GLENN SPRINGS HOLDINGS, INC.
MILLER SPRINGS REMEDIATION MANAGEMENT INC.

QUARTERLY MONITORING REPORT
FIRST QUARTER - 2001

Bedrock Monitoring Data
- **NAPL Plume Containment System**
- **APL Plume Containment System**

Overburden Monitoring Data
- **Overburden Barrier Collection System**
- **Community Monitoring System**
- **Leachate Treatment System**

HYDE PARK RRT PROGRAM
NIAGARA FALLS, NEW YORK

JULY 2001
REF. NO. 1069 (295)
This report is printed on recycled paper.

TABLE OF CONTENTS

Page

TABLE OF CONTENTS

Page

LIST OF FIGURES
(Following Text)

<u>LIST OF TABLES</u>
(Following Text)

LIST OF TABLES
(Following Text)

LIST OF APPENDICES

1.0 INTRODUCTION

Reporting of monitoring data for the Non-Aqueous Phase Liquid (NAPL) Plume Containment System, Aqueous Phase Liquid (APL) Plume Containment System, and Overburden Barrier Collection System (OBCS) began in 1993. Quarterly monitoring reports for the NAPL and APL Plume Containment Systems as well as the OBCS have been submitted since 1996. These quarterly monitoring reports have also included data from the Leachate Treatment System, Residential Community Monitoring Program, and NAPL accumulation and recovery.

All monitoring data presented in this report have been collected and presented in accordance with the following documents:

i) "Stipulation on Requisite Remedial Technology Program" (RRT), dated November 13, 1995; and

ii) "Future Monitoring and Assessment Requirements", dated 1996.

Miller Springs Remediation Management, Inc. (MSRM), has been assigned the responsibility of managing the Hyde Park RRT Program under the direction of Glenn Springs Holdings, Inc. (GSHI), a subsidiary of Occidental Petroleum Corporation.

1.1 REPORT ORGANIZATION

The purpose of the report is to present monitoring data collected during the first quarter (January through March) 2001. The report is organized as follows:

- **Section 1.0 Introduction:** Section 1.0 presents a summary of the project, its administration, and the organization of the report.
- **Section 2.0 NAPL Plume Containment System:** Section 2.0 presents NAPL purge well operations data, performance monitoring data, statistical analyses of analytical data, and descriptions of non-routine investigations and activities performed during this reporting period. Recommendations for further investigation, if deemed necessary, are also presented in Section 2.
- **Section 3.0 APL Plume Containment System:** Section 3.0 presents APL purge well operations data, performance monitoring data, APL plume flux calculations where required, and descriptions of non-routine investigations and activities performed during this reporting period. Recommendations for further investigation, if deemed necessary, are also presented in Section 3.

- **Section 4.0 Overburden Monitoring Data:** Section 4.0 presents performance data from the Overburden Barrier Collection System and Residential Community Monitoring Well Network, and descriptions of non-routine investigations and activities performed during this reporting period. Recommendations for further investigation, if deemed necessary, are also presented in Section 5.
- **Section 5.0 Leachate Treatment Facility:** Section 5.0 presents analytical data collected from the Leachate Treatment Facility.
- **Section 6.0 NAPL Accumulation:** Section 6.0 presents a summary of the volume of NAPL collected from the Bedrock and Overburden Containment Systems and volumes of NAPL shipped off-Site for incineration.

2.0 NAPL PLUME CONTAINMENT SYSTEM

The NAPL Plume Containment System consists of a number of purge and performance monitoring wells installed in bedrock. The locations of the purge wells are shown on Figure 2.1. The locations of the monitoring wells in the upper, middle, and lower bedrock zones are shown on Figures 2.2 through 2.4, respectively.

The objectives of the NAPL Plume Containment System are:

i) containment of the APL and NAPL plumes through the maintenance of an inward hydraulic gradient; and

ii) collection of mobile NAPL.

Operation of the NAPL Plume Containment System commenced in 1994 and consisted of extraction from a series of six purge wells. The system has been modified over time to better achieve its objectives. The system presently consists of 12 NAPL Plume Containment Purge Wells (PWs) and one NAPL Purge Well (PW-7U) as shown on Figure 2.1. These wells are installed in three separate waterbearing zones identified within the Lockport bedrock formation and are designated as upper, middle, and lower.

2.1 PURGE WELL OPERATIONS

The PW system operated consistently during the first quarter of 2001. Maintenance of the PW system was required as noted below.

- PW-4M pump and motor were replaced on January 16, 2001. Accumulated NAPL and sediment were removed from the well during pump replacement.
- PW-5UR pump and motor were replaced on February 14 and again on February 27, 2001. Accumulated NAPL and sediment were removed from the well during each pump replacement event.
- PW-6UR pump and motor were replaced on February 16, 2001. Accumulated NAPL and sediment were removed from well during pump replacement.
- PW-7U pump was removed from the well on March 13, 2001 in order to verify its operation. The pump was found to be operational, however, the pump was not reinstalled in order to quantify NAPL recovery within the well.

The average pumping rates and set point elevations at each of the bedrock purge wells for the past 3 months are presented in Table 2.1. Of note, consistent with the results since May 1999, PW-4M remains dewatered; therefore, no APL or NAPL was extracted from this well. It appears that the open intervals of PW-6UR and/or PW-6MR have intercepted the flow zones feeding PW-4M, thus resulting in no flow from PW-4M.

The average pumping rate of the NAPL Plume Containment System over the first quarter was 52.8 gallons per minute (gpm). This flow rate is consistent with previous quarters.

2.2 CONTAINMENT SYSTEM MONITORING

Performance monitoring conducted during this quarter consisted of hydraulic, chemical, and NAPL presence monitoring. The performance monitoring well network is as presented in the "NAPL Plume Assessment and System Design Recommendations" report, dated July 1995, and modified most recently during the fourth quarter of 2000.

During this reporting period, routine hydraulic, chemical and NAPL presence monitoring were conducted as described in Sections 2.2.1, 2.2.2, and 2.2.3 of this report.

2.2.1 HYDRAULIC MONITORING

Hydraulic monitoring of well pairs located at the perimeter of the NAPL plumes (referred to as bedrock performance well pairs) was established in the RRT to gather the data necessary to verify the effective performance of the NAPL Plume Containment System. The hydraulic monitoring data has been used in two methods to assess the effectiveness of the NAPL Plume Containment System. The methods are: groundwater contours and hydraulic gradients.

Over the past year, GSHI/MSRM has undertaken an significant effort to better understand the inter-relationship of the three bedrock zones and to develop monitoring methods which will provide representative information for the evaluation of the performance of the NAPL Plume Containment System. This work included the review of all monitoring wells to determine if they are representative of the monitored interval and a groundwater modeling study. The results of the groundwater modeling study have hypothesized that significant downward vertical groundwater flow occurs from the upper bedrock zone to the middle and lower bedrock zones and from the middle bedrock zone to the lower bedrock zone. In addition, the evaluation of the monitoring wells have shown that they are, in general, completed over a number of individual flow zones. As a result of these findings, groundwater contours and hydraulic gradients are of limited effectiveness in the assessment of the NAPL Plume Containment System.

The hydraulic monitoring performed during this quarter is described in the following subsections.

2.2.1.1 <u>WATER LEVEL MEASUREMENTS</u>

Hydraulic monitoring was performed on January 11, February 1, and March 1, 2001. The measured water level depths were recorded on field data sheets and then converted to elevations based on surveyed reference points (tops of casings). The cumulative hydraulic monitoring data for the Site from 1993 through this report are included on the enclosed compact disc (CD) under the filename HIST.pdf.

2.2.1.2 <u>CONTOUR EVALUATION</u>

The use of groundwater contours to demonstrate the effectiveness of the NAPL Plume Containment System was not contemplated in the RRT. This method was proposed by MSRM as an alternate tool for assessment. However, as noted above, the recently completed groundwater modeling study has hypothesized that a significant downward vertical flow component exists from the upper bedrock zone to the middle and lower bedrock zones and from the middle bedrock zone to the lower bedrock zone. The use of groundwater contours for a bedrock zone (e.g., the upper bedrock zone) implicitly assumes that groundwater flow is horizontal in the plan of the map. As a result of the significant vertical flow component, the conclusions derived from contour maps of horizontal water levels are more than likely erroneous and misleading.

It was stated in the Fourth Quarter 2000 monitoring report that groundwater elevation contour maps for the three bedrock zones at the Site will no longer be prepared; however, after some consideration it has been determined that these contour maps may aid in some understanding of the groundwater flow through the Site with the issues noted above in mind.

Groundwater elevation contour maps have been prepared for each of the three bedrock zones using water level elevation data collected on March 1, 2001. These contour maps are presented in Appendix A of this report.

In generating the contour maps, each individual water level was checked to verify its appropriateness for use. Water level elevation data that were not used in the generation of the contour maps are noted in the legend of the corresponding contour map.

The contour maps were used to estimate the percentage of capture of groundwater across the NAPL plume boundaries in each of the three bedrock zones. This was accomplished by visually identifying segments along the NAPL plume boundaries where the groundwater flow direction is away from the Site, the total distance of the segments where capture is occurring was divided by the total distance of the NAPL plume boundary in order to calculate the percent of capture across the NAPL plume boundary. This method of interpreting the contour maps does not take into account any assumptions of a vertical flow component as was hypothesized in the groundwater model. The NAPL plume boundaries identified on each of the contour maps have been color coded to indicate segments where capture is and is not occurring.

The estimated groundwater capture for each of the three bedrock zones is presented as follows:

- Upper Bedrock Zone 53.4 percent
- Middle Bedrock Zone 86.6 percent
- Lower Bedrock Zone 86.4 percent

In addition to the preparation of groundwater contour maps, an estimation of groundwater capture was also obtained by applying the average first quarter pumping rates to the Hyde Park Groundwater Flow Model. Details of this estimation are presented in Section 2.2.1.4 of this report.

2.2.1.3 HYDRAULIC GRADIENT EVALUATION

The RRT requires that the performance of the NAPL containment system be evaluated through the calculation and review of horizontal hydraulic gradients across the limits of the NAPL plumes. The gradient evaluation criteria are specified in the RRT Section 4.3.7.3 (NAPL Plume Containment Performance Monitoring). Based on the evaluation of the monitoring wells and the groundwater modeling study, it was determined that the hydraulic gradient evaluation prescribed in the RRT may be based on an incomplete conceptual model of the Site. The RRT Stipulation does not take into account the three bedrock flow zones that are currently used to describe Site hydraulics. Nevertheless, MSRM has conducted the evaluation to meet the requirements of the RRT.

MSRM/GSHI are continuing to evaluate monitoring programs that would be both practical and satisfactory to the Governments.

Many of the monitoring wells that are used to make gradient calculations have been classified as representative of the aquifer that they are intended to monitor. However, it was suggested during the non-representative wells investigation that the wells within a gradient pairing do not necessarily monitor the same groundwater flow zones. When this is the case the data from the gradient pairings will yield misleading gradient data. In addition, monitoring wells that were identified as being non-representative were not included in this assessment.

Horizontal hydraulic gradient head differentials were calculated using the water level elevation data collected during the three hydraulic monitoring events performed during the first quarter. For the purpose of this report, the calculated head differentials will be referred to as hydraulic gradients. Table 2.2 presents the calculated horizontal hydraulic gradients for the well pairs in the three bedrock zones.

A summary of the horizontal hydraulic gradients recorded for the first quarter 2001 is provided below.

<u>Upper Bedrock Zone</u>

All monitoring wells in the upper bedrock zone have been used for gradient evaluations for this quarter. Two wells (CMW-12SH and CD3U) were not included in the non-representative wells investigation and two wells (D3U and E5U) were classified in the investigation as questionable due to limited data. Therefore, these wells have been retained for evaluation.

The representative monitoring well pairs that are used for the gradient evaluations in the upper bedrock zone are as follows: A1U-A2U, BC3U-B1U, CMW-12SH-CD3U, D4U-D3U, E5U-E3U, F5UR-F4U, G3U-G4U, H3U-H1U, and J3U-J1U.

The locations of these monitoring well pairs are shown on Figure 2.2.

Inward horizontal hydraulic gradients were present at seven of the nine monitoring well pairs (Vectors A, B, D, F, G, H, and J) during the first quarter 2001. Inward gradients were observed along the D, F, H, and J vectors during all three monitoring events, along the B and G vectors during the February and March monitoring events, and along the A Vector during the February monitoring event.

Middle Bedrock Zone

All monitoring wells in the middle bedrock zone have been used for gradient evaluations for this quarter. Monitoring well F1M was noted as having inconsistent fluctuations in water level; however, this well was not classified as non-representative and is included in this gradient evaluation.

The monitoring well pairs that are used for the gradient evaluations in the middle bedrock zone are as follows: BC3M-B1M, BC3M-C1M, D1M-D2M, E4M-E3M, F4M-F1M, G3M-G1M, H1M-H2M, and J1M-J2M.

The locations of the monitoring wells used in the gradient evaluation of the middle bedrock zone are shown on Figure 2.3.

Inward horizontal hydraulic gradients were present at seven of the eight well pairs (Vectors B, C, D, F, G, H, and J) during the first quarter. Inward gradients were observed along the F, G, H, and J vectors during all three monitoring events, along the B and C Vectors during the February and March monitoring events and along the D Vector during the February monitoring event.

Lower Bedrock Zone

The non-representative wells investigation classified lower bedrock zone monitoring well G5L as questionable due to limited data and monitoring wells G3L, H3L, H4L, J3L, and J4L were non-representative. Therefore, with the exception of G5L, these wells were not used in the gradient evaluation.

The representative monitoring well pairs that are used for the gradient evaluations in the lower bedrock zone are as follows: B1L-B2L, C1L-C2L, and D4L-D1L.

The locations of the monitoring well pairs used in the gradient evaluation of the lower bedrock zone are shown on Figure 2.4.

In the lower bedrock zone, an inward hydraulic gradient was present at each of the three representative well pairs during the first quarter 2001. Inward hydraulic gradients were observed along the C vector during the January and February monitoring events, along the D vector during the February and March monitoring events, and along the B vector during the January monitoring event.

2.2.1.4 GROUNDWATER CAPTURE SIMULATION

As referenced earlier, S.S. Papadopulos and Associates, Inc. has developed a groundwater flow model for the Site. This groundwater flow model represents a revision of the current conceptual model of the Site. Of significant note it hypothesizes the following:

i) vertical hydraulic gradients between bedrock flow zones;

ii) increased permeability in the upper bedrock zone; and

iii) increased permeability in the middle bedrock zone in the northwest portion of the Site.

The current understanding of the Site is that there is a significant component of vertical groundwater flow, particularly in the upper bedrock zone. Therefore, MSRM decided to use the groundwater flow model developed by by S.S. Papadopulos and Associates, Inc. (SSP&A) to assess the degree of capture obtained during the first quarter of 2001. The results of this model simulation are presented in the SSP&A memorandum entitled "Hyde Park Landfill: Simulation of First Quarter 2001 Conditions" dated April 11, 2001 which is presented in Appendix B of this report. It is anticipated that the groundwater model will form a component of the effectiveness monitoring for the NAPL Plume Containment System in the future.

A summary of the modeling results is presented below.

Model Calibration and Sensitivity

A groundwater model simulation was performed by SSP&A in order to predict the percentage of groundwater within the NAPL plume boundaries in each of the three bedrock zones captured during the first quarter of 2001. The percentage of capture was based on the sum of the areas within the NAPL plume boundaries which were captured divided by the total NAPL plume boundary area.

In performing the model simulation the average flow rate from each of the PWs during the first quarter of 2001 was used. The average water levels over the first quarter 2001 were used as calibration targets for the model. Using these values the mean residual (arithmetic average of the differences between observed and calculated) water level was -0.32 feet and the mean absolute residual (arithmetic average of the absolute differences between observed and calculated) water level was 4.93 feet. The mean residual water level was identical to the March 1999 to March 2000 calibration and the mean absolute residual was slightly higher than the March 1999 to March 2000 value of 4.72 feet. This is an indication that the model is appropriately calibrated with respect to the water level data.

Historic Capture

An evaluation of the remedial bedrock pumping was performed for the period between March 1999 to March 2000 using the groundwater flow model. The results of this evaluation are contained in the SSP&A report entitled "Groundwater Modeling Study: Conceptual Evaluation of NAPL Plume Containment", dated March 15, 2001. Using the average combined PW flow rate (52.7 gpm) during the period from March 1999 to March 2000, this evaluation indicated that 49.3 percent of the groundwater within the upper bedrock NAPL plume was captured, 87 percent of the groundwater within the middle bedrock NAPL plume was captured and 98.8 percent of the groundwater within the lower bedrock NAPL plume was captured.

Current Capture

Using the combined PW flow rate during the first quarter (52.8 gpm), the groundwater model has predicted that 52.1 percent of the groundwater within the upper bedrock zone NAPL plume is captured, 90.4 percent of the groundwater within the middle bedrock zone NAPL plume is captured and 98.8 percent of groundwater within the lower bedrock NAPL plume is captured during the first quarter of 2001.

Discussion

The flow rates used for the simulations of historic and current are approximately equal yet the capture zones in the upper and middle zones each increased approximately 3 percent. These increases in capture are attributed to an increase in pumping rate from the middle zone; the pumping rate at PW-2M increased from 20.5 gpm to 26.5 gpm. The pumping rates in two lower zone wells decreased, PW-1L decreased from 8.1 gpm to 6.1 gpm and PW-2L decreased from 3.0 gpm to 1.3 gpm. These decreases in pumping rate did not effect the estimations of capture in the lower zone. It is believed that the decrease in pumping rate from the lower zone purge wells is the result of the increase in pumping at PW-2M; this would be consistent with the hypothesis that a downward vertical hydraulic gradient exists between the bedrock waterbearing zones.

2.2.1 NAPL MONITORING

NAPL monitoring is performed to provide information to assist in the evaluation of containment system effectiveness. NAPL monitoring consists of: i) the physical inspection of monitoring wells located both inside and outside of the NAPL plumes for the presence of NAPL, and ii) determination of the volume of NAPL removed by the NAPL Plume Containment System.

2.2.2.1 NAPL PRESENCE CHECKS

Prior to any purging or sampling activities, a check for NAPL presence was performed at each well using a weighted tape measure with a length of cotton rope attached. This NAPL presence check methodology was summarized in the memorandum entitled "NAPL Presence Check Method Comparison, Hyde Park RRT Program", dated January 12, 2001. NAPL was not observed in any of the outer wells or those inner wells that are located beyond the limits of the bedrock NAPL plume definitions. Table 2.3 summarizes the findings of the NAPL presence checks.

