysene	0.035 J	0.027 J	0.065 J	1	0.4
bis(2-ethylhexyl)phthalate	<0.4	<0.038	0.04 J	<0.37	50
Benzo(b)fluoranthene	<0.4	<0.38	0.087 J	1.9	1.1
Benzo(k)fluoranthene	<0.4	<0.38	0.034 J	0.71	1.1
Benzo(a)pyrene	<0.4	<0.38	0.044 J	0.87	0.061*
Indeno(1,2,3-cd)pyrene	<0.4	<0.38	0.028 J	0.66	3.2
Dibenzo(a,h)anthracene	<0.4	<0.38	<0.4	0.32 J	0.014*
Benzo(g,h,i)perylene	<0.4	<0.38	<0.4	0.59	50
Total TICs	12.5 JX	15.6 JX	12.9 JX	27.8 JX	N/A

Table 1-7 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for Detected TCL Semi-Volatile Organic Compounds

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. in May 1993 (Phase I RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods.
3. All concentrations are reported in parts per million (ppm) or milligrams per kilogram (mg/kg).
4. < = below detection limit.
5. J = estimated value.
6. B = analyte detected in method blank.
7. Sample designations indicate the following: SS = surface soil sample; S = discrete sample; and D = duplicate sample.
8. X = result was manually entered into data file due to software limitations.
9. * = or method detection limit.
10. NYSDEC-recommended soil clean up objective is based on the NYSDEC Technical and Administrative Guidance Memorandum: "Determination of Soil Cleanup Objectives and Cleanup Levels" (January 1994). Concentrations above this cleanup objective are highlighted on this table.
11. N/A = not available.

Table 1-8

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for Detected TCL Volatile and Semi-Volatile Organic Compounds

	Subsurface Soil Samples and Analytical Results (ppm)						
	TP-1S (10-18")	TP-4S (0-2')	TP-8S (0-2')	TP-12S (6-18")	TP-13S (0-2')	TP-14S (0-2')	TP-15S (0-2')
Volatile Organic Compounds							
Methylene Chloride	<0.012	<0.011	<0.014	<0.012	<0.012	<0.011	<0.012
Acetone	<0.012	<0.011	<0.014	<0.012	<0.012	<0.011	<0.012
Total TICs	NTD	NTD	NTD	NTD	NTD	0.032 JX	NTD
Semi-Volatile Organic Compounds							
4-Methylphenol	<0.41	<0.37	<0.44	0.024 J	<1.5	<3.9	<0.39
Fluorene	<0.41	<0.37	<0.44	<0.37	<1.5	3.9	0.039
Pentachlorophenol	0.053 J	<0.9	<1.1	<0.9	<3.7	<9.4	0.027 J
Phenanthrene	0.12 J	<0.37	0.15 J	0.063 J	0.21 J	<3.9	<0.39
Anthracene	0.025 J	<0.37	<0.44	<0.37	<1.5	<3.9	<0.39
Carbazole	<0.41	<0.37	<0.44	<0.37	<1.5	<3.9	<0.39
Di-n-Butylphthalate	<0.41	<0.37	<0.44	<0.37	<1.5	<3.9	<0.39
Fluoranthene	0.15 J	<0.37	0.16 J	0.11 J	0.29 J	<3.9	<0.39
Pyrene	0.17 J	<0.37	0.18 J	0.12 J	0.32 J	<3.9	<0.39
Benzo(a)anthracene	0.093 J	<0.37	0.081 J	0.071 J	0.2 J	<3.9	<0.39
Chrysene	0.11 J	<0.37	0.12 J	0.083 J	0.22 J	<3.9	<0.39
bis(2-ethylhexyl)phthalate	<0.41	<0.37	<0.44	<0.37	<1.5	<3.9	<0.39
Benzo(b)fluoranthene	0.11 J	<0.37	0.18 J	0.12 J	0.2 J	<3.9	<0.39
Benzo(k)fluoranthene	0.1 J	<0.37	<0.44	0.068 J	0.21 J	<3.9	<0.39
Benzo(a)pyrene	0.089 J	<0.37	0.1 J	0.082 J	0.19 J	<3.9	<0.39
Indeno (1,2,3-cd) Pyrene	0.056 J	<0.37	0.066 J	0.066 J	<1.5	<3.9	<0.39
Benzo(g,h,i)perylene	0.041 J	<0.37	0.058 J	0.049 J	<1.5	<3.9	<0.39
Total TICs	15.6 JX	10.2 JX	28.6 JX	4 JX	19 JX	231.5 JX	1.2 JX

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Table 1-8 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for Detected TCL Volatile and Semi-Volatile Organic Compounds

	Subsurface Soil Samples and Analytical Results (ppm)						
	TP-19S (2-4')	TP-22S (6-18")	TP-23S (6-18")	TP-26S (6-18"	TP-27S (6-18")	TP-28S (0-2')	TP-28SD (0-2')
Volatile Organic Compounds							
Methylene Chloride	<0.012	0.004 BJ	<0.012	<0.012	<0.011	0.002 J	0.002 J
Acetone	0.008 J	0.004 BJ	0.007 J	<0.012	0.003 J	<0.012	<0.012
Total TICs	0.036 J	0.03 JX	NTD	NTD	NTD	0.023 J	0.012 J
Semi-Volatile Organic Compounds							
4-Methylphenol	<4	<0.4	<0.39	<0.4	<0.39	<1.6	<0.4
Fluorene	<4	<0.4	<0.39	<0.4	<0.39	<1.6	<0.4
Pentachlorophenol	<9.8	<0.97	<0.94	<0.96	<0.94	<4	<0.96
Phenanthrene	<4	0.038 J	0.024 J	<0.4	<0.39	<1.6	0.03 J
Anthracene	<4	<0.4	<0.39	<0.4	<0.39	<1.6	<0.4
Carbazole	<4	<0.4	<0.39	<0.4	<0.39	<1.6	<0.4
Di-n-Butylphthalate	<4	<0.4	<0.39	<0.4	<0.39	<1.6	<0.4
Fluoranthene	<4	0.05 J	<0.39	<0.4	<0.39	<1.6	0.075 J
Pyrene	<4	0.048 J	0.022 J	<0.4	<0.39	<1.6	0.094 J
Benzo(a)anthracene	<4	0.02 J	<0.39	<0.4	<0.39	<1.6	0.043 J
Chrysene	<4	0.031 J	<0.39	<0.4	<0.39	<1.6	0.057 J
bis(2-ethylhexyl)phthalate	<4	0.051 J	0.022 J	<0.4	<0.39	<1.6	0.1 J
Benzo(b)fluoranthene	<4	0.037 J	<0.39	<0.4	<0.39	<1.6	0.051 J
Benzo(k)fluoranthene	<4	<0.4	<0.39	<0.4	<0.39	<1.6	0.037 J
Benzo(a)pyrene	<4	0.034 J	<0.39	<0.4	<0.39	<1.6	0.027 J
Indeno (1,2,3-cd) Pyrene	<4	<0.4	0.02 J	<0.4	<0.39	<1.6	<0.4
Benzo(g,h,i)perylene	<4	0.12 J	<0.39	<0.4	<0.39	<1.6	<0.4
Total TICs	322.5 JX	5 JX	1.1 JX	0.092 JX	0.078 JX	55.8 JX	10.3 JX

Table 1-8 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for Detected TCL Volatile and Semi-Volatile Organic Compounds

	Subsurface Soil Samples and Analytical Results (ppm)								NYSDEC-Recommended Soil Cleanup Objective (ppm)
	TP-30S (6-18")	TP-52S (2-3')	TP-53S (4-6')	TP-54S (2-4')	TP-54SD (2-4')	TP-55S (2-4')	TP-55R*	TB-5*	
Volatile Organic Compounds									
Methylene Chloride	0.001 J	<0.012	<0.011	<0.011	<0.01	<0.012	<10	<10	0.1
Acetone	<0.012	<0.012	<0.011	<0.01	<0.011	<0.012	<10	<10	0.2
Total TICs	NTD	NTD	NTD	NTD	NTD	NTD	NTD	NTD	N/A
Semi-Volatile Organic Compounds									
4-Methylphenol	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	0.9
Fluorene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	50
Pentachlorophenol	<0.95	<0.93	<0.93	<0.86	<0.86	<0.96	<36	NA	1.0**
Phenanthrene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	50
Anthracene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	50
Carbazole	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	N/A
Di-n-Butylphthalate	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	8.1
Fluoranthene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	50
Pyrene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	50
Benzo(a)anthracene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	0.224**
Chrysene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	0.4
bis(2-ethylhexyl)phthalate	<0.39	0.06 J	0.17 J	<0.35	<0.35	0.045 J	<14	NA	50
Benzo(b)fluoranthene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	1.1
Benzo(k)fluoranthene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	1.1
Benzo(a)pyrene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	0.061**
Indeno(1,2,3-cd)pyrene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	3.2
Benzo(g,h,i)perylene	<0.39	<0.38	<0.38	<0.35	<0.35	<0.4	<14	NA	50.0
Total TICs	0.39 JX	0.27 JX	1.6 JX	0.4 JX	1 JX	4.4 JX	NTD	NA	N/A

Table 1-8 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for Detected TCL Volatile and Semi-Volatile Organic Compounds

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. in May and August 1993 (Phase I RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods. Only detected compounds are listed on this table.
3. All concentrations are reported in parts per million (ppm) or milligrams per kilogram (mg/kg).
4. Sample designations indicate the following: TP = test pit subsurface soil location; S = discrete sample; and D = duplicate sample.
5. < = below detection limit.
6. J = estimated value.
7. B = compound was detected in method blank.
8. Sample designations indicate the following: TP = subsurface soil sample; S = discrete sample; D = duplicate sample; R = rinse blank; and TB = trip blank.
9. * = concentrations reported in micrograms per liter.
10. X = result was manually entered into data file due to software limitations.
11. TICs = tentatively identified compounds.
12. NTD = no TICs detected.
13. NA = not analyzed.
14. ** = or method detection limit.
15. NYSDEC-recommended soil cleanup objective is based on the concentrations presented in the NYSDEC Technical and Administrative Guidance Memorandum: "Determination of Soil Cleanup Objectives and Cleanup Levels" (January 1994). Concentrations above this cleanup objective are highlighted on this table.
16. N/A = not available.

Table 1-9

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for TAL Inorganic Parameters

Inorganics	Soil Samples and Analytical Results (ppm)						
	SS-1S	SS-2S	SS-3S	SS-4S	SS-5S	SS-6S	SS-7S
Aluminum	13200	12000	13400	15200	15800	11400	8400
Antimony	172 J	19.7 J	154 J	<5.6	<6	12.5 J	29.2 J
Arsenic	11.2 J	17.9 J	16.5 J	16.9 J	10.6 J	10.7 J	12.3 J
Barium	285	216	394	398	179	246	205
Beryllium	0.8 B	0.66 B	0.72 B	0.6 B	1 B	0.58 B	0.49 B
Cadmium	8	17	11.8	38.7	1.5	4.6	9.1
Calcium	15400 J	108000 J	6420 J	42700 J	5140 J	43500 J	65300 J
Chromium	98.2 J	65.4	87.1	67.5	22.2	24.1 J	69
Cobalt	13.7	11.6	17.9	13.4	13.7	9.5	11.9
Copper	317	492 J	508 J	1300 J	41 J	662 J	943 J
Iron	63500	51400	111000	94000	31300	32300	73000
Lead	851 J	614 J	970 J	5060 J	249 J	225 J	855 J
Magnesium	3940	5100	3740	4160	3700	4870	3310
Manganese	923	785	971	768	706	648	863
Mercury	0.38 J	0.59 J	0.33 J	0.66 J	0.1 J	0.26 J	1.7 J
Nickel	77.6	153 J	117 J	137	48 J	35.9	63.9 J
Potassium	1880	1800	1800	2050	2020	1320	1170
Selenium	<0.3	<0.25	<0.3	<0.24	<0.24	0.47 BJ	<0.28
Silver	0.98 BJ	<0.83	<1.1	1.6 BJ	<0.94	<0.81	<0.67
Sodium	<113	154 B	<127	305 B	<112	423 B	144 B
Thallium	<0.69	<0.58	<0.69	9.3 J	<0.55	<0.59	<0.65
Vanadium	29.6	30.7	31.3	26.1	36.4	24	41.1
Zinc	883 J	1650	1200	6750	338	1490 J	1040
Cyanide	<0.81	<0.76	<0.78	<0.78	<0.67	<0.74	<0.62

Table 1-9 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for TAL Inorganic Parameters

Inorganics	Soil Samples and Analytical Results (ppm)					
	SS-8S	SS-9S	SS-10S	SS-11S	SS-12S	SS-13S
Aluminum	15300	16000	5160	8790	10500	11100
Antimony	32.7 J	<4.5	12.2 J	16.8 J	16.1 J	26.2 J
Arsenic	13.9 J	9.7 J	12.8 J	44.2 J	12.4 J	14.8 J
Barium	277	135	155	925	165	175
Beryllium	0.78 B	0.84	0.33 B	0.48 B	0.58 B	0.66 B
Cadmium	31.4	2.8	4.3	20.9	8.9	45.7
Calcium	17900 J	23700 J	266000 J	52300 J	51600 J	40000 J
Chromium	198	22.7	27.3	51.6	47.5 J	140
Cobalt	15.2	10.7	6 B	12.2	10.3	13.4
Copper	913 J	111 J	1070 J	1350 J	732	4660 J
Iron	54600	29000	17300	43200	41800	42700
Lead	673 J	149 J	761 J	9700 J	487 J	2450 J
Magnesium	4230	4240	2970	4240	4260	3880
Manganese	832	546	884	530	716	671
Mercury	0.65 J	0.07 J	0.74 J	0.14 J	0.84 J	19.6 J
Nickel	52.1 J	35.8 J	23.1 J	73 J	50.5	60.2 J
Potassium	2230	1620	863	1090	1250	1160
Selenium	0.57 BJ	<0.23	0.25 BJ	<0.22	<0.29	<0.27
Silver	1.3 BJ	<0.72	0.68 BJ	1 BJ	0.72 BJ	2.7J
Sodium	101 B	85.7 B	162 B	133 B	126 B	112 B
Thallium	<0.54	<0.54	<0.55	<0.52	<0.67	<0.62
Vanadium	35.8	30.9	14.6	22.1	27.1	39.6
Zinc	1270	163	764	2310	625 J	1230
Cyanide	<0.63	<0.59	<0.59	<0.6	<0.71	<0.62

Table 1-9 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for TAL Inorganic Parameters

