DELINEATION OF SURFACE WATER BODIES, WETLANDS, AND ECOLOGICAL RECEPTORS AT THE FORMER VANADIUM CORPORATION OF AMERICA SITE TOWN OF NIAGARA, NEW YORK NEW YORK INACTIVE HAZARDOUS WASTE DISPOSAL SITE NO. 932001 OPERABLE UNIT #3

932001
04 #3

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Golder Associates

REPORT ON

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Submitted to:

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December 2001

013-9293

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December 5, 2001

013-9293

James J. Hamula, Esq.
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2575 East Camelback Road
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RE: REPORT ON DELINEATION OF SURFACE WATER BODIES, WETLANDS, AND ECOLOGICAL RECEPTORS AT THE FORMER VANADIUM CORPORATION OF AMERICA SITE
TOWN OF NIAGARA, NEW YORK
NEW YORK STATE HAZARDOUS WASTE DISPOSAL SITE NO. 932001
OPERABLE UNIT #3

Gentlemen:

Golder Associates Inc. (Golder) is pleased to submit the above-referenced report on delineation of surface water bodies, wetlands, and ecological receptors at the New York State Hazardous Waste Disposal Site No. 932001, Operable Unit #3, which is the former Vanadium Corporation of America Site in the Town of Niagara, New York. Golder appreciates the opportunity to provide these services. If you have any questions regarding this report, please do not hesitate to call.

Very truly yours,

GOLDER ASSOCIATES INC.

Brian C. Senefelder, CHMM
Associate

Attachments

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1.0 INTRODUCTION

Golder Associates Inc. (Golder) was retained by Cyprus Amax Minerals Company (Cyprus) to perform supplemental investigations at the New York State Hazardous Waste Disposal Site No. 932001, Operable Unit (OU) 3, which is the former Vanadium Corporation of America (VCA) site in the Town of Niagara, New York (Figure 1). On May 3, 2001, a meeting was held with representatives of the VCA OU3 Group (comprised of Cyprus, Niagara Mohawk Power Corporation (NiMo), and the New York Power Authority (NYPA)), Golder, the New York State Department of Environmental Conservation (NYSDEC), and the New York State Department of Health (NYSDOH) to discuss the results of previous investigations performed by the NYSDEC at the site in 1993 and 1996. In addition, during this meeting it was proposed that certain supplemental investigations be conducted prior to performing (or as part of) a Remedial Investigation/Feasibility Study (RI/FS) for OU3.

Section 2 of this report describes project background information. The scope of work for this project included three tasks consisting of a fish and wildlife analysis (Section 3), a wetland delineation (Section 4), and additional groundwater sampling and analyses from existing monitoring wells at the OU3 site (Section 5). The results of these project tasks are provided in Section 6.

2.0 SITE BACKGROUND INFORMATION

2.1 Location and Ownership

The former VCA site is located on Witmer Road in the Town of Niagara, New York (Figure 1). The approximately 150-acre site is comprised of three Operable Units. OU1 and OU2 are located on the western portion of the former VCA property and comprise approximately 62 acres. The current owners of OU1 and OU2, SKW Metals and Alloys and Airco Properties, Inc., have completed Interim Remedial Measures (IRMs) at their respective facilities. OU3 is currently owned by NiMo and the NYPA and comprises approximately 88 acres of the eastern portion of the site.

The entire property is bounded on the north by an automobile depot and vacant property, to the west by Witmer Road (Route 31), on the east by Interstate 190, and on the south by vacant land and industrial facilities. The nearest waterbodies are the Lower Niagara River located approximately 1.4 miles west of the property and the NYPA reservoir, located approximately 0.8 miles north of the property. Water transfer conduits (tunnels) are located beneath the NYPA property. These conduits transfer water from the Upper Niagara River, located to the south, to the NYPA reservoir. Numerous high voltage transmission lines cross OU3.

2.2 Ferroalloy Production Process and Ferrochromium Slag Characteristics

From about 1920 through 1960, VCA operated a ferroalloy manufacturing plant in the Town of Niagara, New York. During this time, approximately 594,000 tons of wood, brick, ferromanganese slag, and low-carbon ferrochromium (LCFC) slag was reportedly deposited over the former VCA site, a portion of which is now designated as OU3 (NYSDEC 1993). The following information regarding the ferroalloy production process that generated the slag present at OU3 and the slag characteristics was provided by Cyprus during the May 3, 2001 meeting with the NYSDEC and is based on its process knowledge at similar facilities and available corporate records.

Ferroalloy Production Process

Ferroalloys are utilized as alloying materials within the steel industry, and are produced by smelting "charges" of non-ferrous metal ore, iron ore, and coke or coal. Common ferroalloys are made from silicon, chrome, and manganese ores. Based upon historical records and slag characteristics, ferrochromium was the primary ferroalloy produced at the former VCA site. There are two primary types of ferrochromium, high-carbon and low-carbon.

High-carbon ferrochromium (HCFC) involves the smelting of chrome ore and small amounts of silica (quartzite), which are reduced by a carbonaceous agent (coke, wood chips, etc.). HCFC slags are solid, somewhat inert, and occasionally used as roadbed material.

LCFC is generated by an exothermic reaction from the mixing of a chrome ore/lime "melt" with ferrochromesilicon. LCFC slag is a fine-grained calcium silicate that resembles the lime used in the process, and generally contains elevated levels of chromium and pH.

Ferrochromium Slag Characteristics

Based upon the physical and chemical characteristics of the VCA slag material and the fact that VCA's successor to the Niagara Plant in Steubenville Ohio primarily produced LCFC, it appears that a vast majority of the Niagara site slags originated from the LCFC production process. The primary material believed to be historically deposited onto OU3 is LCFC slag.

LCFC slag is not a listed hazardous waste. Based upon Toxicity Characteristic Leaching Procedure (TCLP) data from the LCFC slag at the former Niagara and Steubenville plants, LCFC slag is also not characteristically toxic. In addition, LCFC slag is not characteristically reactive. While a 1997 NYSDEC investigation report (described in

Section 2.3 below) indicates two sample failures of the "sulfide releasable guidance value" of "250 mg/kg," the 1997 guidance value was actually 500 mg/kg, resulting in only one sample failing the 1997 guidance value. Furthermore, in 1998, the United States Environmental Protection Agency (USEPA) withdrew its sulfide reactivity guidance due to reportedly "critical errors made in developing the guidance" (USEPA, Internal memorandum, Michael to Wapensky; February 24,1995; 9443.1995(01) and Bussard to Love; April 21, 1998; FaxBack 14177).

Based on prior investigations described below, the slag thickness on the eastern portion of OU3 is approximately 18 feet and is covered by approximately 6 to 12 inches of soil. In the western portion of OU3, the slag is exposed and has a thickness of approximately 7 feet. The aerial extent of slag at OU3 was estimated to cover approximately 41.8 acres.

2.3 Historic Investigations

The former VCA site is on the New York State Registry of Inactive Hazardous Waste Sites as a Class 2 site. Many investigations have been performed over the past several years. A Preliminary Site Assessment (PSA) was performed by the NYSDEC in 1993. The results of this investigation are presented in the report entitled "Preliminary Site Assessment Evaluation of Initial Data Volume 1; Vanadium Corporation, Site No. 932001, Town of Niagara, Niagara County, ABB Environmental Services, September 1993" (PSA Report). As a result of this investigation, the former VCA site was classified as a Class 2 site and the NYSDEC began negotiations with the current property owners of the site and Cyprus (as successor to VCA) to conduct a site-wide, comprehensive RI/FS. These negotiations led to individual investigations and remedial activities conducted by SKW and Airco on their respective portions of the site (OU1 and OU2).

In 1996, the NYSDEC performed an investigation under the Immediate Investigative Work Assignment (IIWA) program (NYSDEC 1997) to evaluate the NiMo and NYPA portions of the site (OU3). The NYSDEC indicated that the IIWA investigation was not intended to be an RI/FS, but a means to assess the site to enable the RI/FS on the SKW

and Airco properties to continue and provide the basis for future RI/FS work on the NiMo and NYPA properties. NYPA came forward after the IIWA scope of work was developed and agreed to perform the work planned for their portion of OU3, which included the installation of two groundwater monitoring wells and three soil borings in June 1996. The NYSDEC implemented the IIWA scope of work in November 1996 on the NiMo portion of OU3 and completed the investigation report in 1997. The primary findings of the NYSDEC investigation are as follows:

- The aerial extent of slag disposal on OU3 from the operation of the former VCA facility is estimated at 41.8 acres. This area includes the exposed slag between the power transmission towers and the Airco property (estimated at 17 acres) and the covered fill area under the transmission lines (estimated at 24.8 acres).

- The average thickness of the slag varies from 7.25 feet to 18.0 feet, for a total estimated slag volume of 925,000 cubic yards.

- Surface soil, surface water and exposed slag samples collected during this investigation indicate the presence of site related compounds, specifically trivalent and hexavalent chromium.

- Analyses of the native soil and groundwater beneath the slag did not show significant vertical migration of associated constituents.

- Groundwater within OU3 was sampled from both the deep overburden and upper bedrock zones, and was found not to be significantly impacted by the presence of slag material. Although site-related compounds are found in groundwater, contaminant concentrations were below groundwater standards.

- The groundwater level measurements confirm that the NYPA Power Conduits significantly influence the local groundwater flow patterns in both the deep overburden and the upper bedrock hydrogeologic zones.

As previously mentioned, the VCA OU3 Group met with the NYSDEC and the NYSDOH on May 3, 2001 to discuss potential future site activities. During the meeting, the VCA OU3 Group proposed to perform RI/FS-related activities in a phased approach. Phase I included delineation of surface water bodies, wetlands, and ecological receptors. Phase II included additional data collection for the purpose of satisfying any perceived

deficiencies in the site characterization data set and completing site risk evaluations. Phase III included ecological and health risk evaluations and completion of a remedial investigation (RI) report. Phase IV included a remedial alternatives analysis.

With respect to Phase I, the activities included Step #1 of a NYSDEC Fish and Wildlife Impact Analysis (FWIA), a wetlands survey, and additional sampling and analysis of groundwater from existing onsite groundwater monitoring wells. The results of these investigations are presented in this report, and will be used to determine the scope of supplemental RI activities in future project phases.

3.0 FISH AND WILDLIFE IMPACT ANALYSIS (FWIA)

A Fish and Wildlife Impact Analysis (FWIA) was conducted for the former VCA OU3 Site per NYSDEC guidance (NYSDEC 1994) in the summer of 2001. The FWIA consisted of an on-site reconnaissance, regulatory file review, and review of existing data and reports. The FWIA was conducted to identify the fish and wildlife resources that occur at the site. The FWIA report is included in Appendix A.

The OU3 site is a fairly isolated naturalized habitat located in an urban area with transportation corridors on all sides. Very little natural habitat exists on site, and much of that is seasonally disturbed by ATV use. The plant communities on the site are predominantly grasses, herbs, and shrubs typical of heavily disturbed areas. A majority of the site is dedicated to overhead transmission lines maintained by NiMo and the NYPA. The maintenance of the transmission lines likely prevents establishment of trees on much of the site.

The conclusions of the FWIA are summarized below:

The Site Description Phase (Step #1) of the FWIA was conducted to identify any significant fish and wildlife species present at the site that would warrant the performance of subsequent steps of the FWIA. The results of Step #1 indicate that there are no permanent surface water features at the site, therefore the site contains no aquatic or wildlife species that require year-round aquatic habitat. In the absence of aquatic habitat, no further evaluations of fish species are necessary. The grasslands, wooded areas, and wetlands on the site do appear to support a variety of terrestrial and avian wildlife species. However, for the reasons presented below, further FWIA evaluations to determine the potential impact on wildlife at the site do not appear to be necessary:

- The FWIA indicates that no threatened or endangered species exist at or in the vicinity of the site;
- No significant habitats, Federally-designated wild, scenic and, recreational rivers, or significant coastal zone areas occur at or in the vicinity of the site;

- There are no exceedances of NYSDEC fish and wildlife regulatory criteria that are applicable to the site;

- A large portion of the site contains rights-of-ways that accommodate several high voltage transmission lines, which will likely remain for the foreseeable future. Thus, future development of the site is limited to commercial/ industrial land uses as opposed to other potential land uses that might be more beneficial to wildlife ;

- There are no permanent hydrologic features at the site, which limits the accessibility of potential contaminants in surface water or sediment to wildlife; and

- Much of the slag material on the site is covered with soil and vegetated. In areas where slag is exposed, it is a hard, rocky material that is not readily broken down. Thus, intake (ingestion, dermal contact, inhalation) of slag particles by wildlife would not easily occur.

4.0 WETLAND DELINEATION

4.1 Introduction

On August 20 and 21, 2001, Golder delineated wetlands within the boundaries of the OU3 site. This delineation was performed using the routine determination method described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Department of Environmental Conservation Freshwater Wetlands Delineation Manual* (New York State Department of Environmental Conservation, Division of Fish and Wildlife, 1995).

4.2 Wetland Delineation Findings

This delineation identified three separate wetland areas on the OU3 site totaling 4.9 acres. The wetlands are shallow depressions and flats in large part created or modified by slag disposal and earthmoving at the site. A seasonal stream flows from north to south on the west side of the OU3. The stream was not evident at the time of the on-site reconnaissance, however the reconnaissance occurred during an exceptionally dry period and the seasonal stream was dry.

Golder does not believe that the wetland areas of OU3 fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE) under the federal Clean Water Act. In *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers*, 121 S. Ct. 675 (2001), the U.S. Supreme Court clearly foreclosed the imposition of federal Clean Water Act jurisdiction solely on the ground that a water may be used by migratory birds. Indeed, the court suggested that federal Clean Water Act jurisdiction may not be imposed on any isolated, non-navigable water. In Golder's opinion, the wetland areas of OU3 appear to meet all of the criteria of the U.S. Supreme Court decision for being non-jurisdictional. Consequently, Golder believes that the USACE may be expected to conclude that the OU3 wetlands are not subject to USACE jurisdiction under the Clean Water Act.

Nevertheless, wetland jurisdictional determinations are made by the USACE on a case-by-case basis, and Golder recommends that the USACE be requested to make a jurisdictional determination with respect to the wetland areas on OU3. To that end, a "Request for Jurisdictional Determination" (RJD) letter has been prepared for submission to the USACE (Appendix B). The RJD is a request to the USACE to formally verify that the wetland boundaries delineated by Golder are accurate. In addition, Golder is requesting that the USACE concur with Golder's assertion that the wetlands and other waterbodies on the property are not "waters of the United States" within the USACE's jurisdiction under Section 404 of the Clean Water Act. It is customary for the USACE to perform a site visit to make this determination. The Buffalo District USACE currently reports a two-month turnaround time for response to an RJD.

NYSDEC takes jurisdiction over wetlands identified in prepared maps obtained through the NYSDEC and over wetlands not identified in these maps that comprise 12.4 acres or greater. Golder reviewed the NYSDEC wetlands maps (covering the U.S. Geological Survey 7.5 Minute "Lewiston" and "Niagara Falls" Quadrangles), and no NYSDEC wetlands were identified on the OU3 property. The wetlands on OU3 occupy far less than 12.4 acres. The largest single wetland as determined by Golder's delineation is approximately 3.2 acres. Notwithstanding Golder's wetland delineation, the NYSDEC may want to complete its own site determination and may dispute Golder's wetlands delineation. Golder recommends waiting for the USACE response to the RJD before contacting NYSDEC wetlands personnel.

5.0 GROUNDWATER WELL SAMPLING AND ANALYSES

5.1 Introduction

Supplemental investigations performed at OU3 of the former VCA site included the collection and analyses of groundwater samples from the existing site monitoring wells. Based on the information provided to Golder, ten (10) groundwater monitoring wells are located on the OU3 site from prior investigations. Groundwater monitoring wells MW-101A, 102A, 103A, 104A, and 105A reportedly monitor the "deep hydrogeologic groundwater zone" (Zone A), which is actually the overburden directly above bedrock. Monitoring wells MW-101B, 102B, 103B, 104B, and 105B monitor the "upper bedrock hydrogeologic zone" (Zone B). It is Golder's understanding that two (2) monitoring wells, MW-101A and MW-101B were located on NYPA property and were also intended to be included in the scope of work performed by Golder. However, wells MW-101A and MW-101B were found to be destroyed at the ground surface at the time of sampling.

5.2 Groundwater Sampling

Eight (8) of the ten (10) groundwater monitoring wells were targeted for sampling at OU3. Sampling activities were performed on August 21, 2001. One (1) monitoring well, MW-102A, could not be sampled due to insufficient standing water/well volume. As noted above, two (2) wells originally proposed to be sampled located on the NYPA property (MW-101A and MW-101B) were destroyed at the ground surface, apparently by vandals. Thus, they could not be sampled as part of this investigation.

Water Level Measurements

Static water levels of the eight (8) groundwater wells were measured from the top of the well riser, with a weighted electronic water level indicator (QED). Depth to each well bottom was also measured with the same electronic water level indicator in the off mode. Water level and well measurements were recorded to the nearest hundredth of a foot (0.01 feet). Measurements were subsequently recorded on a sample collection log for each respective well.

Upon completion of water level/well bottom measurements at a well, the tape for the water level indicator was cleaned using liquinox soap followed by a deionized water rinse and paper towel wipe. Field information for each well was recorded on sample collection forms, which are provided in Appendix C.

Well Purging

Prior to groundwater sampling, each well was purged. The volume of standing water in each well was calculated by subtracting the depth to groundwater from the bottom of the well depth and multiplying that number by a constant for the corresponding size well.

Upon calculation of the standing water volume for each well, groundwater was purged from each well until either of the following conditions was attained:

- A minimum of three well volumes were purged from the well; or
- Stabilization of monitored parameters including turbidity of less than 5 NTUs.

The wells were evacuated using a non-dedicated 2-inch Grundfos Redi-Flo® submersible groundwater pump with dedicated discharge tubing. During purging, pH, temperature, specific conductance, eH, turbidity, and depth to water measurements were taken after each well volume to monitor stabilization. Wells were then sampled upon stabilization of field parameters. Individual wells exhibited moderate to high recharge during purging activities. Field measurements were recorded on the sample collection forms provided in Appendix C.

Field instruments that came into contact with groundwater were cleaned after each measurement by rinsing with deionized water and wiping dry with paper towels.

Equipment Calibration

Prior to mobilization, all field equipment and instrumentation were checked and calibrated. In-field calibrations were done before field measurements were collected. Calibration checks were done twice a day and re-calibration of field instruments were performed if necessary.

pH/eH meters were two-point calibrated with either 4.00 S.U. and 7.00 S.U. or 7.00 S.U. and 10.00 S.U. buffer solutions. Conductivity meters were three-point calibrated with 180, 1,000 and 18,000 umhos/cm buffer solutions. Turbidity meters were two-point calibrated with 1.0 NTU and 5.0 NTU standards.

Sample Container Preparation

All containers used in the collection of samples for this project were provided new and clean from Friend Laboratories, Inc. (FLI) and Severn Trent Laboratories Inc. (STL). Sample bottles were stored in a clean environment at Golder prior to their use.

Sample Preservation

Sample volume, container, and preservation was carried out as described below:

PARAMETER	CONTAINER	PRESERVATION
Total Metals	1 Liter Plastic	HNO3 to pH <2.0;Cool 4^0C
Dissolved Metals	1 Liter Plastic	Field filtered; HNO3 to pH <2.0;Cool 4^0C
Hexavalent chromium	500 ml Plastic	Cool 4^0C

Sampling

Prior to sampling, a second depth to water level measurement was taken at each well to ensure there was sufficient recharge and sample volume. Wells were sampled using a 2-inch Grundfos submersible pump and dedicated discharge tubing. Sample containers were then filled directly from the dedicated discharge tubing. An additional sample was collected from each well in order to measure field parameters. The sampling pump and leads that were in contact with groundwater were cleaned after each well was sampled by circulating deionized water with Liquinox soap through the pump followed by rinsing with deionized water. Pump power leads not in contact with groundwater were cleaned with deionized water with Liquinox soap followed by wiping with paper towels until dry.

Quality Assurance /Quality Control Samples

Field Duplicate

A field duplicate was collected at a frequency of one (1) per sampling event at well MW-102B. The field duplicate consisted of a set of all parameters and was obtained at the same time the well was being sampled.

Equipment Rinse Blank

An equipment rinse blank was collected at a frequency of one (1) per sampling event. The equipment rinse blank consisted of a set of all parameters and was obtained by running clean laboratory supplied analyte-free water through the cleaned Grundfos pump.

Sample Analyses

Groundwater samples were obtained from seven wells (MW-102B, 103A, 103B, 104A, 104B, 105A and 105B) on August 21, 2001. One (1) monitoring well, MW-102A, could not be sampled due to insufficient standing water/well volume. Two samples from each of these wells, one unfiltered and one filtered, and a duplicate filtered and unfiltered sample from well MW-102B were submitted to FLI, a New York State Department of

Health accredited laboratory, for total and dissolved Target Analyte List (TAL) metals analysis. Samples were analyzed for TAL metals by USEPA Method 6000/7000 series. Hexavalent chromium (total) was also analyzed using USEPA Method 7196A by STL. The STL and FLI laboratory analytical reports are provided in Appendix D.

One additional unfiltered sample from each well and a duplicate (MW-102B) was submitted to STL, also a New York State Department of Health certified laboratory, for hexavalent chromium analysis.

Analyses for organic constituents were not performed as part of this scope of work, as these constituents were not detected at levels of concern in samples collected during prior NYSDEC site investigations.

5.3 Evaluation of Groundwater Sample Analyses

Field Parameters

Field parameter ranges for pH, specific conductance and eH are summarized as follows:

Parameter	**Units**	**Overburden** Wells MW-102A (dry), 103A, 104A, and 105A	**Upper Bedrock** Wells MW-102B, 103B, 104B, and 105B
pH	Std. Units	7.29-7.34	7.32-7.76
Specific Conductance	umhos/cm	1055-1455	682-2220
eH	mV	-5.1 to -7.5	-6.9 to-31.6

Analytical Results

The groundwater analytical data from the wells sampled at OU3 is summarized in Table 1 and are provided in Appendix D. The analytical data from this investigation was compared to the NYSDEC Technical and Operational Guidance Memorandum (TOGS) Water Quality Standard/Guidance Values, June 1998. Iron, magnesium, manganese, and sodium exceeded the TOGS criteria. Only sodium exceeded the TOGS criterion for the

sample collected from MW-102B, which is located down-gradient of the slag disposal area. All other metal concentrations were either non-detect or below the TOGS criteria. Additionally, the TOGS criterion of 5 nephelometric turbidity units (NTU) was slightly exceeded in the samples from MW-104B and MW-105A.

Metal concentrations of filtered and unfiltered samples appeared to be generally consistent. However, there is some slight variability in concentrations of specific metals in filtered samples compared to unfiltered samples. In addition, the specific metals that were detected in samples from the overburden "A" designation wells were similar to those detected in the upper bedrock "B" designation wells

In several samples, hexavalent chromium was detected in trace concentrations (slightly above the detection limit) although total chromium was not. The hexavalent chromium analyses by STL and the total chromium analyses performed by FLI had a detection limit of 0.010 mg/L for all samples analyzed. The detection of hexavalent chromium and the non-detection of total chromium in a sample from the same well may be due to the analyses being performed by two separate laboratories and the analyses being performed by different methods.

Quality Control/Quality Assurance

All samples were analyzed within the required holding times. A duplicate sample was collected for MW-102B. The results of the analyses of the duplicate sample are also presented on Table 1. The metals detected and the concentrations in the sample and duplicate sample for MW-102B for both total metals and dissolved metals analyses are similar.

An equipment rinse blank was also obtained for the sampling event. The equipment rinse blank was obtained by running analyte free water supplied by the laboratory through the cleaned Grundfos™ sampling pump. The sample was split, for total and dissolved (filtered) metals analysis, and analyzed for the same metals as the groundwater samples.

The total metals analysis of the equipment rinse blank had detections of iron (0.058 mg/L) sodium (0.39 mg/L) and zinc (0.02 mg/L). The dissolved metals analysis of the equipment rinse blank had only a detection of sodium (0.639 mg/L). The concentration of these metals detected in the equipment rinse blank are not believed to have a significant effect on the detections and concentrations of the constituents found in the sample analyses.

5.4 Comparison to Previous Groundwater Analytical Data

Groundwater samples were collected on November 7, 1996 by the NYSDEC during a prior sampling event from the wells referenced above. Groundwater samples obtained at that time from these wells were analyzed for total metals (unfiltered) and these data are also presented in Table 1.

The groundwater samples obtained during the November 1996 sampling event had higher turbidity than groundwater samples obtained during the August 2001 sampling event. Analysis of acidified turbid samples often leads to an overestimate of metals concentration in groundwater. This is because the acidification process may release metals bound on the particulate matter that are not representative of groundwater quality.

Total metals concentrations in groundwater samples from the November 1996 event samples are higher in concentration than those obtained during the August 2001 event. Metals that were generally detected in higher concentrations during the November 1996 event compared to the August 2001 event are:

- Aluminum;
- Iron;
- Lead;
- Magnesium;
- Manganese; and
- Zinc.

The higher concentrations of these metals observed in samples from the November 1996 event is most likely the result of the higher turbidity of the samples from the November 1996 event as compared to the August 2001 event.

5.5 Groundwater Elevation Data

Groundwater elevation measurements were taken from each well prior to purging and sampling of the wells. Potentiometric surface maps were prepared for the two hydrogeologic zones that are monitored at OU3. Figures 2 and 3 present the potentiometric surface elevation maps for the two hydrogeologic zones monitored at the OU3 site, based on water levels obtained in August 2001. Table 2 provides a summary of the August 2001 groundwater elevation information and includes 1996 and 1997 data. These data indicate the following:

- The 2001 water level measurements in both zones were deeper than the 1996 and 1997 measurements, with the exception of well MW-102A;
- It appears that the two zones are hydraulically connected since the groundwater elevations are very similar between the overburden "A" zone and the bedrock "B" zone, with the exception of the "A" zone at the MW-102 cluster; and
- Groundwater flow in the "deep hydrogeologic zone" (overburden above bedrock) and the "upper bedrock zone" is generally to the north-northeast. The groundwater flow in these zones is affected by the NYPA conduits located directly to the east of OU3.

The groundwater elevation measurement obtained from deep hydrogeologic zone well MW-102A was not used for the construction of the potentiometric contours. The water level elevation in this well is suspected to not be representative of the potentiometric surface in this unit and is not consistent with water elevation measurements from previous investigations.

The groundwater elevation measurements collected during this investigation were compared to previous elevation measurements for OU3 and from adjacent OU1 and OU2. The comparison indicates that OU3 is apparently on the eastern side of a groundwater flow divide located directly to the west of OU3 as identified by prior NYSDEC investigations. The divide is suspected to be caused by the NYPA conduits.

6.0 SUMMARY

Supplemental investigations were performed for OU3 of the former VCA site in the Town of Niagara, New York. The supplemental investigations included a fish and wildlife impact analysis, wetlands delineation, and collection and analyses of groundwater from existing monitoring wells. Results of these investigations are summarized below.

Fish and Wildlife Impact Analysis

The FWIA was prepared using information collected from existing reports on the site, a regulatory file review, and an on-site reconnaissance conducted by Golder in August 2001. The FWIA was developed in accordance with guidance provided by the NYSDEC for performing FWIA for Inactive Hazardous Waste Sites.

The results of the Step #1 of the FWIA indicate that there are no permanent surface water bodies at the site, which precludes the existence of aquatic (fish) and wildlife species that rely on permanent aquatic habitat. Although wildlife does exist at the site, none of the species present are considered threatened or endangered. There are also no significant habitats, Federally-designated wild, scenic, or recreational rivers, or significant coastal zone areas at or near the site. In addition, future development of the site is limited to commercial/industrial land uses as opposed to other potential land uses that might be more beneficial to wildlife. Accordingly, additional FWIA investigations are not believed to be warranted.