2.2.2.2 NAPL ACCUMULATION QUARTERLY RATIO

In accordance with the Future Monitoring and Assessment Requirements document (1996), Section 4.1.2.2, a determination of the ratio of NAPL/APL extracted through the operation of the bedrock NAPL plume containment system this quarter was made. Approximately 6.84 million gallons of APL were removed from the bedrock purge wells. During the same period, approximately 1,034 gallons of NAPL were removed from the bedrock purge wells. The current NAPL/APL ratio (0.000151) and the ratios calculated from previous quarters are presented in Table 2.4.

2.2.3 CHEMICAL MONITORING

Groundwater samples are collected and analyzed each quarter to obtain data for use in the evaluation of the NAPL Plume Containment System. The groundwater sampling consists of the collection of samples from the outer well of each of the bedrock performance well pairs. The results of the analyses of these samples are used for quarterly comparisons and annual statistical analyses.

2.2.3.1 FIELD PROCEDURES

All monitoring well purging and sample collection activities were conducted in accordance with the procedures presented in the report entitled "Long-Term Monitoring Manual, Hydraulic (Water Levels), Physical (NAPL Presence-Seeps), Chemical (Groundwater Sampling), Hyde Park Landfill Site", dated October 9, 1998. Purging methods and well volumes removed from each well are summarized in Table 2.5. All purged groundwater was transported to the Hyde Park treatment facility for treatment. Table 2.6 presents a sample key and water quality observations and measurements for the samples collected.

2.2.3.2 ANALYTICAL RESULTS

The analytical results for the first quarter 2001 chemical monitoring event are summarized in Table 2.7. The cumulative analytical data for all quarterly chemical monitoring events dating back through 1996 are included on the enclosed CD under the filename HIST.pdf. The analytical data were reviewed for conformance to standard Quality Assurance/Quality Control (QA/QC) protocols and copies of the resultant data validations are kept on file at the Western New York MSRM Administration office and are attached as a PDF file. The first quarter 2001 results are similar in nature to historical results.

2.2.3.3 STATISTICAL ANALYSIS OF ANALYTICAL RESULTS

In accordance with Section 4.3.8.1-Lateral NAPL Plume Migration of the RRT Stipulation, a statistical evaluation on the NAPL Plume Containment Effectiveness Parameters (phenol, benzoic acid, chlorendic acid, total chlorobenzoic acid, and total organic halides [TOX]) analytical data from the outer well of each gradient pair was performed.

Under the statistical methodology used, the hypothesis is drawn that the concentrations of each constituent statistically analyzed are increasing with respect to time. If the hypothesis proves true, then the indication is that NAPL/Site chemistry is migrating away from the Site. To test the hypothesis, regression was performed for each specified parameter for each well. A 95 percent Upper and Lower Confidence Interval (CI) were then calculated for the slope of the regression line. The 95 percent CI represents a 95 percent statistical confidence that the true slope of the regression lies between the Upper and Lower CI. If the chemical concentration were to remain steady with time then the true slope of the regression line would be equal to zero (a flat horizontal line). If the concentrations were increasing with time, the true slope would be greater than zero. If the concentrations were decreasing with time, the true slope would be less than zero.

The 95 percent CI indicates the range of slopes which is likely to include the true slope of the regression line. If the 95 percent CI includes zero as a potential slope then the slope is determined to potentially include zero as a slope and hence the regression line may be neither increasing or decreasing.

If the lower 95 percent CI value is greater than zero, then the regression line is determined to be significantly increasing. This indicates that the potential slopes for the regression line are all greater than zero at a 95 percent statistical confidence level. Likewise, if the upper 95 percent CI value is less than zero then the regression line is determined to be statistically significantly decreasing. This indicates that the potential slopes for the regression line are all less than zero at a 95 percent statistical confidence level. The method used is derived from: McBean, E.A., and Rovers, F.A., 1998, Statistical Procedures for Analysis of Environmental Monitoring Data and Risk Assessment, Prentice-Hall Publishing Co. Inc., Englewood Cliffs, New Jersey.

Table 2.8 presents a summary of the statistical data for each well and individual constituent. A graph of each parameter on a well-by-well basis is presented in Appendix C of this report and is also included on the enclosed CD under the filename HPSTATS.pdf.

The statistical evaluation indicates that the concentrations of the NAPL Plume Containment System Effectiveness Parameters are not increasing at a statistically significant rate in any of the outer wells.

2.3 NON-ROUTINE INVESTIGATIONS AND FIELD ACTIVITIES

Field activities associated with non-routine monitoring that were completed during the first quarter of 2001 with respect to the NAPL Plume Containment System were as follows:

- An investigation was conducted at NAPL Purge Well PW-7U to evaluate the rate of NAPL recovery. During operation of the pump during the fourth quarter of 2000, NAPL was not observed by the mass flowmeter installed at the wellhead. On March 13, 2001, the pump was removed from the well in order to verify proper installation and measure the level of NAPL within the well. Upon removing the pump from the well it was determined that NAPL was present within the pump piping. The NAPL level was measured within the well and was found to be 1.5 feet thick. The typical NAPL level within the well prior to pumping had been approximately 14 feet. Based on these findings, it is apparent that pumping at PW-7U has successfully removed NAPL from the well. NAPL level monitoring in PW-7U will continue in order to determine the rate at which NAPL is entering the well. Once a rate is established, the pump will be re-installed and pumping will be resumed at a flow rate more consistent with the NAPL infiltration rate.

No other investigations were performed with respect to the NAPL plume containment system during the first quarter of 2001.

2.4 SUMMARY

The water levels in the operating bedrock purge wells were generally at or very close to their set point elevations during January, February, and March 2001. The average pumping rate for the system over the first quarter was 52.8 gpm, consistent with the previous quarters pumping rates.

Groundwater contour evaluations for each of the three bedrock zones indicate that 53.4 percent of groundwater within the limits of the upper bedrock zone NAPL plume, 86.6 percent of groundwater within the limits of the middle bedrock zone NAPL plume, and 86.4 percent of groundwater within the limits of the lower bedrock zone NAPL plume is captured by the NAPL Plume Containment System.

This evaluation indicates that four of nine Upper Bedrock Zone monitoring well pairs, four of eight Middle Bedrock Zone monitoring well pairs, and one of the six Lower Bedrock Zone monitoring well pairs achieved inward horizontal gradients during January, February, and March 2001.

Groundwater model simulations using the first quarter flow rate data indicate that 52.1 percent of groundwater within the limits of the upper bedrock zone NAPL plume, 90.4 percent of the groundwater within the limits of the middle bedrock zone NAPL plume, and 98.8 percent of the groundwater within the limits of the lower bedrock zone NAPL plume is captured by the NAPL Plume Containment System.

NAPL monitoring indicates that NAPL is not present in any monitoring well located outside of the NAPL plume boundary for each of the three bedrock zones.

Chemical monitoring and the statistical analysis indicate that chemical concentrations, where detected, are not increasing.

2.5 ACTION ITEMS

During the second quarter of 2001 two investigations are planned that will assist in the determinations of the predictive capabilities of the groundwater flow model and the appropriateness of the monitoring well pairings currently used for calculating horizontal gradients. The first test that is scheduled will involve continuous monitoring of one pair of well clusters (C1 and C2) while one purge well (PW-2M) is turned off for a short period and then re-started. A copy of the letter Work Plan for this test is presented in Appendix D. The results of this test will aid in determining whether:

i) existing monitoring wells are appropriate for use in developing a new monitoring program for the Site;

ii) existing monitoring wells need to be reconstructed to monitor specific flow zones;

iii) new monitoring wells need to be constructed; and

iv) the groundwater flow model requires further calibration.

The second investigation that is scheduled during the second quarter of 2001 is a hydraulic monitoring program that will coincide with a treatment plant shutdown. This monitoring program will focus on obtaining Site-wide hydraulic data prior to the shut-down, during the shutdown and following the restart of all purge wells. An emphasis will be placed on obtaining static groundwater conditions during the shut-down period and impact of pumping from each Purge well on the monitoring well network during the restart period. A copy of the Shutdown Monitoring Program Work Plan is presented in Appendix E of this report. The data collected during this monitoring program will be used to assess the influence of pumping at the Site and validate the groundwater flow model calibration.

3.0 APL PLUME CONTAINMENT SYSTEM

The APL Plume Containment System consists of two purge wells (APW-1 and APW-2) and four monitoring well pairs (ABP-1/ABP-2, ABP-3/ABP-4, ABP-5/ABP-6, and ABP-7/ABP-8). Locations of these wells are shown on Figure 3.1. The performance criteria for the APL Plume Containment System (remediated APL plume) is to achieve flow convergence towards the purge wells and eliminate seepage at the Gorge Face to the extent practicable.

Three clusters of APL Flux Monitoring Wells (AFW-1U/M/L, AFW-2U/M/L, and AFW-3U/M/L) (also shown on Figure 3.2) monitor the remainder of the APL plume, oriented toward the west of the Site and located south of the remediated APL plume. The performance criteria for the APL Flux Monitoring Wells (AFWs) is to monitor the APL plume flux to the Niagara River through chemical monitoring and to determine whether the flux measured in these wells exceeds the Flux Action Levels specified in the RRT Stipulation.

3.1 APL PURGE WELL (APW) OPERATIONS

During the first quarter of 2001, automated pump operations were uninterrupted and groundwater levels within each purge well were generally maintained within their respective design settings. No maintenance activities were performed on APWs during this quarter.

3.2 PERFORMANCE MONITORING

3.2.1 WATER LEVEL MEASUREMENTS

Outward hydraulic gradients were observed between the ABP-1/ABP-2 and ABP-5/ABP-6 monitoring well pairs during the fourth quarter of 2000; therefore, hydraulic monitoring was performed weekly during the first quarter of 2001. The calculated hydraulic head differential gradients (referred to herein as hydraulic gradients) for the four ABP monitoring well pairs are presented in Table 3.1. The cumulative hydraulic monitoring data from March 1997 to present is included on the enclosed CD under the filename HIST.pdf.

Groundwater levels were also measured at the nine AFW monitoring wells prior to sample collection for APL flux monitoring. These levels are required as part of the hydraulic monitoring program, as well as to calculate the standing volume of groundwater in each well to determine the purge volume prior to sample collection. The cumulative monitoring data for the AFW monitoring wells from 1993 to present is included on the enclosed CD under the filename HIST.pdf.

3.2.2 CONTOUR EVALUATION

The ABP monitoring wells were used in the generation of the upper bedrock zone contour map. The upper bedrock zone contour map was generated using water level elevation data collected on March 1, 2001. The upper bedrock zone contour map indicates that generally groundwater flow occurs from the ABP monitoring wells towards the APL purge wells.

3.2.3 GRADIENT EVALUATION

As previously stated, water level measurements were collected weekly at the ABP monitoring wells. During the first quarter of 2001, 12 sets of water level elevation data were collected from these wells. Monitoring well pairs ABP-3/ABP-4 and ABP-7/ABP-8 maintained inward horizontal hydraulic gradients during each of the twelve monitoring events. Outward horizontal hydraulic gradients were observed at well pairs ABP-1/ABP-2 and ABP-5/ABP-6 during each of the twelve monitoring events of this quarter.

The inability to maintain inward hydraulic gradients between monitoring well pairs ABP-1/ABP-2 and ABP-5/ABP-6 may be due to the orientation of these well pairs relative to the direction of groundwater flow, the direction of groundwater flow is to the northwest while the well pairs are oriented in a general north-south direction. Monitoring well pairs ABP-1/ABP-2 and ABP-5/ABP-6 are oriented perpendicular to the direction of groundwater flow rather than with the direction of flow. Therefore, comparisons made between these well pairs indicate gradient reversals that do not necessarily indicate an impact of pumping.

3.2.4 SEEP FLOWS

The four gorge face seeps (GF-S1, GF-S2, GF-S3, and GF-S4 as shown on Figure 3.3) were inspected monthly in conjunction with hydraulic monitoring events and the flow rate of each seep was visually estimated. A cumulative history of the flow rate estimations is included on the enclosed CD under the filename HIST.pdf. No flow observed at the gorge face seeps in January 2001; GF-S1 was dry while GF-S2, GF--S3, and GF-S4 were each frozen. During the February monitoring event the estimated gorge face seep flow rates were as follows: 1 gpm at GF-S1, 3 gpm at GF-S2, 1 gpm at GF-S3, and 2 gpm at GF-S4. During the March monitoring event the estimated gorge face seep flow rates were as follows: 0 gpm at GF-S1, 1 gpm at GF-S2, 0 gpm at GF-S3, and 3 gpm at GF-S4. Seep GF-S4 originates below the Rochester formation and is below any known Hyde Park influences.

3.2.5 CHEMICAL MONITORING

Groundwater samples are collected for analysis each quarter from the APW and AFW wells in order to assist in the evaluation of the APL Plume Containment System and calculate the APL Plume flux when required. The APW wells are also sampled semi-annually for analysis of the Collected Liquids Monitoring Parameters as described in Section 9.9 of the RRT.

3.2.5.1 FIELD PROCEDURES

All monitoring well purging and sample collection activities were conducted in accordance with the procedures presented in the report entitled "Long-Term Monitoring Manual, Hydraulic (Water Levels), Physical (NAPL Presence-Seeps), Chemical (Groundwater Sampling), Hyde Park Landfill Site ", dated October 9, 1998. Purging methods and well volumes removed from each well are summarized in Table 3.2. All purged groundwater was transported to the Hyde Park treatment facility for disposal.

3.2.5.2 AFW/APW FLUX COMPOSITE SAMPLING AND ANALYSES

In order to determine the APL Flux to the Niagara River, a composite sample consisting of water from five AFW monitoring wells and the two APW purge wells is prepared. The required volume from each well is calculated for the composite sample prior to initiation of groundwater sample collection. The volumes presented in Table 3.3 were calculated based on the percentage of cross-sectional contributing area of groundwater flow past each well as compared to the total groundwater flow towards the Niagara River Gorge Face represented by all seven wells.

Groundwater sampling was performed using the protocols previously described for the bedrock performance monitoring wells (Section 2.4.2), with the exception of the two APWs where samples are collected directly from the discharge of the operating pumps. The sample key, pH, conductivity, temperature, and water quality observations are summarized in Table 3.4.

The composite sample was prepared by collecting an individual water sample from each of the monitoring wells. The volume of sample collected from each well is listed in Table 3.3. Each individual sample was poured into a large glass container for mixing. Following mixing, the composite was poured into individual containers for shipment to the analytical laboratories. Samples collected for analysis of volatile organic compounds (VOCs), were submitted in individual containers for compositing at the analytical laboratory to ensure that any VOCs present were not lost due to field compositing. The laboratory was provided with the predetermined percentages listed in Table 3.3 for compositing. Analyses were performed by Severn Trent Laboratories (STL) for the APL Plume Flux Parameters and APL Plume Monitoring Parameters that are defined in the RRT Stipulation (Sections 9.3 and 9.4) while the 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) analyses were performed by Alta Labs and polychlorinated biphenyls (PCB) analyses were performed by Triangle Labs. The results of the AFW/APW composite sampling are presented in Table 3.5.

3.2.5.3 <u>APW CLMP/ACIDS SAMPLING AND ANALYSES</u>

In accordance with the RRT Stipulation (Section 11.1.3 Collected APL Monitoring and Section 9.9 Collected Liquids Monitoring Parameters), the APWs are sampled semi-annually for analysis of the Collected Liquids Monitoring Parameters (CLMP) as well as benzoic, monochlorobenzoic (sum o, p, and m isomers) and chlorendic acids. This sampling was conducted on February 8, 2001 in conjunction with the AFW/APW composite sampling described previously in Section 3.3.2.1. The samples were collected directly from the discharge of the APW pumps at the well heads. The results of the APW CLMP/Acids sampling are presented in Table 3.6.

3.2.5.4 <u>APL PLUME FLUX CALCULATIONS</u>

There were no exceedances of APL Plume Flux Parameter detection levels during the first quarter of 2001 and therefore, chemical flux calculations were not required.

3.3 NON-ROUTINE INVESTIGATIONS AND ACTIVITIES

There were no non-routine investigations or field activities performed with respect to the APL Plume Containment System during the first quarter of 2001.

3.4 SUMMARY

Based on the hydraulic monitoring at the ABP monitoring wells, the APL Plume Containment System (remediated APL plume) did not achieve flow convergence throughout the system during this monitoring period.. Based on the gorge face seep flows, however, the reduction in flows at seeps GF-S3 and GF-S4 indicate that the APWs are working properly in reducing APL migration to the Niagara River.

The following bullets describe the significant individual results from the APL Plume Containment System:

- Inward horizontal gradients were achieved at two of the four ABP monitoring well pairs for all hydraulic monitoring events of this quarter.
- During the first quarter, Gorge Face Seep flows remained similar to historic events.
- During the first quarter of 2001, there were no exceedances of the APL Plume Flux Parameter detection levels, therefore, chemical flux calculations were not required.

The same five AFWs along with the two APWs will form the composite sample during future APL Plume Containment System monitoring events.

3.5 ACTION ITEMS

From the data obtained during the first quarter of 2001, it has been determined that the following task needs to be completed in order to improve the quality of the monitoring system:

i) Due to the outward horizontal gradients observed between monitoring well pairs ABP-1/ABP-2 and ABP-5/ABP-6, hydraulic monitoring will continue at weekly intervals until all measurements during a quarter indicate inward horizontal gradients.

4.0 OVERBURDEN MONITORING DATA

The required overburden monitoring reporting includes monitoring data for the following programs:

i) Overburden Barrier Collection System (Section 4.1); and

ii) Residential Community Monitoring Program (Section 4.2); and

4.1 OVERBURDEN BARRIER COLLECTION SYSTEM

The Overburden Barrier Collection System (OBCS) consists of an overburden collection trench that extends around the north, west, and south of the Site and is located within the limits of the overburden APL plume. Eight pairs of OBCS monitoring wells (OMWs) are located beyond the OBCS alignment, with one well from each pair installed within the overburden APL plume limits and the second well from each pair installed outside of the overburden APL plume limits. The locations of the OMWs are shown on Figure 4.1.

4.1.1 PERFORMANCE MONITORING

Hydraulic monitoring and NAPL monitoring are performed at the OMWs in order to assess the performance of the OBCS system. Hydraulic data are used to determine whether or not an inward horizontal gradient across the APL plume boundary is being created by the OBCS. NAPL monitoring is performed as an additional assessment in order to determine whether or not horizontal migration of overburden NAPL is occurring.

