The electronic version of this file/report should have the file name:

Type of document.Spill Number.Year-Month.File *Year-Year* or Report name.pdf

letter._____._____-_____.File spillfile___.pdf

report.hw915056.2006-12-01.SITE EVALUATION REPORT.pdf

Project Site numbers will be proceeded by the following:

Municipal Brownfields - b
Superfund - hw
Spills - sp
ERP - e
VCP - v
BCP - c

non-releasable - put .nf.pdf
Example: letter.sp9875693.1998-01.Filespillfile.nf.pdf

Department of Environmental Conservation

Division of Environmental Remediation

Site Evaluation Report

Roblin Steel Site, Tonawanda, Erie County, New York Site Number 9-15-056

September 2006
Revised December 2006

New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Site Evaluation Report

Roblin Steel Site
Tonawanda, Erie County, New York
Site Number 9-15-056

Prepared by:

New York State Department of Environmental Conservation
Division of Environmental Remediation
270 Michigan Ave
Buffalo, New York 14203-2999

Glenn M. May, CPG
Engineering Geologist II

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES
(Following Text)

LIST OF TABLES
(Following Report)

1.0 EXECUTIVE SUMMARY

The Roblin Steel property occupies approximately 50 acres at 4000 River Road in the Town of Tonawanda, Erie County, New York (Figure 1-1). The property is currently owned by Niagara River World Inc. who leases portions of the property to various local businesses. The property is currently listed as the Roblin Steel Site (Site No. 915056) in the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites in New York State (the Registry), and is designated as a Class 2 site.

The Site is bordered by River Road to the east, the Niagara River to the west, Tonawanda Coke Corporation property and the Marathon Ashland Petroleum Company facility to the south, and the Lafarge Corporation ready mix concrete plant and vacant land (also owned by Niagara River World) to the north (Figure 1-2). Within the Roblin Steel Site is the former Envirotek II facility, a chemical waste treatment, storage and disposal facility that operated during the 1980's by Envirotek Ltd. This facility occupied a 2.5 acre parcel within the Roblin Steel Site (Figures 1-2 and 1-3). Numerous leaks and spills associated with the handling and storage of hazardous wastes occurred at the facility when it was operating, and resulted in the contamination of fill, soil and groundwater near and under the former Envirotek II facility.

In March 2005, the NYSDEC issued a Record of Decision for the Envirotek II Portion of the Roblin Steel Site that selected Monitored Natural Attenuation as the remedy for groundwater contaminated with volatile organic compounds (VOCs) by the former Envirotek II facility. Excavation of waste, soil and fill was not required by the ROD as the Interim Remedial Measures (IRMs) completed at the Site during the Remedial Investigation/Feasibility Study (RI/FS) process successfully removed all waste and contaminated soil associated with the former Envirotek facility.

With the remediation of the Envirotek II Portion of the Roblin Steel Site essentially complete, the remainder of the Roblin Steel Site needs to be investigated to determine if the levels of contamination justify the continued designation of the Site as Class 2. This report presents an evaluation of the existing analytical data for the Roblin Steel Site that was obtained during investigation of the former Envirotek II facility.

The stratigraphy of the Roblin Steel Site was evaluated by examining the stratigraphic logs obtained from soil borings completed during previous investigations of the Site. With increasing depth, the geologic units encountered include fill, glaciolacustrine silty clays, alluvial sand, glacial till and bedrock of the Camillus Shale Formation. Fill material at the Site consists predominantly of slag and cinders with lesser amounts of glass, brick, concrete and wood.

Groundwater underlying the Roblin Steel Site is confined to the fill material (shallow water bearing zone) and alluvial sands (intermediate water bearing zone). The glaciolacustrine silty clay separates these two zones, and due to its extremely low permeability (2.5×10^{-7} centimeters per second (cm/s)), prevents the downward migration of contaminated groundwater from the shallow to the intermediate water bearing zone. Groundwater flow in the shallow water bearing zone is radial in the area of the former Envirotek II facility but becomes more unidirectional to the west when nearing the Niagara River. Groundwater in the intermediate water bearing zone is also thought to flow westward toward the river. Groundwater within the Camillus Shale has not been investigated at the Site.

The analytical data obtained during the Envirotek RI revealed the presence of volatile organic compounds, semivolatile organic compounds and metals in surface soil, subsurface soil and groundwater samples collected from throughout the Roblin Steel Site at concentrations that exceed the TAGM 4046 soil cleanup objectives and TOGS 1.1.1 water quality standards. The chlorinated VOCs are associated with the former Envirotek II facility, and has been remediated by the Envirotek II PRP Group as described in the March 2005 Record of Decision. The remaining contaminants are likely associated with the former steel-making operations at the Site.

The presence of surface soil contamination indicates that direct contact exposures are possible. Waste at the Site has also adversely impacted groundwater. The analytical results for downgradient monitoring wells indicated that eight metals were detected at concentrations that exceeded the TOGS 1.1.1 water quality standards. Five of these metals are USEPA priority pollutant metals. These data suggest that the Roblin Steel Site is adversely impacting the Niagara River. It is important to note, however, that the analytical data from these wells are from 1999. As a result, it is recommended that all downgradient monitoring wells be sampled and analyzed for Target Compound List (TCL) volatile organic compounds, TCL semivolatile organic compounds, Target Analyte List (TAL) metals, hexavalent chromium and cyanide to determine the current impacts to the Niagara River.

Although a large quantity of analytical data is available for the Roblin Steel Site, large portions of the Site have not been investigated (Figure 6-1). As a result, it is recommended that any development plans for the property include the investigation of these areas. It is also recommended that the Site remain in the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites in New York State until the data gaps have been thoroughly investigated.

2.0 INTRODUCTION

The Roblin Steel Site is a Class 2 Inactive Hazardous Waste Site located at 4000 River Road in the Town of Tonawanda, Erie County, New York (Figure 1-1). Within the Roblin Steel Site is the former Envirotek II facility, a chemical waste treatment, storage and disposal facility that operated during the 1980's (Figure 1-2). Numerous leaks and spills associated with the handling and storage of hazardous wastes occurred at the facility when it was operating, and resulted in the contamination of fill, soil and groundwater near and under the former Envirotek II facility with volatile organic compounds (VOCs). This contamination is the primary reason that the Roblin Steel Site was reclassified in 1992 to Class 2. A Class 2 site is one that presents a significant threat to human health and the environment, and action is required.

Between April 2003 and September 2004 The Envirotek II Site PRP Group implemented three Interim Remedial Measures (IRMs) at the Envirotek II Portion of the Roblin Steel Site. These IRMs consisted of the following activities:

- The excavation, decontamination and backfilling of Waste Pit No. 6 (Figure 1-3), which formerly contained soil, liquid and debris impacted with elevated concentrations of VOCs;
- The removal of lead-contaminated ink waste from the Boiler House (Figure 1-3);
- The excavation of VOC impacted soil and fill in the area of the former Envirotek II facility (Figure 2-1);
- The collection of post excavation samples for chemical analysis to determine the final limits of the excavation;
- The backfilling of excavated areas and the restoration of the site; and
- The sampling of select monitoring wells following the completion of backfilling activities to assess the affect of the IRM soil removal on groundwater contamination.

In March 2005, the NYSDEC issued a Record of Decision for the Envirotek II Portion of the Roblin Steel Site that selected Monitored Natural Attenuation as the remedy for groundwater contaminated with VOCs by the former Envirotek II facility. Additional excavation of waste, soil and fill was not required by

the ROD as the IRMs completed at the Site successfully removed all waste and contaminated soil associated with the facility.

With the remediation of the Envirotek II Portion of the Roblin Steel Site complete, the remainder of the Roblin Steel Site needs to be investigated to determine if the levels of contamination justify the continued designation of the Site as Class 2. This report presents an evaluation of the existing analytical data for the Roblin Steel Site that was obtained during investigation of the former Envirotek II facility.

The remaining sections of this report are organized as follows:

- **Section 3.0, Site History and Background:** Section 3.0 describes the history of the Roblin Steel Site, and summarizes the investigative and remedial activities completed by the Envirotek II Site PRP Group;

- **Section 4.0, Study Objectives:** Section 4.0 describes the objectives of the Site Evaluation study;

- **Section 5.0, Geology and Hydrogeology:** Section 5.0 describes regional and Site geology and hydrogeology. The characteristics, areal extent and hydrogeologic properties of the strata are discussed;

- **Section 6.0, Evaluation Results:** Section 6.0 discusses the analytical results obtained from various environmental media (i.e., surface soil, subsurface soil and groundwater) collected from throughout the Roblin Steel Site;

- **Section 7.0, Discussions and Conclusions:** Section 7.0 summarizes the findings of the Site Evaluation Study as they relate to the objectives presented in Section 4.0. Conclusions drawn from the study are also discussed;

- **Section 8.0, Recommendations:** Section 8.0 discusses the NYSDEC's recommendations for future activities regarding the Roblin Steel Site; and

- **Section 9.0, References:** Section 9.0 contains a list of references utilized or cited in the report.

3.0 SITE HISTORY AND BACKGROUND

3.1 Site Location and Description

The Roblin Steel property occupies approximately 50 acres along River Road in the Town of Tonawanda, Erie County, New York (Figure 1-1). The property is currently listed as the Roblin Steel Site (Site No. 915056) in the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites in New York State (the Registry), and is designated as a Class 2 site. A Class 2 site is one that presents a significant threat to human health and the environment, and action is required.

The Roblin Steel Site is bordered by River Road to the east, the Niagara River to the west, Tonawanda Coke Corporation property and the Marathon Oil facility to the south, and the Lafarge Corporation ready mix concrete plant and vacant land (also owned by Niagara River World) to the north (Figure 1-2). The Tonawanda Coke Corporation Plant is also designated as a Class 2 site (Site No. 915055), while the vacant Niagara River World property is located on portions of the Class 4 River Road Site (Site No. 915031). A Class 4 site is one that is properly closed but requires continued management.

Within the Roblin Steel Site is the former Envirotek II facility, a chemical waste treatment, storage and disposal facility that operated during the 1980's by Envirotek Ltd. This facility occupied a 2.5 acre parcel within the former Roblin Steel Site (Figures 1-2 and 1-3). Numerous leaks and spills associated with the handling and storage of hazardous wastes occurred at the facility when it was operating, and resulted in the contamination of fill, soil and groundwater near and under the former Envirotek II facility with volatile organic compounds (VOCs). This contamination is the primary reason that the Roblin Steel Site was reclassified in 1992 to Class 2.

3.2 Site History

The Roblin Steel property was developed by the Wickwire Spencer Steel Company in the early 1900s for the production of steel. Prior to development of the property, the site was backfilled with slag and other industrial debris to raise the land surface above the Niagara River flood stage. The section of the former Erie Canal along River Road on the east side of the property, and Rattlesnake Creek, which flowed northward through the center of the property, were also backfilled.

In 1945, the property was sold to the Colorado Fuel & Iron Corporation, which operated the plant until filing for bankruptcy in 1963. In the mid to late 1960's, the property was purchased by the Roblin Steel Company, which utilized the site primarily for industrial and commercial storage and warehousing. Over

the years of its ownership, Roblin Steel also subleased portions of the property to various other companies, including, but not limited to, Ascension Chemical, Rupp Rental, Freightways Transportation, Envirotek Ltd., and the Booth Oil Company.

In 1984, the NYSDEC issued a Resource Conservation and Recovery Act (RCRA) permit to Envirotek Ltd. to operate a commercial hazardous waste treatment, storage, and disposal facility. In 1985, Envirotek paid a $7,000 fine for permit violations, and also entered into a Consent Order to reduce its inventory of hazardous wastes. In 1988, Envirotek submitted a Facility Closure Plan, which the NYSDEC determined to be unacceptable. Finally, on February 2, 1989, Envirotek Ltd. filed for bankruptcy, and later abandoned the facility when Niagara River World Inc. took possession of the Roblin Steel Property (the Roblin Steel Company filed for bankruptcy in 1987) and evicted them. On the basis of their inability to develop an acceptable facility closure plan, the NYSDEC revoked Envirotek's permit to operate a hazardous waste treatment, storage and disposal facility on November 16, 1989.

Niagara River World Inc. currently owns the property and leases portions of it to various local businesses.

3.2 Remedial History

In 1985, the NYSDEC first listed the Roblin Steel Site as a Class 2a site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. Class 2a is a temporary classification assigned to a site that has inadequate and/or insufficient data for inclusion in any of the other classifications. In 1992, the NYSDEC reclassified the Roblin Steel Site to Class 2 primarily because of the contamination associated with the former Envirotek II facility.

Following Envirotek's abandonment of the facility in 1989, the United States Environmental Protection Agency (USEPA) conducted a preliminary investigation of the entire Roblin Steel property. At the Envirotek II portion of the property, unsecured drums and other containers, along with contaminated process vessels and tanks, were observed. Adjacent to one of the former waste chemical processing buildings, soil contaminated by liquid discharge from a processing still was encountered.

The preliminary USEPA investigation also included smoke testing of the Roblin Steel sewer system associated with the Envirotek II facility and sampling of sewer sediments. The investigation also encountered hazardous substances in concrete pits of the former Roblin Steel plant rod mill building. These

pits were designated 1 through 3, 3A, 4 and 5 (Figures 1-3 and 2-1).

The USEPA also identified a group of Potentially Responsible Parties (PRP's) who were former Envirotek customers. On May 14, 1990, the USEPA entered into an Administrative Order on Consent (AOC) with this PRP Group to conduct a removal action at the former Envirotek II facility (Envirotek II Site). The boundaries of the Envirotek II Site, as defined in the Removal Action AOC, included the property once leased by Envirotek, as well as the southeast portion of the hanger-like building that contained the aforementioned pits (Figures 1-3 and 2-1). The removal action was completed between 1990 and 1993 and included the following activities:

- Removal of 980 drums, 3,500 gallons of liquid wastes, 725,000 pounds of solid wastes, and 146 laboratory pack containers;

- Removal of waste from process vessels, tanks and concrete pits (Pit Nos. 1, 2, 3, 3A, 4, and 5) with off-site disposal of the wastes;

- Decontamination of the process vessels, tanks, concrete pits, buildings and equipment; and

- Removal of approximately 175 tons of contaminated soil from the area of the former Envirotek II facility.

On September 2, 1997, the NYSDEC and the Envirotek II Site PRP Group entered into an Administrative Order on Consent, which was subsequently amended on August 20, 1998. The Order, and its amendment, obligated the responsible parties to implement an RI/FS remedial program at the Envirotek II Portion of the Roblin Steel Site. The RI was conducted in 2 phases: the first phase was conducted between August and October 1999, with the second phase conducted between March and June 2001. The field activities completed during the RI are summarized as follows:

- Excavation of 3 test pits to document subsurface soil conditions associated with a former sewer line and with an area allegedly contaminated with wastes from Envirotek operations;

- Installation of 35 soil borings and 5 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions. Five of the borings were installed in

upgradient locations to document upgradient subsurface soil conditions;

- Installation of 5 cone penetrometer borings and 15 additional soil borings to further characterize the hydrogeologic setting of the Roblin Steel property, and to provide a basis for identifying the extent of groundwater contamination associated with the former Envirotek II facility;

- Assessment of the sixteen groundwater monitoring wells that had been installed during the USEPA and NYSDEC (Phase II) investigations. Seven of these wells were repaired or replaced, with the remaining wells redeveloped;

- Sampling of 23 new and existing monitoring wells to determine the extent of groundwater contamination;

- Characterization of a waste pile in the northeastern end of the Boiler House to identify potential off-site disposal options;

- Collection of 4 surface soil samples to evaluate potential threats to human health through direct contact exposures; and

- Collection of 2 rounds of water level measurements from site monitoring wells to determine groundwater flow patterns.

Between April 2003 and September 2004 The Envirotek II Site PRP Group implemented three Interim Remedial Measures (IRMs) at the Envirotek II Portion of the Roblin Steel Site. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS process. These IRMs consisted of the following activities:

- The excavation, decontamination and backfilling of Waste Pit No. 6 (Figure 1-3), which formerly contained soil, liquid and debris impacted with elevated concentrations of VOCs. These materials were transported to Modern Landfill in Model City, New York for disposal;

- The removal of lead-contaminated ink waste from the Boiler House (Figure 1-3). This waste was transported to CWM Chemical Services in Model City, New York for treatment and disposal;

- The excavation of VOC impacted soil and fill in the area of the former Envirotek II facility (Figure 2-1). Excavated material that was not suitable for backfill was transported to either Modern Landfill for disposal or CWM Chemical Services for treatment and disposal;

- The collection of post excavation samples for chemical analysis to determine the final limits of the excavation;

- The backfilling of excavated areas and the restoration of the site; and

- The sampling of select monitoring wells following the completion of backfilling activities to assess the affect of the IRM soil removal on groundwater contamination.

As described in the RI report, many soil, fill, waste and groundwater samples were collected to characterize the nature and extent of VOC contamination associated with the Envirotek II Portion of the Roblin Steel Site. The PRP Group was not required to remediate other types of contamination (e.g., SVOCs, PCBs, pesticides or metals) as wastes containing these compounds were not treated at the former Envirotek II facility. The PRP Group agreed, however, to analyze select samples from throughout the Roblin Steel Site for these contaminants. These data are evaluated in Section 5.0 of this report.

4.0 STUDY OBJECTIVES

The main objective of this study was to evaluate existing analytical data for portions of the Roblin Steel Site not impacted by the former Envirotek II facility to determine if the Site should remain in the Registry, and if so, what the appropriate Site classification should be. The specific objectives of the Site Evaluation were to:

- evaluate the existing analytical data to determine if hazardous wastes or substances are present, and if present, to determine if there is a consequential amount;

- evaluate the hydrogeologic properties of the strata underlying the Roblin Steel Site as these attributes govern the occurrence and flow of groundwater across the Site; and

- determine the degree to which historical waste disposal has contaminated Site groundwater, surface soil and subsurface soil.

These objectives were determined through the review of boring logs, water level data, and analytical data of fill, soil and water samples obtained from soil borings, test pits and monitoring wells completed during the 1990 USEPA investigation and the Envirotek Remedial Investigation.

5.0 GEOLOGY AND HYDROGEOLOGY

One objective of this Site Evaluation was to define the characteristics, areal extent and hydrogeologic properties of the strata underlying the Roblin Steel Site. This is important as these attributes of the geologic strata govern the occurrence and flow of groundwater across the Site. These attributes, however, also govern the potential for contaminant migration from the Site, and determine the rate and extent of this migration. As a result, a detailed evaluation of the geology at the Roblin Steel Site is essential. Before completing such a detailed evaluation, however, it is important to first describe the regional geologic history of the western New York area as a general knowledge of this history is critical to a complete understanding of the complex interrelationships between the various geologic strata and their hydrogeologic properties.

5.1 Regional Geology

5.1.1 *Surficial Geology*

Geologic evidence suggests that at least four major glacial episodes covered parts of North America during the Pleistocene Epoch (Buehler and Tesmer, 1963). In western New York, however, there is evidence of only two such episodes. The last glacial event in the area, the Wisconsin, eroded and modified the earlier glacial deposits to such an extent that little evidence of their existence remains. These glacial events also resulted in the widening of preexisting valleys and basins, and led to the development of the present day drainage system in western New York (La Sala, 1968).

A complex sequence of proglacial lakes that formed during the final retreat of the Wisconsin ice sheet inundated an extensive area of western New York. This succession originated in the Erie-Huron Basin prior to 14,000 years ago as the ice sheet retreated from the basin. Further retreat produced Lake Arkona about 13,600 years ago (Hough, 1958); a readvance of the ice sheet followed about 13,000 years ago and resulted in a water level increase to the Lake Whittlesey stage. A series of advances and retreats over the next 3,000 years produced, from latest to earliest, lakes Warren, Wayne, Lowest Warren, Grassmere, Lundy and Tonawanda, the last forming about 9,800 years ago (Calkins and Brett, 1978). To the north, Lake Iroquois occupied the Ontario Basin at this time. This lake sequence was responsible for the deposition of stratified lacustrine clays, silts, sands and gravels that now cover much of western New York.

The Pleistocene Epoch presented a variety of environments that resulted in the deposition of several types of unconsolidated deposits. In the Tonawanda area these deposits include the following (Malcolm Pirnie, 1987; Recra Environmental, 1990; URS, 1992; Woodward-Clyde, 1993; Conestoga Rovers & Associates, 1997; Weston, 1998):

- Glacial till consisting of a non-sorted, non-stratified mixture of sand, silt, clay, gravel and rock fragments deposited directly from glacial ice;

- Glaciolacustrine deposits consisting primarily of silt, sand and clay deposited in lakes that formed during melting and retreat of the ice sheets;

- Glaciofluvial deposits consisting of sand and gravel deposited either by glacial meltwater streams or by the reworking of till and other glacial deposits along the shore of former glacial lakes; and

- Alluvial deposits consisting of silt, sand and gravel deposited by streams during comparatively recent geologic time.

La Sala (1968) reports that glacial till is the most widespread deposit in the Erie-Niagara Basin, ranging in thickness from 2 to 200 feet. Lacustrine clay is also widespread, reaching thicknesses of 300 feet in some valleys within the basin (La Sala, 1968). In the southwestern portion of the Tonawanda area, the combined thickness of glacial till and lacustrine clay ranges from approximately 65 feet south of the Roblin Steel Site to more than 95 feet at the Town of Tonawanda Landfill located approximately 1.25 miles to the northeast (Malcolm Pirnie, 1995).