Wetland Delineation

During August 2001, Golder delineated wetlands within the boundaries of the OU3 site. The wetland delineation identified three separate wetland areas on the OU3 site totaling 4.9 acres. While Golder does not believe that the wetland areas of OU3 qualify as wetlands under the jurisdiction of the USACE, a "Request for Jurisdictional Determination" (RJD) letter has been prepared for submission to the USACE. Golder is

requesting that the USACE concur with Golder's conclusion that the wetlands and other waterbodies on the property are not "waters of the United States" within the USACE's jurisdiction under Section 404 of the Clean Water Act. Because wetland jurisdicational determinations are made by the USACE on a case-by-case basis, Golder recommends that the RJD letter be submitted and that the USACE be consulted to determine if any further action is required.

Golder also reviewed the NYSDEC wetlands maps (covering the U.S. Geological Survey 7.5 Minute "Lewiston" and "Niagara Falls" Quadrangles), and no NYSDEC wetlands were identified on the OU3 property.

Groundwater Evaluation

The groundwater evaluation for OU3 included collection and analyses of groundwater samples from seven of the existing monitoring wells at the site. Groundwater samples collected from the existing monitoring wells were analyzed for total TAL metals, dissolved TAL metals, plus hexavalent chromium. The analytical data from this investigation was compared to the NYSDEC TOGS values, June 1998. Iron, magnesium, manganese, and sodium exceeded the TOGS criteria. Only sodium exceeded the TOGS values in a sample collected down-gradient of the slag disposal area. All other metal concentrations were either non-detect or below the TOGS criteria, including chromium and hexavalent chromium.

The analytical data was compared to previous analytical data collected by the NYSDEC in 1996. Comparison of the metals results indicates that similar metals were detected from the 2001 evaluation, however, at lower concentrations than those detected during previous evaluations. The August 2001 sampling data confirms the NYSDEC 1997 report findings that groundwater on the NiMo and NYPA properties sampled from both the deep overburden and upper bedrock zones were found not to be significantly impacted by waste disposal activities.

Groundwater elevation measurements were also recorded from the existing monitoring wells at OU3 and potentiometric contour maps were prepared for the two hydrogeologic zones monitored at the site. Groundwater flow in the "deep hydrogeologic zone" (overburden above bedrock) and the "upper bedrock zone" is generally to the north-northeast. Based on prior investigations performed by the NYSDEC, the groundwater flow in these zones is affected by the NYPA conduits, located directly to the east of OU3.

The groundwater elevation measurements collected during this investigation were compared to previous elevation measurements for OU3 and from adjacent OU1 and OU2. The comparison indicates that OU3 is apparently on the eastern side of a groundwater flow divide located directly to the west of OU3. The groundwater flow divide is suspected to be caused by the NYPA conduits.

The data generated from these supplemental investigations will be utilized with previous site investigation data in subsequent phases of the RI/FS process to evaluate potential risks and remedial alternatives.

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F/N: G:\Projects\013-9293\Reports\Final\Niagreportfinal.doc

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New York State Department of Environmental Conservation, September 1993, "Engineering Investigations at Inactive Hazardous Waste Sites, Preliminary Site Assessment Evaluation Report of Initial Data, Vanadium Corporation, Site No 932001, Town of Niagara, Niagara County, Volume 1".

New York State Department of Environmental Conservation, August 1997, Immediate Investigative Work Assignment, Vanadium Corporation of America Site, Town of Niagara, Niagara County, Site Number 9-32-001.

United States Environmental Protection Agency, Internal memorandum, Michael to Wapensky; February 24,1995; 9443.1995(01) and Bussard to Love; April 21, 1998; FaxBack 14177.

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
FORMER VANADIUM CORPORATION SITE OPERABLE UNIT #3
TOWN OF NIAGARA, NEW YORK

Analyses (Total Metals, Dissolved Metals) Well ID Sample Date	NYS Ambient Water Quality Standards/ Guidance Values (TOGS 1.1.1.) (June 1998)	Total MW-102B 7-Nov-96	Total MW-102B 21-Aug-01	Dissolved MW-102B 21-Aug-01	Total DUPLICATE 21-Aug-01	Dissolved DUPLICATE 21-Aug-01	Total MW-103B 7-Nov-96	Total MW-103B 21-Aug-01	Dissolved MW-103B 21-Aug-01	Total MW-103A 7-Nov-96	Total MW-103A 21-Aug-01
Metals (mg/L)											
Aluminum	NV	0.314					0.342			5.06	
Antimony	0.003										
Arsenic	0.025										
Barium	1	0.0331 B	0.027	0.028	0.029	0.028	0.122 B	0.07	0.072	0.218	0.096
Beryllium	0.003										
Cadmium	0.005	0.00063 B								0.0011 B	
Calcium	NV	NA	129	137	132	137	NA	48.7	49.4	NA	78.8
Chromium	0.05	0.0028 B					0.0027 B			0.0075 B	
Hexavalent Chromium	0.05	0.0189	0.017	NA	0.017	NA		0.01	NA	0.0236	
Cobalt	0.005									0.0018 B	
Copper	0.2	0.0044 B					0.0023 B			0.0064 B	
Iron	0.3	0.444	0.285	0.177	0.23	0.231	0.367	0.089	0.062	7.91	0.86
Lead	0.025		0.001		0.003					0.0317	
Magnesium	35	36.7	21.5	22.7	21.9	22.6	67.3	26.9	27.5	142	65.3
Manganese	0.3	0.0447	0.01	0.012	0.011	0.011	0.0713	0.031	0.032	0.386	0.095
Mercury	0.0007										
Nickel	0.1	0.003 B					0.0012 B			0.0056 B	
Potassium	NV	2.89	3.28	3.4	3.21	3.36	2.18 B	4.08	4.23	1.53 B	0.996
Selenium	0.01										
Silver	0.05									0.0015 B	
Sodium	20	54.7	51.8	54.8	52.4	54.2	37.7	45.8	47.4	58.5	45.6
Thallium	0.0005										
Vanadium	0.014									0.0053 B	
Zinc	2	0.0165 B	0.06		0.02		0.0225			0.287	0.032
Turbidity (NTU)											
Turbidity	5	38.8	3.17	NA	NA	NA	20.7	2.6	NA	314	4.51

All groundwater analytical results reported in milligrams per liter (mg/L),
except turbidity in Nephelometric Turbidity Units (NTU's).
Turbidity measured in field.
(blank) = Not detected above the detection limits
NV = No value.
DUPLICATE = Duplicate sample of MW-102B.
NA = Not Analyzed
E = Estimated, Exceeds Quantification Limit
B = Value greater than or equal to instrument detection limit;
but less than contract required detection limit

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
FORMER VANADIUM CORPORATION SITE OPERABLE UNIT #3
TOWN OF NIAGARA, NEW YORK

Analyses (Total Metals, Dissolved Metals)	NYS Ambient	Dissolved	Total	Total	Dissolved	Total	Total	Dissolved	Total	Total	Dissolved
Well ID	Water Quality	MW-103A	MW-104A	MW-104A	MW-104A	MW-104B	MW-104B	MW-104B	MW-105A	MW-105A	MW-105A
Sample Date	Standards/ Guidance Values (TOGS 1.1.1.) (June 1998)	21-Aug-01	7-Nov-96	21-Aug-01	21-Aug-01	7-Nov-96	21-Aug-01	21-Aug-01	7-Nov-96	21-Aug-01	21-Aug-01
Metals (mg/L)											
Aluminum	NV	0.093	4.95			1.03	0.132	0.093	8.65	0.115	
Antimony	0.003										
Arsenic	0.025										
Barium	1	0.1	0.146 B	0.121	0.127	0.282	0.297	0.313	0.121 B	0.1	0.099
Beryllium	0.003										
Cadmium	0.005								0.00065 B		
Calcium	NV	80.3	NA	93.9	99.6	NA	108	114	NA	83.6	83.6
Chromium	0.05		0.0059 B			0.0059 B			0.0059 B	0.029	
Hexavalent Chromium	0.05	NA	0.0188	0.014	NA	0.00159	0.016	NA	0.0263		NA
Cobalt	0.005		0.004 B						0.0064 B		
Copper	0.2		0.0046 B								
Iron	0.3	0.368	10.9	3.27	3.08	1.03	0.123	0.083	8.98	0.333	0.1
Lead	0.025	0.001	0.0903	0.001	0.002	0.0063			0.0176	0.003	
Magnesium	35	65.2	69.3	48.5	51.4	59.6	41.4	43.3	87.2	46.2	46.3
Manganese	0.3	0.105	0.455	0.39	0.41	0.101	0.07	0.073	1.2	0.702	0.703
Mercury	0.0007										
Nickel	0.1	0.014	0.0116 B			0.0033 B			0.0197 B	0.023	
Potassium	NV	1.12	1.85 B	1.34	1.41	1.8 B	2.88	3.06	3.14	2.87	2.91
Selenium	0.01										
Silver	0.05										
Sodium	20	47.5	134 E	110	118	183 E	222	232	108 E	112	115
Thallium	0.0005										
Vanadium	0.014		0.0056 B			0.0097 B			0.008 B		
Zinc	2	0.025	0.585	0.021		0.0483	0.023		1.02	0.142	0.049
Turbidity (NTU)											
Turbidity	5	NA	258	3.38	NA	67.2	6.81	NA	723	6	NA

All groundwater analytical results reported in milligrams per liter (mg/L),
except turbidity in Nephelometric Turbidity Units (NTU's).
Turbidity measured in field.
(blank) = Not detected above the detection limits
NV = No value.
DUPLICATE = Duplicate sample of MW-102B.
NA = Not Analyzed
E = Estimated, Exceeds Quantification Limit
B = Value greater than or equal to instrument detection limit;
but less than contract required detection limit

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
FORMER VANADIUM CORPORATION SITE OPERABLE UNIT #3
TOWN OF NIAGARA, NEW YORK

Analyses (Total Metals, Dissolved Metals) Well ID Sample Date	NYS Ambient Water Quality Standards/ Guidance Values (TOGS 1.1.1.) (June 1998)	Total MW-105B 7-Nov-96	Total MW-105B 21-Aug-01	Dissolved MW-105B 21-Aug-01	Total Equip. Blank 21-Aug-01	Dissolved Equip. Blank 21-Aug-01
Metals (mg/L)						
Aluminum	NV	0.39				
Antimony	0.003					
Arsenic	0.025		0.003	0.002		
Barium	1	0.0958 B	0.118	0.114		
Beryllium	0.003					
Cadmium	0.005					
Calcium	NV	NA	74.6	73.9		
Chromium	0.05	0.0013 B	0.012			
Hexavalent Chromium	0.05	0.0115		NA		
Cobalt	0.005	0.004 B				
Copper	0.2					
Iron	0.3	1.96	3.25	2.69	0.058	
Lead	0.025	0.0107	0.015	0.002		
Magnesium	35	54.5	42.5	42.2		
Manganese	0.3	0.69	0.598	0.588		
Mercury	0.0007					
Nickel	0.1	0.0097 B	0.016	0.02		
Potassium	NV	1.16 B	2.13	2.12		
Selenium	0.01					
Silver	0.05					
Sodium	20	124 E	169	171	0.39	0.639
Thallium	0.0005					
Vanadium	0.014					
Zinc	2	0.258	0.148	0.091	0.02	
Turbidity (NTU)						
Turbidity	5	28.3	4.1	NA	NA	NA

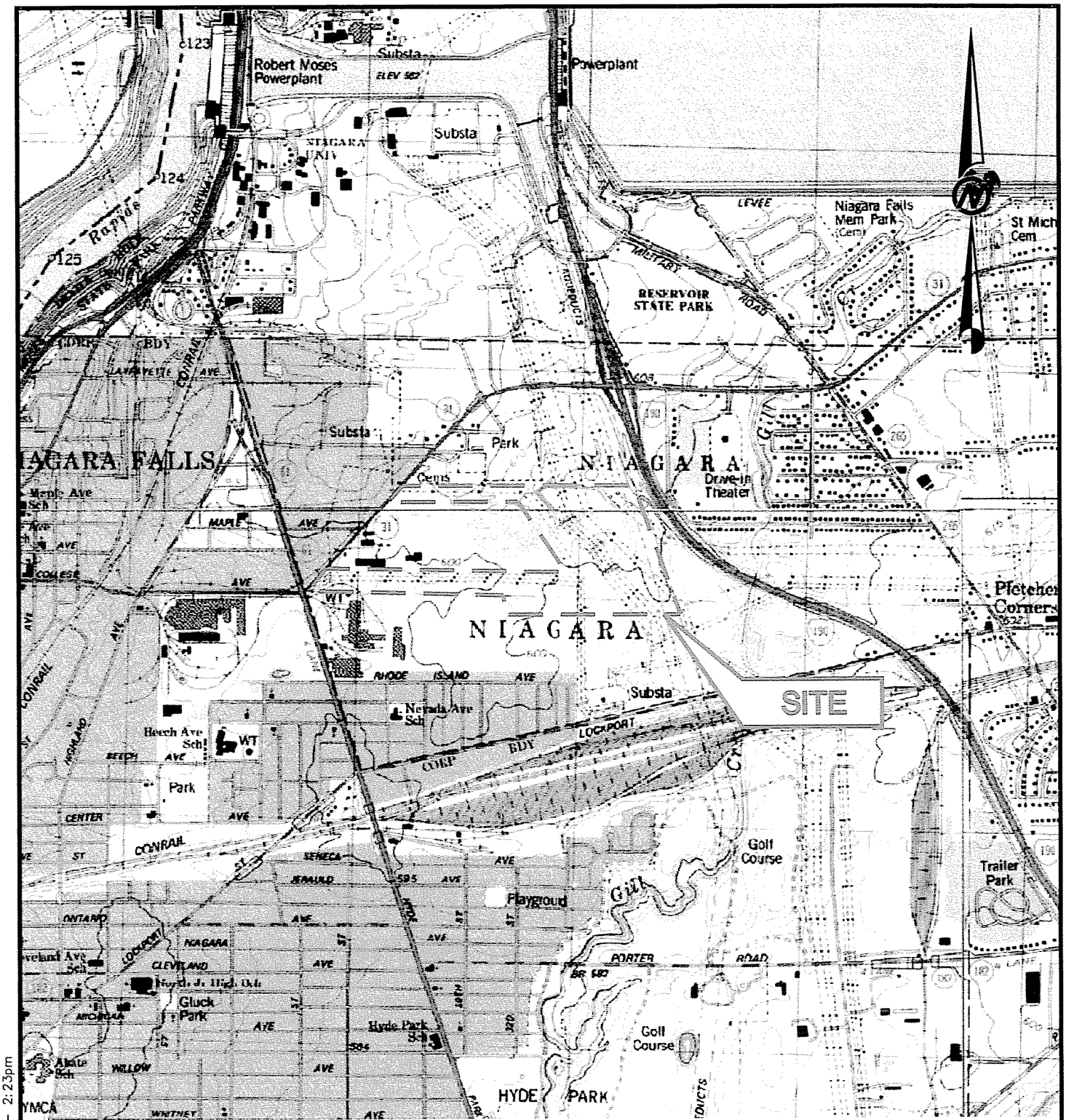
All groundwater analytical results reported in milligrams per liter (mg/L),
except turbidity in Nephelometric Turbidity Units (NTU's).
Turbidity measured in field.
(blank) = Not detected above the detection limits
NV = No value.
DUPLICATE = Duplicate sample of MW-102B.
NA = Not Analyzed
E = Estimated, Exceeds Quantification Limit
B = Value greater than or equal to instrument detection limit;
but less than contract required detection limit

Table 2
Groundwater Elevations
Former Vanadium Corporation of America Site
Operable Unit #3
Town of Niagara, New York

Well	Top of Riser Elevation (ft)	6/6/97 Depth to Groundwater (ft)	6/6/97 Groundwater Elevation (ft)	8/21/01 Depth to Groundwater (ft)	8/21/01 Groundwater Elevation (ft)	Change in Groundwater Elevation (ft)
Overburden/Top of Rock Zone						
MW-102A	608.32	Dry	N/A	11.9	596.42	>+.25
MW-103A	605.96	7.37	598.59	15.47	590.49	-8.1
MW-104A	611.05	12.97	598.08	17.99	593.06	-5.02
MW-105A	614.42	8.87	605.55	12.47	601.95	-3.60
Deep Upper Bedrock Zone						
MW-102B	607.96	40.27	567.69	40.50	567.46	-0.23
MW-103B	606.15	12.75	593.40	17.97	588.18	-5.22
MW-104B	610.60	12.97	597.63	17.57	593.03	-4.60
MW-105B	614.53	10.22	604.31	12.7	601.83	-2.48

Difference in Groundwater Elevations at Well Each Cluster August 2001				
Well	Groundwater Elevation	Well	Groundwater Elevation	Difference
MW-102A	596.42	MW-102B	567.46	28.96
MW-103A	590.49	MW-103B	588.18	2.31
MW-104A	593.06	MW-104B	593.03	0.03
MW-105A	601.95	MW-105B	601.83	0.12

Notes:
ft = feet
N/A =Not applicable
Depths measured in 1997 by NYSDEC.



REFERENCES

1.) BASE MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF NIAGARA FALLS, LEWISTON, RANSOMVILLE, AND TONAWANDA WEST, DATED 1980.

2.) PROPERTY BOUNDARY APPROXIMATE.

2000 0 2000
SCALE FEET

Golder Associates
Philadelphia USA

FILE No.	0139293A001
PROJECT No.	013-9293
REV.	0

SCALE	AS SHOWN
DATE	10/17/01
DESIGN	AFF
CADD	AM
CHECK	JPR
REVIEW	RCS

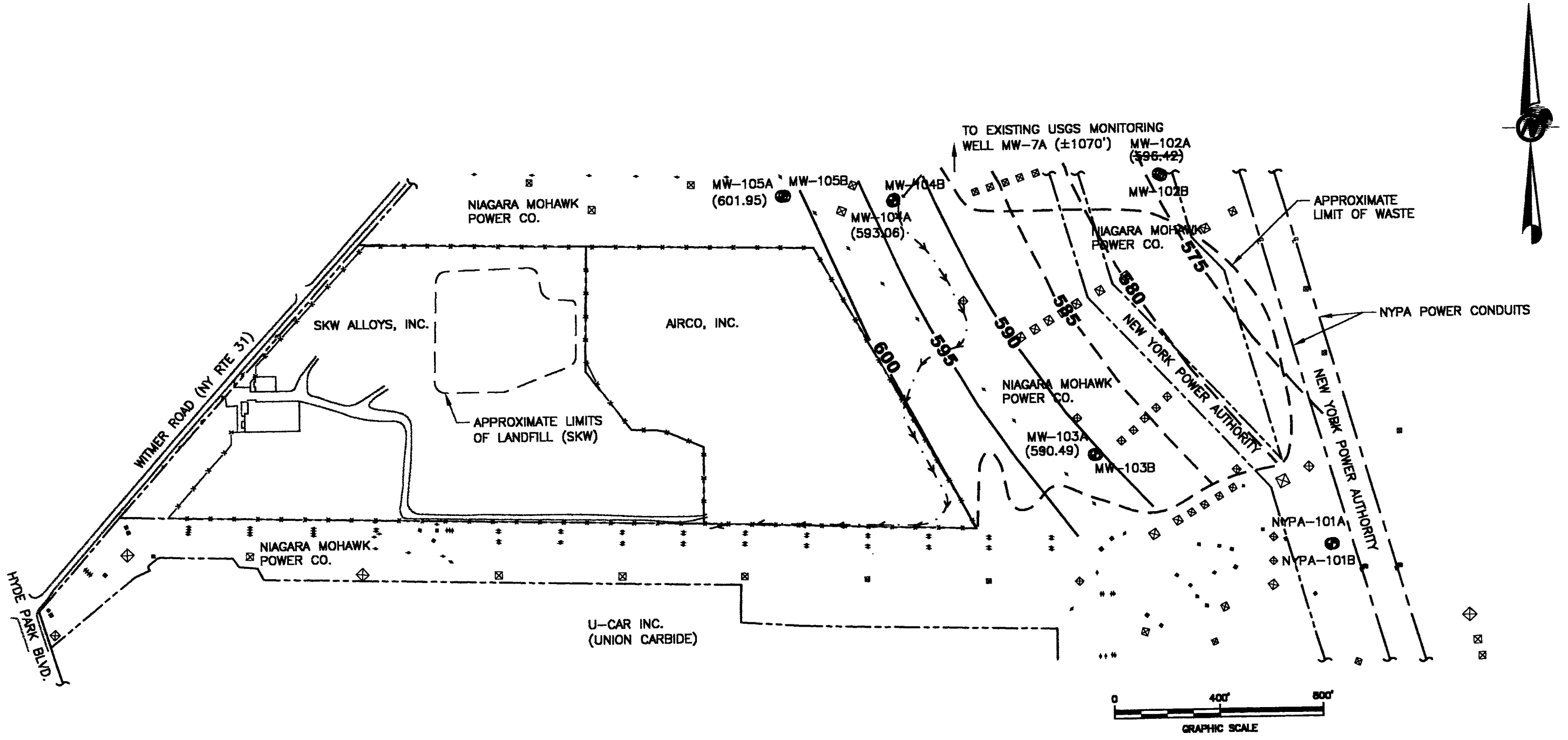
TITLE

SITE LOCATION MAP

FORMER VANADIUM CORPORATION SITE OPERABLE UNIT #3, TOWN OF NIAGARA, NEW YORK

FIGURE 1

Drawing file: 0139293A001.dwg Dec 04, 2001 - 2:23pm



LEGEND

- PROPERTY LINE
- DITCH
- FENCE
- 600 — POTENTIOMETRIC CONTOURS
- UTILITY POLE
- TOWER
- MW-105A — MONITORING WELL LOCATION (VANADIUM SITE)
- MW-102A (592.96) — WATER LEVEL ELEVATION NOT USED FOR INTERPRETATION

NOTES

1.) DRAWING MODIFIED FROM BLASLAND, BOUCK & LEE, INC. DRAWING NO. 36610B01.DWG, 12/08/00. BASE MAP DIGITIZED FROM 'VANADIUM SITE NO. 932001' PROVIDED BY LU ENGINEERS, 2230 PENFIELD RD., PENFIELD, NY, (716) 377-1450. MAP DATA DIGITIZED FROM 'SITEPLAN AND SAMPLING LOCATION' PREPARED BY ABB ENVIRONMENTAL.

2.) SITE FEATURES AND SAMPLE LOCATIONS ARE APPROXIMATE.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

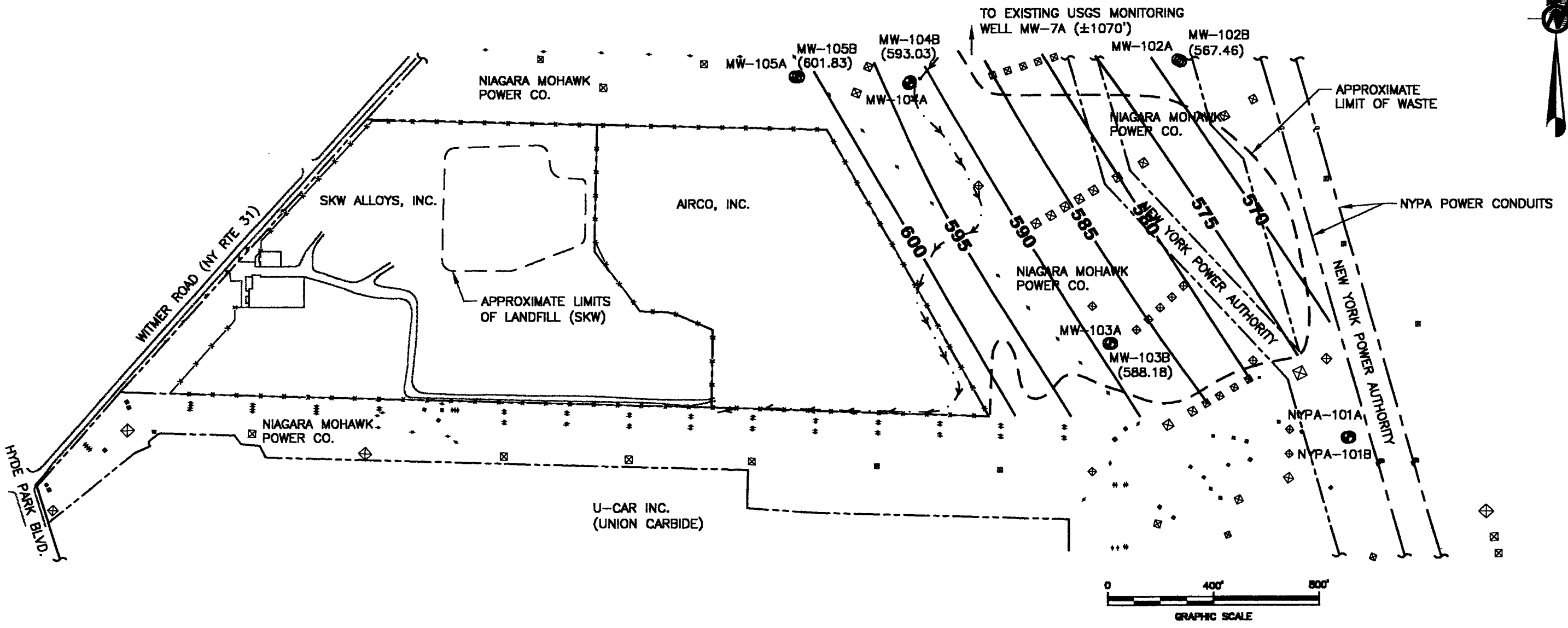
PROJECT
FORMER VANADIUM CORPORATION OF AMERICA SITE
TOWN OF NIAGARA, NEW YORK
SITE #932001 OPERABLE UNIT NO. 3

TITLE
DEEP HYDROGEOLOGIC ZONE (OVERBURDEN) POTENTIOMETRIC CONTOUR MAP (A-ZONE) AUGUST 21, 2001

Golder Associates
Buffalo, New York

PROJECT No.		013-9293	FILE No.		01392938005
DESIGN	JPR	10/22/01	SCALE	AS SHOWN	REV. 0
CADD	AM	10/23/01			
CHECK	JPR	10/25/01			
REVIEW	BCS	10/25/01			

FIGURE 2



LEGEND

- PROPERTY LINE
- DITCH
- FENCE
- 600 — POTENTIOMETRIC CONTOURS
- UTILITY POLE
- TOWER
- MW-105B — MONITORING WELL LOCATION (VANADIUM SITE)

NOTES

1.) DRAWING MODIFIED FROM BLASLAND, BOUCK & LEE, INC. DRAWING NO. 36610B01.DWG, 12/08/00. BASE MAP DIGITIZED FROM 'VANADIUM SITE NO. 932001' PROVIDED BY LU ENGINEERS, 2230 PENFIELD RD., PENFIELD, NY, (716) 377-1450. MAP DATA DIGITIZED FROM 'SITEPLAN AND SAMPLING LOCATION' PREPARED BY ABB ENVIRONMENTAL.

2.) SITE FEATURES AND SAMPLE LOCATIONS ARE APPROXIMATE.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT
FORMER VANADIUM CORPORATION OF AMERICA SITE
TOWN OF NIAGARA, NEW YORK
SITE #932001 OPERABLE UNIT NO. 3

TITLE
UPPER BEDROCK POTENTIOMETRIC CONTOUR MAP (B-ZONE) AUGUST 21, 2001

Golder Associates
Buffalo, New York

PROJECT No.		013-9293	FILE No.		0139293A004
DESIGN	JPR	10/22/01	SCALE	AS SHOWN	REV. 0
CADD	AM	10/23/01			
CHECK	JPR	12/5/01			
REVIEW	TSCS	12/5/01			

FIGURE 3

APPENDIX A

FISH AND WILDLIFE IMPACT ANALYSIS REPORT

Golder Associates Inc.

2221 Niagara Falls Boulevard, Suite 9
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Telephone (716) 215-0650
Fax (716) 215-0655

REPORT ON

FISH AND WILDLIFE IMPACT ANALYSIS REPORT FOR THE FORMER VANADIUM CORPORATION OF AMERICA SITE TOWN OF NIAGARA, NEW YORK NEW YORK HAZARDOUS WASTE DISPOSAL SITE NO. 932001 OPERABLE UNIT # 3

Submitted to:

Gallagher & Kennedy, P.A.
2575 East Camelback Road
Phoenix, AZ 85016-9225

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9 Copies - Gallagher & Kennedy, P.A.
1 Copy - Golder Associates Inc.; Buffalo, New York

December 2001 013-9293

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the results of Step #1 (Site Description) of a Fish and Wildlife Impact Analysis (FWIA) for the New York State Hazardous Waste Disposal Site No. 932001, Operable Unit (OU) 3, which is the former Vanadium Corporation of America (VCA) Site in the Town of Niagara, New York. This report was developed in accordance with guidance provided by the New York State Department of Environmental Conservation (NYSDEC) for performing a Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (NYSDEC 1994).