4.1.1.1 GRADIENT EVALUATION

Hydraulic monitoring of the OBCS is performed by collecting water level measurements from the OMWs installed around the Hyde Park Landfill. Hydraulic monitoring of the 16 OMWs was performed weekly in January, February, and March 2001. Additionally, in order to demonstrate the presence of a downward vertical hydraulic gradient, some Upper Bedrock Zone monitoring wells were monitored monthly at locations where inward horizontal hydraulic gradients were historically not achieved. Table 4.1 summarizes the fourth quarter hydraulic head differential gradients (referred to herein as hydraulic gradients). The cumulative hydraulic monitoring data for the OBCS from 1992 to present are included on the enclosed CD under the filename HIST.pdf.

From Table 4.1, it can be seen that an inward horizontal hydraulic gradient within the overburden regime has been achieved for all monitoring events this quarter at five of the eight monitoring well pairs as follows:

i) OMW-1 / OMW-2;
ii) OMW-3 / OMW-4R;
iii) OMW-5R / OMW-6;
iv) OMW-9 / OMW-10R; and
v) OMW-15 / OMW-16R

Table 4.1 indicates the presence of a downward vertical hydraulic gradient from the overburden to the upper bedrock at each of the monitoring well pairs that did not meet the inward hydraulic gradient criteria as follows:

i) B1U / OMW-8R2;
ii) D1U / OMW-11R; and
iii) E4U / OMW-14R.

4.1.1.2 OVERBURDEN NAPL PRESENCE CHECKS

In accordance with Section 3.6.2.3 of the RRT Stipulation, a NAPL presence check was conducted at all overburden wells within the overburden APL plume but outside the defined (1996) overburden NAPL plume limit. Table 4.2 summarizes the results of the NAPL presence checks for the past year. During the first quarter of 2001, NAPL was not observed in any of the outer overburden monitoring wells.

4.2 RESIDENTIAL COMMUNITY MONITORING PROGRAM

Eleven pairs of Community Monitoring Wells (CMWs), consisting of one overburden and one shallow bedrock well, are located in the residential community areas around the Hyde Park Landfill Site. These wells provide an early warning for possible APL plume migration towards residential areas. The overburden (OB) wells are screened to within 1-foot of the bottom of the clay layer overlying the bedrock, while the shallow bedrock (SH) wells extend approximately 15 feet below the top of bedrock.

4.2.1 PERFORMANCE MONITORING

The performance monitoring activities required for the Residential Community Monitoring Program are as follows:

i) quarterly monitoring of overburden and bedrock groundwater elevations;

ii) where no overburden groundwater is present, soil air samples are collected and analyzed; and

iii) annual groundwater sampling and analysis of the overburden well located closest to the Site (CMW-12OB).

4.2.1.1 HYDRAULIC MONITORING AND GRADIENT EVALUATION

For the first quarter of 2001 hydraulic monitoring of the CMWs was performed monthly on January 11, February 1, and March 1, 2001. Table 4.3 summarizes the vertical hydraulic head differential gradients (referred to herein as hydraulic gradients) for the first quarter. The cumulative hydraulic monitoring data for the CMWs from 1987 to present are included on the enclosed CD under the filename HIST.pdf.

The calculation of vertical hydraulic gradients shows that the required downward hydraulic gradients were present this past quarter at all of the well pairs where water levels were measured (four overburden wells: CMW-7OB, CMW-8OB, CMW-9OB, and CMW-11OB, were dry for all or part of the fourth quarter). At each of the overburden wells that were dry, the elevation of the bottom of the well was higher than the groundwater elevation in the shallow bedrock well of the pair during each monitoring event. Under these conditions downward vertical gradients would be observed if water were present in the overburden well.

4.2.1.2 SOIL AIR SAMPLING

At two CMW well pair locations (CMW-7 and CMW-8), the overburden wells have historically contained little to no groundwater, indicating unsaturated conditions in the overburden soils in these areas. As a result, soil air samples are collected from these two wells each quarter. Table 4.4 presents the analytical data for the soil air samples from CMW-7OB and CMW-8OB on February 22, 2001. All parameters were non-detect at each of these locations during the first quarter and have historically been non-detect.

4.2.1.3 ANNUAL GROUNDWATER SAMPLING

Sampling of the overburden community monitoring well located closest to the Site (CMW-2OB prior to 2000, now CMW-12OB) is performed annually during the fourth quarter of each calendar year. Therefore, the sampling was not performed during this reporting period.

4.3 NON-ROUTINE INVESTIGATIONS AND ACTIVITIES

During the first quarter of 2001, there were no non-routine investigations or field activities conducted with regards to the overburden systems.

4.4 SUMMARY

4.4.1 OVERBURDEN BARRIER COLLECTION SYSTEM

A review of the hydraulic monitoring data for the first quarter of 2001 indicates that inward horizontal hydraulic gradients were present at five of the eight monitoring well pairs. Downward vertical gradients were present at the remaining three monitoring well pairs where an inward horizontal gradient was not maintained.

NAPL was not observed in any of the overburden monitoring wells, indicating that the OBCS continues to serve as an effective barrier to off-Site NAPL migration.

4.4.2 RESIDENTIAL COMMUNITY MONITORING PROGRAM

Downward vertical gradients were achieved at all of the monitored well pairs during the first quarter of 2001. Two monitoring wells, CMW-7OB and CMW-8OB remained dry for each of the monitoring events of the first quarter.

4.5 ACTION ITEMS

From the monitoring data obtained during the first quarter of 2001, it has been determined that the overburden systems are operating properly and no further investigation or maintenance issues are evident at this time.

5.0 LEACHATE TREATMENT SYSTEM

In accordance with Section 11.1.4 of the RRT and Addendum I of the Settlement Agreement, the midpoint and effluent of the APL treatment system are monitored. Sampling is required at daily, weekly, and monthly intervals for various parameter groups in order to determine whether the APL Plume Flux is below the Flux Action Levels and whether and when the carbon beds need to be replaced or other maintenance activities need to be undertaken.

5.1 EFFLUENT ANALYSIS

The APL treatment system effluent was sampled daily, weekly, and monthly during the first quarter of 2001. The sample data is grouped by frequency of sample collection for discussion in the following subsections.

5.1.1 DAILY SAMPLING

Table 5.1 summarizes the results of the daily composite sampling. No exceedances of the treatment levels were reported this quarter for any of the three daily parameters; pH, total organic carbon (TOC), and phenol.

5.1.2 WEEKLY SAMPLING

Table 5.2 summarizes the results of the weekly composite sampling. No exceedances of the treatment levels were reported this quarter for any of the five weekly parameters or their isomers from the collected effluent samples.

5.1.3 MONTHLY SAMPLING

Table 5.3 summarizes the results of the monthly composite sampling. No exceedances of the treatment levels were reported this quarter for any of the eight parameters or their isomers.

6.0 NAPL ACCUMULATION

The well extraction systems and manual NAPL removal collected approximately 1,316 gallons of NAPL during the first quarter of 2001. Monthly NAPL recovery identified by source is summarized in Table 6.1.

6.1 DECANTERS

Manual NAPL level measurements are conducted monthly in the three decanters. The levels are extrapolated to estimate the quantity of NAPL present in each of the decanters. A description of each decanter's source is provided below:

- Decanter No. 1 Bedrock Purge Well System
- Decanter No. 2 Overburden Barrier Collection System
- Decanter No. 3 Source Control System

NAPL accumulated during the first quarter of 2001 was 1,316 gallons. The quantities from each decanter were:

- Decanter No. 1 1,034 gallons
- Decanter No. 2 252 gallons
- Decanter No. 3 0 gallons

NAPL measurements in the decanters are subject to a measurement error of ±6 inches which equates to ±188 gallons of NAPL.

6.2 MANUAL RECOVERY

In an effort to enhance NAPL recovery at the Site, MSRM has voluntarily initiated manual NAPL removal from monitoring wells where sufficient NAPL volumes exist. During the first quarter of 2001, MSRM manually recovered an additional 30 gallons of NAPL directly from monitoring wells at the Hyde Park Landfill Site.

6.3 INCINERATION

During the first quarter of 2001 no NAPL was shipped from the Hyde Park Site for incineration.