Inorganics	Soil Samples and Analytical Results (ppm)					
	SS-14S	SS-15S	SS-16S	SS-17S	SS-18S	SS-19S
Aluminum	9140	12600	12500	14000	11000	7080
Antimony	18.8 J	9.9 BJ	<6.1	6.9 BJ	8.5 J	19.7 J
Arsenic	7.5 J	9.8 J	8.1 J	10.3 J	9.3 J	8.1 J
Barium	141	148	109	251	111	169
Beryllium	0.55 B	0.76 B	0.7 B	0.73 B	0.56 B	0.46 B
Cadmium	5.2	6.2	2 J	28.3	3.2	5.6
Calcium	53600 J	23000 J	19800	5560 J	26300 J	106000 J
Chromium	29.2	54.1	17.8	39	90.2 J	29.4
Cobalt	9.2	11.9	9.9 B	11.7	11.7	7.5 B
Copper	464 J	565 J	60.1 J	133 J	1340	1130 J
Iron	31700	45200	28200	52500	53900	38400
Lead	738 J	643 J	120 J	671 J	439 J	690 J
Magnesium	3230	4260	3850	3950	4090	4280
Manganese	783	700	533	619	736	550
Mercury	0.57 J	0.44 J	0.12 J	0.45 J	0.12 J	0.82 J
Nickel	31.9 J	43.5 J	30 J	48.8 J	90.1	46.8 J
Potassium	990	1140	897 B	1550	970	981 B
Selenium	<0.25	<0.25	<0.21	<0.29	<0.2	<0.25
Silver	1.4 BJ	1.5 BJ	<0.95	0.98 BJ	<0.57	<0.86
Sodium	81.8 B	112 B	<114	<108	<67.8	149 B
Thallium	<0.57	<0.58	<0.49	<0.66	<0.45	<0.58
Vanadium	22.6	28.1	24.6	29.3	29.7	25.1
Zinc	801	732	340	936	382 J	931
Cyanide	<0.59	<0.57	<0.68	<0.8	<0.67	<0.69

Table 1-9 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for TAL Inorganic Parameters

Inorganics	Soil Sample Location and Analytical Results (ppm)					
	SS-20S	SS-21S	SS-22S	SS-23S	SS-24S	SS-25S
Aluminum	11300	14600	11100	13700	10000	13900
Antimony	13.5 J	<7.2	<4.8	<5.2	6.3 BJ	<4.3
Arsenic	8.2 J	32.3 J	10.3 J	7.4 J	8.7 J	8.7 J
Barium	358	870	102	91.8	210	105
Beryllium	0.61 B	0.69 B	0.6 B	0.6 B	0.5 B	0.69 B
Cadmium	20	68.8	3.5	2.3	7	<0.32
Calcium	3170 J	4420	38000	9780	78000	14700
Chromium	43	56.4 J	15.3 J	21.9 J	61.4 J	18.3 J
Cobalt	11.2	9.8 B	8.7 B	10.6	9.2	9.8
Copper	650 J	737 J	79.4 J	120 J	1500 J	44.7 J
Iron	35800 J	64600	26200	30200	33900	24600
Lead	2230 J	4480 J	174 J	92.6 J	1360 J	172 J
Magnesium	3430	3830	3220	4120	3650	3890
Manganese	523	317 J	502 J	519 J	678 J	618 J
Mercury	0.08 J	0.22	<0.04	0.14	0.78	0.05 B
Nickel	36.9 J	54.8	26.6	31.5	36.6	26.2
Potassium	982	1450	1330	1340	947	1940
Selenium	<0.23	<0.27	0.3 BJ	<0.31	0.26 BJ	0.31 BJ
Silver	<0.76	<1.1	<0.76	<0.81	0.65 BJ	<0.68
Sodium	<91	<136	<90.5	<96.9	99.2 B	<81.1
Thallium	<0.53	<0.61	<0.61	<0.72	<0.55	<0.63
Vanadium	23	31.7	23.8	26.4	31	28.4
Zinc	2160	2940	260	294	1680	144
Cyanide	<0.73	1.3	<0.73	<0.63	<0.58	<0.56

Table 1-9 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for TAL Inorganic Parameters

Inorganics	Soil Samples and Analytical Results (ppm)				
	SS-25SD	SS-26S	SS-27S	SS-28S	SS-29S
Aluminum	13000	14600	13400	11700	10200
Antimony	<4.1	8.4 J	<3.4	19.1 J	<5
Arsenic	8.4 J	10.7 J	9.1 J	7.8 J	7.8 J
Barium	104	218	132	262	77
Beryllium	0.68 B	0.71	0.65	0.51 B	0.56 B
Cadmium	<0.30	10.4	1.2	14.8	<0.36
Calcium	11500	3900	4010	48600	4810
Chromium	17.5 J	40.3 J	28.1 J	47 J	13.4 J
Cobalt	10.1	13	12.2	11.2	8.7 B
Copper	47.2 J	231 J	86.4 J	4740 J	29.3 J
Iron	24800	41800	42700	41800	20800
Lead	172 J	833 J	194 J	4320 J	23 J
Magnesium	3670	4010	3960	4480	2980
Manganese	643 J	806 J	603 J	540 J	644 J
Mercury	<0.05	0.05 B	<0.04	4.9	<0.04
Nickel	26.6	48.9	31	58.8	22.5
Potassium	1620	1050	1160	1130	1110
Selenium	0.26 BJ	0.26 BJ	0.28 BJ	0.27 BJ	0.27 BJ
Silver	<0.65	<0.6	<0.54	4.6 J	<0.78
Sodium	<77.7	<71.6	<64.6	117 B	<93.1
Thallium	<0.46	<0.6	<0.49	<0.57	<0.53
Vanadium	26.2	27.8	25.7	151	20.8
Zinc	143	1680	179	2360	104
Cyanide	<0.55	<0.62	<0.6	<0.57	<0.7

Table 1-9 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for TAL Inorganic Parameters

Inorganics	Soil Samples and Analytical Results (ppm)								NYSDEC-Recommended Soil Cleanup Objective (ppm)
	SS-30S	SS-31S	SS-32S	SS-33S	SS-33SD	SS-34S	SS-35S	SSMW-7S	
Aluminum	10900	9330	7150	10300	10600	13000	9320	14,800	33000 (BG)
Antimony	<4.8	<4.9	<5.7	5.7 BJ	<6.1	<5.2	8.6 BJ	8.6 BJ	0.48 (BG)
Arsenic	7.7 J	8.5 J	9.1 J	8.6 J	8.6 J	7.7 J	9 J	6.4 J	7.5
Barium	76.8	65.5	72	75.7	78.1	89.2	101	96.5	300
Beryllium	0.6 B	0.48 B	0.38 B	0.6 B	0.61 B	0.63 B	0.56 B	0.68 B	1.0 (BG)
Cadmium	<0.35	<0.36	<0.41	<0.36	<0.44	<0.38	0.42 B	0.53 B	1.0
Calcium	37900	57400	61100 J	23900	25500 J	19300	69800 J	21,400 J	4400 (BG)
Chromium	14.3 J	12.1 J	10.6	14	14.3	17.8 J	17.9	22.4	10
Cobalt	8.6 B	7.8 B	6.4 B	8.6 B	9 B	9.6 B	8.8	11.4 B	30
Copper	25.5 J	23.8 J	31 J	24.1 J	23.4 J	28.1 J	58.9 J	22.0 J	25
Iron	21900	19700	16200	21800	22200	23500	22100	29,100	2000
Lead	25	20.3	48.1	15.7	15	39.3	207 J	14.5	30 (BG)
Magnesium	3580	3140	3900	3220	3280	4140	5200	4,390	4000 (BG)
Manganese	466 J	478 J	339	513	518	526 J	494	566	500 (BG)
Mercury	0.05 B	<0.04	0.14 J	0.08 BJ	0.05 J	<0.04	0.1 J	0.08 BJ	0.1
Nickel	23.6	20.7	19.4 J	24.5 J	24.4 J	25.3	22.6 J	37.9 J	13
Potassium	1290	1050	1260	1300	1140	1660	1370	1,420	16000 (BG)
Selenium	<0.25	<0.28	<0.29	<0.27	<0.24	0.28 BJ	<0.22	<0.23	2
Silver	<0.76	<0.77	<0.89	<0.77	1 BJ	<0.83	<0.69	<1.0	N/A
Sodium	<90.3	<91.8	133 B	<91.1	<114	<98.4	120 B	<120	7000 (BG)
Thallium	<0.58	<0.65	<0.67	<0.63	<0.55	<0.63	<0.52	<0.54	N/A
Vanadium	21.7	18.8	17.6	20.4	21.6	25.8	21.1	30.1	150
Zinc	71.9	66.6	77.9	63	62.7	76.1	134	72.8	20
Cyanide	<0.7	<0.7	<0.63	<0.59	<0.56	<0.72	<0.53	<0.72	N/A

Table 1-9 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface Soil Analytical Results for TAL Inorganic Parameters

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. in May 1993 (Phase I RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP.
3. Concentrations reported in parts per million (ppm) or milligrams per kilogram (mg/kg).
4. < = below detection limit.
5. Sample designations indicate the following: SS= surface soil sample; S = discrete sample; and D = duplicate sample.
6. B = value is less than the Contract Required Detection Limit, but greater than the Instrument Detection Limit.
7. NYSDEC-recommended soil cleanup objective is based on the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046: "Determination of Soil Cleanup Objectives and Cleanup Levels" (January 1994). Where background concentrations are required under TAGM 4046, average values for eastern New York State from the United States Geological Survey Publication: "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States" (1984) are presented. Concentrations above these cleanup objectives are highlighted on this table.
8. BG = eastern New York State background concentration (see Note 7).
9. N/A = data is not available for background concentration.

Table 1-10

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for TAL Inorganic Parameters

Inorganics	Soil Samples and Analytical Results (ppm)						
	TP-1S (10-18")	TP-4S (0-2')	TP-8S (0-2')	TP-12S (6-18")	TP-13S (0-2')	TP-14S (0-2')	TP-15S (0-2')
Aluminum	16200	6900	9390	10500	16100	16700	14400
Antimony	52.6 J	7.4 BJ	129 J	9.8 BJ	<5.7	<5.8	10.7 J
Arsenic	11.3 J	6.9 J	81.8 J	8.8 J	12.8 J	10.9 J	10.3 J
Barium	187	67.3	886	104	123	170	95.6
Beryllium	0.91 B	0.39 B	0.47 B	0.58 B	0.92 B	0.97 B	0.78 B
Cadmium	1.9	1.8	47.2	3.6	0.87 B	0.96 B	<0.35
Calcium	14000 J	126000 J	15700 J	36900 J	11000 J	17500 J	4000 J
Chromium	50 J	11.4 J	97.5 J	89.2 J	22.4 J	22.3 J	18.4 J
Cobalt	12.3	5.8 B	14.2	9.3	10.1 B	11.1	10.7
Copper	80	101	6780	191	174	159	28.2
Iron	35400	18100	70400	33200	33700	31500	28700
Lead	188 J	110 J	1010 J	164 J	108 J	148 J	15.7 J
Magnesium	4220	2910	2640	4010	3910	4380	3770
Manganese	782	377	871	510	731	604	489
Mercury	0.14 J	0.05 BJ	0.28 J	0.19 J	0.83 J	0.23 J	0.07 BJ
Nickel	78.5	21.6	50.1	44.9	41.9	38.6	31.3
Potassium	2190	965	1630	1170	1390	1390	1250
Selenium	0.41 BJ	<0.18	<0.33	<0.27	<0.25	0.72 BJ	<0.25
Silver	<0.91	<0.8	1.9 BJ	<0.72	<0.89	<0.92	<0.75
Sodium	<108	103 B	<121	<86.2	<106	<109	<89
Thallium	<0.74	<0.42	<0.76	<0.62	<0.58	<0.47	<0.57
Vanadium	33.5	16.6	19.9	27.9	37.6	31.2	28.2
Zinc	261 J	242 J	1930 J	307 J	152 J	271 J	71.7 J
Cyanide	<0.74	<0.67	5.9	1.7	<0.66	<0.69	<0.72

Table 1-10 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for TAL Inorganic Parameters

Inorganics	Soil Samples and Analytical Results (ppm)						
	TP-19S (2-4')	TP-22S (6-18")	TP-23S (6-18")	TP-26S (6-18")	TP-27S (6-18")	TP-28S (0-2')	TP-28SD (0-2')
Aluminum	13600	10700	14600	23800 J	16800 J	18600 J	13000 J
Antimony	<5.9	<4.7	<4.6	<4.2	<5.4	<5.6	<6
Arsenic	15.6	9 J	12.2	11.7	7 B	7.6	6.5
Barium	98.1 J	81.6	82.2 J	233 J	107 J	131 J	112 J
Beryllium	0.88 B	0.58 B	0.81 B	1.3	0.8 B	1.1	0.68 B
Cadmium	1 B	0.66 B	<0.33	<0.31	<0.4	1.7	2.6
Calcium	7690 J	40600	1990 J	3820 J	1830 J	4080 J	3960 J
Chromium	20.4	14.2 J	18	28.2	20.5	24.6	23.1
Cobalt	11.1	8 B	10.4	17.6	14.2	12.6	10.5 B
Copper	115 J	37.4 J	42 J	40.8 J	37.6 J	123 J	1040 J
Iron	29200	22200	31900	42100	33600	36500	30400
Lead	52.7	73.2	13.7	20.4	16.5	5360 J	36600 J
Magnesium	3600	3320	4240	7380	5100	5020	3600
Manganese	420 J	472 J	472 J	482 J	481 J	566 J	684 J
Mercury	0.09 B	<0.04	0.06 B	0.06 B	<0.04	0.27	0.1 B
Nickel	49.6 J	23.4	31.2 J	42.4 J	31.4 J	38.7 J	43.8 J
Potassium	1230	1160	813 B	1420	1270	1220	995 B
Selenium	0.63 BJ	<0.24	<0.15	<0.25	<0.23	<0.31	<0.24
Silver	<0.92	<0.74	<0.72	<0.66	<0.86	6.3 J	96.8 J
Sodium	<110	<88.6	<85.7	<78.6	<102	<104	<112
Thallium	0.94 B	<0.56	<0.36	<0.58	<0.53	0.83 B	<0.55
Vanadium	39.6	22	27.5	39.1	29	34	70.6
Zinc	151 J	126	75.1 J	78.6 J	71.8 J	691 J	1250 J
Cyanide	<0.73	<0.73	<0.71	<0.72	<0.71	<0.74	<0.72

Table 1-10 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

<u>Summary of Subsurface Soil Analytical Results for TAL Inorganic Parameters</u>