The objectives of the Site Description Phase (Step #1) of the FWIA are to identify the fish and wildlife resources that occur at the site, and, if significant fish and wildlife resources do exist, generate information helpful in developing the scope of future RI activities. This initial phase of the FWIA is based on information collected from existing reports, a regulatory file review, and an on-site reconnaissance conducted by Golder Associates Inc. (Golder) the week of August 20, 2001.

2.0 SITE DESCRIPTION

The former VCA site is located on Witmer Road in the Town of Niagara, New York (Figure 1). The approximately 150-acre site is comprised of three Operable Units. OU1 and OU2 are located on the western portion of the former VCA property, and comprise approximately 62 acres. The current owners of OU1 and OU2, SKW Metals and Alloys and Airco Properties, Inc., have completed Interim Remedial Measures (IRMs) at their respective facilities. OU3 is currently owned by Niagara Mohawk Power Corporation (NiMo) and the New York Power Authority (NYPA), and comprises approximately 88 acres of the eastern portion of the site. The site is located in an industrial area, with Interstate-190 bordering on the east, Witmer Road bordering the west, major rail lines to the south, and a car dealership to the north. Rights-of-way owned by the Niagara Mohawk Power Corporation (NiMo) and the New York Power Authority (NYPA) traverse OU3 which accommodate several high voltage transmission lines from the Robert Moses generating plant.

From about 1920 through 1960, VCA operated a ferroalloy manufacturing plant in the Town of Niagara, New York. During this time, approximately 594,000 tons of wood, brick, ferromanganese slag, and low-carbon ferrochromium (LCFC) slag was reportedly deposited over the former VCA site, a portion of which is now designated OU3 (NYSDEC 1993).

The slag located in the central portion of the site has been covered with 6 inches to 12 inches of soil, and is well vegetated. In the western portion of the site, some slag is exposed either due to the lack of, or erosion of cover soil.

The former VCA site is currently fenced and signed to discourage trespassers. However, there is vehicular access to the site along the northern border, and the site is seasonally used by all-terrain vehicle (ATV) users and other trespassers.

2.1 Topography and Natural Resources

The natural resources of concern, per the guidance for conducting a FWIA (NYSDEC 1994) include:

- Topographic features;
- Hydrologic features;
- Habitats supporting endangered, threatened, or rare species, or species of special concern;
- Wild, scenic and recreational rivers; and
- Significant coastal zone areas.

Natural resources were identified through on-site reconnaissance and review of readily available information, including:

- Aerial photograph(s);
- National Wetlands Inventory maps (NWI 2001); and
- NYSDEC Significant Habitats as defined by the NY Natural Heritage Program.

Topographic Features

The topography at and in the vicinity of the site is generally flat with LCFC slag piles, plateaus, and depressions providing relief of about 20 feet (ft).

Several of the transmission towers located on the eastern portion of the site are built into depressions excavated out of the slag. These depressions may be between 10 ft to 20 ft deep, and run the width of the set of towers, which may be up to 300 ft.

The slag piles are intermixed with disturbed soil throughout the site. In the center of the site, the slag pile extends about 10 ft to 15 ft above surrounding the terrain. It slopes downward gradually to meet the terrain towards the northern boundary. In the southeastern corner of the property, the slag pile ends at a more abrupt edge, dropping about 20 ft at a grade of about 30%.

Hydrology

The most significant hydrologic features in the vicinity of the site are the Niagara River and Gorge, which are situated about one mile west of the site. The Niagara Reservoir, constructed for the NYPA, is located just under one mile north of the site. Forebay Canal is an approximately 4,000 ft long canal and connects the reservoir to the Robert Moses Power Plant (located about one mile northwest of the site).

Twin Power Conduits are located underground along the site's eastern boundary. These conduits were constructed to divert river water from the upper Niagara River to the Robert Moses generating station. The conduits were each constructed as trenches 4 miles long and about 52 ft wide, penetrating between 100 ft and 160 ft into bedrock. They are both at least 40 ft below ground surface.

Gill Creek flows from an area east of the NYPA reservoir, is diverted along the southern boundary of the reservoir, and then flows southward. It approaches within 1,000 ft of the eastern boundary of the site.

No permanent aquatic habitats exist on the site. Two small areas of ponded water were observed during the on-site reconnaissance in August 2001 at the northwest corner and in the north-central portion of the site. The Preliminary Site Assessment for the site (ABB 1993) identified a drainage ditch flowing southward along the eastern and southern edge of the Airco parcel. A reported seasonal stream flows from north to south on the west side of the OU3 site near monitoring well MW-104A/B and enters the east side of the Airco property (OU2). The stream was not evident at the time of the on-site reconnaissance, however the reconnaissance occurred after an exceptionally dry period and the seasonal stream was dry. A drainage pipe was observed outside the southeastern corner of the Airco parcel, which appeared to run along the southern boundary of the Airco parcel, inside its fenceline. No permanent surface water features or areas of sedimentation were observed in the vicinity of the drainage pipe.

Wetlands

The wetlands identified in the National Wetlands Inventory (NWI 2001) within two miles of the site are included on Figure 1. The boundaries of the wetlands delineated by Golder during the on-site reconnaissance (August 2001) are included on Figure 2, and are described in more detail in the Wetland Delineation Report for the site (Appendix B of main report). Table 1 presents the key to the wetland classifications used on both wetland maps.

The NWI maps indicate several wetlands along Gill Creek. One wetland (PF01A) is located about 2,000 ft to the northeast of the site, and a series of wetlands (PSS1E and PF01F) are located about 1,000 ft to the southeast of the site. Three isolated wetlands (PEM5A, PEM5E, and PFO1A) occur within a mile of the site.

The Niagara River, Niagara Reservoir, and Forebay Canal are designated as open water features on the NWI maps, and are not designated wetlands.

Three wetland systems were identified on the property that are all designated as PEM1A, as described in Table 1:

1. A shallow drainageway and associated depressions (A2) dominated by common reed (*Phragmites australis*) and cattail (*Typha* sp.), with occasional shrubs;

2. A similar wetland (H3) south of the slag pile, with shrubs such as dogwood (*Cornus* sp.) and ash (*Fraxinus* sp.) in addition to invasive species such as common reed and purple loosestrife (*Lythrum salicaria*), as shown in Photo 16; and

3. A small pond with a vegetated fringe (L2) in the northwest corner of the site.

Significant Habitats

Golder contacted the NYS Natural Heritage Program requesting a review of their database for any significant habitats, rare or state-listed animals and plants, significant natural communities, or other significant habitats that occur or may occur at or in the immediate vicinity of the site. The correspondence and results of the database search are presented in Attachment A.

There are no rare or endangered animals listed in the Natural Heritage Report. Seven plants listed in the Natural Heritage Report occur in the vicinity of the site. With one exception all of the reported occurrences are historical and no recent observations are known. The golden puccoon (*Lithospermum caroliniense var croceum*) was last seen in 1976 at Niagara University and is not expected to occur at or near the site.

There are no Federally designated wild, scenic and recreational rivers or significant coastal zone areas at or in the vicinity of the site.

2.2 Vegetative Cover

Figure 2 presents a covertype map for the site. Photos of several vegetative covertypes are included in Attachment B, and are referenced here by photo number. A key to the vegetative covertypes listed on the map is presented in Table 2. The base map was derived from aerial photos, ground-level photos, USGS topographic maps, and on-site reconnaissance. Major vegetative communities including wetlands and aquatic habitats are included on the covertype map.

The eastern and central portions of the slag plateau were capped with 6" to 12" of soil, and are vegetated predominantly with grasses. The west side of the slag plateau contains exposed slag, and any soil in this area is disturbed by ATV use and is typically unvegetated.

Plant communities on the site are dominated by grasses, herbs, and shrubs typical of heavily disturbed areas. These include plants that are rapid colonizers and can tolerate infertile compacted soils, such as common reed (*Phragmites* sp.), cattail (*Typha* sp.), Russian teasel (*Dipsacus* sp.), goldenrod (*Solidago* sp.), purple loosestrife (*Lythrum salicaria*), gray-stemmed dogwood (*Cornus racemosa*), various willows (*Salix* spp.), and some cottonwood (*Populus deltoides*). It is likely that maintenance of the transmission lines prevents establishment of trees on much of the site.

Four main plant communities are present, as described below. The first three communities grade into each other, so that a variety of intermediate communities are present throughout the site. For example, a large flat with intermixed grass/herbaceous areas and dogwood stands occurs in the southern portion of the site. Similarly, cattails, other herbaceous hydrophytes, dogwood, or upland herbaceous plants are intermingled with the dense reed stands and may dominate small areas.

Broad Flats Dominated by Grasses and Weedy Herbaceous Plants

The predominant vegetative covertypes at the site are grasses or grasses mixed with herbaceous plants or small shrubs (G1), as shown in Photos 17, and 18 through 22. Nearly all of the central grassy areas exhibited disturbed vegetation from ATV vehicle tracks. The predominant herbaceous plants include goldenrod (*Solidago* sp.), and the shrubs are predominantly dogwood (*Cornus racemosa*) and staghorn sumac *(Rhus typhina*).

A small area along the eastern boundary (G3) consists predominantly of grasses, but also includes some mature trees such as honey locust (*Gleditsia triacanthos*), box elder (*Acer negundo*), and some oak (*Quercus* sp.), as shown in Photo 22.

Grassy areas with relatively more herbaceous plants (G2) occur in the northern corridor. The herbaceous plants include goldenrod and ragweed (*Ambrosia* sp.).

Dense Stands of Common Reed

Common reed (*Phragmites australis*) stands occur in shallow depressions and flats in the center, and in the southern corridor of the site (A2). Some of the common reed stands in the center of the site (Photos 1 through 3) were identified by Golder as wetlands, as described in Section 2.1 of the report.

Another common reed community (P1) is located in the southern corridor (Photo 10), and is nearly homogeneous. The common reed community mixes with occasional dogwood at the western end of the southern corridor (P2).

Dense Shrub Coppices

Dogwood shrub coppices are located throughout the site. Rapid and extensive cloning by rhizomatous growth allows dogwood species to create dense thickets which crowd out other vegetation such as grasses, sedges and forbs (Converse 1987). Such colonization is evident in the dogwood-dominated areas on the site.

Dogwood coppices occur at the toe of the slag plateau extending southward (S2), as shown in Photo 17. Occasional willow (*Salix* sp.), common reed, grasses and bur oak (*Quercus macrocarpa*) also occur in these areas.

Dogwood shrub coppices also occur at the eastern portion of the southern corridor, as shown in Photos 4, 6, and 9 (UPL02). This community is predominantly gray-stemmed dogwood (*Cornus racemosa*) with hawthorn (*Crataegus* sp.) and buckthorn (*Rhammus* sp.).

As described above, depressions were excavated out of the slag to construct the transmission towers. The covertype within the depression areas is shrubs and herbaceous plants (S1), predominantly common reed, dogwood and sumac (*Rhus* sp.). A portion of a slag depression is shown in Photos 13 through 15.

Hardwood Forest

Several communities of mature trees occur on the site. The small wooded area (UPL01) shown in Photo 5, has nearly no underbrush, and the ground is littered with scrap wood and metal. Paint was observed on several scraps and trees, indicating that this area is used for paint ball recreation. The trees in this area include shagbark hickory (*Carya ovata)*, northern red oak (*Quercus rubra)*, bur oak (*Quercus macrocarpa)*, American basswood (*Tilia americana)*, red maple (*Acer rubrum)*, various willow (*Salix* spp.*)*, and cottonwood (*Populus deltoides)*. The willow and cottonwood occur on a rise above the paintball area. The soil in the willow and cottonwood area appears to be ash from an industrial source, as shown in Photo 23.

The wooded area UPL03 is contiguous with wooded areas to the south of the site (Photos 6, 13 through 15, and 17). The central southern wooded area contains tree species similar to UPL01, but the area is relatively undisturbed compared to UPL01.

The wooded area to the west of UPL03 (UPL04) is a more open area of aspens and cottonwoods and a thick underbrush community of raspberries (*Rubus* sp.), dogwood, goldenrod, and riverbank grape (*Vitus riparia*), as shown in Photo 7.

3.0 DESCRIPTION OF FISH AND WILDLIFE RESOURCES

3.1 Fish and Wildlife Resources and Covertypes

No permanent watercourses or water bodies exist on or in the immediate vicinity of the site. Therefore, no fish were observed.

Wildlife observed on site includes several amphibian, reptile, bird and mammal species (Table 3). Two amphibians were seen on the site. They are the northern leopard frog (*Rana pipiens*) and American toad (*Bufo americanus*). Habitats within the site were generally dry at the time of the reconnaissance, with few wet areas present. However, many small ponded areas likely exist on the site during the spring which may provide breeding habitat. American toads (Photo 12) are known to require nothing more than temporary shallow water bodies in which to reproduce (Conant and Collins, 1998). After the breeding season, toads can be found in almost any terrestrial habitat and are likely widespread throughout the site, although not in large numbers. Northern leopard frogs are known to wander far from water bodies during summer (Conant and Collins, 1998) and were seen in several habitats throughout the site. They likely breed in the wetland areas on the site in the spring, but may wander in from adjacent aquatic habitats. Both species are widespread throughout New York.

A single northern brown snake (*Storeria dekayi*) was the only reptile observed on the site during the reconnaissance. Known to inhabit moist areas, this snake species likely lives in the wetter areas of the site. The northern brown snake is also known to be common in urban areas (Conant and Collins, 1998). This species is widespread throughout New York.

A total of 28 bird species were observed on the site (Table 3). The most common species was mourning dove (*Zenaida macroura*), which was seen both individually and in flocks throughout the open areas of the site and on power line transmission towers over wetland

habitats. Other commonly seen species were American goldfinch (*Carduelis tristis*) and song sparrow (*Melospiza melodia*), both of which were seen in most habitats.

The southern portion of the site, downslope of the slag pile, contained the highest diversity of birds. This is likely due to the diversity and complexity of habitats in these areas. Common species in the more shrubby areas (H3, UPL02, UPL04) included gray catbird (*Dumetalla carolinensis*), northern mockingbird (*Mimus polyglottos*), American robin (*Turdus migratorius*), house finch (*Carpodacus mexicanus*), eastern kingbird (*Tyrannus tyrannus*), great crested flycatcher (*Myiarchus crinitus*), cedar waxwing (*Bombycilla cedrorum*), common yellowthroat (*Geothlpis trichas*) and 2 *Empidonax* flycatchers.

In the wooded areas (UPL01, UPL03) northern flicker (*Colaptes auratus*), downy woodpecker (*Picoides pubescens*), American crow (*Corvus imparatus*), blue jay (*Cyanocitta cristata*), black-capped chickadee (*Poecile atricapillus*), red-eyed vireo (*Vireo olivaceus*), American redstart (*Setophaga ruticilla*), Nashville warbler (*Vermivora ruficapilla*), chestnut-sided warbler (*Dendroica pensylvanica*) and northern cardinal (*Cardinalis cardinalis*) were seen.

Several red-tailed hawks (*Buteo jamaicensis*) were seen hunting over the open areas of the site and roosting on the power line transmission towers. Barn swallows (*Hirundo rustica*) were also seen hunting insects over the open areas in the southern portion of the site. Exotic species seen were European starlings (*Sturnus vulgaris*) roosting on the power line transmission towers and rock doves flying over the landfill areas.

Despite the heavy disturbances on the site (both past and present), several different feeding strategies, from top carnivores (red-tailed hawk) to small seed-eaters (American goldfinch), are well represented. Many insectivorous birds were observed on the site (flycatchers and warblers) as well as several omnivores (northern mockingbird, gray catbird, American robin, black-capped chickadee, cedar waxwing, song sparrow).

A single, previously used nest was observed on the site, deep within a common reed stand P1 (Photo 10). It is likely that additional birds nested in this area (and probably other common reed areas) due to their gregarious nature and preference for nesting in similar habitats. No other bird nests were directly observed. Other birds likely to have nested in the area as evidenced by birds observed with juvenile plumage and/or with adults are northern mockingbird, American robin and red-tailed hawk.

Seven mammal species were either directly (visually) or indirectly (tracks, scat, burrows, etc.) observed on the site (Table 3). These were red fox (*Vulpes vulpes*), coyote (*Canis latrans*), eastern gray squirrel (*Sciurus carolinensis*), mouse (*Peromyscus* sp.), meadow vole (*Microtus pennsylvanicus*), whitetail deer (*Odocoilus virgininiansus*) and eastern cottontail (*Sylvilagus floridanus*). Red fox, a furbearer, are very common in New York and are found in a variety of habitats from open farmland to urban areas. Evidence of fox presence on the site was from two separate burrows observed by Golder personnel. One burrow had two openings and was located on a northeast facing slope leading up to the UPL01 covertype area (Photo 23). It is likely that both burrows seen, if they were fox dens, were used by one family due to their fairly large home range (1 to 2 square miles) and habit of utilizing several dens in one area (Burt and Grossenheider, 1980). Red fox feed on a variety of small animals and birds.

A single coyote was seen within the fenced area of the Airco Landfill during the August, 2001 site reconnaissance. It is estimated that between 20,000 and 30,000 coyotes live in New York during the summer (NYSDEC, 2001). This species has become increasingly abundant in the eastern United States and Canada over the past several decades and is now frequently seen in areas of human development. It is not surprising that coyotes exist within the site due to the apparently healthy population of prey species (rabbits, small rodents; see below). Coyotes have been described as opportunistic feeders and will eat anything from plant material to whitetail deer (NYSDEC, 2001). Coyotes are listed as a furbearer in New York.

The eastern gray squirrel, another furbearer, was seen in the forested areas of the southern portion of the site (UPL01, UPL03, UPL04). This species is very common in both the wooded and urban areas of New York. The gray squirrel feeds primarily on nuts and seeds, but has also been known to eat fruits, fungi and the cambium layer of trees (Burt and Grossenheider, 1980). Oaks were common in the wooded areas on the site and acorns from these trees likely provide a winter food source for the local gray squirrel population.

The small rodent (mouse and meadow vole) population on the site appeared to be healthy. Several mice (either deer or white-footed mice) and meadow voles were seen during the site reconnaissance and evidence of their nesting was observed in the form of small burrows in the face of slopes in the large G1 covertype area. The predator population (red-tailed hawk, red fox, and coyote) also indicate a high presence of small rodents in the area. Both mice species and the meadow vole are widespread across North America and are common in open habitats. They feed on seeds, nuts, grasses and insects (Burt and Grossenheider, 1980).

Although no whitetail deer were directly observed on the site, tracks and scat were seen in almost all areas. Deer are abundant in New York and live in a variety of habitats from dense forest to open farmland. This species browses on vegetation and has a home range of usually less than 1 mile (Burt and Grossenheider, 1980).

Evidence of eastern cottontail inhabitation of the site was observed during the site reconnaissance in the form of scat and burrows (Photo 19) seen within the large G1 covertype area. This species feeds on vegetation and has a home range of approximately 3 to 20 acres (Burt and Grossenheider, 1980). The eastern cottontail is common in New York and is often observed browsing on grasses along the buffer strips of roads. These small rabbits are likely a portion of the diet of the larger predators found on the site (red fox, coyote and possibly red-tailed hawk).

3.2 Submergent Aquatic Vegetation

No permanent watercourses or water bodies exist on or in the immediate vicinity of the site. Therefore, no submergent aquatic vegetation was observed.

3.3 Fauna Expected Within Each Cover Type and Aquatic Habitat

The wetland areas of the site (A2, H3, L2), and the P1 and P2 areas, are small in size without extensive indundation. Therefore, on-site wetlands do not support the wildlife and plant diversity expected in larger wetlands. No permanent water bodies or watercourses were found on the site and therefore, no fish or other fauna requiring year-round aquatic habitat are present.

Due to the small size of the wetlands and absence of water, typical wetland species such as muskrat are not expected on the site. Similarly many of the amphibian and reptile species (e.g., bullfrog, northern water snake, midland painted turtle, etc.) requiring permanent water are not expected. Many wetland bird species, which require water for feeding (e.g., herons) or nesting habitat (e.g., rails) would not be found in these habitats either. Basically, these are marginal wetlands in terms of wildlife habitat and will likely only be utilized by a limited number of species, many of which were seen on the site (i.e., American toad, northern leopard frog, red-winged blackbird).

The open areas on the site (G1, G2, G3, S2), dominated by grasses and crisscrossed with ATV trails and power line transmission towers, appear to be utilized by species typical of these types of habitats. Despite the disturbances associated with current human activities, a healthy population of predator and prey mammals and birds exists on the site. It is likely that the shrubs and grasses in these areas are used by various bird species not seen on the site, such as the savannah sparrow (*Passerculus sandwichensis*) and eastern meadowlark (*Sturnella magna*) for nesting in the spring; or for foraging at night, such as the great-horned and short-eared owls (*Bubo virginianus* and *Asio flammeus*, respectively) during fall and winter.

The isolated shrub-dominated areas underneath the power line transmission towers (S1) are likely used as nesting and foraging habitat by various bird and mammal species. Extensive shrub and vine growth in the southern area may also provide shaded resting habitat for large mammals (i.e., whitetail deer) during the spring and summer. The northern S1 area is highly disturbed with ATV trails and likely supports few species.

The wooded areas (UPL01, UPL03, UPL04) appear to support typical woodlot species, at least birds. These areas also are likely to provide daytime resting habitat for deer. As evidenced during the reconnaissance, they do provide foraging habitat for eastern gray squirrels and typical seed eating and insectivorous bird species (black-capped chickadee, various warbler species, northern cardinal). During the spring, birds that prefer nesting in deciduous woodlands would expect to be found in these areas, such as eastern wood pewee (*Contopus virens*), warbling vireo (*Vireo gilvus*), wood thrush (*Hylocichla mustelina*), and ovenbird (*Seiurus aurocapillus*). The woodlots are likely too small to support ruffed grouse (*Bonasa umbellus*) or other species requiring contiguous tracks of forest.

The shrub area UPL02 was well utilized by many wildlife species. The bird diversity was high, with many species seen feeding on the edges of this area (e.g., flycatchers, song sparrow). Vegetation growth in this area was thick and was utilized by the northern brown snake and camouflaged predatory insects (Photos 9 and 11). During spring, the shrubs within UPL02 likely provide nesting habitat for various birds such as house finch, ruby-throated hummingbird (*Archilochus colubris*) and rodents such as the white-footed mouse (*Peromyscus leucopus*). Deer and rabbits likely use this area for foraging and shelter during the winter.

During the site reconnaissance in August, 2001 no endangered, threatened, rare species or species of special concern were observed on the site.

3.4 Observations of Stress

Very little natural habitat exists on site, and much of that continues to be seasonally disturbed by ATV use. Soil erosion is common in areas along the slopes of the slag pile. Throughout much of the site, large pieces of refuse exist including piles of wood, discarded furniture and a burnt out car.

The slag on the site is, for the most part, covered with soil and is vegetated. There are a few areas on the western side of the site where slag is exposed, either due to lack of cover soil or erosion. However, the slag is a hard, rocky material that is relatively immobile and not readily broken down. Thus, it is likely that the slag on the site is relatively inaccessible to terrestrial and avian species via plant uptake, burrowing, or direct ingestion.

No areas of reduced vegetation growth or density were obvious on the site, except in areas where growing conditions were not optimal (i.e., exposed slag areas, ATV tracks). No wildlife mortality was observed, and species diversity was surprisingly high for many of the areas within the site. No abnormalities could be seen on any biota seen. Specimens of both amphibian species, common indicators of chemical stress, appeared to be in good health. No deformities or observable anomalies could be seen and behavior was typical of the species.

4.0 DESCRIPTION OF FISH AND WILDLIFE RESOURCE VALUES

4.1 Value of Habitat to Associated Fauna

The VCA Site is located in an urban area and is bordered by transportation corridors on all sides. It is therefore fairly isolated naturalized habitat. To the south, east of the Union Carbide property and west of I-190, the open shrub habitat (S2) continues for some distance to the railway. This area, combined with the area on the site, likely provides the only habitat for wildlife within a 2-mile radius. As long as disturbances do not increase, the ability of the habitat on the site to support local wildlife should remain stable. The foraging, shelter, breeding and roosting requirements for many species mentioned in this report are supported on the site. For example, it is probable that the red-tailed hawks have nested successfully in the area and utilize the power line transmission towers for nest building, hunting and roosting during various times of the year. Forage for this species appears to be abundant in the open areas underneath the power line transmission towers.

The fact that so many species were observed indicates that, despite on-going human disturbance, the habitat on the site is meeting the requirements of many species, from great crested flycatchers to whitetail deer. The species directly or indirectly observed appeared healthy (i.e., no dead or sick animals were observed), thus leading to the conclusion that the habitat is meeting all of their requirements.

4.2 Value of Resources to Humans

The site is intended to be inaccessible to trespassers, even though it is well-used on a seasonal basis. If the site is maintained as a "no trespassing" area, the wildlife resources on the site would be considered inaccessible to humans for hunting, fishing, wildlife observation, scientific research, and other recreational or economic activities. As it is, the site is used by trespassers for activities that do not utilize the wildlife resources on the site.

5.0 IDENTIFICATION OF APPLICABLE FISH AND WILDLIFE REGULATORY CRITERIA

Both contaminant-specific and site-specific criteria applicable to the evaluation of fish and wildlife resources are identified in this section.

Surface and Groundwater Quality Standards and Guidance Values

The water quality standards and guidance values for the protection of aquatic life are listed in 6 New York Codes, Rules, and Regulations (NYCRR), Part 701 and NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. These regulations apply to the discharge of wastewater to significant recreational or ecological waters where the waste may affect the quality of water where the quality of water is critical to maintaining the value for which the water was distinguished. The significant recreational or ecological waters that may be in the vicinity of the site include groundwaters and surface waters tributary to and within freshwater wetlands designated class I pursuant to 6 NYCRR Part 664. The stream that drains the site is intermittent, so site runoff is predominantly from sheetflow onto immediately adjacent areas. Therefore, discharge of impaired surface water to significant recreational or ecological waters is unlikely.

The potential for groundwater discharge to off-site locations is addressed in the groundwater section of the main report text.

Sediment Criteria

Sediment criteria are not applicable on this site due to the lack of permanent surface water features with sedimentation.

Freshwater Wetlands Act

The freshwater wetlands act and its implementing regulations (NYS Environmental Conservation Law, Article 24, 6 NYCRR Parts 663 and 664) provides regulations for the delineation and classification of freshwater wetlands in New York State. As described in Appendix B of the main report, three freshwater wetlands were identified on the site, and a request for jurisdictional determination within New York State will be submitted. The applicability of the freshwater wetlands act and the associated permit requirements for this site will be determined based on the outcome of the jurisdictional determination.

6.0 CONCLUSIONS

The Site Description Phase (Step #1) of the FWIA was conducted to identify any significant fish and wildlife species present at the site that would warrant the performance of subsequent steps of the FWIA. The results of Step #1 indicate that there are no permanent surface water features at the site, therefore the site contains no aquatic or wildlife species that require year-round aquatic habitat. In the absence of aquatic habitat, no further evaluations of fish species are necessary. The grasslands, wooded areas, and wetlands on the site do appear to support a variety of terrestrial and avian wildlife species. However, for the reasons presented below, further FWIA evaluations to determine the potential impact on wildlife at the site do not appear to be necessary:

- The FWIA indicates that no threatened or endangered species exist at or in the vicinity of the site;
- No significant habitats, Federally-designated wild, scenic and, recreational rivers, or significant coastal zone areas occur at or in the vicinity of the site;
- There are no exceedances of NYSDEC fish and wildlife regulatory criteria that are applicable to the site;
- A large portion of the site contains rights-of-ways that accommodate several high voltage transmission lines, which will likely remain for the foreseeable future. Thus, future development of the site is limited to commercial/ industrial land uses as opposed to other potential land uses that might be more beneficial to wildlife;

- There are no permanent hydrologic features at the site, which limits the accessibility of potential contaminants in surface water or sediment to wildlife; and

- Much of the slag material on the site is covered with soil and vegetated. In areas where slag is exposed, it is a hard, rocky material that is not readily broken down. Thus, intake (ingestion, dermal contact, inhalation) of slag particles by wildlife would not easily occur.