FIGURES

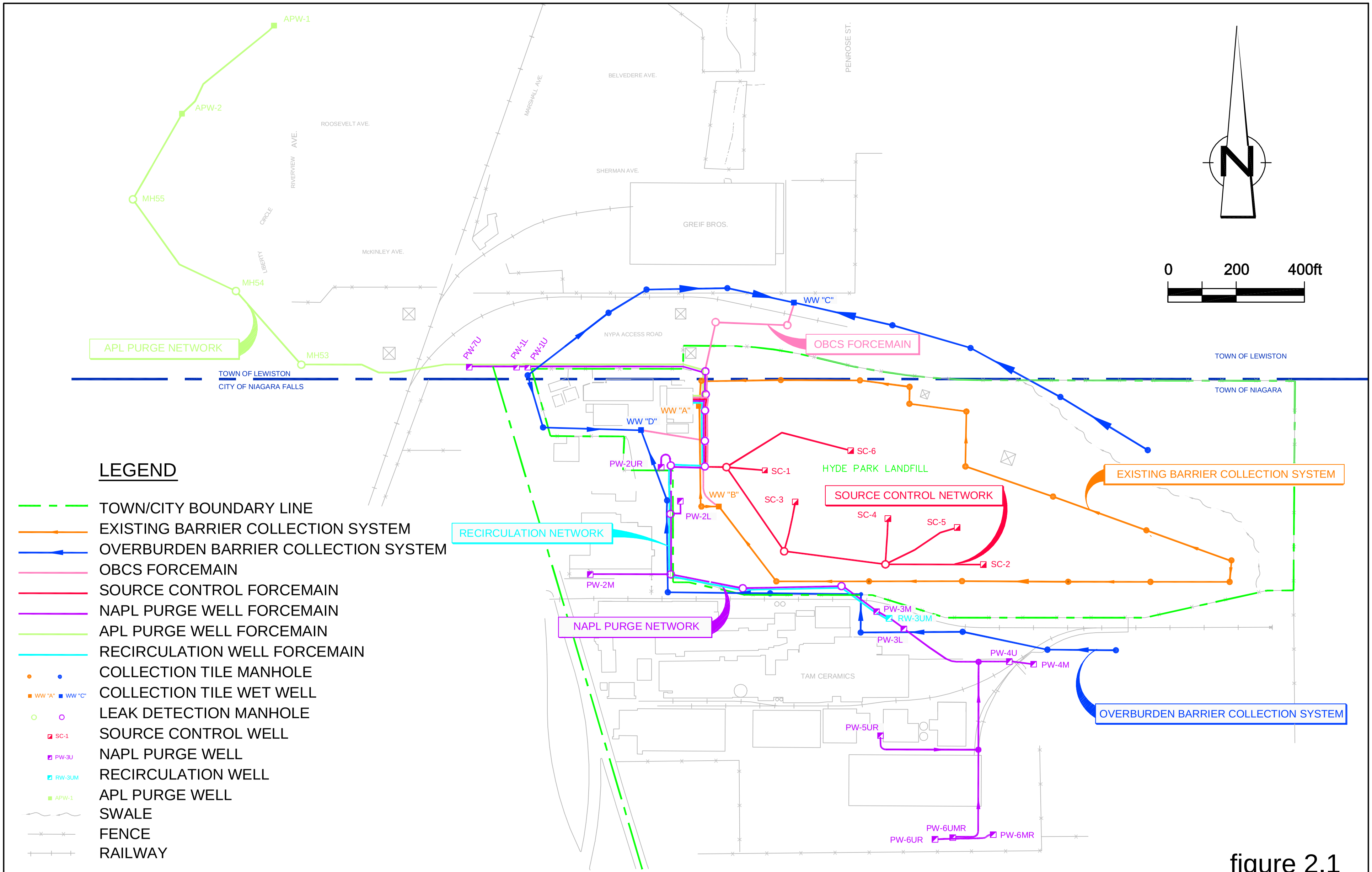


figure 2.1

APL/NAPL REMEDIAL ACTION ELEMENTS
Hyde Park RRT Program

01069-20(295)GN-NF001 MAY 08/2001

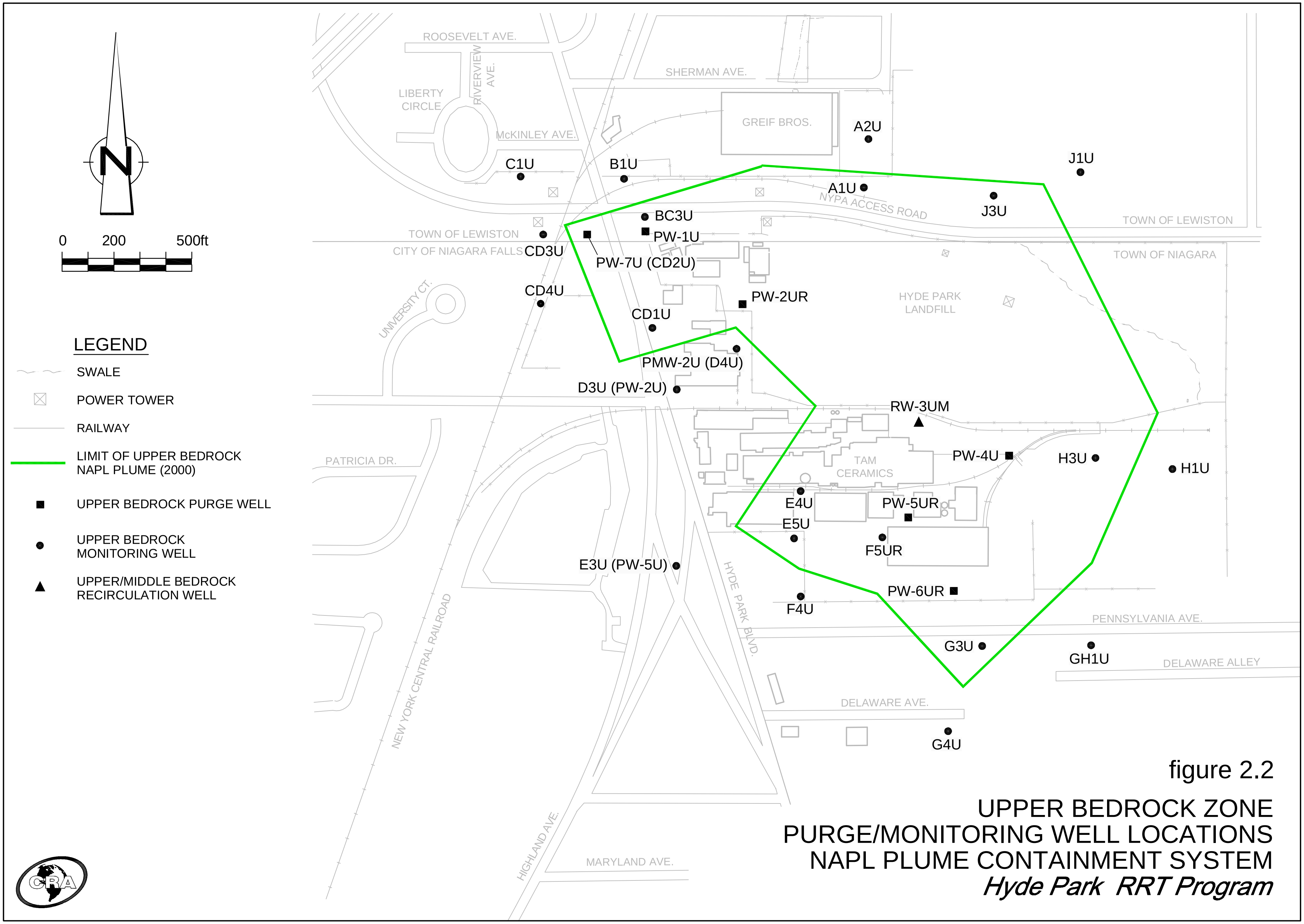


figure 2.2

UPPER BEDROCK ZONE
PURGE/MONITORING WELL LOCATIONS
NAPL PLUME CONTAINMENT SYSTEM
Hyde Park RRT Program

01069-20(295)GN-NF002 MAY 08/2001

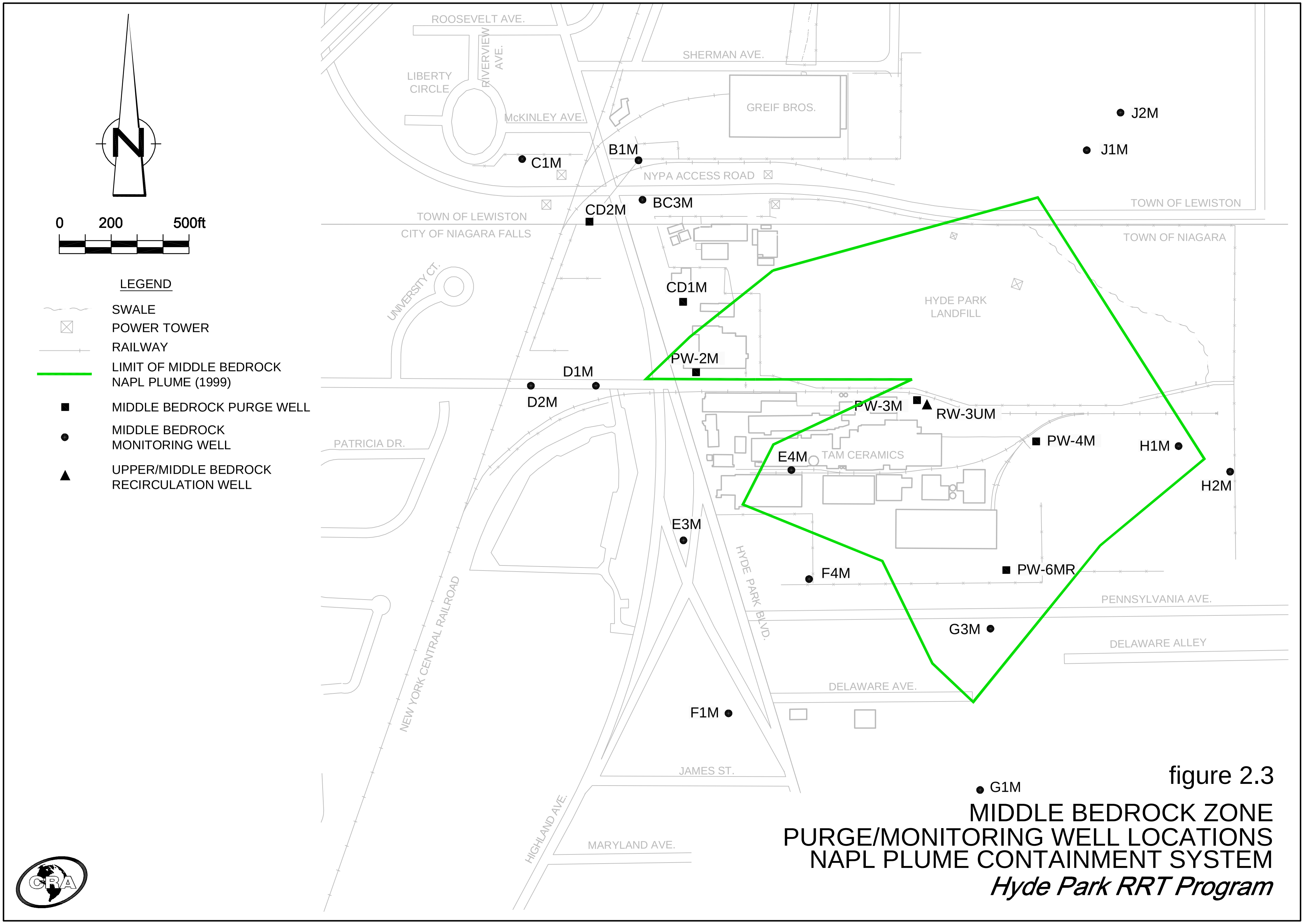


figure 2.3

MIDDLE BEDROCK ZONE
PURGE/MONITORING WELL LOCATIONS
NAPL PLUME CONTAINMENT SYSTEM
Hyde Park RRT Program

01069-20(295)GN-NF003 MAY 08/2001

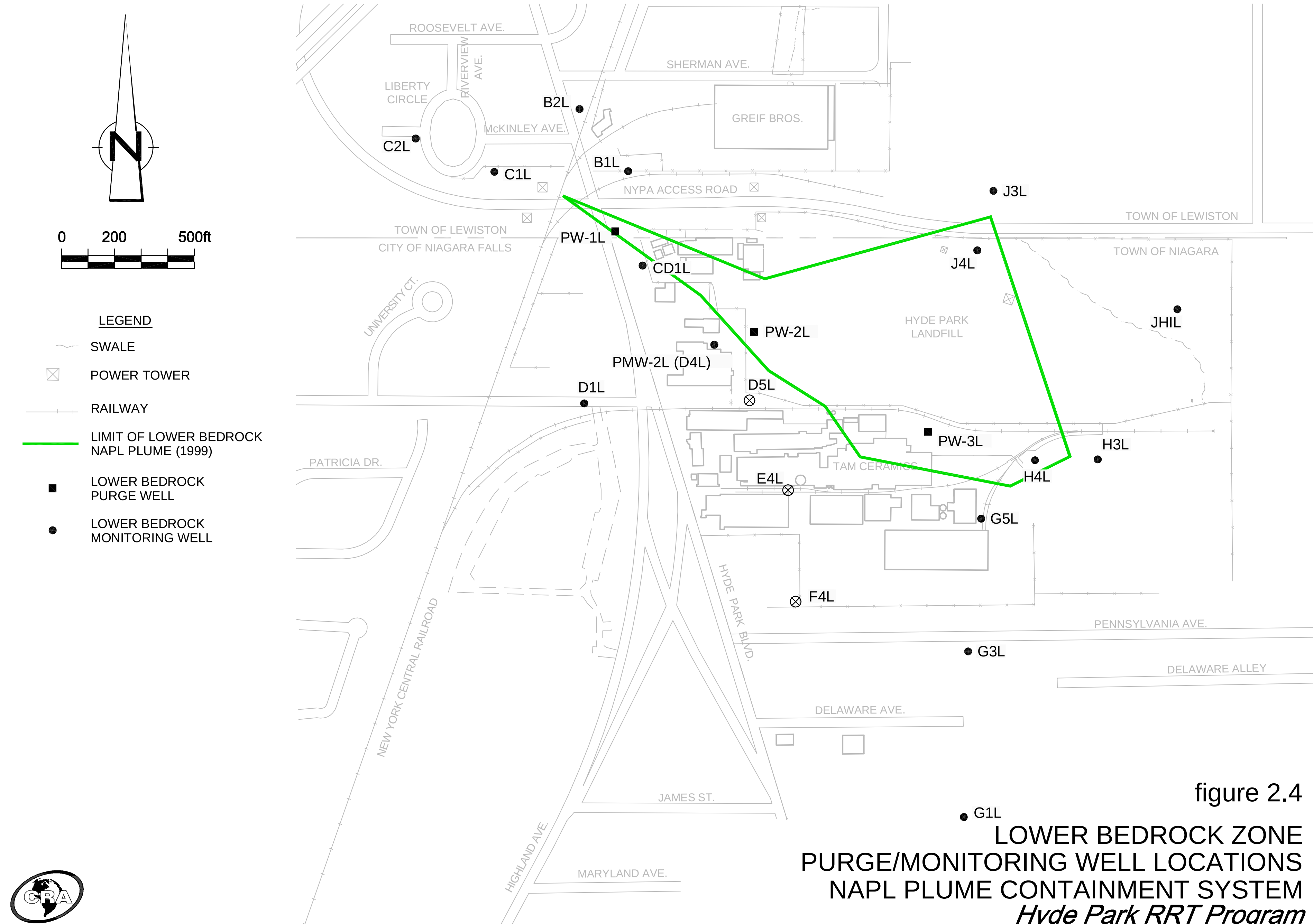


figure 2.4

LOWER BEDROCK ZONE
PURGE/MONITORING WELL LOCATIONS
NAPL PLUME CONTAINMENT SYSTEM
Hyde Park RRT Program

01069-20(295)GN-NF004 MAY 08/2001

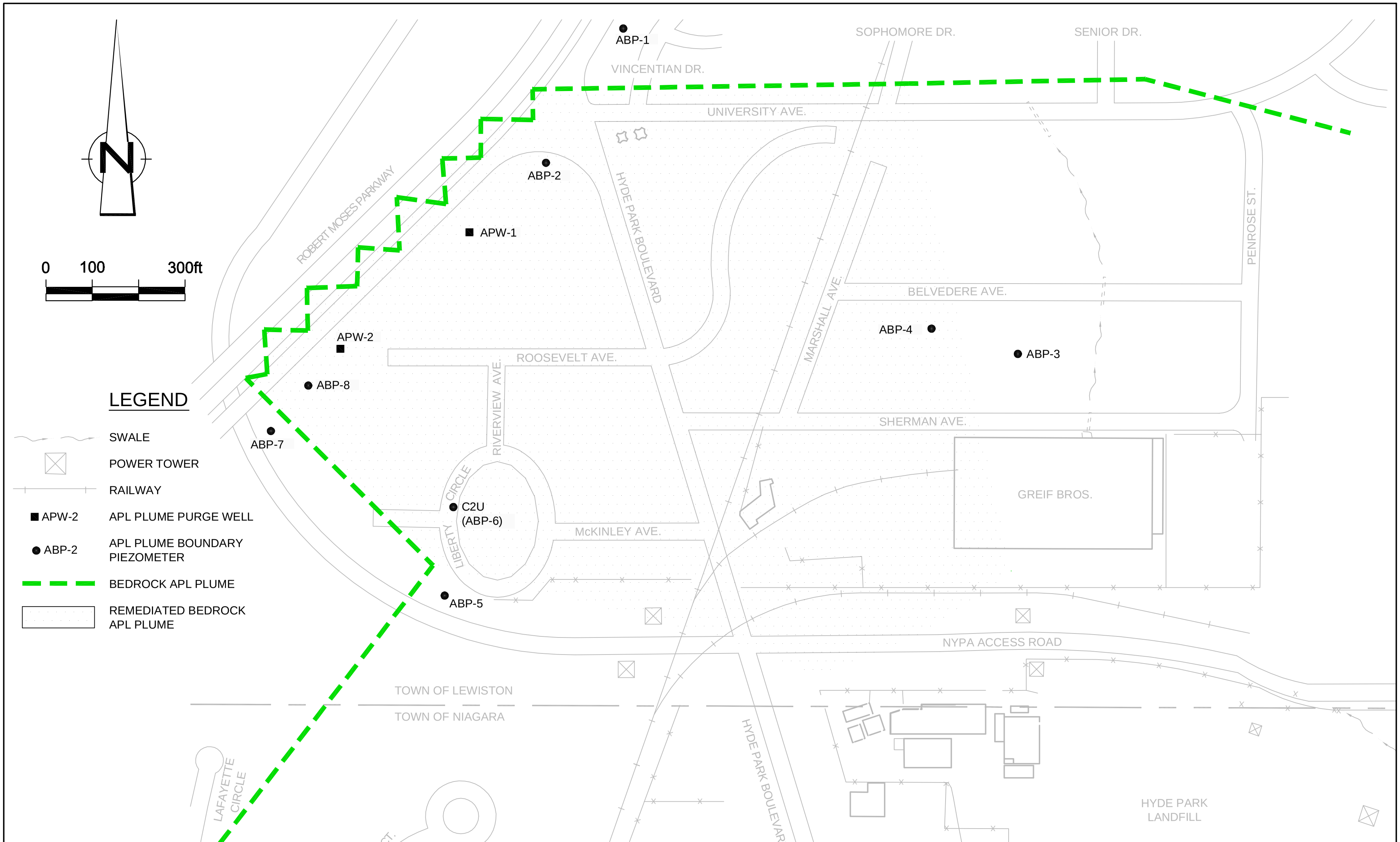


figure 3.1

PURGE/MONITORING WELL LOCATIONS
APL PLUME CONTAINMENT SYSTEM
Hyde Park RRT Program

01069-20(295)GN-NF005 MAY 08/2001

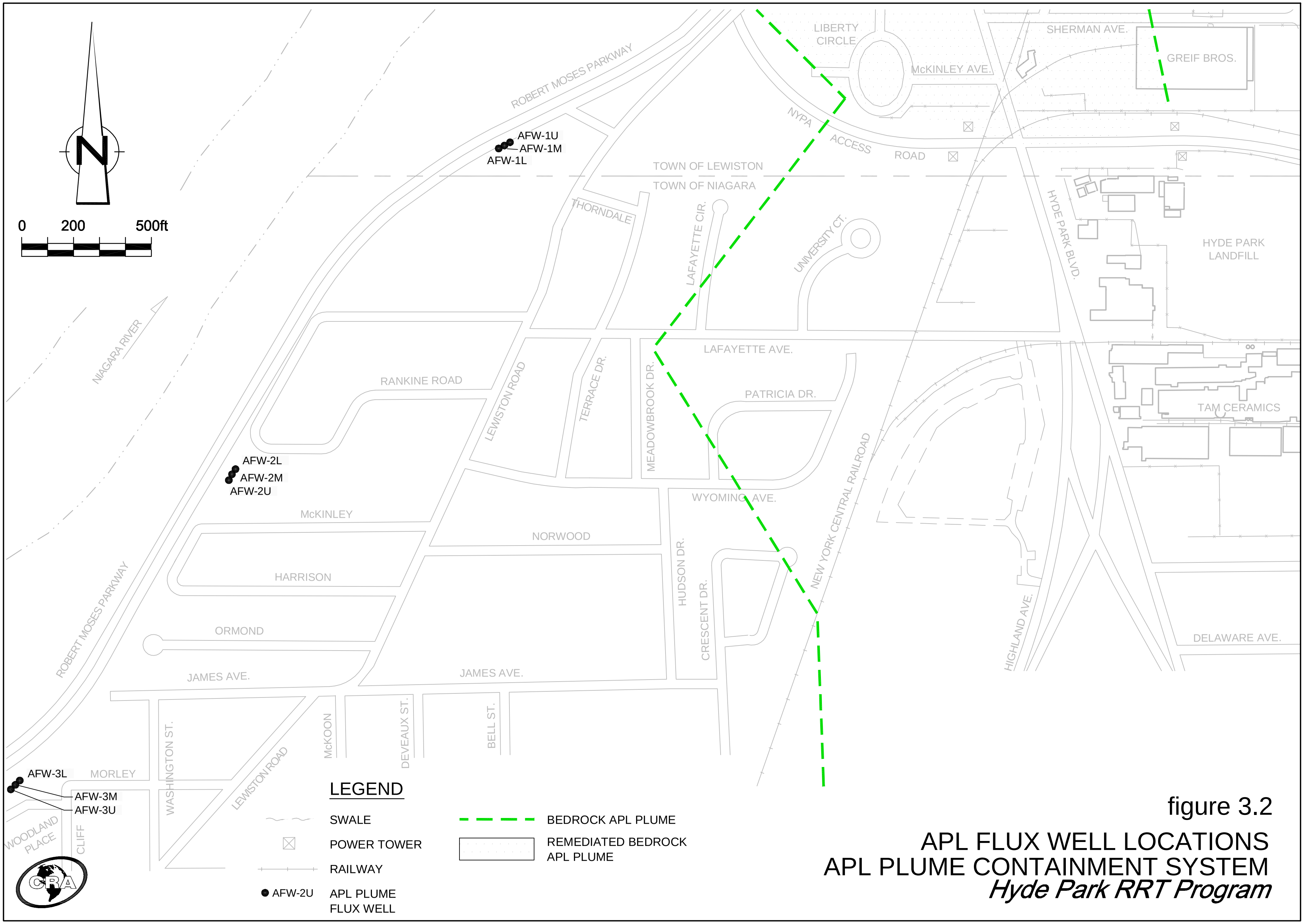


figure 3.2

APL FLUX WELL LOCATIONS
APL PLUME CONTAINMENT SYSTEM
Hyde Park RRT Program

01069-20(295)GN-NF006 MAY 08/2001

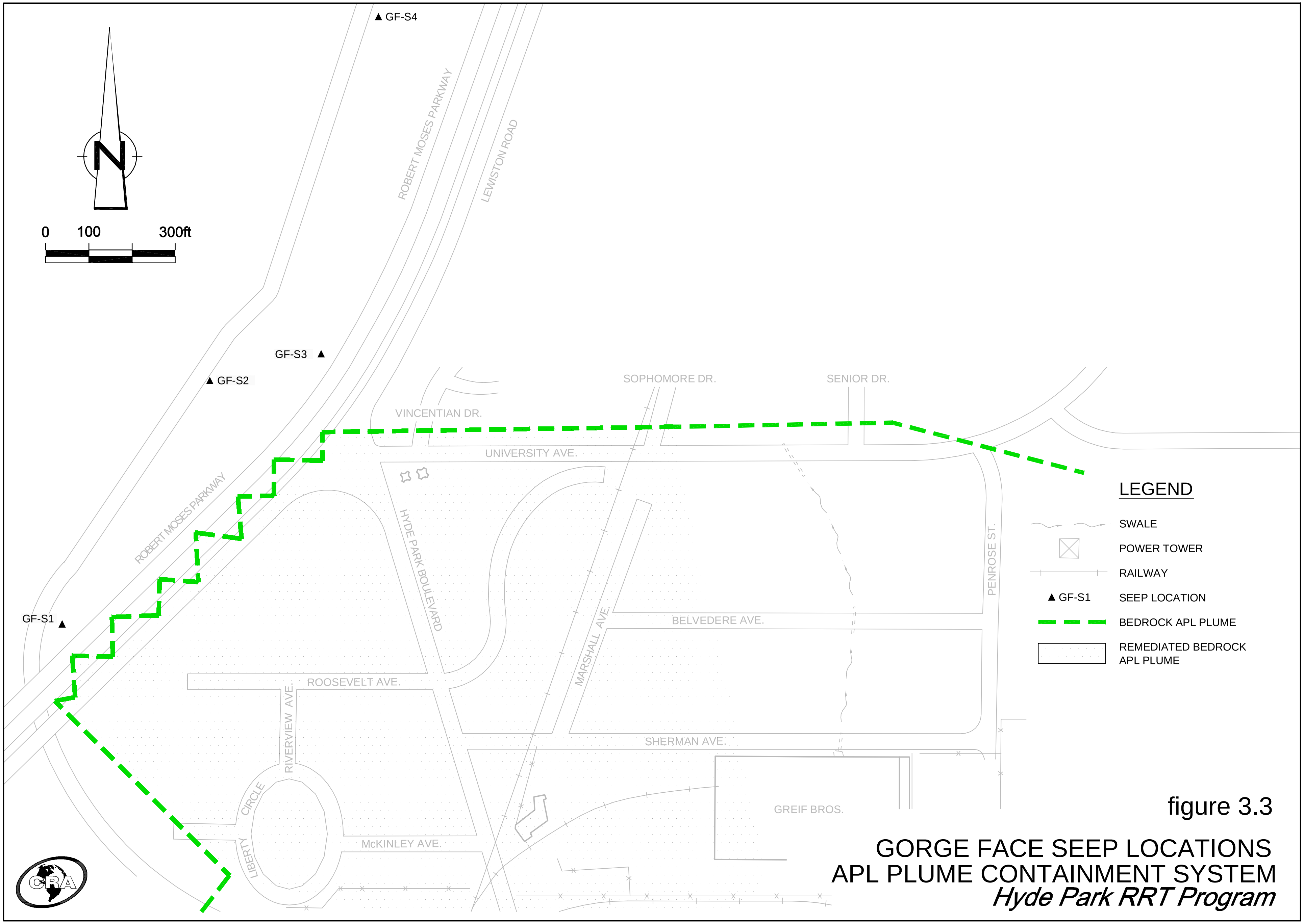


figure 3.3

GORGE FACE SEEP LOCATIONS
APL PLUME CONTAINMENT SYSTEM
Hyde Park RRT Program

01069-20(295)GN-NF007 MAY 08/2001

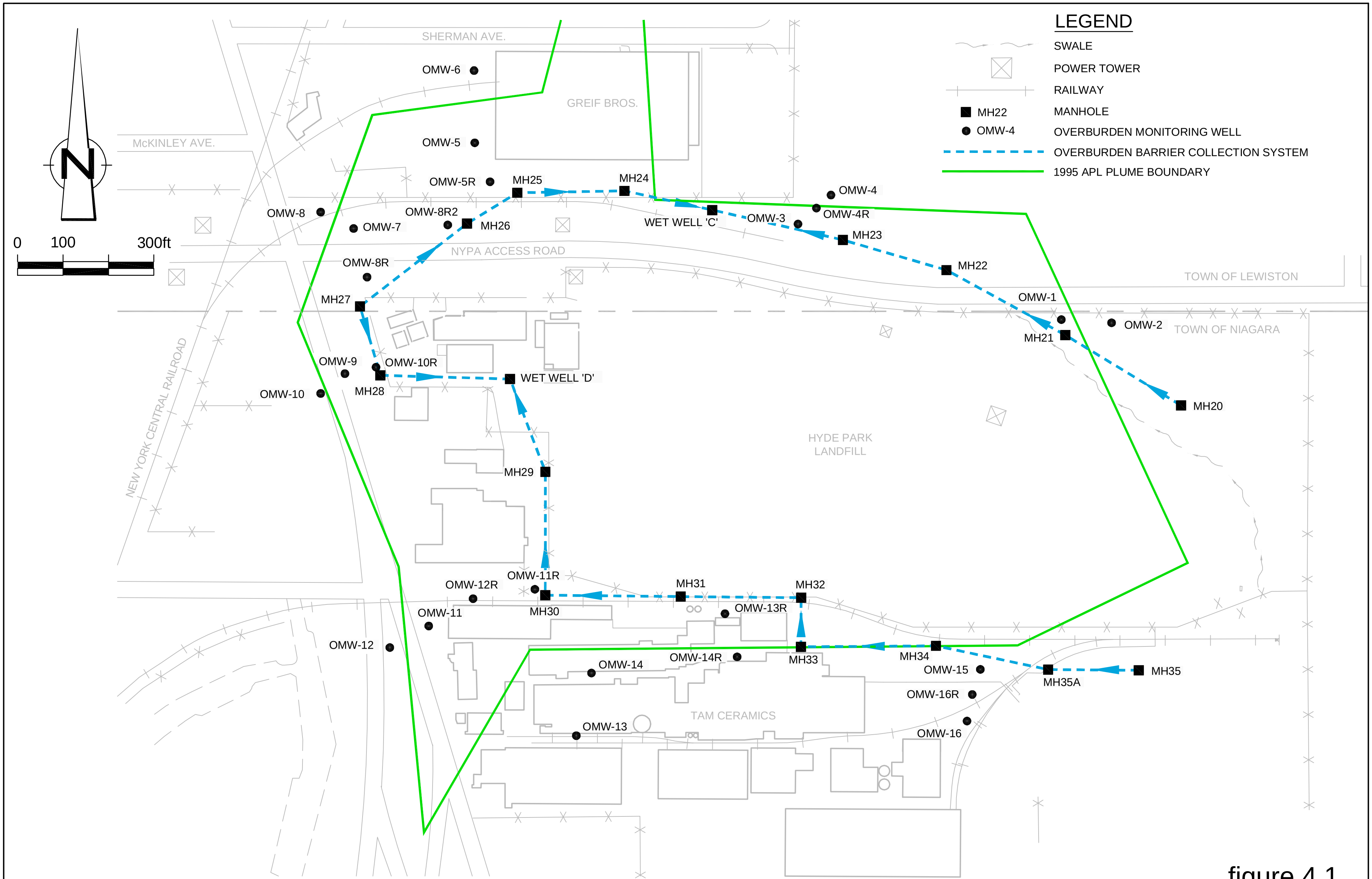


figure 4.1

OBCS MONITORING WELL LOCATIONS

Hyde Park RRT Program

01069-20(295)GN-NF008 MAY 08/2001

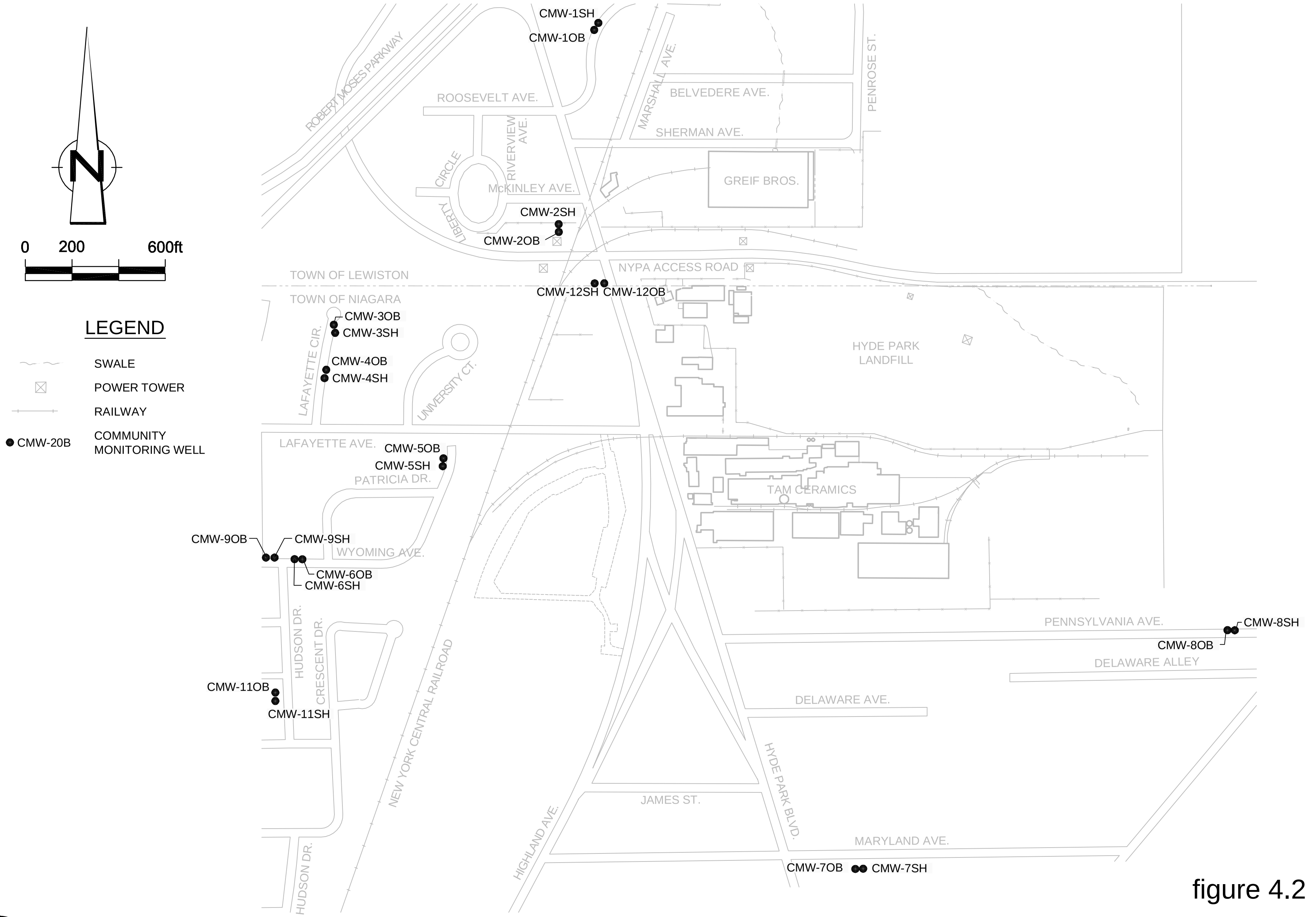


figure 4.2

COMMUNITY MONITORING WELL LOCATIONS

Hyde Park RRT Program

01069-20(295)GN-NF009 MAY 08/2001

TABLES

TABLE 2.1

MONTHLY AVERAGE PURGE WELL PUMPING RATES (GPM)
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Bedrock Purge Wells	*Set Points (Ft. AMSL)*	*January*	*February*	*March*	*April*	*May*	*June*	*July*	*August*	*September*	*October*	*November*	*December*	*Monthly Average*
PW-1U	**549**	0.4	0.4	0.4										0.4
PW-1L	**527**	5.6	6.2	6.7										1.2
PW-2UR	**559**	1.1	1.2	1.2										1.2
PW-2M	**532**	25.4	26.8	27.4										5.2
PW-2L	**505**	1.1	1.3	1.4										1.3
PW-3M	**522**	0.6	0.7	0.6										2.9
PW-3L	**525**	4.8	5.2	5.6										5.2
PW-4U	**573**	0.5	0.6	0.7										0.6
PW-4M	**522**	0.0	(1) 0.0	0.0										0.0
PW-5UR	**555**	3.9	3.5	(2) 4.7										4.1
PW-6UR	**560**	2.0	2.8	(3) 4.0										2.9
PW-6MR	**505**	3.9	3.9	3.8										3.9
Individual Total		49.3	52.4	56.5										52.8
Combined Meter		53.5	55.0	61.3										56.6

Notes:

(1) Pump and Motor Replaced 1/16/2000

(2) Pump and Motor Replacedon 2/14 and 2/27, Well bailed of NAPL/Sediment both times.

(3) Pump and Motor Replacedon 2/16, Well bailed of NAPL/Sediment.

GPM Gallons per Minute

N/A Not Available

TABLE 2.2

HYDRAULIC GRADIENT SUMMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well Pair	*January*			*February*			*March*		
	Inner Elevation (Ft. AMSL)	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient [1] (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient [1] (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient [1] (Vert. Ft.)*
Inner-Outer									
A1U-A2U	576.78	576.78	0.00	579.89	580	-0.11	582.62	582.56	0.06
BC3U-B1U	567.33	564.2	3.13	569.31	568.7	0.61	567.88	569.7	-1.82
CMW-12SH-CD3U	568.68	567.52	1.16	574.49	568.8	5.69	570.55	569.19	1.36
D4U-D3U	581.27	585.07	-3.80	582.09	586.14	-4.05	579.37	586.74	-7.37
E5U-E3U	586.18	584.89	1.29	588.14	587.69	0.45	588.25	587.2	1.05
F5UR-F4U	585.05	586.48	-1.43	585.39	590.05	-4.66	585.22	590.26	-5.04
G3U-G4U	-	-	N / A	595.18	601.65	-6.47	598.31	605.03	-6.72
H3U-H1U	601.83	606.23	-4.40	604.58	609.53	-4.95	606.35	609.53	-3.18
J3U-J1U	586.82	593.53	-6.71	589.75	596.86	-7.11	592.4	598.11	-5.71
BC3M-B1M	533.15	533.08	0.07	530.9	532.31	-1.41	531	531.23	-0.23
BC3M-C1M	533.15	532.94	0.21	530.9	532.09	-1.19	531	531.24	-0.24
D1M-D2M	531.93	531.84	0.09	531.1	531.5	-0.40	531.6	531.15	0.45
E4M-E3M	539.11	532.05	7.06	537.18	531.26	5.92	537.76	530.6	7.16
F4M-F1M	532.9	538.41	-5.51	535.5	540.08	-4.58	530.21	-	N / A
G3M-G1M	534.96	567.77	-32.81	534.34	567.3	-32.96	535.25	568.23	-32.98
H1M-H2M	554.28	569.85	-15.57	552.74	569.77	-17.03	554.32	575.22	-20.90
J1M-J2M	553.93	554.28	-0.35	552.37	559.33	-6.96	553.33	553.55	-0.22
B1L-B2L	523.34	524.17	-0.83	524.84	524.55	0.29	524.22	523.33	0.89
C1L-C2L	524.11	524.85	-0.74	524.33	525.37	-1.04	524.14	523.31	0.83
D4L-D1L	522.49	521.45	1.04	522.46	522.52	-0.06	522.19	522.64	-0.45

Notes:
(1) Negative number indicates an inward gradient measured in feet.
AMSL Above Mean Sea Level.
Ft. Feet.
N / A Not Available.
Vert. Vertical.

TABLE 2.3

NAPL PRESENCE CHECK
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well I.D.	*1st Quarter 1998 2/6 to 2/17*	*2nd Quarter 1998 05/11/98*	*3rd Quarter 1998 08/17/98*	*4th Quarter 1998 11/23/98*	*1st Quarter 1999 02/23/99*	*2nd Quarter 1999 05/06/99*	*3rd Quarter 1999 07/27/99*	*4th Quarter 1999 11/17/99*	*1st Quarter 2000 02/03/00*	*2nd Quarter 2000 May-00*	*3rd Quarter 2000 Aug-00*	*4th Quarter 2000 Nov-00*	*1st Quarter 2001 Feb-01*
A1U	-	-	-	-	-	-	NO	NO	NO	YES	NO	YES	YES
A2U	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO
B1L	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
B1M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
B1U	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
BC3L	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
BC3M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
BC3U	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C1L	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C1M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C1U	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CD1L	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO
CD1M	-	-	-	-	-	-	NO	NO	NO	NO	NO	-	NO
CD1U	-	-	-	-	-	-	YES	NO	NO	YES	NO	YES	YES
CD2U	-	-	-	-	-	-	-	-	NO	YES	NO	YES	YES
CD3U	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO
D1L	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D1M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D2M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D3U	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
