Department of Environmental Conservation

Division of Environmental Remediation

Immediate Investigative Work Assignment Report

Guterl Excised Area, City of Lockport, Niagara County

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New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
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Immediate Investigative Work Assignment (IIWA) Report for the Unlisted Guterl Excised Area

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Section I Executive Summary

This Immediate Investigative Work Assignment (IIWA) for the Guterl Steel Excised Area was conducted by the New York State Department of Environmental Conservation, Division of Environmental Remediation (DER) to determine the presence and extent of hazardous wastes at this site. As part of this study, the characteristics, areal extent and hydrogeologic properties of the strata underlying the site were also assessed to determine the effect of the Erie Barge Canal and the Frontier Stone Products quarry on the groundwater flow pattern in this area. Data for this IIWA investigation was obtained from analysis of surface and subsurface soil, groundwater, sludge and sediment samples. The results for each of these environmental media are discussed in detail in the subsequent sections of this report.

Under contract with the DER, Ecology & Environment Engineering P.C. (E&E) hired and supervised a drilling contractor to conduct subsurface soil borings and install groundwater monitoring wells. E&E also hired a surveyor to develop a comprehensive topographic map of this site and the appropriate surrounding areas. The collection of all environmental samples was performed by DER staff. Analysis of the IIWA samples was performed by Recra Environmental, Inc. in Amherst, New York. Field work for this IIWA began on May 12, 1997 and was completed on June 5, 1997 with the collection of groundwater samples from the newly installed groundwater monitoring wells. During June, October and November 1997, the United States Environmental Protection Agency (EPA) collected and analyzed surface and subsurface soil samples from the Excised Area. The EPA data is included as part of this report.

The results of this investigation indicate that the Erie Barge Canal and the Frontier Stone Products quarry exert a significant effect on local groundwater flow patterns. Essentially, a north-south groundwater flow divide is centered near the Guterl Specialty Steel Corporation Landfill (DEC Site no. 932032). From this divide, groundwater flows west toward the Frontier Stone Products quarry and east toward the Erie Barge Canal. Because the Excised Area is east of the divide, the groundwater in this area flows toward the Erie Barge Canal.

Analytical results indicate that surface soils contain the highest levels of contamination at the site. Elevated levels of heavy metals exist throughout the site and frequently exceed NYSDEC cleanup guidance values. Similarly, phenol and polycyclic aromatic hydrocarbons (PAHs) are prevalent in site surface soils.

Contaminants found in subsurface soils reflect those found in surface soils. The concentrations of the subsurface soil contaminants are in general significantly lower. The data suggests some leaching of

surface contaminants into the subsurface soils is occurring. Fill encountered during soil boring activities may also be contributing to the contaminants found in subsurface soils.

Soil/waste found on the site was analyzed for hazardous waste characteristics as defined in 6NYCRR Part 371 for the Identification and Listing of Hazardous Wastes (i.e. Toxicity Characteristic Leaching Procedure, or TCLP). While none of the samples collected during this IIWA exceeded TCLP criteria, several samples collected by EPA exceeded the TCLP regulatory limit for lead, indicating the presence of a characteristic hazardous waste. TCLP exceedances were generally limited to a small area on the west side of the site.

Waste and sediment samples were collected in association with the former water/sewer systems and water treatment facility at the site. Elevated levels of PCB's and lead were found in sediments collected in a pump house located within the site. Analysis of the former water treatment system lagoon did not reveal significant contamination. An underground storage tank at the site was found to contain petroleum type materials.

Groundwater contamination at the site is primarily organic and may in part reflect the decomposition of trichloroethylene. Upgradient monitoring well data suggest the possibility of organic contamination from sources other than the Excised Area. PCB was found in one on-site well. Down gradient monitoring well data does not indicate significant off-site contaminant migration or leaching from overburden soils.

The results of this IIWA indicate relatively wide spread, but moderate to low concentrations of contaminants, exist at the site. The types of heavy metal and organic contamination found is consistent with the past industrial history of the site. While not prevalent throughout the entire Excised Area, sample analyses indicated the presence of hazardous wastes (as defined by 6NYCRR Part 371) in limited areas of the site.

Given the findings of this IIWA, it is recommended that the site be listed in the New York State Registry of Inactive Hazardous Waste Sites. The classification of the site must consider the apparent lack of significant public health and/or environmental impacts and will require appropriate agency review and scrutiny.

Section II Introduction

This report addresses the site investigation conducted by the New York State Department of Environmental Conservation, Division of Environmental Remediation (DER)of the Guterl Steel Excised Area. The primary purpose of this investigation was to evaluate the Excised Area to determine if consequential amounts of hazardous wastes were disposed at the site; thus requiring that the site be listed in the New York State Registry of Inactive Hazardous Waste Sites. The study was also conducted to establish the characteristics, areal extent and hydrogeologic properties of the strata underlying the site, and to assess the effect of the Erie Barge Canal and the Frontier Stone Products quarry on the area groundwater flow patterns. An Immediate Investigative Work Assignment (IIWA) was utilized to implement the investigation.

The Guterl Specialty Steel Corporation is no longer a viable corporation. The Excised Area is a portion of the former Guterl Specialty Steel Corporation Plant (Guterl Plant Site) located in the City of Lockport, Niagara County, New York (Figure II-1). The property is currently divided into three parcels consisting of an active manufacturing facility not related to the former Guterl Corporation, the Guterl Specialty Steel Corporation Landfill Area, currently an Inactive Hazardous Waste Disposal Site (DER Site No. 932032), and the Excised Area (Figure II-2).

The Excised Area consists of an abandoned manufacturing facility in an advancing state of deterioration. Allegheny Ludlum presently leases the remaining lands of the original Guterl tract from the Niagara County Industrial Development Agency, and operates an active metals processing facility adjacent to the Excised Area. The Guterl Steel Landfill Site is part of the lands leased to Allegheny Ludlum. The landfill is designated by DER as a Class 2 site, indicating that the site presents a significant threat to human health and/or the environment, and that action is required. Several investigations of the landfill have been conducted over the past several years and a detailed Remedial Investigation is presently being sought with the site Potentially Responsible Parties.

Portions of the Guterl Steel Plant site including parts of the Excised Area have been found to contain elevated levels of radioactivity, as discussed briefly in Section III of this report. As radioactive wastes do not fall under the purview of the DER and State Superfund Law, such contamination was not investigated as part of the IIWA investigation. Areas within the Excised Area where elevated radioactivity exists were identified prior to the DER field investigation and excluded from hazardous waste disposal investigation as well.

This report summarizes the findings of the IIWA investigation. Following the history of the site and the description of the IIWA in the next two sections, III and IV, the results of the geology and groundwater hydrology are presented in Sections V and VI respectively. The findings of the surface and subsurface soil analyses are given in Sections VII and VIII respectively, and of the analyses of miscellaneous liquid wastes and sludges are given in Section IX. A review of the groundwater chemistry is given in Section X. The final sections, Nos. XI and XII, present the conclusions and recommendations respectively.

Section III History and Background

Site Description

The Guterl Specialty Steel Corporation Plant Site was a steel manufacturing facility encompassing a 70 acre parcel in the southwest portion of the City of Lockport. The site is bordered by Ohio Street to the east, Simons and Crosby streets to the north, and Route 93 to the west. Residential and commercial properties are located to the north along Simons and Crosby streets, while commercial properties are located east of the Guterl Plant Site along Ohio Street. To the west are the Frontier Stone Products Quarry and the Niagara County Refuse Disposal District (NCRDD) Landfill. The Erie Barge Canal is located several hundred feet to the southeast.

In addition to the Guterl Specialty Steel Corporation Landfill, Diamond Shamrock ,a former inactive hazardous waste disposal site (DER Site No. 932071), is located to the east across Ohio Street from the Guterl Plant Site. Investigations of the Diamond Shamrock site led to its removal from the DER registry in July 2000.

The Excised Area is located in the eastern quadrant of the Guterl Plant Site, and encompasses the 9 acres of the former plant adjacent to Ohio Street. Nine abandoned and deteriorating buildings occupy the Excised Area, including Buildings 1 and 2; the co-joined Buildings 3, 4, 5, 6, 8, 9; and Building 35 (Figure II-2). Except for Building 35, which was built in 1950, these structures were constructed between 1913 and 1920. Their areas range from approximately 3750 square feet (Building 5) to over 69,000 square feet (Building 2). The majority of the buildings are approximately 30 feet in clear height to the structural steel roof trusses. The walls are constructed of brick and the floors consist primarily of compacted soils.

The structures contained within the Excised Area housed various manufacturing processes conducted during the active life of Guterl Specialty Steel. Plant records indicate that the following operational units were housed within the buildings of the Excised Area:

Building 1:	Carpenter Shop
Building 2:	Casting, Pickle and Etch Rooms; Boiler Room; Stock Room & Maintenance
Building 3:	Grinding Room, Machine Shop & 30" Mill
Building 4&9:	Sheet Mills, Sheet Finishing
Building 5:	Power House; 25 cycle heat exchanger
Building 6&8:	Band Mill, 10" Mill & 16" Mill

Building 35: Welding Shop

The exterior grounds of the Excised Area include a crane yard to the east of Buildings 1 and 2, an alleyway between Buildings 2 and 3, a courtyard area between Buildings 2 and 35, the exterior loading dock area to the west of Buildings 6 and 8, and rail spurs presumably used for receipt and/or shipment of goods.

Site Operations and History

In the early 1900's, the Simons Manufacturing Company built a large steel mill at this 70 acre site for the manufacture of cutting tools. The company later evolved into a producer of specialty steels. Manufacturing operations conducted at the plant included casting, pickling, and grinding and milling of steel. Supporting these operations were power generation, welding, bulk petroleum and chemical storage, machining, and product and raw material storage facilities.

From 1948 through 1956, the plant also milled uranium ingots and, to a much smaller extent, thorium ingots, for the Manhattan Engineering District of the Atomic Energy Commission (AEC). A total of 25 to 35 million pounds of uranium and approximately 30 to 40 thousand pounds of thorium were rolled during this time. More than 99 percent of the rolling mill operations involved uranium, which was rolled on the 16-inch rolling mill located in Building 8. Several small lots of uranium bars were run through the 10-inch rolling mill, located in Building 6, and approximately 15 to 20 ingots were processed in the hammer forge shop located in Building 3.

In November 1965, the Wallace-Murray Corporation purchased the facility, which at that time was known as Simons Saw and Steel Company. In May 1978, the facility, which had been re-named Simons Steel, was purchased by the Guterl Specialty Steel Corporation with the specific intention of re-establishing the plant as a reliable source of specialty steel.

In August 1982, the Guterl Specialty Steel Corporation filed for Chapter 11 protection, and in March 1984 conveyed the entire property except for the 9 acre Excised Area to the Niagara County Industrial Development Agency (NCIDA). The Excised Area is currently held by the Guterl Steel Bankruptcy Trustee at the Western Bankruptcy Court in Pittsburgh, Pennsylvania. Later in 1984, the NCIDA leased the remaining portions of the former Guterl Specialty Steel Corporation property, including the landfill portion of the site, to the Allegheny Ludlum Company. Allegheny Ludlum currently operates a mill for recycling of stainless steel.

Other Site Investigations

A radiological survey of the site was conducted in 1958. The survey found elevated radiation levels in portions of Building 8. Decontamination measures were taken, and a second radiological survey was performed in December 1958 to verify the effectiveness of decontamination. In October 1976, at the request of the Department of Energy (DOE), Oak Ridge National Laboratory (ORNL) conducted another radiological survey of the property. This survey revealed that most of the residual contamination remaining from the uranium and thorium rolling operations was confined to the areas inside and immediately outside Buildings 6 and 8 (Figure II-2), the rolling mill buildings (ORNL, 1979). Buildings 6 and 8 were not evaluated as part of this IIWA study due to the elevated levels of radioactivity that remain therein.

In 1980, DOE determined that the site required consideration for remedial action. New York State was notified of these findings and took steps to ensure that the site would be adequately controlled. In August of 1984, after reviewing historical and contractual information, DOE determined that they did not have the authority under the Atomic Energy Act of 1954 to conduct remedial action at the site. This was primarily due to a "hold harmless" provision in the contract between Simonds Steel and the AEC, which released the government from liability in regard to these operations.

In 1994, it was discovered that hazardous wastes were stored on-site in the vacant buildings of the Excised Area. Commencing in 1996, the EPA removed drummed hazardous wastes, mixed hazardous/ radioactive wastes, and radioactive wastes. A significant quantity of radioactive dust exists in portions of some buildings within the Excised Area. In June 1997 EPA collected surface soils samples from 12 locations in the Excised Area. During October and November 1997, the EPA conducted a sampling investigation of surface and subsurface soils at the Excised Area, including areas internal to the on-site buildings. The results of this study were published in an April 1998 report "Final Report, Guterl Steel Site, Lockport, New York" (USEPA/ERT). While all specific data generated from the EPA study are not provided in this IIWA report, summary and discussion of the study results are included in Sections VI and VII.

In April 1996, the Department of Environmental Conservation, Division of Solid and Hazardous Materials (DSHM) first inspected the Guterl Plant Site relative to radioactivity. DSHM did another inspection, including radiological surveying and sampling, in May 1996 and returned to the site in April and May 1997 and June 1999 to collect soil samples for radiological analysis. During April and May 1999, the Oak Ridge Institute for Science and Education (ORISE) performed a comprehensive radiological investigation for the bankruptcy trustee. ORISE returned to the site in November 1999, to complete their

investigation. A report of the ORISE radiological investigation was issued in December 1999. In follow-up to the ORISE findings, the DOE has initiated steps to determine if the Guterl Plant site, including all or part of the Excised Area, should be designated a federal Formerly Utilized Site Remedial Action Program (FUSRAP) site, requiring further investigation an possibly remediation of radioactive contamination.

Section IV Immediate Investigative Work Assignment Program

Objectives of the Investigation

To implement the IIWA, certain project elements were provided by Ecology & Environment, Inc. (E&E) through contract with DER. These elements are briefly summarized in this section. For a more detailed description of these elements, the reader is referred to the August 1997 IIWA Report submitted by E&E as part of this contract.

The objectives of this IIWA investigation were to:

- assess whether hazardous waste was disposed on site for purposes of listing the Site in the Registry;
- establish the characteristics, areal extent, and hydrogeologic properties of the strata underlying the Site;
- determine groundwater quality and flow direction taking into account the influence of the Erie Barge Canal and Frontier Stone Products quarry on the local groundwater flow;
- obtain samples of various environmental media to assess the impact of the Site on public health and/or the environment; and
- prepare a scale map of the Excised Area that includes pertinent site features and the location of all borings, wells, and samples.

Scope of Work

To complete the IIWA objectives, the following activities were conducted:

Site Survey

A topographic map of the Excised Area, at a scale of 1"=200', was prepared by E&E. Existing AutoCAD files of the Guterl Specialty Steel Corporation Landfill, the Diamond Shamrock Site, and the NCRDD Landfill were integrated into the Excised Area map. The survey was coordinated and tied to the New York State Plane Coordinate System. In addition to the soil borings, monitoring wells and other sampling activities listed below, this map includes the locations of roads, buildings and monitoring wells, soil borings and test pits obtained for previous investigations at the Excised Area and adjacent sites. The locations (11 wells) and elevations (15 wells) from adjacent sites were also plotted to allow for study of the hydrologic and geologic characteristics of the immediate area of the Guterl Site and to determine the general impact any contaminants at the site might have on

this area. In addition, the accuracy among the various maps of their respective areas was ensured. The survey map is provided as Plate 1 of this report.

The location of sampling, boring, and monitoring wells discussed below are presented in figure IV-1 and/or Plate 1.

Surface Soil Samples

Five surface soil samples, designated SS-1 through 5, were collected. In addition, 12 surface soil/waste samples plus one duplicate, designated GS-1 through 13, were collected by the USEPA in June 1997. The analysis of these samples are discussed in Section VII.

Soil Borings

Seven soil borings through the waste and underlying native soils were completed by E&E during this IIWA investigation. Continuous split spoon samples were collected, with the borings advanced to spoon refusal. These borings are designated SB-1 through 7. SB-1 through 5 are at the same locations as the Monitoring Wells. The results of these analysis are presented in Section VIII.

Surface Water and Sediment Samples

Water samples were obtained from the holding lagoon of the former plant water supply/treatment system and from an abandoned fuel oil tank located in the alleyway between Buildings 2 and 3. The water intake system is located across Ohio Street from the site. A sludge sample was also obtained from the fuel oil tank. The analysis if these samples is discussed in Section IX.

Monitoring Wells

Five of the soil borings were completed by E&E as upper bedrock monitoring wells, and are designated MW-1 through 5 on the Survey Map. Four wells were initially proposed, but based upon air monitoring results for volatile organics, a fifth well was installed. The wells were constructed with 2" diameter PVC riser and screen with appropriate sand pack, bentonite seal, grout, and protective casing with locking cap. The wells were constructed with a maximum 3' stickup. Specific details concerning well construction are included in the E&E report. Coring of bedrock was completed with standard HQ coring tools. After construction, the wells were developed in accordance with standard NYSDEC well development protocols. The results of the analysis of the groundwater samples are discussed in Section X.

Health and Safety

All work was performed in level D personal protective equipment. Air monitoring was conducted during all intrusive activities for particulates, organic vapors, and radiation.

Sampling

Sampling was conducted by DER staff with Department equipment. All samples were analyzed by Recra Environmental, Inc. under separate contract to the NYSDEC.

Section V Geology

Regional Geology

One objective of this IIWA was to establish the characteristics, areal extent and hydrogeologic properties of the strata underlying the Guterl Excised Area. 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 Guterl Excised Area 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. More detailed information can be found in the report entitled Hydrogeologic Investigation of the Southwestern Portion of the Town of Lockport, Niagara County, New York (NYSDEC, in preparation).

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. A series of advances and retreats over the next 4000± years produced, from latest to earliest, lakes Arkona, Whittlesey, Warren, Wayne, Lowest Warren, Grassmere, Lundy and Tonawanda, the last forming about 9,800 years ago (Calkins and Brett, 1978) and having an outlet in the Lockport area. 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 Lockport area these deposits include the following (GZA, 1987; Smith, 1990; Ecology and Environment, 1991):

- 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 of the ice sheets; and

- 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.

The thickness of these deposits in the Lockport Area varies considerably, ranging from less than 2 feet near the Niagara Escarpment (this investigation) to approximately 45 feet at the Frontier Pendleton Quarry Site approximately 6 miles southwest of the Guterl Excised Area (Golder, 1989).

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 (439-360 million years ago) (Buehler and Tesmer, 1963). This stratigraphic sequence is summarized in Table V-1 the end of this section. 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 differences in the bedrock surface configuration (Snyder Engineering, 1987).

The uppermost bedrock formation underlying the Lockport area south of the Niagara Escarpment is the Goat Island Dolostone Formation of the Lockport Group, which was deposited in a shallow sea environment during the Middle Silurian Period (439-408 million years ago) (Brett et al., 1995). Brett et al (1995, page 45) describe the Lockport Group as a "massive- to medium-bedded, argillaceous dolomite with minor amounts of dolomite and shale." The upper 10 to 25 feet of this unit, however, can be heavily weathered and often contains abundant bedding planes and vertical fractures enlarged by dissolution and glacial scour (Miller and Kappel, 1987). The Lockport Group varies in thickness from 20 to 175 feet (Johnson, 1964; Brett et al., 1995), and ranges in thickness from 35 to 63 feet near the Guterl Excised Area. Much of this unit, however, has been quarried from an area west of the Site (Figure II-1), with the depth to the underlying Rochester Shale now being less than 15 feet in this area.

Study Area Geology

The stratigraphy of the Guterl Excised Area has been evaluated by examining stratigraphic logs obtained from test borings and monitoring wells completed during this IIWA. Due to the presence of nearby inactive hazardous waste sites, however, boring, well, and/or test pit logs from these sites were also compiled and evaluated (Appendix C). The locations of all borings, monitoring wells, and test pits evaluated during the IIWA are shown on Plate 1. While the focus of the following discussion is the Guterl Excised Area, we also discuss stratigraphy from the adjacent sites when this information will provide a better understanding of the area geology. More detailed information can be found in the report entitled Hydrogeologic Investigation of the Southwestern Portion of the Town of Lockport, Niagara County, New York (NYSDEC, in preparation). For purposes of this discussion, therefore, the Guterl Excised Area, Diamond Shamrock Site and Guterl Specialty Steel Corporation Landfill will together be called the "Study Area."

Fill

Fill material mantles either native deposits or bedrock throughout the Study Area (Figure V-1), although native deposits were encountered directly at the surface at three locations (Table C-1). The thickness of this material across the Study Area is relatively constant, generally ranging from 2.0 to 3.0 feet. Fill thickness at the Guterl Specialty Steel Corporation Landfill, however, ranges to 14 feet (Figure V-1). Fill material at the Guterl Excised Area consists predominantly of production and miscellaneous plant wastes from the former Guterl Specialty Steel Corporation and includes coal, ash, coke, and brick. This material was encountered in all borings completed at the Site, and ranges in thickness from 0.3 to 3.7 feet.

Glaciolacustrine Deposit

A thin, discontinuous glaciolacustrine deposit is encountered sporadically throughout the Study Area (Figure V-1), and either underlies the fill material or is found directly at the surface. The glaciolacustrine deposit was only encountered in four borings/test pits completed in the area (Table C-1), and consists predominantly of reddish brown, reddish gray, or brownish gray, soft to stiff, dry to moist, silty clays, clayey silts, and silts containing traces of gravel and fine sand. This deposit is commonly mottled and contains vertical desiccation cracks throughout its thickness. Borings and test pits that have completely penetrated this deposit reveal that it directly overlies either glacial till or bedrock, and where encountered, ranges in thickness from 0.5 to 8.7 feet (Table C-1).

Glacial Till

A thin, discontinuous glacial till deposit is encountered throughout the Study Area and mantles the

underlying dolostone bedrock (Figure V-1). The term "till" is used for a variety of non-sorted, non-stratified glacial deposits; however, because a till is so variable, caution must be exercised when describing its character and hydrogeological properties. The till underlying the Study Area is characterized as a soft to dense, heterogeneous mixture of reddish brown, grayish brown, yellowish brown, or brown clay, silt, sand, and dolostone bedrock fragments, with silt and clay occurring at the greatest percentage. The thickness of this deposit ranges from 0.3 to 4.0 feet across the Study Area (Table C-1). Due to the thinness of this deposit, a blocky soil structure has developed through the normal soil forming process (Earth Dimensions, 1980). The lack of mottling indicates that the glacial till is well drained, suggesting that the underlying bedrock is well jointed (Earth Dimensions, 1980).

Lockport Dolostone

The uppermost bedrock formation underlying the Study Area is the Goat Island Dolostone Formation of the Lockport Dolostone Group. The Lockport Dolostone was encountered in 30 borings/test pits completed in the Study Area (Table C-1) and is characterized as a weathered to dense, medium to dark gray, fine to coarse, crystalline, thin to massively bedded dolostone, limestone, and shaly dolostone with vugs containing gypsum, dolomite, and calcite crystals. The upper 10 to 15 feet of this unit contains numerous horizontal and vertical weathered fractures, with vugs and other solution features.

Bedrock beneath the Study Area is shallow (generally less than 5 feet) and relatively flat-lying. Depth to bedrock at the Guterl Specialty Steel Corporation Landfill, however, ranges to 15 feet due to the greater fill thickness in this area. Bedrock beneath the Study Area dips gently to the east-southeast toward the Erie Barge Canal from a bedrock high under the Guterl Specialty Steel Corporation Landfill (Figure V-1).

Table V-1.
Stratigraphic Sequence of the Western New York Area. Compiled from Buehler and Tesmer (1963) and Brett et al. (1995).

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 Ordivician	Richmond	Queenston Shale Oswego Sandstone	

Section VI Groundwater Hydrology

Regional Hydrogeology

Water bearing zones in the Lockport area include unconsolidated glacial deposits and bedrock of the Lockport Group and Rochester Shale (Johnson, 1964; GZA, 1981; EHC, 1989). Most of the unconsolidated deposits in the area consist of fine grained glacial deposits with hydraulic conductivities roughly 10^{-7} cm/s or less (Earth Dimensions, 1980). These deposits, however, often contain horizontal laminations and sand lenses that can produce perched water table conditions, or if areally extensive, can be utilized as sources of water (La Sala, 1968). Because the unconsolidated deposits in the southwestern Lockport area are relatively thin and horizontal laminations and sand lenses are not common (NYSDEC, in preparation), groundwater yields from these deposits would be too low for domestic or industrial purposes. Overburden groundwater flow in the area, therefore, is expected to be highly localized and discontinuous.

