2021 Hazardous Waste Scanning Project

File Form Naming Convention.

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Note 1: Each category is separated by a period "."
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932001

September 2003 Monitoring Event Report and Annual Report for 2003 and Operation and Maintenance of the Groundwater Collection and Treatment System, Site No. 932001, Airco Properties, Inc., Airco Parcel Niagara Falls, New York

Prepared for

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Prepared by

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March 2004
Project No. 12040.69

September 2003 Monitoring Event Report and Annual Report for 2003 and Operation and Maintenance of the Groundwater Collection and Treatment System, Site No. 932001, Airco Properties, Inc., Airco Parcel Niagara Falls, New York

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Charles E. McLeod, Jr., P.E., Vice President — 30 March 2004
EA Engineering, P.C. — Date

Scott Graham, Project Geologist — 30 March 2004
EA Science and Technology — Date

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1. INTRODUCTION

EA Engineering, P.C. and its affiliate EA Science and Technology initiated the post-closure monitoring and facility maintenance program at the Airco parcel located in Niagara Falls, New York in December 2000. Post-closure monitoring and facility maintenance is required by New York State Solid Waste Management Facilities Regulations (6 NYCRR Part 360 2.15[k][4]) and as stipulated in the Order on Consent No. B9-0470-94-12. The purpose of this monitoring event/annual report is to summarize the analytical results of the third groundwater monitoring event in calendar year 2003, to summarize the three monitoring/sampling events completed during calendar year 2003, and provide an overview of the operations and maintenance of the groundwater collection and treatment system (GCTS) installed during 2003.

1.1 OBJECTIVES

In accordance with the Revised Final Post-Closure Monitoring and Facility Maintenance Plan (EA 2001[1]), environmental monitoring points will be maintained and sampled during the post-closure monitoring period. Sampling includes collection of groundwater, surface water, and leachate samples. The Revised Final Post-Closure Monitoring and Facility Maintenance Plan documents sampling locations and sampling parameters and methods, in addition to other required maintenance activities, such as landfill cap inspections. A revised post-closure operation and maintenance plan is currently being prepared to incorporate the GCTS, and will be submitted in 2004.

The objectives of the Post-Closure Monitoring and Facility Maintenance Program are to:

- Collect representative groundwater and surface water samples in order to monitor potential leachate migration from the landfill and to document the effectiveness of the landfill capping system constructed in 2000
- Evaluate these data to determine whether potential impacts may be occurring that could affect human health or the environment
- Conduct quarterly landfill inspections
- Provide this information to the BOC Group and the New York State Department of Environmental Conservation (NYSDEC).

1. EA Engineering P.C. and its Affiliate EA Science and Technology. 2001. Interim Remedial Measure Report Documenting Closure of the Witmer Road Landfill, Niagara Falls, New York. Includes Revised Final Post-Closure Monitoring and Facility Maintenance Plan. January.

As noted in the Revised Final Post-Closure Monitoring and Facility Maintenance Plan, the results of the sampling events will be summarized in a letter report describing the findings of the environmental sampling. Monitoring event letter reports will be limited to documenting the results of each sampling event. This report summarizes the findings of the twelfth post-closure monitoring event completed at this site. As this report also serves as the Year 2003 annual report, this report summarizes and evaluates the GCTS operation and maintenance beginning on 20 November 2003, and the three monitoring/sampling/inspection events completed during 2003.

1.2 REPORT ORGANIZATION

This report is divided into the following sections:

- Section 1—Introduction
- Section 2—Background
- Section 3—Third Monitoring Event – September 2003 Activities
- Section 4—Groundwater Collection and Treatment System Monitoring 20 November – 31 December 2003
- Section 5—Annual Summary of Post-Closure Monitoring and Facility and Treatment System Maintenance for the Period 1 January – 31 December 2003
- Section 6—Observations and Recommendations.

The following appendixes are also included:

- Appendix A: Interpreted Groundwater Contour Maps
- Appendix B: Sampling Results Tag Maps
- Appendix C: Landfill Cap Inspection Checklists
- Appendix D: Groundwater Collection and Treatment System Checklists
- Appendix E: Analytical Results
- Appendix F: Field Notes
- Appendix G: Laboratory Chain-of-Custody Records
- Appendix H: Form I Analytical Results

2. BACKGROUND

The Airco parcel is part of the U.S. Vanadium Corporation of America site that is located in the Town of Niagara Falls, New York (Figure 1). The Vanadium site is approximately 150 acres. This sampling event focused on the 25-acre Airco parcel operated by the BOC Group. The site contains waste material from the operation of onsite and nearby production facilities.

An Immediate Investigative Work Assignment (IIWA) was conducted by NYSDEC for a portion of the 150-acre parcel in August 1997. Approximately 70 acres from the Niagara Mohawk – A National Grid Company and New York Power Authority parcel were investigated. During the investigation, NYSDEC determined that the site had been used by Vanadium Corporation of America (the owners of the site from 1924 to 1964) to dispose of wood, brick, ash, lime slag, ferrochromium silicon slag, and ferrochromium silicon dust. According to the IIWA, much of the surface material consisted of fill, including fly ash, dust, slag, and cinder materials.

Analysis of site groundwater during a preliminary site assessment that was reviewed as part of the NYSDEC IIWA indicated that surface water and groundwater standards were exceeded for hexavalent chromium and pH. Based on the IIWA and other investigations, the facility has been listed as a Class 2 Hazardous Waste Site in the New York State Registry of Inactive Hazardous Waste Sites (Site No. 932001). A Class 2 listing indicates a site posing a significant threat to public health and the environment, and requiring remedial action.

Remedial measures completed at the Airco parcel during 2000 included installation of a low permeability cap and groundwater relief system. A complete description of the history of the site, and the construction details of the landfill capping system, can be found in the Interim Remedial Measure Report (EA 2001).

The Airco parcel was capped in 2000. During construction of the capping system, a relief pipe system was installed to allow perched water to exit from under the cap without causing slope instability. Flow monitoring and quarterly sampling were initiated as part of post-closure operations and facility maintenance. The data collected since December 2000 indicated that the leachate was actually shallow groundwater discharging to surface water. The data also indicated that groundwater discharge at the site fluctuated seasonally. The data further indicated that elevated hexavalent chromium concentrations and pH in groundwater, upon mixing with surface water, remained in excess of the ambient water quality criteria.

A GCTS was installed during Summer and Fall 2003, and officially began operation on 20 November 2003 when the first compliance sample was collected for offsite laboratory analysis. The GCTS is designed to implement additional remedial actions, which were deemed necessary to meet the goals of the interim remedial measures program. The main portion of the groundwater collection and treatment system is located on the northwest corner of the site and

contains the main control panel, carbon dioxide storage tank, carbon dioxide aeration tank, two sediment ponds, duplex pump station, zero valence iron (ZVI) reaction tank, engineered wetland, and an effluent pump station. At the southwest corner of the site, there is an influent wetwell pump station, and an effluent discharge groundwater diffuser.

3. THIRD MONITORING EVENT – SEPTEMBER 2003 ACTIVITIES

The third 2003 monitoring event included the following activities:

- Monitoring well gauging
- Groundwater sampling
- Collection of groundwater relief pipe sample
- Surface water sampling
- Landfill engineering inspection.

Further details on the September 2003 sampling activities are discussed below. A discussion of the operations, maintenance, and monitoring of the GCTS is provided in Section 4.

3.1 MONITORING WELL GAUGING

The site monitoring wells (MW-1B through MW-8B [Figure 2]) were gauged to determine depth to groundwater prior to sampling on 10 September 2003. The depth to water ranged from 4.97 ft below top of well casing at MW-6B to 15.45 ft below top of well casing at MW-2B. Gauging data recorded during 2003 are summarized in Table 1.

Illustrations provided in Appendix A are the interpretations of groundwater flow patterns based on water level gauging data collected during each of the three sampling events undertaken during 2003. The interpretation illustrates the data based on groundwater elevations and a hydrogeochemical analysis of the groundwater analytical results. Hydrogeochemical analysis is used to provide a clearer picture of site hydrogeologic conditions. In addition to groundwater elevations, groundwater analytical results are evaluated to determine if the groundwater flow patterns are consistent with the surrounding groundwater chemistry.

Based on the interpretive method, a groundwater divide bisects the landfill. This interpretation is consistent for each of the monitoring events since December 2001. Based on this evaluation, groundwater flows from northwest to southeast and east and west off of the divide (Figure 2). This interpretation is consistent with the information from the IIWA.

3.2 GROUNDWATER, GROUNDWATER RELIEF PIPE, AND SURFACE WATER SAMPLING

3.2.1 Sampling Procedures

Monitoring wells were sampled on 10 and 11 September 2003. Eight groundwater samples were collected from the site monitoring wells. Monitoring wells MW-2B, MW-4B, MW-5B, and MW-8B were purged using dedicated bailers due to low recharge rate water yield. These wells were bailed dry at least once and allowed to recharge to at least 90 percent of the static

(i.e., before purging) water level prior to sample collection. Monitoring wells MW-1B, MW-3B, MW-6B, and MW-7B had adequate recharge rates; consequently, four well volumes were removed and water quality indicator parameters allowed to stabilize prior to sample collection.

One groundwater relief pipe sample (L-1) and one surface water sample (SS-1) were also collected on 11 September 2003. The surface water sample was collected from the wetland adjacent to monitoring well MW-6B. The groundwater relief pipe sample was collected directly from the groundwater relief pipe in the southwest corner of the landfill. All aqueous samples (unfiltered) were submitted to Life Science Laboratories of East Syracuse, New York for analysis of phenolics by U.S. Environmental Protection Agency (EPA) Method 420.2, sulfate by EPA Method 375.3, ammonia (expressed as nitrogen) by EPA Method 350.2, silica by EPA Method 200.7, and Target Analyte List metals (including hexavalent chromium) by EPA Series 6010/620.

Groundwater sampling results were compared to NYSDEC Ambient Water Quality Standards (AWQS) and guidance values for Class GA waters. Groundwater relief pipe and surface water samples were compared to NYSDEC AWQS for Class D surface waters. If no Class D standards were applicable for a particular analyte, analytical results were compared to the more stringent Class C standards. Tag maps are provided in Appendix B. Appendix C provides Landfill Cap Inspection Checklists. Analytical results are summarized on the table provided in Appendix E. Copies of the field notebook, including the results for well gauging, purging, and sampling, are provided in Appendix F. Laboratory chain-of-custody records are provided in Appendix G. Laboratory Form I analytical results are included in Appendix H.

3.2.2 Analytical Results

Based on the analytical results collected during the fourth quarter 2000 and first quarter 2001, NYSDEC approved a reduction in the sampling requirements for the remaining sampling events. As per a letter to NYSDEC dated 5 June 2001, samples were analyzed for the following water quality parameters: ammonia, phenolics, sulfate, and total (unfiltered) metals. Summary tables listing analytical results for the third quarter 2003 event compared to applicable NYSDEC AWQS are included in Appendix E. Notable results of chemical analyses are as follows.

3.2.2.1 Target Analyte List Metals

Unfiltered samples were collected from each of the site monitoring wells, the groundwater relief pipe discharge, and a surface water location (Figure 2). Notable results included the following:

- Chromium, hexavalent chromium, iron, magnesium, manganese, selenium, and sodium were detected in one or more of the groundwater samples at concentrations in excess of NYSDEC AWQS in monitoring well MW-4B.

- Hexavalent chromium and selenium were detected at concentrations exceeding NYSDEC AWQS in monitoring wells MW-2B, MW-4B, MW-8B, and the groundwater relief pipe sample. Selenium was also detected in excess of NYSDEC GA in MW-4B and MW-8B.

3.2.2.2 Water Quality Parameters

Water quality indicator parameter data, including pH, temperature, conductivity, dissolved oxygen, turbidity, oxidation-reduction potential, and salinity, were collected in the field during sampling and is summarized in Appendix E. In addition, water quality parameters, including ammonia (expressed as nitrogen), phenolics, and sulfate were also analyzed by the laboratory. Notable results included the following:

- Sulfate was detected at a concentration in excess of NYSDEC AWQS in the sample collected from MW-8B.

- pH measurements exceeded NYSDEC AWQS in monitoring wells MW-2B and MW-3B, and surface water and groundwater relief pipe samples.

3.3 LANDFILL INSPECTION

A landfill cap inspection was conducted on 11 September 2003. The Landfill Cap Inspection Checklist is provided as Appendix C. No deterioration or damage to the landfill, cap, drainage swales, or access roads was noted during the engineering inspection.

4. GROUNDWATER COLLECTION AND TREATMENT SYSTEM MONITORING, 20 NOVEMBER – 31 DECEMBER 2003

4.1 OVERVIEW

The GCTS was implemented to address the high pH (>12), and the elevated hexavalent chromium concentrations which have been characteristic of the groundwater discharge at the southwest corner of the site. The general process flow includes collection of untreated water at the southwest corner of the site via a 6-in. high density polyethylene pipe, which is connected to a wetwell pump station (Figures 3 and 4). The pump station conveys this water from the collection area through a 3-in. discharge line. The water flows to the northwest treatment area, where initial pH adjustment occurs using a carbon dioxide aeration tank. Primary settling of precipitate occurs in Sediment Pond No. 1, prior to treatment for hexavalent chromium. ZVI is used to reduce the concentration of hexavalent chromium to below discharge limits established by NYSDEC. Secondary settling of iron and chromate precipitates occurs in Sediment Pond No. 2, with final settling/clarification occurring in the engineered wetland. Treated water discharges from the wetland through a 2-in.discharge return line back to the initial collection area and then outlets into an offsite wetland area.

4.1.1 Hexavalent Chromium Reduction

The reduction of hexavalent chromium occurs within a vessel containing ZVI. The iron acts as an electron donor during the oxidation-reduction process. The hexavalent chromium will accept three electrons during the process to convert to trivalent chromium, and ultimately precipitates out as an insoluble compound. The ZVI vessel is configured to allow the required contact time at the maximum flow rate of 15 gpm. The vessel, a compartmental tank with a minimum ZVI working volume of 480 ft^3, is designed with partition walls to reduce the potential for short-circuiting through the vessel by development of horizontal channels. The vessel also contains multiple piezometers, which are used to check the hexavalent chromium concentrations within the vessel at various stages. This allows the operator to track breakthrough of the ZVI and calculate when ZVI replacement will be required. Based on the bench-scale studies, and proper selection of the ZVI source material, additional filtration is not warranted given the settling capacity of the engineered wetland downstream of the ZVI process.

4.1.2 Secondary Settling

Sediment Pond No. 2 was incorporated into the design to provide adequate settling time for the iron and chromate precipitates, which form after the water has been processed through the ZVI. The sediment pond is constructed with a 40-mil high density polyethylene liner. The pond has an approximate volume of 25,000 gal and a designed retention time ranging in excess of 1 day. The minimum retention time to allow for settling is 10 hours.

4.1.3 Engineered Wetland

The final treatment step includes processing the water through an engineered wetland of approximately 4,019 ft^2. The water depth in this wetland varies based on the number of pump cycles required to transfer the treated water from the wetland to the discharge area for release into the environment. The volume within the wetland ranges from a low of 23,162.5 gal to a high of approximately 46,325 gal. The wetland is designed to provide a retention time of 1-2 days, while maintaining sufficient capacity to control the 24-hour duration, 100-year return frequency storm event.

4.2 SYSTEM SAMPLING FREQUENCY AND PROCEDURES

The GCTS sampling occurred weekly for the first 8 weeks of operation. This report addresses the sampling conducted during the first 6 weeks of operation, covering the period 20 November – 31 December 2003. Samples were collected at various locations to evaluate treatment system performance and compliance with discharge criteria. Samples were collected prior to (Sediment Pond A) and after treatment via the ZVI tank (Sediment Pond B), and after the engineered wetland (EFF7). The samples were analyzed in the field for total chromium and hexavalent chromium using a HACH DR4000 spectrophotometer. The HACH DR4000 spectrophotometer is EPA-approved for reporting water and wastewater analyses within a detection limit of 0.005 mg/L for hexavalent chromium and 0.003 mg/L for total chromium. The engineered wetland discharge samples were analyzed in the field as well as separate samples taken for offsite laboratory analysis at Life Science Laboratories, East Syracuse, New York, for a full list of discharge criteria. Field sampling results for total and hexavalent chromium are provided in Table 2, and results of the engineered wetland discharge samples analyzed offsite are provided in Table 3. A complete description of field sampling results is provided in Section 5.4.

4.2.1 Routine Operations and Maintenance and Sampling

Full-time operating personnel are not required for operation of the GCTS. For operations and maintenance requirements, it is anticipated that site visits will be conducted on a monthly basis by a technician in order to collect monitoring data and perform preventive maintenance. Additional site visits may be necessary based on operational or maintenance requirements.

Monthly compliance sampling for the GCTS will occur from February to May, with two sampling events in September and December 2004. Sampling frequency in 2005 will be quarterly to ensure the treatment system is operating properly and within the discharge criteria. However, EA will continue monthly visits to oversee carbon dioxide deliveries, and will perform field testing for the presence and concentration of hexavalent chromium and total chromium using the HACH DR4000 spectrophotometer to evaluate system performance.

5. ANNUAL SUMMARY OF POST-CLOSURE MONITORING AND FACILITY AND TREATMENT SYSTEM MAINTENANCE FOR THE PERIOD 1 JANUARY – 31 DECEMBER 2003

5.1 WATER LEVEL GAUGING PROGRAM

During the 2003 monitoring events, groundwater monitoring wells were gauged to obtain depth to water measurements a total of 3 times (Appendix A). Well gauging was conducted as part of the sampling events completed in March, June, and September 2003. A summary of the quarterly gauging data includes interpretive water table elevation contour maps developed for the data collected during the sampling events (Appendix A). The data are also summarized in Table 1. Based on the gauging data, groundwater flows from northwest to southeast with localized variations.

