MALCOLM PIRNIE

FINAL

REMEDIAL INVESTIGATION REPORT

Volume 1

Prepared For:

LAPP Insulator Company

September 2005

2932-015

Submitted by:
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Introduction

SECTION 1

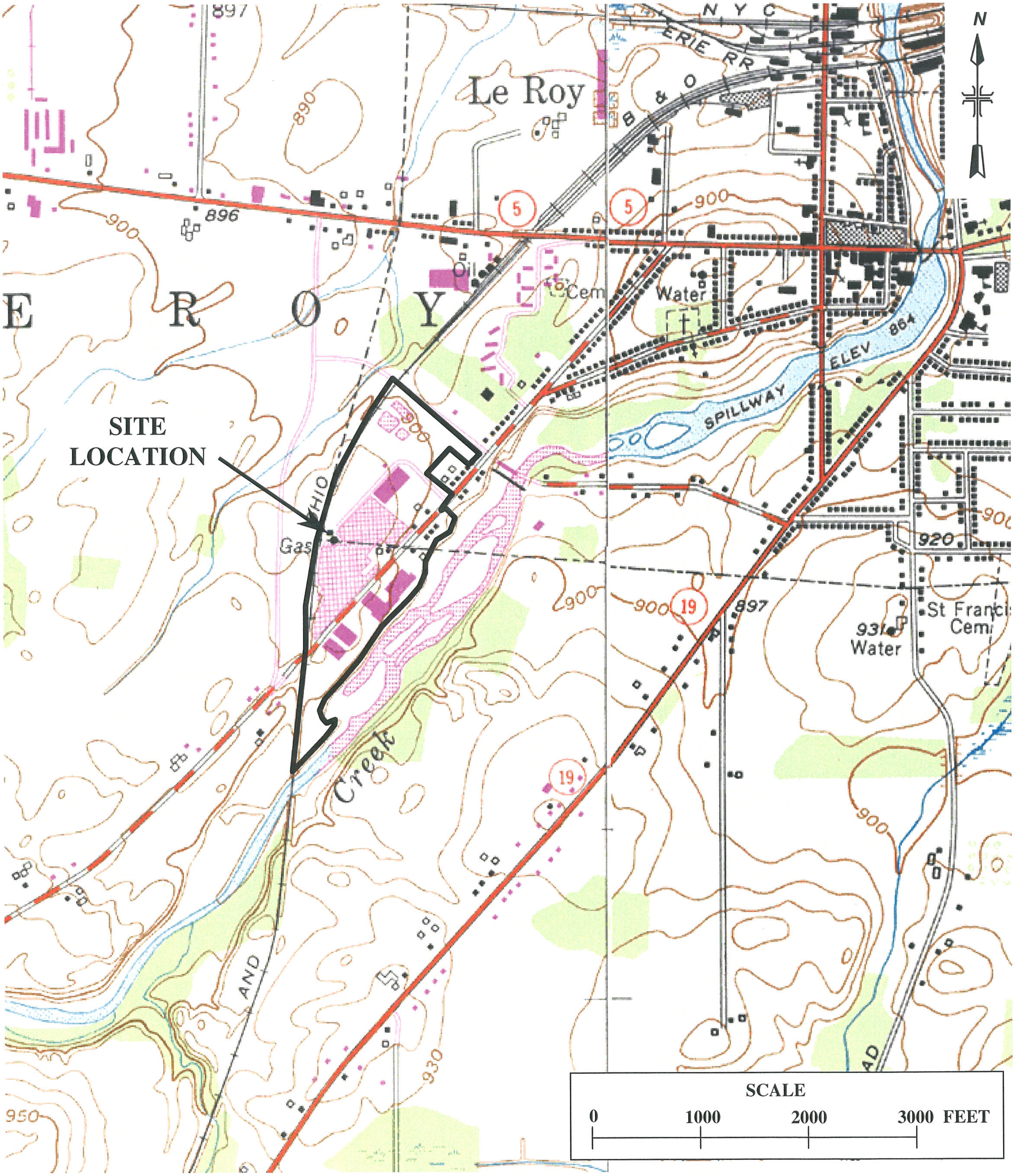
1.1 Purpose and Scope

Malcolm Pirnie Inc. (Malcolm Pirnie), on behalf of the Lapp Insulator Company, LLC (Lapp), performed a Remedial Investigation (RI) of Lapp's ceramic insulator manufacturing facility located in the Town and Village of LeRoy, New York. Lapp's LeRoy site is classified by the New York State Department of Environmental Conservation (NYSDEC) as a Class 2 inactive hazardous waste (Site No. 819017) based on the presence of known volatile organic compounds (VOCs) in on-site soils and groundwater. This RI was performed as required, and in accordance with, the requirements of Order On Consent No. B8-0548-99-02 issued by the NYSDEC and signed by Lapp on August 8, 2001. The Order on Consent requires the completion of an RI and a subsequent Feasibility Study (FS) to identify and mitigate, if necessary, any contamination which poses a potentially significant threat to public health or the environment.

This report provides a description of the RI tasks performed and findings of the RI including quantification of the potential risks posed by the site contaminants and recommendations for future investigative or remedial activities.

1.2 Site Description and Location

The Lapp site is an active manufacturing facility engaged in the production of ceramic insulators and transformer bushings used for electrical transmission. The facility is located on approximately 80 acres of land on either side of 130 Gilbert Street in the Village and Town of Leroy, New York (Figure 1-1). The site is bordered to the west by the B&O Railroad tracks, to the north by Munson Street and to the east and south by Oatka Creek (see Figure 1-2).



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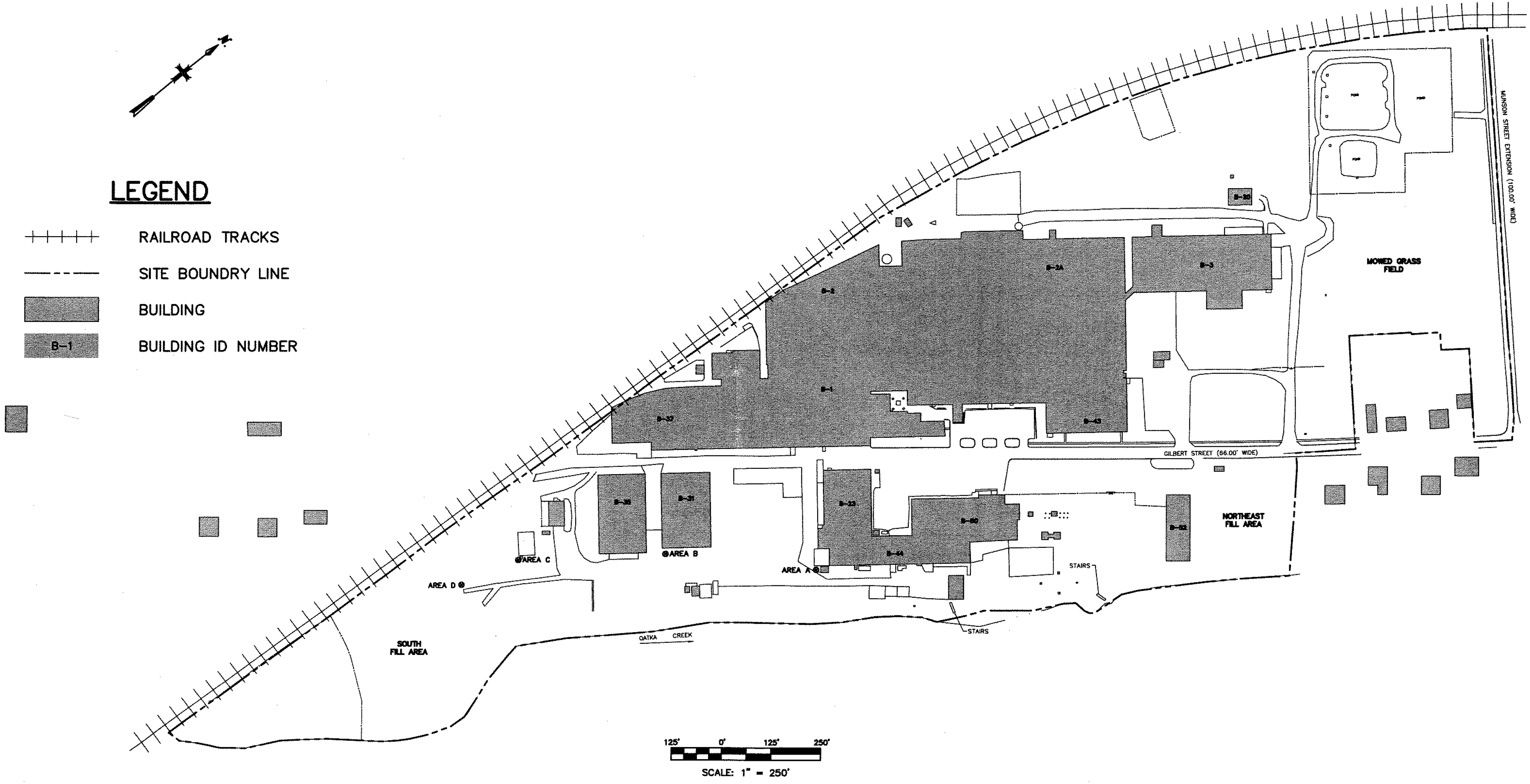
Project No.: 2932-015

LAPP INSULATOR COMPANY
LEROY, NEW YORK
REMEDIAL INVESTIGATION REPORT

FIGURE 1-1
SITE LOCATION MAP

Site location map.ppt



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LAPP INSULATOR COMPANY, LLC
LEROY, NEW YORK

FIGURE 1-2
SITE MAP

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The manufacturing and production of insulators and transformer bushings began at the site in 1917. Historical records indicate that oils, petroleum based products, and chlorinated solvents; including 1,1,1- trichloroethane (TCA), trichloroethene (TCE), and tetrachloroethene (PCE), were stored and utilized for production at the Lapp site, primarily on the east side of Gilbert Street. Two remote areas of the site, referred to as the Northeast and South fill areas have been used for the disposal of inert materials, primarily crushed ceramic insulators. During the late 1980's and early 1990's, remedial tank closures were completed at the site resulting in the removal and closure of all on-site storage tanks used to containerize underground oil and solvents and 787 tons of petroleum-contaminated soil was removed from a former fuel tank area and disposed off-site.

1.3 Site Background and History

Previous investigations conducted to assess environmental conditions at the site include:

- Phase I Environmental Due Diligence Examination (ENSR, 1991)
- Phase II Environmental Due Diligence Examination (ENSR, 1992)
- Phase I Site Characterization Report (ENSR, 1995)
- Supplemental Site Soil Characterization (Haley & Aldrich, 1995)

Based on the results of these investigations, and despite implementation of an interim remedial measure (IRM) that included the installation of a soil vapor extraction (SVE) system directed at three "hot spots" of soil and shallow groundwater VOC contamination, the NYSDEC concluded that further investigation was warranted.

RI work activities required under the Order on Consent are presented in the November 2000 RI/FS Work Plan, which contains a Quality Assurance Plan (QAP) as well as appended Health and Safety Plan (HASP) and a Citizen Participation Plan (CPP). The details of the previous investigations are presented in Section 3.0 of this work plan.

The first of two phases of RI work activities began in October 2001with site characterization tasks, installation of an upgradient deep bedrock monitoring well, and sampling of several media including soil, groundwater, surface water and sediments. Results of the Phase I RI were submitted to the NYSDEC in the form of a Technical Memorandum in November 2002, (Malcolm Pirnie, Inc. - Nov.2002). The second phase of investigation was performed to confirm and expand upon the information obtained from the initial phase. The Phase II field program was performed in July and August 2003. This RI report provides the results of both phases of remedial investigation at the Lapp Site.

1.4 Report Organization

Section 2 of this RI report provides a detailed description of site features including physiography, climate, and soils of the site. Section 3 provides a summary of previous investigations and remedial actions performed. Section 4 presents an overview of the field activities conducted during the RI. Section 5 presents the hydrogeology of the site subsurface. The validity and usability of the RI data collected is presented in Section 6 and Section 7 summarizes the nature and extent of contaminants detected on-site. Section 8 and 9 present evaluations of human health and ecological risks, respectively. Section 10 presents a summary of the investigation findings.

Physical Setting

SECTION 2

2.1 Land Use and Demography

Located in Genesee County, the Lapp facility is situated within the Village and Town of Leroy, New York. Since 1917 Lapp has been actively engaged in the manufacture and production of ceramic insulators and electrical transformer bushings. The Lapp site is located on three parcels. The larger one encompasses approximately 80 acres, of which approximately 66 acres have been developed and are currently being utilized for manufacturing purposes, see Figure 1-2. The remaining two contiguous, undeveloped parcels that comprise approximately 14 acres are situated west of the adjacent B&O Railroad and are bordered to the west by East Bethany-Leroy Road and lie in a fallow condition.

The Lapp site is flanked along its eastern perimeter by multiple distributary channels of Oatka Creek. Located immediately adjacent and to the north of the site are single dwelling residences and community/public properties along Munson Street. The B&O Railroad forms the south and western-most perimeter of the actively used portion of the site. Land situated west of the site is a mix of wooded lots interspersed with small agricultural tracts. The nearest single-family dwelling is located within 100 feet of the site in a residential area north of the site on Gilbert Street. Additional homes are located within 200 feet from the southern portion of the site along Bethany-LeRoy Road.

2.2 Topography

The Lapp site is located within the flat-lying Erie-Ontario Lowlands physiographic province. Topographic relief within a 2-3 mile radius of the site ranges from a low elevation of approximately 700 feet above mean sea level (amsl) along Oatka Creek to a maximum elevation of approximately 1,000 feet amsl approximately one mile from the Site on either side of the Oatka Creek valley.

Topographic features of the area are primarily glacially derived landforms. These features include moraines, glacial outwash plains and other types of glacial deposits. The site topography is nearly flat, dipping slightly from west to east toward Oatka Creek. The maximum relief of the site is a precipitous drop in elevation of approximately 30 feet at the steep rock bank at the adjacent Oatka Creek.

2.3 Drainage

Genesee County is located within the Lake Ontario drainage basin. The interior of the county is drained by dendritic secondary and tertiary feeder streams such as Oatka Creek that coalesce into the northward flowing Genesee River that passes through the City of Rochester and ultimately discharges into Lake Ontario at an approximate elevation of 245 feet above mean sea level.

The site property drains in an easterly direction toward Oatka Creek via surficial sheet flow. Oatka Creek flows as a single channel from the southern property line, which is upstream of the railroad bridge, to approximately the northern edge of an area identified as the Southern Landfill. At this point, Oatka Creek splits and a minor channel flows at a lesser velocity along the eastern bank of the site (western bank of the creek). Well-established islands of soil and wetland vegetation divide Oatka Creek. The minor channel varies in size from approximately 3 to 8 feet deep and 50 to 75 feet wide. The main channel east of the islands varies in size from approximately 1 to 12 feet deep and 75 to 150 feet wide. The distance from Lapp's eastern bank to the main channel varies between 150 and 350 feet. The minor channel rejoins the main channel immediately upstream of the Red Bridge Dam.

2.4 Climate

The climate of the Lapp site area is characterized as temperate continental and is influenced by air masses and weather systems that originate over land areas of the North American continent. Cold, dry weather prevails when the airflow is from the northwest.

Conversely, warmer more humid weather prevails when airflow is from the south and southwest. The site climate can be generally defined as follows:

- 30 year Mean Average Annual Precipitation = 34 inches
- 30 year Mean Average Annual Temperature = 48° F
- Maximum Average Annual Temperature = 57° F
- Minimum Average Annual Temperature = 39° F

In general, the precipitation ranges from a minimum of about 2.5 inches per month in the winter and spring to approximately 3 inches per month in summer and fall. The National Weather Service operates a weather station at the City of Rochester airport located approximately 20 miles northeast of the Site. Detailed monthly precipitation and temperature records were obtained from the weather station for the period of time from 1940 to 2002.

Great Lakes Erie and Ontario have a moderating effect on the climate of the site. The mechanism for the moderating effect lies with increased moist airflow over open lake waters that extend seasonal periods of cloudiness and lake effect precipitation. Summers are pleasantly warm; and the temperatures cool when dry air from the higher latitudes of the continent are pushed into the region by the jet stream.

The maximum daytime temperatures in the summer usually range from the upper seventies to the mid-eighties, with occasional nineties recorded in the valleys. The average daytime temperature in the winter usually ranges from the middle twenties to the mid-thirties, but extreme temperatures of minus twenty have been recorded. Killing frosts can occur in spring as late as May 20th and in autumn as early as September 25th.

2.5 Soils

The soils throughout Genesee County are derived from both lacustrine and glacial sediments. The soils on most of the uplands in southern Genesee County developed from glacial till, with prevalent usage limitations hampered by slope and seasonal moisture conditions. The valleys are dominated by soils formed as a result of glacial outwash and fluvial sorting. In locations where drainage is uncontrolled, wetlands and associated soils are predominant. Wet spots or flooding problems may be associated with soils in flat, stagnant low-lying areas.

The native soil cover in the immediate vicinity of the Lapp site consists of deep, well-drained soils derived from glacial till and developed on level to steeply sloping topography. Till deposits consist of a thick, unstratified, unsorted mixtures of particles ranging from clay to rock fragments. In northern Genesee County, dependent upon the underlying shale or limestone bedrock stratigraphy, an elevated supply of potassium, phosphorus and carbonate mineralogy has been imparted to the unconsolidated sediments.

Generally, one soil series characterizes the soils within the immediate Lapp site area. The Ontario loam (gently sloping phase) has developed a moderate soil profile with thicknesses that may range from 24 to 48-inches (USDA, 1969). In a representative profile, the Ontario loam consists of a 6-10 inch dark brown organic loam surface soil. Immediately below the surface soil, a fine sandy loam extends to approximately 12 to 16 inches. The underlying red-brown subsoil horizon is characterized with increased clay content and is described as loam or clayey loam. With increasing depth, a heavy firm brown clay loam with some gravel and a blocky structure can develop in calcareous loamy till. Below 24-inches, the sediment consists of a gray-brown calcareous till with faint mottling characterizing the unsaturated zone.

2.6 Regional Geology and Hydrogeology

2.6.1 Regional Overburden Geology

Unconsolidated overburden material in the region consists of glacially deposited clay, silt, sand and gravel. The glacial deposits in the region compose landforms such as drumlins, moraines, kames and eskers as well as an unsorted, clay-sand-gravel till. Undifferentiated glacial till generally forms the foundation of the land surface in upland areas and is present on top of the bedrock throughout the area.

2.6.2 Regional Bedrock Geology

The uppermost bedrock strata identified beneath the site are horizontally bedded shale and limestone of the Middle Devonian series. On a regional scale, the Levanna shale and Stafford limestone of the Skaneateles Formation, Oatka Creek shale of the Marcellus formation, and the Onondaga Limestone bedrock dips gently to the south at approximately 15 feet per mile; thus, successively younger bedrock units are exposed toward the south. A detailed description of the bedrock stratigraphy underlying the Lapp facility site is provided in Section 5.2.2.

2.6.3 Regional Hydrogeology

Regional Overburden Hydrogeology

Unconsolidated deposits in the vicinity of the site were mapped by Kammerer and Hobba (1986) as undifferentiated glacial till which is described as an unsorted clay-sand-gravel mixture. Well yields in these units are generally less than 1 gallon per minute (gpm).

Regional Bedrock Hydrogeology

Regionally, the most widely used aquifer is the Onondaga Limestone. Saturated conditions in this formation occur due to primary and secondary porosity features including joints and bedding planes, some of which have been widened by solution of the carbonate bedrock. Wells completed in this unit have a range of yields from 5 to 160 gpm, with a median yield of 10 gpm (Gibert and Kammerer, 1971).

Summary of Previous Investigations and Remedial Actions

SECTION 3

3.1 General

A summary of previous investigations completed at the Lapp site is presented below, followed by a discussion of remedial measures implemented at the site to date.

3.2 Previous Environmental Investigations

September 1991 ENSR Phase I Due Diligence Examination - ENSR Consulting and Engineering (ENSR) completed a Phase I due diligence study in September 1991. Through this study ENSR identified the potential for on-site soil and/or groundwater contamination and recommended a Phase II investigation be performed to collect analytical data.

January 1992 ENSR Phase II Due Diligence Examination - In January 1992 ENSR conducted a preliminary subsurface investigation as part of the Phase II that included the drilling and sampling of approximately 40 borings and installation of 3 overburden groundwater monitoring wells (MW-1, MW-2, and MW-3). Soil and groundwater samples were collected at all locations and analyzed for target compound list (TCL) volatile organic compounds (VOCs), priority pollutant metals, and total petroleum hydrocarbons (TPH). The areas of investigation for this preliminary field program were selected based on the information gathered during Phase I.

This Phase II investigation identified VOC contamination at many of the sampling locations, including all of the underground storage tank (UST) areas. VOC contaminants included BTEX and low levels of chlorinated solvents. Total petroleum hydrocarbons

(TPH) were also found at all of the sites tested. Additionally, varying levels of metals were found in the soils, although the values were all below RCRA Corrective Action Levels. Elevated VOC and metal (e.g., lead, cadmium) concentrations were also found in the three groundwater wells sampled.

July 1994 ENSR Site Characterization - This investigation was conducted to augment and verify the analytical results of the 1992 sampling event, and included the completion of additional subsurface borings and installation of more overburden groundwater-monitoring wells. Each of these locations as well as four sediment and two surface water locations were sampled. Samples collected during this event were submitted for TCL VOCs, TCL semi-volatile organic compounds (SVOCs), and priority pollutant metals analyses. The 1992 analytical results were verified by this site characterization.

June 1995 H&A Supplemental Site Soil Characterization - Haley & Aldrich of New York (H&A) completed more than 65 test borings in areas that were found to contain petroleum products in the soil during the 1992 Phase II. In the following months of July and August, H&A completed 135 test borings in three areas that were found to contain VOCs in soil during the 1994 investigation and installed 12 bedrock groundwater monitoring wells (6 shallow rock wells labeled SR-1 through SR-6 and 6 intermediate rock wells labeled IR-1 through IR-6).

Samples collected in June 1995 were analyzed for petroleum-related VOCs and SVOCs. H&A reported that VOCs and SVOCs were found in many of the samples at the former UST area and former drum rack area, but that no petroleum-related VOCs or SVOCs were found at the former drum crushing area. Free product was observed in one of the soil samples.

The July and August 1995 samples were analyzed for TCL VOCs. H&A reported that chlorinated VOCs were detected at the former machine shop area, chlorinated and petroleum-related VOCs and BTEX compounds were found near the Building 31 area, and chlorinated VOCs were found near the hazardous materials area. These three areas were subsequently called "Hot Spot" areas A, B, and C respectively.

December 1995 Interim Remedial Measures (IRMs) - In December 1995 Lapp implemented interim remedial measures (IRMs) designed by H&A. The three hot spot areas were addressed with a soil vapor extraction (SVE) system:

- VEW – 1: VEW-1 was installed directly southeast of the sump at the southern corner of the former hazardous waste storage pad.
- VEW – 2: VEW-2 was installed approximately 40 feet southeast of the southern corner of the B-31 warehouse building.
- VEW – 3: VEW-3 was installed directly adjacent to the southern corner of the B-23 machine shop building. This installation was inside a small building, which also housed the SVE equipment (e.g., blower, activated carbon).

The blower inside the VEW-3 housing supplied the vacuum to all three wells. Piping to VEW-1 and VEW-2 was installed within a trench extending from VEW-3 southwest along a linear path to VEW-1 and VEW-2. VEW 1 and 2 were designed as conventional soil vapor extraction (SVE) units. VEW 3 was designed as a 2-PHASE Extraction system. 2-PHASE Extraction is a patented process where liquid and vapor are simultaneously extracted from the well with a single pipe. In September 1999 the system was shut off due to questions about its effectiveness at removing contamination from the site.

April and July 1996 H&A Sampling of Surface Water - In April and July of 1996, H&A collected samples of sediment and surface water from Oatka Creek. Lab results indicated the presence of 1,1,1-TCA and TCE in upstream, downstream, and one intermediate sample location at a peak concentration of 0.018 ppm. Since upstream samples contained the contaminants, H&A determined that the origin of these contaminants might be from an upstream source. Sediment sample analysis identified acetone and H&A cited weathering of organic material as a possible natural source.

June 1996 H&A Risk Assessment Report - In June 1996 H&A completed a risk assessment of contaminated groundwater pathways for the Lapp facility at LeRoy, NY. The risk assessment did not identify an unacceptable risk for either non-carcinogenic or carcinogenic effects for the groundwater exposure scenario. The report also concluded that the IRM system was continuing to have a positive impact in removing VOCs from soils and groundwater at the three source areas.

July 1996 to March 1999 Quarterly Monitoring **-** From July 1996 to March 1999 H&A performed quarterly groundwater monitoring of the 12 bedrock groundwater monitoring wells that were sampled to monitor the effectiveness of soil vapor extraction systems that had previously been installed at three hot spots as an IRM.

The following sections provide an overview, by media, of the conclusions that can be drawn from the environmental sampling efforts conducted at the site prior to the performance of this RI. A detailed summary of sampling analytical results was presented in the approved RI work plan that defined the basis for the RI scope of work.

3.2.1 Groundwater

Groundwater was sampled at the site during the preliminary and follow-up investigations completed in 1992, 1994 and 1995. In 1992, overburden groundwater monitoring wells were sampled and analyzed for TCL VOCs and priority pollutant metals. In 1994/1995, both overburden and bedrock groundwater-monitoring wells were sampled and analyzed for TCL VOCs. The following is a summary of the groundwater sample results presented by contaminant category.

VOCs in Groundwater

Results of groundwater samples collected from overburden wells in 1992 and 1994 contained elevated concentrations of several chlorinated VOCs. Significant concentrations of similar chlorinated VOCs were detected in overburden wells in the vicinity of the three known hot spot areas.

The volatile organic compounds most frequently and consistently detected in groundwater samples collected from the bedrock wells are the chlorinated solvents 1,1,1-trichloroethane, 1,1-dichloroethane, and trichloroethene. Reported concentrations of these VOCs are consistent with the historical solvent usage operations and storage practices at the site. The highest concentrations of these compounds have been detected in the shallow bedrock in the vicinity of the former machine shop area, with lesser concentrations detected north of this area and south of the former hazardous materials pad area.

Metals in Groundwater

Elevated concentrations of five priority pollutant metals were detected in the overburden monitoring wells during the 1992 preliminary investigation. Five of the metals detected (beryllium, chromium, copper, lead, and nickel) in the overburden well (MW-2) exceeded Class GA standards. With the exception of copper, these metals were not detected in any soil samples collected from the site. No further characterization of metals in groundwater was performed in these or any other additional wells.

3.2.2 Soil

During the 1992 and 1994 field programs, surface and subsurface soil samples were collected. In 1992, the soil samples were analyzed for TCL VOCs, priority pollutant metals, and TPH. In 1994, the soil samples were analyzed for TCL VOCs, TCL SVOCS, and priority pollutant metals. The July/August 1995 investigation focused on the three known hot spot areas A, B, and C found to contain VOCs. The following subsections summarize conclusions that can be drawn from the data.

VOCs in Soil

The conclusion drawn from the 1992 and 1994 subsurface soil sample collection efforts were that high concentrations of 1,1,1-trichloroethane and trichloroethene existed in three areas: the former hazardous materials pad area, Building 31 area, and the former machine shop area.

In July and August 1995, soil samples collected from test borings completed within the hot spot areas were field-screened and selected soil samples submitted for TCL VOCs analysis. Results are summarized below.

Hazardous Materials Pad Area: Tetrachloroethene, trichloroethene and 1,1,1-trichloroethane were detected in subsurface soil at concentrations greater than guidance values presented in TAGM 4046.

Building 31 Area: BTEX compounds were detected near the approximate location of former gasoline USTs. The chlorinated solvent compounds 1,1,2-trichloroethane, 1,1,1-

trichloroethane, and cis-1,2-dichloroethene were also detected but at concentrations less than TAGM 4046. Trichloroethene was detected at concentrations slightly above TAGM 4046.

Former Machine Shop Area: Soil samples collected southwest of the former underground storage tank contained acetone, 1,1,1-trichloroethane, and trichloroethene at concentrations above TAGM 4046 guidelines. Other subsurface soil samples submitted for analyses contained elevated concentrations of 1,1-dichloroethene, 1,1-dichloroethane, and trichloroethene.

SVOCs in Soil

Only one SVOC (4-chlori-3-methylphenol) was detected above TAGM 4046 in one subsurface soil sample south of the former hazardous materials pad area. Other SVOCs were detected in the vicinity of the South fill area, but at concentrations below TAGM 4046 standards.

Metals in Soil

In 1992, arsenic and zinc were detected in shallow soils [< 1-foot below ground surface (bgs)] throughout the site at concentrations above TAGM 4046 standards and above average Eastern U.S. background concentrations identified by the USEPA.

TPH in Soil (Total Petroleum Hydrocarbons)

In June 1995, a supplemental investigation was conducted in three areas of petroleum-contaminated soil identified during the 1992 preliminary investigation. Sub- surface soil samples were submitted for analysis of petroleum-related VOCs and SVOCs in accordance with the NYSDEC Stars Memo No. 1 (STARS Memo). Based on the detection of elevated concentrations of petroleum by-products, the areal and vertical extent of contamination was delineated and an interim remedial measure (IRM) was implemented to remove impacted soils.

3.2.3 Surface Water and Sediment

Surface water and sediment were collected at sampling locations upstream, adjacent to, and downstream of the Lapp facility during sampling events completed in 1994 and 1996. The samples were analyzed for TCL VOCs during both events.

Analytical results of surface water and sediment samples collected during the 1994 sampling event indicate that no VOCs could be conclusively identified. Low concentrations of chloroethane and chloromethane were detected only in the sediment samples collected adjacent to the site. These compounds were not detected in any surface water samples and have not been detected in site soils.

Low concentrations of 1,1,1-trichloroethane and trichloroethene were detected in the surface water samples collected upstream and adjacent to the site. Low concentrations of 1,1-dichloroethane were detected in surface water samples collected adjacent to the site. These three compounds have consistently been detected in groundwater collected from shallow and intermediate bedrock monitoring wells. Trichloroethene and 1,1,1-trichloroethane have also been detected at concentrations above TAGM 4046 in soil samples collected from the Building 31 area and former machine shop area. The furthest downstream sediment sample contained 1,1-dichloroethane and 1,1,1-trichloroethane in both sediment and surface water. However, due to the sampling location, the source of these compounds could not reliably be established because other contributors were possible.

3.3 Remedial Action

Laboratory analysis results indicated that petroleum compounds were present above the STARS Memo Guidance values, and thus, remedial activity consisting of removal of the impacted soils was undertaken. A total of 787 tons of soil was removed from August 28 to September 5 1995 from the former fuel oil tank area adjacent to the property line north-west of Building 2. The excavated soil was disposed at Waste Management of New York's High Acres Landfill in Perinton, New York. NYSDEC Region 8 stated in a January 3, 1996 letter that the areas identified as being contaminated with petroleum had been satisfactorily remediated and that no further remedial action was deemed necessary in these areas at that time.

Remedial Investigation Methods and Results

SECTION 4

4.1 General

The field activities for the Lapp site RI began in October 2001 with the first of two phases of investigation. The first phase of investigation included:

- Well inspection and subsequent well maintenance to confirm and/or restore the usefulness of the existing monitoring well network.
- A site survey to prepare a base map of the site that included topography, site features, property boundaries, and the monitoring well network.
- A residential well survey to identify potential human receptors of groundwater contamination.
- Focused drilling and sampling in Hot Spot Areas A, B, and C.
- Inspection of facility sewers for evidence of damage and/or accumulation of debris.
- A bedrock evaluation including completion of a Very Low Frequency (VLF) geophysical survey, a fracture trace analysis, and a geologic survey.
- A stream flow rate analysis of Oatka Creek as well as sampling of surface and subsurface soil, groundwater, cliff seep water, and Oatka Creek surface water and sediments.
- A site-wide passive soil gas survey to confirm areas of concern.
- Installation of an upgradient deep bedrock monitoring well.
- In-situ hydraulic conductivity testing of all new and existing monitoring wells.

Subsequent to the evaluation of data collected from the first phase of investigation, a second investigation phase was implemented to supplement and confirm the results of the first phase.

The second phase of investigation included the following field tasks:

- Soil and groundwater sampling at newly-discovered fourth Hot Spot "Area D".
- Drilling and installation of four additional bedrock groundwater monitoring wells (two shallow and two deep).
- Sampling of groundwater from on-site monitoring wells and off-site residential wells, surface water, sediment, and seep water.
- In-situ hydraulic conductivity testing of the four new bedrock monitoring wells.
- Characterization of investigation-derived waste (IDW) for disposal.
- Water level measurement in all newly-installed and existing monitoring wells and Oatka Creek.
- Site surveys to locate boring, monitoring well, and sampling locations.

Both phases of field investigation were performed in accordance with the NYSDEC-approved RI/FS Work Plan (Malcolm Pirnie, Inc. revised 2000), and NYSDEC-approved modifications based on findings of the first phase of investigation as presented in the *Phase I Remedial Investigation Results and Conclusions* (Malcolm Pirnie, Inc. November 2000).

Table 4-1 provides a summary of all field tasks performed during the RI with dates and number of sample points.

Detailed discussions of each of the investigative activities are presented in the following subsections.

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TABLE 4-1
RI FIELD PROGRAM SUMMARY
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Task	Date(s) Performed	Actions	Samples Collected
Phase 1 - Initiated October 2001			
Site Surveying and Mapping	10/01/01	Site boundaries, topography, and existing monitoring wells	
Site Wide Soil Gas Survey	5/8/02 - 5/20/02	Installed Soil-Gas modules across site.	69 Soil-Gas modules submitted for analysis
Soil Boring Program	10/15/01 - 10/31/01	82 boring locations were drilled and soil samples screened in the three hot spot locations	46 soil samples submitted for Confirmatory Analysis
	10/01	4 borings locations were drilled and soil samples screened on each side of the former hazardous waste storage pad	Soil samples were submitted for Confirmatory Analysis
	10/19/01	Surface soil samples collected	7 samples were submitted for PCB analysis
Background Soil Sample Analysis	10/19/01	Surface soil samples collected	3 samples submitted for TCL/TAL Analysis
Deep Bedrock Well Installation	12/5/01 - 12/19/01	Installation of DR-101	
Sewer Inspection	10/29/01 - 10/30/01	Video inspection of sewer lines	
Residential Well Survey	10/01 - 12/01	Distributed 151 surveys on 11/2/02	
Fracture Trace Analysis	11/20/01 - 11/21/01	Aerial photos analyzed to identify joint patterns and fracture lineaments	
VLF Survey	11/29/02 - 11/30/02	VLF radiowave survey completed to identify location and orientation of fractures	
Well Inspection and Maintenance	10/19/01	Replacement of concrete drainage pads on five wells and the replacement of the flush-mounted protective casing and the concrete drainage pad on one well	
Water Level Measurements	1/16/02, 5/10/02	Synoptic water levels measured in on-site monitoring wells	
Groundwater Sampling	1/16/02 - 1/22/02	Purged and sampled on-site monitoring wells	17 wells sampled
In-Situ Hydraulic Conductivity Testing	1/7/02 - 1/10/02	Performed slug testing of existing MW's for hydraulic conductivity calculations	
Sediment, Surface Water, and Water Seep Sampling	5/8/02 - 5/9/02	Performed sampling in Oatka Creek	5 surface water, 5 sediment, 1 seep sample
Phase 2 - Initiated July 2003			
Sediment, Surface Water, and Water Seep Sampling	8/26/03	Performed sampling in Oatka Creek	5 surface water, 5 sediment, 1 seep sample
Bedrock Well Installation	7/28/03 - 8/18/03	Monitoring wells SR-107 and SR-108 and DR-103 installed	
Groundwater Sampling	8/28/03 - 8/30/03	Purged and sampled on-site monitoring wells	20 wells sampled
Water Level Measurements	8/26/03	Synoptic water levels measured in on-site monitoring wells	

Created by: JH Date: 11/2/03
Checked by: BW Date: 11/14/03

4.2 Site Survey and Base Map Preparation

RU-SH surveying of Fishers, New York, using aerial photogrammetry and field surveying techniques, prepared a topographic and site base map of the Lapp site. Ground control was established on site that includes USGS vertical control and NYS Plane Coordinates for horizontal control. The topographic base map developed for the site, Map No. 1, has a horizontal scale of 1-inch equal to 120 feet and covers an area of approximately 66 acres. Topographic contours are shown at 5-foot intervals.

4.3 Site Soil Gas Survey

4.3.1 Purpose

To establish whether any other areas of elevated soil or shallow groundwater VOC contamination exist outside the known hot spots, a site-wide grid was established at equidistantly spaced intervals for completion of a passive soil gas screening survey. Orientation of the grid was approximately parallel to the centerline of Gilbert Street and traverses and terminates within the site. The grid accommodates the location of site-specific features of the facility (e.g., physical structures, areas of distressed vegetations, known hot spot areas) and potential sample collection points. "Patio" areas in and around the facility buildings allowed collection of samples that represent soil gas conditions under the buildings.

4.3.2 Methodology

Malcolm Pirnie personnel, in accordance with procedures described in the Work Plan, performed the passive soil gas screening survey between May 8 and May 20, 2002. Sixty-nine Gore-Sorber soil gas modules were installed and subsequently collected from depths approximately 2 to 3 feet below grade at locations across the site. The soil-gas modules were shipped in airtight sample containers to W.L. Gore and Associates Inc. laboratory located in Elkton, Maryland and analyzed for Gore's "Al " list of 25 volatile organic compounds (VOCs). Soil gas samples were collected along the eight parallel grid lines established at approximately 150-foot spacing. Two additional areas of soil gas samples were collected within the South fill area (area L) and within patio areas of the various plant buildings (samples designated P). The soil gas sampling locations were given a gridline-specific alphanumeric designation (e.g., SGA-1, SGB-1 SGH-1) for identification purposes. The soil gas sampling locations are shown on Map No.1.

4.3.3 Results

The Gore-Sorber passive soil gas analytical results are summarized on Figures F-1, F-2 and F-3 in Appendix A. The soil gas survey identified the presence of several volatile organic compounds, most prevalent of which were trichloroethene, 1,1,1-trichoroethane. These two compounds as well as total chlorinated VOCs were mapped and are presented in the soil gas report prepared and submitted by W.L. Gore and Associates as provided in Appendix F. Examination of the mapped data indicates that TCE, TCA and chlorinated compounds are concentrated within the known hot spot areas. Trace or no soil gas concentrations are detectable beyond these known areas of VOC contamination.

4.4 Residential Well Survey

4.4.1 Purpose

The purpose of the residential well survey was to identify residential water wells that potentially could be affected by VOCs present in groundwater at the Site.

4.4.2 Methodology

A residential well survey questionnaire was prepared and distributed during October 2001 to a list of 151 residential property owners within 1/4 mile of the Lapp site.

4.4.3 Results

Thirty-three of the 151 questionnaires were returned by the recipients. Results of the survey were used to identify potential "at risk" residential well locations and to support an evaluation of potential sentry well locations. Based on the results of the responses evaluation of potential sentry well locations. Based on the results of the responses received, five actively used residential wells were identified within the 1/4 mile radius. The location of these wells was in one general area to the southwest of the site, see Map No 1. Table 4-2 provides a summary of responses to the residential well survey from those residents with a well. Information provided by the well owners on the questionnaire indicated that these five wells ranged in total depth between 35 and 110 feet. They were also reported as providing water for residential usage at a rate of between 25 and 150 GPD. Based on the area topography and the composition and thickness of overburden encountered on-site, all five of these active residential wells are likely completed in bedrock as opposed to the unconsolidated overburden. No construction specifics were reported for one of the wells. Three of the wells ranged in depth from 35 to 55 feet and are likely completed in the Levanna Shale. The fifth well, reported to be 110 feet deep, is likely completed in the Onondaga Limestone formation. These five wells have been sampled by the NYSDOH on three occasions prior to the RI, in November 1995, May 1998, and March 2001. During the November 1995 sampling event, two of the residential wells contained 1,1,1-trichloroethane at concentrations less than 1.0 ug/l, below the NYSDEC groundwater standard of 5.0 ug/l. During the subsequent two sampling events, these and the other three residential wells did not contain VOCs above the detection level of 0.5 ug/l.

4.5 Sewer Inspection

4.5.1 Purpose

The purpose of the sewer inspection was to assess the potential for sewers traversing the area of known VOC contamination to act as a pathway for contaminant migration.

4.5.2 Methodology

During October 29 and 30, 2001, State Pipe Services, Inc. performed a video inspection of the subsurface sewer distribution system leading to Outfall 006. A videotaped record of the sewers was made using a crawler-mounted television camera. Access to the sewer lines was gained through available manholes.

TABLE 4-2
Residences With Water Wells Within 1/4 Mile of the Lapp Insulator Site
Lapp Insulator - Phase I Remedial Investigation
LeRoy, New York

Well ID	Well Information						Sampling Conducted
	Well In Use	Depth	Reported Usage (GPD)	Pumping Rate (GPM)	Treatment	Problems	
RES-1	Yes	NA	NA	NA	NA	NA	NYSDOH
RES-2	Yes	35	NA	NA	Brita	No	NYSDOH
RES-3	Yes	55	100	10	Chlorinator	Sulfur	NYSDOH
RES-4	Yes	36	150	15	Softener	No	NYSDOH
RES-5	Yes	110	25	2	Softener	No	NYSDOH
RES-6	No	NA	NA	NA	No	NA	No

Notes:
NA - Information not available.
Prepared 11/19/02

4.5.3 Results

Examination of the video taped inspection of approximately 2,450 feet of sewer line determined that the condition of the sewers was good with little potential for groundwater infiltration or exfiltration. A map of the sewer pipes surveyed by State Pipe Services, Inc., is provided in Appendix B.

4.6 Monitoring Well Inspection and Maintenance

4.6.1 Purpose

To determine the integrity of the existing monitoring wells at the site, Malcolm Pirnie inspected all 18 existing on-site monitoring wells on November 12, 1999.

4.6.2 Methodology

Each monitoring well was inspected for evidence of aging, damage, sedimentation and obstructions. A photograph was taken of each well and a checklist of inspection items was used to record in detail the present physical condition both above and below grade of each well to the maximum extent possible. Particular attention was given to the current total depth, conditions of the bottom of the well, and the condition of casing, cap, lock, and concrete drainage pad.

4.6.3 Results

Generally, all of the wells were determined to be of good integrity and useable. Based on the well inspection, the following maintenance was performed:

- 17 wells were painted and properly labeled.
- 6 wells required replacement of the concrete drainage pad.
- 6 wells required replacement of the concrete drainage pad.
- 4 wells required replacement of the inner well cap.

- 1 well required replacement of the flush mount protective assembly.
- 12 wells required a new pad lock.

4.7 Bedrock Evaluation

4.7.1 Purpose

A bedrock evaluation was performed to establish an understanding of site bedrock characteristics relative to groundwater flow dynamics. The bedrock evaluation included three field elements; a fracture trace analysis, a very low frequency (VLF) geophysical survey, and geologic field mapping.

4.7.2 Methodology

4.7.2.1 Fracture Trace Analysis

A geologist, trained in the interpretation of aerial photography, analyzed stereo optic pairs of aerial photos of the area surrounding the Lapp site to identify potential bedrock joint patterns and fracture lineaments. Results of the fracture trace analysis were used during the scoping of the subsequent VLF survey and geologic field mapping tasks.

4.7.2.2 Very Low Frequency Survey

A VLF radio wave survey was completed in the area surrounding the Lapp site to identify the location and orientation of near-vertical water-bearing rock fractures. The VLF survey was conducted along 10 survey lines that were aligned primarily in a north-northwest/south-southeast orientation. Further details of the VLF methods used are provided in Appendix C.

4.7.2.3 Geologic Mapping

Malcolm Pirnie geologists conducted a field reconnaissance geologic survey on November 28, 2001 to supplement the fracture trace analysis and VLF survey. This geologic survey identified areas of exposed bedrock within the project area for the purpose of better defining bedrock lithology and structural features that may influence groundwater movement at the site. Bedrock outcrops were examined, described, and their bedding and fracture plane orientations (strike and dip) measured using a Brunton® pocket transit.

4.7.3 Results

Groundwater moves through the local bedrock mostly through secondary porosity (ex. fractures and joints) and joint fracture sets are known to pervade bedrock stratigraphic sections throughout New York. Given this, and the fact that property boundaries are not barriers to continuity, site-specific geologic and fracture studies are often useful in identifying directional trends. Malcolm Pirnie conducted such a study at the Lapp Insulator site.

The results of the geologic evaluation effort, presented in Appendix C, identified joint patterns and fracture trends with a predominant east-west orientation. However, no evidence was found indicating the presence of major interconnected, water-bearing, bedrock fractures between the on-site hot spot areas and the five known active residential wells near the site. Also, multiple measurements of groundwater elevations and flow direction collected during the various seasons indicate a consistent groundwater flow away from the homes toward the site.

The overall results of the bedrock evaluation confirmed that sentry wells were neither necessary nor appropriate as early warning of contamination reaching residential wells since such sentry wells could not be located in a place so as to serve that intended purpose. Also, groundwater equipotential maps indicate that groundwater does not naturally flow from the site toward the residential wells. Appendix C provides the complete report of the bedrock evaluation studies performed.

4.8 Monitoring Well Installation

4.8.1 Purpose

Two shallow bedrock and three deep bedrock groundwater monitoring wells were installed during the RI to supplement the existing monitoring well network. The purpose of these wells was to provide hydrogeologic and water quality data at locations and/or depths important to the site characterization. Data was collected from these five new wells, along with the existing wells, and included soil and rock characteristics, water elevations, hydraulic conductivity, and water quality.

4.8.2 Methodology

The drilling methods used to install borings required for shallow and deep bedrock groundwater monitoring wells were outlined in the RI/FS Work Plan. After completion of the Phase I RI, which included the installation of an upgradient deep bedrock well, the number and depth of remaining bedrock monitoring wells proposed in the Work Plan was modified with NYSDEC concurrence based on the evaluation of the Phase I analytical and geologic data. Correspondence (dated 5/02, 3/03, 5/03) documenting the approved work plan modifications implemented is presented in Appendix D.

All of the borings drilled during the RI were completed using a combination of drilling techniques including hollow-stem auger, roller bit, and a wire-line double-tube, swivel-type HQ size core barrel to install both permanent and temporary casing. During coring operations, potable water from the Town of Leroy public water supply was recirculated and used as the drilling fluid. Water return was monitored during rock drilling and zones of significant water loss to the formation were noted on the drilling logs. Core samples were retained in wooden core boxes for future reference and are stored at the Lapp site.

Shallow Bedrock Well Installation - Two bedrock wells were completed in the shallow bedrock interval at the locations designated SR-107 and SR-108. Well SR-107 was drilled to characterize conditions downgradient of Hot Spot Area B. Well SR-108 was installed adjacent to well PMW-10 at the request of the NYSDEC. The shallow bedrock wells were constructed to monitor water quality in the upper bedrock using an open hole interval.

Borings were advanced through unconsolidated overburden using 6 1/4-inch hollow stem augers at each shallow well location to the top of bedrock determined to be approximately 17 and 10 feet bgs, respectively. A 5 7/8-inch diameter roller bit was used to facilitate the advancement of a rock socket into competent shale bedrock determined to be approximately 20 feet bgs. A permanent black steel casing having a 4-inch inner diameter (ID) was then grouted into the bedrock socket and the grout allowed to set a minimum of 12 hours prior to continuing drilling operations. After the grout cured, a wire-line double-tube, swivel-type HQ core barrel having a nominal 4-inch outside diameter (OD), was used to obtain core samples of bedrock. The coring process advanced the rock borehole an additional 10 feet to a depth sufficient to monitor the first occurrence of saturated conditions in the bedrock.

Deep Bedrock Well Installation - A total of three deep bedrock wells (designated DR-101, DR-103 and DR-105) were installed at NYSDEC approved upgradient and downgradient locations within the Lapp site perimeter. Well DR-101 was installed at an upgradient location, adjacent to an existing shallow and intermediate bedrock cluster. The purpose of the upgradient well was to explore the deeper rock formations for contact depths, lithology, and degree of fracturing as well as to monitor the existing (background) deep bedrock groundwater conditions. At this location, the Stafford Limestone was present but water-bearing fractures were not observed within the formation, therefore the well was completed in the deeper Onondaga Limestone formation that typically is relatively productive of groundwater locally. While the upgradient deep bedrock well indicated that both the Stafford and the Onondaga limestone formation were not significantly fractured and produced little to no water, at the request of the NYSDEC, deep bedrock wells DR-103 and DR-105 were installed and completed in the Stafford Limestone during Phase II at locations on the downgradient edge of the Site adjacent to existing well clusters SR/IR-103 and SR/IR -105 respectively. The stated purpose of these two deep wells was to monitor groundwater quality in the Stafford Limestone at locations of known (shallower) groundwater contamination (Hot Spot Area A and the Northeast fill area).

A drilling methodology similar to that used to advance the shallow bedrock wells was employed to facilitate deep monitoring well installation. Hollow stem augers were used to advance the requisite boreholes through the overburden to the top of bedrock prior to installation of temporary black steel casing.

Drilling activities were completed during the period of December 5, 2001 to December 19, 2001 at the DR-101 borehole location. A wire-line double-tube, swivel-type core barrel having a nominal 4-inch OD was used to obtain HQ core samples from the bottom of the temporary casing at 33.5 feet bgs to the top of the Onondaga Limestone at approximately 110 feet bgs. Subsequent to coring, a 5 7/8-inch diameter roller bit was then used to ream the cored interval to a depth of 110 feet to facilitate the installation of a permanent 4-inch OD black steel casing. The top of the Onondaga limestone was encountered at a depth of 108 feet and the casing was seated two feet into the competent limestone. A cement-bentonite grout was pumped through a tremie pipe into the bottom of the borehole annulus and brought to the ground surface as the temporary 6-inch casing was removed. The 4-inch casing was constructed to serve as well riser and extends approximately two feet above grade. Subsequent to the installation of permanent casing, the grout was allowed to cure a minimum of 12 hours prior to resuming drilling activities. After curing, a wire-line double-tube, swivel-type core barrel was used to obtain HQ core samples of the uppermost Onondaga Limestone from 110 to 130 feet bgs. The monitoring well was completed in this 20-foot open hole interval.

The downgradient deep bedrock monitoring wells were installed during the Phase 2 drilling program conducted from July 28, to August 18, 2003. At borehole location DR-103, a 7 7/8-inch diameter roller bit was used to advance the borehole from the bottom of the temporary casing to a depth approximately equal to the bottom elevation of the adjacent IR-103 monitoring well, approximately 50 feet. The borehole was then advanced to 55 feet to facilitate an open bedrock-monitoring interval that straddled the Stafford Limestone formation. A permanent 4-inch diameter black steel casing was telescoped through the 8-inch surface casing to the depth of 55 feet and grouted in place. A cement-bentonite grout was pumped through a tremie pipe into the borehole annulus and brought to the ground surface as the temporary casing was removed.

Subsequent to the installation of permanent casing, the grout was allowed to cure a minimum of 12 hours prior to resuming drilling activities. After the grout cured, a wire-line double-tube, swivel-type core barrel was used to obtain HQ core samples of bedrock in boring DR-103 from 55 to 62 feet below ground surface. Monitoring well location DR-105 was advanced using a 5 7/8-inch roller bit from the bottom of the 8-inch surface casing set at approximately 20 feet bgs, to a depth approximately equal to the adjacent intermediate bedrock monitoring well IR-105 depth of 38 feet. A second, temporary 4-inch black steel casing then was telescoped to the bottom of the boring at 39.5 feet below grade prior to continuing borehole advancement. A wire-line double-tube, swivel-type core barrel having a nominal 4-inch outside diameter was used to obtain HQ core samples of from the bottom of the temporary casing at 39.5 feet bgs to a depth of 66.8 feet bgs. Subsequent to coring, the temporary 4-inch casing was removed and a 7 7/8-inch diameter roller bit used to ream the borehole to a depth of 66.5 feet to facilitate the installation of a permanent 4-inch diameter black steel casing. The 4-inch I.D. permanent casing was installed, and the well cored and completed using the identical methodology described above for the deep well DR-103.

4.8.3 Results

Shallow Bedrock Wells - The total cored depth of the newly installed wells SR-107 and SR-108 were 30.0 feet and 34.0 feet, respectively. The rock core was placed in labeled wooden core boxes and described on stratigraphic borehole logs by an on-site geologist. Detailed well construction diagrams and borehole logs with geologic descriptions for the bedrock wells are presented in Appendix E.

Deep Bedrock Wells - Monitoring Well DR-103 was completed with an open hole interval of 110 to 130 feet bgs. Monitoring Well DR-105 was completed with an open hole interval that straddles the Stafford Limestone from 66.5 to 83 feet bgs. Well construction diagrams and field borehole logs for the completed deep bedrock groundwater monitoring wells are presented in Appendix E.

4.9 Monitoring Well Development

4.9.1 Purpose

Monitoring wells are developed to create sample points that will yield water samples that are representative of the groundwater quality at that location. All newly installed monitoring wells were developed.

4.9.2 Methodology

In accordance with the approved RI Work Plan, the newly installed monitoring wells were developed no sooner than 24 hours after well completion. Depending on well volume and recharge rate, well development was performed using submersible pumps, centrifugal pumps, or dedicated disposable bailers. Groundwater evacuated from each well during development was monitored for pH, specific conductivity, temperature, dissolved oxygen and turbidity. Development continued until approximately 10 well volumes had been purged, or until pH, temperature and conductivity values had stabilized. Development water was containerized in 55-gallon drums pending characterization and later disposal.

4.9.3 Results

Well Development/Purging Logs are included in Appendix F.

4.10 Hydraulic Conductivity Testing

4.10.1 Purpose

In-situ hydraulic conductivity tests were conducted to determine the hydraulic conductivity of the geologic formations in which the monitoring wells were completed.

4.10.2 Methodology

In-situ hydraulic conductivity tests were conducted where feasible in all newly installed and existing groundwater-monitoring wells. Hydraulic conductivity testing consisted of performing rising-head slug tests with the resultant change in water levels recorded manually or with a pressure transducer and data logger. The rising-head data for all wells monitoring unconfined groundwater conditions were analyzed using the methods of Hvorslev (Hvorslev, M.J., 1951).

4.10.3 Results

Hydraulic conductivity measurements determined for newly installed and existing monitoring wells are presented and summarized in Appendix G.

4.10.3.1 Overburden Wells

One of the six on-site overburden wells (PW-6) was dry at the time the slug-testing task was completed and therefore could not be tested. Two of the five overburden wells tested (PW-3 and PW-5) are completed in fill material and, thus, are not representative of the natural overburden soils on site. Slug test data indicate that hydraulic conductivity values determined for the shallow overburden wells, located outside of the fill areas, range from a low of 1.60×10^{-6} centimeters per second (cm/s) at MW-1 to a high of 8.22×10^{-4} cm/s at well MW-5. The geometric mean hydraulic conductivity for these shallow overburden wells is 1.39×10^{-5} cm/s. Hydraulic conductivity values for those wells completed in fill material was very similar to those completed in native soils. Well PW-3 was 5.17×10^{-6} cm/s and PW-5 was 8.33×10^{-4} cm/s.

4.10.3.2 Shallow Bedrock Wells

All eight shallow bedrock wells had sufficient water and recharge to complete the slug tests. Test data collected for the shallow bedrock monitoring wells indicate a wide range of hydraulic conductivity values from a low of 5.96×10^{-7} centimeters per second (cm/s) at SR-102 to a high of 9.89×10^{-4} cm/s at well SR-101. Such a wide range of results can be attributed to high variability of rock fracture presence and interconnectedness. The geometric mean hydraulic conductivity of the eight shallow bedrock wells tested is 2.09 x 10^{-5} cm/s.

4.10.3.3 Intermediate Bedrock Wells

Three of the six intermediate bedrock wells (IR-102, IR-104, and IR-106) had insufficient water or insufficient recharge to successfully complete a slug test. For the three wells that were tested, the hydraulic conductivity values were very low ranging from a low of 3.24 x 10^{-8} cm/s at well IR-101 to a high of 7.21 x 10^{-7} cm/s at well IR-103. The geometric mean hydraulic conductivity for the three intermediate wells tested is 9.79 x 10^{-8} cm/s.

4.10.3.4 Deep Bedrock Wells

Due to the massive character and competency of the bedrock in the open hole intervals at monitoring wells DR-101 (completed in the Onondaga Limestone) and DR-103 (completed through the Stafford Limestone), hydraulic conductivity tests could not be performed because of insufficient water in the wells. The hydraulic conductivity value calculated for the deep bedrock well DR-105 (also completed through the Stafford Limestone) is 1.70 x 10^{-4} cm/s. This well has an open hole of approximately 16 feet, only two of which comprises the entire Stafford Limestone member. Most of the remaining 14 feet of open hole is within the lowermost shale of the Levanna member above the Stafford Limestone. Well logs for this well indicate that the Stafford was massive with no open fractures (such that if the core was limited to the Stafford only it would be 100%). The Lavanna shale above the Stafford however, had numerous fractures, both vertical and horizontal. Therefore, although this well was intended to be a "Stafford" well and does include the entire two-foot thick Stafford in the 16-foot open hole interval, virtually all of the water entering the well is from fractures in the overlying Levanna shale and thus the hydraulic conductivity value for the well represents the Levanna shale and not the Stafford Limestone.

4.11 Groundwater Elevation Measurement

4.11.1 Purpose

Groundwater levels were measured prior to each groundwater sampling event at all new and existing groundwater monitoring wells and piezometers. The synoptic water level events were collected to provide data for the determination of the groundwater flow direction and to determine if significant seasonal variations exist.

4.11.2 Methodology

Depth-to-water measurements were determined to the nearest 0.01 foot from the top of the well riser using an electronic water level indicator. Following the completion of the site survey, all water levels were converted to elevation measurements in units of feet above mean sea level.

4.11.3 Results

Equipotential maps for the overburden, shallow and intermediate bedrock intervals were prepared using these data after each of the investigation phases. A discussion of groundwater flow directions, and water level and vertical gradient calculation data is presented in Section 5.3, Site Hydrogeology. A tabulated summary of the water level and vertical gradient calculations data is provided in Appendix H.

4.12 Stream Flow Calculation

4.12.1 Purpose

Oatka Creek comprises the eastern boundary of the Site and stream flow calculations for the creek were completed using flow measurements from two gauging stations in Oatka creek to calculate the volumetric flow rate, or discharge, of Oatka Creek. These flow measurements were calculated for both upstream and downstream stations as described below.

4.12.2 Methodology/Results

- The Oatka Creek USGS gauging station in Warsaw, New York is approximately 15 miles upstream of the Lapp site. The 20-year average flow rate (9/1982 to 9/2002) at the Warsaw gauging station is 56 cubic feet per second. The contributing drainage area for the station is approximately 39.1 square miles.
- The Oatka Creek USGS gauging station in Garbutt, New York is approximately 10 miles downstream of the Lapp site. The same 20-year average flow rate at the Garbutt gauging station is 222 cubic feet per second. The contributing drainage area for the station is approximately 200.0 square miles.
- Using stream flow rates and drainage areas at the Warsaw and Garbutt gauging stations, the average rate of stream flow of Oatka Creek in LeRoy (with an estimated drainage area of 134 square miles) is estimated at 156 cubic feet per second.

Stream flow calculation data are presented in Appendix H.

4.13 Environmental Sampling Program

The environmental sampling program included the collection of sediment, surface and subsurface soils, surface water, and groundwater samples in accordance with the NYSDEC approved RI Work Plan. Two coordinated sampling events were completed during each phase of investigation, one during October 2001-January 2002, the second during August 2003. All samples collected during the first phase of sampling were sent to PSC Laboratories Inc., for analyses. Samples collected during the second phase of sampling were submitted to Columbia Analytical Laboratories, Inc. Environmental Quality Associates, Inc. validated all of the data. The validation results are presented in Appendix I (in Volume II). Post-validation analytical results for both sampling events are presented in tables presented by media and discussed in Section 7.

4.13.1 Soil Sampling

4.13.1.1 Purpose

The purpose of the soil screening and sampling task(s) was to more fully characterize overburden materials and to delineate the areal and vertical extent of contamination in suspected or known hot spot areas. Analytical results of soil samples collected in the locations designated as hot spot areas facilitated the estimation of contaminant mass within site soils. The proposed soil borings were located in the known contaminated hot spot areas based on the results of previous sampling events. The hot spot areas were designated Area A, Area B, Area C, and Area D. Additionally, sampling was performed at selected locations assumed to be representative of background conditions and three areas where PCBs had been historically handled. Soil-boring locations are shown on the Site base map, Map No.1.

4.13.1.2 Methodology

Hot Spot Areas (A-D)

Approximately 100 soil borings were advanced through unconsolidated overburden soils using direct-push sampling methods in Hot Spot Areas A-D. Borings sampled in each of the Hot Spot areas were given an alphanumeric designation and included the soil sampling locations SB-A (1-14) in Area A, SB-B (1-17) in Area B, SB-C (1-55) in Area C and PMW-10 (A-M) in Area D. In accordance with the approved work plan, boreholes were typically advanced to the first occurrence of saturated conditions or to refusal. Dependant on location, borehole depths generally terminated at 8 to 12 feet bgs. However, most boreholes advanced in Hot Spot Area D, were advanced a minimum of 16 feet bgs. All soil borings were advanced to qualitatively characterize the native soils, obtain soil samples for analysis, or in Hot Spot Area D, to provide grab sample locations for a selected number of groundwater samples.

At each direct-push borehole location, continuous core soil samples were collected at two or four-foot intervals using a macro-spoon sampler. All soil samples were screened for volatile organic vapors using a HNu PID equipped with a 10.2eV lamp, visually examined, and described on field borehole logs in accordance with the United States Soil

Conservation System (USCS) soil classification system. Soil cuttings were containerized in 55-gallon drums and subsequently staged for disposal. The borehole logs with overburden descriptions are presented in Appendix A. The PID measurements were used as a screening tool to obtain qualitative estimates of total VOCs in the soil samples and to identify depth-specific intervals for quantitative analyses. PID readings for each sampled interval are recorded on the borehole logs included in Appendix E.

Based on the PID soil screening results, a total of 55 soil samples were submitted for TCL VOCs analyses from the Hot Spot areas A-D. At the request of the NYSDEC, thirteen of these soil samples were submitted for full TCL/TAL analysis including VOC, SVOC, PCB and metals analytes. Results are presented on the summary Tables 7-2 through 7-13 discussed in Section 7, Site Characterization.

A total of five groundwater samples were collected from five geoprobe (direct push) boreholes advanced in Area D during the Phase 2 investigation. The samples were obtained using a plastic disposable bailer lowered to the shallow groundwater subsequent to allowing the borehole to recharge. Groundwater analytical results are tabulated and discussed in Section 7. Three soil samples, one from each Hot Spot Area, were collected at boreholes SBA-7 (2-4'), SBC-3 (7-8') and SBC-12 (8-9') and submitted for physical parameter characterization. Results for grain size distribution, Atterberg limits and organic content are tabulated and provided in Appendix J and discussed in Section 5.2.1.

Potential PCB Areas

A total of seven surface soil samples were collected to investigate potential polychlorinated biphenol (PCB) contamination at four locations within the Lapp site. Soil samples were collected at four locations around the perimeter of the high voltage testing area, one location adjacent to the equipment storage area, and two staging locations used to repair electrical bushings. The soil sampling locations were given alphanumeric designations appropriate to the area collected (i.e., HVT-1, EQSTRG-1, and BURPR-1).

In accordance with the approved work plan, the soil samples were collected at the 0.0 to 0.5 foot bgs interval using stainless steel spatulas, placed in a stainless steel mixing bowl, and composited, and appropriate sample bottles were filled. Analytical results are presented in the summary tables of Section 7.

Background Soil Samples

A total of three shallow soil samples were collected at three different off-site locations. Each boring was advanced to a total depth of 1-2 feet below ground surface using a hand auger. Soil collected during borehole advancement was submitted to the analytical testing lab for full TCL/TAL analysis. The sampling locations designated BKGRND-1 through BKGRND-3 are shown on the site map with the tabulated data presented and discussed in Section 7.0

Quality Assurance/Quality Control (QA/QC) samples (blind duplicates, matrix spikes and matrix spike duplicates) were collected at all hot spot, PCB and background soil sampling locations.

4.13.1.3 Results

Analytical results for the soil samples are discussed in detail in Section 7.0, Site Contaminant Characterization.

4.13.2 Surface Water/Sediment Sampling

4.13.2.1 Purpose

A surface water and sediment sampling program was conducted to determine if contaminants detected at the Lapp site are migrating into Oatka Creek.

4.13.2.2 Methodology

Surface water and sediment samples were collected concurrently with the groundwater sampling tasks completed during the May 2002 and August 2003 sampling events. In accordance with the Work Plan, the samples were submitted for full TCL/TAL analyses.