The Lockport Group consists predominantly of dolostone, however, thin beds of limestone and shaly dolostone, and small irregularly shaped masses of gypsum are common. These thin beds and masses are subject to dissolution by groundwater, resulting in the enlargement of fractures and the formation of migration pathways that transmit large quantities of groundwater. Groundwater wells completed in the Lockport Group have yields commonly ranging from 10 to 100 gpm (Miller and Kappel, 1987), with yields up to 950 gpm reported (Yager and Kappel, 1987). Reported transmissivity values range from 330 to 68,000 gpd/ft (Johnson, 1964). Groundwater in the Lockport Group is typically either a calcium-sulfate or calcium-bicarbonate water, is very hard, and highly mineralized; calcium, bicarbonate, magnesium, sulphate and chloride are present in significant concentrations (Johnson, 1964; La Sala, 1968; NYSDEC, 1997). Due to this poor water quality and the nearby presence of the Niagara River, an important source of municipal drinking water throughout Western New York, bedrock groundwater is not extensively utilized as a source of domestic water in the Lockport area. Because of significant well yields, however, groundwater is commonly utilized for industrial purposes (i.e., non-contact cooling; quarry washing operations).

Most recharge to the Lockport Group results from infiltration of rainfall, snowmelt, and surface water through the overburden deposits; subsurface flow of groundwater from areas of higher elevation (e.g., the Niagara Escarpment) also recharges the bedrock aquifer (Johnson, 1964; La Sala, 1968; Miller and Kappel, 1987; Yager and Kappel, 1987). The blocky structure of the native glacial deposits in the southwestern Lockport area likely permits rapid recharge of the upper bedrock aquifer by infiltration. Recharge of deeper bedrock aquifers by infiltration through the floor of the nearby quarry and Erie Barge Canal is also expected to be rapid.

Groundwater occurs primarily within the Lockport Group in the following types of openings: (1) weathered surface fractures, (2) bedding joints, (3) vertical joints, and (4) small cavities and vugs. The principal control on groundwater flow, however, is the vertical and horizontal bedding plane fractures. The latter are the primary groundwater flow pathways in the Lockport Group and are areally extensive over several miles (Johnson, 1964; Yager and Kappel, 1987). Johnson (1964) identified seven such zones in the Niagara Falls area. Similar zones are likely to be found in the Lockport area but have not been extensively studied, nor correlated with those in Niagara Falls. Some horizontal groundwater flow, however, also occurs through small cavities and vugs (Woodward-Clyde and Conestoga-Rovers & Associates, 1992). Vertical movement of groundwater also occurs, especially in the upper 10 to 25 feet of rock where vertical fractures, created by stress relief from tectonic events, glacial rebound (Gross and Engelder, 1991), and quarrying operations (GZA, 1981) have been enlarged by dissolution and/or glacial scour. Vertical movement of groundwater within the Lockport Group is quite prevalent, with both upward and downward gradients observed (Woodward-Clyde and Conestoga-Rovers & Associates, 1992). Where horizontal and vertical fractures intersect, the water bearing capacity of the bedrock is substantially increased. Although such areas have been identified in the Niagara Falls area, little investigation has been conducted to identify such areas in the Lockport area.

Regional Groundwater Flow

There are several natural features and man-made structures that greatly influence bedrock groundwater flow in the southwestern Lockport area, including the Niagara Escarpment and Gulf, the former Frontier Stone Products quarry, and the Erie Barge Canal (Figure II-1). Prior to the initiation of quarrying operations, little information regarding regional groundwater flow in the upper Lockport Group bedrock is available. Based upon groundwater level data from two sites north of the Guterl Excised Area, however, we speculate that historical regional groundwater flow in the southwestern portion of Lockport was largely toward the Gulf, with more localized flow toward the Erie Barge Canal. The initiation of quarrying operations, however, has altered this flow. Water levels measured in area wells indicate that upper bedrock groundwater flows from a roughly north-south trending groundwater divide centered over the Guterl Specialty Steel Corporation Landfill. From this divide, groundwater flows west toward the former Frontier Stone Products quarry, while groundwater under the Diamond Shamrock Site and Guterl Excised Area flows east toward the Erie Barge Canal. As a result, contaminated groundwater from these sites has the potential to impact the canal. More detailed information concerning the regional upper bedrock groundwater flow can be found in the report entitled Hydrogeologic Investigation of the Southwestern Portion of the Town of Lockport, Niagara County, New York (NYSDEC, in preparation).

Study Area Hydrogeology

The hydrogeology of the Guterl Excised Area has been evaluated by examining data obtained during this IIWA. Due to the presence of the nearby Diamond Shamrock Site and Guterl Specialty Steel Corporation Landfill, hydrogeologic data from these sites were also compiled and evaluated (Appendix C). While the focus of the following discussion is the Guterl Excised Area, we also discuss data from the adjacent sites when this information will provide a better understanding of the area hydrogeology. Once again, therefore, these sites together will be called the "Study Area." More detailed information can be found in the report entitled Hydrogeologic Investigation of the Southwestern Portion of the Town of Lockport, Niagara County, New York (NYSDEC, in preparation).

The hydrogeologic data compiled for the Study Area suggest that only two hydrogeologic zones underlie the area: an overburden water bearing zone consisting of miscellaneous fill and the discontinuous native deposits, and the upper bedrock water bearing zone. The designation of the overburden water bearing zone as a separate hydrogeologic unit is highly generalized, however, as this zone is in hydraulic connection with the upper bedrock water bearing zone in some portions of the Study Area.

Overburden Hydrogeologic Zone

Only five overburden monitoring wells have been installed within the Study Area, and all are located at the Guterl Specialty Steel Corporation Landfill (Table C-2). This zone was not evaluated at the Diamond Shamrock Site nor was it evaluated during this IIWA. As a result, a complete evaluation of this zone within the Study Area cannot be made, although some conclusions can be drawn.

Laboratory permeameter tests have not been conducted on undisturbed Shelby tube soil samples collected from the overburden hydrogeologic zone, although one remolded sample has been tested (Table VI-1, end of this section). The conductivity of this sample (3.6×10^{-7} cm/sec) is consistent with hydraulic conductivity values obtained from undisturbed Shelby Tube samples of similar soils at other locations within Niagara County (e.g., NYSDEC, 1997). Vertical hydraulic conductivities, however, would be much higher than 10^{-7} cm/sec due to the blocky structure of this deposit, which would permit rapid recharge to the upper bedrock hydrogeologic zone.

Slug, bail down or pump tests have not been conducted on any of the wells that screen this zone. In addition, hydraulic conductivity measurements have not been conducted on the miscellaneous fill materials at any of the three sites within the Study Area. These materials, however, should have relatively high

conductivities due to the low compaction/high porosity character of the materials. The conductivity data suggests, therefore, that groundwater discharge from the glacial till under the Study Area will be extremely low, while more substantial groundwater discharge from the miscellaneous fill material would be expected.

Water level measurements from the five overburden wells within the Study Area were collected four times between December 1980 and December 1993. In order to obtain a more recent data set, water level measurements from these wells were collected seven times between June 4, 1997 and April 20, 1998 (Table VI-2, end of this section). Due to the shallow depth of these wells, groundwater fluctuates widely due to evapotranspiration, precipitation and infiltration into the upper bedrock hydrogeologic zone. In general, water levels will be higher during wet-weather conditions and lower during the relatively hot summer and fall months. At the Guterl Specialty Steel Corporation Landfill, water level fluctuations up to ≈4 feet were observed, with two wells going dry during the dry summer months (Figure VI-1). A groundwater contour map was not constructed for the overburden hydrogeologic zone due to the paucity of available data and because this zone is hydraulically connected to the upper bedrock hydrogeologic zone (see following subsection for details).

Upper Bedrock Hydrogeologic Zone

Twelve upper bedrock monitoring wells have been installed within the Study Area (Table C-2); seven at the Diamond Shamrock Site and five at the Guterl Excised Area. Water level measurements from the Diamond Shamrock wells were collected seven times between November 10, 1994 and October 4, 1996, and were utilized by the PRP to determine groundwater gradients and flow patterns of the upper bedrock hydrogeologic zone at the site. In order to obtain a more recent and spatial data set, water level measurements were collected seven times between June 4, 1997 and April 20, 1998 (Table VI-2) from the Guterl Excised Area and Diamond Shamrock wells.

Like the overburden hydrogeologic zone, upper bedrock zone groundwater fluctuates widely due to evapotranspiration and precipitation. In general, water levels will be higher during wet-weather conditions and lower during the relatively hot summer and fall months. At the Guterl Excised Area, water level fluctuations up to ≈2 feet were observed, while water level fluctuations up to ≈3.5 feet were observed at the Diamond Shamrock Site (Figure VI-2).

Figures VI-3 and VI-4 illustrate the overburden and upper bedrock groundwater flow pattern across the Study Area on June 4 and October 10, 1997, respectively. The data utilized to construct these contours

are summarized in Table VI-2. These figures suggest that groundwater in the overburden and upper bedrock hydrogeologic zones flows from a groundwater mound centered over the Guterl Specialty Steel Corporation Landfill. From this divide, groundwater flows east toward the Erie Barge Canal and west toward the former Frontier Stone Products quarry. Additional wells would be required west and south of the Guterl Specialty Steel Corporation Landfill and Guterl Excised Area to determine better the exact location of this divide.

Water level data from the overburden and upper bedrock hydrogeologic zones have been combined because we believe, for various reasons, that these zones are in hydraulic connection. First, the well screens at the Guterl Specialty Steel Corporation Landfill sit directly on bedrock, thus providing a direct connection between these wells and the upper bedrock hydrogeologic zone. Second, an evaluation of the water level data indicates that water levels in some wells are found below the bedrock surface, while other wells exhibit artesian conditions (compare Tables VI-2 with C-1). The former occurrence is observed in wells closest to the Erie Barge Canal, where the steep gradients have effectively dewatered the overburden materials. The latter occurrence is observed in wells farthest from the canal, where the effect of the canal is substantially diminished. Lastly, the hydrographs shown in Figure VI-1 and VI-2 show seasonal fluctuations in all wells that appear related to the wet-weather/dry-weather climate cycle of the region. The similarity in water level fluctuations between the deep overburden and upper bedrock wells again suggests that the two hydrogeologic zones are hydraulically connected.

In situ hydraulic conductivity tests have been conducted on seven wells that monitor the upper bedrock hydrogeologic zone. The results of these tests are summarized in Table VI-1, along with the geometric and arithmetic means. All hydraulic conductivity tests were completed by utilizing the slug test methodology, with the field data evaluated by the solution developed by Cooper et al (1967). Hydraulic conductivities for the upper bedrock zone range from 1.10×10^{-1} to 2.89×10^{-3} cm/sec, with arithmetic and geometric means of 5.27×10^{-2} and 2.10×10^{-2} cm/sec, respectively. The two orders of magnitude variation in these data may be due to the presence of vertical fractures and horizontal bedding planes. As a result, groundwater discharge from the upper bedrock hydrogeologic zone under the Study Area can be extremely variable, but in general will be relatively high, especially from the area influenced by the Erie Barge Canal.

Table VI-1.
Hydraulic Conductivity Test Data for Glacial Till and Upper Lockport Group Dolostone.

Well or Boring Number	Site Name	Hydraulic (1) Conductivity (cm/sec)	Screened Unit	Test Method
Hydraulic Conductivity for Glacial Till				
N/A	GSL	3.60e-07	Glacial Till	Remolded
Hydraulic Conductivity for Upper Bedrock				
MW1-94	DSS	9.00e-03	Goat Island Dolostone	Falling Head
MW2-94	DSS	1.10e-01	Goat Island Dolostone	Falling Head
MW3-94	DSS	1.76e-01	Goat Island Dolostone	Falling Head
MW4-94	DSS	5.50e-02	Goat Island Dolostone	Falling Head
MW5-94	DSS	2.89e-03	Goat Island Dolostone	Falling Head
MW6-94	DSS	9.00e-03	Goat Island Dolostone	Falling Head
MW7-94	DSS	7.27e-03	Goat Island Dolostone	Falling Head
Geometric Mean		**2.10e-02**		
Arithmetic Mean		**5.27e-02**		

N/A Not Applicable.
DSS Diamond Shamrock Site.
GSL Guterl Specialty Steel Corporation Landfill.
(1) Hydraulic conductivity calculated by the Cooper et al (1967) confined slug test method.

Table VI-2.
Groundwater Elevations in Deep Overburden and Upper Bedrock Wells Installed in the Study Area.
(All water levels and elevations measured in feet)

Well Designation	Top of Riser Elevation	11/10/94 (1)		12/07/94 (2)		1/18/95 (2)		1/11/96 (2)		4/8/96 (2)	
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Guterl Excised Area (Unlisted)											
MW-1	599.14										
MW-2	598.56										
MW-3	598.82										
MW-4	598.67										
MW-5	598.24										
Guterl Specialty Steel Corporation Site (Registry Number 932032)											
MW-1	601.44										
MW-2	604.28										
MW-4	605.29										
MW-105	599.25										
Diamond Shamrock Site (Registry Number 932071)											
MW1-94	597.35	0.55	596.80	0.82	596.53	0.79	596.56	2.00	595.35	1.44	595.91
MW2-94	596.52	3.42	593.10	3.52	593.00	3.04	593.48	4.96	591.56	3.36	593.16
MW3-94	596.94	3.10	593.84	3.24	593.70	2.68	594.26	4.06	592.88	3.59	593.35
MW4-94	595.34	1.44	593.90	1.43	593.91	1.22	594.12	1.90	593.44	1.70	593.64
MW5-94	594.14	2.06	592.08	2.57	591.57	2.33	591.81	3.46	590.68	3.16	590.98
MW6-94	595.21	1.30	593.91	1.39	593.82	1.06	594.15	2.08	593.13	1.79	593.42
MW7-94	594.91	2.14	592.77	1.22	593.69	1.02	593.89	2.04	592.87	1.05	593.86
Extraction Well	595.36	4.22	591.14	4.34	591.02	4.05	591.31	2.10	593.26	2.07	593.29

(1) The average canal elevation is maintained between 565.5 and 570.0 feet above mean sea level (AMSL) during the navigation season.
(2) The canal is drained for the winter starting the first week of November. The low water elevation is maintained between 554.0 and 556.0 feet AMSL during this period.

Table VI-2.
Groundwater Elevations in Deep Overburden and Upper Bedrock Wells Installed in the Study Area.
(All water levels and elevations measured in feet)

Well Designation	Top of Riser Elevation	7/3/96 (1)		10/4/96 (1)		6/4/97 (1)		7/15/97 (1)		8/14/97 (1)	
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Guterl Excised Area (Unlisted)											
MW-1	599.14					5.96	593.18	6.44	592.70	6.96	592.18
MW-2	598.56					7.80	590.76	8.10	590.46	8.15	590.41
MW-3	598.82					4.59	594.23	5.20	593.62	5.82	593.00
MW-4	598.67					4.24	594.43	5.18	593.49	5.79	592.88
MW-5	598.24					4.64	593.60	5.18	593.06	5.65	592.59
Guterl Specialty Steel Corporation Site (Registry Number 932032)											
MW-1	601.44					4.68	596.76	5.67	595.77	Dry @ 7.14'	<594.3
MW-2	604.28					3.55	600.73	4.68	599.60	5.64	598.64
MW-4	605.29					Dry @ 5.6'	<599.69	5.59	599.70	Dry @ 5.6'	<599.6
MW-105	599.25					2.57	596.68	3.22	596.03	4.98	594.27
Diamond Shamrock Site (Registry Number 932071)											
MW1-94	597.35	2.56	594.79	1.87	595.48	2.08	595.27	2.28	595.07	4.10	593.25
MW2-94	596.52	3.81	592.71	3.64	592.88	3.37	593.15	4.33	592.19	5.12	591.40
MW3-94	596.94	3.98	592.96	3.23	593.71	3.78	593.16	4.12	592.82	4.46	592.48
MW4-94	595.34	2.24	593.10	1.81	593.53	1.89	593.45	2.48	592.86	2.79	592.55
MW5-94	594.14	4.06	590.08	3.38	590.76	2.90	591.24	3.77	590.37	3.90	590.24
MW6-94	595.21	2.30	592.91	1.88	593.33	1.96	593.25	2.32	592.89	2.92	592.29
MW7-94	594.91	1.72	593.19	1.34	593.57	1.73	593.18	2.21	592.70	2.82	592.09
Extraction Well	595.36			3.72	591.64	2.66	592.70	2.74	592.62	3.02	592.34

(1) The average canal elevation is maintained between 565.5 and 570.0 feet above mean sea level (AMSL) during the navigation season.
(2) The canal is drained for the winter starting the first week of November. The low water elevation is maintained between 554.0 and 556.0 feet AMSL during this period.

Table VI-2.
Groundwater Elevations in Deep Overburden and Upper Bedrock Wells Installed in the Study Area.
(All water levels and elevations measured in feet)

Well Designation	Top of Riser Elevation	8/28/97 (1)		9/17/97 (1)		10/10/97 (1)		4/20/98 (2)			
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Guterl Excised Area (Unlisted)											
MW-1	599.14	6.28	592.86	6.26	592.88	5.53	593.61	4.80	594.34		599.14
MW-2	598.56	7.90	590.66	7.74	590.82	7.77	590.79	7.20	591.36		598.56
MW-3	598.82	4.88	593.94	4.94	593.88	4.45	594.37	3.89	594.93		598.82
MW-4	598.67	4.87	593.80	4.94	593.73	4.74	593.93	3.67	595.00		598.67
MW-5	598.24	4.96	593.28	4.97	593.27	4.78	593.46	4.16	594.08		598.24
Guterl Specialty Steel Corporation Site (Registry Number 932032)											
MW-1	601.44	6.70	594.74	6.77	594.67	4.56	596.88	4.33	597.11		601.44
MW-2	604.28	5.20	599.08	5.21	599.07	2.92	601.36	1.74	602.54		604.28
MW-4	605.29	5.94	599.35	Dry @ 5.6'	<599.6	5.13	600.16	4.62	600.67		605.29
MW-105	599.25	3.68	595.57	3.60	595.65	2.46	596.79	2.29	596.96		599.25
Diamond Shamrock Site (Registry Number 932071)											
MW1-94	597.35	3.11	594.24	3.12	594.23	1.85	595.50	0.62	596.73		597.35
MW2-94	596.52	3.95	592.57	3.90	592.62	3.50	593.02	2.90	593.62		596.52
MW3-94	596.94	3.91	593.03	3.92	593.02	3.34	593.60	3.03	593.91		596.94
MW4-94	595.34	2.16	593.18	2.12	593.22	1.86	593.48	1.25	594.09		595.34
MW5-94	594.14	3.38	590.76	3.28	590.86	2.56	591.58	2.40	591.74		594.14
MW6-94	595.21	2.34	592.87	2.30	592.91	1.57	593.64	1.28	593.93		595.21
MW7-94	594.91	2.23	592.68	2.20	592.71	1.72	593.19	1.39	593.52		594.91
Extraction Well	595.36	2.70	592.66	2.70	592.66			2.31	593.05		595.36

(1) The average canal elevation is maintained between 565.5 and 570.0 feet above mean sea level (AMSL) during the navigation season.
(2) The canal is drained for the winter starting the first week of November. The low water elevation is maintained between 554.0 and 556.0 feet AMSL during this period.

Section VII Surface Soil

DER Sampling of May 1997 and EPA Sampling of June 1997

A total of 18 surface soils samples were collected at the locations shown in Figure IV-1 and Plate 1. Five samples were collected by DEC in May 1997, designated SS-1 through SS-5 (Plate 1), and 13 samples were collected by EPA in June 1997, designated GS-1 through GS-13. Note that GS-13 is a duplicate of GS-12, resulting in 18 samples collected at 17 locations. The 13 surface soil samples collected by EPA were at randomly selected locations, and the 5 samples collected by DEC were selected to evaluate potentially significant areas of contamination. DEC sample locations are as follows:

SS-1: soils near the fill port of an underground storage tank between Buildings 2 and 3,
SS-2: stained soil near former aboveground storage tanks near the Building 35,
SS-3: oily stained soil near a press in Building 3,
SS-4: oily residue on an equipment pad outside Building 3, and
SS-5: below two transformers that contained PCB oil west of Buildings 6 and 8.

Target Compound List (TCL) analyses were conducted on all surface soil samples. In addition, Toxicity Characteristic Leaching Procedure (TCLP) analyses were conducted on the EPA samples. Surface soils sample results are contained in Tables D-1 through D-4C located in Appendix D of this report.

These sampling results were compared to soil cleanup guidance contained in NYSDEC Technical and Administrative Guidance Memoranda No. 4046 to screen data and identify contaminants of potential concern. For contaminants exceeding the NYSDEC guidance criteria, this comparison is summarized in Tables VII-1A through VII-2B located at the end of this report section.

The primary organic compounds found in the surface soil samples were phenol and polycyclic aromatic hydrocarbons (PAHs). Phenol in excess of guidance criteria was detected in 9 samples. As can be noted in the above tables, numerous PAH's, including anthracenes, pyrenes, and fluoranthenes were encountered; many of these were at levels exceeding their respective guidance criteria.

Generally, the concentrations of metals were more pronounced than those of the organic compounds. Many of the 23 metals analyzed were encountered at most of the locations. Chromium, cobalt, copper, iron, nickel and zinc were encountered at levels exceeding TAGM 4046 guidance at all 17 sample locations. The TAGM 4046 guidance criteria was exceeded at 11 of 16 sampling locations for aluminum, arsenic, beryllium,

calcium, lead, magnesium, manganese and vanadium. Selenium and potassium levels exceeded the TAGM 4046 guidance criteria at 7 locations, and antimony and mercury levels at 6. Cadmium, silver, sodium and thallium levels exceeded the TAGM 4046 guidance criteria at less than 4 locations. Of the 17 samples analyzed for the TCL parameters, only barium was not detected at any of the sampling locations.

Surface soil TCLP data is provided in the Appendix D tables. There were detection levels in seven metals analyzed for the TCLP. Of these, only surface soil collected at Sample Location GS-12 exceeded the DEC Part 371 TCLP criteria for designation as a characteristic hazardous waste, was an exceedance for lead (13.2 ppm-measured vs. 5 ppm- criteria). While Sample GS-12 is located within the former Guterl Plant Site, it is outside the Excised Area. Although not exceeding Part 371 criteria, detection levels of barium, cadmium, chromium, lead and silver were encountered at all 12 sample locations, and detection levels of arsenic and selenium were encountered at 8 and 3 locations respectively.

EPA Sampling of October/November 1997

Utilizing X-Ray Fluorescence methodologies (XRF), EPA analyzed 290 surface soil samples and 58 shallow subsurface (0-6" depths) soil samples from the Excised Area, both within and outside of the site buildings. Primary indicator parameters evaluated and associated screening levels established by EPA were lead (400 ppm) and cadmium (200 ppm). Notable results of the XRF study include the following findings:

Building 2 Interior: Lead contamination exceeding 400 ppm is present in approximately 50% of the floor. Lead contamination in 3 smaller areas of the floor exceed 1000 ppm. Cadmium contamination exceeding 200 ppm exists in 3 small areas of the floor.

Building 3, 4 & 9 Interior: Lead contamination exceeding 400 ppm is present in approximately 40% of the floor of Building 3 and 75% of the floor of Buildings 4 and 9. Lead contamination exceeding 1000 ppm exists in approximately 10% of the floor of Building 3 and 30 % of the floor of Buildings 4 and 9. Cadmium concentrations exceeding 200 ppm exist in several smaller floor areas of these buildings.

Alley Between Buildings 2 & 3: Three samples indicate lead contamination (1100 ppm - 1500 ppm) in the southern portion of the alley, in the general vicinity of the water system pump sump. Cadmium concentrations (210 ppm - 250 ppm) in 3 samples taken from the northern end of the alley indicate concentrations exceeding 200 ppm. This contamination appears to extend into the area immediately

north of Building 3 and into Building 35.

Transformer Area West of Buildings 6 & 8: Four samples indicate lead contamination (1100 ppm - 3800 ppm) exceeding 1000 ppm. Approximately 30% of the soils in this 1/3 acre parcel contain lead above 400 ppm. Two small areas within the contamination area indicate elevated levels of cadmium (210 ppm - 810 ppm).

The EPA collected 58 soil samples (0-6") form the excised area for TCLP metals analysis. Samples were collected from both locations within and outside of the site buildings, and generally targeted areas where XRF analyses identified elevated lead and or cadmium levels. Of these 58 samples, 6 samples were found to exceed the characteristic hazardous waste criteria of 5 ppm for lead. No other samples indicated TCLP levels exceeding the characteristic hazardous waste criteria. Of the 6 samples exceeding the TCLP criteria for lead, 1 sample was located within Building 2 (268 ppm), and 5 were located in the 1/3 acre transformer area west of Buildings 6 and 8 (5.18 ppm - 17 ppm).

Eleven soil samples were also collected by EPA and analyzed for PCB. Seven of the samples were collected from oil stained areas within Buildings 3, 4 and 9, and 4 samples were collected in the transformer area west of Buildings 6 and 8. PCBs were not found in the samples collected from the building interiors. Aroclor 1260, in concentrations ranging from 1.8 ppm to 64 ppm, was found in each of the 4 samples taken from the transformer area.