D4L	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
D4U	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
D5L	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
E3M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
E3U	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
E4L	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
E4U	YES	YES	YES	NO *	NO	YES	NO	NO	NO	NO	NO	NO	NO
E5U	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO
F1M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F4L	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
F4M	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
F4U	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
F5UR (2	YES	NO	NO	NO *	NO	NO	YES	YES	YES	YES	YES	NO	NO
G1L	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G1M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G3L	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G3M	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
G3U	NO	NO	NO	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO
G4U	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
GH1U	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
H1L	-	NO	NO	NO	NO	NO	NO	NO	NO	-	-	NO	NO
H1M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
H1U	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
H2L	-	NO	NO	NO	NO	NO	NO	NO	NO	-	-	NO	NO

TABLE 2.3

NAPL PRESENCE CHECK
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well I.D.	*1st Quarter 1998 2/6 to 2/17*	*2nd Quarter 1998 05/11/98*	*3rd Quarter 1998 08/17/98*	*4th Quarter 1998 11/23/98*	*1st Quarter 1999 02/23/99*	*2nd Quarter 1999 05/06/99*	*3rd Quarter 1999 07/27/99*	*4th Quarter 1999 11/17/99*	*1st Quarter 2000 02/03/00*	*2nd Quarter 2000 May-00*	*3rd Quarter 2000 Aug-00*	*4th Quarter 2000 Nov-00*	*1st Quarter 2001 Feb-01*
H2M	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
H3L	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	-
H3U	YES	NO	YES	YES *	YES	YES	YES	YES	NO	NO	YES	NO	YES
J1M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
J1U	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
J2M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
J3L	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
J3U	NO	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES
J4L	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-1	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-10R	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-11	NO	NO	NO	NO *	NO	NO	NO	NO	NO	-	-		NO
OMW-11R	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO
OMW-12R	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-13R	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW14R	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-15	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-16R	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-4R	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-5	NO	NO	NO	NO	NO	NO	NO	NO	NO	-	-	-	NO
OMW-5R	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-8R	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-8R2	-	-	-	-	-	-	-	-	-	-	NO	NO	NO
OMW-9	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
PMW-1L	-	-	-	-	-	-	-	-	-	NO	YES	YES	YES
PMW-3M	-	-	-	-	-	-	-	-	NO	YES	YES	YES	YES
PW-2L	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO
PW-3UM	-	-	-	-	-	-	-	-	-	YES	-	YES	YES
PW-6UMR	-	-	-	-	-	-	YES	YES	NO	YES	NO	NO	YES

Notes:

(1) LNAPL found in well, no DNAPL (due to historic diesel fuel spill in well area).
(2) Not NAPL but Fuel Oil
\- Not Available
* Wells checked on 12/10/98, strike at TAM (wells located on TAM property).
Manual NAPL recoveries listed in Table 5.1 of this report.
LNAPL Light Aqueous Phase Liquid.
NAPL Non-Aqueous Phase Liquid.

TABLE 2.4

NAPL/APL RATIO
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

	NAPL Gallons	*APL Gallons*	*NAPL/APL Ratio*
First Quarter 1999	940	5,426,453	**0.000173**
Second Quarter 1999	376	6,520,094	**0.000058**
Third Quarter 1999	899	6,408,207	**0.000140**
Fourth Quarter 1999	376	7,160,202	**0.000053**
First Quarter 2000	0	7,791,656	**0.000000**
Second Quarter 2000	188	7,259,189	**0.000026**
Third Quarter 2000	94	6,506,615	**0.000014**
Fourth Quarter 2000	2,350	6,642,719	**0.000354**
First Quarter 2001	1,034	6,838,819	**0.000151**

Notes:
APL Aqueous Phase Liquid.
NAPL Non-Aqueous Phase Liquid.

TABLE 2.5

WELL PURGING SUMMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well I.D.	*Starting Date*	*Initial Water Level (Ft. BTOC)*	*Depth of Well (Ft. BTOC)*	*Standing Volume (1) (Gallons)*	*Purge Volume (Gallons)*	*Purge Method*
B1L	02/21/01	68.57	104.0	23.0	115.0	Submersible (2-inch)
B1M	02/07/01	60.78	83.0	15.0	75.0	Submersible (2-inch)
BIU	02/07/01	23.50	57.0	22.0	110.0	Submersible (2-inch)
C1L	02/06/01	69.68	104.0	24.0	120.0	Submersible (2-inch)
C1M	02/06/01	63.00	81.5	12.0	60.0	Submersible (2-inch)
C1U	02/06/01	26.00	55.5	19.0	95.0	Submersible (2-inch)
D1L	02/15/01	69.32	110.0	27.0	135.0	Submersible (2-inch)
D1U	02/15/01	11.17	50.1	25.0	125.0	Submersible (2-inch)
D2M	02/13/01	57.86	85.8	18.0	90.0	Submersible (2-inch)
D3U	02/12/01	12.90	48.3	207.0	1215.0	Submersible (2-inch)
E1U	02/09/01	17.53	55.6	25.0	125.0	Submersible (2-inch)
E3M	02/09/01	62.72	94.0	20.0	100.0	Submersible (2-inch)
E3U	02/22/01	4.10	46.7	250.0	1250.0	Centrifugal
F1M	02/13/01	62.00	110.0	31.0	155.0	Submersible (2-inch)
F4U	02/21/01	10.46	69.2	39.0	195.0	Submersible (2-inch)
G1L	02/21/01	34.25	147.0	73.0	365.0	Submersible (2-inch)
G1M	02/21/01	50.10	124.0	48.0	240.0	Submersible (2-inch)
G4U	02/20/01	15.57	57.0	27.0	135.0	Submersible (2-inch)
H1U	02/20/01	9.95	57.0	30.0	150.0	Submersible (2-inch)
H2M	02/20/01	49.00	129.0	52.0	260.0	Submersible (2-inch)
H3L	02/20/01	56.45	138.0	53.0	265.0	Submersible (2-inch)
J1U	02/12/01	11.20	45.4	23.0	145.0	Submersible (2-inch)
J2M	02/12/01	53.38	101.0	31.0	155.0	Submersible (2-inch)
J3L	02/12/01	45.70	120.5	49.0	245.0	Submersible (2-inch)

Note:

(1) All wells are 4 inches in diameter, except D3U and E3U (former purge wells PW-2U and PW-5U) which are 12 inches in diameter.