5.1.2 *Bedrock Geology*

The bedrock underlying western New York is characterized as a thick sequence of shales, sandstones, limestones and dolostones deposited in ancient seas during the Silurian and Devonian Periods (Buehler and Tesmer, 1963). This stratigraphic sequence is summarized in Table 5-1. Bedrock bedding generally strikes in an east-west direction, approximately paralleling the Niagara and Onondaga escarpments, and dips to the south at approximately 30 to 40 feet per mile (Johnson, 1964; La Sala, 1968; Yager and Kappel, 1987). Erosion and weathering, however, have produced local irregularities in the bedrock surface (Snyder Engineering, 1987).

The uppermost bedrock formation underlying the Tonawanda Area is the Camillus Shale Formation of the Salina Group, which was deposited in a shallow sea environment during the Late Silurian Period (Rickard and Fisher, 1970). This formation extends across northern Erie County in an east-west trending belt approximately 6 to 8 miles wide (Conestoga-Rovers & Associates, 1997). Exposures of this formation are rare because of the low relief of the outcrop area and the mantle of glacial deposits. Buehler and Tesmer

(1963, page 30) describe the Camillus Shale as a "thin bedded shale to massive mudstone. Color is gray or brownish gray with some beds showing a red or green tinge. Gypsum and anhydrite are present throughout the formation in Erie County," and occur in beds and lenses up to 5 feet in thickness (La Sala, 1968). Subsurface data indicate that a considerable quantity of grey limestone and dolostone is interbedded within the shale (Stanley Consultants, 1981; GZA, 1983; URS, 1992; Woodward-Clyde, 1993; Parsons Engineering Science, 1995). The upper 10 to 25 feet of this formation can be heavily weathered and often contains abundant bedding planes and vertical fractures enlarged by dissolution and glacial scour (La Sala, 1968). Buehler and Tesmer (1963) report that the maximum thickness of the Camillus Shale is 400 feet. Within the Erie-Niagara Basin, however, the thickness of this formation ranges from approximately 80 to 100 feet (Rickard, 1966).

5.2 Site Geology

At the Roblin Steel Site five distinct geologic units exist. These units, in order of increasing depth, are described as follows:

- Fill consisting primarily of slag and cinders with lesser amounts of glass, brick, concrete and wood. The thickness of this unit ranges to 19 feet;

- Glaciolacustrine sediments consisting primarily of brown to dark gray silty clay with a small sand component. This deposit has a very low permeability (2.5×10^{-7} centimeters per second (cm/s)) and can be considered an aquitard. The thickness of this unit ranges from 8.3 to 11.9 feet, and was encountered at depths ranging from 14.0 to 19.0 feet below ground surface;

- Alluvial sediments consisting primarily of very fine to medium grained, brown to dark gray sand. The thickness of this unit ranges from 15.0 to 27.5 feet, and was encountered at depths ranging from 15.0 to 28.5 feet below ground surface;

- A dense glacial till consisting of gray to dark gray sand with abundant rock fragments and gravel. The thickness of this unit ranges from 1.7 to 9.0 feet, and was encountered at depths ranging from 30.0 to 49.5 feet below ground surface; and

- Shale bedrock of the Camillus Shale Formation. This unit was encountered at depths ranging from 42.1 to 53.7 feet below ground surface.

5.3 Regional Hydrogeology

Many site investigations and hydrogeologic studies have been completed in the Tonawanda area. These studies indicate that there are three principal hydrogeologic zones in the area described as follows:

- Shallow alluvium, glaciofluvial and fill deposits, which can be characterized as either unconfined (water table) or perched aquifers;

- The glaciolacustrine silty clay deposit, which can be characterized as an aquitard, confining groundwater from the underlying Camillus Shale; and

- The upper Camillus Shale bedrock, which can be characterized as a confined aquifer.

Of these zones, the principal aquifers include the sands and gravels of the recent alluvium and glaciofluvial deposits, and the upper bedrock of the Camillus Shale Formation. In the Tonawanda area, unconfined groundwater is encountered largely within the glaciofluvial, alluvium and fill deposits. Where these deposits overlie the glaciolacustrine silty clay deposit, perched groundwater conditions occur. Well yields from these deposits in the Tonawanda area are generally unknown, although wells installed in highly permeable outwash deposits in the Tonawanda Creek valley have yields ranging from 1,000 to 1,400 gallons per minute (gpm) (La Sala, 1968).

The glaciolacustrine deposit separates the perched aquifer from the confined upper bedrock aquifer. The hydraulic conductivity of this deposit is extremely low, typically ranging from 10^{-6} to 10^{-8} cm/s. The glaciolacustrine deposit, therefore, can be considered an aquitard, preventing the vertical movement of shallow groundwater to the underlying Camillus Shale. Some vertical movement, however, can occur through dessication cracks commonly found in the upper portion of this deposit. Horizontal groundwater flow within this deposit is also severely limited. In fact, the glaciolacustrine deposit is generally not water bearing, yielding only small quantities of water, which is primarily interstitial pore water that is tightly bound to the soil particles. This deposit, however, often contain thin seams and stringers of silt and sand that can allow limited horizontal groundwater flow. If areally extensive, these seams and stringers can be utilized as a source of water (La Sala, 1968).

The Camillus Shale is one of the highest yielding formations in the Erie-Niagara Basin. In the Buffalo and Tonawanda area, wells completed in this formation have individual yields ranging from 300 to

1,200 gpm (La Sala, 1968). The production well at the Dunlop Tire Corporation, located approximately 0.75 miles south of the Roblin Steel Site, typically yields 600 to 900 gpm (Pyanowski, 1990), although yields of 1,800 gpm have been observed.

5.4 Site Hydrogeology

Groundwater underlying the Roblin Steel Site is encountered in three distinct water bearing zones described as follows:

- A shallow water bearing zone located within the fill materials;
- An intermediate water bearing located within the alluvial sands; and
- A deep water bearing zone located within the upper weathered zone of the Camillus Shale bedrock.

The shallow water bearing zone is perched on top of the glaciolacustrine silty clay (where present) because of the unit's low permeability. This deposit prevents the downward movement of contaminated groundwater into the intermediate and deep water bearing zones.

Hydraulic conductivity values were calculated for the shallow water bearing zone from slug and pump tests performed on monitoring wells installed throughout the Roblin Steel Site. These data are summarized in Table 5-2, and indicate that there is large variability in hydraulic conductivities for the shallow water bearing zone. Hydraulic conductivity values for this zone range from 1.0×10^{-1} (GW-7) to 1.6×10^{-5} cm/s (ENV-1), with the arithmetic and geometric means calculated as 2.12×10^{-2} and 2.22×10^{-3} cm/s, respectively. The extreme variability of the hydraulic conductivity data suggests that the heterogeneity of the fill and soil screened by the shallow zone wells greatly affects the permeability across the Roblin Steel Site.

Hydraulic conductivity values were also calculated for intermediate water bearing zone wells. These data are summarized in Table 5-3. Hydraulic conductivity values for this zone range from 1.78×10^{-4} (ENV-10D) to 5.89×10^{-3} cm/s (ENV-1D), with the arithmetic and geometric means calculated as 3.03×10^{-3} and 1.02×10^{-3} cm/s, respectively.

Table 5-4 presents water level data for Site monitoring wells from 1990 through 2004. Groundwater

in the shallow water bearing zone ranges from 6.15 to 11.77 feet below ground surface, while depth to groundwater in the intermediate water bearing zone ranges from 10.93 to 12.65 feet below ground surface. The deep water bearing zone was not investigated during the Envirotek RI.

The groundwater elevation data obtained on July 16, 2001 is presented as a groundwater contour map for the shallow water bearing zone (Figure 5-1). This figures shows that groundwater within the shallow water bearing zone flows to the west toward the Niagara River. In the vicinity of the former Envirotek II facility, however, groundwater flow is radial, but becomes more unidirectional to the west when nearing the Niagara River. Figure 5-1 also illustrates the presence of a modest hydraulic gradient of approximately 0.0034 ft/ft across the Roblin Steel Site.

The groundwater flow pattern for the intermediate water bearing zone was not determined during the Envirotek RI because only two monitoring wells were installed in this zone. The water level data from these wells, however, suggest that groundwater within this zone also flows toward the Niagara River. The hydraulic gradient on July 16, 2001 between the two wells was calculated as 0.00024 ft/ft.

The deep water bearing zone was not evaluated during the Envirotek RI. A study of the southwestern portion of the Town of Tonawanda just south of the Roblin Steel Site indicates, however, that groundwater within the upper Camillus Shale bedrock also flows toward the Niagara River (May, 1997).

6.0 EVALUATION RESULTS

A brief summary of the activities completed during the Remedial Investigation at the Envirotek II Portion of the Roblin Steel Site was presented in Section 3.0. In this section, a detailed evaluation of the analytical results obtained from the field activities is presented. Results are summarized by environmental media, and include surface soil, subsurface soil and groundwater.

6.2 Surface Soil Samples

During the Envirotek RI, four surface soil samples (SS-102, SS-103, SS-104, and SS-105) were collected from the Roblin Steel Site (Figure 6-1) for analysis of Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds and Target Analyte List (TAL) metals. The analytical results from these samples are summarized in Table 6-1.

During the summer of 2003, personnel from the NYSDEC central office collected eight surface soil samples from throughout the Roblin Steel Site for analysis of TAL metals. These samples were collected as part of a larger investigation in which an XRF unit was utilized to analyze surface soils in a grid pattern throughout the Site to determine if surface soils are contaminated with metals at concentrations exceeding DEC guidelines for exposure. A report describing this investigation was never prepared, so the exact locations of the surface soil samples are unknown. The analytical results from the eight samples sent for laboratory analysis, however, are summarized in Table 6-1.

The results of the organic analyses reveal the presence of both volatile and semivolatile organic compounds, although none of the volatile concentrations exceeded the TAGM 4046 soil cleanup objectives. Volatile organic compounds detected in the surface soil samples include methylene chloride (4 samples), tetrachloroethene (1 sample) and trichloroethene (1 sample).

Twenty-two semivolatile organic compounds were detected in the surface soil samples with sixteen of these constituents being polycyclic aromatic hydrocarbons (PAHs). Of these compounds, benzo(a)anthracene (3 samples), benzo(a)pyrene (3 samples), benzo(b)fluoranthene (1 sample), benzo(k)fluoranthene (1 sample), chrysene (2 samples) and dibenzo(a,h)anthracene (2 samples) were detected at concentrations that exceeded the TAGM 4046 soil cleanup (Table 6-1).

PAHs are a group of over 100 different chemicals that are ubiquitous in the environment. Sources of PAHs include incomplete combustion of coal, coke, oil, gasoline, garbage and wood from stoves,

automobiles and incinerators. PAHs are also found in coal tar, crude oil, creosote, roofing tar, medicines, dyes, plastics and pesticides. Because coal and coke are utilized in the production of steel, the presence of PAHs at the Roblin Steel Site was expected.

Four phthalates, including bis(2-ethylhexyl)phthalate (2 samples), butylbenzylphthalate (1 sample), di-n-butylphthalate (2 samples) and di-n-octylphthalate (1 sample), were also detected in the surface soil samples collected from the Roblin Steel Site (Table 6-1). None of the phthalate concentrations, however, exceeded the TAGM 4046 soil cleanup objectives.

The elevated SVOC concentrations detected at SS-104 (Table 6-1) may be due to the sampling point location being adjacent to an access road constructed of asphalt millings in the southern area of the Roblin Steel Site (Figure 6-1). The elevated SVOC concentrations detected in surface soil samples SS-102 and SS-105 are likely associated with previous steel making activities on the Roblin Steel property.

Twenty-two metals were detected in the surface soil samples collected from the Roblin Steel Site (Table 6-1). Of these compounds, sixteen were detected at concentrations that exceeded the TAGM 4046 soil cleanup objectives, with nine of these metals being USEPA priority pollutant metals. USEPA priority pollutant metals are toxic metals for which technology-based effluent limitations and guidelines are required by Federal law. The priority pollutant metals that exceeded the soil cleanup objectives include arsenic (3 samples), beryllium (4 samples), cadmium (9 samples), chromium (10 samples), copper (11 samples), lead (11 samples), mercury (2 samples), nickel (8 samples) and zinc (12 samples).

6.3 Subsurface Soil Samples

6.3.1 *USEPA Samples*

The USEPA conducted a soil sampling program in 1990 to investigate alleged Envirotek operations/activities that may have impacted the Roblin Steel property. Twenty subsurface (24-inch depth) samples (19 samples plus one duplicate) of soil/fill/slag material were collected from five general locations on the Roblin Steel property (Areas "A" through "E") as presented on Figure 6-1. Samples were analyzed for TCL volatile organic compounds, TCL semivolatile organic compounds, TCL pesticides, TCL PCBs and TAL metals. The analytical results from these samples are summarized in Table 6-2.

The results of the organic analyses reveal the presence of both volatile and semivolatile organic compounds throughout the Roblin Steel Site. Twelve volatile organic compounds were detected in the

subsurface soil samples with the concentrations of six of these compounds exceeding the TAGM 4046 soil cleanup objectives. Volatile organic compounds detected above the soil cleanup objectives include 1,2-dichloropropane (1 sample), acetone (1 sample), benzene (1 sample), methylene chloride (6 samples), toluene (1 sample) and xylene (1 sample). Area "A" did not exhibit any exceedances, while Areas "C", "D" and "E" only exceeded the TAGM 4046 soil cleanup objectives for methylene chloride. It is important to note that methylene chloride is a common laboratory contaminant, so it is possible that this compound is not actually present at the Site. The remaining exceedances were observed in Sample No. 5 from Area "B" near the Niagara River (Figure 6-1; Table 6-2). The remaining samples from this area, however, did not exhibit any exceedances of the TAGM 4046 soil cleanup objectives for volatile organic compounds.

Due to the elevated VOC concentrations detected in Sample No. 5, and allegations of field spreading activities at the Roblin Steel complex by Envirotek personnel, this area was considered a potential area of concern by the NYSDEC. The presence of elevated VOCs in this sample (primarily benzene, toluene, ethylbenzene, and xylenes [BTEX] and solvents) appeared to be related to the presence of greasy rags, oil-stained "sand-coating materials," and debris such as "diesel fuel line material." The conclusions made by USEPA TAT personnel were that this area may have served as an isolated dumping ground. The types of debris noted during collection of this sample suggested that the sources of these wastes could be Roblin Steel operations, Envirotek operations, or an unknown source. However, tan oil/sand materials, which were noted in this sample, appear to be related to old sand casting materials, wastes typically generated during steel manufacturing operations.

Thirty-two semivolatile organic compounds were detected in the subsurface soil samples with sixteen of these constituents being PAHs. Of these compounds, benzo(a)anthracene (7 samples), benzo(a)pyrene (4 samples), benzo(b)fluoranthene (4 samples), benzo(k)fluoranthene (2 samples), chrysene (7 samples), indeno(1,2,3-cd)pyrene (1 sample) and naphthalene (1 sample) were detected at concentrations that exceeded the TAGM 4046 soil cleanup (Table 6-2). Area "A" did not exhibit any PAH exceedances, while the remaining areas exhibited PAH exceedances in two or more samples. These compounds are potentially indicative of the widespread residual hydrocarbon impacts from past steel-making operations and activities.

Four phthalates, including bis(2-ethylhexyl)phthalate (12 samples), butylbenzylphthalate (3 samples), di-n-butylphthalate (4 samples) and di-n-octylphthalate (3 samples), were also detected in the subsurface soil samples collected from the Roblin Steel Site (Table 6-2). Although phthalates were detected in all five areas sampled by the USEPA, none of the phthalate concentrations exceeded the TAGM 4046 soil cleanup

objectives.

Six phenolic compounds were also detected in the subsurface soil samples collected from the Roblin Steel Site (Table 6-2). These compounds included 2,3,4,6-tetrachlorophenol (1 sample), 2-methylphenol (1 sample), 3-methylphenol (1 sample), 4,6-dinitro-2-methylphenol (1 sample), 4-methylphenol (2 samples) and phenol (1 sample). These compounds were only detected in Areas "A" and "B", with the concentrations of 2-methylphenol (1 sample), 4-methylphenol (1 sample) and phenol (1 sample) from Area "B" exceeding the TAGM 4046 soil cleanup objectives (Table 6-2).

Fifteen metals were detected in the subsurface soil samples collected from the Roblin Steel Site (Table 6-2). Of these compounds, eleven were detected at concentrations that exceeded the TAGM 4046 soil cleanup objectives, with nine of these metals being USEPA priority pollutant metals. The priority pollutant metals that exceeded the soil cleanup objectives include arsenic (15 samples), beryllium (4 samples), cadmium (10 samples), chromium (9 samples), copper (10 samples), lead (15 samples), mercury (12 samples), nickel (3 samples) and zinc (11 samples). Although metals exceedances were observed at all five areas sampled by the USEPA, Area "A" contained the fewest exceedances, with only arsenic (3 samples) and barium (1 sample) exceeding the TAGM 4046 soil cleanup objectives.

No PCBs or pesticides were detected in any of the subsurface soil samples collected by the USEPA from the Roblin Steel Site.

6.3.2 *Bike Path Samples*

During the Envirotek RI, five subsurface soil samples (BG-01, BG-02, BG-03, BG-04 and BG-05) were collected from along the bike path in an area between River Road and the Roblin Steel property (Figure 6-1). These samples were collected to establish background soil quality conditions adjacent to the Roblin Steel Site because it was believed that the areas sampled were not impacted by past operational activities at the Site or the former Envirotek II facility. These sample locations, however, may correspond to the location of the former Erie Canal that had been backfilled prior to development of the Roblin Steel property. As a result, the analytical results from these samples may not represent true background conditions.

Five soil borings were advanced from the ground surface to the top of the water table using 4¼-inch-inside-diameter hollow-stem augers with continuous sample collection at 2-foot intervals using a 2-inch-diameter split-spoon sampler. Soil samples were visually characterized by an on-site geologist and screened

using a photo ionization detector (PID). Representative samples from each split spoon were collected for purposes of creating one composite sample from each boring. Each composite sample was subsequently submitted to a laboratory for analysis of TCL volatile organic compounds, TCL semivolatile organic compounds, TAL metals and cyanide. The analytical results from these samples are summarized in Table 6-3.

The results of the organic analyses reveal the presence of both volatile and semivolatile organic compounds, although none of the volatile concentrations exceeded the TAGM 4046 soil cleanup objectives. Volatile organic compounds detected in the subsurface soil samples include acetone (1 sample), carbon disulfide (1 sample) and tetrachloroethene (1 sample).

Nineteen semivolatile organic compounds were detected in the subsurface soil samples with sixteen of these constituents being PAHs. Of these compounds, benzo(a)anthracene (2 samples), benzo(a)pyrene (5 samples), benzo(k)fluoranthene (1 sample) and chrysene (2 samples) were detected at concentrations that exceeded the TAGM 4046 soil cleanup (Table 6-3). The maximum concentrations reported for each compound were primarily detected in sample BG-02. Based upon the presence of several SVOCs above the TAGM 4046 soil cleanup objectives, these samples may not be indicative of background soil conditions for the Roblin Steel Site. Rather, these concentrations are comparable to the historical soil data documented in Table 6-2 for the Roblin Steel property.

Twenty-two metals were detected in the subsurface soil samples collected from along the bike path adjacent to the Roblin Steel Site (Table 6-3). Of these compounds, eighteen were detected at concentrations that exceeded the TAGM 4046 soil cleanup objectives, with nine of these metals being USEPA priority pollutant metals. The priority pollutant metals that exceeded the soil cleanup objectives include arsenic (1 sample), beryllium (5 samples), cadmium (2 samples), chromium (3 samples), copper (4 samples), lead (5 samples), mercury (2 samples), selenium (1 sample) and zinc (3 samples).

Cyanide was not detected in the three subsurface soil samples (BG-01, BG-02, and BG-03) analyzed for this contaminant.

6.3.3 *Envirotek II Area Samples*

1992 Investigation

The Envirotek II PRP Group conducted a soil sampling program in 1992 to obtain information

necessary to support the design of an Interim Remedial Program for addressing contaminated soil in the vicinity of the former Envirotek II facility. The field activities associated with this investigation included the collection of subsurface soil and groundwater samples, the installation of a recovery well (RW-1), and the performance of a pump test to characterize the hydraulic properties of the shallow water bearing zone.

Fourteen soil borings (B-7 through B-20) were installed near the former Envirotek II facility in May 1992 (Figure 6-2). Visual observations of the samples recovered from the zone of water-table fluctuation indicated the presence of residual hydrocarbons that extended beyond the limits of the facility. Dark staining and oily sheens was observed in soil samples from the water table to the top of the glaciolacustrine silty clay deposit. In addition, soil samples collected from two borings (B-19 and B-20) installed to the base of this deposit exhibited dark staining and oily sheens. The report entitled "Supplemental Investigation Results, Still Discharge Area" (Blasland & Bouck, November 1992) concluded that the presence of residual hydrocarbons within the saturated soil upgradient, as well as downgradient of the former Envirotek II facility, indicates that the residual hydrocarbons are associated with the surrounding Roblin Steel complex and do not appear to be related to former Envirotek operations.