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TABLE 1
WETLAND CLASSIFICATION KEY
VANADIUM SITE AND VICINITY

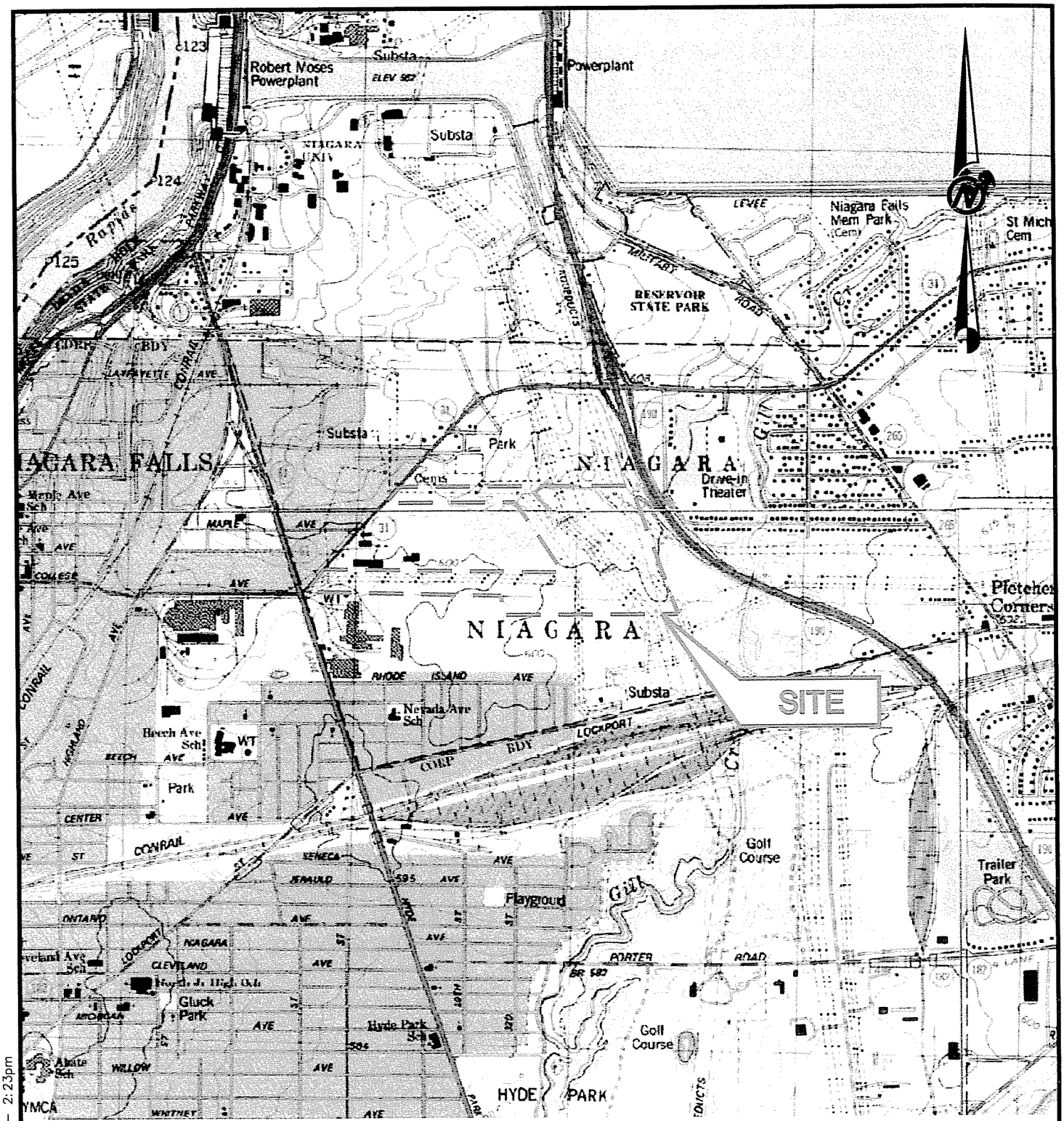
L1UBKZh	[L] Lacustrine, [1] Limnetic, [UB] Unconsolidated Bottom, [K] Artificially Flooded, [Z] Intermittently Exposed/Permanent, [h] Diked/Impounded
PEM1A	[P] Palustrine, [EM] Emergent, [1] Broad-Leafed Deciduous, [A] Temporarily Flooded
PEM5A	[P] Palustrine, [EM] Emergent, [5] Dead, [A] Temporarily Flooded
PEM5E	[P] Palustrine, [EM] Emergent, [5] Dead, [A] Seasonally Flooded/Saturated
PFO1A	[P] Palustrine, [FO] Forested, [1] Broad-Leafed Deciduous, [A] Temporarily Flooded
PFO1F	[P] Palustrine, [FO] Forested, [1] Broad-Leafed Deciduous, [A] Semi-Permanently Flooded
PSS1E	[P] Palustrine, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated
R2UBKZx	[R] Riverine, [2] Lower Perennial, [UB] Unconsolidated Bottom, [K] Artificially Flooded, [Z] Intermittently Exposed/Permanent, [x] Excavated
R3UBH	[R] Riverine, [3] Upper Perennial, [UB] Unconsolidated Bottom, [H] Permanently Flooded

TABLE 2
VEGETATIVE COVERTYPE KEY
VANADIUM SITE AND VICINITY

Key	Name	Description
A2	Wetland Area 1	PEM (Palustrine, Emergent, Temporarily Flooded) Wetland. Predominant species include common reed (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*).
G1	Grass Area 1	Grass areas (70%) with sporadic clusters of herbaceous and shrub layer plants (30%). Herbaceous plants include goldenrod (*Solidago* sp.) and teasel (*Dipsacus sp.*). Shrub layer plants include gray-stemmed dogwood (*Cornus racemosa*), and staghorn sumac (*Rhus typhina*).
G2	Grass Area 2	Grass areas (70%) with occasional herbaceous plants (20%). Herbaceous plants might include goldenrod and ragweed (*Ambrosia* sp).
G3	Grass Area 3	Grass areas (80%) with sporadic trees (20%). Trees might include honey locust (*Gleditsia triacanthos*), box elder (*Acer negundo*), and oak (*Quercus* spp.).
H3	Wetland Area 2	PEM/PSS (Palustrine, Emergent, Shrub-Sapling, Temporarily Flooded) Wetland. Predominant species include cattail (*Typha* sp.), common reed, purple loostrife, gray-stemmed dogwood and ash (*Fraxinus* sp.).
I1	Industrial Area 1	No vegetation, area covered with pavement or stockpiles.
L2	Wetland Area 3	PEM (Palustrine, Emergent, Temporarily Flooded) Wetland. Predominant species include common reed, purple loostrife, and cattail.
P1	Phragmites Area 1	Common reed area (99%) with little or no other species.
P2	Phragmites Area 2	Common reed area (80%) with occasional gray-stemmed dogwood.
S1	Shrub Area 1	Shrubs in electrical tower depression areas. Predominantly common reed., gray-stemmed dogwood, poison ivy (*Toxicodendron radicans*), mixed sumac species (*Rhus* spp.).
S2	Shrub Area 2	Gray-stemmed dogwood clusters with occasional herbaceous plants. Plants include willow (*Salix* spp.), common reed., bur oak (*Q. macrocarpa*), grasses.
UPL01	Upland Area 1	Wooded area with little or no underbrush. Trees include shagbark hickory (*Carya ovata*), northern red oak (*Q. rubra*), bur oak, American basswood (*Tilia americana*), red maple (*Acer rubra*), black willow (*S. nigra*), cottonwood (*Populus deltoides*). Underbrush might include poison ivy, Virginia-creeper (*Parthenocissus quinquefolia*).
UPL02	Upland Area 2	Gray-stemmed dogwood shrub area (80%) with occasional (20%) other shrubs. Gray-stemmed dogwood, with hawthorn (*Crataegus* sp.), buckthorn (*Rhamnus* sp.).
UPL03	Upland Area 3	Wooded area with some underbrush. Trees include northern red oak (*Q. rubra*), northern white oak (*Q. alba*), American basswood, red maple, quaking aspen (*P. tremuloides*). Underbrush might include poison ivy, Virginia creeper.
UPL04	Upland Area 4	Wooded area with cottonwood overstory, gray-stemmed dogwood/berry underbrush. Trees might include cottonwood, quaking aspen. Underbrush might include gray-stemmed dogwood, red raspberries (*Rubus* sp.), mixed sumac, goldenrod, riverbank grape (*Vitis Riparia*).

TABLE 3
WILDLIFE SPECIES OBSERVED
DURING AUGUST, 2001 SITE RECONNAISSANCE

Common Name	Scientific Name	Habitat Observed
AMPHIBIANS		
American Toad	*Bufo americanus*	G1
Northern Leopard Frog	*Rana pipiens*	Most habitats (G1, G2, A2, H3, L2, P1, UPL02)
REPTILES		
Northern Brown Snake	*Storeria dekayi*	UPL02
BIRDS		
Red-tailed Hawk	*Buteo jamaicensis*	G1
Rock Dove	*Columba livia*	G1
Mourning Dove	*Zenaida macroura*	All habitats except UPL01 and UPL03
Northern Flicker	*Colaptes auratus*	Woodlands (UPL01 and UPL03)
Downy Woodpecker	*Picoides pubescens*	A2, UPL01, UPL03
Flycatcher 1	*Empidonax* sp.	UPL02
Flycatcher 2	*Empidonax* sp.	UPL01
Great Crested Flycatcher	*Myiarchus crinitus*	H3
Eastern Kingbird	*Tyrannus tyrannus*	H3, S2, UPL02
Red-eyed Vireo	*Vireo olivaceus*	Woodlands (UPL01 and UPL03)
Blue Jay	*Cyanocitta cristata*	Woodlands (UPL01 and UPL03)
American Crow	*Corvus imparatus*	Woodlands (UPL01 and UPL03)
Barn Swallow	*Hirundo rustica*	S2
Black-capped Chickadee	*Poecile atricapillus*	Woodlands (UPL01 and UPL03)
American Robin	*Turdus migratorius*	H3, UPL01, UPL02, UPL04
Gray Catbird	*Dumetella carolinensis*	H3, UPL01, UPL02, UPL04
Northern Mockingbird	*Mimus polyglottos*	H3, UPL01, UPL02, UPL04, S1
European Starling	*Sturnus vulgaris*	UPL02
Cedar Waxwing	*Bombycilla cedrorum*	H3, UPL01, UPL02
Nashville Warbler	*Vermivora ruficapilla*	H3, UPL01
Chestnut-sided Warbler	*Dendroica pensylvanica*	H3, UPL01, UPL03
Common Yellowthroat	*Geothlpis trichas*	H3
American Redstart	*Setophaga ruticilla*	H3, UPL01
Song Sparrow	*Melospiza melodia*	All habitats except UPL01 and UPL03
Northern Cardinal	*Cardinalis cardinalis*	Woodlands (UPL01 and UPL03), H3
Red-winged Blackbird	*Agelaius phoeniceus*	P1, A2
House Finch	*Carpodacus mexicanus*	UPL02
American Goldfinch	*Carduelis tristis*	All habitats
MAMMALS		
Red Fox	*Vulpes vulpes*	G1
Coyote	*Canis latrans*	Airco Landfill, UPL02
Eastern Gray Squirrel	*Sciurus carolinensis*	Woodlands (UPL01,UPL03, UPL04)
Mouse	*Peromyscus* sp.	G1
Meadow Vole	*Microtus pennsylvanicus*	G1
Whitetail Deer	*Odocoileus virginianus*	Most habitats
Eastern Cottontail	*Sylvilagus floridanus*	G1



REFERENCES

1.) BASE MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF NIAGARA FALLS, LEWISTON, RANSOMVILLE, AND TONAWANDA WEST, DATED 1980.

2.) PROPERTY BOUNDARY APPROXIMATE.

2000 0 2000
SCALE FEET

Golder Associates
Philadelphia USA

SCALE	AS SHOWN
DATE	10/17/01
DESIGN	AFF
CADD	AM
CHECK	JPR
REVIEW	RCJ

FILE No. 0139293A001
PROJECT No. 013-9293 REV. 0

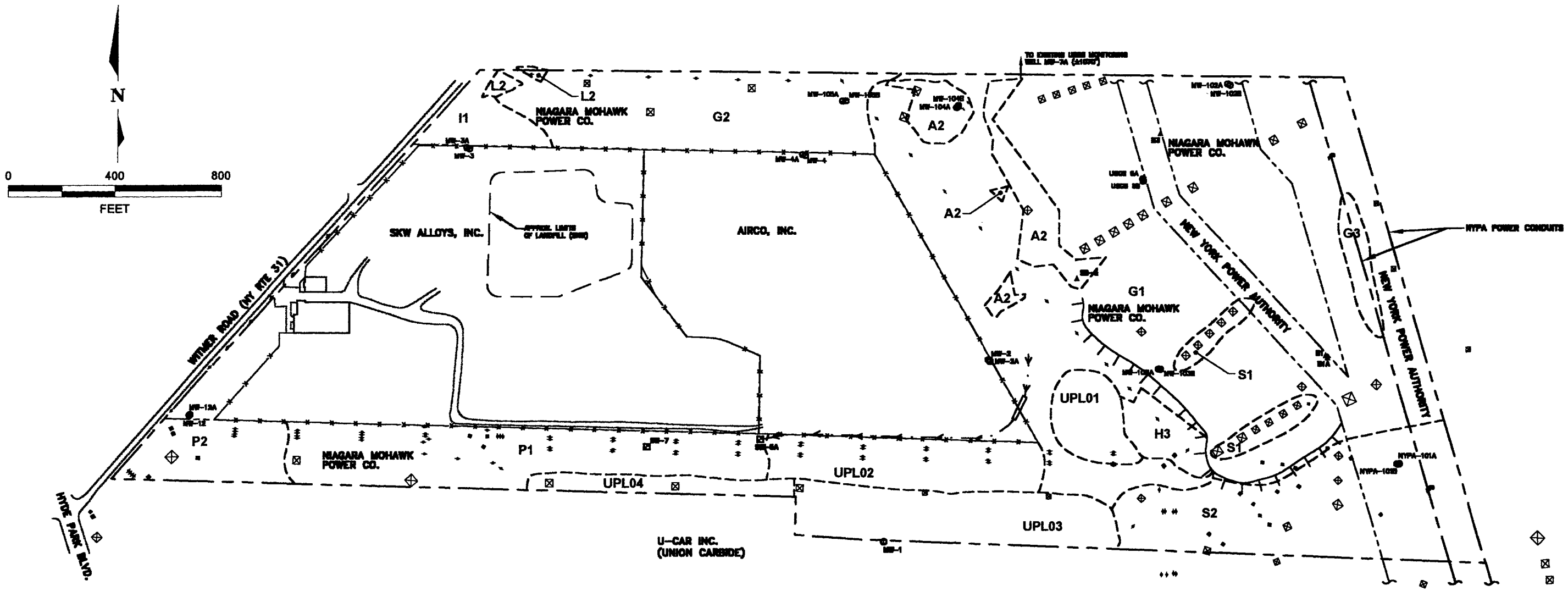
TITLE

SITE LOCATION MAP

FORMER VANADIUM CORPORATION SITE OPERABLE UNIT #3, TOWN OF NIAGARA, NEW YORK

FIGURE 1

Drawing file: 0139293A001.dwg Dec 04, 2001 - 2:23pm



LEGEND

PROPERTY LINE		MW-5	MONITORING WELL LOCATION (VANADIUM SITE)
UTILITY POLE		SD/SW-102-92	SURFACE WATER/SEDIMENT SAMPLE LOCATION
TOWER		SW-7	SURFACE WATER SAMPLING LOCATION
DITCH			
FENCE			
SLAG PILE SLOPE			
A2	COVERTYPE AND NAME		

VEGETATIVE COVERTYPE KEY

A2	WETLAND AREA 1
G1	GRASS AREA 1
G2	GRASS AREA 2
G3	GRASS AREA 3
H3	WETLAND AREA 2
I1	INDUSTRIAL AREA 1
L2	WETLAND AREA 3
P1	PHRAGMITES AREA 1
P2	PHRAGMITES AREA 2
S1	SHRUB AREA 1
S2	SHRUB AREA 2
UPL01	UPLAND AREA 1
UPL02	UPLAND AREA 2
UPL03	UPLAND AREA 3
UPL04	UPLAND AREA 4

NOTES:

1. BASE MAP DIGITIZED FROM "VANADIUM SITE NO. 932001" PROVIDED BY LU ENGINEERS, 2230 PENFIELD RD., PENFIELD, NY, (716) 377-1450. MAP DATA DIGITIZED FROM "SITE PLAN AND SAMPLING LOCATION" PREPARED BY ABB ENVIRONMENTAL.
2. SITE FEATURES AND SAMPLE LOCATIONS ARE APPROXIMATE.

SOURCE: BLASLAND, BOUCK & LEE, INC., SITE PLAN DRAWING DATED 12-08-00

FIGURE **2**

VEGETATIVE COVERTYPE MAP

PD/NIAGARA/NY

ATTACHMENT A

CORRESPONDENCE WITH NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Golder Associates Inc.

2221 Niagara Falls Boulevard, Suite 9
Niagara Falls, NY USA 14304
Telephone (716) 215-0650
Fax (716) 215-0655

August 16, 2001

013-9293

Information Services
New York Natural Heritage Program
625 Broadway, 5th Floor
Albany, NY 12233-4757

VIA FACSIMILE: (518) 402-8925

RE: Request for Information; Fish And Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA)

Gentlemen:

Golder Associates Inc. (Golder) is conducting a Fish and Wildlife Impact Analysis at the former Vanadium Corporation Site in Niagara County, NY. The project is sited as shown on the USGS 7.5 Minute Series Topographic Quadrangles: Niagara Falls, NY –Ont. 1980; and Lewiston, N.Y.-Ont. 1980. A detailed outline of the facility map is attached.

Golder requests the following information from the Natural Heritage Program for our study:

- The NYSDEC Significant Habitat Map, for the study area;
- A listing of endangered, threatened, rare species, or species of special concern for the area;
- Classifications of Natural Communities in the area; and
- Wild, scenic, and recreational riverways and significant coastal zone areas in the area.

Golder appreciates your assistance in this matter. Please contact the undersigned with any questions you may have.

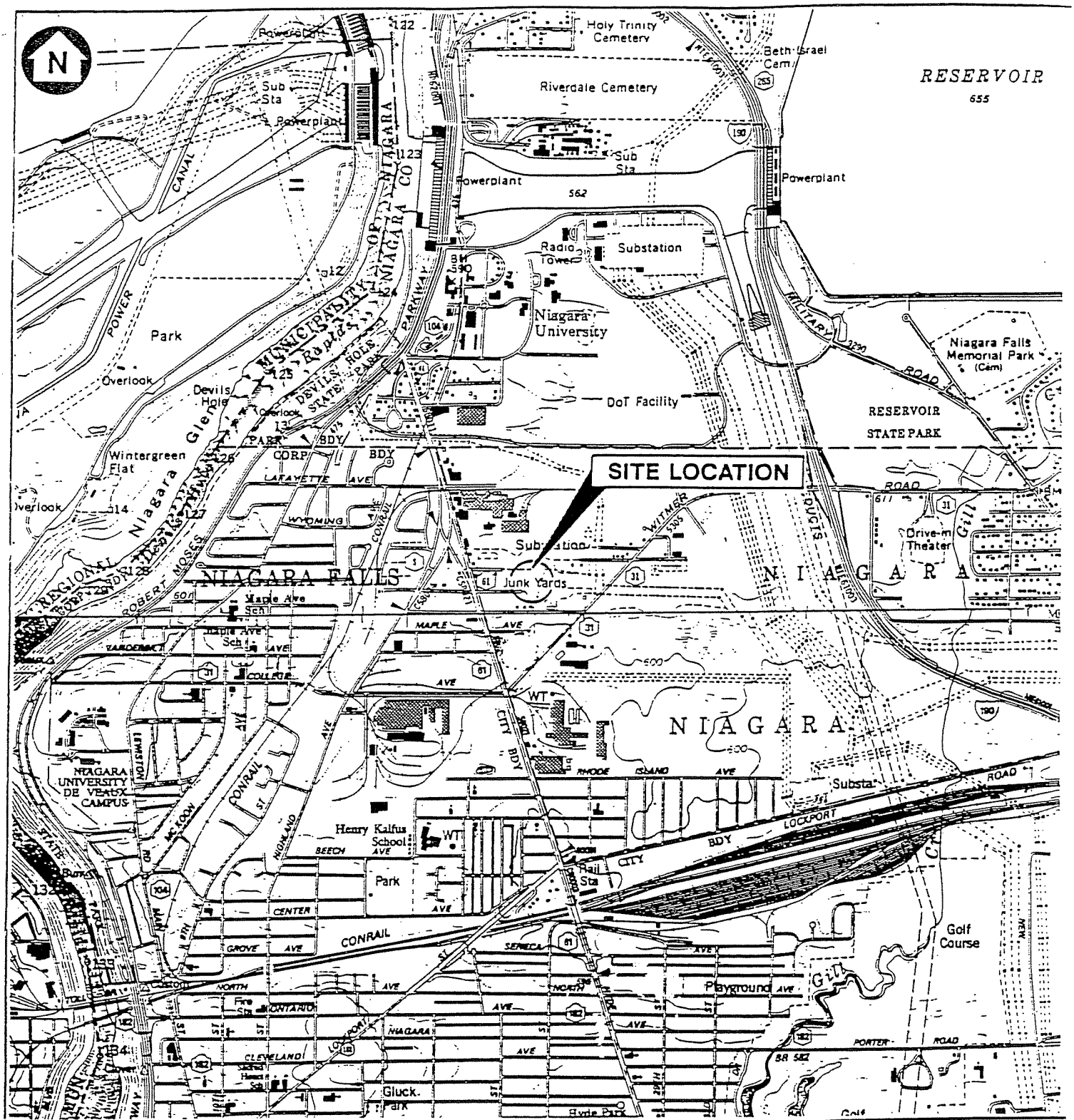
Very truly yours,

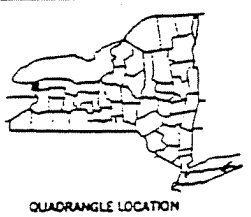
GOLDER ASSOCIATES INC.

Edward M. Murphy

Edward M. Murphy
Chemical/Environmental Engineer

Attachment(s)





SOURCE: N.Y.S. DEPARTMENT OF TRANSPORTATION, NIAGARA FALLS AND LEWISTON QUADRANGLE DATED 1989 AND 1976, RESPECTIVELY, 7.5 MINUTE SERIES

SITE NO: 932027
LOCATION: TOWN OF NIAGARA
NIAGARA COUNTY

SCALE IN FEET

0 2000 4000

FIGURE 1-1
SITE LOCATION MAP
WITMER ROAD SITE
PRELIMINARY SITE ASSESSMENT
NEW YORK STATE DEC

ABB Environmental Services

7081-50

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

September 21, 2001

013-9293

SEP 26

BUFFALO, NY

Edward M. Murphy
Golder Associates
2221 Niagara Falls Blvd, Suite 9
Niagara Falls, NY 14304

Dear Mr. Murphy:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the proposed Fish and Wildlife Analysis for Inactive Hazardous Waste Site Vanadium Corporation Site in Niagara County, area as indicated on the map you provided, located in the Town of Niagara.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

The presence of rare species may result in your project requiring additional permits, permit conditions, or review. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted, the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,

Heidi Krahling

Heidi J. Krahling, Information Services
NY Natural Heritage Program

Encs.
cc: Reg. 9, Wildlife Mgr.

* * * * * PLEASE NOTE THE ABOVE NEW ADDRESS * * * * *

Natural Heritage Report on Rare Species and Ecological Communities

Prepared 20 September 2001 by NY Natural Heritage Program, NYS DEC, Albany, New York

This report contains SENSITIVE information that should be treated in a sensitive manner -- Please see cover letter. Refer to the Users' Guide for explanations of codes, ranks, and fields. We do not always provide maps of locations of species most vulnerable to disturbance, nor of some records whose locations and/or extents are not precisely known or are too large to display.

* County
** Town

Scientific Name, COMMON NAME, & Group Name	NY Legal Status, Heritage Ranks, & Federal Status	EO Rank, Last Seen, & Acreage	Detailed Location	General Habitat and Quality	Office Use
NIAGARA CITY OF NIAGARA FALLS					
Draba arabisans ROCK-CRESS Vascular Plant	THREATENED G4; S2	H 1872-06 0.00	NIAGARA FALLS		4307818
Solidago ohioensis OHIO GOLDENROD Vascular Plant	THREATENED G4; S2	H 1843 0.00	NIAGARA FALLS		4307818
Triglochin palustre MARSH ARROW-GRASS Vascular Plant	THREATENED G5; S2	H 1875-08-20 0.00	NIAGARA FALLS	Wet places.	4307818
Valeriana uliginosa MARSH VALERIAN Vascular Plant	ENDANGERED G4; S1S2	H? NO DATE 0.00	NIAGARA FALLS		4307818
CITY OF NIAGARA FALLS, NIAGARA, WHEATFIELD					
Arabis drummondii DRUMMOND'S ROCK CRESS Vascular Plant	ENDANGERED G5; S1S2	H 1898-05-31 0.00	NIAGARA FALLS [NIAGARA RESERVATION OR WHIRLPOOL].		4307818
LEWISTON, CITY OF NIAGARA FALLS					

Natural Heritage Report on Rare Species and Ecological Communities

Prepared 20 September 2001 by NY Natural Heritage Program, NYS DEC, Albany, New York

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* County
** Town

Scientifc Name, COMMON NAME, & Group Name	NY Legal Status, Heritage Ranks, & Federal Status	EO Rank, Last Seen, & Acreage	Detailed Location	General Habitat and Quality	Office Use
NIAGARA LEWISTON, CITY OF NIAGARA FALLS					
Cynoglossum virginianum var boreale NORTHERN WILD COMFREY Vascular Plant	ENDANGERED G5T4; S1S2	H NO DATE 0.00	NIAGARA FALLS NEAR DEVAUX COLLEGE [IN THE CITY OF NIAGARA FALLS].		4307911
LEWISTON, NIAGARA FALLS					
Lithospermum caroliniense var croceum GOLDEN PUCCOON Vascular Plant	ENDANGERED G4G5T?; SH	H 1976-09-05 9.00	NIAGARA UNIVERSITY NIAGARA FALLS, NIAGARA COUNTY. OLD FIELD ALONG RAILROAD TRACKS NEAR NIAGARA UNIVERSITY.	Growing in an old field along railroad tracks with sonchus sp., Bidens sp., Solidago sp., and Aster sp.	4307921 M

7 Records Processed

DIVISION OF ENVIRONMENTAL PERMITS

June 2001

REGION	COUNTIES	REGIONAL PERMIT ADMINISTRATORS
1	Nassau & Suffolk Telephone: (631) 444-0365	John Pavacic NYS-DEC BLDG. 40 SUNY at Stony Brook Stony Brook, NY 11790-2356
2	New York City (Boroughs of Manhattan, Brooklyn, Bronx, Queens, & Staten Island Telephone: (718) 482-4997	John Cryan NYS-DEC One Hunters Point Plaza 47-40 21st Street Long Island City, NY 11101-5407
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster & Westchester Telephone: (845) 256-3054	Margaret Duke (Peg) NYS-DEC 21 South Putt Corners Road New Paltz, NY 12561-1696
4	Albany, Columbia, Greene, Montgomery, Rensselaer & Schenectady Telephone: (518) 357-2069	William Clarke NYS-DEC 1150 North Wescott Road Schenectady, NY 12306-2014
4 (sub-office)	Delaware, Otsego & Schoharie Telephone: (607) 652-7741	John Feltman NYS-DEC Route 10 HCR#1, Box 3A Stamford, NY 12167-9503
5	Clinton, Essex, Franklin & Hamilton Telephone: (518) 897-1234	Richard Wild NYS-DEC Route 86, PO Box 296 Ray Brook, NY 12977-0296
5 (sub-office)	Fulton, Saratoga, Warren & Washington Telephone: (518) 623-3671	Thomas Hall* NYS-DEC County Route 40 PO Box 220 Warrensburg, NY 12885-0220
6	Jefferson, Lewis & St. Lawrence Telephone: (315) 785-2245	Brian Fenlon NYS-DEC State Office Building 317 Washington Street Watertown, NY 13601-3787
6 (sub-office)	Herkimer & Oneida Telephone: (315) 793-2555	J. Joseph Hornburger* NYS-DEC State Office Building 207 Genesee Street Utica, NY 13501-2885

USERS GUIDE TO NY NATURAL HERITAGE DATA

New York Natural Heritage Program, 700 Troy-Schenectady Road, Latham NY 12110-2400 phone: (518) 783-3932

NATURAL HERITAGE PROGRAM: The Natural Heritage Program is an ongoing, systematic, scientific inventory whose goal is to compile and maintain data on the rare plants and animals native to New York State, and significant ecological communities. The data provided in the report facilitate sound planning, conservation, and natural resource management and help to conserve the plants, animals and ecological communities that represent New York's natural heritage.