BTOC Below Top of Casing.

TABLE 2.6

WELL SAMPLING SUMMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well I.D.	*Sample I.D.*	*Sample Date*	*Sample Time*	*Depth to Water (Ft. BTOC)*	*Well Volume (Gallons)*	*Volume Removed (Gallons)*	*pH*	*Specific Conductivity*	*Temperature (°C)*	*Turbidity (NTU)*	*NYSDEC Split*	*Final Water Quality*	*Comment*
BIU	B1U201	02/07/01	9:25	24.60	22.00	110.0	7.05	27	12.0	7.4	no	N/A	#1 RINSE BLANK
B1M	B1M201	02/07/01	10:10	60.90	15.00	75.0	7.09	24	11.9	6.7	no	trace pink	#2 RINSE BLANK
B1L	B1L201	02/21/01	9:20	88.90	23.00	115.0	7.32	22300	10.7	37.0	no	N/A	
C1U	C1U201	02/06/01	9:20	27.07	19.00	95.0	7.16	770	12.0	6.5	no	N/A	MS/MSD
C1M	C1M201	02/06/01	9:55	63.10	12.00	60.0	7.24	1550	11.5	5.0	no	N/A	
C1L	C1L201	02/06/01	10:45	69.10	24.00	120.0	7.39	2980	11.3	5.1	no	N/A	
D1U	D1U201	02/15/01	10:35	14.44	25.00	125.0	6.76	850	11.9	90.0	no	N/A	
D1L	D1L201	02/15/01	11:40	72.50	27.00	135.0	6.41	69700	11.7	24.0	no	N/A	
D2M	D2M201	02/13/01	11:05	58.00	18.00	90.0	7.15	2790	11.6	10.0	no	N/A	
D3U	D3U201	02/14/01	9:50	23.15	207.00	1215.0	7.21	1850	12.8	37.0	no	N/A	MS/MSD
E1U	E1U201	02/09/01	10:10	18.13	25.00	125.0	7.06	1380	11.6	5.8	no	N/A	
E3U	E3U201	02/22/01	11:25	7.55	250.00	1250	6.91	2170	11.6	65.4	no	N/A	
E3M	E3M201	02/09/01	9:25	62.70	20.00	100.0	6.99	2260	12.0	5.6	no	N/A	
F1M	F1M201	02/13/01	10:25	61.70	31.00	155.0	7.07	1970	11.2	11.0	no	N/A	
F4U	F4U201	02/21/01	10:55	28.40	39.00	195	7.69	1060	12.6	12.4	no	N/A	
G1M	G1M201	02/21/01	11:35	50.35	48.00	240.0	7.44	1650	9.2	9.1	no	N/A	MS/MSD
G1L	G1L201	02/21/01	13:00	39.50	73.00	365.0	7.29	3980	10.1	166.0	no	N/A	
G4U	G4U201	02/21/01	11:35	15.52	27.00	135.0	7.36	680	9.8	12.0	no	N/A	
H1U	H1U201	02/20/01	8:55	12.86	30.00	150.0	7.40	930	9.8	85.0	no	N/A	
H2M	H2M201	02/20/01	8:20	62.18	52.00	260.0	7.46	1450	10.5	6.8	no	N/A	
H3L	H3L201	02/20/01	10:02	58.97	53.00	265.0	7.41	3830	10.6	6.7	no	N/A	
J1U	J1U201	02/14/01	11:00	15.20	23.00	145.0	7.74	860	11.0	48.0	no	N/A	
J2M	J2M201	02/12/01	10:05	52.40	31.00	155.0	7.13	1500	10.4	6.1	no	N/A	
J3L	J3L201	02/12/01	11:00	51.13	49.00	245.0	6.97	5780	10.5	70.0	no	N/A	
L1U	L1U201	02/09/01	9:00	62.70	20.00	100.0	6.99	2260	12.0	5.6	no	N/A	DUPLICATE
L3U	L3U201	02/13/01	9:30	61.70	31.00	155.0	7.07	1970	11.2	11.0	no	N/A	LIND DUPLICAT

Notes:

°C	Degree Centrigrade.
BTOC	Below Top of Casing.
MS	Matrix Spike.
MSD	Matrix Spike Duplicate.
NTU	Nephelometric Turbidity Unit.
NYSDEC	New York State Department of Environmental Conservation.

TABLE 2.7

ANALYTICAL RESULTS SUMMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

	Sample Location:	***B1L***	***B1M***	***B1U***	***C1L***	***C1M***	***C1U***	***D1L***	***D1U***	***D2M***	***D3U***	***E1U***	***E3M***	***E3M***
	Sample ID:	***BIL201***	***BIM201***	***BIU201***	***CIL 201***	***CIM 201***	***CIU 201***	***D1L201***	***D1U201***	***D2M201***	***D3U201***	***E1U201***	***E3M201***	***L1U201***
	Sample Date:	***2/21/2001***	***2/7/2001***	***2/7/2001***	***2/6/2001***	***2/6/2001***	***2/6/2001***	***2/15/2001***	***2/15/2001***	***2/13/2001***	***2/14/2001***	***2/9/2001***	***2/9/2001***	***2/9/2001***
														Duplicate
Parameter	***Unit***													
Acids														
2-Chlorobenzoic acid	mg/L	0.24	ND 0.030	0.069	0.074	ND 0.030	0.083	ND 0.030	ND 0.030	0.33	ND 0.030	ND 0.030	ND 0.030	ND 0.030
3-Chlorobenzoic acid	mg/L	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	0.054	ND 0.030	ND 0.030	0.064	ND 0.030	ND 0.030	ND 0.030	ND 0.030
4-Chlorobenzoic acid	mg/L	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	0.061	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030
Benzoic acid	mg/L	ND 0.10	0.19	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Chlorendic acid	mg/L	0.92	0.44	8.9 E	0.59	0.55	0.73	ND 0.25	ND 0.25	0.88	0.65	0.41	ND 0.25	ND 0.25
General Chemistry														
Total Organic Halides (TO	ug/L	1540	839	43400	1890 J	1300 J	1820 J	740	148	1460	1650	998	89.3	7550
Phenolics (Total)	mg/L	0.068	0.023 J	0.021 J	0.012	ND 0.0050	ND 0.0050	0.026	ND 0.0050	0.0070	ND 0.0050	ND 0.0050	0.010	0.015

	Sample Location:	***E3U***	***F1M***	***F1M***	***F4U***	***G1L***	***G1M***	***G4U***	***H1U***	***H2M***	***H3L***	***J1U***	***J2M***	***J3L***
	Sample ID:	***E3U201***	***F1M201***	***L3U201***	***F4U201***	***G1L201***	***G1M201***	***G4U201***	***H1U201***	***H2M201***	***H3L201***	***J1U201***	***J2M201***	***J3L201***
	Sample Date:	***2/22/2001***	***2/13/2001***	***2/13/2001***	***2/21/2001***	***2/21/2001***	***2/21/2001***	***2/20/2001***	***2/20/2001***	***2/20/2001***	***2/20/2001***	***2/14/2001***	***2/12/2001***	***2/12/2001***
				Duplicate										
Acids														
2-Chlorobenzoic acid	mg/L	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	0.30	0.034	ND 0.030	0.48	1.1 D
3-Chlorobenzoic acid	mg/L	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	0.055	ND 0.030	ND 0.030	0.057	0.32
4-Chlorobenzoic acid	mg/L	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	ND 0.030	0.12	ND 0.030	ND 0.030	ND 0.030	0.61
Benzoic acid	mg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	ND 0.10	1.0 D
Chlorendic acid	mg/L	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.50
General Chemistry														
Total Organic Halides (TO	ug/L	336	111	94.5	76.8	573	46.4	19.6	204	512	52.5	18.7	801	3890
Phenolics (Total)	mg/L	ND 0.0050	ND 0.0050	ND 0.0050	0.0060	0.025	0.010	ND 0.0050	ND 0.0050	0.0080	0.0060	ND 0.0050	0.014	0.72

Notes:
D Dilution.
J Associated value is estimated.
NDx Non-detect at associated value.

TABLE 2.8

SUMMARY OF STATISTICAL ANALYSES
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

	B1U					***B1M***					***B1L***				
	Benzoic Acid	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***	***Benzoic Acid***	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***	***Benzoic Acid***	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***
Observations	20	20	21	20	21	21	21	21	21	21	21	21	21	21	21
% ND	80%	5%	33%	10%	0%	95%	5%	67%	5%	0%	100%	10%	43%	5%	0%
Slope	n / a	-6.86E-03	-2.02E-04	-9.63E-04	1.18E-02	n / a	-2.02E-03	n / a	-2.41E-03	-3.50E-03	ND	-5.24E-04	-1.37E-03	4.19E-04	4.56E-01
Upper 95% CI	n / a	-5.35E-04	2.09E-05	-4.57E-04	2.58E-02	n / a	-1.13E-03	n / a	-1.48E-03	-1.33E-03	ND	2.86E-04	9.40E-04	2.06E-03	1.06E+00
Lower 95% CI	n / a	-1.32E-02	-4.25E-04	-1.47E-03	-2.17E-03	n / a	-2.91E-03	n / a	-3.33E-03	-5.66E-03	ND	-1.33E-03	-3.69E-03	-1.23E-03	-1.53E-01
Probability	n / a	**0.035**	0.073	**0.00084**	0.093	n / a	**0.00014**	0.50	**0.00003**	**0.0032**	ND	0.19	0.23	0.60	0.13
Increasing?	n / a	No	No	No	No	n / a	No	n / a	No	No	ND	No	No	No	No

	C1U					***C1M***					***C1L***				
	Benzoic Acid	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***	***Benzoic Acid***	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***	***Benzoic Acid***	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***
Observations	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
% ND	81%	5%	57%	14%	0%	100%	5%	81%	62%	0%	100%	10%	71%	29%	0%
Slope	n / a	-1.35E-03	n / a	8.14E-05	-1.16E-03	ND	2.59E-04	n / a	n / a	7.26E-05	ND	2.57E-04	n / a	8.58E-05	1.85E-05
Upper 95% CI	n / a	-3.95E-04	n / a	4.42E-04	3.75E-04	ND	6.38E-04	n / a	n / a	8.79E-04	ND	6.20E-04	n / a	3.33E-04	1.13E-03
Lower 95% CI	n / a	-2.30E-03	n / a	-2.79E-04	-2.70E-03	ND	-1.20E-04	n / a	n / a	-7.34E-04	ND	-1.07E-04	n / a	-1.62E-04	-1.10E-03
Probability	n / a	**0.0080**	n / a	0.64	0.13	ND	0.17	n / a	n / a	0.85	n / a	0.16	n / a	0.48	0.97
Increasing?	n / a	No	n / a	No	No	ND	No	n / a	n / a	No	ND	No	n / a	No	No

	D3U					***D2M***					***D1L***				
	Benzoic Acid	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***	***Benzoic Acid***	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***	***Benzoic Acid***	***Chlorendic Acid***	***Phenol***	***Total Chlorobenzoic Acid***	***Total Organic Halides***
Observations	21	21	21	21	21	29	29	29	29	27	21	21	21	21	21
% ND	100%	38%	86%	90%	5%	97%	31%	62%	21%	0%	100%	100%	29%	95%	0%
Slope	ND	-9.19E-04	n / a	n / a	-8.11E-04	n / a	-2.72E-04	n / a	-2.02E-04	-1.67E-04	ND	ND	-8.97E-04	n / a	-6.22E-04
Upper 95% CI	ND	6.21E-04	n / a	n / a	2.65E-04	n / a	-4.69E-05	n / a	1.82E-05	4.00E-04	ND	ND	-1.80E-04	n / a	5.32E-04
Lower 95% CI	ND	-2.46E-03	n / a	n / a	-1.89E-03	n / a	-4.97E-04	n / a	-4.22E-04	-7.34E-04	ND	ND	-1.61E-03	n / a	-1.78E-03
Probability	ND	0.23	n / a	n / a	0.13	n / a	**0.020**	n / a	0.071	0.55	ND	ND	**0.017**	n / a	0.28
Increasing?	ND	No	n / a	n / a	No	n / a	No	n / a	No	No	ND	ND	No	n / a	No

TABLE 2.8

SUMMARY OF STATISTICAL ANALYSES
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

	E3U					*E3M*					*E2L*				
	Benzoic Acid	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*
Observations	20	20	21	20	21	21	21	21	21	21	6	6	6	6	5
% ND	100%	50%	86%	60%	5%	100%	100%	86%	95%	19%	100%	100%	17%	100%	0%
Slope	ND	n/a	n/a	n/a	-1.72E-03	ND	ND	n/a	n/a	-1.66E-04	ND	ND	8.38E-04	ND	1.45E-03
Upper 95% CI	ND	n/a	n/a	n/a	-7.41E-04	ND	ND	n/a	n/a	8.14E-04	ND	ND	5.09E-03	ND	3.92E-03
Lower 95% CI	ND	n/a	n/a	n/a	-2.69E-03	ND	ND	n/a	n/a	-1.15E-03	ND	ND	-3.42E-03	ND	-1.01E-03
Probability	ND	n/a	n/a	n/a	**0.0016**	ND	ND	n/a	n/a	0.73	ND	ND	0.62	ND	0.16
Increasing?	ND	n/a	n/a	n/a	No	ND	ND	n/a	n/a	No	ND	ND	No	ND	No

	F4U					*F1M*					*F2L*				
	Benzoic Acid	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*
Observations	21	21	21	21	21	21	21	21	21	21	6	6	6	6	5
% ND	67%	33%	38%	43%	10%	100%	95%	90%	81%	19%	100%	100%	33%	100%	0%
Slope	n/a	-7.83E-03	-5.06E-03	-3.76E-03	-6.74E-03	ND	n/a	n/a	n/a	-2.53E-04	ND	ND	-3.03E-03	ND	-8.08E-04
Upper 95% CI	n/a	1.24E-04	-2.33E-03	-1.24E-03	-3.62E-03	ND	n/a	n/a	n/a	9.84E-05	ND	ND	-1.61E-03	ND	1.12E-03
Lower 95% CI	n/a	-1.58E-02	-7.78E-03	-6.27E-03	-9.86E-03	ND	n/a	n/a	n/a	-6.05E-04	ND	ND	-4.45E-03	ND	-2.73E-03
Probability	n/a	0.053	**0.0010**	**0.0056**	**0.00024**	ND	n/a	n/a	n/a	0.15	ND	ND	**0.0040**	ND	0.27
Increasing?	n/a	No	No	No	No	ND	n/a	n/a	n/a	No	ND	ND	No	ND	No

	G4U					*G1M*					*G1L*				
	Benzoic Acid	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*
Observations	19	19	19	19	19	21	21	21	21	21	21	21	21	21	21
% ND	100%	100%	95%	100%	42%	100%	100%	90%	81%	29%	100%	100%	38%	100%	0%
Slope	ND	ND	n/a	ND	-1.09E-05	ND	ND	n/a	n/a	-4.68E-04	ND	ND	-2.42E-05	ND	-4.13E-03
Upper 95% CI	ND	ND	n/a	ND	8.03E-04	ND	ND	n/a	n/a	1.18E-04	ND	ND	2.79E-05	ND	-5.03E-04
Lower 95% CI	ND	ND	n/a	ND	-8.25E-04	ND	ND	n/a	n/a	-1.05E-03	ND	ND	-7.64E-05	ND	-7.75E-03
Probability	ND	ND	n/a	ND	0.98	ND	ND	n/a	n/a	0.11	ND	ND	0.34	ND	**0.028**
Increasing?	ND	ND	n/a	ND	No	ND	ND	n/a	n/a	No	ND	ND	No	ND	No

TABLE 2.8

SUMMARY OF STATISTICAL ANALYSES
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

	H1U	*H1U*	*H1U*	*H1U*	*H1U*	*H2M*	*H2M*	*H2M*	*H2M*	*H2M*	*H3L*				
	Benzoic Acid	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*
Observations	21	21	21	21	21	29	29	29	29	27	21	21	21	20	21
% ND	100%	62%	95%	67%	0%	93%	97%	72%	17%	7%	100%	95%	71%	25%	5%
Slope	ND	n/a	n/a	n/a	-4.59E-06	n/a	n/a	n/a	-5.08E-04	5.68E-06	ND	n/a	n/a	-4.05E-05	-6.71E-04
Upper 95% CI	ND	n/a	n/a	n/a	7.21E-04	n/a	n/a	n/a	-1.98E-04	1.37E-04	ND	n/a	n/a	-1.42E-05	5.86E-05
Lower 95% CI	ND	n/a	n/a	n/a	-7.30E-04	n/a	n/a	n/a	-8.17E-04	-1.25E-04	ND	n/a	n/a	-6.68E-05	-1.40E-03
Probability	ND	n/a	n/a	n/a	0.99	n/a	n/a	n/a	**0.0023**	0.93	ND	n/a	n/a	**0.0046**	0.069
Increasing?	ND	n/a	n/a	n/a	No	n/a	n/a	n/a	No	No	ND	n/a	n/a	No	No

	J1U					*J2M*					*J3L*				
	Benzoic Acid	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*	*Benzoic Acid*	*Chlorendic Acid*	*Phenol*	*Total Chlorobenzoic Acid*	*Total Organic Halides*
Observations	21	21	21	21	21	29	29	29	29	27	21	21	21	21	21
% ND	100%	100%	95%	100%	43%	34%	17%	14%	0%	0%	5%	81%	5%	5%	0%
Slope	ND	ND	n/a	ND	-2.55E-04	######	-5.70E-03	-1.98E-03	-8.85E-03	-5.22E-03	-9.54E-04	n/a	-1.40E-03	-1.80E-03	-3.89E-03
Upper 95% CI	ND	ND	n/a	ND	9.47E-05	######	-7.82E-04	5.45E-03	-5.08E-03	-1.49E-03	-4.53E-04	n/a	-2.32E-04	-8.58E-04	4.29E-04
Lower 95% CI	ND	ND	n/a	ND	-6.05E-04	######	-1.06E-02	-9.42E-03	-1.26E-02	-8.96E-03	-1.46E-03	n/a	-2.58E-03	-2.75E-03	-8.20E-03
Probability	ND	ND	n/a	ND	0.14	**4.6E-05**	**0.025**	0.59	**0.000051**	**0.0081**	**0.00080**	n/a	**0.021**	**0.00078**	0.075
Increasing?	ND	ND	n/a	ND	No	No	No	No	No	No	No	n/a	No	No	No