One sample was collected from each boring and submitted to a laboratory for analysis of TCL volatile and semivolatile organic compounds to further define the extent of impacted soil associated with the former Envirotek II facility. The analytical results from subsurface soil samples collected during the 1992 investigation are summarized in Table 6-4. Only data from borings not located within the limits of the 2003 IRM excavation are included in the table.

The results of the organic analyses reveal the presence of both volatile and semivolatile organic compounds in the vicinity of the former Envirotek II facility. Eleven volatile organic compounds were detected in the subsurface soil samples with the concentrations of six of these compounds exceeding the TAGM 4046 soil cleanup objectives. Volatile organic compounds detected above the soil cleanup objectives include 1,1-dichloroethane (1 sample), acetone (1 sample), methylene chloride (2 samples), tetrachloroethene (2 samples), trichloroethene (1 sample) and xylene (1 sample). It is important to note that acetone and methylene chloride are common laboratory contaminants, so it is possible that these compounds are not actually present at the Site.

Sixteen semivolatile organic compounds were detected in the subsurface soil samples collected near the former Envirotek II facility with eleven of these constituents being PAHs. Of these compounds,

benzo(a)anthracene (1 sample), benzo(b)fluoranthene (1 sample) and chrysene (2 samples) were detected at concentrations that exceeded the TAGM 4046 soil cleanup (Table 6-4). Of the additional SVOCs detected, none were detected at concentrations that exceeded the soil cleanup objectives.

Envirotek RI

During the Envirotek RI, twenty-eight soil borings (SB-01 through SB-13, SB-15 through SB-26, and SB-28 through SB-30) were installed in the vicinity of the Former Envirotek II facility(Figure 6-2) to further characterize subsurface soil conditions. In addition, these borings were also used to delineate the horizontal and vertical extent of contamination associated with the facility. Soil borings SB-01 through SB-10 were completed in 1999, while soil borings SB-11 through SB-13, SB-15 through SB-26, and SB-28 through SB-30 were completed in 2001.

The soil borings completed in 1999 were advanced from the ground surface to the top of the water table using 4¼-inch-inside-diameter hollow-stem augers with continuous sample collection at 2-foot intervals using a 2-inch-diameter split-spoon sampler. Soil samples were visually characterized by an on-site geologist and screened using a photo ionization detector PID. Two subsurface samples from each boring that exhibited the highest PID readings or visible staining were submitted to a laboratory for analysis of TCL volatile and semivolatile organic compounds. In addition, one composite subsurface soil sample (SB-03 [0' to 8']) was collected and submitted for analysis of TAL metals and cyanide.

The soil borings completed in 2001 were advanced from the ground surface to the top of glaciolacustrine silty clay deposit using 4¼-inch-inside-diameter hollow-stem augers with continuous sample collection at 2-foot intervals using a 2-inch-diameter split-spoon sampler. Soil samples were visually characterized by an on-site geologist and screened using a photo ionization detector PID. Two subsurface samples from each boring that exhibited the highest PID readings or visible staining were submitted to a laboratory for analysis of TCL volatile organic compounds only. Soil samples were collected from boring SB-30 but were not analyzed because the analytical data for boring SB-29 (closer to the former Envirotek II facility) did not reveal any VOC concentrations above the TAGM 4046 soil cleanup objectives.

The analytical results from subsurface soil samples collected during the Envirotek RI are summarized in Table 6-5. Only data from borings located outside the limits of the 2003 IRM excavation are included in the table.

The results of the organic analyses reveal the presence of both volatile and semivolatile organic compounds in the vicinity of the former Envirotek II facility. Eighteen volatile organic compounds were detected in the subsurface soil samples; however, only the concentration of acetone in one sample (SB-24) exceeded the TAGM 4046 soil cleanup objective. It is important to note that acetone is a common laboratory contaminant, so it is possible that acetone is not actually present at the Site.

Sixteen semivolatile organic compounds were detected in the subsurface soil samples collected near the former Envirotek II facility with fifteen of these constituents being PAHs. Of these compounds, only benzo(a)anthracene (2 samples), benzo(a)pyrene (1 sample) and chrysene (1 sample) were detected at concentrations that exceeded the TAGM 4046 soil cleanup objectives (Table 6-5). Dibenzofuran was the only other SVOC detected in the subsurface soil samples. This compound was detected in two samples at concentrations well below the TAGM 4046 soil cleanup objective.

Twenty-one metals were detected in the subsurface soil sample that was analyzed for metals (Table 6-5). Of these compounds, fourteen were detected at concentrations that exceeded the TAGM 4046 soil cleanup objectives, with nine of these metals being USEPA priority pollutant metals. The priority pollutant metals that exceeded the soil cleanup objectives include arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel and zinc. Cyanide was not detected in this sample.

6.4 Test Pit Samples

Two test pits (TP-1 and TP-2) were completed along a section of the sewer line that emanated from the former wastewater treatment plant to verify the presence of the sewer line and to determine impacts to subsurface soils. The locations of these pits are shown on Figures 6-1 and 6-2. The test pits were installed to the base of the sewer line at an approximate depth of 14 feet below grade. Soil samples were collected from each test pit and submitted to a laboratory for analysis of TCL volatile organic compounds, TCL semivolatile organic compounds, TAL metals and cyanide. The analytical results from these samples are summarized in Table 6-6.

Test pit TP-3 (Figure 6-1) was installed in the approximate location of USEPA Sample No. 5 (Figure 6-1) to confirm subsurface observations and the analytical results of the USEPA sampling effort conducted in 1990. The test pit was installed to a depth of 3.0 feet below ground surface. A soil sample was collected from the base of the test pit and submitted to a laboratory for analysis of TCL volatile organic compounds. The analytical results from this sample are also summarized in Table 6-6.

The results of the organic analyses reveal the presence of both volatile and semivolatile organic compounds, although none of the concentrations exceeded the TAGM 4046 soil cleanup objectives. Volatile organic compounds detected in the test pit samples include 1,2-dichloroethene (2 samples), methylene chloride (1 sample), tetrachloroethene (3 samples) and trichloroethene (1 sample), while bis(2-ethylhexyl)phthalate was the only semivolatile organic compound detected (2 samples). The elevated volatile concentrations detected in USEPA Sample No. 5 (Table 6-2) were not detected in test pit TP-3 (Table 6-5).

Twenty-one metals were detected in the test pit samples collected from the Roblin Steel Site (Table 6-6). Of these compounds, sixteen were detected at concentrations that exceeded the TAGM 4046 soil cleanup objectives, with eight of these metals being USEPA priority pollutant metals. The priority pollutant metals that exceeded the soil cleanup objectives include arsenic (2 samples), beryllium (2 samples), cadmium (1 sample), chromium (2 samples), copper (2 samples), lead (2 samples), nickel (2 samples) and zinc (2 samples). Cyanide was detected at relatively low concentrations in the two samples that were analyzed for this compound. Soil cleanup objectives, however, have not been established for this contaminant. The presence of cyanide at the Roblin Steel Site may be related to historical steel-making activities at the Site.

6.5 Groundwater Samples

Two rounds of groundwater samples were collected during the Envirotek RI, although the second round was only analyzed for TCL volatile organic compounds. As a result, only the first round results will be presented and evaluated in this report. The locations of these wells are shown on Figure 5-1.

The first round of groundwater samples were collected from September 29 through October 1, 1999, approximately two weeks after completion of well redevelopment. At each well location, an electronic water-level probe was used to measure the depth to groundwater. The volume of standing water in each well was calculated, as well as the three well volumes that were required to be removed prior to collection of groundwater samples. Purging of each well was performed using a disposable polyethylene bailer, and field parameters (pH, temperature, specific conductivity, and turbidity) were recorded after removal of each well volume. Upon removal of three well volumes, groundwater samples were collected for TCL volatile organic compounds, TCL semivolatile organic compounds, TAL metals and cyanide. The analytical results from these samples are summarized in Table 6-7.

The results of the organic analyses reveal the presence of both volatile and semivolatile organic compounds throughout the Roblin Steel Site. Sixteen volatile organic compounds were detected in the

groundwater samples with the concentrations of fifteen of these compounds exceeding the TOGS 1.1.1 water quality standards. Excluding well ENV-2, which was located in contaminated soils associated with the former Envirotek II facility and removed during the IRM soil removal, volatile organic compounds detected above the water quality standards include 1,1-dichloroethane (2 samples), 1,2-dichloroethene (5 samples), benzene (3 samples), chloroethane (1 sample), ethylbenzene (1 sample), toluene (1 sample), trichloroethene (1 sample), vinyl chloride (4 samples) and xylene (1 sample). The chlorinated VOCs are associated with the former Envirotek II facility and will be remediated by the Envirotek II PRP Group as specified in the March 2005 Record of Decision.

Five semivolatile organic compounds were detected in groundwater samples collected from throughout the Roblin Steel Site (Table 6-7). Of these compounds, only phenol (2 samples) was detected at concentrations that exceeded the TOGS 1.1.1 water quality standards. Phenol is a potential waste byproduct associated with steel-making operations.

Twenty-one metals were detected in the groundwater samples collected in 1999 (Table 6-7). For upgradient monitoring wells ENV-1, GW-2 and NW-5, eight metals were detected at concentrations that exceeded the TOGS 1.1.1 water quality standards, with four of these metals being USEPA priority pollutant metals. The priority pollutant metals that exceeded water quality standards include antimony (1 sample), arsenic (1 sample), lead (1 sample) and selenium (2 samples). The majority of these exceedances were associated with well ENV-1 (4 exceedances), with wells GW-2 and NW-5 exhibiting 0 and 1 exceedance, respectively.

For wells in the central portion of the Roblin Steel Site (ENV-2 through ENV-6, GW-3, GW-7, NW-1, NW-4 and ESI-8), thirteen metals were detected at concentrations that exceeded the TOGS 1.1.1 water quality standards, with nine of these metals being USEPA priority pollutant metals. The priority pollutant metals that exceeded water quality standards include antimony (5 samples), arsenic (1 sample), beryllium (1 sample), chromium (4 samples), lead (7 samples), nickel (1 sample), selenium (6 samples), thallium (1 sample) and zinc (1 sample).

For downgradient monitoring wells GW-4, GW-5 and GW-6, eight metals were detected at concentrations that exceeded the TOGS 1.1.1 water quality standards, with five of these metals being USEPA priority pollutant metals. The priority pollutant metals that exceeded water quality standards include antimony (1 sample), arsenic (2 samples), chromium (1 sample), lead (1 sample) and selenium (1 sample).

The majority of these exceedances were associated with well GW-4 (5 exceedances), with wells GW-5 and GW-6 exhibiting 1 and 0 exceedance, respectively.

Cyanide was only detected in monitoring wells GW-2 and ESI-8 at concentrations well below the TOGS 1.1.1 water quality standard (Table 6-7).

7.0 DISCUSSION AND CONCLUSION

7.1 Discussion

The principle objective of the Site Evaluation study was to (1) evaluate the existing analytical data for the Roblin Steel Site to determine if hazardous wastes or substances are present, and if present, to determine if there is a consequential amount; (2) evaluate the hydrogeologic properties of the strata underlying the Site; and (3) determine the degree to which historical waste disposal has contaminated Site groundwater, surface soil and subsurface soil. These objectives were determined through the review of boring logs, water level data, and analytical data of fill, soil and water samples obtained from soil borings, test pits and monitoring wells completed largely during the Envirotek Remedial Investigation.

7.1.1 *Soil Quality Conditions*

Soil analytical data obtained by the USEPA in 1990, the Envirotek II PRP Group in 1992 and the Envirotek II PRP Group during the Envirotek Remedial Investigation consisted of surface and subsurface soil. The samples collected by the USEPA were analyzed for TCL volatile organic compounds, TCL semivolatile organic compounds, TCL pesticides, TCL PCBs and TAL metals. The samples collected by the Envirotek II PRP Group in 1992 were analyzed for TCL volatile and semivolatile organic compounds. During the 1999 RI field activities, soil samples were analyzed for TCL volatile organic compounds, TCL semivolatile organic compounds, TAL metals and cyanide, except for USEPA Sample Point No. 5 (test pit TP-3), which was analyzed for TCL VOCs only. During the 2001 RI field activities, soil samples were analyzed for TCL volatile organic compounds with one soil sample also analyzed for TCL semivolatile organic compounds. These data can be summarized as follows:

<u>USEPA Samples</u>

The USEPA conducted a soil sampling program in 1990 to investigate alleged Envirotek operations/activities that may have impacted the Roblin Steel property. Twenty subsurface (24-inch depth) soil samples were collected from five general locations on the Roblin Steel property (Areas "A" through "E").

Analytical results from USEPA Sample No. 5 (Area "B") indicated the presence of ten volatile organic compounds at elevated concentrations (Table 6-2). These compounds included acetone (2,124 µg/kg), benzene (70.0 µg/kg), 2-butanone (156 µg/kg), 1,2-dichloropropane (760 µg/kg), ethylbenzene (2,365 µg/kg), methylene chloride (131 µg/kg), tetrachloroethene (1,052 µg/kg), toluene (5,506 µg/kg) and xylenes (14,727 µg/kg). The presence of elevated VOCs in this sample appeared to be related to the presence

of greasy rags, oil-stained "sand-coating materials," and debris such as "diesel fuel line material." Area "A" did not exhibit any volatile exceedances, while Areas "C", "D" and "E" only exceeded the TAGM 4046 soil cleanup objectives for methylene chloride (Table 6-2). The maximum concentration of methylene chloride detected was 263 µg/kg in Area "E".

Semivolatile organic compounds were also detected in the USEPA samples (Table 6-2). The following PAHs with their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives: benzo(a)anthracene (14,012 µg/kg), benzo(a)pyrene (9,500 µg/kg), benzo(b)fluoranthene (21,632 µg/kg), benzo(k)fluoranthene (14,823 µg/kg), chrysene (13,657 µg/kg), indeno(1,2,3-cd)pyrene (11,415 µg/kg) and naphthalene (29,658 µg/kg). Area "A" did not exhibit any PAH exceedances, while the remaining areas exhibited PAH exceedances in two or more samples (Table 6-2).

Six phenolic compounds were also detected in the USEPA samples collected from the Roblin Steel Site (Table 6-2). These compounds were only detected in Areas "A" and "B", with the concentrations of 2-methylphenol (274 µg/kg), 4-methylphenol (1,495 µg/kg) and phenol (1,398 µg/kg) from Area "B" exceeding the TAGM 4046 soil cleanup objectives.

The following priority pollutant metals with their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives (Table 6-2): arsenic (60.5 mg/kg), beryllium (2.43 mg/kg), cadmium (8.92 mg/kg), chromium (575 mg/kg), copper (12,100 mg/kg), lead (3,570 mg/kg), mercury (0.72 mg/kg), nickel (142 mg/kg) and zinc (2,580 mg/kg). Although metals exceedances were observed at all five areas sampled by the USEPA, Area "A" contained the fewest exceedances, with only arsenic (3 samples) and barium (1 sample) exceeding the TAGM 4046 soil cleanup objectives.

Surface Soil Samples

During the Envirotek RI, four surface soil samples were collected from throughout the Roblin Steel Site. Eight additional surface soil samples were collected by the NYSDEC in 2003. The analytical results from these samples indicated that VOC concentrations were detected below the TAGM 4046 soil cleanup objectives (Table 6-1). The following SVOCs and their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives (Table 6-1): benzo(a)anthracene (1,500 µg/kg), benzo(a)pyrene (1,600 µg/kg), benzo(b)fluoranthene (1,600 µg/kg), benzo(k)fluoranthene (1,600 µg/kg), chrysene (1,800 µg/kg) and dibenzo(a,h)anthracene (790 µg/kg).

Metals were also detected in the surface soil samples (Table 6-1). The following priority pollutant metals and their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives: arsenic (24.0 mg/kg), beryllium (2.4 mg/kg), cadmium (21.0 mg/kg), chromium (200 mg/kg), copper (2,330 mg/kg), lead (1,210 mg/kg), mercury (0.96 mg/kg) and zinc (2,600 mg/kg).

Bike Path Samples

During the Envirotek RI, five subsurface soil samples were collected from along the bike path in an area between River Road and the Roblin Steel property. The analytical results from these samples indicated that VOC concentrations were detected below the TAGM 4046 soil cleanup objectives (Table 6-3). The following SVOCs and their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives (Table 6-3): benzo(a)anthracene (1,000 µg/kg), benzo(a)pyrene (1,000 µg/kg), benzo(k)fluoranthene (1,200 µg/kg) and chrysene (970 µg/kg).

Metals were also detected in the bike path samples (Table 6-3). The following priority pollutant metals and their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives: arsenic (7.7 mg/kg), beryllium (3.6 mg/kg), cadmium (2.1 mg/kg), chromium (1,320 mg/kg), copper (74.8 mg/kg), lead (306 mg/kg), mercury (0.17 mg/kg), selenium (15.5 mg/kg) and zinc (367 mg/kg).

Envirotek II Area Samples

The Envirotek II PRP Group conducted a soil sampling program in 1992 to obtain information necessary to support the design of an Interim Remedial Program for addressing contaminated soil in the vicinity of the former Envirotek II facility. As part of this investigation, fourteen soil borings were installed near the former Envirotek II facility. During the Envirotek RI, twenty-eight soil borings were installed in the vicinity of the Former Envirotek II facility to further characterize subsurface soil conditions. In addition, these borings were also used to delineate the horizontal and vertical extent of contamination associated with the facility to facilitate the IRM soil removal that was completed in 2003.

Eighteen volatile organic compounds were detected in the subsurface soil samples collected from areas outside the limits of the 2003 IRM excavation (Tables 6-4 and 6-5). The following VOCs with their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives: 1,1-dichloroethane (390 µg/kg), acetone (260 µg/kg), methylene chloride (280 µg/kg), tetrachloroethene (8,300 µg/kg), trichloroethene (780 µg/kg) and xylene (8,500 µg/kg). It is important to note that acetone and methylene chloride are common laboratory contaminants, so it is possible that these compounds are not

actually present at the Site.

Semivolatile organic compounds were also detected in the Envirotek area (Tables 6-4 and 6-5). The following PAHs with their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives: benzo(a)anthracene (1,400 µg/kg), benzo(a)pyrene (520 µg/kg), benzo(b)fluoranthene (2,100 µg/kg) and chrysene (2,100 µg/kg).

The following priority pollutant metals with their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives (Table 6-5): arsenic (12.4 mg/kg), beryllium (0.8 mg/kg), cadmium (2.9 mg/kg), chromium (163 mg/kg), copper (486 mg/kg), lead (506 mg/kg), mercury (0.49 mg/kg), nickel (55.3 mg/kg) and zinc (1,260 mg/kg).

Test Pit Samples

During the Envirotek RI, three test pits were completed; two (TP-1 and TP-2) were completed along a section of the sewer line that emanated from the former Envirotek wastewater treatment plant to verify the presence of the sewer line and to determine impacts to subsurface soils and the third (TP-3) was completed in the approximate location of USEPA Sample No. 5 to confirm subsurface observations and the analytical results of the USEPA sampling effort conducted in 1990.

The analytical results from the test pits samples indicated that VOC and SVOC concentrations were detected below the TAGM 4046 soil cleanup objectives (Table 6-6). The elevated volatile concentrations detected in USEPA Sample No. 5 were not detected in test pit TP-3.

Metals were also detected in the test pit samples (Table 6-6). The following priority pollutant metals and their respective maximum concentrations were reported above the TAGM 4046 soil cleanup objectives: arsenic (21.3 mg/kg), beryllium (4.0 mg/kg), cadmium (1.2 mg/kg), chromium (75.5 mg/kg), copper (137 mg/kg), lead (96.5 mg/kg) and zinc (303 mg/kg). Cyanide was detected at relatively low concentrations (7.47 mg/kg and 0.617 mg/kg) in test pit samples TP-1 and TP-2, respectively. Soil cleanup objectives have not been established for this contaminant.

7.1.2 *Groundwater Quality Conditions*

During the Envirotek RI, groundwater samples were collected from monitoring wells that screen the saturated fill materials located above the glaciolacustrine silty clay deposit. These samples were analyzed

for TCL volatile organic compounds, TCL semivolatile organic compounds, TAL metals, and cyanide. These data indicated the following:

- Sixteen volatile organic compounds were detected in the groundwater samples with the concentrations of fifteen of these compounds exceeding the TOGS 1.1.1 water quality standards (Table 6-7). The groundwater contaminant plume will be remediated by the Envirotek II PRP Group as specified in the March 2005 Record of Decision and will not be considered further in this evaluation.

- Analysis of groundwater samples for semivolatile organic compounds indicated that phenol was the only semivolatile detected at concentrations above the TOGS 1.1.1 water quality standards (Table 6-7). Phenol was detected in wells GW-3 and GW-4 at concentrations of 6.0 µg/L and 7.0 µg/L, respectively.