As stated earlier, a review of the IIWA indicates that an overburden groundwater divide bisects the landfill. The divide trends along the northern and eastern perimeter. The IIWA had a number of additional monitoring wells from which to collect data, which augmented their interpretation. However, a hydrogeochemical evaluation that couples the analytical results with groundwater elevation data for each sampling event provides an alternative interpretation of groundwater flow patterns. These alternative interpretations are provided in Appendix A (interpreted groundwater contour maps). It appears that a groundwater divide exists along the central and eastern portion of the landfill. Additional information and evaluation of the data discussed in subsequent sections of this report clarify and support this interpretation of groundwater flow. Using this interpretation, groundwater flows from northwest to southeast and off the flanks of the divide.

5.2 MONITORING, SAMPLING, AND ANALYSIS PROGRAM

Groundwater, surface water, and leachate samples were collected on the following dates, unless otherwise indicated: 10-11 March 2003, 4-5 June 2003, and 10-11 September 2003. Summary tables and tag maps for each quarterly sampling event are provided in Appendix B. During this time frame, three modified routine sampling events were completed (March, June, and September 2003). The NYSDEC-approved modification of the routine sampling events consisted of a reduced parameter list based on the analytical results for numerous sampling events completed at this site in the past. The modification of the sampling events required analysis for a limited number of metals, water quality parameters, and collection of field water quality indicator parameters. For the 2003 sampling events, the metals list was limited to chromium, hexavalent chromium, iron, lead, magnesium, manganese, selenium, silica, sodium, and zinc. During the March, June, and September 2003 sampling events, only unfiltered samples were collected.

5.2.1 Routine Metals

5.2.1.1 March 2003 Sampling Event

During the March 2003 sampling event, samples were collected from the eight groundwater monitoring wells, groundwater relief pipe, and one surface water sampling station. All of the aqueous samples were unfiltered. Notable results are listed below:

- Chromium, hexavalent chromium, iron, lead, magnesium, manganese, selenium, and sodium were detected in one or more of the groundwater samples at concentrations in excess of NYSDEC AWQS.

- Hexavalent chromium and selenium were detected in the surface water sample and the groundwater relief pipe sample at concentrations in excess of NYSDEC AWQS.

5.2.1.2 June 2003 Sampling Event

During the June 2003 sampling event, samples were collected from the eight groundwater monitoring wells, groundwater relief pipe, and one surface water sampling station. All of the aqueous samples were unfiltered. Notable results are summarized below:

- Chromium, hexavalent chromium, iron, magnesium, manganese, selenium, and sodium were detected in one or more of the groundwater samples at concentrations in excess of NYSDEC AWQS.

- Iron and selenium were detected in the surface water sample at concentrations in excess of NYSDEC AWQS.

- Hexavalent chromium and selenium were detected at concentrations in excess of NYSDEC AWQS in the groundwater relief pipe sample.

5.2.1.3 September 2003 Sampling Event

During the September 2003 sampling event, samples were collected from the eight groundwater monitoring wells and groundwater relief pipe. No surface water samples were collected due to insufficient water in the wetland. All aqueous samples were unfiltered. Notable results are summarized below:

- Chromium, hexavalent chromium, iron, lead, magnesium, manganese, selenium, sodium, and thallium were detected in groundwater samples at concentrations in excess of NYSDEC AWQS.

- Hexavalent chromium was detected at a concentration in excess of the NYSDEC AWQS in the groundwater relief pipe sample.

5.2.2 Water Quality Indicator Parameters

Water quality indicator parameters, including pH, temperature, conductivity, dissolved oxygen, turbidity, and salinity, were measured in the field. In addition, water quality parameters, including ammonia (expressed as nitrogen), phenolics, and sulfate, were analyzed by an offsite laboratory.

5.2.2.1 March 2003 Sampling Event

Notable results from this sampling event are summarized below:

- Sulfate was detected at a concentration in excess of the AWQS in the sample collected from monitoring well MW-8B.
- Phenolics were detected at a concentration in excess of the AWQS in the samples collected from monitoring wells MW-1B, MW-2B, and MW-7B.
- Measurements of pH exceeded NYSDEC AWQS in groundwater samples collected from monitoring wells MW-2B and MW-3B, as well as the surface water and groundwater relief pipe samples.

5.2.2.2 June 2003 Sampling Event

Notable results from this sampling event are summarized below:

- Sulfate was detected at a concentration in excess of the NYSDEC AWQS in the sample collected from monitoring well MW-8B.
- Phenolics were detected at a concentration in excess of the NYSDEC AWQS in the samples collected from monitoring wells MW-2B and MW-7B.
- Ammonia (expressed as nitrogen) was detected at a concentration in excess of the NYSDEC AWQS in the sample collected from monitoring well MW-2B.
- Measurements of pH exceeded the NYSDEC AWQS in groundwater samples collected from monitoring wells MW-2B and MW-3B, as well as the surface water and groundwater relief pipe samples.

5.2.2.3 September 2003 Sampling Event

Notable results from this sampling event are summarized below:

- Sulfate was detected at a concentration in excess of the NYSDEC AWQS in the sample collected from monitoring well MW-8B.

- Measurements of pH exceeded the NYSDEC AWQS in groundwater samples collected from monitoring wells MW-2B and MW-3B, as well as the groundwater relief pipe samples.

5.3 LANDFILL ENGINEERING INSPECTIONS

Landfill engineering inspections were completed concurrent with each of the sampling events. The landfill inspection checklists completed during these inspections are provided in Appendix C. Following is a summary of the findings for each inspection.

5.3.1 March 2003

The landfill cap inspection was completed 11 March 2003. Notable results are summarized below:

- No deterioration or damage to the landfill, cap, drainage swales, or access roads was noted during the engineering inspection.

5.3.2 June 2003

The landfill cap inspection was completed 5 June 2003. Notable results are summarized below:

- No deterioration or damage to the landfill, cap, drainage swales, or access roads was noted during the engineering inspection.

- EA noted that some vegetation growth was occurring within the access roads; this vegetative growth was, therefore, scheduled to be mowed during the annual mowing event.

5.3.3 September 2003

The landfill cap inspection was completed 11 September 2003. Notable results are summarized below:

- No deterioration or damage to the landfill, cap, drainage swales, or access roads was noted during the engineering inspection.

- The landfill cap and surrounding access road were mowed during September 2003.

5.4 GROUNDWATER COLLECTION AND TREATMENT SYSTEM

The GCTS was operated, maintained, and sampled weekly from 20 November 2003 through the end of the reporting period (31 December 2003). The GCTS consumed an average of 3,000 lb of carbon dioxide per week. The carbon dioxide tank has a storage capacity of 12,000 lb and supplies carbon dioxide to the reaction chamber and Sediment Ponds A and B. Tank refills have

been occurring on a 3-week cycle (i.e., between every 21st and 24th day) since the system was started on 20 November 2003. Field sampling during the first 6 weeks of operation have shown the treatment system removal efficiency has ranged from 88 to 100 percent for hexavalent chromium, and from 88 to 96 percent for total chromium, based on field analysis of total and hexavalent chromium. Since completion of Week 2 (early December 2003), the chromium removal efficiency has been above 93 percent. The discharge limits of 100 µg/L for total chromium and 11 µg/L for hexavalent chromium have not been exceeded since the completion of the second week of operations. Treatment system discharge sampling results have shown that pH has been within the allowable discharge criteria during system operation. Sampling results have also indicated that iron concentrations have exceeded the discharge criteria during the first 8 weeks of sampling. Elevated iron concentrations above the specified criteria were expected for two reasons. The first is that the GCTS utilizes iron for the oxidation-reduction reaction, which results in high iron concentrations as the reaction occurs. Secondly, the engineered wetland is not vegetated and additional iron removal, other than traditional settling, has not occurred. It should be noted that the GCTS was designed prior to NYSDEC issuing the discharge criteria and, at that time, iron was not a contaminant of concern, nor was such a low discharge criteria level discussed with NYSDEC personnel. Currently, the discharge level remains very low, equal to the secondary Maximum Contaminant Level for iron at 300 µg/L. Concentrations of selenium also exceeded discharge criteria during the second and third week of sampling, but have been consistently below discharge criteria limits in the other sampling events.

Winter operations and monitoring are scheduled to be performed on a weekly basis through early January 2004, and monthly thereafter. Results of field sampling activities for hexavalent chromium, total chromium, and pH have been consistent since the system became operational. Operation and maintenance tasks are scheduled to continue monthly, with carbon dioxide tank replenishment occurring as required (i.e., approximately every 3 weeks).

6. OBSERVATIONS AND RECOMMENDATIONS

Based on the evaluation of the data through the reporting period of 1 January – 31 December 2003, the following observations and recommendations are presented.

6.1 GROUNDWATER ANALYSIS

Analytical results for metals indicate that the primary leachate indicators are chromium, hexavalent chromium, sodium, and ammonia. Of these, sodium is common to groundwater found at this site; therefore, it was eliminated as an effective leachate indicator. Using the remaining analytes, it was observed that monitoring wells MW-1B, MW-3B, MW-5B, and MW-6B have similar groundwater chemistry and are consistent with ambient or background groundwater quality. The chemistry of these wells is also similar to three of the offsite wells sampled during the IIWA (MW-103A, MW-104A, and MW-105A), which further supports the premise that the wells are consistent with ambient or background groundwater quality.

Wells MW-2B, MW-4B, MW-7B, and MW-8B have similar hydrogeochemical signatures. Their chemical signatures suggest that these wells lie in a mixing zone between leachate and ambient groundwater. This is supported by the groundwater flow patterns identified at the site by NYSDEC in the IIWA report, as well as groundwater flow patterns interpreted by EA.

Silica has been identified as a contaminant of concern. Based on the concentrations of silica identified in leachate and in the samples collected from the wells in the mixing and ambient groundwater zones, it appears that concentrations of silica are the result of offsite activities and not the result of leachate migration from the landfill.

Based on a review of the analytical results for groundwater samples collected at the eight site monitoring wells since December 2000, EA submitted a request to NYSDEC on 23 April 2003 for a reduction in the number of monitoring events. NYSDEC approved the request to collect groundwater samples on a bi-annual basis on 14 May 2003. Consistent with analyses previously performed, sample analysis currently includes phenolics by EPA Method 420.2, sulfate by EPA Method 375.3, ammonia (expressed as nitrogen) by EPA Method 350.2, silica by EPA Method 200.7, and Target Analyte List metals by EPA Series 6010/6020, including hexavalent chromium (SM18 3500-CR D[2]).

6.2 LANDFILL INSPECTIONS

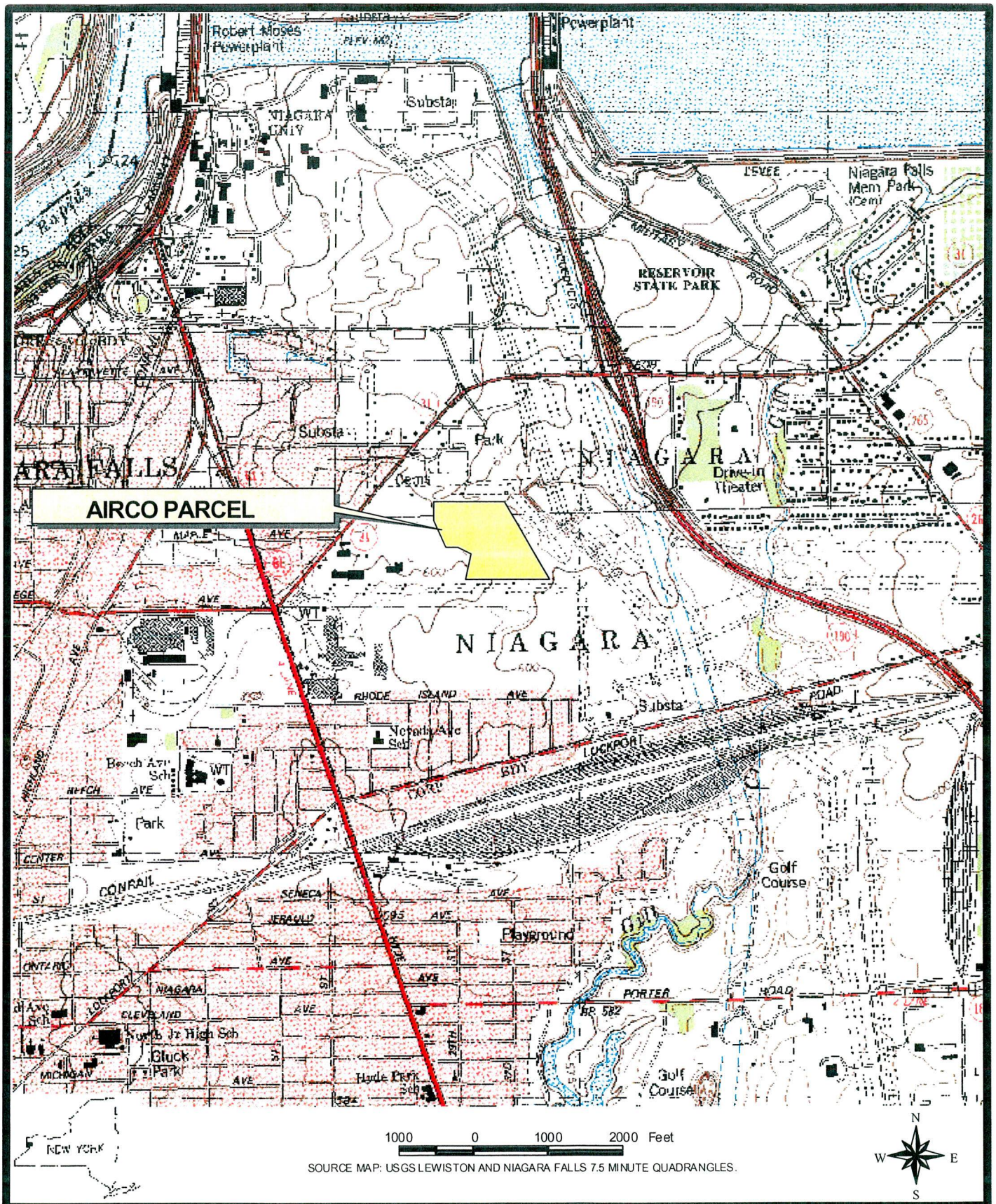
Engineering inspections of the landfill and appurtenances should continue to be completed on a quarterly basis. In addition, the inspections should continue to monitor the condition of the landfill cap and surrounding drainage areas to identify areas where excess erosion has or may occur. Mowing of the vegetation on the landfill cap was completed during September 2003.

2. American Public Health Association, American Water Works Association, and Water Environment Federation. 1998. Standard Method for Examination of Water and Wastewater, 20th Edition.

6.3 GROUNDWATER COLLECTION AND TREATMENT SYSTEM

Since the GCTS went on-line in November 2003, it has been noted that the 6-in. high density polyethylene collection line is yielding a higher flow than the original 3-in. relief pipe. The treatment system was designed based on data from the relief pipe monitoring and was verified during the initial pump test prior to system installation. The GCTS has the capacity to handle additional flow with some system modifications. EA will assess what the required flow rate to be extracted from the wetwell is in order to achieve the original design intent of controlling the recharge of groundwater in the southwest corner of the site, and lowering the groundwater elevation to prevent any landfill cap instability. EA will assess the flow rate requirements during Spring 2004, as this should provide high flow data. Modifications to the system will be assessed, and a letter work plan submitted to NYSDEC, detailing any recommended changes. At a minimum, it is anticipated that programming modifications and larger pumps in both the duplex pump station and effluent pump station will be required to manage an increase in flow rate.

Weekly sampling of the effluent discharge continued through the week ending 9 January 2004. Monthly compliance sampling will then occur from February to May 2004, with two quarterly sampling events in September and December 2004. Based on the current operational status of the system, and the consistency with which it has been operating, EA anticipates that the sampling frequency in 2005 will be quarterly. Routine operation and maintenance tasks will be completed monthly during carbon dioxide tank refills. It is anticipated that both sediment ponds will be cleaned once or twice during 2004 based on sediment buildup. A complete operations and maintenance manual will be issued in Spring 2004 as an attachment to the revised Post-Closure Monitoring and Facility Maintenance Plan.