A total of five surface water and sediment samples were collected at five locations along the westernmost bank of Oatka Creek during each sampling event. The samples were collected at locations designated SW/SD-1 through SW/SD-5 and were strategically located to characterize the surface water/sediment quality upstream, adjacent, and downstream of the Lapp site. Specifically, one sample designated SW/SD-1 was collected south of the site at the upstream sampling location for the purpose of representing background concentrations. Three locations designated SW/SD-2, SW/SD-3 and SW/SD-4 were located immediately adjacent to the site and SW/SD-5 is representative of conditions downstream of the Site. The locations of the surface water and sediment samples collected during the RI are shown on the Site base map (Map No. 1).

At each sample location, the surface water was collected prior to the sediment samples, and relative downstream sampling points were sampled first. The surface water samples were collected by carefully dipping unpreserved sample bottles into the creek, and removing the lid below the surface of the water to avoid collecting samples at the air-water interface.

Sediment samples collected for TAL/TCL analysis were collected directly from the bottom of the water body using decontaminated stainless steel spoons.

4.13.2.3 Results

Surface water and sediment analytical data are provided in Appendix J. Analytical results of the surface water/sediment sampling are summarized in Tables 7-14 through 7-18 discussed in Section 7.0

4.13.3 Surface Seep Sampling

Seep samples were collected from the face of the bank of Oatka Creek. Only one seep was evident at the time of each sampling event (May 8, 2002 and August 26, 2003). This single seep is located on the bedrock face of the western bank of Oatka Creek directly east of Hot Spot Area A. The seep location is shown on Map No.1.

Each seep sample was analyzed for full TCL volatiles, semi-volatiles, pesticides/PCBs and TAL analyses.

4.13.4 Groundwater Sampling Program

Groundwater samples were collected during both phases of the RI investigation in accordance with the sample collection methodology presented in the RI Work Plan. Aqueous samples were collected from a total of 20 monitoring wells of the 21 well network (PW-6 was dry) during Phase 1 and included the 19 monitoring wells in the existing well network and one new deep bedrock well (DR-101). All ground water samples were analyzed for TCL volatiles, semi-volatiles, pesticides/PCBs, TAL metals, and field parameters including specific conductance, temperature, turbidity, pH and eH.

Groundwater samples were then collected from a total from 24 well locations during the Phase 2 sampling event in accordance with the sampling program and methodology described in the RI Work Plan. The addition of four more sample locations included water collected from two newly installed shallow bedrock (SR-107 and SR-108) and deep bedrock (DR-103, Dr-105) monitoring wells and the existing well network. At the time of the Phase 2 sampling event, well PW-6 had insufficient water to sample. Based on the results of the Phase 1 sampling and with the concurrence of the NYSDEC, the second round of groundwater samples were analyzed for a reduced list of analytical parameters that included only TCL volatile organics.

On August 29 and 30, 2003, during the Phase 2 groundwater sampling event, groundwater samples were collected from each of five residential wells located closest to (and cross gradient of) the Site. These samples were analyzed for VOCs using the same analytical method and laboratory as the samples collected from on-site groundwater monitoring wells. No VOCs were detected in any of the residential wells.

Hydrogeologic Evaluation

SECTION 5

5.1 Introduction

The geology and hydrogeology of the Lapp site described herein was characterized using data from previous site investigations, hydrogeologic reference literature, and the most recent data gathered during the RI. Of particular importance for this characterization was information collected from soil borings and monitoring wells installed at the site. Many soil borings were drilled and sampled in each of the four hot spots on site. There are 23 groundwater-monitoring wells currently at the Lapp site. Locations of soil borings and wells are illustrated on Map No.1. Each of the 23 on-site wells is completed in one of four distinct water-producing zones monitored at the Site, illustrated on Figure 5-1. All but two (PW-5 and PW-6) of the 23 monitoring wells are located in one of six well clusters positioned around the perimeter of the Site. Each well cluster contains three or four wells, each well monitoring a distinct vertical interval. In addition to the 23 monitoring wells, there are 11 microwells (PMWs) at the site completed in the overburden. The microwells are small diameter (< 1/2 inch) wells that have no sand filter pack surrounding the slotted pipe. The total depths of the microwells range from approximately 9 to 30 feet below grade. Because of their construction and locations, the majority of the microwells were not sampled during the RI. The exception to this was PMW-10, which was sampled at the request of the NYSDEC. Table 5-1 provides a complete listing and construction details of the existing wells at the Lapp site, see cross section (Figure 5-1).

The four monitored zones and their respective wells are summarized below in order from shallowest to deepest:

- ***Overburden*** - Six overburden wells (MWs and PWs) monitor the unconsolidated soil and/or fill material and range in total depth from 9 to 29 feet below grade. Hydraulic conductivity of the overburden was calculated to have a geometric mean of 2.43 x 10^{-4} cm/sec.

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TABLE 5-1
Summary of Monitoring Well Construction Details
Remedial Investigation Report
Lapp Insulator

Well Number	Well Type	Date Installed	Well Diameter (inches)	Well Material	Screened/Open Interval (feet below grade)		Borehole Bottom Elevation[1]
					Top	Bottom	
MW-1	IF	1/7/92	2	PVC	8.5	18.5	875
MW-2	OB	8/1/92	2	PVC	4	9	903.2
MW-3	IF	1/9/92	2	PVC	4.5	19.5	889.9
PW-2	Abandoned because dry to 15 feet						
PW-3	OB	6/10/94	2	PVC	9	19	873.1
PW-4D	Abandoned because dry to 20 feet						
PW-5	OB	6/8/94	2	PVC	19	29	868.25
PW-6	OB	6/10/94	2	PVC	9.5	4.5	883.50
PMW-2	-	6/7/94	0.62	Steel	7.8	12.8	-
PMW-3	OB	6/7/94	0.62	Steel	7.8	12.8	-
PMW-5	OB	6/7/94	0.62	Steel	7.5	12.5	-
PMW-6	OB	6/7/94	0.62	Steel	6	11	-
PMW-7	-	6/7/94	0.62	Steel	11.5	16.5	-
PMW-8	OB	6/8/94	0.62	Steel	4.2	9.2	-
PWM-9	OB	6/8/94	0.62	Steel	25	30	-
PMW-10	OB	6/8/94	0.62	Steel	9.3	14.3	-
PMW-11	OB	6/7/94	0.62	Steel	9	14	-
PMW-12	OB	6/7/94	0.62	Steel	7	12	-
PMW-13	OB	6/7/94	0.62	Steel	3.7	8.7	-
SR-101	SR	7/12/95	4	Open	33	42.8	871.58
SR-102	SR	7/20/95	4	Open	27	37	875.20
SR-103	SR	7/21/95	4	Open	24	34	860.08
SR-104	SR	8/1/95	4	Open	17	27	882.83
SR-105	SR	7/26/95	4	Open	17.5	28.2	878.10
SR-106	SR	7/31/95	4	Open	23	33.1	864.59
SR-107	SR	8/6/03	4	Open	20	30	877.50
SR-108	SR	8/4/03	4	Open	24	34	874.00
IR-101	IR	7/17/95	4	Open	43.5	54.3	860.01
IR-102	IR	7/19/95	4	Open	38	48	863.81
IR-103	IR	7/21/95	4	Open	36	46	848.86
IR-104	IR	8/1/95	4	Open	28	38	871.68
IR-105	IR	7/26/95	4	Open	28.5	38.3	867.89
IR-106	IR	7/31/95	4	Open	34.2	44	853.66
DR-101	DR	12/19/01	4	Open	110	130	783.30
DR-103	DR	8/5/03	4	Open	52	62	829.28
DR-105	DR	8/14/03	4	Open	73	83	820.50

Notes:

(1) Elevations based on ENSR's 1994 Report (with the exception of DR-101, installed in 2002).
MW, PW = Monitoring Wells
PMW = Micro-wells
- = Data not available.
SR = Shallow bedrock wells.
IR = Intermediate bedrock wells.
DR - Deep bedrock.
OB = Overburden well.
IF = Interface between OB & BR.
Open - Open bedrock well.

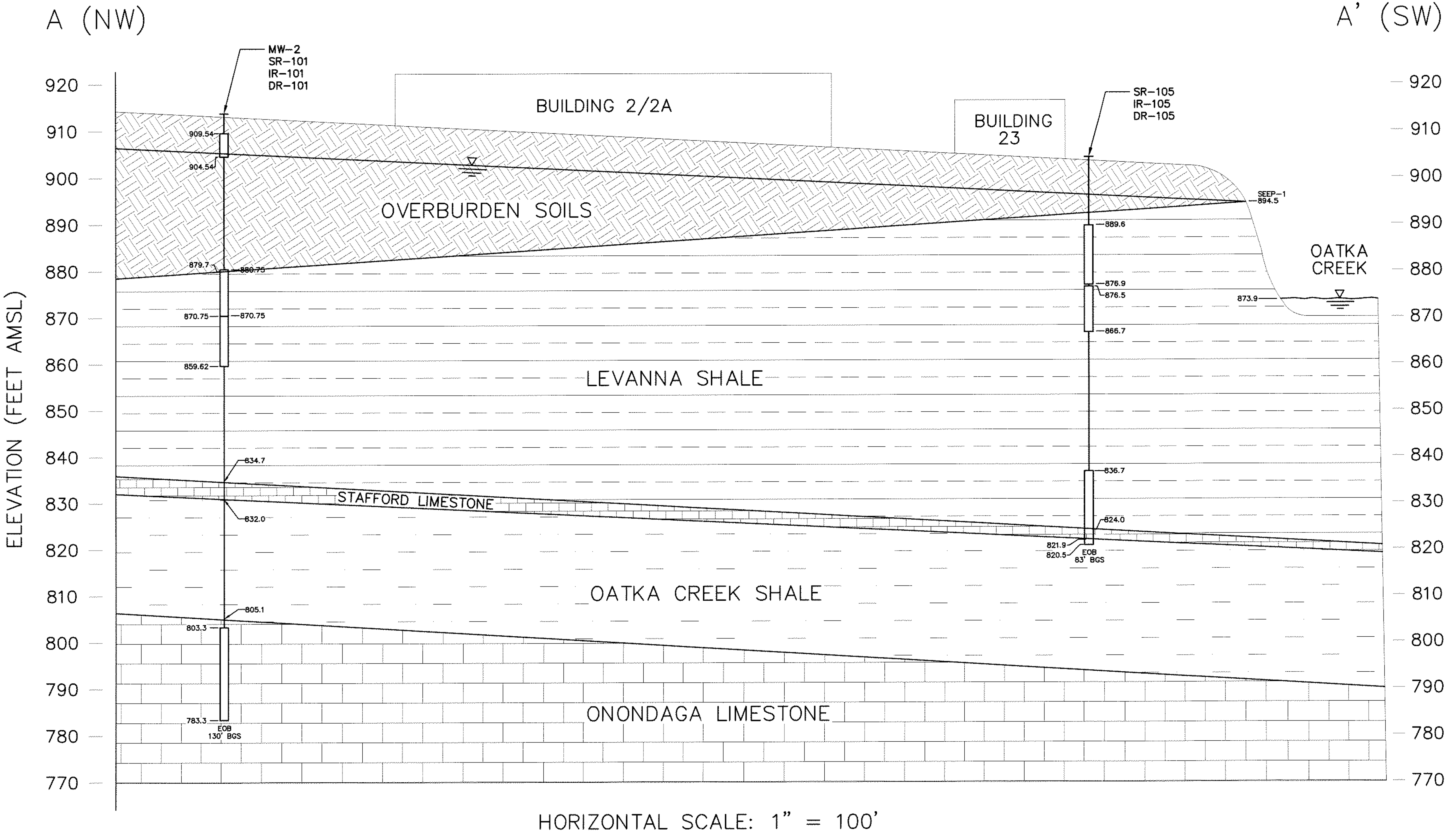

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FIGURE 5-1
GEOLOGIC CROSS SECTION A-A'

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- ***Shallow Rock*** - Eight wells monitor the uppermost 5 to 10 feet of competent shale bedrock, referred to as the shallow rock (SR) zone. The SR wells range in depth from 27 to 43 feet below grade. Hydraulic conductivity of the shallow bedrock is variable to three orders of magnitude relative to the degree of fracturing present at each well location. The geometric mean of the measured hydraulic conductivities of the shallow rock zone was 2.09×10^{-05} cm/sec.

- ***Intermediate Rock*** - Six wells are completed in the same shale rock formation directly beneath the SR zone. Total depths of these intermediate bedrock (IR) wells range from 38 to 54 feet below grade. Three of the six intermediate rock wells had insufficient water or recharged too slowly to even complete a slug test. The geometric mean hydraulic conductivity of the other three IR wells was 9.79×10^{-08} cm/sec.

- ***Deep Rock*** – The three deepest on site monitoring wells, or deep rock (DR) wells, are completed at total depths between 62 and 130 feet below grade. The deepest well (DR-101) is completed in the Onondaga Limestone formation at a total depth of 130 feet. The other two DR wells (DR-103 and DR-105) are completed at 62 and 83 feet respectively. These two wells monitor the thin Stafford Limestone formation and the lower Levanna shale immediately above the Stafford. Like the IR zone, the deep rock zone contained very few fractures to transmit groundwater. Only one of the three DR wells has sufficient water and recharge to perform a slug test. This well (DR-105) had a hydraulic conductivity of 1.70×10^{-04} cm/sec. This conductivity measurement represents the lower Levanna shale since only approximately two feet of the wells' 16 feet of open-rock interval is Stafford Limestone (which contained no fractures). The remaining 14 feet of this wells' open-rock interval is in the Levanna Shale.

5.2 Site-Specific Geology

5.2.1 Overburden Geology

Overburden thickness was measured at drilling locations throughout the site and ranged from approximately 10 to 30 feet. Overburden is thickest (>25 feet) at two areas of the site, the South fill area and at well cluster 101 located along the western site boundary northwest of Building B-2A. Overburden is relatively thin (< 15 feet) in the area from just south of the Northeast fill area south to the railroad tracks. Figure 5-2 illustrates the variations of overburden thickness across the site. Two distinct overburden units are

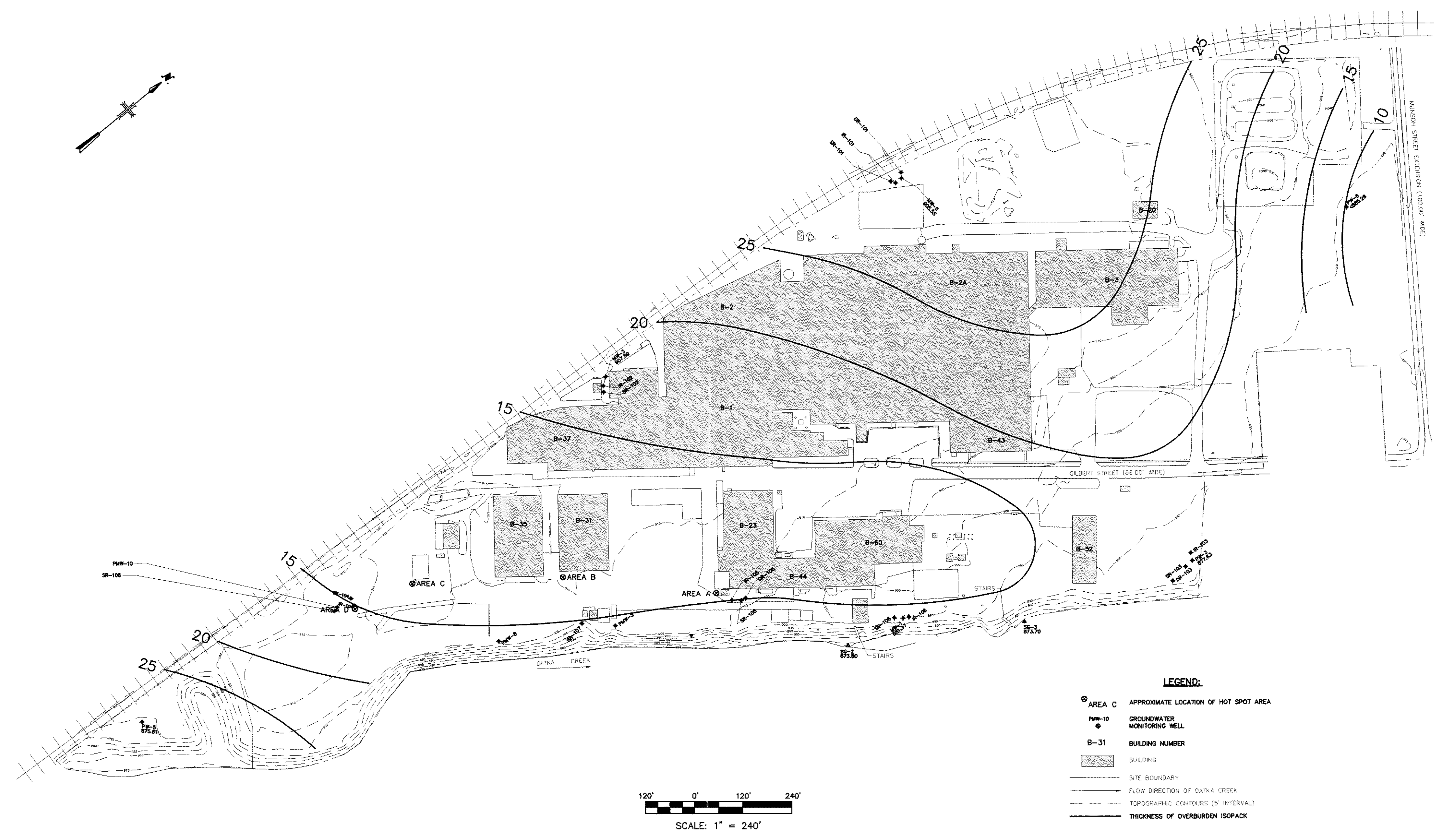

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FIGURE 5–2

THICKNESS OF OVERBURDEN MAP

present at the Site, fill material and glacial till. Map No.1 shows the location of the cross-section A-A', and Figure 5-1 presents the cross-section. These units are described below:

- ***Fill Material*** – Fill was used to level topographically low areas and provide support to the steep bank of Oatka Creek along the eastern edge of the property. Two distinct areas contain most of the fill material at the Site. These two areas are the Northeast and the South fill areas, illustrated on Figure 1-2. Where present, fill is the uppermost overburden unit and was encountered up to 30 feet thick in the South fill area. The fill material consists primarily of anthropogenic materials including brick, coal, cinders, and fragments of porcelain from insulators. These materials are mixed with disturbed natural soil material of clay, silt, sand, and gravel.

- ***Glacial Till*** - The native overburden material at the site is glacial till which is composed of unsorted silt with clay, sand, and gravel. The till is deposited directly on the underlying bedrock and, where not covered by fill, is present at the ground surface. The maximum thickness of till encountered at the site is 25 feet at well cluster 101, along the western Site boundary. This unit increases in density with depth. Three subsurface soil samples were collected from Hot Spots A and C from depths ranging from 2.5 feet to 9 feet and analyzed for geotechnical analyses (grain size and Atterberg limits). Analytical results of these samples indicate that this material is composed primarily of silt with clay and some sand and gravel. These results are summarized in Table J-1, along with the laboratory's raw data in Appendix J.

5.2.2 Bedrock Geology

Depth to bedrock was measured throughout the Site at depths ranging from 10 to 29.5 feet below grade. The elevation of the bedrock surface is highest in the general area of the four hot spots. This area is coincident, and likely the reason for, the area of relatively thin overburden cover discussed in Section 5.2.1, see Figure 5-3. From this high, the bedrock surface elevation decreases to the north, east, and, most steeply to the south. The bedrock surface is an erosional surface and the bedding of the bedrock is nearly horizontal. Calculation of the bedrock "attitude" (strike and dip of the rock bedding) resulted in a nearly east/west strike and a dip to the south of 0.011 ft/ft or 57 feet per mile. This calculation was based on the elevations of top of the Stafford Limestone unit at the locations of the three on-site deep monitoring wells.

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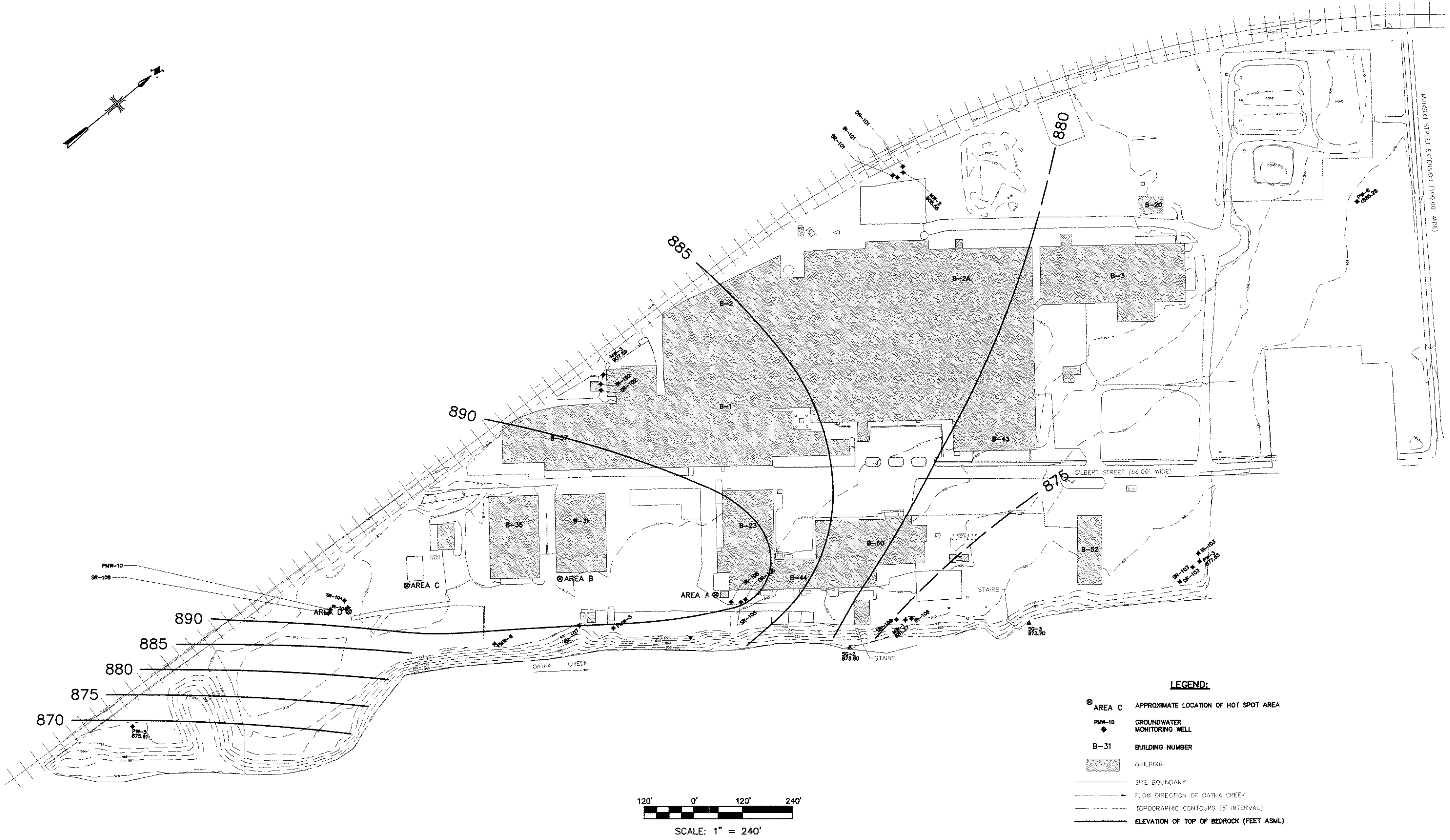

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FIGURE 5–3
TOP OF BEDROCK
MAP

A total of four distinct bedrock units were encountered during rock well drilling at the Site. These are, in descending order:

- Levanna Shale
- Stafford Limestone
- Oatka Creek Shale
- Onondaga Limestone

Each of these rock units is described below.

Levanna Shale - The Levanna Shale member of the Skaneateles Formation is present directly beneath overburden deposits at the site. The Levanna shale is described as light olive gray shale near its top and weathered fissile dark gray or black shale near the base. Publications also report calcareous beds and some petroliferous concretions within this unit but none were observed during rock well drilling at the Site (Buehler, 1963). This unit was observed in outcrop along the eastern border of the site at the western bank of Oatka Creek where it is exposed along a steep cliff approximately 30 feet high. This rock unit also underlies the creek by an estimated additional 50 feet. The thickness of this unit beneath the site ranged from 50 to 70 feet, thickening from northwest (at DR-101) to southeast (at DR-105), see geologic cross section A – A', Figure 5-1. All of the shallow rock (SR) and intermediate rock (IR) wells are completed in the Levanna Shale member. Rock cores recovered from the upper portion of this unit indicate that the shale is highly fractured and weathered, generally in the top 1 to 2 feet of the bedrock surface, and up to 4 to 5 feet in certain areas of the site. The fractures occur predominantly along horizontal bedding planes, but vertical fractures were also reported in the upper bedrock. Rock quality designation (RQD) values were calculated by dividing the total length of recovered core segments greater than or equal to four inches by the total length of the core run times 100. The resulting number is an indication of the percent of unfractured rock encountered with 100 being the most competent rock RQD value.

RQDs of the Levanna shale were averaged for the three deep wells (DR-101, DR-103, and DR-105) at 95, 68, and 82 respectively.

Stafford Limestone - Beneath the Levanna Shale is the relatively thin Stafford Limestone member of the Skaneateles formation. The Stafford is a gray limestone that weathers chocolate brown and is massively bedded at the Site. The Stafford limestone was encountered in all three deep bedrock wells at a thickness between 1.6 and 2.7 feet. The Stafford member was massive with no open natural fractures noted at all three locations drilled. RQD values of core runs that included the thin Stafford averaged 84. However, the RQD values averaged are more representative of the shale units above and below the Stafford because most of the core retrieved (typically 10-feet) were of these shale units. RQD of the Stafford unit only was 100 for all three deep bedrock wells.

Because of its sharp lithologic distinction from the overlying and underlying shales, the Stafford limestone provided a useful marker bed for measurement of the bedrock attitude (strike and dip) at the site. The strike of the Stafford limestone was calculated as essentially east/west with a southward dip of 0.0107 feet per foot, or 57 feet per mile. This measured bedrock attitude agrees with published reports of regional geologic conditions (Rickard, 1969). Since the bedrock formations at the site lie conformably on top of one another with no known deformation such as folding or faulting, the strike and dip of the Stafford is representative of all of the bedrock units encountered at the Site.

Oatka Creek Shale - Beneath the Stafford limestone is the Oatka Creek Shale member of the Marcellus Formation. The Oatka Creek Shale is dense black fissile shale with a petroliferous odor. Beds of gray shale and several concretionary layers are also known to exist in this unit. The base also contains pyrite nodules in black shale layers. Only one well (DR-101) was drilled deep enough to completely penetrate the Oatka Creek Shale unit. At that location the unit is 27 feet thick. Few fractures were noted during the drilling of this member at this location. The average RQD of this rock member was calculated at 74.

Onondaga Limestone – The Onondaga Limestone Formation was encountered directly beneath the Oatka Creek Shale at well DR-101. The Onondaga contains several fossiliferous limestone members, some containing chert. The Onondaga is reportedly over 100 feet thick in the area but was only drilled for 22 feet at well DR-101. This upper portion of the Onondaga was found to be massive limestone with no significant natural fractures. RQDs of the two 10-foot core runs were 99 and 100.

5.3 Site Hydrogeology

5.3.1 Introduction

Groundwater and surface water elevations were measured on three occasions during the RI: January 16, 2002, May10, 2002, and August 26, 2003. Elevations from each of these measurement events were plotted on site maps and contoured by water-producing interval (overburden, shallow rock, and intermediate rock). Surface water elevation measurements from Oatka Creek were incorporated on the overburden groundwater map. Equipotential contours between the three measurement events show consistent flow patterns toward Oatka Creek in all three water-producing intervals. As is typical, seasonal variations were observed. The May 2002 (spring) water levels were generally the highest of the three events and the August 2003 (summer) water levels were lowest.

The average water elevation difference between the two seasonal extremes was approximately one, two, and four feet at the overburden, shallow rock, and intermediate rock intervals respectively. Figures 5-4, 5-5, and 5-6 illustrate the equipotential surfaces of the three mapped zones at the time of the most recent measurement event (August 26, 2003). An equipotential map of the deep bedrock groundwater was not prepared because a minimum of three similarly completed wells is necessary to create a useful equipotential map and one of the three DR wells (DR-101) is completed in a deeper formation and depth (Onondaga) than the other two (in the Levanna and Stafford). Also, two of the three deep wells (DR-101 and DR-103) appear not to be in hydraulic communication with water-bearing fractures. Thus these well do not produce water sufficient to reach equilibrium. Calculation of horizontal and vertical hydraulic gradients was also performed using the elevation measurements. Additionally, hydraulic conductivity of the geologic formations was measured at each of the 23 monitoring wells using a slug test method and the data analyzed using the methods of Hvorslev (Hvorslev, M.J., 1951).

5.3.2 Overburden Groundwater Flow

Based on water table mapping, the overburden groundwater beneath the site has a gradient toward the east where it discharges to Oatka Creek, a shallow groundwater discharge zone. The gradient of the water table is relatively steep at approximately 0.027

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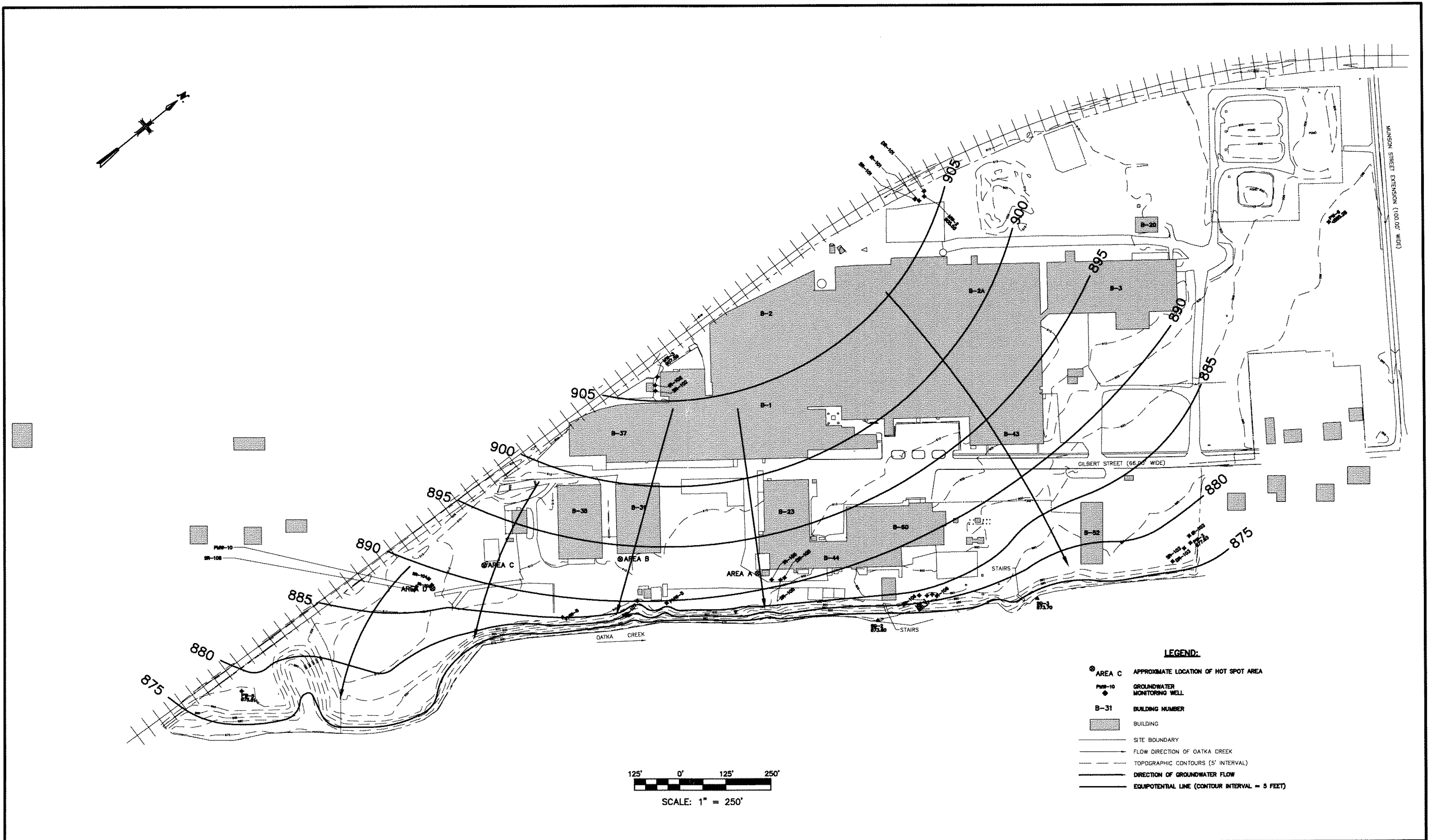

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FIGURE 5-4
OVERBURDEN (WATERTABLE) GROUNDWATER
EQUIPOTENTIAL MAP
AUGUST 26, 2003

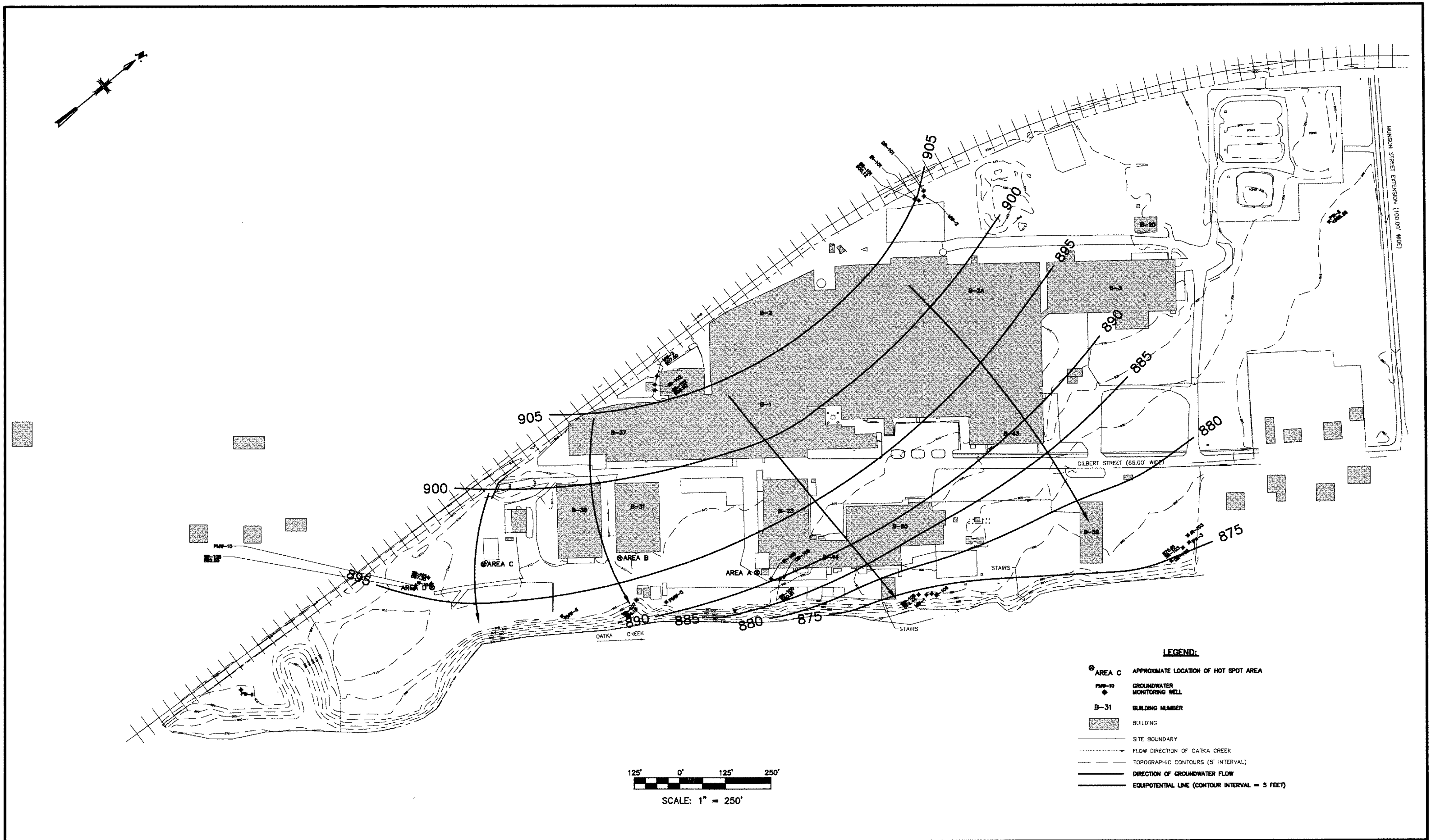

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FIGURE 5–5
SHALLOW BEDROCK GROUNDWATER
EQUIPOTENTIAL MAP AUGUST 26, 2003

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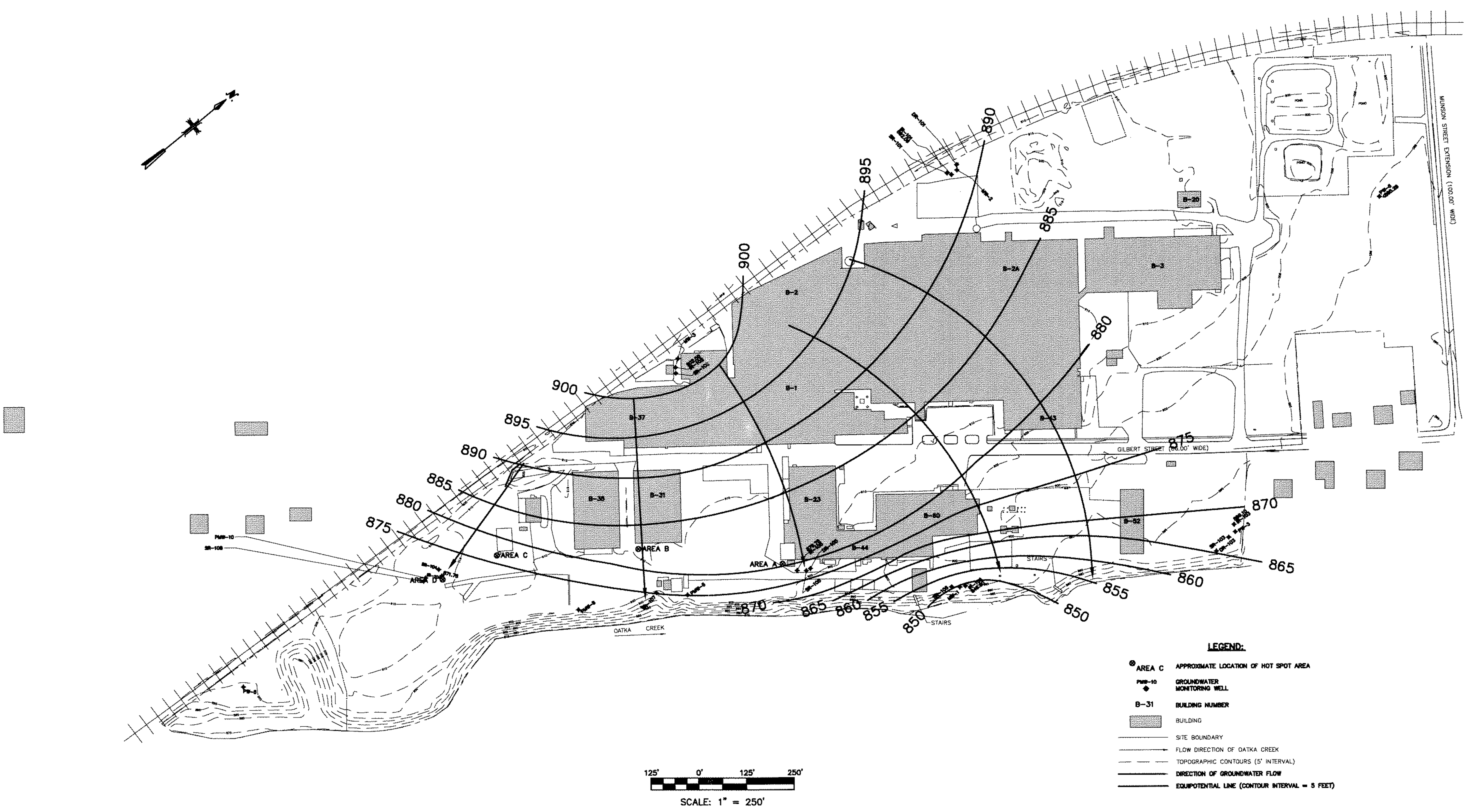

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FIGURE 5–6

INTERMEDIATE BEDROCK GROUNDWATER EQUIPOTENTIAL MAP AUGUST 26, 2003 feet per foot (ft/ft) across the site and steepens dramatically immediately adjacent to the Oatka Creek bank to approximately 0.22 ft/ft, see Figure 5-4.

5.3.3 Bedrock Groundwater Flow

The upper bedrock is weathered and fractured and groundwater from the overburden infiltrates into the underlying upper bedrock. The upper 1 to 2 feet of the bedrock is highly fractured and weathered and transmits groundwater faster than the underlying, less fractured bedrock. Although, none of the Site monitoring wells is completed in this upper weathered zone, observations made during drilling indicated that the hydraulic conductivity of this weathered/fractured zone is greater than the deeper zones in which the shallow, intermediate and deep wells are completed. The hydraulic conductivity of the shallow bedrock wells averaged 10^{-5}cm/sec while the average hydraulic conductivity of the intermediate wells was three orders of magnitude less, at 10^{-8} cm/sec. Groundwater is present in the shallow bedrock wells year-round but hydraulic conductivities vary greatly depending on the degree of fracturing encountered in the well. Equipotential contours of the shallow rock groundwater elevations indicate a steep horizontal gradient from west to east toward the creek at approximately 0.04 ft/ft, see Figure 5-5.

Along the eastern margin of the site, i.e., the western bank of Oatka Creek, the contact between the overburden and the bedrock can be seen approximately 20 feet above the creek bed (~ 10 feet below grade). Therefore the most conductive upper portion of the bedrock is above the creek and drains, at least in part, out of the rock face and down the surface of the valley sidewall to the creek below.

The cliff face was examined three times during the RI, once during the geologic survey and twice during the groundwater/surface water/seep sampling events. At each of these times only one seep could be observed. The seep is located approximately 10 feet below site grade, slightly upstream of building B-23 near Hot Spot Area A. Relative to the geologic stratigraphy, the seep appeared to be flowing from the upper weathered bedrock zone. The flow rate of the seep was estimated at less than one gallon per minute and was observed to flow down along the cliff face and into the creek. Although only one seep was observed during the RI, groundwater from the overburden and bedrock is believed to be constantly discharging to the creek along the entire reach of cliff face between the elevations of the water table and the creek surface. This groundwater discharge may not be visible because of the slow rates of groundwater flow. Also a network of small rock fractures immediately behind the cliff face is likely present due to natural weathering processes and the absence of lateral rock pressure on the east of the rock face. Such a network of fracturing would tend to direct the discharge downward to the rock debris that accumulates along the water's edge.

The intermediate bedrock (IR) zone is less fractured than the shallow bedrock and has a much lower hydraulic conductivity. Equipotential contours of the intermediate rock groundwater elevations indicate a very steep horizontal gradient from west to east to the creek of 0.046 ft/ft (see Figure 5-6).

Comparison of all three potentiometric surface maps shows that groundwater in all three zones flows laterally in a similar direction from west to east toward the creek. As illustrated on Figure 5-1, the creek is a discharge for the overburden, shallow rock, and intermediate zones. Groundwater in the deep rock zone flows downward (see Section 5.3.4 below).

5.3.4 Vertical Gradients

Vertical gradient was calculated at each well cluster using groundwater elevation measurements from all three measurement events. Comparison of these data shows a consistent downward vertical gradient between the overburden and shallow bedrock of an average of approximately 0.18 feet per foot. A steeper downward gradient was calculated between the shallow and intermediate bedrock at an average of approximately 1.57 feet per foot. Average vertical gradient between the intermediate and deep bedrock groundwater was downward at an average of 1.29 feet per foot. Tables H-4, H-5, and H-6 in Appendix H provide vertical gradient calculations for each of the three groundwater measurement events. Although the vertical gradients at the site are clearly and consistently downward, the relatively high hydraulic conductivities of the overburden and shallow bedrock zones transmit most of the groundwater laterally to the creek and not downward to the intermediate and deep bedrock zones. These deeper zones have a much lower (three or more orders of magnitude) hydraulic conductivity than the shallower zones.

SECTION 6

Data Validation/Usability

Samples were collected in two phases. The first phase of sampling was conducted in October of 2001 and January and May of 2002. A second phase was carried out in July and August of 2003. Phase 1 and Phase 2 data were analyzed at Philip Analytical Services Corporation and Columbia Analytical Services, respectively. Phase 2 sample results were used to confirm the repeatability of the Phase 1 results.

Environmental Quality Associates, Inc. (EQA), a qualified data validator, reviewed the offsite laboratory analytical data obtained from each sampling event. The data review was conducted according to the guidelines established by NYSDEC's Data Usability Summary Review (DUSR) process. The DUSR process was performed to provide a determination of whether the data meets the project specific criteria for data quality and data use.

Data Review Reports were prepared for each sample delivery group (SDG) and are attached to this report as Appendix I. The Data Review Reports provide copies of the laboratory analytical results and descriptions of the criteria used to review the laboratory results and supporting quality control documentation. While a few data points were rejected, overall, both phases of data were deemed usable by the data validator. The usability of the data, as assessed by the data validator is discussed in the following sections.

6.1 Surface Water Samples

Volatile Organics

In the Phase 1 data set, all detected analytes were quantitatively estimated and flagged "J" because the associated Continuing Calibration was not preceded by a compliant bromofluorobenzene (BFB) performance check (instrument tune). Results for several specific compounds were qualified as "J" because the reported values were below the concentration of the lowest calibration standard.

For the Phase 2 data, the values for 1,2-dibromo-3-chloropropane for samples SW-1, SW-2, SW-3, and SW-4 were rejected because the continuing calibration relative response factor was below 0.05. Several values were flagged as "J" because the reported values were above the compound's method detection limit (MDL), but below the practical quantitation limit (PQL); no bias direction is inferred.

Semi-Volatile Organics

For the Phase 1 data, butylbenzylphthalate is qualified as "J" for sample SW-1 because the result was below the concentration of the lowest calibration standard.

In the Phase 2 data, the result for caprolactam for sample SW-3 was flagged as "J" because the reported value was above the compound's MDL, but below the PQL; no bias direction is inferred.

Inorganics

For the Phase 1 data, the quarterly Instrument Detection Limits and Linear Range Analysis were over the scheduled frequencies at the time of analysis. All results were qualified "J" for this reason; no bias direction is inferred. No Serial Dilution analysis was performed for the Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) analytes. These results were also flagged "J"; no bias direction may be inferred. Some results for silver were flagged as "J" because the associated Matrix Spike recovery was below the lower limit of 75%; a potential negative bias is suggested.

In the Phase 2 data sets, several values for each sample were estimated and qualified "J" because the values were less than the Contract Required Detection Limit, but greater than or equal to the Instrument Detection Limit.

6.2 Groundwater Samples

Volatile Organics

In Phase 1, several sample analytes were qualified "J" because the results were below the concentration of the lowest calibration standard. Other results were qualified "J" because the recovery for those compounds in the associated Blank Spikes were below the laboratory-established lower limit, and below 70%; a negative bias is suggested.

In Phase 2, for samples from the July, 2003 sample collection, several values were flagged as "J" because they were below the lowest calibration. Other values were flagged as "J" because the results were above the compounds detection limit, but below their quantitation limit; no bias direction is inferred. Several results were classified as "J" because the % RSD for those compounds exceeded the associated Initial Calibration sequence acceptable limit of 30.0%; no bias direction is inferred. Results were flagged as "J" because the percent difference for those compounds in the associated Continuing Calibration standard exceeded the acceptance limit of 25.0%. The reported result for trichloroethene (TCE) in sample PMW-10D was qualified "J" because the recovery for TCE in the matrix spike was below the allowable limit; a negative bias is suggested for this compound.

In Phase 2, for samples from the August, 2003 sample collection, SR-105 and SR-105 DUP were analyzed one day after the ten day maximum from Validated Time of Sample Receipt to analysis. Some results were flagged as "J" because the percent difference for these compounds in the associated Continuing Calibration standard exceeds the acceptance limit of 25.0%. Other values were flagged as "J" because the results were above the compound's detection limit, but below their quantitation limit; no bias direction is inferred. Several results were flagged as "J" because the reported values were above the compound's MDL, but below the PQL; no bias direction is inferred.

Semi-Volatile Organics

For the Phase 1 sample set, all detected analytes were quantitatively estimated and flagged "J" because the results were below the concentration of the lowest calibration standard.

Inorganics

For the Phase 1 data, the quarterly Instrument Detection Limits and Linear Range Analysis were over the scheduled frequencies at the time of analysis. All results were qualified "J" for this reason; no bias direction is inferred. No Serial Dilution analysis was performed for the ICP-MS analytes. These results were also flagged "J"; no bias direction may be inferred. All detections of zinc and detections of manganese for samples MW-1, DR-101, PW-3, and DUP-2 were flagged "J" because the associated Interelement Correction standard recovery was above the upper limit of 120%; a potential positive bias is suggested. Detections of aluminum for samples MW-3 and SR-106, and detections of lead for samples MW-1, DR-101, PW-3, and DUP-2 were flagged "J" because the applicable Matrix Duplicate precision criterion were exceeded for these analytes; no bias direction is inferred.

6.3 Sediment Samples

Volatile Organics

In Phase 1, for SED-2, the laboratory incorrectly neglected to quantitate sample results on a "dry-weight" basis. The reported QA value was recalculated to take sample moisture content and sample mass into account. Several results were flagged "J" because the concentrations reported were below the concentration of the lowest calibration standard.

In the Phase 2 samples, several results were flagged "J" because the percent relative standard deviation (% RSD) for these compounds in the associated Initial Calibration sequence exceeded the method limit of 30.0%; no bias direction is inferred. Other results were flagged "J" because those compounds were non-compliant with the continuing calibration limitation of less than 25% difference. Several results were flagged as "J" because the reported values were above the compound's MDL, but below the PQL; no bias direction is inferred.

Semi-Volatile Organics

In Phase 1, with one exception, all accepted results were quantitatively estimated and flagged "J" because the results were below the concentration of the lowest calibration standard. The concentration of bis(2-ethylhexyl)phthalate for SED-2 was not flagged as "J". All phenolic compounds for samples SED-4, SED-5, and SED-3 DUP were rejected because one or more surrogate compound recoveries from this fraction were below 10%.

For Phase 2 samples, several results were flagged "J" because the reported values were above the compound's MDL, but below the PQL; no bias direction is inferred. Pyrene for sample SED-5 was flagged "J" because the applicable Matrix Spike/Duplicate criteria was exceeded for this analyte; a positive bias is suggested.

Inorganics

For the Phase 1 data, the quarterly Instrument Detection Limits and Linear Range Analysis were over the scheduled frequencies at the time of analysis. All results were qualified "J" for this reason; no bias direction is inferred. No Serial Dilution analysis was performed for the ICP-MS analytes. These results were also flagged "J"; no bias direction may be inferred. Some antimony and copper results were flagged as "J" because the associated Matrix Spike recovery was below the lower limit of 75%; a potential negative bias is suggested. Some lead and chromium results were flagged as

"J" because the applicable Matrix Duplicate precision criterion were exceeded for these analytes; no bias direction is inferred.

For the Phase 2 data, the zinc results for samples SED-1, SED-2, SED-4, and SED-5 were rejected because the reported concentrations were less than ten times the preparation blank value. The zinc values for SED-3 and SED-3 DUP were flagged "J" because their % Difference was greater than the 10.0% maximum for the serial dilution. Positive manganese values were flagged "J" because the percent recovery from the matrix spike was above 125%. Several other results were flagged "J" because the values were less than the contract required detection limits, but greater than the instrument detection limits.

6.4 Soil Samples

Volatile Organics

For the Phase 1 data, several results were flagged "J" for one of the following seven reasons. Several Phase 2 results were flagged "J" for the first listed reason only:

- The reported results were quantitatively estimated because the results were below the concentration of the lowest calibration standard.
- The reported results were flagged "J" because the response exceeded the calibrated detector range.
- The reported results were flagged "J" because the percent difference for this compound in the associated Continuing Calibration standard exceeded the method limit of 20.0%; no bias direction is inferred.
- The reported results were flagged "J" because the associated internal standard recovery was below 50% of the corresponding Continuing Calibration response.
- The reported values were flagged "J" because the associated Matrix Spike and/or Matrix Spike Duplicate recoveries for these compounds were below the laboratory-established lower limits. A negative bias for positive results is inferred, and a potential false-negatives for non-detects are suggested.
- The reported values were qualified "J" because the % RSD for this compound in the associated Initial Calibration sequence exceeded the method limit of 15.0%; no bias direction is inferred.

- The reported values were qualified “J” because the sample was analyzed outside of the allowable 10-days from the validated time of sample receipt maximum holding time; a potential negative bias is suggested.

Semi-Volatile Organics

For the Phase 1 data, several results were flagged “J” for one of the following five reasons:

- The reported results were quantitatively estimated because the results were below the concentration of the lowest calibration standard.
- The reported results were flagged “J” because the associated internal standard recovery was below 50% of the corresponding Continuing Calibration response.
- The reported values were flagged “J” because the recoveries of one acid (phenolic) and one base/neutral surrogate were below limits, but greater than 10%; a potential negative bias is suggested.
- The reported values were flagged “J” because the associated Matrix Spike and/or Matrix Spike Duplicate recoveries for these compounds were below the laboratory-established lower limits. A negative bias for positive results is inferred, and potential false-negatives for non-detects are suggested.
- The reported results were flagged “J” because the percent difference for this compound in the associated Continuing Calibration standard exceeded the method limit of 20.0%; no bias direction is inferred.

Inorganics

For the Phase 1 data, the quarterly Instrument Detection Limits and Linear Range Analysis were over the scheduled frequencies at the time of analysis. All results were qualified “J” for this reason; no bias direction is inferred. No Serial Dilution analysis was performed for the ICP-MS analytes. These results were also flagged “J”; no bias direction may be inferred. Several results were also flagged as follows:

- The reported results were flagged “J” because the associated continuing calibration standard recovery was above the upper limit of 110%. Heightened sensitivity is indicated; a potential positive bias is suggested.
- The reported results were flagged “J” because the associated Interelement Correction standard recovery was above the upper limit of 120%. A potential positive bias is suggested.

- The reported results were flagged "J" because the associated Matrix Spike recovery was below the lower limit of 75%. A potential negative bias is suggested. No post digestion spike was analyzed.

- The reported results were flagged "J" because the associated Laboratory Control standard recovery was below the lower limit. A negative bias is suggested.

Site Contaminant Characterization

SECTION 7

7.1 Introduction

The nature and extent of contamination at the Lapp site was fully characterized through collection and analysis of soil, sediment, surface water, groundwater, and soil-gas samples during two phases of investigation. All sample locations are shown on Map-1. Sampling protocols and methodologies are described in Section 4.0 of the RI Report for each sample matrix. Surface water, sediment, soil, and groundwater samples were submitted for analysis under chain-of-custody to PSC Analytical Services of Burlington, Ontario, during the Phase I investigation, and to Columbia Analytical Services of Rochester, New York, during the Phase II sampling events. Analytical services were performed in accordance with the most current SW-846 and USEPA 600 analytical methods and protocols. Appendix J contains analytical data packages from each sampling event and independent third-party validation reports are attached as Appendix I. The analytical summary Tables presented in this section (Tables 7-1 through 7-19) include only those parameters for which a concentration greater than the laboratory detection limit was detected in at least one sample location. These tabulated data were then compared to New York State Department of Environmental Conservation (NYSDEC) TAGM 4046 guidelines or NYS Ambient Water Quality Standards and Guidelines. A discussion of the constituents identified during the investigation is presented in the following subsections. The discussion is presented by environmental medium and further subdivided by analytical compound groups detected, or areas investigated.

7.2 Passive Soil-Gas Results

A passive soil-gas survey was conducted across the Site to identify if any additional areas of potential VOC contamination beyond the known hot spots exist. The origin of VOCs in the soil-gas may come from soil, groundwater or both. The soil-gas sampling locations are shown in Map No.1. Passive soil-gas vials were submitted under chain of custody to W.L. Gore & Associates for analysis according to a modified US EPA Method 8260 in air. The full soil-gas survey report as prepared by W.L. Gore & Associates is included as Appendix A. The results represent a semi-quantitative measurement in units of micrograms (ug) per Gore-Sober module of VOCs within the soil gases. Figures in Appendix F illustrate the contoured results for the compounds with the highest average VOC concentration detected in the modules, trichloroethylene (TCE), and 1,1,1-trichloroethane (TCA), respectively. Total chlorinated VOCs detected were also contoured.

The results indicate that VOC contamination is concentrated in the known hot spot areas located east of Gilbert Street with no new areas of significant contamination identified. In general, soil gas results are consistent with both soil and groundwater VOC data collected, with the highest concentrations of total chlorinated VOCs detected near Hot Spot Area B. Trace or no soil gas concentrations were found beyond these known areas of VOC contamination.

7.3 Soil Analytical Results

Surface and subsurface soil sampling was performed at three off-site locations adjacent to the site to establish background soil concentrations at the four Hot Spot Areas A, B, C, and D; as well as adjacent to the former hazardous waste materials storage pad; the equipment staging area, the outdoor high voltage testing area; and the temporary storage area for bushings to be repaired. These locations were sampled as outlined in the NYSDEC-approved Work Plan (MPI, March 2000), to characterize the extent of known contamination in site soil, and to locate other potential contaminant source areas. The results of each soil sampling effort are discussed below.

Off-Site Background Samples

Background soil samples were collected from zero to two feet bgs at three different locations adjacent to the site, and analyzed for full TCL/TAL parameters to determine the characteristics of the native overburden materials at the site. Two samples (BKGRND-2 and BKGRND-3) were located west of the railroad tracks, while BKGRND-1 was located northwest of the Northeast fill area, adjacent to Gilbert Street. The sample locations were selected in areas near the site that are not anticipated to have been impacted by past site activities. The background soil sampling results are summarized in Table 7-1.

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TABLE 7-1
SUMMARY OF BACKGROUND SOIL SAMPLE ANALYTICAL RESULTS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location *Sampling Depth (feet bgs)* *Collection Date*	NYSDEC TAGM 4046(1)	Eastern USA Background Concentration	BKGRND-1 0 - 2 10/19/2001	BKGRND-2 0 - 2 10/19/2001	BKGRND DUP (BKGRND-2)	BKGRND-3 0 - 2 10/19/2001
TCL Volatile Organic Compounds (ug/kg)						
Toluene	1,500	-	2 J	3	1 J	12
Benzene	60	-				3
Ethylbenzene	5,500	-				1
m&p-Xylene	1,200	-				7
o-Xylene	1,200	-				2 J
TCL Semivolatile Organic Compounds (ug/kg)						
Carbazole	-	-				180 J
2-Methylnaphthalene	36,400	-				35 J
Dibenzofuran	6,200	-				48 J
1,2,4-Trichlorobenzene	-	-	35			
Naphthalene	13,000	-				70 J
4-Chloro-3-Methylphenol	240	-	120 J			
Acenaphthylene	41,000	-				440 J
Fluorene	50,000	-				180 J
Diethyl phthalate	7,100	-	90 J	96 J	24 J	68 J
Phenanthrene	50,000	-				3200
Anthracene	50,000	-				300 J
Fluoranthene	50,000	-			33 J	6100
Pyrene	50,000	-	250 J		220 J	4100
Benzo(a)anthracene	224	-				3100
Chrysene	400	-				4100
Benzo(b)fluoranthene	1,100	-				5200
Benzo(k)fluoranthene	1,100	-				1900 J
Benzo(a)pyrene	61	-			170 J	1200 J
Indeno(1,2,3-cd)pyrene	3,200	-			120 J	1400 J
Dibenzo(a,h)anthracene	14	-				620 J
Benzo(ghi)perylene	50,000	-				75 J
TCL Pesticides and PCBs (ug/kg)						
Total Pesticides/PCBs	-	-				
TAL Inorganic Analytes (mg/kg)						
Cyanide total	-	-				
Mercury	0.1	0.001 - 0.2				0.05 J
Calcium	SB	130 - 35,000	1800 J	1600 J	1700 J	21000 J
Iron	2000 or SB	2,000 - 550,000	4400 J	11000 J	12000 J	15000 J
Magnesium	SB	100 - 5,000	1200 J	1300 J	1400 J	5900 J
Potassium	SB	8,500 - 43,000	220 J	300 J	300 J	800 J
Sodium	SB	6,000 - 8,000				87 J
Aluminum	SB	33,000	3800 J	6400 J	6200 J	7100 J
Arsenic	7.5 or SB	3 -12		1.8 J	1.8 J	3.5 J
Barium	300 or SB	15-600	43 J	40 J	40 J	47 J
Beryllium	0.16 or SB	0 - 1.75	0.2 J	0.3 J	0.3 J	0.4 J
Cadmium	1 or SB	0.1 - 1				0.2 J
Chromium	10 or SB	1.5 - 40	4.8 J	8.2 J	8 J	9.1 J
Cobalt	30 or SB	2.5 - 60	2.3 J	3.1 J	3.1 J	5.9 J
Copper	25 or SB	1 - 50	4.3 J	6.3 J	6.4 J	15 J
Lead	400 (2)	4 - 500	5.4 J	8.6 J	8.6 J	23 J
Manganese	SB	50 - 5,000	38 J	160 J	170 J	360 J
Nickel	13 or SB	0.5 - 25	6.8 J	6.9 J	6.8 J	13 J
Vanadium	150 or SB	1 - 300	6.0 J	13 J	13 J	13 J
Zinc	20 or SB	9 - 50	27 J	29 J	29 J	59 J

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) USEPA Region 3 Soil Screening Level.

* - The Soil Cleanup Objective refers to the sum of these compounds.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed Eastern US Background Concentration Range.

J - Indicates and estimated value.

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Checked by: BW Date: 11/14/03

Overall, the detected compounds and concentrations are considered to be within range of those typically found in similar settings (i.e., along rail road tracks and roadside). The majority of the detected compounds in the background samples occurred in one sample (BKGRND-3). Trace levels of BTEX compounds were detected in BKGRD-3, however all at concentrations several orders of magnitude below the TAGM 4046 guidelines. Six SVOCs (benzo(a)anthracene, chrysene, benzo(b)flouranthene, benzo(k)flouranthene, benzo(a)pyrene, and dibenzo(a,h)anthracene) were detected primarily in sample BKGRND-3 at concentrations above the TAGM 4046 guidelines, however, these detections are within the range typically encountered for soils in this type of setting (i.e., along railroad tracks or roadsides).

No pesticides or PCBs were detected in the background samples. Nineteen metals were detected in the background samples, however, with the exception of one metal, magnesium, all detected concentrations were within the range of Eastern USA Background Concentrations listed in NYSDEC TAGM 4046. The magnesium concentration in the sample from BKGRND-3 was 5,900 mg/kg, and is only slightly above the upper range of the Eastern USA Background range.

Hot Spot Area Data Analysis

The majority of the soil samples collected on-site were from the unsaturated zone of hot spot area borings, which were analyzed for TCL VOCs. A discussion of the results for each hot spot area follows. Calculations of total chlorinated contaminant mass in the unsaturated soils were performed based on the laboratory analytical results of the soil samples analyzed during previous investigations (H&A September 1995) as well as the samples collected and analyzed during this investigation. The calculations were performed for each hot spot area separately. The areal extent of VOC contamination at each hot spot area was estimated by assigning a ten-foot radius as the area of soils contaminated around each sampled soil boring with chlorinated VOC detections. The areal extent was then estimated as the area encompassing each of the most outerlying borings (including the ten-foot radius) from all depth intervals sampled. These calculations were performed assuming one cubic yard of overburden soils weighs 1.5 tons or 3000 pounds. The results of these calculations are presented in Table 7-2, as well as each of the "Hot Spot" Area discussions below.