Inorganics	Soil Samples and Analytical Results (ppm)								NYSDEC-Recommended Soil Cleanup Objective (ppm)
	TP-30S (6-18")	TP-52S (2-3')	TP-53S (4-6')	TP-64S (2-4')	TP-64SD (2-4')	TP-65S (2-4')	TP-56R*	TPMW-7S (2-4')	
Aluminum	11100 J	9190	6630	10800	7180	10400	<72.2	7640	33000 (BG)
Antimony	<5.4	<8.6	<7.0	<9.7	<8.9	<12.0	<49.7	<5.6	0.48 (BG)
Arsenic	5.7	7.2	7.5	9.1	7.8	8.4	<1.9	6.9 J	7.5
Barium	72.1 J	85.6	61.5	62.6	41.6	89.0	<38.5	60.1	300
Beryllium	0.56 B	0.52 B	0.36 B	0.54 B	0.36 B	0.57 B	<0.89	0.45 B	1.0 (BG)
Cadmium	<0.4	<0.48	<0.39	<0.54	<0.5	<0.67	<2.8	<0.41	1.0
Calcium	45100 J	6460	102000	36000	42400	18100	<616	113000 J	4400
Chromium	14	12.6	9.8	13.3	10.1	15.1	4.8 B	10.4	10
Cobalt	8.3 B	7.5 B	6.5 B	10.2	6.8 B	9.9 B	<5.5	6.6 B	30
Copper	21.7 J	23.1	33.8	27.5	24.9	26.2	5.0 B	17.7 J	25
Iron	23200	21300	16500	25500	17300	23500	220	14700	2000
Lead	11.6	11.3	17.2	13.4	11.3	11.1	<0.8	8.0	30 (BG)
Magnesium	3590	2780	3090	3230	2710	3560	<751	3190	4000 (BG)
Manganese	490	586	346	466	381	471	6.3 B	344	500 (BG)
Mercury	<0.02	0.07 B	<0.05	0.07 B	0.05 B	0.06 B	<0.09	0.03 BJ	0.1
Nickel	25.3 J	29.6	19.9	26.3	19.9	26.7	<7.5	17.7 J	13
Potassium	793 B	834 B	811	1220	671 B	1100 B	<743	1280	16000 (BG)
Selenium	<0.2	0.35 B	0.34 B	<0.29	<0.27	<0.36	<1.5	<0.27	2
Silver	<0.85	<0.94	<0.77	<1.1	<0.97	<1.3	<5.5	<0.87	N/A
Sodium	<102	<162	<132	<183	<167	<227	<939	147 B	7000 (BG)
Thallium	<0.47	<0.59	<0.49	<0.51	<0.47	<0.62	<2.6	<0.62	N/A
Vanadium	21.1	19.4	15.7	24.5	17.4	22.8	<6.8	17.3	150
Zinc	62.2 J	67.1	93.5	83.7	72.1	65.2	3.5 B	58.8	20
Cyanide	<0.69	<0.08	0.19 B	<0.04	<0.04	<0.04	<1.2	<0.54	N/A

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Table 1-10 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Subsurface Soil Analytical Results for TAL Inorganic Parameters

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. in May and August 1993 (Phase I RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods.
3. Concentrations reported in parts per million (ppm) or milligrams per kilogram (mg/kg).
4. < = below detection limit.
5. Sample designations indicate the following: TP = subsurface soil sample; S = discrete sample; and D = duplicate sample.
6. B = value is less than the Contract Required Detection Limit, but greater than the Instrument Detection Limit.
7. J = estimated value.
8. * = concentrations reported in parts per billion (ppb) or micrograms per liter (ug/l).
9. NYSDEC-recommended soil cleanup objective is based on the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046: "Determination of Soil Cleanup Objectives and Cleanup Levels" (January 1994). Where background concentrations are required under TAGM 4046, average values for eastern New York State from the United States Geological Survey Publication: "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States" (1984) are used. Concentrations above these cleanup objectives are highlighted on this table.
10. BG = eastern New York State background concentration (see Note 9).
11. N/A = data is not available for background concentration.

Table 1-11

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface and Subsurface Soil Analytical Results for EP Toxic Metals

EP Toxic Metals	Surface Soil Samples and Analytical Results (ppb)					
	SS-3	SS-3D	SS-4	SS-7	SS-8	SS-11
Arsenic	<48.7	<48.5	<48.5	<48.8	<48.8	<48.8
Barium	2950 J	1070 J	1360 J	786 J	1070 J	808 J
Cadmium	45.3	48.3	169	49.8	75.5	85.5
Chromium	13.3	9.0 B	8.9 B	11.7	8.2 B	8.7 B
Lead	207 J	116 J	2190 J	568 J	1080 J	542 J
Mercury	11.5 BJ	10.4 B	10.0 BJ	9.2 BJ	8.2 BJ	8.5 BJ
Selenium	<76.2	<75.8	<75.9	<76.4	<76.4	<76.3
Silver	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7

EP Toxic Metals	Surface Soil Samples and Analytical Results (ppb)					
	SS-13	SS-20	SS-21	SS-24	SS-28	Regulatory Level*
Arsenic	<48.8	<48.6	<48.7	<48.9	<48.7	5000
Barium	918 J	668 J	267 J	1110 J	1910 J	100000
Cadmium	41.4	19.5	5.9	111	186	1000
Chromium	11.2	9.3 B	9.7 B	12.0	9.9 B	5000
Lead	551 J	112 J	34.1 J	1660 J	7320 J	5000
Mercury	9.0 BJ	11.4 BJ	10.7 BJ	<7.0	<7.0	200
Selenium	<76.4	<76.1	<76.2	<76.5	<76.3	1000
Silver	<3.7	<3.7	<3.7	<3.7	<3.7	5000

Table 1-11 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Surface and Subsurface Soil Analytical Results for EP Toxic Metals

EP Toxic Metal	Subsurface Soil Samples and Analytical Results (ppb)		Regulatory Level* (ppb)
	TP-8 (6-24")	TP-26 (6-24")	
Arsenic	<48.8	<48.9	5000
Barium	502 J	1760 J	100000
Cadmium	15.6	176	1000
Chromium	10.1	14.1	5000
Lead	46.9 J	44,000 J	5000
Mercury	<7.0	<7.0	200
Selenium	<76.4	<76.4	1000
Silver	<3.7	5.5 B	5000

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. in September 1994 (Phase II RI).
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods.
3. Concentrations reported in parts per billion (ppb) or micrograms per liter (ug/L).
4. < = below detection limit.
5. TP = subsurface soil sample.
6. J = concentration is estimated.
7. B = value is less than the contract required deletion limit but greater than the instrument detection limit.
8. * = Regulatory level presented in 6NYCRR 371.3, Table 1. Concentrations above these regulatory levels are highlighted in this table.

Table 1-12

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Sediment Analytical Results for Total PCBs, Total Organic Carbon, and Percent Solids

Sample I.D.	Total PCB Concentration (ppm)	% TOC	% Solids
Quarry Pond			
SD-1S	9.2	3.4	27
SD-2S	13.2	4.7	24
SD-3S	0.65 J	13.1	47
SD-4S	7.4	4.8	25
SD-5S	12.1	4.6	19
SD-6S	14.9	5.2	19
SD-7S	21.8	3.6	38
SD-8S	4.9	4.0	23
SD-9S	2.8	3.1	32
SD-10S	4.4 J	4.2	24
SD-11S	14.9	5.1	22
SD-12S	13.8	4.6	40
SD-13S	8.4 J	2.6	52
SD-14S	20.6	5.0	14
SD-14A	0.55	3.2	32
SD-15S	4.2 J	4.8	20
SD-16S	8.0	4.3	24
SD-17S	9.3	5.0	25
SD-18S	19.4	4.7	43
SD-18A	0.81 J	6.3	61
SD-18B	1.1 J	0.7	70
SD-19S	0.18 J	0.4	67
SD-20S	3.4 J	3.1	33
SD-21S	1.6 J	8.3	41
SD-22S	21	5.1	36
SD-23S	63	9.6	39

Table 1-12 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Sediment Analytical Results for Total PCBs, Total Organic Carbon, and Percent Solids

Sample I.D.	Total PCB Concentration (ppm)	% TOC	% Solids
SD-24S	13.3	3.2	29
SD-24A	0.29	3.1	43
SD-25S (Duplicate of SD-10S)	3.7 J	4.4	25
SD-26S (Duplicate of SD-14A)	0.26 J	2.7	34
SD-27S	2.8 J	NA	40
SD-28S	7.7	NA	30
SD-28A	0.17 J	NA	49
SD-29S	11.5	NA	27
SD-30S	1.6 J	NA	29
SD-31S	9.8	NA	25
SD-32S	44.9	NA	32
SD-33S	5.3	NA	25
SD-34S	9.3	NA	23
SD-34A	3.2	NA	27
Quarry Pond Outlet Channel			
SD-35S	8.2	2.6	61
SD-36S	4.2 X	2.8	63
SD-37S	0.84	3.7	69
RB-1R	<0.050*	NA	NA
RB-2R	<0.050*	NA	NA
RB-3R	<0.050*	NA	NA
RB-4R	<0.050*	NA	NA

Table 1-12 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Sediment Analytical Results for Total PCBs, Total Organic Carbon, and Percent Solids

Sample I.D.	Total PCB Concentration (ppm)	% TOC	% Solids
Storm-Water Drainage System			
SD-38A	0.37	2.9	79
SD-39A	<0.033	0.8	90
SD-40A	<0.047	0.6	64
SD-41A	0.05	1.4	86
SD-42A	<0.047	1.5	64
SD-43A	0.06	1.1	89
SD-44A	<0.038	0.9	79
SD-44B	<0.037	0.4	81
SD-45A	0.34	1.4	77
SD-46A	0.68	1.7	52
SD-47A	<0.041	1.5	74
SD-55A	0.16	0.9	77
SD-55B	<0.034	0.7	89
WS-CC-1	2.2	4.6	54
WS-CC-2	4.3	13	30
Cobleskill Creek			
SD-48A	<0.043	2.2	70
SD-49A	<0.036	0.3	83
SD-49B	<0.035	0.2	85
SD-50A	0.18	1.8	63
SD-51A	<0.036	0.2	83
SD-51D	<0.036	0.2	83
SD-52A	<0.038	0.3	80
SD-52B	<0.037	0.4	82
SD-54A	<0.035	0.3	85

Table 1-12 (cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Summary of Sediment Analytical Results for Total PCBs, Total Organic Carbon, and Percent Solids

Sample I.D.	Total PCB Concentration (ppm)	% TOC	% Solids
SD-56A	<0.045	0.8	66
SD-01R	<0.050*	NA	NA
SD-02R	<0.050*	NA	NA

Notes:

1. Samples collected by Blasland, Bouck & Lee, Inc. in January 1993 (Phase I RI). Samples SD-1 through SD-34 were collected from quarry pond locations. Samples SD-35 through SD-37 were collected from the quarry pond outlet channel.
2. Samples analyzed in accordance with NYSDEC 1991 ASP methods.
3. All sediment sample concentrations are reported on a dry-weight basis.
4. Concentrations are reported in parts per million (ppm) or milligrams per kilogram (mg/kg).
5. TOC = Total organic carbon, reported as percent organic carbon by weight.
6. J = estimated value.
7. X = reported result was derived from an instrument response outside the calibration range.
8. Sample designations indicate the following: S = Surface sample (0- to 6-inch depth); A = Core sample collected from a depth of 6-18 inches; B = Core sample collected from a depth of 18-30 inches; and R = Rinse blank.
9. NA = not analyzed.
10. -- = not applicable.
11. * = concentrations reported in parts per billion (ppb) or micrograms per liter (ug/l).
12. < = each aroclor was not detected at the concentration presented.

Table 2-1

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

<u>Potential Action-Specific SCGs</u>

SCGs	Potential Status	Summary of Requirements	Actions to be Taken to Satisfy Requirements
1. SCGs Potentially Common to all Alternatives			
OSHA-General Industry Standards (29 CFR 1910)	Applicable	These regulations specify the 8-hour time-weighted average concentration for worker exposure to various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is not possible to maintain the work atmosphere below these concentrations.
OSHA-Safety and Health Standards (29 CFR 1926)	Applicable	These regulations specify the type of safety equipment and procedures to be followed during site remediation.	Appropriate safety equipment will be on site and appropriate procedures will be followed during remedial activities.
OSHA-Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	These regulations outline recordkeeping and reporting requirements for an employer under OSHA.	These regulations apply to the company(s) contracted to install, operate, and maintain remedial actions at the site.
RCRA-Preparedness and Prevention (40 CFR 264.30-264.31)	Relevant & Appropriate	These regulations outline requirements for safety equipment and spill control.	Safety and communication equipment will be installed at the site, as necessary. Local authorities will be familiarized with the site.
RCRA-Contingency Plan and Emergency Procedures (40 CFR 264.50-264.56)	Relevant & Appropriate	Provides requirements for outlining emergency procedures to be used following explosions, fires, etc.	Plans will be developed and implemented during remedial design. Copies of the plan will be kept on site.
New York Hazardous Waste Management System - General (6NYCRR Part 370)	Relevant & Appropriate	Provides definitions of terms and general instructions for the Part 370 series of hazardous waste management.	Hazardous waste will be managed according to this regulation.
Identification and Listing of Hazardous Wastes (6NYCRR Part 371)	Applicable	Establishes procedures for identifying solid wastes which are subject to regulation as hazardous wastes.	Materials excavated/removed from the site will be handled in accordance with RCRA, TSCA, and New York State Hazardous Waste regulations, if appropriate.
RCRA-Regulated Levels for Toxic Characteristics Leaching Procedure Constituents (40 CFR 261)	Applicable	These regulations specify the TCLP constituent levels for identification of hazardous wastes that exhibit the characteristic of toxicity.	Excavated soil/sediment and moat materials may be sampled and analyzed for TCLP constituents prior to disposal to determine if the materials are hazardous based on the characteristic of toxicity.

Table 2-1
(Cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Potential Action-Specific SCGs

SCGs	Potential Status	Summary of Requirements	Actions to be Taken to Satisfy Requirements
RCRA-General Standards (40 CFR 264.111)	Relevant & Appropriate	General performance standards requiring minimization of need for further maintenance and control; minimization or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products. Also requires decontamination or disposal of contaminated equipment, structures, and soils.	Proper design considerations will be implemented to minimize the need for future maintenance. Decontamination actions and facilities will be included.
RCRA-Closure and Post-Closure (40 CFR 264.110 - 264.120)	Relevant & Appropriate	These regulations detail specific requirements for closure and post-closure of hazardous waste facilities.	The remedial action implemented at the site will be (if necessary) designed and operated to meet the RCRA closure requirements.
Final Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (6NYCRR Part 373)	Applicable	These regulations outline the requirements for owners and operetors of hazardous waste treatment, storage, and disposal facilities (TSDFs).	Site activities, as well as off-site facilities receiving materials from this site, will be required to follow these regulations as appropriate.
Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities (6NYCRR Part 372)	Applicable	Provides guidelines relating to the use of the manifest system and its recordkeeping requirements. It applies to generators, transporters, and facilities in New York State.	This regulation will be applicable to any company(s) contracted to do treatment work at the site or to transport hazardous material from the site.
Inactive Hazardous Waste Disposal Site Remedial Program (6NYCRR Part 375)	Applicable	These regulations set forth the requirements regarding remedial programs.	The remedial action Work Plan for the site would be prepared in accordance with these regulations.
Standards Applicable to Transporters of Applicable Hazardous Waste-RCRA Section 3003, (40 CFR 262 and 263, 40 CFR 170 to 179)	Applicable	Establishes the responsibility of off-site transporters of hazardous waste in the handling, transportation and management of the waste. Requires manifesting, recordkeeping, and immediate action in the event of a discharge.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.