Table VII-1A.
Analytical Summary of Surface Soil Samples Collected by DER in May 1997.
Organic Results.
(Concentrations and guidance values reported in µg/kg)

Contaminant of Concern	Number of Samples	Concentration Range	Frequency of Exceedance	NYSDEC Guidance
Phenol	5	110	1/5	30
4-Chloro-3-Methylphenol	5	3100	1/5	3100
Benzo(a)Anthracene	5	380 - 2400	3/5	224
Chrysene	5	430 - 2100	3/5	400
Benzo(b)Fluoranthene	5	1100 - 3900	2/5	224
Benzo(k)Fluoranthene	5	360 - 980	2/5	224
Benzo(a)Pyrene	5	93 - 2700	3/5	61
Dibenz(a,h)Anthracene	5	82 - 360	2/5	14

Table VII-1B.
Analytical Summary of Surface Soil Samples Collected by EPA in June 1997.
Organic Results.
(Concentrations and guidance values reported in µg/kg)

Contaminant of Concern	Number of Samples	Concentration Range	Frequency of Exceedance	NYSDEC Guidance
Phenol	12	45 - 380	8/12	30
Pyrene	12	57000	1/12	50000
Benzo(a)Anthracene	12	240 - 58000	5/12	224
Chrysene	12	410 - 58000	6/12	400
Benzo(b)Fluoranthene	12	290 - 25000	6/12	224
Benzo(k)Fluoranthene	12	360 - 25000	5/12	224
Benzo(a)Pyrene	12	81 - 25000	8/12	61
Indeno(1,2,3-cd)Pyrene	12	12000	1/12	3200

Table VII-2A.
Analytical Summary of Surface Soil Samples Collected by DER in May 1997.
Inorganic Results.
(Concentrations and guidance values reported in mg/kg)

Contaminant of Concern	Number of Samples	Concentration Range	Frequency of Exceedance	NYSDEC Guidance
Aluminum	5	1990 - 3630	4/5	BG (1000)
Antimony	5	37 110	4/5	BG (20)
Arsenic	5	19 - 36	4/5	7.5
Beryllium	5	0.51 - 0.78	4/5	0.16
Chromium	5	1120 - 5300	5/5	50
Cobalt	5	77 - 3070	5/5	30
Copper	5	1140 - 7590	5/5	25
Iron	5	53400 - 128000	5/5	2000
Lead	5	447 - 2820	3/5	400
Magnesium	5	18500 - 44100	2/5	BG(1000)
Manganese	5	2930 - 104100	4/5	BG(1500)
Mercury	5	0.11 - 0.15	3/5	0.10
Nickel	5	14400 - 26600	5/5	13
Selenium	5	3 - 27	5/5	2
Silver	5	16	1/5	BG(5)
Thallium	5	16 - 17	3/5	BG(8)
Vanadium	5	322 - 498	4/5	150
Zinc	5	183 - 1010	5/5	20

Table VII-2B. Analytical Summary of Surface Soil Samples Collected by EPA in June 1997. Inorganic Results. (Concentrations and guidance values reported in mg/kg)				
Contaminant of Concern	**Number of Samples**	**Concentration Range**	**Frequency of Exceedance**	**NYSDEC Guidance**
Aluminum	12	505 - 17200	8/12	BG (1000)
Antimony	12	28 - 279	2/12	BG (20)
Arsenic	12	13 - 61	9/12	7.5
Beryllium	12	0.23 - 0.89	9/12	0.16
Chromium	12	143 - 6140	12/12	50
Cobalt	12	222 - 6940	12/12	30
Copper	12	135 - 6220	12/12	25
Iron	12	7370 - 170000	12/12	2000
Lead	12	422 - 2150	7/12	400
Magnesium	12	12000 - 20700	8/12	BG(1000)
Manganese	12	1240 - 11000	10/12	BG(1500)
Mercury	12	0.13 - 0.44	4/12	0.10
Nickel	12	807 - 28500	12/12	13
Selenium	12	4 - 6	2/12	2
Vanadium	12	170 - 1060	7/12	150
Zinc	12	76 - 1220	12/12	20

Section VIII Subsurface Soil

DER Sampling of May 1997

Seven soil borings (Nos. SB-1 to SB-7) were advanced as part of this study to evaluate subsurface soil conditions at the site. Borings SB-1, 2, 3, 4 and 6 are located in the Excised Area, and SB-7 is located near the former Guterl Plant process/cooling water treatment holding lagoon, across Ohio St. from the Excised Area. The locations of the borings (Figure IV-1 and Plate 1) were selected to evaluate potentially worst case contamination and/or to provide effective placement of monitoring wells for determining the groundwater flow pattern across the area. The rationale for the placement of these borings is as follows:

Boring 1: monitoring well location; down gradient of a former TCE storage tank inside Building 2,

Boring 2: monitoring well location,

Boring 3: monitoring well location; down gradient from aboveground storage tanks on the Allegheny Ludlum Property and down gradient from former aboveground storage tanks near the Building 3,

Boring 4: monitoring well location,

Boring 5: monitoring well location; underground storage tank located in the alley between Buildings 2 and 3; noted volatile contamination detected by OVA,

Boring 6: contamination from former aboveground storage tanks near the Building 35, and

Boring 7: former plant water system; oil/water separator located east of Ohio Street.

A total of 7 composite soil samples from depths up to 8 feet below surface were collected from 6 of the soil borings. Soil boring SB-5 was not sampled due to the lack of soil/waste to be sampled (fill in the boring was coarse crushed stone). The soils interval sampled and chemical analyses preformed were determined in field based on visual observation and screening for volatile organics using an OVA meter.

The soil stratigraphy for all 7 borings is given in the Monitoring Well and Boring Logs contained in Appendix A. The results of the chemical analyses of the 7 subsurface soil samples are given in Tables D-5 through D-6B contained in Appendix D

As with the screening of surface soils discussed in Section VII, subsurface soil data was compared to DEC TAGM 4046 guidance. For those parameters exceeding this guidance, the comparison is summarized in Tables VIII-1 and VIII-2 located at the end of this report section.

Organic compounds found in these samples were similar to those found in the surface soils of the site and include phenol and polycyclic aromatic hydrocarbons (PAH's). Phenol was detected in 2 of the subsurface soil samples. Several PAH's, including anthracenes, chrysene, fluoranthenes, naphthalenes, and pyrenes were encountered; many of these were at levels exceeding their respective guidance. There were no detections of any organic chemicals for any of the TCLP analyses.

Similar to the surface samples, the levels of the metals in these samples were more pronounced than those of the organic compounds. Many of the 23 metals analyzed were encountered in most of the subsurface soil samples. Of those analyzed only cadmium and silver were not detected at any of the samples. Aluminum, copper, iron. nickel and zinc were encountered at levels exceeding TAGM 4046 guidance in all 6 samples. Also of significance, TAGM 4046 levels were exceeded in 3 to 5 samples for arsenic, beryllium, calcium, chromium, cobalt, selenium and vanadium. Antimony, magnesium, manganese, mercury and potassium levels also exceeded TAGM 4046 guidance; but at a lesser frequency.

There were detection levels for 5 metals analyzed by the TCLP procedure. None of these exceeded the DEC Part 371 TCLP criteria for designation as a characteristic hazardous waste. Detection levels of barium and lead were encountered in all 6 samples, detection levels of cadmium were encountered in 3 samples, and chromium and selenium were encountered in 2 samples. Subsurface soil TCLP data is included in the Appendix D tables.

EPA Sampling of October/November 1997

EPA collected 33 subsurface soils samples from the Excised Area to evaluate vertical distribution of contaminants found at the Excised Area. Sample locations were generally in locations where surface soils samples indicated the highest levels of contamination. Samples were collected at depth of refusal, assumed to be the top of shallow bedrock, and the midway point between 6 inches below ground surface and depth of refusal. XRF was used for sample analysis. With few exceptions, the sampling data indicates that the concentrations of lead and cadmium decrease notably with sample depth. In most cases, concentrations decreased to below Method Detection Levels (MDL) 2 feet to 3 feet below ground surface. MDLs for this study were 70 ppm and 180 ppm for lead and cadmium respectively.

Table VIII-1. Analytical Summary of Subsurface Soil Samples Collected by DER in May 1997. Organic Results. (Concentrations and guidance values reported in µg/kg)				
Contaminant of Concern	**Number of Samples**	**Concentration Range**	**Frequency of Exceedance**	**NYSDEC Guidance**
Phenol	6	67 - 300	2/6	30
Benzo(a)Anthracene	6	360 - 3200	3/6	224
Chrysene	6	400 -3300	3/6	400
Benzo(b)Fluoranthene	6	2800 - 3400	2/6	224
Benzo(a)Pyrene	6	100 -2400	4/6	61
Indeno(1,2,3-cd)Pyrene	6	7800	1/6	3200
Dibenz(a,h)Anthracene	6	38 - 1100	3/6	14

Table VIII-2. Analytical Summary of Subsurface Soil Samples Collected by DER in May 1997. Inorganic Results. (Concentrations and guidance values reported in mg/kg)				
Contaminant of Concern	**Number of Samples**	**Concentration Range**	**Frequency of Exceedance**	**NYSDEC Guidance**
Aluminum	6	1010 - 4730	6/6	BG (1000)
Antimony	6	29 - 32	2/6	BG (20)
Arsenic	6	14 - 69	4/6	7.5
Beryllium	6	0.34 - 0.50	5/6	0.16
Chromium	6	328 - 1880	5/6	50
Cobalt	6	210 - 508	4/6	30
Copper	6	60 - 1980	6/6	25
Iron	6	10700 - 100000	6/6	2000
Magnesium	6	34600 - 43300	2/6	BG(1000)
Manganese	6	2550 - 3200	2/6	BG(1500)
Mercury	6	0.11 - 0.21	2/6	0.10
Nickel	6	305 - 26600	6/6	13
Selenium	6	3 - 23	5/6	2
Thallium	6	13	1/6	BG(8)
Vanadium	6	180 - 431	3/6	150
Zinc	6	37 -173	6/6	20

Section IX Groundwater

Subsurface Soil Borings SB-1 through SB-5 were converted to groundwater monitoring wells, and are designated MW-1 through MW-5 respectively. Their locations are shown on Figure IV-1 and Plate 1. The rationale for the locations selected is given in Section VIII. An additional monitoring well, MW-6, located at the Diamond Shamrock site adjacent to and east of the Excised Area was also utilized for evaluation of site groundwater. Groundwater samples were collected from MW-1 through MW-5 as part of this study and analyzed for TCL organics and metals. The analytical results of the groundwater samples are given in Tables D-7 and D-8 in Appendix D. In these tables, the wells are arranged in up gradient to down gradient order. Data obtained from sampling of MW-6 in November 1994 is also included.

The groundwater sampling results were compared to NYSDEC Class GA groundwater standards to screen data and identify contaminants of potential concern. For contaminants found in excess of groundwater standards, this comparison is summarized in Tables IX-1 through IX-3 located at the end of this report section.

Well MW-4 is located up gradient of groundwater flow direction at the site. Contaminants found in this well may suggest sources outside the Excised Area. Given MW-4's proximity to Buildings 6 and 8, and considering that manufacturing activities at the Guterl Plant Site includes areas up gradient of the Excised Area, past plant operations cannot be ruled out as a source. Wells MW-3, MW-5 and MW-6 are located within the Excised Area and are likely impacted by past activities at the site. The down gradient well, MW-2, is located at the southeast corner of the site and also likely impacted by past site activities. To a lesser extent, well MW-1, located along the eastern site boundary, is also down gradient of the site, but up gradient of MW-2.

Monitoring well MW-4 and MW-5 indicated the highest levels of organics. To a lesser degree, Wells MW-2 and MW-3 also showed to be impacted by organic contamination. Chlorinated solvents were used as part of the manufacturing operations at Guterl. A 1981 State Pollutant Discharge Elimination System (SPDES) Permit application filed by Guterl Specialty Steel indicates use of trichloroethylene at a rate of 2000 gallons per year. Containers of 1,1,1-trichloroethane were found at the site and removed during EPA's 1996 emergency removal action. Based on a 1999 inspection of the presently active Allegheny-Ludlum facility by DSHM, chlorinated solvents are not currently used at the facility.

No organic chemistry was encountered at levels exceeding the groundwater standard in either MW-6

or MW-1. During well development and sampling light oil-like sheens were encountered in wells MW-2, MW-3 and MW-5. Appearance and odor suggested these materials may be petroleum based. Organic analysis however did not show concentrations of benzene, xylene and toluene indicative of petroleum. Field observations made of this material are included as notations in the well logs contained in Appendix A.

PCB (Aroclor 1260) was found in MW-3 located within the courtyard near Building 35. No other wells were found to contain PCB.

Significant metals contamination was not found through groundwater sampling. Magnesium, sodium and iron were prevalent throughout the site above groundwater standards. Standards were also exceeded by moderately elevated levels of manganese in three wells and zinc in one. Comparison of the groundwater quality to the concentration and leaching potential of contaminants found in the site surface soils suggest that significant release of metals from these soils into groundwater is not presently occurring.

Table IX-I.
Analytical Summary of Groundwater Samples Collected by DER in June 1997.
Organic Results.
(Concentrations and standards reported in μg/l)

Contaminant of Concern	Number of Samples	Concentration Range	Frequency of Exceedance	NYSDEC Groundwater Std.
Chloroethane	6	64	1/6	50
Methylene Chloride	6	10	1/6	5
1,1-Dichloroethene	6	18 - 54	2/6	5
1,1-Dichloroethane	6	20 - 730	4/6	5
Chloroform	6	82	1/6	7
1,1,1-Trichloroethane	6	7 - 480	3/6	5
Trichloroethene	6	10 - 130	2/6	5
Alpha-BHC	6	0.007	1/6	ND
Aroclor 1260	6	1.9	1/6	0.1

Table IX-2.
Analytical Summary of Groundwater Samples Collected by DER in June 1997.
Inorganic Results.
(Concentrations and standards reported in μg/l)

Contaminant of Concern	Number of Samples	Concentration Range	Frequency of Exceedance	NYSDEC Groundwater Std.
Iron	6	406 - 15500	5/6	300
Magnesium	6	40600 - 55300	4/6	35000
Manganese	6	325 - 632	3/6	300
Sodium	6	27800 - 334000	6/6	20000
Zinc	6	359	1/6	300

Table IX-3. Groundwater Standard Exceedances for the June 1997 Sampling Event. (Concentrations and standards reported in µg/l)							
Parameter	**NYSDEC Groundwater Standard**	**MW-4**	**MW-3**	**MW-5**	**MW-6**	**MW-1**	**MW-2**
1,1-Dichloroethene	5	54		18			
1,1-Dichloroethane	5		20	730			31
1,1,1-Trichloroethane	5		7	270			
Trichloroethene	5	130		10			
Chloroethane	50			64			
Methylene Chloride	5			10			
Chloroform				82			
Alpha-BHC	ND			0.0071			
Aroclor 1260	0.1		1.9				
Iron	300	406	15,500	1,830		415	471
Magnesium	35,000	45,600	55,300		53,000	40,600	
Sodium	20,000	167,000	47,300	27,800	62,000	334,000	33,300
Manganese	300		632	325			358

Section X Surface Water and Other Facility Sampling

Process/Cooling Water System

Inspection of the Excised Area did not reveal a clear and distinct stormwater system to collect and convey surface water at the site, although there is an expectation that such a system did exist. Current conditions at the site including shallow bedrock with permeable overburden fill suggest that a significant portion of any precipitation readily percolates into the site groundwater system. Given these conditions, the IIWA attempted to sample structures that may be or have been impacted or associated with surface water flows.

During its active life, the Guterl manufacturing facility used water for both process and cooling purposes. Records indicate that the plant withdrew water from the Erie Barge Canal, storing this supply in a small intake reservoir. The pumphouse and intake reservoir are located southeast of the plant, between Ohio Street and the canal. From here, waters were pumped to the plant facility for use as contact-cooling, non-contact cooling, and process waters. A sump and pumping system located within the plant complex between Buildings 2 and 3 collected these waters after use in the plant and directed them an oil/water separator located at the pumphouse facility near the canal. After oil separation, the waters were returned to the intake reservoir or overflowed back to the canal. From 1974 to 1986, discharges form this system to the Erie Barge Canal were regulated through National/State Pollutant Discharge Elimination System (N/SPDES) Permit No. 0002674. The permit was terminated in 1986 upon confirmation that discharges to the canal had been eliminated. The former oil/water separator has been backfilled , covered with stone/soil and is no longer visible.

As part of this investigation, sediment and/or surface water samples were collected from three areas of the cooling water system. These include a sewer line located within Building 3 (SW-1), the former pump house and intake reservoir southeast of the plant (SW-2), and the sump located between Buildings 2 and 3 (SW-3, SED-3). Sample SW-1 was water collected for analysis of radiological parameters only and is therefore not included in this report. Sample SW-2 was a surface water sample taken from water collected in the former intake reservoir. A sufficient amount of sediment enabling sample collection (i.e. SED-2) was not found in the intake reservoir. Both surface water (SW-3) and sediment (SED-3) were collected form the alleyway sump pump location. Sample locations are included on Figure IV-1 and Plate 1. The analytical results of Samples SW-2 and SW-3 are presented in Tables D-11 and D-12 contained in Appendix D. Those for SED-3 are given in Tables D-9 and D-10; also in Appendix D.

Soil boring SB-7 was taken in the area of the former oil/water separator. Auger refusal at a depth of approximately 8 feet suggests that the boring was within the separator and refusal was the concrete bottom of the separator. SB-7 analytical results are contained in Tables D-5 and D-6 in Appendix D and are summarized and discussed in Section VIII.

Analytical results for surface water were compared to NYSDEC Water Quality Standards and Guidance values established for Class "C" waters. For sediment, the NYSDEC Technical G for Screening Contaminated Sediments was utilized. These criteria were used strictly for screening of the data, recognizing that the water withdrawal/circulation system for the Guterl plant at one time overflowed to the Erie Barge Canal; a Class "C" water body. With closure and filling of the oil/water separator, a direct discharge to the canal in no longer apparent from the former plant water system.

Although the surface water sample, SW-2, taken from the intake reservoir showed the presence of several metals, only aluminum was above water quality standard. Aluminum concentrations found in the lagoon wasters was 153 μg/l; compared to a standard of 100 μg/l. Pump sump water, SW-3, and sediment, SED-3, samples indicate notable levels of organic and metals contamination. Most significant in the water sample is the presence of PCB (Aroclor 1248) at a concentration of 8.8 μg/l. The pump sump sediment sample also indicates the presence of many metals, phenol and PAHs at elevated levels. TCLP analysis of the sediment detected several metals; with lead exceeding DEC Part 371 limits. The sediment sample was also found to contain PCB (Aroclor 1248) at a concentration of 38 mg/kg.

The Department's Division of Water (DOW) has conducted several sampling events for sediment and surface water along the Barge Canal and combined sewer overflows (CSO) from the City of Lockport. In a 1994 sampling of CSOs, DOW found levels of PCB (Arochlor 1248) in the Prospect Street diversion chamber discharge at elevated levels (+/- 320 ng/l vs 25 ng/l screening criteria). The Prospect Street sewer system serves an industrialized area of Lockport that includes the Guterl Plant site. While a direct discharge has not been identified, the findings suggest the possibility of off site PCB migration from the plant site via the municipal infrastructure, during sewer overflow conditions.

Underground Storage Tank

Although not directly related to surface water impacts at the site, an under ground storage tank (UST) was discovered in the alley between Buildings 2 and 3. The tank is situated near subsurface soils sampling location SS-1(Figure IV-1 and Plate 1). The contents of the tank were sampled by accessing the tank fill port

and analyzed for benzene, xylene, toluene and ethyl benzene. Test results are contained in Table D-14 in Appendix D. The tank contents appear to be petroleum based.

Section XI Discussions & Conclusions

The objectives of this IIWA investigation were to:

- prepare a scale map of the Excised Area that includes pertinent site features and the location of all borings, wells, and samples.
- establish the characteristics, areal extent, and hydrogeologic properties of the strata underlying the site;
- determine groundwater quality and flow direction taking into account the influence of the Erie Barge Canal and Frontier Stone Products quarry on the local groundwater flow;
- obtain samples of various environmental media to assess the impact of the site on public health and/or the environment; and
- assess whether hazardous waste was disposed on site.

The first three objectives listed above are address in the previous text and appendices of this report.

In regards to the fourth objective, the summaries of the analyses presented in Sections VII through X indicate that all environmental media evaluated as part of this IIWA (surface soil, subsurface soil, groundwater) have been impacted by past operations at the Guterl Steel/Excised Area site. Given the industrial history of the site and past use for steel making operations, the contaminants found were not surprising. The following summaries are based on the environmental data obtained through this IIWA project and the 1997 sampling conducted by USEPA:

Surface Soils

By far, surface soils of the Excised Area demonstrate the highest levels of contamination. Elevated metals concentrations exist throughout the site and frequently exceed cleanup guidance. Both building interiors and exterior site areas reflect widespread metals contamination. Phenols and PAHs represent the notable organics found in the surface soils, although not as widely dispersed as metals. Phenolic binders in foundry sand castings and coal, coke and ash found throughout the site are likely sources of these semi-volatiles.

The potential for release of metals from surface soils is demonstrated exists throughout the Excised Area. TCLP analyses detected several metals capable of leaching at low concentrations. However, only 1 lead sample from within Building 2 several samples from the 1/3 acre transformer area west of Buildings 6 and 8 indicated levels high enough to suggest a characteristic hazardous waste.

Subsurface Soils

Contaminants found in the subsurface soils of the site reflect those found in surface soils; the difference being in the concentrations of contaminants. In general, subsurface soils demonstrated lower concentrations of metals and organics than the overlying surface soils. The presence of common contaminants suggests that leaching of surface soil contaminants into the subsurface soils is occurring to some degree. Fill encountered in many areas included ash, coal and castings and is also a source of the subsurface contamination found. Subsurface soils demonstrated low leachability. TCLP analyses revealed low concentrations for only a few metals and no organics.

Groundwater

Given the shallow depth to bedrock and coarse overburden fill, perched groundwater was not found at the site. The groundwater gradient has been determined to be southeasterly toward the Barge Canal. Chemical analyses show that groundwater contamination is primarily organic in nature. Based on the presence of various indicator compounds, natural decomposition of this solvent may be occurring. Up gradient monitoring well data also suggests that organic contaminant sources outside the Excised Area exist. Down gradient monitoring wells show little contamination and do not indicate significant off-site releases via groundwater flow to the Barge Canal. Of particular note is the presence of PCB (Aroclor 1260) in Monitoring Well No. MW-3 within the site. This appears isolated in that no other wells were found to contain PCB. A possible source of the PCB may be the Welding Building, and associated electrical equipment assumed to have once been present, adjacent to this well location.

Lagoon & Pump House

Contaminants in the lagoon formerly serving the water treatment system were not significant. However the associated pump house located within the interior of the site (between Buildings 2 and 3) indicates notable organic and metals concentrations. Elevated levels of PCB (Aroclor 1248) in the pump house sediments are of concern. Given this data, the pump house should be considered a "hot spot" area of the site. The UST containing petroleum product does not appear to be leaking in that its contents are at levels above that of nearby groundwater elevations. However this is only a casual observation without the benefit of long term inventory monitoring or tank testing.

Although this IIWA project was not intended to fully evaluate in detail the impacts of site contaminants on public health or the environment, the work completed does provide additional information and insight relative to these impacts. As discussed in Section VI, the City of Lockport is served by a public water supply

system. Water for this system is drawn from the Niagara River. Use of groundwater in the area of the Guterl Steel site appears limited to industrial purposes at best. The City of Lockport maintains an emergency water supply intake in the Barge Canal downstream of the Guterl Plant site. This supply could be impacted if site contaminants were released to the canal and taken in during operation of the emergency water supply. Although not confirmed, the presence of the same PCB arochlor found at the Excised Area and in the Prospect Street CSO suggests a potential off site release. Groundwater quality data obtained from this IIWA suggests that although some organics were found at the down gradient boundary of the site, significant releases potentially impacting potable groundwater supplies and/or the Barge Canal were not occurring. Site surface soils demonstrated to highest level of contamination; particularly in the form of metals contamination. The most likely means of human exposure to these soils would be by direct contact. The site is fenced in part; partially limiting access that would allow for such exposure. However, illegal trespass is possible and likely to some degree.

Environmental exposure would generally follow those associated with human health exposures. Direct contact with on site soils would likely present the greatest potential impact to the areas flora and fauna. Significant off-site contaminant releases from the site via groundwater or surface water were not observed nor confirmed through environmental media sampling.

The final objective of this project was to determine whether consequential amounts of hazardous waste was disposed on site for purposes of listing the Site in the NYSDEC Registry of Inactive Hazardous Waste Sites. The results of this IIWA indicate the disposal of hazardous waste in two ways. First, the surface soil samples collected west of Buildings 6 and 8, and the sediment collected from the pump sump between buildings 2 and 3, exceeded TCLP criteria for lead and therefore are considered characteristic hazardous wastes. Although other TCLP failures were not identified through the IIWA, additional TCLP failures are possible should further detailed sampling be conducted at the site. Secondly, groundwater monitoring data indicate the presence of halogenated solvents (trichloroethylene, et. al.) at varying concentrations within the site. Some of these solvents are listed hazardous wastes pursuant to 6NYCRR Part 371. Given the presence of these degreasers in site groundwater and historical records indicating their use on site, disposal of listed hazardous waste is indicated. Historical records utilized to plan this IIWA project did not provide detailed information relative to the amounts of waste generated or disposed at the site. However, based on the manufacturing operations known to exist during the facilities active life, and the residual contaminants found through site sampling, the amount of hazardous waste disposed appears to be consequential.