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TABLE 7-2
CHLORINATED CONTAMINANT MASS IN SOIL - AREAS A, B, C, AND D
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

	Soil Volumes							VOC Concentrations	Calculated Contaminant Mass		
Depth Interval (ft)	Thickness (ft)	Areal Extent (ft2)	Volume (ft3)	Volume (yd3)	Mass (Pounds)	Mass (kg)	Number of Samples Collected	Average Total VOC Concentration (mg/kg)	Average Contaminant Mass (kg)	Average Contaminant Mass (lbs)	Percent of Total %
Area A											
0-2	2	6,715	13,430	497	1492222	678283	5	103.7	70.34	154.74	78.7
2-4	2	3,764	7,528	279	836444	380202	3	35.68	13.57	29.84	15.2
4-6	2	1,714	3,428	127	380889	173131	3	31.23	5.41	11.90	6.0
6-8	2	3,613	7,225	268	802778	364899	2	0.058	0.02	0.05	0.0
8-10	2	314	628	23	69778	31717	1 *	1.6	0.05	0.11	0.1
								TOTAL	**89.4 kg**	**196.6 lbs**	--
Area B											
0-2	2	3,354	6,708	248	745333	338788	6	1.424	0.48	1.06	65.4
2-4	2	1,989	3,978	147	442000	200909	4	0.2765	0.06	0.12	7.5
4-6	2	6,944	13,888	514	1543111	701414	6 *	0.258	0.18	0.40	24.5
6-8	2	2,784	5,568	206	618667	281212	3	0.065	0.02	0.04	2.5
								TOTAL	**0.7 kg**	**1.6 lbs**	--
Area C											
0-2	2	314	628	23	69778	31717	1	0.002	0.00	0.00	0.0
2-4	2	17,612	35,223	1305	3913667	1778939	5	0.319	0.57	1.25	0.7
4-6	2	6,741	13,482	499	1498000	680909	8 *	111.48	75.91	167.00	90.0
6-8	2	11,204	22,407	830	2489667	1131667	4	5.41	6.12	13.47	7.3
8-10	2	2,253	4,505	167	500556	227525	3 *	7.78	1.77	3.89	2.1
								TOTAL	**84.4 kg**	**185.6 lbs**	--
Area D											
0-2	2	314	628	23	69778	31717	1	0.009	0.00	0.00	0.2
2-4	2	774	1,548	57	172000	78182	2	0.026	0.00	0.00	1.2
4-6	2	854	1,708	63	189778	86263	2	0.619	0.05	0.12	30.3
6-8	2	314	628	23	69778	31717	1	3.8	0.12	0.27	68.4
								TOTAL	**0.2 kg**	**0.4 lbs**	--
								ESTIMATED SITE TOTAL	**175 kg**	**384 lbs**	

Assumptions:

1. One cubic yard equals 3000 pounds.
2. Assumed 10 foot radius around soil borings with chlorinated VOC detections for area of contamination.

* Includes samples collected by H&A, 1995.

Created by: JH Date: 1/07/04
Checked by: BW Date: 1/8/04

Hot Spot Area A

Hot Spot Area A is located near the southeast corner of Building 23, the former machine shop area. Historical information indicates that handling of solvents occurred at the loading dock at the southeast corner of the building and that USTs containing TCA and TCE were formerly located here. Test boring locations were initiated here and subsequent sampling locations were then guided by field PID readings.

The analytical results for the Area A soil samples are summarized in Table 7-3 (VOCs) and Table 7-4 (SVOCs, pesticides, PCBs, and metals). A total of 14 soil samples were collected from Area A during the RI, all were analyzed for VOCs and three of the 14 were also analyzed for SVOCs, PCBs, pesticides, and metals. The primary compound detected was TCA. The highest concentration of TCA detected was 110,000 μg/kg at soil boring SB-A1, at four to six feet bgs. TCE and 1,1-DCA were also detected at several of the soil boring locations, as high as 35,000 μg/kg and 6700 μg/kg, respectively.

The VOCs detected in the unsaturated soils of this area encompass an area up to 11,000 square feet. The majority of the VOCs, approximately 80 % of the estimated mass in this area, were detected within the unsaturated uppermost surface soils from the ground surface to two feet bgs. VOC levels exceeding TAGM 4046 guidelines were detected as deep as six feet bgs. The mass of chlorinated VOCs in the soils sampled from the unsaturated interval (zero to 10 feet bgs) is estimated at 89 kilograms. No SVOCs, pesticides, or PCBs were detected at concentrations above the TAGM values in the unsaturated soil samples collected from Area A.

Metals were analyzed in three Area A samples and were for the most part not present above TAGM guidelines or Eastern USA background concentrations with the exception of the zero to two-foot depth sample at SB-A8. Five metals (cadmium, copper, nickel, silver and zinc) exceeded the Eastern US Background Concentration Range in this sample.

Hot Spot Area B

Hot Spot Area B is located east of Building 31, and is currently used as a storage warehouse. Past activities in this area included a shipping and receiving dock and warehouse area. A gasoline UST was formerly located at the southeast corner of Building 31.

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TABLE 7-3
AREA A SOIL SAMPLES - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	SB-A1	SB-A1	SB-A3	Blind	SB-A3	SB-A5	SB-A5
Sampling Depth (feet bgs)	TAGM	2-4	4-6	0.5-2.0	Dup	6-8	2-4	6-8
Collection Date	4046 (1)	12/20/01	12/20/01	12/20/01	(A3 0.5-2)	12/20/01	10/25/01	10/25/01
TCL Volatile Organic Compounds (ug/kg)								
Chloromethane	-	180 J	150 J					
Acetone	200					120 J	5 J	8 J
Methylene Chloride				2 J	9 J		2 J	1 J
cis-1,2-Dichloroethene	-			2 J	15 J			
Carbon Disulfide	2700							
1,1-Dichloroethene	400	630 J	160 J				1 J	
1,1-Dichloroethane	200	2000	250					
Chloroform	300							
1,1,2-Trichloroethane	-	1300	700					
1,1,1-Trichloroethane	800	65000 J	110000 J	9	120	14 J	38	11
Trichloroethene	700	35000 J	11000	54	650	6 J	55	15
Benzene	60			2			4	11
Tetrachloroethene	1400	140 J	350	2 J	11 J			
Toluene	1500	280		9		6 J	11	27
Ethylbenzene	5500	350		2 J		3 J	1 J	4
m&p-Xylene	1200	380 J		9		14 J	6	22
o-Xylene	1200	320		3		5 J	2 J	7
Total Chlorinated VOCs(2)	-	104,250	122,610	67	796	20	93	26

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046).

J - Indicates an estimated value.

Created by: JH Date: 11/2/03
Checked by: BW Date: 11/14/03

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TABLE 7-3 (cont'd)
AREA A SOIL SAMPLES - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	SB-A6	SB-A6	SB-A7	SB-A7	SB-A8	SB-A8	SB-A12
Sampling Depth	TAGM	0-2	4-6	0-2	4-6	0-2	2-4	0-2
Collection Date	4046 (1)	10/25/01	10/25/01	10/25/01	10/25/01	10/25/01	10/25/01	10/25/01
TCL Volatile Organic Compounds (ug/kg)								
Chloromethane	-							200
Acetone	200	13	12 J					
Methylene Chloride			1 J					
cis-1,2-Dichloroethene	-			1100	240			
Carbon Disulfide	2700	6 J	5 J					
1,1-Dichloroethene	400							
1,1-Dichloroethane	200			330 J		6700		110 J
Chloroform	300							
1,1,2-Trichloroethane	-							
1,1,1-Trichloroethane	800	88	41	6400	380	57000	2500	2100
Trichloroethene	700	89	27	23000	1500	1700	180 J	2000
Benzene	60	2 J	13					
Tetrachloroethene	1400			470 J		800		
Toluene	1500	6	36					120 J
Ethylbenzene	5500		6					
m&p-Xylene	1200	3 J	27			130 J		110 J
o-Xylene	1200		8			130 J		95 J
Total Chlorinated VOCs(2)	-	177	68	31,300	2,120	66,200	2,680	4,410

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046).

J - Indicates an estimated value.

Created by: JH Date: 11/2/03
Checked by: BW Date: 11/14/03

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TABLE 7-4
AREA A SOIL SAMPLES - SVOCs, PESTICIDES, PCBs, AND METALS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC TAGM 4046[1]	Site Background Concentration[2]	Eastern USA Background Concentration	SB-A1	SB-A3	Area A Dup (SB-A3)	SB-A8
Sampling Depth (feet bgs)				2-4	6-8		0-2
Collection Date				10/25/2001	10/25/2001		10/25/2001
TCL Semivolatile Organic Compounds (ug/kg)							
2-Methylnaphthalene	36400	-	-	170 J			570 J
Dibenzofuran	6200	-	-	53 J			
N-Nitroso-di-N-Propylamine	-	-	-		53 J		
Naphthalene	13000	-	-	120 J			140 J
2,6-Dinitrotoluene	1000	-	-		170 J	160 J	
Phenanthrene	50000	-	-	180 J			650 J
Di-n-butyl phthalate	50000	-	-	220 J			
Fluoranthene	50000	-	-	280 J			
Pyrene	50000	-	-	320 J	32 J		
Benzyl butyl phthalate	-	-	-		32 J	38 J	
Benzo(a)anthracene	224	-	-	190 J	30 J	23 J	
Chrysene	400	-	-	250 J			
Bis(2-ethylhexyl)phthalate	50000	-	-				1100 J
Di-n-octyl phthalate	50000	-	-			25 J	
Benzo(b)fluoranthene	1100	-	-	320 J	28 J		
Benzo(k)fluoranthene	1100	-	-	97 J			
Benzo(a)pyrene	61	-	-	150 J			
TCL Pesticides and PCBs (mg/kg)							
Total Pesticides	-	-	-				
Aroclor-1260	-	-	-	0.52			
Total PCBs	1.0	-	-	0.52			
TAL Inorganic Analytes (mg/kg)							
Mercury	0.1	ND - 0.05	0.001 - 0.2	0.060 J			0.13 J
Calcium	SB	1800 - 21000	130 - 35,000	23000 J	50000 J	50000 J	88000 J
Iron	2000 or SB	4400 - 15000	2,000 - 550,000	16000 J	5900 J	5700 J	23000 J
Magnesium	SB	1200 - 5900	100 - 5,000	3100 J	17000 J	17000 J	5500 J
Potassium	SB	220 - 800	8,500 - 43,000	600 J	400 J	320 J	400 J
Sodium	SB	ND - 87	6,000 - 8,000	64 J	54 J	53 J	250 J
Aluminum	SB	3800 - 7100	33,000	5700 J	1900 J	1900 J	6200 J
Antimony	SB	ND	-	0.9 J			0.9 J
Arsenic	7.5 or SB	ND - 3.5	3 -12	8.5 J	2.0 J	1.8 J	4 J
Barium	300 or SB	40 - 47	15-600	53 J	18 J	17 J	39 J
Beryllium	0.16 or SB	0.2 - 0.4	0 - 1.75	0.4 J	0.2 J		0.2 J
Cadmium	1 or SB	ND - 0.2	0.1 - 1	0.3 J	0.1 J		1.2 J
Chromium	10 or SB	4.8 - 9.1	1.5 - 40	26 J	4.2 J	3.4 J	26 J
Cobalt	30 or SB	2.3 - 5.9	2.5 - 60	13 J	3.0 J	2.9 J	15 J
Copper	25 or SB	4.3 - 15	1 - 50	65 J	11 J	9.7 J	360 J
Lead	400 [3]	5.4 - 23	4 - 500	67 J	5.6 J	5 J	160 J
Manganese	SB	38 - 360	50 - 5,000	300 J	240 J	220 J	170 J
Nickel	13 or SB	6.8 - 13	0.5 - 25	12 J	9.7 J	9.2 J	27 J
Silver	SB	ND	-	0.2 J			4 J
Thallium	SB	ND	-	0.2 J	0.4 J	0.2 J	
Vanadium	150 or SB	6.0 - 13	1 - 300	18 J	5.3 J	4.9 J	12 J
Zinc	20 or SB	27 - 59	9 - 50	80 J	39 J	37 J	460 J

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Site background concentrations range of analytical results from on-site surface soil sampling, Table 7-9.

(3) USEPA Region 3 Soil Screening Level.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046) or Site Background Concentration range.

J - Indicates an estimated value.

Created by: JH Date: 11/2/03
Checked by: BW Date: 11/14/03

All test boring locations were selected based on PID detections and were located within an unpaved approach area to the loading dock. A total of 14 soil samples were collected from the unsaturated zone of Area B during the RI, all were analyzed for VOCs and three of the 14 were also analyzed for SVOCs, PCBs, pesticides, and metals. Table 7-5 provides a tabulated summary of the VOCs detected in the unsaturated soil samples collected from Area B. TCE was the primary VOC detected at Hot Spot Area B. The highest value was 4500 µg/kg detected in the surface soil sample (0-2 feet) at SB-B7. 1,2-DCE, and 1,1-DCA were also detected at the same locations as the TCE detections. The chlorinated contaminants detected in the unsaturated soils are located in an area of up to 11,500 square feet. Approximately 65 % of the estimated mass of VOCs detected in the unsaturated zone of this area, were detected at the surface from zero to two feet below the ground surface. The mass of contaminants in the unsaturated soils, the upper eight feet, at Area B is estimated at less than one kilogram.

Benzene was detected above the TAGM 4046 guideline at boring locations SB-B7 and SB-B16 at 210 µg/kg and 65 µg/kg respectively. However, the detection at SB-B16 is only slightly above the TAGM value and the duplicate of this sample detected only 53 µg/kg. The benzene detections are likely a result of vehicular traffic in this area. 2-butanone was detected in seven of the 11 boring locations sampled at Hot Spot Area B, ranging from 3 µg/kg to 380 µg/kg, but only one location at boring SB-B16 (2-4 feet). exceeded the TAGM 4046 guideline of 300 µg/kg.

Table 7-6 provides a tabulated summary of the SVOCs, pesticides, PCBs, and metals detected in the soil samples collected from Area B. No SVOCs, pesticides, or PCBs were detected above their respective TAGM values in the soil samples collected from Area B. Ten metals were detected at concentrations that exceed the TAGM values primarily in one of the three samples collected for metals in Area B (SB-B16 at 0-2 feet depth). These detections include cyanide, calcium, magnesium, antimony, arsenic, cadmium, chromium, copper, silver and zinc. The metals were detected at concentrations within the same order of magnitude as the TAGMs with the exception of zinc, which were two orders of magnitude above the TAGM value. The arsenic detections were consistent with site-wide arsenic concentrations detected in previous investigations that occurred throughout the site, and therefore may represent true background concentrations.

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TABLE 7-5
AREA B SOIL SAMPLES - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	SB-B2	SB-B2	SB-B3	SB-B5	SB-B7	SB-B10	SB-B10	SB-B11
Sampling Depth (feet)	TAGM	0-2	4-6	0-2	2-4	0-2	0-2	6-8	4-6
Collection Date	4046 [(1)]	10/29/01	10/29/01	10/29/01	10/29/01	10/29/01	10/30/01	10/30/01	10/30/01
TCL Volatile Organic Compounds (ug/kg)									
Chloromethane	-	11 J			2 J				
Vinyl Chloride	200	3 J				120 J			
trans-1,2-Dichloroethene	300	8 J				140 J	26 J		
cis-1,2-Dichloroethene	-	110		4		3200	430	12	1 J
Vinyl Acetate	-	12 J	39	13		430	310	98	
Acetone	200	280	50	39					
Carbon Disulfide	2700	2 J	5	2 J		7 J	12 J	2 J	
1,1-Dichloroethene	400	2 J				42 J			
1,1-Dichloroethane	200	9 J		2 J		450	130 J	2 J	
Chloroform	300					10 J			
1,2-Dichloroethane	100	1 J							
2-Butanone	300	61	14	11		130 J	180 J	32	3
1,1,1-Trichloroethane	800		5			100 J	41 J	12	2 J
1,2-Dichloropropane	-							1 J	
Trichloroethene	700	2 J	5			4500	2200	110	12
1,1,2-Trichloroethane	-	2 J	15	5		41 J	68 J	40	
Benzene	60	51	10	5		210	60 J	21	
trans-1,3-Dichloropropene	300							2 J	
4-Methyl-2-Pentanone	1000	2 J	13	2 J		170 J	130 J	42	
2-Hexanone	-	5J	6	5		80 J	79 J	17	
Tetrachloroethene	1400						26 J	7 J	1 J
Toluene	1500	26	25	20		59 J	49 J	68	2 J
Ethylbenzene	5500	10 J	4	3		12 J	9 J	11	
m&p-Xylene	1200	56	21	18		45 J	39 J	63	1 J
o-Xylene	1200	47	7	6		33 J	21 J	22	
Total Chlorinated VOCs[(2)]	-	146	25	11	2	8,113	2,804	186	16

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046).

J - Indicates an estimated value.

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TABLE 7-5 (cont'd)
AREA B SOIL SAMPLES - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	SB-B12	SB-B14	SB-B15	SB-B16	BDUP-2	SB-B16	BDUP-3	SB-B17
Sampling Depth (feet)	TAGM	6-8	2-4	4-6	0-2	(B16 0-2)	2-4	(B16 2-4)	0-4
Collection Date	4046 (1)	10/30/01	10/30/01	10/30/01	10/30/01	10/30/01	10/30/01	10/30/01	10/30/01
TCL Volatile Organic Compounds (ug/kg)									
Chloromethane	-		2 J						2 J
Vinyl Chloride	200								
trans-1,2-Dichloroethene	300								
cis-1,2-Dichloroethene	-								
Vinyl Acetate	-				210	190 J	410 J	500 J	
Acetone	200			58					
Carbon Disulfide	2700			2 J	11 J	25 J	65 J	75 J	3
1,1-Dichloroethene	400								
1,1-Dichloroethane	200								
Chloroform	300								
1,2-Dichloroethane	100								
2-Butanone	300			8	170 J	140 J	360 J	380 J	
1,1,1-Trichloroethane	800								
1,2-Dichloropropane	-								
Trichloroethene	700	1 J							
1,1,2-Trichloroethane	-				86 J	130 J	1100 J	1400 J	
Benzene	60		4	9	10 J	10 J	65 J	53 J	4
trans-1,3-Dichloropropene	300						140 J		
4-Methyl-2-Pentanone	1000				40 J	52 J	530 J	760 J	
2-Hexanone	-				110 J	160 J	2300		
Tetrachloroethene	1400								
Toluene	1500		17	22	47 J	32 J	160 J	190 J	17
Ethylbenzene	5500		2 J	4	23 J	15 J			2 J
m&p-Xylene	1200		17	20	10 J	74 J	170 J	200 J	14
o-Xylene	1200		5	7	74 J	50 J	100 J	110 J	4
Total Chlorinated VOCs(2)	-	1	2	ND	86	130	1,100	1,400	2

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046).

J - Indicates an estimated value.

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TABLE 7-6
AREA B SOIL SAMPLES - SVOCs, PESTICIDES, PCBs, AND METALS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	Site	Eastern USA	SB-B2	SB-B10	Area	SB-B16
Sampling Depth (feet bgs)	TAGM	Background	Background	4-6	0-2	B Dup	0-2
Collection Date	4046(1)	Concentration(2)	Concentration	10/29/2001	10/30/2001	(SB-B10)	10/30/2001
TCL Semivolatile Organic Compounds (ug/kg)							
Phenanthrene	50000	-	-		61 J		
Naphthalene	13000	-	-				130 J
2-Methylnaphthalene	100	-	-				110 J
Fluoranthene	50000	-	-		84 J		260 J
Pyrene	50000	-	-		87 J		920 J
TCL Pesticides and PCBs (mg/kg)							
p,p'-DDE	2.1	-	-			0.016	
Aroclor-1254	1.0	-	-		0.2	0.18	0.14
TAL Inorganic Analytes (mg/kg)							
Cyanide total	-	ND	-				0.22 J
Mercury	0.1	ND - 0.05	0.001 - 0.2	0.050 J	0.060 J	0.070 J	0.10 J
Calcium	SB	1800 - 21000	130 - 35,000	37000 J	50000 J	66000 J	95000 J
Iron	2000 or SB	4400 - 15000	2,000 - 550,000	14000 J	13000 J	11000 J	11000 J
Magnesium	SB	1200 - 5900	100 - 5,000	14000 J	4300 J	4900 J	10000 J
Potassium	SB	220 - 800	8,500 - 43,000	1100 J	820 J	590 J	620 J
Sodium	SB	ND - 87	6,000 - 8,000	180 J	250 J	290 J	170 J
Aluminum	SB	3800 - 7100	33,000	6800 J	7700 J	7100 J	6400 J
Antimony	SB	ND	-	0.3 J			0.6 J
Arsenic	7.5 or SB	ND - 3.5	3 -12	3.2 J	3.1 J	2.7 J	30 J
Barium	300 or SB	40 - 47	15-600	41 J	51 J	53 J	48 J
Beryllium	0.16 or SB	0.2 - 0.4	0 - 1.75	0.4 J	0.4 J	0.3 J	0.4 J
Cadmium	1 or SB	ND - 0.2	0.1 - 1	0.1 J	0.1 J	0.1 J	5.9 J
Chromium	10 or SB	4.8 - 9.1	1.5 - 40	17 J	9.7 J	9.4 J	89 J
Cobalt	30 or SB	2.3 - 5.9	2.5 - 60	5.6 J	5.8 J	5.2 J	4.4 J
Copper	25 or SB	4.3 - 15	1 - 50	16 J	14 J	13 J	83 J
Lead	400 (3)	5.4 - 23	4 - 500	13 J	14 J	14 J	97 J
Manganese	SB	38 - 360	50 - 5,000	470 J	360 J	330 J	190 J
Nickel	13 or SB	6.8 - 13	0.5 - 25	14 J	14 J	13 J	20 J
Selenium	2 or SB	ND	0.1 - 3.9				1.6 J
Silver	SB	ND	-				0.3 J
Thallium	SB	ND	-	0.2 J	0.2 J		0.2 J
Vanadium	150 or SB	6.0 - 13	1 - 300	13 J	13 J	12 J	22 J
Zinc	20 or SB	27 - 59	9 - 50	48 J	47 J	49 J	4500 J

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Site background concentrations range of analytical results from on-site surface soil sampling, Table 7-9.

(3) USEPA Region 3 Soil Screening Level.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046) or Site Background Concentration range.

J - Indicates an estimated value.

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Checked by: BW Date: 11/14/03

Hot Spot Area C

Hot Spot Area C is located at the former hazardous materials storage pad in the southern portion of the site. The sampling program in this hot spot area encompassed the concrete storage pad and extended southeast to the top of the steep embankment adjacent to Oatka Creek. This area was known to formerly store hazardous waste, waste oil, virgin oil, and solvents. A drain at the southeastern end of the concrete pad was connected to a subsurface oil/water separator. The oil/water separator was then connected to a drain that allowed the water to drain into the subsurface. The oil/water separator and drain were decommissioned in 1993. A total of 22 soil samples were collected from Area C during the RI, their locations based on PID readings. All were analyzed for VOCs and seven of the 22 were also analyzed for SVOCs, PCBs, pesticides, and metals. Tables 7-7 and 7-8 summarize the analytical results for the soil samples collected at Area C.

Overall the data collected from Area C indicated no well-defined area from past use, but instead scattered detection of primarily chlorinated VOCs. The primary VOCs detected in the unsaturated soil samples collected from Hot Spot Area C are TCE, PCE, and TCA. TCE was detected as high as 45000 µg/kg in the soil sample (from 4-6 feet) at SB-C41 located approximately 125 feet southeast of the former storage pad. The soil samples collected from four to eight feet bgs at this location were field noted as having a sweet chemical and petroleum odor. The VOCs detected in unsaturated soils encompass an area of up to 27,300 square feet, and extend in a southeast direction towards Oatka Creek, presumably following the pathway of the drain from the oil/water separator. VOCs were detected in the unsaturated zone as deep as ten feet bgs at borings SB-C3 and SB-C7. The majority of the VOCs in the unsaturated zone (approximately 90 % of the estimated mass in Area C) were detected from 4 feet to 6 feet bgs. The mass of VOCs in the unsaturated soil at Hot Spot Area C is estimated at 84 kilograms. No SVOCs, pesticides, or PCBs were detected above TAGM 4046 values in the soil samples collected from Area C.

Three metals (calcium, magnesium, and thallium) were detected in 4 of the nine samples collected for metals analysis in Area C samples at concentrations that exceed the TAGM 4046 values.

Hot Spot Area D

Hot Spot Area D is located adjacent to the south side of Area C and near the northwest corner of the Southeast fill area and encompasses an area including micro well PMW-10.

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TABLE 7-7
AREA C SOIL SAMPLES - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	SB-C1	SB-C3	SB-C3	SB-C3	SB-C6	SB-C7	SB-C8	SB-C18	SB-C18	SB-C23	SB-C23	BLDP-1
Sampling Depth (feet)	TAGM	8-10	2-4	2-4	8-10	4-6	8-10	4-6	4-6	6-8	2-4	10-12	(C23 10-12)
Collection Date	4046 (1)	10/15/01	10/15/01	10/17/01	10/15/01	10/15/01	10/15/01	10/17/01	10/16/01	10/16/01	10/17/01	10/17/01	10/17/01
TCL Volatile Organic Compounds (ug/kg)													
Chloromethane	-	2 J			1 J								
Methylene Chloride	100					1 J	1 J				2 J		
cis-1,2-Dichloroethene	-	1 J											
Carbon Disulfide	2700	2 J				1							1 J
2-Butanone	300												
1,1,1-Trichloroethane	800	8 J			93	4	4				2 J	6	
Trichloroethene	700	11 J	2	88 J	5100	4	5		12	3100	10	24	2 J
Benzene	60	6 J			8	5	9	4			9	14	14
Tetrachloroethene	1400	920	8	1400	16000	25	11		2 J				
Toluene	1500	15 J			21	15	27	20	6		28	44	43
Ethylbenzene	5500	2 J			3	2 J	4	2 J			4	6	6
m&p-Xylene	1200	13 J			15	13	21	9			18	34	37
o-Xylene	1200	4 J			5	4	6	3			6	11	11
Total Chlorinated VOCs(2)	-	942	10	1,488	21,194	33	20	ND	14	3,100	12	30	2

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

SB-C3 was resampled on 10/17/01 for the collection of full TCL/TAL analysis.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046).

J - Indicates an estimated value.

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TABLE 7-7 (cont'd)
AREA C SOIL SAMPLES - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	SB-C24	SB-C25	SB-C26	Pad-Dup	SB-C-31	SB-C31	SB-C34	SB-C34	SB-C37,	SB-C39	SB-C39	SB-C41
Sampling Depth (feet)	TAGM	6-8	4-6	4-6	(SB-C26)	2-4	6-8	2-4	6-8	0-2	2-4	6-8	4-6
Collection Date	4046 (1)	10/17/01	10/17/01	10/17/01	10/17/01	10/17/01	10/17/01	10/18/01	10/18/01	10/18/01	10/17/01	10/18/01	10/18/01
TCL Volatile Organic Compounds (ug/kg)													
Chloromethane	-												
Methylene Chloride	100						2 J	1 J		2 J			
cis-1,2-Dichloroethene	-												
Carbon Disulfide	2700												
2-Butanone	300			5		5							
1,1,1-Trichloroethane	800	2 J					5				67	18000	
Trichloroethene	700	3 J						4	2 J		14	3400	45000
Benzene	60	13 J					2 J		8 J		7		
Tetrachloroethene	1400	10 J				2 J	4	4	2 J		6	220	
Toluene	1500	42 J		3	4	2 J	6	8	29 J	2 J	18		
Ethylbenzene	5500	6 J							4 J		2 J		
m&p-Xylene	1200	38 J					3 J	1 J	21 J		13		
o-Xylene	1200	12 J							6 J		4		
Total Chlorinated VOCs(2)	-	12	ND	ND	ND	2	9	8	4	0	87	21,620	45,000

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

SB-C3 was resampled on 10/17/01 for the collection of full TCL/TAL analysis.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046).

J - Indicates an estimated value.

Created by: JH Date: 11/2/03
Checked by: BW Date: 11/14/03

TABLE 7-8
AREA C SOIL SAMPLES - SVOCs, PESTICIDES, PCBs, AND METALS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC TAGM 4046[1]	Site Background Concentration[2]	Eastern USA Background Concentration	SB-C1	SB-C3	SB-C8	BLDP-1	SB-C24	SB-C25	SB-C26	Pad-Dup	SB-C37
Sampling Depth (feet bgs)				8-10	2-4	4-6	(SB-C8)	6-8	4-6	4-6	(SB-C26)	0-2
Collection Date				10/15/01	10/17/01	10/17/01	10/17/01	10/17/01	10/17/01	10/17/01	10/17/01	10/18/01
TCL Semivolatile Organic Compounds (ug/kg)												
Diethyl phthalate	-	-	-					66 J	29 J	58 J	69 J	48 J
Butylbenzylphthalate	-	-	-					33 J		28 J		
Fluoranthene	50000	-	-									39 J
Pyrene	50000	-	-			34 J						50 J
TCL Pesticides and PCBs (mg/kg)												
Total Pesticides/PCBs	-	-	-									
TAL Inorganic Analytes (mg/kg)												
Mercury	0.1	ND - 0.05	0.001 - 0.2		NA							0.04 J
Calcium	SB	1800 - 21000	130 - 35,000	36000 J	1500 J	34000 J	31000 J	33000 J	1900 J	1800 J	1300 J	2400 J
Iron	2000 or SB	4400 - 15000	2,000 - 550,000	8000 J	15000 J	14000 J	14000 J	7500 J	10000 J	13000 J	9200 J	19000 J
Magnesium	SB	1200 - 5900	100 - 5,000	9900 J	2100 J	12000 J	12000 J	12000 J	1200 J	1700 J	1000 J	3200 J
Potassium	SB	220 - 800	8,500 - 43,000	360 J	640 J	740 J	700 J	260 J	280 J	570 J	300 J	840 J
Sodium	SB	ND - 87	6,000 - 8,000			55 J	55 J	60 J				1200 J
Aluminum	SB	3800 - 7100	33,000	2100 J	6500 J	5100 J	5400 J	2100 J	3400 J	4500 J	3300 J	8500 J
Arsenic	7.5 or SB	ND - 3.5	3 -12	2.0 J	1.9 J	3.0 J	3.3 J	1.3 J	1.5 J	2.3 J	1.8 J	3.7 J
Barium	300 or SB	40 - 47	15-600	13 J	30 J	44 J	61 J	11 J	17 J	24 J	17 J	56 J
Beryllium	0.16 or SB	0.2 - 0.4	0 - 1.75		0.3 J	0.3 J	0.4 J		0.2 J	0.3 J	0.2 J	0.4 J
Cadmium	1 or SB	ND - 0.2	0.1 - 1	0.2 J		0.1 J	0.1 J			0.1 J		0.1 J
Chromium	10 or SB	4.8 - 9.1	1.5 - 40	3.8 J	8.3 J	7.9 J	8.4 J	3.4 J	5 J	7.4 J	4.7 J	12 J
Cobalt	30 or SB	2.3 - 5.9	2.5 - 60	2.7 J	5.8 J	5.7 J	6.2 J	2.7 J	3.2 J	4.1 J	3.4 J	7 J
Copper	25 or SB	4.3 - 15	1 - 50	11 J	9.6 J	18 J	20 J	8.1 J	10 J	14 J	11 J	17 J
Lead	400[3]	5.4 - 23	4 - 500	4.4 J	7.0 J	7.7 J	7.7 J	3.1 J	3.8 J	5.4 J	4.3 J	11 J
Manganese	SB	38 - 360	50 - 5,000	220 J	360 J	410 J	440 J	240 J	250 J	320 J	290 J	410 J
Nickel	13 or SB	6.8 - 13	0.5 - 25	15 J	10 J	17 J	19 J	6.7 J	6.9 J	11 J	7.2 J	15 J
Thallium	SB	ND	-		0.2 J	0.4 J	0.4 J					
Vanadium	150 or SB	6.0 - 13	1 - 300	5.2 J	11 J	11 J	12 J	5.5 J	8.2 J	11 J	7.6 J	16 J
Zinc	20 or SB	27 - 59	9 - 50	44 J	30 J	47 J	52 J	27 J	29 J	44 J	31 J	50 J

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) Site background concentrations range of analytical results from on-site surface soil sampling, Table 7-9.

(3) USEPA Region 3 Soil Screening Level.

Only those analytes detected at a minimum of one location are shown.

Blank space indicates analyte was not detected.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046) or Site Background Concentration range.

J - Indicates and estimated value.

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This area was investigated at the request of the NYSDEC to further characterize the fill in this area and to locate the source of the elevated TCE and TCA concentrations found in the groundwater samples collected from PMW-10. Six soil samples were collected from the unsaturated zone of Area D during the RI located aerially outward from PMW-10 and were submitted for TCL VOC analysis only. Table 7-9 summarizes the detected results of the soil sampling conducted in Area D.

The primary VOCs detected (TCE, and TCA) in the unsaturated soil samples from Area D are similar to those detected at Area C. The maximum TCE concentration detected was 2300 µg/kg in the unsaturated soil sample from (4-6 feet) at boring location PMW-10M. The VOCs were detected in an area of unsaturated soil up to 2800 square feet, with the majority of the VOCs (approximately 68%of the estimated total mass in this area) occurring at the deepest unsaturated interval sampled (six feet to eight feet bgs). However, the mass of VOCs in the unsaturated soil at Hot Spot Area D is estimated at less than one kilogram.

Surface Soil PCB Sampling

Surficial PCB sampling was performed at several targeted areas located in the eastern portion of the site where PCB-containing materials are believed to have been handled. These areas included the equipment staging area north of Building 52, the outdoor high voltage testing area north of Building 60; and the temporary storage areas for bushings to be repaired east of Building 23 and north of Building 60. These samples were collected at the surface from 0 to 0.5 feet bgs. The sampling results are presented in Table 7-10.

PCBs (Aroclors 1248, 1254, and 1260) were detected at concentrations just slightly above the TAGM 4046 guidelines for total PCBs in two of the seven surface soil samples collected in targeted areas. These two detections were in samples collected from the high voltage testing area (HVT-1), and the storage area for bushings to be repaired (BURPR-2) east of Building 23.

7.4 Groundwater Analytical Results

Groundwater characterization consisted of two events, January of 2002 (Phase I) and August of 2003 (Phase II). Groundwater samples were collected from micro-wells, monitoring wells, and open-hole soil borings (geoprobe). Not all wells could be sampled during the RI sampling events. Wells IR-104 and IR-106 were not sampled on either

TABLE 7-9
AREA D SOIL SAMPLES - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	PMW-10A	PMW-10G	PMW-10H	PMW-10DUP	PMW-10I	PMW-10L	PMW-10M
Sampling Depth (feet bgs)	TAGM	2-4	2-4	0-2	0-2	4-6	6-8	4-6
Collection Date	4046 (1)	7/14/2003	7/14/2003	7/15/2003	7/15/2003	7/15/2003	7/15/2003	7/15/2003
TCL Volatile Organic Compounds (ug/kg)								
1,1-Dichloroethene	600						7 J	
1,1,1-Trichloroethane	800	12	3 J			200 J	1500 D	68
Trichloroethene	700	25	10 J			830 J	2300 D	98
Tetrachloroethene	1400		2 J	9 J	18	40	10 J	2 J
General Chemistry Data								
Percent Solids (%)	-	94.5	90.7	94.2	94.5	91.0	92.7	91.6

Notes:

(1) New York State Department of Environmental Conservation TAGM 4046, Recommended Soil Clean-up Objectives, Dec. 2000.

- NYSDEC TAGM 4046 value not available.

Blank space indicates analyte was not detected.

J - Indicates an estimate value.

Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046).

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TABLE 7-10
SUMMARY OF SURFACE SOIL SAMPLE RESULTS - POLYCHLORINATED BIPHENYLS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location *Collection Date*	NYSDEC TAGM 4046(1)	HVT-1 10/19/2001	HVT-2 10/19/2001	PCB-DUP (HVT-2)	HVT-3 10/19/2001	HVT-4 10/19/2001	EQSTRG-1 10/19/2001	BURPR-1 10/19/2001	BURPR-2 10/19/2001
Polychlorinated Biphenyls (mg/kg)									
Aroclor-1248	-	0.46			0.15				
Aroclor-1254	-	0.55							
Aroclor-1260	-	0.21					0.42		1.4
Total PCB	1*	1.2			0.15		0.42		1.4

Notes:

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.
(2) Site background concentrations range of analytical results from on-site surface soil sampling, Table 7-9.
* - The Soil Cleanup Objective refers to the sum of these compounds.
Only those analytes detected at a minimum of one location are shown.
Blank space indicates analyte was not detected.
Shaded concentrations exceed NYSDEC Recommended Soil Cleanup Objectives (TAGM 4046) or Site Background Concentration range.
J - Indicates and estimated value.

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occasion due to insufficient volume of water within the wells. A summary of groundwater analytical results from the two RI sampling efforts are presented with comparisons to NYSDEC Class GA Water Quality Guidance Values (TOGS Series 1.1.1) in the following sections.

Overall, the data collected indicates a similar site wide trend as compared to historical data collected by others (H&A 1998). The wells with elevated VOC concentrations generally exhibited detections of the same VOCs and within one to two orders of magnitude of historical data. In addition, the data from the two rounds of RI investigation generally had good correlation in that all VOC detections were at the same locations and at similar concentrations. One exception was evidenced at well location PW-5, in which low concentrations of several chlorinated VOCs were detected in the Phase I sampling while no VOCs were detected during the Phase II sampling or previous samplings of this well (ENSR, 1994). The VOCs detected are therefore attributed to the result of residual contamination on the sampling equipment following decontamination procedures since this well was sampled immediately after a well with known elevated concentrations of VOCs. The resulting data from this micro well is not considered representative and is identified and treated as such in the associated tabulations.

7.4.1 VOCs

Table 7-11 summarizes the VOCs detected in the groundwater samples from both events. The primary contaminants detected at concentrations greater than the NYSDEC Class GA Standard were chlorinated VOCs, including TCA, TCE, and 1,1-DCA. Other VOCs detected at concentrations above the water quality guidance values in at least one sample include acetone, benzene, ethylbenzene, toluene, xylene, chloroethane, 1,2-dichloroethane (1,2-DCA), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethene (1,2-DCE), 1,1,2-trichloroethane (1,1,2-TCA), and vinyl chloride. A discussion of the remedial investigation results for the contaminants detected in each of the groundwater bearing zones follows.

The groundwater analytical data indicate that the groundwater VOC contamination at the site is generally confined to the hot spot areas in the southern and eastern portions of the site, with the highest concentrations occurring within the overburden and the shallow bedrock zones. Overall, concentrations of chlorinated VOCs were typically one to four

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TABLE 7-11
GROUNDWATER - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	Overburden Monitoring or Micro Well Data												
Sample Location	NYSDEC	MW-1	DUP-2	MW-1	MW-2	MW-2	MW-3	MW-3	PW-3	PW-3	PW-5 (2)	PW-5	PMW-10	PMW-10
Collection Date	Class GA (1)	01/22/02	(MW-1)	08/28/03	01/18/02	08/28/03	01/17/02	08/28/03	01/22/02	08/28/03	01/22/02	08/29/03	01/22/02	08/30/03
TCL Volatile Organic Compounds (ug/L)														
Acetone	50													7 J
Benzene	1													
Bromomethane	5													
2-Butanone	50													31
Chloroethane	5	22	22	22										
Chloroform	7													
Cyclohexane	-													
1,1-Dichloroethane	5	3200	2000	2200			3				5		1500	1400 J
1,2-Dichloroethane	0.6	5	5											
1,1-Dichloroethene	5	130	130	72									330	600 J
cis-1,2-Dichloroethene	5	35	35	28			6	9 J					34 J	31
trans-1,2-Dichloroethene	5	2	2				4	6 J						4 J
Ethylbenzene	5													
2-Hexanone	50													
Isopropylbenzene	5													
Methylcyclohexane	-													
Methylene Chloride	5												60 J	14
Tetrachloroethene	5													
Toluene	5													
1,1,1-Trichloroethane	5	360	350	200 J							23		12000	12000
1,1,2-Trichloroethane	1	7	7	4 J										28
Trichloroethene	5	26	26	22			2 J				5		13000	13000
Vinyl Chloride	2	12	12	4 J										5 J
m&p-Xylene	5													
o-Xylene	5													
Total Chlorinated VOCs(3)	-	3,799	2,589	2,552	0	0	15	15	0	0	33	0	26,864	27,068

Notes:

(1) NYSDEC Water Quality Guidance Values for Class GA Waters from NYS Ambient Water Quality Standards and Guidelines (TOGS 1.1.1, June 1998).

(2) Detected VOC compounds are likely the result of residual contamination present on the sampling equipment following decontamination, and therefore data is not considered representative.

(3) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

- Water Quality Standard or Guideline not available.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

J - Indicates an estimated value.

Blank space indicates analyte was not detected.

B - Result is between Instrument Detection Limit and Contact Required Detection Limit.

Shaded text indicates guidance criteria was exceeded.

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TABLE 7-11 (cont'd)
GROUNDWATER - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

Sample Location	NYSDEC	Shallow Rock Groundwater Monitoring Well Data															
Sample Location	NYSDEC	SR-101	SR-101	SR-102	SR-102	SR-103	SR-103	SR-104	SR-104	SR-105	SR-105	SR-105 DUP	SR-106	SR-106	SR-107	SR-107 DUP	SR-108
Collection Date	Class GA $^{(1)}$	01/17/02	08/28/03	01/18/02	08/28/03	01/18/02	08/28/03	01/22/02	08/30/03	01/22/02	08/29/03	08/29/03	01/17/02	08/28/03	08/30/03	08/30/03	08/30/03
TCL Volatile Organic Compounds (ug/L)																	
Acetone	50				8 J						3700	3900					
Benzene	1														18	17	
Bromomethane	5					1 J											
2-Butanone	50			1 J													
Chloroethane	5												18	36			
Chloroform	7																
Cyclohexane	-				4 J		10								16	15	
1,1-Dichloroethane	5							180	410 J	24000	29000	30000	2800	2800	170	170	29
1,2-Dichloroethane	0.6																
1,1-Dichloroethene	5							36		1000			51	41	15	15	
cis-1,2-Dichloroethene	5							57		1900	1600	1700	53	85	540 J	560	33
trans-1,2-Dichloroethene	5							3		100 J			2		68	69	
Ethylbenzene	5																
2-Hexanone	50																
Isopropylbenzene	5																
Methylcyclohexane	-				4 J		9J								19	19	8 J
Methylene Chloride	5												2 J				
Tetrachloroethene	5												4	6 J			
Toluene	5						4 J								15	14	
1,1,1-Trichloroethane	5							410	950 J	120000	100000 J	110000 J	1800	1800			
1,1,2-Trichloroethane	1												3				
Trichloroethene	5							9300	12000	37000	32000	35000	54	68	150	160	15
Vinyl Chloride	2												7	9 J	14	15	
m&p-Xylene	5					1 J									13	12	
o-Xylene	5					2 J									5 J	5 J	
Total Chlorinated VOCs$^{(3)}$	-	0	0	0	0	0	0	9,986	13,360	184,000	162,600	176,700	4,792	4,845	957	989	77

Notes:

(1) NYSDEC Water Quality Guidance Values for Class GA Waters from NYS Ambient Water Quality Standards and Guidelines (TOGS 1.1.1, June 1998).

(2) Detected VOC compounds are likely the result of residual contamination present on the sampling equipment following decontamination, and therefore data is not considered representative.

(3) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

- Water Quality Standard or Guideline not available.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

J - Indicates an estimated value.

Blank space indicates analyte was not detected.

B - Result is between Instrument Detection Limit and Contact Required Detection Limit.

Shaded text indicates guidance criteria was exceeded.

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TABLE 7-11 (cont'd)
GROUNDWATER - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

		Intermediate Rock Groundwater Monitoring Well Data									Deep Rock Groundater Monitoring Well Data			
Sample Location	NYSDEC	IR-101	DUP-1	IR-101	IR-102	IR-102	IR-103	IR-103	IR-105	IR-105	DR-101	DR-101	DR-103	DR-105
Collection Date	Class GA (1)	01/22/02	(IR-101)	08/28/03	01/18/02	08/29/03	01/18/02	08/28/03	01/18/02	08/29/03	01/22/02	08/28/03	08/28/03	08/29/03
TCL Volatile Organic Compounds (ug/L)														
Acetone	50					9 J				**52**	**300**	**140**	**150**	11
Benzene	1			**17**	**9 J**	**14**			**15**	**15**	**30**	**63**	**53**	**17**
Bromomethane	5													
2-Butanone	50								4	16		18	**51**	6 J
Chloroethane	5						**5**	**5 J**						**29**
Chloroform	7												**11**	
Cyclohexane	-			18		88		5 J		11		130	120	43
1,1-Dichloroethane	5						**110**	**56**	**130**	**190**				**24**
1,2-Dichloroethane	0.6													
1,1-Dichloroethene	5													
cis-1,2-Dichloroethene	5						**47**	**16**	2	4 J				
trans-1,2-Dichloroethene	5													
Ethylbenzene	5				**12 J**	4 J			4	**13**	**11**	**16**	**29**	**7 J**
2-Hexanone	50												7 J	
Isopropylbenzene	5												4 J	
Methylcyclohexane	-			14		42		5 J		5 J		71	130	29
Methylene Chloride	5													
Tetrachloroethene	5													
Toluene	5			**6 J**			2 J		**7**		**8.6**	**7 J**	**100**	**14**
1,1,1-Trichloroethane	5						**40**	**13**	**28**	**77**				
1,1,2-Trichloroethane	1													
Trichloroethene	5						3		**25**	**110**				
Vinyl Chloride	2						**5**							
m&p-Xylene	5			**10 J**	**13 J**	**6 J**	3 J		**11**		**38**	**34**	**130**	**27**
o-Xylene	5						1 J		3		**5.6**	4 J	**46**	**7 J**
Total Chlorinated VOCs(3)	-	0	0	0	0	0	210	90	185	381	0	0	11	53

Notes:

(1) NYSDEC Water Quality Guidance Values for Class GA Waters from NYS Ambient Water Quality Standards and Guidelines (TOGS 1.1.1, June 1998).

(2) Detected VOC compounds are likely the result of residual contamination present on the sampling equipment following decontamination, and therefore data is not considered representative.

(3) Total chlorinated VOCs does not include methylene chloride because is was identified as a probable lab contaminants.

- Water Quality Standard or Guideline not available.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

J - Indicates an estimated value.

Blank space indicates analyte was not detected.

B - Result is between Instrument Detection Limit and Contact Required Detection Limit.

Shaded text indicates guidance criteria was exceeded.

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TABLE 7-11 (cont'd)
PMW-10 AREA GROUNDWATER SAMPLES - VOLATILE ORGANIC COMPOUNDS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

		Geoprobe Overburden Groundwater Sampling Site					
Sample Location	NYSDEC Class GA 1	10B	10C	10D	10I	10DUP	10K
Collection Date		7/14/2003	7/15/2003	7/14/2003	7/15/2003	7/15/2003	7/15/2003
TCL Volatile Organic Compounds (ug/L)							
Acetone	50	33 J	50 J	25 J			
1,1-Dichloroethene	5	370	320	130	620	690	
1,1-Dichloroethane	5	340	1100	640	310	250	
1,1,1-Trichloroethane	5	7400 J	9400	2400	43000	49000	96 J
Trichloroethene	5	2500 J	1500 D	4000 J	71000	76000	9000
1,1,2-Trichloroethane	1		65 J		16 J	18 J	
Tetrachloroethene	5				31 J	30 J	

Notes:

(1) NYSDEC Water Quality Guidance Values for Class GA Waters from NYS Ambient Water Quality Standards and Guidelines (TOGS 1.1.1, June 1998).

- Water Quality Standard or Guideline not available.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

J - Indicates an estimated value.

Blank space indicates analyte was not detected.

B - Result is between Instrument Detection Limit and Contact Required Detection Limit.

D - Identifies compounds in an analysis at a secondary dilution factor.

Shaded text indicates guidance criteria was exceeded.

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orders of magnitude lower in the intermediate and deep rock wells as compared to the shallow or overburden wells at the same well clusters.

Overburden Groundwater-Bearing Zone

Chlorinated VOCs were detected in overburden groundwater at concentrations above Class GA groundwater standards. The highest concentrations occurred in the area of well PMW-10 at the South fill area with maximum values of TCA and TCE of 49,000 µg/l and 76,000 µg/l, respectively. Concentrations of TCE at this location were above the indicator value of 1% of the solubility for TCE (1,100,000 µg/l) at which DNAPL could be anticipated. Because of the high concentrations of TCE and TCA detected, a field testing for presence of DNAPL was performed at the two most highly contaminated wells (well SR-105 in Hot Spot A and well PMW-10 in Hot Spot D). An interface probe was used but did not find free-phase liquids in either well, and field samples collected from the bottom of each of these wells did not contain DNAPL when tested using a color-reactive dye. Although extensive geoprobe investigations revealed no DNAPL here or in any onsite borings or wells, the persistence of VOCs within 1% of the solubility levels for VOCs detected beneath the site Hot Spots indicates that DNAPL, while not mobile, may be present in the matrix of the saturated overburden (and upper bedrock) providing a continuing source of mass flux.

Other VOCs detected in overburden groundwater at concentrations above standards include chlorinated VOCs associated with the degradation of the primary VOCs TCA and TCE. These include 1,1-DCE, 1,2-DCE, 1,2-DCA, chloroethane, and vinyl chloride. As would be expected, these "breakdown" VOCs were present at both areas PMW-10 and MW-1. Acetone and methylene chloride were also detected in the PMW-10 area but are not believed to be site-related, but rather lab contaminants due to their low and estimated concentrations. Trace levels of chlorinated VOCs were present in upgradient well MW-3 at a total VOC concentration of 15ug/l during both sampling events. Samples from upgradient overburden well MW-2 and well PW-3 contained no VOCs.

Shallow Bedrock Groundwater-Bearing Zone

Chlorinated VOCs were also the primary contaminants present in the shallow bedrock groundwater-bearing zone. These compounds were present at concentrations above the Class GA groundwater standards in all downgradient shallow bedrock wells except SR-103 at the Northeast fill area. These include (from north to south along Oatka Creek) wells SR-104, SR-105, SR-106, SR-107, and SR-108. Upgradient shallow rock wells SR-101 and SR-102 contained no VOCs at concentrations above standards. The highest concentrations detected were of 120,000 TCA and 37,000 TCE, found in the groundwater at Area A in well SR-105, adjacent to the former machine shop. Other VOCs detected in the shallow groundwater-bearing zone above groundwater standards include the breakdown products of TCA and TCE, as well as PCE, acetone, benzene, toluene, and xylenes. The acetone detection occurred at SR-105 in the field sample and its duplicate sample collected during the Phase II sampling event and was at a concentration of 3900 μg/l. The presence of acetone in this well at such an elevated concentration is suspect because acetone was not detected at all during the first phase of the RI and was either absent or present below 1 ug/l during nine previous quarterly sampling events. Low concentrations of the BTEX (benzene, toluene, and xylene) compounds were detected at well SR-107 at Hot Spot Area B. These detections correspond with low BTEX detections in soils at this area, and are likely the result of residual leaks or spills from vehicular traffic in the area. Intermediate and Deep Bedrock Groundwater-Bearing Zones.

Concentrations of chlorinated VOCs were typically one to four orders of magnitude lower in the intermediate and deep rock wells as compared to the shallow rock or overburden wells at the same well clusters. The predominant VOCs detected above the Class GA standards in the intermediate groundwater bearing zone were the chlorinated VOCs, TCA, 1,1-DCA, and TCE. Low concentrations of these VOCs occurred at wells IR-105 in Area A, and IR-103 in the Northeast fill area.

Trace levels of other VOCs detected in the intermediate rock (IR) wells include 1,2-DCE, chloroethane, cyclohexane, methylcyclohexane, vinyl chloride, acetone, 2-butanone, benzene, ethylbenzene, toluene, and xylenes. The secondary chlorinated VOCs (1,2-DCE, chloroethane, and vinyl chloride) are likely breakdown products of the primary VOCs (TCA and TCE). Their presence can be attributed to natural degradation since they were detected at the same locations as the TCA or TCE detections.

Several of the VOC's detected in the intermediate and deep rock wells are known to be naturally occurring in the local bedrock units (Oatka Creek Shale and the Onondaga Limestone) due to the presence of natural oil and gas (Copey and Gill, 1982), or are natural breakdown products of those constituents. These compounds include acetone, 2-butanone, cyclohexane, methylcyclohexane, and the BTEX compounds detected in the upgradient and downgradient intermediate and deep wells. The cyclohexane and methylcyclohexane detections in the intermediate and deep wells can also be attributed to the presence of hexanes as part of the natural gas constituents in the deep bedrock units.

The acetone concentrations in the deep rock wells DR-101 (upgradient), and DR-103 (downgradient), were at relatively similar concentrations (140 µg/l and 150 µg/l). Based on their locations and their similar concentrations, these detections may be the breakdown product of propane (Merck, 1976), which is a constituent of the natural gas in the deep bedrock units.

The BTEX (benzene, ethylbenzene, toluene, and xylene) compounds were detected in several intermediate and deep wells across the site, including the upgradient wells. Generally the BTEX detections were higher in the deep groundwater-bearing zone than the intermediate and shallow zones, and therefore likely represent naturally occurring concentrations attributed to the oil and gas present in the deep bedrock.

2-butanone was detected at low levels at the upgradient well DR-101, as well as down gradient locations IR-105, DR-105, and DR-103. These occurrences can be attributed to the microbial oxidation of butane (ATSDR, 1992), also a natural gas constituent present in the deep bedrock units. 2-butanone was not detected in the overburden and shallow rock wells at these locations, indicating that this constituent does not originate from a surface source area.

7.4.2 VOC Loading to Oakta Creek

Calculations of the potential for chlorinated VOCs to discharge to Oatka Creek were performed in order to assess the potential impact of these site contaminants on the surface waters and sediments. These calculations are shown in Table 7-12 and are considered conservatively high estimates since volatilization during the VOC migration pathway is not taken into account. The following summarizes the calculations, which were performed to estimate the mass loading of VOCs to the creek.

Groundwater discharge from each segment was calculated based on:

$Q_{gn} = K_n i_n A$ where Q_{gn} = groundwater discharge from subsection n (L/sec)

K_n = hydraulic conductivity for subsection n (m/sec)

Table 7-12
Calculations of Potential Chlorinated VOC Loading to Oatka Creek
Lapp Insulator Site
Remedial Investigation Report

Water-Bearing Zone	Well	Subsection Number	Hydraulic Conductivity cm/sec	Hydraulic Conductivity m/sec	Gradient	Subsection Width (ft)	Saturated Thickness (ft)	Cross-Sectional Area (ft^2)	Cross-Sectional Area (m^2)	Flow Rate (m^3/sec)	Flow Rate (L/sec)	Total Chlorinated VOC Concentration (ug/L)	Mass Flux (ug/sec)	Mass Flux (ug/day)	Mass flux (kg/day)	Percent of Total
Overburden																
	PW-3	O-4	1.85E-05	1.85E-07	0.04	380	5	1900	177	1.31E-06	1.31E-03	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	MW-1	O-3	2.57E-04	2.57E-06	0.083	1070	6	6420	596	1.27E-04	1.27E-01	2552	3.25E+02	2.81E+07	2.81E-02	8.09E+00
	PMW-10	O-2	NA	2.43E-06	0.057	930	6	5580	518	7.18E-05	7.18E-02	27068	1.94E+03	1.68E+08	1.68E-01	4.84E+01
	PW-5	O-1	2.04E-03	2.04E-05	0.045	440	7	3080	286	2.63E-04	2.63E-01	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total Mass Flux													**Total**	**1.96E-01**	**56.502**
Shallow Bedrock																
	SR-103	SR-5	1.74E-06	1.74E-08	0.02	370	10	3700	344	1.20E-07	1.20E-04	0	0	0	0	0.00E+00
	SR-106	SR-4	3.76E-04	3.76E-06	0.045	570	10	5700	530	8.96E-05	8.96E-02	4845	4.34E+02	3.75E+07	3.75E-02	1.08E+01
	SR-105	SR-3	2.77E-05	2.77E-07	0.056	380	10	3800	353	5.48E-06	5.48E-03	176700	9.68E+02	8.36E+07	8.36E-02	2.41E+01
	SR-104/108	SR-1	1.42E-04	1.42E-06	0.038	1020	10	10200	948	5.11E-05	5.11E-02	6719	3.44E+02	2.97E+07	2.97E-02	8.557
	SR-107	SR-2	6.15E-06	6.15E-08	0.035	480	10	4800	446	9.60E-07	9.60E-04	989	9.49E-01	8.20E+04	8.20E-05	2.36E-02
	Total Mass Flux													**Total**	**1.51E-01**	**43.498**
Intermediate Bedrock																
	IR-103	IR-4	7.21E-07	7.21E-09	0.042	380	10	3800	353	1.07E-07	1.07E-04	90	9.62E-03	8.31E+02	8.31E-07	2.40E-04
	IR-106	IR-3	Dry	2.86E-10	0.105	580	0	0	0	0	0		0	0	0	0.00E+00
	IR-105	IR-2	4.02E-08	4.02E-10	0.029	690	10	6900	641	7.47E-09	7.47E-06	381	2.85E-03	2.46E+02	2.46E-07	7.09E-05
	IR-104	IR-1	Dry	2.86E-10	0.047	1170	0	0	0	0	0		0	0	0	0.00E+00
	Total Mass Flux													**Total**	**1.08E-06**	**3.1E-04**
														Total Flux	**0.347**	**kg/day**
															0.76	**lbs/day**

Assumptions:
Hydraulic conductivity for the wells not slug tested (PMW-10, IR-104, and IR-106) is the geometric mean for that water-bearing zone.
Saturated thickness for each bedrock interval is the thickness of the open interval in each well.
Saturated thickness for overburden well PMW-10 is the average of the other OB wells near the creek.
Cross-sectional area is segment width times saturated thickness.
Flow Rate is calculated using Q=KiA (Flow Rate = Hydraulic conductivity*Gradient*Cross-Sectional Area)
Mass Flux equals Flow Rate times Total VOC Concentration.
Wells SR-104 and SR-108 are treated as one unit due to their close proximity. The wells' hydraulic conductivity and VOC concentrations are averaged for this calculation.

Well	H. Cond.	H. Cond.	VOCs
SR-104	2.82E-04	2.82E-06	13360
SR-108	1.98E-06	1.98E-08	77
Average	1.42E-04	1.42E-06	6718.5

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i_n = gradient for subsection n

A_n = cross-sectional area (m^2)

A = WD(0.0929) where W = subsection width (ft)

D = saturated thickness (ft)

0.0929 = conversion factor to m^2

Chlorinated VOCs loading to the creek was based on:

$E_n = Q_{gn}C_n(86{,}400)(1.00 \times 10^{-9})$

where E_n = amount of chlorinated VOCs discharged from subsection n (kg/day)

C_n = total chlorinated VOC Concentration (μg/l)

86,400 = conversion factor for seconds to days

1.00×10^{-9} = conversion factor for ug to kg.

In order to estimate the mass loading of VOCs to the creek, certain simplifying assumptions were made. The shoreline of the site was divided into subsections with the limits determined by the midpoint between two wells for each of the groundwater bearing zones (overburden, shallow, and intermediate), see Figures 7-1 through 7-3. The hydraulic conductivity for each subsection is either the average hydraulic conductivity of each well within the subsection or the geometric mean for that water-bearing zone if individual hydraulic conductivities were not available. The thickness of each subsection was determined as the height of water in the open well interval or the length of the open interval of the wells. The gradients across each segment were measured from the Groundwater Equipotential Maps (Figures 5-4 through 5-6). The Phase II sampling results were used as the total chlorinated VOC concentrations for each segment.