EA®	AIRCO PARCEL NIAGARA FALLS, NEW YORK	FIGURE 1 SITE LOCATION MAP

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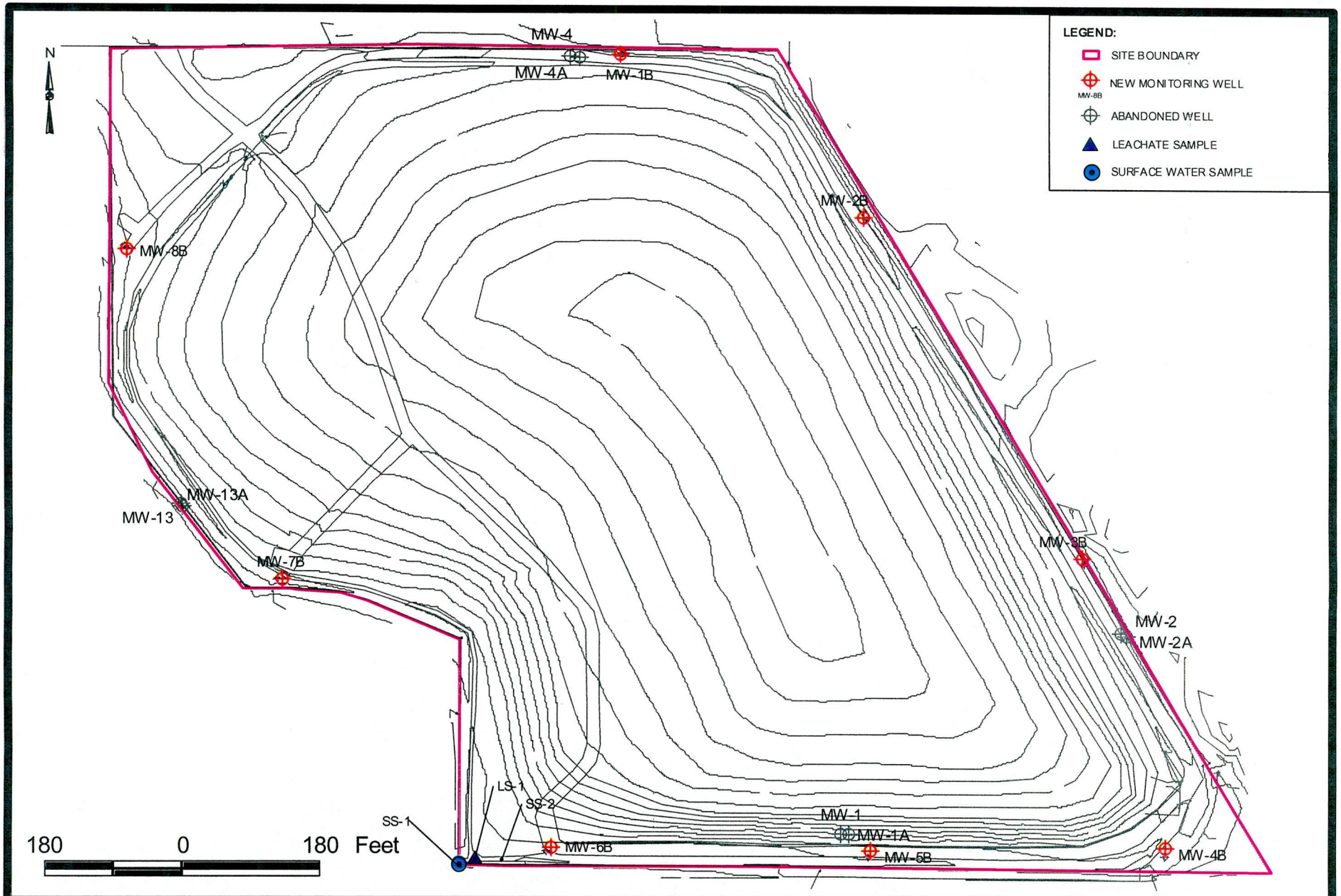
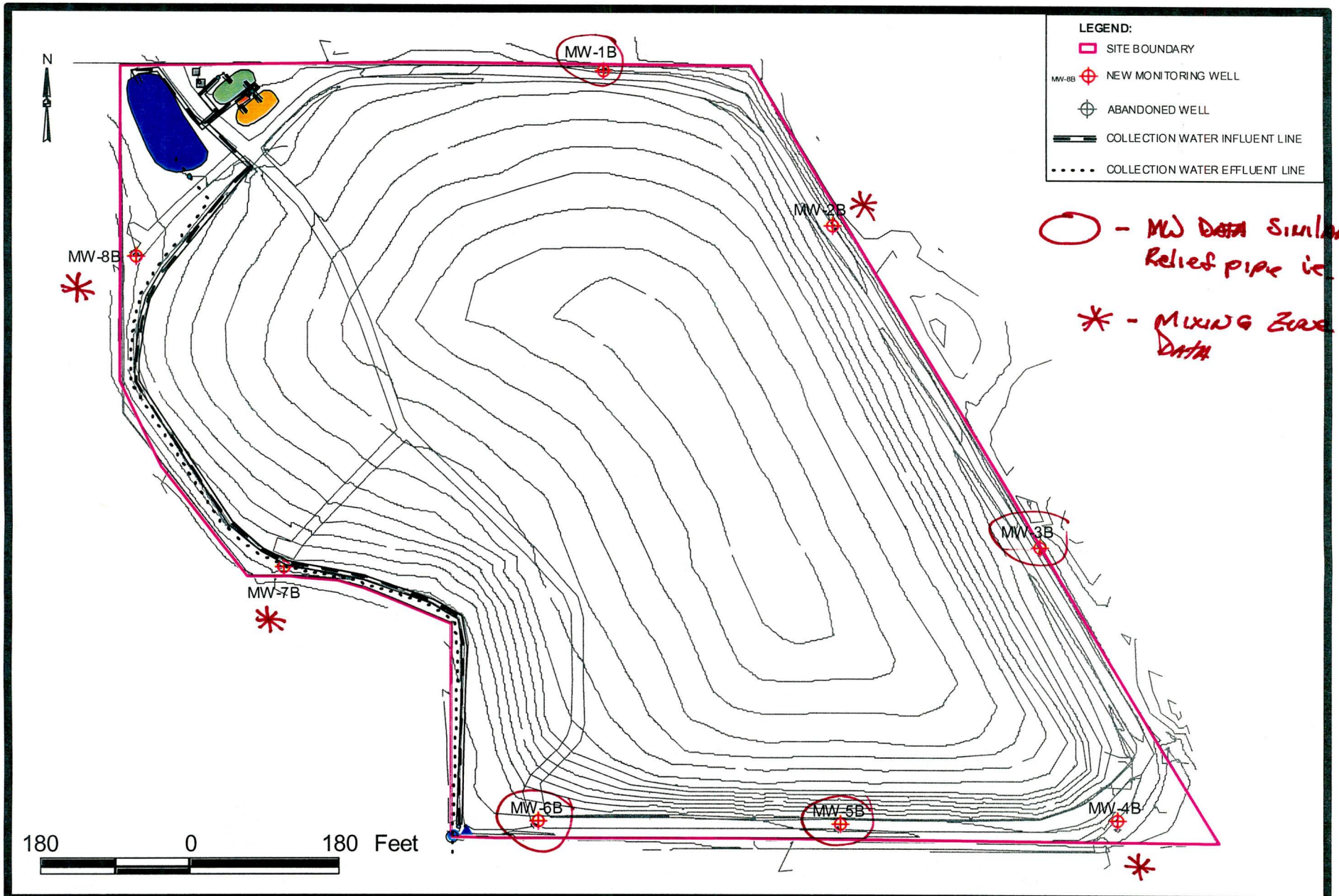


EA	AIRCO PARCEL NIAGARA FALLS, NEW YORK	FIGURE 2 MONITORING WELL SITE MAP

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	12 MARCH 2002	12040.69	I:\BOC-NIAGARA-GIS\FINAL.APR

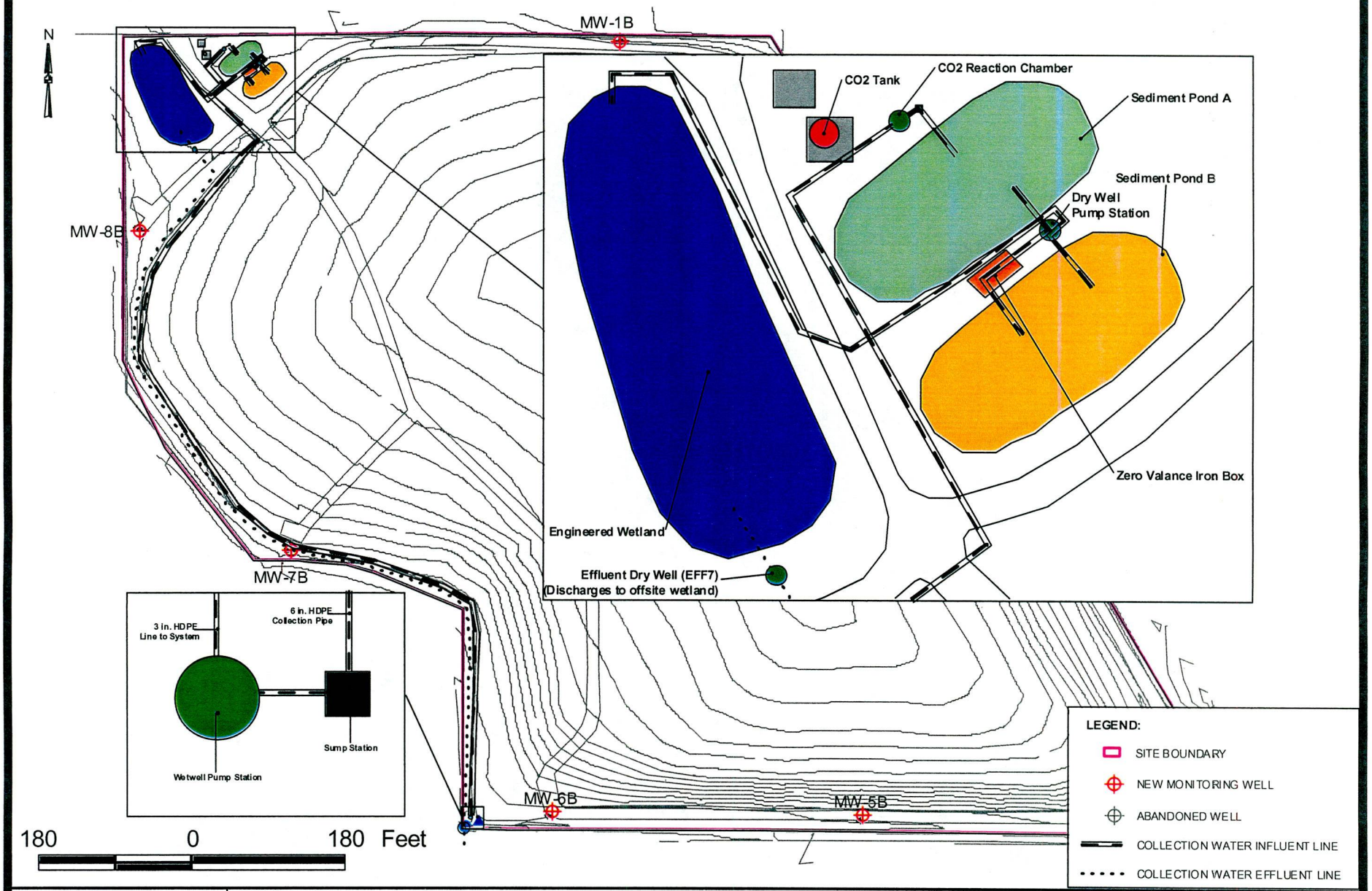


- MW Data Similar to Relief pipe in GW

* - Mixing Zone Data

EA	AIRCO PARCEL NIAGARA FALLS, NEW YORK	FIGURE 3 GROUNDWATER COLLECTION AND TREATMENT SYSTEM NOVEMBER 2003

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	20 NOVEMBER 2003	12040.69	I:\BOC-NIAGARA-GIS\FINAL.APR



EA	AIRCO PARCEL NIAGARA FALLS, NEW YORK	FIGURE 4 GROUNDWATER COLLECTION AND TREATMENT SYSTEM (DETAIL VIEW) NOVEMBER 2003

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	15 DECEMBER 2003	12040.69	I:\BOC-NIAGARA-GIS\FINAL.APR

TABLE 1 SUMMARY OF CALENDAR YEAR 2003 WATER LEVEL GAUGING DATA

Gauging Date	Depth to Water (ft below TOC)	Well Elevation (ft MSL)	Groundwater Elevation (ft MSL)
MW-1B			
10 MAR 03	11.82	617.77	605.95
04 JUN 03	9.61	617.77	608.16
10 SEP 03	14.31	617.77	603.46
MW-2B			
10 MAR 03	13.96	615.88	601.92
04 JUN 03	12.21	615.88	603.67
10 SEP 03	15.45	615.88	600.43
MW-3B			
10 MAR 03	9.05	611.22	602.17
04 JUN 03	7.87	611.22	603.35
10 SEP 03	11.02	611.22	600.20
MW-4B			
10 MAR 03	7.62	606.68	599.06
04 JUN 03	5.72	606.68	600.92
10 SEP 03	13.23	606.68	593.45
MW-5B			
10 MAR 03	6.82	605.48	598.66
04 JUN 03	4.41	605.48	601.07
10 SEP 03	11.39	605.48	594.09
MW-6B			
10 MAR 03	4.90	603.47	598.57
04 JUN 03	3.92	603.47	599.55
10 SEP 03	4.97	603.47	598.50
MW-7B			
10 MAR 03	9.67	609.48	599.81
04 JUN 03	8.56	609.48	600.92
10 SEP 03	10.89	609.48	598.59
MW-8B			
10 MAR 03	7.91	611.62	603.71
04 JUN 03	5.52	611.62	606.10
10 SEP 03	8.81	611.62	602.81

NOTE: TOC = Top of casing.
MSL = Mean sea level.

TABLE 2 SUMMARY OF WEEKLY FIELD SAMPLING RESULTS FOR SAMPLES COLLECTED FROM THE GROUNDWATER COLLECTION AND TREATMENT SYSTEM 20 NOVEMBER – 31 DECEMBER 2003

Date	Sediment Pond A		Sediment Pond B		Wetland Discharge	
	Total Chromium	Hexavalent Chromium	Total Chromium	Hexavalent Chromium	Total Chromium	Hexavalent Chromium
20 NOV 03	NS	NS	NS	NS	NS	NS
25 NOV 03	250	180	120	100	30	**20**
02 DEC 03	190	150	40	30	10	10
09 DEC 03	290	250	140	130	10	0
16 DEC 03	260	120	150	70	10	0
23 DEC 03	240	150	160	90	10	0
30 DEC 03	250	170	20	10	10	0

NOTE: NS = Not sampled.
Results in µg/L.
Field samples were analyzed using a Hach DR4000 spectrophotometer, Methods 8023 (hexavalent chromium) and 8084 (total chromium).
Bold numbers indicate value in excess of discharge guidelines.

TABLE 3 SUMMARY OF WEEKLY DISCHARGE SAMPLE RESULTS FOR THE GROUNDWATER COLLECTION AND TREATMENT SYSTEM 20 NOVEMBER – 31 DECEMBER 2003

Parameter	20 NOV 03	25 NOV 03	2 DEC 03	9 DEC 03	16 DEC 03	23 DEC 03	30 DEC 03	NYSDEC Discharge Criteria
pH	**2.1**[(a)]	7.7	**8.1**	6.3	7.0	6.8	7.2	6-8 NTU
Total suspended solids	**12**	(<4U)	7	**160**	**43**	10	**30**	10 mg/L
Ammonia as N	2.9	2.1	2.6	3.1	4.3	3.6	3.0	9.2 mg/L
Total Kjeldahl nitrogen	2.3	3.3	2.1	4.8	5.0	3.2	2.3	Monitor
Biological oxygen demand	4	(<4U)	(<4U)	**70**	**7.6**	(<4U)	**8.0**	5.0 mg/L
1,1-Dichloroethane	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	5.0 µg/L
Trichloroethane	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	5.0 µg/L
Nickel	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.07 mg/L
Copper	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.0147 mg/L
Barium	(<0.01U)	(<0.2U)	(<0.2U)	(<0.2U)	(<0.01U)	(<0.2U)	(<0.2U)	2 mg/L
Total Chromium	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.1 mg/L
Hexavalent Chromium	NA	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.011 mg/L
Iron	**1.7**	0.22	**1.6**	**150**	**24**	**7.8**	**21**	0.3 mg/L
Selenium	(<0.01U)	**0.012**	**0.014**	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.0046 mg/L
Thallium	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.004 mg/L
Zinc	(<0.01U)	(<0.01U)	0.013	(<0.01U)	(<0.01U)	(<0.01U)	0.016	0.115 mg/L
Nitrate as N	0.83	(<0.1U)	(<0.1U)	0.17	0.34	0.25	0.26	Monitor
Nitrite as N	(<0.1U)	0.88	0.89	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	Monitor
Chemical oxygen demand	14	3.8	4.0	36	20	23	21	40 mg/L
Total dissolved solids	480	NA	NA	660	890	730	450	Monitor

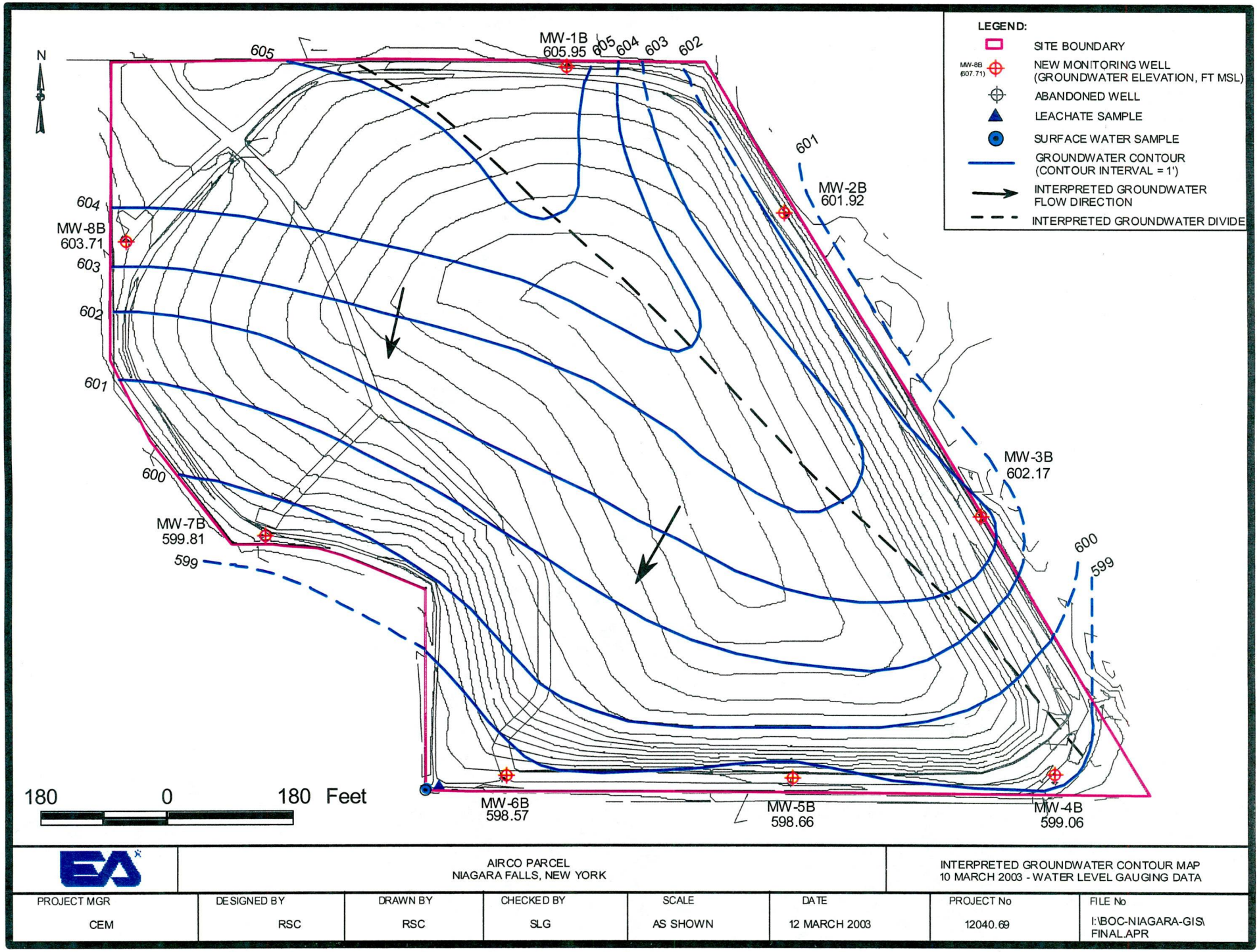
(a) Laboratory error; sample diluted with acid.