Section XII Recommendations

- Based on the results of this IIWA project, listing of the site on the NYSDEC Registry of Inactive Hazardous Wastes Sites is recommended.

- Groundwater movement is a means by which contaminants could migrate off-site. As such, it is recommended that a follow-up groundwater sampling be conducted in the future to assess changes in contaminant migration, both entering and exiting the site.

- Installation of an additional groundwater monitoring well located down gradient and near the Erie Barge Canal is recommended to enhance efforts to monitor off-site releases via groundwater transport.

- Installation of an additional groundwater monitoring well upstream of the site to evaluate possible off-site contributions to groundwater contamination seen in MW-4 is recommended.

- The potential for PCB releases to the municipal sewer system and subsequently to the Barge Canal (via CSO discharges) should be evaluated further.

- The UST found at the plant site should be emptied, cleaned and/or removed to preclude the future release of petroleum materials contained therein.

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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.

FIGURES

Lockport Quadrangle

Scale Depends on Final Plotted Size

SITE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 09/13/00 DRAWING: LOCATION.DWG

SITE: GUTERL EXCISED AREA

FIGURE II--1

SCALE IN FEET

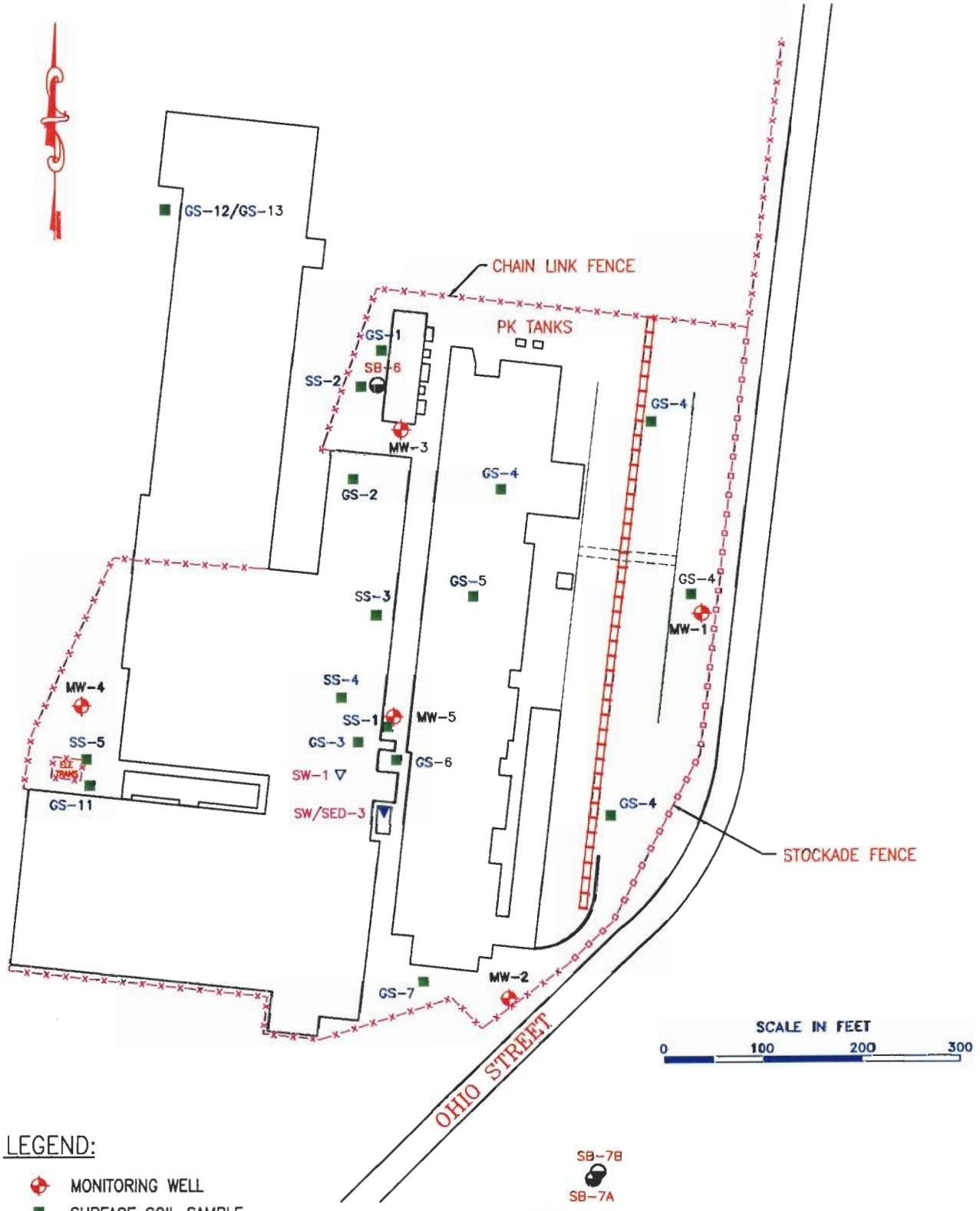
0 200 400 600

FORMER GUTERL STEEL CORP.
SITE MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 09/13/00 DRAWING: Sitemap.dwg

GUTERL EXCISED AREA FIGURE II-2



LEGEND:

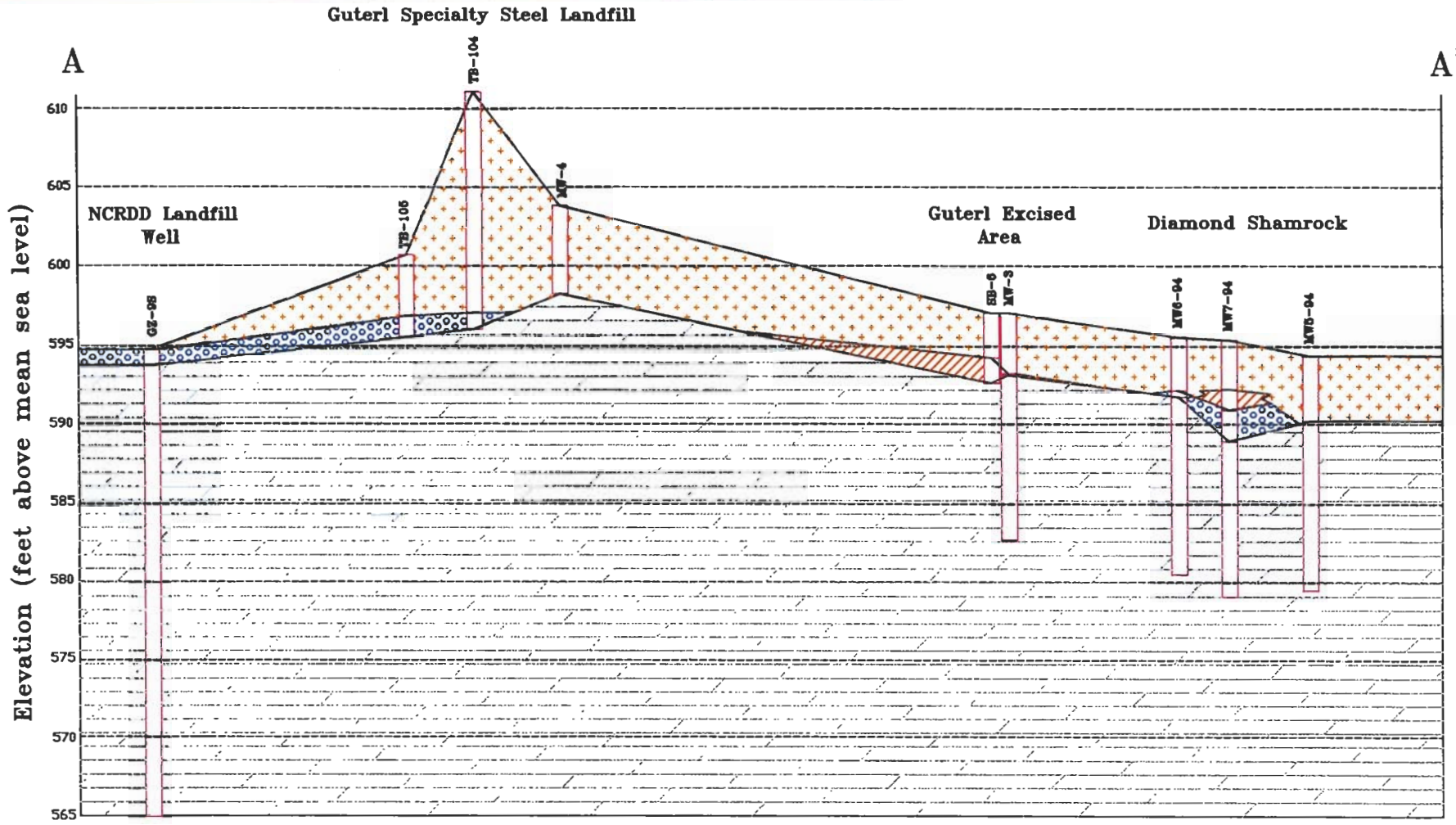
- MONITORING WELL
- SURFACE SOIL SAMPLE
- SURFACE WATER
- SURFACE WATER AND SEDIMENT
- SOIL BORING

SAMPLE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 09/13/00 DRAWING: Sample.dwg

GUTERL EXCISED AREA FIGURE IV-1



GEOLOGIC CROSS-SECTION A-A'

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE 6/23/99 DRAWING Section1.dwg

SITE GUTERL EXCISED AREA FIGURE V-1

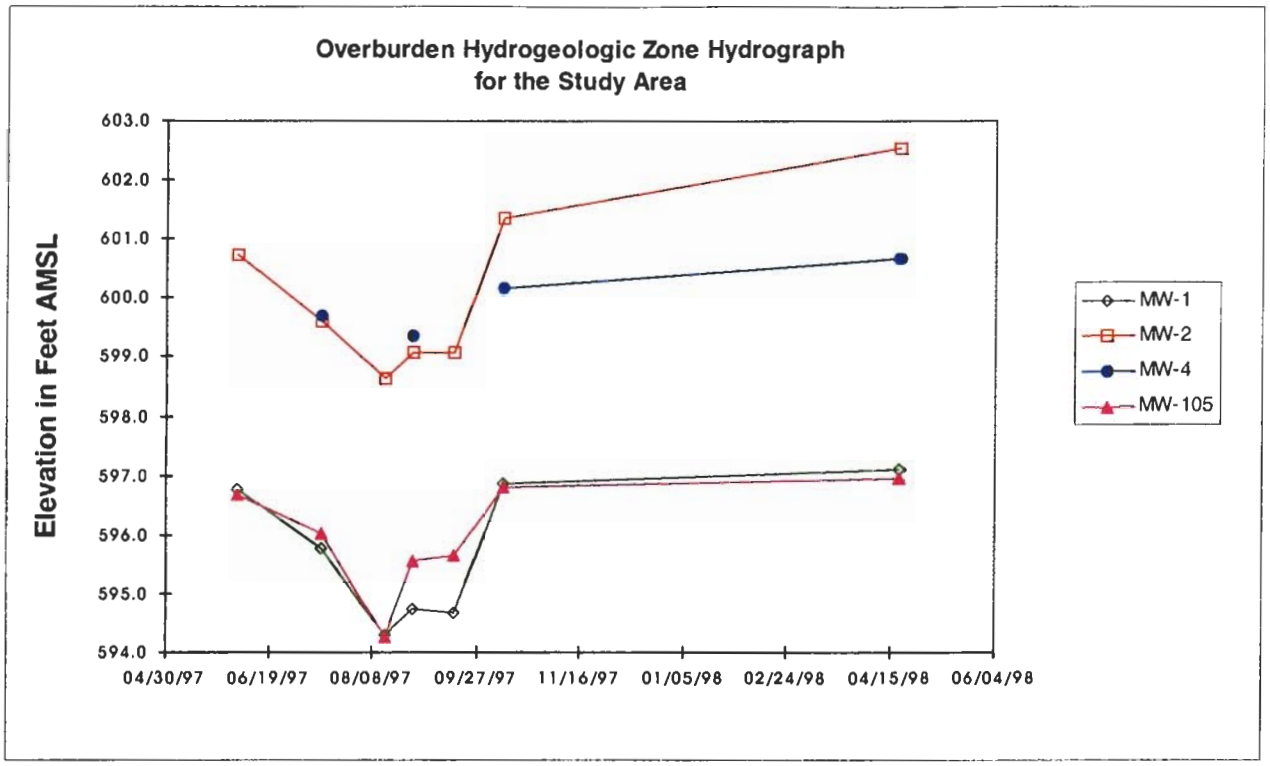


Figure VI-1. Study Area hydrograph for the overburden hydrogeologic zone.

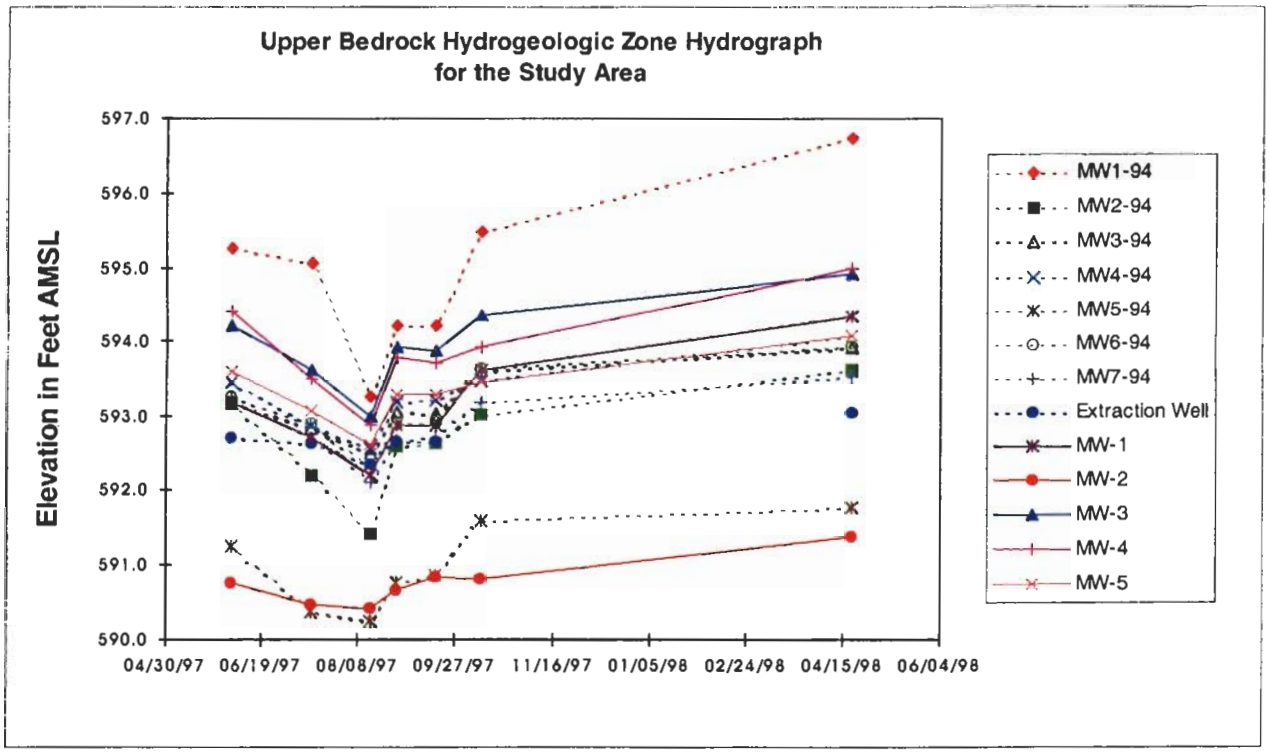
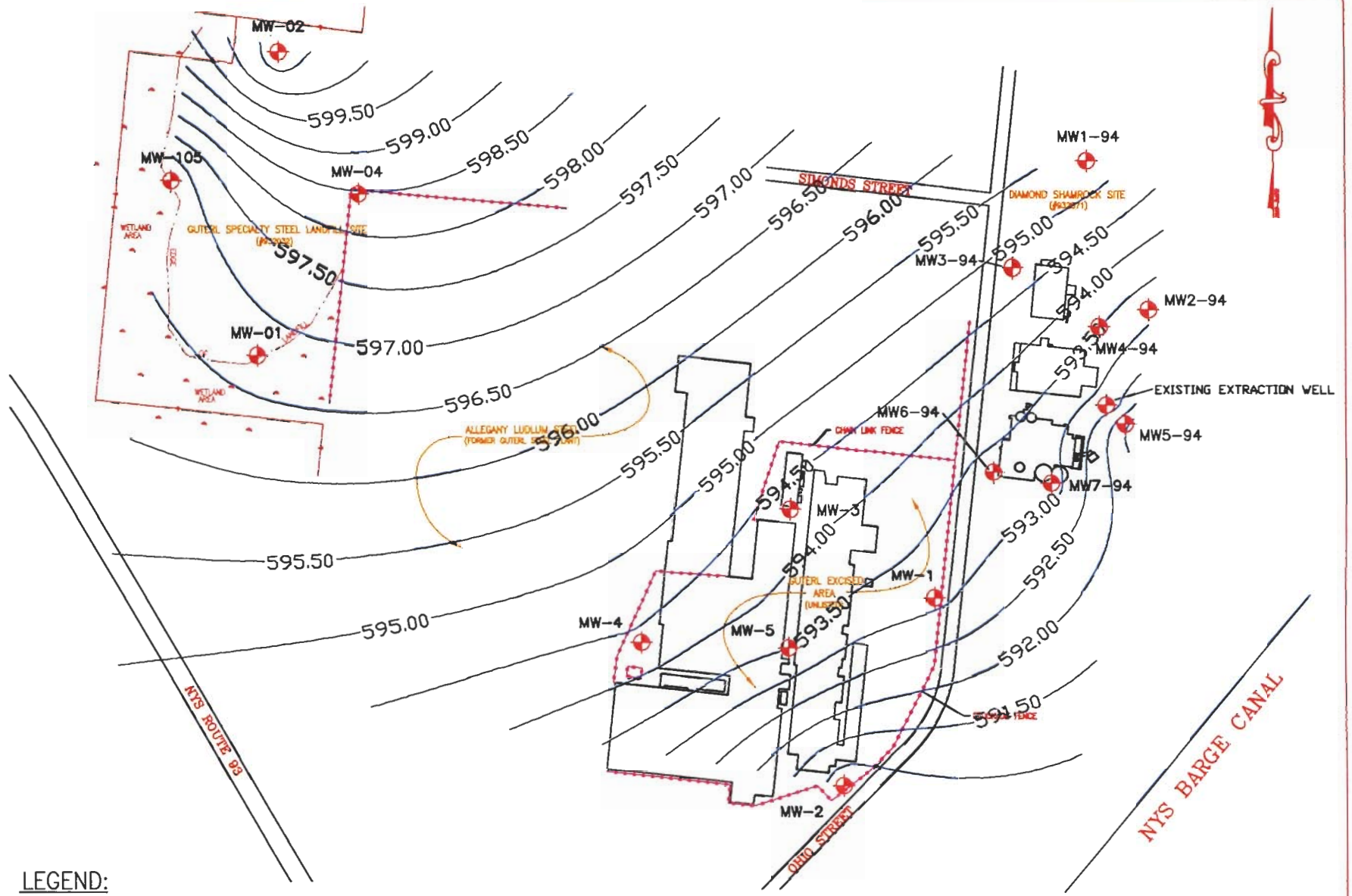


Figure VI-2. Study Area hydrograph for the upper bedrock hydrogeologic zone.



LEGEND:

◆ MONITORING WELL

Note: Contour does not include data from Well MW3-94.

SCALE IN FEET

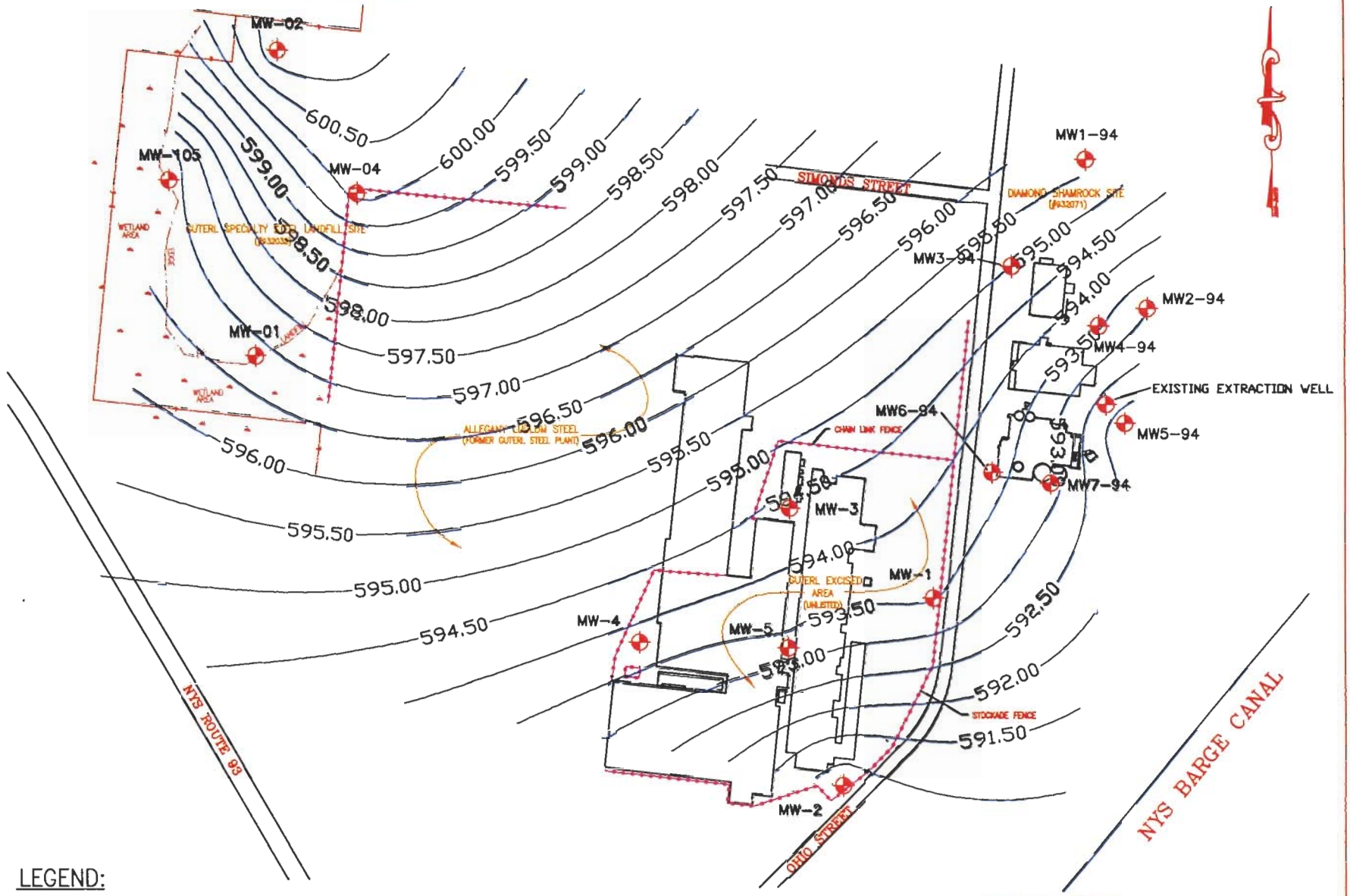
0 200 400 500

GROUNDWATER CONTOURS
JUNE 4, 1997

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 09/13/00 DRAWING: Gut-Figs.dwg

GUTERL EXCISED AREA FIGURE VI-3



LEGEND:

◆ MONITORING WELL

Note: Contour does not include data from Well MW3-94.