These calculations result in an estimated maximum mass loading of chlorinated VOCs from the Lapp site to Oatka Creek of 0.15 kg/day or 0.32 lbs/day. As discussed above, this estimate is based on several conservative assumptions, which tend to increase the estimated concentration of total chlorinated VOCs discharging to the creek. These calculations do not consider the potential for volatilization of the compounds prior to

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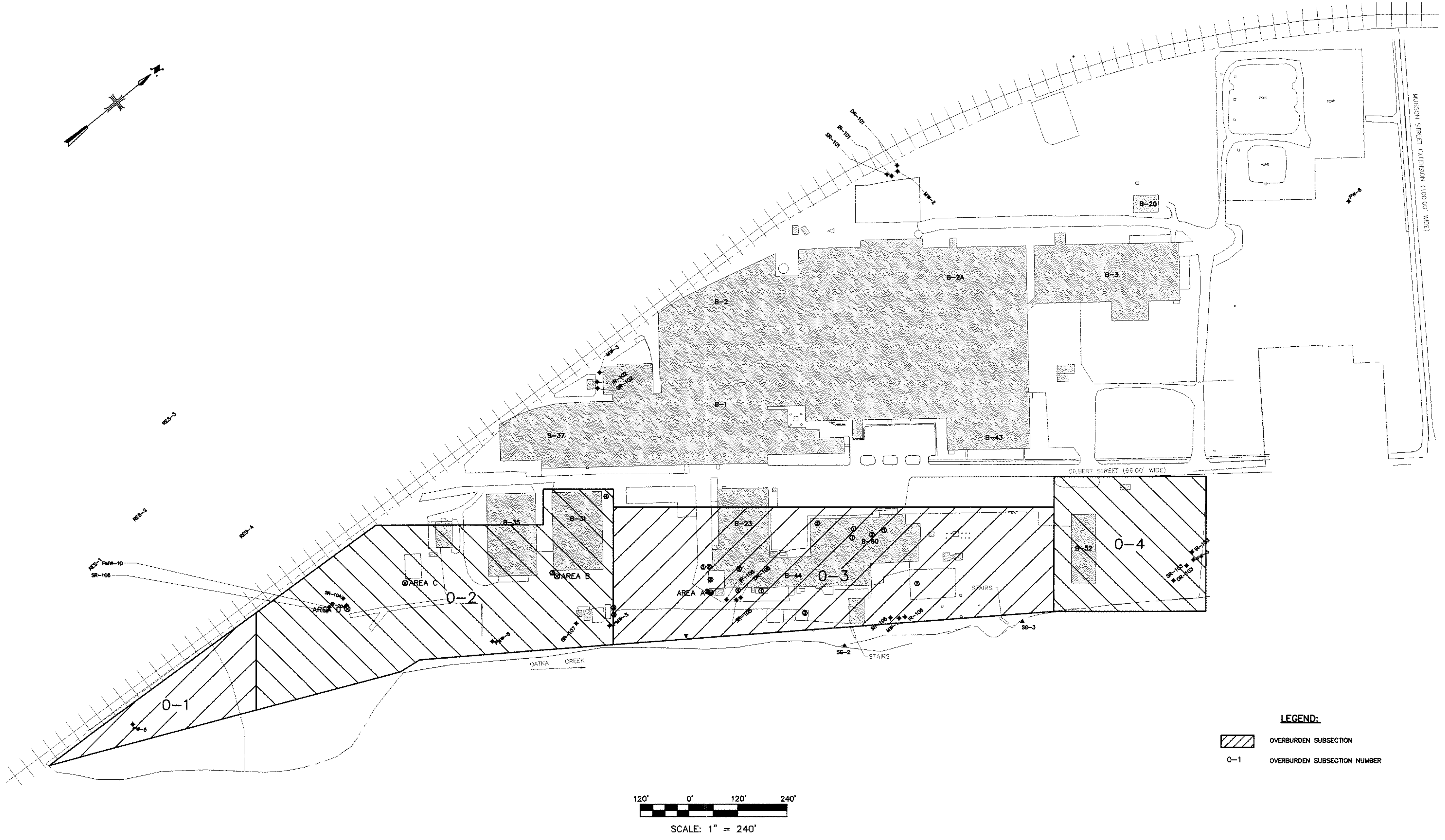

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FIGURE 7-1
OVERBURDEN SUBSECTIONS FOR
CHLORINATED VOC LOADING CALCULATIONS

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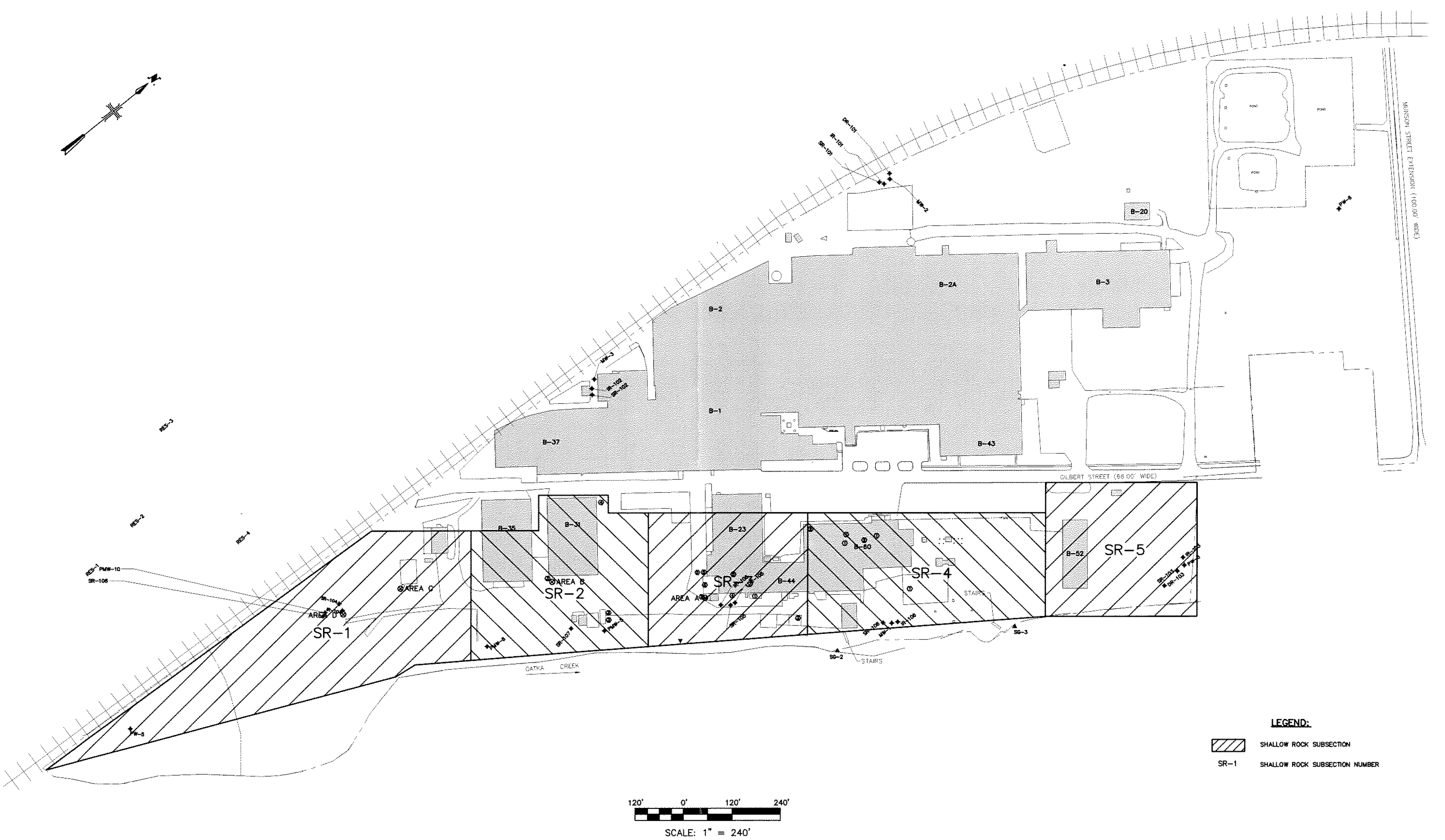

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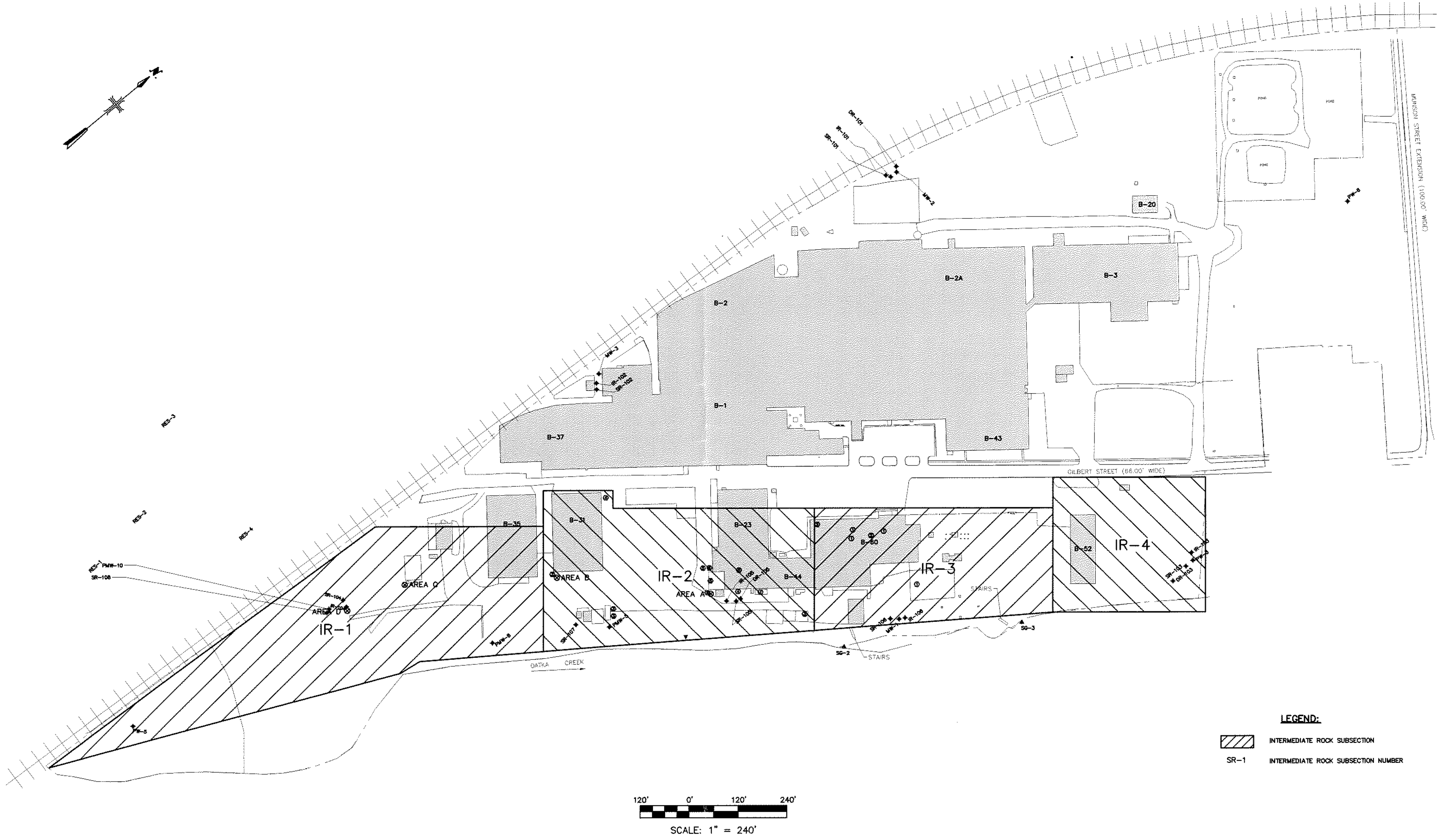
FIGURE 7–2
SHALLOW ROCK SUBSECTIONS FOR CHLORINATED VOC LOADING CALCULATIONS



LEGEND:

▨	INTERMEDIATE ROCK SUBSECTION
SR-1	INTERMEDIATE ROCK SUBSECTION NUMBER

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FIGURE 7-3
INTERMEDIATE ROCK SUBSECTIONS FOR CHLORINATED VOC LOADING CALCULATIONS

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reaching the creek as the discharge points for the overburden and shallow rock zones occur above the water level of the creek.

7.4.3 SVOCs, Inorganics, and Water Quality Parameters

During the first groundwater sampling event (Phase I), nine wells areally distributed across the site were selected for analysis of full TCL/TAL analysis including VOCs, SVOCs, inorganics (metals), pesticides and PCBs. Eight of the nine wells were also characterized for general water quality. Tables 7-13 through 7-15 provide a summary of these results, as well as a comparison to NYSDEC Class GA standards.

SVOCs

Table 7-13 summarizes the results of the SVOC analysis for the nine wells sampled. Three SVOCs, bis(2-ethylhexyl)phthalate, benzo(ghi)perylene, and 2-methylnaphthalene, were detected at only trace levels ($\leq$ 2 ug/l) at one or more of the nine wells. All SVOC detections were below the class GA Standards and most qualified as estimated.

Pesticides and Polychlorinated Biphenyls

Pesticide and PCB analytical results are also summarized in Table 7-13. No pesticides were detected in any of the nine groundwater samples collected. The PCB Aroclor 1262 was detected in only one monitoring well (PW-3) at a concentration of 0.15 μg/l, slightly above the groundwater quality standard of 0.09 μg/l. The groundwater sample collected at PW-3 was very turbid due to the low recharge rate of the well, and therefore the PCB detection should be considered biased high since the samples were not filtered prior to analysis.

Inorganics (Metals)

The results of the inorganic analysis are summarized in Table 7-14. The metals iron, magnesium, sodium, antimony, barium, and manganese were detected at concentrations above the Class GA standard in at least one of the nine groundwater samples collected. The concentrations of barium, manganese, and antimony only slightly exceeded the standards. Elevated concentrations of iron, magnesium, and sodium occurred in almost all the groundwater samples at concentrations above the standards, including upgradient wells, thus it is reasonable to conclude that these detections are naturally occurring

TABLE 7-13
GROUNDWATER - SEMIVOLATILE ORGANIC COMPOUNDS, PESTICIDES, AND PCBs
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

		Overburden Monitoring Wells				Shallow Rock Wells			Intermediate Rock Wells		Deep Rock Wells
Sample Location	NYSDEC	MW-1	DUP-2	MW-3	PW-3	SR-102	SR-103	SR-106	IR-102	IR-103	DR-101
Collection Date	Class GA[1]	01/22/02	(MW-1)	01/17/02	01/22/02	01/18/02	01/18/02	01/17/02	01/18/02	01/18/02	01/22/02
Semivolatile Organic Compounds (ug/L)											
Bis(2-ethylhexyl)phthalate	5	1 J	1 J		2 J						1 J
Benzo(ghi)perylene	-								0.4		
2-Methylnaphthalene	-										2 J
TCL Pesticides/PCBs (ug/L)											
Aroclor-1262	0.09				0.15						

Notes:

(1) NYSDEC Water Quality Guidance Values for Class GA Waters from NYS Ambient Water Quality Standards and Guidelines (June 1998).

- Water Quality Standard or Guideline not available.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

J - Indicates an estimated value.

Blank space indicates analyte was not detected.

Shaded text indicates guidance criteria was exceeded.

Monitoring wells MW-2, PW-5, PMW-10, SR-101, SR-104, SR-105, IR-101, and IR-105 were not sampled due to insufficient water.

TABLE 7-14
GROUNDWATER - INORGANIC ANALYTES
REMEDIAL INVESTIGATION REPORT

LAPP INSULATOR SITE

		Overburden Monitoring Wells				Shallow Wells			Intermediate Rock Wells		Deep Rock Well
Sample Location	NYSDEC	MW-1	DUP-2	MW-3	PW-3	SR-102	SR-103	SR-106	IR-102	IR-103	DR-101
Collection Date	WQS$^{(1)}$	01/22/02	(MW-1)	01/17/02	01/22/02	01/18/02	01/18/02	01/17/02	01/18/02	01/18/02	01/22/02
TAL Inorganic Analytes (mg/L)$^{(2)}$											
Calcium	-	290 J	290 J	150 J	190 J	150 J	150 J	180 J	190 J	88 J	550 J
Iron	0.3	0.11 J	.095 J	4.9 J	14 J	6.1 J	2.5 J	6.8 J	1.5 J	0.68 J	5.7 J
Magnesium	35	39 J	39 J	25 J	40 J	77 J	52 J	47 J	120 J	47 J	320 J
Potassium	-	3.6 J	3.6 J	4.8 J	3.0 J	10 J	3.5 J	3.6 J	15 J	7.7 J	160 J
Sodium	20	58 J	58 J	590 J	94 J	110 J	22 J	160 J	300 J	90 J	3900 J
Aluminum	-	0.021 J	0.020 J	0.050 J	2.8 J	0.014 J	0.066 J	0.013 J	0.019 J	0.014 J	0.15 J
Antimony	0.003	0.003 J	0.005 J		0.006 J						
Arsenic	0.025			0.003 J	0.002 J	0.002 J			0.014 J	0.002 J	0.12 J
Barium	1	0.021 J	0.022 J	0.15 J	0.29 J	0.65 J	0.75 J	0.11 J	1.1 J	0.35 J	0.68 J
Cadmium	5	0.0002 J	0.0002 J	0.0001 J	0.0003 J		0.0002 J		0.0001 J		
Chromium	0.05				0.006 J			0.003 J			
Cobalt	-	0.0014 J	0.0015 J	0.0068 J	0.0035 J		0.0005 J	0.0054 J			
Copper	0.2	0.002 J	0.002 J	0.003 J	0.019 J	0.001 J	0.002 J	0.002 J	0.002 J		0.014 J
Lead	0.025	0.0010 J		0.0015 J	0.0086 J	0.0004 J	0.0006 J	0.0004 J	0.0007 J	0.0007 J	
Manganese	0.3	0.086 J	0.082 J	0.16 J	1.0 J	0.13 J	0.048 J	0.10 J	0.16 J	0.020 J	0.31 J
Nickel	0.1	0.010 J	0.011 J	0.035 J	0.018 J	0.018 J	0.014 J	0.005 J	0.004 J	0.002 J	
Selenium	0.01			0.005 J		0.005 J	0.002 J	0.002 J	0.010 J	0.005 J	0.088 J
Vanadium	-				0.010 J						
Zinc	2	0.017 J	0.012 J	0.017 J	0.052 J	0.005 J	0.006 J	0.008 J	0.011 J		

Notes:

(1) NYSDEC Water Quality Guidance Values for Class GA Waters from NYS Ambient Water Quality Standards and Guidelines (June 1998).

(2) Sample concentrations are for total metals, while some NYSDEC WQS are for the dissolved form of the metals.

- Water Quality Standard or Guideline not available.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

J - Indicates an estimated value.

Blank space indicates analyte was not detected.

Shaded text indicates guidance criteria was exceeded.

Monitoring wells MW-2, PW-5, PMW-10, SR-101, SR-104, SR-105, IR-101, and IR-105 were not sampled due to insufficient water.

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concentrations in the local groundwater. In addition, the samples were not filtered prior to analysis and in some cases were high in turbidity. Based on the analytical results and the well locations at which they were found, no source of metals contamination was indicated.

Water Quality Parameters

Analytical results for those parameters considered indicators of water quality are summarized in Table 7-15. Samples were collected from eight on-site wells for analysis of water quality parameters. This information was used to evaluate the current water quality conditions areally across the site as well as evaluating the conditions in the different groundwater-bearing zones. A review of the water quality analysis indicates no significant changes in the groundwater quality across the groundwater-bearing zones. Key parameter ranges included chloride (62-1100 mg/l), hardness (410-970 mg/l), alkalinity (220-500 mg/l), and pH (7.4-8.0).

7.5 Surface Water Analytical Results

Two surface water sampling events were conducted to determine if any site contaminants have migrated to Oatka Creek. A total of ten samples were collected, two rounds from five locations; one upstream location (SW-1), three locations adjacent to the site (SW-2, 3, and 4), and one location downstream (SW-5) of the site. Each sample was submitted to the subcontracted laboratory for full TCL/TAL analysis. Samples were also collected (once each round) from the only visible seep (SP-1) discharging from the steep embankment along the eastern side of the site, adjacent to Oatka Creek. A summary of analytical results from each sampling event, with comparisons to NYSDEC Class C Ambient Water Quality Standards and Guidance Values is presented in Tables 7-16 and 7-17.

Oatka Creek Surface Water Samples

No organic compounds (VOCs, SVOCs, Pesticides, and PCBs) were detected in the surface water samples at concentrations above the water quality standards. Several VOCs that were detected in on-site groundwater samples (1,1,1-TCA, TCE, 1,1-DCA) were also detected in surface water samples collected adjacent to the northern half of the site (SW-3, SW-4, and SW-5); however, concentrations were below the water quality

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TABLE 7-15
GROUNDWATER - WATER QUALITY PARAMETERS
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

		Overburden Monitoring Wells				Shallow Rock Wells			Intermediate Rock Wells	
Sample Location	NYSDEC	MW-1	DUP-2	MW-3	PW-3	SR-102	SR-103	SR-106	IR-102	IR-103
Collection Date	Class GA[1]	01/22/02	(MW-1)	01/17/02	01/22/02	01/18/02	01/18/02	01/17/02	01/18/02	01/18/02
Water Quality Parameters (mg/L)										
Chloride	250	62	62	1100	190	460	200	340	990	140
Nitrate (as N)	10				0.12					
Sulphate (as SO4)	250	560	580	97	61	27	25	170	7.2	1.2
Hardness (as CaCO3)	-	870 J	880 J	490 J	640 J	700 J	590 J	650 J	970 J	410 J
Alkalinity (as CaCO3)	-	320	310	220	500	340	340	370	420	480
Bicarbonate (as CaCO3) - calculated	-	320	310	220	500	340	340	370	420	470
Carbonate (as CaCO3) - calculated	-	2.8	3.0	1.4	4.8		2.3	3.3	1.3	3.0
pH (20 DEG C)	6.5 - 8.5	7.97	8.02	7.83	8.01	7.38	7.87	7.98	7.51	7.83
TOC (uv/persulf)	-	4.8	5.2	3.2	4.5	1.7	1.4	3.0	1.3	1.3
Ammonia (as N)	2	0.09	0.08	0.38	1.3	4.5	0.99	0.52	7.2	4.4
Soluble Reactive Silica	-	10	10	21	14	14	9.1	10	10	14
Fluoride	1.5	0.19	0.19	0.37	0.16	0.85	0.22	0.29	0.41	0.55

Notes:

(1) NYSDEC Water Quality Guidance Values for Class GA Waters from NYS Ambient Water Quality Standards and Guidelines (TOGS 1.1.1, June 199

\- Water Quality Standard or Guideline not available.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.
J - Indicates an estimated value.
Blank space indicates analyte was not detected.
Shaded text indicates guidance criteria was exceeded.
Monitoring wells MW-2, PW-5, PMW-10, SR-101, SR-104, SR-105, IR-101, and IR-105 were not sampled due to insufficient water.

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TABLE 7-16
SURFACE WATER - VOCs, SVOCs, AND PESTICIDES
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

		Upstream Sampling Locations		Sampling Locations Adjacent to Site										Downstream Sampling Locations		Cliff Seep	
Sample Location	NYSDEC Class "C"	SW-1	SW-1	SW-2	SW-2	SW-3	SW-3 DUP	SW-3	SW-3 DUP	SW-4	SW-4	SW-5	SW-5	SP-1	SP-1
Collection Date	Standard$^{(1)}$	05/08/02	08/26/03	05/08/02	08/26/03	05/08/02	05/08/02	08/26/03	08/26/03	05/08/02	08/26/03	05/08/02	08/26/03	05/08/02	08/26/03
TCL Volatile Organic Compounds (ug/L)															
2-Butanone	-							80	110		6 J				
Chlorodibromomethane	-													1 J	
Chloroform	-							9 J	9 J		5 J			34 J	120
Dichlorobromomethane	-													9 J	19
1,1-Dichloroethane	-											2 J	7 J		
cis-1,2-Dichloroethene	-					2 J	2J					1 J	7 J		
Toluene	6000					4 J									
1,1,1-Trichloroethane	-					3 J	3 J			3 J		3 J	15	2 J	14
Trichloroethene	40					5 J	4 J	7 J	7 J	2 J				5 J	30
Semivolatile Organic Compounds (ug/L)															
Butylbenzylphthalate	-	1 J													
Caprolactam	-							2 J							
TCL Pesticides (ug/L)															
TCL Pesticides (ug/L)	-														

Notes:

(1) New York State Ambient Water Quality Standards and Guidance Values, from TOGS Series 1.1.1, June 1998.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

- Water Quality Standard or Guideline not available.

Blank space indicates analyte was not detected.

J - Indicates an estimate value.

Shaded/bolded text indicates guidance criteria was exceeded.

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TABLE 7-17
SURFACE WATER - PCBs AND INORGANIC ANALYTES
REMEDIAL INVESTIGATION REPORT
LAPP INSULATOR SITE

		Upstream Sampling Locations		Sampling Locations Adjacent to Site								Downstream Sampling Locations		Cliff Seep	
Sample Location	NYSDEC Class	SW-1	SW-1	SW-2	SW-2	SW-3	SW-3 DUP	SW-3	SW-3 DUP	SW-4	SW-4	SW-5	SW-5	SP-1	SP-1
Collection Date	"C" Standard(1)	05/08/02	08/26/03	05/08/02	08/26/03	05/08/02	05/08/02	08/26/03	08/26/03	05/08/02	08/26/03	05/08/02	08/26/03	05/08/02	08/26/03
TCL PCBs (ug/L)															
TCL PCBs	-														
TAL Inorganic Analytes (mg/L)(3)															
Hardness (as CaCO3)	-	210 J		210 J		220 J	230 J			220 J		220 J		210 J	
Calcium	-	63 J	45.3	63 J	61.2	66 J	69 J	49.8	49.4	65 J	50.1	67 J	62.5	63 J	35.4
Iron	0.300	0.29 J	0.0835 J	0.17 J	0.175	**1.2 J**	**1.1 J**	0.286	0.285	**0.68 J**	**0.357**	**0.38 J**	**.34**	0.034 J	0.0908 J
Magnesium	-	12 J	15.6	12 J	15.1	13 J	14 J	14.2	14.1	13 J	13.7	13 J	16	12 J	12.6
Potassium	-	2.2 J	3.63 J	2.2 J	4.15 J	4.9 J	4.7 J	6.7	6.59	2.6 J	5.05	2.7 J	3.9 J	3.3 J	4.69 J
Sodium	-	26 J	35.7	26 J	30.9	39 J	41 J	47.3	46.3	28 J	36.4	26 J	34.8	23 J	26.3
Aluminum	0.100	**0.10 J**		0.062 J	.0482 J	**0.31 J**	**0.39 J**	**.135 J**	**.136 J**	**0.19 J**	**.153 J**	**0.12 J**	**.216**	0.046 J	.0555 J
Arsenic	-				.0038 J			.0033 J	.0043 J				.0024 J		.0034 J
Barium	-	0.048 J	.0397 J	0.043 J	.0536 J	0.058 J	0.059 J	.0432 J	.0433 J	0.046 J	.0431 J	0.049 J	.0533 J	0.036 J	.0223 J
Cadmium	0.004(2)			0.0001 J		0.0001 J	0.0001 J					0.0001 J		0.0001 J	
Chromium	-		.00062 J		.00072 J			.0008 J	.0012 J		.00071 J		.00095 J		.00076 J
Cobalt	0.005					0.0007 J	0.0007 J	.0013 J		0.0005 J					
Copper	0.018(2)	0.003 J		0.004 J		0.009 J	0.007 J	.0061 J	.0058 J	0.007 J		0.003 J		0.005 J	
Lead	0.009(2)	0.0008 J		0.0007 J		0.0037 J	0.0020 J			0.0014 J		0.0007 J			
Manganese	-	0.035 J	.0136 J	0.023 J	.034	0.15 J	0.13 J	.0689	.0698	0.19 J	.0826	0.054 J	.0727	0.004 J	.061
Nickel	0.101(2)	0.002 J				0.002 J	0.002 J	.0018 J	.0023 J	0.003 J		0.002 J			
Vanadium	0.014					0.005 J	0.005 J	.0042 J	.0042 J	0.002 J					
Zinc	0.162(2)	0.015 J	.0038 J	0.008 J	.0034 J	0.021 J	0.017 J	.0171 J	.0175 J	0.043 J	.0073 J	0.015 J	.0027 J	0.016 J	.003 J

Notes:

(1) New York State Ambient Water Quality Standards and Guidance Values, from TOGS Series 1.1.1, June 1998.

(2) Guidance value expressed as a function of hardness (as $CaCO_3$) of 220 mg/L.

(3) Sample concentrations are for total metals, while some NYSDEC WQS are for the dissolved form of the metals.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

- Water Quality Standard or Guideline not available.

Blank space indicates analyte was not detected.

J - Indicates an estimate value.

Shaded/bolded text indicates guidance criteria was exceeded.

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standards for Class C surface waters. Chloroform was detected in surface water samples SW-3 and SW-4, adjacent to the northern half of the site. These detections were at low concentrations (9 µg/l and 5 µg/l) and are qualified as estimated. 2-Butanone was detected at surface water samples SW-3 and SW-4 adjacent to the site, ranging in concentration from an estimated 6 µg/l to a high of 110 µg/l. It is likely that these 2-butanone detections in surface water are not site-related, but represent laboratory contamination. 2-butanone (or MEK) is known to be a common laboratory contaminant and has not been evident as a primary site contaminant. In site groundwater it is present only in low concentrations primarily in only the deepest rock wells, likely as a result of natural conditions. The only location that this compound was detected at significant concentrations (slightly above the NYSDEC TAGM of 300 ug/kg) in on-site soil samples was at Hot Area B. If this location were the source of the 2-butanone detected in the surface water it would likely also have been detected in the well directly downgradient of Hot Spot B (SR-107) and the surface water sample nearest Hot Spot B (SW-2). 2-butanone was not present in either of these samples. Also, 2-butanone is known to be highly volatile and since discharge of site contaminants would be via groundwater transport from the steep cliff of Oatka Creek, low levels of highly volatile organics such as 2-butanone would likely volatilize significantly prior to reaching the creek.

The only metals detected in the surface water samples at concentrations above the surface water quality standards were iron and aluminum. The maximum iron concentration detected was 1.2 mg/l (unfiltered), which exceeded the Class C surface water quality standard of 0.3 mg/l in the surface water samples collected adjacent to and downstream of the site. Based on the elevated iron concentration detected in the upgradient and on-site groundwater samples, it's likely that these are naturally occurring iron concentrations. Aluminum was detected in four of the five surface water samples, at concentrations above the surface water quality standard. Since these concentrations were relatively consistent upstream and downstream of the Site, it can be concluded that these concentrations are naturally occurring or from an upstream source.

Seep Sample

A single visibly flowing seep exists southeast of Area A, along the steep embankment adjacent to Oatka Creek. This location was sampled during both events and submitted for full TCL/TAL analysis. The resulting data is summarized in Tables 7-16 and 7-17. Four VOCs (TCE, TCA, chlorodibromomethane, and dichlorobromomethane) were detected at low concentrations in both seep samples. The concentrations were below NYSDEC Class C surface water criteria and were lower in the first round of sampling than the second. No SVOCs, pesticides, or PCBs were detected in the seep samples, and no metals were detected at concentrations above the water quality standards.

7.6 Sediment Analytical Results

Every reasonable effort was taken to collect sediment samples at approximately the same locations as the five surface water sampling locations in Oatka Creek. These samples were collected during each of two events for a total of ten samples plus duplicates (one each event). The sediment samples were analyzed for full TCL/TAL parameters. The analytical results are summarized in Tables 7-18 through 7-20 and compared to the sediment criteria from the NYSDEC Technical Guidance for Screening Contaminated Sediments, assuming a conservatively low total organic carbon content of one percent.

VOCs

A summary of the VOCs detected in the sediment samples is presented in Table 7-18. Only one VOC, benzene, was detected above the NYSDEC Sediment Criteria. It was detected at the downstream sample location (SED-5) and only once, during the Phase I sampling event only. Other BTEX constituents were also detected at low concentrations at this location. These BTEX detections are not likely site-related and may be the result of runoff from street traffic, as SED-5 is located close and downstream of the Munson Street Bridge. No VOCs were detected above the sediment criteria during the Phase II sampling event.

Low levels of several other VOCs were detected in the sediment samples. They include acetone; carbon disulfide, chloroethane, TCA; TCE; 1,1-DCA; 1,2-DCE; 2-Butanone, and toluene. Acetone was inconsistently detected in various sediment samples with qualified results and is thus attributed to lab contamination. Toluene was detected at low concentrations in both sampling events in the upstream sample SED-1, and may be the result of an upstream source. The 2-Butanone results for SED-1, SED-2 and the duplicate SED-3 are qualified as estimated by the data validator because the result was greater than the method detection limit, but less than the practical quantitation limit. For reasons previously discussed in Section 7.5 as well as the fact that 2-butanone is typically not deposited in sediments of streams and lakes (REF = public health statement) the

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TABLE 7-18
SUMMARY OF ANALYTICAL RESULTS - SEDIMENT
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		Upstream Sampling Location		Downstream Sampling Locations								Downstream Sampling Locatons	
Sample Location	NYSDEC Sediment Criteria$^{(1)}$	SED-1	SED-1	SED-2	SED-2	SED-3	SED-3 DUP	SED-3	SED-3 DUP	SED-4	SED-4	SED-5	SED-5
Collection Date		5/8/2002	8/26/2003	5/8/2002	8/26/2003	5/8/2002	5/8/2002	8/26/2003	8/26/2003	5/8/2002	8/26/2003	5/8/2002	8/26/2003
TCL Volatile Organic Compounds (ug/kg)													
Chloroethane	-			64	20 J								
cis-1,2-Dichloroethene	-											11	73
Acetone	-		52 J		48 J			19 J	39 J		57 J		8 J
Carbon Disulfide	-									3		11	
1,1-Dichloroethane	-					3 J	3 J					11	91
2-Butanone	-		17 J	19	13 J				6 J	10			
1,1,1-Trichloroethane	-											15	71
Trichloroethene	20											2 J	3 J
Benzene	6											**9**	
Toluene	-	62	27	44								25	
Ethylbenzene	-											4	
m&p-Xylene	-											22	
o-Xylene	-											8	

Notes:

(1) Sediment Criteria from NYSDEC Tech. Guidance for Screening Contaminated Sediments (June 1998). These conservative criteria were derived using the lowest sediment criteria in the guidance document and an organic content of 1 percent.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

- Sediment Criteria not available.

Blank space indicates analyte was not detected.

J - Indicates an estimate value.

Shaded/bolded text indicates guidance criteria was exceeded.

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detections of 2-butanone in sediment are believed to be the result of laboratory contamination. Chloroethane, TCA; TCE; 1,1-DCA; 1,2-DCE are compounds that are consistent with the contaminants detected on-site, however only chloroethane and 1,1-DCA were detected in samples collected adjacent to the site (SED-2 and SED-3). The TCE detection in SED-5 is also qualified as estimated by the data validator because the result was greater than the method detection limit, but less than the practical quantitation limit.

SVOCs

A summary of the SVOCs, pesticides, and PCBs detected in the sediment samples is presented in Table 7-19. A total of 24 SVOCs were detected in the sediment samples, however only nine of these compounds were detected at concentrations above the NYSDEC Sediment Screening Criteria. The concentration of SVOCs at three of the sample locations (SED-1, SED-4, and SED-5) only slightly (< 1 order of magnitude) exceeded the screening criteria. Fifteen of the 24 detected compounds are considered Polycyclic Aromatic Hydrocarbons (PAHs). PAHs are ubiquitous in soils, and sediments tend to be major sinks for these compounds due to their low solubility and strong affinity for organic carbon (Research Triangle Institute, 1995). The majority of the SVOC detections occurred at the midpoint and downstream (SED-3, SED-4 and SED-5) sampling locations and most SVOCs detected in sediment were at the SED-3 location where site fill material was observed along the steam bank near the sample location.

The elevated concentration of bis(2-ethylhexyl)phthalate in SED-2 during the Phase I sampling event is likely due to laboratory contamination. The Phase II sampling event revealed no detections of bis(2-ethylhexyl)phthalate in any of the sediment samples analyzed.

Pesticides / PCBs

PCB (Aroclor 1260) was detected in the Phase I sampling event at the SED-3 and SED-4 sample locations at concentrations above the NYSDEC Sediment Screening Criteria. However, no PCBs were detected in the second sampling event, even in samples collected from these same locations; indicating that the areal extent of potentially PCB-contaminated sediment is very limited.

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TABLE 7-19
SUMMARY OF ANALYTICAL RESULTS - SEDIMENT
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		Upstream Sampling Locations		Sampling Locations Adjacent to Site								Downstream Sampling Locations	
Sample Location	Sediment	SED-1	SED-1	SED-2	SED-2	SED-3	SED-3 DUP	SED-3	SED-3 DUP	SED-4	SED-4	SED-5	SED-5
Collection Date	Criteria$^{(1)}$	5/8/2002	8/26/2003	5/8/2002	8/26/2003	5/8/2002	5/8/2002	8/26/2003	8/26/2003	5/8/2002	8/26/2003	5/8/2002	8/26/2003
Semivolatile Organic Compounds (ug/kg)													
Biphenyl	-	61 J		81 J		62 J	61 J			87 J			
Naphthalene	-								1100 J				
Acenaphthene	1400							960 J	**1700 J**				
Fluorene	-							1200 J	1900 J				
Diethyl phthalate	-			94 J									
Phenanthrene	1200	53 J		87 J			130 J	**10000**	**13000**	490 J	190 J	80 J	140 J
Anthracene	-							2100 J	3400 J	73 J			
Di-n-butyl phthalate	-											120 J	
Fluoranthene	10200	140 J		140 J	93 J		180 J	**16000**	**18000**	810 J	360 J	200 J	290 J
Pyrene	-	110 J		160 J			260 J	13000	14000	810 J	270 J	180 J	250 J
Benzyl butyl phthalate	-			350 J									
Benzo(a)anthracene	13	110 J					130 J	**6900**	**7800**	**390 J**		130 J	**140 J**
Chrysene	13	**140 J**					**150 J**	**7800**	**8100**	**480 J**	**170 J**	**180 J**	**160 J**
Bis(2-ethylhexyl)phthalat	1995			**4,500,000**									
Di-n-octyl phthalate	-	26 J											
Benzo(b)fluoranthene	13	**150 J**					**210 J**	**6400**	**6700**	**560 J**	**150 J**	**240 J**	**140 J**
Benzo(k)fluoranthene	13	66 J					120 J	**3100 J**	**4100**	**310 J**		120 J	84 J
Benzo(a)pyrene	13	92 J					**150 J**	**5700**	**6300**	**370 J**		**160 J**	**140 J**
Indeno(1,2,3-cd)pyrene	13							**4000**	**4300**	**370 J**		**150 J**	120 J
Dibenzo(a,h)anthracene	-							1100 J	1200 J				
Benzo(ghi)perylene	-							4600	4800	410 J		150 J	130 J
Benzyl alcohol	-	110 J		140 J			83 J						
Carbazole	-							1300 J	1800 J				
Dibenzofuran	-							580 J	1100 J				
TCL Pesticides(ug/kg)													
Endrin Aldehyde	-							11	19				
PCBs (ug/kg)													
Aroclor-1260	0.008						**70**			**280**			

Notes:

(1) Sediment Criteria from NYSDEC Tech. Guidance for Screening Contaminated Sediments (June 1998). These conservative criteria were derived using the lowest sediment criteria in the guidance document and an organic content of 1 percent.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

\- Sediment Criteria not available.

Blank space indicates analyte was not detected.

J - Indicates an estimate value.

Shaded/bolded text indicates guidance criteria was exceeded.

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No pesticides were detected above the NYSDEC Sediment Screening Criteria in any of the sediment samples.

Inorganics (Metals)

The results of the inorganic analysis on the sediment samples collected are summarized in Table 7-20. All Phase I (May, 2002) results are qualified as estimated, due to the laboratory's quarterly Instrument Detection Limits and Linear Range Analysis that surpassed the scheduled frequencies at the time of analysis. The metals mercury, magnesium, cadmium, chromium, copper, lead, manganese, nickel, silver, and zinc were detected at concentrations above the NYSDEC Sediment Screening Criteria in at least one of the ten sediment samples collected. Magnesium exceeded the Sediment Screening Criteria in all samples collected, while nickel exceeded the Sediment Screening Criteria in all samples except SED-5. Copper, silver, and lead exceeded the criteria in at least two of the samples collected adjacent to the site (SED-2, SED-3, and SED-4). Mercury exceeded the Sediment Screening Criteria in the duplicate sample of SED-3, however it was detected well below the Screening Criteria in the regular sample. The Chromium Sediment Screening Criteria was exceeded in SED-3; however, the duplicate of that sample was below the criteria. Manganese and cadmium were detected above the criterion at only one location for each analyte; SED-1, and SED-4 locations, respectively. For the Phase 2 data, the data validator rejected the zinc results for samples SED-1, SED-2, SED-4, and SED-5 because the reported concentrations were less than ten times the preparation blank value. The zinc values for SED-3 and SED-3 DUP were flagged "J" because their % difference was greater than the 10.0% maximum for the serial dilution. Several other inorganic results were flagged "J" because the values were less than the contract required detection limits, but greater than the instrument detection limits. Based on the analytical results and the locations at which they were found, no site-related source of metals contamination was indicated.

7.7 Conceptual Site Model

The results of the interpretation of the analytical data resulting from the Remedial Investigation of the Lapp site have confirmed that the primary chemicals of interest associated with the site are the chlorinated VOCs, trichloroethylene, 1,1,1-trichloroethane, and 1,1-dichloroethane. Figure 7-4 presents a conceptual model of the on-site loading and off-site migration of the VOCs associated with the site. This model

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TABLE 7-20
SUMMARY OF ANALYTICAL RESULTS - SEDIMENT
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		Upstream Sampling Locations		Sampling Locations Adjacent to Site								Downstream Sampling Locations	
Sample Location	NYSDEC Sediment	SED-1	SED-1	SED-2	SED-2	SED-3	SED-3 DUP	SED-3	SED-3 DUP	SED-4	SED-4	SED-5	SED-5
Collection Date		5/8/2002	8/26/2003	5/8/2002	8/26/2003	5/8/2002	5/8/2002	8/26/2003	8/26/2003	5/8/2002	8/26/2003	5/8/2002	8/26/2003
TAL Inorganic Analytes (mg/kg)													
Cyanide total	-	0.60 J		0.52 J		0.54 J	0.31 J			0.65 J		0.17 J	
Mercury	0.15	0.040 J		0.050 J	0.03 J	0.070 J	0.070 J	.04 J	**0.27**	0.090 J	0.07 J		0.02 J
Calcium	-	37000 J	87200	78000 J	63900	15000 J	20000 J	70000	67100	32000 J	31000	29000 J	70500
Iron	2000000	12000 J	14200	14000 J	14500	12000 J	11000 J	13600	16000	23000 J	16700	5800 J	9090
Magnesium	460.0	**3400 J**	**4360**	**6600 J**	**5250**	**3700 J**	**3500 J**	**10500**	**6250**	**3300 J**	**4260**	**4100 J**	**9940**
Potassium	-	680 J	1310 J	970 J	1360 J	910 J	840 J	1170 J	902 J	1000 J	1950	390 J	767 J
Sodium	-	110 J	245 J	460 J	279 J	120 J	120 J	235 J	217 J	530 J	456 J	77 J	151 J
Aluminum	-	5400 J	7400	6000 J	8050	6800 J	6400 J	6530	5600	6000 J	10300	1900 J	3450
Antimony	-					0.5 J	0.9 J			1.8 J	6.4 J		
Arsenic	6.0	1.6 J	2.6 J	2.6 J	3.3 J	2.0 J	1.7 J	4.1	4.2	3.7 J		0.9 J	1.4 J
Barium	-	74 J	106	96 J	96.9 J	73 J	69 J	64.6 J	71.1	110 J	126 J	24 J	24.4 J
Beryllium	-	0.3 J	0.23 J	0.3 J	0.2 J	0.4 J	0.4 J	0.28 J	0.21 J	0.4 J	0.33 J		0.07 J
Cadmium	0.6	0.3 J	0.56 J	0.4 J	0.49 J	0.5 J	0.4 J	0.47 J	0.52 J	**0.8 J**	**0.92 J**	0.1 J	0.12 J
Chromium	26.0	8.4 J	11.3	11 J	12.7	12 J	11 J	**48.8**	16.7	12 J	19.2	4.0 J	6.6
Cobalt	-	5.0 J	6.2 J	5.9 J	6.8 J	7.7 J	6.9 J	16.1 J	12.5 J	9.2 J	11.5 J	2.6 J	3.4 J
Copper	16.0	13 J	15.3	**22 J**	**21.3**	**44 J**	**36 J**	**117**	**173**	**54 J**	**52.8**	15 J	11.9
Lead	31.0	12 J	13.7	16 J	17.5	**53 J**	**210 J**	**76.4**	**101**	24 J	**35**	7.3 J	25.4
Manganese	460.0	190 J	**487**	230 J	235 J	160 J	160 J	424 J	369 J	200 J	291 J	170 J	217 J
Nickel	16.0	14 J	**20.2**	**17 J**	**19.6**	**20 J**	**18 J**	**32.7**	**30.8**	**22 J**	**32**	6.7 J	9.7
Selenium	-									1.1 J			
Silver	1.0	0.1 J		0.1 J		**1.4 J**	**1.4 J**	**5.5**	**7.4**	**2.3 J**	**1.2 J**	0.1 J	
Thallium	-	0.2 J		0.2 J		0.2 J	0.2 J			0.3 J			
Vanadium	-	9.2 J	14.1 J	11 J	16.2 J	12 J	11 J	14.3 J	15.1 J	19 J	29.1 J	3.7 J	8.6 B
Zinc	120.0	50 J	R	75 J	R	110 J	97 J	**237 J**	**286 J**	**130 J**	R	28 J	R

Notes:

(1) Sediment Criteria from NYSDEC Tech. Guidance for Screening Contaminated Sediments (June 1998). These conservative criteria were derived using the lowest sediment criteria in the guidance document and an organic content of 1 percent.

Only those parameters having a value above the laboratory detection limit, and found at a minimum of one location are shown.

- Sediment Criteria not available.

Blank space indicates analyte was not detected.

J - Indicates an estimate value.

Shaded/bolded text indicates guidance criteria was exceeded.

R - Indicates that the value was rejected by the Data Validator.

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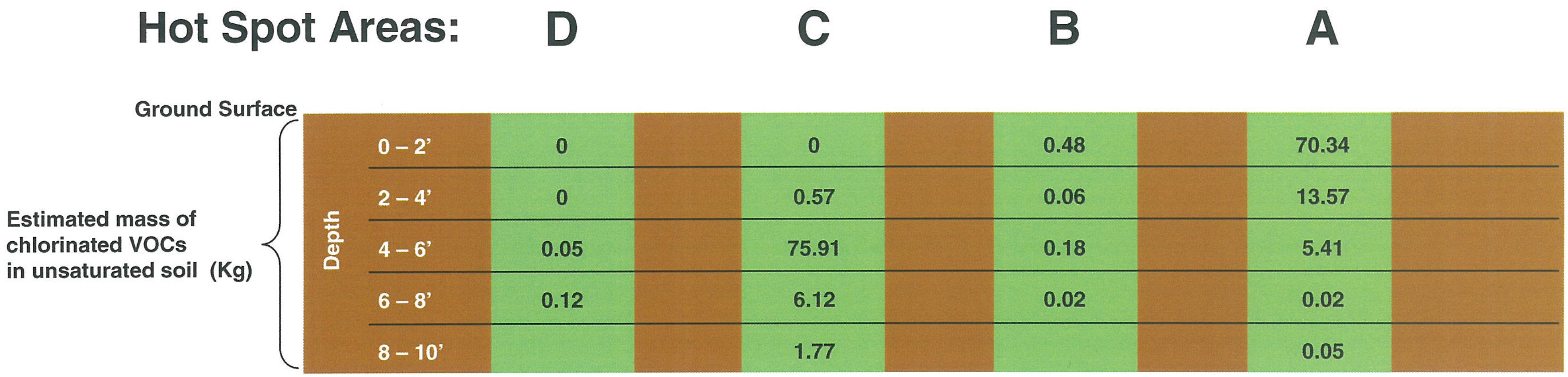
← SW

NE →



Hot Spot Areas: D C B A

Ground Surface

Estimated mass of chlorinated VOCs in unsaturated soil (Kg)

Depth	D	C	B	A
0 – 2’	0	0	0.48	70.34
2 – 4’	0	0.57	0.06	13.57
4 – 6’	0.05	75.91	0.18	5.41
6 – 8’	0.12	6.12	0.02	0.02
8 – 10’		1.77		0.05

	D	C	B	A	Totals
Mass of Chlorinated VOCs	0.17 Kg	84.4 Kg	0.74 Kg	89.4 Kg	175 Kg
Percent of Mass	0.001%	48.3%	0.004%	51.2%	100%

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FIGURE 7-4
DISTRIBUTION OF CHLORINATED VOCs IN UNSATURATED HOT SPOT SOILS

illustrates that 99.5 % of the total VOCs detected in the unsaturated zone exist in the upper six feet of soils in Hot Spot Areas A and C and that the VOC quantity in Areas B and D are by comparison minor. Additionally, while VOCs may be traveling horizontally through groundwater posing the potential to reach Oatka Creek; the slow rate of movement through groundwater, the volatile nature of the contaminants, and the volume of diluting flow of Oatka Creek prevent the VOCs from accumulating in the creek.

While isolated samples of on-site soils contained metals and PCBs slightly above TAGM guidelines and/or the range of those typically found in Eastern US soils, stream and groundwater sampling do not demonstrate that these same contaminants of interest have leached into groundwater or pose a significant risk of run off into Oatka Creek.

Human Health Risk Assessment

SECTION 8

The objectives of this human health risk assessment are to:

- Evaluate the potential for adverse health effects following exposure to chemicals detected at and in the vicinity of the site, currently and in the future, in the absence of any action to control or mitigate contamination, and
- Assist in determining the need for and extent of remediation.

This human health risk assessment is conducted in USEPA's standard four-step process: data evaluation, exposure assessment, toxicity assessment, and risk characterization. Each of these steps is described in the following sections.

8.1 Data Evaluation

Section 7.0 of this report interprets all RI data collected taking into account historical data trends, potential adjacent contributors or influences on the site, field conditions and laboratory performance and draws conclusions as to what are, or are not, site-related chemicals. However, a strict human health risk assessment initially focuses on all chemicals detected in soil, groundwater, surface water, and sediment at the Site without taking into account external influences for determining whether a chemical is a site-related chemical or not. The intent of this approach is to identify those chemicals of potential concern (COPC) in each environmental medium that, if contacted, pose potential risks to human health regardless of their origin. The analysis is carried out primarily through a series of data summary tables, organized to facilitate the data evaluation, which are presented in the following sections. The soil data are organized by designated hot spot area and depth (i.e., surface soil ($\leq$ 2 feet) vs. subsurface soil (> 2 feet)), the groundwater data are organized by aquifer unit (i.e., overburden, shallow bedrock, intermediate bedrock, and deep bedrock) and by sampling event, and the surface water and sediment data are organized by location (i.e., upstream, adjacent to, and downstream of the Site). As a first step, for each data grouping in each environmental medium, the frequency of detection and the range of detected concentrations are presented. In addition to soil, groundwater, surface water, and sediment, air may also be an environmental medium of concern due to the potential for volatile organic chemicals (VOCs) and chemically-contaminated respirable particulate matter to be released to air.

The analytical data for each environmental medium are then screened against appropriate New York State criteria, where available and appropriate, to identify those areas, environmental media, and COPC that pose potential risks to human health. Chemicals detected in an environmental medium in excess of the relevant screening criteria are evaluated further as COPC. Chemicals detected in an environmental medium without relevant screening criteria are taken through the next step of the evaluation process as an identified COPC. For all environmental media, chemical-specific analytical data are used. Data with qualifiers (e.g., "J" and "B") are used. If a sample has a duplicate, then the higher value for each detected analyte is used. The chemical-specific analytical data for each environmental medium are presented as ranges in the data summary tables; the spatial distribution of chemicals in each environmental medium as well as the depths of surface and subsurface soil samples and the well screen intervals for the groundwater samples can be found in tables and figures presented in previous sections of this RI Report. The only detected chemicals, which are categorically eliminated from further evaluation in all environmental media are those regarded as essential nutrients (i.e., calcium, iron, magnesium, potassium, and sodium).

COPC in soil are selected using a two step process, Step 1: compares the soil quality data for all chemicals detected to NYSDEC recommended soil cleanup objectives as presented in its Technical Administrative Guidance Memorandum (TAGM) No. 4046. The recommended soil cleanup objectives are the lower of criteria derived to be protective of groundwater quality and protective of human health. Consistent with TAGM No. 4046, the recommended soil cleanup objective for several inorganic chemicals is set equal to site background. Site background samples were collected as described previously in Section 4.13.1. Additionally, larger more regional background databases exist which present the range of concentrations, which are typically detected for any given organic chemical. Therefore, the maximum detected site-specific background concentration is used as the recommended soil cleanup objective. Step 2: the data are compared to the soil quality data typical of soils in the Eastern U.S. as presented in TAGM No. 4046 or Dragun and Chiasson (1991).

COPC in groundwater are selected by comparison of groundwater quality data to NYSDEC Ambient Water Quality Standards and Guidance Values for Class GA groundwater. (Ref.?)

COPC in surface and seep water and COPC in stream sediment are each selected in a two-step process. Because the NYSDEC does not have criteria for the protection of human health from contact with surface water and sediment during recreational activities, as might be expected for Oatka Creek, COPC in surface water are selected by: 1) comparison of surface water quality data to NYSDEC Ambient Water Quality Standards and Guidance Values for Class A freshwater used as a source of drinking water. Then, 2) for those chemicals that exceed the initial screen, the surface water quality data are compared to chemical-specific, risk-based screening levels (RBSLs), specifically developed for this risk assessment as described in Appendix K. The RBSLs are those concentrations that are considered protective based on exposure of adolescents assumed to swim in the creek.

COPC in sediment are selected by: comparison of sediment quality data to the TAGM No. 4046 recommended cleanup objectives for soil described above. For those chemicals that exceed the initial screen, the sediment quality data are compared to RBSLs specifically developed for this risk assessment as described in Appendix K. These RBSLs represent those concentrations that are considered protective based on exposure of adolescents assumed to swim in the creek.

8.1.1 Soil

Surface and subsurface soil samples were collected from the following four hot spot areas:

- Area A - associated with the former trichloroethene tanks at the former machine shop at Building B-23.
- Area B - associated with the former trichloroethene tank at Building B-31.

- Area C - associated with the former chemical waste storage pad.
- Area D - located adjacent (upgradient and/or crossgradient) to the South fill area, with an unknown source.

The data for soil samples from Areas A, B, and C, collected in October 2001, and soil samples from Area D, collected in July 2003, are summarized and presented in Tables 8-1, 8-2, and 8-4 to 8-9. The data for surface soil (i.e., ≤ 2 feet) are summarized separately from that for subsurface soil (i.e., > 2 feet).

Area A

Surface and subsurface soil data are presented in Tables 8-1 and 8-2, respectively. Three VOCs and four inorganic chemicals are selected as COPC in surface soil and four VOCs, one semi-volatile organic chemical (SVOC), and three inorganic chemicals are selected as COPC in subsurface soil. In addition, three VOCs (chloromethane, cis-1,2-dichloroethene, and 1,1,2-trichloroethane) and one SVOC (n-nitroso-di-n-propylamine) detected in surface and/or subsurface soil are also selected as COPC because no soil cleanup objectives are available. Table 8-3 presents the COPC for Area A.

Area B

Surface and subsurface soil data are presented in Tables 8-4 and 8-5, respectively. Four VOCs and six inorganic chemicals are selected as COPC in surface soil and three VOCs and one inorganic chemical are selected as COPC in subsurface soil. In addition, seven VOCs (chloromethane, cis-1,2-dichloroethene, 1,2-dichloropropane, trans-1,3-dichloropropene, 2-hexanone, 1,1,2-trichloroethane, and vinyl acetate) and cyanide detected in surface and/or subsurface soil are selected as COPC because no soil cleanup objectives are available. Table 8-3 presents the COPC for Area B.

Area C

Surface and subsurface soil data are presented in Tables 8-6 and 8-7, respectively. No chemicals are selected as COPC in surface soil. Three VOCs and one inorganic chemical are selected as COPC in subsurface soil. In addition, two VOCs (chloromethane and cis-1,2-dichloroethene) detected in subsurface soil are selected as COPC because no soil cleanup objectives are available. Table 8-3 presents the COPC for Area C.

TABLE 8-1
AREA-A SURFACE SOIL SAMPLE DATA SUMMARY (0 - 2 FEET COMBINED)
LAPP INSULATOR, LE ROY, NY

	October 2001			NYSDEC TAGM	
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Recommended Soil Cleanup Objectives**	**Eastern USA Background ppm**
Volatile Organics (µg/kg)					
Acetone	1 / 5	13	SB-A6 0-2	200	
Benzene	2 / 5	2 - 2	SB-A5 0.5-2.0, SB-A6 0-3	60	
Carbon disulfide	1 / 5	6	SB-A6 0-2	2,700	
Chloromethane	1 / 5	200	SB-A12 0-2	NA	
1,1-Dichloroethane	3 / 5	110 - 6,700	SB-A8 0-2	200	
cis-1,2-Dichloroethene	2 / 5	15 - 1,100	SB-A7 0-2	NA	
Ethylbenzene	1 / 5	2	SB-A5 0.5-2.0	5,500	
Methylene chloride	1 / 5	9	SB-A5 0.5-2.0	100	
Tetrachloroethene	3 / 5	11 - 800	SB-A8 0-2	1,400	
Toluene	3 / 5	6 - 120	SB-A12 0-2	1,500	
1,1,1-Trichloroethane	5 / 5	88 - 57,000	SB-A8 0-2	800	
Trichloroethene	5 / 5	89 - 23,000	SB-A7 0-2	700	
m&p-Xylene	4 / 5	3 - 130	SB-A8 0-2	1,200 a	
o-Xylene	3 / 5	3 - 130	SB-A8 0-2	1,200 a	
Semi-Volatile Organics (µg/kg)					
bis(2-Ethylhexyl)phthalate	1 / 1	1,100	SB-A8 0-2	50,000 b	
2-Methylnaphthalene	1 / 1	570	SB-A8 0-2	36,400	
Naphthalene	1 / 1	140	SB-A8 0-2	13,000	
Phenanthrene	1 / 1	650	SB-A8 0-2	50,000 b	
Inorganics (mg/kg)					
Aluminum	1 / 1	6,200	SB-A8 0-2	7,100 d	33,000
Antimony	1 / 1	0.9	SB-A8 0-2	ND d	ND-8.8 [1]
Arsenic	1 / 1	4	SB-A8 0-2	7.5	3-12 e
Barium	1 / 1	39	SB-A8 0-2	300	15-600
Beryllium	1 / 1	0.2	SB-A8 0-2	0.4 d	0-1.75
Cadmium	1 / 1	1.2	SB-A8 0-2	1	0.1-1
Calcium *	1 / 1	88,000	SB-A8 0-2	21,000 d	130-35,000 e
Chromium	1 / 1	26	SB-A8 0-2	10	1.5-40 e
Cobalt	1 / 1	15	SB-A8 0-2	30	2.5-60 e
Copper	1 / 1	360	SB-A8 0-2	25	1-50
Iron *	1 / 1	23,000	SB-A8 0-2	15,000 d	2,000-550,000
Lead	1 / 1	160	SB-A8 0-2	23 d	4-500 f
Magnesium *	1 / 1	5,500	SB-A8 0-2	5,900 d	100-5,000
Manganese	1 / 1	170	SB-A8 0-2	360 d	50-5,000
Mercury	1 / 1	0.13	SB-A8 0-2	0.1	0.001-0.2
Nickel	1 / 1	27	SB-A8 0-2	13	0.5-25
Potassium *	1 / 1	400	SB-A8 0-2	800 d	8,500-43,000 e
Silver	1 / 1	4	SB-A8 0-2	ND d	ND-5 [1]
Sodium *	1 / 1	250	SB-A8 0-2	87 d	6,000-8,000
Vanadium	1 / 1	12	SB-A8 0-2	150	1-300
Zinc	1 / 1	460	SB-A8 0-2	59 d	9-50

1 = Background values from Dragun and Chiasson, 1991.

NA = Not Available.

ND = Not Detected.

a = Cleanup objectives were adopted for total xylenes

b = As per TAGM #4046, total VOCs<10 ppm, total SVOCs < 500 ppm, and individual SVOCs<50 ppm.

c = Cleanup objectives were adopted for total PCBs

d = Site background value is the maximum detected concentration in the three background samples.

e = New York State background

f = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm.
Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

* = Essential nutrients are categorically excluded as COPC.

TABLE 8-2
AREA-A SUBSURFACE SOIL SAMPLE DATA SUMMARY (> 2 FEET)
LAPP INSULATOR, LE ROY, NY

	October 2001			NYSDEC TAGM	
CHEMICAL	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Recommended Soil Cleanup Objectives	Eastern USA Background ppm
Volatile Organics (μg/kg)					
Acetone	4 / 8	5 - 120	SB-A3 6-8	200	
Benzene	3 / 8	4 - 13	SB-A6 4-6	60	
Carbon disulfide	1 / 8	5	SB-A6 4-6	2,700	
Chloromethane	2 / 8	150 - 180	SB-A2 2-4	NA	
1,1-Dichloroethane	2 / 8	**250** - **2,000**	SB-A1 2-4	200	
cis-1,2-Dichloroethene	1 / 8	240	SB-A7 4-6	NA	
1,1-Dichloroethene	3 / 8	1 - **630**	SB-A1 2-4	400	
Ethylbenzene	5 / 8	1 - 350	SB-A1 2-4	5,500	
Methylene chloride	3 / 8	1 - 2	SB-A5 2-4	100	
Tetrachloroethene	2 / 8	140 - 350	SB-A1 4-6	1,400	
Toluene	5 / 8	6 - 280	SB-A1 2-4	1,500	
1,1,1-Trichloroethane	8 / 8	11 - **110,000**	SB-A1 4-6	800	
1,1,2-Trichloroethane	2 / 8	700 - 1,300	SB-A1 2-4	NA	
Trichloroethene	8 / 8	6 - **35,000**	SB-A1 2-4	700	
m&p-Xylene	5 / 8	6 - 380	SB-A1 2-4	1,200 a	
o-Xylene	5 / 8	2 - 320	SB-A1 2-4	1,200 a	
Semi-Volatile Organics (μg/kg)					
Benzo(a)anthracene	2 / 2	30 - 190	SB-A1 2-4	224	
Benzo(a)pyrene	1 / 2	**150**	SB-A1 2-4	61	
Benzo(b)fluoranthene	2 / 2	28 - 320	SB-A1 2-4	1,100	
Benzo(k)fluoranthene	1 / 2	97	SB-A1 2-4	1,100	
Benzyl butyl phthalate	1 / 2	38	SB-A3 6-8	50,000 b	
Chrysene	1 / 2	250	SB-A1 2-4	400	
Dibenzofuran	1 / 2	53	SB-A1 2-4	6,200	
Di-n-butyl phthalate	1 / 2	220	SB-A1 2-4	8,100	
Di-n-octyl phthalate	1 / 2	25	SB-A3 6-8	50,000 b	
Fluoranthene	1 / 2	280	SB-A1 2-4	50,000 b	
2-Methylnaphthalene	1 / 2	170	SB-A1 2-4	36,400	
Naphthalene	1 / 2	120	SB-A1 2-4	13,000	
N-Nitroso-di-N-Propylamine	1 / 2	53	SB-A3 6-8	NA	
Phenanthrene	1 / 2	180	SB-A1 2-4	50,000 b	
Pyrene	2 / 2	32 - 320	SB-A1 2-4	50,000 b	
PCBs (mg/kg)					
Aroclor 1260	1 / 2	0.52	SB-A1 2-4	10 c	

TABLE 8-3

CHEMICALS OF POTENTIAL CONCERN IN SOIL

HUMAN HEALTH EVALUATION
LAPP INSULATOR

CHEMICAL	AREA A		AREA B		AREA C		AREA D	
	SURFACE SOIL	SUBSURFACE SOIL	SURFACE SOIL	SUBSURFACE SOIL	SURFACE SOIL	SUBSURFACE SOIL	SURFACE SOIL	SUBSURFACE SOIL
VOLATILE ORGANICS								
Acetone	O	O	X	O	ND	ND	ND	ND
Benzene	O	O	X	X	ND	O	ND	ND
2-Butanone	ND	ND	O	X	ND	O	ND	ND
Chloromethane	NS	NS	NS	NS	ND	NS	ND	ND
1,1-Dichloroethane	X	X	X	O	ND	ND	ND	ND
1,1-Dichloroethene	ND	X	O	ND	ND	ND	ND	O
cis-1,2-Dichloroethene	NS	NS	NS	NS	ND	NS	ND	ND
1,2-Dichloropropane	ND	ND	ND	NS	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	NS	ND	ND	ND	ND
2-Hexanone	ND	ND	NS	NS	ND	ND	ND	ND
Tetrachloroethene	O	O	O	O	ND	X	O	O
1,1,1-Trichloroethane	X	X	O	O	ND	X	ND	X
1,1,2-Trichloroethane	ND	NS	NS	NS	ND	ND	ND	ND
Trichloroethene	X	X	X	X	ND	X	ND	X
Vinyl acetate	ND	ND	NS	NS	ND	ND	ND	ND
SEMIVOLATILE ORGANICS								
Benzo(a)pyrene	ND	X	ND	ND	ND	ND	N/A	N/A
N-Nitroso-di-N-Propylamine	ND	NS	ND	ND	ND	ND	N/A	N/A
PCBs								
Total PCBs *	ND	O	O	ND	ND	ND	N/A	N/A
INORGANICS								
Arsenic	O	O	X	O	O	O	N/A	N/A
Cadmium	X	O	X	O	O	O	N/A	N/A
Chromium	O	O	X	O	O	O	N/A	N/A
Copper	X	X	X	O	O	O	N/A	N/A
Nickel	X	O	O	O	O	O	N/A	N/A
Thallium	ND	X	X	X	O	X	N/A	N/A
Zinc	X	X	X	O	O	O	N/A	N/A
OTHER								
Cyanide	ND	ND	NS	ND	ND	ND	N/A	N/A

N/A = Not analyzed
ND = Not detected
NS = Selected as a COPC because there is no Recommended Soil Cleanup Objective available
O = Detected but not selected as a COPC
X = Selected as a COPC
* = Total PCBs detected in two of seven surface soil samples (HVT-1 and BURPR-2) collected in targeted areas around the Site are selected as COPC.

TABLE 8-4
AREA-B SURFACE SOIL SAMPLE DATA SUMMARY (0 - 2 FEET COMBINED)
LAPP INSULATOR, LE ROY, NY

	October 2001			NYSDEC TAGM	
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Recommended Soil Cleanup Objectives**	**Eastern USA Background ppm**
Volatile Organics (µg/kg)					
Acetone	2 / 6	39 - 280	SB-B2 0-2	200	
Benzene	6 / 6	4 - 210	SB-B7 0-2	60	
2-Butanone	5 / 6	11 - 180	SB-B10 0-2	300	
Carbon disulfide	6 / 6	2 - 25	SB-16 0-2	2,700	
Chloroform	1 / 6	10	SB-B7 0-2	300	
Chloromethane	2 / 6	2 - 11	SB-B2 0-2	NA	
1,1-Dichloroethane	4 / 6	2 - 450	SB-B7 0-2	200	
1,2-Dichloroethane	1 / 6	1	SB-B2 0-2	100	
1,1-Dichloroethene	2 / 6	2 - 42	SB-B7 0-2	400	
cis-1,2-Dichloroethene	4 / 6	4 - 3,200	SB-B7 0-2	NA	
trans-1,2-Dichloroethene	3 / 6	8 - 140	SB-B7 0-2	300	
1,2-Dichloropropane	0 / 6	ND		NA	
trans-1,3-Dichloropropene	0 / 6	ND		NA	
Ethylbenzene	6 / 6	2 - 23	SB-16 0-2	5,500	
2-Hexanone	5 / 6	5 - 160	SB-16 0-2	NA	
4-Methyl-2-pentanone	5 / 6	2 - 170	SB-B7 0-2	1,000	
Tetrachloroethene	1 / 6	26	SB-B10 0-2	1,400	
Toluene	6 / 6	17 - 59	SB-B7 0-2	1,500	
1,1,1-Trichloroethane	2 / 6	41 - 100	SB-B7 0-2	800	
1,1,2-Trichloroethane	5 / 6	2 - 130	SB-16 0-2	NA	
Trichloroethene	3 / 6	2 - 4,500	SB-B7 0-2	1	
Vinyl acetate	5 / 6	12 - 430	SB-B7 0-2	NA	
Vinyl chloride	2 / 6	3 - 120	SB-B7 0-2	200	
m&p-Xylene	6 / 6	14 - 74	SB-16 0-2	1,200 a	
o-Xylene	6 / 6	4 - 74	SB-16 0-2	1,200 a	
Semi-Volatile Organics (µg/kg)					
Fluoranthene	2 / 2	84 - 260	SB-16 0-2	50,000 b	
2-Methylnaphthalene	1 / 2	110	SB-16 0-2	36,400	
Naphthalene	1 / 2	130	SB-16 0-2	13,000	
Phenanthrene	1 / 2	61	SB-B10 0-2	50,000 b	
Pyrene	2 / 2	87 - 920	SB-16 0-2	50,000 b	
Pesticides / PCBs (mg/kg)					
p,p'-DDD	1 / 2	0.016	SB-B10 0-2	2.9	
Aroclor 1254	2 / 2	0.14 - 0.2	SB-B10 0-2	1 c	

TABLE 8-4
AREA-B SURFACE SOIL SAMPLE DATA SUMMARY (0 - 2 FEET COMBINED)
LAPP INSULATOR, LE ROY, NY

	October 2001			NYSDEC TAGM	
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Recommended Soil Cleanup Objectives**	**Eastern USA Background ppm**
Inorganics (mg/kg)					
Aluminum	2 / 2	6,400 - 7,700	SB-B10 0-2	7,100 d	33,000
Antimony	1 / 2	0.6	SB-16 0-2	ND d	ND-8.8 [1]
Arsenic	2 / 2	3.1 - 30	SB-16 0-2	7.5	3-12 e
Barium	2 / 2	48 - 53	SB-B10 0-2	300	15-600
Beryllium	2 / 2	0.4	SB-B10 0-2, SB-16 0-2	0.4 d	0-1.75
Cadmium	2 / 2	0.1 - 5.9	SB-16 0-2	1	0.1-1
Calcium *	2 / 2	66,000 - 95,000	SB-16 0-2	21,000 d	130-35,000 e
Chromium	2 / 2	9.7 - 89	SB-16 0-2	10	1.5-40 e
Cobalt	2 / 2	4.4 - 5.8	SB-B10 0-2	30	2.5-60 e
Copper	2 / 2	14 - 83	SB-16 0-2	25	1-50
Iron *	2 / 2	11,000 - 13,000	SB-B10 0-2	15,000 d	2,000-550,000
Lead	2 / 2	14 - 97	SB-16 0-2	23 d	4-500 f
Magnesium *	2 / 2	4,900 - 10,000	SB-16 0-2	5,900 d	100-5,000
Manganese	2 / 2	190 - 360	SB-B10 0-2	360 d	50-5,000
Mercury	2 / 2	0.07 - 0.1	SB-16 0-2	0.1	0.001-0.2
Nickel	2 / 2	14 - 20	SB-16 0-2	13	0.5-25
Potassium *	2 / 2	620 - 820	SB-B10 0-2	800 d	8,500-43,000 e
Selenium	1 / 2	1.6	SB-16 0-2	2	0.1-3.9
Silver	1 / 2	0.3	SB-16 0-2	ND d	ND-5 [1]
Sodium *	2 / 2	170 - 290	SB-B10 0-2	87 d	6,000-8,000
Thallium	2 / 2	0.2	SB-B10 0-2, SB-16 0-2	ND d	N/A
Vanadium	2 / 2	13 - 22	SB-16 0-2	150	1-300
Zinc	2 / 2	49 - 4,500	SB-16 0-2	59 d	9-50
Other (mg/kg)					
Cyanide Total	1 / 2	0.22	SB-16 0-2	NA	N/A

1 = Background values from Dragun and Chiasson, 1991.