- The analytical results for upgradient monitoring wells ENV-1, GW-2 and NW-5 indicated that eight metals were detected at concentrations that exceeded the TOGS 1.1.1 water quality standards (Table 6-7). Four of these metals are USEPA priority pollutant metals. The following priority pollutant metals with their respective maximum concentrations were reported above the TOGS 1.1.1 water quality standards: antimony (7.4 µ/L), arsenic (42.1 µg/L), lead (38.2 µg/L) and selenium (15.1 µg/L). The majority of these exceedances were associated with well ENV-1.

- The analytical results for wells in the central portion of the Roblin Steel Site (ENV-2 through ENV-6, GW-3, GW-7, NW-1, NW-4 and ESI-8) indicated that thirteen metals were detected at concentrations that exceeded the TOGS 1.1.1 water quality standards (Table 6-7). Nine of these metals are USEPA priority pollutant metals. The following priority pollutant metals with their respective maximum concentrations were reported above the TOGS 1.1.1 water quality standards: antimony (61.9 µg/L), arsenic (33.7 µg/L), beryllium (4.2 µg/L), chromium (165 µg/L), lead (238 µg/L), nickel (109 µg/L), selenium (60.5 µg/L), thallium (8.9 µg/L) and zinc (3,000 µg/L).

- The analytical results for downgradient monitoring wells GW-4, GW-5 and GW-6 indicated that eight metals were detected at concentrations that exceeded the TOGS 1.1.1 water quality standards (Table 6-7). Five of these metals are USEPA priority pollutant metals. The following priority pollutant metals with their respective maximum concentrations were reported above the TOGS 1.1.1

water quality standards: antimony (13.9 µg/L), arsenic (40.8 µg/L), chromium (67.7 µg/L), lead (276 µg/L) and selenium (13.3 µg/L). The majority of these exceedances were associated with well GW-4.

7.2 Conclusion

The Site Evaluation study for the Roblin Steel Site revealed the presence of volatile organic compounds, semivolatile organic compounds and metals in surface soil, subsurface soil and groundwater samples collected from the Site at concentrations that exceed TAGM 4046 soil cleanup objectives and TOGS 1.1.1 water quality standards. The chlorinated VOCs detected in groundwater are associated with the former Envirotek II facility, and will be remediated by the Envirotek II PRP Group as described in the March 2005 Record of Decision.

Polycyclic aromatic hydrocarbons are the primary semivolatile organic compounds detected throughout the Roblin Steel Site. PAHs are a group of over 100 different chemicals that are ubiquitous in the environment. Sources of PAHs include incomplete combustion of coal, coke, oil, gasoline, garbage and wood from stoves, automobiles and incinerators. PAHs are also found in coal tar, crude oil, creosote, roofing tar, medicines, dyes, plastics and pesticides. Because coal and coke are utilized in the production of steel, the presence of PAHs are likely associated with the former steel-making operations at the Site.

Phenols were also detected in samples collected from the Roblin Steel Site. Phenols are waste byproducts associated with steel-making operations, and are likely associated with the former steel-making operations at the Site. The presence of metals and cyanide at the Roblin Steel Site may also be related to historical steel-making activities. Metals are also known impurities in coal.

The presence of surface soil contamination indicates that direct contact exposures are possible. Waste at the Site has also adversely impacted groundwater. The analytical results for downgradient monitoring wells GW-4, GW-5 and GW-6 indicated that eight metals were detected at concentrations that exceeded the TOGS 1.1.1 water quality standards. Five of these metals are USEPA priority pollutant metals. These data suggest that the Roblin Steel Site is adversely impacting the Niagara River.

8.0 RECOMMENDATIONS

Although a large quantity of analytical data is available for the Roblin Steel Site, large portions of the Site have not been investigated (e.g., the warehouse area, the boiler house area and the northwest portion of the property; Figure 6-1). As a result, it is recommended that any development plans for the property include the investigation of these areas.

The analytical results for downgradient monitoring wells GW-4, GW-5 and GW-6 suggest that the Roblin Steel Site is adversely impacting the Niagara River. It is important to note, however, that the analytical data from these wells are from 1999. As a result, it is recommended that these wells, along with downgradient wells NW-2 and NW-3, be sampled and analyzed for TCL volatile organic compounds, TCL semivolatile organic compounds, TAL metals, hexavalent chromium and cyanide to determine the current impacts to the Niagara River.

It is also recommended that the Site remain in the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites in New York State as a Class 2 site until the data gaps have been thoroughly investigated.

9.0 REFERENCES

Blasland, Bouck & Lee, 2002, Remedial Investigation Report, Envirotek II Site: Blasland, Bouck & Lee, Inc., Fairport, New York.

Blasland, Bouck & Lee, 2003, Interim Remedial Measures Final Report for Operable Unit 1, Envirotek II Site: Blasland, Bouck & Lee, Inc., Fairport, New York.

Blasland, Bouck & Lee, 2004, Interim Remedial Measures Final Report for Operable Unit 2, Envirotek II Site: Blasland, Bouck & Lee, Inc., Fairport, New York.

Blasland, Bouck & Lee, 2005, Interim Remedial Measures Final Report for Operable Unit 3, Envirotek II Site: Blasland, Bouck & Lee, Inc., Fairport, New York.

Buehler, E.J., and Tesmer, I.H., 1963, Geology of Erie County, New York: Buffalo Society of Natural Sciences Bulletin, v. 21, no. 3, 118p.

Calkins, P.E., and Brett, C.E., 1978, Ancestral Niagara River Drainage: Stratigraphic and Paleontologic Setting: Geological Society of America Bulletin, v. 89, p. 1140-1154.

Conestoga Rovers & Associates, 1997, RCRA Facility Investigation and Remedial Investigation Report, Spaulding Composites Company, Tonawanda, New York: Conestoga Rovers & Associates, Niagara Falls, New York.

GZA, 1983, Geotechnical Report for Niagara Mohawk Power Corporation C.R. Huntley Steam Station Wastewater Management Systems Project: Goldberg-Zoino Associates, Buffalo, New York.

Hough, J., 1958, Geology of the Great Lakes: Illinois University Press, Urbana, Illinois, 313p.

Johnson, R.H., 1964, Ground Water in the Niagara Falls Area, New York: State of New York Water Resources Commission Bulletin GW 53, 93p.

La Sala, A.M., Jr., 1968, Ground-Water Resources of the Erie-Niagara Basin, New York: Water Resources Commission, Basin Planning Report ENB-3, New York State Conservation Department, Albany, New York, 114p.

Malcolm Pirnie, 1987, C.R. Huntley Flyash Landfill Hydrogeologic Investigation: Malcolm Pirnie, Inc., Liverpool, New York.

Malcolm Pirnie, 1995, Landfill Closure Investigation, Town of Tonawanda Landfill, Tonawanda, New York: Malcolm Pirnie, Buffalo, New York.

May, G.M., 1997, Geochemical Evaluation of the Southwestern Portion of the Town of Tonawanda, Erie County, New York: New York State Department of Environmental Conservation, Division of Environmental Remediation, Buffalo, New York.

NYSDEC, 1995, Determination of Soil Cleanup Objectives and Cleanup Levels: New York State Department of Environmental Conservation, Division of Environmental Remediation Technical and Administrative Guidance Memorandum # HWR-95-4046, Albany, New York.

NYSDEC, 1995, Identification and Listing of Hazardous Wastes, New York State Codes, Rules and Regulations Title 6, Part 371: New York State Department of Environmental Conservation, Division of Hazardous Substances Regulation, Albany, New York.

NYSDEC, 1998, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations: New York State Department of Environmental Conservation, Division of Water Technical and Operational Guidance Series (1.1.1), Albany, New York.

NYSDEC, 2005, Record of Decision, Envirotek II Portion of the Roblin Steel Site: New York State Department of Environmental Conservation, Division of Environmental Remediation, Albany, New York.

Parsons Engineering Science, 1995, Remedial Investigation Report, Polymer Applications Site, Site No. 915044: Parsons Engineering Science, Inc., Liverpool, New York.

Pyanowski, D., 1990, Memorandum to File, dated June 14, 1990: Dunlop Tire Corporation, Buffalo, New York.

Recra Environmental, 1990, Phase II Investigation, Roblin Steel Site, Site No. 915056: Recra Environmental, Inc., Amherst, New York.

Rickard, L.V., 1966, Upper Silurian Cayugan Series, Niagara Frontier, New York in Buehler, E.J., (ed.), Geology of Western New York, Guide Book, New York State Geological Association 38th Annual Meeting: Department of Geological Sciences, State University of New York at Buffalo, New York.

Rickard, L.V. and Fisher, D.W., 1970, Geologic Map of New York State, Niagara Sheet: New York State Museum and Science Service, Map and Chart Series No. 15.

Snyder Engineering, 1987, Support Documentation for an Application to Construct and Operate Cell Number Three at the SKW Alloys, Inc. Witmer Road Solid Waste Management Facility: Snyder Engineering, Grand Island, New York.

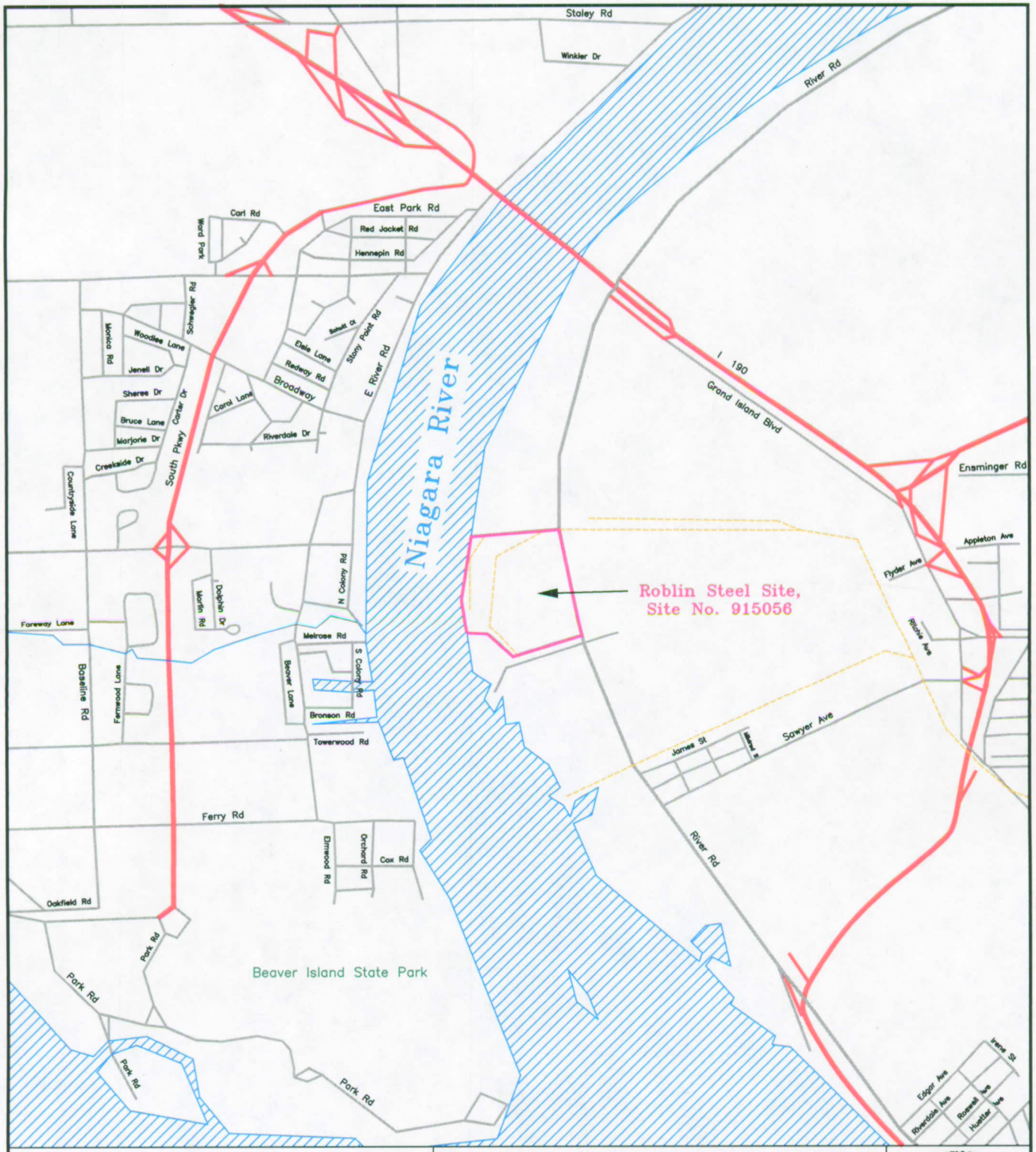
Stanley, 1981, Coal Pile Groundwater Monitoring Study, C.R. Huntley Steam Station: Stanley Consultants, Muscatine, Iowa.

URS, 1992, Report of Field Investigation and Data Analysis, Inactive Disposal Sites, No's 915018A,B,C: URS Consultants, Inc., Buffalo, New York.

Weston, 1998, Report on the Site Assessment and Risk Characterization Study, 3M Facility, Tonawanda, New York: Roy F. Weston, Inc., West Chester, Pennsylvania.

Woodward-Clyde, 1993, Phase II Investigation Report, DuPont Yerkes Plant, Site No. 915019: Woodward-Clyde Consultants, North Tonawanda, New York.

Yager, R.M., and Kappel, W.M., 1987, Characterization of Fractures in the Lockport Dolomite, Niagara County, New York, in Khanbilvardi, R.M., and Fillos, J., (eds.), Pollution, Risk Assessment and Remediation in Groundwater Systems: Washington, D.C., Scientific Publications Co., p. 149-195.



Tonawanda West &
Buffalo NW
Quadrangles

Scale Depends on Final Plotted Size

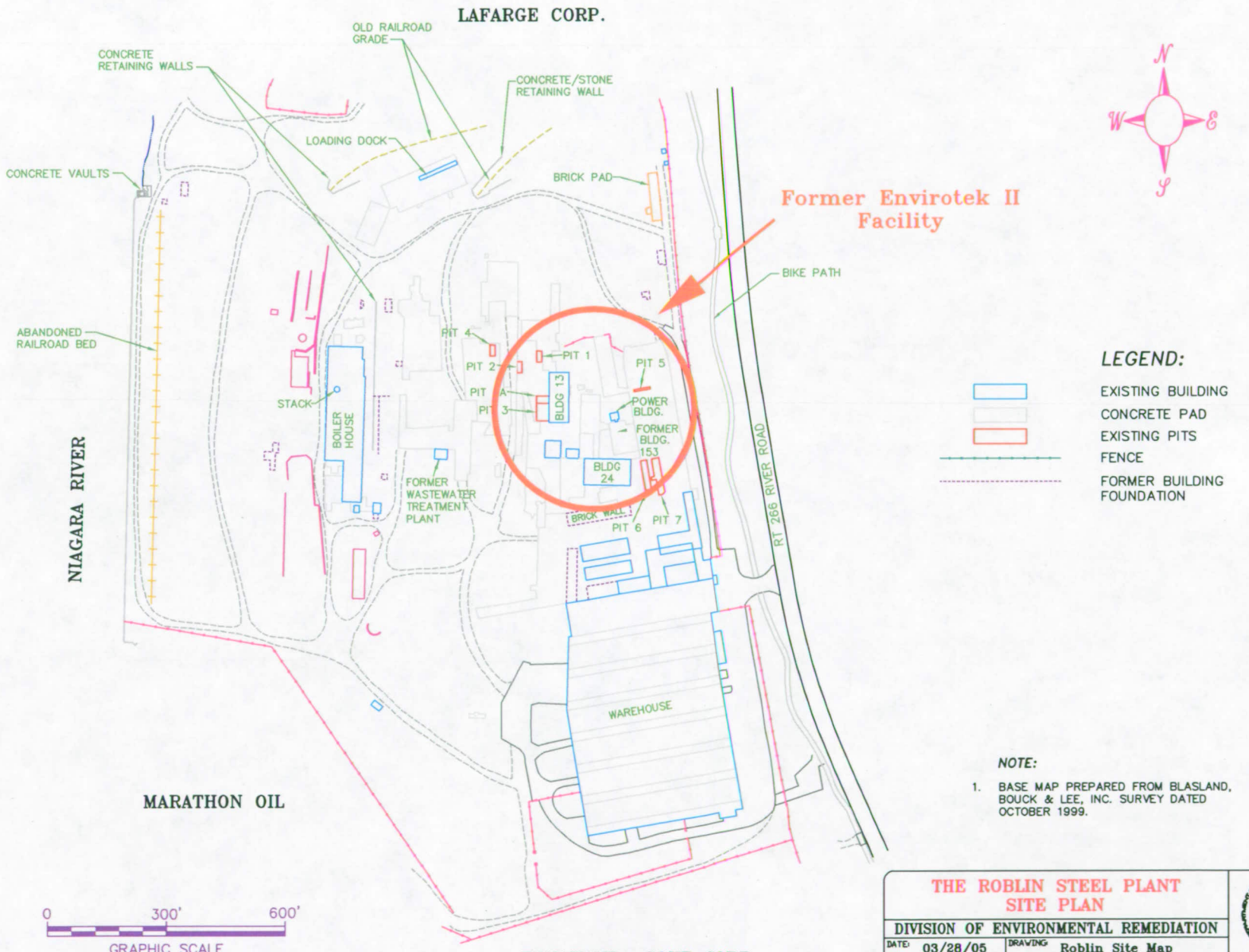
SITE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 11/18/04 | DRAWING: Site Location Map

SITE: Roblin Steel Site

Figure 1-1



NOTE:

1. BASE MAP PREPARED FROM BLASLAND, BOUCK & LEE, INC. SURVEY DATED OCTOBER 1999.

THE ROBLIN STEEL PLANT SITE PLAN

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 03/28/05 | DRAWING: Roblin Site Map

SITE NAME: Roblin Steel Site

Figure 1-2

NOTE:

1. BASE MAP PREPARED FROM BLASLAND, BOUCK & LEE, INC. SURVEY DATED OCTOBER 1999.

0 150' 300'

GRAPHIC SCALE

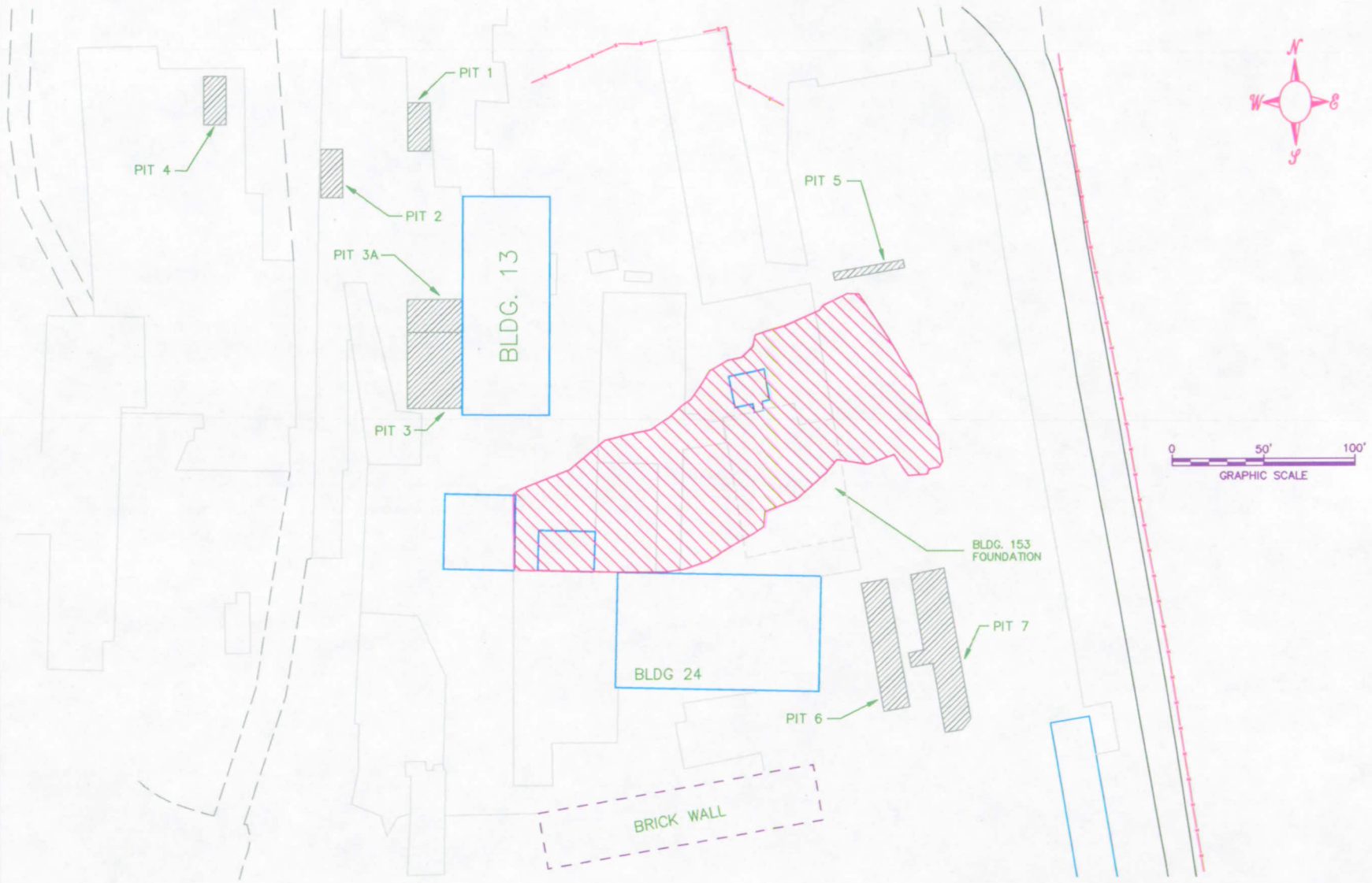
ENVIROTEK II FACILITY SITE PLAN

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 12/28/04 DRAWING: Envirotek Site Map