NOTE: Results shown in mg/L except pH.
NA = Sample not analyzed for parameter.
U = Not detected.
Values in bold indicate an excess of discharge criteria.

Needs to include Flow Data
Need Seperate ~~edition~~ Volume 6 GCTS Data.

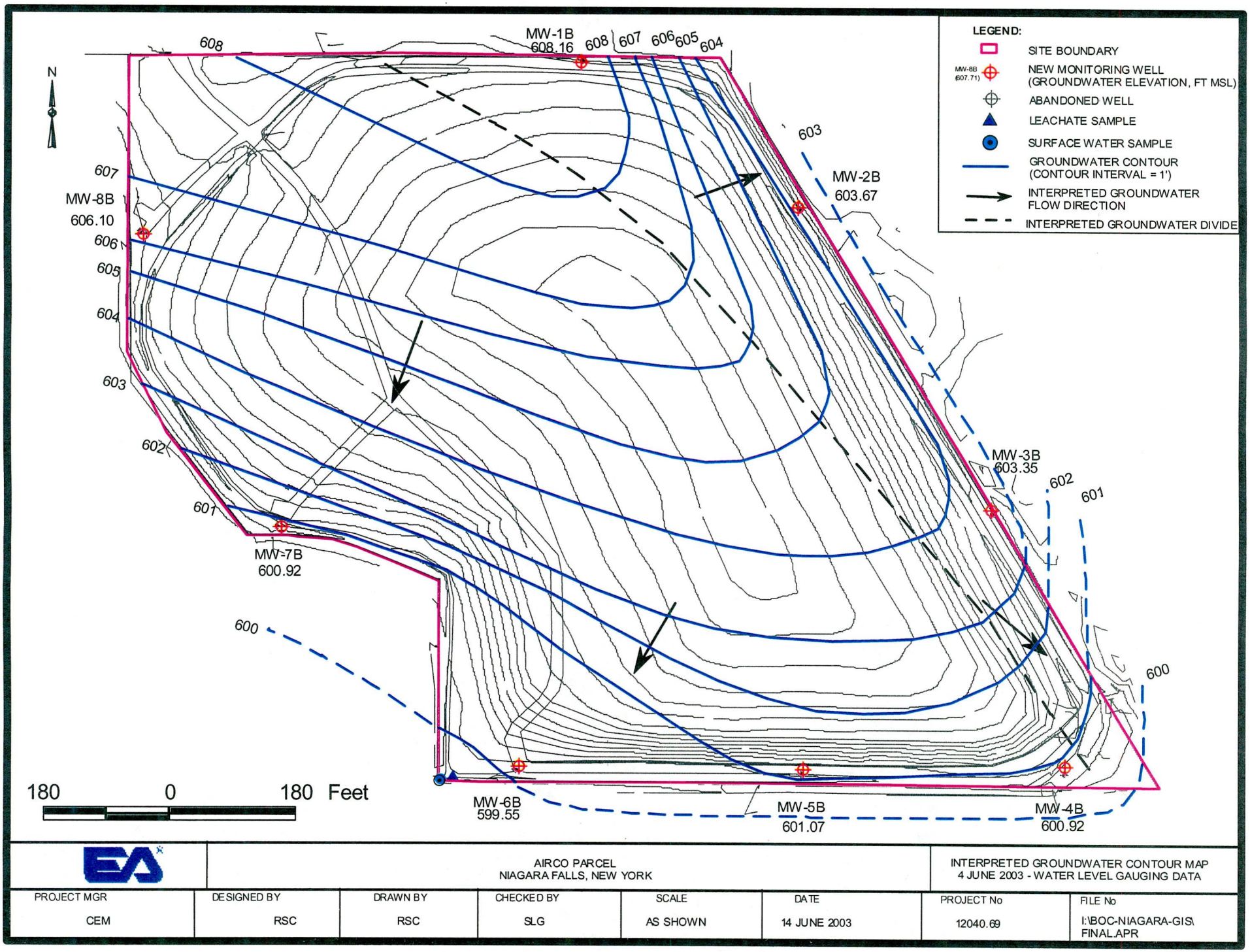
Appendix A

Interpreted Groundwater Contour Maps



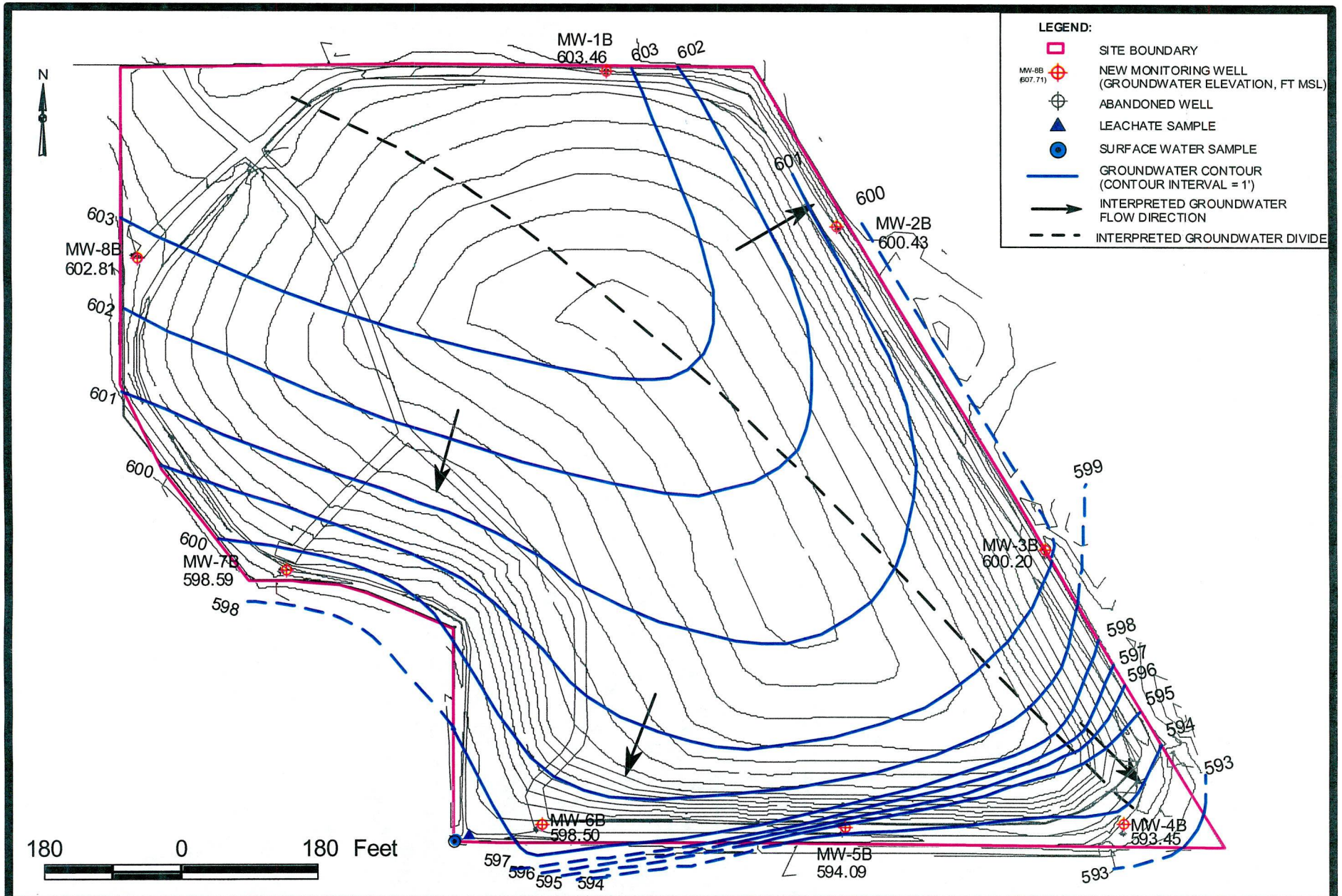
EA	AIRCO PARCEL NIAGARA FALLS, NEW YORK	INTERPRETED GROUNDWATER CONTOUR MAP 10 MARCH 2003 - WATER LEVEL GAUGING DATA

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	12 MARCH 2003	12040.69	I:\BOC-NIAGARA-GIS\FINAL.APR



EA	AIRCO PARCEL NIAGARA FALLS, NEW YORK	INTERPRETED GROUNDWATER CONTOUR MAP 4 JUNE 2003 - WATER LEVEL GAUGING DATA

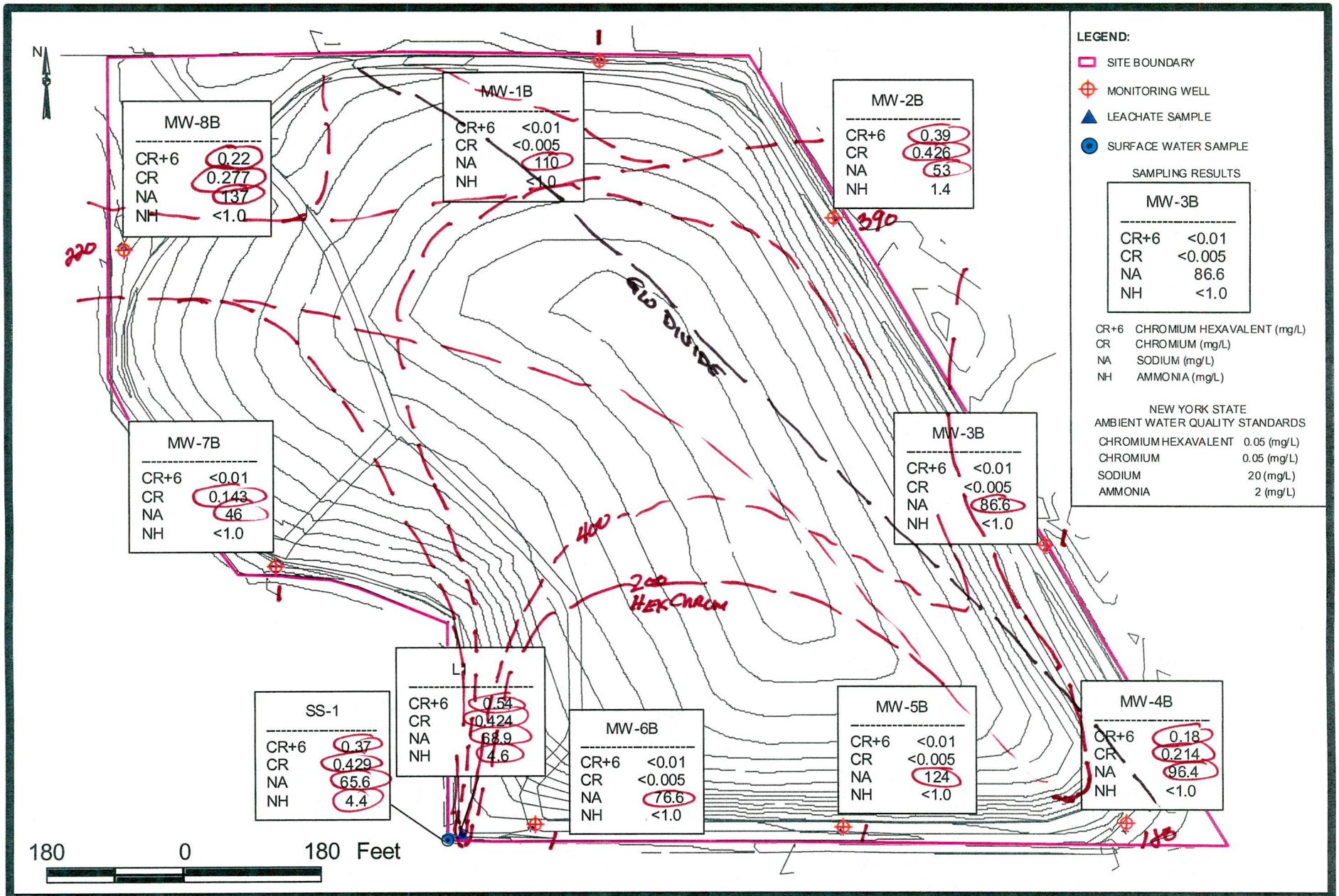
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	14 JUNE 2003	12040.69	I:\BOC-NIAGARA-GIS\FINAL.APR



EA	AIRCO PARCEL NIAGARA FALLS, NEW YORK					INTERPRETED GROUNDWATER CONTOUR MAP 10 SEPTEMBER 2003 - WATER LEVEL GAUGING DATA	
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	20 SEPTEMBER 2003	12040.69	I:\BOC-NIAGARA-GIS\ FINAL.APR