DATA SENSITIVITY: The data provided in the report are ecologically sensitive and should be treated in a sensitive manner. The report is for your in-house use and should not be released, distributed or incorporated in a public document without prior permission from the Natural Heritage Program.

NATURAL HERITAGE REPORTS (may contain any of the following types of data):

COUNTY NAME: County where the occurrence of a rare species or significant ecological community is located.
TOWN NAME: Town where the occurrence of a rare species or significant ecological community is located.
USGS 7 ½' TOPOGRAPHIC MAP: Name of 7.5 minute US Geological Survey (USGS) quadrangle map (scale 1:24,000).

SIZE (acres): Approximate acres occupied by the rare species or significant ecological community at this location. A blank indicates unknown size.
SCIENTIFIC NAME: Scientific name of the occurrence of a rare species or significant ecological community.
COMMON NAME: Common name of the occurrence of a rare species or significant ecological community.
ELEMENT TYPE: Type of element (i.e. plant, animal, significant ecological community, other, etc.)

LAST SEEN: Year rare species or significant ecological community last observed extant at this location.

EO RANK: Comparative evaluation summarizing the quality, condition, viability and defensibility of this occurrence. Use with LAST SEEN.
A-E = Extant: A=excellent, B=good, C=marginal, D=poor, E=extant but with insufficient data to assign a rank of A - D.
F = Failed to find. Did not locate species, but habitat is still there and further field work is justified.
H = Historical. Historical occurrence without any recent field information.
X = Extirpated. Field/other data indicates element/habitat is destroyed and the element no longer exists at this location.
? = Unknown.
Blank = Not assigned.

NEW YORK STATE STATUS (animals): Categories of Endangered and Threatened species are defined in New York State Environmental Conservation Law section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6NYCRR 182.5.
E = Endangered Species: any species which meet one of the following criteria:
1) Any native species in imminent danger of extirpation or extinction in New York.
2) Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.
T = Threatened Species: any species which meet one of the following criteria:
1) Any native species likely to become an endangered species within the foreseeable future in NY.
2) Any species listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of the Federal Regulations 50 CFR 17.11.
SC = Special Concern Species: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law section 11-0535 (Endangered and Threatened Species).
P = Protected Wildlife (defined in Environmental Conservation Law section 11-0103): wild game, protected wild birds, and endangered species of wildlife.
U = Unprotected (defined in Environmental Conservation Law section 11-0103): the species may be taken at any time without limit; however a license to take may be required.
G = Game (defined in Environmental Conservation Law section 11-0103): any of a variety of big game or small game species as stated in the Environmental Conservation Law; many normally have an open season for at least part of the year, and are protected at other times.

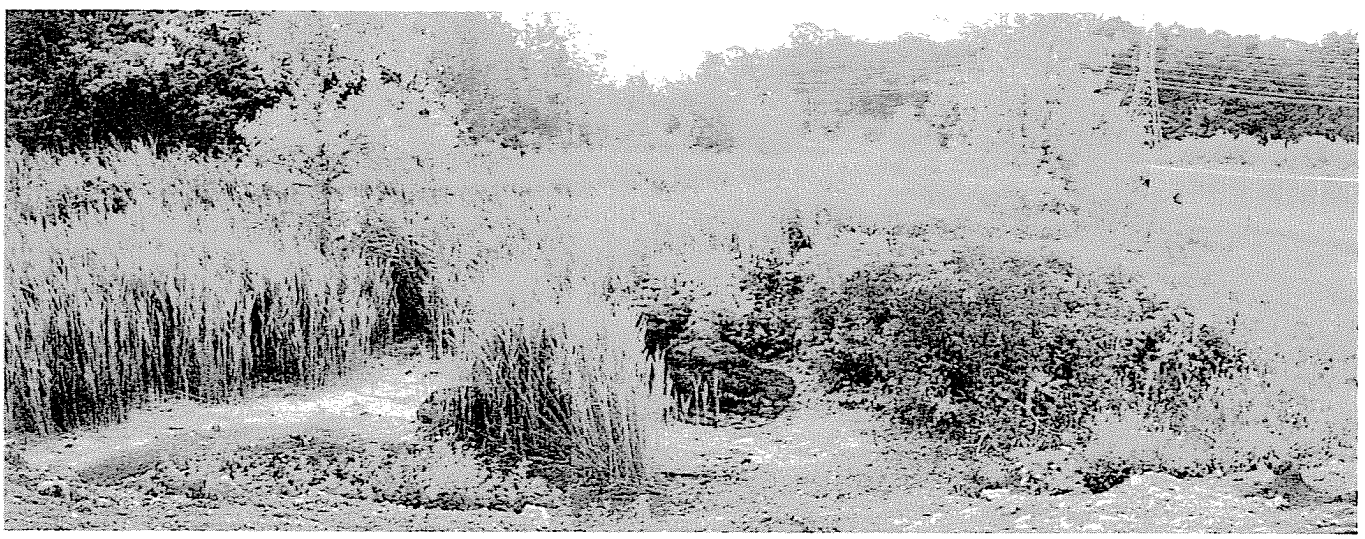
NEW YORK STATE STATUS (plants): The following categories are defined in regulation 6NYCRR part 193.3 and apply to NYS Environmental Conservation Law section 9-1503.
E = Endangered Species: listed species are those with:
1) 5 or fewer extant sites, or
2) fewer than 1,000 individuals, or
3) restricted to fewer than 4 U.S.G.S. 7 ½ minute topographical maps, or
4) species listed as endangered by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.
T = Threatened: listed species are those with:
1) 6 to fewer than 20 extant sites, or
2) 1,000 to fewer than 3,000 individuals, or
3) restricted to not less than 4 or more than 7 U.S.G.S. 7 and ½ minute topographical maps, or
4) listed as threatened by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.
R = Rare: listed species have:
1) 20 to 35 extant sites, or
2) 3,000 to 5,000 individuals statewide.

continued on next page

ATTACHMENT B

SITE PHOTOS

Photo 1. Small wetland area (A2, part of a larger corridor) east of Airco landfill (in background) – facing west. Grass area G1 in background.



Photos 2 & 3. Edge of slag along *Phragmites* corridor (A2). Large pieces of slag waste in foreground. Wooded Area UPL01 (paintball woods) to left and wooded area UPL03 further back to the right. Southeast corner of Airco landfill fence to right – facing south.

Photo 4. Looking west down the Airco landfill fence along powerline corridor from Airco's southeast corner. Vegetation dominated by dogwood (UPL02). Note gravel drainage area ending in *Phragmites* in distance.

Photo 5. Wooded area UPL01 (paintball woods) – facing north.

Photo 6. Northeast corner of wooded area UPL03 with dogwood shrub area UPL02 in foreground. The wooded area (UPL03) continues to the south approximately 300 feet and to the west about 100 feet – facing southwest.

Photo 7. Open wooded area UPL04 to the west of wooded area UPL03. This area comprised of a few trembling aspens and cottonwoods with a thick underbrush community of wild red raspberry and goldenrod with a few hawthorns and dogwoods. Note fence and adjacent property in background – facing south.

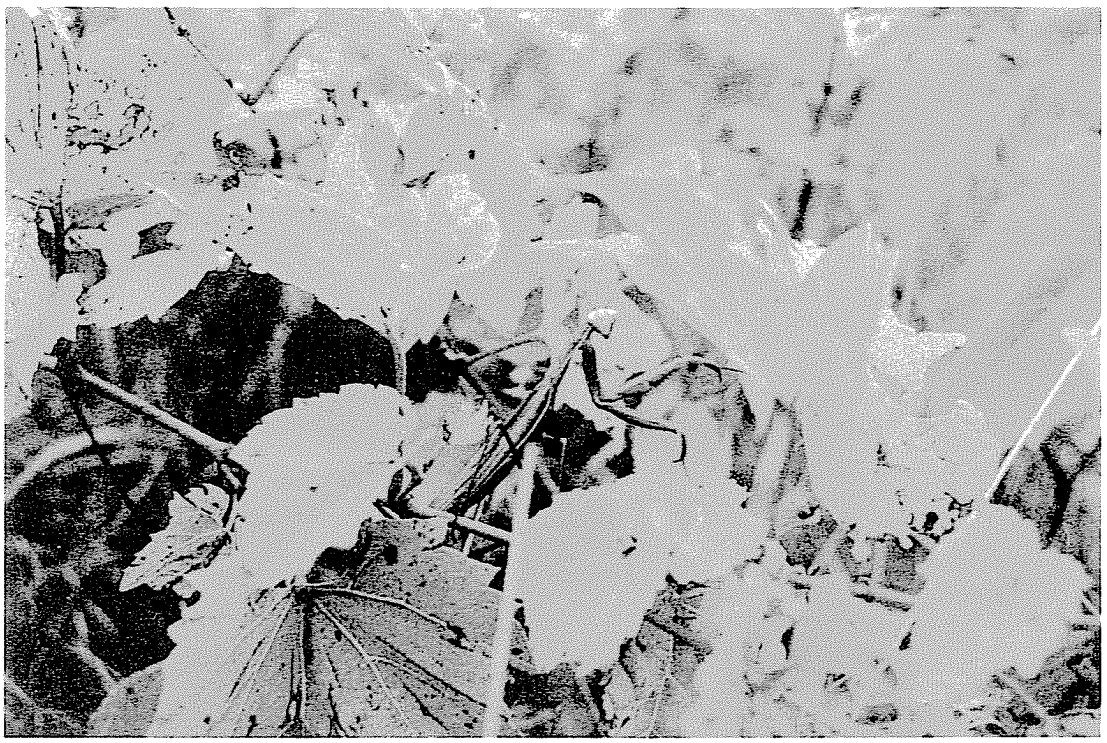


Photo 9. Praying mantis in southern corridor (UPL02).

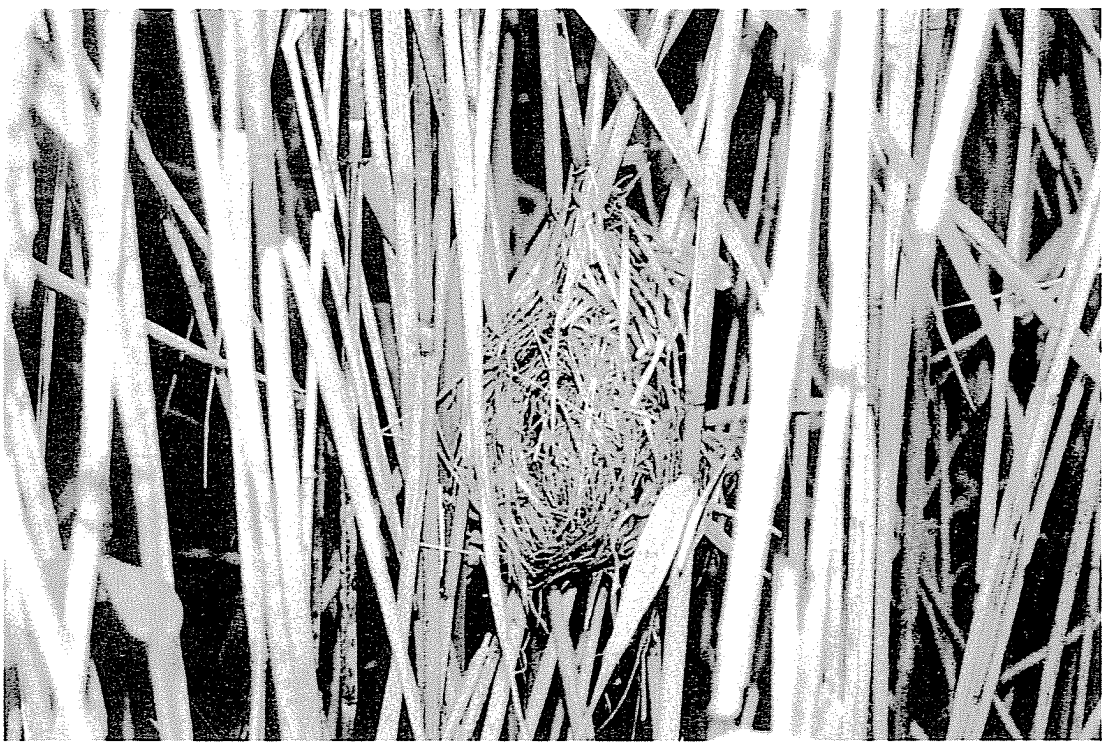


Photo 10. Red-winged blackbird nest in thick *Phragmites* located toward to western end of the southern corridor (P1), near border of SKW and Airco landfills.

Photo 11. Walking stick in southern corridor (UPL02).

Photo 12. American toad found in a depression (S1) just west and downslope from main slag plateau.

Photos 13-15. Depression area to the left (S1) taken from edge of slag plateau. Note grassy area in foreground to left (G1). Willow area of UPL01 (growing in ash) in background and wooded area UPL03 behind that (center). Airco landfill in background to right. Wetland area A2 in middle ground of photos (center and left) – facing south (left) to west (right).

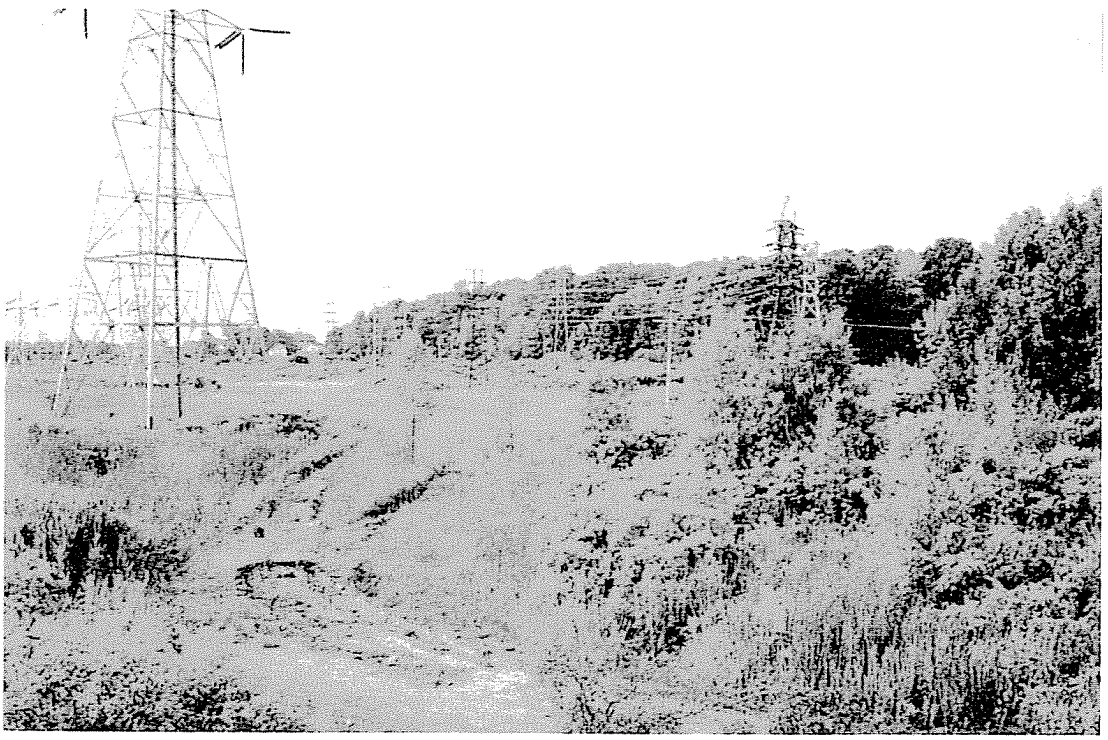


Photo 16. Looking southwest from edge of southwest corner of slag plateau at the wetland area H3 of previous photos (foreground) and Wooded Area UPL03 (background). Edge of wooded area UPL01 to right.

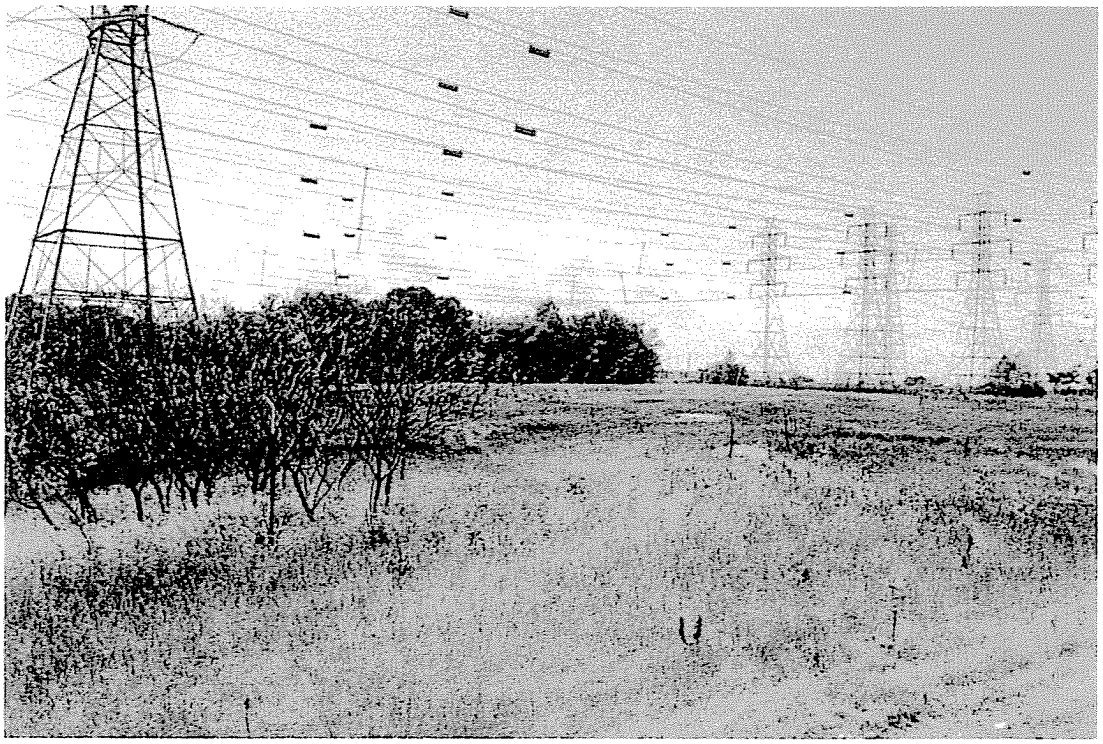


Photo 17. Looking west along southern edge of slag plateau. Grass area G1 in foreground, wooded area UPL01 and Airco landfill in background. Shrub area S2 to the left.

Photo 18. Looking east at southeast corner of slag plateau (foreground) at adjacent open habitat (G1) with I-190 in background.

Photo 19. Medium-sized burrow in small slope on slag plateau – likely used by rabbits (G1).

Photo 20. Grass habitat (G1) to the north of slag plateau. Witmer Road in background. Photo taken from the northeast corner of slag plateau facing north.

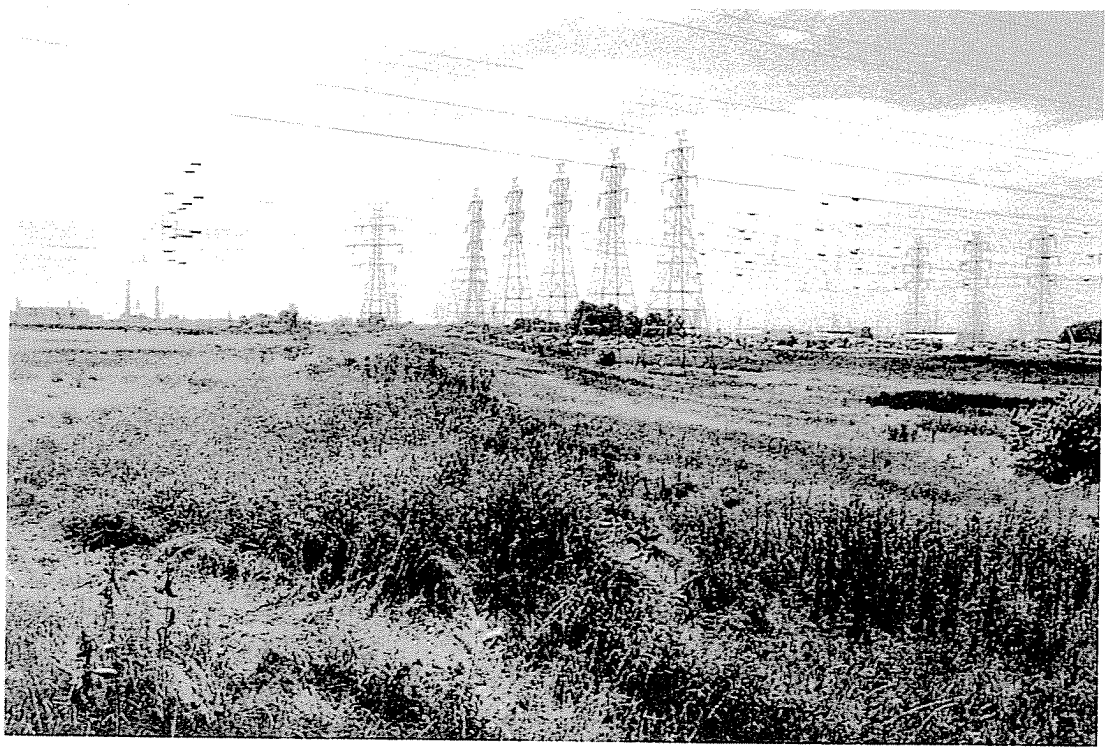


Photo 21. Northern slope of slag plateau facing west at automobile depot (G1). Many rodent holes/burrows seen in slope in the foreground.

Photo 22. Open area between slag and I-190 to the east - used as a parking area for dirt bike/ATV unloading. Grass area G1 in foreground, grass and tree area G3 in background.

Photo 23. Large burrow in ash slope east of wooded area UPL01. This slope faces the area in Photos 13-15. Likely a fox den.

APPENDIX B

WETLAND DELINEATION
REQUEST FOR DETERMINATION

December 5, 2001 013-9293

Request for Jurisdictional Determination
Within the State of New York

To: U.S. Army Corps of Engineers
Regulatory Branch
1776 Niagara Street
Buffalo, NY 14207

Attention: Mr. Jim Seyler

Project Name: Former Vanadium Corporation of America Site
Operable Unit No. 3

Property Owner/Lessee: New York Power Authority
Niagara Mohawk Power Corporation

Wetland Consultant: Golder Associates Inc.
The Federal Trust Building
24 Commerce Street
Suite 1527, 15th Floor
Newark, NJ 07102
TEL (973) 621-0777 FAX (973) 621-7725
Attn: Antonio Federici

Property Location: The former Vanadium Corporation of America (VCA) site is located on Witmer Road in the Town of Niagara, Niagara County, New York (Figure 1). The site is bounded on the north by an automobile depot and vacant property along Witmer Road (Route 31), on the east by Interstate 190, on the south by vacant land, and on the west by a landfill. The nearest waterbodies are the Niagara River located approximately 1.4 miles west of the property and the New York Power Authority reservoir that derives water from this river, located approximately 0.8 miles north of the property. However, the subject of this request is a portion of the VCA site known as Operable Unit No. 3 (OU3), which is described more fully below.

Property Description: The former VCA site consists of approximately 150 acres that were used historically for certain smelting operations and the placement of flyash and slag from those operations. Currently, the former VCA site consists of undeveloped land and two ash/slag landfills. The OU3 area of the VCA site consists of approximately 88 acres. Numerous high voltage transmission lines cross OU3. No buildings or other structures are present on OU3. No natural surface waterbodies are present. Several ditches were observed that were formed by the installation of the overhead power-lines.

As the OU3 site has been heavily disturbed by ash disposal and maintenance of the transmission lines, natural vegetation communities are not present except for some remnant woodland in the southwestern portion of the property. Invasive exotic and native grasses, herbs, and shrubs, such as gray-stemmed dogwood (*Cornus racemosa*), giant reed (*Phragmites australis*), and teasel (*Dipsacus sp.*) have colonized the disturbed areas.

Wetlands on the property were delineated on August 20 and 21, 2001, using the routine determination method described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). The wetland/upland boundaries are portrayed on a topographic base map, using a Trimble Pro XRS Global Positioning System (GPS) operated by Wendel Duchscherer, a New York State registered professional land surveyor.

Wetland Boundary Description: Wetlands on the property do not appear to be waters of the United States because they are isolated areas that lack a connection to other waters. In *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers*, 121 S. Ct. 675 (2001), the U.S. Supreme Court foreclosed the imposition of federal Clean Water Act jurisdiction solely on the ground that a water may be used by migratory birds. Indeed, the court suggested that federal Clean Water Act jurisdiction may not be imposed on any isolated, non-navigable water. In this investigator's opinion, the wetland areas of OU3 appear to meet all of the criteria of the U.S. Supreme Court decision for being non-jurisdictional. The oldest aerial photograph (1963) that could be obtained is attached and does not appear to this investigator to exhibit any natural drainage patterns.

Wetlands within the property are primarily disturbed and isolated patches of giant reed (*Phragmites australis*) that occupy depressions and flats created by ash disposal and overhead powerline construction. These patches are documented in Data Form A2 and are represented in Figure 2 with this same identifier (A2). In the vicinity of the ash/slag landfill slopes, the wetland – upland boundary was clearly indicated by the obvious limit of occasional inundation at the toe of the slope. In diffuse reed flats, the wetland boundary was mapped along the line where other hydrophytes (e.g. cat-tail) were no longer intermixed with the reed and evidence of surface ponding (e.g. stained litter) was not obvious.

Other areas similarly disturbed by powerline construction and ash/slag disposal were not dominated solely by giant reed. These areas were dominated by intermixed cattail (*Typha* spp.), purple loosestrife (*Lythrum salicaria*), and gray-stemmed dogwood (*Cornus racemosa),* with giant reed scattered throughout. These assemblages are documented in Data Form H3 and are represented in Figure 2 with this same identifier (H3). In general, these wetlands occupied shallow depressions and the wetland – upland boundary was located where obvious surface inundation was not present and non-hydrophytes began to be abundant (e.g. teasel).