SCALE IN FEET

0 200 400 500

GROUNDWATER CONTOURS
OCTOBER 10, 1997

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 09/13/00 DRAWING: Gut-Figs.dwg

SITE: GUTERL EXCISED AREA FIGURE VI-4

APPENDICES

APPENDIX A

GUTERL EXCISED AREA BORING AND WELL LOGS

NYSDEC - Region 9 - Division of Environmental Remediation
Stratigraphic Log

Project Name:	Guterl Excised Area	**Hole Designation:**	SB-1/MW-1
Site Number:	Unlisted	**Date Completed:**	5/15/97
Location:	Lockport, New York	**Drilling Company:**	Maximum Technologies
Logged By:	Glenn M. May	**Drilling Method:**	5¼" ID Hollow Stem Augers
Total Depth:	15.0 feet	**Sampling Method:**	Split Spoon/HQ Coring

Depth (ft bgs)	Stratigraphic Description & Remarks	Elevation (ft amsl)	Sample				Core		
			NUMBER	COUNT	N VALUE	HNU	NUMBER	RECOVERY	RQD
	Ground Surface	**597.20**							
0.0	0.0'-1.0': Very fine grained black ash? with slag and brick fragments, moist. FILL MATERIAL	597.20	1	6 11 5	16	0			
	1.0'-2.0': Coarse grained multicolored ash with slag, coke and coal fragments, moist. FILL MATERIAL	596.20		6					
2.0	2.0'-3.6': Medium to coarse grained black ash with slag and rock fragments overlying a coarse grained, orange ash with gravel sized fragments, moist. FILL MATERIAL	595.20	2	17 29 6 5	35	0			
	3.6'-3.7': Coarse grained white ash, highly cemented, moist. FILL MATERIAL	593.60							
	3.7'-4.0': Grayish brown silty clay with roots, mottled, moist, some vertical desiccation cracks, plastic, cohesive. NATIVE	593.50							
4.0	Spoon refusal @ 4.2' bgs. Auger refusal @ 4.5' bgs. Augered rock socket to 6.8' bgs.	593.00 Top of Rock	3	50/ 0.2	NA	0			
	Bedrock								
6.8	Dark gray dolostone, blocky, few shale partings, several calcite filled vugs, few calcite filled fractures. Slight water wear along some fractures with clay present.	590.40					1	94%	0%
8.5	Dark gray dolostone, blocky, few shale partings, few calcite fossils and filled vugs to 10.1' bgs. Highly fossiliferous to 12.5' bgs. Most breaks appear to be mechanical. Some iron staining on fracture at 9.0' bgs.	588.70					2	100%	38%
11.8	Dark gray dolostone, blocky to massive, calcite crystals in large vugs at 12.0' and 13.0' bgs. Some fossiliferous zones. Most breaks appear to be mechanical.	585.40					3	100%	47%
15.0	BOH = 15.0'	582.20							

Notes: Measuring Point Elevations May Change: Refer to Current Elevation Table

Grain Size ◯ Water Found ▽ Static Level ▼

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

MONITORING WELL LOG

Project Name:	Guterl Excised Area	**Hole Designation:**	MW-1
Site Number:	Unlisted	**Date Completed:**	5/1597
Location:	Lockport, New York	**Drilling Company:**	MaximTechnologies
Screen Type:	PVC	**Casing Type:**	Steel
Screen Diameter:	2 inch	**Casing Diameter:**	6 inch
Screen Length:	5 feet	**Total Depth:**	15.0 feet

Top of Riser Elevation: 599.14 ft amsl

Ground Surface Elevation:
597.20 ft amsl

Top of Grout: 0.0 ft

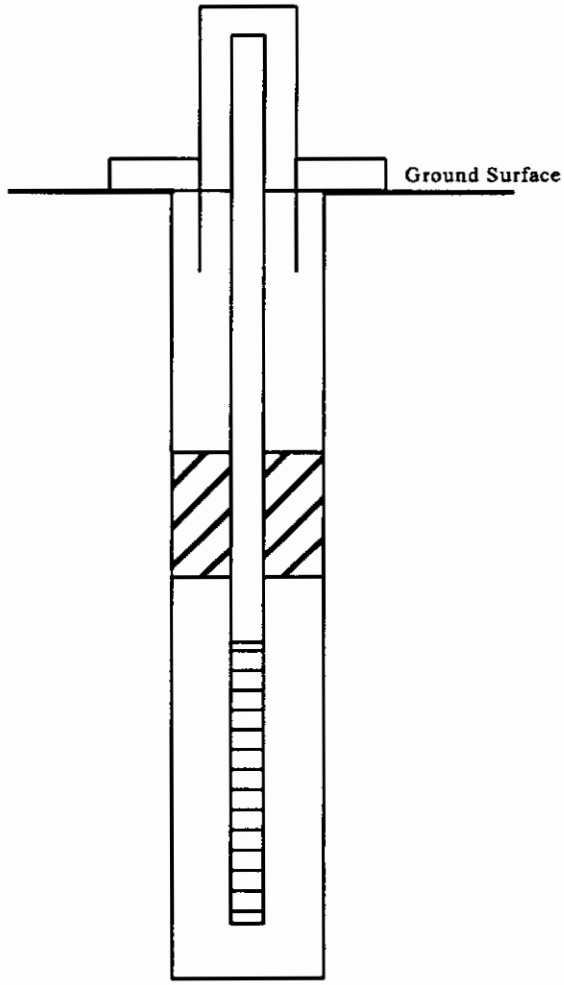
Top of Seal: 5.5 ft

Top of Filter Pack: 7.5 ft

Top of Screen: 9.7 ft

Bottom of Screen: 14.7 ft

Bottom of Filter Pack: 15.0 ft



NYSDEC - Region 9 - Division of Environmental Remediation
Stratigraphic Log

Project Name:	Guterl Excised Area	**Hole Designation:**	SB-2/MW-2
Site Number:	Unlisted	**Date Completed:**	5/16/97
Location:	Lockport, New York	**Drilling Company:**	Maximum Technologies
Logged By:	Glenn M. May	**Drilling Method:**	5¼" ID Hollow Stem Augers
Total Depth:	14.5 feet	**Sampling Method:**	Split Spoon/ HQ Coring

Depth (ft bgs)	Stratigraphic Description & Remarks	Elevation (ft amsl)	Sample				Core		
			NUMBER	COUNT	N VALUE	HNU	NUMBER	RECOVERY	RQD
	Ground Surface	**596.70**							
0.0	0"-1": Brownish gray soil with rock fragments, dry.	596.70		4					
			1	3	11	0			
	1"-2.0': Very fine to coarse grained, black ash with coal fragments, dry. Some rust colored fragments. FILL MATERIAL	596.62		8 8					
2.0	Very fine grained black ash with coal fragments, dry. Bottom of sample contains pebble sized pieces of rock - most likely the Lockport. Exact depth of native soils is indeterminant. Only 0.3' recovery.	594.70		14					
			2	18 9 6	27	0			
4.0	Spoon refusal: N/A. Auger refusal @ 4.5' bgs. Augered rock socket to 6.5' bgs.	592.20 Top of Rock							
	Bedrock								
6.5	Dark gray dolostone, blocky, few shale partings throughout, several large calcite (7.1', 7.5' and 8.4' bgs) and dolomite (8.3' to 8.4' bgs) filled vugs. Fossiliferous zone from 9.0' to 9.6' bgs. Void at 9.6' bgs with reduced return water flow. Pinhole porosity at 11.0' bgs. Some slightly weathered zones with gray clay coating in first 2' of run. Slight oily sheen on bottom 0.5' of core.	590.20				0*	1	96%	0%
11.5	Dark gray dolostone, blocky to massive, few shale partings throughout. The entire zone is fossiliferous. Oil sheen on surface of core.	585.20				0	2	93%	65%
14.5	BOH = 14.5'	582.20							
	* 10-15 ppm methane								

Notes: Measuring Point Elevations May Change: Refer to Current Elevation Table

Grain Size ◯ Water Found ▽ Static Level ▼

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

MONITORING WELL LOG

Project Name:	Guterl Excised Area	**Hole Designation:**	MW-2
Site Number:	Unlisted	**Date Completed:**	5/16/97
Location:	Lockport, New York	**Drilling Company:**	MaximTechnologies
Screen Type:	PVC	**Casing Type:**	Steel
Screen Diameter:	2 inch	**Casing Diameter:**	6 inch
Screen Length:	5 feet	**Total Depth:**	14.5 feet

Top of Riser Elevation: 598.56 ft amsl

Ground Surface Elevation:
596.70 ft amsl

Top of Grout: 0.0 ft

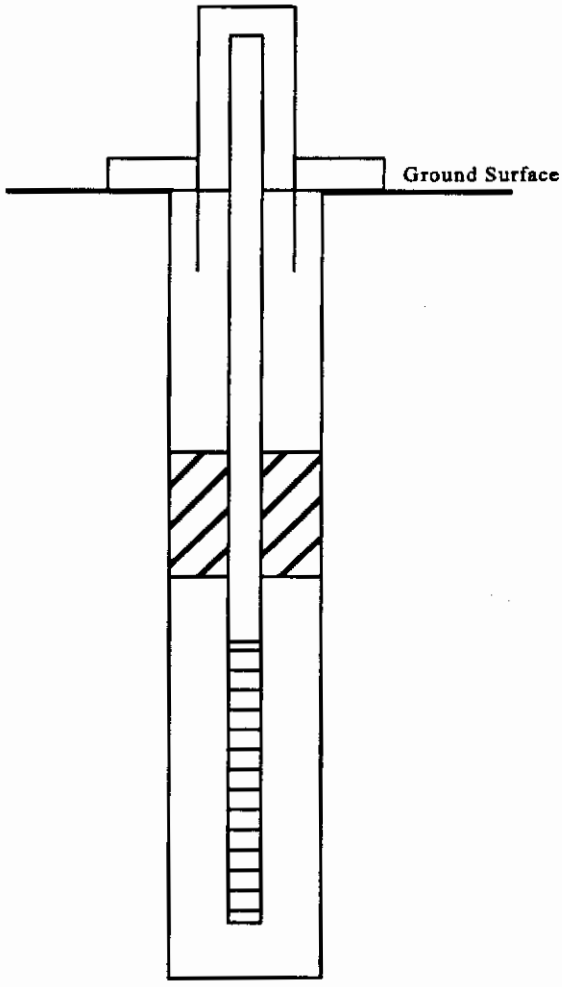
Top of Seal: 5.5 ft

Top of Filter Pack: 7.5 ft

Top of Screen: 9.2 ft

Bottom of Screen: 14.2 ft

Bottom of Filter Pack: 14.5 ft



NYSDEC - Region 9 - Division of Environmental Remediation
Stratigraphic Log

Project Name:	Guterl Excised Area	**Hole Designation:**	SB-3/MW-3
Site Number:	Unlisted	**Date Completed:**	5/14/97
Location:	Lockport, New York	**Drilling Company:**	Maximum Technologies
Logged By:	Glenn M. May	**Drilling Method:**	5¼" ID Hollow Stem Augers
Total Depth:	14.4 feet	**Sampling Method:**	Split Spoon/ HQ Coring

Depth (ft bgs)	Stratigraphic Description & Remarks	Elevation (ft amsl)	Sample				Core		
			NUMBER	COUNT	N VALUE	HNU	NUMBER	RECOVERY	RQD
	Ground Surface	**597.00**							
0.0	0"-3": Brown subsoil with slag, gravel and roots, moist.	597.00		3					
			1	10	17	0			
	3"-2.0': Ash, slag and coal fragments, moist. Some rust colored fragments. FILL MATERIAL	596.75		7					
				4					
2.0	2.0'-3.8': Gray mottled clay with pebble sized clasts, slag, saturated. FILL MATERIAL	595.00		1					
			2	1	2	0			
				1					
	3.8'-3.9': Silty clay with rock fragments in shoe of spoon, moist. NATIVE	593.20		22					
4.0	Auger refusal @ 4.5' bgs. Augered rock socket to 6.3' bgs.	592.50 Top of Rock							
	Bedrock								
6.4	Dark gray dolostone, blocky to massive, fossiliferous zone to 8.8' bgs. Some signs of water wear at 7.3' bgs. Below 8.8' bgs the rock contains shale partings and calcite filled vugs. Small amount of gravel at 8.6' bgs with gray clay on surface of rock. Small vug with calcite and a thin vertical filled fracture at 10.4' bgs. The rock is wavy in nature in the bottom 0.8' of run. Void at bottom of run contains tan clay with iron staining.	590.60					1	94%	47%
11.4	Medium to dark gray dolostone, mostly massive, fractures at 12.2' and 12.5' bgs are ironed stained. Numerous vugs containing calcite crystals below 12.5' bgs. This zone is also highly stylolized.	585.60					2	97%	77%
14.4	BOH = 14.4'	582.60							

Notes: Measuring Point Elevations May Change: Refer to Current Elevation Table

Grain Size ◯ Water Found ▽ Static Level ▼

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

MONITORING WELL LOG

Project Name:	Guterl Excised Area	**Hole Designation:**	MW-3
Site Number:	Unlisted	**Date Completed:**	5/14/97
Location:	Lockport, New York	**Drilling Company:**	MaximTechnologies
Screen Type:	PVC	**Casing Type:**	Steel
Screen Diameter:	2 inch	**Casing Diameter:**	6 inch
Screen Length:	5 feet	**Total Depth:**	14.4 feet

Top of Riser Elevation: 598.82 ft amsl

Ground Surface Elevation:
597.00 ft amsl

Top of Grout: 0.0 ft

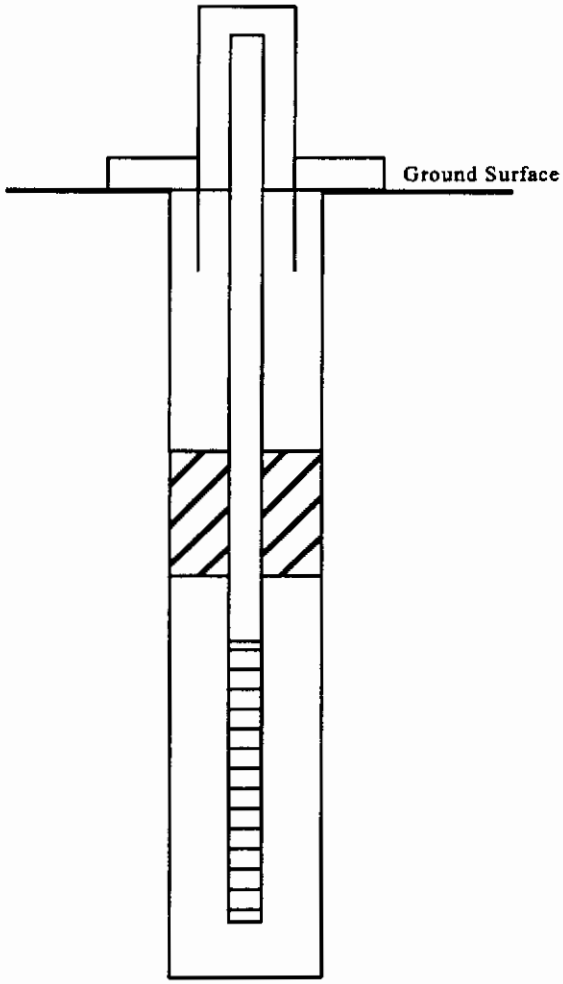
Top of Seal: 4.8 ft

Top of Filter Pack: 7.2 ft

Top of Screen: 9.1 ft

Bottom of Screen: 14.1 ft

Bottom of Filter Pack: 14.4 ft



NYSDEC - Region 9 - Division of Environmental Remediation
Stratigraphic Log

Project Name:	Guterl Excised Area	**Hole Designation:**	SB-4/MW-4
Site Number:	Unlisted	**Date Completed:**	5/16/97
Location:	Lockport, New York	**Drilling Company:**	Maximum Technologies
Logged By:	Glenn M. May	**Drilling Method:**	5¼" ID Hollow Stem Augers
Total Depth:	14.4 feet	**Sampling Method:**	Split Spoon/HQ Coring

Depth (ft bgs)	Stratigraphic Description & Remarks	Elevation (ft amsl)	Sample				Core		
			NUMBER	COUNT	N VALUE	HNU	NUMBER	RECOVERY	RQD
	Ground Surface	**596.50**							
0.0	0"-1": Brown soil with rock fragments, moist.	596.50		3					
			1	6	13	0			
	1"-5": Crushed stone. FILL MATERIAL	596.42		7					
				7					
	5"-1.5': Medium to coarse grained black ash with coal and slag fragments, some rust coloration, moist. FILL MATERIAL	596.08							
	1.5'-2.0': Brown silty clay with mottling, orange blebs and pebble sized rock fragments. Some iron staining. NATIVE	595.00							
2.0	Yellow brown silty clay, vertical desiccation cracks, mottled, gravel to pebble sized angular rock fragments, cohesive, slightly moist. NATIVE	594.50		8					
				8					
			2	15	23	0			
				40/					
4.0	Spoon refusal @ 3.5' bgs. Auger refusal @ 4.0' bgs. Augered rock socket to 6.0' bgs.	593.00 Top of Rock		0.0					
	Bedrock								
6.4	Dark gray dolostone, blocky, minor shale partings throughout. Rubble zone at beginning of run. Numerous vugs at 7.4' bgs and only about 1.5" wide, some vugs contain calcite crystals. Very uniform and competent throughout remainder of run with only a few calcite filled vugs. Signs of water wear along a fracture at 8.7' bgs.	590.10				0	1	100%	14%
11.4	Dark gray dolostone, mostly blocky, minor shale partings throughout. Very uniform and competent throughout. Few calcite filled vugs. A vertical fracture observed at 12.7' bgs.	585.10				0	2	100%	47%
14.4	BOH = 14.4'	582.10							

Notes: Measuring Point Elevations May Change: Refer to Current Elevation Table

Grain Size ◯ Water Found ▽ Static Level ▼

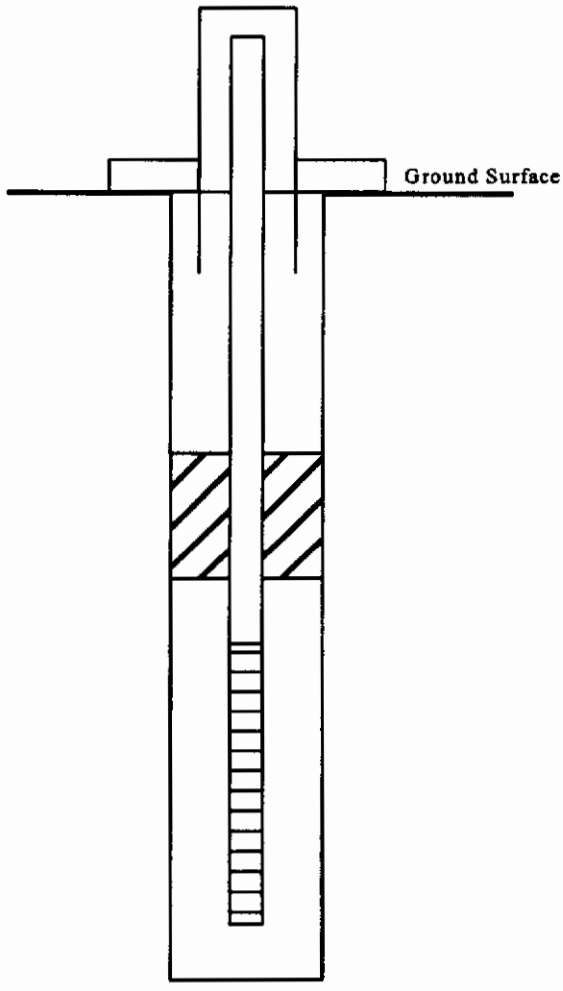
New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York, 14203-2999

MONITORING WELL LOG

Project Name:	Guterl Excised Area	**Hole Designation:**	MW-4
Site Number:	Unlisted	**Date Completed:**	5/16/97
Location:	Lockport, New York	**Drilling Company:**	MaximTechnologies
Screen Type:	PVC	**Casing Type:**	Steel
Screen Diameter:	2 inch	**Casing Diameter:**	6 inch
Screen Length:	5 feet	**Total Depth:**	14.4 feet

Top of Riser Elevation: 598.67 ft amsl

Ground Surface Elevation:
596.50 ft amsl



Top of Grout: 0.0 ft

Top of Seal: 4.9 ft

Top of Filter Pack: 6.9 ft

Top of Screen: 9.1 ft

Bottom of Screen: 14.1 ft

Bottom of Filter Pack: 14.4 ft

NYSDEC - Region 9 - Division of Environmental Remediation
Stratigraphic Log

Project Name:	Guterl Excised Area	**Hole Designation:**	SB-5/MW-5
Site Number:	Unlisted	**Date Completed:**	5/15/97
Location:	Lockport, New York	**Drilling Company:**	Maximum Technologies
Logged By:	Glenn M. May	**Drilling Method:**	5¼" ID Hollow Stem Augers
Total Depth:	15.5 feet	**Sampling Method:**	Split Spoon/HQ Coring

Depth (ft bgs)	Stratigraphic Description & Remarks	Elevation (ft amsl)	Sample				Core		
			NUMBER	COUNT	N VALUE	HNU	NUMBER	RECOVERY	RQD
	Ground Surface	**596.10**							
0.0	0"-4": Asphalt and gravel, dry.	596.10		14					
			1	20	38	0			
	4"-2.0': Pebble sized rock (Lockport) fragments with small percentage of brown soil and smaller rock fragments, dry. NATIVE	595.76		18 20					
2.0	2.0'-4.0': Dark gray, crystalline, poker chip rock fragments, saturated. Brown silt with some clay and rock fragments were observed in the auger cuttings. NATIVE	594.10		18 9					
			2	25	34	0*			
4.0		592.35		50/ 0.25					
	Spoon refusal @ 3.75' bgs. Auger refusal @ 4.3' bgs. Augered rock socket to 6.3' bgs.	Top of Rock							
	Bedrock								
6.5	Dark gray dolostone, blocky, minor shale partings throughout. Few calcite filled vugs and minor fractures at 11' bgs. Trace gray and reddish brown clay on break surfaces. No signs of water wear on solid rock. Slight oil sheen on rock at bottom of run.	589.60				0	1	100%	0%
11.5	Dark gray dolostone, blocky, minor shale partings throughout. Few calcite and sphalerite filled vugs, little sign of water wear except at 12.8' bgs where gray clay is noted on break surface. This zone is rubble and had a gasoline odor. The bottom 0.25' of run is wavy and contains brown dolostone and calcite within the dark gray rock.	584.60				0	2	95%	32%
13.5	Medium gray and brown dolostone, massive, wavy, several shale partings and few stylolites, few open vugs, many calcite filled vugs. Vertical fracture with iron staining from 14.8' to 15.0' bgs. Slight water wear in this zone and horizontal fracture below it.	582.60				0	3	100%	89%
15.5	BOH = 15.5' * >1000 ppm OVA reading in the borehole following sampling.	580.60							

Notes: Measuring Point Elevations May Change: Refer to Current Elevation Table

Grain Size ◯ Water Found ▽ Static Level ▼

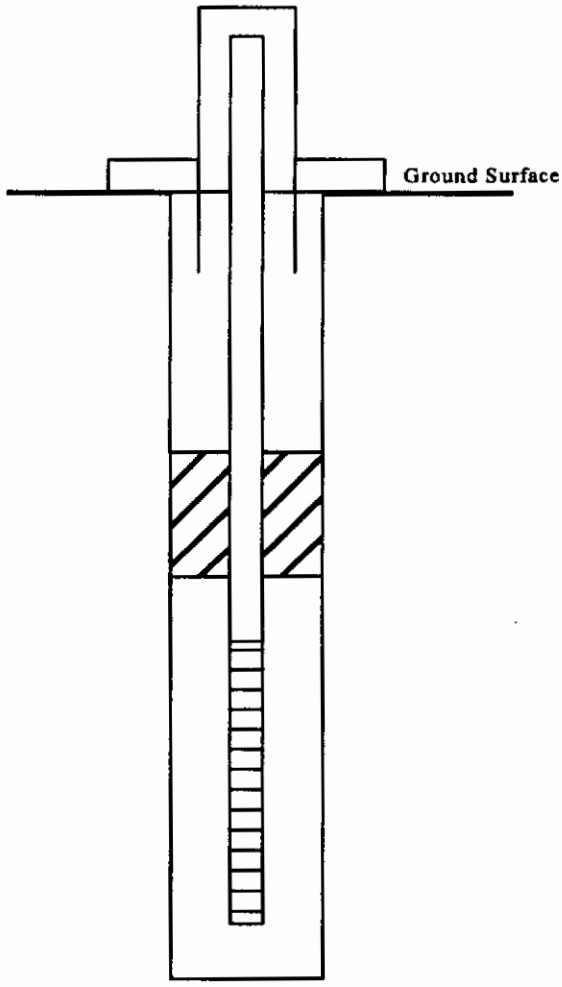
New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York, 14203-2999

MONITORING WELL LOG

Project Name:	Guterl Excised Area	**Hole Designation:**	MW-5
Site Number:	Unlisted	**Date Completed:**	5/15/97
Location:	Lockport, New York	**Drilling Company:**	MaximTechnologies
Screen Type:	PVC	**Casing Type:**	Steel
Screen Diameter:	2 inch	**Casing Diameter:**	6 inch
Screen Length:	5 feet	**Total Depth:**	15.5 feet

Top of Riser Elevation: 598.24 ft amsl

Ground Surface Elevation:
596.10 ft amsl



Top of Grout: 0.0 ft

Top of Seal: 5.0 ft

Top of Filter Pack: 8.2 ft

Top of Screen: 10.2 ft

Bottom of Screen: 15.2 ft

Bottom of Filter Pack: 15.5 ft

NYSDEC - Region 9 - Division of Environmental Remediation
Stratigraphic Log

Project Name:	Guterl Excised Area	**Hole Designation:**	SB-6
Site Number:	Unlisted	**Date Completed:**	5/14/97
Location:	Lockport, New York	**Drilling Company:**	Maximum Technologies
Logged By:	Glenn M. May	**Drilling Method:**	5¼" Hollow Stem Augers
Total Depth:	4.3 feet	**Sampling Method:**	Split Spoon