Appendix B

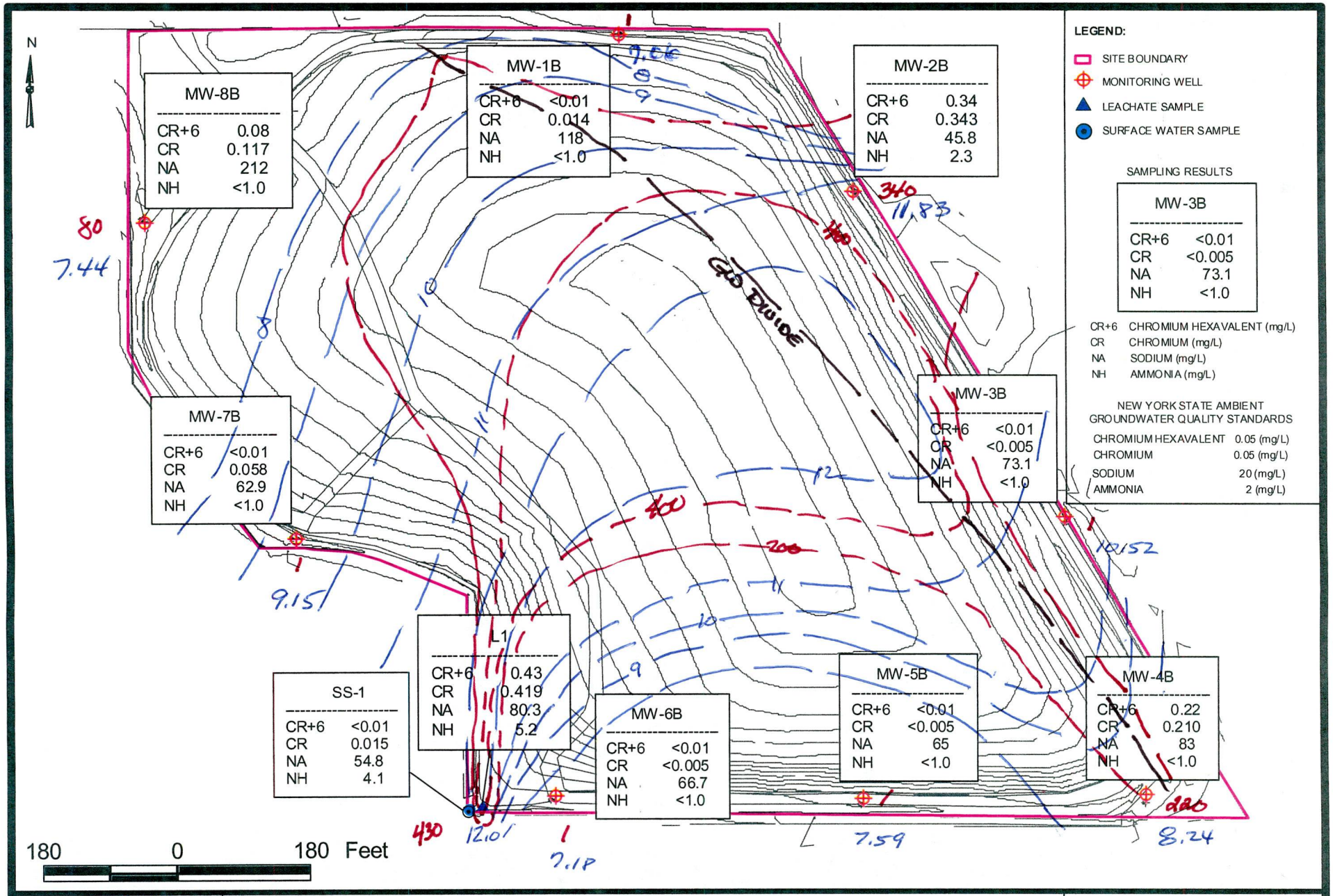
Sampling Results Tag Maps



AIRCO PARCEL
NIAGARA FALLS, NEW YORK

SAMPLING RESULTS TAG MAP
10-11 MARCH 2003

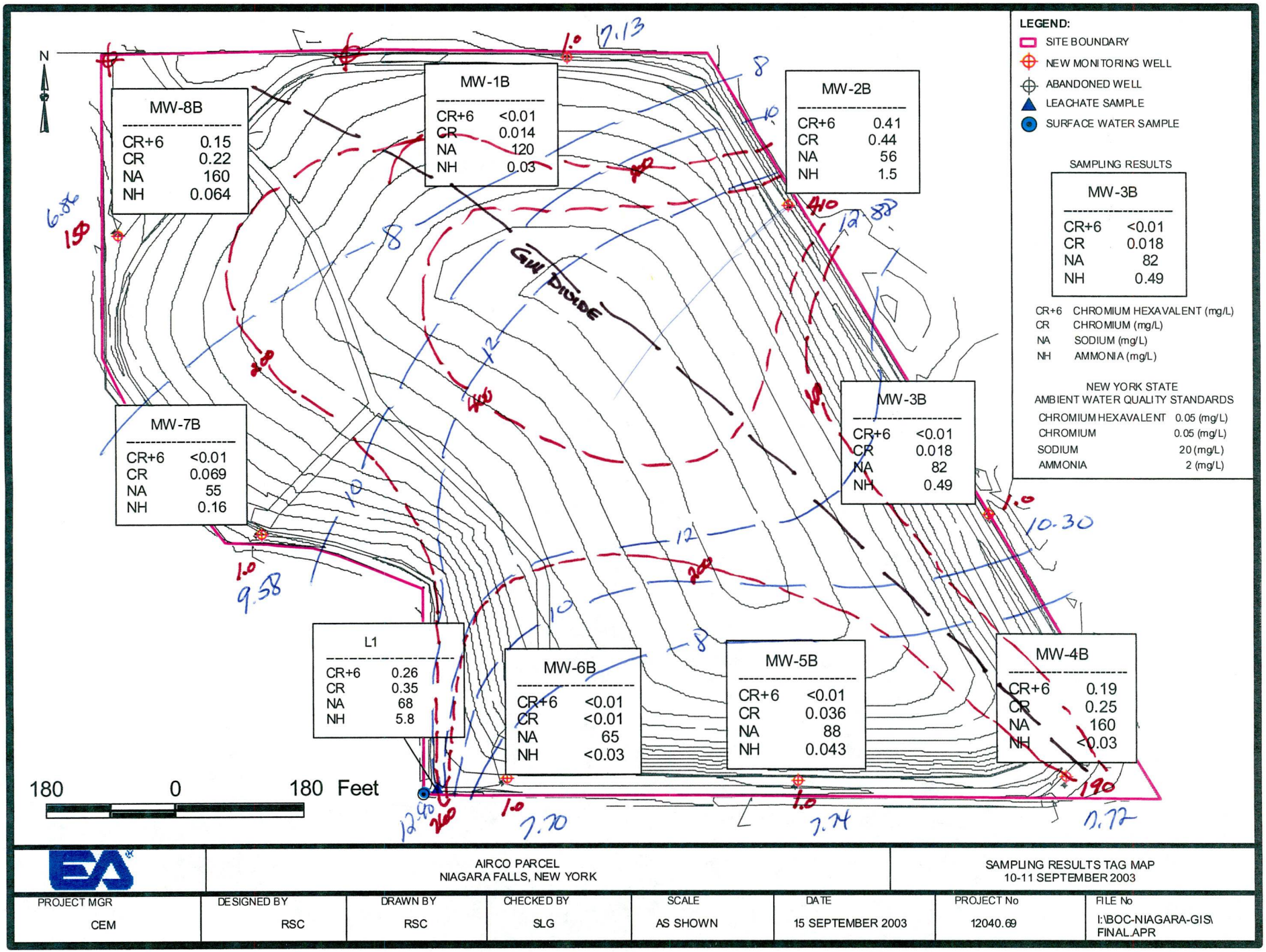
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	13 MARCH 2003	12040.69	I:\BOC-NIAGARA-GIS\FINAL.APR



AIRCO PARCEL
NIAGARA FALLS, NEW YORK

SAMPLING RESULTS TAG MAP
4-5 JUNE 2003

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	14 JUNE 2003	12040.69	I:\BOC-NIAGARA-GIS\ FINAL.APR



EA

AIRCO PARCEL
NIAGARA FALLS, NEW YORK

SAMPLING RESULTS TAG MAP
10-11 SEPTEMBER 2003

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	RSC	RSC	SLG	AS SHOWN	15 SEPTEMBER 2003	12040.69	I:\BOC-NIAGARA-GIS\ FINAL.APR

Appendix C

Landfill Cap
Inspection Checklists

LANDFILL CAP INSPECTION CHECKLIST
AIRCO PARCEL, NIAGARA FALLS, NEW YORK

EA Personnel:	Robert Casey
Date:	11 March 2003
Weather:	Clear, windy, 10s

1. **Inspection of ground surface for exposure of geotextile cover (cap erosion):**
   No erosion observed.
2. **Inspection of ground surface for differential settlement resulting in soil cracking or ponded water:**
   No deficiencies observed.
3. **Identification of stressed vegetation:**
   Vegetation on landfill (grass), ~1/2 ft. high, No stressed vegetation observed.
4. **Identification of seeps, rooted vegetation (trees), and/or animal burrows:**
   No deficiencies observed.
5. **Identification of deteriorating equipment (i.e., monitoring wells, fencing, or drainage structures):**
   No deficiencies observed.
6. **Inspection of stormwater drainage swales for erosion, sloughing, or flow-through:**
   No deficiencies observed.
7. **Inspection of east side of the landfill (Niagara Mohawk Power Corporation parcel) along the intermittent stream for the presence of erosion or sloughing:**
   No deficiencies observed.
8. **Inspection of access roads:**
   Access roads were in good shape.

LANDFILL CAP INSPECTION CHECKLIST
AIRCO PARCEL, NIAGARA FALLS, NEW YORK

EA Personnel:	Kurt Ilker, Chip McLeod,Robert Casey
Date:	04 June 2003
Weather:	Overcast, light rain, windy, mid-60s

1. **Inspection of ground surface for exposure of geotextile cover (cap erosion):**
   No erosion observed.

2. **Inspection of ground surface for differential settlement resulting in soil cracking or ponded water:**
   One area located at the top and east of the access road which cuts across the center of landfill; will have a better idea when grass is cut.

3. **Identification of stressed vegetation:**
   Vegetation on landfill (grass), approximately 1 ft high; no stressed vegetation observed.

4. **Identification of seeps, rooted vegetation (trees), and/or animal burrows:**
   Observed some small rodent burrows in topsoil throughout the site. Rodents are most likely a type of field mice. Groundwater flow structure located along the southwest side of landfill.

5. **Identification of deteriorating equipment (i.e., monitoring wells, fencing, or drainage structures):**
   Monitoring wells show some rusting of the steel protective casings. May choose to grind rust, prime, and paint before rust gets too far into the metal.

6. **Inspection of stormwater drainage swales for erosion, sloughing, or flow-through:**
   Drainage swales are clear with the exception of the one located at the southwest edge, where soils and vegetation have covered the stone swale. Should be cleaned and new stone installed.

7. **Inspection of east side of the landfill (Niagara Mohawk Power Corporation parcel) along the intermittent stream for the presence of erosion or sloughing:**
   No deficiencies observed.

8. **Inspection of access roads:**
   Access roads were in good shape. Vegetation was observed growing in many areas of the road. Defoliant should be used to remove the vegetation in the roadways.

LANDFILL CAP INSPECTION CHECKLIST
AIRCO PARCEL, NIAGARA FALLS, NEW YORK

EA Personnel:	Robert Casey
Date:	11 September 2003
Weather:	Clear, sunny, 70's

1. **Inspection of ground surface for exposure of geotextile cover (cap erosion):**
   No erosion observed.
2. **Inspection of ground surface for differential settlement resulting in soil cracking or ponded water:**
   No deficiencies observed.
3. **Identification of stressed vegetation:**
   Vegetation on landfill (grass), ~1/4 ft. high, mowing occurred in September 2003, No stressed vegetation observed.
4. **Identification of seeps, rooted vegetation (trees), and/or animal burrows:**
   Observed some small rodent burrows in topsoil throughout the site. Rodents are most likely a type of field mice. Groundwater flow structure located along the southwest side of Landfill.
5. **Identification of deteriorating equipment (i.e., monitoring wells, fencing, or drainage structures):**
   No deficiencies observed.
6. **Inspection of stormwater drainage swales for erosion, sloughing, or flow-through:**
   No deficiencies observed.
7. **Inspection of east side of the landfill (Niagara Mohawk Power Corporation parcel) along the intermittent stream for the presence of erosion or sloughing:**
   No deficiencies observed.
8. **Inspection of access roads:**
   Access roads were in good shape.

LANDFILL CAP INSPECTION CHECKLIST
AIRCO PARCEL, NIAGARA FALLS, NEW YORK

EA Personnel:	Robert Casey
Date:	9 December 2003
Weather:	Clear, sunny, 30's

1. **Inspection of ground surface for exposure of geotextile cover (cap erosion):**
   No erosion observed.
2. **Inspection of ground surface for differential settlement resulting in soil cracking or ponded water:**
   No deficiencies observed.
3. **Identification of stressed vegetation:**
   No stressed vegetation observed.
4. **Identification of seeps, rooted vegetation (trees), and/or animal burrows:**
   No deficiencies observed.
5. **Identification of deteriorating equipment (i.e., monitoring wells, fencing, or drainage structures):**
   No deficiencies observed.
6. **Inspection of stormwater drainage swales for erosion, sloughing, or flow-through:**
   No deficiencies observed.
7. **Inspection of east side of the landfill (Niagara Mohawk Power Corporation parcel) along the intermittent stream for the presence of erosion or sloughing:**
   No deficiencies observed.
8. **Inspection of access roads:**
   Access roads were in good shape.

Appendix D

Groundwater Collection and Treatment System Checklists

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Checklist

Yes / No Wet Well Pump Station Checked

Yes / No T3 Pressure Transducer Cleaned

Yes / No T3 pH Probe Cleaned

P4A / P4B Pump Station

Yes / No Water in Station

Yes / No Pumped out?

Yes / No P6 Pressure Transducer Cleaned

Yes / No P7 Pressure Transducer Cleaned

Zero Valance Tank

Yes / No Outlet Structure Checked

Yes / No Water Level OK

Sed Pond Manifold

NA Sed Pond A Flow (scfh)

NA Sed Pond B Flow (scfh)

date: 18 NOV 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Treatment System Checklist

233 CO2 Storage Tank Pressure (Normal Range = 220 - 235psi)

10,550 CO2 Storage Liquid Level (Normal Range = 2,000 - 12,000lbs)
***Note: call for refill @ 2,000 - 3,000lbs**

ON P1 Running Status (on/off)

615.8 T3 Water Elevation

6.8 T3 pH

49.6 T3 Temperature

ON P4A Running Status (on/off)

4psi P4A Pressure Gauge (normal range = 10psi)

616.0 T6 Water Elevation

ON P4B Running Status (on/off)

614.3 T7 Water Elevation

ON P7 Running Status (on/off)

date: 18 NOV 2003
personnel: RCASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Field sampling

		Standard
0.21	P4A Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.26	P4A Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.14	P4B Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.16	P4B Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.03	P7 Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.04	P7 Total Chromium Concentration (mg/L)	(0.05 mg/L)

_____ pH Sed Pond A

_____ pH Sed Pond B

_____ pH Wetland

date: 20 NOV 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Checklist

Yes / No Wet Well Pump Station Checked

Yes / No T3 Pressure Transducer Cleaned

Yes / No T3 pH Probe Cleaned

P4A / P4B Pump Station

Yes / No Water in Station

Yes / No Pumped out?

Yes / No P6 Pressure Transducer Cleaned

Yes / No P7 Pressure Transducer Cleaned

Zero Valance Tank

Yes / No Outlet Structure Checked

Yes / No Water Level OK

Sed Pond Manifold

7 Sed Pond A Flow (scfh)

10 Sed Pond B Flow (scfh)

date: 25 NOV 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Treatment System Checklist

221 CO2 Storage Tank Pressure (Normal Range = 220 - 235psi)

8,200 CO2 Storage Liquid Level (Normal Range = 2,000 - 12,000lbs)
***Note: call for refill @ 2,000 - 3,000lbs**

OFF P1 Running Status (on/off)

615.8 T3 Water Elevation

7.0 T3 pH

47.6 T3 Temperature

OFF P4A Running Status (on/off)

3 psi P4A Pressure Gauge (normal range = 10psi)

615.9 T6 Water Elevation

OFF P4B Running Status (on/off)

614.2 T7 Water Elevation

OFF P7 Running Status (on/off)

date: 25 NOV 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Field sampling

		Standard
0.18	P4A Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.25	P4A Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.10	P4B Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.12	P4B Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.02	P7 Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.03	P7 Total Chromium Concentration (mg/L)	(0.05 mg/L)

_____ pH Sed Pond A

_____ pH Sed Pond B

_____ pH Wetland

date: 26 NOV 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Checklist

Yes / No Wet Well Pump Station Checked

Yes / No T3 Pressure Transducer Cleaned

Yes / No T3 pH Probe Cleaned

P4A / P4B Pump Station

Yes / No Water in Station

Yes / No Pumped out?

Yes / No P6 Pressure Transducer Cleaned

Yes / No P7 Pressure Transducer Cleaned

Zero Valance Tank

Yes / No Outlet Structure Checked

Yes / No Water Level OK

Sed Pond Manifold

7 Sed Pond A Flow (scfh)

10 Sed Pond B Flow (scfh)

date: 2 DEC 2005
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Treatment System Checklist

222 CO2 Storage Tank Pressure (Normal Range = 220 - 235psi)

5,200 CO2 Storage Liquid Level (Normal Range = 2,000 - 12,000lbs)
***Note: call for refill @ 2,000 - 3,000lbs**

OFF P1 Running Status (on/off)

615.7 T3 Water Elevation

6.6 T3 pH

42.3 T3 Temperature

OFF P4A Running Status (on/off)

2.5 P4A Pressure Gauge (normal range = 10psi)

616.2 T6 Water Elevation

ON P4B Running Status (on/off)

614.3 T7 Water Elevation

OFF P7 Running Status (on/off)

date: 2 DEC 2003
personnel: E. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Field sampling

		Standard
0.15	P4A Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.14	P4A Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.03	P4B Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.04	P4B Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.01	P7 Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.01	P7 Total Chromium Concentration (mg/L)	(0.05 mg/L)

_____ pH Sed Pond A

_____ pH Sed Pond B

_____ pH Wetland

date: 3 DEC 2003
personnel: C. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Checklist

(Yes) / No Wet Well Pump Station Checked

(Yes) / No T3 Pressure Transducer Cleaned

(Yes) / No T3 pH Probe Cleaned

P4A / P4B Pump Station

(Yes) / No Water in Station

Yes / (No) Pumped out?

(Yes) / No P6 Pressure Transducer Cleaned

(Yes) / No P7 Pressure Transducer Cleaned

Zero Valance Tank

(Yes) / No Outlet Structure Checked

(Yes) / No Water Level OK

Sed Pond Manifold

6 Sed Pond A Flow (scfh)
9 Sed Pond B Flow (scfh)
} reset to 7½10 scfh

date: 9 DEC 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Treatment System Checklist

224	CO2 Storage Tank Pressure (Normal Range = 220 - 235psi)
1,750	CO2 Storage Liquid Level (Normal Range = 2,000 - 12,000lbs) ***Note: call for refill @ 2,000 - 3,000lbs**
ON	P1 Running Status (on/off)
615.8	T3 Water Elevation
6.49	T3 pH
45.1	T3 Temperature
OFF	P4A Running Status (on/off)
3 psi	P4A Pressure Gauge (normal range = 10psi)
616.0	T6 Water Elevation
ON	P4B Running Status (on/off)
612.7	T7 Water Elevation
OFF	P7 Running Status (on/off)

date: 9 DEC 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Field sampling

		Standard
0.25	P4A Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.29	P4A Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.13	P4B Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.14	P4B Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.00	P7 Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.01	P7 Total Chromium Concentration (mg/L)	(0.05 mg/L)

_____ pH Sed Pond A

_____ pH Sed Pond B

_____ pH Wetland

date: 9 DEC 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Checklist

Yes / No Wet Well Pump Station Checked

Yes / No T3 Pressure Transducer Cleaned

Yes / No T3 pH Probe Cleaned

P4A / P4B Pump Station

Yes / No Water in Station

Yes / No Pumped out?

Yes / No P6 Pressure Transducer Cleaned

Yes / No P7 Pressure Transducer Cleaned

Zero Valance Tank

Yes / No Outlet Structure Checked

Yes / No Water Level OK

Sed Pond Manifold

7 Sed Pond A Flow (scfh)

10 Sed Pond B Flow (scfh)

date: 16 DEC 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Treatment System Checklist

230	CO2 Storage Tank Pressure (Normal Range = 220 - 235psi)
8,900	CO2 Storage Liquid Level (Normal Range = 2,000 - 12,000lbs) ***Note: call for refill @ 2,000 - 3,000lbs**
OFF	P1 Running Status (on/off)
615.7	T3 Water Elevation
6.54	T3 pH
43.5	T3 Temperature
OFF	P4A Running Status (on/off)
3	P4A Pressure Gauge (normal range = 10psi)
616.1	T6 Water Elevation
OFF	P4B Running Status (on/off)
614.2	T7 Water Elevation
OFF	P7 Running Status (on/off)

date: 16 DEC 2003
personnel: R CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Field sampling

		Standard
0.12	P4A Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.26	P4A Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.07	P4B Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.16	P4B Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.00	P7 Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.01	P7 Total Chromium Concentration (mg/L)	(0.05 mg/L)
_____	pH Sed Pond A	
_____	pH Sed Pond B	
_____	pH Wetland	

date: 16 DEC 2005
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Checklist

(Yes) / No Wet Well Pump Station Checked

(Yes) / No T3 Pressure Transducer Cleaned

(Yes) / No T3 pH Probe Cleaned

P4A / P4B Pump Station

(Yes) / No Water in Station

(Yes) / No Pumped out?