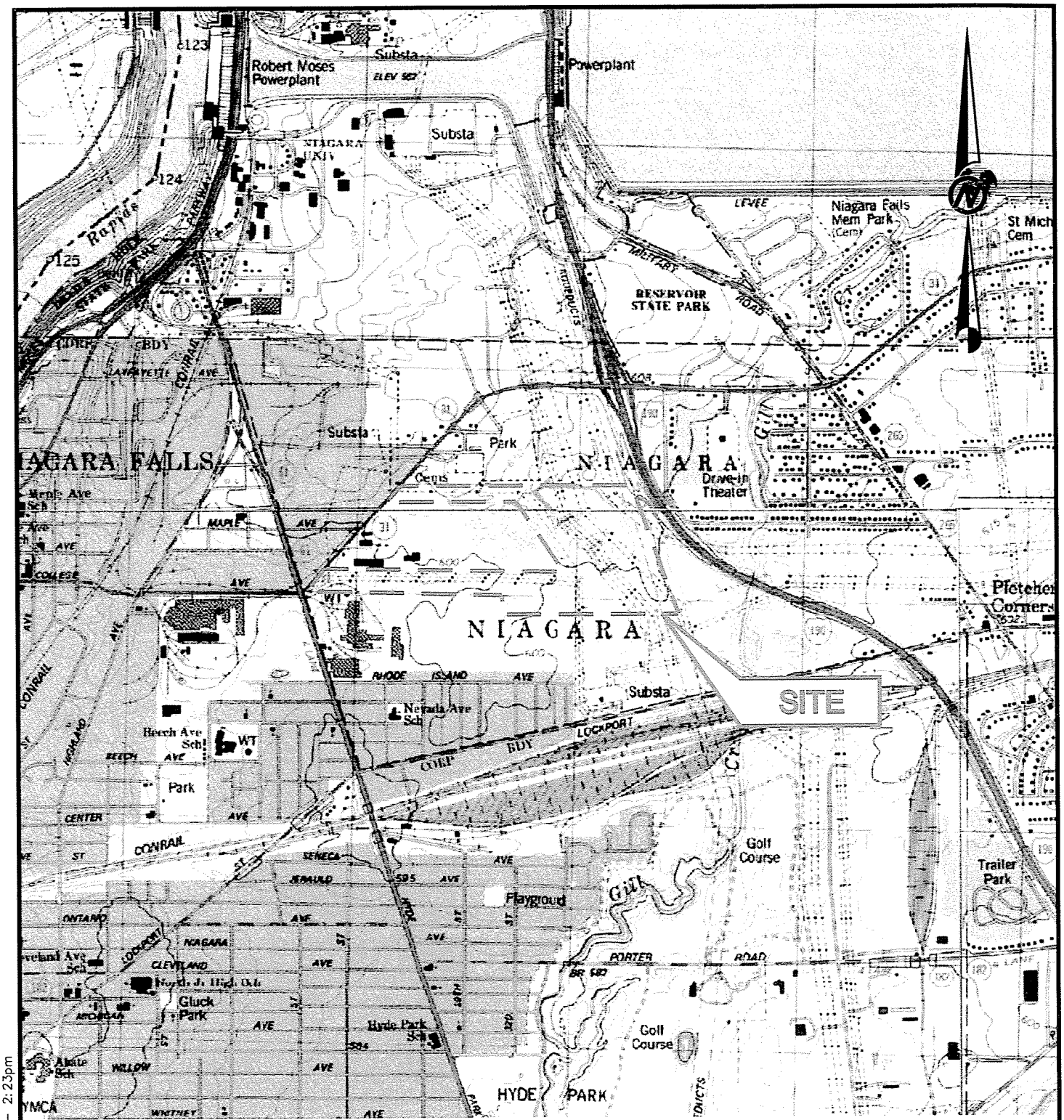
The third type of wetland on site is an isolated ponded area bisected by a dirt road that enters the property's northwest boundary. This inundated section is documented in Data Form L2 and is represented in Figure 2 with this same identifier (L2). This appears to be the result of road construction. The plant community is dominated by cattail, purple loosestrife, giant reed and duckweed (*Lemna* sp.).

A mix of grasses and herbs with scattered clumps of gray-stemmed dogwood dominates large upland areas of the property on the landfill and under the power-lines. Golder examined the clumps and flats dominated by gray-stemmed dogwood and we suggest that these areas are uplands. Grimm (1957) describes gray-stemmed dogwood as being one of the most common shrubs, occupying roadsides, fencerows, wood borders, and other disturbed areas and tolerating dry and moist conditions. Golder believes the dogwood is abundant in the disturbed flats because there is no other shrub or tree competition, the seeds are readily spread by wildlife, and once established, clumps rapidly spread by root shoots. No evidence of saturation or inundation was observed in these clumps, the distribution of dogwood did not seem to correspond to any topographically defined drainageway or depression, and upland herbaceous vegetation is intermixed with dogwood shoots at the margins of the clumps. Soils sampled in this area exhibited disturbed conditions, 2.5 Y 3/1 Munsell colors from 0-6" below ground surface (bgs) and 10 YR 4/1 mixed with fly ash from 6-18" bgs.

I hereby request a jurisdictional determination of waters of the United States on the above described property. Permission to conduct an on-site inspection can be obtained if a site visit is determined appropriate by the U.S. Army Corps of Engineers.

Antonio Federici, Environmental Scientist Date

Attached:
Figure 1 Site Location Map
Figure 2 Potential Wetlands Map
Figure 3 Aerial Photograph (1995)
Figure 4 Aerial Photograph (1963)
USACE Data Forms (5)
Documented Photographs (3 pages)



REFERENCES

1.) BASE MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF NIAGARA FALLS, LEWISTON, RANSOMVILLE, AND TONAWANDA WEST, DATED 1980.

2.) PROPERTY BOUNDARY APPROXIMATE.

2000 0 2000
SCALE FEET

Golder Associates
Philadelphia USA

FILE No.	0139293A001
PROJECT No.	013-9293
REV.	0

SCALE	AS SHOWN
DATE	10/17/01
DESIGN	AFF
CADD	AM
CHECK	JPR
REVIEW	BCS

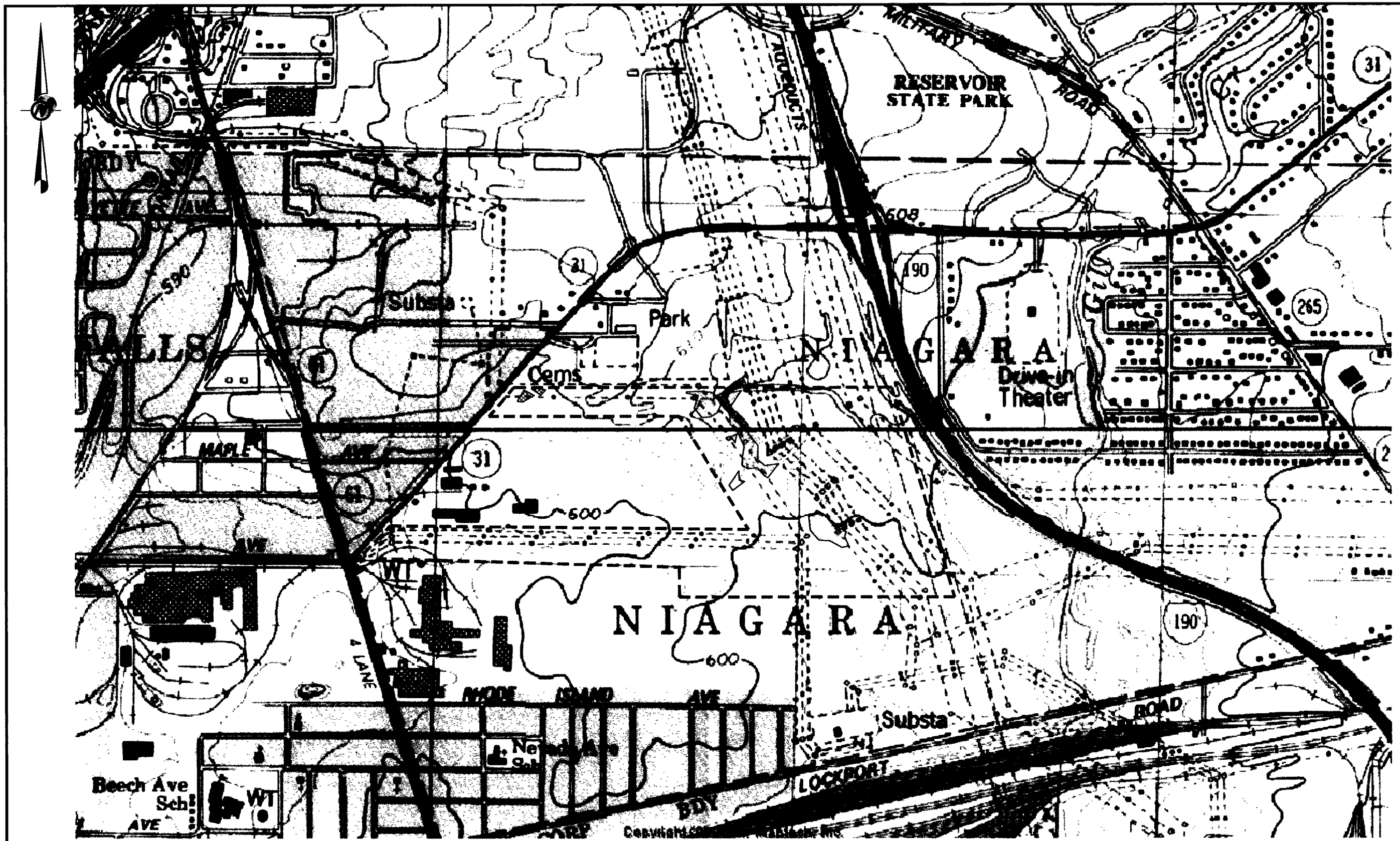
TITLE

SITE LOCATION MAP

FORMER VANADIUM CORPORATION SITE OPERABLE UNIT #3, TOWN OF NIAGARA, NEW YORK

FIGURE 1

Drawing file: 0139293A001.dwg Dec 04, 2001 - 2:23pm



LEGEND

PROPERTY BOUNDARY

POTENTIALLY JURISDICTIONAL WETLANDS

WETLAND ASSEMBLAGES:		ACRES:
	L2 (PEMIA)	L2 0.27 (11,959 S.F.)
	H3 (PSS/PEMIA)	H3 3.16 (137,781 S.F.)
	A2 (PEMIA)	A2 1.48 (64,297 S.F.)

REFERENCES

1.) BASE MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF NIAGARA FALLS, LEWISTON, RANSOMVILLE, TONAWANDA WEST, DATED 1980.

2.) PROPERTY BOUNDARY APPROXIMATE.

400 0 400 800
SCALE FEET

Golder Associates
Philadelphia USA

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RW

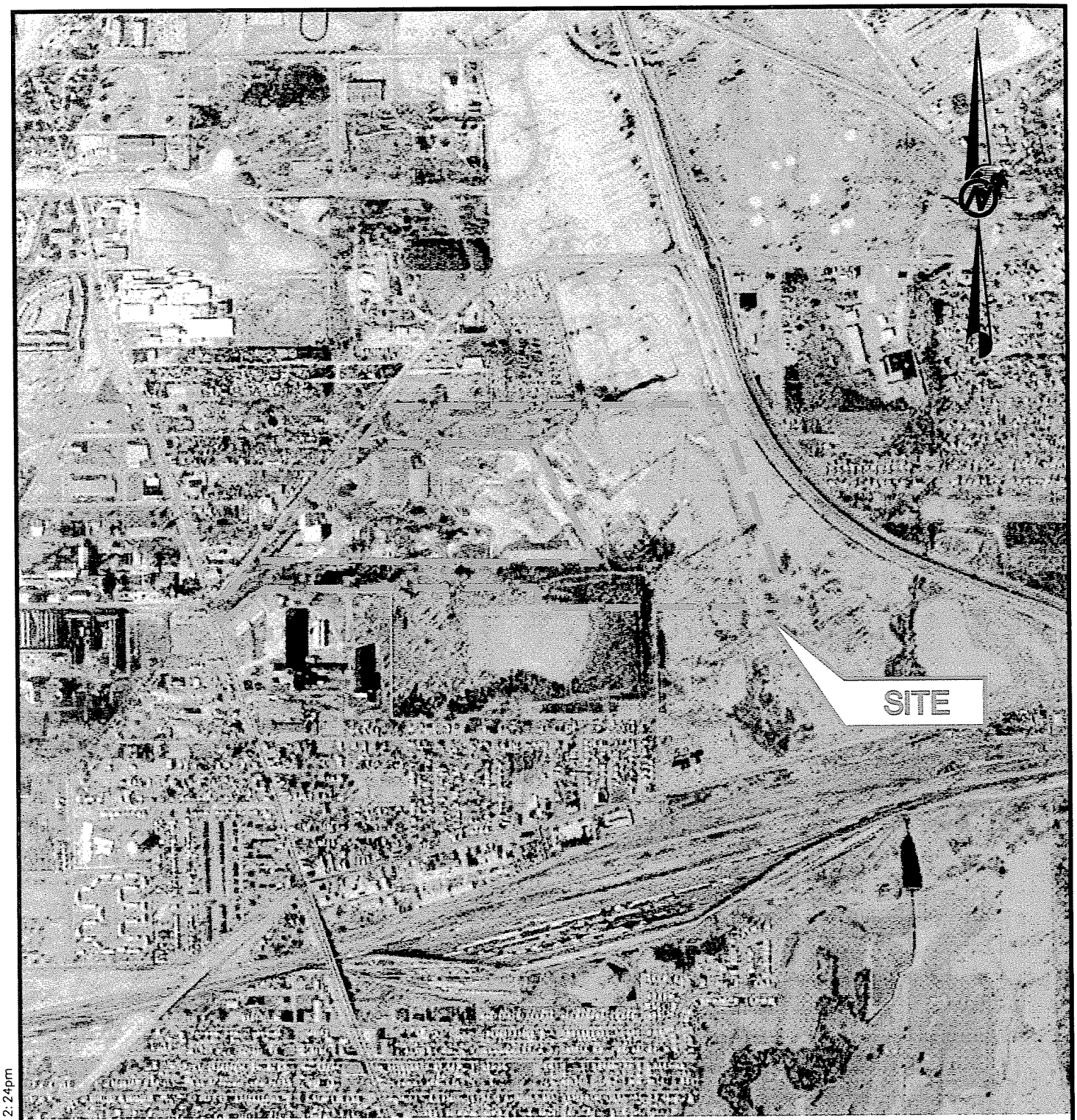
PROJECT
FORMER VANADIUM CORPORATION SITE
OPERABLE UNIT #3
TOWN OF NIAGARA
NEW YORK

TITLE
POTENTIAL WETLANDS MAP

PROJECT No.		013-9293
FILE No.		0139293A002
REV. 0	SCALE	AS SHOWN
DESIGN	AAF	08/27/01
CADD	AM	10/17/01
CHECK	JPR	11/5/01
REVIEW		11/5/01

FIGURE 2

Drawing file: 0139293A002.dwg Dec 04, 2001 - 2:31pm



REFERENCES

1.) AERIAL TAKEN FROM U.S.G.S. AERIAL OF NIAGARA FALLS, NEW YORK, DATED MARCH 28, 1995.

2.) PROPERTY BOUNDARY APPROXIMATE.

1300 0 1300
APPROXIMATE SCALE FEET

Golder Associates
Philadelphia USA

FILE No.	0139293A003
PROJECT No.	013-9293 REV. 0
SCALE	AS SHOWN
DATE	10/17/01
DESIGN	AFF
CADD	AM
CHECK	JPR
REVIEW	BCS

TITLE

AERIAL PHOTOGRAPH

FORMER VANADIUM CORPORATION SITE OPERABLE UNIT #3, TOWN OF NIAGARA, NEW YORK

FIGURE 3

Drawing file: 0139293A003.dwg Dec 04, 2001 - 2:24pm

vistainfo
vistainfo.com

Location : Former Vanadium Corp. Site
Niagara Falls, NY
Year : 1963

Scale : 1inch = 520 feet

N

VISTA Information Solutions
If you have any questions call
me at 1-800-767-0403

Order # 440432-759893
October 17, 2001

FIGURE 4

L2 PEMIA

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Former VCA Site OU #3 Site #932001 Date: 8/20/01
Applicant/Owner: County: Niagara
Investigator: AFF, Golder Associates Inc. State: NY

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem Area? Yes No
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Phragmites australis	H	FACW
2. Typha sp.	H	OBL
3. Lythrum salicaria	H	FACW+
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:
Depth of Surface Water: >6" (in.)
Depth to Free Water in Pit: ____ (in.)
Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
☒ Inundated
☒ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Taxonomy (Subgroup): _____ Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12"+					MUCK

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Muck substrate (soil/sediment) was present and is considered hydric.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	(Circle)
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Approved by HQUSACE 3/92

H3

PSS/PEM 1A

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Former VCA Site OU #3 Site #932001
Applicant/Owner:
Investigator: AFF, Golder Associates Inc.

Date: 8/21/01
County: Niagara
State: NY

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem Area? Yes No
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Typha sp.	H	OBL	9.		
2. Phragmites australis	H	FACW	10.		
3. Lythrum salicaria	H	FACW+	11.		
4. Cornus racemosa *	S	FAC	12.		
5. Fraxinus sp.	S	?	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100% FAC or wetter

Remarks: * Synonymy = C. foemina. Fraxinus assumed wetter than FAC.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: — (in.)
Depth to Free Water in Pit: — (in.)
Depth to Saturated Soil: — (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
X Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test:
___ Other (Explain in Remarks)

Remarks: Disturbed right of way for overhead powerlines. Unable to ~~do~~ find any defined channels, rather depressional area was created by ash/slag land fill that is surrounding this "wetland."

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations
Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18		10YR 4/1			loam / ash

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Highly disturbed ash/slag "soil." This is result of ash landfill deposits (gray in color) and disturbance (possible fill) from overhead powerline maintenance and installation.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

Approved by HQUSACE 3/92

A2 ↓ PEM1A

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Former VCA Site OU #3 Site #932001
Applicant/Owner:
Investigator: AFF, Golder Associates Inc.

Date: 8/29/01
County: Niagara
State: N.Y.

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem Area? Yes No
(If needed, explain on reverse.)

Community ID: PEM1A
Transect ID:
Plot ID: A2

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Phragmites australis	H	FACW
2. Lythrum salicaria	H	FACW+
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 2 out of 2 = 100% FACW or wetter.

Remarks: Occasional Cornus racemosa present.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available

Field Observations:
Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: 15 (in.)
Depth to Saturated Soil: ≈15 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
X Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Pronounced swale between fill piles.

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations
Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-7		10 YR 5/1	None	N/A	C-M grain sand / silt
7-18		10 YR 5/2	None	N/A	C-M grain sand / rock frags

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Highly disturbed substrate. Soil horizon developing in slag ash deposits. This is not native soil.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)
Wetland Hydrology Present? Yes No
Hydric Soils Present? Yes No

PEMIA

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

This is a disturbed site that is a swale surrounded by slag heaps. This depressional corridor is also the right of way for overhead power lines.

Approved by HQUSACE 3/92

V

UPL01

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Former VCA Site OU #3 Site #932001	Date: 8/20/01
Applicant/Owner:	County: Niagara
Investigator: AFF, Golder Associates Inc.	State: New York
Do Normal Circumstances exist on the site? Yes (No)	Community ID:
Is the site significantly disturbed (Atypical Situation)? (Yes) No	Transect ID:
Is the area a potential Problem Area? Yes No	Plot ID:
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Carya ovata	T	FACU-	9.		
2. Quercus rubra	T	FACU-	10.		
3. Acer rubrum	T	FAC	11.		
4. Quercus macrocarpa	T	FAC-	12.		
5. Toxicodendron radicans	V	FAC	13.		
6. Parthenocissus sp.	V	FACU	14.		
7. Tilia americana	S	FACU	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 2 out of 7 = 30% FAC

Remarks: Terrestrial plant community dominated by deciduous tree species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water: ___ (in.)

Depth to Free Water in Pit: ___ (in.)

Depth to Saturated Soil: ___ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No evidence of wetland hydrology present.

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations
Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4		10YR 4/2	None	N/A	loam
4-18		10YR 7/2	10YR 6/1	Abundant / Faint	loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Disturbed soil; possibly man altered as is surrounding soil found in landfill area around this forested "island."

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
Is this Sampling Point Within a Wetland?	Yes (No)	(Circle)

Remarks:

Approved by HQUSACE 3/92

V

UPL 02

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Former VCA Site OU #3 Site #932001
Applicant/Owner:
Investigator: AFF

Date: 8/20/01
County: Niagara
State: NY

Do Normal Circumstances exist on the site? Yes ~~No~~
Is the site significantly disturbed (Atypical Situation)? ~~Yes~~ No
Is the area a potential Problem Area? Yes No
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Cornus racemosa*	S	FAC
2. Parthenocissus sp.	V	FACU
3. Toxicodendron radicans	V	FAC
4. Daucus carota	H	NL
5. Dipsacus sylvestris	H	NI
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). Unable to determine exact %.

Remarks: * synonymy = C. foemina. NL = Not Listed. NI = Not Indicated.
This is a plant community found in overhead power line right of way (ROW). C. racemosa is described as common along roadsides & fencerows in dry and moist places. The forest detailed in data sheet UPL01 (8/20/01, Phelps Dodge) is found on either side of this ROW and the cornus thrives without competition due to suppression ~ ROW maintence.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available

Field Observations:
Depth of Surface Water: ____ (in.)
Depth to Free Water in Pit: ____ (in.)
Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: No evidence of wetland hydrology present.

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Taxonomy (Subgroup): _____ Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6		2.5Y 3/1	None	N/A	loam
6-18		10YR 4/1	2.5Y 7/2	Few/Faint	loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Highly disturbed soils found in right of way for overhead powerlines: Ash/slag possibly part of this "soil."

WETLAND DETERMINATION

Hydrophytic Vegetation Present? * Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: * Not able to clearly discern through % FAC or wetter criteria. Due to lack of any wetland hydrology indicators and the nature of the advantagous species present this is assumed to be a disturbed upland community, in the professional opinion of this investigator. — [signature]

Approved by HQUSACE 3/92

Photo 1. Photograph was taken facing NW at two emergent wetlands identified by USACE Data Form "L2." Giant reed (*Phragmites australis*) dominates the two depressions that lie on either side of the gated dirt road.

Photo 2. Photograph was taken facing NNW. A dirt road in the foreground separates the two northern most two sections of the emergent wetland identified by USACE Data Form "A2."

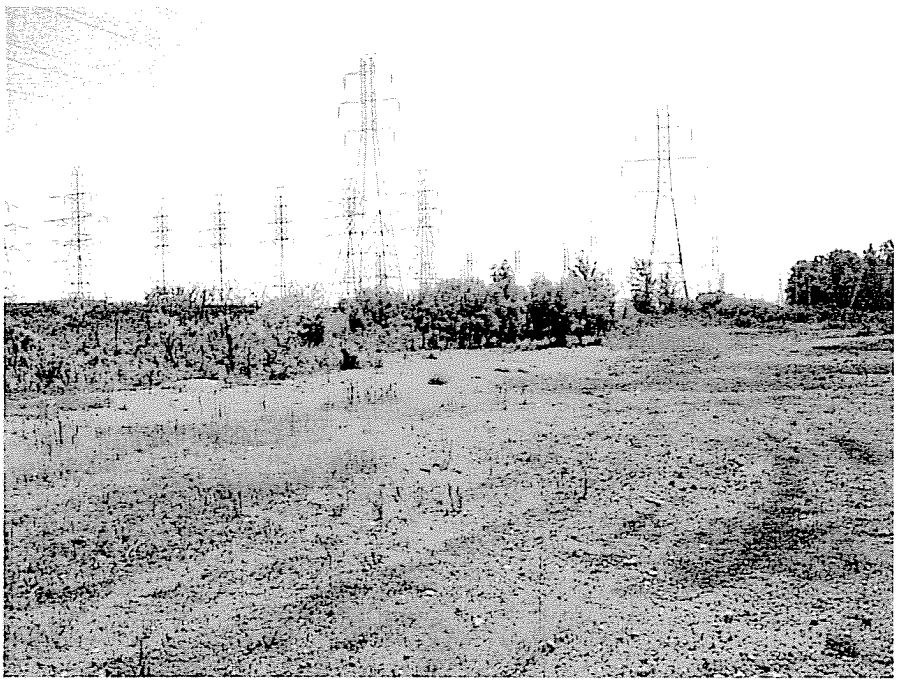


Photo 3. Photograph was taken facing ESE from the same location as Photo 2, displaying the same emergent wetland. Note the overhead power lines, thought to have been a prime factor (ground disturbance) in the creation of these isolated wetlands.

Photo 4. Photograph was taken facing S into the NE corner of the shrub-sapling dominated wetland identified by USACE Data Form "H3."

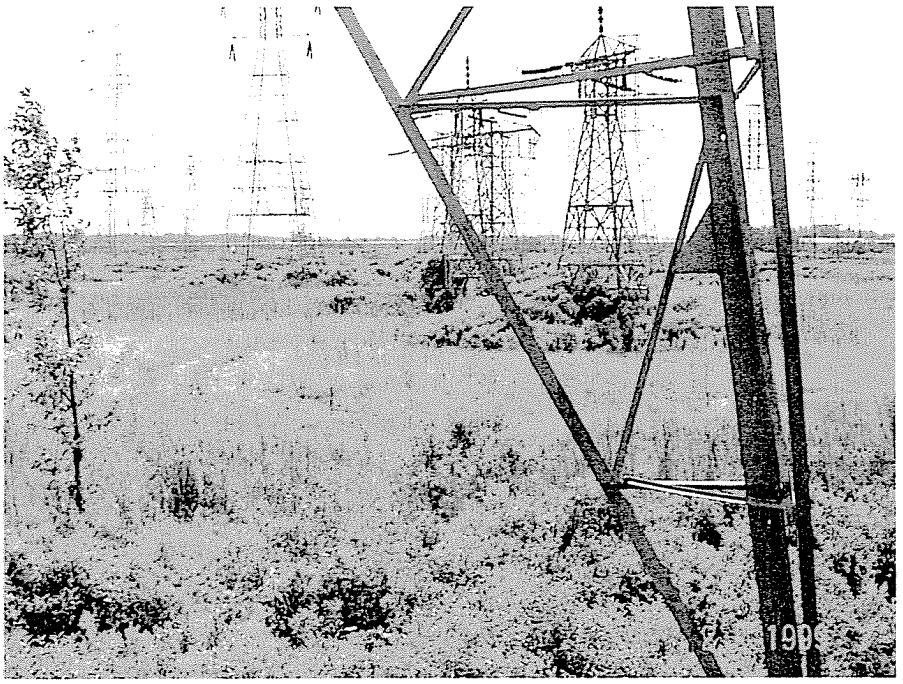


Photo 5. Photograph was taken facing E from SE corner of "H3" shrub-sapling wetland looking at the typical upland community occupying the eastern portion of the property.

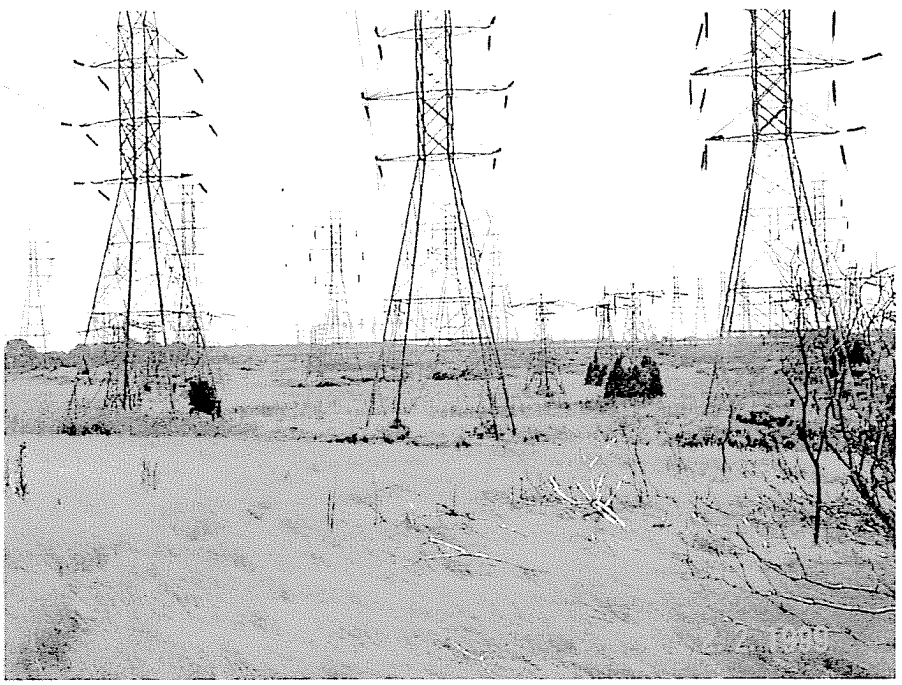


Photo 6. Photograph was taken facing SE, approximately 200 feet E of the location of Photo 5. This was taken to display the large number of power lines that transect the property.