NA = Not Available.

ND = Not Detected.

a = Cleanup objectives were adopted for total xylenes

b = As per TAGM #4046, total VOCs<10 ppm, total SVOCs < 500 ppm, and individual SVOCs<50 ppm.

c = Cleanup objectives were adopted for total PCBs

d = Site background value is the maximum detected concentration in the three background samples.

e = New York State background

f = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm.

Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

* = Essential nutrients are categorically excluded as COPC.

TABLE 8-5
AREA-B SUBSURFACE SOIL SAMPLE DATA SUMMARY (> 2 FEET)
LAPP INSULATOR, LE ROY, NY

	October 2001			NYSDEC TAGM	
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Recommended Soil Cleanup Objectives**	**Eastern USA Background ppm**
Volatile Organics (µg/kg)					
Acetone	2 / 8	50 - 58	SB-B15 4-6	200	
Benzene	5 / 8	4 - 65	SB-B16 2-4	60	
2-Butanone	5 / 8	3 - 380	SB-B16 2-4	300	
Carbon disulfide	4 / 8	2 - 75	SB-B16 2-4	2,700	
Chloromethane	2 / 8	2 - 2	SB-B5 2-4, SB-B14 2-4	NA	
1,1-Dichloroethane	1 / 8	2	SB-B10 6-8	200	
cis-1,2-Dichloroethene	2 / 8	1 - 12	SB-B10 6-8	NA	
1,2-Dichloropropane	1 / 8	1	SB-B10 6-8	NA	
trans-1,3-Dichloropropene	2 / 8	2 - 140	SB-B16 2-4	NA	
Ethylbenzene	4 / 8	2 - 11	SB-B10 6-8	5,500	
2-Hexanone	3 / 8	6 - 2,300	SB-B16 2-4	NA	
4-Methyl-2-pentanone	3 / 8	13 - 760	SB-B16 2-4	1,000	
Tetrachloroethene	2 / 8	1 - 7	SB-B10 6-8	1,400	
Toluene	6 / 8	2 - 190	SB-B16 2-4	1,500	
1,1,1-Trichloroethane	3 / 8	2 - 12	SB-B10 6-8	800	
1,1,2-Trichloroethane	3 / 8	15 - 1,400	SB-B16 2-4	NA	
Trichloroethene	4 / 8	1 - 110	SB-B10 6-8	1	
Vinyl acetate	3 / 8	39 - 500	SB-B16 2-4	NA	
m&p-Xylene	6 / 8	1 - 200	SB-B16 2-4	1,200 a	
o-Xylene	5 / 8	5 - 110	SB-B16 2-4	1,200 a	
Inorganics (mg/kg)					
Aluminum	1 / 1	6,800	SB-B2 4-6	7,100 d	33,000
Antimony	1 / 1	0.3	SB-B2 4-6	ND d	ND-8.8 [1]
Arsenic	1 / 1	3.2	SB-B2 4-6	7.5	3-12 e
Barium	1 / 1	41	SB-B2 4-6	300	15-600
Beryllium	1 / 1	0.4	SB-B2 4-6	0.4	0-1.75
Cadmium	1 / 1	0.1	SB-B2 4-6	1	0.1-1
Calcium *	1 / 1	37,000	SB-B2 4-6	21,000 d	130-35,000 e
Chromium	1 / 1	17	SB-B2 4-6	10	1.5-40 e
Cobalt	1 / 1	5.6	SB-B2 4-6	30	2.5-60 e
Copper	1 / 1	16	SB-B2 4-6	25	1-50
Iron *	1 / 1	14,000	SB-B2 4-6	15,000 d	2,000-550,000
Lead	1 / 1	13	SB-B2 4-6	23 d	f
Magnesium *	1 / 1	14,000	SB-B2 4-6	5,900 d	100-5,000
Manganese	1 / 1	470	SB-B2 4-6	360 d	50-5,000
Mercury	1 / 1	0.05	SB-B2 4-6	0.1	0.001-0.2
Nickel	1 / 1	14	SB-B2 4-6	13	0.5-25
Potassium *	1 / 1	1,100	SB-B2 4-6	800 d	8,500-43,000 e
Sodium *	1 / 1	180	SB-B2 4-6	87 d	6,000-8,000
Thallium	1 / 1	0.2	SB-B2 4-6	ND d	N/A
Vanadium	1 / 1	13	SB-B2 4-6	150	1-300
Zinc	1 / 1	48	SB-B2 4-6	59 d	9-50

1 = Background values from Dragun and Chiasson, 1991.
NA = Not Available.
ND = Not Detected.
a = Cleanup objectives were adopted for total xylenes
b = As per TAGM #4046, total VOCs<10 ppm, total SVOCs < 500 ppm, and individual SVOCs<50 ppm.
c = Cleanup objectives were adopted for total PCBs
d = Site background value is the maximum detected concentration in the three background samples.
e = New York State background
f = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm.
Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.
* = Essential nutrients are categorically excluded as COPC.

TABLE 8-6
AREA-C SURFACE SOIL SAMPLE DATA SUMMARY (0 - 2 FEET COMBINED)
LAPP INSULATOR, LE ROY, NY

	October 2001			NYSDEC TAGM	
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Recommended Soil Cleanup Objectives**	**Eastern USA Background ppm**
Volatile Organics (μg/kg)					
Benzene	0 / 1	ND		60	
2-Butanone	0 / 1	ND		300	
Carbon disulfide	0 / 1	ND		2,700	
Chloromethane	0 / 1	ND		NA	
cis-1,2-Dichloroethene	0 / 1	ND		NA	
Ethylbenzene	0 / 1	ND		5,500	
Methylene chloride	1 / 1	2	SB-C37 0-2	100	
Tetrachloroethene	0 / 1	ND		1,400	
Toluene	1 / 1	2	SB-C37 0-2	1,500	
1,1,1-Trichloroethane	0 / 1	ND		800	
Trichloroethene	0 / 1	ND		700	
m&p-Xylene	0 / 1	ND		1,200 a	
o-Xylene	0 / 1	ND		1,200 a	
Semi-Volatile Organics (μg/kg)					
Diethyl phthalate	1 / 1	48	SB-C37 0-2	7,100	
Fluoranthene	1 / 1	39	SB-C37 0-2	50,000 b	
Pyrene	1 / 1	50	SB-C37 0-2	50,000 b	
Inorganics (mg/kg)					
Aluminum	1 / 1	8,500	SB-C37 0-2	7,100 d	33,000
Arsenic	1 / 1	3.7	SB-C37 0-2	7.5	3-12 e
Barium	1 / 1	56	SB-C37 0-2	300	15-600
Beryllium	1 / 1	0.4	SB-C37 0-2	0.4 d	0-1.75
Cadmium	1 / 1	0.1	SB-C37 0-2	1	0.1-1
Calcium *	1 / 1	2,400	SB-C37 0-2	21,000 d	130-35,000 e
Chromium	1 / 1	12	SB-C37 0-2	10	1.5-40 e
Cobalt	1 / 1	7	SB-C37 0-2	30	2.5-60 e
Copper	1 / 1	17	SB-C37 0-2	25	1-50
Iron *	1 / 1	19,000	SB-C37 0-2	15,000 d	2,000-550,000
Lead	1 / 1	11	SB-C37 0-2	23 d	f
Magnesium *	1 / 1	3,200	SB-C37 0-2	5,900 d	100-5,000
Manganese	1 / 1	410	SB-C37 0-2	360 d	50-5,000
Mercury	1 / 1	0.04	SB-C37 0-2	0.1	0.001-0.2
Nickel	1 / 1	15	SB-C37 0-2	13	0.5-25
Potassium *	1 / 1	840	SB-C37 0-2	800 d	8,500-43,000 e
Sodium *	1 / 1	1,200	SB-C37 0-2	87 d	6,000-8,000
Vanadium	1 / 1	16	SB-C37 0-2	150	1-300
Zinc	1 / 1	50	SB-C37 0-2	59 d	9-50

NA = Not Available.

ND = Not Detected.

a = Cleanup objectives were adopted for total xylenes

b = As per TAGM #4046, total VOCs<10 ppm, total SVOCs < 500 ppm, and individual SVOCs<50 ppm.

c = Cleanup objectives were adopted for total PCBs

d = Site background value is the maximum detected concentration in the three background samples.

e = New York State background

f = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm.
Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

* = Essential nutrients are categorically excluded as COPC.

TABLE 8-7
AREA-C SUBSURFACE SOIL SAMPLE DATA SUMMARY (> 2 FEET)
LAPP INSULATOR, LE ROY, NY

	October 2001			NYSDEC TAGM	
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Recommended Soil Cleanup Objectives**	**Eastern USA Background ppm**
Volatile Organics (µg/kg)					
Benzene	11 / 20	2 - 14	SB-C23 10-12	60	
2-Butanone	2 / 20	5	SB-C26 4-6, SB-C31 2-4	300	
Carbon disulfide	3 / 20	1 - 2	SB-C1 8-10	2,700	
Chloromethane	2 / 20	1 - 2	SB-C1 8-10	NA	
cis-1,2-Dichloroethene	1 / 20	1	SB-C1 8-10	NA	
Ethylbenzene	10 / 20	2 - 6	SB-C23 10-12	5,500	
Methylene chloride	5 / 20	1 - 2	SB-C23 2-4	100	
Tetrachloroethene	13 / 20	2 - 16,000	SB-C3 8-10	1,400	
Toluene	15 / 20	2 - 44	SB-C23 10-12	1,500	
1,1,1-Trichloroethane	10 / 20	2 - 18,000	SB-C39 6-8	800	
Trichloroethene	15 / 20	2 - 45,000	SB-C41 4-6	700	
m&p-Xylene	12 / 20	1 - 38	SB-C24 6-8	1,200 a	
o-Xylene	10 / 20	3 - 12	SB-C24 6-8	1,200 a	
Semi-Volatile Organics (µg/kg)					
Butylbenzylphthalate	2 / 6	28 - 33	SB-C24 6-8	50,000 b	
Diethyl phthalate	3 / 6	29 - 69	SB-C26 4-6	7,100	
Pyrene	1 / 6	34	SB-C8 2-4	50,000 b	
Inorganics (mg/kg)					
Aluminum	6 / 6	2,100 - 6,500	SB-C3 2-4	7,100 d	33,000
Arsenic	6 / 6	1.3 - 3.3	SB-C8 4-6	7.5	3-12 e
Barium	6 / 6	11 - 61	SB-C8 4-6	300	15-600
Beryllium	4 / 6	0.2 - 0.4	SB-C8 4-6	0.4 d	0-1.75
Cadmium	3 / 6	0.1 - 0.2	SB-C1 8-10	1	0.1-1
Calcium *	6 / 6	1,500 - 36,000	SB-C1 8-10	21,000 d	130-35,000 e
Chromium	6 / 6	3.4 - 8.4	SB-C8 4-6	10	1.5-40 e
Cobalt	6 / 6	2.7 - 6.2	SB-C8 4-6	30	2.5-60 e
Copper	6 / 6	8.1 - 20	SB-C8 4-6	25	1-50
Iron *	6 / 6	7,500 - 15,000	SB-C3 2-4	15,000 d	2,000-550,000
Lead	6 / 6	3.1 - 7.7	SB-C8 4-6	23 d	f
Magnesium *	6 / 6	1,200 - 12,000	SB-C8 4-6	5,900 d	100-5,000
Manganese	6 / 6	220 - 440	SB-C8 4-6	360 d	50-5,000
Nickel	6 / 6	6.7 - 19	SB-C8 4-6	13	0.5-25
Potassium *	6 / 6	260 - 740	SB-C8 4-6	800 d	8,500-43,000 e
Sodium *	2 / 6	55 - 60	SB-C24 6-8	87 d	6,000-8,000
Thallium	2 / 6	0.2 - 0.4	SB-C8 4-6	ND d	N/A
Vanadium	6 / 6	5.2 - 12	SB-C8 4-6	150	1-300
Zinc	6 / 6	27 - 52	SB-C8 4-6	59 d	9-50

ND = Not Detected.

a = Cleanup objectives were adopted for total xylenes
b = As per TAGM #4046, total VOCs<10 ppm, total SVOCs < 500 ppm, and individual SVOCs<50 ppm.
c = Cleanup objectives were adopted for total PCBs
d = Site background value is the maximum detected concentration in the three background samples.
e = New York State background
f = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm.
Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.
* = Essential nutrients are categorically excluded as COPC.

Area D

Surface and subsurface soil data are presented in Tables 8-8 and 8-9, respectively. No chemicals are selected as COPC in surface soil. Two VOCs are selected as COPC in subsurface soil. Table 8-3 presents the COPC for Area D.

PCBs were also analyzed for in seven surface soil samples collected in targeted areas throughout the Site. Total PCBs were detected in four of the seven samples at concentrations ranging from 0.15 mg/kg to 1.4 mg/kg. Total PCBs were detected slightly above the recommended soil cleanup objectives in two of the samples (HVT-1 at 1.2 mg/kg and BURPR-2 at 1.4 mg/kg). As such, total PCBs are selected as COPC for those two PCB-targeted areas (HVT-1 and BURPR-2).

8.1.2 Groundwater

Two rounds of groundwater data, from January 2002 and August 2003, are summarized and presented, by sampling round, for the overburden, shallow bedrock, and intermediate bedrock aquifers, in Tables 8-10, 8-12, and 8-13, respectively. Only one round of groundwater data was collected in August 2003 for the deep bedrock aquifer; these data are summarized and presented in Table 8-14.

Overburden

As shown in Table 8-10, ten VOCs, the PCB mixture Aroclor 1262, and two inorganic chemicals are selected as COPC in overburden groundwater. In addition, three inorganic chemicals (aluminum, cobalt, and vanadium) are selected as COPC because no ambient water quality standards or guidance values are available. Table 8-11 presents the COPC for overburden groundwater.

Shallow Bedrock

As shown in Table 8-12, 11 VOCs are selected as COPC in shallow bedrock groundwater. In addition, one VOC (2-butanone) and two inorganic chemicals (aluminum and cobalt) are selected as COPC because no ambient water quality standards or guidance values are available. Table 8-11 presents the COPC for shallow bedrock groundwater.

TABLE 8-8
AREA-D SURFACE SOIL SAMPLE DATA SUMMARY (0 - 2 FEET COMBINED)
LAPP INSULATOR, LE ROY, NY

	July 2001			NYSDEC TAGM
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Recommended Soil Cleanup Objectives**
Volatile Organics (μg/kg)				
Tetrachloroethene	1 / 1	18	10H 0-2	1,400

TABLE 8-9
AREA-D SUBSURFACE SOIL SAMPLE DATA SUMMARY (> 2 FEET)
LAPP INSULATOR, LE ROY, NY

	July 2001			NYSDEC TAGM
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Recommended Soil Cleanup Objectives**
Volatile Organics (µg/kg)				
1,1-Dichloroethene	1 / 5	7	10L 6-8	400
Tetrachloroethene	4 / 5	2 - 40	10I 4-6	1,400
1,1,1-Trichloroethane	5 / 5	3 - **1,500**	10L 6-8	800
Trichloroethene	5 / 5	10 - **2,300**	10L 6-8	700

TABLE 8-10
OVERBURDERN GROUNDWATER SAMPLE DATA SUMMARY
LAPP INSULATOR, LE ROY, NY

CHEMICAL	Round 1 (January 2002)			Round 2 (August 2003)			NYSDEC Ambient Water Quality Standards and Guidance Values [1]
	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	
Volatile Organics (µg/L)							
Chloroethane	1 / 6	22	MW-1	1 / 6	22	MW-1	5 b
1,1-Dichloroethane	4 / 6	3 - 3,200	MW-1	2 / 6	1,400 - 2,200	MW-1	5 b
1,2-Dichloroethane	1 / 6	5	MW-1	0 / 6	ND		0.6
1,1-Dichloroethene	2 / 6	130 - 330	PMW-10	2 / 6	72 - 600	PMW-10	5 b
cis-1,2-Dichloroethene	3 / 6	6 - 35	MW-1	3 / 6	9 - 31	PMW-10	5 b
trans-1,2-Dichloroethene	2 / 6	2 - 4	MW-3	2 / 6	4 - 6	MW-3	5 b
Methylene Chloride	1 / 6	60	PMW-10	1 / 6	14	PMW-10	5 b
1,1,1-Trichloroethane	3 / 6	23 - 12,000	PMW-10	2 / 6	200 - 12,000	PMW-10	5 b
1,1,2-Trichloroethane	1 / 6	7	MW-1	2 / 6	4 - 28	PMW-10	1
Trichloroethene	4 / 6	2 - 13,000	PMW-10	2 / 6	22 - 13,000	PMW-10	5 b
Vinyl Chloride	1 / 6	12	MW-1	2 / 6	4 - 5	PMW-10	2
Semi-Volatile Organics (µg/L)							
bis(2-Ethylhexyl)phthalate	2 / 3	1 - 2	PW-3	N/A	N/A		5
TCL Pesticides / PCBs (µg/L)							
Aroclor 1262	1 / 3	0.15	PW-3	N/A	N/A		0.09 c

TABLE 8-11

CHEMICALS OF POTENTIAL CONCERN IN GROUNDWATER

HUMAN HEALTH EVALUATION
LAPP INSULATOR

CHEMICAL	OVERBURDEN	SHALLOW BEDROCK	INTERMEDIATE BEDROCK	DEEP BEDROCK
VOLATILE ORGANICS				
Acetone	ND	ND	ND	X
Benzene	ND	ND	X	X
2-Butanone	ND	NS	NS	NS
Chloroethane	X	X	O	X
Chloroform	ND	ND	ND	X
Cyclohexane	ND	ND	ND	NS
1,1-Dichloroethane	X	X	X	X
1,1-Dichloroethene	X	X	ND	ND
cis-1,2-Dichloroethene	X	X	X	ND
trans-1,2-Dichloroethene	X	X	ND	ND
Ethylbenzene	ND	ND	X	X
Methylcyclohexane	ND	ND	ND	NS
Methylene chloride	X	O	ND	ND
Tetrachloroethene	ND	X	ND	ND
Toluene	ND	ND	X	X
1,1,1-Trichloroethane	X	X	X	ND
1,1,2-Trichloroethane	X	X	ND	ND
Trichloroethene	X	X	X	ND
Vinyl chloride	X	X	X	ND
m&p-Xylene	ND	X	X	X
o-Xylene	ND	O	O	X
SEMIVOLATILE ORGANICS				
2-Methylnaphthalene	ND	ND	ND	NS
PCBs				
Aroclor 1262	X	ND	ND	ND
INORGANICS				
Aluminum	NS	NS	NS	NS
Antimony	X	ND	ND	ND
Arsenic	O	O	O	X
Barium	O	O	X	O
Cobalt	NS	NS	ND	ND
Manganese	X	O	O	X
Vanadium	NS	ND	ND	ND

ND = Not detected
NS = Selected as a COPC because there is no Ambient Water Quality Standard for class GA groundwater available
O = Detected but not selected as a COPC
X = Selected as a COPC

TABLE 8-12
SHALLOW BEDROCK GROUNDWATER SAMPLE DATA SUMMARY
LAPP INSULATOR, LE ROY, NY

CHEMICAL	Round 1 (January 2002)			Round 2 (August 2003)			NYSDEC Ambient Water Quality Standards and Guidance Values [1]
	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	
Volatile Organics (μg/L)							
Bromomethane	1 / 6	1	SR-103	0 / 8	ND		5 b
2-Butanone	1 / 6	1	SR-102	0 / 8	ND		NA
Chloroethane	1 / 6	18	SR-106	1 / 8	36	SR-106	5 b
1,1-Dichloroethane	3 / 6	180 - 24,000	SR-105	5 / 8	29 - 30,000	SR-105	5 b
1,1-Dichloroethene	3 / 6	36 - 1,000	SR-105	2 / 8	15 - 41	SR-106	5 b
cis-1,2-Dichloroethene	3 / 6	53 - 1,900	SR-105	4 / 8	33 - 1,700	SR-105	5 b
trans-1,2-Dichloroethene	3 / 6	2 - 100	SR-105	1 / 8	69	SR-107	5 b
Methylene chloride	1 / 6	2	SR-106	0 / 8	ND		5 b
Tetrachloroethene	1 / 6	4	SR-106	1 / 8	6	SR-106	5 b
1,1,1-Trichloroethane	3 / 6	410 - 120,000	SR-105	3 / 8	950 - 110,000	SR-105	5 b
1,1,2-Trichloroethane	1 / 6	3		0 / 8	ND		1
Trichloroethene	3 / 6	54 - 37,000	SR-105	5 / 8	15 - 35,000	SR-105	5 b
Vinyl chloride	1 / 6	7	SR-106	2 / 8	9 - 15	SR-107	2
m&p-Xylene	1 / 6	1	SR-103	1 / 8	13	SR-107	5 b
o-Xylene	1 / 6	2	SR-103	1 / 8	5	SR-107	5 b
Inorganics (mg/L)							
Aluminum	3 / 3	0.013 - 0.066	SR-103	N/A	N/A		NA
Arsenic	1 / 3	0.002	SR-102	N/A	N/A		0.025
Barium	3 / 3	0.11 - 0.75	SR-103	N/A	N/A		1
Cadmium	1 / 3	0.0002	SR-103	N/A	N/A		0.005
Calcium *	3 / 3	150 - 180	SR-106	N/A	N/A		NA
Chromium	1 / 3	0.003	SR-106	N/A	N/A		0.05
Cobalt	2 / 3	0.0005 - 0.0054	SR-106	N/A	N/A		NA
Copper	3 / 3	0.001 - 0.002	SR-103, SR-106	N/A	N/A		0.2
Iron *	3 / 3	2.5 - 6.8	SR-106	N/A	N/A		0.3 c
Lead	3 / 3	0.0004 - 0.0006	SR-103	N/A	N/A		0.025
Magnesium *	3 / 3	47 - 77	SR-102	N/A	N/A		35 a
Manganese	3 / 3	0.048 - 0.13	SR-102	N/A	N/A		0.3 c
Nickel	3 / 3	0.005 - 0.018	SR-102	N/A	N/A		0.1
Potassium *	3 / 3	3.5 - 10	SR-102	N/A	N/A		NA
Selenium	3 / 3	0.002 - 0.005	SR-102	N/A	N/A		0.01
Sodium *	3 / 3	22 - 160	SR-106	N/A	N/A		20
Zinc	3 / 3	0.005 - 0.008	SR-106	N/A	N/A		2 a

NA = Not Available.
N/A = Not Analyzed.
ND = Not Detected.
a = Guidance Value
b = The principle organic contaminant standard for groundwater of 5 ug/L applies to this chemical.
c = aesthetic

Intermediate Bedrock

As shown in Table 8-13, nine VOCs and one inorganic chemical are selected as COPC in intermediate bedrock groundwater. In addition, one VOC (2-butanone) and one inorganic chemical (aluminum) are selected as COPC because no ambient water quality standards or guidance values are available. Table 8-11 presents the COPC for intermediate bedrock groundwater.

Deep Bedrock

As shown in Table 8-14, nine VOCs and two inorganic chemicals are selected as COPC in deep bedrock groundwater. In addition, three VOCs (2-butanone, cyclohexane, and methylcyclohexane), one SVOC (2-methylnephthalene), and one inorganic chemical (aluminum) are selected as COPC because no ambient water quality standards or guidance values are available. Table 8-11 presents the COPC for deep bedrock groundwater.

8.1.3 Surface Water and Sediment in Oatka Creek

Two rounds of surface water and sediment data, from May 2002 and August 2003, from each of five sampling locations, are summarized and presented in Tables 8-15 to 8-16, respectively. The sampling locations include: one upstream of the Site, three adjacent to the Site, and one downstream of the Site. In addition, data for water samples collected from a seep located adjacent to the Site in May 2002 and August 2003 are also summarized and presented in Table 8-15.

Two VOCs are selected as COPC in surface water. One VOC and one inorganic chemical are selected as COPC in sediment. Three VOCs are selected as COPC in seep water. In addition, three inorganic chemicals (aluminum, cobalt, and vanadium) are selected as COPC in surface water and one VOC (cis-1,2-dichloroethene) and two SVOCs (benzyl alcohol and carbazole) are selected as COPC in sediment because no soil cleanup objectives or RBSLs are available. Tables 8-17 and 8-18 present the COPC for surface water and sediment, respectively.

TABLE 8-13
INTERMEDIATE BEDROCK GROUNDWATER SAMPLE DATA SUMMARY
LAPP INSULATOR, LE ROY, NY

	Round 1 (January 2002)			Round 2 (August 2003)			NYSDEC Ambient
CHEMICAL	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Water Quality Standards and Guidance Values [1]
Volatile Organics (μg/L)							
Benzene	2 / 4	9 - 15	IR-105	3 / 4	14 - 17	IR-101	1
2-Butanone	1 / 4	4	IR-105	1 / 4	16	IR-105	NA
Chloroethane	1 / 4	5	IR-103	1 / 4	5	IR-103	5 b
1,1-Dichloroethane	2 / 4	110 - 130	IR-105	2 / 4	56 - 190	IR-105	5 b
cis-1,2-Dichloroethene	2 / 4	2 - 47	IR-103	2 / 4	4 - 16	IR-103	5 b
Ethylbenzene	2 / 4	4 - 12	IR-102	2 / 4	4 - 13	IR-105	5 b
Toluene	2 / 4	2 - 7	IR-105	1 / 4	6	IR-101	5 b
1,1,1-Trichloroethane	2 / 4	28 - 40	IR-103	2 / 4	13 - 77	IR-105	5 b
Trichloroethene	2 / 4	3 - 25	IR-105	1 / 4	110	IR-105	5 b
Vinyl chloride	1 / 4	5	IR-103	0 / 4	ND		2
m&p-Xylene	3 / 4	3 - 13	IR-102	2 / 4	6 - 10	IR-101	5 b
o-Xylene	2 / 4	1 - 3	IR-105	0 / 4	ND		5 b
Inorganics (mg/L)							
Aluminum	2 / 2	0.014 - 0.019	IR-102	N/A	N/A		NA
Arsenic	2 / 2	0.002 - 0.014	IR-102	N/A	N/A		0.025
Barium	2 / 2	0.35 - 1.1	IR-102	N/A	N/A		1
Cadmium	1 / 2	0.0001	IR-102	N/A	N/A		0.005
Calcium *	2 / 2	88 - 190	IR-102	N/A	N/A		NA
Copper	1 / 2	0.002	IR-102	N/A	N/A		0.2
Iron *	2 / 2	0.68 - 1.5	IR-102	N/A	N/A		0.3 c
Lead	2 / 2	0.0007 - 0.0007	IR-102, IR-103	N/A	N/A		0.025
Magnesium *	2 / 2	47 - 120	IR-102	N/A	N/A		35 a
Manganese	2 / 2	0.02 - 0.16	IR-102	N/A	N/A		0.3 c
Nickel	2 / 2	0.002 - 0.004	IR-102	N/A	N/A		0.1
Potassium *	2 / 2	7.7 - 15	IR-102	N/A	N/A		NA
Selenium	2 / 2	0.005 - 0.01	IR-102	N/A	N/A		0.01
Sodium *	2 / 2	90 - 300	IR-102	N/A	N/A		20
Zinc	1 / 2	0.011	IR-102	N/A	N/A		2 a

NA = Not Available.
N/A = Not Analyzed.
ND = Not Detected.
a = Guidance Value
b = The principle organic contaminant standard for groundwater of 5 ug/L applies to this chemical.

TABLE 8-14
DEEP BEDROCK GROUNDWATER SAMPLE DATA SUMMARY
LAPP INSULATOR, LE ROY, NY

CHEMICAL	Round 2 (August 2003)			NYSDEC Ambient Water Quality Standards and Guidance Values [1]
	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	
Volatile Organics (µg/L)				
Acetone	3 / 3	11 - 150	DR-103	50 a
Benzene	3 / 3	17 - 63	DR-101	1
2-Butanone	3 / 3	6 - 51	DR-103	NA
Chloroethane	1 / 3	29	DR-105	5 b
Chloroform	1 / 3	11	DR-103	7
Cyclohexane	3 / 3	43 - 130	DR-101	NA
1,1-Dichloroethane	1 / 3	24	DR-105	5 b
Ethylbenzene	3 / 3	7 - 29	DR-103	5 b
2-Hexanone	1 / 3	7	DR-103	50 a
isopropylbenzene	1 / 3	4	DR-103	5 b
Methylcyclohexane	3 / 3	29 - 130	DR-103	NA
Toluene	3 / 3	7 - 100	DR-103	5 b
m&p-Xylene	3 / 3	27 - 130	DR-103	5 b
o-Xylene	3 / 3	4 - 46	DR-103	5 b
Semi-Volatile Organics (µg/L)				
bis(2-Ethylhexyl)phthalate	1 / 3	1	DR-101	5
2-Methylnaphthalene	1 / 3	2	DR-101	NA
Inorganics (mg/L)				
Aluminum	1 / 1	0.15	DR-101	NA
Arsenic	1 / 1	0.12	DR-101	0.025
Barium	1 / 1	0.68	DR-101	1
Calcium *	1 / 1	550	DR-101	NA
Copper	1 / 1	0.014	DR-101	0.2
Iron *	1 / 1	6	DR-101	0.3 c
Magnesium *	1 / 1	320	DR-101	35 a
Manganese	1 / 1	0.31	DR-101	0.3 c
Potassium *	1 / 1	160	DR-101	NA
Selenium	1 / 1	0.088	DR-101	0.01
Sodium *	1 / 1	3,900	DR-101	20

NA = Not Available.

ND = Not Detected.

a = Guidance Value

b = The principle organic contaminant standard for groundwater of 5 ug/L applies to this chemical.

c = aesthetic

* = Essential nutrients are categorically excluded as COPC.

TABLE 8-15
STREAM SURFACE WATER DATA SUMMARY
LAPP INSULATOR/OATKA CREEK FWIA

CHEMICAL	May 2002						NYSDSEC Ambient Water Quality Standards [a]	Risk-Based Screening Levels
	Sampling Location SW-1 Upstream Background Conditions	Adjacent to Site			Sampling Location SW-5 Downstream Conditions	Seep Sample		
		Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection				
TCL Volatile Organics (μg/L)								
Bromodichloromethane	ND	0 / 3	ND		ND	9	50 b	
2-Butanone	ND	0 / 3	ND		ND	ND	50 b	>1e+06 nc
Chlorodibromomethane	ND	0 / 3	ND		ND	1	50 b	
Chloroform	ND	0 / 3	ND		ND	34	7 b	3.39E+05 nc
1,1-Dichloroethane	ND	0 / 3	ND		2	ND	0.6 b	>1e+06 nc
cis-1,2-Dichloroethene	ND	1 / 3	2	SW-3	1	ND	5 b	3.39E+05 nc
Toluene	ND	1 / 3	4	SW-3	ND	ND	5 b	
1,1,1-Trichloroethane	ND	2 / 3	3 - 3	SW-3, SW-4	3	2	5 b	>1e+06 sol
Trichloroethene	ND	2 / 3	2 - 5	SW-3	ND	5	5 b	9.88E+02 ca
Semi-Volatile Organics (μg/L)								
Butylbenzylphthalate	1	0 / 3	ND		ND	ND	50 b	
Caprolactam	ND	0 / 3	ND		ND	ND	NA	>1e+06 nc
Inorganics (mg/L)								
Aluminum	0.1	3 / 3	0.062 - 0.39	SW-3	0.12	0.046	NA	3.39E+04 nc
Arsenic	ND	0 / 3	ND		ND	ND	0.05 b	
Barium	0.048	3 / 3	0.043 - 0.059	SW-3	0.049	0.036	1 b	
Cadmium	ND	2 / 3	0.0001 - 0.0001	SW-3	0.0001	0.0001	0.005 b	
Calcium *	63	3 / 3	63 - 69	SW-3	67	63	NA	
Chromium	ND	0 / 3	ND		ND	ND	0.05 b	
Cobalt	ND	2 / 3	0.0005 - 0.0007	SW-3	ND	ND	NA	6.78E+02 nc
Copper	0.003	3 / 3	0.004 - 0.009	SW-3	0.003	0.005	0.2 b	
Iron *	0.29	3 / 3	0.17 - 1.2	SW-3	0.38	0.034	0.3 c	
Lead	0.0008	3 / 3	0.0007 - 0.0037	SW-3	0.0007	ND	0.05 b	
Magnesium *	12	3 / 3	12 - 14	SW-3	13	12	NA	
Manganese	0.035	3 / 3	0.023 - 0.19	SW-4	0.054	0.004	0.3 c	4.74E+03 nc
Nickel	0.002	2 / 3	0.002 - 0.003	SW-4	0.002	ND	0.1 b	
Potassium *	2.2	3 / 3	2.2 - 4.9	SW-3	2.7	3.3	NA	
Sodium *	26	3 / 3	26 - 41	SW-3	26	23	NA	
Vanadium	ND	2 / 3	0.002 - 0.005	SW-3	ND	ND	NA	2.37E+02 nc
Zinc	0.015	3 / 3	0.008 - 0.043	SW-4	0.015	0.016	2 b	

ND = Not Detected.
NA = Not Available.
a = protective of drinking water source. (values protective of fish consumption in parentheses)
b = guidance value
c = aesthetic

TABLE 8-16
STREAM SEDIMENT DATA SUMMARY
LAPP INSULATOR, LE ROY, NY

CHEMICAL	May 2002						NYSDEC TAGM Recommended Soil Cleanup Objectives	Risk-Based Screening Levels
	Sampling Location SED-1 Upstream Background Conditions	Adjacent to Site			Sampling Location SED-5 Downstream Conditions	Background [1] ppm		
		Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection				
Volatile Organics (µg/kg)								
Acetone	ND	0 / 3	ND		ND		200	
Benzene	ND	0 / 3	ND		9		60	
2-Butanone	ND	2 / 3	10 - 19	SED-2	ND		300	
Carbon disulfide	ND	1 / 3	3	SED-4	11		2,700	
Chloroethane	ND	1 / 3	64	SED-2	ND		1,900	
1,1-Dichloroethane	ND	1 / 3	3	SED-3	11		200	
cis-1,2-Dichloroethene	ND	0 / 3	ND		11		NA	
Ethylbenzene	ND	0 / 3	ND		4		5,500	
Toluene	62	1 / 3	44	SED-2	25		1,500	
1,1,1-Trichloroethane	ND	0 / 3	ND		15		800	
Trichloroethene	ND	0 / 3	ND		2		1	4.94E+05 ca
m&p-Xylene	ND	0 / 3	ND		8		1,200 a	
o-Xylene	ND	0 / 3	ND		22		1,200 a	
Semi-Volatile Organics (µg/kg)								
Acenaphthene	ND	0 / 3	ND		ND		50,000 b	
Anthracene	ND	1 / 3	73	SED-4	ND		50,000 b	
Benzo(a)anthracene	110	2 / 3	130 - 390	SED-4	130		224	2.08E+05 ca
Benzo(a)pyrene	92	2 / 3	150 - 370	SED-4	160		61	2.08E+04 ca
Benzo(b)fluoranthene	150	2 / 3	210 - 560	SED-4	240		1,100	2.08E+05 ca
Benzo(g,h,i)perylene	ND	1 / 3	410	SED-4	150		50,000 b	
Benzo(k)fluoranthene	66	2 / 3	120 - 310	SED-4	120		1,100	>1e+06 ca
Benzyl alcohol	110	2 / 3	83 - 140	SED-2	ND		NA	
Benzyl butyl phthalate	ND	1 / 3	350	SED-2	ND		50,000 b	
Biphenyl	61	3 / 3	62 - 87	SED-4	ND		NA	
bis(2-Ethylhexyl)phthalate	ND	1 / 3	4,500,000	SED-2	ND		50,000 b	>1e+06 ca
Carbazole	ND	0 / 3	ND		ND		NA	
Chrysene	140	2 / 3	150 - 480	SED-4	180		400	>1e+06 ca
Dibenzo(a,h)anthracene	ND	0 / 3	ND		ND		14 or MDL	2.08E+04 ca
Dibenzofuran	ND	0 / 3	ND		ND		6,200	
Diethyl phthalate	ND	1 / 3	94	SED-2	ND		7,100	
Di-n-butyl phthalate	ND	0 / 3	ND		120		8,100	
Di-n-octyl phthalate	26	0 / 3	ND		ND		50,000 b	
Fluoranthene	140	3 / 3	140 - 810	SED-4	200		50,000 b	
Fluorene	ND	0 / 3	ND		ND		50,000 b	
Indeno(1,2,3-cd)pyrene	ND	1 / 3	370	SED-4	150		3,200	2.08E+05 ca
Naphthalene	ND	0 / 3	ND		ND		13,000	
Phenanthrene	53	3 / 3	87 - 490	SED-4	80		50,000 b	
Pyrene	110	3 / 3	160 - 810	SED-4	180		50,000 b	

TABLE 8-16
STREAM SEDIMENT DATA SUMMARY
LAPP INSULATOR, LE ROY, NY

CHEMICAL	May 2002						NYSDEC TAGM Recommended Soil Cleanup Objectives	Risk-Based Screening Levels
	Sampling Location SED-1 Upstream Background Conditions	Adjacent to Site			Sampling Location SED-5 Downstream Conditions	Background [1] ppm		
		Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection				
Pesticides / PCBs (µg/kg)								
Endrin aldehyde	ND	1 / 3	19	SED-3	ND		NA	
Aroclor 1260	ND	2 / 3	70 - 280	SED-4	ND		1 c	7.47E+04 ca
Inorganics (mg/kg)								
Aluminum	5,400	3 / 3	6,000 - 6,800	SED-3	1,900	33,000	7,100 d	7.E+03 nc
Antimony	ND	2 / 3	0.9 - 1.8	SED-4	ND	ND-8.8 [2]	ND d	7.E+03 nc
Arsenic	1.6	3 / 3	2 - 3.7	SED-4	0.9	3-12 e	7.5	
Barium	74	3 / 3	73 - 110	SED-4	24	15-600	300	
Beryllium	0.3	3 / 3	0.3 - 0.4	SED-4	ND	0-1.75	0.4 d	
Cadmium	0.3	3 / 3	0.4 - 0.8	SED-4	0.1	0.1-1	1	
Calcium *	37,000	3 / 3	20,000 - 78,000	SED-2	29,000	130-35,000 e	21,000 d	
Chromium	8.4	3 / 3	11 - 12	SED-3	4.0	1.5-40 e	10	>1e+06 nc
Cobalt	5	3 / 3	5.9 - 9.2	SED-4	2.6	2.5-60 e	30	
Copper	13	3 / 3	22 - 54	SED-4	15	1-50	25	6.27E+05 nc
Iron *	12,000	3 / 3	12,000 - 23,000	SED-4	5,800	2,000-550,000	15,000 d	
Lead	12	3 / 3	16 - 210	SED-3	7.3	4-500 f	23 d	NA
Magnesium *	3,400	3 / 3	3,300 - 6,600	SED-2	4,100	100-5,000	5,900 d	
Manganese	190	3 / 3	160 - 230	SED-2	170	50-5,000	360 d	8.47E+04 nc
Mercury	0.04	3 / 3	0.05 - 0.09	SED-4	ND	0.001-0.2	0.1	
Nickel	14	3 / 3	17 - 22	SED-4	6.7	0.5-25	13	3.39E+05 nc
Potassium *	680	3 / 3	910 - 1,000	SED-4	390	8,500-43,000 e	800 d	
Selenium	ND	1 / 3	1.1	SED-4	ND	0.1-3.9	2	
Silver	0.1	3 / 3	0.1 - 2.3	SED-4	0.1	ND-5 [2]	ND d	8.47E+04 nc
Sodium *	110	3 / 3	120 - 530	SED-4	77	6,000-8,000	87 d	
Thallium	0.2	3 / 3	0.2 - 0.3	SED-4	ND	NA	ND d	1.36E+03 nc
Vanadium	9.2	3 / 3	11 - 19	SED-4	3.7	1-300	150	
Zinc	50	3 / 3	75 - 130	SED-4	28	9-50	59 d	1.36E+03 nc
Other (mg/kg)								
Cyanide total	0.6	3 / 3	0.52 - 0.65	SED-4	0.17	NA	NA	

1 = Eastern USA background values as published in the NYSDEC TAGM #4046.
2 = Background values from Dragun and Chiasson, 1991.
NA = Not Available.
ND = Not Detected
R = Rejected
* = Essential nutrients are categorically excluded as COPC.

a = Cleanup objectives were adopted for total xylenes
b = As per TAGM #4046, total VOCs<10 ppm, total SVOCs < 500 ppm, and individual SVOCs<50 ppm.
c = Cleanup objectives were adopted for total PCBs
d = Site background value is the maximum detected concentration in the three background samples.
e = New York State background
f = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

TABLE 8-17

CHEMICALS OF POTENTIAL CONCERN IN SURFACE WATER

HUMAN HEALTH EVALUATION
LAPP INSULATOR

CHEMICAL	UPSTREAM	ADJACENT TO THE SITE	DOWNSTREAM	SEEP
VOLATILE ORGANICS				
2-Butanone	ND	X	ND	ND
Chloroform	ND	X	ND	X
1,1-Dichloroethane	ND	ND	X	ND
cis-1,2-Dichloroethene	ND	O	X	ND
1,1,1-Trichloroethane	ND	O	X	X
Trichloroethene	ND	X	ND	X
SEMIVOLATILE ORGANICS				
Caprolactam	ND	NS	ND	ND
INORGANICS				
Aluminum	NS	NS	NS	NS
Cobalt	ND	NS	ND	ND
Manganese	NS	NS	NS	NS
Vanadium	ND	NS	ND	ND

ND = Not detected
NS = Selected as a COPC because there is no Recommended Soil Cleanup Objective available
O = Detected but not selected as a COPC
X = Selected as a COPC

TABLE 8-18

CHEMICALS OF POTENTIAL CONCERN IN SEDIMENT

HUMAN HEALTH EVALUATION
LAPP INSULATOR

CHEMICAL	UPSTREAM	ADJACENT TO THE SITE	DOWNSTREAM
VOLATILE ORGANICS			
cis-1,2-Dichloroethene	ND	ND	NS
Trichloroethene	ND	ND	X
SEMIVOLATILE ORGANICS			
Benzo(a)anthracene	ND	X	O
Benzo(a)pyrene	X	X	X
Benzo(b)fluoranthene	O	X	O
Benzo(k)fluoranthene	O	X	O
Benzyl alcohol	NS	NS	ND
Biphenyl	NS	NS	ND
bis(2-Ethylhexyl)phthalate	ND	X	ND
Carbazole	ND	NS	ND
Chrysene	O	X	O
Dibenz(a,h)anthracene	ND	X	ND
Indeno(1,2,3-cd)pyrene	ND	X	O
PESTICIDES/ PCBs			
Endrin aldehyde	ND	NS	ND
Aroclor 1260	ND	X	ND
INORGANICS			
Aluminum	X	X	O
Antimony	ND	X	ND
Chromium	X	X	O
Copper	O	X	O
Lead	O	X	X
Manganese	X	X	O
Mercury	O	X	O
Nickel	X	X	O
Silver	O	X	O
Thallium	X	X	ND
Zinc	O	X	O
OTHER			
Cyanide	NS	NS	NS

ND = Not detected
NS = Selected as a COPC because there is no Recommended Soil Cleanup Objective available
O = Detected but not selected as a COPC
X = Selected as a COPC

8.1.4 Groundwater Discharge to Oatka Creek

While only one groundwater seep was found adjacent to the Site along Oatka Creek during the RI investigation, groundwater from the overburden and shallow and intermediate bedrock is believed to be discharging to the creek. Therefore, the potential discharge of COPC in overburden and shallow and intermediate bedrock groundwater to Oatka Creek was evaluated by conservatively calculating the mass loading for each COPC in overburden and shallow and intermediate bedrock groundwater without taking into account volatilization, as described previously in Section 5.0. COPC concentrations in Oatka Creek were then predicted from the mass loading based on a site-specific Oatka Creek volumetric flow of 156 ft^3/s for the creek. The mass loading calculations and predicted COPC concentrations in surface water are presented in Section 7.7.

The predicted COPC concentrations in surface water were then compared to NYSDEC Ambient Water Quality Standards and Guidance Values for Class A freshwater used as a source for drinking water and also to the RBSLs, that are protective of exposure of adolescents assumed to swim in the creek, developed for this risk assessment as described in Appendix K. The results of this comparison are presented in Table 8-19. The worst case predicted 1,1,1-trichloroethane and trichloroethene concentrations in surface water as a result of groundwater discharge to Oatka Creek exceed the corresponding NYSDEC Ambient Water Quality Standards and Guidance Values for Class A freshwater used as a source of drinking water; however, do not exceed the RBSLs protective of exposure to adolescents. In addition, the predicted trichloroethene concentration, however, is less than the NYSDEC standard based on fish consumption.

8.2 Exposure Assessment

Once the COPC for each medium have been selected, the objective of the exposure assessment is to estimate the type and magnitude of human exposure to the COPC that are present in or migrating from those environmental media of concern identified in the data evaluation. The exposure assessment is facilitated through the development of a conceptual site model, which graphically illustrates chemical source areas, possible chemical release mechanisms, environmental media that currently show or may show the presence of chemicals in the future, and possible exposure pathways. It considers current

TABLE 8-19
SUMMARY OF PREDICTED SURFACE WATER CONCENTRATIONS IN OATKA CREEK
LAPP INSULATOR/OATKA CREEK FWIA

CHEMICAL	Predicted Surface Water Concentration	NYSDSEC Ambient Water Quality Standards ^{a}	Risk-Based Screening Levels	
TCL Volatile Organics (µg/L)				
Benzene	8.62E-07	10	2.64E+04	ca
Chloroethane	3.84E-02		1.36E+05	ca
1,1-Dichloroethane	7.97E+00		>1.00E+06	nc
1,1-Dichloroethene	3.94E-01		>1.00E+06	nc
cis-1,2-Dichloroethene	2.59E-01		3.39E+05	nc
trans-1,2-Dichloroethene	1.46E-02		6.78E+05	nc
Ethylbenzene	7.50E-07		1.69E+05	sol
Methylene chloride	6.28E-03	200	5.27E+04	ca
Tetrachloroethene	8.24E-05	1	2.06E+05	ca
Toluene	1.94E-04	6000	5.26E+05	sol
1,1,1-Trichloroethane	9.05E+00		>1.00E+06	sol
1,1,2-Trichloroethane	1.50E-02		6.94E+03	ca
Trichloroethene	2.02E+01	40	9.88E+02	ca
Vinyl chloride	2.15E-02		2.82E+02	ca
Xylenes	1.66E-04		1.06E+05	sol
Inorganics (µg/L)				
Antimony	8.69E-03		1.36E+04	nc
Barium	4.63E-02		>1.00E+06	nc
Manganese	1.67E-01		>1.00E+06	nc

NA = Not Available.
a = Class C Waters
c = aesthetic
ca = RBSL based on carcinogenic risk
nc = RBSL based on noncarcinogenic effects
sol = RBSL is set to the solubility limit because the RBSl is greater than the solubility limit.

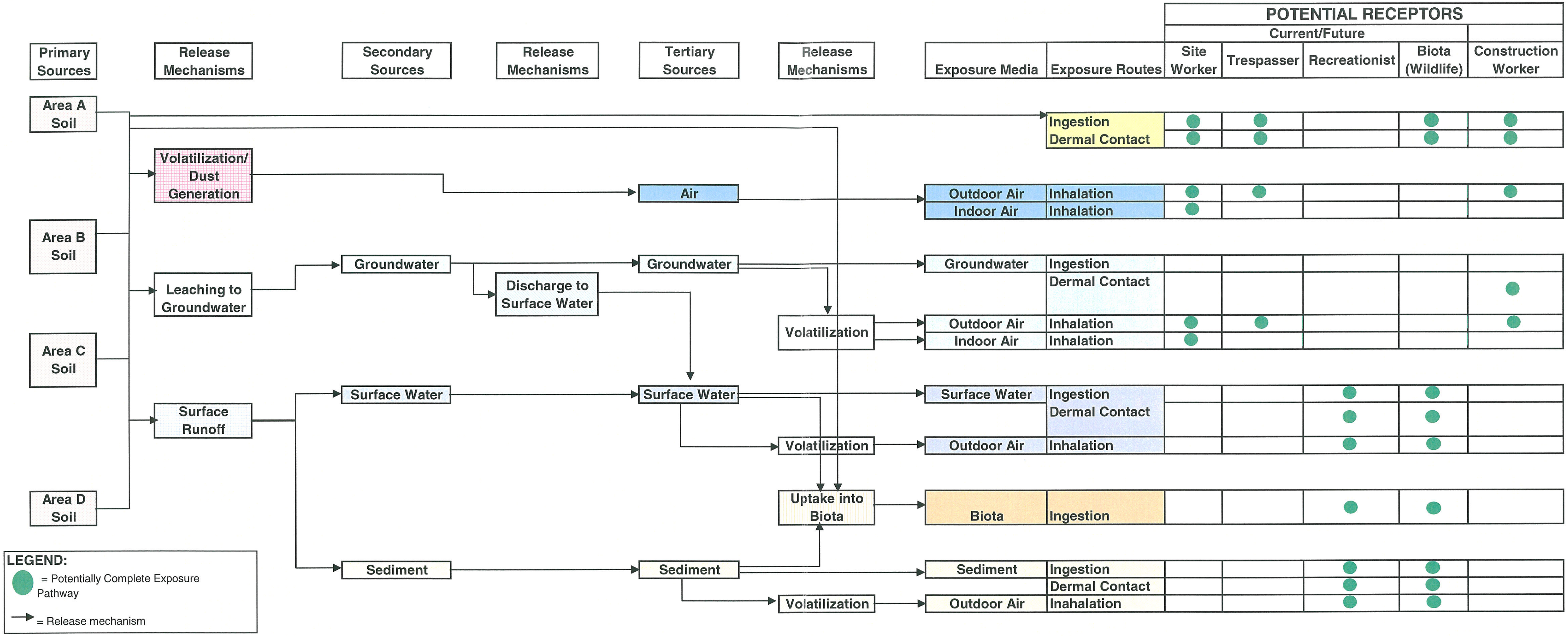
site conditions and surrounding land use, as well as the most likely future site conditions and surrounding land use.

The Site has been a manufacturing facility of electric insulators for over 100 years. It is bordered on the west by railroad tracks, on the east and south by Oatka Creek, and on the north by a community center and residential properties along Munson and Gilbert Streets. A walking trail runs along the east bank of Oatka Creek, where a swinging rope and campfire pit were observed during a December 2003 Site visit. A public fishing dock is located on the east bank of Oatka Creek just upstream of the dam. A vocational school is located on Munson Street, just east of the Munson Street Bridge.

The conceptual site risk model for the Site is shown in Figure 8-1. As indicated in Figure 8-1, the environmental media of concern include soil, groundwater underlying the Site, and surface water and sediment in Oatka Creek. In addition, air may be an environmental medium of concern since volatile COPC release from soil (to indoor and/or outdoor air), groundwater (to indoor and/or outdoor air), and surface water and sediment (to outdoor air) is a potential release mechanism of concern. Wind erosion of surface soil and/or mechanical erosion of surface and subsurface soil during excavation activities are also potential release mechanisms.

Based on the results of a residential well survey, described previously in Section 4.0, five residences adjacent to and southwest of the Site (upgradient) use residential wells as a potable water supply. Recent sampling has shown that no VOCs have been detected in any of the five residential wells. Also, multiple measurements of groundwater elevations and flow direction collected seasonally indicate a consistent groundwater flow away from the homes toward the site. As a result, evidence suggests that the nearby residential wells are currently not impacted by the Site and are not likely to be impacted by the Site in the future. It is also unlikely that groundwater in the vicinity of the Site would be used as a potable source in the future due to the low yields. Potable and process water at the Lapp facility is supplied municipally.

Oatka Creek is used by recreational fishers, with a public fishing dock located adjacent to the Site on the east bank of the creek just upstream of the Munson Street bridge. Observation of the swinging rope along the walking trail on the east bank of Oatka Creek indicates that the creek in the immediate vicinity of the Site is used for swimming in the



		POTENTIAL RECEPTORS				
		Current/Future				
Exposure Media	Exposure Routes	Site Worker	Trespasser	Recreationist	Biota (Wildlife)	Construction Worker
	Ingestion	●	●		●	●
	Dermal Contact	●	●		●	●
Outdoor Air	Inhalation	●	●			●
Indoor Air	Inhalation	●				
Groundwater	Ingestion					
	Dermal Contact					●
Outdoor Air	Inhalation	●	●			●
Indoor Air	Inhalation	●				
Surface Water	Ingestion			●	●	
	Dermal Contact			●	●	
Outdoor Air	Inhalation			●	●	
Biota	Ingestion			●	●	
Sediment	Ingestion			●	●	
	Dermal Contact			●	●	
Outdoor Air	Inahalation			●	●	

MALCOLM PIRNIE

CONCEPTUAL SITE RISK MODEL
Lapp Insulator Company, LLC
LeRoy, New York

December, 2003
MALCOLM PIRNIE, INC

FIGURE 8-1

summer. Evidence of hunting was also observed on the walking trail during the December 2003 Site visit, indicating the land east of Oatka Creek opposite the site is used for hunting.

8.2.1 Potentially Exposed Populations

In this exposure assessment, receptors with the potential to be exposed to the COPC, both currently and in the future, in the absence of remediation, are identified. The potential pathways and routes of exposure for these receptors, and the exposure factors used to estimate COPC exposure for the receptors, are described. Finally, for those receptors selected for a more quantitative evaluation (i.e., site worker and construction/utility worker), the COPC concentrations to which they might be exposed (i.e., the exposure point concentrations (EPCs)) are determined.

The Site is expected to remain a manufacturing facility that produces electrical insulators into the foreseeable future. As such, current and likely future use of the Site is industrial in nature. However, although unlikely in the foreseeable future, residential development of the Site may be a possibility in the future. As indicated in the conceptual site model (Figure 8-1), potentially exposed populations include:

- Site Workers, whose responsibilities include work outdoors or who take breaks outdoors, may be exposed to COPC in soil.
- Trespassers, who may gain unauthorized entry to the Site, because the Site is not fenced, may be exposed to COPC in soil.
- Receptionists, who fish, wade, or swim in Oatka Creek, may be exposed to COPC in surface water and sediment and to COPC taken up in fish that are consumed. Additionally, recreationists hunting on adjacent land may be exposed to COPC from soil, surface water, and sediment, taken up into wildlife (i.e., deer) that are consumed.
- Construction/utility workers whose activities may require soil excavation on-site may be exposed to COPC in soil and shallow groundwater.

8.2.2 Potential Pathways and Routes of Exposure

Specific exposure pathways relevant to the potentially exposed populations are indicated in the conceptual site model (Figure 8-1).

Current Scenario

Current Site workers may be exposed to surface soil if their responsibilities involve work outdoors or if they take breaks outdoors; exposure routes could include incidental ingestion of and casual contact with surface soil. Since their work or break activities would not typically involve soil intrusion, and because gravel and vegetation cover the hot spot areas, inhalation of COPC volatilized from soil or adsorbed onto soil particles is unlikely and not evaluated further. While inhalation of COPC volatilized from soil and groundwater to indoor air was identified as potentially complete exposure route, because regularly occupied buildings are located away from the hot spot areas, this pathway is unlikely and not evaluated further. Site workers are most likely to be exposed to surface soil in Hot Spot Areas A, B, and C. Hot Spot Area D in the South fill area is too remote for regular use by site workers.

Because the Site is not fenced, trespassers may gain access to the Site and be exposed to surface soil via incidental ingestion and dermal contact. Since their activities would not typically involve soil intrusion, and because gravel and vegetation cover the hot spot areas, inhalation of COPC volatilized from soil or adsorbed onto soil particles is unlikely and not evaluated further. Hot Spot Areas C and D are most likely to be attractive to trespassers due to their location and distance from more developed areas of the Site.

Individuals using Oatka Creek for recreation may be exposed to surface water and sediment. Recreationists wading in the creek could be exposed via dermal contact with surface water and via incidental ingestion of and dermal contact with sediment. Recreationists swimming in the creek could be exposed via incidental ingestion of and dermal contact with both surface water and sediment. While inhalation of chemicals volatilized to outdoor air from these media was identified as a potentially complete exposure route, it is unlikely to be a significant exposure route and is not evaluated further. Recreationists who consume fish caught from the creek may be exposed to chemicals in surface water and sediment that bioaccumulate in fish tissue. Also, recreationists who hunt game (e.g., deer) on adjacent land may also be exposed to chemicals in soil, surface water, or sediment, that bioaccumulate in wildlife tissue. The potential for exposure from consumption of fish and/or wildlife is evaluated qualitatively based on the evaluation of the potential for chemical bioaccumulation.

Future Scenario

The current scenarios described above are expected to continue into the foreseeable future. In addition, construction/utility workers who may be required to open a utility excavation on-site could be exposed to surface and subsurface soil via incidental ingestion, dermal contact, and inhalation of volatile chemicals volatilized from soil and respirable particulates from mechanical erosion of soil during excavation activities. In addition, in areas of the Site where the water table is shallow, construction/utility workers may be exposed to groundwater via dermal contact and inhalation of volatile chemicals volatilized from groundwater. Construction is unlikely to take place at Hot Spot Area D. The depth to groundwater at Hot Spot Areas A, B, and C is deeper than a typical utility excavation; therefore, it is unlikely that construction/utility workers would be exposed to groundwater in a utility trench.

The following potentially complete exposure pathways are considered “of concern” and are evaluated quantitatively:

- Site worker ingestion of COPC in surface soil,
- Trespasser ingestion of and dermal contact with COPC in surface soil,
- Construction/utility worker ingestion of and dermal contact with COPC in all soil, inhalation of volatile COPC from all soil, and COPC sorbed onto particles from all soil, and
- Recreationist ingestion of and dermal contact with surface water and sediment.

8.2.3 Estimates of COPC Intake/Exposure

Estimates of chemical intake and exposure were developed to portray reasonable maximum exposure (RME) that might be expected to occur under current and future exposure scenarios. Thus, the highest exposure that might reasonably be expected to occur (i.e., well above the average case of exposure but within the range of possibility) was considered. For the site worker and construction/utility worker, COPC intake was calculated for estimating risks to these receptors in the Risk Characterization. For the recreationist, exposure parameters were used to derive risk-based screening levels (RBSLs), as described in Appendix K.

The equations and exposure parameters for estimating COPC intake are presented in Tables 8-20 to 8-34 and described below. Application of the intake calculations results in chronic daily intake (CDI) or, for dermal contact exposure, absorbed dose, expressed in mg per kg of body weight per day (mg/kg-day). The CDI is the amount of chemical at the exchange boundary. A fundamental assumption in the estimate of the dermally absorbed dose is that absorption continues long after the exposure has ended (USEPA, 2001a); thus, the final absorbed dose is estimated to be the total dose dissolved in the skin at the end of the exposure. The RBSL equations and exposure parameter values are presented and described in Appendix K.

All of these calculations require a contact rate, which is the amount of contaminated medium contacted per unit time or event (e.g., kg soil/day), body weight, which is the average body weight over the exposure period (in kg), and an averaging time, which is the time period over which exposure is averaged (in days).

The averaging time (AT) depends on the type of potential adverse effect being assessed. When evaluating exposures for potential long-term, non-cancer health effects, intakes are calculated by averaging over the period of exposure. This is equal to the exposure duration (ED) multiplied by 365 days/year. When evaluating potential excess lifetime cancer risks, intakes are calculated by prorating the total cumulative intake over a lifetime (i.e., lifetime average daily intake). For calculation purposes, this is equal to 70 years multiplied by 365 days/year. This distinction is consistent with the hypothesis that the mechanism of action for each of these health effect endpoints is different. The approach for carcinogens is based on the assumption that a high dose received over a short period of time is equivalent to a corresponding low dose spread over a lifetime. These, and other COPC-related, population-related, and evaluation-determined parameters, are discussed below.

The intake estimates for site workers and construction/utility workers potentially exposed to the COPC in surface soil and "all soil" (i.e., surface and subsurface soil combined), respectively, are provided in Tables 8-20 to 8-34.

Site Workers

The exposure parameters necessary to estimate COPC intakes by adult site workers, via potential inadvertent ingestion of COPC in surface soil, are as follows. An ingestion rate for soil (IR-S) of 50 mg/day was assumed (USEPA, 1997a). An exposed skin surface area (SA) of 3,300 cm^2 and a soil-to-skin adherence factor (AF) of 0.2 mg/cm^2-event were assumed (USEPA, 2002b). An exposure frequency (EF) of 250 days/year, and an exposure duration (ED) of 25 years were assumed (USEPA, 2002b). The average body weight (BW) of an adult is 70 kg (USEPA, 1989). Parameters for an outdoor worker exposure to soil were used.

Trespassers

As Hot Spot Areas C and D would seem to be the most attractive areas at the Site to trespassers and no COPC were identified in surface soil at Areas C and D, trespasser exposure is only evaluated qualitatively in the Risk Characterization.

Recreationists

Ambient water quality standards and guidance values are available for chemicals in surface water, but the human exposure basis considers ingestion of the water (as the source of potable water) and consumption of fish. Recreational activities along or in a small, flowing water body (e.g., wading, swimming, or fishing) are typically seasonal, intermittent, and involve more casual contact with surface water and sediment. Because the NYSDEC does not have standards and criteria for the protection of human health from contact with surface water and sediment during recreational activities, COPC-specific, RBSLs were developed based on the potential for contact with these media during representative recreational activities.