Depth (ft bgs)	Stratigraphic Description & Remarks	Elevation (ft amsl)	Sample				Core		
			NUMBER	COUNT	N VALUE	BNU	NUMBER	RECOVERY	RQD
	Ground Surface	**597.0**							
0.0	0"-2": Medium to coarse grained ash with coal and slag fragments, visible iron staining, some metallic zones, dry. Clay at bottom of sample is highly stained and mottled. FILL MATERIAL	597.0	1	4 4 5 42	9	0			
2.0	2.0'-2.7': Top of sample contains an area of shiny metallic deposition - sampled for TCLP. FILL MATERIAL	595.0	2	7 7 14 18	21	0			
	2.7'-4.0': Grayish black clay upper 0.55', some silt, some metal in vertical desiccation cracks, mottled, moist. Grades into a brownish gray silty clay with mottling, iron stained blebs and desiccation cracks, cohesive, moist. Some dolostone rock fragments. NATIVE	594.3	3	50/ 0.3	NA	0			
4.0	4.0'-4.3': Reddish gray silty clay, mottled, iron stained, filled vertical desiccation cracks, plastic, moist. NATIVE	593.0							
4.3	Spoon refusal @ 4.3' bgs. BOH = 4.3'	592.7 Top of Rock							

Notes: Measuring Point Elevations May Change: Refer to Current Elevation Table

Grain Size ◯ Water Found ▽ Static Level ▼

NYSDEC - Region 9 - Division of Environmental Remediation
Stratigraphic Log

Project Name:	Guterl Excised Area	**Hole Designation:**	SB-7A
Site Number:	Unlisted	**Date Completed:**	5/14/97
Location:	Lockport, New York	**Drilling Company:**	Maximum Technologies
Logged By:	Glenn M. May	**Drilling Method:**	5¼" Hollow Stem Augers
Total Depth:	6.3 feet	**Sampling Method:**	Split Spoon

Depth (ft bgs)	Stratigraphic Description & Remarks	Elevation (ft amsl)	Sample				Core		
			NUMBER	COUNT	N VALUE	HNU	NUMBER	RECOVERY	RQD
	Ground Surface	**NA**							
0.0	0"-1": Black topsoil with roots, few gravel sized rocks, moist.		1	1 5 50/ 0.5	NA	0			
	1"-2.0': Gravel sized rocks in a brown silty clay matrix, some coal, iron staining. Moist. FILL MATERIAL								
2.0	No sample. Drillers augered to 4.0' bgs								
4.0	Mixture of mottled silty clay and rock fragments in powder-like matrix, very dry. FILL MATERIAL		2	43 36	NA	0			
6.3	Auger refusal @ 6.3' bgs. BOH = 6.3'								

Notes: Measuring Point Elevations May Change: Refer to Current Elevation Table

Grain Size ◯ Water Found ▽ Static Level ▼

NYSDEC - Region 9 - Division of Environmental Remediation
Stratigraphic Log

Project Name:	Guterl Excised Area	**Hole Designation:**	SB-7B
Site Number:	Unlisted	**Date Completed:**	5/14/97
Location:	Lockport, New York	**Drilling Company:**	Maximum Technologies
Logged By:	Glenn M. May	**Drilling Method:**	5¼" Hollow Stem Augers
Total Depth:	7.2 feet	**Sampling Method:**	Split Spoon

Depth (ft bgs)	Stratigraphic Description & Remarks	Elevation (ft amsl)	Sample				Core		
			NUMBER	COUNT	N VALUE	HNU	NUMBER	RECOVERY	RQD
	Ground Surface	**597.0**							
0.0	0.0'-2.0': Black topsoil with roots, gravel at the bottom of the sample, dry. Only 3" recovery.	597.0	1	2 4 2 4	6				
2.0	No sample recovery.		2	1 2 1 1	3				
4.0	4.0'-6.0': Slag and reworked reddish brown silty clay with rock fragments, mottled, moist. Poor recovery. FILL MATERIAL	593.0	3	1 1 11 8	12	0			
6.0	6.0'-7.2': Reworked brown silty clay with rock fragments, wet, sheen on water, oil on sample. Concrete in bottom 1" of the sample. Poor recovery.	591.0	4	1 8 11 50/ 0.2	19	0			
7.3	Spoon refusal @ 7.2' bgs. BOH = 7.2'	589.8							

Notes: Measuring Point Elevations May Change: Refer to Current Elevation Table

Grain Size ◯ Water Found ▽ Static Level ▼

APPENDIX B

WELL DEVELOPMENT AND PURGING LOGS

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

WELL DEVELOPMENT LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
DEVELOPER:	Glenn M. May/James J. Richert (E&E)		
DEVELOPMENT DATE:	May 19, 1997		
START DEVELOPMENT:	1017	END DEVELOPMENT:	1150

WELL NUMBER: MW-1

1. TOTAL CASING AND SCREEN LENGTH (FT): **16.56**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **5.91**
4. VOLUME OF WATER IN CASING (GAL): **≈7.0**

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 10 CASINGS: **≈70.0** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	0	5	15	25	40	50	55	60		
pH	8.08	7.45	7.19	7.26	7.26	7.37	7.27	7.25		
CONDUCTIVITY (μmhos)	1125	2100	2100	2100	2100	2100	2100	2100		
TURBIDITY (NTU)	31.5	>200	>200	>200	177	62.7	107.5	155		
TEMPERATURE (^{o}C)	8.9	8.4	8.6	8.6	8.6	8.6	8.6	8.6		
Eh										
TIME	1017	1026	1040	1055	1115	1131	1141	1150		

COMMENTS: Initial development water was clear but became gray in color and turbid by 5 gallons. Final development was less turbid but the water was still gray in color.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

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

WELL DEVELOPMENT LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
DEVELOPER:	Glenn M. May/James J. Richert (E&E)		
DEVELOPMENT DATE:	May 19, 1997		
START DEVELOPMENT:	1420	END DEVELOPMENT:	1546

WELL NUMBER: MW-2

1. TOTAL CASING AND SCREEN LENGTH (FT): **16.02**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **7.77**
4. VOLUME OF WATER IN CASING (GAL): **5.36**

#1 - #3 x #2 (Gal/Ft)

VOLUME OF 10 CASINGS: **53.6** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	0	5	10	15	20	25	30	35	40	45
pH	7.37	7.72	7.71	7.74	7.76	7.74	7.79	7.78	7.79	7.77
CONDUCTIVITY (μmhos)	893	783	808	803	835	839	837	820	820	804
TURBIDITY (NTU)	572	480	259	355	175	135	149	237	204	103
TEMPERATURE (^{o}F)	55.6	55.1	56.5	56.7	59.2	58.6	58.9	57.4	58.6	56.7
Eh										
TIME	1420	1433	1437	1449	1456	1505	1510	1515	1520	1525

COMMENTS: Initial purge water was light brown in color, had an oil sheen on the surface, and a slight fuel odor. After bailing 5 gallons, oil droplets were observed and remained through the end of development. The purge water became gray in color after 15 gallons, cloudy after 25 gallons, and clear after 45 gallons.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

New York State Department of Environmental Conservation
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WELL DEVELOPMENT LOG

SITE NAME: Guterl Excised Area	SITE NUMBER: Not Listed
DEVELOPER: Glenn M. May/James J. Richert (E&E)	
DEVELOPMENT DATE: May 19, 1997	
START DEVELOPMENT: 1420	END DEVELOPMENT: 1546

WELL NUMBER: **MW-2 (continued)**

1. TOTAL CASING AND SCREEN LENGTH (FT): **16.02**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **7.77**
4. VOLUME OF WATER IN CASING (GAL): **5.36**

#1 - #3 x #2 (Gal/Ft)

VOLUME OF 10 CASINGS: **53.6** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	50	55	60							
pH	7.73	7.76	7.76							
CONDUCTIVITY (μmhos)	792	790	791							
TURBIDITY (NTU)	90.9	62.5	69.8							
TEMPERATURE (^{o}F)	55.1	55.7	55.4							
Eh										
TIME	1532	1538	1546							

COMMENTS: Initial purge water was light brown in color, had an oil sheen on the surface, and a slight fuel odor. After bailing 5 gallons, oil droplets were observed and remained through the end of development. The purge water became gray in color after 15 gallons, cloudy after 25 gallons, and clear after 45 gallons.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

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

WELL DEVELOPMENT LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
DEVELOPER:	Glenn M. May/James J. Richert (E&E)		
DEVELOPMENT DATE:	May 19, 1997		
START DEVELOPMENT:	1510	END DEVELOPMENT:	1635

WELL NUMBER: MW-3

1. TOTAL CASING AND SCREEN LENGTH (FT): 15.78
2. CASING INTERNAL DIAMETER (IN): 4.0*
3. WATER LEVEL BELOW TOP OF CASING (FT): 4.68
4. VOLUME OF WATER IN CASING (GAL): 7.22

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 10 CASINGS: 72.2 GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	0	5	10	15	20	25	30	35	40	45
pH	7.04	7.05	7.35	7.26	7.23	7.26	7.32	7.33	7.30	7.32
CONDUCTIVITY (μmhos)	1340	4220	780	770	1660	760	1495	760	742	735
TURBIDITY (NTU)	127	>1000	1000	846	538	598	655	871	590	461
TEMPERATURE (^{o}F)	52.2	48.2	47.8	47.5	47.3	47.0	47.8	47.5	47.3	47.3
Eh										
TIME	1510	1516	1520	1528	1532	1539	1550	1555	1600	1604

COMMENTS: Initial purge water was rusty brown in color, had a slight oil sheen on the surface, and a petroleum odor. After bailing 5 gallons, the sheen and odor were gone. The purge water became greenish tan in color after 10 gallons, greenish gray after 25 gallons, and light greenish gray after 55 gallons.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

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

WELL DEVELOPMENT LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
DEVELOPER:	Glenn M. May/James J. Richert (E&E)		
DEVELOPMENT DATE:	May 19, 1997		
START DEVELOPMENT:	1510	END DEVELOPMENT:	1635

WELL NUMBER: MW-3 (continued)

1. TOTAL CASING AND SCREEN LENGTH (FT): 15.78
2. CASING INTERNAL DIAMETER (IN): 4.0*
3. WATER LEVEL BELOW TOP OF CASING (FT): 4.68
4. VOLUME OF WATER IN CASING (GAL): 7.22

#1 - #3 x #2 (Gal/Ft)

VOLUME OF 10 CASINGS: 72.2 GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	48	55	60	65	70					
pH	7.21	7.25	7.29	7.28	7.27					
CONDUCTIVITY (μmhos)	836	729	726	724	721					
TURBIDITY (NTU)	435	389	395	492	345					
TEMPERATURE (^{o}F)	47.5	47.5	47.2	47.6	47.2					
Eh										
TIME	1610	1618	1623	1630	1635					

COMMENTS: Initial purge water was rusty brown in color, had a slight oil sheen on the surface, and a petroleum odor. After bailing 5 gallons, the sheen and odor were gone. The purge water became greenish tan in color after 10 gallons, greenish gray after 25 gallons, and light greenish gray after 55 gallons.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

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WELL DEVELOPMENT LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
DEVELOPER:	Glenn M. May/James J. Richert (E&E)		
DEVELOPMENT DATE:	May 19, 1997		
START DEVELOPMENT:	1150	END DEVELOPMENT:	1357

WELL NUMBER: MW-4

1. TOTAL CASING AND SCREEN LENGTH (FT): 16.41
2. CASING INTERNAL DIAMETER (IN): 4.0*
3. WATER LEVEL BELOW TOP OF CASING (FT): 4.21
4. VOLUME OF WATER IN CASING (GAL): ≈8.0

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 10 CASINGS: ≈80.0 GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	0	5	10	20	30	40	45	50	55	60
pH	9.33	9.00	8.47	7.93	7.88	8.22	7.79	7.83	8.37	7.43
CONDUCTIVITY (μmhos)	958	1531	1538	1593	1595	1601	1625	1620	1587	1614
TURBIDITY (NTU)	24.4	>1000	1000	583	165	375	240	220	195	241
TEMPERATURE (^{O}F)	51.3	50.9	50.1	52.0	51.0	52.3	53.0	52.6	52.7	52.4
Eh										
TIME	1150	1205	1215	1231	1247	1304	1313	1320	1328	1335

COMMENTS: Initial purge water was clear but became brownish gray after purging 5 gallons. No sheens or odors were observed. The purge water became gray in color after 10 gallons, light gray after 30 gallons, and very light gray after 65 gallons.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

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WELL DEVELOPMENT LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
DEVELOPER:	Glenn M. May/James J. Richert (E&E)		
DEVELOPMENT DATE:	May 19, 1997		
START DEVELOPMENT:	1150	END DEVELOPMENT:	1357

WELL NUMBER: **MW-4 (continued)**

1. TOTAL CASING AND SCREEN LENGTH (FT): **16.41**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **4.21**
4. VOLUME OF WATER IN CASING (GAL): **≈8.0**

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 10 CASINGS: **≈80.0** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	65	70	75							
pH	7.50	7.64	7.59							
CONDUCTIVITY (μmhos)	1628	1595	1627							
TURBIDITY (NTU)	204	229	184							
TEMPERATURE (^{o}F)	53.4	52.3	52.1							
Eh										
TIME	1342	1350	1357							

COMMENTS: Initial purge water was clear but became brownish gray after purging 5 gallons. No sheens or odors were observed. The purge water became gray in color after 10 gallons, light gray after 30 gallons, and very light gray after 65 gallons.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

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WELL DEVELOPMENT LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
DEVELOPER:	Glenn M. May/James J. Richert (E&E)		
DEVELOPMENT DATE:	May 19, 1997		
START DEVELOPMENT:	0830	END DEVELOPMENT:	1108

WELL NUMBER: MW-5

1. TOTAL CASING AND SCREEN LENGTH (FT): **17.50**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **4.65**
4. VOLUME OF WATER IN CASING (GAL): **8.35**

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 10 CASINGS: **83.5** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	0	5	10	20	30	40	50	60	70	80
pH	7.40	7.70	7.54	7.64	7.57	7.68	7.69	7.79	7.90	7.76
CONDUCTIVITY (μmhos)	832	1822	825	822	779	816	815	813	808	813
TURBIDITY (NTU)	536	>1000	>1000	761	619	527	371	302	647	187
TEMPERATURE (^{o}F)	51.9	48.4	48.3	47.8	47.6	48.0	48.3	48.3	48.5	48.4
Eh										
TIME	0830	0838	0844	0854	0905	0915	0926	0939	0952	1007

COMMENTS: Initial purge water was clear, had a sheen on the surface, and a gasoline odor. This odor was observed through the end of development. The purge water became medium gray in color after 5 gallons, light gray after 20 gallons, and very light gray after 100 gallons.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

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WELL DEVELOPMENT LOG

SITE NAME:	Guteri Excised Area	SITE NUMBER:	Not Listed
DEVELOPER:	Glenn M. May/James J. Richert (E&E)		
DEVELOPMENT DATE:	May 19, 1997		
START DEVELOPMENT:	0830	END DEVELOPMENT:	1108

WELL NUMBER: **MW-5 (continued)**

1. TOTAL CASING AND SCREEN LENGTH (FT): **17.50**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **4.65**
4. VOLUME OF WATER IN CASING (GAL): **8.35**

#1 - #3 x #2 (Gal/Ft)

VOLUME OF 10 CASINGS: **83.5** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	90	100	105	110	115	120	125			
pH	7.83	7.65	7.88	8.04	7.67	7.96	8.07			
CONDUCTIVITY (μmhos)	812	811	809	808	811	808	808			
TURBIDITY (NTU)	120	191	177	114	131	97.3	99.3			
TEMPERATURE (^{o}F)	48.2	48.2	48.0	47.5	48.2	47.8	47.8			
Eh										
TIME	1019	1030	1041	1046	1052	1101	1108			

COMMENTS: Initial purge water was clear, had a sheen on the surface, and a gasoline odor. This odor was observed through the end of development. The purge water became medium gray in color after 5 gallons, light gray after 20 gallons, and very light gray after 100 gallons.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

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WELL PURGING LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
SAMPLER:	Glenn M. May/John W. Hyden		
PURGE DATE:	June 5, 1997	START PURGE: 1330	END PURGE: 1415
SAMPLE DATE:	June 5, 1997		SAMPLE TIME: 1430

WELL NUMBER: MW-1

1. TOTAL CASING AND SCREEN LENGTH (FT): **16.56**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **5.96**
4. VOLUME OF WATER IN CASING (GAL): **≈7.0**

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 3 CASINGS: **≈21.0** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	2	5	10	15	20	25				
pH	7.52	7.57	7.79	7.53	7.59	7.61				
CONDUCTIVITY (μmhos)	1860	2000	1960	2000	2000	2000				
TURBIDITY (NTU)	>200	>200	>200	>200	>220	>200				
TEMPERATURE (^{o}C)	12.2	10.2	10.3	10.0	10.4	10.4				
Eh	-72.1	-82.0	-81.4	-70.7	-72.3	-72.1				
TIME	1342	1347	1352	1358	1404	1411				

COMMENTS: Initial purge water was cloudy and remained cloudy through the completion of purging.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.
Turbidity meter was not available, therefore, all turbidity measurements are estimated.

New York State Department of Environmental Conservation
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WELL PURGING LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
SAMPLER:	Glenn M. May/John W. Hyden		
PURGE DATE:	June 5, 1997	START PURGE: 1450	END PURGE: 1520
SAMPLE DATE:	June 5, 1997		SAMPLE TIME: 1535

WELL NUMBER: MW-2

1. TOTAL CASING AND SCREEN LENGTH (FT): **16.02**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **7.80**
4. VOLUME OF WATER IN CASING (GAL): **5.37**

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 3 CASINGS: **16.1** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	2	5	10	15	20	Sample				
pH	7.93	8.08	8.04	8.00	8.07	7.74**				
CONDUCTIVITY (μmhos)	630	660	640	670	660	660				
TURBIDITY (NTU)	≈50	≈50	≈50	≈50	≈50	≈50				
TEMPERATURE (^{o}C)	13.0	10.5	10.9	11.6	10.8	12.6				
Eh	-94.8	-99.5	-97.1	-95.6	-98.2	-80.2				
TIME	1457	1459	1506	1515	1519	1546				

COMMENTS: Initial purge water was clear, had an oil sheen on the surface, contained oil globules, and had a slight petroleum odor. The oil globules and odor were observed through the end of purging.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

** The glass jar utilized for the field parameters was cleaned with Alconox and rinsed with water prior to measuring the field parameters at the time of sampling. This likely explains the significant change in pH from the end of purging to the end of sampling. Turbidity meter was not available, therefore, all turbidity measurements are estimated.

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WELL PURGING LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
SAMPLER:	Glenn M. May/John W. Hyden		
PURGE DATE:	June 5, 1997	START PURGE: 0900	END PURGE: 0945
SAMPLE DATE:	June 5, 1997		SAMPLE TIME: 1000

WELL NUMBER: MW-3

1. TOTAL CASING AND SCREEN LENGTH (FT): **15.78**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **4.59**
4. VOLUME OF WATER IN CASING (GAL): **7.30**

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 3 CASINGS: **21.9** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	2	5	15	20	25	30	35	Sample		
pH	6.95	6.94	7.03	7.01	7.03	7.02	7.01	7.05		
CONDUCTIVITY (μmhos)	1030	1090	920	1070	1030	1030	1010	1000		
TURBIDITY (NTU)	>200	>200	>200	>200	>220	>200	>200	>220		
TEMPERATURE (^{o}C)	9.7	9.2	9.1	9.1	8.0	8.0	8.1	9.5		
Eh	-36.0	-34.8	-40.2	-39.8	-40.0	-40.4	32.4	-42.9		
TIME	0904	0912	0920	0929	0933	0938	0943	1011		

COMMENTS: Initial purge water was greenish gray in color and remained that color through the completion of purging. No sheen was observed. There was little change in turbidity, but it appeared to increase slightly as purging progressed.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.
Turbidity meter was not available, therefore, all turbidity measurements are estimated.

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WELL PURGING LOG

SITE NAME:	Guterl Excised Area	SITE NUMBER:	Not Listed
SAMPLER:	Glenn M. May/John W. Hyden		
PURGE DATE:	June 4, 1997	START PURGE: 1515	END PURGE: 1634
SAMPLE DATE:	June 4, 1997		SAMPLE TIME: 1700

WELL NUMBER: MW-4

1. TOTAL CASING AND SCREEN LENGTH (FT): **16.41**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **4.24**
4. VOLUME OF WATER IN CASING (GAL): **≈8.0**

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 3 CASINGS: **≈24.0** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	1	8	10**	15	20	30	35	40		
pH	9.35	10.36	8.68	8.12	8.20	7.83	7.44	7.55		
CONDUCTIVITY (μmhos)	1575	1600	1600	1600	1350+	1350	1380	1400		
TURBIDITY (NTU)	>200	>200	>200	>200	>220	>200	>200	>220		
TEMPERATURE (^{o}C)	11.7	10.2	12.2	10.9	11.5	11.0	10.7	10.7		
Eh		-211	-143.6	-115.7	-120.7	-97.4	-80.2	-92.6		
TIME	1520	1530	1543	1552	1600	1616	1625	1634		

COMMENTS: Initial purge water was clear but became turbid after 1 gallon was purged. No sheen was observed. Final purge water was gray and cloudy.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.
** Due to the significant increase in pH, the truck was repositioned to move the instruments into the shade.
\+ The conductivity meter was recalibrated.
Turbidity meter was not available, therefore, all turbidity measurements are estimated.

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

WELL PURGING LOG

SITE NAME:	Guterl Excised Area			SITE NUMBER:	Not Listed
SAMPLER:	Glenn M. May/John W. Hyden				
PURGE DATE:	June 5, 1997	START PURGE:	1025	END PURGE:	1055
SAMPLE DATE:	June 5, 1997			SAMPLE TIME:	1120

WELL NUMBER: MW-5

1. TOTAL CASING AND SCREEN LENGTH (FT): **17.50**
2. CASING INTERNAL DIAMETER (IN): **4.0***
3. WATER LEVEL BELOW TOP OF CASING (FT): **4.64**
4. VOLUME OF WATER IN CASING (GAL): **8.40**

   #1 - #3 x #2 (Gal/Ft)

   VOLUME OF 3 CASINGS: **25.2** GAL.

WELL ID.	VOL. (GAL/FT)
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

	ACCUMULATED VOLUME PURGED (GALLONS)									
PARAMETERS	2	8	15	20	25	Sample				
pH	7.33	7.24	7.20	7.30	7.20	7.26				
CONDUCTIVITY (μmhos)	750	800	800	800	775	775				
TURBIDITY (NTU)	≈50	≈50	≈50	≈50	≈50	≈50				
TEMPERATURE (^{o}C)	9.3	8.3	8.7	8.4	8.0	8.2				
Eh	-57.6	-53.7	-52.8	-54.4	-50.2	-53.9				
TIME	1033	1039	1045	1049	1055	1128				

COMMENTS: Initial purge water was clear, had a sheen on the surface, contained oil globules, and had a strong gasoline odor. The odor, sheen, and oil globules were observed through the end of purging.

* A 4 inch casing diameter was used to account for the 3 7/8" bedrock corehole.

APPENDIX C

SOIL BORING, TEST PIT AND MONITORING WELL SUMMARY TABLES

Table C-1.
Stratigraphic Summary of Borings, Test Pits, and Monitoring Wells Installed at the Guterl Excised Area, the Guterl Specialty Steel Corporation Landfill (932032), the Diamond Shamrock Site (932071), the Niagara Materials Site (932073), and the Niagara County Refuge Disposal District Landfill (932024), Lockport, New York. All Depths and Elevations are Measured in Feet.