APPENDIX C

FIELD SAMPLING FORMS

SITE NAME: VANADIUM CORP. OU#3 SITE | POINT ID: MW - 102 B

LOCATION: TOWN OF NIAGARA, NEW YORK | FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: GROUNDWATER | LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) 40.50 | DEPTH TO BOTTOM (FEET) 54.32

ELEVATION, MEAS.PT.(MSL): NA | ELEVATION, G/W (MSL): NA

DATE 8-21-01 | TIME: START/FINISH 9:05 / 9:34

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES (X) NO

WELL RISER DIAMETER (IN.): (X) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) 2.21 | WAS WELL PURGED TO DRYNESS ( ) YES (X) NO

TOTAL VOLUME EVACUATED (GAL) 3.50 | WATER LEVEL AFTER PURGE (FT.) 40.55

TURBIDITY OF PURGINGS : START SL. TURBID - BLACK TINT | FINISH CLEAR

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]
9:05	150	40.57	0	14.0	7.73	1092	75.60	-29.9
9:09	150	40.55	0.5	14.2	7.73	1081	17.10	-29.6
9:13	150	40.55	1.0	14.6	7.72	1092	7.88	-29.5
9:17	150	40.54	1.5	14.3	7.73	1102	6.33	-29.8
9:21	150	40.55	2.0	14.4	7.74	1104	5.24	-30.5
9:25	150	40.55	2.5	14.5	7.76	1105	3.69	-31.7
9:29	150	40.54	3.0	14.5	7.75	1106	4.62	-31.2
9:34	150	40.55	3.5	14.3	7.77	1106	2.98	-32.3

SAMPLING INFORMATION

DATE / TIME 8-21-0 / 9:34 + 9:36 | DEPTH TO GROUNDWATER (FT.) 40.55

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES (X) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )
9:38	7.76	14.6	1104	3.17	-31.6	NA	NA

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS: CLEAR

COMMENTS: DUP TAKEN (#2 @ 9:36)

SAMPLE COLLECTION NUMBER 1 & 2

SITE NAME: VANADIUM CORP. OU#3 SITE | POINT ID: MW - 103 B

LOCATION: TOWN OF NIAGARA, NEW YORK | FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: GROUNDWATER | LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) 17.97 | DEPTH TO BOTTOM (FEET) 35.48

ELEVATION, MEAS.PT.(MSL): NA | ELEVATION, G/W (MSL): NA

DATE 8-21-01 | TIME: START/FINISH 10:22 / 10:37

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES (X) NO

WELL RISER DIAMETER (IN.): (X) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) 2.80 | WAS WELL PURGED TO DRYNESS ( ) YES (X) NO

TOTAL VOLUME EVACUATED (GAL) 5.00 | WATER LEVEL AFTER PURGE (FT.) 19.84

TURBIDITY OF PURGINGS : START SL. TURBID - GRAY | FINISH CLEAR

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]
10:22	130	19.65	0	13.8	8.00	566	159.00	-44.9
10:25	130	19.7	1.0	13.8	7.95	587	15.50	-42.3
10:28	130	19.8	2.0	13.5	7.82	633	6.56	-34.7
10:31	130	19.81	3.0	13.3	7.77	650	4.52	-32.0
10:34	130	19.84	4.0	13.5	7.72	670	2.55	-29.2
10:37	130	19.84	5.0	13.6	7.70	680	2.75	-27.7

SAMPLING INFORMATION

DATE / TIME 8-21-0 / 10:37 | DEPTH TO GROUNDWATER (FT.) 19.84

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES (X) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )
10:39	7.70	13.6	682	2.60	-27.6	NA	NA

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS: CLEAR

COMMENTS:

SAMPLE COLLECTION NUMBER 3

SITE NAME: VANADIUM CORP. OU#3 SITE | POINT ID: MW - 103 A

LOCATION: TOWN OF NIAGARA, NEW YORK | FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: GROUNDWATER | LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) 15.47 | DEPTH TO BOTTOM (FEET) 18.84

ELEVATION, MEAS.PT.(MSL): NA | ELEVATION, G/W (MSL): NA

DATE 8-21-01 | TIME: START/FINISH 10:46 / 10:56

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES (X) NO

WELL RISER DIAMETER (IN.): (X) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) 0.54 | WAS WELL PURGED TO DRYNESS ( ) YES (X) NO

TOTAL VOLUME EVACUATED (GAL) 2.50 | WATER LEVEL AFTER PURGE (FT.) 16.25

TURBIDITY OF PURGINGS : START TURBID - TAN | FINISH CLEAR

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]
10:46	96	15.68	0	15.7	7.19	1695	166.00	+1.1
10:48	96	15.85	0.5	14.1	7.23	1369	222.00	-1.4
10:50	96	15.87	1.0	14.0	7.30	1170	15.70	-5.1
10:52	96	16.00	1.5	13.9	7.30	1128	7.33	-4.9
10:54	96	16.15	2.0	13.7	7.32	1079	3.95	-6.2
10:56	96	16.25	2.5	13.9	7.32	1067	4.34	-6.1

SAMPLING INFORMATION

DATE / TIME 8-21-0 / 10:56 | DEPTH TO GROUNDWATER (FT.) 16.25

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES (X) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )
10:58	7.34	14.0	1055	4.51	-6.9	NA	NA

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS: CLEAR

COMMENTS:

SAMPLE COLLECTION NUMBER 4

SITE NAME: VANADIUM CORP. OU#3 SITE POINT ID: EQUIPMENT RINSE BLANK

LOCATION: TOWN OF NIAGARA, NEW YORK FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: DEIONIZEDWATER LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) NA DEPTH TO BOTTOM (FEET) NA

ELEVATION, MEAS.PT.(MSL): NA ELEVATION, G/W (MSL): NA

DATE NA TIME: START/FINISH NA / NA

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER ( ) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES ( ) NO

WELL RISER DIAMETER (IN.): ( ) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) WAS WELL PURGED TO DRYNESS ( ) YES ( ) NO

TOTAL VOLUME EVACUATED (GAL) WATER LEVEL AFTER PURGE (FT.)

TURBIDITY OF PURGINGS : START FINISH

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]

SAMPLING INFORMATION

DATE / TIME 8-21-0 / 11:15 DEPTH TO GROUNDWATER (FT.) NA

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES (X) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )
NA	NA	NA	NA	NA	NA	NA	NA

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS: CLEAR

COMMENTS: SAMPLE COLLECTED BY RUNNING LABORATORY SUPPLIED DI WATER THROUGH THE DECONTAMINATED GRUNDFOS PUMP.

SAMPLE COLLECTION NUMBER 5

SITE NAME: VANADIUM CORP. OU#3 SITE | POINT ID: MW - 104 A

LOCATION: TOWN OF NIAGARA, NEW YORK | FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: GROUNDWATER | LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) 17.99 | DEPTH TO BOTTOM (FEET) 21.42

ELEVATION, MEAS.PT.(MSL): NA | ELEVATION, G/W (MSL): NA

DATE 8-21-01 | TIME: START/FINISH 12:14 / 12:50

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES (X) NO

WELL RISER DIAMETER (IN.): (X) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) 0.55 | WAS WELL PURGED TO DRYNESS ( ) YES (X) NO

TOTAL VOLUME EVACUATED (GAL) 3.00 | WATER LEVEL AFTER PURGE (FT.) 18.45

TURBIDITY OF PURGINGS : START CLEAR - TAN TINT | FINISH CLEAR

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]
12:14	100	18.20	0	15.4	7.71	957	54.80	-29.7
12:20	100	18.40	0.5	15.4	7.40	1224	18.30	-11.2
12:26	100	18.40	1.0	15.3	7.34	1353	5.07	-7.6
12:32	100	18.45	1.5	15.5	7.34	1397	3.31	-7.4
12:38	100	18.45	2.0	15.7	7.33	1424	3.26	-7.3
12:44	100	18.45	2.5	15.5	7.35	1450	3.24	-8.0
12:50	100	18.45	3.0	15.4	7.35	1445	2.56	-8.1

SAMPLING INFORMATION

DATE / TIME 8-21-0 / 12:50 | DEPTH TO GROUNDWATER (FT.) 18.45

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES (X) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )
12:52	7.34	15.2	1455	3.38	-7.5	NA	NA

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS: CLEAR

COMMENTS:

SAMPLE COLLECTION NUMBER 6

SITE NAME: VANADIUM CORP. OU#3 SITE | POINT ID: MW - 104 B

LOCATION: TOWN OF NIAGARA, NEW YORK | FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: GROUNDWATER | LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) 17.57 | DEPTH TO BOTTOM (FEET) 37.78

ELEVATION, MEAS.PT.(MSL): NA | ELEVATION, G/W (MSL): NA

DATE 8-21-01 | TIME: START/FINISH 13:02 / 13:26

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES (X) NO

WELL RISER DIAMETER (IN.): (X) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) 3.23 | WAS WELL PURGED TO DRYNESS ( ) YES (X) NO

TOTAL VOLUME EVACUATED (GAL) 6.00 | WATER LEVEL AFTER PURGE (FT.) 18.30

TURBIDITY OF PURGINGS : START CLEAR | FINISH CLEAR

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]
13:02	120	18.16	0	15.2	7.54	2160	31.80	-19.3
13:06	120	18.25	1.0	15.3	7.55	2120	95.90	-19.6
13:10	120	18.30	2.0	15.5	7.49	2180	171.00	-16.0
13:14	120	18.32	3.0	15.3	7.48	2220	46.90	-15.4
13:18	120	18.35	4.0	15.5	7.46	2230	17.40	-14.7
13:22	120	18.30	5.0	14.9	7.45	2240	9.33	-14.0
13:26	120	18.30	6.0	14.9	7.43	2220	7.31	-12.9

SAMPLING INFORMATION

DATE / TIME 8-21-0 / 13:26 | DEPTH TO GROUNDWATER (FT.) 18.30

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES (X) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )
13:28	7.43	14.9	2220	6.81	-12.9	NA	NA

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS: CLEAR

COMMENTS:

SAMPLE COLLECTION NUMBER 7

SITE NAME: VANADIUM CORP. OU#3 SITE | POINT ID: MW - 105 A

LOCATION: TOWN OF NIAGARA, NEW YORK | FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: GROUNDWATER | LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) 12.47 | DEPTH TO BOTTOM (FEET) 15.77

ELEVATION, MEAS.PT.(MSL): NA | ELEVATION, G/W (MSL): NA

DATE 8-21-01 | TIME: START/FINISH 13:42 / 13:58

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES (X) NO

WELL RISER DIAMETER (IN.): (X) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) 0.53 | WAS WELL PURGED TO DRYNESS ( ) YES (X) NO

TOTAL VOLUME EVACUATED (GAL) 2.00 | WATER LEVEL AFTER PURGE (FT.) 12.90

TURBIDITY OF PURGINGS : START CLEAR - GRAY TINT | FINISH CLEAR

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]
13:42	80	12.85	0	18.0	7.16	1474	86.30	+2.4
13:46	80	12.90	0.5	18.0	7.23	1351	21.50	-1.3
13:50	80	12.90	1.0	18.1	7.26	1351	7.72	-2.9
13:54	80	12.90	1.5	18.4	7.24	1354	6.24	-2.1
13:58	80	12.90	2.0	18.6	7.25	1348	6.56	-2.5

SAMPLING INFORMATION

DATE / TIME 8-21-0 / 13:58 | DEPTH TO GROUNDWATER (FT.) 12.90

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES (X) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )
14:00	7.29	18.8	1354	6.00	-5.1	NA	NA

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS: CLEAR

COMMENTS:

SAMPLE COLLECTION NUMBER 8

SITE NAME: VANADIUM CORP. OU#3 SITE | POINT ID: MW - 105 B

LOCATION: TOWN OF NIAGARA, NEW YORK | FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: GROUNDWATER | LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) 12.70 | DEPTH TO BOTTOM (FEET) 32.21

ELEVATION, MEAS.PT.(MSL): NA | ELEVATION, G/W (MSL): NA

DATE 8-21-01 | TIME: START/FINISH 14:08 / 14:28

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES (X) NO

WELL RISER DIAMETER (IN.): (X) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) 3.12 | WAS WELL PURGED TO DRYNESS ( ) YES (X) NO

TOTAL VOLUME EVACUATED (GAL) 5.00 | WATER LEVEL AFTER PURGE (FT.) 16.10

TURBIDITY OF PURGINGS : START TURBID - BROWN | FINISH CLEAR

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]
14:08	140	16.10	0	15.4	7.36	1487	>1000	-8.6
14:12	140	16.10	1.0	15.1	7.41	1336	26.60	-11.7
14:16	140	16.10	2.0	14.9	7.43	1453	8.87	-12.7
14:20	140	16.10	3.0	14.7	7.38	1562	7.23	-9.5
14:24	140	16.10	4.0	14.6	7.36	1605	4.42	-8.5
14:28	140	16.10	5.0	14.4	7.33	1625	4.21	-7.2

SAMPLING INFORMATION

DATE / TIME 8-21-0 / 14:28 | DEPTH TO GROUNDWATER (FT.) 16.10

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER (X) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES (X) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )
14:30	7.32	14.3	1628	4.10	-6.9	NA	NA

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS: CLEAR

COMMENTS:

SAMPLE COLLECTION NUMBER 9

SITE NAME: VANADIUM CORP. OU#3 SITE | POINT ID: MW - 102 A

LOCATION: TOWN OF NIAGARA, NEW YORK | FIELD REPRESENTATIVE: E S & S - R.CHIODO/P.MEYER

SAMPLE MATRIX: GROUNDWATER | LAB SAMPLE / PROJECT #: NA

EVACUATION INFORMATION

INITIAL WATER LEVEL (FEET) 11.90 | DEPTH TO BOTTOM (FEET) 12.15

ELEVATION, MEAS.PT.(MSL): NA | ELEVATION, G/W (MSL): NA

DATE 8-21-01 | TIME: START/FINISH 8:58 / NA

METHOD OF EVACUATION:
( ) PVC BAILER ( ) S.S. BAILER ( ) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

EVACUATION EQUIPMENT DEDICATED:
( ) YES ( ) NO

WELL RISER DIAMETER (IN.): (X) 2 ( ) 3 ( ) 4 ( ) 6 ( ) OTHER

ONE (1) RISER VOLUME (GAL) 0.04 | WAS WELL PURGED TO DRYNESS ( ) YES ( ) NO

TOTAL VOLUME EVACUATED (GAL) NA | WATER LEVEL AFTER PURGE (FT.) NA

TURBIDITY OF PURGINGS : START | FINISH

EVACUATION STABILIZATION DATA

TIME	PURGE RATE (gpm/htz)	DTW (FT)	CUMULATIVE VOLUME	TEMP. (C)	pH (Std.Units)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	OTHER [eh (mV)]

SAMPLING INFORMATION

DATE / TIME / | DEPTH TO GROUNDWATER (FT.)

METHOD OF SAMPLING:
( ) PVC BAILER ( ) S.S. BAILER ( ) GRUNDFOS PUMP
( ) S.S. BAILER ( ) WELL WIZARD ( ) OTHER

SAMPLING EQUIPMENT DEDICATED:
( ) YES ( ) NO

SAMPLING FIELD MEASUREMENT DATA

TIME	pH (Std.Units)	TEMP. (C)	CONDUCT. (umhos/cm)	TURBIDITY (NTU)	eH (mV)	DISS. OXY. (PPM)	OTHER ( )

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING: SUNNY, 75 F

SAMPLE CHARACTERISTICS:

COMMENTS: NOT SAMPLED - INSUFFICIENT VOLUME TO PURGE / SAMPLE WITH A BAILER OR PUMP.

SAMPLE COLLECTION NUMBER NS

APPENDIX D

ANALYTICAL REPORTS

SEVERN TRENT SERVICES

STL Buffalo
10 Hazelwood Drive
Suite 106
Amherst, NY 14228

Tel: 716 691 2600
Fax: 716 691 7991
www.stl-inc.com

August 21, 2001

Mr. Brian Senefelder
2221 Niagara Falls Boulevard, Suite 9
Niagara Falls, NY 14304

RE: Analytical Results A01-8083

Dear Mr. Senefelder:

Please find enclosed analytical results concerning the samples recently submitted by your firm. The pertinent information regarding these analyses is listed below:

Quote #:	NY01-205
Project Name:	Hexavalent Chromium
Matrix:	Water
Samples Received:	08/21/01
Sample Date:	08/21/01

If you have any questions concerning these data, please contact the Program Manager at (716) 691-2600 and refer to the I.D. number listed below. It has been our pleasure to provide Occidental Chemical Corporation with environmental testing services. We look forward to serving you in the future.

Sincerely,

STL Buffalo

James L. Rickus
Program Manager

JLR/dk;
Enclosure

I.D. #A01-8083
#NY1A8829

This report contains 12 pages which are individually numbered.

SEVERN TRENT SERVICES

STL Buffalo

METHODOLOGY

The specific methodology employed in obtaining the enclosed analytical results is indicated on the specific data tables. The method number presented refers to the following U.S. Environmental Protection Agency reference:

- 40 CFR Part 136 "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act" October 26, 1984 (Federal Register) United States Environmental Protection Agency.

COMMENTS

The enclosed data has been reported utilizing data qualifiers (Q) as defined on the Data Comment Page.

The cooler was received at a temperature of 15°C.

No deviations from protocol were encountered for Wet Chemistry.

Sample Data Package

Date: 08/22/2001
Time: 15:57:23

GOLDER ASSOCIATES
HEXAVALENT CHROMIUM
WET CHEMISTRY ANALYSIS

Rept: AN1246

Client ID / Job No / Lab ID / Sample Date		DUP@WM-102B A01-8083 08/21/2001 A1808301FD		EQUIP RINSE BLANK A01-8083 08/21/2001 A1808304		MW-102B A01-8083 08/21/2001 A1808301		MW-104A A01-8083 08/21/2001 A1808305	
Analyte	Units	Sample Value	Reporting Limit	Sample Value	Reporting Limit	Sample Value	Reporting Limit	Sample Value	Reporting Limit
Hexavalent Chromium - Total	MG/L	0.017	0.010	ND	0.010	0.017	0.010	0.014	0.010

Client ID / Job No / Lab ID / Sample Date		MW-104B A01-8083 08/21/2001 A1808306		MW-105A A01-8083 08/21/2001 A1808307		MW-105B A01-8083 08/21/2001 A1808308		WM-103A A01-8083 08/21/2001 A1808303	
Analyte	Units	Sample Value	Reporting Limit	Sample Value	Reporting Limit	Sample Value	Reporting Limit	Sample Value	Reporting Limit
Hexavalent Chromium - Total	MG/L	0.016	0.010	ND	0.010	ND	0.010	ND	0.010

Client ID / Job No / Lab ID / Sample Date		WM-103B A01-8083 08/21/2001 A1808302							
Analyte	Units	Sample Value	Reporting Limit	Sample Value	Reporting Limit	Sample Value	Reporting Limit	Sample Value	Reporting Limit
Hexavalent Chromium - Total	MG/L	0.010	0.010	NA		NA		NA	

000003

NA = Not Applicable ND = Not Detected

STL Buffalo

Chronology and QC Summary Package

Date: 08/22/2001
Time: 15:58:11

GOLDER ASSOCIATES
HEXAVALENT CHROMIUM
WET CHEMISTRY ANALYSIS

Rept: AN1246

Client ID Job No Sample Date	Lab ID	Method Blank A01-8083	A1B0753202						
Analyte	Units	Sample Value	Reporting Limit	Sample Value	Reporting Limit	Sample Value	Reporting Limit	Sample Value	Reporting Limit
Hexavalent Chromium - Total	MG/L	ND	0.010	NA		NA		NA	

000005

NA = Not Applicable ND = Not Detected

STL Buffalo

Client Sample ID: Method Blank | LCS
Lab Sample ID: A1B0753202 | A1B0753201

Analyte	Units of Measure	Concentration Blank Spike	Concentration Spike Amount	% Recovery Blank Spike	QC LIMITS
WET CHEMISTRY ANALYSIS HEXAVALENT CHROMIUM	MG/L	0.0550	0.050	110	90-110

000006

* Indicates Result is outside QC Limits
NC = Not Calculated ND = Not Calculated

GOLDER ASSOCIATES
HEXAVALENT CHROMIUM
HEXAVALENT CHROMIUM
SAMPLE CHRONOLOGY

Lab ID	Sample ID	Lab	Analyte	Method	DF	Sample wt/vol g/L	Sample Date	Receive Date	TCLP Date	TH	Analysis Date	ANL INI	AH	Matrix
A1808304	EQUIP RINSE BLANK	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 11:56	08/21 16:20	NA		08/21	GR	Y	WATER
A1808301	MW-102B	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 09:34	08/21 16:20	NA		08/21	GR	Y	WATER
A1808305	MW-104A	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 12:50	08/21 16:20	NA		08/21	GR	Y	WATER
A1808306	MW-104B	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 13:26	08/21 16:20	NA		08/21	GR	Y	WATER
A1808307	MW-105A	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 13:58	08/21 16:20	NA		08/21	GR	Y	WATER
A1808308	MW-105B	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 14:28	08/21 16:20	NA		08/21	GR	Y	WATER
A1808303	WM-103A	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 10:56	08/21 16:20	NA		08/21	GR	Y	WATER
A1808302	WM-103B	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 10:37	08/21 16:20	NA		08/21	GR	Y	WATER

AH = Analysis Holding Time Met
TH = TCLP Holding Time Met
NA = Not Applicable

ANL INI = Analyst Initials
DF = Dilution Factor

GOLDER ASSOCIATES
HEXAVALENT CHROMIUM
HEXAVALENT CHROMIUM
QC CHRONOLOGY

Lab ID	Sample ID	Lab	Analyte	Method	DF	Sample wt/vol g/L	Sample Date	Receive Date	TCLP Date	TH	Analysis Date	ANL INI	AH	Matrix
A1808301FD	DUP@WM-102B	RECNY	Hexavalent Chromium - Total	7196A	1.0		08/21/01 09:36	08/21 16:20	NA		08/21	GR	Y	WATER

800000

AH = Analysis Holding Time Met
TH = TCLP Holding Time Met
NA = Not Applicable

ANL INI = Analyst Initials
DF = Dilution Factor

Lab ID	Sample ID	Lab	Analyte	Method	DF	Sample wt/vol g/L	Sample Date	Receive Date	TCLP Date	TH	Analysis Date	ANL INI	AH	Matrix
A1B0753202	Method Blank	RECNY	Hexavalent Chromium - Total	7196A	1.0	0.1 L	-	-	NA		08/21	GR	Y	WATER

600009

AH = Analysis Holding Time Met
TH = TCLP Holding Time Met
NA = Not Applicable

ANL INI = Analyst Initials
DF = Dilution Factor

Chain of Custody

PAGE 1 OF 1

GOLDER ASSOCIATES CHAIN OF CUSTODY RECORD

PROJECT NO./NAME	CLIENT NAME	SAMPLE SITE	SAMPLER'S SIGNATURE
013-9293	Golder Associates Inc	NF RIFS	

SAMPLE NO.	SAMPLING DATE TIME	ORIGIN/SOURCE	# OF CONTAIN-ERS	DESCRIPTION COMP	GRAB	OTHER	ANALYSES/TESTS REQUESTED
1	8-21-01 @ 9:34	MW-102B	1		X		Hex. Chromium
2	8-21-01 @ 9:36	Dup @ MW-102B	1		X		Hex. Chrome
3	8-21-01 @ 10:37	MW-103B	1		X		Hex. Chrome
4	8-21-01 @ 10:56	MW-103A	1		X		Hex. Chrome
5	8-21-01 @ 11:15	Equipment Rinse Blank	1		X		Hex. Chrome
6	8-21-01 @ 12:50	MW-104A	1		X		Hex. Chrome

RELINQUISHED BY SIGNATURE PRINT R. Chiodo	DATE/TIME 8-21-01 / 16:20	RELINQUISHED BY SIGNATURE PRINT	DATE/TIME	RELINQUISHED BY SIGNATURE PRINT	DATE/TIME
RECEIVED BY SIGNATURE PRINT	DATE/TIME	RECEIVED BY SIGNATURE PRINT	DATE/TIME	RECEIVED BY SIGNATURE PRINT	DATE/TIME

REMARKS

Golder Associates

000011

PAGE 1 OF 1

GOLDER ASSOCIATES CHAIN OF CUSTODY RECORD

PROJECT NO./NAME	CLIENT NAME	SAMPLE SITE	SAMPLER'S SIGNATURE
013-9293	Golder Associates Inc	NF RIFS	

SAMPLE NO.	SAMPLING DATE TIME	ORIGIN/SOURCE	# OF CONTAIN-ERS	DESCRIPTION COMP	GRAB	OTHER	ANALYSES/TESTS REQUESTED
7	8-21-01 @ 13:26	MW-104B	1		X		Hex. Chrome
8	8-21-01 @ 13:58	MW-105A	1		X		Hex. Chrome
9	8-21-01 @ 14:28	MW-105B	1		X		Hex. Chrome.

RELINQUISHED BY SIGNATURE / PRINT	DATE/TIME	RELINQUISHED BY SIGNATURE / PRINT	DATE/TIME	RELINQUISHED BY SIGNATURE / PRINT	DATE/TIME
R.Chiodo	8-21-01/16:20				
RECEIVED BY SIGNATURE / PRINT	**DATE/TIME**	**RECEIVED BY SIGNATURE / PRINT**	**DATE/TIME**	**RECEIVED BY SIGNATURE / PRINT**	**DATE/TIME**
Franklin STL	8/21/01/16:20				

REMARKS

$50

Golder Associates

000012

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

SEP

Date:05-SEP-2001

Lab Sample ID: L74909-1

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-102B
Description: GRAB
Sampled On: 21-AUG-01 09:34 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:08	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:08	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.027	mg/l	0.016	29-AUG-01 08:08	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:08	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:08	EPA 6010	01-146-03
Calcium	129	mg/l	0.500	29-AUG-01 08:08	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:08	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:08	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:08	EPA 6010	01-146-03
Iron	0.285	mg/l	0.040	29-AUG-01 08:08	EPA 6010	01-146-03
Lead	0.001	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	21.5	mg/l	0.500	29-AUG-01 08:08	EPA 6010	01-146-03
Manganese	0.01	mg/l	0.005	29-AUG-01 08:08	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:08	EPA 6010	01-146-03
Potassium	3.28	mg/l	0.500	29-AUG-01 08:08	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 02:41	EPA 6010	01-146-04
Sodium	51.8	mg/l	0.200	29-AUG-01 08:08	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

FLI
FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-1

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-102B
Description: GRAB
Sampled On: 21-AUG-01 09:34 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:08	EPA 6010	01-146-03
Zinc	0.06	mg/l	0.020	29-AUG-01 08:08	EPA 6010	01-146-03

QC 2 NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A Kent
Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

"Our family, caring about your analytical needs . . . Since 1963."