SITE NAME: Roblin Steel Site

Figure 1-3



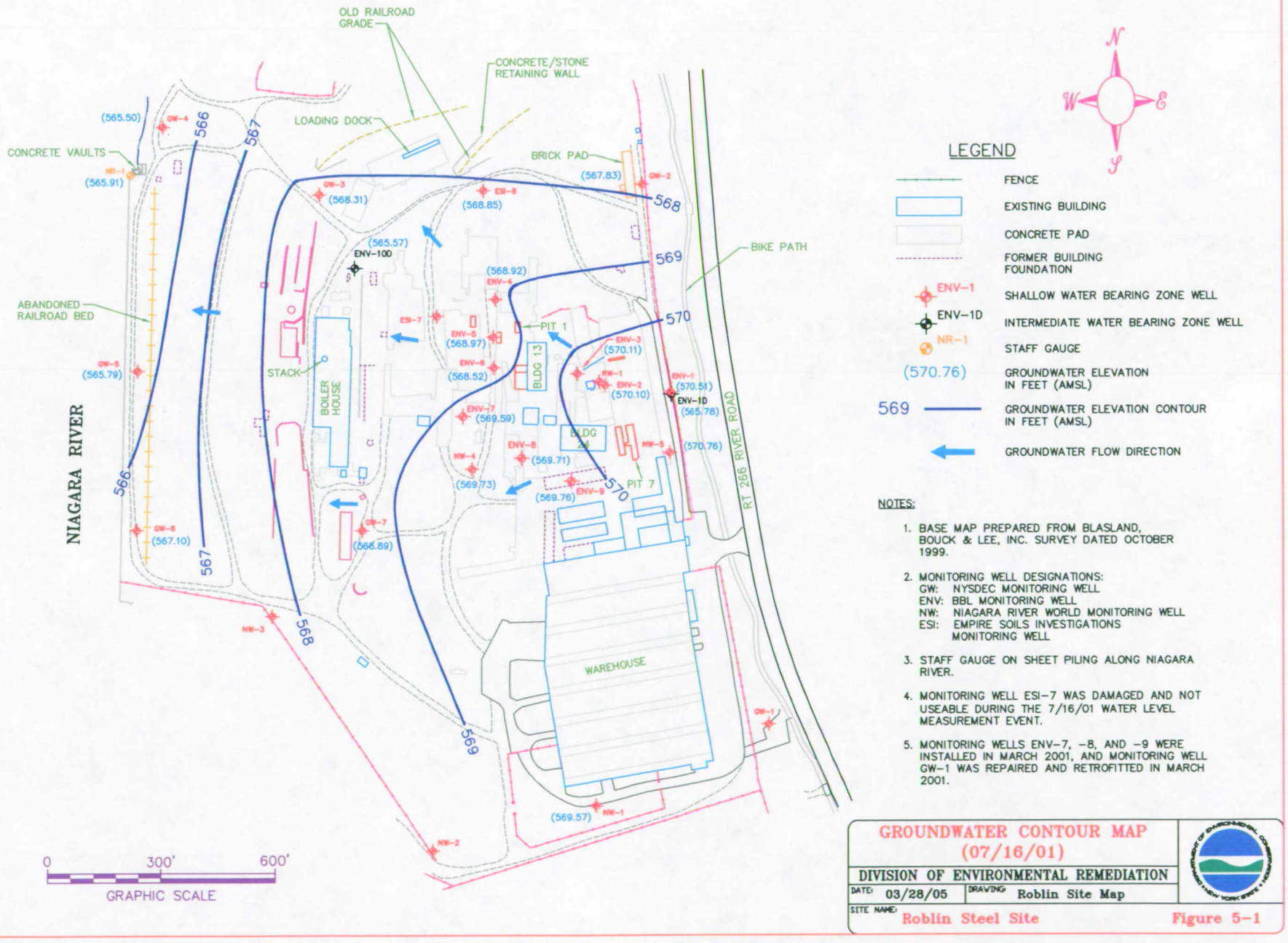
ENVIROTEK SOIL EXCAVATION LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 03/28/05 DRAWING: Envirotek Sample Map

SITE NAME: Roblin Steel Site

Figure 2-1



LEGEND

- FENCE
- EXISTING BUILDING
- CONCRETE PAD
- FORMER BUILDING FOUNDATION
- ENV-1 — SHALLOW WATER BEARING ZONE WELL
- ENV-1D — INTERMEDIATE WATER BEARING ZONE WELL
- NR-1 — STAFF GAUGE
- (570.76) — GROUNDWATER ELEVATION IN FEET (AMSL)
- 569 — GROUNDWATER ELEVATION CONTOUR IN FEET (AMSL)
- GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP PREPARED FROM BLASLAND, BOUCK & LEE, INC. SURVEY DATED OCTOBER 1999.
2. MONITORING WELL DESIGNATIONS:
   GW: NYSDEC MONITORING WELL
   ENV: BBL MONITORING WELL
   NW: NIAGARA RIVER WORLD MONITORING WELL
   ESI: EMPIRE SOILS INVESTIGATIONS MONITORING WELL
3. STAFF GAUGE ON SHEET PILING ALONG NIAGARA RIVER.
4. MONITORING WELL ESI-7 WAS DAMAGED AND NOT USEABLE DURING THE 7/16/01 WATER LEVEL MEASUREMENT EVENT.
5. MONITORING WELLS ENV-7, -8, AND -9 WERE INSTALLED IN MARCH 2001, AND MONITORING WELL GW-1 WAS REPAIRED AND RETROFITTED IN MARCH 2001.

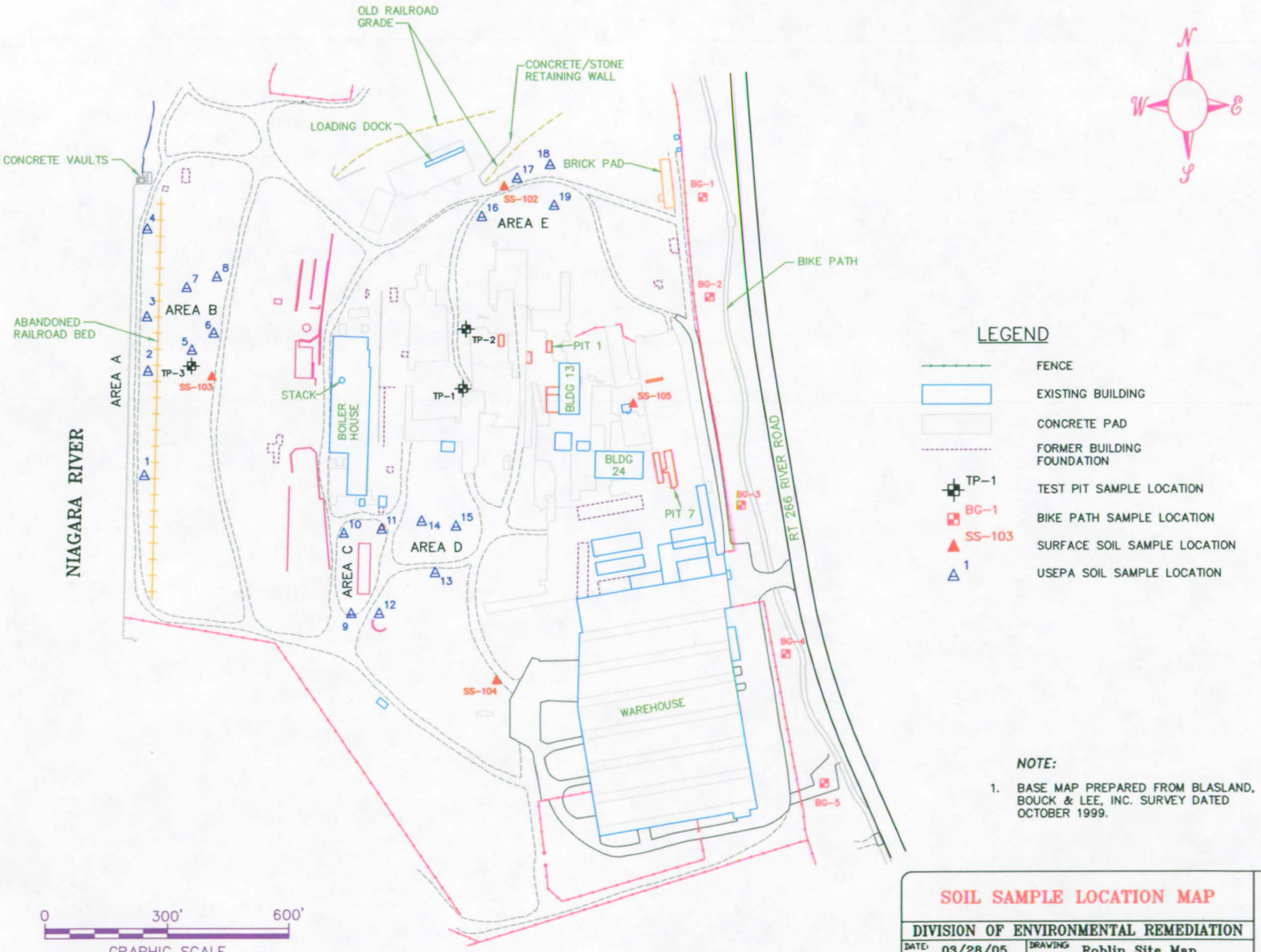
GROUNDWATER CONTOUR MAP (07/16/01)

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 03/28/05 | DRAWING: Roblin Site Map

SITE NAME: Roblin Steel Site

Figure 5-1



LEGEND

- FENCE
- EXISTING BUILDING
- CONCRETE PAD
- FORMER BUILDING FOUNDATION
- TP-1 — TEST PIT SAMPLE LOCATION
- BG-1 — BIKE PATH SAMPLE LOCATION
- SS-103 — SURFACE SOIL SAMPLE LOCATION
- 1 — USEPA SOIL SAMPLE LOCATION

NOTE:

1. BASE MAP PREPARED FROM BLASLAND, BOUCK & LEE, INC. SURVEY DATED OCTOBER 1999.

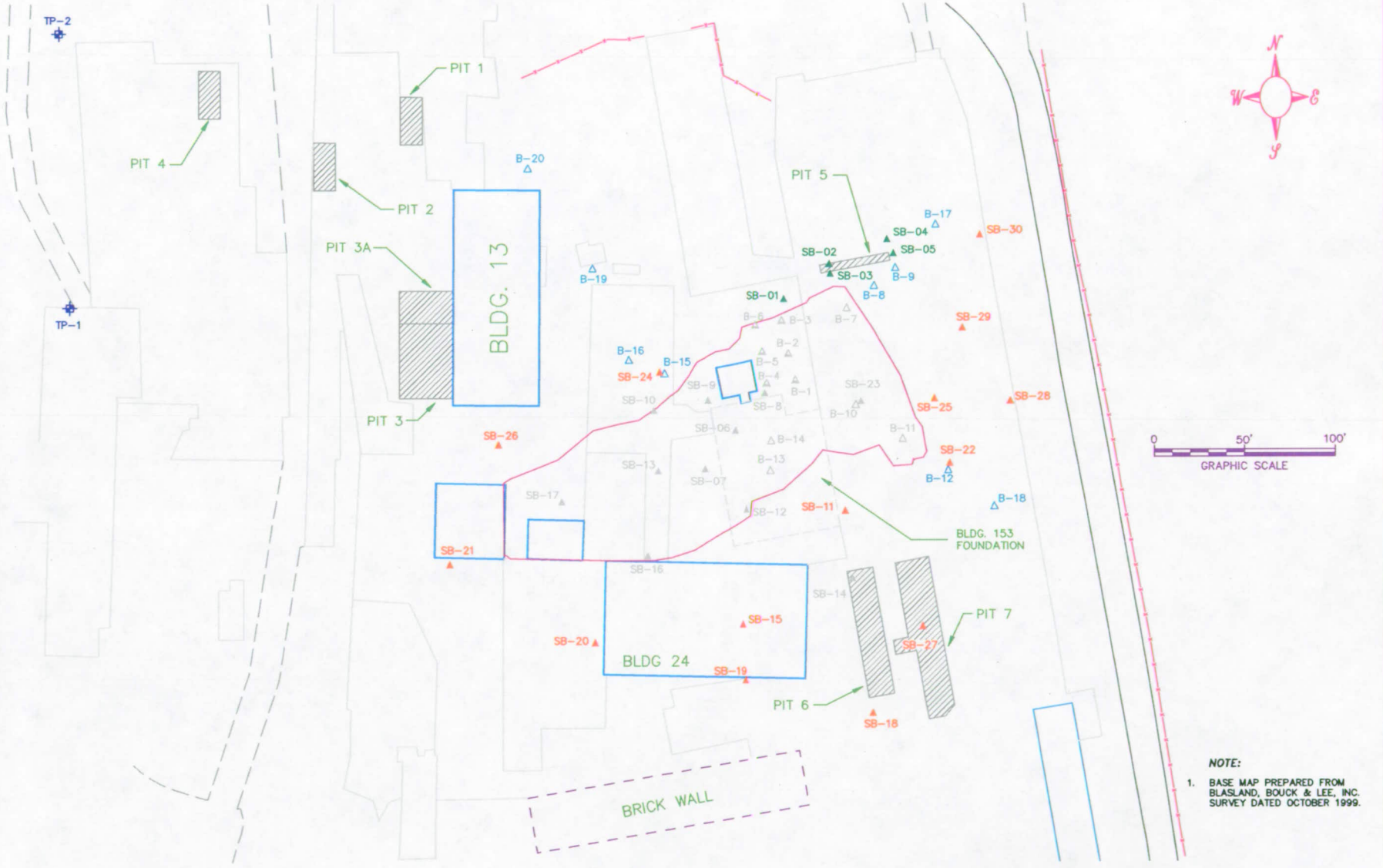
SOIL SAMPLE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 03/28/05 | DRAWING: Roblin Site Map

SITE NAME: **Roblin Steel Site**

Figure 6-1



NOTE:

1. BASE MAP PREPARED FROM BLASLAND, BOUCK & LEE, INC. SURVEY DATED OCTOBER 1999.

LEGEND:

- EXISTING BUILDING
- CONCRETE PAD
- EXISTING PITS
- FENCE
- FINAL LIMITS OF EXCAVATION
- FORMER BUILDING FOUNDATION
- TEST PIT LOCATION
- SB-11 ▲ SOIL BORING (4/01 & 6/01)
- SB-01 ▲ SOIL BORING (9/99)
- B-11 △ SOIL BORING (5/92)
- B-1 ▲ SOIL BORING (10/90)

TEST PIT AND SOIL BORING LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 03/28/05 | DRAWING: Envirotek Sample Map

SITE NAME: Roblin Steel Site

Figure 6-2

TABLE 5-1
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

STRATIGRAPHIC SEQUENCE OF THE WESTERN NEW YORK AREA

Epoch	Group	Formation	Member
Middle Devonian	Hamilton	Moscow Shale	Windom Shale Kashong Shale
		Ludlowville Formation	Tichenor Limestone Wanakah Shale Ledyard Shale Centerfield Limestone
		Skaneateles Formation	Levanna Shale Stafford Limestone
		Marcellus Shale	Oatka Creek Shale
		Onondaga Limestone	Seneca Limestone Morehouse Limestone Nedrow Limestone Clarence Limestone Edgecliff Limestone
Late Silurian	Salina	Akron Dolostone	
		Bertie Dolostone	Williamsville Dolostone Scajaquada Dolostone Falkirk Dolostone Oatka Dolostone
		Camillus Shale Syracuse Formation Vernon Shale	
Middle Silurian	Lockport	Guelph Dolostone Eramosa Dolostone	
		Goat Island Dolostone	Vinemount Dolostone Ancaster Dolostone Niagara Falls Dolostone
		Gasport Limestone	Pekin Dolostone Gothic Hill Limestone
	Clinton	Decew Dolostone	
		Rochester Shale	Burleigh Hill Shale Lewiston Shale
		Irondequoit Limestone Rockway Dolostone Williamson Shale Merritton Limestone	
		Reynales Limestone	Hickory Corners Limestone
		Neahga Shale	
Early Silurian	Medina	Kodak Sandstone Cambria Shale Thorold Sandstone Grimsby Formation Devils Hole Shale Power Glen Shale Whirlpool Sandstone	
Late Ordovician	Richmond	Queenston Shale Oswego Sandstone	

Notes:
Table compiled from Buehler and Tesmer (1963) and Brett et al. (1995).

TABLE 5-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

HYDRAULIC CONDUCTIVITY TEST DATA FOR THE SHALLOW WATER BEARING ZONE

Well Number	Hydraulic Conductivity (cm/sec)	Screened Unit	Test Method
Horizontal Hydraulic Conductivity			
GW-1	2.00e-03	Silty Clay; Silt and Sand	Constant Head
GW-2	9.00e-02	Stratified Sand, Silt and Clay	"
GW-3	8.00e-02	Miscellaneous Fill; Sand and Silt	"
GW-4	1.00e-04	Miscellaneous Fill	"
GW-5	4.00e-03	Silt and Sand	"
GW-6	4.00e-04	Miscellaneous Fill; Sand and Silt	"
GW-7	1.00e-01	Miscellaneous Fill; Sand and Silt	"
ENV-1	1.60e-05	Stratified Sand, Silt and Clay	Rising Head
ENV-2	5.50e-03	Sand; Sand and Gravel	"
ENV-3	1.10e-03	Sand; Clay and Silt	"
ENV-6	1.00e-04	Miscellaneous Fill; Sand, Silt, Clay	"
ENV-7	7.97e-04	Miscellaneous Fill	"
ENV-8	1.21e-03	Miscellaneous Fill	"
ENV-9	2.42e-03	Miscellaneous Fill; Clay and Silt	"
RW-1	3.10e-02	Miscellaneous Fill; Silty Clay	Pump
Minimum:	**1.60e-05**		
Maximum:	**1.00e-01**		
Geometric Mean:	**2.22e-03**		
Arithmetic Mean:	**2.12e-02**		

Notes:
Monitoring wells ENV-4 and ENV-5 recovered too quickly to provide adequate test data.

TABLE 5-3
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

HYDRAULIC CONDUCTIVITY TEST DATA FOR THE INTERMEDIATE WATER BEARING ZONE

Well Number	Hydraulic Conductivity (cm/sec)	Screened Unit	Test Method
Horizontal Hydraulic Conductivity			
ENV-1D	5.89e-03	Stratified Sand, Silt and Clay; Glacial Till	Rising Head
ENV-10D	1.78e-04	Stratified Clay and Sand	"
Minimum:	**1.78e-04**		
Maximum:	**5.89e-03**		
Geometric Mean:	**1.02e-03**		
Arithmetic Mean:	**3.03e-03**		

TABLE 5-4
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

WATER LEVEL MEASUREMENTS
(All water levels and elevations measured in feet)

Well Designation	Top of Riser Elevation	11/19/90 *		1/21/91 *		5/11/92 *		09/29/99	
		Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation
GW-1 +	575.77	6.63	570.17	6.15	570.65	6.26	570.54	--	--
GW-2	582.00	13.11	568.90	12.24	569.77	12.24	569.77	14.09	567.91
GW-3	579.00	9.86	568.59	8.72	569.73	8.87	569.58	11.17	567.83
GW-4	575.89	10.32	566.12	9.68	566.76	9.92	566.52	10.04	565.85
GW-5	573.39	8.43	565.79	7.86	566.36	8.18	566.04	6.93	566.46
GW-6	574.08	6.80	567.16	6.24	567.72	6.20	567.76	6.98	567.10
GW-7	581.96	12.35	569.61	11.48	570.48	11.58	570.38	13.32	568.64
ENV-1	579.46	6.58	572.91	5.96	573.53	6.41	573.08	8.92	570.54
ENV-2	582.94	11.89	571.05	11.19	571.75	11.26	571.68	12.95	569.99
ENV-3	582.62	11.38	571.21	10.40	572.19	10.64	571.95	12.82	569.80
ENV-3R	580.14	Installed 04/14/04							
ENV-4	582.60	12.14	570.41	10.61	571.94	10.67	571.88	14.11	568.49
ENV-5	581.48	10.95	570.43	9.50	571.88	9.48	571.90	12.97	568.51
ENV-6	582.05	13.40	568.63	10.21	571.82	10.19	571.84	13.96	568.09
ENV-7	582.74	--	--	--	--	--	--	--	--
ENV-8	583.11	--	--	--	--	--	--	--	--
ENV-9	583.65	--	--	--	--	--	--	--	--
ESI-7		--	--	--	--	--	--	--	--
ESI-8	580.06	--	--	--	--	--	--	11.77	568.29
NW-1	578.92	--	--	--	--	--	--	9.35	569.57
NW-2	581.25	--	--	--	--	--	--	--	--
NW-4	581.16	--	--	--	--	--	--	11.90	569.26
NW-5	581.58	--	--	--	--	--	--	10.40	571.18
ENV-1D	579.63	--	--	--	--	--	--	--	--
ENV-10D	579.20	--	--	--	--	--	--	--	--
NR-1	571.07	--	--	--	--	--	--	7.13	563.94

Notes:

* Data based upon site survey prior to October 1990.