Since a swinging rope was observed along the shoreline of Oatka Creek adjacent to the Site and upstream of the dam, RBSLs were derived for adolescents (ages 12 to 18) that periodically swim in the creek. The exposure routes considered include ingestion of and

TABLE 8-20
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: SITE WORKER - AREA A
LAPP INSULATOR, LE ROY, NY

INGESTION OF CHEMICALS IN SURFACE SOIL

CHEMICAL	SURFACE SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	**CANCER RISK**
VOLATILE ORGANICS							
Chloromethane	2.00E-01	1E-07	Not Available	No Tox Data	Not Applicable		
1,1-Dichloroethane	6.70E+00	3E-06	1E-01	3E-05	1E-06	Not Available	No Tox Data
cis-1,2-Dichloroethene	1.10E+00	5E-07	1E-02	5E-05	Not Applicable		
1,1,1-Trichloroethane	5.70E+01	3E-05	3E-01	1E-04	Not Applicable		
Trichloroethene	2.30E+01	1E-05	3E-04	4E-02	4E-06	4E-01	2E-06
INORGANICS							
Cadmium	1.20E+00	6E-07	1E-03	6E-04	2E-07	Not Available	No Tox Data
Copper	3.60E+02	2E-04	3.7E-02	5E-03	Not Applicable		
Nickel	2.70E+01	1E-05	2E-02	7E-04	5E-06	Not Available	No Tox Data
Zinc	4.60E+02	2E-04	3E-01	8E-04	Not Applicable		
			HAZARD INDEX:	**4E-02**		**CANCER RISK:**	**2E-06**

CDI of noncarcinogenic chemicals in surface soil via ingestion (site worker):
(mg/kg) * 1E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 9,125 days)
CDI of carcinogenic chemicals in surface soil via ingestion (site worker):
(mg/kg) * 1E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 years * 25,550 days)

TABLE 8-21
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: SITE WORKER - AREA A
LAPP INSULATOR, LE ROY, NY

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL

CHEMICAL	SURFACE SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	**CANCER RISK**
INORGANICS							
Cadmium	1.20E+00	8E-09	3E-05	3E-04	3E-09	Not Available	No Tox Data
			HAZARD INDEX:	**3E-04**		**CANCER RISK:**	**--**

CDI of noncarcinogenic chemicals in all soil via dermal contact (site worker):

(mg/kg) * 1E-06 kg/mg * 0.2 mg/cm^2 * DABS * 3,300 cm^2/event * 1 event/day * 250 days/year * 25 years)/(70 kg * 9,125 days)

CDI of carcinogenic chemicals in all soil via dermal contact (site worker):

(mg/kg) * 1E-06 kg/mg * 0.2 mg/cm^2 * DABS * 3,300 cm^2/event * 1 event/day * 250 days/year * 25 years)/(70 kg * 25,550 days)

TABLE 8-22
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: SITE WORKER - AREA B
LAPP INSULATOR, LE ROY, NY

INGESTION OF CHEMICALS IN SURFACE SOIL

CHEMICAL	SURFACE SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	**CANCER RISK**
VOLATILE ORGANICS							
Acetone	2.80E-01	1E-07	9E-01	2E-07	Not Applicable		
Benzene	2.10E-01	1E-07	4E-03	3E-05	4E-08	5.5E-02	2E-09
Chloromethane	1.10E-02	5E-09	Not Available	No Tox Data	Not Applicable		
1,1-Dichloroethane	4.50E-01	2E-07	1E-01	2E-06	8E-08	Not Available	No Tox Data
cis-1,2-Dichloroethene	3.20E+00	2E-06	1E-02	2E-04	Not Applicable		
2-Hexanone	1.60E-01	8E-08	Not Available	No Tox Data	3E-08	Not Available	No Tox Data
Trichloroethene	4.50E+00	2E-06	3E-04	7E-03	8E-07	4E-01	3E-07
INORGANICS							
Arsenic	3.00E+01	1E-05	3E-04	5E-02	5E-06	1.5E+00	8E-06
Cadmium	5.90E+00	3E-06	1E-03	3E-03	1E-06	Not Available	No Tox Data
Chromium	8.90E+01	4E-05	1.5E+00	3E-05	Not Applicable		
Copper	8.30E+01	4E-05	3.7E-02	1E-03	Not Applicable		
Thallium	2.00E-01	1E-07	8E-05	1E-03	3E-08	Not Available	No Tox Data
Zinc	4.50E+03	2E-03	3E-01	7E-03	Not Applicable		
OTHER							
Cyanide	2.20E-01	1E-07	2E-02	5E-06	Not Applicable		
			HAZARD INDEX:	**7E-02**		**CANCER RISK:**	**8E-06**

CDI of noncarcinogenic chemicals in surface soil via ingestion (site worker):
(mg/kg) * 1E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 9,125 days)
CDI of carcinogenic chemicals in surface soil via ingestion (site worker):
(mg/kg) * 1E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 years * 25,550 days)

TABLE 8-23
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: SITE WORKER - AREA B
LAPP INSULATOR, LE ROY, NY

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL

CHEMICAL	SURFACE SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	**CANCER RISK**
INORGANICS							
Arsenic	3.00E+01	6E-06	3E-04	2E-02	2E-06	1.5E+00	3E-06
Cadmium	5.90E+00	4E-08	3E-05	2E-03	1E-08	Not Available	No Tox Data
			HAZARD INDEX:	**2E-02**		**CANCER RISK:**	**3E-06**

CDI of noncarcinogenic chemicals in all soil via dermal contact (site worker):

(mg/kg) * 1E-06 kg/mg * 0.2 mg/cm^2 * DABS * 3,300 cm^2/event * 1 event/day * 250 days/year * 25 years)/(70 kg * 9,125 days)

CDI of carcinogenic chemicals in all soil via dermal contact (site worker):

(mg/kg) * 1E-06 kg/mg * 0.2 mg/cm^2 * DABS * 3,300 cm^2/event * 1 event/day * 250 days/year * 25 years)/(70 kg * 25,550 days)

TABLE 8-24
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA A
LAPP INSULATOR, LE ROY, NY

INGESTION OF CHEMICALS IN ALL SOIL							
CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	**CANCER RISK**
VOLATILE ORGANICS							
Chloromethane	2.00E-01	5E-08	Not Available	No Tox Data	Not Applicable		
1,1-Dichloroethane	6.70E+00	2E-06	1E-01	2E-05	2E-08	Not Available	No Tox Data
1,1-Dichloroethene	5.48E-01	1E-07	5E-02	3E-06	2E-09	Not Available	No Tox Data
cis-1,2-Dichloroethene	9.50E-01	2E-07	1E-02	2E-05	Not Applicable		
1,1,1-Trichloroethane	1.10E+02	3E-05	3E-01	1E-04	Not Applicable		
1,1,2-Trichloroethane	1.24E+00	3E-07	4E-03	8E-05	5E-09	5.7E-02	3E-10
Trichloroethene	3.50E+01	9E-06	3E-04	3E-02	1E-07	4E-01	5E-08
SEMI-VOLATILE ORGANICS							
Benzo(a)pyrene	1.50E-01	4E-08	Not Available	No Tox Data	6E-10	7.3E+00	4E-09
Ni-Nitroso-di-N-propylamine	5.30E-02	1E-08	Not Available	No Tox Data	2E-10	7.0E+00	1E-09
INORGANICS							
Cadmium	1.20E+00	3E-07	1E-03	3E-04	4E-09	Not Available	No Tox Data
Copper	3.60E+02	9E-05	3.7E-02	3E-03	Not Applicable		
Nickel	2.70E+01	7E-06	2E-02	3E-04	1E-07	Not Available	No Tox Data
Thallium	4.00E-01	1E-07	8E-05	1E-03	1E-09	Not Available	No Tox Data
Zinc	4.60E+02	1E-04	3E-01	4E-04	Not Applicable		
			HAZARD INDEX:	**4E-02**		**CANCER RISK:**	**6E-08**

CDI of noncarcinogenic chemicals in all soil via ingestion (construction/utility worker):
(mg/kg) * 1E-06 kg/mg * 330 mg/day * 1 * 20 days/year * 1 years)/(70 kg * 365 days)
CDI of carcinogenic chemicals in all soil via ingestion (construction/utility worker):
(mg/kg) * 1E-06 kg/mg * 330 mg/day * 1 * 20 days/year * 1 years)/(70 years * 25,550 days)

TABLE 8-25
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA A
LAPP INSULATOR, LE ROY, NY

DERMAL CONTACT WITH CHEMICALS IN ALL SOIL							
CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)$^{-1}$	**CANCER RISK**
SEMI-VOLATILE ORGANICS							
Benzo(a)pyrene	1.50E-01	2E-08	Not Available	No Tox Data	2E-10	7.3E+00	2E-09
Ni-Nitroso-di-N-propylamine	5.30E-02	4E-09	Not Available	No Tox Data	6E-11	7.0E+00	4E-10
INORGANICS							
Cadmium	1.20E+00	9E-10	3E-05	4E-05	1E-11	Not Available	No Tox Data
			HAZARD INDEX:	**4E-05**		**CANCER RISK:**	**2E-09**

CDI of noncarcinogenic chemicals in all soil via dermal contact (construction/utility worker):

(mg/kg) * 1E-06 kg/mg * 0.3 mg/cm^2 * DABS * 3,300 cm^2/event * 1 event/day * 20 days/year * 1 years)/(70 kg * 365 days)

CDI of carcinogenic chemicals in all soil via dermal contact (construction/utility worker):

(mg/kg) * 1E-06 kg/mg * 0.3 mg/cm^2 * DABS * 3,300 cm^2/event * 1 event/day * 20 days/year * 1 years)/(70 kg * 25,550 days)

TABLE 8-26
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA A
LAPP INSULATOR, LE ROY, NY

INHALATION OF VOLATILE CHEMICALS FROM ALL SOIL								
CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	OUTDOOR AIR CONCENTRATION (mg/m^3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)$^{-1}$	**CANCER RISK**
VOLATILE ORGANICS								
Chloromethane	2.00E-01	6.26E-02	3E-04	3E+02	1E-06	Not Applicable		
1,1-Dichloroethane	6.70E+00	1.42E-01	7E-04	1E-01	7E-03	1E-05	Not Available	No Tox Data
1,1-Dichloroethene	5.48E-01	7.27E-02	4E-04	6E-02	6E-03	5E-06	1.2E+00	6E-06
cis-1,2-Dichloroethene	9.50E-01	2.94E-02	2E-04	Not Available	No Tox Data	Not Applicable		
1,1,1-Trichloroethane	1.10E+02	9.44E-01	5E-03	6.3E-01	8E-03	Not Applicable		
1,1,2-Trichloroethane	1.24E+00	1.83E-02	1E-04	Not Available	No Tox Data	1E-06	5.7E-02	8E-08
Trichloroethene	3.50E+01	4.30E-01	2E-03	1E-02	2E-01	3E-05	4E-01	1E-05
				HAZARD INDEX:	**2E-01**		**CANCER RISK:**	**2E-05**

CDI of noncarcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 365 days)

CDI of carcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 25,550 days)

TABLE 8-27
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA A
LAPP INSULATOR, LE ROY, NY

INHALATION OF CHEMICALS ADSORBED TO RESPIRABLE PARTICULATES FROM ALL SOIL

CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	OUTDOOR AIR CONCENTRATION (mg/m^3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	**CANCER RISK**
SEMI-VOLATILE ORGANICS								
Benzo(a)pyrene	1.50E-01	1.65E-09	9E-12	Not Available	No Tox Data	1E-13	3.1E+00	4E-13
N-Nitroso-di-N-propylamine	5.30E-02	5.83E-10	3E-12	Not Available	No Tox Data	4E-14	Not Available	No Tox Data
INORGANICS								
Cadmium	1.20E+00	1.73E-08	9E-11	5.7E-05	2E-06	1E-12	6.3E+00	8E-12
Copper	3.60E+02	3.96E-06	2E-08	Not Available	No Tox Data	Not Applicable		
Nickel	2.70E+01	2.97E-07	2E-09	Not Available	No Tox Data	2E-11	Not Available	No Tox Data
Thallium	4.00E-01	4.40E-09	2E-11	Not Available	No Tox Data	3E-13	Not Available	No Tox Data
Zinc	4.60E+02	5.06E-06	3E-08	Not Available	No Tox Data	Not Applicable		
				HAZARD INDEX:	**2E-06**		**CANCER RISK:**	**8E-12**

CDI of noncarcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 365 days)

CDI of carcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 25,550 days)

TABLE 8-28
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA B
LAPP INSULATOR, LE ROY, NY

INGESTION OF CHEMICALS IN ALL SOIL

CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)$^{-1}$	**CANCER RISK**
VOLATILE ORGANICS							
Acetone	2.29E-01	6E-08	9E-01	7E-08	Not Applicable		
Benzene	1.81E-01	5E-08	4E-03	1E-05	7E-10	5.5E-02	4E-11
2-Butanone	3.63E-01	9E-08	6E-01	2E-07	Not Applicable		
Chloromethane	4.80E-03	1E-09	Not Available	No Tox Data	Not Applicable		
1,1-Dichloroethane	3.68E-01	9E-08	1E-01	9E-07	1E-09	Not Available	No Tox Data
cis-1,2-Dichloroethene	2.53E+00	7E-07	1E-02	7E-05	9E-09	Not Available	No Tox Data
1,2-Dichloropropane	6.90E-04	2E-10	Not Available	No Tox Data	3E-12	6.8E-02	2E-13
trans-1,3-Dichloropropene	7.28E-02	2E-08	3E-02	6E-07	3E-10	1.0E-01	3E-11
2-Hexanone	1.81E+00	5E-07	Not Available	No Tox Data	7E-09	Not Available	No Tox Data
1,1,2-Trichloroethane	1.11E+00	3E-07	4E-03	7E-05	4E-09	5.7E-02	2E-10
Trichloroethene	4.50E+00	1E-06	3E-04	4E-03	2E-08	4E-01	7E-09
Vinyl acetate	5.00E-01	1E-07	2E-01	6E-07	2E-09	Not Available	No Tox Data
INORGANICS							
Arsenic	3.00E+01	8E-06	3E-04	3E-02	1E-07	1.5E+00	2E-07
Cadmium	5.90E+00	2E-06	1E-03	2E-03	2E-08	Not Available	No Tox Data
Chromium	8.90E+01	2E-05	1.5E+00	2E-05	3E-07	Not Available	No Tox Data
Copper	8.30E+01	2E-05	3.7E-02	6E-04	Not Applicable		
Thallium	2.00E-01	5E-08	8E-05	6E-04	7E-10	Not Available	No Tox Data
Zinc	4.50E+03	1E-03	3E-01	4E-03	Not Applicable		
OTHER							
Cyanide	2.20E-01	6E-08	2.00E-02	3E-06	Not Applicable		
			HAZARD INDEX:	**4E-02**		**CANCER RISK:**	**2E-07**

CDI of noncarcinogenic chemicals in all soil via ingestion (construction/utility worker):
(mg/kg) * 1E-06 kg/mg * 330 mg/day * 1 * 20 days/year * 1 years)/(70 kg * 365 days)
CDI of carcinogenic chemicals in all soil via ingestion (construction/utility worker):
(mg/kg) * 1E-06 kg/mg * 330 mg/day * 1 * 20 days/year * 1 years)/(70 years * 25,550 days)

TABLE 8-29
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA B
LAPP INSULATOR, LE ROY, NY

DERMAL CONTACT WITH CHEMICALS IN ALL SOIL

CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR $(mg/kg-day)^{-1}$	**CANCER RISK**
INORGANICS							
Arsenic	3.00E+01	7E-07	3E-04	2E-03	1E-08	1.5E+00	1E-08
Cadmium	5.90E+00	5E-09	3E-05	2E-04	7E-11	Not Available	No Tox Data
			HAZARD INDEX:	**3E-03**		**CANCER RISK:**	**1E-08**

CDI of noncarcinogenic chemicals in all soil via dermal contact (construction/utility worker):

(mg/kg) * 1E-06 kg/mg * 0.3 mg/cm^2 * DABS * 3,300 cm^2/event * 1 event/day * 20 days/year * 1 years)/(70 kg * 365 days)

CDI of carcinogenic chemicals in all soil via dermal contact (construction/utility worker):

(mg/kg) * 1E-06 kg/mg * 0.3 mg/cm^2 * DABS * 3,300 cm^2/event * 1 event/day * 20 days/year * 1 years)/(70 kg * 25,550 days)

TABLE 8-30
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA B
LAPP INSULATOR, LE ROY, NY

INHALATION OF VOLATILE CHEMICALS FROM ALL SOIL								
CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	OUTDOOR AIR CONCENTRATION (mg/m^3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)$^{-1}$	**CANCER RISK**
VOLATILE ORGANICS								
Acetone	2.29E-01	3.86E-03	2E-05	Not Available	No Tox Data	3E-07	Not Available	No Tox Data
Benzene	1.81E-01	6.59E-03	3E-05	9E-03	4E-03	5E-07	2.7E-02	1E-08
2-Butanone	3.63E-01	5.25E-03	3E-05	1E+00	2E-05	Not Applicable		
Chloromethane	4.80E-03	9.39E-03	5E-05	3E+02	2E-07	Not Applicable		
1,1-Dichloroethane	3.68E-01	1.91E-02	1E-04	1E-01	1E-03	1E-06	Not Available	No Tox Data
cis-1,2-Dichloroethene	2.53E+00	5.95E-02	3E-04	Not Available	No Tox Data	Not Applicable		
1,2-Dichloropropane	6.90E-04	2.24E-04	1E-06	1E-03	1E-03	2E-08	Not Available	No Tox Data
trans-1,3-Dichloropropene	7.28E-02	2.54E-03	1E-05	6E-03	2E-03	2E-07	1E-02	3E-09
2-Hexanone	1.81E+00	NA	NA	Not Available	No Tox Data	NA	Not Available	No Tox Data
1,1,2-Trichloroethane	1.11E+00	1.65E-02	9E-05	Not Available	No Tox Data	1E-06	5.7E-02	7E-08
Trichloroethene	4.50E+00	9.20E-02	5E-04	1E-02	4E-02	7E-06	4E-01	3E-06
Vinyl acetate	5.00E-01	9.70E-03	5E-05	5.7E-02	9E-04	7E-07	Not Available	No Tox Data
				HAZARD INDEX:	**5E-02**		**CANCER RISK:**	**3E-06**

CDI of noncarcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 365 days)

CDI of carcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 25,550 days)

TABLE 8-31
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA B
LAPP INSULATOR, LE ROY, NY

INHALATION OF CHEMICALS ADSORBED TO RESPIRABLE PARTICULATES FROM ALL SOIL								
CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	OUTDOOR AIR CONCENTRATION (mg/m^3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	**CANCER RISK**
INORGANICS								
Arsenic	3.00E+01	4.23E-07	2E-09	Not Available	No Tox Data	3E-11	1.5E+01	5E-10
Cadmium	5.90E+00	8.51E-08	4E-10	5.7E-05	8E-06	6E-12	6.3E+00	4E-11
Chromium	8.90E+01	4.62E-06	2E-08	Not Available	No Tox Data	3E-10	Not Available	No Tox Data
Copper	8.30E+01	9.14E-07	5E-09	Not Available	No Tox Data	Not Applicable		
Thallium	2.00E-01	2.20E-09	1E-11	Not Available	No Tox Data	2E-13	Not Available	No Tox Data
Zinc	4.50E+03	4.95E-05	3E-07	Not Available	No Tox Data	Not Applicable		
OTHER								
Cyanide	2.20E-01	2.42E-09	1E-11	Not Available	No Tox Data	Not Applicable		
				HAZARD INDEX:	**8E-06**		**CANCER RISK:**	**5E-10**

CDI of noncarcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 365 days)

CDI of carcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 25,550 days)

TABLE 8-32
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA C
LAPP INSULATOR, LE ROY, NY

INGESTION OF CHEMICALS IN ALL SOIL							
CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR $(mg/kg-day)^{-1}$	**CANCER RISK**
VOLATILE ORGANICS							
Chloromethane	9.19E-04	2E-10	Not Available	No Tox Data	Not Applicable		
cis-1,2-Dichloroethene	6.28E-04	2E-10	1E-02	2E-08	Not Applicable		
Tetrachloroethene	1.60E+01	4E-06	1E-02	4E-04	6E-08	Not Available	No Tox Data
1,1,1-Trichloroethane	9.39E+00	2E-06	3E-01	9E-06	Not Applicable		
Trichloroethene	4.50E+01	1E-05	3E-04	4E-02	2E-07	4E-01	7E-08
INORGANICS							
Thallium	4.00E-01	1E-07	8E-05	1E-03	1E-09	Not Available	No Tox Data
			HAZARD INDEX:	4E-02		**CANCER RISK:**	7E-08

CDI of noncarcinogenic chemicals in all soil via ingestion (construction/utility worker):
(mg/kg) * 1E-06 kg/mg * 330 mg/day * 1 * 20 days/year * 1 years)/(70 kg * 365 days)
CDI of carcinogenic chemicals in all soil via ingestion (construction/utility worker):
(mg/kg) * 1E-06 kg/mg * 330 mg/day * 1 * 20 days/year * 1 years)/(70 years * 25,550 days)

TABLE 8-33
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA C
LAPP INSULATOR, LE ROY, NY

INHALATION OF VOLATILE CHEMICALS FROM ALL SOIL								
CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	OUTDOOR AIR CONCENTRATION (mg/m^3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)$^{-1}$	**CANCER RISK**
VOLATILE ORGANICS								
Chloromethane	9.19E-04	4.10E-03	2E-05	3E+02	7E-08	Not Applicable		
cis-1,2-Dichloroethene	6.28E-04	4.77E-04	2E-06	Not Available	No Tox Data	Not Applicable		
Tetrachloroethene	1.60E+01	2.93E-01	2E-03	1.4E-01	1E-02	2E-05	Not Available	No Tox Data
1,1,1-Trichloroethane	9.39E+00	2.15E-01	1E-03	6.3E-01	2E-03	Not Applicable		
Trichloroethene	4.50E+01	4.45E-01	2E-03	1E-02	2E-01	3E-05	4E-01	1E-05
				HAZARD INDEX:	**2E-01**		**CANCER RISK:**	**1E-05**

CDI of noncarcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 365 days)

CDI of carcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 25,550 days)

TABLE 8-34
SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS: CONSTRUCTION/UTILITY WORKER - AREA C
LAPP INSULATOR, LE ROY, NY

INHALATION OF CHEMICALS ADSORBED TO RESPIRABLE PARTICULATES FROM ALL SOIL								
CHEMICAL	ALL SOIL CONCENTRATION (mg/kg)	OUTDOOR AIR CONCENTRATION (mg/m^3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	**HAZARD QUOTIENT**	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	**CANCER RISK**
INORGANICS								
Thallium	4.00E-01	4.40E-09	2E-11	Not Available	No Tox Data	3E-13	Not Available	No Tox Data
				HAZARD INDEX:	--		**CANCER RISK:**	–

CDI of noncarcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 365 days)

CDI of carcinogenic chemicals in all soil via inhalation (construction/utility worker):

(mg/m^3) * 0.83 m^3/hour * 8 hours/day * 20 days/year * 1 years)/(70 kg * 25,550 days)

dermal contact with both surface water and sediment. The RBSLs were back calculated to correspond to an incremental cancer risk of 10^{-6} (i.e., 1 in 1,000,000) and/or a hazard quotient of 1 and the lower of the two values was selected.

Recreationist exposure to surface water and sediment is evaluated quantitatively by comparing the detected concentrations of the COPC in these media to the RBSLs.

Construction/Utility Workers

The exposure parameters necessary to estimate COPC intakes by construction/utility workers, via potential inadvertent ingestion, dermal contact, and inhalation exposure to the COPC in all soil are as follows. An IR-S of 330 mg/day was assumed (USEPA, 2002b). An exposed skin surface area (SA) of 3,300 cm^2 and a soil-to-skin adherence factor (AF) of 0.3 mg/cm^2-event were assumed (USEPA, 2002b). An inhalation rate of IRi of 0.83 m^3/hour was used to assess inhalation of volatile COPC from soil pore space potentially released to outdoor air around an excavation (USEPA, 2002b). An exposure time (ET) of 8 hours/day, an EF of 20 days/year, because construction work is limited in duration, and an ED of 1 year were assumed. The same adult body weight of 70 kg is assumed as described previously for the site worker.

8.2.4 Exposure Point Concentrations

For estimating the potential exposure and risk to site workers and construction/utility workers, the analytical data are used to derive representative EPCs in soil and all soil, respectively. If a COPC was not detected in a sample, it was assumed to be present at one-half its limit of detection. Using one-half the limit of detection as conservative "proxy" concentrations assumes that a chemical may be present at a concentration just below the reported detection limit and may tend to overestimate the EPC.

In order to determine the COPC concentrations to which an individual might be exposed over many years, representative EPCs were calculated from the available/usable data sets described earlier in Section 8.1. The USEPA (2002a, 1992, 1989) recommends that the arithmetic average concentration of the data be used for evaluating long-term exposure and that, because of the uncertainty associated with estimating the true average concentration at a site, the 95% upper confidence limit (UCL) on the arithmetic average be used as the EPC. The 95% UCL on the arithmetic average concentration provides reasonable confidence that the true average will not be underestimated. The USEPA (2002a, 1992) also indicates that, in calculating a 95% UCL on the arithmetic average concentration, where there is a question about the distribution of the data set, a statistical test should be used to identify the best distributional assumption for the data set. The ProUCL Version 2.1 program developed for the USEPA, Region III through the USEPA's Technology Support Center for Monitoring and Site Characterization was used to test the distributional assumptions and calculate the 95% UCL concentrations.

In a few cases where the 95% UCL concentration was greater than the maximum detected concentration, the maximum detected concentration was used as the EPC. The maximum detected concentration was also used as the EPC where a data set was comprised of less than 10 samples.

The EPCs for the COPC in surface soil are the maximum detected concentrations since fewer than 10 surface soil samples were collected at each hot spot area. The EPCs for the COPC in all soil are presented in Appendix K. As described above, the soil datasets were kept separate by hot spot area.

The EPCs for all soil were also used to predict COPC concentrations in outdoor air to evaluate potential inhalation exposure by construction/utility workers working around an excavation, as described in Appendix K.

Emissions of the non-volatile COPC in soil were estimated under the assumption that COPC associated with respirable particulates are released to outdoor air during the digging of the excavation. In addition, emissions of the volatile COPC in soil were estimated under the assumption that the chemicals are released from the soil pore space during the digging of the excavation and that the chemicals diffuse through the sidewalls and bottom of the excavation once completed. Resulting volatile and non-volatile COPC concentrations in outdoor air around an excavation were determined using USEPA-approved screening level atmospheric dispersion models. Because the depth to groundwater at the hot spot areas ranges from 15 to 18 feet, it is not expected to infiltrate a construction/utility excavation.

8.3 Toxicity Assessment

Toxicity information that quantitatively evaluates the relationship between the dose of chemical received and the incidence of adverse effects is required in estimating risk and in deriving RBSLs. The USEPA and other regulatory agencies have performed toxicity assessments for numerous chemicals to determine this relationship. The toxicity information they provide, including verified reference doses (RfDs) for the evaluation of non-carcinogenic effects from chronic exposures and cancer potency slope factors (SFs) for the evaluation of incremental cancer risk from lifetime exposures, are used in estimating risks and in deriving RBSLs. Each of these is discussed below. Sources of toxicity information, in order of preference, include:

- IRIS (Integrated Risk Information System), which is a USEPA database containing current health risk and regulatory information for many chemicals,
- The USEPA Health Effects Assessment Summary Tables (HEAST) which are tabular presentations of provisional toxicity data,
- Provisional values taken from the USEPA Region III Risk-Based Concentration Table (USEPA, 2004b), which represent values from the USEPA National Center for Environmental Assessment, Superfund Technical Support Center and the USEPA Provisional Peer Reviewed Toxicity Values Database, and
- The Trichloroethylene Health Risk Assessment: Synthesis and Characterization (USEPA, 2001b), for trichloroethene.

The available RfDs and SFs used in this risk assessment are presented in Tables 8-35 to 8-38.

8.3.1 Non-Carcinogenic Effects

The potential for non-cancer health effects associated with chemical exposure is evaluated by comparing an estimated intake with an RfD. The RfD (expressed as mg/kg-day) is an estimate of a daily exposure level for the human population, including sensitive subpopulations that are likely to be without an appreciable risk of deleterious effects during a lifetime. Chronic RfD values are specifically developed to be protective of long-term exposure to a chemical (i.e., greater than six years). For the construction/utility

TABLE 8-35
TOXICITY VALUES: POTENTIAL NONCARCINOGENIC EFFECTS - ORAL EXPOSURE
LAPP INSULATOR, LE ROY, NY

Chemical	Chronic RfD (mg/kg-day)	Critical Effect	Combined Uncertainty/ Modifying Factors	RfD Source
VOLATILE ORGANICS				
Acetone	9E-01	Nephropathy	1,000	IRIS
Benzene	4E-03	Decreased lymphocyte count	300	IRIS
2-Butanone	6E-01	Decreased pup weight	1,000	IRIS
Chloroform	1E-02	Fatty cyst formation in liver	1,000	IRIS
Chloromethane	--	--	--	IRIS; HEAST
1,1-Dichloroethane	1E-01	None observed	1,000	HEAST
1,1-Dichloroethene	5E-02	Liver toxicity	100	IRIS
cis-1,2-Dichloroethene	1E-02	Decreased hemoglobin and hematocrit	3,000	HEAST
1,2-Dichloropropane	--	--	--	IRIS; HEAST
1,3-Dichloropropene(telone II)	3E-02	Chronic irritation	10,000	IRIS
2-Hexanone	--	--	--	IRIS; HEAST
Tetrachloroethene	1E-02	Hepatotoxicity	1,000	IRIS
1,1,1-Trichloroethane	3E-01	--	--	EPA-NCEA
1,1,2-Trichloroethane	4E-03	Clinical serum chemistry	1,000	IRIS
Trichloroethene	3E-04	Liver, kidney, developmental effeccts	3,000	USEPA, 2001
Vinyl acetate	2E-01	Nasal epithelial lesions	30	IRIS
SEMI-VOLATILE ORGANICS				
Benzo[a]anthracene	--	--	--	IRIS; HEAST
Benzo[a]pyrene	--	--	--	IRIS; HEAST
Benzo[b]fluoranthene	--	--	--	IRIS; HEAST
Benzo[k]fluoranthene	--	--	--	IRIS; HEAST
Benzyl alcohol	3E-01	Stomach epithelial hyperplasia	1,000	HEAST
1,1-Biphenyl	5E-02	Kidney Damage	100	IRIS
bis(2-Ethylhexyl)phthalate	2E-02	Increased liver weight	1,000	IRIS
Caprolactum	5E-01	Reduced offspring body weight	100	IRIS
Carbazole	--	--	--	IRIS; HEAST
Chrysene	--	--	--	IRIS; HEAST
Dibenz[a,h]anthracene	--	--	--	IRIS; HEAST
Indeno[1,2,3-cd]pyrene	--	--	--	IRIS; HEAST
N-Nitroso-di-N-Propylamine	--			IRIS;HEAT
PESTICIDES/PCBs				
Endrin	3E-04	Mild histological lesions in the liver, occassional convulsions	100	IRIS
Endrin aldehyde	--	--	--	0.00E+00
Polychlorinated biphenyls	--	--	--	IRIS; HEAST
Aroclor 1254	2E-05	Ocular exudate, inflamed Meibomian glands, distorted nail growth, decreased antibody response.	300	IRIS

TABLE 8-35
TOXICITY VALUES: POTENTIAL NONCARCINOGENIC EFFECTS - ORAL EXPOSURE
LAPP INSULATOR, LE ROY, NY

Chemical	Chronic RfD (mg/kg-day)	Critical Effect	Combined Uncertainty/ Modifying Factors	RfD Source
INORGANICS				
Aluminum	1.00E+00	--	--	EPA
Antimony	4E-04	Longevity, blood glucose, and cholesterol	1,000	IRIS
Arsenic	3E-04	Hyperpigmentation, keratosis and possible vascular complications	3	IRIS
Cadmium (food)	1E-03	Chronic human studies	10	IRIS
Chromium III	1.5E+00	No effects observed	1,000	IRIS
Cobalt	2.0E-02	--	--	EPA
Copper	3.7E-02	Gastrointestinal irritation	--	HEAST
Lead	--	--	--	IRIS; HEAST
Manganese	1.4E-01	CNS effects	1 (3 non-diet)	IRIS
Mercury (elemental)	--	--	--	IRIS; HEAST
Mercuric chloride	3E-04	Autoimmune effects	1,000	IRIS
Nickel (soluble salts)	2E-02	Decreased body and organ weights	300	IRIS
Silver	5E-03	Argyria	3	IRIS
Thallium	--	--	--	IRIS; HEAST
Thallium(I)sulfate	8E-05	No observed adverse effects	3,000	IRIS
Vanadium	7E-03	--	100	HEAST
Zinc	3E-01	Decrease in erythrocyte superoxide	3	IRIS
OTHER				
Cyanide	2E-02	Weight loss, thyroid effects and myelin degeneration.	100	IRIS

-- = Not Available
HEAST = Health Effects Assessment Summary Tables (USEPA, 1997).
IRIS = Integrated Risk Information System (USEPA, 2004).
Uncertainty factor accounts for inter- and intraspecies extrapolation and extrapolation from subchronic to chronic exposures; modifying factor accounts for uncertainty in the test program.

EPA-NCEA provisional value from the USEPA Region 3 Risk-Based Concentrations Table dated 4/14/2004.
EPA provisional peer-reviewed value

TABLE 8-36
TOXICITY VALUES: POTENTIAL NONCARCINOGENIC EFFECTS - INHALATION EXPOSURE
LAPP INSULATOR, LE ROY, NY

Chemical	Chronic RfC (mg/m^3)	Chronic RfD (mg/kg-day)	Critical Effect	Combined Uncertainty/ Modifying Factors	RfD Source
VOLATILE ORGANICS					
Acetone	--	--	--	--	IRIS; HEAST
Benzene	3E-02	9E-03	Decreased lymphocyte count	300	IRIS
2-Butanone	5E+00	1E+00	Developmental	300	IRIS
Chloroform	--	1E-02	--	--	EPA-NCEA
Chloromethane	9E+02	3E+02	Cerebellar lesions	1,000	IRIS
1,1-Dichloroethane	5E-01	1E-01	Kidney damage	1,000	HEAST
1,1-Dichloroethene	2E-01	6E-02	Liver toxicity	30	IRIS
cis-1,2-Dichloroethene	--	--	--	--	IRIS; HEAST
1,2-Dichloropropane	4E-03	1E-03	Hyperplasia of the nasal mu cosa	300	IRIS
1,3-Dichloropropene(telone II)	2E-02	6E-03	Hypretrophy/hyperplasia of nasal epithelium	10	IRIS
2-Hexanone	--	--	--	--	IRIS; HEAST
Tetrachloroethene	--	1.4E-01	--	--	EPA-NCEA
1,1,1-Trichloroethane	--	6.3E-01	--	--	EPA
1,1,2-Trichloroethane	--	--	--	--	IRIS; HEAST
Trichloroethene	4E-02	1E-02	CNS, liver, endocrine	1,000	USEPA, 2001
Vinyl acetate	2E-01	5.7E-02	Nasal epithelial lesions	30	IRIS
SEMI-VOLATILE ORGANICS					
Benzo[a]anthracene	--	--	--	--	IRIS; HEAST
Benzo[a]pyrene	--	--	--	--	IRIS; HEAST
Benzo[b]fluoranthene	--	--	--	--	IRIS; HEAST
Benzo[k]fluoranthene	--	--	--	--	IRIS; HEAST
Benzyl alcohol	--	--	--	--	IRIS; HEAST
1,1-Biphenyl	--	--	--	--	IRIS; HEAST
bis(2-Ethylhexyl)phthalate	--	--	--	--	IRIS; HEAST
Caprolactum	--	--	--	--	IRIS; HEAST
Carbazole	--	--	--	--	IRIS; HEAST
Chrysene	--	--	--	--	IRIS; HEAST
Dibenz[a,h]anthracene	--	--	--	--	IRIS; HEAST
Indeno[1,2,3-cd]pyrene	--	--	--	--	IRIS; HEAST
N-Nitroso-di-N-Propylamine	--	--			IRIS; HEAST
PESTICIDES/PCBs					
Endrin	--	--	--	--	IRIS; HEAST
Endrin aldehyde	--	--	--	--	IRIS; HEAST
Polychlorinated biphenyls	--	--	--	--	IRIS; HEAST
Aroclor 1254	--	--	--	--	IRIS; HEAST

TABLE 8-36
TOXICITY VALUES: POTENTIAL NONCARCINOGENIC EFFECTS - INHALATION EXPOSURE
LAPP INSULATOR, LE ROY, NY

Chemical	Chronic RfC (mg/m^3)	Chronic RfD (mg/kg-day)	Critical Effect	Combined Uncertainty/ Modifying Factors	RfD Source
INORGANICS					
Aluminum	--	1.0E-03	--	--	EPA
Antimony	--	--	--	--	IRIS; HEAST
Arsenic	--	--	--	--	IRIS; HEAST
Cadmium (food)	--	5.7E-05			EPA-NCEA
Chromium III	--	--	--	--	IRIS; HEAST
Cobalt	--	--	--	--	IRIS; HEAST
Copper	--	--	--	--	IRIS; HEAST
Lead	--	--	--	--	IRIS; HEAST
Manganese	5E-05	1.4E-05	Impairment of neurobehavioral function	1,000	IRIS
Mercury (elemental)	3E-04	8.6E-05	Neurotoxicity	30	IRIS
Mercuric chloride	--	--	--	--	IRIS; HEAST
Nickel (soluble salts)	--	--	--	--	IRIS; HEAST
Silver	--	--	--	--	IRIS; HEAST
Thallium	--	--	--	--	IRIS; HEAST
Vanadium	--	--	--	--	IRIS; HEAST
Zinc	--	--	--	--	IRIS; HEAST
OTHER					
Cyanide	--	--	--		IRIS; HEAST

-- = Not Available

HEAST = Health Effects Assessment Summary Tables (USEPA, 1997).

IRIS = Integrated Risk Information System (USEPA, 2004).

Uncertainty factor accounts for inter- and intraspecies extrapolation and extrapolation from subchronic to chronic exposures; modifying factor accounts for uncertainty in the test program.

TABLE 8-37
TOXICITY VALUES: POTENTIAL CARCINOGENIC EFFECTS - ORAL EXPOSURE
LAPP INSULATOR, LE ROY, NY

Chemical	Slope Factor (SF) (mg/kg-day)-1	Type of Cancer	Weight-of-Evidence Classification	SF Source
VOLATILE ORGANICS				
Acetone	--	--	D	IRIS; HEAST
Benzene	1.5E-2 to 5.5E-02	Leukemia	A	IRIS
2-Butanone	--	--	D	IRIS
Chloroform	--	--	B2	IRIS
Chloromethane	--	--	D	IRIS
1,1-Dichloroethane	--	--	C	IRIS
1,1-Dichloroethene	--	--	C	IRIS
cis-1,2-Dichloroethene	--	--	D	IRIS; HEAST
1,2-Dichloropropane	6.8E-02	Liver tumors	B2	HEAST
1,3-Dichloropropene(telone II)	1.0E-01	Bladder, respiratory, forestomach, liver	B2	HEAST
2-Hexanone	--	--	--	IRIS; HEAST
Tetrachloroethene	--	--	--	IRIS; HEAST
1,1,1-Trichloroethane	--	--	D	IRIS
1,1,2-Trichloroethane	5.7E-02	Hepatocellular carcinoma	C	IRIS
Trichloroethene	2E-02 to 4E-01	--	Highly likely in humans	USEPA, 2001
Vinyl acetate	--	--	--	IRIS; HEAST
SEMI-VOLATILE ORGANICS				
Benzo[a]anthracene	7.3E-01	--	B2	USEPA
Benzo[a]pyrene	7.3E+00	Forestomach	B2	IRIS
Benzo[b]fluoranthene	7.3E-01	--	B2	USEPA
Benzo[k]fluoranthene	7.3E-02	--	B2	USEPA
Benzyl alcohol	--	--	--	IRIS; HEAST
1,1-Biphenyl	--	--	D	IRIS; HEAST
bis(2-Ethylhexyl)phthalate	1.4E-02	Hepatocellular carcinoma and adenoma	B2	IRIS
Caprolactum				
Carbazole	2E-02	Liver	B2	HEAST
Chrysene	7E-03	--	B2	USEPA
Dibenz[a,h]anthracene	7E+00	--	B2	USEPA
Indeno[1,2,3-cd]pyrene	7E-01	--	B2	USEPA
N-Nitroso-di-N-Propylamine	7E+00	Hepatocellular carcinomas	B2	IRIS
PESTICIDES/PCBs				
Endrin	--	--	D	IRIS
Endrin aldehyde	--	--	--	IRIS; HEAST
Polychlorinated biphenyls	2E+00	Trabecelar carcinoma/adenocarcinoma	B2	IRIS
Aroclor 1254	--	--	--	IRIS; HEAST
INORGANICS				
Aluminum	--	--	D	IRIS; HEAST
Antimony	--	--	B1	IRIS; HEAST
Arsenic	1.5E+00	Skin	A	IRIS
Cadmium (food)	--		B1	IRIS
Chromium III	--	--	D	IRIS
Cobalt	--	--	ND	IRIS; HEAST
Copper	--	--	D	IRIS
Lead	--	--	B2	IRIS; HEAST
Manganese	--		D	IRIS
Mercury (elemental)	--	--	D	IRIS
Mercuric chloride	--	--	C	IRIS
Nickel (soluble salts)	--	--	--	IRIS; HEAST
Silver	--	--	D	IRIS
Thallium	--	--	ND	IRIS; HEAST
Vanadium	--	--	ND	IRIS; HEAST
Zinc	--	--	D	IRIS
OTHER				
Cyanide	--	--	D	IRIS

-- = Not Available

HEAST = Health Effects Assessment Summary Tables (USEPA, 1997).

IRIS = Integrated Risk Information System (USEPA, 2004).

A = Human Carcinogen (sufficient evidence of carcinogenicity in humans)

B1 = Probable Human Carcinogen (limited evidence of carcinogenicity in humans)

B2 = Probable Human Carcinogen (sufficient evidence of carcinogenicity in animal with inadequate or lack of evidence in humans)

C = Possible Human Carcinogen (limited evidence of carcinogenicity in animals and inadequate or lack of human data)

D = Not classifiable as to human carcinogenicity (inadequate or no evidence)

TABLE 8-38
TOXICITY VALUES: POTENTIAL CARCINOGENIC EFFECTS - INHALATION EXPOSURE
LAPP INSULATOR, LE ROY, NY

Chemical	Unit Risk (mg/m3)	Slope Factor (SF) (mg/kg-day)-1	Type of Cancer	Weight-of-Evidence Classification	SF Source
VOLATILE ORGANICS					
Acetone	--	--	--	D	IRIS; HEAST
Benzene	2.2E-06 to 7.8E-06	7.7E-03 to 2.7E-02	Leukemia	A	IRIS
2-Butanone	--	--	--	D	IRIS; HEAST
Chloroform	2.3E-05	8.05E-02	Heptacellular carcinoma	B2	IRIS
Chloromethane	--	--	--	D	IRIS
1,1-Dichloroethane	--	--	--	C	IRIS
1,1-Dichloroethene	--	1.2E+00	Kidney adenocarcinomas	C	HEAST
cis-1,2-Dichloroethene	--	--	--	D	IRIS
1,2-Dichloropropane	--	--	--	B2	IRIS
1,3-Dichloropropene(telone II)	4E-06	1E-02	Lung Adenoma	B2	HEAST
2-Hexanone	--	--	--	--	IRIS; HEAST
Tetrachloroethene	--	--	--	--	IRIS; HEAST
1,1,1-Trichloroethane	--	--	--	D	IRIS
1,1,2-Trichloroethane	1.6E-05	5.7E-02	Hepatocellular carcinoma	C	IRIS
Trichloroethene	--	2E-02 to 4E-01	--	--	USEPA, 2001
Vinyl acetate	--	--		--	IRIS; HEAST
SEMI-VOLATILE ORGANICS					
Benzo[a]anthracene	--	3.1E-01	--	B2	USEPA
Benzo[a]pyrene	--	3.1E+00	--	B2	EPA-NCEA
Benzo[b]fluoranthene	--	3.1E-01	--	B2	USEPA
Benzo[k]fluoranthene	--	3.1E-02	--	B2	USEPA
Benzyl alcohol	--	--	--	--	IRIS; HEAST
1,1-Biphenyl	--	--	--	D	IRIS
bis(2-Ethylhexyl)phthalate	--	1.4E-02	--	B2	EPA-NCEA
Caprolactum					
Carbazole	--	--	--	B2	IRIS
Chrysene	--	3.1E-03	--	B2	USEPA
Dibenz[a,h]anthracene	--	3.1E+00	--	B2	USEPA
Indeno[1,2,3-cd]pyrene	--	3.1E-01	--	B2	USEPA
N-Nitroso-di-N-Propylamine	--	--	--	B2	IRIS
PESTICIDES/PCBs					
Endrin	--	--	--	D	IRIS
Endrin aldehyde	--	--	--	--	IRIS; HEAST
Polychlorinated biphenyls	--	2E+00	--	B2	IRIS
Aroclor 1254	--	--	--	--	IRIS; HEAST
INORGANICS					
Aluminum	--	--		D	IRIS
Antimony	--	--	--	B1	IRIS
Arsenic	4.3E-03	1.5E+01	Respiratory	A	IRIS
Cadmium (food)	1.8E-03	6.3E+00		B1	IRIS
Chromium III	--	--	--	D	IRIS
Cobalt	--	9.80E+00	--	ND	EPA
Copper	--	--	--	D	IRIS
Lead	--	--	--	B2	IRIS; HEAST
Manganese	--	--	--	D	IRIS
Mercury (elemental)	--	--	--	D	IRIS
Mercuric chloride	--	--	--	C	IRIS
Nickel (soluble salts)	--	--	--	--	IRIS; HEAST
Silver	--	--	--	D	IRIS
Thallium	--	--	--	ND	IRIS; HEAST
Vanadium	--	--	--	ND	IRIS; HEAST
Zinc	--	--	--	D	IRIS
OTHER					
Cyanide	--	--	--	D	IRIS; HEAST

-- = Not Available
HEAST = Health Effects Assessment Summary Tables (USEPA, 1997).
IRIS = Integrated Risk Information System (USEPA, 2004).
A = Human Carcinogen (sufficient evidence of carcinogenicity in humans)
B1 = Probable Human Carcinogen (limited evidence of carcinogenicity in humans)
B2 = Probable Human Carcinogen (sufficient evidence of carcinogenicity in animal with inadequate or lack of evidence in humans)
C = Possible Human Carcinogen (limited evidence of carcinogenicity in animals and inadequate or lack of human data)
D = Not classifiable as to human carcinogenicity (inadequate or no evidence)

worker assumed to have exposure over a 1-year period, subchronic RfDs are the more appropriate criteria, but as subchronic RfDs are often unavailable or in some cases set equal to chronic RfDs, chronic RfDs can be used as conservative approximations.

RfD values are not available for dermal exposure. Unlike intake for ingestion, intake for dermal contact represents the exposure to the estimated amount of chemical absorbed through the skin and not the amount of chemical that comes in contact with the skin. Therefore, in the absence of dermal RfDs, oral RfD (RfDo) values are used and adjusted as per USEPA guidance (USEPA, 1989) to reflect dermally absorbed doses, resulting in adjusted RfDos (RfDoadj). This allows for a direct comparison between estimated intakes as absorbed doses and published toxicity values expressed as absorbed doses. The RfDoadj was calculated as RfDo multiplied by an oral absorption efficiency.

The oral absorption efficiencies used to adjust RfDos, from USEPA (2001a) are listed below. A default oral absorption efficiency of 1.0 was used for all COPC not listed below.

Chemical	Oral Absorption Efficiency (Unitless)
PAHs	1.0
Antimony	0.15
Arsenic	1.0
Cadmium (water)	0.05
Cadmium (diet)	0.025
Chromium	0.013
Copper	1.0
Manganese	0.04
Mercuric chloride	0.07
Nickel	0.04
Silver	0.04
Thallium	1.0
Zinc	0.4

The USEPA reports toxicity information for inhalation exposure as a concentration (i.e., mg of chemical/m^3 of air) known as a reference concentration. A limited number of reference concentration (RfC) values for inhalation exposure are available. These RfCs were converted to RfDs (i.e., in units of mg/kg-day) based on a standard inhalation rate of 20 m^3/day and adult body weight of 70 kg.

8.3.2 Carcinogenic Effects

The USEPA has established the carcinogenic potency of known or suspected carcinogens based on dose-response relationships. The carcinogenic potency characterized by the slope factor (SF) is expressed as a function of intake [i.e., (mg of chemical/kg of body weight per day)$^{-1}$]. The SFs are used to estimate incremental excess cancer risk from lifetime exposures to known or suspected carcinogens (i.e., cancer risk), by multiplying the estimated intake by the SF.

As with RfDs, the USEPA has not derived SFs for dermal exposure. Therefore, in the absence of dermal SFs, SFs for oral exposure (SFo) are used and adjusted, as described above, to reflect absorbed dose, resulting in adjusted SFs (SFadj). The same absorption factors used to adjust RfDs are applied in adjusting SFs; however, they are calculated by dividing the Sfo by the oral absorption efficiency.

Similar to the RfCs for non-carcinogenic effects, the USEPA reports toxicity information for carcinogenic risk via inhalation exposure as a unit risk expressed as a function of concentration (i.e., risk per ug chemical/m^3 of air). A limited number of unit risk factors for inhalation exposure are available. These unit risk factors are converted to SFs (i.e., in units of mg/kg-day) based on a standard inhalation rate of 20 m^3/day and adult body weight of 70 kg.

8.3.3 Chemicals of Potential Concern Without Toxicological Criteria

Toxicological criteria (i.e., reference concentrations and/or slope factors) are not available for 2-hexanone and lead. Possible health implications that may be associated with exposure to these chemicals are as follows:

2-Hexanone: 2-Hexanone is used as a paint thinner, cleaning agent and solvent for dye printing; it is also used in the lacquer industry. In humans, it is readily absorbed by the lungs, the gastrointestinal tract, and the skin and is excreted relatively slowly in expired air and urine (Fawell and Hunt, 1988). Concern for exposure to 2-hexanone centers on its neurotoxic potential, with the neurotoxic syndrome best described as a sensorimotor or motor polyneuropathy (Amdur et al., 1991).

Lead: Chronic exposure to low levels of lead may result in hematologic (blood and blood-forming), neurobehavioral, kidney, and other effects in humans (ATSDR, 1999). Effects such as slowed nerve conduction velocities, altered testicular function, reduced hemoglobin production, and other signs of impaired heme synthesis, and blood pressure effects have been observed in adults. Children, who represent a sensitive portion of the population, may experience an array of pathophysiological effects. Electrophysiological effects, impaired cognitive performance (as measured by IQ tests, performance in school, and other means), heme synthesis impairment, inhibition of pyrimidine and alanine synthesis, interference with vitamin D hormone synthesis, and early childhood growth reductions have been observed in children. In addition, factors influencing neurological development such as low birth weights and decreased gestational age and deficits in mental indices have been reported in infants.

As a frame of reference; however, all the detected lead concentrations in soil and sediment were below the USEPA's revised interim screening criterion for lead in soil (400 mg/kg) which is protective for direct contact at residential settings (USEPA, 1998) and all detected lead concentrations in groundwater and surface water were below the USEPA action level for lead in drinking water (15 ug/l).

8.4 Risk Characterization

The risk characterization step serves to estimate the likelihood and magnitude of adverse health risks to potential receptors by integrating the data evaluation and the exposure and toxicity assessments. The likelihood and magnitude of adverse health risks are discussed qualitatively for all potential receptors and, for the site worker and construction/utility worker receptors, the likelihood and magnitude of adverse health risks is quantified in the form of non-cancer hazard quotients and excess lifetime cancer risks. The COPC and exposure route specific non-cancer hazard quotients and excess lifetime cancer risks associated with potential exposure to the site worker and construction/utility worker receptors considered in this evaluation are summed for all exposure routes, and the total pathway non-cancer hazard indices and excess lifetime cancer risks (i.e., summed for all COPC and exposure routes), are compared to USEPA acceptable levels. Potential cancer risks are assessed through the computation of a probability estimate, the likelihood of developing a cancer following exposure to the COPC under the set of exposure conditions evaluated.

The estimated risks are compared to the USEPA acceptable levels specified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (USEPA, 1990). For non-cancer health effects, the NCP states that acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety. In practice, the USEPA defines this as both HQs and HIs less than or equal to 1.0. For known or suspected carcinogens, the NCP states that acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual which range from 10-4 (i.e., 1E-04 or 1 in 10,000) and 10-6 (i.e., 1E-06 or 1 in 1,000,000).

8.4.1 Current Scenario

The potential for exposure to the COPC at the Site exists under current conditions. Relative exposure and the potential for adverse health effects are discussed for each potentially-exposed population below.

For those receptors evaluated quantitatively (i.e., site worker and construction/utility worker), the COPC and exposure route specific non-cancer hazard quotients (HQs) and excess lifetime cancer risks associated with potential exposure to surface soil and all soil, respectively, are presented in Tables 8-20 to 8-34. The total non-cancer hazard indices (HIs) and excess lifetime cancer risks for the COPC summed for all exposure routes, and the total pathway non-cancer hazard indices and excess lifetime cancer risks (i.e., summed for all COPC and exposure routes), are summarized in Table 8-38 and discussed below.

Where the total hazard index is greater than the USEPA acceptable level of 1.0 or total excess lifetime cancer risk is greater than the USEPA acceptable risk range of 10^{-4} (i.e., 1E-04 or 1 in 10,000) and 10^{-6} (i.e., 1E-06 or 1 in 1,000,000), the predominant contributors to the risk estimates are identified

For recreationist exposure to surface water and sediment where RBSLs were derived, the detected concentrations in surface water and sediment that exceed their corresponding RBSLs are discussed.

Site Workers

Site workers whose work responsibilities involve work outdoors or who may take breaks outdoors may be exposed to COPC in surface soil via incidental ingestion and dermal contact. Due to the nature of the manufacturing at the Site, it is not expected that outdoor work responsibilities would occur with much frequency or for long durations; however, risks were conservatively estimated as if contact with surface soil occurs during every workday.

Area A

The total HI (Table 8-39) for site worker exposure to the COPC in surface soil at Area A from ingestion and dermal contact is 4E-02 (i.e., 0.04); this HI is less than the USEPA acceptable level of 1.0, indicating that adverse, non-carcinogenic effects from such exposure are unlikely. The total estimated excess lifetime cancer risk (Table 8-38) is 2E-06 (i.e., 2 in 1,000,000), within the USEPA acceptable risk range.

Area B

The total HI (Table 8-38) for site worker exposure to the COPC in surface soil at Area B from ingestion and dermal contact is 9E-02 (i.e., 0.09); this HI is less than the USEPA acceptable level of 1.0, indicating that adverse, non-carcinogenic effects from such exposure are unlikely. The total estimated excess lifetime cancer risk (Table 8-39) is 1E-05 (i.e., 1 in 100,000), within the USEPA acceptable risk range.

PCB-targeted areas (HVT-1 and BURPR-2)

Although site workers are not expected to spend significant time in the PCB-targeted areas, risks were estimated for site worker exposure to the maximum detected concentration of PCBs (1.4 mg/kg of Aroclor 1260 in sample BURPR-2) in surface soil using the same parameters and assumptions as used for Areas A and B. The HQ for site

TABLE 8-39
SUMMARY OF HAZARD INDICES AND CANCER RISKS
LAPP INSULATOR, LE ROY, NY

EXPOSURE POPULATION AND PATHWAY	HAZARD INDEX	CANCER RISK
CURRENT AND FUTURE SCENARIOS		
SITE WORKERS		
AREA A		
Ingestion of Chemicals in Surface Soil	4E-02	2E-06
Dermal Contact with Chemicals in Surface Soil	3E-04	--
TOTAL PATHWAY HAZARD INDEX/CANCER RISK:	**4E-02**	**2E-06**
AREA B		
Ingestion of Chemicals in Surface Soil	7E-02	8E-06
Dermal Contact with Chemicals in All Soil	2E-02	3E-06
TOTAL PATHWAY HAZARD INDEX/CANCER RISK:	**9E-02**	**1E-05**
FUTURE SCENARIO		
CONSTRUCTION WORKERS		
AREA A		
Ingestion of Chemicals in All Soil	4E-02	6E-08
Dermal Contact with Chemicals in All Soil	4E-05	2E-09
Inhalation of Volatile Chemicals from All Soil	2E-01	2E-05
Inhalation of Chemicals Adsorbed to Respirable Particulates from All Soil	2E-12	8E-18
TOTAL PATHWAY HAZARD INDEX/CANCER RISK:	**3E-01**	**2E-05**
AREA B		
Ingestion of Chemicals in All Soil	4E-02	2E-07
Dermal Contact with Chemicals in All Soil	3E-03	1E-08
Inhalation of Volatile Chemicals from All Soil	5E-02	3E-06
Inhalation of Chemicals Adsorbed to Respirable Particulates from All Soil	8E-12	5E-16
TOTAL PATHWAY HAZARD INDEX/CANCER RISK:	**9E-02**	**3E-06**
AREA C		
Ingestion of Chemicals in All Soil	4E-02	7E-08
Dermal Contact with Chemicals in All Soil	NA	NA
Inhalation of Volatile Chemicals from All Soil	2E-01	1E-05
Inhalation of Chemicals Adsorbed to Respirable Particulates from All Soil	--	--
TOTAL PATHWAY HAZARD INDEX/CANCER RISK:	**3E-01**	**1E-05**

-- = Toxicological data were not available to quanitfy risks.

NA = COPC did not inlcude those for which dermal exposure is quanitfied (i.e., benzo(a)pyrene, SVOCs, PCBs, arsenic, and cadmium.

worker exposure to Aroclor 1260 in surface soil at the PCB-targeted areas from ingestion and dermal contact is 1E-01 (i.e., 0.1); this HQ is less than the USEPA acceptable level of 1.0, indicating that adverse, non-carcinogenic effects from such exposure is unlikely. The total estimated excess lifetime cancer risk is 1E-06 (i.e., 1 in 1,000,000), within the USEPA acceptable risk range.

Trespassers

As the Site is not fenced, trespassers may gain access to the Site and be exposed to COPC in surface soil via incidental ingestion and dermal contact. Since no COPC were selected in surface soil at Hot Spot Areas C and D, trespasser exposure should not be of concern.

Recreationists

Recreationists who wade, fish, swim, or otherwise recreate in Oatka Creek may be exposed to COPC in surface water and sediment that migrate through overburden and shallow bedrock groundwater and discharge to Oatka Creek. Other point and non-point sources of contamination in the vicinity of the Site, are possible. Recreationists who consume fish caught from Oatka Creek may be exposed to COPC in surface water and sediment that bioaccumulate in fish tissue. Also, recreationists who consume game (i.e., deer) they have hunted on adjacent land may also be exposed to COPC in surface soil, surface water, and/or sediment that bioaccumulate in wildlife tissue.

Since the NYSDEC does not have criteria for the protection of human health from contact with surface water and sediment during recreational activities as might be expected for Oatka Creek, RBSLs were derived to be protective of such exposure as described above. Tables 8-15 and 8-16 present comparisons of the surface water and sediment data for the COPC to the corresponding RBSLs, respectively. For the COPC, the maximum detected concentrations are less than the RBSLs, where derived, indicating that adverse effects to recreationists are unlikely.

The mass loading of COPC in groundwater was used to predict concentrations in Oatka Creek. These predicted surface water concentrations were then compared to the RBSLs in Table 8-19. The predicted concentrations of COPC in surface water are an order of magnitude or several orders of magnitude less than the RBSLs indicating that adverse effects to recreationists are unlikely.

The potential for human exposure from consumption of local fish and wildlife is evaluated by considering the likelihood of chemicals to bioaccumulate in fish and wildlife tissue. Bioaccumulation is the process by which the chemical concentration in an organism increases as a result of chemical uptake through all possible routes of exposure from the environment in which it lives. PCBs, mercury, benzo[a]pyrene, and the pesticides 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and dieldrin are generally regarded as persistent, bioaccumulative, and toxic. However, the primary chemicals of concern at the Site are VOCs, which are generally regarded as having low potential for bioaccumulation.

PCBs, benzo[a]pyrene, and 4,4'-DDD in soil were detected infrequently and at relatively low concentrations and, while mercury in soil was more widespread, it was generally detected at low concentrations. These chemicals are not considered to be site related. A review of pertinent data follows:

- PCBs were detected in 1 of 2 subsurface soil samples at Area A, were detected in both surface soil samples at Area B, and were not detected at Area C. PCBs were also detected in 4 of 7 samples collected in the PCB-targeted areas. Detected PCB concentrations were all below the adopted cleanup objective of 1 mg/kg for total PCBs, with the exception of one sample from BURPR-2 (1.4 mg/kg) in one of the PCB-targeted areas, which slightly exceeded.

- Benzo[a]pyrene was detected in both subsurface soil samples at Area A at concentrations below those detected in background soil samples. Benzo[a]pyrene was not detected in soil at Areas B and C.

- 4,4'-DDD was detected in both surface soil samples at Area B at concentrations well below the TAGM recommended soil cleanup objective. 4,4'-DDD was not detected in soil at Areas A and C.

- Mercury was detected in soil from Areas A, B, and C at concentrations generally at or below the TAGM recommended soil cleanup objective. Mercury was also detected in one of the four background samples.

PCBs, benzo[a]pyrene, 4,4'-DDD, and mercury detected in hotspot area soil have the potential to bioaccumulate in terrestrial mammals. However, the greatest potential for bioaccumulation is in animals higher on the food chain (carnivorous mammals). The most likely species to be hunted in the area include whitetail deer and rabbit, both herbivorous mammals. The hotspot areas at the Site do not provide ideal habitat for whitetail deer and rabbits due to the compacted, gravel-topped soil and lack of vegetation.

PCBs and benzo[a]pyrene in sediment were generally detected infrequently and are not considered widespread or site related. A review of pertinent data follows:

- PCBs were detected in 2 of 5 sediment samples from May 2002 and were not detected in any of the five samples from August 2003.
- Benzo[a]pyrene was detected in sediment infrequently in the samples from August 2003 (in only 2 of 5 samples) and more frequently in the samples from May 2002; however, it was also detected in the upstream background sample from May 2002.
- Mercury was detected more frequently in sediment; however, it was also detected in the upstream background sample from May 2002 at concentrations similar to those detected in the samples adjacent to the Site.

PCBs, benzo[a]pyrene, and mercury detected in sediment in Oatka Creek have the potential to bioaccumulate in fish and semi-aquatic organisms (i.e., geese and ducks). These bioaccumulative chemicals are likely to be predominantly found in sediments where they may be persistent. Mercury bioaccumulates most efficiently in aquatic environments, predominately as methyl mercury. However, the greatest potential for bioaccumulation is in animals higher on the food chain (carnivorous fish or mammals). Geese are predominantly herbivorous and ducks are omnivorous. The most likely species in Oatka Creek to be fished, including bass, crappie, and sunfish, are omnivorous.

The greatest potential for adverse health effects from human consumption of fish and wildlife is for subsistence hunters and fishers. Subsistence hunting and fishing is not likely to occur in the vicinity of the Site and it is unlikely that any hunters and fishers in the vicinity of the Site are consuming a significant portion of their diets from local fish and wildlife. In addition, there are no current NYSDEC fish health advisories in Genesee County.

The potential for adverse health effects from this exposure pathway is unlikely for the following reasons:

- The primary chemicals of concern at the Site are VOCs, which are generally regarded as having low potential for bioaccumulation.
- Those detected chemicals that are generally regarded as persistent, bioaccumulative, and toxic (i.e., PCBs, benzo[a]anthracene, 4,4'-DDD, and mercury), were generally detected infrequently and/or at concentrations similar to or below background and are not considered site related.
- The terrestrial mammals most likely to be hunted are herbivorous and less likely to bioaccumulate these chemicals from the hotspot areas that do not provide ideal habitat.
- There are no current NYSDEC fish health advisories in Genesee County.
- Hunters and fishers in the vicinity of the Site are not likely to consume a significant portion of the diet from local fish and wildlife caught in the vicinity of the Site.

8.4.2 Future Scenario

The potentially exposed populations in the current scenario are expected to remain potentially exposed populations into the future. The Site is expected to remain a manufacturing facility that produces electrical insulators into the foreseeable future.

Construction/utility workers

Construction/utility workers who may be required to open a utility excavation on-Site could be exposed to COPC in surface and subsurface soil via direct contact and to COPC in soil and groundwater via inhalation of COPC volatilized from these media. In addition, under the hypothetical, yet plausible scenario, that the Site is developed for residential and/or commercial use in the future, construction/utility workers conducting excavation for building foundations may also be exposed to COPC in soil and groundwater.

Area A

The total HI (Table 8-39) for construction/utility worker exposure to the COPC in all soil at Area A from ingestion, dermal contact, and inhalation of volatile COPC and respirable particulates is 3E-01 (i.e., 0.3), indicating that adverse, non-carcinogenic effects from such exposure are unlikely. The total estimated excess lifetime cancer risk (Table 8-39) is 2E-05 (i.e., 2 in 100,000), within the USEPA acceptable risk range.

Area B

The total HI (Table 8-39) for construction/utility worker exposure to the COPC in all soil at Area B from ingestion, dermal contact, and inhalation of volatile COPC and respirable particulates is 9E-02 (i.e., 0.09); this HI is less than the USEPA acceptable level of 1.0, indicating that adverse, non-carcinogenic effects form such exposure are unlikely. The total estimated excess lifetime cancer risk (Table 8-39) is 3E-06 (i.e., 3 in 1,000,000), within the USEPA acceptable risk range.