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-2

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-102B
Description: GRAB
Sampled On: 21-AUG-01 09:34 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:11	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:11	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.028	mg/l	0.016	29-AUG-01 08:11	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:11	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:11	EPA 6010	01-146-03
Calcium	137	mg/l	0.500	29-AUG-01 08:11	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:11	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:11	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:11	EPA 6010	01-146-03
Iron	0.177	mg/l	0.040	29-AUG-01 08:11	EPA 6010	01-146-03
Lead	U	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	22.7	mg/l	0.500	29-AUG-01 08:11	EPA 6010	01-146-03
Manganese	0.012	mg/l	0.005	29-AUG-01 08:11	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:11	EPA 6010	01-146-03
Potassium	3.4	mg/l	0.500	29-AUG-01 08:11	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 02:44	EPA 6010	01-146-04
Sodium	54.8	mg/l	0.200	29-AUG-01 08:11	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John D Kent
Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-2

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-102B
Description: GRAB
Sampled On: 21-AUG-01 09:34 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:11	EPA 6010	01-146-03
Zinc	U	mg/l	0.020	29-AUG-01 08:11	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-3

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DUPLICATE
Description: GRAB
Sampled On: 21-AUG-01 09:36 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:20	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:20	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.029	mg/l	0.016	29-AUG-01 08:20	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:20	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:20	EPA 6010	01-146-03
Calcium	132	mg/l	0.500	29-AUG-01 08:20	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:20	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:20	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:20	EPA 6010	01-146-03
Iron	0.23	mg/l	0.040	29-AUG-01 08:20	EPA 6010	01-146-03
Lead	0.003	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	21.9	mg/l	0.500	29-AUG-01 08:20	EPA 6010	01-146-03
Manganese	0.011	mg/l	0.005	29-AUG-01 08:20	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:20	EPA 6010	01-146-03
Potassium	3.21	mg/l	0.500	29-AUG-01 08:20	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 03:30	EPA 6010	01-146-04
Sodium	52.4	mg/l	0.200	29-AUG-01 08:20	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC L NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John D Kent
Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

FLI
FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-3

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DUPLICATE
Description: GRAB
Sampled On: 21-AUG-01 09:36 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:20	EPA 6010	01-146-03
Zinc	0.02	mg/l	0.020	29-AUG-01 08:20	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

FLI
FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-4

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, DUPLICATE
Description: GRAB
Sampled On: 21-AUG-01 09:36 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:23	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:23	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.028	mg/l	0.016	29-AUG-01 08:23	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:23	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:23	EPA 6010	01-146-03
Calcium	137	mg/l	0.500	29-AUG-01 08:23	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:23	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:23	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:23	EPA 6010	01-146-03
Iron	0.231	mg/l	0.040	29-AUG-01 08:23	EPA 6010	01-146-03
Lead	U	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	22.6	mg/l	0.500	29-AUG-01 08:23	EPA 6010	01-146-03
Manganese	0.011	mg/l	0.005	29-AUG-01 08:23	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:23	EPA 6010	01-146-03
Potassium	3.36	mg/l	0.500	29-AUG-01 08:23	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 03:33	EPA 6010	01-146-04
Sodium	54.2	mg/l	0.200	29-AUG-01 08:23	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC R NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A Kent
Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-4

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, DUPLICATE
Description: GRAB
Sampled On: 21-AUG-01 09:36 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:23	EPA 6010	01-146-03
Zinc	U	mg/l	0.020	29-AUG-01 08:23	EPA 6010	01-146-03

QC A NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

The information in this report is accurate to the best of our knowledge and ability. In no event shall our liability exceed the cost of these services. Your samples will be discarded after 14 days unless we are advised otherwise.

"Our family, caring about your analytical needs . . . Since 1963."

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-5

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-103B
Description: GRAB
Sampled On: 21-AUG-01 10:37 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:26	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:26	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.07	mg/l	0.016	29-AUG-01 08:26	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:26	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:26	EPA 6010	01-146-03
Calcium	48.7	mg/l	0.500	29-AUG-01 08:26	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:26	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:26	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:26	EPA 6010	01-146-03
Iron	0.089	mg/l	0.040	29-AUG-01 08:26	EPA 6010	01-146-03
Lead	U	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	26.9	mg/l	0.500	29-AUG-01 08:26	EPA 6010	01-146-03
Manganese	0.031	mg/l	0.005	29-AUG-01 08:26	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:26	EPA 6010	01-146-03
Potassium	4.08	mg/l	0.500	29-AUG-01 08:26	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 03:36	EPA 6010	01-146-04
Sodium	45.8	mg/l	0.200	29-AUG-01 08:26	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A Kent
Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-5

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-103B
Description: GRAB
Sampled On: 21-AUG-01 10:37 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:26	EPA 6010	01-146-03
Zinc	U	mg/l	0.020	29-AUG-01 08:26	EPA 6010	01-146-03

QC R NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John M Kent
Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-6

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-103B
Description: GRAB
Sampled On: 21-AUG-01 10:37 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:38	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:38	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.072	mg/l	0.016	29-AUG-01 08:38	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:38	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:38	EPA 6010	01-146-03
Calcium	49.4	mg/l	0.500	29-AUG-01 08:38	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:38	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:38	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:38	EPA 6010	01-146-03
Iron	0.062	mg/l	0.040	29-AUG-01 08:38	EPA 6010	01-146-03
Lead	U	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	27.5	mg/l	0.500	29-AUG-01 08:38	EPA 6010	01-146-03
Manganese	0.032	mg/l	0.005	29-AUG-01 08:38	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:38	EPA 6010	01-146-03
Potassium	4.23	mg/l	0.500	29-AUG-01 08:38	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 03:45	EPA 6010	01-146-04
Sodium	47.4	mg/l	0.200	29-AUG-01 08:38	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-6

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-103B
Description: GRAB
Sampled On: 21-AUG-01 10:37 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:38	EPA 6010	01-146-03
Zinc	U	mg/l	0.020	29-AUG-01 08:38	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
	ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)
	mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)
	B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-7

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-103A
Description: GRAB
Sampled On: 21-AUG-01 10:56 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:44	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:44	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.096	mg/l	0.016	29-AUG-01 08:44	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:44	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:44	EPA 6010	01-146-03
Calcium	78.8	mg/l	0.500	29-AUG-01 08:44	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:44	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:44	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:44	EPA 6010	01-146-03
Iron	0.86	mg/l	0.040	29-AUG-01 08:44	EPA 6010	01-146-03
Lead	U	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	65.3	mg/l	0.500	29-AUG-01 08:44	EPA 6010	01-146-03
Manganese	0.095	mg/l	0.005	29-AUG-01 08:44	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:44	EPA 6010	01-146-03
Potassium	0.996	mg/l	0.500	29-AUG-01 08:44	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 03:51	EPA 6010	01-146-04
Sodium	45.6	mg/l	0.200	29-AUG-01 08:44	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:
ND or U = None Detected
< = less than
ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million)
mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank
J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-7

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-103A
Description: GRAB
Sampled On: 21-AUG-01 10:56 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:44	EPA 6010	01-146-03
Zinc	0.032	mg/l	0.020	29-AUG-01 08:44	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-8

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-103A
Description: GRAB
Sampled On: 21-AUG-01 10:56 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	0.093	mg/l	0.075	29-AUG-01 08:47	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:47	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.1	mg/l	0.016	29-AUG-01 08:47	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:47	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	30-AUG-01 03:54	EPA 6010	01-146-04
Calcium	80.3	mg/l	0.500	29-AUG-01 08:47	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:47	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:47	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:47	EPA 6010	01-146-03
Iron	0.368	mg/l	0.040	29-AUG-01 08:47	EPA 6010	01-146-03
Lead	0.001	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	65.2	mg/l	0.500	29-AUG-01 08:47	EPA 6010	01-146-03
Manganese	0.105	mg/l	0.005	29-AUG-01 08:47	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	0.014	mg/l	0.012	29-AUG-01 08:47	EPA 6010	01-146-03
Potassium	1.12	mg/l	0.500	29-AUG-01 08:47	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 03:54	EPA 6010	01-146-04
Sodium	47.5	mg/l	0.200	29-AUG-01 08:47	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A Kent
Lab Director

KEY:
ND or U = None Detected
< = less than
ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million)
mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank
J = result estimated below the quantitation limit

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-8

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-103A
Description: GRAB
Sampled On: 21-AUG-01 10:56 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:47	EPA 6010	01-146-03
Zinc	0.025	mg/l	0.020	29-AUG-01 08:47	EPA 6010	01-146-03

QC 2 NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John D Kent
Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-9

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: EQUIPMENT BLANK
Description: GRAB
Sampled On: 21-AUG-01 11:15 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:50	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:50	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	U	mg/l	0.016	29-AUG-01 08:50	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:50	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:50	EPA 6010	01-146-03
Calcium	U	mg/l	0.500	29-AUG-01 08:50	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:50	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:50	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:50	EPA 6010	01-146-03
Iron	0.058	mg/l	0.040	29-AUG-01 08:50	EPA 6010	01-146-03
Lead	U	mg/l	0.001	28-AUG-01 00:00	EPA 7421	01-014-82
Magnesium	U	mg/l	0.500	29-AUG-01 08:50	EPA 6010	01-146-03
Manganese	U	mg/l	0.005	29-AUG-01 08:50	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:50	EPA 6010	01-146-03
Potassium	U	mg/l	0.500	29-AUG-01 08:50	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 03:57	EPA 6010	01-146-04
Sodium	0.39	mg/l	0.200	29-AUG-01 08:50	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-9

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: EQUIPMENT BLANK
Description: GRAB
Sampled On: 21-AUG-01 11:15 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:50	EPA 6010	01-146-03
Zinc	0.02	mg/l	0.020	29-AUG-01 08:50	EPA 6010	01-146-03

QC 2 NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A Kent
Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-10

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, EQUIPMENT BLK
Description: GRAB
Sampled On: 21-AUG-01 11:15 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:53	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:53	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	U	mg/l	0.016	29-AUG-01 08:53	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:53	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:53	EPA 6010	01-146-03
Calcium	U	mg/l	0.500	29-AUG-01 08:53	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:53	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:53	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:53	EPA 6010	01-146-03
Iron	U	mg/l	0.040	29-AUG-01 08:53	EPA 6010	01-146-03
Lead	U	mg/l	0.001	28-AUG-01 00:00	EPA 7421	01-014-82
Magnesium	U	mg/l	0.500	29-AUG-01 08:53	EPA 6010	01-146-03
Manganese	U	mg/l	0.005	29-AUG-01 08:53	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:53	EPA 6010	01-146-03
Potassium	U	mg/l	0.500	29-AUG-01 08:53	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:00	EPA 6010	01-146-04
Sodium	0.639	mg/l	0.200	29-AUG-01 08:53	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A Kent
Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-10

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, EQUIPMENT BLK
Description: GRAB
Sampled On: 21-AUG-01 11:15 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:53	EPA 6010	01-146-03
Zinc	U	mg/l	0.020	29-AUG-01 08:53	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-11

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-104A
Description: GRAB
Sampled On: 21-AUG-01 12:50 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:56	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:56	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.121	mg/l	0.016	29-AUG-01 08:56	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:56	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:56	EPA 6010	01-146-03
Calcium	93.9	mg/l	0.500	29-AUG-01 08:56	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:56	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:56	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:56	EPA 6010	01-146-03
Iron	3.27	mg/l	0.040	29-AUG-01 08:56	EPA 6010	01-146-03
Lead	0.001	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	48.5	mg/l	0.500	29-AUG-01 08:56	EPA 6010	01-146-03
Manganese	0.39	mg/l	0.005	29-AUG-01 08:56	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:56	EPA 6010	01-146-03
Potassium	1.34	mg/l	0.500	29-AUG-01 08:56	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:03	EPA 6010	01-146-04
Sodium	110	mg/l	0.200	29-AUG-01 08:56	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-11

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-104A
Description: GRAB
Sampled On: 21-AUG-01 12:50 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:56	EPA 6010	01-146-03
Zinc	0.021	mg/l	0.020	29-AUG-01 08:56	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
	ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)
	mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)
	B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-12

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-104A
Description: GRAB
Sampled On: 21-AUG-01 12:50 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 08:59	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 08:59	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.127	mg/l	0.016	29-AUG-01 08:59	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 08:59	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 08:59	EPA 6010	01-146-03
Calcium	99.6	mg/l	0.500	29-AUG-01 08:59	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 08:59	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 08:59	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 08:59	EPA 6010	01-146-03
Iron	3.08	mg/l	0.040	29-AUG-01 08:59	EPA 6010	01-146-03
Lead	0.002	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	51.4	mg/l	0.500	29-AUG-01 08:59	EPA 6010	01-146-03
Manganese	0.41	mg/l	0.005	29-AUG-01 08:59	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 08:59	EPA 6010	01-146-03
Potassium	1.41	mg/l	0.500	29-AUG-01 08:59	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:06	EPA 6010	01-146-04
Sodium	118	mg/l	0.200	29-AUG-01 08:59	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC K NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-12

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-104A
Description: GRAB
Sampled On: 21-AUG-01 12:50 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 08:59	EPA 6010	01-146-03
Zinc	U	mg/l	0.020	29-AUG-01 08:59	EPA 6010	01-146-03

QC 2 NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A Kent
Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-13

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-104B
Description: GRAB
Sampled On: 21-AUG-01 13:26 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	0.132	mg/l	0.075	29-AUG-01 09:01	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 09:01	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.297	mg/l	0.016	29-AUG-01 09:01	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 09:01	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	30-AUG-01 04:09	EPA 6010	01-146-04
Calcium	108	mg/l	0.500	29-AUG-01 09:01	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 09:01	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 09:01	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 09:01	EPA 6010	01-146-03
Iron	0.123	mg/l	0.040	29-AUG-01 09:01	EPA 6010	01-146-03
Lead	U	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	41.4	mg/l	0.500	29-AUG-01 09:01	EPA 6010	01-146-03
Manganese	0.07	mg/l	0.005	29-AUG-01 09:01	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 09:01	EPA 6010	01-146-03
Potassium	2.88	mg/l	0.500	29-AUG-01 09:01	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:09	EPA 6010	01-146-04
Sodium	222	mg/l	0.200	29-AUG-01 09:01	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion); mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million); B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-13

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-104B
Description: GRAB
Sampled On: 21-AUG-01 13:26 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 09:01	EPA 6010	01-146-03
Zinc	0.023	mg/l	0.020	29-AUG-01 09:01	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John O'Keefe
Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-14

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-104B
Description: GRAB
Sampled On: 21-AUG-01 13:26 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	0.093	mg/l	0.075	29-AUG-01 09:13	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 09:13	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Analysis Comment:Result suspect due to no spike recovery. Spike analysis repeated with similar result.						
Barium	0.313	mg/l	0.016	29-AUG-01 09:13	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 09:13	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 09:13	EPA 6010	01-146-03
Calcium	114	mg/l	0.500	29-AUG-01 09:13	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 09:13	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 09:13	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 09:13	EPA 6010	01-146-03
Iron	0.083	mg/l	0.040	29-AUG-01 09:13	EPA 6010	01-146-03
Lead	U	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	43.3	mg/l	0.500	29-AUG-01 09:13	EPA 6010	01-146-03
Manganese	0.073	mg/l	0.005	29-AUG-01 09:13	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 09:13	EPA 6010	01-146-03
Potassium	3.06	mg/l	0.500	29-AUG-01 09:13	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:21	EPA 6010	01-146-04
Sodium	232	mg/l	0.200	29-AUG-01 09:13	EPA 6010	01-146-03

)C 2 NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John D Kent
Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-14

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-104B
Description: GRAB
Sampled On: 21-AUG-01 13:26 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81
Vanadium	U	mg/l	0.010	29-AUG-01 09:13	EPA 6010	01-146-03
Zinc	U	mg/l	0.020	29-AUG-01 09:13	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

FLI
FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-15

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-105A
Description: GRAB
Sampled On: 21-AUG-01 13:58 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	0.115	mg/l	0.075	29-AUG-01 09:16	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 09:16	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.1	mg/l	0.016	29-AUG-01 09:16	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 09:16	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 09:16	EPA 6010	01-146-03
Calcium	83.6	mg/l	0.500	29-AUG-01 09:16	EPA 6010	01-146-03
Chromium	0.029	mg/l	0.010	29-AUG-01 09:16	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 09:16	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 09:16	EPA 6010	01-146-03
Iron	0.333	mg/l	0.040	29-AUG-01 09:16	EPA 6010	01-146-03
Lead	0.003	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	46.2	mg/l	0.500	29-AUG-01 09:16	EPA 6010	01-146-03
Manganese	0.702	mg/l	0.005	29-AUG-01 09:16	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	0.023	mg/l	0.012	29-AUG-01 09:16	EPA 6010	01-146-03
Potassium	2.87	mg/l	0.500	29-AUG-01 09:16	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:24	EPA 6010	01-146-04
Sodium	112	mg/l	0.200	29-AUG-01 09:16	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC L NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A Kent
Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-15

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-105A
Description: GRAB
Sampled On: 21-AUG-01 13:58 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 09:16	EPA 6010	01-146-03
Zinc	0.142	mg/l	0.020	29-AUG-01 09:16	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John A. Kent
Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-16

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-105A
Description: GRAB
Sampled On: 21-AUG-01 13:58 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 09:19	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 09:19	EPA 6010	01-146-03
Arsenic	U	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.099	mg/l	0.016	29-AUG-01 09:19	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 09:19	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 09:19	EPA 6010	01-146-03
Calcium	83.6	mg/l	0.500	29-AUG-01 09:19	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 09:19	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 09:19	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 09:19	EPA 6010	01-146-03
Iron	0.1	mg/l	0.040	29-AUG-01 09:19	EPA 6010	01-146-03
Lead	U	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	46.3	mg/l	0.500	29-AUG-01 09:19	EPA 6010	01-146-03
Manganese	0.703	mg/l	0.005	29-AUG-01 09:19	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	U	mg/l	0.012	29-AUG-01 09:19	EPA 6010	01-146-03
Potassium	2.91	mg/l	0.500	29-AUG-01 09:19	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:27	EPA 6010	01-146-04
Sodium	115	mg/l	0.200	29-AUG-01 09:19	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY: ND or U = None Detected; < = less than; ug/L = micrograms per liter (equivalent to parts per billion); mg/L = milligrams per liter (equivalent to parts per million); mg/kg = milligrams per kilogram (equivalent to parts per million); B = analyte was detected in the method or trip blank; J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-16

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-105A
Description: GRAB
Sampled On: 21-AUG-01 13:58 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 09:19	EPA 6010	01-146-03
Zinc	0.049	mg/l	0.020	29-AUG-01 09:19	EPA 6010	01-146-03

)C 2 NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John D Kent
Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date: 05-SEP-2001

Lab Sample ID: L74909-17

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-105B
Description: GRAB
Sampled On: 21-AUG-01 14:28 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 09:22	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 09:22	EPA 6010	01-146-03
Arsenic	0.003	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.118	mg/l	0.016	29-AUG-01 09:22	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 09:22	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 09:22	EPA 6010	01-146-03
Calcium	74.6	mg/l	0.500	29-AUG-01 09:22	EPA 6010	01-146-03
Chromium	0.012	mg/l	0.010	29-AUG-01 09:22	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 09:22	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 09:22	EPA 6010	01-146-03
Iron	3.25	mg/l	0.040	29-AUG-01 09:22	EPA 6010	01-146-03
Lead	0.015	mg/l	0.002	28-AUG-01 00:00	EPA 7421	01-014-82
Magnesium	42.5	mg/l	0.500	29-AUG-01 09:22	EPA 6010	01-146-03
Manganese	0.598	mg/l	0.005	29-AUG-01 09:22	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	0.016	mg/l	0.012	29-AUG-01 09:22	EPA 6010	01-146-03
Potassium	2.13	mg/l	0.500	29-AUG-01 09:22	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:29	EPA 6010	01-146-04
Sodium	169	mg/l	0.200	29-AUG-01 09:22	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:
ND or U = None Detected
< = less than
ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million)
mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank
J = result estimated below the quantitation limit

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-17

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: MW-105B
Description: GRAB
Sampled On: 21-AUG-01 14:28 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 09:22	EPA 6010	01-146-03
Zinc	0.148	mg/l	0.020	29-AUG-01 09:22	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-18

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-105B
Description: GRAB
Sampled On: 21-AUG-01 14:28 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Aluminum	U	mg/l	0.075	29-AUG-01 09:25	EPA 6010	01-146-03
Antimony	U	mg/l	0.050	29-AUG-01 09:25	EPA 6010	01-146-03
Arsenic	0.002	mg/l	0.002	30-AUG-01 00:00	SM3114B	00-196-27
Barium	0.114	mg/l	0.016	29-AUG-01 09:25	EPA 6010	01-146-03
Beryllium	U	mg/l	0.002	29-AUG-01 09:25	EPA 6010	01-146-03
Cadmium	U	mg/l	0.005	29-AUG-01 09:25	EPA 6010	01-146-03
Calcium	73.9	mg/l	0.500	29-AUG-01 09:25	EPA 6010	01-146-03
Chromium	U	mg/l	0.010	29-AUG-01 09:25	EPA 6010	01-146-03
Cobalt	U	mg/l	0.010	29-AUG-01 09:25	EPA 6010	01-146-03
Copper	U	mg/l	0.017	29-AUG-01 09:25	EPA 6010	01-146-03
Iron	2.69	mg/l	0.040	29-AUG-01 09:25	EPA 6010	01-146-03
Lead	0.002	mg/l	0.001	27-AUG-01 00:00	EPA 7421	01-014-81
Magnesium	42.2	mg/l	0.500	29-AUG-01 09:25	EPA 6010	01-146-03
Manganese	0.588	mg/l	0.005	29-AUG-01 09:25	EPA 6010	01-146-03
Mercury	U	mg/l	0.0002	28-AUG-01 00:00	EPA 7470	01-002-19
Nickel	0.02	mg/l	0.012	29-AUG-01 09:25	EPA 6010	01-146-03
Potassium	2.12	mg/l	0.500	29-AUG-01 09:25	EPA 6010	01-146-03
Selenium	U	mg/l	0.002	31-AUG-01 00:00	SM3114B	00-007-43
Silver	U	mg/l	0.010	30-AUG-01 04:32	EPA 6010	01-146-04
Sodium	171	mg/l	0.200	29-AUG-01 09:25	EPA 6010	01-146-03
Thallium	U	mg/l	0.001	27-AUG-01 00:00	EPA 7841	01-011-81

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: Lab Director

KEY:
ND or U = None Detected
< = less than
ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million)
mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank
J = result estimated below the quantitation limit

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FRIEND LABORATORY I · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

Date:05-SEP-2001

Lab Sample ID: L74909-18

Golder Associates, Inc.
Jonathan Rizzo
2221 Niagara Falls Boulevard
Suite 9
Niagara Falls, NY 14304-4069

Sample Source: PHELPS DODGE 013-9293
Origin: DISSOLVED, MW-105B
Description: GRAB
Sampled On: 21-AUG-01 14:28 by CLIENT
Date Received: 22-AUG-01 13:25
P.O. No: N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
Vanadium	U	mg/l	0.010	29-AUG-01 09:25	EPA 6010	01-146-03
Zinc	0.091	mg/l	0.020	29-AUG-01 09:25	EPA 6010	01-146-03

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: John M. Kent
Lab Director

KEY:					
ND or U	= None Detected	< = less than	ug/L	= micrograms per liter (equivalent to parts per billion)	
mg/L	= milligrams per liter (equivalent to parts per million)		mg/kg	= milligrams per kilogram (equivalent to parts per million)	
B	= analyte was detected in the method or trip blank		J	= result estimated below the quantitation limit	

CUSTOMER CODE # _____

CHAIN OF CUSTODY RECORD

FLI
FRIEND LABORATORY I • N • C
ONE RESEARCH CIRCLE
WAVERLY NY 14892-1532
Telephone (607) 565 3500
Fax (607) 565 7160

Untreated	Sodium thiosulfate	HCl pH <2	Ascorbic acid & HCl pH <2	HNO_3 pH <2	H_2SO_4 pH <2	NaOH pH >12	NaOH & Zinc acetate pH >9	Acetic Buffer pH <3	Sodium sulfite

CLIENT: Golder Assoc.
ADDRESS: Niagara Falls, NY
PHONE: FAX:

INVOICE TO: Golder Assoc.
ADDRESS: Niagara Falls, NY

Sample Site: Golder - Phelps Dodge

P.O. #

PROJECT NO. / NAME
Golder #
013-9293

COPY TO:
ADDRESS:

74909

DATE & TIME OF SAMPLE COLLECTION	SAMPLE DESCRIPTION	NUMBER OF CONTAINERS	ANALYSES / TESTS REQUESTED	SAMPLE NUMBER (LAB USE ONLY)
8-21-01 9:34	MW-102B	2 Description: Grab Composite Other Matrix: DW WW MW Soil Air Other	T. Metals D. Metals	-1, -2
8-21-01 9:36	DUP of MW-102B	2 Description: Grab Composite Other Matrix: DW WW MW Soil Air Other	T. Metals D. Metals	-3, -4
8-21-01 10:37	MW-103B	2 Description: Grab Composite Other Matrix: DW WW MW Soil Air Other	T. Metals D. Metals	-5, -6
8-21-01 10:56	MW-103A	2 Description: Grab Composite Other Matrix: DW WW MW Soil Air Other	T. Metals D. Metals	-7, -8

RELINQUISHED BY	DATE /TIME	ACCEPTED BY	DATE/TIME	NOTES TO LABORATORY
SAMPLER:	8-21-01/16:00	Tom Jones	8/22/01 1:25	T. Metals > TAL Metals D. Metals
				SUSPECTED CONTAMINATION LEVEL
				NONE SLIGHT MODERATE HIGH (please circle)

CUSTOMER CODE # _____

CHAIN OF CUSTODY RECORD

FLI FRIEND LABORATORY I • N • C
ONE RESEARCH CIRCLE
WAVERLY NY 14892-1532
Telephone (607) 565 3500
Fax (607) 565 7160

Sample Site: Golder - Phelps Dodge

P.O. #

Untreated	Sodium thiosulfate	HCl pH <2	Ascorbic acid & HCl pH <2	HNO_3 pH <2	H_2SO_4 pH <2	NaOH pH >12	NaOH & Zinc acetate pH >9	Acetic Buffer pH <3	Sodium sulfite

CLIENT: Golder Assoc.
ADDRESS: Niagara Falls, NY
PHONE: FAX:

INVOICE TO:
ADDRESS: Golder Assoc. Niagara Falls, NY

PROJECT NO. / NAME
Golder # 013-9293

COPY TO:
ADDRESS:

74909

DATE & TIME OF SAMPLE COLLECTION	SAMPLE DESCRIPTION	NUMBER OF CONTAINERS	ANALYSES / TESTS REQUESTED	SAMPLE NUMBER (LAB USE ONLY)
8-21-01 11:15	Equipment Rinse Blank	2 Description: (Grab) Composite Other Matrix: DW (WW) MW Soil Air Other	T. Metals D. Metals	-9, -10
8-21-01 12:50	MW-104A	2 Description: (Grab) Composite Other Matrix: DW (WW) MW Soil Air Other	T. Metals D. Metals	-11, -12
8-21-01 13:26	MW-104B	2 Description: (Grab) Composite Other Matrix: DW (WW) MW Soil Air Other	T. Metals D. Metals	-13, -14
8-21-01 13:58	MW-105A	2 Description: (Grab) Composite Other Matrix: DW (WW) MW Soil Air Other	T. Metals D. Metals	-15, -16

RELINQUISHED BY	DATE /TIME	ACCEPTED BY	DATE/TIME	NOTES TO LABORATORY
SAMPLER	8-21-01 16:00	Tom Yanes	8/22/01 1:25	T. Metals D. Metals > TAL Metals

SUSPECTED CONTAMINATION LEVEL
NONE SLIGHT MODERATE HIGH (please circle)

CUSTOMER CODE # _____

CHAIN OF CUSTODY RECORD

FLI
FRIEND LABORATORY I • N • C
ONE RESEARCH CIRCLE
WAVERLY NY 14892-1532
Telephone (607) 565 3500
Fax (607) 565 7160

CLIENT: Golder Assoc.
ADDRESS: Niagara Falls, NY
PHONE: FAX:

INVOICE TO:
ADDRESS: Golder Assoc
Niagara Falls, NY

Sample Site: Golder - Phelps Dodge

P.O. #

PROJECT NO. / NAME
Golder # 013-9293

COPY TO:
ADDRESS:

24909

DATE & TIME OF SAMPLE COLLECTION	SAMPLE DESCRIPTION	NUMBER OF CONTAINERS	ANALYSES / TESTS REQUESTED	LAB USE ONLY SAMPLE NUMBER
8-21-01 14:28	MW-105B	Untreated: 2 Description: (Grab) Composite Other Matrix: DW (WW) MW Soil Air Other	T. Metals D. Metals	18
~~8-21-01~~		Description: (Grab) Composite Other Matrix: DW (WW) MW Soil Air Other		
		Description: Grab Composite Other Matrix: DW WW MW Soil Air Other		
		Description: Grab Composite Other Matrix: DW WW MW Soil Air Other		

Untreated | Sodium thiosulfate | HCl pH <2 | Ascorbic acid & HCl pH <2 | HNO_3 pH <2 | H_2SO_4 pH <2 | NaOH pH >12 | NaOH & Zinc acetate pH >9 | Acetic Buffer pH <3 | Sodium sulfite

- 17 -

RELINQUISHED BY	DATE /TIME	ACCEPTED BY	DATE/TIME	NOTES TO LABORATORY
SAMPLER	8-21-01 16:00	Tom Jones	8/22/01 1:25	T. Metals > T.A.L Metals D. Metals

SUSPECTED CONTAMINATION LEVEL
NONE SLIGHT MODERATE HIGH (please circle)