Table 2-1
(Cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Potential Action-Specific SCGs

SCGs	Potential Status	Summary of Requirements	Actions to be Taken to Satisfy Requirements
2. SCGs Applicable to Excavation with Off-Site Disposal			
New York Regulations for Hazardous Waste Management Facilities (6NYCRR 373-1.1 - 373-1.8)	Applicable	Provides requirements and procedures for obtaining a permit to operate a hazardous waste TSDF. Also lists contents and conditions of permits.	Any off-site facility accepting waste from the site must be properly permitted.
EPA-Administered Permit Program: The Hazardous Waste Permit Program RCRA Section 3005, 40 CFR 270.124)	Applicable	Covers the basic permitting, application, monitoring, and reporting requirements for off-site hazardous waste management facilities.	Any off-site facility accepting hazardous waste from the site must be properly permitted. Implementation of the alternative will include consideration of these requirements.
6NYCRR Part 376 - Land Disposal Restrictions (1/31/92)	Relevant and Appropriate	Defines land disposal and identifies hazardous waste restricted from land disposal.	Any facility accepting hazardous waste from the site must be properly permitted.
3. SCGs Applicable to Capping			
Closure and Post-Closure Care for Surface Impoundments, Waste Piles, Landfills, and Land Treatment Units (40 CFR 264)	Relevant & Appropriate	These regulations identify closure and site monitoring requirements for closed hazardous waste facilities.	A closure plan will be prepared and implemented to meet these requirements as appropriate.

			implementation of the RA.

Table 2-1
(Cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Potential Action-Specific SCGs

SCGs	Potential Status	Summary of Requirements	Actions to be Taken to Satisfy Requirements
New York Emissions Testing, Sampling, and Analytical Determinations (6NYCRR Part 202)	Applicable	Outlines requirements for emissions testing for air emission sources. States that independent emissions tests can be ordered by the Commissioner of the NYSDEC.	Emissions from the treatment procedure must be analyzed.
New York Regulations for General Process Emission Sources (6NYCRR Part 212)	Applicable	Outlines the procedure of environmental rating. The Commissioner determines a rating of emissions based on sampling.	The Commissioner will issue an environmental rating for emissions based on this regulation.
Protection of Significant Deterioration of Air Quality [PSD (40 CFR 51.2)]	Applicable	New major stationary sources may be subject to PSD review [i.e., require best available control technology (BACT), lowest achievable emission limit (LAEL), and/or emission off-sets].	If necessary, PSD procedures will be included in the RD/RA process. The procedures could be expanded to BACT and LAEL evaluations.
New York Air Quality Area Classifications - Schoharie County (6NYCRR Part 303)	Relevant & Appropriate	Defines areas of Schoharie County into levels of the air quality classification system.	The M. Wallace and Son, Inc. site is located in a Level II area.
New York Hazardous Waste Management Facilities [(6NYCRR Part 373-1.5(f)]	Applicable	Lists specific requirements for the operation of incinerators and energy recovery units. A trial burn plan must be submitted.	A trial burn plan will be submitted before operation begins.
New York Hazardous Waste Management Facilities [6NYCRR 373-1.6 and 373-1.9(a)]	Applicable	This regulation describes the permit required for operation of a hazardous waste incinerator and/or energy recovery unit.	Permits are not required for remedial actions taken at hazardous waste sites; however, documentation for relevant and appropriate permit conditions would be provided to the NYSDEC prior to and during the implementation of the RA.

Table 2-1
(Cont'd)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Potential Action-Specific SCGs

SCGs	Potential Status	Summary of Requirements	Actions to be Taken to Satisfy Requirements
New York Hazardous Waste Management Facilities (6NYCRR Part 373-2.15)	Applicable	Provides requirements for the operation of a thermal treatment unit, including information about monitoring, inspections, closure, and hazardous waste constituents.	Operational requirements must be followed during thermal treatment.
New York Hazardous Waste Management Facilities (6NYCRR 373-3.15)	Applicable	Outlines requirements for the operation of a thermal treatment unit, including information about waste analysis, general operating requirements, closure, and standards for particular hazardous wastes.	Operational requirements must be followed during thermal treatment.
New York Requirements Specific to Thermal Treatment (6NYCRR 373-3.16)	Applicable	Outlines requirements for the operetion of a thermal treatment unit, including information about waste analysis, general operating requirements, closure, and standards for particular hazardous wastes.	Operational requirements must be followed during thermal treatment.
New York State Air Resources Regulations - General Provisions (6NYCRR Part 200)	Relevant & Appropriate	Provides definitions end general provisions of New York State Air Resources regulations. Lists references used in developing these laws.	This regulation may serve as a reference during the thermal treatment process design.
New York General Prohibitions (6NYCRR Part 211)	Relevant & Appropriate	Lists restricted pollution activities.	No restricted activities will occur at the site.
New York Air Quality Standards (6NYCRR Part 257)	Applicable	Provides air quality standards for different chemicals (including those found at the site), particles, and processes.	The emissions from the treatment processes will meet the air quality standards

Table 5-1

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Installation and Maintenance of Residential Household Water Treatment Systems

Item No.	Description	Estimated Quantity	Unit	Unit Price Mat. & Labor	Estimated Amount
Capital Costs					
1	Purchase Water Treatment Systems	2	LS	5,000	10,000
				Capital Cost Subtotal	$10,000
				Administration and Engineering (30%)	$3,000
				Contingency (20%)	$2,000
				Total Capital Cost	$15,000
Annual Operation and Maintenance (O&M) Costs					
2	Maintenance	1	LS	$5,000	$5,000
3	Quarterly Sampling	4	EA	200	800
4	Analysis of PCB Samples	20	EA	150	3,000
5	Analysis of TDS and Bacteria Count Samples	8	EA	45	360
6	Depth Filter and Carbon Filter Changeouts	1	LS	1,950	1,950
7	Electric Service Charges	1	LS	700	700
				Subtotal Annual O&M	$11,810
				Contingency (20%)	$2,362
				Total Annual O&M Costs	$14,172
				Present Worth of O&M (30 years @ 7%)	$175,860
				Total Estimated Cost of Alternative	**$190,860**
				Rounded To	**$190,000**

Table 5-1

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Purchasing and Maintaining Household Water Treatment Systems

Assumptions:

1. Purchase water treatment systems cost estimate includes costs associated with preparing a letter to the NYSDEC presenting plans for purchasing and long-term operation of the two activated carbon water treatment systems currently installed to treat the water pumped from RW-1 and RW-2. Cost estimate assumes each system, consisting of depth filter canister, two activated carbon canisters installed in series, a metered water softener, and an ultraviolet (UV) disinfection unit, meets the design and operation requirements previously approved by the NYSDEC as a precautionary interim measure for these locations. Costs based on a November 1996 quote from Culligan of the Mohawk Valley (Culligan).

2. Maintenance cost estimate includes biweekly inspection of each system and recording of operation data (e.g. pressure readings, flow data, temperatures). This estimate assumes that 75% of the maintenance visits will be conducted while personnel are on-site for periodic monitoring or sampling of the quarry pond water treatment system and that one non-scheduled (emergency) service call by Culligan or a local plumber or electrician will be required per year for each system. Cost also includes the purchase of 960 pounds of water softening salts per year for each system and annual replacement of the UV light bulb in each system.

3. Quarterly sampling cost estimate assumes that these samples will be collected while sampling personnel are on site conducting periodic quarry pond water treatment system sampling or routine maintenance for the residential water treatment systems.

4. Analysis of PCB samples cost estimate includes costs for analysis of PCBs by USEPA Method 8080 in accordance with NYSDEC 1991 ASP. Cost is based on a November 1996 quote from Galson Laboratories for analysis on a three day turnaround basis using a detection limit of 0.05 ppb and includes costs for QA/QC sample analyses and data validation.

5. Analysis of TDS and bacteria count cost estimate includes costs for analyzing quarterly effluent samples from each water treatment system for TDS, total fecal coliform, and heterotrophic plate count.

6. Depth filter and Carbon filter changeout cost estimate assumes that two filtration canister units of each medium will require rebedding annually. Cost estimate includes disposal costs for spent filtration media as non-hazardous materials.

Table 5-1

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Purchasing and Maintaining Household Water Treatment Systems

Assumptions (cont'd):

7. Electric usage cost estimate includes costs for heating the approximately 8' X 8' well shed during the winter months and for operating two water treatment systems for the entire year. Estimate assumes the 3kW electric heater will operate 6 hours per day during the months of December, January, February and March, and three hours per day during November and April. Each water treatment system is assumed to draw 0.12 kW (the rating of the UV disinfection unit) and be operational 24 hours per day and 365 days per year. The residential electric rate of $0.13 per kWh is used for these calculations.

Table 5-2

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Detailed Cost Estimate for Extending the Village of Cobleskill Public Water Supply

Item No.	Description	Estimated Quantity	Unit	Unit Price Mat. & Labor	Estimated Amount
Capital Costs					
1	Install 6-inch Water Transmission Pipe	1,000	LF	$50.00	$50,000
2	Install Culverts	2	EA	3,500.00	7,000
3	Pipe Fittings (Angled)	1	LS	3,500.00	3,500
4	6-inch Valves	3	EA	1,200.00	3,600
5	Flushing Hydrants	3	EA	1,500.00	4,500
6	Service Connections	2	EA	4,500.00	9,000
7	Pressure Test	1,200	LF	3.00	3,600
8	Traffic Control	1	LS	24,000.00	24,000
9	Abandon Existing Water Supply Wells	2	EA	1,000.00	2,000
				Capital Cost Subtotal	$107,200
				Administration and Engineering (30%)	$32,160
				Contingency (20%)	$21,440
				Total Capital Cost	$160,800
Annual Operation and Maintenance (O&M) Costs					
None					$0
				Total Estimated Cost of Alternative	**$160,800**
				Rounded To	**$160,000**

Table 5-2

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

<u>**Detailed Cost Estimate for Extending the Village of Cobleskill Public Water Supply**</u>

Assumptions:

1. Install 6-inch water transmission pipe cost estimate includes equipment, labor and material costs associated with excavating up to 1,000 feet in overburden and installing 6-inch ductile iron pipe with no corrosion protection system. Assumes open cut excavations to a minimum depth of 5 feet with no temporary sheeting, bracing or inertial barriers required. Also assumes that no bedrock removal will be required, that excavated soil will be used as backfill and that no ground-water pumping or treating will be required. Cost estimate includes costs for crossing one, two-lane highway and renovating excavated areas to pre-excavation condition.

2. Install culverts cost estimate includes costs to install and backfill two 15-feet long and 18-inch wide corrugated steel culverts to transmit storm water presently conveyed in ditches over water transmission lines that cross the path of the ditches. Includes costs for diverting ditch water during installation, providing and compacting up to 30 cubic yards of clean, select fill and renovating the excavated areas.

3. Pipe fittings cost estimate includes costs for providing and installing 6-inch ductile iron tees and wyes required to alter the path of the water transmission line and to facilitate service connections.

4. Six-inch valves cost estimate includes costs for providing and installing three valves at a maximum spacing of 500 feet along the water transmission line.

5. Flushing hydrants cost estimate includes costs for providing and installing three, six-inch flushing hydrants at a maximum spacing of 500 feet.

6. Service connections cost estimate includes equipment, labor and materials costs required to provide, at each of two locations, a curb stop; 3/4-inch K-copper pipe buried a minimum of 5 feet below grade and extending up to 100 feet to the service entrance; an inlet shut-off valve; a totalizing flow meter with remote exterior readout; connection to existing distribution system; and disconnection of existing water supply system.

7. Pressure test cost estimate includes costs for conducting a pressure test in accordance with American Association of Water Works methods prior to backfilling the installed water transmission line.

Table 5-2

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Detailed Cost Estimate for Extending the Village of Cobleskill Public Water Supply

Assumptions (cont'd):

8. Traffic control cost estimate includes costs for preparing a traffic control plan, submitting the plan to the New York State Department of Transportation (NYSDOT) and carrying out the provisions of the NYSDOT-approved plan. The plan will include the anticipated construction schedule, the route of the water line extension, a description of the activities that will be conducted to control traffic during construction activities. Costs are included for the provision of two workers for 50 hours per week for four weeks to conduct traffic control activities.

9. Abandon existing water supply wells cost estimate includes labor, materials, and equipment necessary to remove pumps and piping, disconnect pump electrical service, and fill boreholes and casings with grout.

10. Engineering designs and materials specifications will be in accordance with American Water Works Association Standards. Costs are included for obtaining permits as required by the Village of Cobleskill Board of Supervisors, the Schoharie County Health Department, and the NYSDOT. Costs are not included for obtaining institutional controls to preclude the use of existing water supply wells or to preclude the installation of additional water supply wells at the properties served by the public water line extension.

11. Cost estimate includes no buy-in costs to existing water supply, no right-of-way acquisition costs, and no annual operating and maintenance costs.

12. Costs are in 1997 dollars.

Table 5-3

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 1 - No Further Action

Item No.	Description	Estimated Quantity	Unit	Unit Price Mat. & Labor	Estimated Amount
Capital Costs					
1	Water Treatment System Purchase	1	LS	$150,000	$150,000
				Capital Cost Subtotal	$150,000
				Administration and Engineering (30%)	$45,000
				Contingency (20%)	$30,000
				Total Capital Cost	$225,000
Annual Operation and Maintenance (O&M) Costs					
2	Permanent 100 gpm Water Treatment System Operation & Maintenance	12	EA	$9,500	$114,000
3	Temporary 300 gpm Water Treatment System Operation and Maintenance	2.5	EA	16,300	40,750
4	Weekly Water Treatment System Sampling	44	EA	480	21,120
5	Water Treatment System Sample Analyses	101	EA	125	12,625
				Subtotal Annual O&M	$188,495
				Contingency (20%)	$37,699
				Total Annual O&M	$226,194
				Present Worth of O&M (30 years @ 7%)	$2,806,841
				Total Estimated Cost of Alternative 2	**$3,031,841**
				Rounded To	**$3,000,000**

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Table 5-3 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 1 - No Futher Action

Assumptions:

1. Water treatment system purchase cost estimate is based on a quote from CSK Technical of Tonawanda, New York and includes all components (e.g., tanks, pipes, pumps, wiring, telemetry, etc.) and materials (e.g., multi-media depth filter and activated charcoal filter materials) which comprise the permanent 100 gpm water treatment system or which are common to the combined permanent 100 gpm system and the 300 gpm temporary water treatment system.

2. Operation and maintenance of the permanent 100 gpm water treatment system cost estimate includes labor and materials required to maintain the system. Costs include chemicals required to operate the system, carbon and depth filter changeouts (including spent material disposal in a secure landfill) on a four-year basis, site security maintenance, insurance (general and pollution liability), and telephone/modem lines.

3. Operation and maintenance of the temporary 300 gpm water treatment system cost estimate includes labor and materials required to operate the system around the clock for up to eighteen days per year. Costs include carbon and depth filter changeouts (including disposal of spent material in a secure landfill) on a two-year basis.