Area C

The total HI (Table 8-38) for construction/utility worker exposure to the COPC in all soil at Area C from ingestion and inhalation of volatile COPC and respirable particulates is 3E-01 (i.e., 0.3); this HI is less than the USEPA acceptable level of 1.0, indicating that adverse, non-carcinogenic effects form such exposure are unlikely. The total estimated excess lifetime cancer risk (Table 8-38) is 1E-05 (i.e., 1 in 100,000), within the USEPA acceptable risk range.

PCB-targeted areas (HVT-1 and BURPR-2)

Risks were estimated for construction/utility worker exposure to the maximum detected concentration of PCBs (1.4 mg/kg of Aroclor 1260 at sample BURPR-2) in all soil using the same parameters and assumptions as used for Areas A, B, and C. The HQ for construction/utility worker exposure to Aroclor 1260 in all soil from ingestion, dermal contact, and inhalation of respirable particulates is 3E-01 (i.e., 0.3); this HQ is less than the USEPA acceptable level of 1.0, indicating that adverse, non-carcinogenic effects from such exposure are unlikely. The total estimated excess lifetime cancer risk is 2E-05 (i.e., 2 in 100,000), within the USEPA acceptable risk range.

8.4.3 Uncertainty Analysis

Some uncertainty is inherent in the process of conducting human health risk assessments. Environmental sampling and analysis and estimations of the potential for human exposure are all prone to uncertainty, as are the available toxicity data used to characterize risks.

Uncertainty associated with environmental sampling is generally related to the limitations of the sampling in terms of the number and distribution of samples, while uncertainty associated with the analysis of samples is generally associated with systematic or random errors (e.g., false positive or false negative results). Thus, the potential exposure may be overstated or understated depending on how well the environmental medium is characterized.

Chemical release and transport modeling were used to estimate EPCs for the COPC in outdoor air above an excavation for the construction/utility worker scenario. Uncertainty associated with such modeling is related to the accuracy with which environmental conditions and processes, and the characteristics of the excavation are modeled.

COPC release and transport were evaluated based on screening-level emissions and atmospheric dispersion models that, due to their relative simplicity, tend to overestimate these processes. For example, source depletion over time (e.g., through COPC release or environmental degradation) was not taken into account. The potential inhalation exposure scenario for construction/utility workers was modeled in ways that likely overestimated exposure and risk.

The number of non-detects in the datasets for all soil is, for some COPC, quite large (greater than 50%). This amount of "censored" data, and the treatment of non-detects in this evaluation (i.e., substitution of one-half the detection limit), may result in uncertainty in the 95% UCL on the arithmetic average concentrations used to represent the EPCs. The USEPA indicates that:

- there is no general rule about which substitution method will yield an appropriate 95% UCL,

- the uncertainty associated with the substitution method increases as the number of non-detects in the data increases, and
- if the proportion of non-detects is high (>75%), no substitution method will work well.

As a result, the EPCs represented by the 95% UCLs may be underestimated or overestimated.

The computational method used to compute the 95% UCL on the arithmetic average concentrations depends on the distribution of the data. Statistical testing to determine the data distributions was conducted using the ProUCL software and 95% UCL on the arithmetic average concentrations recommended by the software were selected as the EPCs. The EPCs for some of the COPC in groundwater were computed using the nonparametric Chebychev inequality, an approach that provides a conservative and stable estimate of the EPC, subject to the uncertainty noted above. The ProUCL output indicated that the all-soil datasets for the following COPC and hot spot areas were highly skewed such that the 95% UCL needed further evaluation:

- 1,1-dichloroethane and 1,1,1-trichloroethane at Hot Spot Area A,
- trichloroethene at Hot Spot Area B,
- tetrachloroethene and trichloroethene at Hot Spot Area C.

As a result the maximum detected concentration was used as the EPC (see Appendix K).

Also for trichloroethene at Hot Spot Area A and vinyl acetate at Hot Spot Area B the recommended 95% UCLs from ProUCL were greater than the maximum detected concentration, in which case the maximum detected concentration was used as the EPC. As a result, use of maximum detected concentrations as the EPC should result in overestimates of exposure and risk.

Assumptions and model input parameters that result in RME estimates were used in the exposure assessment; the actual frequencies and durations of exposure would probably be less than evaluated so that long-term exposure should be overestimated. Model input parameters (e.g., skin surface areas) that are influenced by a number of factors may result in overestimates or underestimates of long-term exposure.

Potential exposure to chemicals in surface water from dermal contact during swimming in Oatka Creek and the final dermally absorbed doses and dermal contact risk estimates should be considered highly uncertain, according to the USEPA (2001a). In the dermally absorbed dose equation, the permeability constant (Kp) is the most uncertain variable, with measured values spanning an order of magnitude.

While aspects of the exposure assessment methods can result in overestimation or underestimation of long-term exposure, exposure is probably overestimated, overall, for the potentially exposed populations evaluated. The EPCs used in the exposure assessment (i.e., the 95% UCL on the average concentration or the maximum detected concentration, (without consideration of environmental migration, transformation, degradation, or loss) should result in overestimates of long-term exposure.

The derivation of health effects criteria can result in overstated or understated potential health risks. In most cases, the criteria are derived from extrapolation from laboratory animal data to human beings. Furthermore, for some chemicals, health criteria are insufficient to determine reference doses or slope factors for oral and/or inhalation exposure. As a result of the cumulative impact of all of the uncertainties, the overall risks may be underestated.

8.5 Summary

Current Scenario

Although COPC were selected in groundwater, there are currently no potentially exposed populations.

Since no COPC were selected in surface soil at Hot Spot Areas C and D, trespasser exposure should not be of concern.

Estimated risks to site workers exposed to surface soil at Hot Spot Areas A and B and the PCB-targeted areas are less than or within the acceptable risk ranges, indicating that adverse, non-carcinogenic effects from such exposure are unlikely and excess lifetime cancer risks are within the acceptable range.

The concentrations of COPC in surface water and sediment are less than the RBSLs protective of a recreationist swimming and recreating in Oatka Creek, indicating that adverse effects to recreationists are unlikely. In addition, the predicted concentrations of COPC in surface water from discharge of groundwater are well below the NYSDEC Ambient Water Quality Standards and Guidance Values for Class A freshwater used as a source of drinking water and/or the RBSLs, indicating that groundwater discharge to surface water is not of concern.

The potential for adverse health effects from consumption of local fish and/or wildlife is unlikely.

Future Scenario

Although COPC were selected in groundwater, no potentially exposed populations are anticipated in the future.

Estimated risks to construction/utility workers exposed to all soil at Hot Spot Areas A, B, and C and the PCB-targeted areas are less than or within the acceptable risk ranges, indicating that adverse, non-carcinogenic effects from such exposure are unlikely and excess lifetime cancer risks are within the acceptable range.

Screening-Level Ecological Risk Assessment

SECTION 9

9.1 Introduction

This screening-level ecological risk assessment, which follows guidance in the NYSDEC's Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA) (NYSDEC, 1994) Steps I to IIB, was conducted to assess the potential for adverse effects on natural resources on and in the vicinity of the Site. Step I was conducted in 1996 by TPC Environmental Consulting (TPC), Buffalo, NY (TPC, 1996). The objectives of the initial steps of a FWIA are as follows:

- Step I:
  - Identify fish and wildlife resources that presently exist and that existed prior to a release.
  - Provide information necessary for potential design of a remedial investigation.
- Step II:
  - Determine the impacts of site-related chemicals of concern on fish and wildlife resources.

The assessment includes a summary of TPC's discussion of natural resources within the study area and supplemental information obtained for this RI during a site visit in December 2003. Additionally, a chemical-specific evaluation identifying potential sources and ecological pathways is also included in the assessment.

9.2 Step I – Natural Resources Inventory

9.2.1 TPC 1996 Assessment

TPC conducted a natural resources inventory within a 0.5-mile radius of the Site in May 1996. Their report provided a general overview of the ecological cover types within a 0.5-mile study area, including upland and wetland plant communities, aquatic resources, wildlife usage and the value of these resources to humans. Their report also identified state wetlands and significant habitats within a 2-mile radius of the Site. The TPC report is included in Appendix K.

TPC identified six state regulated wetlands within a 2-mile radius of the Site. The New York State Natural Heritage Program identified three plant species listed as rare, threatened or endangered within a 2-mile radius of the Site [sweet-scented water plantain (*Cacalia suaveolens*), yellow harlequin (*Corydalis flavula*), and woodland agrimony (A*grimonia rostellata*)]. There are no designated wild and scenic rivers or major deer wintering areas within a 2-mile radius of the Site. TPC indicated that these significant habitats and species were probably not at risk from chemicals at the Site.

The primary land-use in the northern portion of the study area consists of residential housing and commercial businesses associated with the Town of LeRoy. Much of the study area surrounding the remaining portions of the Site contains both active and abandoned farmland. The majority of the active farmland is being used for hay and corn production in support of the dairy industry.

Both upland and wetland communities were encountered within a 0.5-mile radius of the Site. Upland plant communities consisted of agricultural fields, “old field”, “shrub-land”, and “woodlot”. The classification system used by TPC to characterize ecological communities closely matched the classifications for successional old field, successional shrubland and northern hardwood forest as described in Edinger et al. (2002). However, two of the “woodlots”, located immediately west of the Site, are dominated by conifer species. One of these woodlots meets the description of a pine plantation, dominated by white pine (*Pinus strobes*), scotch pine (*Pinus sylvestris*) and a species of larch (*Larix sp.*). The other of these woodlots is dominated by Norway spruce (*Picea aibies*) and resembles a spruce/fir plantation (Edinger et al., 2002). These types of woodlots are generally used for timber production, wildlife habitat, erosion control, wind breaks, or landscaping. These particular woodlots were likely planted as either a wind barrier to protect former agricultural land or as a visual screen from the Lapp Insulator plant. Nevertheless, the two woodlots are relatively large in size and are a likely source of cover for a variety of wildlife. Wetland communities characterized by TPC included "scrub-shrub", "wet meadow", "forested", and "riparian" wetlands and "emergent marsh". With few exceptions, most of the wetlands within the study area are associated with Oatka Creek. Figure 1 in Appendix K is the vegetative cover type map prepared by TPC for the study area. Table 1 in Appendix K lists the species identified during their site inventory. The primary aquatic resource associated with the Site is Oatka Creek, which flows north, northeast and parallels the Lapp Insulator plant along its east and southeast boundaries. Oatka Creek is listed as a Class C stream (suitable for fish propagation) by the NYSDEC along the segment of the creek that borders the Site. The creek is dammed approximately 1,000 feet downstream of the Site, at the Munson Street Bridge. The dammed portion of the creek is listed as a Class B stream (suitable for swimming and wading) by the NYSDEC. Approximately 6 miles downstream of the Site, Oatka Creek is listed as Class C(t) (suitable for trout spawning, in addition to the other Class C uses).

Terrestrial wildlife usage in the areas surrounding the Site is likely diverse and relatively abundant. The agricultural fields in close proximity to conifer and hardwood forests, as well as shrubland, likely provide a year-round source of food and cover. The addition of wetland habitat along Oatka Creek provides an even greater advantage to wildlife as a source of water and likely adds to the diversity of wildlife. Tables 2 through 4 in Appendix K list of mammal, bird, and herpetological species, respectively, which could potentially utilize habitat within the study area.

The portion of Oatka Creek in the immediate vicinity of the Site supports a warm water fishery. According to the NYSDEC and local fisherman, fish species occurring in this segment of the creek include smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), rock bass (*Ambloplites rupestris*), crappie (*Pomoxis sp.*), sunfish (*Lepomis spp.*), brown bullhead (*Ameiurus nebulosus*), white sucker (*Catostomus commersoni*), northern hog sucker (*Hypentelium roanokense*), and several species of the minnow family including common carp (*Cyprinus carpio*), creek chubs (*Semoltilus* *atromaculatus*), various shiners (*Notropis spp.*), dace (*Rhinichthys spp.*), and darters (*Percina* and *Etheostoma spp.*).

9.2.2 Supplemental 2003 Information

The natural resources surrounding the Site provide substantial value to both fish and wildlife and humans. Based on the recent site visit and an evaluation of potential chemical migration routes, a more detailed discussion of the portion of Oatka Creek that flows past the Site and its adjacent land is warranted. Fish and wildlife in this portion of the study area would be most susceptible to chemical exposure. Oatka Creek appears to be the centralized location that the most wildlife are drawn to, for one reason or another, and would attract the greatest abundance and diversity of wildlife during spring and fall migrations. Oatka Creek is a key component of the overall ecosystem in the immediate vicinity of the Site.

In addition to fish, many other species likely utilize the creek and its adjacent wetland/riparian areas. The portion of the creek that flows past the Site contains several emergent wetland islands that provide significant nesting habitat for waterfowl and migratory birds on a seasonal basis. A Canada goose (*Branta canadensis*) was observed nesting on one of the islands during the groundwater sampling phase of this RI. Nesting waterfowl potentially attract a variety of predators including, but not limited to, raccoon (*Procyon lotor*), weasels and mink (*Mustela spp.*), striped skunk (*Mephitis mephitis*), American crow (*Corvus brachyrhynchos*), coyote (*Canis latrans*), and red fox (*Vulpes fulva*). These species are all known to prey on waterfowl eggs. Additionally, during the RI, several tracks were observed in and around the creek, as well as in the areas of concern on the Site. The majority of tracks observed on-Site were from whitetail deer (*Odocoileus virginiana*), gray squirrel (*Sciurus carolinensis*), and eastern cottontail rabbit (*Sylvilagus floridanus*). Both eastern cottontail rabbit and eastern gray squirrel tracks were observed in Areas A and B and along the slope leading down to the creek. Other wildlife and/or wildlife signs observed on-Site and in the creek adjacent to the Site included a significant flock of Canada geese, gray fox (*Urocyon cinereoargenteus*) tracks, and domestic cat tracks. Although none appeared to be recent, beaver cuttings were observed in the ravine just south of Area D. Whitetail deer appear to be moving through the Site, from the coniferous forests west of the Site, in order to access the creek and the agricultural fields on the east side of the creek. Numerous whitetail deer tracks were observed on and adjacent to the Site and three deer were observed browsing on vegetation on one of the wetland islands.

The whitetail deer population and the Oatka Creek fishery provide a significant value to humans as both a food source and for recreational activities. A public fishing access point on the east side of the creek at the Munson Street Dam allows for angling opportunities. Although it is unclear if angling in the vicinity of the Site is practiced for sport or food consumption, it is likely that some of the caught fish are consumed. In addition, regardless of local ordinances, hunting for whitetail deer is being practiced near the Site. A "gut pile" from a whitetail deer and a bloody trail leading from it where the deer had been dragged were observed on the trail paralleling Oatka Creek on its south side. This implies that humans are consuming meat from at least some of the deer in the vicinity of the Site. In addition to utilization of resources for food, Oatka Creek, in the vicinity of the Site, is also used for recreation such as swimming. A swinging rope was observed on a tree adjacent to the creek, which would indicate that people swim in this portion of the creek. A human health evaluation is provided in Section 8.0 Human Health Risk Assessment.

9.3 Establishing Chemicals of Potential Ecological Concern

This portion of the assessment reviews all the analytical data for surface water, stream sediment, soil and groundwater to establish chemicals of potential ecological concern (COPEC).

The analytical data for samples collected from surface water and sediments within Oatka Creek were compared to the standards and criteria in the following technical guidance documents:

- NYSDEC Ambient Water Quality Standards and Guidance Values, from the Division of Water Technical and Operational Guidance Series, Number 1.1.1. (NYSDEC, 1998).
- NYSDEC Technical Guidance for Screening Contaminated Sediments. Division of Fish, Wildlife and Marine Resources (NYSDEC, 1999).

No criteria or guidelines are currently available from the NYSDEC for the protection of wildlife against exposure to chemicals in soil. Therefore, analytical data for on-Site soils are evaluated using toxicological benchmarks for wildlife developed for the Oak Ridge National Laboratory (Sample et al., 1996).

All chemicals detected at least once in an environmental medium were summarized as described below and considered in the selection of COPEC.

9.3.1 Surface Water

Surface water samples were collected from a total of six locations. Of these six, five were collected directly from Oatka Creek. Three of these samples were collected from the creek adjacent to the Site (SW-2 through SW-4), one was collected from Oatka Creek approximately 1,300 feet downstream of the Site (SW-5), and the last was collected in the creek approximately 40 feet upstream of the south end of the Site to demonstrate background surface water quality (SW-1). The sixth sample (SP-1) was collected from a seep located along the sloping terrain adjacent to the creek opposite Area A. Sampling events were conducted during May 2002 and August 2003 representing surface water quality during both high and low flow conditions.

Surface water samples were analyzed for VOCs, SVOCs, pesticides and PCBs, and inorganic chemicals. The data are summarized and compared to the NYSDEC surface water quality standards and guidance values for fish propagation and survival in "Class C" streams, as presented in Table 9-1.

The concentrations of all VOCs, SVOCs, pesticides and PCBs were below their respective standards or guidance values, where available, during both sampling events and thus were not determined to be COPECs.

Of the inorganic chemicals detected, aluminum and iron were detected in concentrations that met or exceeded their respective surface water standards. Both aluminum and iron were detected above their respective standards during the May 2002 sampling event and thus were established as COPECs. In the corresponding background sample, the aluminum concentration equaled its standard and the iron concentration was just below

TABLE 9-1
COMPARISON OF SURFACE WATER DATA TO TOXICITY BENCHMARKS
LAPP INSULATOR, LE ROY, NY

CHEMICAL	May-02				August-03				NYS Standards/Values[1] Class "C" Waters	
	Sampling Location SW-1 Upstream Background Conditions	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Sampling Location SW-1 Upstream Background Conditions	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection		
Volatile Organics (μg/L)										
Bromodichloromethane	ND	1 / 5	9	SP-1	ND	1 / 5	19	SP-1	-	
2-Butanone	ND	0 / 5	ND	N/A	ND	2 / 5	6 - 110	SW-3	-	
Chlorodibromomethane	ND	1 / 5	1	SP-1	ND	0 / 5	ND	N/A	-	
Chloroform	ND	1 / 5	34	SP-1	ND	3 / 5	5 - 120	SP-1	-	
cis-1,2-Dichloroethene	ND	2 / 5	1 - 2	SW-3	ND	1 / 5	7	SW-5	-	
1,1-Dichloroethane	ND	1 / 5	2	SW-5	ND	1 / 5	7	SW-5	-	
Toluene	ND	1 / 5	4	SW-3	ND	0 / 5	ND	N/A	100	A(C)
1,1,1-Trichloroethane	ND	4 / 5	2 - 3	SW-3,4, & 5	ND	2 / 5	14 - 15	SW-5	-	
Trichloroethene	ND	3 / 5	2 - 5	SP-1 & SW-5	ND	2 / 5	7 - 30	SP-1	-	
Semi-Volatile Organics (μg/L)										
Butylbenzylphthalate	1	0 / 5	ND	N/A	ND	0 / 5	ND	N/A	-	
Caprolactam	ND	0 / 5	ND	N/A	ND	1 / 5	2	SW-3	-	
Inorganics (mg/L)										
Hardness (as $CaCO_3$)	210	4 / 5	210 - 230	SW-3	ND	0 / 5	ND	N/A	-	
Aluminum	0.1	5 / 5	0.046 - 0.39	SW-3	ND	5 / 5	0.0482 - 0.216	SW-5	0.1	A(C)
Arsenic	ND	0 / 5	ND	N/A	ND	4 / 5	0.002 - 0.004	SW-3	0.15	A(C)
Barium	0.048	5 / 5	0.036 - 0.059	SW-3	ND	5 / 5	0.022 - 0.054	SW-2	-	
Cadmium	ND	4 / 5	0.0001	SW-2,3,5, & SP-1	ND	0 / 5	ND	N/A	0.004	A(C)^{2,3}
Calcium	63	5 / 5	63 - 69	SW-3	45.3	5 / 5	35.4 - 62.5	SW-5	-	
Chromium	ND	0 / 5	ND	N/A	0.00062	5 / 5	0.00071 - 0.0012	SW-3	0.14	A(C)^{3}
Cobalt	ND	2 / 5	0.0005 - 0.0007	SW-3	ND	1 / 5	0.0013	SW-3	0.005	A(C)
Copper	0.003	5 / 5	0.003 - 0.009	SW-3	ND	1 / 5	0.0061	SW-3	0.018	A(C)^{2}
Iron	0.29	5 / 5	0.034 - 1.2	SW-3	0.0835	0 / 5	ND	N/A	0.3	A(C)
Lead	0.0008	4 / 5	0.0007 - 0.0037	SW-3	ND	0 / 5	ND	N/A	0.009	A(C)^{3}
Magnesium	12	5 / 5	12 - 14	SW-3	15.6	5 / 5	12.6 - 16.0	SW-5	-	
Manganese	0.035	5 / 5	0.004 - 0.19	SW-4	0.0136	5 / 5	0.034 - 0.0826	SW-4	-	
Nickel	0.002	3 / 5	0.002 - 0.003	SW-4	ND	1 / 5	0.0023	SW-3	0.1	A(C)^{3}
Potassium	2.2	5 / 5	2.2 - 4.9	SW-3	3.63	5 / 5	3.9 - 6.7	SW-3	-	
Sodium	26	5 / 5	23 - 41	SW-3	35.7	5 / 5	26.3 - 47.3	SW-3	-	
Vanadium	ND	2 / 5	0.002 - 0.005	SW-3	ND	1 / 5	0.0042	SW-3	0.014	A(C)
Zinc	0.015	5 / 5	0.008 - 0.043	SW-4	0.0038	5 / 5	0.0027 - 0.018	SW-3	0.16	A(C)^{3}

"ND" = Not Detected.
"N/A" = Not Applicable.
(1) From New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Division of Water, TOGS 1.1.1.
(2) Standards given are for dissolved forms
(3) Standard expressed as a function of hardness of 217 mg/L
"A(C)" = Fish Propagation

its standard. Only aluminum was detected at a concentration above its respective standard during the August 2003 sampling event. Five inorganic chemicals that were not detected in the background sample were detected in one or more samples from the remaining five sample locations.

9.3.2 Groundwater Discharge to Surface Water

Since groundwater from the overburden and shallow and intermediate bedrock is believed to be constantly discharging to the creek, groundwater data for these units are summarized and presented in Tables 9-2 to 9-4. Groundwater was analyzed for VOCs, SVOCs, pesticides/PCBs, and inorganic chemicals. The initial evaluation of these data is a simple and direct comparison to the NYSDEC Ambient Water Quality Standards and Guidance Values for "Class C" waters. As indicated in Tables 9-2 to 9-4, of the chemicals detected in groundwater, concentrations of bis(2-ethylhexyl) phthalate, the PCB mixture Aroclor 1262, cobalt, copper, and iron were found to exceed the NYSDEC Standards and Guidance Values for "Class C" waters for fish propagation or, for Aroclor 1262, the protection of wildlife. There are no NYSDEC Standards and Guidance Values for "Class C" waters for most of the detected VOCs and some of the detected inorganic chemicals.

Quantifying the potential discharge of these chemicals in overburden and shallow and intermediate bedrock groundwater to Oatka Creek was then performed as described in Section 8.1.3 and presented in Appendix K and the predicted surface water concentrations were compared to the NYSDEC Standards and Guidance Values for "Class C" waters. As indicated in Table 9-5, none of the predicted chemical concentrations in surface water from discharge of groundwater to the creek exceed the NYSDEC Standards and Guidance Values for "Class C" waters and thus none were established as COPEC.

9.3.3 Sediment

In May 2002 and August 2003, sediment samples were collected from Oatka Creek from the same locations as the surface water samples. Sediment samples were analyzed for VOCs, SVOCs, pesticides/PCBs, and inorganic chemicals. The data are summarized and compared to NYSDEC sediment quality criteria, as presented in Table 9-6. For the organic chemicals, the listed criteria are the lowest level of protection for benthic aquatic

TABLE 9-2
COMPARISON OF OVERBURDERN GROUNDWATER DATA TO TOXICITY BENCHMARKS
LAPP INSULATOR, LE ROY, NY

CHEMICAL	Round 1 (January 2002)			Round 2 (August 2003)			NYS Standards/Values[1] Class "C" Waters
	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	
Volatile Organics (µg/L)							
Chloroethane	1 / 6	22	MW-1	1 / 6	22	MW-1	-
1,1-Dichloroethane	4 / 6	3 - 3,200	MW-1	2 / 6	1,400 - 2,200	MW-1	-
1,2-Dichloroethane	1 / 6	5	MW-1	0 / 6	ND		-
1,1-Dichloroethene	2 / 6	130 - 330	PMW-10	2 / 6	72 - 600	PMW-10	-
cis-1,2-Dichloroethene	3 / 6	6 - 35	MW-1	3 / 6	9 - 31	PMW-10	-
trans-1,2-Dichloroethene	2 / 6	2 - 4	MW-3	2 / 6	4 - 6	MW-3	-
Methylene chloride	1 / 6	60	PMW-10	1 / 6	14	PMW-10	-
1,1,1-Trichloroethane	3 / 6	23 - 12,000	PMW-10	2 / 6	200 - 12,000	PMW-10	-
1,1,2-Trichloroethane	1 / 6	7	MW-1	2 / 6	4 - 28	PMW-10	-
Trichloroethene	4 / 6	2 - 13,000	PMW-10	2 / 6	22 - 13,000	PMW-10	-
Vinyl chloride	1 / 6	12	MW-1	2 / 6	4 - 5	PMW-10	-
Semi-Volatile Organics (µg/L)							
Bis(2-ethylhexyl)phthalate	2 / 3	1 - 2	PW-3	N/A	N/A		0.6 A(C)
TCL Pesticides / PCBs (µg/L)							
Aroclor 1262	1 / 3	0.15	PW-3	N/A	N/A		0.00012 W

TABLE 9-3
COMPARISON OF SHALLOW BEDROCK GROUNDWATER DATA TO TOXICITY BENCHMARKS
LAPP INSULATOR, LE ROY, NY

CHEMICAL	Round 1 (January 2002)			Round 2 (August 2003)			NYS Standards/Values[1] Class "C" Waters
	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	
Volatile Organics (μg/L)							
Bromomethane	1 / 6	1	SR-103	0 / 8	ND		-
2-Butanone	1 / 6	1	SR-102	0 / 8	ND		-
Chloroethane	1 / 6	18	SR-106	1 / 8	36	SR-106	-
1,1-Dichloroethane	3 / 6	180 - 24,000	SR-105	5 / 8	29 - 30,000	SR-105	-
1,1-Dichloroethene	3 / 6	36 - 1,000	SR-105	2 / 8	15 - 41	SR-106	-
cis-1,2-Dichloroethene	3 / 6	53 - 1,900	SR-105	4 / 8	33 - 1,700	SR-105	-
trans-1,2-Dichloroethene	3 / 6	2 - 100	SR-105	1 / 8	69	SR-107	-
Methylene chloride	1 / 6	2	SR-106	0 / 8	ND		-
Tetrachloroethene	1 / 6	4	SR-106	1 / 8	6	SR-106	-
1,1,1-Trichloroethane	3 / 6	410 - 120,000	SR-105	3 / 8	950 - 110,000	SR-105	-
1,1,2-Trichloroethane	1 / 6	3		0 / 8	ND		-
Trichloroethene	3 / 6	54 - 37,000	SR-105	5 / 8	15 - 35,000	SR-105	-
Vinyl chloride	1 / 6	7	SR-106	2 / 8	9 - 15	SR-107	-
m&p-Xylene	1 / 6	1	SR-103	1 / 8	13	SR-107	65 A(C)
o-Xylene	1 / 6	2	SR-103	1 / 8	5	SR-107	65 A(C)
Inorganics (mg/L)							
Aluminum	3 / 3	0.013 - 0.066	SR-103	N/A	N/A		0.1 A(C)
Arsenic	1 / 3	0.002	SR-102	N/A	N/A		0.15 A(C)
Barium	3 / 3	0.11 - 0.75	SR-103	N/A	N/A		-
Cadmium	1 / 3	0.0002	SR-103	N/A	N/A		0.004 A(C)^{2,3}
Calcium *	3 / 3	150 - 180	SR-106	N/A	N/A		-
Chromium	1 / 3	0.003	SR-106	N/A	N/A		0.14 A(C)^{3}
Cobalt	2 / 3	0.0005 - **0.0054**	SR-106	N/A	N/A		0.005 A(C)
Copper	3 / 3	0.001 - 0.002	SR-103, SR-106	N/A	N/A		0.018 A(C)^{2}
Iron *	3 / 3	**2.5 - 6.8**	SR-106	N/A	N/A		0.3 A(C)
Lead	3 / 3	0.0004 - 0.0006	SR-103	N/A	N/A		0.009 A(C)^{3}
Magnesium *	3 / 3	47 - 77	SR-102	N/A	N/A		-
Manganese	3 / 3	0.048 - 0.13	SR-102	N/A	N/A		-
Nickel	3 / 3	0.005 - 0.018	SR-102	N/A	N/A		0.1 A(C)^{3}
Potassium *	3 / 3	3.5 - 10	SR-102	N/A	N/A		-
Selenium	3 / 3	0.002 - 0.005	SR-102	N/A	N/A		-
Sodium *	3 / 3	22 - 160	SR-106	N/A	N/A		-
Zinc	3 / 3	0.005 - 0.008	SR-106	N/A	N/A		0.16 A(C)^{3}

ND = Not Detected.
N/A = Not Analyzed.
(1) From New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Division of Water, TOGS 1.1.1.
(2) Standards given are for dissolved forms
(3) Standard expressed as a function of hardness of 217 mg/L

TABLE 9-4
COMPARISON OF INTERMEDIATE BEDROCK GROUNDWATER DATA TO TOXICITY BENCHMARKS
LAPP INSULATOR, LE ROY, NY

	Round 1 (January 2002)			Round 2 (August 2003)			NYS Standards/Values[1] Class "C" Waters
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	
Volatile Organics (µg/L)							
Benzene	2 / 4	9 - 15	IR-105	3 / 4	14 - 17	IR-101	210 A(C)
2-Butanone	1 / 4	4	IR-105	1 / 4	16	IR-105	-
Chloroethane	1 / 4	5	IR-103	1 / 4	5	IR-103	-
1,1-Dichloroethane	2 / 4	110 - 130	IR-105	2 / 4	56 - 190	IR-105	-
cis-1,2-Dichloroethene	2 / 4	2 - 47	IR-103	2 / 4	4 - 16	IR-103	-
Ethylbenzene	2 / 4	4 - 12	IR-102	2 / 4	4 - 13	IR-105	17 A(C)
Toluene	2 / 4	2 - 7	IR-105	1 / 4	6	IR-101	100 A(C)
1,1,1-Trichloroethane	2 / 4	28 - 40	IR-103	2 / 4	13 - 77	IR-105	-
Trichloroethene	2 / 4	3 - 25	IR-105	1 / 4	110	IR-105	-
Vinyl chloride	1 / 4	5	IR-103	0 / 4	ND		-
m&p-Xylene	3 / 4	3 - 13	IR-102	2 / 4	6 - 10	IR-101	65 A(C)
o-Xylene	2 / 4	1 - 3	IR-105	0 / 4	ND		65 A(C)
Inorganics (mg/L)							
Aluminum	2 / 2	0.014 - 0.019	IR-102	N/A	N/A		0.1 A(C)
Arsenic	2 / 2	0.002 - 0.014	IR-102	N/A	N/A		0.15 A(C)
Barium	2 / 2	0.35 - 1.1	IR-102	N/A	N/A		-
Cadmium	1 / 2	0.0001	IR-102	N/A	N/A		0.004 A(C)[2,3]
Calcium *	2 / 2	88 - 190	IR-102	N/A	N/A		-
Copper	1 / 2	0.002	IR-102	N/A	N/A		0.018 A(C)[2]
Iron *	2 / 2	0.68 - 1.5	IR-102	N/A	N/A		0.3 A(C)
Lead	2 / 2	0.0007 - 0.0007	IR-102, IR-103	N/A	N/A		0.009 A(C)[3]
Magnesium *	2 / 2	47 - 120	IR-102	N/A	N/A		-
Manganese	2 / 2	0.02 - 0.16	IR-102	N/A	N/A		-
Nickel	2 / 2	0.002 - 0.004	IR-102	N/A	N/A		0.1 A(C)[3]
Potassium *	2 / 2	7.7 - 15	IR-102	N/A	N/A		-
Selenium	2 / 2	0.005 - 0.01	IR-102	N/A	N/A		-
Sodium *	2 / 2	90 - 300	IR-102	N/A	N/A		-
Zinc	1 / 2	0.011	IR-102	N/A	N/A		0.16 A(C)[3]

ND = Not Detected.

N/A = Not Analyzed.

(1) From New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Division of Water, TOGS 1.1.1.

(2) Standards given are for dissolved forms

(3) Standard expressed as a function of hardness of 217 mg/L

TABLE 9-5
COMPARISON OF PREDICTED SURFACE WATER CONCENTRATIONS TO TOXICITY BENCHMARKS
LAPP INSULATOR, LE ROY, NY

CHEMICAL	Predicted Surface Water Concentrations	NYS Standards/Values[1] Class "C" Waters	
Semi-Volatile Organics (µg/L)			
Bis(2-ethylhexyl)phthalate	1.76E-03	6.00E-01	A(C)
TCL Pesticides/PCBs (µg/L)			
Aroclor 1262	2.67E-06	1.20E-04	W
Inorganics (µg/L)			
Cobalt	2.72E-03	5.00E+00	A(C)
Copper	3.81E-03	1.80E+01	A(C)[2]
Iron	5.37E-01	3.00E+02	A(C)

(1) From New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent

(2) Standards given are for dissolved forms

A(C) = Fish Propagation

TABLE 9-6
COMPARISON OF SEDIMENT DATA TO TOXICITY BENCHMARKS
LAPP INSULATOR, LE ROY, NY

CHEMICAL	May-02				August-03				NYSDEC Sediment Criteria[f] Levels of Protection
	Sampling Location SED-1 Upstream Background Conditions	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Sampling Location SED-1 Upstream Background Conditions	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	
Volatile Organics (µg/kg)									
Acetone	ND	0 / 4	ND	N/A	52	4 / 4	8 - 57	SED-4	-
Benzene	ND	1 / 4	9	SED-5	ND	0 / 4	ND	N/A	280 bc
2-Butanone	ND	2 / 4	10 - 19	SED-2	17	2 / 4	6 - 13	SED-2	-
cis-1,2-Dichloroethene	ND	1 / 4	11	SED-5	ND	1 / 4	73	SED-5	-
1,1-Dichloroethane	ND	2 / 4	3 - 11	SED-5	ND	1 / 4	91	SED-5	-
Carbon Disulfide	ND	2 / 4	3 - 11	SED-5	ND	0 / 4	ND	N/A	-
Chloroethane	ND	1 / 4	64	SED-2	ND	1 / 4	20	SED-2	-
Ethylbenzene	ND	1 / 4	4	SED-5	ND	0 / 4	ND	N/A	240 bc
1,1,1-Trichloroethane	ND	1 / 4	15	SED-5	ND	1 / 4	71	SED-5	-
Trichloroethene	ND	1 / 4	2	SED-5	ND	1 / 4	3	SED-5	-
Toluene	62	2 / 4	25 - 44	SED-2	27	0 / 4	ND	N/A	490 bc
o-Xylene	ND	1 / 4	8	SED-5	ND	0 / 4	ND	N/A	920 bc
m&p-Xylene	ND	1 / 4	22	SED-5	ND	0 / 4	ND	N/A	920 bc
Semi-Volatile Organics (µg/kg)									
Acenaphthene	ND	0 / 4	ND	N/A	ND	1 / 4	**1,700**	SED-3	1,400 bc
Anthracene	ND	1 / 4	73	SED-4	ND	1 / 4	**3,400**	SED-3	1,070 bc
Benzo(a)anthracene	110	3 / 4	110 - **390**	SED-4	ND	2 / 4	**140 - 7,800**	SED-3	120 bc
Benzo(a)pyrene	92	3 / 4	150 - 370	SED-4	ND	2 / 4	140 - 6,300	SED-3	-
Benzo(b)fluoranthene	150	3 / 4	210 - 560	SED-4	ND	3 / 4	140 - 6,700	SED-3	-
Benzo(g,h,i)perylene	ND	2 / 4	150 - 410	SED-4	ND	2 / 4	130 - 4,800	SED-3	-
Benzo(k)fluoranthene	66	3 / 4	120 - 310	SED-4	ND	2 / 4	84 - 4,100	SED-3	-
Benzyl alcohol	110	2 / 4	83 - 140	SED-2	ND	0 / 4	ND	N/A	-
Benzyl butyl phthalate	ND	1 / 4	350	SED-2	ND	0 / 4	ND	N/A	-
Biphenyl	61	3 / 4	62 - 87	SED-4	ND	0 / 4	ND	N/A	-
bis(2-Ethylhexyl)phthalate	ND	1 / 4	**4,500,000**	SED-2	ND	0 / 4	ND	N/A	1,995 bc
Carbazole	ND	0 / 4	ND	N/A	ND	1 / 4	1,800	SED-3	-
Chrysene	140	3 / 4	150 - 480	SED-4	ND	3 / 4	160 - 8,100	SED-3	-
Dibenzo(a,h)anthracene	ND	0 / 4	ND	N/A	ND	1 / 4	1,200	SED-3	-
Dibenzofuran	ND	0 / 4	ND	N/A	ND	1 / 4	1,100	SED-3	-
Diethyl phthalate	ND	1 / 4	94	SED-2	ND	0 / 4	ND	N/A	-
Di-n-butyl phthalate	ND	1 / 4	120	SED-5	ND	0 / 4	ND	N/A	-
Di-n-octyl phthalate	26	0 / 4	ND	N/A	ND	0 / 4	ND	N/A	-
Fluoranthene	140	4 / 4	140 - 810	SED-4	ND	4 / 4	93 - **18,000**	SED-3	10,200 bc(E)
Fluorene	ND	0 / 4	ND	N/A	ND	1 / 4	**1,900**	SED-3	80 bc
Indeno(1,2,3-cd)pyrene	ND	2 / 4	160 - 370	SED-4	ND	2 / 4	120 - 4,300	SED-3	-
Naphthalene	ND	0 / 4	ND	N/A	ND	1 / 4	**1,100**	SED-3	300 bc
Phenanthrene	53	4 / 4	80 - 490	SED-4	ND	3 / 4	140 - **13,000**	SED-3	1,200 bc(E)
Pyrene	110	4 / 4	160 - 810	SED-4	ND	3 / 4	250 - **14,000**	SED-3	9,610 bc

TABLE 9-6
COMPARISON OF SEDIMENT DATA TO TOXICITY BENCHMARKS
LAPP INSULATOR, LE ROY, NY

CHEMICAL	May-02				August-03				NYSDEC Sediment Criteria[1] Levels of Protection
	Sampling Location SED-1 Upstream Background Conditions	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	Sampling Location SED-1 Upstream Background Conditions	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	
Pesticides / PCBs (µg/kg)									
Endrin aldehyde	ND	1 / 4	19	SED-3	ND	1 / 4	11	SED-3	-
Aroclor 1260	ND	2 / 4	**70 - 280**	SED-4	ND	0 / 4	ND	N/A	14 wb
Inorganics (mg/kg)									
Aluminum	5,400	4 / 4	1,900 - 6,800	SED-3	7,400	4 / 4	3,450 - 10,300		-
Antimony	ND	2 / 4	0.9 - 1.8	SED-4	ND	1 / 4	**6**	SED-4	2.0 (25) le (se)
Arsenic	1.6	4 / 4	0.9 - 3.7	SED-4	2.6	3 / 4	1.4 - 4.2	SED-3	6.0 (33) le (se)
Barium	74	4 / 4	24 - 110	SED-4	106	4 / 4	24.4 - 126	SED-4	-
Beryllium	0.3	3 / 4	0.3 - 0.4	SED-3 & 4	0.23	4 / 4	0.07 - 0.33	SED-4	-
Cadmium	0.3	4 / 4	0.1 - **0.8**	SED-4	0.56	4 / 4	0.12 - **0.92**	SED-4	0.6 (9.0) le (se)
Calcium	37,000	4 / 4	20,000 - 78,000	SED-2	87,200	4 / 4	31,000 - 70,500	SED-5	-
Chromium	8.4	4 / 4	4 - 12	SED-3 & 4	11.3	4 / 4	6.6 - **48.8**	SED-3	26 (110) le (se)
Cobalt	5	4 / 4	2.6 - 9.2	SED-4	6.2	4 / 4	3.4 - 16.1	SED-3	-
Copper	13	4 / 4	15 - **54**	SED-4	15.3	4 / 4	11.9 - **173**	SED-3	16 (110) le (se)
Cyanide total	0.6	4 / 4	0.17 - 0.65	SED-4	ND	0 / 4	ND	N/A	-
Iron	1,100	4 / 4	4,700 - 19,000	SED-4	14,200	4 / 4	9,090 - 16,700	SED-4	20,000 (40,000) le (se)
Lead	12	4 / 4	7.3 - **210**	SED-3	13.7	4 / 4	17.5 - **101**	SED-3	31 (110) le (se)
Magnesium	3,400	4 / 4	3,300 - 6,600	SED-2	4,360	4 / 4	4,260 - 10,500	SED-3	-
Manganese	190	4 / 4	160 - 230	SED-2	**487**	4 / 4	217 - 424	SED-3	460 (1,100) le (se)
Mercury	0.04	3 / 4	0.05 - 0.09	SED-4	ND	4 / 4	0.02 - **0.27**	SED-3	0.15 (1.3) le (se)
Nickel	14	4 / 4	6.7 - **22**	SED-4	**20.2**	4 / 4	9.7 - **32.7**	SED-3	16 (50) le (se)
Potassium	680	4 / 4	390 - 1,000	SED-4	1,310	4 / 4	767 - 1,950	SED-4	-
Selenium	ND	1 / 4	1.1	SED-4	ND	0 / 4	ND	N/A	-
Silver	0.1	4 / 4	0.1 - **2.3**	SED-4	ND	2 / 4	**1.2 - 7.4**	SED-3	1.0 (2.2) le (se)
Sodium	110	4 / 4	77 - 530	SED-4	245	4 / 4	151 - 456	SED-4	-
Thallium	0.2	3 / 4	0.2 - 0.3	SED-4	ND	0 / 4	ND	N/A	-
Vanadium	9.2	4 / 4	3.7 - 19	SED-4	14.1	4 / 4	8.6 - 29.1	SED-4	-
Zinc	50	4 / 4	28 - **130**	SED-4	R	1 / 4	**286**	SED-3	120 (270) le (se)

"ND" = Not Detected.
"N/A" = Not Applicable.
"NA" = Not Available.
"R" = Rejected

1. From NYSDEC Technical Guidance for Screening Contaminated Sediments (June 1998). "Criteria derived using the lowest level of protection for contaminated sediment offered in the guidance document with an assumed organic content of 1%".

"wb" =Wildlife Bioaccumulation
"bc" =Benthic Aquatic Life Chronic Toxicity
"le" =Lowest Effect Level
"se" =Severe Effect Level
"(E)" = EPA proposed sediment quality criteria for the protection of benthic organisims

life/acute toxicity, benthic aquatic life/chronic toxicity, and wildlife bioaccumulation. For the inorganic chemicals, the listed criteria are the lowest effect level (LELs; a level that can be tolerated by the majority of benthic organisms, but still causes toxicity to a few species) and the severe effect levels (SEL; a level at which pronounced disturbance of the sediment dwelling community can be expected).

No VOCs were found in concentrations above their respective levels of protection for benthic aquatic life chronic toxicity (LPBC), where available and thus were not established as COPECs.

Nine SVOCs were found in concentrations above the LPBCs , including eight polynuclear aromatic hydrocarbons (PAHs) (acenaphthene, anthracene, benzo(a)anthracene, fluoranthene, fluorine, naphthalene, phenanthrene, and pyrene) and bis(2-ethylhexyl)phthalate and were thus selected to be COPECs. Of these chemicals, only benzo(a)anthracene and bis(2-ethylhexyl)phthalate were found at concentrations exceeding their respective LPBCs during the May 2002 sampling event. Eight chemicals were found at concentrations exceeding their respective LPBCs during the August 2003 sampling event. Benzo(a)anthracene and fluoranthene were also detected in the background sample from the May 2002 sampling event but at concentrations below their respective LPBCs.

Pesticides and PCBs were not detected in the background sample from either sampling event. Endrin aldehyde was detected at Location SED-3 during both sampling events but no sediment criteria are available for this chemical. Aroclor 1260, a PCB, was detected at a concentration exceeding the level of protection for wildlife bioaccumulation (LPWB) at location SED-4 during the May 2002 sampling event and thus is a COPEC for this analysis, even though it was not detected in any of the August 2003 samples.

Ten inorganic chemicals were detected in concentrations exceeding the LEL, including antimony, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc and are thus COPECs. Both manganese and nickel were detected in the background sample from the August 2003 sampling event in concentrations above the LEL. In addition, with the exception of antimony, the other inorganic chemicals detected above the LELs were also found in concentrations just below the LELs in one or both of the background samples. Four inorganic chemicals were detected in concentrations exceeding the SEL, including copper, lead, silver, and zinc.

9.3.4 Soil

No New York State criteria or guidelines are currently available for the protection of wildlife from exposure to chemicals in soil. Therefore, to evaluate the potential risk of chemicals detected in soil at the Site, a screening-level approach was selected that utilizes test species to calculate benchmarks of "no observed adverse effect levels" (NOAEL) and "lowest observed adverse effect levels" (LOAEL) for common wildlife species (Sample et al., 1996).

For conservatism, the NOAEL-based benchmarks for food consumption, for representative wildlife species known or expected to inhabit the Site, are used. The receptors chosen for this evaluation are whitetail deer and short-tailed shrew (*Blarina brevicauda*). The whitetail deer was chosen due to their high abundance on and adjacent to the Site and herbivorous feeding habits. The short-tailed shrew was selected as they have a small home range, feed mainly on vegetation and earthworms and are possible inhabitants of the Site and its surroundings.

Sample Screening – Direct Comparison to Benchmarks

Soil samples were collected on site within Areas A, B, and C during October 2001. Additional soil samples were collected in Area D in July 2003. Soil samples collected in Areas A, B, and C were analyzed for VOCs, SVOCs, TCL Pesticides and PCBs, and inorganic chemicals. Soil samples collected in Area D were only analyzed for VOCs. Sample depths ranged from 0 to 12 feet, but only samples collected from 0 to 4 feet are used in this evaluation as this is the typical depth of burrowing animals and is the approximate root zone depth of most plants. These data are summarized, by hot spot area, in Tables 9-7 through 9-10. In the initial evaluations presented in these tables, the soil concentrations are simply and conservatively compared directly (i.e., without consideration of uptake into the food source) to the benchmarks for food.

Of the VOCs detected, only trichloroethene concentrations exceeded the benchmark for food for both whitetail deer and short-tailed shrew in Areas A and B. None of the SVOC

TABLE 9-7
COMPARISON OF SHALLOW SOIL DATA TO TOXICITY BENCHMARKS: AREA A
LAPP INSULATOR, LE ROY, NY

CHEMICAL	October-01			NOAEL-Based Benchmarks for Food[1]			
	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection				
Volatile Organics (µg/kg)							
Acetone	2 / 8	5 - 13	A6	91,100	W	36,600	S
Benzene	3 / 8	2 - 4	A5	129,900	W	52,200	S
Chloromethane	2 / 8	180 - 200	A12	-		-	
cis-1,2-Dichloroethene	2 / 8	15 - 1,100	A7	222,800	W	89,600	S
1,1-Dichloroethene	2 / 8	1 - 630	A1	273,300	W	109,900	S
1,1-Dichloroethane	4 / 8	110 - 6,700	A8	-		-	
Carbon Disulfide	1 / 8	6	A6	-		-	
Ethylbenzene	3 / 8	1 - 350	A1	-		-	
Tetrachloroethene	4 / 8	11 - 800	A8	6,900	W	2,770	S
1,1,1-Trichloroethane	8 / 8	38 - 65,000	A1	5,123,000	W	2,060,000	S
1,1,2-Trichloroethane	1 / 8	1,300	A1	-		-	
Trichloroethene	8 / 8	55 - **35,000**	A1	3,450	W	1,387	S
Toluene	5 / 8	6 - 280	A1	128,200	W	51,500	S
Methylene Chloride	2 / 8	2	A2 & A5	53,300	W	21,400	S
m&p-Xylene	6 / 8	3 - 380	A1	10,351	W	4,162	S
o-Xylene	5 / 8	2 - 320	A1	10,351	W	4,162	S
Semi-Volatile Organics (µg/kg)							
Benzo(a)anthracene	1 / 2	190	A1	-		-	
Benzo(a)pyrene	1 / 2	150	A1	4,930	W	1,980	S
Benzo(b)fluoranthene	1 / 2	320	A1	-		-	
Benzo(k)fluoranthene	1 / 2	97	A1	-		-	
bis(2-Ethylhexyl)phthalate	1 / 2	1,100	A8	90,000	W	36,000	S
Chrysene	1 / 2	250	A1	-		-	
Dibenzofuran	1 / 2	53	A1	-		-	
Di-n-butyl phthalate	1 / 2	220	A1	2,711,000	W	1,090,000	S
Fluoranthene	1 / 2	280	A1	-		-	
2-Methylnaphthalene	2 / 2	170 - 570	A8	-		-	
Naphthalene	2 / 2	120 - 140	A8	-		-	
Phenanthrene	2 / 2	180 - 650	A8	-		-	
Pyrene	1 / 2	320	A1	-		-	
Pesticides / PCBs (mg/kg)							
Aroclor 1260	1 / 2	0.52	A1	-		-	
Inorganics (mg/kg)							
Aluminum	2 / 2	**5,700 - 6,200**	A8	9.513	W	3.825	S
Antimony	2 / 2	**0.9**	A1 & A8	0.616	W	0.248	S
Arsenic	2 / 2	**4 - 8.5**	A1	0.621	W	0.250	S
Barium	2 / 2	**39 - 53**	A1	49.1	W	19.7	S
Beryllium	2 / 2	0.2 - 0.4	A1	-		-	
Cadmium	2 / 2	0.3 - 1.2	A8	8.79	W	3.53	S
Calcium	2 / 2	23,000 - 88,000	A8	-		-	
Chromium	2 / 2	26 - 26	A1 & A8	24,933	W	10,026	S
Cobalt	2 / 2	13 - 15	A8	-		-	
Copper	2 / 2	**65 - 360**	A8	138.600	W	55.700	S
Iron	2 / 2	16,000 - 23,000	A8	-		-	
Lead	2 / 2	**67 - 160**	A8	72.88	W	29.300	S
Magnesium	2 / 2	3,100 - 5,500	A8	-		-	
Manganese	2 / 2	170 - 300	A1	802	W	322	S
Mercury	2 / 2	0.06 - 0.13	A8	11.84	W	4.76	S
Nickel	2 / 2	12 - 27	A8	364	W	147	S
Potassium	2 / 2	400 - 600	A1	-		-	
Silver	2 / 2	0.2 - 4	A8	-		-	
Sodium	2 / 2	64 - 250	A8	-		-	
Thallium	1 / 2	**0.2**	A1	0.068	W	0.027	S
Vanadium	2 / 2	**12 - 18**	A1	1.776	W	0.714	S
Zinc	2 / 2	80 - 460	A8	1,457.600	W	586.100	S

(1) NOAEL="No Observed Adverse Effects Level for dietary level or concentration in food: fromToxicological Benchmarks for Wildlife, 1996 Revison, Prepared by the Risk Assessment Program, Health Sciences Research Division, Oak Ridge, TN."
"W" = Whitetail deer

TABLE 9-8
AREA-B SOIL SAMPLE DATA SUMMARY (0 - 4 FEET COMBINED)
LAPP INSULATOR, LE ROY, NY

	October-01			NOAEL-Based Benchmarks for Food[1]			
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**				
Volatile Organics (µg/kg)							
Acetone	2 / 9	39 - 280	B2	91,100	W	36,600	S
Benzene	8 / 9	4 - 210	B7	129,900	W	52,200	S
2-Butanone	6 / 9	11 - 380	B16	16,133,000	W	6,487,000	S
Chloromethane	4 / 9	2 - 11	B2	-		-	
cis-1,2-Dichloroethene	4 / 9	4 - 3,200	B7	222,800	W	89,600	S
1,1-Dichloroethene	2 / 9	2 - 42	B7	273,300	W	109,900	S
1,1-Dichloroethane	4 / 9	2 - 450	B7	-		-	
1,2-Dichloroethane	1 / 9	1	B2	256,100	W	103,000	S
Carbon Disulfide	7 / 9	2 - 75	B16	-		-	
Chloroform	1 / 9	10	B7	137,000	W	55,000	S
Ethylbenzene	7 / 9	2 - 23	B16	-		-	
2-Hexanone	6 / 9	5 - 2,300	B16				
4-Methyl-2-Pentanone	6 / 9	2 - 760	B16	227,700	W	91,600	S
m&p-Xylene	8 / 9	10 - 200	B16	10,351	W	4,162	S
o-Xylene	8 / 9	5 - 110	B16	10,351	W	4,162	S
Tetrachloroethene	1 / 9	26	B10	6,900	W	2,770	S
trans-1,2-Dichloroethene	3 / 9	8 - 140	B7	222,800	W	89,600	S
trans-1,3-Dichloropropene	1 / 9	140	B16				
1,1,1-Trichloroethane	2 / 9	41 - 100	B7	5,123,000	W	2,060,000	S
1,1,2-Trichloroethane	6 / 9	2 - 1,400	B16	-		-	
Trichloroethene	3 / 9	2 - 4,500	B7	3,450	W	1,387	S
Toluene	8 / 9	17 - 190	B16	128,200	W	51,500	S
Vinyl Acetate	6 / 9	12 - 500	B16	-		-	
Vinyl Chloride	2 / 9	3 - 120	B7	1,549	W	623	S
					W		S
Semi-Volatile Organics (µg/kg)							
Fluoranthene	2 / 2	84 - 260	B16	-		-	
2-Methylnaphthalene	1 / 2	110	B16	-		-	
Naphthalene	1 / 2	130	B16	-		-	
Phenanthrene	1 / 2	61	B10	-		-	
Pyrene	2 / 2	87 - 920	B16	-		-	
Pesticides / PCBs (mg/kg)							
p,p'-DDD	1 / 2	0.016	B10	7.29	W	2.93	S
Aroclor 1254	2 / 2	0.14 - 0.2	B16	0.277	W	0.111	S
Inorganics (mg/kg)				-		-	
				-		-	
Aluminum	2 / 2	6,400 - 7,700	B10	9.51	W	3.83	S
Antimony	1 / 2	0.6	B16	0.616	W	0.248	S
Arsenic	2 / 2	3.1 - 30	B16	0.621	W	0.250	S
Barium	2 / 2	48 - 53	B10	49.1	W	19.7	S
Beryllium	2 / 2	0.4	B10 & B16	-		-	
Cadmium	2 / 2	0.1 - 5.9	B16	8.79	W	3.53	S
Calcium	2 / 2	66,000 - 95,000	B16	-		-	
Chromium	2 / 2	9.7 - 89	B16	24,933	W	10,026	S
Cobalt	2 / 2	4.4 - 5.8	B10	-		-	
Copper	2 / 2	14 - 83	B16	139	W	55.70	S
Cyanide Total	1 / 2	0.22	B16	0.5881	W	0.2365	S
Iron	2 / 2	11,000 - 13,000	B10	-		-	
Lead	2 / 2	14 - 97	B16	72.88	W	29.30	S
Magnesium	2 / 2	4,300 - 10,000	B16	-		-	
Manganese	2 / 2	190 - 360	B10	802	W	322	S
Mercury	2 / 2	0.07 - 0.1	B10	11.84	W	4.76	S
Nickel	2 / 2	14 - 20	B16	364	W	147	S
Potassium	2 / 2	620 - 820	B10	-		-	
Selenium	1 / 2	1.6	B16	1.8	W	0.733	S
Silver	1 / 2	0.3	B16	-		-	
Sodium	2 / 2	170 - 250	B10	-		-	
Thallium	2 / 2	0.2	B10 & B16	0.068	W	0.027	S
Vanadium	2 / 2	13 - 22	B16	1.78	W	0.714	S
Zinc	2 / 2	49 - 4,500	B16	1458	W	586	S

(1) NOAEL="No Observed Adverse Effects Level for dietary level or concentration in food: fromToxicological Benchmarks for Wildlife, 1996 Revison, Prepared by the Risk Assessment Program, Health Sciences Research Division, Oak Ridge, TN."

"W" = Whitetail deer

TABLE 9-9
AREA-C SOIL SAMPLE DATA SUMMARY (0 - 4 FEET COMBINED)
LAPP INSULATOR, LE ROY, NY

	October-01				
CHEMICAL	Frequency of Detection	Range of Detected Concentrations	Sampling Location of Maximum Detection	NOAEL-Based Benchmarks for Food[1]	
Volatile Organics (µg/kg)					
Benzene	2 / 6	7 - 9	C23	129,900 W	52,200 S
2-Butanone	1 / 6	5	C31	16,133,000 W	6,487,000 S
Ethylbenzene	2 / 6	2 - 4	C23	-	-
Methylene Chloride	3 / 6	1 - 2	C23 & C37	53,300 W	21,400 S
m&p-Xylene	3 / 6	1 - 18	C23	10,351 W	4,162 S
o-Xylene	2 / 6	4 - 6	C23	10,351 W	4,162 S
Tetrachloroethene	4 / 6	2 - 1,400	C3	6,900 W	2,770 S
1,1,1-Trichloroethane	3 / 6	2 - 67	C39	5,123,000 W	2,060,000 S
Trichloroethene	4 / 6	4 - 88	C3	3,450 W	1,387 S
Toluene	5 / 6	2 - 28	C23	128,200 W	51,500 S
Semi-Volatile Organics (µg/kg)					
Diethyl phthalate	1 / 2	48	C37	22,590,000 W	9,084,000 S
Fluoranthene	1 / 2	39	C37	-	-
Pyrene	1 / 2	50	C37	-	-
Inorganics (mg/kg)					
Aluminum	2 / 2	6,500 - 8,500	C37	9.51 W	3.83 S
Arsenic	2 / 2	1.9 - 3.7	C37	0.616 W	0.248 S
Barium	2 / 2	30 - 56	C37	49.1 W	19.7 S
Beryllium	2 / 2	0.3 - 0.4	C37	-	-
Cadmium	1 / 2	0.1	C37	8.79 W	3.53 S
Calcium	2 / 2	1,500 - 2,400	C37	-	-
Chromium	2 / 2	8.3 - 12	C37	24,933 W	10,026 S
Cobalt	2 / 2	5.8 - 7	C37	-	-
Copper	2 / 2	9.6 - 17	C37	139 W	55.70 S
Iron	2 / 2	15,000 - 19,000	C37	-	-
Lead	2 / 2	7 - 11	C37	72.88 W	29.30 S
Magnesium	2 / 2	2,100 - 3,200	C37	-	-
Manganese	2 / 2	360 - 410	C37	802 W	322 S
Mercury	1 / 2	0.04	C37	11.84 W	4.76 S
Nickel	2 / 2	10 - 15	C37	364 W	147 S
Potassium	2 / 2	640 - 840	C37	-	-
Sodium	1 / 2	1,200	C37	-	-
Thallium	1 / 2	0.2	C3	0.068 W	0.027 S
Vanadium	2 / 2	11 - 16	C37	1.78 W	0.714 S
Zinc	2 / 2	30 - 50	C37	1,458 W	586 S

(1) NOAEL="No Observed Adverse Effects Level for dietary level or concentration in food: fromToxicological Benchmarks for Wildlife, 1996 Revison, Prepared by the Risk Assessment Program, Health Sciences Research Division, Oak Ridge, TN."

"W" = Whitetail deer

TABLE 9-10
AREA-D SOIL SAMPLE DATA SUMMARY (0 - 4 FEET COMBINED)
LAPP INSULATOR, LE ROY, NY

	July-03						
CHEMICAL	**Frequency of Detection**	**Range of Detected Concentrations**	**Sampling Location of Maximum Detection**	**NOAEL-Based Benchmarks for Food[1]**			
Volatile Organics (µg/kg)							
Tetrachloroethene	2 / 3	2 - 18	10H	6,900	W	2,770	S
1,1,1-Trichloroethane	2 / 3	3 - 12	10A	5,123,000	W	2,060,000	S
Trichloroethene	2 / 3	10 - 25	10A	3,450	W	1,387	S
				-		-	

(1) NOAEL="No Observed Adverse Effects Level for dietary level or concentration in food: fromToxicological Benchmarks for Wildlife, 1996 Revison, Prepared by the Risk Assessment Program, Health Sciences Research Division, Oak Ridge, TN."
"W" = Whitetail deer

or pesticide concentrations exceeded the benchmarks for food for either species. Aroclor 1260 was detected at concentrations exceeding the benchmark for short-tailed shrew at Area B. No other PCBs were detected at Areas A, B, C, or D.

Eight inorganic chemicals were detected in Area A at concentrations exceeding the benchmarks for both whitetail deer and short-tailed shrew. Twelve inorganic chemicals were detected in Area B at concentrations exceeding the benchmarks for whitetail deer and/or short-tailed shrew. Six inorganic chemicals were detected at concentrations exceeding the benchmarks for whitetail deer and/or short-tailed shrew in Area C.

While the purpose of a screening-level assessment is to identify those chemicals that are present at sufficiently high concentrations that they may pose a risk to wildlife, directly comparing soil quality data to NOAEL-based benchmarks for food is conservative. Such a comparison not only assumes that the wildlife species spend all of their time foraging at the Site but also assumes that the maximum concentration of a chemical in the wildlife food source (i.e., plants for whitetail deer and earthworms for short-tailed shrew) is equal to that in soil. Therefore, a more refined approach is to estimate the potential for risks to representative wildlife species using a food chain model, by calculating COPEC concentrations in the food source using appropriate uptake models (Sample et al., 1996).

Refined Screening – Food Chain Modeling

For those chemicals, indicated above, whose maximum detected concentration exceeds the benchmarks for food, the food chain model was run to estimate potential wildlife exposure based on ingestion of contaminated soil, plants, and invertebrates. The concentration in the food source was estimated using plant uptake factors (as presented in Baes et al., 1984 or calculated as in USEPA, 1999) and earthworm uptake factors (as presented in or calculated as in USEPA, 1999). The COPEC concentrations in plant tissue were converted to wet weight plant tissue using an average plant moisture of approximately 80%, based on moisture content of plant material ranging from 70% to 88% (USEPA, 1993). Because the earthworm uptake factors are based on wet weight of earthworm, no conversion was necessary. The calculations for COPEC uptake in food and estimated COPEC exposure from ingestion of contaminated soil, plants, and invertebrates are shown in Tables 9-11 to 9-16.

The following is a description of the assumptions and exposure parameters used in the food chain model. The average whitetail deer is estimated to weigh approximately 56.5 kg and have a food ingestion rate of 1.74 kg/day, wet weight of vegetation (Suter and Tsao, 1994). When normalized for body weight, the food ingestion rate is 0.031 g/g-day. The soil ingestion rate is 2% of the food ingestion rate (USEPA, 1993). The total estimated exposure for the whitetail deer is based on the assumption that 100% of the diet is from vegetation. The average short-tailed shrew is estimated to weigh approximately 0.015 kg and have a food ingestion rate of 0.62 g/g-day wet weight (USEPA, 1993). The total estimated exposure for the short-tailed shrew is based on the assumption that 88% of the diet is from soil invertebrates and 12% is from vegetation. The soil ingestion rate is 9.4% of the food ingestion rate (USEPA, 1993).

Area use factors (AUFs) represent the proportion of the wildlife species' lifetime that is spent in the area being evaluated for this assessment. AUFs are calculated for each hot spot area. The typical home range for a whitetail deer is between 145 acres and 1,285 acres, 145 acres is used as a conservative estimate. The typical home range for a short-tailed shrew is 0.96 acre. Based on the approximate footprint areas for Hot Spot Areas A, B, and C of 0.25, 0.26, and 0.63 acres, respectively, the AUFs are as follows:

Area Use Factors		
Hot Spot	**Whitetail Deer**	**Short-tailed Shrew**
Area A	0.002	0.3
Area B	0.002	0.3
Area C	0.004	0.7

The risk characterization is in the form of HQs calculated as the ratio of the total wildlife exposure estimates to toxicity reference values (TRVs), where available. The risk characterization for surface soils also includes a qualitative discussion of potential risks, taking into account habitat quality and other factors that could affect risk.

The results of the food chain modeling for Hot Spot Area A are presented in Tables 9-11 and 9-12 for the whitetail deer and short-tailed shrew, respectively. Based on ingestion of soil, plants, and earthworms, the following COPEC have estimated HQs greater than 1.0, indicating the potential for adverse effects:

- Short-tailed Shrew – trichloroethene, aluminum, arsenic, and vanadium.