\+ Well repaired and retrofitted as a flush mount in April 2001.

TABLE 5-4
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

WATER LEVEL MEASUREMENTS
(All water levels and elevations measured in feet)

Well Designation	Top of Riser Elevation	04/18/01		07/16/01		05/05/04		09/28/04	
		Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation
GW-1 +	575.77	7.05	568.72	7.47	568.30	6.15	569.62	6.37	569.40
GW-2	582.00	--	--	14.17	567.83	12.85	569.15	13.01	568.99
GW-3	579.00	--	--	10.69	568.31	8.62	570.38	8.79	570.21
GW-4	575.89	--	--	10.39	565.50	9.72	566.17	9.87	566.02
GW-5	573.39	--	--	7.60	565.79	6.93	566.46	7.16	566.23
GW-6	574.08	--	--	7.90	566.18	6.35	567.73	6.49	567.59
GW-7	581.96	12.19	569.77	13.07	568.89	11.78	570.18	11.93	570.03
ENV-1	579.46	7.17	572.29	8.95	570.51	7.10	572.36	7.29	572.17
ENV-2	582.94	11.99	570.95	12.84	570.10	Removed during Envirotek IRM at OU2			
ENV-3	582.62	11.64	570.98	12.51	570.11	Removed during Envirotek IRM at OU2			
ENV-3R	580.14	Installed 04/14/04				8.98	571.16	9.12	571.02
ENV-4	582.60	12.23	570.37	13.68	568.92	11.21	571.39	11.39	571.21
ENV-5	581.48	11.07	570.41	12.51	568.97	10.05	571.43	10.31	571.17
ENV-6	582.05	11.65	570.40	13.53	568.52	10.62	571.43	10.84	571.21
ENV-7	582.74	12.38	570.36	13.24	569.50	12.10	570.64	12.26	570.48
ENV-8	583.11	11.53	571.58	13.40	569.71	12.15	570.96	12.37	570.74
ENV-9	583.65	13.00	570.65	13.89	569.76	12.70	570.95	12.93	570.72
ESI-7		--	--	--	--	12.42		12.56	
ESI-8	580.06	--	--	11.21	568.85	8.82	571.24	8.97	571.09
NW-1	578.92	--	--	9.60	569.32	Could not locate		Could not locate	
NW-2	581.25	12.07	569.18	12.50	568.75	11.95	569.30	12.08	569.17
NW-4	581.16	10.58	570.58	11.43	569.73	10.28	570.88	10.36	570.80
NW-5	581.58	--	--	10.82	570.76	9.01	572.57	9.32	572.26
ENV-1D	579.63	12.77	566.86	13.85	565.78	12.65	566.98	12.79	566.84
ENV-10D	579.20	13.56	565.64	13.63	565.57	13.08	566.12	13.29	565.91
NR-1	571.07	--	--	5.46	565.61	5.35	565.72	5.61	565.46

Notes:

* Data based upon site survey prior to October 1990.

\+ Well repaired and retrofitted as a flush mount in April 2001.

TABLE 6-1
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SURFACE SOIL SAMPLING RESULTS

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SS-102 9/10/1999 (0.0" - 6.0")	SS-103 9/10/1999 (0.0" - 6.0")	SS-104 9/10/1999 (0.0" - 6.0")	SS-105 9/10/1999 (0.0" - 6.0")
Volatiles					
Methylene Chloride	100.0	2 J	2 J	3 J	2 J
Tetrachloroethene	1,400	--	--	--	100 J
Trichloroethene	700.0	--	--	--	6 J
Semi-Volatiles					
2-Methylnaphthalene	36,400	--	76 J	--	--
4-Methylphenol	900.0	--	38 J	--	--
Acenaphthylene	41,000	52 J	--	620	120 J
Anthracene	50,000	71 J	--	800	240 J
Benzo (a) anthracene	224.0	***280 J***	53 J	***1,500***	***350 J***
Benzo (a) pyrene	61.0	***110 J***	--	***1,600***	***350 J***
Benzo (b) fluoranthene	1,100	260 J	--	***1,600***	260 J
Benzo (g,h,i) perylene	50,000	410	120 J	2,500	550
Benzo (k) fluoranthene	1,100	290 J	--	***1,600***	330 J
Bis(2-ethylhexyl)phthalate	50,000	1,100 B	--	--	1,700 B
Butylbenzylphthalate	50,000	--	--	--	140 J
Carbazole	NS	--	--	130 J	51 J
Chrysene	400.0	380 J	77 J	***1,800***	***420***
Dibenz (a,h) anthracene	14.0	--	--	***790***	***120 J***
Di-n-butylphthalate	8,100	--	--	92 J	74 J
Di-n-octylphthalate	50,000	--	--	--	43 J
Fluoranthene	50,000	460	60 J	1,900	540
Indeno (1,2,3-cd) pyrene	3,200	310 J	85 J	2,200	430
Naphthalene	13,000	--	43 J	--	--
Phenanthrene	50,000	190 J	94 J	730	270 J
Pyrene	50,000	460	66 J	2,600	500

Notes:

Only compounds with detectable concentrations reported in table.

VOC and SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

B Analyte was detected in the associated blank as well as the sample.

J Compound reported at an estimated concentration below the reporting limit.

NS No standard or guidance value available.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-1
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SURFACE SOIL SAMPLING RESULTS

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SS-102 9/10/1999 (0.0" - 6.0")	SS-103 9/10/1999 (0.0" - 6.0")	SS-104 9/10/1999 (0.0" - 6.0")	SS-105 9/10/1999 (0.0" - 6.0")
Metals					
Aluminum	SB (13,600)	***19,100***	8,390	12,200	***18,800***
Antimony	SB	1.0 JN	4.4 JN	2.5 JN	5.0 JN
Arsenic	7.5	4.9	3.8	***17.5***	***17.1***
Barium	300.0	139	139	223	171
Beryllium	SB (0.7)	***1.2***	***0.76***	***1.3***	***2.4***
Cadmium	1.0	***1.2***	***1.9***	***4.6***	***5.7***
Calcium	SB (44,800)	***85,800***	***47,400***	***70,900***	***67,700***
Chromium	SB (19.6)	***40.8***	***69.5***	***200.0***	***46.2***
Cobalt	30.0	2.1	1.2	3.2	3.8
Copper	25.0	***122 JN***	***37 JN***	***148 JN***	***132 JN***
Iron	SB (24,000)	***29,000 *****	16,400 **	***77,300 *****	***58,000 *****
Lead	SB (22.5)	***148.0***	***83.5***	***399.0***	***1,210***
Magnesium	SB (13,600)	***35,300 J***	1,170 J	***13,900 J***	9,930 J
Manganese	SB (592)	***1,130***	***1,840***	***6,120***	***1,970***
Mercury	0.10	0.06	0.06	***0.16***	***0.96***
Nickel	SB (22.0)	20.5	18.6	***62.3***	***25.0***
Potassium	SB (1,900)	1,200	614.0	1,470	969.0
Selenium	SB (11.3)	1.8 JN	2.3 JN	4.3 JN	1.9 JN
Silver	SB	--	--	--	--
Sodium	SB (126)	***392.0***	***271.0***	***583.0***	***1,020***
Thallium	SB	--	--	0.58	--
Vanadium	150.0	19.1	6.5	69.4	24.3
Zinc	SB (120)	***152 JN***	***221 JN***	***436 JN***	***2,600 JN***
Inorganics					
Cyanide	NS	--	6.35 JN	--	--

Notes:

Only compounds with detectable concentrations reported in table.

Concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

N Spiked sample recovery not within control limits.

** Duplicate analysis not within control limits.

NS No standard or guidance value available.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawanda, NY.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-1
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SURFACE SOIL SAMPLING RESULTS

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	BB-23 7/28/2003 (0.0" - 2.0")	AJ-19 7/24/2003 (0.0" - 2.0")	AF-18 7/24/2003 (0.0" - 2.0")	AH-17 7/24/2003 (0.0" - 2.0")
Metals					
Antimony	SB	--	--	--	--
Arsenic	7.5	3.5	***24.0***	--	--
Barium	300.0	--	200.0	***473.0***	--
Cadmium	1.0	***3.0***	--	--	--
Chromium	SB (19.6)	***112 E***	16.0	***54.0***	2.4
Cobalt	30.0	--	14.0	***54.0***	--
Copper	25.0	***40.0***	***68.0***	***63.0***	13.0
Iron	SB (24,000)	***25,200 E***	***87,300 E***	***85,600 E***	9,150 E
Lead	SB (22.5)	***136 E***	***99.0***	***102 E***	13.0
Manganese	SB (592)	***813.0***	***1,240 E***	***2,980 E***	167.0
Mercury	0.10	--	--	--	--
Nickel	SB (22.0)	***23.0***	***27.0***	20.0	6.3
Selenium	SB (11.3)	--	--	--	--
Silver	SB	--	--	--	--
Zinc	SB (120)	***359 E***	***389.0***	***182.0***	***136.0***

Notes:

Only compounds with detectable concentrations reported in table.

Concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

E The reported value is estimated due to the presence of interference.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawanda, NY.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-1
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SURFACE SOIL SAMPLING RESULTS

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	AI-18 7/24/2003 (0.0" - 2.0")	BC-27 7/28/2003 (0.0" - 2.0")	AK-12 7/24/2003 (0.0" - 2.0")	DN-32 8/4/2003 (0.0" - 2.0")
Metals					
Antimony	SB	22.0	--	--	37.0
Arsenic	7.5	--	--	--	--
Barium	300.0	***360.0***	82.0	230.0	140.0
Cadmium	1.0	***21.0***	***4.4***	***4.0***	***5.0***
Chromium	SB (19.6)	***162.0***	***81.0***	***118.0***	***162.0***
Cobalt	30.0	16.0	--	12.0	9.0
Copper	25.0	***1,370 E***	***193.0***	***2,330 E***	***169.0***
Iron	SB (24,000)	***85,600 E***	***36,100 E***	***87,300 E***	***87,300 E***
Lead	SB (22.5)	***922 E***	***152.0***	***449.0***	***595 E***
Manganese	SB (592)	***5,080 E***	***957.0***	***6,290 E***	***3,730 E***
Mercury	0.10	--	--	--	--
Nickel	SB (22.0)	***123.0***	***63.0***	***152.0***	***30.0***
Selenium	SB (11.3)	--	--	--	--
Silver	SB	--	--	--	--
Zinc	SB (120)	***1,100 E***	***551.0***	***407 E***	***693 E***

Notes:

Only compounds with detectable concentrations reported in table.

Concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

E The reported value is estimated due to the presence of interference.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawanda, NY.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUMMARY OF 1990 USEPA SUBSURFACE SOIL SAMPLING RESULTS

Sample Location:	TAGM 4046	Area A					Area B			
Sample ID:	Soil Cleanup	1	2	3	4	20	5	6	7	8
Sample Depth:	Objectives *	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')
Volatiles										
1,2-Dichloropropane	300.0	--	--	--	--	--	***760.0***	--	--	--
2-Butanone	300.0	--	--	1 J	--	2 J	156 J	--	1 J	--
Acetone	200.0	--	--	--	--	--	***2,124***	--	--	--
Benzene	60.0	--	--	--	--	--	***70 J***	--	--	--
Ethylbenzene	5,500	--	--	--	--	--	2,365	--	--	--
Methylene chloride	100.0	6 J	11.0	8.0	33.0	44.0	***131 J***	13.0	49.0	33.0
Tetrachloroethene	1,400	--	--	--	--	--	1,052	--	--	--
Toluene	1,500	--	--	--	--	1 J	***5,506***	--	--	--
Trichloroethene	700.0	--	--	--	--	--	--	--	--	3 J
Xylenes	1,200	24.0	--	--	--	--	***14,727***	--	--	--
Semi-Volatiles										
2,3,4,6-Tetrachlorophenol	NS	--	--	--	--	--	--	35,968	--	--
2-Methylnaphthalene	36,400	--	--	--	--	--	--	15,865	276.0	233.0
2-Methylphenol	100	--	--	--	--	--	--	--	***274.0***	--
3-Methylphenol	NS	--	--	--	--	--	--	--	107.0	--
4,6-Dinitro-2-methylphenol	NS	1,132	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	NS	--	--	203.0	222.0	194.0	--	--	--	--
4-Methylphenol	900.0	--	--	--	--	--	--	***1,495***	107.0	--
Acenaphthene	50,000	--	--	--	--	--	97.0	22,601	--	--

Notes:

Only compounds with detectable concentrations reported in table.

VOC and SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

NS No standard or guidance value available.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUMMARY OF 1990 USEPA SUBSURFACE SOIL SAMPLING RESULTS

Sample Location:	TAGM 4046	Area A					Area B			
Sample ID:	Soil Cleanup	1	2	3	4	20	5	6	7	8
Sample Depth:	Objectives *	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')
Semi-Volatiles (cont.)										
Anthracene	50,000	--	--	--	--	--	211.0	--	115.0	92.0
Benzidine	NS	185.0	--	--	--	--	--	--	--	--
Benzo (a) anthracene	224.0	***242.0***	--	--	--	--	--	***5,741***	221.0	95.0
Benzo (a) pyrene	61.0	--	--	--	--	--	--	--	***283.0***	***82.0***
Benzo (b) fluoranthene	1,100	--	--	--	--	--	--	***4,165***	575.0	201.0
Benzo (k) fluoranthene	1,100	--	--	--	--	--	--	***8,904***	797.0	278.0
Benzoic acid	2,700	--	--	--	--	--	--	--	87.0	--
Bis(2-ethylhexyl)phthalate	50,000	1,010	638.0	129.0	515.0	281.0	--	6,607	1,950	1,769
Butylbenzylphthalate	50,000	--	--	--	--	--	--	713.0	127.0	41.0
Chrysene	400.0	274.0	--	--	--	--	--	***7,370***	253.0	123.0
Dibenzofuran	6,200	--	--	--	--	--	68.0	--	--	103.0
Di-n-butylphthalate	8,100	633.0	--	--	143.0	--	--	--	--	314.0
Di-n-octylphthalate	50,000	543.0	--	--	--	--	--	--	205.0	85.0
Fluoranthene	50,000	--	--	--	--	--	127.0	--	334.0	187.0
Fluorene	50,000	--	62.0	56.0	63.0	97.0	82.0	7,634	76.0	41.0
Hexachloroethane	NS	165.0	--	--	--	--	--	--	--	--
Isophorone	4,400	254.0	--	--	--	--	--	--	--	--
Naphthalene	13,000	230.0	--	--	--	--	--	***29,658***	--	505.0
Phenanthrene	50,000	403.0	--	--	--	--	200.0	--	536.0	459.0
Phenol	30.0	--	--	--	--	--	--	***1,398***	--	--
Pyrene	50,000	--	--	--	--	--	75.0	26,651	338.0	162.0

Notes:

Only compounds with detectable concentrations reported in table.

VOC and SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

NS No standard or guidance value available.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUMMARY OF 1990 USEPA SUBSURFACE SOIL SAMPLING RESULTS

Sample Location:	TAGM 4046	Area A					Area B			
Sample ID:	Soil Cleanup	1	2	3	4	20	5	6	7	8
Sample Depth:	Objectives *	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')
Metals										
Aluminum	SB (13,600)	R	R	R	R	R	R	R	R	R
Antimony	SB	--	--	5.71	--	--	--	--	--	--
Arsenic	7.5	***46.0***	***8.01***	4.38	--	***7.66***	***37.6***	***7.85***	***15.0***	***10.2***
Barium	300.0	***374.0***	11.3	5.94	7.48	13.8	291.0	70.3	96.1	81.6
Beryllium	SB (0.7)	--	--	--	--	--	--	--	--	--
Cadmium	1.0	--	--	--	--	--	***6.54***	***7.56***	***6.4***	***8.92***
Calcium	SB (44,800)	R	R	R	R	R	R	R	R	R
Chromium	SB (19.6)	11.4	5.3	--	--	--	***575.0***	***35.7***	***77.6***	***41.2***
Cobalt	30.0	19.3	--	--	--	--	21.6	--	--	--
Copper	25.0	15.8	--	--	--	8.28	***998.0***	***40.5***	***92.2***	***43.4***
Iron	SB (24,000)	R	R	R	R	R	R	R	R	R
Lead	SB (22.5)	15.7	--	6.66	7.29	7.22	***197.0***	***269.0***	***227.0***	***275.0***
Magnesium	SB (13,600)	R	R	R	R	R	R	R	R	R
Manganese	SB (592)	R	R	R	R	R	R	R	R	R
Mercury	0.10	--	--	--	--	--	--	--	--	--
Nickel	SB (22.0)	--	--	--	--	--	***142.0***	11.2	***34.1***	12.8
Potassium	SB (1,900)	451.0	142.0	128.0	164.0	937.0	187.0	408.0	489.0	506.0
Sodium	SB (126)	58.1 J	38.9 J	42.5 J	36 J	56.9 J	***176 J***	119 J	***172 J***	***157 J***
Vanadium	150.0	--	--	--	--	--	18.9	--	--	--
Zinc	SB (120)	29.5 J	16.6 J	18.7 J	19.2 J	--	***264 J***	***1,049 J***	***902 J***	***1,071 J***

Notes:

Only compounds with detectable concentrations reported in table.

Metals concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

R Data rejected.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawanda, NY.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUMMARY OF 1990 USEPA SUBSURFACE SOIL SAMPLING RESULTS

Sample Location:	TAGM 4046	Area C			Area D			
Sample ID:	Soil Cleanup	9	10	11	12	13	14	15
Sample Depth:	Objectives *	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')
Volatiles								
2-Butanone	300.0	1 J	2 J	1 J	4 J	1 J	1 J	1 J
Methylene chloride	100.0	48.0	96.0	***110.0***	94 J	***177.0***	50.0	95.0
Tetrachloroethene	1,400	13.0	20 J	13 J	23 J	114 J	28 J	6 J
Toluene	1,500	2 J	4 J	2 J	1 J	3 J	2 J	2 J
Trichloroethene	700.0	2 J	--	3 J	--	5 J	4 J	3 J
Trichlorofluoromethane	NS	--	--	2 J	--	--	--	--
Xylenes	1,200	--	2 J	--	--	2 J	--	--
Semi-Volatiles								
2-Methylnaphthalene	36,400	284.0	924.0	--	--	--	--	--
Acenaphthene	50,000	70.0	--	--	3,196	--	--	--
Acenapthylene	41,000	--	112.0	--	--	--	--	--
Anthracene	50,000	609.0	734.0	869.0	2,032	--	--	--
Benzo (a) anthracene	224.0	***458.0***	88.0	***14,012***	***2,091***	***1,249***	--	--
Benzo (a) pyrene	61.0	--	--	***9,500***	--	--	--	--
Benzo (b) fluoranthene	1,100	316.0	--	***21,632***	***6,933***	--	--	--
Benzo (g,h,i) perylene	50,000	--	--	18,062	--	--	--	--
Benzo (k) fluoranthene	1,100	438.0	--	--	***14,823***	--	--	--
Bis(2-ethylhexyl)phthalate	50,000	2,389	362.0	--	--	--	--	134.0
Chrysene	400.0	***513.0***	94.0	***13,657***	***3,341***	***1,544***	--	--
Dibenzofuran	6,200	--	392.0	--	--	--	--	--
Di-n-butylphthalate	8,100	220.0	--	--	--	--	--	--
Fluoranthene	50,000	122.0	148.0	13,441	2,102	1,581	--	--
Indeno (1,2,3-cd) pyrene	3,200	--	--	***11,415***	--	--	--	--
Naphthalene	13,000	--	1,037	--	--	--	--	--
Phenanthrene	50,000	577.0	696.0	5,210	749.0	713.0	503.0	--
Pyrene	50,000	232.0	164.0	20,957	5,362	2,741	784	--

TABLE 6-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUMMARY OF 1990 USEPA SUBSURFACE SOIL SAMPLING RESULTS

Sample Location:	TAGM 4046	Area C			Area D			
Sample ID:	Soil Cleanup	9	10	11	12	13	14	15
Sample Depth:	Objectives *	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')	(2.0')
Metals								
Aluminum	SB (13,600)	R	R	R	R	R	R	R
Antimony	SB	--	20.8	--	--	--	--	--
Arsenic	7.5	***33.5***	***56.7***	***50.6***	***29.1***	3.47	4.47	--
Barium	300.0	***621.0***	***633.0***	167.0	***680.0***	39.3	32.3	174.0
Beryllium	SB (0.7)	--	***3.66***	--	***2.1***	--	--	--
Cadmium	1.0	***4.98***	--	***2.56***	***3.04***	--	--	--
Calcium	SB (44,800)	R	R	R	R	R	R	R
Chromium	SB (19.6)	***37.4***	--	***28.4***	***36.2***	5.76	7.12	16.3
Cobalt	30.0	7.45	8.74	7.21	6.57	--	--	--
Copper	25.0	19.1	***12,100***	24.6	***259.0***	16.4	21.1	***27.6***
Iron	SB (24,000)	R	R	R	R	R	R	R
Lead	SB (22.5)	***218.0***	***3,570***	***777.0***	***1,100***	***34.3***	***43.8***	***52.5***
Magnesium	SB (13,600)	R	R	R	R	R	R	R
Manganese	SB (592)	R	R	R	R	R	R	R
Mercury	0.10	***0.72***	--	***0.12***	***0.32***	***0.25***	***0.12***	***0.33***
Nickel	SB (22.0)	11.9	15.1	15.5	15.5	--	--	--
Potassium	SB (1,900)	664.0	***2,190***	995.0	981.0	535.0	613.0	699.0
Sodium	SB (126)	92.1 J	***369 J***	***173 J***	***262 J***	120 J	84 J	***236 J***
Vanadium	150.0	40.9	9.62	29.8	12.4	7.58	6.18	27.5
Zinc	SB (120)	***977 J***	***309 J***	***486 J***	***322 J***	66.6 J	86.3 J	***123 J***

TABLE 6-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUMMARY OF 1990 USEPA SUBSURFACE SOIL SAMPLING RESULTS

Notes:

Only compounds with detectable concentrations reported in table.