Notes:
ND Not detected during any monitornig event, linear regression analysis not performed.
N/A Due to high proportion of non-detect results (>50 percent), regression anaylsis not applicable.
No Slope of regression line is not statistically significantly (P<0.05) increasing. No increase is observed.
Probabilities highlighted in **bold** are statistically significant (P<0.05). Note that the only significant slopes found were negative (i.e., decreasing)

TABLE 3.1

HYDRAULIC GRADIENT SUMMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well Pair	*01/11/01*			*01/17/01*			*01/25/01*			*02/01/01*		
	Inner Elevation (Ft. AMSL)	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*
Inner-Outer												
ABP-2-ABP-1	551.95	549.23	2.72	551.93	545.33	6.60	551.7	545.26	6.44	552.46	545.45	7.01
ABP-4-ABP-3	552.31	566.27	-13.96	552.55	566.41	-13.86	553.75	566.58	-12.83	552.36	566.62	-14.26
ABP-6-ABP-5	567.58	565.57	2.01	567.58	565.64	1.94	568.04	566.37	1.67	569.35	566.26	3.09
ABP-8-ABP-7	521.83	534.61	-12.78	521.93	535.33	-13.40	521.85	534.94	-13.09	521.98	534.49	-12.51

Well Pair	*02/07/01*			*02/15/01*			*02/22/01*			*03/01/01*		
	Inner Elevation (Ft. AMSL)	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*
Inner-Outer												
ABP-2-ABP-1	550.85	544.68	6.17	550.72	543.93	6.79	550.25	541.88	8.37	550.43	542.03	8.40
ABP-4-ABP-3	551.48	567.03	-15.55	553.88	567.86	-13.98	556.36	567.41	-11.05	553.41	567.88	-14.47
ABP-6-ABP-5	568.36	566.22	2.14	567.91	566.76	1.15	567.43	566.33	1.10	569.24	567.23	2.01
ABP-8-ABP-7	521.95	529.41	-7.46	521.94	535.66	-13.72	526.05	534.96	-8.91	521.98	535.33	-13.35

Well Pair	*03/07/01*			*03/15/01*			*03/21/01*			*03/28/01*		
	Inner Elevation (Ft. AMSL)	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient (1) (Vert. Ft.)*
Inner-Outer												
ABP-2-ABP-1	549.85	542.06	7.79	550.35	542.98	7.37	550.54	544.98	5.56	549.3	544.78	4.52
ABP-4-ABP-3	558.31	567.31	-9.00	552.63	567.31	-14.68	556.39	567.36	-10.97	553.09	567.2	-14.11
ABP-6-ABP-5	567.41	566.61	0.80	568.99	566.44	2.55	569.59	567.04	2.55	568.98	566.99	1.99
ABP-8-ABP-7	525.83	534.96	-9.13	521.93	535.76	-13.83	521.93	535.76	-13.83	521.98	535.16	-13.18

Notes:

(1) Negative number indicates an inward gradient measured in feet.

AMSL Above Mean Sea Level.

N / A Not Available.

TABLE 3.2

AFW WELL PURGING SUMMARY
APL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well I.D.	*Starting Date*	*Initial Water Level (Ft. BTOC)*	*Depth of Well (Ft. BTOC)*	*Standing Volume [(1)] (Gallons)*	*Purge Volume (Gallons)*	*Purge Method*
AFW-1U	02/05/01	18.30	28.5	7.0	14	Submersible (2-inch
AFW-1M	02/05/01	47.63	55.1	5.0	10.5	Submersible (2-inch
AFW-2U	02/05/01	16.15	59.20	28.0	110	Submersible (2-inch
AFW-3U	02/08/01	18.75	47.70	19.0	95	Submersible (2-inch
AFW-3L	02/05/01	97.54	105.00	5.0	25	Submersible (2-inch

Notes:

[(1)] All wells are 4-inch diameter

Ft. BTOC Feet Below Top of Casing.

TABLE 3.3

COMPOSITE SAMPLE VOLUME DETERMINATION
APL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well Identification	*Cross-Sectional Flow Area*			*Percent of Total*	*Approximate Volume Required (L)*
	Width (Ft.)	*Depth (Ft.)*	*Total (Ft.2)*		
APW-1	640	64	40,960	13.9	1.25
APW-2	830	34	28,220	9.2	0.83
AFW-1U	1,470	22	32,340	11.1	1.00
AFW-1M	1,470	26	38,220	13.0	1.17
AFW-2U	1,550	45	69,750	24.1	2.17
AFW-3U	1,460	35	51,100	17.6	1.58
AFW-3L	1,460	22	32,120	11.1	1.00
		Totals	292,710	100	9.0

TABLE 3.4

WELL SAMPLING SUMMARY
APL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well I.D.	*Sample I.D.*	*Sample Date*	*Sample Time*	*pH*	*Specific Conductivity*	*Temp (°C)*	*Turb. (NTU)*	*NYSDEC Split*	*Final Water Quality*	*Comment*
#1COMP201	#1COMP201	02/08/01	12:15:00	N/A	N/A	N/A	N/A	no	N/A	N/A
1U201	AFW-1U201	02/08/01	10:25:00	7.38	2210.0	9.00	400.0	no	N/A	11.10%
1M201	AFW-1M201	02/08/01	10:30:00	7.15	2650.0	9.80	450.0	no	N/A	13.00%
2U201	AFW-2U201	02/08/01	10:00:00	6.77	1300.0	9.20	370.0	no	N/A	24.10%
3U1201	AFW-3U201	02/08/01	9:10:00	7.13	1160.0	10.30	80.0	no	N/A	17.60%
3L210	AFW-3L210	02/08/01	9:30:00	7.02	19.4	10.20	170.0	no	N/A	11.10%
APW1201	APW-1201	02/08/01	11:35:00	7.11	80.0	10.60	140.0	no	N/A	13.90%
APW2201	APW-2201	02/08/01	11:05:00	7.56	170.0	9.60	180.0	no	N/A	9.20%

Notes:
°C Degree Centrigrade.
BTOC Below Top of Casing.
MS Matrix Spike.
MSD Matrix Spike Duplicate.
NTU Nephelometric Turbidity Unit.
NYSDEC New York State Department of Environmental Conservation.

TABLE 3.5

ANALYTICAL RESULTS SUMMARY
APL PLUME CONTAINMENT SYSTEM - AFW/APW COMPOSITE
FIRST QUARTER 2001
HYDE PARK RRT PROGRAM

		Sample Location:	*Composite*
		Sample ID:	*#1COMP201*
		Sample Date:	*2/8/01*
APL Plume Monitoring Parameter Units	***Unit***	***Monitoring Level***	
Phenolics (Total)	mg/L	50	ND 0.010
2,4,5-Trichlorophenol	ug/L	10	ND 9
2,4-Dichlorophenol	ug/L	10	ND 9
2-Chlorophenol	ug/L	10	ND 9
Benzene	ug/L	10	ND 5.0
Hexachlorocyclohexanes*	ug/L	10	0.225J
APL Flux Parameters			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/l	500	391 J
Polychlorobiphenyls (Aroclor 1248**)	ppb	1.0	ND 0.005
Perchloropentacyclodecane (Mirex)	ug/L	1.0	ND 0.94
Chloroform	ug/L	1.0	ND 5.0

Notes:

* Analyzed for alpha-, beta-, gamma-, and delta-Hexachlorocyclohexanes.
** Analyzed for tri-, tetra-, and penta-chlorobiphenyls and reported as Aroclor 1248.
J Associated value is estimated.
NDx Non-detect at associated value.

TABLE 3.6

ANALYTICAL RESULTS SUMMARY
APL PLUME CONTAINMENT SYSTEM - APW COLLECTED APL MONITORING
FIRST QUARTER 2001
HYDE PART RRT PROGRAM

		Sample Location:	***APW-1***	***APW-2***
		Sample ID:	***APW-1S***	***APW-2S***
		Sample Date:	***2/8/2001***	***2/8/2001***
Collected Liquids Monitoring Parameters	***Unit***	***Monitoring Level***		
Chloride	mg/L	1000	1410	973
Total Organic Carbon (TOC)	mg/L	200	3.8	3.9
Phenolics (Total)	mg/L	10	ND 0.0050	ND 0.0050
Total Organic Halides (TOX)	ug/L	500	1820	830
Hexachlorocyclohexane	ug/L	10	ND 9.5	0.055 J
2-Chlorotoluene	ug/L	10	16	14
3-Chlorotoluene	ug/L	10	ND 3.0	ND 3.0
4-Chlorotoluene	ug/L	10	7.9	6.2
Chlorobenzene	ug/L	10	14	15
1,2,3,4-Tetrachlorobenzene	ug/L	10	ND 5	ND 5
1,2,3-Trichlorobenzene	ug/L	10	ND 3	ND 3
1,2,4,5-Tetrachlorobenzene	ug/L	10	ND 5	ND 5
1,2,4-Trichlorobenzene	ug/L	10	ND 3	ND 3
1,3,5-Trichlorobenzene	ug/L	10	ND 3	ND 3
2,4,5-Trichlorophenol	ug/L	10	ND10	9 R
Octachlorocyclopentene	ug/L	10	ND 10	ND 9
Acids				
2-Chlorobenzoic acid	mg/L	100	ND 0.030	ND 0.030
3-Chlorobenzoic acid	mg/L	100	ND 0.030	ND 0.030
4-Chlorobenzoic acid	ug/L	100	ND 0.030	ND 0.030
Benzoic acid	ug/L	100	ND 0.10	ND 0.10
Chlorendic acid	ug/L	250	0.60	ND 0.25
Monochlorobenzoic acid	ug/L	100	3.1	4.6

Notes:
J Estimated.
NDx Non-detect at associated value.
R Rejected.
* Analyzed for alpha-, beta-, gamma-, and delta-hexachlorocyclohexanes.

TABLE 4.1

HYDRAULIC GRADIENT SUMMARY
OVERBURDEN BARRIER COLLECTION SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well Pair	*01/11/01*			*01/17/01*			*01/25/01*			*02/01/01*		
	Inner Elevation (Ft. AMSL)	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*
Inner-Outer												
OMW-10R-OMW-9	586.42	587.02	-0.60	586.56	587.55	-0.99	586.46	587.36	-0.90	N / A	587.83	N / A
OMW-11R-OMW-12R	590.25	589.95	0.30	590.86	590.43	0.43	N / A	590.74	N / A	N / A	591.55	N / A
OMW-13R-OMW-14R	592.21	591.42	0.79	592.57	591.42	1.15	592.63	591.42	1.21	592.67	591.4	1.27
OMW-15-OMW-16R	601.43	602.98	-1.55	601.53	603.08	-1.55	601.91	603.13	-1.22	602.04	603.31	-1.27
OMW-1-OMW-2	599.57	603.35	-3.78	601.34	604.27	-2.93	599.96	604.32	-4.36	601.84	604.3	-2.46
OMW-3-OMW-4R	N / A	589.49	N / A	586.52	589.51	-2.99	586.59	589.72	-3.13	N / A	590.09	N / A
OMW-5R-OMW-6	583.7	N / A	N / A	584.6	586.32	-1.72	583.79	N / A	N / A	584.63	N / A	N / A
OMW-8R2-OMW-7	587.1	585.23	1.87	586.26	585.24	1.02	586.12	585.14	0.98	588.48	585.23	3.25

Well Pair	*02/07/01*			*02/15/01*			*02/22/01*			*3/1/2001*		
	Inner Elevation (Ft. AMSL)	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*
Inner-Outer												
OMW-10R-OMW-9	586.68	587.72	-1.04	584.89	588.19	-3.30	586.54	587.52	-0.98	586.59	587.58	-0.99
OMW-11R-OMW-12R	N / A	591.15	N / A	592.07	591.75	0.32	N / A	591.25	N / A	591.94	591.55	0.39
OMW-13R-OMW-14R	592.89	591.42	1.47	593.54	591.48	2.06	593.1	594.27	-1.17	593.66	591.3	2.36
OMW-15-OMW-16R	602.88	603.29	-0.41	602.76	603.56	-0.80	602.69	603.51	-0.82	602.8	603.24	-0.44
OMW-1-OMW-2	600.51	604.09	-3.58	601.06	N / A	N / A	600.17	604.42	-4.25	600.38	N / A	N / A
OMW-3-OMW-4R	586.86	590.25	-3.39	587.64	590.71	-3.07	588.22	590.78	-2.56	589.65	590.82	-1.17
OMW-5R-OMW-6	584.15	N / A	N / A	584.45	586.26	-1.81	583.85	586.02	-2.17	584.12	N / A	N / A
OMW-8R2-OMW-7	587.95	584.89	3.06	586.95	584.85	2.10	586.31	584.64	1.67	587.85	584.81	3.04

TABLE 4.1

HYDRAULIC GRADIENT SUMMARY
OVERBURDEN BARRIER COLLECTION SYSTEM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well Pair	*3/7/2001*			*3/15/2001*			*3/21/2001*			*3/28/2001*		
	Inner Elevation (Ft. AMSL)	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*
Inner-Outer												
OMW-10R-OMW-9	586.56	587.52	-0.96	586.69	587.86	-1.17	586.29	588.07	-1.78	586.67	587.88	-1.21
OMW-11R-OMW-12R	N / A	591.2	N / A	N / A	591.23	N / A	N / A	591.97	N / A	N / A	591.95	N / A
OMW-13R-OMW-14R	592.54	591.17	1.37	593.17	591.32	1.85	593.49	591.32	2.17	593.34	591.37	1.97
OMW-15-OMW-16R	602.54	603.53	-0.99	602.64	603.56	-0.92	602.92	603.53	-0.61	602.99	603.62	-0.63
OMW-1-OMW-2	600.02	604.49	-4.47	601.52	604.29	-2.77	601.97	604.24	-2.27	600.87	604.2	-3.33
OMW-3-OMW-4R	589.22	590.71	-1.49	589.27	590.63	-1.36	589.35	590.64	-1.29	589.42	590.83	-1.41
OMW-5R-OMW-6	583.5	587.17	-3.67	584.65	586.27	-1.62	584.65	586.52	-1.87	584.06	586.37	-2.31
OMW-8R2-OMW-7	587.56	584.99	2.57	587.96	584.94	3.02	588.46	584.99	3.47	588.2	584.82	3.38

Well Pair	*January*			*February*			*March*		
	Inner Elevation (Ft. AMSL)	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*	*Inner Elevation (Ft. AMSL)*	*Outer Elevation (Ft. AMSL)*	*Hydraulic Gradient(1) (Vert. Ft.)*
Bedrock-Overburden									
N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A
N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A
B1U-OMW-6	564.2	N / A	N / A	568.7	N / A	N / A	569.7	N / A	N / A
B1U-OMW-8R2	564.2	587.1	-22.90	568.7	588.48	-19.78	569.7	587.85	-18.15
B1U-OMW-9	564.2	587.02	-22.82	568.7	587.83	-19.13	569.7	587.58	-17.88
D1U-OMW-11R	578.89	590.25	-11.36	580.56	N / A	N / A	580.52	591.94	-11.42
E4U-OMW-14R	588.57	591.42	-2.85	588.51	591.4	-2.89	588.41	591.3	-2.89
N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A

Notes:

(1) Negative number indicates an inward / downward gradient measured in feet.

N / A Not Applicable.

Ft. AMSL Feet Above Mean Sea Level.

TABLE 4.2

OVERBURDEN BARRIER COLLECTION SYSTEM
NAPL PRESENCE MONITORING
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well I.D.	*1st Quarter 1998 2/6 to 2/17*	*2nd Quarter 1998 05/11/98*	*3rd Quarter 1998 08/17/98*	*4th Quarter 1998 11/23/98*	*1st Quarter 1999 02/23/99*	*2nd Quarter 1999 05/06/99*	*3rd Quarter 1999 07/27/99*	*4th Quarter 1999 11/17/99*	*1st Quarter 2000 02/03/00*	*2nd Quarter 2000 05/01/00*	*3rd Quarter 2000 08/01/00*	*4th Quarter 2000 11/01/00*	*1st Quarter 2001 02/01/01*
OMW1	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW4	NO	NO	NO	NO	NO	-	-	-	-	-	-	-	-
OMW4R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO
OMW5	NO	NO	NO	NO	NO	-	-	-	-	-	-	-	-
OMW5R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO
OMW6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW8	NO	NO	NO	NO	NO	-	-	-	-	-	-	-	-
OMW8R	-	-	-	-	-	NO	-	-	-	-	-	-	-
OMW8R2	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO
OMW9	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW10	NO	NO	NO	NO	NO	-	-	-	-	-	-	-	-
OMW10R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO
OMW11	NO	NO	NO	NO *	NO	NO	NO	NO	-	-	-	-	-
OMW11R	-	-	-	-	-	-	-	-	NO	NO	NO	NO	NO
OMW12	NO	NO	NO	NO *	NO	-	-	-	-	-	-	-	-
OMW12R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO
OMW13	NO	NO	NO	NO *	NO	NO	-	-	-	-	-	-	-
OMW13R	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO
OMW14	NO	NO	NO	NO *	NO	-	-	-	-	-	-	-	-
OMW14R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO
OMW15	NO	NO	NO	NO *	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW16	NO	NO	NO	NO *	NO	-	-	-	-	-	-	-	-
OMW16R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO

Notes:
* NAPL checks performed on 12/10/98 due to work stoppage at TAM Ceramics (wells located on TAM's property).
\- Not available.