(Yes) / No P6 Pressure Transducer Cleaned

(Yes) / No P7 Pressure Transducer Cleaned

Zero Valance Tank

(Yes) / No Outlet Structure Checked

(Yes) / No Water Level OK

Sed Pond Manifold

7 Sed Pond A Flow (scfh) → turned up to 20 scfh

10 Sed Pond B Flow (scfh)

date: 23 DEC 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Treatment System Checklist

234 CO2 Storage Tank Pressure (Normal Range = 220 - 235psi)

5,550 CO2 Storage Liquid Level (Normal Range = 2,000 - 12,000lbs)
***Note: call for refill @ 2,000 - 3,000lbs**

ON P1 Running Status (on/off)

615.8 T3 Water Elevation

6.98 T3 pH

41.7 T3 Temperature

ON P4A Running Status (on/off)

3 P4A Pressure Gauge (normal range = 10psi)

615.9 T6 Water Elevation

OFF P4B Running Status (on/off)

614.2 T7 Water Elevation

OFF P7 Running Status (on/off)

date: 23 DEC 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Field sampling

		Standard
0.15	P4A Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.24	P4A Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.09	P4B Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.16	P4B Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.00	P7 Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.01	P7 Total Chromium Concentration (mg/L)	(0.05 mg/L)

_____ pH Sed Pond A

_____ pH Sed Pond B

_____ pH Wetland

date: 23 DEC 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Checklist

(Yes) / No Wet Well Pump Station Checked

(Yes) / No T3 Pressure Transducer Cleaned

(Yes) / No T3 pH Probe Cleaned

P4A / P4B Pump Station

(Yes) / No Water in Station

Yes / (No) Pumped out?

(Yes) / No P6 Pressure Transducer Cleaned

(Yes) / No P7 Pressure Transducer Cleaned

Zero Valance Tank

(Yes) / No Outlet Structure Checked

(Yes) / No Water Level OK

Sed Pond Manifold

7 Sed Pond A Flow (scfh)

10 Sed Pond B Flow (scfh)

date: 30 DEC 2003
personnel: R. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Treatment System Checklist

225 CO2 Storage Tank Pressure (Normal Range = 220 - 235psi)

2,300 CO2 Storage Liquid Level (Normal Range = 2,000 - 12,000lbs)
***Note: call for refill @ 2,000 - 3,000lbs**

OFF P1 Running Status (on/off)

615.8 T3 Water Elevation

6.60 T3 pH

45.1 T3 Temperature

ON P4A Running Status (on/off)

2.5 P4A Pressure Gauge (normal range = 10psi)

615.8 T6 Water Elevation

ON P4B Running Status (on/off)

614.5 T7 Water Elevation

ON P7 Running Status (on/off)

date: 30 DEC 2003
personnel: D. CASEY

Airco Parcel
Groundwater Collection and Treatment System
Niagara Falls, New York

Field sampling

		Standard
0.17	P4A Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.25	P4A Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.01	P4B Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.02	P4B Total Chromium Concentration (mg/L)	(0.05 mg/L)
0.00	P7 Hexavalent, Chromium Concentration (mg/L)	(0.011 mg/L)
0.01	P7 Total Chromium Concentration (mg/L)	(0.05 mg/L)

6.74	pH Sed Pond A
7.07	pH Sed Pond B
7.35	pH Wetland

date: 30 DEC 2003
personnel: R CASEY

Appendix E

Analytical Results for March, June, and September 2003

APPENDIX E
SUMMARY OF ANALYTICAL RESULTS OF GROUNDWATER, SURFACE WATER, AND RELIEF PIPE SAMPLES COLLECTED IN MARCH 2003,
AIRCO PARCEL, NIAGARA FALLS, NEW YORK

Ground Water

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

Compound/Element	AWQS	MW-1B	MW-2B	MW-3B	MW-4B	MW-5B	MW-6B	MW-6B (Dup)	MW-7B	MW-8B
Chromium	0.05	(<0.005U)	0.426	(<0.005U)	0.214	(<0.005U)	(<0.005U)	(<0.005U)	0.143	0.277
Chromium, Hexavalent	0.05	(<0.01U)	0.39	(<0.01U)	0.18	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.22
Iron	0.3	1.27	0.175	0.445	1.22	0.312	0.338	0.334	9.3	1.46
Lead	0.025	(<0.005U)	0.04	0.029	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)
Magnesium	35*	61	(<1U)	2.44	44.7	60.4	43.2	38.1	13.6	66.4
Manganese	0.3	0.756	(<0.005U)	0.006	0.013	(<0.005U)	0.069	0.065	0.248	0.185
Selenium	0.01	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	0.134
Silica	---	22.4	2.25	21.6	20.3	20.4	13.2	12.9	46	20.8
Sodium	20	110	53	86.6	96.4	124	76.6	80.9	62.2	137
Zinc	2*	0.319	0.02	0.209	0.03	0.027	(<0.005U)	(<0.005U)	0.034	0.065

Water Quality Parameters (mg/L)

Total (Unfiltered)

Compound/Element	AWQS	MW-1B	MW-2B	MW-3B	MW-4B	MW-5B	MW-6B	MW-6B (Dup)	MW-7B	MW-8B
Ammonia (expressed as N)	2	(<1U)	1.4	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Phenolics	0.001	0.002	0.002	(<0.002U)	(<0.002U)	(<0.002U)	(<0.002U)	(<0.002U)	0.003	(<0.002U)
Sulfate	250	215	15.7	132	156	207	182	221	53.2	366

Surface Water

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

		SS
Compound/Element	**AWQS**	
Chromium	---	0.429
Chromium, Hexavalent	0.016	**0.37**
Iron	0.3	0.099
Lead	---	(<0.005U)
Magnesium	---	2.46
Manganese	---	(<0.005U)
Selenium	0.0046	**0.024**
Silica	---	1.4
Sodium	---	65.6
Zinc	---	(<0.005U)

Water Quality Parameters (mg/L)

Total (Unfiltered)

		SS
Compound/Element	**AWQS**	
Ammonia (expressed as N)	---	4.4
Phenolics	---	0.018
Sulfate	---	14.7

Ground Water Relief Pipe

Baseline Metals by EPA Method 6010/6020 (mg/L)
Total (Unfiltered)

		L1
Compound/Element	**AWQS**	
Chromium	---	0.424
Chromium, Hexavalent	0.016	0.54
Iron	0.3	(<0.025U)
Lead	---	(<0.005U)
Magnesium	---	(<1U)
Manganese	---	(<0.005U)
Selenium	0.0046	0.009
Silica	---	0.574
Sodium	---	68.9
Zinc	---	(<0.005U)

Water Quality Parameters (mg/L)
Total (Unfiltered)

		L1
Compound/Element	**AWQS**	
Ammonia (expressed as N)	---	4.6
Phenolics	---	0.04
Sulfate	---	9.9

QA/QC

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

		Rinse Blank	Source Water Blank
Compound/Element	**AWQS**		
Chromium	---	(<0.005U)	(<0.005U)
Chromium, Hexavalent	---	(<0.01U)	(<0.01U)
Iron	---	(<0.025U)	(<0.025U)
Lead	---	(<0.005U)	(<0.005U)
Magnesium	---	(<1U)	(<1U)
Manganese	---	(<0.005U)	(<0.005U)
Selenium	---	(<0.005U)	(<0.005U)
Silica	---	16.1	16.7
Sodium	---	(<1U)	(<1U)
Zinc	---	(<0.005U)	(<0.005U)

Water Quality Parameters (mg/L)

		Rinse Blank	Source Water Blank
Compound/Element	**AWQS**		
Ammonia (expressed as N)	---	(<1U)	(<1U)
Phenolics	---	(<0.002U)	(<0.002U)
Sulfate	---	(<2U)	(<2U)

TABLE NOTES

AWQS	=	New York State Ambient Water Quality Standards and Guidance Values from Water Quality Regulations, Title 6, Chapter X Parts 700-706 August 1999.
*	=	Indicates guidance value.
---	=	Indicates no standard or guidance value exists.
U	=	Not detected. Sample quantitation limits shown as (<__U).

Only those analytes detected in at least one of the samples is shown on this table.
Results shaded and in boldface indicate concentrations in excess of New York State Ambient Water Quality Standards or Guidance Values.

Analytical Methods for Water Quality Parameters

Ammonia (expressed as Nitrogen)	=	EPA 350.2
Phenolics	=	EPA 420.2
Sulfate	=	EPA 375.3

APPENDIX E
SUMMARY OF ANALYTICAL RESULTS OF GROUNDWATER, SURFACE WATER, AND RELIEF PIPE SAMPLES COLLECTED IN JUNE 2003,
AIRCO PARCEL, NIAGARA FALLS, NEW YORK

Groundwater

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

Compound/Element	AWQS	MW-1B	MW-2B	MW-3B	MW-4B	MW-5B	MW-6B	MW-6B (Dup)	MW-7B	MW-8B
Cadmium	0.005	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	0.005
Chromium	0.05	0.014	0.343	(<0.005U)	0.21	(<0.005U)	(<0.005U)	(<0.005U)	0.058	0.117
Chromium, Hexavalent	0.05	(<0.01U)	0.34	(<0.01U)	0.22	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.08
Iron	0.3	1.85	1.14	0.129	1.18	0.548	0.696	0.751	5.04	3.51
Lead	0.025	0.005	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)
Magnesium	35*	69.5	(<1U)	1.95	47.7	71.6	82.8	82.3	11.6	51
Manganese	0.3	0.809	0.024	(<0.005U)	0.007	0.026	0.151	0.158	0.116	0.145
Selenium	0.01	(<0.005U)	0.008	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	(<0.005U)	0.064
Silica	---	25.9	10	20.2	18.3	18	15.7	15.2	43	30.9
Sodium	20	118	45.8	73.1	83	65	66.7	65.6	62.9	212
Zinc	2*	0.36	(<0.005U)	0.091	0.01	0.028	(<0.005U)	(<0.005U)	(<0.005U)	0.117

Water Quality Parameters (mg/L)

Total (Unfiltered)

Compound/Element	AWQS	MW-1B	MW-2B	MW-3B	MW-4B	MW-5B	MW-6B	MW-6B (Dup)	MW-7B	MW-8B
Ammonia (expressed as N)	2	(<1U)	2.3	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Phenolics	0.001	(<0.002U)	0.003	(<0.002U)	(<0.002U)	(<0.002U)	(<0.002U)	0.002	0.013	(<0.002U)
Sulfate	250	185	14.8	96.9	138	126	209	198	44.3	335

Surface Water

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

		SS
Compound/Element	**AWQS**	
Cadmium	---	(<0.005U)
Chromium	---	0.015
Chromium, Hexavalent	0.016	(<0.01U)
Iron	0.3	[redacted]
Lead	---	(<0.005U)
Magnesium	---	8.87
Manganese	---	0.035
Selenium	0.0046	[redacted]
Silica	---	7.05
Sodium	---	54.8
Zinc	---	(<0.005U)

Water Quality Parameters (mg/L)

Total (Unfiltered)

		SS
Compound/Element	**AWQS**	
Ammonia (expressed as N)	---	4.1
Phenolics	---	0.113
Sulfate	---	31.5

Groundwater Relief Pipe

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

		L1
Compound/Element	**AWQS**	
Cadmium	---	(<0.005U)
Chromium	---	0.419
Chromium, Hexavalent	0.016	0.43
Iron	0.3	(<0.025U)
Lead	---	(<0.005U)
Magnesium	---	(<1U)
Manganese	---	(<0.005U)
Selenium	0.0046	0.019
Silica	---	0.438
Sodium	---	80.3
Zinc	---	(<0.005U)

Water Quality Parameters (mg/L)

Total (Unfiltered)

		L1
Compound/Element	**AWQS**	
Ammonia (expressed as N)	---	5.2
Phenolics	---	0.026
Sulfate	---	8.26

QA/QC

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

		Rinse Blank	Source Water Blank
Compound/Element	**AWQS**		
Cadmium	---	(<0.005U)	(<0.005U)
Chromium	---	(<0.005U)	(<0.005U)
Chromium, Hexavalent	---	(<0.01U)	(<0.01U)
Iron	---	(<0.025U)	(<0.025U)
Lead	---	(<0.005U)	(<0.005U)
Magnesium	---	(<1U)	(<1U)
Manganese	---	(<0.005U)	(<0.005U)
Selenium	---	(<0.005U)	(<0.005U)
Silica	---	0.217	0.2
Sodium	---	(<1U)	(<1U)
Zinc	---	(<0.005U)	(<0.005U)

Water Quality Parameters (mg/L)

		Rinse Blank	Source Water Blank
Compound/Element	**AWQS**		
Ammonia (expressed as N)	---	(<1U)	(<1U)
Phenolics	---	(<0.002U)	(<0.002U)
Sulfate	---	(<2U)	5.39

TABLE NOTES

AWQS	=	New York State Ambient Water Quality Standards and Guidance Values from Water Quality Regulations, Title 6, Chapter X Parts 700-706 August 1999.
*	=	Indicates guidance value.
---	=	Indicates no standard or guidance value exists.
U	=	Not detected. Sample quantitation limits shown as (<__U).

Only those analytes detected in at least one of the samples is shown on this table.
Results shaded and in boldface indicate concentrations in excess of New York State Ambient Water Quality Standards or Guidance Values.

Analytical Methods for Water Quality Parameters

Ammonia (expressed as Nitrogen)	=	EPA 350.2
Phenolics	=	EPA 420.2
Sulfate	=	EPA 375.3

APPENDIX E
SUMMARY OF ANALYTICAL RESULTS OF GROUNDWATER, SURFACE WATER, AND RELIEF PIPE SAMPLES COLLECTED IN SEPTEMBER 2003,
AIRCO PARCEL, NIAGARA FALLS, NEW YORK

Ground Water

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

		MW-1B	MW-2B	MW-3B	MW-4B	MW-5B	MW-6B	MW-6B (Dup)	MW-7B	MW-8B
Compound/Element	**AWQS**									
Chromium	0.05	0.014	0.44	0.018	0.25	0.036	(<0.01U)	0.011	0.069	0.22
Chromium, Hexavalent	0.05	(<0.01U)	0.41	(<0.01U)	0.19	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.15
Iron	0.3	1.6	0.44	0.46	7.8	29	0.45	0.45	2.8	9.6
Lead	0.025	0.017	(<0.01U)	(<0.01U)	0.027	0.16	(<0.01U)	(<0.01U)	(<0.01U)	0.029
Magnesium	35*	75	(<1U)	3.5	45	120	89	85	8.3	79
Manganese	0.3	0.87	0.015	0.019	0.16	1.2	0.19	0.18	0.1	0.87
Selenium	0.01	(<0.01U)	(<0.01U)	(<0.01U)	0.02	0.01	(<0.01U)	(<0.01U)	(<0.01U)	0.14
Silica	---	10	2.4	9.7	15	31	7.9	7.8	9.8	18
Sodium	20	120	56	82	160	88	65	63	55	160
Thallium	0.0005*	(<0.01U)	0.013	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	(<0.01U)	0.01
Zinc	2*	0.52	0.078	0.067	0.24	1.7	0.058	0.065	0.11	0.32

Water Quality Parameters (mg/L)

Total (Unfiltered)

		MW-1B	MW-2B	MW-3B	MW-4B	MW-5B	MW-6B	MW-6B (Dup)	MW-7B	MW-8B
Compound/Element	**AWQS**									
Ammonia (expressed as N)	2	(<0.03U)	1.5	0.49	(<0.03U)	0.043	(<0.03U)	(<0.03U)	0.16	0.064
Sulfate	250	210	17	99	160	150	210	210	29	330

Ground Water Relief Pipe

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

		L1
Compound/Element	**AWQS**	
Chromium	---	0.35
Chromium, Hexavalent	0.016	[redacted]0.26
Iron	0.3	0.068
Lead	---	0.016
Magnesium	---	(<1U)
Manganese	---	(<0.01U)
Selenium	0.0046	(<0.01U)
Silicon	---	0.54
Sodium	---	68
Thallium	0.02	(<0.1U)
Zinc	---	(<0.1U)

Water Quality Parameters (mg/L)

Total (Unfiltered)

		L1
Compound/Element	**AWQS**	
Ammonia (expressed as N)	---	5.8
Sulfate	---	52

QA/QC

Baseline Metals by EPA Method 6010/6020 (mg/L)

Total (Unfiltered)

		Rinse Blank	Source Water Blank
Compound/Element	**AWQS**		
Chromium	---	(<0.01U)	(<0.01U)
Chromium, Hexavalent	---	(<0.01U)	(<0.01U)
Iron	---	(<0.05U)	(<0.05U)
Lead	---	(<0.01U)	(<0.01U)
Magnesium	---	(<1U)	(<1U)
Manganese	---	(<0.01U)	(<0.01U)
Selenium	---	(<0.01U)	(<0.01U)
Silicon	---	(<0.5U)	(<0.5U)
Sodium	---	(<1U)	(<1U)
Thallium	---	(<0.01U)	(<0.01U)
Zinc	---	(<0.01U)	(<0.01U)

Water Quality Parameters (mg/L)

		Rinse Blank	Source Water Blank
Compound/Element	**AWQS**		
Ammonia (expressed as N)	---	(<0.03U)	(<0.03U)
Sulfate	---	(<1U)	(<1U)

TABLE NOTES

AWQS	=	New York State Ambient Water Quality Standards and Guidance Values from Water Quality Regulations, Title 6, Chapter X Parts 700-706 August 1999.
*	=	Indicates guidance value.
---	=	Indicates no standard or guidance value exists.
U	=	Not detected. Sample quantitation limits shown as (<__U).

Only those analytes detected in at least one of the samples is shown on this table.
Results shaded and in boldface indicate concentrations in excess of New York State Ambient Water Quality Standards or Guidance Values.