4. Weekly water treatment system sampling cost estimate includes labor and materials required to collect up to six water treatment system samples (including a duplicate sample from each of up to three sampling locations) during one weekly visit to the site. Costs include travel expenses from Syracuse, New York, disposable sampling supplies and personal protective equipment.

5. Water treatment system sample analyses cost estimate is based on a November 1996 price quotation from Galson Laboratories of Syracuse, New York. Cost estimate assumes that only the 100 gpm permanent water treatment system will be operating for 36 weeks per year (2 samples per week), that the combined water treatment will be operating for 8 weeks per year (3 samples per week), and that 5% of the duplicate samples collected will need to be analyzed (5 samples per year). Samples will be analyzed by USEPA Method 608 with a detection limit of 0.05 ppb on a 24-hour turnaround basis.

Table 5-4

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 2 - Limited Action

Item No.	Description	Estimated Quantity	Unit	Unit Price Mat. & Labor	Estimated Amount
Capital Costs					
1	Water Treatment System Purchase	1	LS	$150,000	$150,000
2	LNAPL Collection Systems Installation	2	EA	10,500	21,000
				Capital Cost Subtotal	$171,000
				Administration and Engineering (30%)	$51,300
				Contingency (20%)	$34,200
				Total Capital Cost	$256,500
Annual Operation and Maintenance (O&M) Costs					
3	Permanent 100 gpm Water Treatment System Operation & Maintenance	12	EA	$9,500	$114,000
4	Temporary 300 gpm Water Treatment System Operation and Maintenance	2.5	EA	16,300	40,750
5	Weekly Water Treatment System Sampling	44	EA	480	21,120
6	Water Treatment System Sample Analyses	101	EA	125	12,625
7	LNAPL Collection System Maintenance and Ground-Water Monitoring	1	LS	9,500	9,500
				Subtotal Annual O&M	$197,995
				Contingency (20%)	$39,599
				Total Annual O&M	$237,594
				Present Worth of O&M (30 years @ 7%)	$2,948,304
				Total Estimated Cost of Alternative 2	**$3,204,804**
				Rounded To	**$3,200,000**

Table 5-4 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 2 - Limited Action

Assumptions:

1. Water treatment system purchase cost estimate is based on a quote from CSK Technical of Tonawanda, New York and includes all components (e.g., tanks, pipes, pumps, wiring, telemetry, etc.) and materials (e.g., multi-media depth filter and activated charcoal filter materials) which comprise the permanent 100 gpm water treatment system or which are common to the combined permanent 100 gpm system and the 300 gpm temporary water treatment system.

2. LNAPL collection system installation cost estimate includes labor, equipment, and materials associated with the fabrication and installation of two skid-mounted LNAPL collection systems. Each system will be comprised of a covered enclosure with secondary containment, a 120 volt single phase power hookup, an automatic level seeking product only skimmer pump, and a 30-gallon closed-top LNAPL storage drums (UN ID # A1/Y) with float sensor shutoff actuator. Cost estimate includes one week installation/startup period, weekly monitoring for the first month of operation, and monthly monitoring thereafter. Cost estimate also includes the installation of a 6-inch recovery well at the locations of bedrock coreholes C-4 and C-3/MW-8. Determination of whether to install the recovery wells and the location and depth of the installations (if any), will be based on analysis of ground-water/LNAPL data collected during the bi-weekly LNAPL monitoring conducted as an ongoing IRM since being initiated in June 1993. This analysis will be conducted during pre-design activities and in conjunction with the NYSDEC.

3. Operation and maintenance of the permanent 100 gpm water treatment system cost estimate includes labor and materials required to maintain the system. Costs include chemicals required to operate the system, carbon and depth filter changeouts (including spent material disposal in a secure landfill) on a four-year basis, site security maintenance, insurance (general and pollution liability), and telephone/modem lines.

4. Operation and maintenance of the temporary 300 gpm water treatment system cost estimate includes labor and materials required to operate the system around the clock for up to eighteen days per year. Costs include carbon and depth filter changeouts (including disposal of spent material in a secure landfill) on a two-year basis.

5. Weekly water treatment system sampling cost estimate includes labor and materials required to collect up to six water treatment system samples (including a duplicate sample from each of up to three sampling locations) during one weekly visit to the site. Costs include travel expenses from Syracuse, New York, disposable sampling supplies and personal protective equipment.

Table 5-4 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 2 - Limited Action

Assumptions (continued):

6. Water treatment system sample analyses cost estimate is based on a November 1996 price quotation from Galson Laboratories of Syracuse, New York. Cost estimate assumes that only the 100 gpm permanent water treatment system will be operating for 36 weeks per year (2 samples per week), that the combined water treatment will be operating for 8 weeks per year (3 samples per week), and that 5% of the duplicate samples collected will need to be analyzed (5 samples per year). Samples will be analyzed by USEPA Method 608 with a detection limit of 0.05 ppb on a 24-hour turnaround basis.

7. LNAPL collection system/ground-water monitoring cost estimate includes costs for maintaining the two LNAPL collection systems at the site on a monthly basis. Cost estimate assumes that the pumps have a useful life of ten years (i.e., each will be replaced twice during the thirty year span of this estimate) and that one thirty gallon drum of LNAPL will be disposed every two years. Cost estimate assumes that 90% of maintenance will be conducted by personnel on-site for water treatment system monitoring or sampling, but that two trips per year will be required for maintenance of LNAPL collection systems only. Costs are also included under this item for monthly monitoring for LNAPL and water levels in all site monitoring wells and for semi-annual sampling for total PCBs analysis of up to five monitoring wells.

Table 5-5

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 3 - On-Site Capping

Item No.	Description	Estimated Quantity	Unit	Unit Price Mat. & Labor	Estimated Amount
Capital Costs					
1	Water Treatment System Purchase	1	LS	$150,000	$150,000
2	Mobilization/Demobilization and Site Preparation	1	LS	30,000	30,000
3	Excavation, Transport, and Placement of Sediments and Soils	920	CY	30	27,600
4	Backfill and Renovation of Excavated Areas	920	CY	20	18,400
5	Verification Sampling and Analysis	35	EA	120	4,200
6	Bituminous Cap Installation	43,000	SF	6	258,000
7	Multi-layer Vegetated Cap Installation	132,000	SF	4	462,000
8	LNAPL Collection Systems Installation	2	EA	10,500	21,000
				Capital Cost Subtotal	$971,200
				Administration and Engineering (30%)	$291,360
				Contingency (20%)	$194,240
				Total Capital Cost	$1,456,800
Annual Operation and Maintenance (O&M) Costs					
9	Permanent 100 gpm Water Treatment System Operation & Maintenance	12	EA	$9,500	$114,000
10	Temporary 300 gpm Water Treatment System Operation and Maintenance	2.5	EA	16,300	40,750

Table 5-5 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 3 - On-Site Capping

Annual O&M Costs (continued)					
11	Weekly Water Treatment System Sampling	44	EA	480	21,120
12	Water Treatment System Sample Analyses	101	EA	125	12,625
13	LNAPL Collection System Maintenance / Ground-Water Monitoring	1	LS	9,500	9,500
14	Annual Cap Maintenance	2	EA	6,000	12,000
				Subtotal O&M	$209,995
				Contingency (20%)	$41,999
				Total Annual O&M	$251,994
				Present Worth of O&M (30 years @ 7%)	$3,126,994
				Total Estimated Cost of Alternative 3	**$4,583,794**
				Rounded To	**$4,600,000**

Assumptions:

1. Water treatment system purchase cost estimate is based on a quote from CSK Technical of Tonawanda, New York and includes all components (e.g., tanks, pipes, pumps, wiring, telemetry, etc.) and materials (e.g., multi-media depth filter and activated charcoal filter materials) which comprise the permanent 100 gpm water treatment system or which are common to the combined permanent 100 gpm system and the 300 gpm temporary water treatment system.

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 3 - On-Site Capping

Assumptions (continued):

2. Mobilization/demobilization and site preparation cost estimate includes costs associated with mobilizing/demobilizing equipment and materials to and from the site, construction of an equipment decontamination pad, and clearing and grubbing the areas to be capped and excavated, and removing all stored scrap and debris from the active scrapyard area. This estimate does not include costs for disposal of scrap materials from the active scrapyard area. Costs are also included for collecting scrap metal or debris exposed during clearing and grubbing of the areas to be capped. These materials will be stored temporarily in roll-offs or covered piles and disposed of at an appropriate disposal facility.

3. Excavation, transport, and placement of sediments and soils cost estimate includes costs to remove, transport and place the following impacted materials (see Figures 3-1 and 3-2):

    - Soils located north and east of the quarry below the 982 feet AMSL contour will be excavated to a depth of six inches; and

    - Sediments in the quarry pond outlet channel and storm water drainage system, will be excavated to a depth of 12 inches or refusal (if less than twelve inches of sediment exist).

    Includes costs to transport the excavated materials to the upper portion of the site (above the 982 feet AMSL contour), and spread and rough grade the materials to achieve a uniform slope in the area to be capped. Costs are included for incorporating the approximately 350 cubic yards of soil that are stockpiled in the northwestern corner of the site into area to be capped.

4. Backfill and renovation of excavated areas cost estimate includes costs to backfill to original grades with select fill materials. Includes costs to replace bank run crushed stone in the areas where this material was placed prior to excavation and to ploace, grade and lightly compact a minimum of 3 inches of topsoil on top of areas to be revegetated. Also includes costs for placement of crushed stone rip-rap as an erosion control measure along the excavated sections of the quarry pond outlet channel and the storm water drainage system where necessary and for maintaining erosion control measures in appropriate areas until vegetation is established.

5. Verification sampling and analysis includes collecting one verification sample for PCB analysis from every 1000 square feet of on-site surface soil excavation in the areas north and east of the quarry pond. These samples would be submitted for laboratory analysis of PCBs by Method 8080 to verify achievement of the 10 ppm cleanup objective for subsurface soils in the area.

Table 5-5 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 3 - On-Site Capping

Assumptions (continued):

6. Bituminous cap installation cost estimate includes labor and materials required to install approximately two inches of binder, and appropriate thickness of sealant over the compacted crushed stone surface. Prior to installing the cap, the crushed stone present in the area would be graded, amended as required, and compacted to provide a uniform six-inch layer. The bituminous cap will be placed in the areas west of the quarry pond below the 970 feet AMSL contour, including the active scrapyard area, and it is assumed that the capped area will not include areas inside any existing buildings. Costs are included for installation of surface water management facilities, including two culverts and ditch improvements along West Street.

7. Multi-layer vegetated cap installation cost estimate includes costs for installing:

    - A low permeability soil barrier layer spread and compacted to a total depth of at least 24 inches;
    - A low-permeability geomembrane with overlying protective geotextile;
    - A drainage layer of coarse, granular material overlain by permeable protective geotextile;
    - A six-inch layer of fill and a six-inch layer of topsoil, lightly compacted; and
    - Vegetative cover.

    To the north and east of the quarry pond, the multi-layer vegetated cap will cover areas above the 982 feet AMSL contour; to the west of the quarry pond the multi-layer vegetated cap will cover areas above the 970 feet AMSL contour (Figure 5-1). Costs are included for an upgradient diversion trench and downgradient water management facilities to route surface water from the cap to the quarry pond or storm water drainage system.

Table 5-5 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 3 - On-Site Capping

Assumptions (continued):

8. LNAPL collection system installation cost estimate includes labor, equipment, and materials associated with the fabrication and installation of two skid-mounted LNAPL collection systems. Each system will be comprised of a covered enclosure with secondary containment, a 120 volt single phase power hookup, an automatic level seeking product only skimmer pump, and a 30-gallon closed-top LNAPL storage drum (UN ID # A1/Y) with float sensor shutoff actuator. Cost estimate includes one week installation/startup period, weekly monitoring for the first month of operation, and monthly monitoring thereafter. Cost estimate also includes the installation of a 6-inch recovery well at the locations of bedrock coreholes C-4 and C-3/MW-8. Determination of whether to install the recovery wells and the location and depth of the installations (if any), will be based on analysis of ground-water/LNAPL data collected during the bi-weekly LNAPL monitoring conducted as an ongoing IRM since being initiated in June 1993. This analysis will be conducted during pre-design activities and in conjunction with the NYSDEC.

9. Operation and maintenance of the permanent 100 gpm water treatment system cost estimate includes labor and materials required to maintain the system. Costs include chemicals required to operate the system, carbon and depth filter changeouts (including spent material disposal in a secure landfill) on a four-year basis, site security maintenance, insurance (general and pollution liability), and telephone/modem lines.

10. Operation and maintenance of the temporary 300 gpm water treatment system cost estimate includes labor and materials required to operate the system around the clock for up to eighteen days per year. Costs include carbon and depth filter changeouts (including disposal of spent material in a secure landfill) on a two-year basis.

11. Weekly water treatment system sampling cost estimate includes labor and materials required to collect up to six water treatment system samples (including a duplicate sample from each of up to three sampling locations) during one weekly visit to the site. Costs include travel expenses from Syracuse, New York, disposable sampling supplies and personal protective equipment.

12. Water treatment system sample analyses cost estimate is based on a November 1996 price quotation from Galson Laboratories of Syracuse, New York. Cost estimate assumes that only the 100 gpm permanent water treatment system will be operating for 36 weeks per year (2 samples per week), that the combined water treatment will be operating for 8 weeks per year (3 samples per week), and that 5% of the duplicate samples collected will need to be analyzed (5 samples per year). Samples will be analyzed by USEPA Method 608 with a detection limit of 0.05 ppb on a 24-hour turnaround basis.

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 3 - On-Site Capping

Assumptions (continued):

13. LNAPL collection system/ground-water monitoring cost estimate includes costs for maintain the two LNAPL collection systems at the site on a monthly basis. Cost estimate assumes that the pumps have a useful life of ten years (i.e., each will be replaced twice during the thirty year span of this estimate) and that one thirty gallon drum of LNAPL will be disposed every two years. Cost estimate assumes that 90% of maintenance will be conducted by personnel on-site for water treatment system monitoring or sampling, but that two trips per year will be required for maintenance of LNAPL collection systems only. Costs are also included under this item for monthly monitoring for LNAPL and water levels in all site monitoring wells and for semi-annual sampling for total PCBs analysis of up to five monitoring wells.

14. Cap maintenance cost estimate includes costs for sealing and patching the asphalt cap and for mowing and maintaining the vegetated cap, as required.