Well or Boring Number	Date Installed or Completed	Total Boring Depth	UTM Coordinates		Ground Surface Elevation	Glaciolacustrine Deposits			Glacial Till			Lockport Dolostone	
			East	North		Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness	Depth	Surface Elevation
Guterl Excised Area (Unlisted)													
MW-1 (B-1)	5/15/97	15.0	686190	4780828	597.20				3.7	593.50	0.5	4.2	593.00
MW-2 (B-2)	5/16/97	14.5	686147	4780694	596.70	Indeterminate Due to Poor Sample Recovery						4.5	592.20
MW-3 (B-3)	5/14/97	14.4	686081	4780872	597.00	Indeterminate Due to Poor Sample Recovery						3.9	593.10
MW-4 (B-4)	5/16/97	14.4	685991	4780767	596.50				1.5	595.00	2.0	3.5	593.00
MW-5 (B-5)	5/15/97	15.5	686094	4780780	596.10				0.3	595.80	4.0	4.3	591.80
SB-6	5/14/97	4.3	686072	4780884	597.0+	2.7	594.30	1.6				4.3	592.70
SB-7B	5/14/97	7.2	686185	4780643	597.0+	Former Lagoon - Native Deposits Not Encountered							
Guterl Specialty Steel Corporation Landfill (Registry Number 932032)													
MW-1 (B-1)	12/3/80	5.5	685694	4780916	598.50				4.0	594.50	1.5	5.5	593.00
MW-2 (B-2)	12/3/80	3.4	685677	4781119	602.50				1.0	601.50	2.4	3.4	599.10
MW-3 (B-3)	12/3/80	3.7	Location Unknown		598.8*							3.7	595.10
MW-4 (B-4)	12/3/80	5.5	685749	4781033	603.70							5.5	598.20
B-5	12/17/80	4.9	Location Unknown		---------				2.0	---------	2.9	4.9	---------
B-6	12/17/80	3.5	Location Unknown		---------				1.3	---------	2.2	3.5	---------
MW-105	10/28/92	5.0	685616	4781033	597.40				0.6	596.80	4.0	4.6	592.80
TB-101	10/28/92	11.0	685753	4781106	605.4*	0.0	605.40	8.7	8.7	596.70	2.3	11.0	594.40
TB-103	10/28/92	10.0	685709	4781088	604.4*				6.0	598.40	4.0	10.0	594.40
TB-104	10/28/92	15.3	685691	4781071	611.2*				14.2	597.00	1.1	15.3	595.90
TB-105	10/28/92	5.2	685636	4781088	600.7*				4.0	596.70	1.2	5.2	595.50
TP-101	1/12/93	7.0	685662	4781028	604.6*								
TP-102	1/12/93	9.5	685719	4781113	604.3*				7.5	596.80			
TP-103	1/12/93	4.0	685723	4781023	602.7*							4.0	598.70
TP-104	1/12/93	7.5	685671	4780998	602.6*								
TP-105	1/12/93	4.0	685649	4780948	597.8*				2.5	595.30			
TP-106	1/12/93	6.0	685716	4780951	599.9*				4.2	595.70			

Table C-1 (continued).
Stratigraphic Summary of Borings, Test Pits, and Monitoring Wells Installed at the Guterl Excised Area, the Guterl Specialty Steel Corporation Landfill (932032), the Diamond Shamrock Site (932071), the Niagara Materials Site (932073), and the Niagara County Refuge Disposal District Landfill (932024), Lockport, New York. All Depths and Elevations are Measured in Feet.

Well or Boring Number	Date Installed or Completed	Total Boring Depth	UTM Coordinates		Ground Surface Elevation	Glaciolacustrine Deposits			Glacial Till			Lockport Dolostone	
			East	North		Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness	Depth	Surface Elevation
Diamond Shamrock Site (Registry Number 932071)													
TP1-94	6/21/94	1.0	686243	4781091	595.1*				0.0	595.10	0.7	0.7	594.40
TP2-94	6/21/94	2.1	686285	4781078	596.3*				1.0	595.30	1.1	2.1	594.20
TP3-94	6/21/94	0.9	686292	4781098	595.3*	0.0	595.30	0.5	0.5	594.80	0.4	0.9	594.40
TP4-94	6/21/94	4.0	686242	4781074	597.3*				2.5	594.80	1.5	4.0	593.30
BH1-94	6/21/94	4.7	686304	4780961	595.0*				3.0	592.00	1.7	4.7	590.30
MW1-94	11/8/94	14.2	686250	4781134	597.70				0.8	596.90	0.3	1.1	596.60
MW2-94	11/4/94	14.6	686307	4781049	596.75				0.5	596.25	2.4	2.9	593.85
MW3-94	11/7/94	14.5	686210	4781056	597.50							4.1	593.40
MW4-94	11/4/94	14.9	686275	4781026	595.70							2.3	593.40
MW5-94	11/8/94	15.0	686305	4780965	594.43							4.2	590.23
MW6-94	11/9/94	15.1	686217	4780918	595.60				3.5	592.10	0.4	3.9	591.70
MW7-94	11/7/94	16.3	686260	4780917	595.27	3.0	592.27	1.4	4.4	590.87	2.1	6.5	588.77
Ext. Well	Unknown	Unknown	686291	4780978	595.36	Boring Log Not Available							

* Elevation adjustments of -1.68' and -1.39' were added to the Guterl Specialty Steel Corporation Landfill and Diamond Shamrock elevations to bring all elevations into a common datum.
\+ Estimated Elevation.

Table C-2.
Monitoring Well Instrumentation Summary for Deep Overburden and Upper Lockport Bedrock Wells Installed in the Study Area.

Well Designation	Ground Surface Elevation (ft. AMSL)	Top of Riser Elevation (ft. AMSL)	Sandpack Interval (ft. BGS)	Sandpack Interval (ft. AMSL)	Well Screen Interval (ft. BGS)	Well Screen Interval (ft. AMSL)	Screened Unit
Guterl Excised Area (Unlisted)							
MW-1	597.20	599.14	7.70 to 15.00	589.50 to 582.20	9.70 to 14.70	587.50 to 582.50	Goat Island Dolostone
MW-2	596.70	598.56	7.50 to 14.50	589.20 to 582.20	9.20 to 14.20	587.50 to 582.50	Goat Island Dolostone
MW-3	597.00	598.82	7.20 to 14.40	589.80 to 582.60	9.10 to 14.10	587.90 to 582.90	Goat Island Dolostone
MW-4	596.50	598.67	6.90 to 14.40	589.60 to 582.10	9.10 to 14.10	587.40 to 582.40	Goat Island Dolostone
MW-5	596.10	598.24	8.20 to 15.50	587.90 to 580.60	10.2 to 15.20	585.90 to 580.90	Goat Island Dolostone
Guterl Specialty Steel Corporation Site (Registry Number 932032)							
MW-1	598.50	601.44	3.50 to 5.50	595.00 to 593.00	4.50 to 5.50	594.00 to 593.00	Glacial Till
MW-2	602.50	604.28	1.40 to 3.40	601.10 to 599.10	2.40 to 3.40	600.10 to 599.10	Glacial Till
MW-3	598.8*	601.5*	1.70 to 3.70	597.10 to 595.10	2.70 to 3.70	596.10 to 595.10	Misc. Fill; Destroyed
MW-4	603.70	605.29	3.50 to 5.50	600.20 to 598.20	4.50 to 5.50	599.20 to 598.20	Miscellaneous Fill
MW-105	597.40	599.25	2.00 to 5.00	595.40 to 592.40	3.00 to 5.00	594.40 to 592.40	Glacial Till
Diamond Shamrock Site (Registry Number 932071)							
MW1-94	597.70	597.35	4.50 to 14.20	593.20 to 583.50	5.51 to 13.51	592.19 to 584.19	Goat Island Dolostone
MW2-94	596.75	596.52	4.60 to 14.60	592.15 to 582.15	6.60 to 14.60	590.15 to 582.15	Goat Island Dolostone
MW3-94	597.50	596.94	5.00 to 14.50	592.50 to 583.00	6.08 to 14.08	591.42 to 583.42	Goat Island Dolostone
MW4-94	595.70	595.34	5.60 to 14.90	590.10 to 580.80	6.58 to 14.58	589.12 to 581.12	Goat Island Dolostone
MW5-94	594.43	594.14	4.50 to 15.00	589.93 to 579.43	5.88 to 13.88	588.55 to 580.55	Goat Island Dolostone
MW6-94	595.60	595.21	5.40 to 15.10	590.20 to 580.50	6.44 to 14.44	589.16 to 581.16	Goat Island Dolostone
MW7-94	595.27	594.91	7.30 to 16.30	587.97 to 578.97	8.08 to 16.08	587.19 to 579.19	Goat Island Dolostone

Ft. AMSL Feet Above Mean Sea Level. **Ft. BGS** Feet Below Ground Surface. * Adjusted Elevation.

APPENDIX D

ANALYTICAL DATA SUMMARY TABLES

Surface Soil, Subsurface Soil, Groundwater,
Lagoon & Pump House Sampling

Table D-1.
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Organic Compounds in Samples Collected by DEC, May 1997.
(All results in µg/kg)

Parameter	DEC Cleanup Goal	SS-1	SS-2	SS-3	SS-4	SS-5
Semi-Volatile Compounds						
Phenol	30			**110 J (120 J)**		
2-Methylphenol	100			69 J (66 J)		
4-Methylphenol	900			100 J (110 J)		
Naphthalene	13,000	66 J		92 J (150 J)		
4-Chloro-3-Methylphenol	240			72 J (100 J)	**3100 J**	
2-Methylnaphthalene	36,400	100 J		150 J (270 J)		
Dibenzofuran	6,200			69 J (110 J)		
Fluorene	50,000					89 J
Phenanthrene	50,000	100 J	490 J	1000 (1500) (1400 J)		1300
Anthracene	50,000		140 J	76 J		260 J
Carbazole				180 J		190 J
Di-n-Butylphthalate	8,100	90 J		65 J		
Fluoranthene	50,000	150 J	2500	570 (150 J) (740 J)		1500
Pyrene	50,000	120 J	2100	910 (800) (1200 J)		1300
Butylbenzylphthalate	50,000			190 J		
Benzo(a)Anthracene	224	70 J	**2400**	**380**		**650 J**
Chrysene	400	100 J	**2100**	**430 (520) (890 J)**		**680 J**
Bis(2-Ethylhexyl)Phthalate	50,000	320 J	360 J	1500 (11000 E) (18000)		85 J
Di-n-Octyl Phthalate	50,000	670		76 J (160 J)		
Benzo(b)Fluoranthene	224	150 J	**3900**	210 J (410)		**1100**
Benzo(k)Fluoranthene	224		**980**			**360 J**
Benzo(a)Pyrene	61	62 J	**2700**	**93 J**		**730 J**
Indeno(1,2,3-cd)Pyrene	3,200	55 J	1400	43 J		410 J
Dibenz(a,h)Anthracene	14		**360 J**			**82 J**
Benzo(g,h,i)Perylene	50,000	83 J	1200	44 J		350 J

J Estimated concentration.
E Estimated concentration that exceeds the calibration range.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals.

Table D-2.
Surface Soil Analytical Results for the Guterl Excised Area.
Analyses of Metals in Samples Collected by DEC, May 1997.
(All results in mg/kg)

Parameter	DEC Cleanup Goal	SS-1	SS-2	SS-3	SS-4	SS-5
Aluminum	BG (1000)	1990	3630	2430	472	2300
Antimony	BG (20)	37.4	46.4	110	17.1	108
Arsenic	7.5	18.9	25.9	36.1	5.0	36.5
Barium	300	64.4	87.3	249	279	146
Beryllium	0.16	0.51 B	0.58 B	0.64 B		0.78 B
Cadmium	10	0.43 BN			2.8 N	
Calcium	BG (10000)	77200 E	29700 E	20900 E	10500 E	37500 E
Chromium	50	2510	5300	4060	1120	1590
Cobalt	30	660	1050	734	77.0	3070
Copper	25	1140 N	2850 N	2600 N	1030 N	7590 N
Iron	2,000	61800	113000	73700	53400	128000
Lead	400	447	148	775	67.6	2820
Magnesium	BG (10000)	44100 E	9500 E	5740 E	7190 E	18500 E
Manganese	BG (1500)	2930 N	10400 N	5620 N	1480 N	3150 N
Mercury	0.1	0.15		0.11		0.13
Nickel	13	14400 N	26600 N	25200 N	1930 N	20200 N
Potassium	BG (500)	559 B	402 B	2090	1170	372 B
Selenium	2	14.6	20.4	27.3	3.0	19.9
Silver	BG (5)	1.1 B	1.2 B	16.5		2.4 B
Sodium	BG (1000)	372 B	297 B	7890	2040	434 B
Thallium	BG (8)	7.2	16.0	17.4	2.0	15.5
Vanadium	150	322	475	405	29.7	498
Zinc	20	903	183	1010	563	507

BG Background.
J Estimated concentration.
B Value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E Estimated concentration due to the presence of interference.
N Spike sample recovery is not within control limits.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals.

Table D-3A.
Surface Soil Analytical Results for the Guterl Excised Area.
Analyses of Organic Compounds in EPA Samples 1 through 4.
(TCL Results in µg/kg; TCLP Results in µg/L)

Parameter	DEC Cleanup Goal	GS-1 (TCL)	GS-2 (TCL)	GS-3 (TCL)	GS-4 (TCL)	GS-4 (TCLP)
Volatile Compounds						
Methylene Chloride	100	2 JB	2 JB	2 JB	2 J	
Acetone	200	12	8 J	11		
2-Butanone	300	3	3 J	5 J		
Benzene	60					6 J*
Semi-Volatile Compounds						
Phenol	30	130 J		ND (45 J)	71 J	
4-Methylphenol	900	46 J	41 J		40 J	
Naphthalene	13,000	1400	180 J		510	
2-Methylnaphthalene	36,400	1800	170 J		490	
Acenaphthylene	41,000	160 J				
Acenaphthene	50,000	1400	71 J		240 J	
Dibenzofuran	6,200	1900	130 J		360 J	
Fluorene	50,000	1300	59 J		170 J	
Phenanthrene	50,000	19000 E (5200 J)	410	890 (640)	1100	
Anthracene	50,000	6900 E (1800 J)			71 J	
Carbazole		2100			39 J	
Fluoranthene	50,000	35000 E (20000)	280 J	240 J (190 J)	670	
Pyrene	50,000	57000 E (19000)	160 J	320 J (290 J)	500	
Benzo(a)Anthracene	224	58000 E (14000)	52 J	93 J (69 J)	150 J	
Chrysene	400	29000 E (21000)	180 J	280 J (180 J)	410	
Bis(2-Ethylhexyl)Phthalate	50,000	2100		100 J (80 J)	210 J	
Benzo(b)Fluoranthene	224	25000 E (17000)	57 J	120 J (95 J)	130 J	
Benzo(k)Fluoranthene	224	25000 E (11000)	140 J	130 J (67 J)	140 J	
Benzo(a)Pyrene	61	8400 E (16000)		66 J	110 J	

Table D-3A (continued).
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Organic Compounds in EPA Samples 1 through 4.
(TCL Results in µg/kg; TCLP Results in µg/L)

Parameter	DEC Cleanup Goal	GS-1 (TCL)	GS-2 (TCL)	GS-3 (TCL)	GS-4 (TCL)	GS-4 (TCLP)
Semi-Volatile Compounds (continued)						
Indeno(1,2,3-cd)Pyrene	3,200	12000 E (9900)		35 J (42 J)	64 J	
Benzo(g,h,i)Perylene	50,000	16000 E (14000)		43 J (62 J)	98 J	
Pesticides and PCB's						
Heptachlor Epoxide	20	120 PE (140 P)		8.2 PX	6.2	
Endosulfan I	900	3.2 P		18 P	2.7 P	
Dieldrin	44	12 PX			2.4 JPX	
4,4'-DDE	2,100	37 PX (34 JPX)	3 JPX	14 PX	10 X	
Endrin	100	3.7 JPX	10 PX	9.6 PX	2.8 JPX	
4,4'-DDD	2,900	3.2 JP		14 X		
Endosulfan Sulfate	1,000	25 P (30 JP)		6.9 PX		
4,4'-DDT	2,100	22 PX (26 JPX)	4.4 PX	12 PX	6.2 PX	
Endrin Ketone		45 PX (33 JPX)	15 PX	6.5 PX		
Endrin Aldehyde			53 X (57 X)		10 PX	
Alpha Chlordane	540	2.4 P		1.5 JP		
gamma Chlordane	540			2.3 PX	7 PX	
Arochlor 1254	1,000	180 P (150 JP)			380	
Arochlor 1260	1,000		980 E (800)		150 PJ	

J Estimated concentration.
E Estimated concentration that exceeds the calibration range.
B Analyte was detected in the associated blank as well as the sample.
P >25% difference between the analytical results on two GC columns. The lower value is reported.
X Manually integrated and calculated.
***** TCLP regulatory limit for benzene is 500 µg/L.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals or regulatory limits.

Table D-3B.
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Organic Compounds in EPA Samples 5 through 8.
(All results in µg/kg)

Parameter	DEC Cleanup Goal	GS-5	GS-6	GS-7	GS-8
Volatile Compounds					
Methylene Chloride	100	3 J	2 J	3 J	4 J
Trichloroethene	700		3 J		
Benzene	60				
Tetrachloroethene	1,400				
Semi-Volatile Compounds					
Phenol	30	**130 J**	**84 J**	**380**	
4-Methylphenol	900	61 J			
Naphthalene	13,000	530 (470 J)	290 J	42 J	150 J
2-Methylnaphthalene	36,400	460 (360 J)	340 J	54 J	210 J
Acenaphthylene	41,000		42 J		
Acenaphthene	50,000	200 J	130 J		
Dibenzofuran	6,200	260 J (220 J)	230 J		66 J
Fluorene	50,000	250 J (220 J)	110 J		
Phenanthrene	50,000	3600 E (3700)	980	89 J	210 J
Anthracene	50,000	1100 (970 J)	100 J		
Carbazole		940 (1000 J)			
Fluoranthene	50,000	6000 E (8800)	1100	58 J	220 J
Pyrene	50,000	7400 E (5400)	740	46 J	170 J
Benzo(a)Anthracene	224	**4400 E (3700)**	**410**		110 J
Chrysene	400	**7200 E (5700)**	**710**	47 J	250 J
Bis(2-Ethylhexyl)Phthalate	50,000	230 J	170 J	52 J	
Benzo(b)Fluoranthene	224	**3200 E (2700)**	**380**		140 J
Benzo(k)Fluoranthene	224	**3000 (3100)**	**560**		130 J
Benzo(a)Pyrene	61	**3200 E (2900)**	**320 J**		**130 J**
Indeno(1,2,3-cd)Pyrene	3,200	1100 (1600 J)	120		36 J
Benzo(g,h,i)Perylene	50,000	1500 (2400)	160 J		49 J

Table D-3B (continued)
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Organic Compounds in EPA Samples 5 through 8.
(All results in µg/kg)

Parameter	DEC Cleanup Goal	GS-5	GS-6	GS-7	GS-8
Pesticides and PCB's					
Aldrin	41	6.4 P	1 JP		0.99 JP
Heptachlor Epoxide	20	4.8 P	4.8	1.1 JPX	2.9 P
Endosulfin I	900	10 P	4.2 P		
Dieldrin	44	11 PX	6.7 X		2.3 JPX
4,4'-DDE	2,100	17 X	13 X		
Endrin	100	3.4 JPX	5.1 PX		2.4 JPX
4,4'-DDD	2,900	6.4 P			
Endosulfan Sulfate	1,000	2.2 JP			
4,4'-DDT	2,100	11 PX	5.7 PX	1.8 JPX	2.6 JPX
Endrin Ketone		13 PX	1.8 JPX		
Endrin Aldehyde		16 X	20 PX	2.8 JX	4.2 PX
Alpha Chlordane	540	3.6 P			
gamma Chlordane	540	21 X	6.1 PX		1.2 JPX
Aroclor 1248	1,000	120 J			
Aroclor 1254	1,000	410 P	470	23 JP	210
Aroclor 1260	1,000	250 JP	300 J		40 JP

J Estimated concentration.
E Estimated concentration that exceeds the calibration range.
P >25% difference between the analytical results on two GC columns. The lower value is reported.
X Manually integrated and calculated.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals.

Table D-3C.
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Organic Compounds in EPA Samples 9 through 13.
(All results in µg/kg)

Parameter	DEC Cleanup Goal	GS-9	GS-10	GS-11	GS-12/13
Volatile Compounds					
Methylene Chloride	100	ND (6 J)	2 JB (3 J)		
Carbon Disulfide	2,700	ND (2 J)			
Benzene	60	ND (7 J)			
Tetrachloroethane	1,400		7 J	17	
Toluene	1,500	ND (3 J)	2 J		
Ethylbenzene	5,500	ND (4 J)			
Xylene (Total)	1,200	ND (16)			
Semi-Volatile Compounds					
Phenol	30	**85 J**	**240 J**		
2,4-Dimethylphenol		130 J			
Naphthalene	13,000	5600 E (4300)	990	590	180 J (36 J)
2-Methylnaphthalene	36,400	8200 E (6900)	1300	860	260 J (57 J)
Acenaphthene	50,000		230 J	38 J	
Dibenzofuran	6,200	2300 (1700 J)	550	240 J	84 J
Fluorene	50,000	290 J	180 J		
Phenanthrene	50,000	3200 E (2400)	1400	450	220 J (250 J)
Anthracene	50,000	140 J	82 J		ND (57 J)
Carbazole		240 J	54 J		ND (42 J)
Fluoranthene	50,000	590 (380 J)	860	260 J	170 J (360)
Pyrene	50,000	780 (510 J)	580	230 J	140 J (270 J)
Benzo(a)Anthracene	224	**610 (430 J)**	**240 J**	170 J	81 J (180 J)
Chrysene	400	**1600 (870 J)**	**570**	390	190 J (350 J)
Bis(2-Ethylhexyl)Phthalate	50,000		71 J		
Benzo(b)Fluoranthene	224	**550 (300 J)**	**290 J**	200 J	100 J (200 J)
Benzo(k)Fluoranthene	224	**410 (240 J)**	**310 J**	**240 J**	**120 J (250 J)**
Benzo(a)Pyrene	61	**500 (240 J)**	**210 J**	**150 J**	**81 J (170 J)**
Indeno(1,2,3-cd)Pyrene	3,200	85 J	63 J	52 J	ND (50 J)
Benzo(g,h,i)Perylene	50,000	130 J	88 J	74 J	44 J (55 J)

Table D-3C (continued).
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Organic Compounds in EPA Samples 9 through 13.
(All results in μg/kg)

Parameter	DEC Cleanup Goal	GS-9	GS-10	GS-11	GS-12/13
Pesticides and PCB's					
Aldrin	41		1.4 JP		2.7 P (2.4 P)
Heptachlor Epoxide	20	0.96 JP	6.7 P	4.5	6.7 P (5.6 P)
Endosulfan I	900		1.8 P	1.8 JP	1.6 JP
Dieldrin	41				6.2 PX (8.2 X)
4,4'-DDE	2,100	8.4 PX	3.2 JP	5.4 X	12 PX (13 X)
Endrin	100				2.1 JPX (4.7 PX)
4,4'-DDD	2,900	3.9 P			
Endosulfan Sulfate	1,000	3.9 P			
4,4'-DDT	2,100	14 PX	3.4 JPX	9.9 PX	5.1 PX (5.5 PX)
Endrin Ketone		7.9 PX	5 X	4 PX	4.6 PX (8 PX)
Endrin Aldehyde		3.1 JPX	3.7 PX	9.6 PX	17 PX (26 X)
gamma Chlordane	540	3.1 PX			10 PX
Arochlor 1248	1,000				100 P (96 P)
Arochlor 1254	1,000	160 P	140	79 J	430 (520)
Arochlor 1260	1,000	36 JP	70 JP	280	490 (470)

J Estimated concentration.
E Estimated concentration that exceeds the calibration range.
B Analyte was detected in the associated blank as well as the sample.
P >25% difference between the analytical results on two GC columns. The lower value is reported.
X Manually integrated and calculated.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals.

Table D-4A.
Surface Soil Analytical Results for the Guterl Excised Area.
Analyses of Metals in EPA Samples 1 through 4.
(TCL Results in mg/kg; TCLP Results in µg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	GS-1 (TCL)	GS-1 (TCLP)	GS-2 (TCL)	GS-2 (TCLP)	GS-3 (TCL)	GS-3 (TCLP)	GS-4 (TCL)	GS-4 (TCLP)
Aluminum	BG (1000)		7870		2330		5080		17200	
Antimony	BG (20)								279 N	
Arsenic	7.5	5,000	26.7		50.9		5.3	3.1 B	61.2	18.2 B
Barium	300	100,000	168	1330 B	43.5 B	373 B	225	402 B	161	197 B
Beryllium	0.16		0.48 B		0.14 B		0.25 B		0.89 B	
Cadmium	10	1,000		1.8 B	3.8 B	50.9 B	0.19 B	10.6 B		7.9 B
Calcium	BG (10000)		7240		24300		14500		47400	
Chromium	50	5,000	4690	428 B	2410	1370	303	2.2 B	4350	2.7 B
Cobalt	30		961		970		66.6		548	
Copper	25		6220		610		135		1060	
Iron	2,000		161000		106000		37600		144000	
Lead	400	5,000	422 E	22.6 B	396 E	9.6 B	55.8 E	8.9 B	2220 E	2030
Magnesium	BG (10000)		2800 B		14200		4300		16900	
Manganese	BG (1500)		9510		3630		1600		4370	
Mercury	0.1	200	0.1 B		0.44				0.13	
Nickel	13		22900		15600		807		19500	
Potassium	BG (500)		383 B		422 B		929 B		1310	
Selenium	2	1,000			5.6 B	7.8 B	1.6	4 B		
Silver	BG (5)	5,000	3.7 B	10 B	4.6 B	10 B		20 B		20 B
Sodium	BG (1000)		426 B		228 B		270 B		2300	
Thallium	BG (8)		4.8 B				0.7 B			
Vanadium	150		376 N		209 N		86.4 N		393 N	

Table D-4A (continued).
Surface Soil Analytical Results for the Guterl Excised Area.
Analyses of Metals in EPA Samples 1 through 4.
(TCL Results in mg/kg; TCLP Results in µg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	GS-1 (TCL)	GS-1 (TCLP)	GS-2 (TCL)	GS-2 (TCLP)	GS-3 (TCL)	GS-3 (TCLP)	GS-4 (TCL)	GS-4 (TCLP)
Zinc	20		299		427		144		404	

BG	Background.
B	Value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E	Estimated concentration due to the presence of interference.
N	Spike sample recovery is not within control limits.
(2.8)	Results of duplicate analysis.
	Shaded values exceed the DEC Cleanup Goals or regulatory limits.