Analytical Methods for Water Quality Parameters

Ammonia (expressed as Nitrogen)	=	EPA 350.2
Phenolics	=	EPA 420.2
Sulfate	=	EPA 375.3

Appendix F

Field Notes

WIDENER

MW6B

method 2" sub
time 1225

DTW 3.[illegible]
B.A. Purged 1½ gal

H_2O QUALITY

Param	initial	1	2	3	4	5
time	1228	12[illegible]	1236	124[illegible]	1244	1248
pump rate	0.25L/m			→		→
Vol pumped	—	1L	2L	3L	4L	5L
pH	8.77	8.23	8.01	7.9[illegible]	[illegible]	7.91
COND	0.771	0.745	0.776	0.77[illegible]	0.7[illegible]	0.776
TURB	845	[illegible]	>999	49.[illegible]	[illegible]	30.3
DO	4.02	3.51	3.80	4.16	4.1[illegible]	4.12
Temp	10.76	9.6[illegible]	9.7[illegible]	9.54	[illegible]	9.32
ORP	64	69	80	93	94	96
DTW	4.02	6.[illegible]	6.91	[illegible]	6.91	6.91

SAMPLE COLLECTION TIME 1255

D[illegible]

WRC-MWP 1202 COLLECTED c WRL-MW6B-1202

M 10 MAR 2003 R. LOSEY

- R. LOSEY ONSITE @ [illegible] [illegible] [illegible] QUARTERLY [illegible] WATER [illegible] AND LANDFILL INSPECTION.
  - → WEATHER: CLEAR, WINDY, 10°F
- MONITORING WELL GAUGING

	DTW	DTB	PURGE METHOD
✓ MW1B	11.82	27.90	PUMP
✓ MW2B	13.96	27.58	PUMP
✓ MW3B	9.05	18.35	PUMP
✓ MW4B	7.62	15.09	BAIL
✓ MW5B	6.82	14.17	BAIL
✓ MW6B	4.90	22.98	PUMP
MW7B	9.67	21.72	PUMP
MW8B	7.91	15.60	BAIL

HORIBA U-22, CALIBRATION

PINE # 01519

pH → 3.99
COND → 4.15
TURB → 6
DO → 5.11

MW-8B

Method: [illegible] — DTW: 7.91
Time: [illegible] — Vol purg: [illegible]

H2O Quality

Param	Initial	Final
pH	[illegible]	[illegible]
Cond	[illegible]	[illegible]
Turb	0	999
DO	[illegible]	4.86
Temp	[illegible]	4.16
ORP	[illegible]	187

- Well bailed dry
- To be sampled 3/11/2003
- WRL-MW8B-0303
  ↳ Sample collection time 1240, 3/11/03

MW-4B

Method: [illegible] — DTW: 7.62
Time: 1011 — Vol purg: [illegible]

H2O Quality

Param	Initial	Final
pH	7.49	7.72
Cond	[illegible]	[illegible]
Turb	76	999
DO	4.96	4.52
Temp	[illegible]	4.63
ORP	177	148

- Well bailed dry
- To be sampled 3/11/03
- WRL-MW4B-0303
  ↳ Sample collection time 915, 3/11/03

MW-5B

METHOD: HANDBAIL — DTW: 6.82

TIME: 1031 — vol purge: ~2½ gal

H2O QUALITY

PARAM	INITIAL	FINAL
pH	7.69	7.74
COND	1.19	1.22
Turb	407	57.3
DO	4.72	4.82
temp	3.86	2.91
ORP	183	143

* WELL BAILED DRY
* TO BE SAMPLED 3/11/03

* WRL-MW-5B-0303
↳ SAMPLE COLLECTION TIME

935, 3/11/03

MW-1B

METHOD: 2" sub — DTW: 11.81

TIME: 1050 — vol purge: ~1 gal

H2O QUALITY

PARAM	INITIAL	①	②	③	④	⑤
TIME	1130	1134	1138	1142	1146	
purge rate	~.25 gpm	→	→	→	→	
vol purg	—	1L	2L	3L	4L	
pH	7.40	7.19	7.22	7.19	7.18	
COND	1.60	1.64	1.59	1.52	1.60	
Turb	4810	1420	130	73.2	47.0	
DO	2.04	1.96	OF	NA	NA	
TEMP	11.6	9.95	9.81	10.01	10.05	
ORP	+4	18	20	16	15	
DTW	11.82	12.08	12.11	12.12	12.12	

WRL-MW-1B-0303
↳ SAMPLE COLLECTION TIME 1150

* DO not recorded properly

M10MAR2003 RCASEY : BCASEY | M10MAR2003 1[?]

MW-2B

METHOD: 2" sub DTW: 13.90
TIME: 1205 vol purg: ~4gal

H_2O QUALITY

PARAM	INITIAL	1	2	3	4	5
TIME	1225	1227	1231	1235	1239	
purg rate	0.25 gal	⟶				
vol purg	—	1L	2L	3L	4L	
pH	12.72	[illegible]	12.75	12.80	12.82	
COND	4.67	4.[illegible]	4.72	4.77	4.79	
TURB	0	7.8	4.9	24.8	32.1	
DO	5.41	1.[illegible]	0.87	1.10	1.09	
TEMP	6.77	10.10	[illegible]	8.62	8.78	
ORP	-103	[illegible]	-1[illegible]	-120	-1[illegible]	
DTW	13.90	18.17	18.22	18.23	X	

WRL-MW2B-0303
⟶ SAMPLE COLLECTION TIME 1315

* well purged dry. will let recharge then sample.

MW-3B

METHOD: 2" sub DTW: 9.05
TIME: 1340 vol purg: ~2½ gal

H_2O QUALITY

PARAM	INITIAL	1	2	3	4	5	6	7
TIME	1348	1352	1356	1400	1404	1408	1412	1416
PURG RATE	0.25 gal	⟶						
VOL PURG	—	1L	2L	3L	4L	5L	6L	7L
pH	11.08	11.01	10.82	10.71	10.[illegible]	10.[illegible]	10.57	[illegible]
COND	0.710	0.497	0.535	0.502	0.518	0.511	0.510	0.547
TURB	14.5	1.8	16.4	22.4	12	6.6	5.4	1.6
DO	4.44	1.04	0	0	0	0	0	0
TEMP	6.57	4.79	4.10	4.44	4.17	4.61	5.04	5.10
ORP	-22	-22	-21	-22	-26	-34	-37	-37
DTW	9.05	9.82	9.90	9.98	10.05	10.15	10.15	10.15

WRL-MW3B-0303
↳ SAMPLE COLLECTION TIME 1420.

N. 4 MARCH 2003 R. CASEY

- WRL - RB-0303
  - → SAMPLE COLLECTION TIME ____.

- WRL - SWB-0303
  - → SAMPLE COLLECTION TIME ____.

~~~~~~~~

4 MARCH 2003 R. CASEY

R. CASEY ONSITE @ 0850 TO COMPLETE QUARTERLY GWS and LANDFILL ENGINEERING INSPECTION.
→ WEATHER: CLOUDY, MID 30'S

- WRL - MW-4B - 0303
  - → SAMPLE COLLECTION TIME 915
  - (dedicated bailer)

- WRL - MW-?B - 0303
  - → SAMPLE COLLECTION TIME 935
  - (dedicated bailer)

R. CASEY 4 MARCH 2003

MW-6B

METHOD: 2" sub TIME: 950

DTW: 4.40 vol purge: ~2.5 gal.

H_2O QUALITY

PARAM	INITIAL	@	@	@	@	@	@	@
TIME	1008	10??	1016	1020	1024	10??	1032	1036
purg rate	0.25 ?/min	→						→
vol purg	—	1L	2L	3L	4L	5L	6L	7L
pH	9.27	7.54	8.53	8.49	7.42	7.75	7.72	7.70 (circled)
CONT	0.904	0.954	0.678	0.646	0.772	0.??4	0.824	0.821
TURB	164.0	19.3	0	25.1	10.6	8.9	0	1.3
DO	3.31	7.69	2.54	1.79	0.40	0	0	0
TEMP	4.71	8.00	8.56	8.?7	8.14	9.46	9.51	9.51
ORP	42	86	58	58	38	31	29	28
DTW	4.40	3.62	11.14	11.41	—	11.58	11.54	—

WRL - MW-6B - 0303
→ SAMPLE COLLECTION TIME 1040

WRL - DUP - 0303
→ COLLECTED @ MW6B
~~~~~~~~

MAR 2003 R. CASEY

LEACHATE

H_2O QUALITY

pH: 12.96
COND: 732
TURB: 0
DO: 12.71
TEMP: 7.77
ORP: -56

WRL-LI-0303
↳ SAMPLE COLLECTION TIME 1110.

WRL-SS-0303
↳ SAMPLE COLLECTION TIME 1130.

SURFACE WATER

H_2O QUALITY

pH: 12.96
COND: 6.69
TURB: 0
DO: 7.75
TEMP: 6.43
ORP: -66.

R. CASEY 11 MAR 2003

MW-7B

METHOD: 2" sub
TIME: 1145
DTW: 9.67
Vol purged: ~1½ gal

H_2O QUALITY

PARAM	INITIAL	①	②	③	④	⑤
TIME	1150	1154	1158	1202	1206	1210
PURGE RATE	0.25 L/min	→	→	→	→	→
VOL PURGED	—	1L	2L	3L	4L	5L
pH	10.23	9.81	9.68	9.62	9.57	9.58
COND	0.354	0.351	0.351	0.349	0.348	0.349
TURB	366	244.0	283.0	244.0	142.6	81.6
DO	7.21	0.41	0.11	0	0	0
TEMP	6.81	7.51	7.62	8.84	9.07	9.12
ORP	-5	0	4	6	8	9
DTW	9.67	11.71	11.74	13.32	—	—

° WRL-MW7B-0303
↳ SAMPLE COLLECTION TIME 1215

TUESDAY 2003 R CASEY

- LANDFILL ENGINEERING INSPECTIONS

1) FENCE IN GOOD CONDITION NO CUTS OR DAMAGE OBSERVED.
2) SWALES AND CAP ARE IN GOOD CONDITION.
3) WILDLIFE OBSERVED:
   - REDTAIL HAWKS (3)
   - NUMEROUS RAVENS
   - RABBIT (1)
   - COYOTE (1)
     - DEN IN TRENCH NEAR SW CORNER
4) VEGETATION LOOKS GOOD.
5) ACCESS ROADS WERE IN GOOD CONDITION, SOME SECTIONS COVERED W/ ICE.

- OFFSITE @ 1400 TO TAKE 5 GAL OF LEACHATE TO UPS FOR SHIPPING. WILL DELIVER REST OF SAMPLES MYSELF TO ELS TOMORROW AM.

3/11/03

Appendix G

Laboratory Chain-of-Custody Records for September 2003 Event

Life Science Laboratories, Inc.

CHAIN OF CUSTODY RECORD

LSL Central Lab
5854 Butternut Drive
E. Syracuse, N.Y. 13057
Phone: (315)445-1105
Fax: (315)445-1301

LSL North Lab
131 St. Lawrence Ave.
Waddington, N.Y. 13694
Phone: (315)388-4476
Fax: (315)388-4061

LSL Fin|
16 N. Ma
Wayland
Phone:
Fax:

Tier Lab
Fax:

Report Address:
Name: JOHN CAREY
Company: EA SCIENCE + TECH
Street: 6712 COLLAMER RD
City/State: E. SYRACUSE, N.Y. Zip: 13057
Phone: (315) 431-4610 Fax: (315)431-4280
Email: JCAREY@EAEST.COM
Client Project ID/Client Site ID: BCC WITMER RD LANDFILL

Turnaround Time
Normal: 14 DAY ☒
Pre-Authorized: Next Day* ☐ 3-Day* ☐ 2-Day* ☐ 7-Day* ☐
*Additional Charges may apply
Date Needed or Special Instructions:
Authorization or P.O. #: 12040.69 0015
LSL Project Number:

Client's Sample Identifications	Sample Date	Sample Time	Type grab/comp	Matrix	Preserv Added	Containers #	Containers size/type	Analyses	Preserv Check	LSL ID#
WRL-MW1B-0903	10-9-03	1310	G	GW		4		CH4 + SO4, NH3-N, METALS, TPHENOLS		001 ABCd
WRL-MW3B-0903	↓	1410	↓	↓		↓		↓		002
WRL-MW6B-0903	↓	1500	↓	↓		↓		↓		003
WRL-MW7B-0903	↓	1550	↓	↓		↓		↓		004
WRL-DUP-0903	↓	—	↓	↓		↓		↓		005 ↓

LSL use only:
electronic report needed for John
Escatt… 9-10-03

Containers this C-O-C

Custody Transfers

			Date	Time
Sampled By: [signature]	Received By:			
Relinquished By: [signature]	Received By:			
Relinquished By:	Rec'd for Lab By: [signature]		09-10-03	11:08
Shipment Method:	Received Intact: Y (N)			RVD
			Sample Temp	

** All areas of this Chain of Custody Record MUST be filled out in order to process samples in a timely manner IN PEN ONLY **

Reg COC

5.5 °C

Life Science Laboratories, Inc.

CHAIN OF C

LSL Central Lab
5854 Butternut Drive
E. Syracuse, N.Y. 13057
Phone: (315)445-1105
Fax: (315)445-1301

LSL North La
131 St. Lawre
Waddington,
Phone: (315)
Fax: (315)388-4031

0314835
EAEng

Fax: (585)728-2711

LSL Southern Tier Lab
30 East Main St.
Cuba, N.Y. 14727
Phone: (585)968-2640
Fax: (585)968-0906

Report Address:
Name: Robert CASEY
Company: EA SCIENCE & TECH
Street: 6731 COLLAMER RD
City/State: E. Syracuse NY Zip: 13057
Phone: 315 431 4610 Fax: 315 431 4280
Email: rcasey@eaest.com
Client Project ID/Client Site ID

Turnaround Time
Normal: 14 DAY
Pre-Authorized: Next Day* / 2-Day* / 3-Day* / 7-Day*
*Additional Charges may apply
Date Needed or Special Instructions:
Authorization or P.O. # 12040.69.0015
LSL Project Number:

Client's Sample Identifications	Sample Date	Sample Time	Type grab/comp	Matrix	Preserv Added	Containers #	Containers size/type	Analyses	Preserv Check	LSL ID#
WRL-MW8B-0903	11SEP03	1440* ~~1455~~	G	GW		4		Cr+6 SO4, NH3-N, Metals, T Phenols		001
WRL-MW5B-0903	↓	1505	↓	↓		4		↓		004
WRL-MW4B-0903	↓	1455	↓	↓		4		↓		002
WRL-L1-0903	↓	1500	↓	↓		4		↓		003
WRL-SWB-0903	↓	–	↓	↓		4		↓		005
WRL-RB-0903	↓	–	↓	↓		4		↓		006

ABcd ↓

LSL use only:
* per bottle

Containers this C-O-C

Custody Transfers

				Date	Time
Sampled By:	Robert [signature]	Received By:			
Relinquished By:	Robert [signature]	Received By:			
Relinquished By:		Rec'd for Lab By:	[signature]	9-12-03	10:30
Shipment Method:		Received Intact:	✓ Y / N	Sample Temp	

*** All areas of this Chain of Custody Record MUST be filled out in order to process samples in a timely manner IN PEN ONLY***

Reg COC

5.4°C on Ice

315 4314280 EA Engineering LSL 009/016 P.2

Life Science Laboratories, Inc.

CHAIN OF CUSTODY RECORD

0314078

LSL Central Lab
5854 Buttermut Drive
E. Syracuse, N.Y. 13057
Phone: (315)445-1105
Fax: (315)445-1301

LSL North Lab
131 St. Lawrence Ave.
Waddington, N.Y. 13694
Phone: (315)388-4476
Fax: (315)388-4061

LSL Fin
16 N. M
Waylan
Phone: (585)728-3320
Fax: (585)728-2711

ern Tier Lab
n St.
14727
Phone: (585)968-2640
Fax: (585)968-0906

Report Address:
Name: JOHN CLARK
Company: EA SCIENCE
Street: 6731 COLLAMER RD
City/State: E. SYRACUSE, N.Y.
Zip: 13057
Phone: (315) 431-4610
Fax:
Email:

Turnaround Time
Normal: 14 DAY [X]
Pre-Authorized: Next Day* [ ] 2-Day * [ ] 3-Day * [ ] 7-Day* [ ]
*Additional Charges may apply

Date Needed or Special Instructions:

Authorization or P.O. # 12040.69 0015

LSL Project Number:

Client Project ID/Client Site ID

Client's Sample Identifications	Sample Date	Sample Time	Type grab/comp	Matrix	Preserv Added	Containers #	Containers size/type	Analyses	Preserv Check	LSL ID#
NRL-MW2B-0903	9/9/03	1105	G	GW		4		Cr^{+6}, NH_3-N, METALS, PHENOLS, SULFATE		001 Added

LSL use only:
Electronic deliverables

Containers this C-O-C

Custody Transfers

		Date	Time
Sampled By: JRC	Received By:		
Relinquished By:	Received By:	9/10/03	1105
Relinquished By:	Rec'd for Lab By:	9/10/03	1450
Shipment Method:	Received Intact: Y N	Sample Temp	

*** All areas of this Chain of Custody Record MUST be filled out in order to process samples in a timely manner IN PEN ONLY***

Reg COC

Appendix H

Form I Analytical Results for September 2003 Event

John Clark
EA Engineering, Science and Technology
6731 Collamer Road
East Syracuse, NY 13057-9759

Phone: (315) 431-4610
FAX: (315) 431-4280
Authorization: PO# 12040.69.0015

Laboratory Analysis Report

For

EA Engineering, Science and Technology

LSL Project ID: **0314978**

Receive Date/Time: 09/19/03 14:50

Project Received by: GS

Life Science Laboratories, Inc.