TABLE 9-11
FOOD CHAIN MODEL: WHITETAIL DEER - AREA A
LAPP INSULATOR, LE ROY, NY

Chemical	Concentration in Soil (mg/kg)	Plant Uptake Factor (PUF)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Whitetail Deer TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Volatile Organics								
Trichloroethene	35	1.55E+00	4.33E+01	4.31E-05	2.68E-03	2.73E-03	0.106	3E-02
Inorganics								
Aluminum	6,200	4.00E-03	1.98E+01	7.64E-03	1.23E-03	8.87E-03	0.293	3E-02
Antimony	0.9	2.00E-01	1.44E-01	1.11E-06	8.93E-06	1.00E-05	0.019	5E-04
Arsenic	8.5	4.00E-02	2.72E-01	1.05E-05	1.69E-05	2.73E-05	0.019	1E-03
Barium	53	1.50E-01	6.36E+00	6.53E-05	3.94E-04	4.60E-04	1.5	3E-04
Copper	360	4.00E-01	1.15E+02	4.43E-04	7.14E-03	7.59E-03	4.3	2E-03
Lead	160	4.50E-02	5.76E+00	1.97E-04	3.57E-04	5.54E-04	2.24	2E-04
Thallium	0.2	8.50E-04	1.36E-04	2.46E-07	8.43E-09	2.55E-07	0.002	1E-04
Vanadium	18	5.50E-03	7.92E-02	2.22E-05	4.91E-06	2.71E-05	0.055	5E-04
	Cs = MAX of detected conc. in surface soil (dry weight)	(dry weight)	Cv = Cs x PUF*80% (wet weight)	EEsoil = Cs x FS x IR x FR x AUF / B FS = 2% (USEPA, 1993) IR = 1.74 kg/day (wet weight) FR = 1 BW = 56.5 kg	EEveg = Cv x FRv x NIRv x AUF FRv = 1 NIRv = 0.031 g/g-day NIRv = 1.74 kg/day / 56.5 kg BW) (wet weight)	EEtotal = EEsoil + Eeveg AUF = 0.002		HQ = EEtotal / TRVr

Note: Highlighting indicates that HQ > 1.0

TABLE 9-12
FOOD CHAIN MODEL: SHORT-TAILED SHREW - AREA A
LAPP INSULTAOR, LE ROY, NY

Chemical	Concentration in Soil (mg/kg)	Plant Uptake Factor (PUF)	Concentration in Vegetation (mg/kg)	Earthworm Uptake Factor (EUF)	Concentration in Invertebrates (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Estimated Exposure from Invertebrates (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Short-tailed Shrew TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Volatile Organics											
Trichloroethene	35	1.55E+00	4.33E+01	6.85E+00	2.40E+02	6.12E-01	9.09E-01	3.96E+01	4.11E+01	0.832	5E+01
Inorganics											
Aluminum	6,200	4.00E-03	1.98E+01	2.20E-01	1.36E+03	1.08E+02	4.17E-01	2.25E+02	3.34E+02	2.295	1E+02
Antimony	0.9	2.00E-01	1.44E-01	2.20E-01	1.98E-01	1.57E-02	3.02E-03	3.27E-02	5.14E-02	0.149	3E-01
Arsenic	8.5	4.00E-02	2.72E-01	1.10E-01	9.35E-01	1.49E-01	5.71E-03	1.54E-01	3.09E-01	0.150	2E+00
Barium	53	1.50E-01	6.36E+00	2.20E-01	1.17E+01	9.27E-01	1.34E-01	1.92E+00	2.98E+00	11.8	3E-01
Copper	360	4.00E-01	1.15E+02	4.00E-02	1.44E+01	6.29E+00	2.42E+00	2.38E+00	1.11E+01	33.4	3E-01
Lead	160	4.50E-02	5.76E+00	3.00E-02	4.80E+00	2.80E+00	1.21E-01	7.92E-01	3.71E+00	17.58	2E-01
Thallium	0.2	8.50E-04	1.36E-04	2.20E-01	4.40E-02	3.50E-03	2.86E-06	7.26E-03	1.08E-02	0.016	7E-01
Vanadium	18	5.50E-03	7.92E-02	2.20E-01	3.96E+00	3.15E-01	1.66E-03	6.53E-01	9.70E-01	0.428	2E+00
	Cs = MAX of detected conc. in surface soil (dry weight)	(dry weight)	Cv = Cs x PUF*80% (wet weight)	(wet weight)	Cv = Cs x PUF (wet weight)	EEsoil = Cs x FS x IR x FR x AUF / B FS = 9.4% (USEPA, 1993) IR = 0.0093 kg/day (wet weight) FR = 1 BW = 0.015 kg	EEveg = Cv x FRv x NIRv x AU FRv = 1 NIRv = 0.07 g/g-day NIRv = 0.62 g/g-day * 12% (wet weight)	EEinvert = Ci x FRi x NIRi x AU FRi = 1 NIRi = 0.55 g/g-day NIRv = 0.62 g/g-day * 88% (wet weight)	EEtotal = EEsoil + Eeveg + EEinvert AUF = 0.3	NA = Not Available	HQ = EEtotal / TRVr

Note: Highlighting indicates that HQ > 1.0

The results of the food chain modeling for Hot Spot Area B are presented in Tables 9-13 and 9-14 for the whitetail deer and short-tailed shrew, respectively. Based on ingestion of soil, plants, and earthworms, the following COPEC have estimated HQs greater than 1.0, indicating the potential for adverse effects:

- Short-tailed Shrew – trichloroethene, aluminum, arsenic, and zinc.

The results of the food chain modeling for Hot Spot Area C are presented in Tables 9-15 and 9-16 for the whitetail deer and short-tailed shrew, respectively. Based on ingestion of soil, plants, and earthworms, the following COPEC have estimated HQs greater than 1.0, indicating the potential for adverse effects:

- Short-tailed Shrew – aluminum and arsenic.

An additional comparison of the maximum detected concentrations of these inorganic chemicals to background levels in soil samples from the Site and New York State soils is presented in Table 9-17. As indicated in the table, the maximum detected aluminum and vanadium concentrations are somewhat elevated relative to the site-specific soil levels but less than or within the range for New York State soils. As a result, aluminum and vanadium are not considered further.

PCBs were also analyzed for in seven surface soil samples collected in targeted areas throughout the Site. The maximum detected concentrations of each PCB mixture (Aroclor) at the HVT Area and the BURR-2 Area, locations where the maxima occurred, were evaluated in a food chain model as described above for whitetail deer and short-tailed shrew, as presented in Tables 9-18 and 9-19, respectively. This evaluation does not result in HQs that exceed 1.0, indicating the potential for adverse effects are unlikely.

9.3.5 Selection of COPEC Summary

Comparing analytical results with appropriate NYSDEC standards and criteria and the food chain modeling, COPEC whose maximum detected concentrations in surface water and sediment in Oatka Creek exceed the standards, criteria, or benchmarks or whose HQs for wildlife exposure with on-site soil exceed 1.0, are considered to indicate a potential for adverse effects. The COPEC selected are presented in Table 9-20. However, this is

TABLE 9-13
FOOD CHAIN MODEL: WHITETAIL DEER - AREA B
LAPP INSULATOR, LE ROY, NY

Chemical	Concentration in Soil (mg/kg)	Plant Uptake Factor (PUF)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Whitetail Deer TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Volatile Organics								
Trichloroethene	4.5	1.55E+00	5.57E+00	5.54E-06	3.45E-04	3.51E-04	0.106	3E-03
PCBs								
Aroclor 1254	0.2	8.96E-03	1.43E-03	2.46E-07	8.89E-08	3.35E-07	0.009	4E-05
Inorganics								
Aluminum	7,700	4.00E-03	2.46E+01	9.49E-03	1.53E-03	1.10E-02	0.293	4E-02
Antimony	0.6	2.00E-01	9.60E-02	7.39E-07	5.95E-06	6.69E-06	0.019	4E-04
Arsenic	30	4.00E-02	9.60E-01	3.70E-05	5.95E-05	9.65E-05	0.019	5E-03
Barium	53	1.50E-01	6.36E+00	6.53E-05	3.94E-04	4.60E-04	1.5	3E-04
Cadmium	5.9	5.50E-01	2.60E+00	7.27E-06	1.61E-04	1.68E-04	0.271	6E-04
Copper	83	4.00E-01	2.66E+01	1.02E-04	1.65E-03	1.75E-03	4.3	4E-04
Lead	97	4.50E-02	3.49E+00	1.19E-04	2.17E-04	3.36E-04	2.24	1E-04
Manganese	360	2.50E-01	7.20E+01	4.43E-04	4.46E-03	4.91E-03	25	2E-04
Selenium	1.6	2.50E-02	3.20E-02	1.97E-06	1.98E-06	3.95E-06	0.056	7E-05
Thallium	0.2	8.50E-04	1.36E-04	2.46E-07	8.43E-09	2.55E-07	0.002	1E-04
Vanadium	22	5.50E-03	9.68E-02	2.71E-05	6.00E-06	1.30E-02	0.055	2E-01
Zinc	4,500	1.50E+00	5.40E+03	5.54E-03	3.35E-01	3.40E-01	44.9	8E-03
	Cs = MAX of detected conc. in surface soil (dry weight)	(dry weight)	Cv = Cs x PUF*80% (wet weight)	EEsoil = Cs x FS x IR x FR x AUF / B FS = 2% (USEPA, 1993) IR = 1.74 kg/day (wet weight) FR = 1 BW = 56.5 kg	EEveg = Cv x FRv x NIRv x AUF FRv = 1 NIRv = 0.031 g/g-day NIRv = 1.74 kg/day / 56.5 kg BW) (wet weight)	EEtotal = EEsoil + Eeveg AUF = 0.002	NA = Not Available	HQ = EEtotal / TRVr

Note: Highlighting indicates that HQ > 1.0

TABLE 9-14
FOOD CHAIN MODEL: SHORT-TAILED SHREW - AREA B
LAPP INSULATOR, LE ROY, NY

Chemical	Concentration in Soil (mg/kg)	Plant Uptake Factor (PUF)	Concentration in Vegetation (mg/kg)	Earthworm Uptake Factor (EUF)	Concentration in Invertebrates (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Estimated Exposure from Invertebrates (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Short-tailed Shrew TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Volatile Organics											
Trichloroethene	4.5	1.55E+00	5.57E+00	6.85E+00	3.08E+01	7.87E-02	1.17E-01	5.09E+00	5.29E+00	0.832	6E+00
PCBs											
Aroclor 1254	0.2	4.61E-03	7.37E-04	1.13E+00	2.26E-01	3.50E-03	1.55E-05	3.73E-02	4.08E-02	0.067	6E-01
Inorganics											
Aluminum	7,700	4.00E-03	2.46E+01	2.20E-01	1.69E+03	1.35E+02	5.17E-01	2.80E+02	4.15E+02	2.295	2E+02
Antimony	0.6	2.00E-01	9.60E-02	2.20E-01	1.32E-01	1.05E-02	2.02E-03	2.18E-02	3.43E-02	0.149	2E-01
Arsenic	30	4.00E-02	9.60E-01	1.10E-01	3.30E+00	5.25E-01	2.02E-02	5.45E-01	1.09E+00	0.150	7E+00
Barium	53	1.50E-01	6.36E+00	2.20E-01	1.17E+01	9.27E-01	1.34E-01	1.92E+00	2.98E+00	11.8	3E-01
Cadmium	5.9	5.50E-01	2.60E+00	9.60E-01	5.66E+00	1.03E-01	5.45E-02	9.35E-01	1.09E+00	2.12	5E-01
Copper	83	4.00E-01	2.66E+01	4.00E-02	3.32E+00	1.45E+00	5.58E-01	5.48E-01	2.56E+00	33.4	8E-02
Lead	97	4.50E-02	3.49E+00	3.00E-02	2.91E+00	1.70E+00	7.33E-02	4.80E-01	2.25E+00	17.58	1E-01
Manganese	360	2.50E-01	7.20E+01	2.20E-01	7.92E+01	6.29E+00	1.51E+00	1.31E+01	2.09E+01	193	1E-01
Selenium	1.6	2.50E-02	3.20E-02	2.20E-01	3.52E-01	2.80E-02	6.72E-04	5.81E-02	8.67E-02	0.44	2E-01
Thallium	0.2	8.50E-04	1.36E-04	2.20E-01	4.40E-02	3.50E-03	2.86E-06	7.26E-03	1.08E-02	0.016	7E-01
Vanadium	22	5.50E-03	9.68E-02	2.20E-01	9.90E-02	3.85E-01	2.03E-03	1.63E-02	4.03E-01	0.428	8E-01
Zinc	4,500	1.50E+00	5.40E+03	5.60E-01	2.52E+03	7.87E+01	1.13E+02	4.16E+02	6.08E+02	351.7	2E+00
	Cs = MAX of detected conc. in surface soil (dry weight)	(dry weight)	Cv = Cs x PUF*80% (wet weight)	(wet weight)	Cv = Cs x PUF*80% (wet weight)	EEsoil = Cs x FS x IR x FR x AUF / B FS = 9.4% (USEPA, 1993) IR = 0.0093 kg/day (dry weight) FR = 1 BW = 0.015 kg	EEveg = Cv x FRv x NIRv x AU FRv = 1 NIRv = 0.07 g/g-day NIRv = 0.62 g/g-day * 12% (wet weight)	EEinvert = Ci x FRi x NIRi x A FRi = 1 NIRi = 0.55 g/g-day NIRv = 0.62 g/g-day * 88% (wet weight)	EEtotal = EEsoil + EEinvert AUF = 0.3	NA = Not Available	HQ = EEtotal / TRVr

Note: Highlighting indicates that HQ > 1.0

TABLE 9-15
FOOD CHAIN MODEL: WHITETAIL DEER - AREA C
LAPP INSULATOR, LE ROY, NY

Chemical	Concentration in Soil (mg/kg)	Plant Uptake Factor (PUF)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Whitetail Deer TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Inorganics								
Aluminum	8,500	4.00E-03	2.72E+01	1.05E-02	1.69E-03	1.22E-02	0.293	4E-02
Arsenic	3.7	4.00E-02	1.18E-01	4.56E-06	7.34E-06	1.19E-05	0.019	6E-04
Barium	56	1.50E-01	6.72E+00	6.90E-05	4.17E-04	4.86E-04	1.5	3E-04
Manganese	410	2.50E-01	8.20E+01	5.05E-04	5.08E-03	5.59E-03	25	2E-04
Thallium	0.2	8.50E-04	1.36E-04	2.46E-07	8.43E-09	2.55E-07	0.002	1E-04
Vanadium	16	5.50E-03	7.04E-02	1.97E-05	4.36E-06	2.41E-05	0.055	4E-04
	Cs = MAX of detected conc. in surface soil (dry weight)	(dry weight)	Cv = Cs x PUF*80% (wet weight)	EEsoil = Cs x FS x IR x FR x AUF / B FS = 2% (USEPA, 1993) IR = 1.74 kg/day (wet weight) FR = 1 BW = 56.5 kg	EEveg = Cv x FRv x NIRv x AUF FRv = 1 NIRv = 0.031 g/g-day NIRv = 1.74 kg/day / 56.5 kg BW (wet weight)	EEtotal = EEsoil + EEveg AUF = 0.002	NA = Not Available	HQ = EEtotal / TRVr

Note: Highlighting indicates that HQ > 1.0

TABLE 9-16
FOOD CHAIN MODEL: SHORT-TAILED SHREW - AREA C
LAPP INSULATOR, LE ROY, NY

Chemical	Concentration in Soil (mg/kg)	Plant Uptake Factor (PUF)	Concentration in Vegetation (mg/kg)	Earthworm Uptake Factor (EUF)	Concentration in Invertebrates (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Estimated Exposure from Invertebrates (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Short-tailed Shrew TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Inorganics											
Aluminum	8,500	4.00E-03	2.72E+01	2.20E-01	1.87E+03	4.95E+02	8.43E-01	2.43E+02	7.39E+02	2.295	3E+02
Arsenic	3.7	4.00E-02	1.18E-01	1.10E-01	4.07E-01	2.16E-01	3.67E-03	5.29E-02	2.72E-01	0.150	2E+00
Barium	56	1.50E-01	6.72E+00	2.20E-01	1.23E+01	3.26E+00	2.08E-01	1.60E+00	5.07E+00	11.8	4E-01
Manganese	410	2.50E-01	8.20E+01	2.20E-01	9.02E+01	2.39E+01	2.54E+00	1.17E+01	3.82E+01	193	2E-01
Thallium	0.2	8.50E-04	1.36E-04	2.20E-01	4.40E-02	1.17E-02	4.22E-06	5.72E-03	1.74E-02	0.016	1E+00
Vanadium	16	5.50E-03	7.04E-02	2.20E-01	9.90E-02	9.32E-01	2.18E-03	1.29E-02	9.48E-01	0.428	2E+00
	Cs = MAX of detected conc. in surface soil (dry weight)	(dry weight)	Cv = Cs x PUF*80% (wet weight)	(wet weight)	Cv = Cs x PUF (wet weight)	EEsoil = Cs x FS x IR x FR x AUF / B FS = 9.4% (USEPA, 1993) IR = 0.0093 kg/day (dry weight) FR = 1 BW = 0.015 kg	EEveg = Cv x FRv x NIRv x AU FRv = 1 NIRv = 0.07 g/g-day NIRv = 0.62 g/g-day * 12% (wet weight)	EEinvert = Ci x FRi x NIRi x AU FRi = 1 NIRi = 0.55 g/g-day NIRi = 0.62 g/g-day * 88% (wet weight)	EEtotal = EEsoil + EEveg + EEinvert AUF = 0.3	NA = Not Available	HQ = EEtotal / TRVr

Note: Highlighting indicates that HQ > 1.0

TABLE 9-17

Comparison of COPEC Concentrations in Shallow Soil to Site-Specific and New York State Background Levels

Lapp Insulator, LeRoy, NY

Chemical	Maximum Detected Concentration (mg/kg)	Site-Specifc Background Concentration Range (mg/kg)	New York State Background Concentration Range[1] (mg/kg)
Aluminum	6,200 (Area A)	3,800 - 7,100	1,000 - 25,000 (Albany Area)
	7,700 (Area B)		
	8,500 (Area C)		
Arsenic	30 (Area C)	ND - 3.5	3 - 12 (New York State)
Vanadium	22 (Area C)	6 - 13	25 - 60 (Albany Area)
Zinc	4,500 (Area C)	27 - 59	37 -60 (Albany Area)

1 = From "Background concentrations of 20 elements in soils with special regard for New York State" prepared by E. Carol McGovern, Wildlife Resouces Center, NYSDEC

ND = Not detected

TABLE 9-18
FOOD CHAIN MODEL: WHITETAIL DEER - PCB AREAS
LAPP INSULATOR, LE ROY, NY

Chemical	Concentration in Soil (mg/kg)	Plant Uptake Factor (PUF)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Whitetail Deer TRV (mg/kg BW-day)	Hazard Quotient (unitless)
PCBs HVT Area								
Aroclor 1248	0.46	8.38E-03	3.09E-03	2.83E-04	9.57E-05	3.79E-04	0.106	4E-03
Aroclor 1254	0.55	4.61E-03	2.03E-03	3.39E-04	6.28E-05	4.02E-04	0.002	2E-01
Aroclor 1260	0.21	6.43E-04	1.08E-04	1.29E-04	3.35E-06	1.33E-04	0.055	2E-03
BURR-2 Area								
Aroclor 1260	1.4	6.43E-04	7.20E-04	8.62E-04	2.23E-05	8.85E-04	0.055	2E-02
	Cs = MAX * (dry weight)	(dry weight)	Cv = Cs x PUF*80% (wet weight)	EEsoil = Cs x FS x IR x FR / BW FS = 2% (USEPA, 1993) IR = 1.74 kg/day (wet weight) FR = 1 BW = 56.5 kg	EEveg = Cv x FRv x NIRv FRv = 1 NIRv = 0.031 g/g-day NIRv = 1.74 kg/day / 56.5 kg BW) (wet weight)	EEtotal = EEsoil + Eeveg	NA = Not Available	HQ = EEtotal / TRVr

Note: Highlighting indicates that HQ > 1.0

MAX * = maximum detected concentration in samples collected from targeted PCB areas HVT and BURR-2.

TABLE 9-19
FOOD CHAIN MODEL: SHORT-TAILED SHREW - PCB AREAS
LAPP INSULTAOR, LE ROY, NY

Chemical	Concentration in Soil (mg/kg)	Plant Uptake Factor (PUF)	Concentration in Vegetation (mg/kg)	Earthworm Uptake Factor (EUF)	Concentration in Invertebrates (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Estimated Exposure from Invertebrates (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Short-tailed Shrew TRV (mg/kg BW-day)	Hazard Quotient (unitless)
PCBs											
HTV Area											
Aroclor 1248	0.46	8.38E-03	3.09E-03	1.13E+00	5.20E-01	2.68E-02	2.16E-04	2.86E-01	3.13E-01	0.832	4E-01
Aroclor 1254	0.55	4.61E-03	2.03E-03	1.13E+00	6.22E-01	3.21E-02	1.42E-04	3.42E-01	3.74E-01	0.832	4E-01
Aroclor 1260	0.21	6.43E-04	1.08E-04	1.13E+00	2.37E-01	1.22E-02	7.56E-06	1.31E-01	1.43E-01	0.832	2E-01
BURPR-2 Area											
Aroclor 1260	1.4	6.43E-04	7.20E-04	1.13E+00	1.58E+00	8.16E-02	5.04E-05	8.70E-01	9.52E-01	0.832	1E+00
	Cs = MAX * (dry weight)	(dry weight)	Cv = Cs x PUF*80% (wet weight)	(wet weight)	Cv = Cs x PUF (wet weight)	EEsoil = Cs x FS x IR x FR / BW FS = 9.4% (USEPA, 1993) IR = 0.0093 kg/day (wet weight) FR = 1 BW = 0.015 kg	EEveg = Cv x FRv x NIRv FRv = 1 NIRv = 0.07 g/g-day NIRv = 0.62 g/g-day * 12% (wet weight)	EEinvert = Ci x FRi x NIRi FRi = 1 NIRi = 0.55 g/g-day NIRv = 0.62 g/g-day * 88% (wet weight)	EEtotal = EEsoil + Eeveg + EEinvert	NA = Not Available	HQ = EEtotal / TRVr

Note: Highlighting indicates that HQ > 1.0

MAX * = maximum detected concentration in samples collected from targeted PCB areas HVT and BURR-2.

TABLE 9-20

CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN THAT MAY CAUSE POTENTIAL ADVERSE EFFECTS
LAPP INSULATOR, LE ROY, NY

CHEMICAL	Surface Water	Sediment	Shallow Soil			Groundwater Discharge
			Area A	Area B	Area C	
VOLATILE ORGANICS						
Trichloroethene			X	X		
SEMIVOLATILE ORGANICS						
Acenaphthene		X				
Anthracene		X				
Benzo(a)anthracene		X				
bis(2-Ethylhexyl)phthalate		X				
Fluoranthene		X				
Fluorene		X				
Naphthalene		X				
Phenanthrene		X				
Pyrene		X				
PCBs						
Aroclor 1260		X				
INORGANICS						
Aluminum	X		X	X	X	
Antimony		X				
Arsenic			X	X	X	
Cadmium		X				
Chromium		X				
Copper		X				
Iron	X					
Lead		X				
Manganese		X				
Mercury		X				
Nickel		X				
Silver		X				
Vanadium			X			
Zinc		X		X		

X = Maximum detected concentrations either exceed standards, criteria, or benchmarks in surface water and sediment or result in HQs that exceed 1.0 for soil.

not to suggest that fish and wildlife are currently being adversely affected from contact with these media, but rather that the potential may exist for adverse effects to occur. Risk can only be determined by taking into account frequency and magnitude of exposure as described below.

9.4 Pathway/Exposure Analysis

9.4.1 Chemical Migration

Two major pathways for COPEC to migrate from the Site potentially exist:

- Leaching of COPEC from soil to groundwater and the subsequent discharge of overburden and shallow and intermediate bedrock groundwater to Oatka Creek.
- Transport downstream of COPEC incorporated into sediment in Oatka Creek.

Groundwater flow is towards Oatka Creek and discharge, while slow (as described in Section 5.0), is occurring primarily through the overburden and shallow bedrock zones. Once COPEC enter the creek, the immediate potential for transport downstream may be reduced due to the possible reduced flow in this section of the creek resulting from the Munson Street Dam located immediately downstream of the Site. This reduced flow results in sediment deposition within the creek as evidenced by the emergent wetland islands that were likely formed following construction of the dam.

Once a COPEC enters the creek it has the potential to adsorb to suspended solids and be deposited on the substrate due to the creek's slowed velocity in the vicinity of the Site. Consequently, elevated concentrations of SVOCs, PCBs, and inorganic chemicals above the LPBC for sediments could result. It is likely that this elevation in chemical concentrations has taken place over time rather than through the discharge of slugs of groundwater containing elevated concentrations of COPEC. This is evidenced by the fact that all of the SVOCs detected above the criteria in stream sediments, with the exception of bis(2-ethlyhexyl)phthalate, were not detected above the standards in groundwater when compared with NYS surface water standards. This indicates that the concentration of these chemicals in groundwater at the time of discharge is low, gradual, and subject to dilution in surface water prior to adsorption to sediments. The same scenario is apparent with most of the inorganic chemicals detected above the standards in surface water and sediment when compared to the concentrations in groundwater. Exceptions include aluminum, iron, and copper where concentrations in groundwater exceeded the standards for surface water.

Storm water flow on the surface could potentially provide another, less prominent, pathway for COPEC in on-Site soil to migrate to Oatka Creek. Many of the inorganic chemicals detected above the NOAEL-based benchmarks in soil were also detected in stream sediment in concentrations above the LPBC. This potentially indicates transport of the COPEC through surface runoff is a possible chemical migration pathway; however, leaching of COPEC from soil to groundwater and the subsequent discharge of groundwater to Oatka Creek is likely a more prominent chemical migration pathway.

Sediment samples downstream of the Munson Street dam suggest that the transport of COPEC is limited or at least slowed by the dam, thereby reducing risks to aquatic biota in the Class C(t) waters downstream. It is also plausible that there are other sources of COPEC upstream of the Site since with the reduced flow of Oatka Creek as it passes the Site, there is undoubtedly sediment deposition occurring in the creek adjacent to the Site. It is possible that the reach adjacent to the Site could be one of the first sections of the creek with this level of reduced velocity for 10 to 15 miles. If this were the case, deposited sediments could potentially be laden with some of the COPEC. Most of the inorganic chemicals detected in concentrations in excess of their criteria were detected in the upstream background samples at concentrations close to, but below the criteria. Nickel and manganese actually exceeded the LPBC in background sediment samples during the August 2003 sampling event. Even if no industrial sources are present upstream of the Site, inorganic chemicals and other COPEC detected in surface sediment can often be transported in storm water. These sediments would likely be transported substantial distances before settling to the substrate upstream the Munson Street Dam, and adjacent to the Site. Therefore, there is a possibility for off-Site sources to be contributing some of the COPEC found in Oatka Creek.

9.4.2 Fish and Wildlife Exposure

Regardless of the pathway, chemicals have been deposited on the substrate of Oatka Creek over time and have resulted in the potential for exposure to fish and wildlife utilizing the creek. The primary fish and wildlife at potential risk of exposure include benthic organisms and species of fish within the creek that live in or near the substrate. Benthic organisms within Oatka Creek appear to be at the greatest risk for exposure to COPEC from the Site. This in turn has the potential to expose wildlife such as nesting waterfowl that feed on benthic organisms to support egg production in the spring. In addition, many of the fish species known to inhabit this portion of the creek are bottom dwelling and many feed directly on invertebrates and lay their eggs on the substrate. As indicated previously, the dam likely prevents, or greatly reduces sediment-adsorbed COPEC from being transported downstream except during heavy rain events, thereby greatly minimizing risks to species downstream. Sediment samples downstream of the dam at Location SED-5 resulted in the same SVOCs detected in upstream samples but at concentrations below the LPBC.

Only two inorganic chemicals were detected in surface water at concentrations above the surface water standards or guidance values for fish propagation. Fish and invertebrates in this portion of the creek likely exhibit the greatest risk of exposure to these COPEC as they are both in constant contact with the substrate and water column and could be exposed through cutaneous means, as well as ingestion. Consequently, reproduction within both groups is potentially at risk in this portion of the creek, as well. Additionally, species that feed directly on fish and/or invertebrates such as great blue herons (*Ardea herodias*) could potentially be at risk from bioaccumulated COPEC.

Terrestrial animals that burrow and feed on organisms in soil, on or adjacent to the Site, and species that consume plant matter on-Site and along the creek could also potentially be at risk of exposure. There is evidence of significant use of the Site by whitetail deer. Trichloroethene, Aroclor 1254 and several inorganic chemicals were identified as COPEC in the soil at the Site. However, no deer tracks were observed in hot spot Areas A and B Areas and they do not likely utilize these hot spot areas due to the lack of vegetation and close proximity to buildings. Likewise, shrews are more likely to burrow and feed on earthworms along the wooded slopes adjacent to these hot spot areas and along the creek rather than directly in these hot spot areas, due to soil compaction and lack of food and cover. Most of the deer tracks were observed on the north and south ends of the Site and adjacent to the creek. Whitetail deer do not tend to feed in one spot on one group of plants for long durations, but rather continuously move as they browse. Therefore, it is likely that a large portion of their food is consumed in areas away from the Site and hot spot areas. As a result, AUFs were applied accordingly and the HQs were below 1.0 for the whitetail deer potentially feeding at Hot Spot Areas A, B, and C, indicating that adverse effects from potential exposure at the Site is unlikely.

Trichloroethene, and a few inorganic chemicals in the soil not related to the Site, are associated with HQs greater than 1.0, indicating a potential for adverse effects for short-tailed shrew. Although no shrews have been observed at the Site, their occurrence is possible as they are a common species and the riparian habitats adjacent to the Site offer suitable habitat. However, it is not likely that, if present, they would spend much time in Hot Spot Areas A, B, and C due to the compacted, gravel-topped soil and lack of vegetation. Shrews are omnivores and are known to eat insects, worms, snails and other invertebrates, and vegetation, and also may eat other vertebrates such as mice, voles and frogs. In turn, many species prey on shrew including fox, owls, hawks, weasel and a variety of other carnivorous mammals (USEPA, 1993). Short-tailed shrews in and adjacent to the Site could potentially be at risk of exposure because they are directly in contact with the soil as they typically live between 0.33 and 1.64 feet under the ground. If their diet at the Site consisted mainly of earthworms and snails, which is often the case, the potential for exposure could be high. Consequently, the numerous predators of the shrew could also be subject to exposure of COPEC through ingestion of exposed shrews.

9.5 Summary

Natural resources on the Site are minimal, but are abundant immediately adjacent to the Site. Consequently, wildlife use in and around the Site appears to be abundant and somewhat diverse. Hot Spot Areas A, B, and C, being mostly gravel-paved areas around buildings, are not likely to be attractive to most wildlife species due to the lack of vegetation for food and cover. Wildlife is more likely to be found in the vegetated areas on-Site and adjacent to the Site.

The following summarizes the results of this screening-level ecological risk assessment by medium:

- Surface Water - Aluminum and iron were detected in surface water at concentrations exceeding their respective NYSDEC Standards or Guidance Values for "Class C" waters. Aluminum in the corresponding background sample equaled its standard and iron in the corresponding background sample was just below the standard. None of the predicted chemical concentrations in surface water from discharge of groundwater to Oatka Creek exceed the surface water standards or guidance values.
- Sediment – Ten inorganic chemicals were detected in concentrations exceeding the LEL, including antimony, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc and four inorganic chemicals were detected in concentrations exceeding the SEL, including copper, lead, silver, and zinc. Both manganese and nickel were detected in one of the background samples in concentrations above the LEL and, with the exception of antimony, the other inorganic chemicals were detected in one or both background samples just below the LELs.
- Food chain modeling for Hot Spot areas A, B, and C indicates a potential for adverse effects due to exposure to a short-tailed shrew. HQs for the short-tailed shrew were above 1.0 but below 10 for arsenic and vanadium at Area A, trichloroethene, arsenic, and zinc at Area B, and arsenic at Area C. HQs for the short-tailed shrew were above 10 for trichloroethene and aluminum, at Area A and aluminum at Areas B and C.

9.6 Conclusions

Based on the results of this screening-level assessment, there is a potential for adverse effects to aquatic life and wildlife, however, the magnitude of adverse effects from chemicals at or migrating from the Site is expected to be low. The primary areas of concern are Oatka Creek immediately adjacent to the Site and the on-site soil in Areas A, B, and C. With the exception of antimony, the concentrations of the inorganic chemicals in surface water and sediment identified as exceeding standards and LELs are also detected in background in similar concentrations and thus are not considered site-related chemicals. As such, surface water and sediment are not considered as concerns related to the Site. While the food chain modeling indicates that potential for adverse effects may exist for short-tailed shrews on-Site, it is not likely that short-tailed shrews, if present on-

Site, would spend much time at the hot spot areas due to the compacted, gravel-topped soil and lack of vegetation. Short-tailed shrews, if present, are more likely to occupy the riparian areas adjacent to Oatka Creek.

Summary of Findings

SECTION

10

10.1 Background

The Lapp site is an active manufacturing facility engaged in the production of ceramic insulators used for electrical transmission. The facility is located on approximately 80 acres of land on either side of 130 Gilbert Street in the Village and Town of Leroy, New York. The site is bordered to the west by the B&O Railroad tracks, to the north by Munson Street and to the south by Oatka Creek.

Historical records indicate that oils, petroleum based products, and chlorinated solvents; including 1,1,1-trichloroethane (TCA), trichloroethene (TCE), and tetrachloroethene (PCE), were stored and utilized for production at the Lapp site, primarily on the east side of Gilbert Street. Due diligence investigations revealed the presence of these VOCs in on-site soils and groundwater. As a result, Lapp's LeRoy site is classified by the New York State Department of Environmental Conservation (NYSDEC) as a Class 2 inactive hazardous waste (Site No. 819017) based on the presence of known volatile organic compounds (VOCs) in on-site soils and groundwater. This RI was performed as required, and in accordance with, the requirements of Order On Consent No. B8-0548-99-02 issued by the NYSDEC and signed by Lapp on August 8, 2001. The Order on Consent requires the completion of an RI and a subsequent Feasibility Study (FS) to identify and mitigate, if necessary, any contamination which poses a potentially significant threat to public health or the environment.

The first of two phases of RI work activities began in October 2001with site characterization tasks, installation of an upgradient deep bedrock monitoring well, and sampling of several media including soil gas, soil, groundwater, surface water and sediments. Results of the Phase I RI were submitted to the NYSDEC in the form of a Technical Memorandum in November 2002, (Malcolm Pirnie, Inc. – November 2002). The second phase of investigation was performed to confirm and expand upon the information obtained from the initial phase of investigation. The Phase II field program was performed in July and August 2003. This RI report provides the results of both phases of remedial investigation at the Lapp Site.

The investigation encompassed the following investigative tasks:

- Well inspection and subsequent well maintenance to confirm and/or restore the usefulness of the existing monitoring well network.
- A site survey to prepare a base map of the site which included topography, site features, property boundaries, and the monitoring well network;
- A residential well survey to identify potential human receptors of groundwater contamination;
- Focused drilling and sampling in "hot spot" areas.
- Inspection of facility sewers for evidence of damage and/or accumulation of debris;
- A bedrock evaluation including completion of a Very Low Frequency (VLF) geophysical survey, a fracture trace analysis, and a geologic survey;
- A stream flow rate analysis of Oatka Creek as well as sampling of surface and subsurface soil, groundwater, cliff seep water, and Oatka Creek surface water and sediments;
- A site-wide passive soil gas survey to confirm areas of concern;
- Installation of an upgradient deep bedrock monitoring well.
- Drilling and installation of five bedrock groundwater monitoring wells (two shallow and three deep);
- Sampling of groundwater from on-site monitoring wells and off-site residential wells, surface water, sediment, and seep water;
- In-situ hydraulic conductivity testing of all monitoring wells;
- Water level measurement in all newly-installed and existing monitoring wells and Oatka Creek; and

- Site surveys to locate boring, monitoring well, and sampling locations.

10.2 Investigation Results

The following summarizes the results and conclusions drawn from these investigation elements:

10.2.1 Survey Results

Soil Gas Survey - To establish whether any other areas of elevated soil or shallow groundwater VOC contamination exist outside the known hot spots, a site-wide grid was established for completion of a passive soil gas screening survey. The soil gas survey identified the presence of several volatile organic compounds, most prevalent of which were trichloroethene, 1,1,1-trichoroethane. Mapping indicated that VOCs are concentrated within the known hot spot areas. In general, soil gas results were consistent with both soil and groundwater VOC data collected, with the highest concentrations of total chlorinated VOCs detected near Hot Spot Area B. Trace or no soil gas concentrations were found beyond these known areas of VOC contamination.

Residential Well Survey - A questionnaire regarding well water usage was prepared and distributed during October 2001 to a list of 151 residential property owners within 1/4 mile of the Lapp site. Results of the survey were used to identify potential "at risk" residential well locations and to support an evaluation of potential sentry well locations. Based on the results of the responses received, five actively used residential wells were identified within the 1/4-mile radius. These five wells were sampled by the NYSDOH in 1995, 1998, and 2001. During the November 1995 sampling event, two of the residential wells contained 1,1,1-trichloroethane at concentrations less than the NYSDEC groundwater standard. During the subsequent two sampling events, these and the other three residential wells did not contain VOCs above the detection level of 0.5 ug/l. These five residential wells were again sampled by Malcolm Pirnie Inc. and found not to contain site-related contaminants.

Sewer Inspection - The purpose of the on-site sewer inspection was to assess the potential for sewers traversing the known VOC contamination to act as a pathway for contaminant migration. Approximately 2,450 feet of sewer line was inspected and the survey determined that the condition of the sewers was good with little potential for groundwater infiltration or exfiltration.

Bedrock Evaluation - A geologic interpretation of aerial photography plus field reconnaissance geologic survey and VLF radio wave survey were conducted. No evidence was found that would indicate that interconnected, water-bearing, bedrock fractures exist between the on-site hot spot areas and the five known active residential wells near the site.

10.2.2 Geology and Hydrogeology

Two shallow bedrock and three deep bedrock groundwater monitoring wells were installed during the RI to supplement the existing monitoring well network. Each of the 23 on-site wells of the network is completed in one of four distinct water-producing zones monitored at the Site. All but two of the 23 monitoring wells are located in one of six well clusters positioned around the perimeter of the Site. Each well cluster contains three or four wells, each well monitoring a distinct vertical interval. Information determined regarding the four monitored zones are summarized below in order from shallowest to deepest:

Overburden

Six overburden wells monitor the unconsolidated native soil and/or fill material and range in total depth from 9 to 29 feet below grade. Hydraulic conductivity of the overburden was calculated to have a geometric mean of 1.39 x 10^{-05} cm/sec. Overburden is thickest (>25 feet) at two areas of the site, the South fill area and at well cluster 101 located along the western site boundary northwest of Building B-2A. Two distinct overburden units are present at the Site, fill material and glacial till. Fill was used to level topographically low areas and provide support to the steep bank of Oatka Creek along the eastern edge of the property. Two distinct areas contain most of the fill material at the Site. These two areas are the Northeast and the South fill areas. Where present, fill is the uppermost overburden unit and was encountered up to 30 feet thick in the South fill area. The native overburden material at the site is glacial till which is composed of unsorted silt with clay, sand, and gravel. The till is deposited directly on the underlying bedrock and, where not covered by fill, is present at the ground surface. The maximum thickness of till encountered at the site is 25 feet at well cluster 101, along the western Site boundary. This unit increases in density with depth.

Bedrock

Depth to bedrock was measured throughout the Site at depths ranging from 10 to 29.5 feet below grade. The elevation of the bedrock surface is highest in the general area of the four hot spots. A total of four stratigraphically distinct bedrock units were encountered during rock well drilling at the Site. These are, in descending order:

- Levanna Shale
- Stafford Limestone
- Oatka Creek Shale
- Onondaga Limestone

All of the shallow rock and intermediate rock wells are completed in the Levanna Shale member. Drilling records and rock cores recovered from the upper portion of this unit indicate that the shale is highly fractured and weathered, generally in the top 1 to 2 feet of the bedrock surface, and up to 4 to 5 feet in certain areas of the site.

Shallow Rock - Eight wells monitor the uppermost 5 to 10 feet of competent shale bedrock, referred to as the shallow rock (SR) zone. The SR wells range in depth from 27 to 43 feet below grade. Hydraulic conductivity of the shallow bedrock is variable to three orders of magnitude relative to the degree of fracturing present at each well location. The geometric mean of the measured hydraulic conductivities of the shallow rock zone was 2.09×10^{-05} cm/sec.

Intermediate Rock - Six wells are completed in the same shale rock formation directly beneath the SR zone. Total depths of these intermediate bedrock (IR) wells range from 38 to 54 feet below grade. Three of the six intermediate rock wells had insufficient water or recharged too slowly to even complete a slug test. The geometric mean hydraulic conductivity of the other three IR wells was 9.79×10^{-08} cm/sec.

Deep Rock – The three deepest on site monitoring wells, or deep rock (DR) wells, are completed at total depths between 62 and 130 feet below grade. The deepest well (DR-101 located upgradient) is completed in the Onondaga Limestone formation at a total depth of 130 feet. The other two DR wells (DR-103 and DR-105) are completed at 62 and 83 feet respectively. These two wells were installed to monitor the thin Stafford Limestone formation and the lower Levanna Shale immediately above the Stafford. Like the IR zone, the deep rock zone contained very few fractures to transmit groundwater. Only one of the three DR wells has sufficient water and recharge to perform a slug test. This well (DR-105) had a hydraulic conductivity of 1.70×10^{-04} cm/sec. This conductivity measurement represents the lower Levanna Shale since only approximately two feet of the well's 16 feet of open-rock interval is Stafford Limestone (which contained no fractures). The remaining 14 feet of this well's open-rock interval is in the Levanna Shale.

Groundwater Flow Direction – Groundwater flows more strongly horizontally than vertically due to significantly decreasing hydraulic conductivity with depth. Comparison of potentiometric surface maps for each monitored groundwater zone shows that groundwater in all three zones flows laterally in a similar direction from west to east toward the creek and away from the nearest residential wells identified. The creek is a discharge for the overburden, shallow rock, and intermediate zones. Groundwater in the deep rock zone flows downward.

10.2.3 Sampling Results

10.2.3.1 Soil Characteristics

The environmental sampling program included the collection of sediment, surface and subsurface soils, surface water, and groundwater samples in accordance with the NYSDEC approved RI Work Plan. Two coordinated sampling events were completed during each phase of investigation, one during October 2001-January 2002, the second during August 2003.

The purpose of the soil screening and sampling task(s) was to more fully characterize overburden materials and to delineate the areal and vertical extent of contamination in suspected or known hot spot areas. Analytical results of soil samples collected from the unsaturated zone of the hot spot areas facilitated the estimation of VOC mass within unsaturated Hot Spot soils. The hot spot areas were designated Area A, Area B, Area C, and Area D. Additionally, sampling was performed at selected locations assumed to be representative of background conditions not impacted by site activities and three areas on-site where PCBs had been historically handled.

Hot Spot Area A - is located near the southeast corner of Building 23, the former machine shop area. Historical information indicates that handling of solvents occurred at the loading dock at the southeast corner of the building and that USTs containing TCA and TCE were formerly located here. The primary compound detected was TCA. The highest concentration of TCA detected was 110,000 μg/kg at soil boring SB-A1, at four to six feet bgs. TCE and 1,1-DCA were also detected at several of the soil boring locations, as high as 35,000 μg/kg and 6700 μg/kg, respectively.

The VOCs detected in the unsaturated soils in this area encompass an area up to 11,000 square feet. The majority of the VOCs, approximately 80% of the estimated mass in this area, were detected within the unsaturated uppermost surface soils (from the ground surface to two feet bgs); however, VOC levels exceeding TAGM 4046 guidelines were detected as deep as six feet bgs. The mass of chlorinated VOCs in the soils sampled from the unsaturated interval (zero to 10 feet bgs) is estimated at 89 kilograms.

No SVOCs, pesticides, or PCBs were detected at concentrations above the TAGM values in the unsaturated soil samples collected from Area A.

Metals were analyzed in three Area A samples and were, for the most part, not present above TAGM guidelines or Eastern USA background concentrations with the exception of the zero to two-foot depth sample at SB-A8. Five metals (cadmium, copper, nickel, silver and zinc) exceeded the Eastern US Background Concentration Range in this sample.

Hot Spot Area B - is located east of Building 31, and is currently used as a storage warehouse. Past activities in this area included a shipping and receiving dock and warehouse area. A gasoline UST was formerly located at the southeast corner of Building 31. TCE was the primary VOC detected at Hot Spot Area B, and was detected as high as 4500 μg/kg in the surface soil sample (0-2 feet) at SB-B7. 1,2-DCE, and 1,1-

DCA were also detected at the same locations as the TCE detections. The chlorinated contaminants located within the unsaturated soil extend to an area of up to 11,500 square feet. Approximately 65 % of the estimated mass of VOCs in this area was detected at the surface from zero to two feet below the ground surface; however, the mass of contaminants in the unsaturated soils, (viz. the upper eight feet, at Area B) is estimated at less than one kilogram.

Hot Spot Area C - is located at the former hazardous materials storage pad in the southern portion of the site. The sampling program in this hot spot area encompassed the concrete storage pad and extended southeast to the top of the steep embankment adjacent to Oatka Creek. Overall the data collected from Area C indicated no well-defined area from past use, but instead scattered detections of primarily chlorinated VOCs. The primary VOCs detected in the unsaturated soil samples collected from Hot Spot Area C are TCE, PCE, and TCA. TCE was detected as high as 45,000 μg/kg in the soil sample (from 4-6 feet) located approximately 125 feet southeast of the former storage pad. VOCs were detected in unsaturated soils as deep as ten feet bgs. The majority of the VOCs in the unsaturated soil (approximately 90 % of the estimated mass in Area C) were detected from 4 feet to 6 feet bgs. The mass of VOCs in the unsaturated soil at Hot Spot Area C is estimated at 84 kilograms. No SVOCs, pesticides, or PCBs were detected above TAGM 4046 values in the soil samples collected from Area C.

Three metals (calcium, magnesium, and thallium) were detected in four of the nine samples collected for metals analysis in Area C samples at concentrations that exceed the TAGM 4046 values.

Hot Spot Area D - is located adjacent to the south side of Area C and near the northwest corner of the southeast fill area and encompasses an area including micro well PMW-10. The primary VOCs detected (TCE and TCA) in the unsaturated soil samples from Area D are similar to those detected at Area C. TCE was detected as high as 2300 μg/kg in the unsaturated soil sample from (4-6 feet) at boring location PMW-10M. VOCs detected in the unsaturated soil areally extend up to 2800 square feet, with the majority of the VOCs in the unsaturated zone (approximately 68% of the estimated total mass in this area) occurring at the deepest unsaturated interval sampled (six feet to eight feet bgs). However, based on the concentrations detected, the mass of VOCs in the unsaturated soil at Hot Spot Area D is estimated at less than one kilogram.

PCBs - (Aroclors-1248, -1254, -1260) were detected at concentrations just slightly above the TAGM 4046 guidelines for total PCBs in two of the seven surface soil samples collected in targeted areas. These two detections were in samples collected from the high voltage testing area (HVT-1), and the storage area for bushings to be repaired (BURPR-2) east of Building 23.

10.2.3.2 Groundwater Characteristics

VOCs - Groundwater samples were collected from micro-wells, monitoring wells, and open-hole soil borings (geoprobe). Not all wells could be sampled during the RI sampling events. Wells IR-104 and IR-106 were not sampled on either occasion due to insufficient volume of water within the wells. Overall, the data collected indicates a similar site wide trend as compared to historical data collected by others. The wells with elevated VOC concentrations generally exhibited detections of the same VOCs and within one to two orders of magnitude of historical data. In addition, the data from the two rounds of RI investigation generally had good correlation in that all VOC detections were at the same locations and at similar concentrations. The groundwater analytical data indicate that the groundwater VOC contamination at the site is generally confined to the hot spot areas in the southern and eastern portions of the site, with the highest concentrations occurring within the overburden and the shallow bedrock zones. Overall, concentrations of chlorinated VOCs were typically one to four orders of magnitude lower in the intermediate and deep rock wells as compared to the shallow or overburden wells at the same well clusters.

The highest concentrations occurred in the area of well PMW-10 at the South fill area with maximum values of TCA and TCE of 49,000 μg/l and 76,000 μg/l, respectively. Concentrations of TCE at this location were above the indicator value of 1% of the solubility for TCE (1,100,000 μg/l) at which DNAPL could be anticipated. Although extensive geoprobe and DNAPL investigations resulted in no observable DNAPL here or in any onsite borings or wells, complex distributions of DNAPL are generally very difficult to identify and define. The presence of DNAPL is supported by the high VOC concentrations detected in the on-site groundwater wells over time. It is likely that DNAPL is slowly being released into groundwater from the bedrock matrix. The existing monitoring well network provides sufficient data points to quantify this effect.

Other VOCs detected in overburden groundwater at concentrations above standards include chlorinated VOCs associated with the degradation of the primary VOCs TCA and TCE. These include 1,1-DCE, 1,2-DCE, 1,2-DCA, chloroethane, and vinyl chloride. Chlorinated VOCs were present at concentrations above the Class GA groundwater standards in all downgradient shallow bedrock wells except SR-103 at the Northeast fill area. The highest concentrations detected were of TCA and TCE, found in the groundwater at Area A in well SR-105, adjacent to the former machine shop. Other VOCs detected in the shallow groundwater-bearing zone above groundwater standards include the breakdown products of TCA and TCE, as well as PCE, benzene, toluene, and xylenes.

Pesticides, PCBs, SVOCs - No pesticides were detected in any of the groundwater samples collected. All SVOCs detected were below the Class GA Standards and most qualified as estimated. The PCB Aroclor-1262 was detected in only one monitoring well, (PW-3) at a concentration of 0.15 µg/l, slightly above the groundwater quality standard of 0.09 µg/l. However, the groundwater sample collected at PW-3 was very turbid due to the low recharge rate of the well, and therefore the PCB detection should be considered biased high since the samples were not filtered prior to analysis. Based on the concentrations of the metals detected and the well locations at which they were found, no anthropogenic source of metals contamination was indicated.

10.2.3.3 Surface Water Characteristics

Oatka Creek

No organic compounds (VOCs, SVOCs, Pesticides, and PCBs) were detected in the Oatka Creek surface water samples at concentrations above the water quality standards. Several VOCs that were detected in on-site groundwater samples (1,1,1-TCA, TCE, 1,1-DCA) were also detected in surface water samples collected adjacent to or downstream of the northern half of the site (SW-3, SW-4, and SW-5); however, concentrations were below the water quality standards for Class C surface waters. The only metals detected in the surface water samples at concentrations above the surface water quality standards were iron and aluminum. The maximum iron concentration detected was 1.2 mg/l (unfiltered), which exceeded the Class C surface water quality standard of 0.3 mg/l in the surface water samples collected adjacent to and downstream of the site. Based on the elevated iron concentration detected in the groundwater samples, it's likely that these are naturally occurring iron concentrations. Aluminum was detected in four of the five surface water samples, at concentrations above the surface water quality standard. Since these detections were relatively consistent upstream and downstream of the Site, it can be concluded that these concentrations are naturally occurring or from an upstream source.

Cliff Seep

Four VOCs (TCE, TCA, chlorodibromomethane, and dichlorobromomethane) were detected at low concentrations in both seep samples. The concentrations were below NYSDEC Class C surface water criteria and were lower in the first round of sampling than the second. No SVOCs, pesticides, or PCBs were detected in the seep samples, and no metals were detected at concentrations above the water quality standards.

10.2.3.4 Stream Sediment Characteristics

Only one VOC, benzene, was detected above the NYSDEC Sediment Criteria. It was detected at the downstream sample location (SED-5) and only once, during the Phase I sampling event only. Other BTEX constituents were also detected at low concentrations (below sediment criteria) at this location. These BTEX detections are likely the result of runoff from street traffic, as SED-5 is located close and downstream of the Munson Street Bridge. No VOCs were detected above the sediment criteria during the Phase II sampling event.

A total of 24 SVOCs were detected in the sediment samples, however only nine of these compounds were detected at concentrations above the NYSDEC Sediment Screening Criteria. The concentration of SVOCs at three of the sample locations (SED-1, SED-4, and SED-5) only slightly (<1 order of magnitude) exceeded the screening criteria. Fifteen of the 24 detected compounds are considered Polycyclic Aromatic Hydrocarbons (PAHs). PAHs are ubiquitous in soils, and sediments tend to be major sinks for these compounds due to their low solubility and strong affinity for organic carbon (Research Triangle Institute, 1995). The majority of the SVOC detections occurred at the midpoint and downstream (SED-3, SED-4 and SED-5) sampling locations and most SVOCs detected in sediment were at the SED-3 location were site fill material was observed along the steam bank near the sample location.

PCB (Aroclor-1260) was detected in the Phase I sampling event at the SED-3 and SED-4 sample locations at concentrations above the NYSDEC Sediment Screening Criteria. However, no PCBs were detected in the second sampling event indicating that the areal extent of potentially PCB-contaminated sediment is very limited.

No pesticides were detected above the NYSDEC Sediment Screening Criteria in any of the sediment samples.

Based on the analytical results and the locations at which they were found, no site-related source of metals contamination in stream sediments was indicated.

10.3 Contaminant Fate and Transport

The Lapp site and its surroundings have been extensively and thoroughly investigated. The investigation has revealed that the on-site unsaturated zone soils have been impacted by the past use of volatile organic chemicals, primarily trichloroethylene, 1,1,1-trichloroethane, tetrachloroethene, 1,1,1-dichloroehtane. These compounds of interest are located in four distinct areas on the east side of Gilbert Street. It is estimated that 95 % of the mass of the VOC's in the unsaturated zone soils is in the upper six feet of two of the hot spot areas. These same VOCs have migrated into the overburden and shallow bedrock groundwater beneath these areas. These concentrations, combined with VOCs being slowly released by the bedrock matrix over time, contribute to the VOC mass that is migrating horizontally at a very slow rate towards Oatka Creek. Because of their slow rate of migration, the volatile nature of the contaminants and the large relative volume of the receiving stream; these VOCs, while detectable in a cliff seep and the receiving stream, are present at trace levels below surface water standards.

Isolated samples of on-site soils contained metals and PCBs slightly above TAGM guidelines and/or the range of those typically found in Eastern U.S. soils. However, groundwater and stream sampling have not demonstrated that either group of contaminants has leached into groundwater or present a significant risk of runoff into Oatka Creek.

The velocity of Oatka Creek as it passes by the Lapp site is reduced significantly by the presence of the Munson Street Dam immediately downstream from the site, causing significant sediment deposition along the site. Metals and Polycyclic Aromatic Hydrocarbons (PAHs) were detected in creek sediments along the site. However, most of the metals detected at concentrations in excess of sediment criteria were also detected in sediment samples collected upstream at somewhat lower concentrations. In addition, the concentrations and limited detections of these compounds on-site did not indicate the likelihood that these emanated from the Lapp site. Metals and PAHs are ubiquitous in urbanized settings and sediments tend to be major sinks for these compounds, thus it is likely that upstream sources are contributing these compounds and they are accumulating in the sediments upstream of the dam.

10.4 Human Health Risk Assessment

The human health risk assessment was performed to:

- Evaluate the potential for adverse health effects following exposure to chemicals detected at and in the vicinity of the site, currently and in the future, in the absence of any action to control or mitigate contamination, and
- Assist in determining the need for and extent of remediation.

The risk assessment focuses on all chemicals detected and identifies them as chemicals of potential concern (COPC) without taking into account whether they are a site-related contaminant or not. Once the COPC for each medium have been selected, the exposure assessment estimates the type and magnitude of human exposure to the COPC. While the Site is expected to remain a manufacturing facility that produces electrical insulators into the foreseeable future, residential development of the Site could be a possibility in the future. As a result, potentially exposed populations and their related exposure pathways include:

Site Workers – Under the existing use of the site, site workers whose work responsibilities involve work outdoors or who may take breaks outdoors, could be exposed to COPC in surface soil via incidental ingestion and dermal contact. Due to the nature of the manufacturing at the Site, it is not expected that outdoor work responsibilities would occur with much frequency or for long durations; however, risks were conservatively estimated as if contact with surface soil occurs during every workday. While inhalation of COPC volatilized from soil and groundwater to indoor air is a potentially complete exposure route, because regularly occupied buildings are located away from the hot spot areas, this pathway is unlikely and was not evaluated further. Site workers are most likely to be exposed to surface soil in Hot Spot Areas A, B, and C, since Hot Spot Area D in the South fill area is too remote for regular use by site workers.

Trespassers - As the Site is not fenced and would likely not be in the future, trespassers may gain access to the Site and be exposed to COPC in surface soil via incidental ingestion and dermal contact. Since their activities would not typically involve soil intrusion, and because gravel and/or vegetation cover the hot spot areas, inhalation of COPC volatilized from soil or adsorbed onto soil particles is unlikely and was not evaluated further. Hot Spot Areas C and D are most likely to be attractive to trespassers due to their location and distance from more developed areas of the Site.

Recreationists – Under the existing and potential future uses of the site, recreationists wading in Oatka Creek could be exposed via dermal contact with surface water and via incidental ingestion of and dermal contact with sediment. Recreationists swimming in the creek could be exposed via incidental ingestion of and dermal contact with both surface water and sediment. While inhalation of chemicals volatilized to outdoor air from these media was identified as a potentially complete exposure route, it is unlikely to be a significant exposure route and was not evaluated further. Recreationists who consume fish caught from the creek may be exposed to chemicals in surface water and sediment that bioaccumulate in fish tissue. Also, recreationists who hunt game (e.g., deer) on adjacent land may also be exposed to chemicals in soil, surface water, or sediment, that bioaccumulate in wildlife tissue.

Construction/Utility Workers - Construction/utility workers who may be required to open a utility excavation on-site could be exposed to COPC in surface and subsurface soil via direct contact and to COPC in soil and groundwater via inhalation of COPC volatilized from these media. In addition, under the hypothetical, yet plausible scenario, that the Site is developed for residential and/or commercial use in the future, construction/utility workers conducting excavation for building foundations may also be exposed to COPC in soil and groundwater. Construction was considered unlikely to take place at Hot Spot Area D (the South fill area). The depth to groundwater at Hot Spot Areas A, B, and C is deeper than a typical utility excavation; therefore, it is unlikely that construction/utility workers would be exposed to groundwater in a utility trench.

For each population and exposure pathway estimates of the magnitude of exposure were made and risk-based concentrations were calculated and compared to an incremental cancer risk of 10^{-6} (i.e., 1 in 1,000,000) and/or a hazard quotient of 1. These concentrations were then compared to the maximum concentration of the COPC's identified.

Results - Since no COPC were identified in surface soil at Hot Spot Areas C and D, trespasser exposure should not be of concern. Estimated risks to site workers exposed to surface soil at Hot Spot Areas A and B are less than or within the acceptable risk ranges, indicating that adverse, non-carcinogenic effects from such exposure are unlikely and excess lifetime cancer risks are within the acceptable range.

The concentrations of COPC in surface water and sediment are less than the risk-based concentrations calculated as protective of a recreationist swimming and recreating in Oatka Creek, indicating that adverse effects to recreationists are unlikely. In addition, the predicted concentrations of COPC in surface water from discharge of groundwater are well below the NYSDEC Ambient Water Quality Standards and Guidance Values for Class A freshwater used as a source of drinking water and/or the risk-based concentrations calculated, indicating that groundwater discharge to surface water is not of concern.

Estimated risks to construction/utility workers potentially exposed to all soil at Hot Spot Areas A, B, and C are less than or within the acceptable risk ranges, indicating that adverse, non-carcinogenic effects from such exposure are unlikely and excess lifetime cancer risks are within the acceptable range.

Thus, the potential for risk to human health was assessed for all contaminants detected, even once, on-site or off throughout the investigation. Estimated risks to exposed populations (viz., site workers, construction/utility workers, trespassers and recreationists swimming or wading in the stream) for all projected uses of the site now and in the future indicated that the potential for human health risks were within acceptable ranges for the maximum concentrations of all chemicals detected either on-site or off.

10.5 Ecological Risk Assessment

Natural resources on-site are minimal, but are abundant immediately adjacent to the Site along Oatka Creek, creating conditions conducive to a diverse and potentially abundant wildlife population. A screening-level assessment of the potential for risk to aquatic life and wildlife from all chemicals detected indicates the potential for adverse risk to wildlife populations from on-site hot spot area soils; however the magnitude is expected to be low, since it is not likely that wildlife would spend much time at the hot spot areas given the more appealing conditions along the stream (presence of vegetation for food and cover, less compact soils for burrowing and more remote from human activity). While a number of inorganic chemicals exceeding standards and LELs were detected in Oatka Creek surface water and sediment, the same chemicals were detected in upstream samples and thus are not considered site-related.

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11

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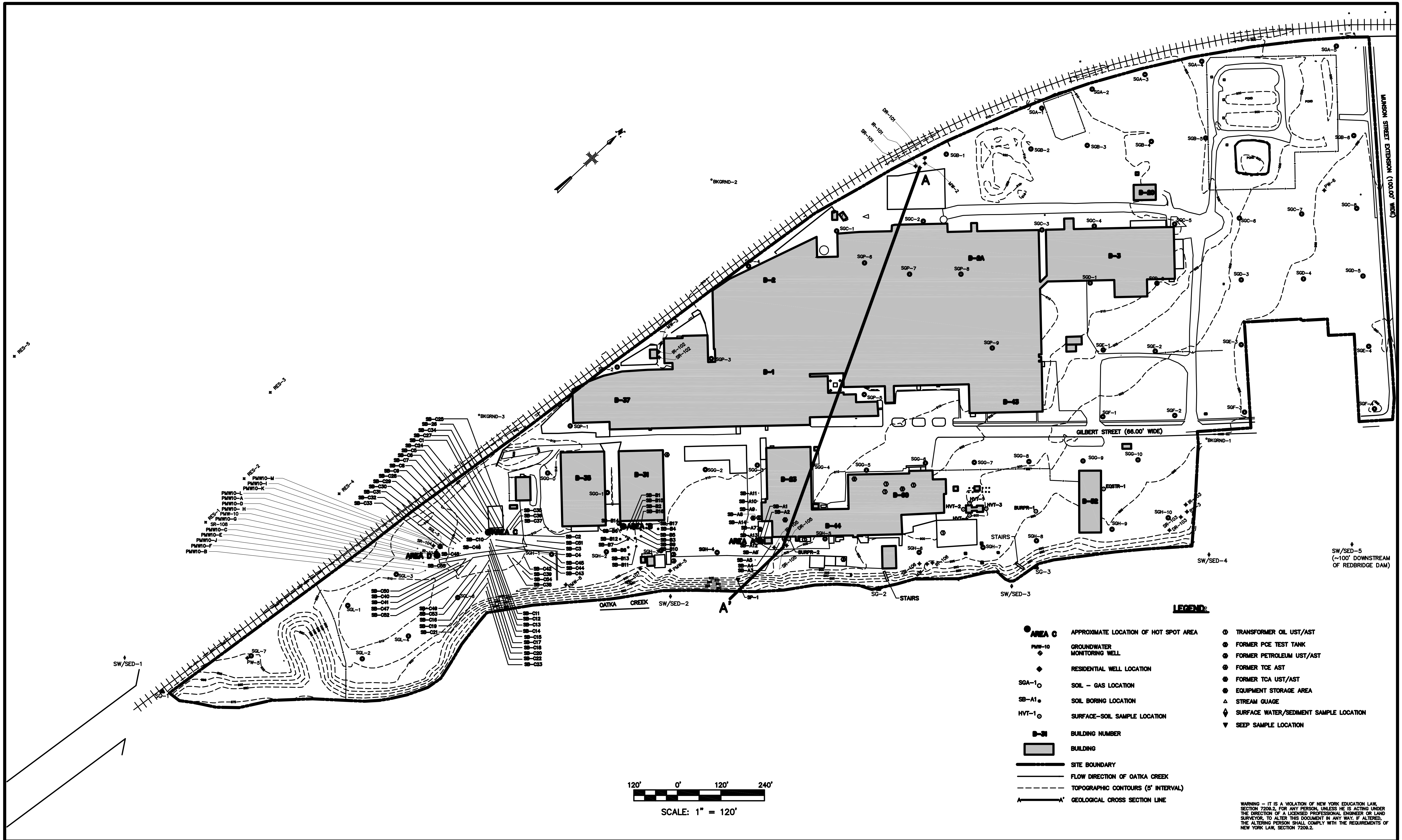

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LAPP INSULATOR COMPANY, LLC
LEROY, NEW YORK

MAP 1
SAMPLE LOCATION MAP

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