Table 5-6

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 4 - Excavation and Off-Site Disposal

Item No.	Description	Estimated Quantity	Unit	Unit Price Mat. & Labor	Estimated Amount
Capital Costs					
1	Water Treatment System Purchase	1	LS	$150,000	$150,000
2	Mobilization/Demobilization and Site Preparation	1	LS	60,000	60,000
3	Excavation and Handling of Sediments and Soils	13,920	CY	30	417,600
4	Verification Sampling and Analysis	190	EA	250	47,500
5	Characterization Sampling and Analysis	1	LS	90,000	90,000
6	Transportation and Off-Site Disposal	20,700	TN	150	3,105,000
7	Solidification/Stabilization	2,100	TN	100	210,000
8	Backfill of Excavated Areas	13,920	CY	20	278,400
9	Site Renovation	1	LS	100,000	100,000
10	LNAPL Collection Systems Installation	2	EA	10,500	16,000
				Capital Cost Subtotal	$4,474,500
				Administration and Engineering (10%)	$447,450
				Contingency (20%)	$894,900
				Total Capital Cost	$5,816,850
Annual Operation and Maintenance (O&M) Costs					
11	Permanent 100 gpm Water Treatment System Operation & Maintenance	12	EA	$9,500	$114,000

Table 5-6 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 4 - Excavation and Off-Site Disposal

O & M Costs (continued)					
12	Temporary 300 gpm Water Treatment System Operation and Maintenance	2.5	EA	16,300	40,750
13	Weekly Water Treatment System Sampling	44	EA	480	21,120
14	Water Treatment System Sample Analyses	101	EA	125	12,625
15	LNAPL Collection System Maintenance and Ground-Water Monitoring	1	LS	9,500	9,500
				Subtotal Annual O&M	$197,995
				Contingency (20%)	$39,599
				Total Annual O & M	$237,594
				Present Worth of O&M (30 years @ 7%)	$2,948,304
				Total Estimated Cost of Alternative 4	**$8,765,154**
				Rounded To	**$8,800,000**

Assumptions:

1. Water treatment system purchase cost estimate is based on a quote from CSK Technical of Tonawanda, New York and includes all components (e.g., tanks, pipes, pumps, wiring, telemetry, etc.) and materials (e.g., multi-media depth filter and activated charcoal filter materials) which comprise the permanent 100 gpm water treatment system or which are common to the combined permanent 100 gpm system and the 300 gpm temporary water treatment system.

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 4 - Excavation and Off-Site Disposal

Assumptions (continued):

2. Mobilization/demobilization and site preparation cost estimate includes costs associated with mobilizing/demobilizing equipment and materials to and from the site, removal of chain link fence (where needed), installation of erosion control measures (e.g., hay bales and silt fence), construction of an equipment decontamination pad and a soil staging area, clearing and grubbing the areas to be excavated, and removing scrap materials and debris from the active scrapyard area. Costs are not included for disposal of scrap materials from the active scrapyard area.

3. Excavation and handling of sediments and soils cost estimate includes costs to remove sediments from the limits shown on Figures 3-1 and 3-2 to a depth of 12 inches or refusal (if less than 12 inches of sediment exist), and to remove soils from the limits shown on Figure 3-1 to a depth of two feet. Includes costs to maintain and modify erosion control measures, as required, and to transport the excavated materials to the soil staging area, collect necessary verification and/or characterization samples, and load the materials onto trailers for off-site disposal. Cost estimate assumes no shoring or bracing will be required for subsurface excavations.

4. Verification sampling and analysis includes collecting one verification sample for PCBs and metals analysis from every 1000 square feet of on-site soil excavation area. These samples would be submitted for laboratory analysis of PCBs by Method 8080 and metals by Method 6010, on a 24-hour turnaround basis, to verify achievement of cleanup objectives.

5. Characterization sampling and analysis cost estimate includes collecting one sample for PCB analysis and one sample for TCLP metals analysis from each approximately 20 tons of staged soils to determine the appropriate disposal facility for these materials and whether solidification of these materials would be required prior to disposal. Costs are also included for collecting and analyzing one sample for each 500 tons of materials to be disposed for the characteristics of reactivity, corrosivity, and flashpoint.

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 4 - Excavation and Off-Site Disposal

Assumptions (continued):

6. Transportation and off-site disposal cost estimate assumes that approximately 50% of excavated materials (assumed to weigh 1.5 tons per cubic yard) would be disposed at a RCRA-permitted subtitle C hazardous waste landfill and that, based on the results of characterization sampling, approximately 50% of the materials will be disposed at a municipal landfill. This conservative estimate was based on the following information:

   - PCB analytical results indicated that approximately 15% of surface and subsurface soil to be excavated is hazardous (contains PCBs at concentrations greater than 50 ppm); and

   - EP toxic metals and total TAL metals analytical results indicate that a number of samples exhibited the hazardous characteristic of toxicity for metals.

   The cost estimate assumes that the cost per ton for transportation and disposal of hazardous and non-hazardous materials will be $250/ton and $50/ton, respectively. The final disposition of the impacted materials would be determined based on a number of considerations, including the results and economic feasibility of characterization sampling and the disposal requirements of the candidate landfills.

7. Solidification/stabilization cost estimate assumes that 10% of the excavated site soils would require solidification prior to disposal, based on the characterization sampling results of TCLP metals analysis. Solidification would be required if one or more metals are detected in the TCLP extract at concentrations exceeding regulatory levels. Cost estimate assumes solidification will be conducted at the disposal facility.

8. Backfill of excavated areas cost estimate includes costs to backfill to original grades with select fill materials. Includes costs to replace bank run crushed stone in the areas where this material was placed prior to excavation and to place, grade and lightly compact a minimum of 3 inches of topsoil on top of areas to be revegetated. Also includes costs for placement of crushed stone rip-rap as an erosion control measure along the excavated sections of the quarry pond outlet channel and the storm water drainage system where necessary and for maintaining erosion control measures in appropriate areas until revegetation is established.

Table 5-6 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 4 - Excavation and Off-Site Disposal

Assumptions (continued):

9. Site renovation cost estimate includes costs for dismantling the soil staging area and the equipment decontamination pad and disposing of the materials at an appropriate disposal facility, reseeding site areas not covered with crushed stone, and replacing any chainlink fence removed or damaged during excavation activities. This cost estimate includes permanent incorporation of subsurface drainage required to control erosion in steep areas near the quarry pond and installation of two culverts with drainage ditch improvements along the east side of West Street.

10. LNAPL collection system installation cost estimate includes labor,equipment, and materials associated with the fabrication and installation of two skid-mounted LNAPL collection systems. Each system will be comprised of a covered enclosure with secondary containment, a 120 volt single phase power hookup, an automatic level seeking product only skimmer pump, and a 30-gallon closed-top LNAPL storage drums (UN ID # A1/Y) with float sensor shutoff actuator. Cost estimate includes one week installation/startup period, weekly monitoring for the first month of operation, and monthly monitoring thereafter.

11. Operation and maintenance of the permanent 100 gpm water treatment system cost estimate includes labor and materials required to maintain the system. Costs include chemicals required to operate the system, carbon and depth filter changeouts (including spent material disposal in a secure landfill) on a four-year basis, site security maintenance, insurance (general and pollution liability), and telephone/modem lines.

12. Operation and maintenance of the temporary 300 gpm water treatment system cost estimate includes labor and materials required to operate the system around the clock for up to eighteen days per year. Costs include carbon and depth filter changeouts (including disposal of spent material in a secure landfill) on a two-year basis.

13. Weekly water treatment system sampling cost estimate includes labor and materials required to collect up to six water treatment system samples (including a duplicate sample from each of up to three sampling locations) during one weekly visit to the site. Costs include travel expenses from Syracuse, New York, disposable sampling supplies and personal protective equipment.

Table 5-6 (continued)

Niagara Mohawk Power Corporation
M. Wallace and Son, Inc. Scrapyard
Cobleskill, New York

Feasibility Study

Cost Estimate for Alternative 4 - Excavation and Off-Site Disposal

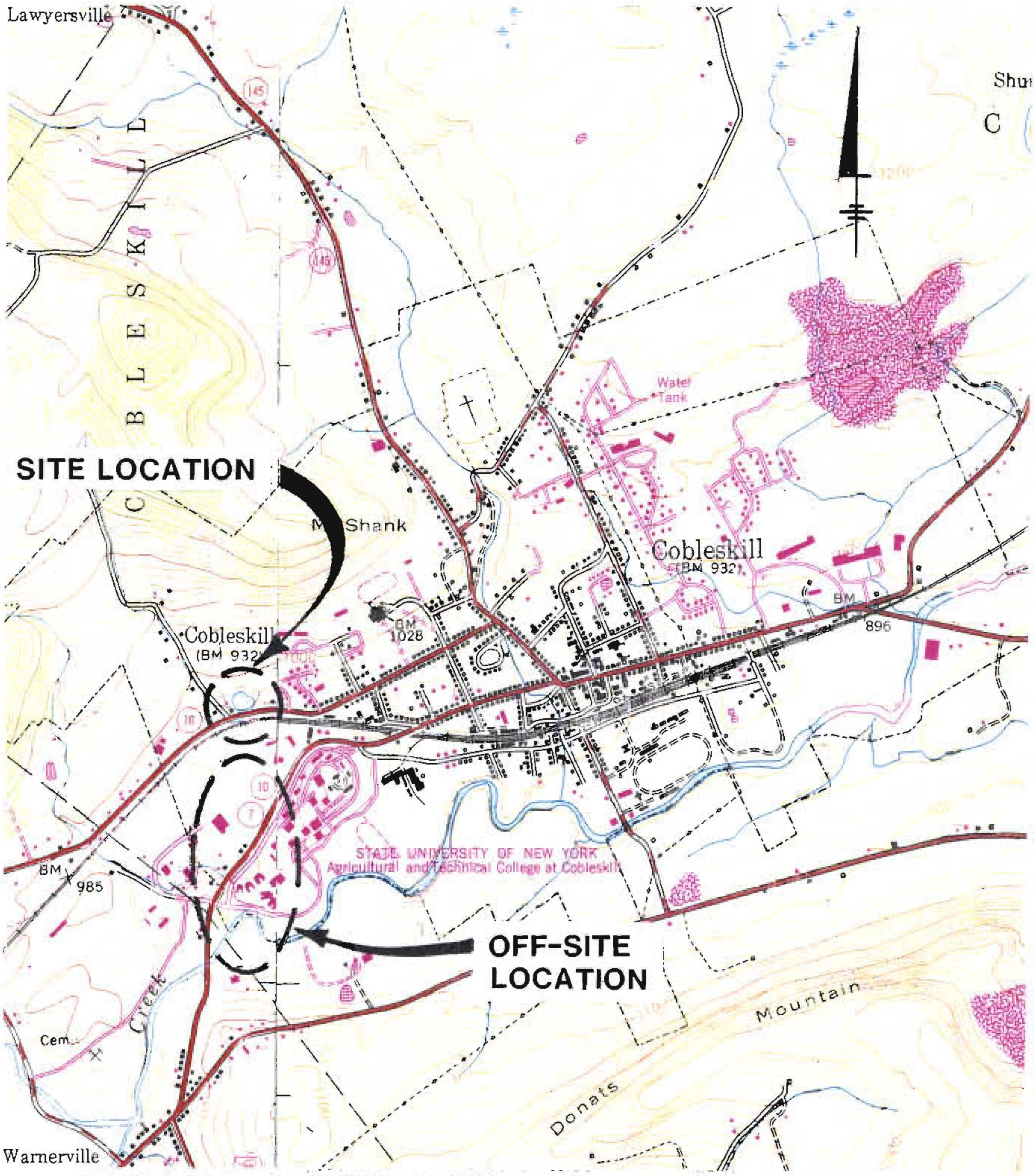
Assumptions (continued):

14. Water treatment system sample analyses cost estimate is based on a November 1996 price quotation from Galson Laboratories of Syracuse, New York. Cost estimate assumes that only the 100 gpm permanent water treatment system will be operating for 36 weeks per year (2 samples per week), that the combined water treatment will be operating for 8 weeks per year (3 samples per week), and that 5% of the duplicate samples collected will need to be analyzed (5 samples per year). Samples will be analyzed by USEPA Method 608 with a detection limit of 0.05 ppb on a 24-hour turnaround basis.

15. LNAPL collection system/ground-water monitoring cost estimate includes costs for maintaining the two LNAPL collection systems at the site on a monthly basis. Cost estimate assumes that the pumps have a useful life of ten years (i.e., each will be replaced twice during the thirty year span of this estimate) and that one thirty gallon drum of LNAPL will be disposed every two years. Cost estimate assumes that 90% of maintenance will be conducted by personnel on-site for water treatment system monitoring or sampling, but that two trips per year will be required for maintenance of LNAPL collection systems only. Costs are also included under this item for monthly monitoring for LNAPL and water levels in all site monitoring wells and for semi-annual sampling for total PCBs analysis of up to five monitoring wells.

Figures

BLASLAND, BOUCK & LEE, INC.
engineers & scientists



REFERENCE: USGS COBLESKILL, RICHMONDVILLE N.Y. QUADS.

2000' 0 2000'

APPROX. SCALE: 1" = 2000'

QUADRANGLE LOCATION

DJA.PCP
1/20/97 SYR-54-RCB
36417085/36417L01.DWG

NIAGARA MOHAWK POWER CORPORATION
M. WALLACE & SON, INC. SCRAPYARD
COBLESKILL, NEW YORK

FEASIBILITY STUDY

LOCATION MAP

BBL BLASLANO, BOUCK & LEE, INC.
engineers & scientists

FIGURE
1-1

GENERAL NOTES:

1. ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929
2. CONTOUR INTERVAL = 2 FT
3. LOCATION OF UNDERGROUND UTILTIES AND OTHER UNDERGROUND STRUCTURES LOCATED BY FIELD MEASUREMENTS WHERE POSSIBLE, OTHERWISE OBTAINED FROM OTHER SOURCES AND MAY BE APPROXIMATE OTHER UNDERGROUND UTILITIES AND STRUCTURES MAY EXIST, THE LOCATIONS OF WHICH ARE PRESENTLY UNKNOWN.
4. PROPERTY BOUNDARY LOCATED IN THE FIELD BY JOANNE DARCY CRUM. L.S., COBLESKILL, N.Y.
5. SITE SURVEY CONDUCTED BY BLASLAND & BOUCK ENGINEERS, P.C. OCTOBER 1992.

NIAGARA MOHAWK POWER CORPORATION
M. WALLACE & SON, INC. SCRAPYARD
COBLESKILL, NEW YORK

FEASIBILITY STUDY

SITE PLAN

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE **1-2**

VIEW: 40SCALE
LAYERS: OFF=* ON=BASE* SITE*
1/17/97 SYR54-DMW.RCB
36417085/36417G01.DWG

LEGEND:

- QUARRY POND SURFACE WATER DRAINAGE ROUTE
- PROPERTY LINE
- STORM SEWER PIPE ROUTE
- DRAINAGE DITCH
- SURFACE WATER FEATURE
- FENCE
- MH — STORM SEWER MANHOLE
- CB — STORM SEWER CATCH BASIN
- BUILDINGS
- DIRECTION OF SURFACE WATER FLOW

200' 0 200 400

GENERAL NOTES:

1. THIS SHEET WAS DEVELOPED FROM THE VILLAGE OF COBLESKILL, NEW YORK, STORM SEWER SYSTEM MAP THIS SHEET HAS BEEN UPDATED UNDER HC 7525 DATED FEBRUARY 1965.