VOC and SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

Metals concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

R Data rejected.

NS No standard or guidance value available.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawanda, NY.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUMMARY OF 1990 USEPA SUBSURFACE SOIL SAMPLING RESULTS

Sample Location:	TAGM 4046	Area E			
Sample ID:	Soil Cleanup	16	17	18	19
Sample Depth:	Objectives *	(2.0')	(2.0')	(2.0')	(2.0')
Volatiles					
2-Butanone	300.0	2 J	3 J	2 J	2 J
Benzene	60.0	--	1 J	--	--
Carbon Disulfide	2,700	--	2 J	--	--
Methylene chloride	100.0	***150.0***	***263.0***	88.0	***119.0***
Toluene	1,500	1 J	2 J	--	2 J
Trichloroethene	700.0	4 J	--	--	--
Semi-Volatiles					
Benzo (a) anthracene	224.0	--	--	--	***1,373***
Benzo (a) pyrene	61.0	--	--	--	***1,500***
Benzo (b) fluoranthene	1,100	--	--	--	***2,303***
Bis(2-ethylhexyl)phthalate	50,000	1,291	--	--	--
Chrysene	400.0	--	***406.0***	--	***1,515***
Fluoranthene	50,000	--	--	--	2,095
Indeno (1,2,3-cd) pyrene	3,200	--	--	--	686.0
Phenanthrene	50,000	--	683.0	--	1,550
Pyrene	50,000	--	--	--	1,518

Notes:

Only compounds with detectable concentrations reported in table.

VOC and SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-2
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUMMARY OF 1990 USEPA SUBSURFACE SOIL SAMPLING RESULTS

Sample Location:	TAGM 4046	Area E			
Sample ID:	Soil Cleanup	16	17	18	19
Sample Depth:	Objectives *	(2.0')	(2.0')	(2.0')	(2.0')
Metals					
Aluminum	SB (13,600)	R	R	R	R
Antimony	SB	--	--	--	--
Arsenic	7.5	***8.45***	***16.1***	***60.5***	***29.1***
Barium	300.0	30.0	113.0	***396.0***	135.0
Beryllium	SB (0.7)	--	--	***2.43***	***1.3***
Cadmium	1.0	--	***2.09***	***2.93***	***1.79***
Calcium	SB (44,800)	R	R	R	R
Chromium	SB (19.6)	6.45	13.4	***33.6***	***98.7***
Cobalt	30.0	--	--	6.99	9.3
Copper	25.0	21.1	***51.1***	***29.2***	***289.0***
Iron	SB (24,000)	R	R	R	R
Lead	SB (22.5)	***22.8***	***118.0***	***80.1***	***1,360***
Magnesium	SB (13,600)	R	R	R	R
Manganese	SB (592)	R	R	R	R
Mercury	0.10	***0.71***	***0.38***	***0.17***	***0.18***
Nickel	SB (22.0)	7.75	9.88	8.59	***33.6***
Potassium	SB (1,900)	252.0	681.0	1,470	1,010
Sodium	SB (126)	117 J	***213 J***	***551 J***	***610 J***
Vanadium	150.0	8.16	13.8	48.5	23.2
Zinc	SB (120)	52.9 J	***190 J***	***184 J***	***2,580 J***

Notes:

Only compounds with detectable concentrations reported in table.

Metals concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

R Data rejected.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawan

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-3
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUBSURFACE SOIL SAMPLING RESULTS - BIKE PATH

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	BG-01 08/11/99 (0.0' - 6.0')	BG-02 08/11/99 (0.0' - 6.0')	BG-03 08/11/99 (0.0' - 6.0')	BG-04 08/11/99 (0.0' - 6.0')	BG-05 08/11/99 (0.0' - 8.0')
Volatiles						
Acetone	200.0	NA	NA	NA	--	8 J
Carbon Disulfide	2,700	NA	NA	NA	--	3 J
Tetrachloroethene	1,400	NA	NA	NA	2 J	--
Semi-Volatiles						
2-Methylnaphthalene	36,400	--	61 J	--	92 J	--
Acenaphthylene	41,000	--	130 J	39 J	--	--
Anthracene	50,000	43 J	180 J	93 J	42 J	--
Benzo (a) anthracene	224.0	150 J	***1,000***	***360.0***	180 J	150 J
Benzo (a) pyrene	61.0	***150 J***	***1,000***	***430.0***	***170 J***	***160 J***
Benzo (b) fluoranthene	1,100	150 J	820.0	560.0	190 J	150 J
Benzo (g,h,i) perylene	50,000	140 J	710.0	480.0	170 J	83 J
Benzo (k) fluoranthene	1,100	110 J	***1,200***	460.0	140 J	120 J
Bis(2-Ethylhexyl)phthalate	50,000	--	--	1400 BJ	--	--
Carbazole	NS	--	64 J	--	--	--
Chrysene	400.0	170 J	***970.0***	***470.0***	210 J	160 J
Dibenzofuran	6,200	--	60 J	--	--	--

Notes:

Only compounds with detectable concentrations reported in table.

VOC and SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

B Analyte was detected in the associated blank as well as the sample.

J Compound reported at an estimated concentration below the reporting limit.

NS No standard or guidance value available.

NA Not analyzed.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-3
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUBSURFACE SOIL SAMPLING RESULTS - BIKE PATH

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	BG-01 08/11/99 (0.0' - 6.0')	BG-02 08/11/99 (0.0' - 6.0')	BG-03 08/11/99 (0.0' - 6.0')	BG-04 08/11/99 (0.0' - 6.0')	BG-05 08/11/99 (0.0' - 8.0')
Semi-Volatiles (cont.)						
Fluoranthene	50,000	240 J	1,800	520.0	320 J	210 J
Fluorene	50,000	--	55 J	--	--	--
Hexachlorobenzene	410.0	--	--	84 J	--	--
Indeno (1,2,3-cd) pyrene	3,200	120 J	800.0	460.0	170 J	140 J
Naphthalene	13,000	--	67 J	--	54 J	--
Phenanthrene	50,000	180 J	720.0	290 J	190 J	100 J
Pyrene	50,000	270 J	1,300	490.0	270 J	200 J
Metals						
Aluminum	SB (13,600)	***18,000***	***17,000***	***13,900***	***28,000***	***16,700***
Antimony	SB	6 JN	--	1.8 JN	--	1.7 J
Arsenic	7.5	--	***7.7***	6.7	3.1 J	4.0 J
Barium	300.0	***549.0***	209.0	123.0	310.0	160.0
Beryllium	SB (0.7)	***0.86***	***1.9***	***1.3***	***3.6***	***0.98***
Cadmium	1.0	***2.1 J****	***1.4 J****	0.92 J**	0.63	0.59
Calcium	SB (44,800)	***143,000***	***60,000***	***59,500***	***152,000***	***93,300***
Chromium	SB (19.6)	***1,320 *****	***41.6 *****	17.5 **	13.3	***292.0***

Notes:

Only compounds with detectable concentrations reported in table.

SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

Metals concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

N Spiked sample recovery not within control limits.

** Duplicate analysis not within control limits.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawanda, NY.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-3
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUBSURFACE SOIL SAMPLING RESULTS - BIKE PATH

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	BG-01 08/11/99 (0.0' - 6.0')	BG-02 08/11/99 (0.0' - 6.0')	BG-03 08/11/99 (0.0' - 6.0')	BG-04 08/11/99 (0.0' - 6.0')	BG-05 08/11/99 (0.0' - 8.0')
Metals (cont.)						
Cobalt	30.0	2.6	5.0	4.3	3.3	7.5
Copper	25.0	***74.8***	***30.1***	***32.1***	9.9 J	***25.4 J***
Iron	SB (24,000)	***72,600***	***27,200***	16,000	10,800	***33,800***
Lead	SB (22.5)	***306 JN***	***70.7 JN***	***133 JN***	***28.5***	***132.0***
Magnesium	SB (13,600)	***30,500***	10,500	9,990	***17,500***	***14,400***
Manganese	SB (592)	***17,500 *****	***1,390 *****	***1,360 *****	***2,550 EJ***	***7,430 EJ***
Mercury	0.10	0.08	***0.1***	***0.17***	--	--
Nickel	SB (22.0)	18.0	18.9	12.2	8.2	17.8
Potassium	SB (1,900)	***2,040***	1,660	1,650	1,890	1,690
Selenium	SB (11.3)	***15.5***	1.5	2.2	4.1	--
Sodium	SB (126)	***372.0***	***539.0***	***188.0***	***1,740***	***1,120***
Thallium	SB	0.44 JW	0.02 JW	--	--	--
Vanadium	150.0	***280.0***	20.2	19.2	15.8	90.5
Zinc	SB (120)	***367.0***	***196.0***	***160.0***	38.5	102.0

Notes:

Only compounds with detectable concentrations reported in table.

Metals concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

N Spiked sample recovery not within control limits.

** Duplicate analysis not within control limits.

E The reported value is estimated due to the presence of interference.

W Post-digestion spike is out of control limits, while sample absorbance is less then 50% of spike absorbance.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawanda, NY.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-4
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

1992 SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	B-8 05/12/92 (8' - 10')	B-9 05/12/92 (8' - 10')	B-12 05/12/92 (8' - 10')	B-15 05/13/92 (6' - 8')	B-16 05/13/92 (6' - 8')	B-17 05/13/92 (8' - 10')
Volatiles							
1,1,1-Trichloroethane	700.0	340.0	--	270.0	660 J	--	--
1,1-Dichloroethane	200.0	17 J	***390 J***	16 J	--	--	--
1,2-Dichloroethene (total)	300.0	--	--	150.0	--	--	--
Acetone	200.0	***200 B***	--	--	--	--	130 B
Carbon Disulfide	2,700	--	--	--	--	--	26 J
Ethylbenzene	5,500	170.0	--	--	550 J	91 J	--
Methylene chloride	100.0	8 J	***280 J***	18 J	***260 BJ***	--	5 J
Tetrachloroethene	1,400	39.0	--	***3,600***	***8,300***	--	--
Toluene	1,500	--	--	--	820.0	--	--
Trichloroethene	700.0	100.0	--	310.0	***780.0***	--	--
Xylenes	1,200	270.0	--	--	***8,500***	--	--

Notes:

Only compounds with detectable concentrations reported in table.

VOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

B Analyte detected in the associated blank, as well as in the sample.

J Compound reported at an estimated concentration below the reporting limit.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-4
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

1992 SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	B-8 05/12/92 (8' - 10')	B-9 05/12/92 (8' - 10')	B-12 05/12/92 (8' - 10')	B-15 05/13/92 (6' - 8')	B-16 05/13/92 (6' - 8')	B-17 05/13/92 (8' - 10')
Semi-Volatiles							
2-Methylnaphthalene	36,400	3,100 J	--	--	--	--	--
4,6-Dinitro-2-methylphenol	NS	1,400 J	--	--	--	--	--
Anthracene	50,000	4,200	--	--	--	--	--
Benzo (a) anthracene	224.0	***1,400 J***	--	--	--	--	--
Benzo (b) fluoranthene	1,100	--	--	--	--	***2,100 J***	--
Benzo (g,h,i) perylene	50,000	--	--	--	--	1,100 J	--
Bis(2-ethylhexyl)phthalate	50,000	--	--	--	1,300 J	--	--
Chrysene	400.0	***1,600 J***	***2,100 J***	--	--	--	--
Dibenzofuran	6,200	710 J	--	--	--	--	--
Di-n-butylphthalate	8,100	630 J	710 J	530 J	--	410 J	--
Fluoranthene	50,000	480 J	1,700 J	--	390 J	560 J	--
Fluorene	50,000	1,000 J	--	--	--	--	--
Indeno (1,2,3-cd) pyrene	3,200	--	2,100 J	--	--	1,200 J	--
Isophorone	4,400	1,600 J	--	--	--	--	--
Phenanthrene	50,000	4,100 J	--	--	--	--	--
Pyrene	50,000	420 J	1,900 J	--	490 J	1,400 J	--

Notes:

Only compounds with detectable concentrations reported in table.

SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

NS No standard or guidance value available.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

ENVIROTEK RI SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-01 08/12/99 (2.0' - 4.0')	SB-01 08/12/99 (4.0' - 6.0')	SB-02 08/12/99 (2.0' - 4.0')	SB-02 08/12/99 (6.0' - 8.0')	SB-03 08/12/99 (4.0' - 6.0')	SB-03 08/12/99 (6.0' - 8.0')
Volatiles							
1,1,1-Trichloroethane	800.0	41.0	33.0	--	13.0	3 J	190.0
1,1-Dichloroethane	200.0	3 J	2 J	--	--	--	110.0
1,2-Dichloroethene	300.0	74.0	30.0	3.0	5.0	26.0	280.0
2-Butanone	300.0	--	--	--	--	3 J	--
Acetone	200.0	--	--	--	5 J	6 J	30.0
Benzene	60.0	--	--	--	--	1 J	--
Carbon Disulfide	2,700	7 J	5 J	2 J	4 J	3 J	7 J
Chloroethane	1,900	--	--	--	--	--	8 J
Ethylbenzene	5,500	--	--	--	--	--	4 J
Methylene Chloride	100.0	--	--	2 J	1 J	6.0	--
Tetrachloroethene	1,400	990 D	370 D	9 J	52.0	77 J	750 D
Toluene	1,500	17 J	23 J	1 J	2 J	4 J	5 J
Trichloroethene	1,400	400 D	130.0	15.0	23.0	120.0	95.0
Xylene	1,200	--	--	--	1 J	--	7 J

Notes:

Only compounds with detectable concentrations reported in table.

VOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

D Compound identified in analysis at a secondary dilution factor.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

ENVIROTEK RI SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-01 08/12/99 (2.0' - 4.0')	SB-01 08/12/99 (4.0' - 6.0')	SB-02 08/12/99 (2.0' - 4.0')	SB-02 08/12/99 (6.0' - 8.0')	SB-03 08/12/99 (4.0' - 6.0')	SB-03 08/12/99 (6.0' - 8.0')
Semi-Volatiles							
Acenaphthylene	41,000	85 DJ	--	--	--	--	--
Anthracene	50,000	150 DJ	--	--	--	--	--
Benzo (a) anthracene	224.0	***300 DJ***	96 J	45 J	--	--	--
Benzo (g,h,i) perylene	50,000	--	170 J	--	--	--	--
Chrysene	400.0	370 DJ	120 J	64 J	--	--	--
Fluoranthene	50,000	400 DJ	140 J	57 J	--	--	--
Indeno (1,2,3-cd) pyrene	3,200	--	130 J	55 J	--	--	--
Phenanthrene	50,000	390 DJ	87 J	40 J	--	--	--
Pyrene	50,000	400 DJ	130 J	51 J	--	--	--

Notes:

Only compounds with detectable concentrations reported in table.

SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

D Compound identified in analysis at a secondary dilution factor.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

ENVIROTEK RI SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-04 08/12/99 (2.0' - 4.0')	SB-04 08/12/99 (6.0' - 8.0')	SB-05 08/13/99 (4.0' - 6.0')	SB-05 08/13/99 (6.0' - 8.0')	SB-11 03/29/01 (6.0' - 8.0')	SB-11 03/29/01 (8.0' - 10.0')
Volatiles							
1,1,1-Trichloroethane	800.0	10 J	37 J	27.0	12 J	--	--
1,1-Dichloroethane	200.0	--	2 J	--	14 J	--	--
1,2-Dichloroethane	200.0	--	--	--	--	2 J	2 J
1,2-Dichloroethene (total)	300.0	--	--	--	--	6 J	9 J
2-Butanone	300.0	4 J	--	3 J	40 J	--	--
Acetone	200.0	18.0	65.0	9.0	140.0	--	--
Benzene	60.0	--	3 J	--	--	--	--
Carbon Disulfide	2,700	--	11 J	2 J	14 J	--	--
Chloroethane	1,900	--	--	--	7 J	--	--
Ethylbenzene	5,500	--	5 J	--	--	--	--
Methylene Chloride	100.0	3 J	--	1 J	--	--	--
Tetrachloroethene	1,400	35 J	71 J	43.0	120.0	110 J	12 J
Toluene	1,500	--	7 J	1 J	6 J	3 J	--
Trichloroethene	1,400	44.0	43 J	50.0	53 J	7 J	4 J
Xylene	1,200	--	13 J	--	16 J	--	--

Notes:

Only compounds with detectable concentrations reported in table.

VOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

ENVIROTEK RI SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-04 08/12/99 (2.0' - 4.0')	SB-04 08/12/99 (6.0' - 8.0')	SB-05 08/13/99 (4.0' - 6.0')	SB-05 08/13/99 (6.0' - 8.0')	SB-11 03/29/01 (6.0' - 8.0')	SB-11 03/29/01 (8.0' - 10.0')
Semi-Volatiles							
2-Methylnaphthalene	36,400	--	160 DJ	39 J	--	--	--
Acenaphthene	50,000	--	--	190 J	--	--	--
Anthracene	50,000	--	--	250 J	--	--	--
Benzo (a) anthracene	224.0	--	130 DJ	***590.0***	--	--	--
Benzo (a) pyrene	61.0	--	--	***520.0***	--	--	--
Benzo (b) fluoranthene	1,100	--	--	420.0	--	--	--
Benzo (g,h,i) perylene	50,000	51 J	--	480.0	--	--	--
Benzo (k) fluoranthene	1,100	--	--	350 J	--	--	--
Carbazole	NS	--	--	130 J	--	--	--
Chrysene	400.0	99 J	360 DJ	***610.0***	--	--	--
Dibenzofuran	6,200	--	91 DJ	70 J	--	--	--
Fluoranthene	50,000	--	320 DJ	1,500	--	--	--
Fluorene	50,000	--	150 DJ	87 J	--	--	--
Indeno (1,2,3-cd) pyrene	3,200	51 J	92 DJ	460.0	--	--	--
Phenanthrene	50,000	--	220 DJ	1,200	470 DJ	--	--
Pyrene	50,000	120 J	210 DJ	930.0	590 DJ	--	--

Notes:

Only compounds with detectable concentrations reported in table.

SVOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

D Compound identified in analysis at a secondary dilution factor.

NS No standard or guidance value available.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

ENVIROTEK RI SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-15 04/04/01 (6.0' - 8.0')	SB-15 04/04/01 (8.0' - 10.0')	SB-18 04/05/01 (6.0' - 8.0')	SB-18 04/05/01 (8.0' - 10.0')	SB-19 04/05/01 (6.0' - 8.0')	SB-19 04/05/01 (8.0' - 10.0')
Volatiles							
1,1,1-Trichloroethane	800.0	--	--	--	2 J	--	--
1,1-Dichloroethane	200.0	--	4 J	1 J	2 J	--	--
1,2-Dichloroethane	200.0	--	9 J	2 J	2 J	2 J	2 J
1,2-Dichloroethene (total)	300.0	2 J	91.0	22.0	28.0	6 J	6 J
2-Butanone	300.0	--	4 J	--	6 J	--	--
4-Methyl-2-Pentanone	1,000	--	--	--	8 J	--	--
Acetone	200.0	--	6 J	22 J	26 J	--	--
Benzene	60.0	--	--	--	1 J	--	--
Carbon Disulfide	2,700	--	--	2 J	6 J	--	--
Ethylbenzene	5,500	--	--	--	2 J	--	--
Methylene Chloride	100.0	--	2 J	2 J	7 J	2 J	2 J
Tetrachloroethene	1,400	2 J	54.0	28.0	1.0	10 J	14 J
Toluene	1,500	--	--	--	40 J	--	--
Trichloroethene	1,400	2 J	18.0	14.0	24.0	12 J	6 J

Notes:

Only compounds with detectable concentrations reported in table.

VOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

ENVIROTEK RI SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-20 04/04/01 (6.0' - 8.0')	SB-20 04/04/01 (8.0' - 10.0')	SB-21 04/04/01 (2.0' - 4.0')	SB-21 04/04/01 (8.0' - 10.0')	SB-22 04/02/01 (6.0' - 8.0')	SB-22 04/02/01 (8.0' - 10.0')
Volatiles							
1,1,1-Trichloroethane	800.0	--	--	--	2 J	--	10 J
1,1-Dichloroethane	200.0	--	--	--	1 J	--	--
1,2-Dichloroethene (total)	300.0	9 J	5 J	--	180.0	--	6 J
2-Butanone	300.0	--	--	--	19 J	--	--
2-Hexanone	NS	--	--	--	10 J	--	--
4-Methyl-2-Pentanone	1,000	--	--	--	200.0	--	--
Acetone	200.0	8 J	--	--	16 J	--	9 J
Benzene	60.0	--	--	--	--	--	34.0
Carbon Disulfide	2,700	--	--	--	7 J	--	--
Ethylbenzene	5,500	--	--	--	3 J	--	--
Methylene Chloride	100.0	2 J	--	--	6 J	--	--
Tetrachloroethene	1,400	8 J	5 J	3 J	10 J	20 J	700 DJ
Trichloroethene	1,400	16.0	6 J	19.0	180.0	3 J	34.0
Xylene	1,200	--	--	--	53.0	--	--

Notes:

Only compounds with detectable concentrations reported in table.

VOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

D Compound identified in analysis at a secondary dilution factor.

NS No standard or guidance value available.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

ENVIROTEK RI SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-24 03/30/01 (6.0' - 8.0')	SB-24 03/30/01 (8.0' - 10.0')	SB-25 06/14/01 (6.0' - 8.0')	SB-25 06/14/01 (8.0' - 10.0')	SB-26 06/14/01 (6.0' - 8.0')	SB-26 06/14/01 (8.0' - 10.0')
Volatiles							
1,1,1-Trichloroethane	800.0	42.0	--	21 J	25 J	--	--
1,1-Dichloroethane	200.0	5 J	33.0	48 J	21 J	22.0	2 J
1,2-Dichloroethene (total)	300.0	9 J	--	9 J	11 J	6 J	3 J
2 Butanone	300.0	--	52.0	--	--	8 J	8 J
4-Methyl-2-Pentanone	1,000	4 J	36.0	13 J	9 J	14.0	95.0
Acetone	200.0	30 J	***260.0***	--	--	--	--
Carbon Disulfide	2,700	--	3 J	--	7 J	2 J	5 J
Chloroethane	1,900	--	5 J	--	--	--	--
Ethylbenzene	5,500	6 J	260.0	--	--	20.0	4 J
Methylene Chloride	100.0	10 J	8 J	7 J	--	4 J	3 J
Tetrachloroethene	1,400	330 J	4 J	61 J	30 J	--	2 J
Toluene	1,500	7 J	22 J	--	--	35.0	7 J
Trichloroethene	1,400	160 J	--	54 J	32 J	11 J	15.0
Vinyl Chloride	200.0	--	--	--	--	9 J	--
Xylene	1,200	50 J	243.0	--	--	48.0	10 J

Notes:

Only compounds with detectable concentrations reported in table.

VOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

ENVIROTEK RI SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-27 06/15/01 (2.0' - 4.0')	SB-27 06/15/01 (4.0' - 6.0')	SB-28 06/15/01 (6.0' - 8.0')	SB-28 06/15/01 (8.0' - 10.0')	SB-29 06/18/01 (6.0' - 8.0')	SB-29 06/18/01 (8.0' - 10.0')
Volatiles							
1,1,1-Trichloroethane	800.0	--	--	--	--	17.0	--
1,2-Dichloroethane	200.0	--	2 J	--	--	--	--
1,2-Dichloroethene (total)	300.0	--	8 J	--	--	--	--
2 Butanone	300.0	--	12.0	--	--	--	--
2-Hexanone	NS	--	1 J	--	--	--	--
Acetone	200.0	--	67.0	--	--	5 J	49 J
Benzene	60.0	--	2 J	--	--	--	--
Carbon Disulfide	2,700	--	10 J	--	--	--	--
Tetrachloroethene	1,400	--	3 J	--	--	19.0	--
Toluene	1,500	--	2 J	--	--	--	--
Trichloroethene	1,400	--	3 J	--	--	4 J	--

Notes:

Only compounds with detectable concentrations reported in table.

VOC concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046). Values in ug/kg.

J Compound reported at an estimated concentration below the reporting limit.

NS No standard or guidance value available.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-5
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

SUBSURFACE SOIL SAMPLING RESULTS - ENVIROTEK II AREA

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	SB-03 08/18/99 (0.0' - 8.0')
Metals		
Aluminum	SB (13,600)	***34,400***
Antimony	SB	3.1 JN
Arsenic	7.5	***12.4***
Barium	300.0	112 JN
Beryllium	SB (0.7)	***0.8***
Cadmium	1.0	***2.9***
Calcium	SB (44,800)	***101,000***
Chromium	SB (19.6)	***163 JN****
Cobalt	30.0	4.1
Copper	25.0	***486 JN***
Iron	SB (24,000)	***67,300***
Lead	SB (22.5)	***506 JN***
Magnesium	SB (13,600)	6,910
Manganese	SB (592)	***1,480 *****
Mercury	0.10	***0.49***
Nickel	SB (22.0)	***55.3***
Potassium	SB (1,900)	850.0
Selenium	SB (11.3)	1.9 J
Sodium	SB (126)	***704.0***
Vanadium	150.0	33.0
Zinc	SB (120)	***1,260 JN***

Notes:
Only compounds with detectable concentrations reported in table.
Metals concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).
* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).
J Compound reported at an estimated concentration below the reporting limit.
N Spiked sample recovery not within control limits.
** Duplicate analysis not within control limits.
SB Site Background concentration determined from clean soil at the Spaulding Composites
Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-6
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

TEST PIT SOIL SAMPLING RESULTS

Sample ID: Sample Date: Sample Depth:	TAGM 4046 Soil Cleanup Objectives *	TP-1 08/19/99 (12.0')	TP-2 08/19/99 (12.4')	TP-3 08/19/99 (1.5' - 3.0')
Volatiles				
1,2-Dichloroethene	300.0	2 J	2 J	--
Methylene Chloride	100.0	1 J	--	--
Tetrachloroethene	1,400	4 J	4 J	1 J
Trichloroethene	700.0	--	5 J	--
Semi-Volatiles				
Bis(2-ethylhexyl)phthalate	50,000	200 J	64 J	NA
Metals				
Aluminum	SB (13,600)	***27,800***	***19,300***	NA
Antimony	SB	1.6 JN	1.2 JN	"
Arsenic	7.5	***20.8***	***21.3***	"
Barium	300.0	***601 JN***	***342 JN***	"
Beryllium	SB (0.7)	***4.0***	***3.1***	"
Cadmium	1.0	***1.2***	--	"
Calcium	SB (44,800)	***146,000***	***100,000***	"
Chromium	SB (19.6)	***75.5 JN****	***62.3 JN****	"
Cobalt	30.0	4.5	2.2	"
Copper	25.0	***137 JN***	***126 JN***	"
Iron	SB (24,000)	***119,000***	***192,000***	"
Lead	SB (22.5)	***96.5 JN****	***73.2 JN****	"
Magnesium	SB (13,600)	***16,300***	9,880	"
Manganese	SB (592)	***5,480 *****	***4,580 *****	"
Mercury	0.10	0.04	0.08	"
Nickel	SB (22.0)	***38.5***	***35.3***	"
Potassium	SB (1,900)	***2,940***	1,850	"
Selenium	SB (11.3)	2.6 J	2.2 J	"
Sodium	SB (126)	***1,560***	***1,000***	"
Vanadium	150.0	44.0	55.6	"
Zinc	SB (120)	***303 JN***	***286 JN***	"
Inorganics				
Cyanide	NS	7.47 J	0.617 J	

TABLE 6-6
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

TEST PIT SOIL SAMPLING RESULTS

Notes:

Only compounds with detectable concentrations reported in table.

Organic concentrations reported in micrograms per kilogram (ug/kg) or parts per billion (ppb).

Metals and inorganics concentrations reported in milligrams per kilogram (mg/kg) or parts per million (ppm).

* NYSDEC TAGM 4046: Determination of Soil Cleanup Objectivess (HWR-94-4046).

J Compound reported at an estimated concentration below the reporting limit.

N Spiked sample recovery not within control limits.

** Duplicate analysis not within control limits.

SB Site Background concentration determined from clean soil at the Spaulding Composites Site in Tonawanda, NY.

NA Not analyzed.

Shaded values equal or exceed the TAGM 4046 soil cleanup objectives.

TABLE 6-7
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

GROUNDWATER SAMPLING RESULTS

Sample ID: Sample Date:	Groundwater Standard *	ENV-1 09/29/99	ENV-2 10/01/99	ENV-3 10/01/99	ENV-4 09/30/99	ENV-5 09/30/99	ENV-6 09/30/99
Volatiles							
1,1-Dichloroethane	5.0	--	***910 DJ***	***71.0***	2 J	2 J	--
1,1-Dichloroethene	5.0	--	***93.0***	--	--	--	--
1,1,1-Trichloroethane	5.0	--	***2,500 D***	--	--	--	--
1,1,2-Trichloroethane	1.0	--	***1 J***	--	--	--	--
1,2-Dichloroethane	0.6	--	***20.0***	--	--	--	--
1,2-Dichloroethene	5.0	--	***26,000 D***	--	***85.0***	***56.0***	***6 J***
Benzene	1.0	--	***2 J***	***1 J***	--	--	--
Chlorobenzene	5.0	--	3 J	--	--	--	--
Chloroethane	5.0	--	--	***52.0***	--	--	--
Ethylbenzene	5.0	--	***170.0***	--	***24.0***	--	--
Methylene Chloride	5.0	--	***180.0***	2 J	--	--	--
Tetrachloroethene	5.0	--	***7,700 D***	--	--	--	--
Toluene	5.0	--	***2,400 D***	--	***9 J***	--	--
Trichloroethene	5.0	--	***7,300 D***	--	***46.0***	--	--
Vinyl Chloride	2.0	--	***790 DJ***	--	***5 J***	***3 J***	***2 J***
Xylene	5.0	--	***900 DJ***	--	***67.0***	--	--
Semi-Volatiles							
Di-n-butylphthalate	50.0	1 J	5 J	4 J	1 J	7 J	3 J

Notes:
Only compounds with detectable concentrations reported in table.
VOC and SVOC concentrations reported in micrograms per kilogram (ug/L) or parts per billion (ppb).
* NYSDEC Togs 1.1.1: Ambient Water Quality Standards and Guidance Values expressed in ug/L.
J Compound reported at an estimated concentration below the reporting limit.
D Compound identified in analysis at a secondary dilution factor.
Shaded values equal or exceed the Ambient Water Quality Standards and Guidance Values.

TABLE 6-7
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

GROUNDWATER SAMPLING RESULTS

Sample ID: Sample Date:	Groundwater Standard *	ENV-1 09/29/99	ENV-2 10/01/99	ENV-3 10/01/99	ENV-4 09/30/99	ENV-5 09/30/99	ENV-6 09/30/99
Metals							
Aluminum	NS	22,300	7,370	7,720	15,000	14,000	29,600
Antimony	3.0	***7.4 JN***	--	***4.7 JN***	***61.9 JN***	--	***7.3 JN***
Arsenic	25.0	***42.1***	8.4	9.7	--	--	--
Barium	1,000	225.0	135.0	128.0	166.0	139.0	238.0
Beryllium	3.0	0.16	0.5	0.29	1.2	1.2	2.0
Cadmium	5.0	0.92	4.1	--	--	--	4.6
Calcium	NS	209,000 EJ	127,000 EJ	35,100 EJ	235,000 EJ	124,000 EJ	408,000 EJ
Chromium	50.0	38.2	10.8	19.5	21.2	16.2	***53.3***
Cobalt	NS	13.7	3.3	7.8	8.4	7.5	15.4
Copper	200.0	53.1	48.3	34.9	31.3	31.4	58.2
Iron	300.0	***57,500***	***8,240***	***39,900***	***14,800***	***15,900***	***33,400***
Lead	25.0	***38.2***	***64.5***	***82.0***	18.5	***43.2***	***37.1***
Magnesium	35,000	***38,000***	5,960	24,600	21,300	28,300	***48,800***
Manganese	300.0	***4,690***	***573.0***	***1,290***	***538.0***	***626.0***	***1,610***
Mercury	0.7	0.10	0.10	0.05	--	0.10	--
Nickel	100.0	46.1	10.8	20.6	25.7	22.5	48.2
Potassium	NS	9,450	7,260	11,700	19,500	21,900	39,400
Selenium	10.0	***12.7***	***15.7***	6.5	***25.2***	8.3	***33.1***
Sodium	20,000	***23,700***	7,890	11,000	***20,000***	***27,200***	***25,300***
Vanadium	NS	48.3	8.2	27.3	33.0	23.2	27.1
Zinc	2,000	143.0	***3,000***	83.5	80.1	93.6	159.0

Notes:

Only compounds with detectable concentrations reported in table.

Metals concentrations reported in micrograms per kilogram (ug/L) or parts per billion (ppb).

* NYSDEC Togs 1.1.1: Ambient Water Quality Standards and Guidance Values expressed in ug/L.

J Compound reported at an estimated concentration below the reporting limit.

N Spiked sample recovery not within control limits.

E The reported value is estimated due to the presence of interference.

NS No standard or guidance value available.

Shaded values equal or exceed the Ambient Water Quality Standards and Guidance Values.

TABLE 6-7
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

GROUNDWATER SAMPLING RESULTS

Sample ID: Sample Date:	Groundwater Standard *	GW-2 09/29/99	GW-3 09/29/99	GW-4 09/30/99	GW-5 09/30/99	GW-6 09/30/99	GW-7 09/30/99
Volatiles							
1,1-Dichloroethane	5.0	--	--	--	--	--	1 J
1,2-Dichloroethene	5.0	--	--	--	--	--	***14.0***
Acetone	50.0	--	--	--	--	--	--
Benzene	1.0	--	***1 J***	***1 J***	--	--	--
Tetrachloroethene	5.0	--	--	--	--	--	3 J
Trichloroethene	5.0	--	--	--	--	--	1 J
Semi-Volatiles							
Bis(2-ethylhexyl)phthalate	5.0	--	1 J	--	--	--	--
Di-n-butylphthalate	50.0	2 J	6 J	--	1 J	--	--
Naphthalene	10.0	--	5 J	2 J	--	--	--
Phenanathrene	50.0	--	1 J	--	--	--	--
Phenol	1.0	--	***6 J***	***7 J***	--	--	--
Metals							
Aluminum	NS	6,590	52,900	37,300	8,470	2,640	744.0
Antmony	3.0	--	--	***13.9 JN***	--	--	--
Arsenic	25.0	--	15.1	***30.8***	***40.8***	3.7	4.0
Barium	1,000	190.0	368.0	510.0	184.0	42.8	38.3
Beryllium	3.0	--	***4.2***	2.2	0.29	--	0.32
Cadmium	5.0	--	2.5	2.8	--	0.88	--

Notes:
Only compounds with detectable concentrations reported in table.
Concentrations reported in micrograms per kilogram (ug/L) or parts per billion (ppb).
* NYSDEC Togs 1.1.1: Ambient Water Quality Standards and Guidance Values expressed in ug/L.
J Compound reported at an estimated concentration below the reporting limit.
N Spiked sample recovery not within control limits.
NS No standard or guidance value available.
Shaded values equal or exceed the Ambient Water Quality Standards and Guidance Values.

TABLE 6-7
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

GROUNDWATER SAMPLING RESULTS

Sample ID: Sample Date:	Groundwater Standard *	GW-2 09/29/99	GW-3 09/29/99	GW-4 09/30/99	GW-5 09/30/99	GW-6 09/30/99	GW-7 09/30/99
Metals (cont.)							
Calcium	NS	196,000 EJ	277,000 EJ	230, 000 EJ	70,400 EJ	63,000 EJ	254,000 EJ
Chromium	50.0	9.6	***62.2***	***67.7***	18.2	7.5	2.0
Cobalt	NS	4.3	35.0	27.9	9.2	2.4	2.7
Copper	200.0	24.3	102.0	159.0	27.6	16.7	--
Iron	300.0	***18,200***	***67,400***	***94,500***	***34,200***	***6,080***	***918.0***
Lead	25.0	17.3	***76.4***	***276.0***	14.2	5.8	--
Magnesium	35,000	***36,200***	27,000	24,200	12,500	10,600	1,110
Manganese	300.0	***1,260***	***1,730***	***3,130***	***552.0***	213.0	27.6
Mercury	0.7	--	0.17	0.26	--	--	--
Nickel	100.0	14.1	91.0	79.5	23.8	6.5	1.6
Potassium	NS	10,500	24,800	24,300	17,500	7,330	29,300
Selenium	10.0	4.8	***13.6***	***13.3***	7.5	--	--
Sodium	20,000	***43,600***	***25,500***	***20,800***	***52,400***	5,480	13,800
Thallium	0.5	--	--	--	--	--	***8.9***
Vanadium	NS	15.0	75.7	91.9	21.6	7.8	21.0
Zinc	2,000	61.4	298.0	548.0	87.6	29.7	8.7
Inorganics							
Cyanide	200.0	19.6	--	--	--	--	--

Notes:

Only compounds with detectable concentrations reported in table.

Metals concentrations reported in micrograms per kilogram (ug/L) or parts per billion (ppb).

* NYSDEC Togs 1.1.1: Ambient Water Quality Standards and Guidance Values expressed in ug/L.

J Compound reported at an estimated concentration below the reporting limit.

E The reported value is estimated due to the presence of interference.

NS No standard or guidance value available.

Shaded values equal or exceed the Ambient Water Quality Standards and Guidance Values.

TABLE 6-7
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

GROUNDWATER SAMPLING RESULTS

Sample ID: Sample Date:	Groundwater Standard	NW-1 09/30/99	NW-4 09/30/99	NW-5 09/30/99	ESI-8 09/29/99		
Volatiles							
1,1-Dichloroethane	5.0	--	***8 J***	--	--		
1,2-Dichloroethene	5.0	--	***8 J***	--	2 J		
Acetone	50.0	--	--	--	--		
Tetrachloroethene	5.0	--	2 J	--	--		
Toluene	5.0	--	--	--	1 J		
Trichloroethene	5.0	--	1 J	--	--		
Vinyl Chloride	2.0	--	***9 J***	--	--		
Semi-Volatiles							
Bis(2-ethylhexyl)phthalate	5.0	1 J	--	--	--		
Di-n-butylphthalate	50.0	5 J	2 J	--	--		
Metals							
Aluminum	NS	4,540	36,500	2,690	5,560		
Antimony	3.0	***3.9 JN***	***12.7 JN***	--	--		
Arsenic	25.0	--	***33.7***	--	--		
Barium	1,000	147.0	447.0	74.7	113.0		
Beryllium	3.0	--	2.6	--	--		
Cadmium	5.0	1.4	3.4	--	--		

Notes:
Only compounds with detectable concentrations reported in table.
Concentrations reported in micrograms per kilogram (ug/L) or parts per billion (ppb).
* NYSDEC Togs 1.1.1: Ambient Water Quality Standards and Guidance Values expressed in ug/L.
J Compound reported at an estimated concentration below the reporting limit.
N Spiked sample recovery not within control limits.
NS No standard or guidance value available.
NA Not analyzed.
Shaded values equal or exceed the Ambient Water Quality Standards and Guidance Values.

TABLE 6-7
ROBLIN STEEL SITE
TONAWANDA, NEW YORK

GROUNDWATER SAMPLING RESULTS

Sample ID: Sample Date:	Groundwater Standard	NW-1 09/30/99	NW-4 09/30/99	NW-5 09/30/99	ESI-8 09/29/99		
Metals (cont.)							
Calcium	NS	56,900 EJ	190,000 EJ	105,000 EJ	172,000 EJ		
Chromium	50.0	***165.0***	***65.2***	7.3	9.1		
Cobalt	NS	4.5	29.1	--	3.7		
Copper	200.0	73.7	132.0	2.9	18.9		
Iron	300.0	***29,400***	***94,300***	***3,400***	***6,870***		
Lead	25.0	***79.5***	***238.0***	5.9	9.9		
Magnesium	35,000	6,470	***40,500***	20,200	4,920		
Manganese	300.0	***2,910***	***2,460***	115.0	268.0		
Mercury	0.7	0.04	0.21	--	--		
Nickel	100.0	19.8	***109.0***	3.9	12.5		
Potassium	NS	4,250	11,300	9,670	21,100		
Selenium	10.0	5.5	***60.5***	***15.1***	***10.9***		
Sodium	20,000	***20,800***	12,400	13,100	***20,200***		
Vanadium	NS	72.4	91.5	7.1	10.6		
Zinc	2,000	114.0	682.0	23.4	53.4		
Inorganics							
Cyanide	200.0	--	--	--	14.4		

Notes:

Only compounds with detectable concentrations reported in table.

Metals concentrations reported in micrograms per kilogram (ug/L) or parts per billion (ppb).

* NYSDEC Togs 1.1.1: Ambient Water Quality Standards and Guidance Values expressed in ug/L.

E The reported value is estimated due to the presence of interference.

J Compound reported at an estimated concentration below the reporting limit.

NS No standard or guidance value available.

NA Not analyzed.

Shaded values equal or exceed the Ambient Water Quality Standards and Guidance Values.