LSL Central Lab
5854 Butternut Drive
East Syracuse, NY 13057
Tel. (315) 445-1105
Fax (315) 445-1301
NYS DOH ELAP #10248

LSL North Lab
131 St. Lawrence Avenue
Waddington, NY 13694
Tel. (315) 388-4476
Fax (315) 388-4061
NYS DOH ELAP #10900

LSL Finger Lakes Lab
16 N. Main St., PO Box 424
Wayland, NY 14572
Tel. (585) 728-3320
Fax (585) 728-2711
NYS DOH ELAP #11667

LSL Southern Tier Lab
30 East Main St.
Cuba, NY 14727
Tel. (585) 968-2640
Fax (585) 968-0906
NYS DOH ELAP #10760

LSL Middlesex Lab
5611 Water St.
Middlesex, NY 14507
Tel. (585) 554-5347
Fax. (585) 554-6743
NYS DOH ELAP #11369

This report was reviewed by: [signature] QCC *Date:* 10-06-03

Life Science Laboratories, Inc

A copy of this report was sent to:

Date Printed: 10/3/03

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-MW2B-0903
Location:
LSL Sample ID: 0314978-001
Sampled: 09/19/03 11:05 **Sampled By:** JRC
Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Total Metals					
Thallium	0.013	mg/l	9/23/03	9/24/03	PEF
Sodium	56	mg/l	9/23/03	9/24/03	PEF
Selenium	<0.01	mg/l	9/23/03	9/24/03	PEF
Silicon	2.4	mg/l	9/23/03	9/24/03	PEF
Manganese	0.015	mg/l	9/23/03	9/24/03	PEF
Magnesium	<1	mg/l	9/23/03	9/24/03	PEF
Iron	0.44	mg/l	9/23/03	9/24/03	PEF
Cadmium	<0.01	mg/l	9/23/03	9/24/03	PEF
Chromium	0.44	mg/l	9/23/03	9/24/03	PEF
Lead	<0.01	mg/l	9/23/03	9/24/03	PEF
Zinc	0.078	mg/l	9/23/03	9/24/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	1.5	mg/l		10/3/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	10/3/03	10/3/03	DWK
(1) EPA Method 300.0 A					
Sulfate	17	mg/l		9/27/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	0.41	mg/l		9/19/03 16:16	DWK

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology East Syracuse, NY

Sample ID: WRL-SWB-0903 LSL Sample ID: 0314535-005

Location:

Sampled: 09/11/03 0:00 Sampled By: RC

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Priority Pollutant Metals					
Thallium	<0.01	mg/l	9/23/03	9/24/03	PEF
Sodium	<1	mg/l	9/23/03	9/24/03	PEF
Silicon	<0.5	mg/l	9/23/03	9/24/03	PEF
Manganese	<0.01	mg/l	9/23/03	9/24/03	PEF
Magnesium	<1	mg/l	9/23/03	9/24/03	PEF
Iron	<0.05	mg/l	9/23/03	9/24/03	PEF
Cadmium	<0.01	mg/l	9/23/03	9/24/03	PEF
Chromium	<0.01	mg/l	9/23/03	9/24/03	PEF
Lead	<0.01	mg/l	9/23/03	9/24/03	PEF
Selenium	<0.01	mg/l	9/23/03	9/24/03	PEF
Zinc	<0.01	mg/l	9/23/03	9/24/03	PEF
(1) EPA 350.1 Ammonia	<0.01	mg/l	9/23/03	9/24/03	PEF
Ammonia as N					
(1) EPA 420.1 Recoverable Phenolics ML	<0.03	mg/l		9/25/03	DRB
Phenolics, Total Recoverable					
(1) EPA Method 300.0 A	<0.05	mg/l	9/24/03	9/25/03	DWK
Sulfate					
(1) SM 18 3500Cr-D Hexavalent Chromium	<1	mg/l		9/26/03	RAF
Chromium, Hexavalent	<0.01	mg/l		9/12/03 10:28	DWK

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology East Syracuse, NY

Sample ID: WRL-RB-0903

Location:

LSL Sample ID: 0314535-006

Sampled: 09/11/03 0:00 Sampled By: RC

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Priority Pollutant Metals					
Thallium	<0.01	mg/l	9/23/03	9/24/03	PEF
Sodium	<1	mg/l	9/23/03	9/24/03	PEF
Silicon	<0.5	mg/l	9/23/03	9/24/03	PEF
Manganese	<0.01	mg/l	9/23/03	9/24/03	PEF
Magnesium	<1	mg/l	9/23/03	9/24/03	PEF
Iron	<0.05	mg/l	9/23/03	9/24/03	PEF
Cadmium	<0.01	mg/l	9/23/03	9/24/03	PEF
Chromium	<0.01	mg/l	9/23/03	9/24/03	PEF
Lead	<0.01	mg/l	9/23/03	9/24/03	PEF
Selenium	<0.01	mg/l	9/23/03	9/24/03	PEF
Zinc	<0.01	mg/l	9/23/03	9/24/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	<0.03	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/24/03	9/25/03	DWK
(1) EPA Method 300.0 A					
Sulfate	<1	mg/l		9/27/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	<0.01	mg/l		9/12/03 10:28	DWK

Scott Graham
EA Engineering, Science and Technology
6731 Collamer Road
East Syracuse, NY 13057-9759

Phone: (315) 431-4610
FAX: (315) 431-4280

Laboratory Analysis Report

For

EA Engineering, Science and Technology

Client Project ID:

12040.69.0015

LSL Project ID: 0314443

Receive Date/Time: 09/11/03 14:08

Project Received by: GS

Life Science Laboratories, Inc.

LSL Central Lab
5854 Butternut Drive
East Syracuse, NY 13057
Tel. (315) 445-1105
Fax (315) 445-1301
NYS DOH ELAP #10248

LSL North Lab
131 St. Lawrence Avenue
Waddington, NY 13694
Tel. (315) 388-4476
Fax (315) 388-4061
NYS DOH ELAP #10900

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This report was reviewed by: Life Science Laboratories, Inc *Date:* 10-02-03

A copy of this report was sent to:

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-MW1B-0903

Location: BOC Witmer Rd Landfill LSL Sample ID: 0314443-001

Sampled: 09/10/03 13:10 Sampled By: RS

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Total Metals					
Silicon	10	mg/l	9/15/03	9/15/03	PEF
Cadmium	<0.01	mg/l	9/15/03	9/15/03	PEF
Chromium	0.014	mg/l	9/15/03	9/15/03	PEF
Iron	1.6	mg/l	9/15/03	9/15/03	PEF
Lead	0.017	mg/l	9/15/03	9/15/03	PEF
Magnesium	75	mg/l	9/15/03	9/15/03	PEF
Manganese	0.87	mg/l	9/15/03	9/15/03	PEF
Selenium	<0.01	mg/l	9/15/03	9/15/03	PEF
Sodium	120	mg/l	9/15/03	9/15/03	PEF
Thallium	<0.01	mg/l	9/15/03	9/15/03	PEF
Zinc	0.52	mg/l	9/15/03	9/15/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	<0.03	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/22/03	9/23/03	DWK
(1) EPA Method 300.0 A					
Sulfate	210	mg/l		10/1/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	<0.01	mg/l		9/11/03 12:21	DWK

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-MW7B-0903

Location: BOC Witmer Rd Landfill

LSL Sample ID: 0314443-004

Sampled: 09/10/03 15:50 Sampled By: RS

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Total Metals					
Silicon	9.8	mg/l	9/15/03	9/15/03	PEF
Cadmium	<0.01	mg/l	9/15/03	9/15/03	PEF
Chromium	0.069	mg/l	9/15/03	9/15/03	PEF
Iron	2.8	mg/l	9/15/03	9/15/03	PEF
Lead	<0.01	mg/l	9/15/03	9/15/03	PEF
Magnesium	8.3	mg/l	9/15/03	9/15/03	PEF
Manganese	0.10	mg/l	9/15/03	9/15/03	PEF
Selenium	<0.01	mg/l	9/15/03	9/15/03	PEF
Sodium	55	mg/l	9/15/03	9/15/03	PEF
Thallium	<0.01	mg/l	9/15/03	9/15/03	PEF
Zinc	0.11	mg/l	9/15/03	9/15/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	0.16	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/22/03	9/23/03	DWK
(1) EPA Method 300.0 A					
Sulfate	29	mg/l		9/26/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	<0.01	mg/l		9/11/03 12:21	DWK

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology East Syracuse, NY

Sample ID: WRL-Dup-0903
Location: BOC Witmer Rd Landfill
LSL Sample ID: 0314443-005
Sampled: 09/10/03 0:00 Sampled By: RS
Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) Electronic Report Generation					
Report Fee					
(1) EPA 200.7 Total Metals					
Silicon	7.8	mg/l	9/15/03	9/15/03	PEF
Cadmium	<0.01	mg/l	9/15/03	9/15/03	PEF
Chromium	0.011	mg/l	9/15/03	9/15/03	PEF
Iron	0.45	mg/l	9/15/03	9/15/03	PEF
Lead	<0.01	mg/l	9/15/03	9/15/03	PEF
Magnesium	85	mg/l	9/15/03	9/15/03	PEF
Manganese	0.18	mg/l	9/15/03	9/15/03	PEF
Selenium	<0.01	mg/l	9/15/03	9/15/03	PEF
Sodium	63	mg/l	9/15/03	9/15/03	PEF
Thallium	<0.01	mg/l	9/15/03	9/15/03	PEF
Zinc	0.065	mg/l	9/15/03	9/15/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	<0.03	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/22/03	9/23/03	DWK
(1) EPA Method 300.0 A					
Sulfate	210	mg/l		10/1/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	a <0.01	mg/l		9/11/03 12:21	DWK

Analysis performed at NYS DOH ELAP Number: (1) 10248, (2) 10900, (3) 11667, (4) 10760, (5) 11369

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-MWSE-0903

Location:

LSL Sample ID: 0314535-001

Sampled: 09/11/03 14:40 Sampled By: RC

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Priority Pollutant Metals					
Thallium	<0.01	mg/l	9/23/03	9/24/03	PEF
Sodium	160	mg/l	9/23/03	9/24/03	PEF
Silicon	18	mg/l	9/23/03	9/24/03	PEF
Manganese	0.87	mg/l	9/23/03	9/24/03	PEF
Magnesium	79	mg/l	9/23/03	9/24/03	PEF
Iron	9.6	mg/l	9/23/03	9/24/03	PEF
Cadmium	<0.01	mg/l	9/23/03	9/24/03	PEF
Chromium	0.22	mg/l	9/23/03	9/24/03	PEF
Lead	0.029	mg/l	9/23/03	9/24/03	PEF
Selenium	0.14	mg/l	9/23/03	9/24/03	PEF
Zinc	0.32	mg/l	9/23/03	9/24/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	0.064	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/24/03	9/25/03	DWK
(1) EPA Method 300.0 A					
Sulfate	330	mg/l		10/1/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	0.15	mg/l		9/12/03 10:28	DWK

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-MW4B-0903

Location:

LSL Sample ID: 0314535-002

Sampled: 09/11/03 14:55 Sampled By: RC

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Priority Pollutant Metals					
Thallium	<0.01	mg/l	9/23/03	9/24/03	PEF
Sodium	160	mg/l	9/23/03	9/24/03	PEF
Silicon	15	mg/l	9/23/03	9/24/03	PEF
Manganese	0.16	mg/l	9/23/03	9/24/03	PEF
Magnesium	45	mg/l	9/23/03	9/24/03	PEF
Iron	7.8	mg/l	9/23/03	9/24/03	PEF
Cadmium	<0.01	mg/l	9/23/03	9/24/03	PEF
Chromium	0.25	mg/l	9/23/03	9/24/03	PEF
Lead	0.027	mg/l	9/23/03	9/24/03	PEF
Selenium	0.020	mg/l	9/23/03	9/24/03	PEF
Zinc	0.24	mg/l	9/23/03	9/24/03	PEF
(3) EPA 350.1 Ammonia					
Ammonia as N	<0.03	mg/l		9/25/03	DRB
(7) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/24/03	9/25/03	DWK
(1) EPA Method 300.0 A					
Sulfate	160	mg/l		10/1/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	0.19	mg/l		9/12/03 10:28	DWK

Analysis performed at NYS DOH ELAP Number: *(1) 10248, (2) 10900, (3) 11667, (4) 10760, (5) 11369*

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-LI-0903

Location:

LSL Sample ID: 0314535-003

Sampled: 09/11/03 15:00 Sampled By: RC

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Priority Pollutant Metals					
Thallium	<0.1	mg/l	9/23/03	9/24/03	PEF
Elevated detection limit due to matrix interference.					
Sodium	68	mg/l	9/23/03	9/24/03	PEF
Silicon	0.54	mg/l	9/23/03	9/24/03	PEF
Manganese	<0.01	mg/l	9/23/03	9/24/03	PEF
Magnesium	<1	mg/l	9/23/03	9/24/03	PEF
Iron	0.068	mg/l	9/23/03	9/24/03	PEF
Cadmium	<0.01	mg/l	9/23/03	9/24/03	PEF
Chromium	0.35	mg/l	9/23/03	9/24/03	PEF
Lead	0.016	mg/l	9/23/03	9/24/03	PEF
Selenium	<0.01	mg/l	9/23/03	9/24/03	PEF
Zinc	<0.1	mg/l	9/23/03	9/24/03	PEF
Elevated detection limit due to matrix interference.					
(1) EPA 350.1 Ammonia					
Ammonia as N	5.8	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/24/03	9/25/03	DWK
(1) EPA Method 300.0 A					
Sulfate	52	mg/l		9/26/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	0.26	mg/l		9/12/03 10:28	DWK

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-MW3E-0903

Location: BOC Witmer Rd Landfill LSL Sample ID: 0314443-002

Sampled: 09/10/03 14:10 Sampled By: RS

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Total Metals					
Silicon	9.7	mg/l	9/15/03	9/15/03	PEF
Cadmium	<0.01	mg/l	9/15/03	9/15/03	PEF
Chromium	0.018	mg/l	9/15/03	9/15/03	PEF
Iron	0.46	mg/l	9/15/03	9/15/03	PEF
Lead	<0.01	mg/l	9/15/03	9/15/03	PEF
Magnesium	3.5	mg/l	9/15/03	9/15/03	PEF
Manganese	0.019	mg/l	9/15/03	9/15/03	PEF
Selenium	<0.01	mg/l	9/15/03	9/15/03	PEF
Sodium	82	mg/l	9/15/03	9/15/03	PEF
Thallium	<0.01	mg/l	9/15/03	9/15/03	PEF
Zinc	0.067	mg/l	9/15/03	9/15/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	0.49	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/22/03	9/23/03	DWK
(1) EPA Method 300.0 A					
Sulfate	99	mg/l		9/26/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	<0.01	mg/l		9/11/03 12:21	DWK

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-MW6R-0903

Location: BOC Witmer Rd Landfill LSL Sample ID: 0314443-003

Sampled: 09/10/03 15:00 Sampled By: RS

Sample Matrix: NPW

Analytical Method / Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
(1) EPA 200.7 Total Metals					
Silicon	7.9	mg/l	9/15/03	9/15/03	PEF
Cadmium	<0.01	mg/l	9/15/03	9/15/03	PEF
Chromium	<0.01	mg/l	9/15/03	9/15/03	PEF
Iron	0.45	mg/l	9/15/03	9/15/03	PEF
Lead	<0.01	mg/l	9/15/03	9/15/03	PEF
Magnesium	89	mg/l	9/15/03	9/15/03	PEF
Manganese	0.19	mg/l	9/15/03	9/15/03	PEF
Selenium	<0.01	mg/l	9/15/03	9/15/03	PEF
Sodium	65	mg/l	9/15/03	9/15/03	PEF
Thallium	<0.01	mg/l	9/15/03	9/15/03	PEF
Zinc	0.058	mg/l	9/15/03	9/15/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	<0.03	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/22/03	9/23/03	DWK
(1) EPA Method 300.0 A					
Sulfate	210	mg/l		10/1/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	<0.01	mg/l		9/11/03 12:21	DWK

-- LABORATORY ANALYSIS REPORT --

EA Engineering, Science and Technology *East Syracuse, NY*

Sample ID: WRL-MWSB-0903

Location:

LSL Sample ID: 0314535-004

Sampled: 09/11/03 15:05 Sampled By: RC

Sample Matrix: NPW

Analyte	Result	Units	Prep Date	Analysis Date & Time	Analyst Initials
Analytical Method					
(1) EPA 200.7 Priority Pollutant Metals					
Thallium	<0.01	mg/l	9/23/03	9/24/03	PEF
Sodium	88	mg/l	9/23/03	9/24/03	PEF
Silicon	31	mg/l	9/23/03	9/24/03	PEF
Manganese	1.2	mg/l	9/23/03	9/24/03	PEF
Magnesium	120	mg/l	9/23/03	9/24/03	PEF
Iron	29	mg/l	9/23/03	9/24/03	PEF
Cadmium	<0.01	mg/l	9/23/03	9/24/03	PEF
Chromium	0.036	mg/l	9/23/03	9/24/03	PEF
Lead	0.16	mg/l	9/23/03	9/24/03	PEF
Selenium	<0.01	mg/l	9/23/03	9/24/03	PEF
Zinc	1.7	mg/l	9/23/03	9/24/03	PEF
(1) EPA 350.1 Ammonia					
Ammonia as N	0.043	mg/l		9/25/03	DRB
(1) EPA 420.1 Recoverable Phenolics ML					
Phenolics, Total Recoverable	<0.05	mg/l	9/24/03	9/25/03	DWK
(1) EPA Method 300.0 A					
Sulfate	150	mg/l		10/1/03	RAF
(1) SM 18 3500Cr-D Hexavalent Chromium					
Chromium, Hexavalent	<0.01	mg/l		9/12/03 10:28	DWK

Analysis performed at NYS DOH ELAP Number: *(1) 10248, (2) 10900, (3) 11667, (4) 10760, (5) 11369*