NIAGARA MOHAWK POWER CORPORATION
M. WALLACE & SON, INC. SCRAPYARD
COBLESKILL, NEW YORK

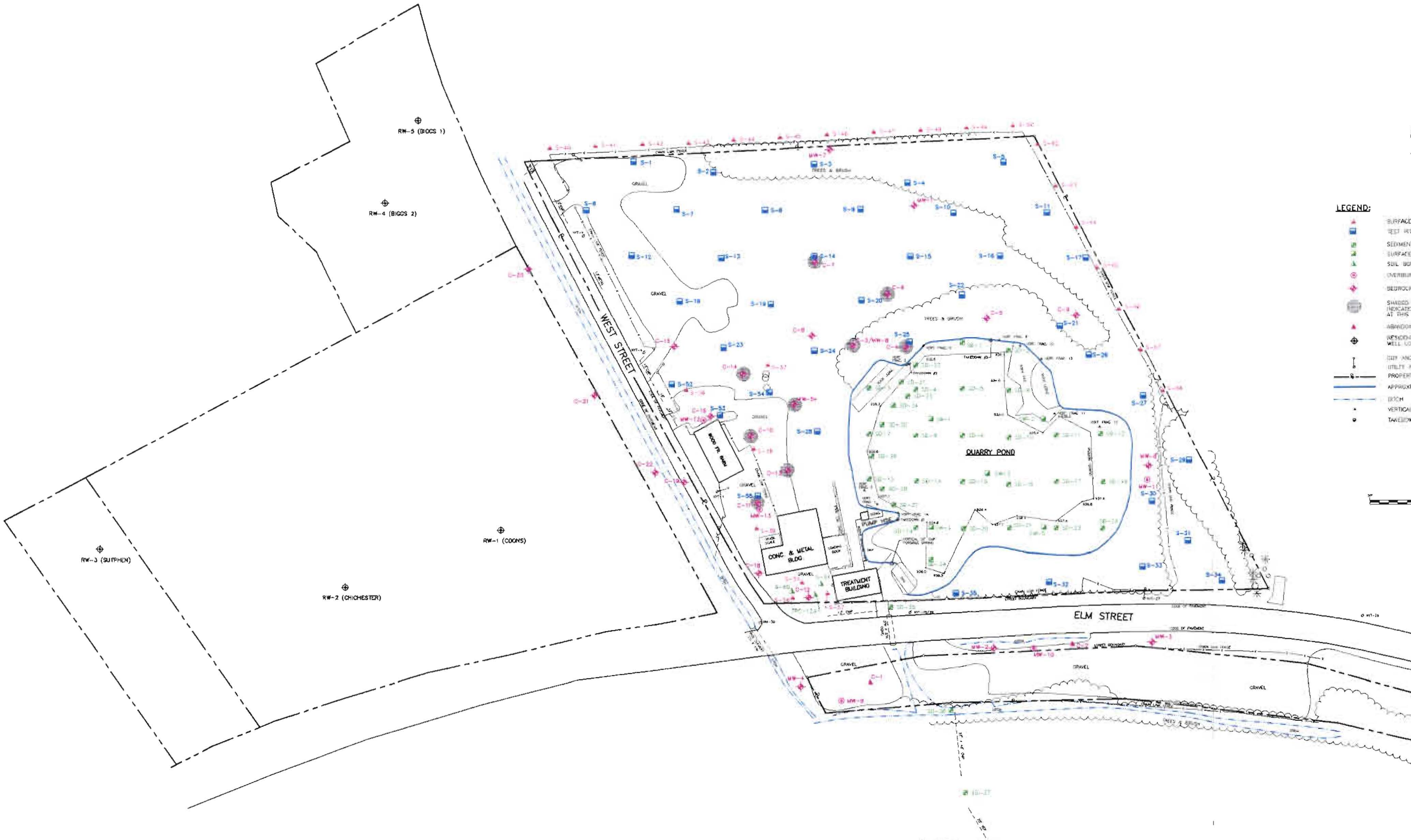
FEASIBILITY STUDY

SURFACE WATER FEATURES AND SITE DRAINAGE PATH

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE **1-3**

LAYERS ON = *, LAYERS OFF = 36417X10*,36417X03-SPDATA, REF
1/20/97 64-DMW RCB
36417085\36417004.DWG



LEGEND:

- SURFACE SOIL SAMPLE LOCATION
- TEST PIT / SOIL SAMPLE LOCATION
- SEDIMENT SAMPLE LOCATION
- SURFACE WATER SAMPLE LOCATION
- SOIL BORING LOCATION
- OVERBURDEN MONITORING WELL LOCATION
- BEDROCK COREHOLE MONITORING WELL LOCATION
- SHADED MONITORING WELL OR COREHOLE INDICATES LNAPL HAS BEEN OBSERVED AT THIS LOCATION
- ABANDONED COREHOLE LOCATION
- RESIDENTIAL WATER SUPPLY WELL LOCATION
- GUY ANCHOR
- UTILITY POLE
- PROPERTY LINE
- APPROXIMATE LIMIT OF QUARRY
- DITCH
- VERTICAL FRACTURE
- TAKEDOWN LOCATION

GENERAL NOTES:

1. ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. CONTOUR INTERVAL = 2 FT.
3. LOCATION OF UNDERGROUND UTILTIES AND OTHER UNDERGROUND STRUCTURES LOCATED BY FIELD MEASUREMENTS WHERE POSSIBLE. OTHERWISE OBTAINED FROM OTHER SOURCES AND MAY BE APPROXIMATE. OTHER UNDERGROUND UTILITIES AND STRUCTURES MAY EXIST, THE LOCATIONS OF WHICH ARE PRESENTLY UNKNOWN.
4. PROPERTY BOUNDARY LOCATED IN THE FIELD BY JOANNE DARCY CRUM, L.S., COBLESKILL, N.Y.
5. SITE SURVEY CONDUCTED BY BLASLAND, BOUCK & LEE, INC., OCTOBER 1992.
6. STORM WATER DRAINAGE SYSTEM AND COBLESKILL CREEK SAMPLING LOCATIONS ARE SHOWN ON FIGURE 2-2.

NIAGARA MOHAWK POWER CORPORATION
M. WALLACE & SON, INC. SCRAPYARD
COBLESKILL, NEW YORK

FEASIBILITY STUDY

SITE SAMPLING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 1-4

GENERAL NOTES:

1. THIS SHEET WAS DEVELOPED FROM THE VILLAGE OF COBLESKILL, NEW YORK, STORM SEWER SYSTEM MAP THIS SHEET HAS BEEN UPDATED UNDER HC 7525 DATED FEBRUARY 1985.

NIAGARA MOHAWK POWER CORPORATION
M. WALLACE & SON, INC. SCRAPYARD
COBLESKILL, NEW YORK

FEASIBILITY STUDY

STORM WATER DRAINAGE SYSTEM AND COBLESKILL CREEK SAMPLING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 1-5

LEGEND:

- GUY ANCHOR
- UTILTY POLE
- PROPERTY LINE
- APPROXIMATE LIMIT OF QUARRY
- DITCH
- ESTIMATED LIMITS OF IMPACTED SOIL
- ESTIMATED LIMITS OF IMPACTED SEDIMENT

40' 0 40'

GENERAL NOTES:

1. ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. CONTOUR INTERVAL = 2 FT
3. LOCATION OF UNDERGROUND UTILTIES AND OTHER UNDERGROUND STRUCTURES LOCATED BY FIELD MEASUREMENTS WHERE POSSIBLE, OTHERWISE OBTAINED FROM OTHER SOURCES AND MAY BE APPROXIMATE. OTHER UNDERGROUND UTILITIES AND STRUCTURES MAY EXIST. THE LOCATIONS OF WHICH ARE PRESENTLY UNKNOWN
4. PROPERTY BOUNDARY LOCATED IN THE FIELD BY JOANNE DARCY CRUM, L.S., COBLESKILL, N.Y.
5. SITE SURVEY CONDUCTED BY BLASLAND, BOUCK & LEE, INC., SEPTEMBER 1993.

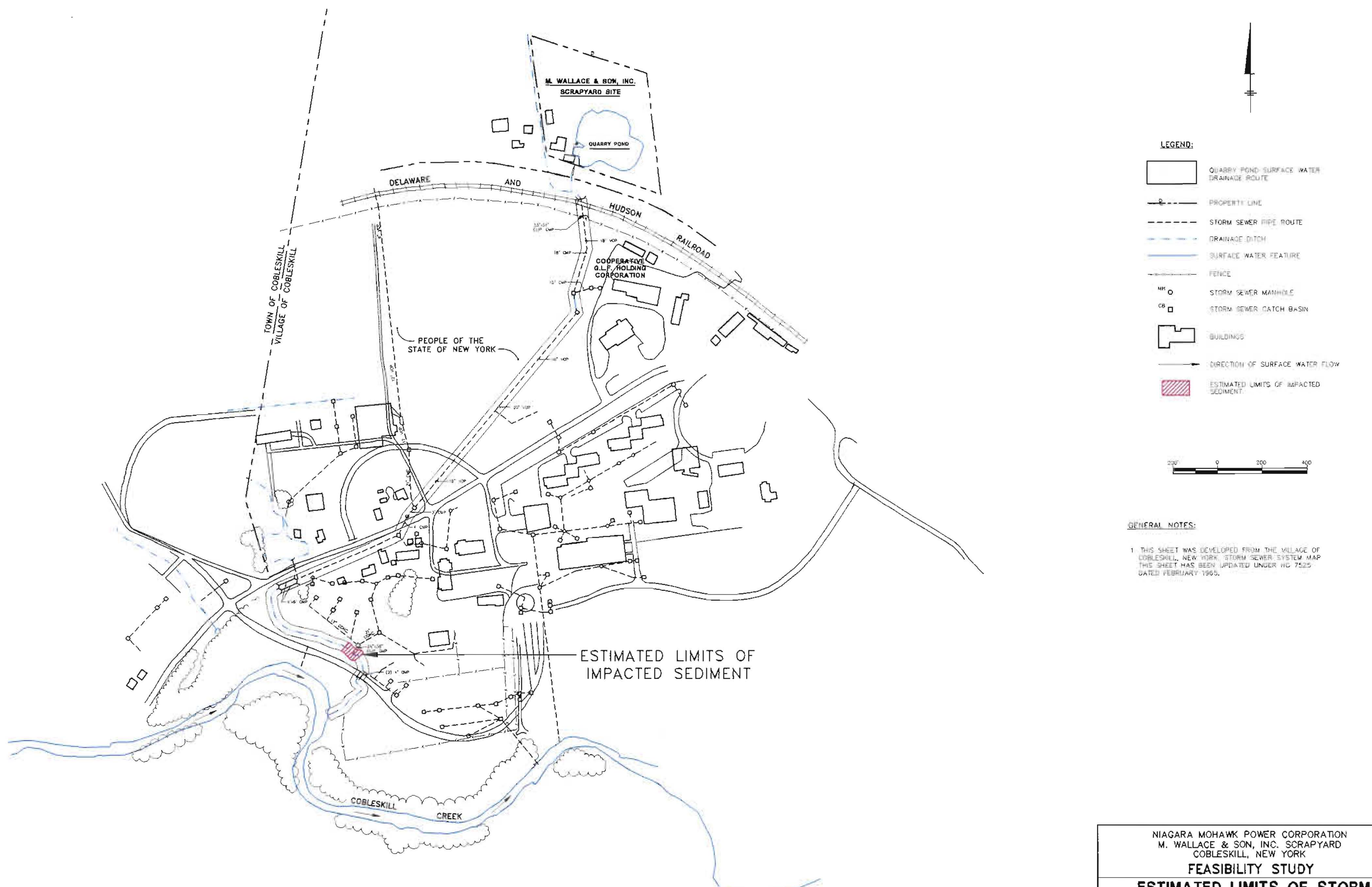
NIAGARA MOHAWK POWER CORPORATION
M. WALLACE & SON, INC. SCRAPYARD
COBLESKILL, NEW YORK

FEASIBILITY STUDY

ESTIMATED LIMITS OF IMPACTED SOIL AND SEDIMENT

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 3-1



GENERAL NOTES:

1. THIS SHEET WAS DEVELOPED FROM THE VILLAGE OF COBLESKILL, NEW YORK, STORM SEWER SYSTEM MAP. THIS SHEET HAS BEEN UPDATED UNDER HC 7525 DATED FEBRUARY 1965.

NIAGARA MOHAWK POWER CORPORATION
M. WALLACE & SON, INC. SCRAPYARD
COBLESKILL, NEW YORK

FEASIBILITY STUDY

ESTIMATED LIMITS OF STORM WATER DRAINAGE SYSTEM IMPACTED SEDIMENT

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 3-2

LAYERS ON = ; LAYERS OFF = 36417X10-36417X03-SPDATA REF
1/20/97 54-DMW RCB
36417085\36417005.DWG

LEGEND:
GUY ANCHOR
UTILITY POLE
PROPERTY LINE
APPROXIMATE LIMIT OF QUARRY
DITCH
MULTI-LAYER VEGETATED CAP AREA
SURFACE SOIL AREA TO BE EXCAVATED
BITUMINOUS ASPHALT CAP AREA
SEDIMENT AREAS TO BE EXCAVATED
GENERAL NOTES:
1. ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929
2. CONTOUR INTERVAL = 2 FT
3. LOCATION OF UNDERGROUND UTILITIES AND OTHER UNDERGROUND STRUCTURES LOCATED BY FIELD MEASUREMENTS WHERE POSSIBLE, OTHERWISE OBTAINED FROM OTHER SOURCES AND MAY BE APPROXIMATE. OTHER UNDERGROUND UTILITIES AND STRUCTURES MAY EXIST, THE LOCATIONS OF WHICH ARE PRESENTLY UNKNOWN.
4. PROPERTY BOUNDARY LOCATED IN THE FIELD BY JOANNE DARCY CRUM, L.S., COBLESKILL, N.Y.
5. SITE SURVEY CONDUCTED BY BLASLAND & BOUCK ENGINEERS, P.C., OCTOBER 1992.
WEST STREET
ELM STREET
QUARRY POND
WOOD FR. BARN
CONC. & METAL BLDG.
PUMP HSE
TREATMENT BUILDING
GRAVEL
TREES & BRUSH
NIAGARA MOHAWK POWER CORPORATION
M. WALLACE & SON, INC. SCRAPYARD
COBLESKILL, NEW YORK
FEASIBILITY STUDY
AREAS TO BE CAPPED UNDER ALTERNATIVE 3
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
5-1

Appendices

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Appendix A - LNAPL Extraction Demonstration

Introduction

A light non-aqueous phase liquid (LNAPL) extraction demonstration was implemented at the site, in accordance with the New York State Department of Environmental Conservation- (NYSDEC-) approved *LNAPL Extraction Demonstration Work Plan* (BBL, June 1996), during the period from June 24, 1996 to August 9, 1996. The purpose of this demonstration was to evaluate the feasibility of recovering LNAPL from the subsurface at two or more monitoring well locations, or from the quarry pond, where LNAPL had been observed during the Remedial Investigation (RI) and Interim Remedial Measure (IRM) activities. The *LNAPL Extraction Demonstration Work Plan* described the project scope and objectives and provided the technical basis of design for the demonstration systems.