Table D-4B.
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Metals in EPA Samples 5 through 8.
(TCL Results in mg/kg; TCLP Results in µg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	GS-5 (TCL)	GS-5 (TCLP)	GS-6 (TCL)	GS-6 (TCLP)	GS-7 (TCL)	GS-7 (TCLP)	GS-8 (TCL)	GS-8 (TCLP)
Aluminum	BG (1000)		10700		3420		1660		2720	
Antimony	BG (20)		27.6 N							
Arsenic	7.5	5,000	31.2	4.2 B	18.2		0.57 B		4.6	2.9 B
Barium	300	100,000	127	473 B	121	862 B	13 B	316 B	41.7 B	735 B
Beryllium	0.16		0.41 B		0.26 B		0.05 B		0.17 B	
Cadmium	10	1,000	15.6	7.6 B		9.2 B	0.15 B	5.9 B		1.6 B
Calcium	BG (10000)		39800		31900		6850		23900	
Chromium	50	5,000	1440	11.8 B	6140	38.6 B	143	18.4 B	581	1 B
Cobalt	30		458		1290		527		222	
Copper	25		526		2830		315		374	
Iron	2,000		80400		170000		7370		23400	
Lead	400	5,000	940 E	4.1 B	422 E	17.1 B	22.2 E	16.9 B	441 E	122 B
Magnesium	BG (10000)		21100		13200		4650		19800	
Manganese	BG (1500)		4960		11000		2270		1330	
Mercury	0.1	200	0.29		0.15				0.06 B	
Nickel	13		4460		28500		945		2220	
Potassium	BG (500)		1540		431 B		126 B		384 B	
Selenium	2	1,000	2 B	6 B			1.2	4.7 B	1.6	
Silver	BG (5)	5,000	4.4 B	20 B	1.2 B	20 B		10 B	0.19 B	10 B
Sodium	BG (1000)		526 B		177 B		121 B		100 B	
Thallium	BG (8)		1.6 B		6.8 B					
Vanadium	150		111 N		422 N		15.7 N		81	

Table D-4B (continued).
Surface Soil Analytical Results for the Guterl Excised Area.
Analyses of Metals in EPA Samples 5 through 8.
(TCL Results in mg/kg; TCLP Results in µg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	GS-5 (TCL)	GS-5 (TCLP)	GS-6 (TCL)	GS-6 (TCLP)	GS-7 (TCL)	GS-7 (TCLP)	GS-8 (TCL)	GS-8 (TCLP)
Zinc	20		1220		746		76.2		85.5	

BG Background.
B Value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E Estimated concentration due to the presence of interference.
N Spike sample recovery is not within control limits.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals or regulatory limits.

Table D-4C.
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Metals in EPA Samples 9 through 13.
(TCL Results in mg/kg; TCLP Results in µg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	GS-9 (TCL)	GS-9 (TCLP)	GS-10 (TCL)	GS-10 (TCLP)	GS-11 (TCL)	GS-11 (TCLP)	GS-12/13 (TCL)	GS-12/13 (TCLP)
Aluminum	BG (1000)		5330		4070		4120		505 (698)	
Antimony	BG (20)								ND (9.2 B)	
Arsenic	7.5	5,000	12.6		16.5	2.7 B	18.9	3.3 B	38.8 (34)	57.1 B (12.8 B)
Barium	300	100,000	126	716 B	101	685 B	91	1080 B	29.8 B (27.7 B)	827 B (792 B)
Beryllium	0.16		0.43 B		0.25 B		0.35 B		0.23 B (0.17 B)	
Cadmium	10	1,000		1.5B		3.5B		4.8B		5.1 B (3.9 B)
Calcium	BG (10000)		41100		18400		34600		26400 (22800)	
Chromium	50	5,000	964	4.2 B	2000	24.6 B	1240	3.8 B	2770 (1640)	8.2 B (4.2 B)
Cobalt	30		433		2700		299		6940 (5740)	
Copper	25		422		3050		404		1360 (2670)	
Iron	2,000		58900		87800		94300		169000 (98800)	
Lead	400	5,000	183 E	49.5 B	1810 E	27.3 B	233 E	51.7 B	449 E (2150 E)	13200 (2270)
Magnesium	BG (10000)		20700		9290		16600		14100 (12000)	
Manganese	BG (1500)		1610		4560		974		1550 (1240)	

Table D-4C (continued).
Surface Soil Analytical Results for the Guteri Excised Area.
Analyses of Metals in EPA Samples 9 through 13.
(TCL Results in mg/kg; TCLP Results in µg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	GS-9 (TCL)	GS-9 (TCLP)	GS-10 (TCL)	GS-10 (TCLP)	GS-11 (TCL)	GS-11 (TCLP)	GS-12/13 (TCL)	GS-12/13 (TCLP)
Mercury	0.1	200	0.08 B		0.06 B		0.06 B			
Nickel	13		**4950**		**15200**		**3820**		**4860 (4660)**	
Potassium	BG (500)		405 B		382 B		**598 B**		173 B (136 B)	
Selenium	2	1,000	**3.7**	3.3 B			1.4 B	3 B		
Silver	BG (5)	5,000	0.35 B	10 B	0.99 B	10 B		10 B	ND (1.1 B)	10 B (10 B)
Sodium	BG (1000)		329 B		197 B		195 B		65.8 B (71.6 B)	
Thallium	BG (8)		0.89 B		4.2 B					
Vanadium	150		107 N		**229 N**		**170**		**1060 N (703 N)**	
Zinc	20		**202**		**322**		**328**		**92.7 (116)**	

BG Background.
B Value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E Estimated concentration due to the presence of interference.
N Spike sample recovery is not within control limits.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals or regulatory limits.

Table D-5.
Subsurface Soil Analytical Results for the Guterl Excised Area.
Analyses of Organic Compounds in Samples Collected by DEC, May 1997.
(All results in µg/kg)

Parameter	DEC Cleanup Goal	SB-1/MW-1 (2-4 ft. bgs)	SB-2/MW-2 (0-4 ft. bgs)	SB-3/MW-3 (0.2-0.8 ft. bgs)	SB-4/MW-4 (0-1.5 ft. bgs)	SB-6 (0-2 ft. bgs)	SB-6 (2 ft. bgs)	SB-7 (6-8 ft. bgs)
Volatile Organic Compounds								
Methylene Chloride	100	1 J	1 J (3 BJ)	2 BJ		2 BJ		
Acetone	200					23		
Carbon disulfide	2,700		8 J					
Toluene	1,500		6 J (4 J)					
Semi-Volatile Compounds								
Phenol	30		67 J					300 J (270 J)
4-Methylphenol	900							120 J (110 J)
2,4-Dimethylphenol								600 (500)
Naphthalene	13,000		190 J	74 J (120 J)	180 J (280 J)	42 J		74 J (67 J)
2-Methylnaphthalene	36,400		320 J	85 J (160 J)	210 J (250 J)	59 J		290 J (370 J)
Dimethyl Phthalate	2,000							ND (350 J)
Acenaphthene	50,000				390 (550 J)			94 J
Dibenzofuran	6,200		88 J	43 J (50 J)	230 J (370 J)			64 J
Fluorene	50,000				400 (690 J)			160 J (230 J)
Phenanthrene	50,000		360 J	140 J (170 J)	3800 E (5900)	550 (510 J)		810
Anthracene	50,000				930 (1500)	190 J		110 J (910)
Carbazole					380 (490 J)	51 J		
Fluoranthene	50,000		310 J	180 J (140 J)	4200 E (6100)	1400 (2500)		300 J (340 J)
Pyrene	50,000		300 J	150 J (140 J)	4100 E (5300)	4000 E (2700)		1200 (920)
Benzo(a)Anthracene	224		150 J	130 J (120 J)	2400 (3200)	2100 (1900)		360 J

Table D-5 (continued).
Subsurface Soil Analytical Results for the Guterl Excised Area.
Analyses of Organic Compounds in Samples Collected by DEC, May 1997.
(All results in µg/kg)

Parameter	DEC Cleanup Goal	SB-1/MW-1 (2-4 ft. bgs)	SB-2/MW-2 (0-4 ft. bgs)	SB-3/MW-3 (0.2-0.8 ft. bgs)	SB-4/MW-4 (0-1.5 ft. bgs)	SB-6 (0-2 ft. bgs)	SB-6 (2 ft. bgs)	SB-7 (6-8 ft. bgs)
Semi-Volatile Compounds (continued)								
Chrysene	400		200 J	170 J (140 J)	1900 (3300)	1900 (1800)		400 J (780)
Bis(2-Ethylhexyl)Phthalate	50,000	370	240 J	210 J (860)		530 (330 J)		940 (840)
Benzo(b)Fluoranthene	1,100	72 J	220 J	200 J (230 J)	2800 (3400)	3400 E (3700)		
Benzo(k)Fluoranthene	1,100		79 J	82 J (110 J)	790 (950 J)	970 (1200 J)		
Benzo(a)Pyrene	61		120 J	120 J (100 J)	1700 (2700)	2100 (2400)		
Indeno(1,2,3-cd)Pyrene	3,200			92 J (87 J)	620 (1500)	7800 E (1200 J)		ND (250 J)
Dibenz(a,h)Anthracene	14			38 J	55 J (360 J)	1100 (290 J)		
Benzo(g,h,i)Perylene	50,000		75 J	110 J (100 J)	480 (100 J)	14000 E (1000 J)		

J Estimated concentration.
E Estimated concentration that exceeds the calibration range.
B Analyte was detected in the associated blank as well as the sample.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals.

Table D-6A.
Subsurface Soil Analytical Results for the Guterl Excised Area.
Analyses of Metals in Samples Collected by DEC, May 1997; Borings SB-1 through SB-3.
(TCL results in mg/kg; TCLP results in μg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	SB-1/MW-1 (2-4 ft. bgs) (TCL)	SB-1/MW-1 (2-4 ft. bgs) (TCLP)	SB-2/MW-2 (0-4 ft. bgs) (TCL)	SB-2/MW-2 (0-4 ft. bgs) (TCLP)	SB-3/MW-3 (0.2-0.8 ft. bgs) (TCL)
Aluminum	BG (500)		**4430**		**4340**		**1010**
Antimony	BG (20)		2.0 B				**32.0**
Arsenic	7.5	5,000	5.9		**13.5**		**43.1**
Barium	300	100,000	28.1	299 E	91.8	554 E	151
Beryllium	0.16		**0.4 B**		**0.5 B**		**0.47 B**
Cadmium	10	1,000		10.4		3.4 B	
Calcium	BG (10000)		3270 E		**13600**		859 BE
Chromium	50	5,000	40.6		**459**		**1420**
Cobalt	30		18.5		**238**		26.2
Copper	25		**91.4**		**1410 N**		**59.9 N**
Iron	2,000		**10700**		**55000**		**81800**
Lead	400	5,000	14.1	12.2	52	26.5	31.6
Magnesium	BG (10000)		2020		7460 E		204 BE
Manganese	BG (1500)		393		**2550 N**		180
Mercury	0.1	200		0.2			
Nickel	13		**305**		**22200**		**447 N**
Potassium	BG (500)		401 B		316 B		85.6 B
Selenium	2	1,000	1.8	8.8	**6.8**	15.5	**16.1**
Sodium	BG (500)		305 B		430 B		285 B
Thallium	BG (8)		3.2		5.0		5.4
Vanadium	150		9.1 B		**265**		**431**

Table D-6A (continued).
Subsurface Soil Analytical Results for the Guterl Excised Area.
Analyses of Metals in Samples Collected by DEC, May 1997; Borings SB-1 through SB-3.
(TCL results in mg/kg; TCLP results in μg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	SB-1/MW-1 (2-4 ft. bgs) (TCL)	SB-1/MW-1 (2-4 ft. bgs) (TCLP)	SB-2/MW-2 (0-4 ft. bgs) (TCL)	SB-2/MW-2 (0-4 ft. bgs) (TCLP)	SB-3/MW-3 (0.2-0.8 ft. bgs) (TCL)
Zinc	20		169		102		37.3

BG	Background.
B	Value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E	Estimated concentration due to the presence of interference.
N	Spike sample recovery is not within control limits.
(2.8)	Results of duplicate analysis.
	Shaded values exceed the DEC Cleanup Goals or regulatory limits.

Table D-6B.
Subsurface Soil Analytical Results for the Guterl Excised Area.
Analyses of Metals in Samples Collected by DEC, May 1997; Borings SB-4 through SB-7.
(TCL results in mg/kg; TCLP results in μg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	SB-4/MW-4 (0-1.5 ft. bgs) (TCL)	SB-4/(MW-4 (0-1.5 ft. bgs) (TCLP)	SB-6 (0-2 ft. bgs) (TCL)	SB-6 (0-2 ft. bgs) (TCLP)	SB-6 (2 ft. bgs) (TCLP)	SB-7 (6-8 ft. bgs) (TCL)
Aluminum	BG (500)		**4730**		**4270**			**3540**
Antimony	BG (20)		14.8		**28.6**			19.8
Arsenic	7.5	5,000	**14.8**		**69**			6.2
Barium	300	100,000	68.2	574 E	84.6	359 E	328 E	69.4
Beryllium	0.16		**0.35 B**		**0.34 B**			
Cadmium	10	1,000		2.8 B				
Calcium	BG (10000)		**59000 E**		9340 E			**144000 E**
Chromium	50	5,000	**328**		**1880**	46.0	4.8 B	**561**
Cobalt	30		**290**		**508**			**210**
Copper	25		**696 N**		**1980 N**			**1970 N**
Iron	2,000		**32800**		**100000**			**26300**
Lead	400	5,000	347	105	240	18.5	84.0	329
Magnesium	BG (10000)		**43300 E**		2150			**34600 E**
Manganese	BG (1500)		785 N		**3200 N**			854 N
Mercury	0.1	200	**0.11**					**0.21**
Nickel	13		**1540 N**		**26600 N**			**1450 N**
Potassium	BG (500)		**754 B**		417 B			**727 B**
Selenium	2	1,000	**8.4**		**23.1**			**3.1**
Sodium	BG (500)		**590 B**		251 B			396 B
Thallium	BG (8)		4.0		**12.6**			3.3
Vanadium	150		57.1		**180**			63.6

Table D-6B (continued).
Subsurface Soil Analytical Results for the Guterl Excised Area.
Analyses of Metals in Samples Collected by DEC, May 1997; Borings SB-4 through SB-7.
(TCL results in mg/kg; TCLP results in µg/L)

Parameter	DEC Cleanup Goal	TCLP Regulatory Limits	SB-4/MW-4 (0-1.5 ft. bgs) (TCL)	SB-4/(MW-4 (0-1.5 ft. bgs) (TCLP)	SB-6 (0-2 ft. bgs) (TCL)	SB-6 (0-2 ft. bgs) (TCLP)	SB-6 (2 ft. bgs) (TCLP)	SB-7 (6-8 ft. bgs) (TCL)
Zinc	20		119		164			173

BG Background.
B Value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E Estimated concentration due to the presence of interference.
N Spike sample recovery is not within control limits.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals or regulatory limits.

Table D-7.
Analyses of Organic Compounds in Groundwater at the Guterl Excised Area, June 1997.
(All results in µg/L)

Parameter	Groundwater Standard	Upgradient				Downgradient	
		MW-4	MW-3	MW-5	MW6-94**	MW-1	MW-2
Volatile Organic Compounds							
Chloroethane	50*			64			11
Methylene Chloride	5			10 J			
1,1-Dichloroethene	5	54 (37 DJ)	4 J	18 J			2 J
1,1-Dichloroethane	5	130 (100 D)	20	730			31
1,2-Dichloroethene (total)	50*	24 (16 DJ)		7 J			4 J
Chloroform	7			82			
1,1,1-Trichloroethane	5	480 E (380 D)	7 J	270			5 J
Trichloroethene	5	130 (110 D)		10 J			2 J
Semi-Volatile Compounds							
Bis(2-ethylhexyl)phthalate	50	7 BJ	2 BJ	8 BJ		2 BJ	3 BJ
Total Semi-Volatile TICs		103 J	15 J	24 J		7 BJ	60 J
Pesticide/PCB's							
Alpha-BHC	ND			0.0071 JP			
Aroclor 1260	0.1		1.9 P				

J Estimated value.
D Compound identified in an analysis at a secondary dilution factor.
B Compound detected in blank.
****** Sample collected on November 10, 1994.

Shaded values exceed the Class GA ambient water quality standards or guidance values.

***** Guidance value, unspecified organic contaminant.
E Concentration exceeds the calibration range of the GC (MS instrument.
P There is a >25% difference between the analytical results of the two GC columns. The lower value is reported.
ND Non-detect.
(2.8) Results of duplicate analysis.

Table D-8.
Analyses of Metals in Groundwater at the Guterl Excised Area, June 1997.
(All results in µg/L)

Parameter	Groundwater Standard	Upgradient			Downgradient		
		MW-4	MW-3	MW-5	MW6-94**	MW-1	MW-2
Aluminum		377	5,520	394	170	178 B	328
Arsenic	25		7.3 B		2.8		
Barium	1,000	76.8 BJ	86.1 BJ	59.3 BJ	27.0	39.8 BJ	62.9 BJ
Calcium		102,000	178,000	109,000	130,000	165,000	97,800
Chromium	50		10.0				
Cobalt			39.5 B	7.6 B		4.7 B	
Copper	200	4.1 B	48.3	35.5		5.5 B	
Iron	300	**406**	**15,500**	**1,830**		**415**	**471**
Lead	25		12.7		3.1 J	3.8	2.8 B
Magnesium	35,000	**45,600**	**55,300**	30,600	**53,000**	**40,600**	29,300
Manganese	300	260	**632**	**325**	98	295	**358**
Nickel		6.1 B	2,150	807	21.0	146	4.0 B
Potassium		6,290	6,460	4,310 B	3,100	3,420 B	4,450 B
Sodium	20,000	**167,000**	**47,300**	**27,800**	**62,000**	**334,000**	**33,300**
Vanadium			7.0 B				
Zinc	300	123	**359**	50.8	53.0	272	117

B Value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
****** Sample collected on November 10, 1994.

J Estimated value.
Shaded values exceed the Class GA ambient water quality standards or guidance values.

Table D-9.
Analyses of Organic Compounds in Pump House Sediments at the Guteri Excised Area, June 1997.
(TCL Results in μg/kg; TCLP results in μg/L)

Parameter	DEC Sediment Criteria	TCLP Regulatory Limits	SED-3 (TCL)	SED-3 (TCLP)
Volatile Compounds				
1,1-Dichloroethane			1500 J	
Toluene	49,000		16000	
Chlorobenzene	3,500	100,000	610 J	
Semi-Volatile Compounds				
Phenol	500		**8700 (13000 J) (7900)**	
2-Methylphenol		200,000	680 J	
m-Cresol		200,000		92
4-Methylphenol		200,000	9200 (19000 J) (9100)	92
2,4-Dimethylphenol			24000 E (250000) (250000 E)	
2-Methylnaphthalene	34,000		4000 (6200 J) (4300)	
Dimethyl Phthalate			14000 (14000 E)	
Acenaphthene	140,000		940 J (1100 J) (50 J)	
Fluorene	8,000		2300 (2600 J) (140 J)	
Phenanthrene	120,000		7000 (14000 J) (8600)	
Anthracene	107,000		1300 J (2100 J) (1300 J)	
Carbazole			310 J (470 J) (250 J)	
Fluoranthene	1,020,000		2000 (8600 J) (3400)	
Pyrene	961,000		11000 (10000 J) (15000 E)	
Pesticide/PCB's				
Endosulfan Sulfate			28 JP	
Endrin Ketone			130 P (440 PD)	
Aroclor 1242	19,300		**38000 E (44000)**	

J Estimated value.
D Compound identified in an analysis at a secondary dilution factor.
***** Guidance value, unspecified organic contaminant.
E Concentration exceeds the calibration range of the GC (MS instrument.
P There is a >25% difference between the analytical results between the two GC columns. The lower value is reported.
(2.8) Results of duplicate analysis.
Shaded values exceed the DEC Cleanup Goals or regulatory limits.

Table D-10.
Analyses of Metals in Pump House Sediments at the Guterl Excised Area, June 1997.
(Totals results in mg/kg; TCLP results in µg/L)

Parameter	DEC Sediment Criteria	TCLP Regulatory Limits	SED-3 (TCL)	SED-3 (TCLP)
Aluminum			6050	
Antimony	2.0		**193**	
Arsenic	6.0	5,000	**44.0**	7 B
Barium		100,000	113	581 E
Beryllium			0.64 B	
Cadmium	0.6	1,000		25.5
Calcium			20900	
Chromium	26.0	5,000	**1910**	96.4
Cobalt			3370	
Copper	16.0		**25900**	
Iron	20,000		**91200**	
Lead	31.0	5,000	**4860**	**16600**
Magnesium			9320	
Manganese	460		**1560**	
Mercury	0.15	200	**1.0**	0.2
Nickel	16.0		**10800**	
Potassium			1100 B	
Selenium		1,000	24.1	10.6
Silver	1.0	5,000	**9.4**	
Sodium			756 B	
Thallium			15.0	
Vanadium			512	
Zinc	120		**690**	

E **Estimated value.**
B **Value greater than or equal to the instrument detection limit, but less than the contract required detection limit.**
Shaded values exceed the DEC Cleanup Goals or regulatory limits.

Table D-11.
Analyses of Metals in Lagoon and Pump House Waters at the Guterl Excised Area, May and June 1997.
(All results in µg/L)

Parameter	Surface Water Standard	SW-2	SW-3
Aluminum	100.0	**153 B**	**830**
Antimony		9.2 B	25.7 B
Arsenic	150.0		6.2 B
Barium		28.6 B	57.1 BE
Cadmium	6.2		1.4 B
Calcium		56300	73900
Chromium	231.0		**403**
Cobalt	5.0		**253**
Copper	29.0		**1890**
Iron	300.0	137	**14300**
Lead	16.5		**463**
Magnesium		13700	19000
Manganese		119	397
Nickel	168.0	16.9 B	**1710**
Potassium		12500	2920 B
Selenium	4.6		**6.3**
Sodium		10500	24600
Vanadium	14.0		**62.3**
Zinc	268.0	7.7 B	**502**

Note: Class "C" surface water standards with an assumed hardness of 400 ppm.
B Concentration is between the instrument detection limit (DL) and the contract required DL.
E Estimated value.
Shaded values exceed the surface water standards.

Table D-12.
Analyses of Organics in Lagoon and Pump House Waters at the Guteri Excised Area, May and June 1997.
(All results in µg/L)

Parameter	Surface Water Standard	SW-2	SW-3
Volatile Organic Compounds			
Chloroethane			2 J
1,1-Dichloroethene			10
1,1-Dichloroethane			87
1,2-Dichloroethene (total)			9 J
Chloroform			7 J
1,1,1-Trichloroethane			140
Carbon Tetrachloride			3 J
Trichloroethene	40		**41**
Semi-Volatile Compounds			
1,2,4-Trichlorobenzene	5		4 J
Bis(2-ethylhexyl)phthalate	0.6		**3 BJ**
Pesticide/PCBs			
Aroclor 1248	0.00012		**8.8 J**

Note: **Class "C" surface water standards.**
J **Estimated value.**
B **Compound detected in blank.**
P **There is a >25% difference between the analytical results of the two GC columns. The lower value is reported.**
Shaded values exceed the ambient water quality standards.

Table D-13.
Analyses of Organic Compounds and Metals in the Drill Water Utilized During the Guterl Excised Area IIWA Investigation.
(All results in µg/L)

Parameter	Results	Parameter	Results
Volatile Organic Compounds		**Semi-Volatile Compounds**	
Chloroform	23	Di-n-Butylphthalate	3 J
Bromodichloromethane	6 J	Bis(2-ethylhexyl)phthalate	1 J
Dibromochloromethane	2 J	Total Semi-Volatile TICs	64 J
Pesticides		**PCBs**	
Total Pesticides	ND	Total PCBs	ND
Metals			
Aluminum	700	Lead	14.2
Barium	24.3	Magnesium	9,400
Calcium	34,000	Manganese	79.8
Chromium	4.5 B	Nickel	17.9 B
Cobalt	11.8 B	Potassium	1,560 B
Copper	47.5	Sodium	12,700
Iron	1,050	Zinc	18.2 B

J Estimated value.
B Concentration is between the instrument detection limit (DL) and the contract required DL.

Table D-14.
Analyses of Organic Compounds in the Underground Storage Tank at the Guterl Excised Area, June 1997.
(All results in µg/L)

Parameter	Results
Volatile Organic Compounds	
Benzene	13000 E (10000 D)
Ethylbenzene	2300 (1600 DJ)
Toluene	39000 E (31000 D)
Total Xylenes	30000 E (23000 D)

Note: Sample was only analyzed for VOCs.
J Estimated value.
E Concentration exceeds the calibration range of the GC (MS instrument.
D Compound identified in an analysis at a secondary dilution factor.
(2.8) Results of duplicate analysis.