A description of the field activities associated with the LNAPL extraction demonstration, along with a summary of the data collected and the results obtained, are presented below. The conclusions regarding the distribution and extent of LNAPL at the site and the characterization of LNAPL at the site are discussed in Section 1.4.5 of the *Feasibility Study (FS) Report* (BBL, October 1997). The feasibility of applying the methods studied to a site-wide effort to remove LNAPL from the subsurface is discussed in Section 4 of the *FS Report*.

LNAPL Extraction Demonstration Field Activities

Prior to commencing the LNAPL extraction demonstration field activities, BBL collected a sample of LNAPL from bedrock monitoring well C-3/MW-8. This sample was submitted to Doble Engineering Company of Watertown, Massachusetts for analysis of physical parameters (density, viscosity, and interfacial tension) needed to determine equipment specifications and to estimate the drawdowns required to potentially mobilize LNAPL during the demonstration. The following table presents the results of these analyses.

LNAPL Physical Parameters	
Physical Parameter/Test Method	**Data**
Viscosity/ASTM D445	58.64 centistokes (at 5 degrees Celsius)
Density/ASTM D1481	0.89 grams/cubic centimeter
Interfacial Tension/ASTM D971	20 dynes/centimeter

In accordance with the *LNAPL Extraction Demonstration Work Plan*, the field activities were conducted in three phases (identified below). During each of these phases LNAPL recovery data and ground-water elevation data were collected and field observations were recorded to monitor and compare the techniques for recovering LNAPL from the subsurface at select site monitoring wells and from the surface of the quarry pond. Prior to conducting the three phases of field work, protective enclosures, electrical supply, and secondary containment storage areas were installed at select monitoring well locations. The three phases of the LNAPL extraction demonstration are described below, followed by a summary of the results.

Phase 1 - LNAPL skimming was performed using a belt skimmer and an electric, product-only skimmer pump at monitoring wells C-13 and C-3/MW-8, respectively. Data regarding the volume of LNAPL skimmed from these two wells during baseline (i.e., no hydraulic manipulation) conditions were obtained between June 26, 1996 and July 2, 1996.

Phase 2 - LNAPL skimming was performed (as described above) concurrent with ground-water pumping at monitoring wells C-13 and C-3/MW-8. In addition, the on-site combined water treatment systems (i.e., the 100 gallon per minute (gpm) and 300 gpm on-site treatment systems) were used to lower the quarry pond water level. LNAPL skimming data, ground-water elevation data, and field observations (e.g., observing the fractures along the north and west wall of the quarry pond for LNAPL seeps) were recorded during this phase of the demonstration designed to mobilize LNAPL by creating hydraulic gradients towards monitoring wells C-13 and C-3/MW-8 and the quarry pond. Phase 2 activities were conducted between July 10, 1996 and August 6, 1996. Prior to initiating pumping at the wells, RI data (e.g., slug tests, packer tests, boring logs) were reviewed to estimate target drawdowns for monitoring wells C-13 and C-3/MW-8. The drawdowns were limited to historically low ground-water elevations observed during previous monitoring activities at these wells [approximately 938 feet above mean sea level (AMSL) at C-13 and 942 feet AMSL at C-3/MW-8].

Phase 3 - Treated water from the on-site 100 gpm water treatment system was injected at monitoring well C-4, concurrent with continued LNAPL recovery at C-13 and C-3/MW-8 and monitoring of the quarry pond for LNAPL seeps. LNAPL skimming data, ground-water elevation data, and field observations were recorded during this phase of the demonstration designed to mobilize LNAPL by enhancing existing hydraulic gradients north of the quarry pond. Phase 3 activities were conducted between August 6, 1996 and August 9, 1996. Floating oil booms were installed in the quarry pond to contain LNAPL (if any) mobilized into the pond as a result of the injection.

In accordance with the *LNAPL Extraction Demonstration Work Plan*, precipitation data for Cobleskill, New York were obtained from the Northeast Regional Climate Center and compared with observed water surface elevations or LNAPL skimming data to evaluate the presence and extent (if any) of precipitation effects and water surface elevations or LNAPL recovered or observed. In addition, pressure transducers were installed at the three test wells (C-3/MW-8, C-4, and C-13) and at three adjacent locations (C-11, C-15, and C-16) and data loggers recorded ground-water elevations during Phase 2 and Phase 3 activities. Daily ground-water elevation measurements were also obtained from each site monitoring well during each phase of the demonstration.

Demonstration Results

A summary of the demonstration results and field observations from the three phases of the demonstration is provided below.

Phase 1 of the LNAPL Extraction Demonstration

- During Phase 1, after the initially present volume of LNAPL was skimmed, the LNAPL recovery rate decreased at both monitoring well locations. The following table presents the estimated volume of LNAPL recovered during each day of the Phase 1 at monitoring wells C-13 and C-3/MW-8, and total LNAPL removed at each location during Phase 1.

Location	Phase 1 - Estimated Volume of LNAPL Recovered (gallons)				
	Day 1 (6/26/96)	Day 2 (6/27/96)	Day 3 (6/28/96)	Day 4 (7/1/96)	Total - Phase 1
C-3/MW-8	0.23	0.047	0.025	0.007	0.31
C-13	0.02	0.007	0.00	0.00	0.03
Note: Recovered volumes of LNAPL were estimated by calculating the volume (area x depth) of LNAPL recovered in a clean container and then multiplying by 7.48 to convert from cubic feet to gallons. Because of the limited amounts of LNAPL recovered, the volumes presented are considered estimates.					

Day 1 (June 26, 1996) LNAPL skimming was ceased overnight and LNAPL was allowed to equilibrate in the wells. Continuous LNAPL skimming was conducted during the remainder of Phase 1.

Phase 2 of the LNAPL Extraction Demonstration

- During Phase 2 ground-water pumping and LNAPL removal at C-13 and C-3/MW-8, an initial increase in LNAPL recovered, compared to Day 4 of Phase 1 recovery, was observed at both locations. At C-3/MW-8, the LNAPL recovery rate increased (compared to Day 4 of Phase 1) during pumping from the well, but much less than the relative increase at C-13. The following table presents the static ground-water elevation data (measured prior to beginning pumping), the pumping rates and ground-water level drawdowns, and the LNAPL recovery data from Phase 2 ground-water pumping activities.

Phase 2 - Water Surface Elevations, Pumping Rates, and Estimated LNAPL Recovery Volumes									
Day (Date) Duration of Pumping	C-3/MW-8				C-13				Quarry Pond Elev. (AMSL)
	Static Water Level (AMSL)	Average Pumping Rate (gpm)	Draw-down (ft)	LNAPL Rec.* (gal)	Static Water Level (AMSL)	Average Pumping Rate (gpm)	Draw-down (ft)	LNAPL Rec.* (gal)	
1 (7/10/96) 7 hours	947.9	1.0	0.4	0.02	956.0	0.033	17	0.00	947.9
2 (7/11/96) 4 hours	947.9	3.0	0.9	0.03	948.7	0.023	12	0.015	947.9
3 (7/11/96 7 hours	947.9	4.3	1.3	0.03	948.8	0.023	12	0.06	947.9
4 (7/16/96) 25 hours	953.9	6.0	3.5	0.08	957.6	0.023	18	0.06	951.3
5 (8/5/96) 24 hours	946.6	6.5	3.2	0.02	952.1	0.018	14	0.00	946.5
Estimated Total Phase 2 LNAPL Recovered (gallons)				0.18	Estimated Total Phase 2 LNAPL Recovered (gallons)			0.14	

Note:
* = Recovered volumes of LNAPL were estimated by calculating the volume (area x depth) of LNAPL recovered in a clean container and then multiplying by 7.48 to convert from cubic feet to gallons. Because of the limited amounts of LNAPL recovered, the volumes presented are considered estimates.

- During Phase 2 ground-water pumping, a maximum discharge rate of greater than 6 gpm resulted in a maximum drawdown of approximately 3.5 feet at C-3/MW-8, while at C-13, average pumping rates ranging from 0.018 to 0.033 gpm provided 12 to 18-foot drawdowns.

- The total LNAPL recovered at C-13 during Phase 2 pumping (0.14 gallons) was greater than the amount recovered during Phase 1 (0.03 gallons). However, by the fifth day of Phase 2, there was no additional LNAPL recovery at C-13. At C-3/MW-8, total Phase 2 recovery was less than the volume recovered during Phase 1.

- Based on the Northeast Regional Climate Center records for Cobleskill, New York, a total of 9.10 inches of rain fell during July 1996. Major rainfall events occurred on July 13 and 14, 1996 (prior to the fourth day of Phase 2 pumping), and on July 20 and 26, 1996 (between the fourth and fifth days of phase 2 pumping). The changes in the water levels measured in the six coreholes (C-3, C-4, C-11, C-13, C-15, and C-16) in response to these storm events were similar to water level changes observed during storm events on April 13 and 19, 1995 (reported in the RI Report). The peak water elevations during the 1996 storm events were generally higher by 2 to 3 feet than the peak water levels during the 1995 storm events except at C-13 and C-15, where peak water elevations were over 6 to 10 feet higher, respectively. During the January 1996 thaw, the highest water levels observed (although these measurements were not continuous) were generally similar to the peak elevations observed during April 1995 storm events except at C-13 and C-15 where the highest elevations were over 10 feet greater.

- The combined water treatment system was operated on a continuous basis from July 29, 1996 through August 6, 1996 to lower the quarry pond surface. Pumping rates of 350 gpm to 400 gpm were maintained throughout this period, resulting in a 7.5 foot drawdown of the quarry pond over the period (from approximately 952.5 feet AMSL to approximately 945 feet AMSL). Delay of the final day of Phase 2 monitoring well pumping was necessary so that this test could be implemented when the static ground-water elevation at C-3/MW-8 was lower than those observed during Phase 1.

- During Phase 2 pumping of the quarry pond with the combined water treatment systems, observations for LNAPL seeps were conducted a minimum of three times daily. No LNAPL was observed entering the quarry pond as the water surface level decreased from 952.5 feet AMSL to approximately 945 feet AMSL over the period from July 29, 1996 through August 6, 1996. During this period, the LNAPL recovery systems at C-3/MW-8 (product-only skimmer pump) and C-13 (belt skimmer) were operated on a continuous basis and monitored at least three times per day. At monitoring well C-13, no LNAPL was measured (or skimmed) during this period and the volume of LNAPL measured (and recovered) at C-3/MW-8 was less than 0.02 gallons per day.

Phase 3 of the LNAPL Extraction Demonstration

- During the Phase 3 water injection, an injection rate of less than 0.5 gpm at C-4 maintained a ground-water elevation which was approximately 20 feet above the static water level. At C-3/MW-8 a water injection rate of approximately 10 gpm produced a ground-water elevation of approximately two feet above the static ground-water level. Based on the ability to maintain the higher elevation at C-4, Phase 3 water injection was conducted at this location.

- During the three day injection period (August 6, 1996 through August 9, 1996) ground-water seepage into the quarry pond was observed at three locations along a horizontal bedding plane in the rock ledge adjacent to monitoring well C-4. The first seep was observed adjacent to C-4 approximately 0.5 hours after injection commenced and the other two seeps were observed at increasing distances from the well approximately 6 and 24 hours later, respectively. An LNAPL sheen was present on the surface of the pond during water injection at C-4. The sheen was contained between the floating oil booms and the bedrock ledge, but no measurable thicknesses of LNAPL were observed.

During the period following the demonstration, biweekly monitoring of LNAPL thicknesses and ground-water elevations along with the removal of LNAPL (when practicable), has been continued as part of the IRM described in Section 1.3.4 of the *FS Report*. The data from this biweekly monitoring, summarized in Table 1, indicate that the LNAPL depletion at C-3/MW-8 and C-13 observed during the LNAPL extraction demonstration exhibited minimal recovery during the first two months following the demonstration. During the period from October 16, 1996 through March 20, 1997, LNAPL thicknesses observed at C-13 remained minimal (maximum thickness of 0.04 feet). LNAPL has not been encountered in measurable thicknesses at C-13 since March 20, 1997. LNAPL thicknesses at C-3/MW-8 have increased (maximum thickness of 1.71 feet) to thicknesses comparable to predemonstration thicknesses at that location.

Table 1

Niagara Mohawk Power Corporation
M. Wallace & Son, Inc. Scrapyard
Cobleskill, New York

LNAPL Thicknesses and Quantities of LNAPL/Water Bailed from Monitoring Wells C-3/MW-8 and C-13 Since the End of the LNAPL Extraction Demonstration (8/9/96)

Date	Monitoring Well Location			
	C-3/MW-8		C-13	
	LNAPL Thickness (ft)	LNAPL/Water Bailed (gal)	LNAPL Thickness (ft)	LNAPL/Water Bailed (gal)
8/16/96	0.03	0.0	0.01	0.0
8/29/96	0.01	0.0	0.0	0.0
9/10/96	0.06	0.0	0.0	0.0
9/10/96	0.08	0.0	0.0	0.0
10/16/96	0.50	0.25	0.0	0.0
10/30/96	0.17	0.0	0.0	0.0
11/14/96	0.43	0.25	0.0	0.0
11/25/96	0.30	0.25	0.0	0.0
12/11/96	0.20	0.0	0.04	0.0
12/31/96	0.01	0.0	0.0	0.0
1/14/97	0.19	0.25	0.01	0.0
1/29/97	1.71	0.0	0.02	0.0
2/18/97	0.41	0.25	NA	0.0
3/6/97	0.27	0.25	0.0	0.0
3/20/97	0.41	0.25	0.0	0.0
4/2/97	0.07	0.25	0.0	0.0
4/16/97	0.15	0.25	0.0	0.0
5/8/97	0.38	0.75	0.0	0.0
5/20/97	1.02	0.50	0.0	0.0
6/11/97	0.85	0.75	0.0	0.0
6/24/97	0.82	0.75	0.0	0.0
7/10/97	0.76	0.50	0.0	0.0

Table 1

Niagara Mohawk Power Corporation
M. Wallace & Son, Inc. Scrapyard
Cobleskill, New York

LNAPL Thicknesses and Quantities of LNAPL/Water Bailed from Monitoring Wells C-3/MW-8 and C-13 Since the End of the LNAPL Extraction Demonstration (8/9/96)

Date	Monitoring Well Location			
	C-3/MW-8		C-13	
	LNAPL Thickness (ft)	LNAPL/Water Bailed (gal)	LNAPL Thickness (ft)	LNAPL/Water Bailed (gal)
7/22/97	0.13	0.25	0.0	0.0
8/5/97	0.17	0.25	0.0	0.0
8/21/97	0.21	0.25	0.0	0.0
9/3/97	0.28	0.25	0.0	0.0
9/19/97	0.28	0.25	0.0	0.0
9/30/97	0.19	0.25	0.0	0.0
10/17/97	0.19	0.25	0.0	0.0
10/28/97	0.23	0.25	0.0	0.0

Note:

NA = not accessible