TABLE 4.3

HYDRAULIC GRADIENT SUMMARY
COMMUNITY MONITORING PROGRAM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

Well Pair	*January* OB Elevation (Ft. AMSL)	*January* SH Elevation (Ft. AMSL)	*January* Hydraulic Gradient (Vert. Ft.) (1)	*February* OB Elevation (Ft. AMSL)	*February* SH Elevation (Ft. AMSL)	*February* Hydraulic Gradient (Vert. Ft.) (1)	*March* OB Elevation (Ft. AMSL)	*March* SH Elevation (Ft. AMSL)	*March* Hydraulic Gradient (Vert. Ft.) (1)
Overburden-Bedrock									
CMW-1OB - CMW-1SH	573.21	566.69	**-6.52**	573.5	567.22	**-6.28**	573.37	566.67	**-6.7**
CMW-2OB - CMW-2SH	582.51	566.63	**-15.88**	590.02	567.76	**-22.26**	589.28	569.03	**-20.25**
CMW-3OB - CMW-3SH	573.12	554.85	**-18.27**	547.77	554.84	**7.07**	576.55	555.46	**-21.09**
CMW-4OB - CMW-4SH	573.36	567.06	**-6.3**	574.2	567.58	**-6.62**	574.22	567.79	**-6.43**
CMW-5OB - CMW-5SH	577.64	575.6	**-2.04**	578.26	578.13	**-0.13**	580.37	578.35	**-2.02**
CMW-6OB - CMW-6SH	569.54	562.15	**-7.39**	571.03	562.3	**-8.73**	570.69	562.99	**-7.7**
CMW-7OB - CMW-7SH	Dry	598.2	**NA(2)**	Dry	598.15	**NA(2)**	Dry	600.33	**NA(2)**
CMW-8OB - CMW-8SH	Dry	605.69	**NA(2)**	Dry	608.35	**NA(2)**	Dry	611.15	**NA(2)**
CMW-9OB - CMW-9SH	Dry	559.14	**NA(2)**	Dry	560.79	**NA(2)**	572.36	560.59	**-11.77**
CMW-11OB- CMW-11SH	Dry	565.24	**NA(2)**	Dry	565.58	**NA(2)**	573.49	565.62	**-7.87**
CMW-12OB - CMW-12SH	579.42	568.68	**-10.74**	582.12	569.49	**-12.63**	583.5	570.55	**-12.95**

Notes:

(1) Negative number indicates a downward gradient measured in feet.
(2) Elevation of OB well greater than SH groundwater elevation indicating downward gradient.
AMSL Above Mean Sea Level.
NA Not Applicable.
OB Overburden.
SH Shallow Bedrock.

TABLE 4.4

QUARTERLY SOIL AIR MONITORING ANALYTICAL RESULTS
COMMUNITY MONITORING PROGRAM
FIRST QUARTER - 2001
HYDE PARK RRT PROGRAM

	Sample Location:	***CMW-7***	***CMW-8***
	Sample ID:	***CMW7201***	***CMW8201***
	Sample Date:	***2/22/2001***	***2/22/2001***
Parameter	***Unit***		
2-Chlorotoluene	mg/m3	ND 0.18	ND 0.23
Chlorobenzene	mg/m3	ND 0.18	ND 0.23
m-Monochlorobenzotrifluoride	mg/m3	ND 0.18	ND 0.23
o-Monochlorobenzotrifluoride	mg/m3	ND 0.18	ND 0.23
p-Monochlorobenzotrifluoride	mg/m3	ND 0.18	ND 0.23

Notes:
NDx Non-detect at associated value.

TABLE 5.1

LEACHATE TREATMENT SYSTEM DAILY EFFLUENT MONITORING DATA
FIRST QUARTER 2001 - JANUARY
HYDE PARK RRT PROGRAM

Date	*Operating Hours*	*TOC (1) - mg/L*				*Phenol (2) - mg/L*				*Effluent pH 5-10*	*Gallons*	*Comments*
		C.B. Feed	*1st Instg.*	*2nd Instg.*	*Effluent*	*C.B. Feed*	*1st Instg.*	*2nd Instg.*	*Effluent*			
01/02/01	24	-	-	-	1.6	2.60	0.31	0.07	0.02	7.35	164,300	
01/03/01	24	-	-	-	1.7	0.10	0.24	0.10	0.10	7.1	210,900	
01/04/01	24	-	-	-	0.0	0.10	0.26	0.10	0.06	7.13	208,842	
01/05/01	24	-	-	-	0.0	0.10	0.30	0.10	0.07	7.19	137,946	
01/08/01	16	-	-	-	0.0	0.10	0.49	0.16	0.02	7.25	140,256	
01/09/01	16	-	-	-	3.0	0.10	0.30	0.10	0.09	7.33	140,687	
01/10/01	16	-	-	-	2.3	0.10	0.34	0.10	0.07	7.26	140,531	
01/11/01	16	-	-	-	2.5	0.10	0.36	0.10	0.08	7.23	140,546	
01/12/01	8	-	-	-	3.7	0.10	0.35	0.10	0.07	7.23	40,228	
01/15/01	16	-	-	-	2.5	0.10	0.83	0.32	0.14	7.42	136,910	
01/18/01	24	-	-	-	4.8	0.10	0.40	0.10	0.09	7.36	177,761	
01/19/01	24	-	-	-	4.0	0.10	0.40	0.10	0.09	7.33	191,689	
01/22/01	20	-	-	-	3.6	0.10	0.33	0.09	0.03	7.37	159,913	
01/23/01	20	-	-	-	2.6	0.10	0.37	0.10	0.12	7.46	165,370	
01/24/01	20	-	-	-	1.4	0.10	0.10	0.09	0.08	7.42	171,895	
01/25/01	16	-	-	-	0.0	0.10	0.06	0.10	0.06	7.37	138,056	
01/26/01	16	-	-	-	0.0	0.10	0.09	0.10	0.03	7.46	136,608	
01/29/01	16	-	-	-	0.0	0.10	0.18	0.06	0.02	7.66	140,224	
01/30/01	16	-	-	-	0.0	0.10	0.07	0.10	0.03	7.38	132,759	
01/31/01	20	-	-	-	0.0	0.10	0.08	0.10	0.05	7.29	155,352	

Notes:
(1) TOC treatment level = 1000 mg/L.
(2) Phenol treatment level = 1 mg/L.
NA Not Available.
TOC Total Organic Compound.

TABLE 5.1

LEACHATE TREATMENT SYSTEM DAILY EFFLUENT MONITORING DATA
FIRST QUARTER 2001 - FEBRUARY
HYDE PARK RRT PROGRAM

	Operating	TOC [(1)] - mg/L				Phenol [(2)] - mg/L				Effluent		
Date	Hours	C.B. Feed	1st Instg.	2nd Instg.	Effluent	C.B. Feed	1st Instg.	2nd Instg.	Effluent	pH 5-10	Gallons	Comments
02/01/01	24	-	-	-	1.7	2.60	0.06	0.04	0.04	7.26	213,789	
02/02/01	24	-	-	-	2.7	0.10	0.07	0.10	0.04	7.35	212,807	
02/03/01	16	-	-	-	2.2	0.10	0.06	0.10	0.02	7.3	183,345	
02/04/01	8	-	-	-	2.9	0.10	0.09	0.10	0.03	7.37	57,878	
02/05/01	16	20.6	8.5	3.0	1.8	0.10	0.05	0.10	0.02	7.49	140,245	
02/06/01	24	-	-	-	1.9	0.10	0.04	0.10	0.02	7.52	159,630	
02/07/01	24	-	-	-	2.1	0.10	0.06	0.10	0.03	7.4	214,410	
02/08/01	16	-	-	-	3.0	0.10	0.15	0.12	0.03	7.21	180,254	
02/09/01	16	-	-	-	3.1	0.10	0.06	0.10	0.07	7.34	138,283	
02/12/01	24	-	-	-	4.6	0.10	0.06	0.10	0.04	7.41	154,469	
02/13/01	24	-	-	-	3.2	0.10	0.05	0.10	0.03	7.45	211,145	
02/14/01	24	-	-	-	2.0	0.10	0.11	0.10	0.05	7.2	211,074	
02/15/01	24	-	-	-	2.6	0.10	0.06	0.10	0.03	7.2	205,176	
02/16/01	24	-	-	-	3.2	0.10	0.06	0.10	0.02	7.05	212,734	
02/17/01	24	-	-	-	3.0	0.10	0.04	0.06	0.02	7.07	211,172	
02/18/01	24	-	-	-	2.9	0.10	0.08	0.10	0.03	6.97	186,245	
02/19/01	24	-	-	-	6.2	0.10	0.36	0.10	0.05	7.41	198,248	
02/20/01	24	-	-	-	0.0	0.10	0.48	0.10	0.03	7.31	186,996	
02/21/01	24	-	-	-	0.0	0.10	0.48	0.10	0.08	7.56	135,576	
02/22/01	24	-	-	-	2.6	0.10	0.10	0.10	0.10	7.36	133,908	
02/23/01	24	-	-	-	3.1	0.10	0.10	0.10	0.10	7.46	134,910	
02/26/01	24	-	-	-	2.8	0.10	0.64	0.24	0.33	7.43	152,110	
02/27/01	24	-	-	-	3.1	0.1	0.7	0.1	0.1	7.46	173,500	
02/28/01	24	-	-	-	2.8	0.1	0.7	0.1	0.1	7.22	209,400	

Notes:

(1) TOC treatment level = 1000 mg/L.

(2) Phenol treatment level = 1 mg/L.

NA Not Available.

TOC Total Organic Compound.

TABLE 5.1

LEACHATE TREATMENT SYSTEM DAILY EFFLUENT MONITORING DATA
FIRST QUARTER 2001 - MARCH
HYDE PARK RRT PROGRAM

	Operating	TOC (1) - mg/L				Phenol (2) - mg/L				Effluent		
Date	Hours	C.B. Feed	1st Instg.	2nd Instg.	Effluent	C.B. Feed	1st Instg.	2nd Instg.	Effluent	pH 5-10	Gallons	Comments
03/01/01	24	-	-	-	2.9	0.10	0.71	0.10	0.07	7	209,300	
03/02/01	24	-	-	-	3.5	0.10	0.11	0.10	0.07	7.5	211,300	
03/03/01	4	-	-	-	-	0.10	0.10	0.10	0.10	-	42,429	
03/05/01	24	-	-	-	3.4	0.10	0.07	0.09	0.11	7.32	229,671	
03/06/01	24	-	-	-	4.5	2.60	0.05	0.05	0.03	7.37	207,100	
03/07/01	24	-	-	-	4.2	0.10	0.12	0.10	0.02	7.24	208,010	
03/08/01	24	-	-	-	3.0	0.10	0.06	0.10	0.02	7.43	150,490	
03/09/01	24	-	-	-	1.6	0.10	0.07	0.10	0.01	7.42	117,216	
03/12/01	24	23.1	10.4	3.6	4.2	0.10	0.25	0.12	0.02	7.42	157,284	
03/13/01	24	-	-	-	2.4	0.10	0.08	0.10	0.03	7.04	212,400	
03/14/01	24	-	-	-	2.5	0.10	0.10	0.10	0.01	7.25	217,400	
03/15/01	24	-	-	-	2.0	0.10	0.10	0.10	0.06	7.26	215,600	
03/16/01	24	-	-	-	3.1	0.10	0.08	0.10	0.03	7.24	216,000	
03/19/01	24	-	-	-	3.2	0.10	0.25	0.08	0.05	7.43	206,600	
03/20/01	24	-	-	-	1.8	0.10	0.08	0.10	0.04	7.25	214,300	
03/21/01	24	-	-	-	3.7	0.10	0.11	0.10	0.07	7.31	213,400	
03/22/01	24	-	-	-	2.1	0.10	0.11	0.10	0.03	7.19	207,450	
03/23/01	24	-	-	-	2.0	0.10	0.18	0.10	0.04	7.14	216,659	
03/24/01	24	-	-	-	2.0	0.10	0.17	0.10	0.04	7.33	218,857	
03/25/01	24	-	-	-	2.0	0.10	0.16	0.10	0.04	7.22	215,534	
03/26/01	24	-	-	-	3.3	0.10	0.17	0.11	0.04	7.41	217,800	
03/27/01	24	-	-	-	2.0	0.10	0.17	0.10	0.03	7.3	214,400	
03/28/01	24	-	-	-	2.0	0.10	0.12	0.10	0.03	7.22	215,600	
03/29/01	24	-	-	-	1.9	0.10	0.16	0.10	0.02	7.3	208,050	
03/30/01	24	-	-	-	2.8	0.10	0.16	0.10	0.03	7.3	212,980	

Notes:

(1) TOC treatment level = 1000 mg/L.

(2) Phenol treatment level = 1 mg/L.

NA Not Available.

TOC Total Organic Compound.

TABLE 6.1

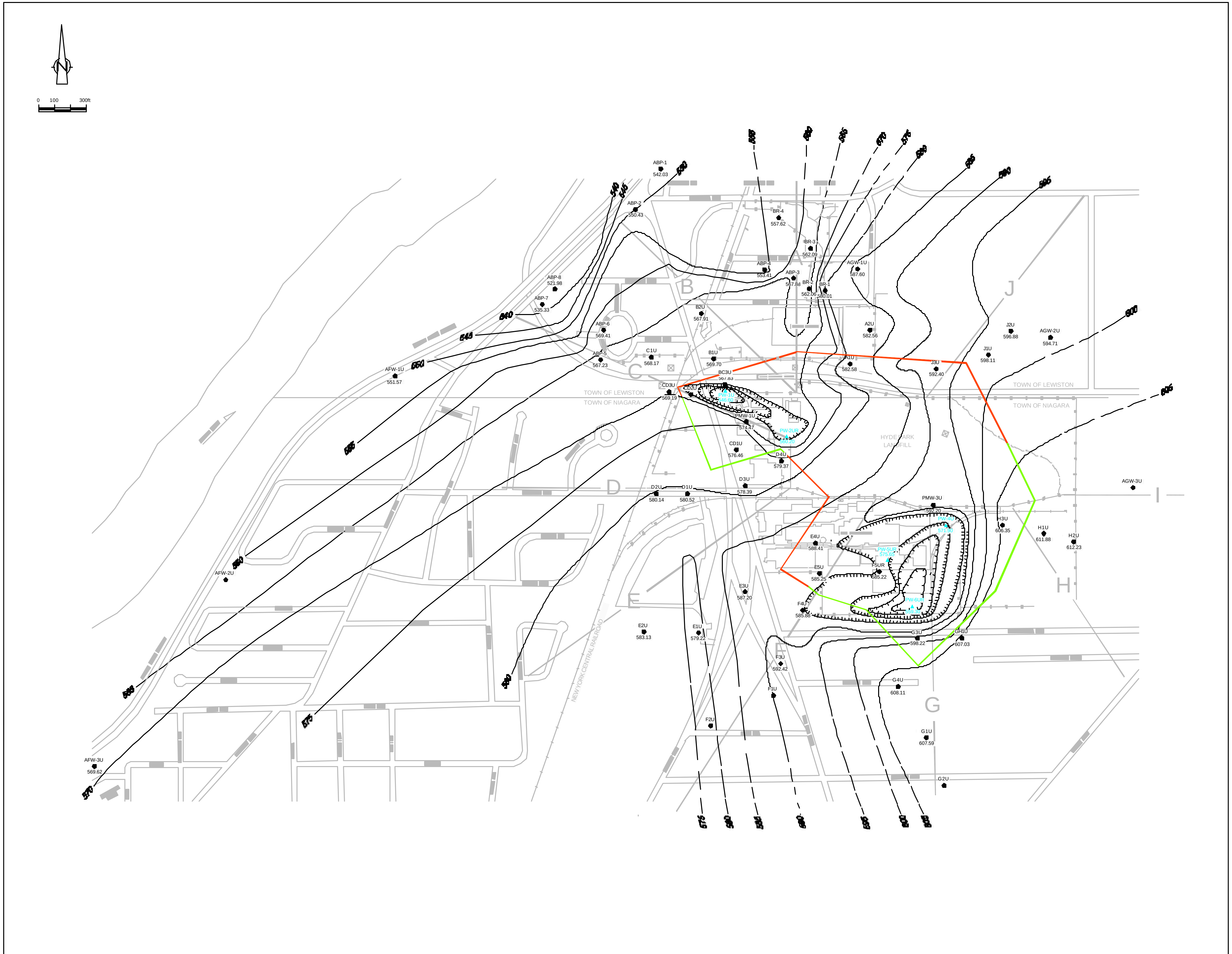
QUARTERLY NAPL ACCUMULATION
HYDE PARK RRT PROGRAM

	* *NAPL Volume Per Decanter* 1	*(Gallons)* 2	3	*Manually Recovered NAPL (Gallons)*	*NAPL Removed Decanter* 1	*(Gallons)* 2	3	*Total*	*Disposed Total Shipped (Gallons)*
Dec-00	2350	3508	3384	0	0	0	0	0	0
Jan-01	2,444	3,760	3,384	30 (1)	0	0	0	0	0
Feb-01	3,196	3,572	3,384	0	0	0	0	0	0
Mar-01	3,384	3,760	3,384	0	0	0	0	0	0
1st Quarter	1,034	252	0	0	0	0	0	0	0
Apr-00	-	-	-	-	-	-	-	-	-
May-00	-	-	-	-	-	-	-	-	-
Jun-00	-	-	-	-	-	-	-	-	-
2nd Quarter	-	-	-	-	-	-	-	-	-
Jul-00	-	-	-	-	-	-	-	-	-
Aug-00	-	-	-	-	-	-	-	-	-
Sep-00	-	-	-	-	-	-	-	-	-
3rd Quarter	-	-	-	-	-	-	-	-	-
Oct-00	-	-	-	-	-	-	-	-	-
Nov-00	-	-	-	-	-	-	-	-	-
Dec-00	-	-	-	-	-	-	-	-	-
4th Quarter	-	-	-	-	-	-	-	-	-
			YTD	0	0	0	0	0	0

Manual Recoveries:
(1) January 25: CD1U 10.0gals; and PMW-3U 20.0 gals.

APPENDIX A

GROUNDWATER ELEVATION CONTOUR MAPS



LEGEND

- SWALE
- POWER TOWER
- RAILWAY
- UPPER BEDROCK PURGE WELL
- UPPER BEDROCK MONITORING WELL
- UPPER BEDROCK NAPL PLUME WERE CAPTURED ACHIEVED
- UPPER BEDROCK NAPL PLUME WERE CAPTURED NOT ACHIEVED
- GROUNDWATER ELEVATION CONTOUR
- FULLY ENCIRCLED GROUNDWATER ELEVATION CONTOUR TICKS INDICATED ELEVATION DIRECTION CHANGES INFERRED GROUNDWATER CONTOURS
- INFERRED GROUNDWATER ELEVATION CONTOUR
- B — AQUIFER SURVEY VECTOR

NOTES:

1. THE FOLLOWING WELLS WERE NOT USED FOR GROUNDWATER ELEVATION CONTOURING

AFW-2U - NOT USED INCONSISTENTLY HIGH WATER LEVEL ELEVATION (595.89FT. AMSL)
G2U - NOT MEASURED
CD2U - NOT MEASURED
F1U - NOT MEASURED, NO ACCESS
F2U - NOT MEASURED, ACCESS
AGW - 3U - NOT MEASURED, BURIED

2. THE NAPL PLUME BOUNDARY IS AN ESTIMATION BASED ON PREVIOUS INVESTIGATIONS INCLUDING THE 1999 DRILLING PROGRAM.

No.	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

OCCIDENTAL CHEMICAL CORPORATION

HYDE PARK RRT PROGRAM

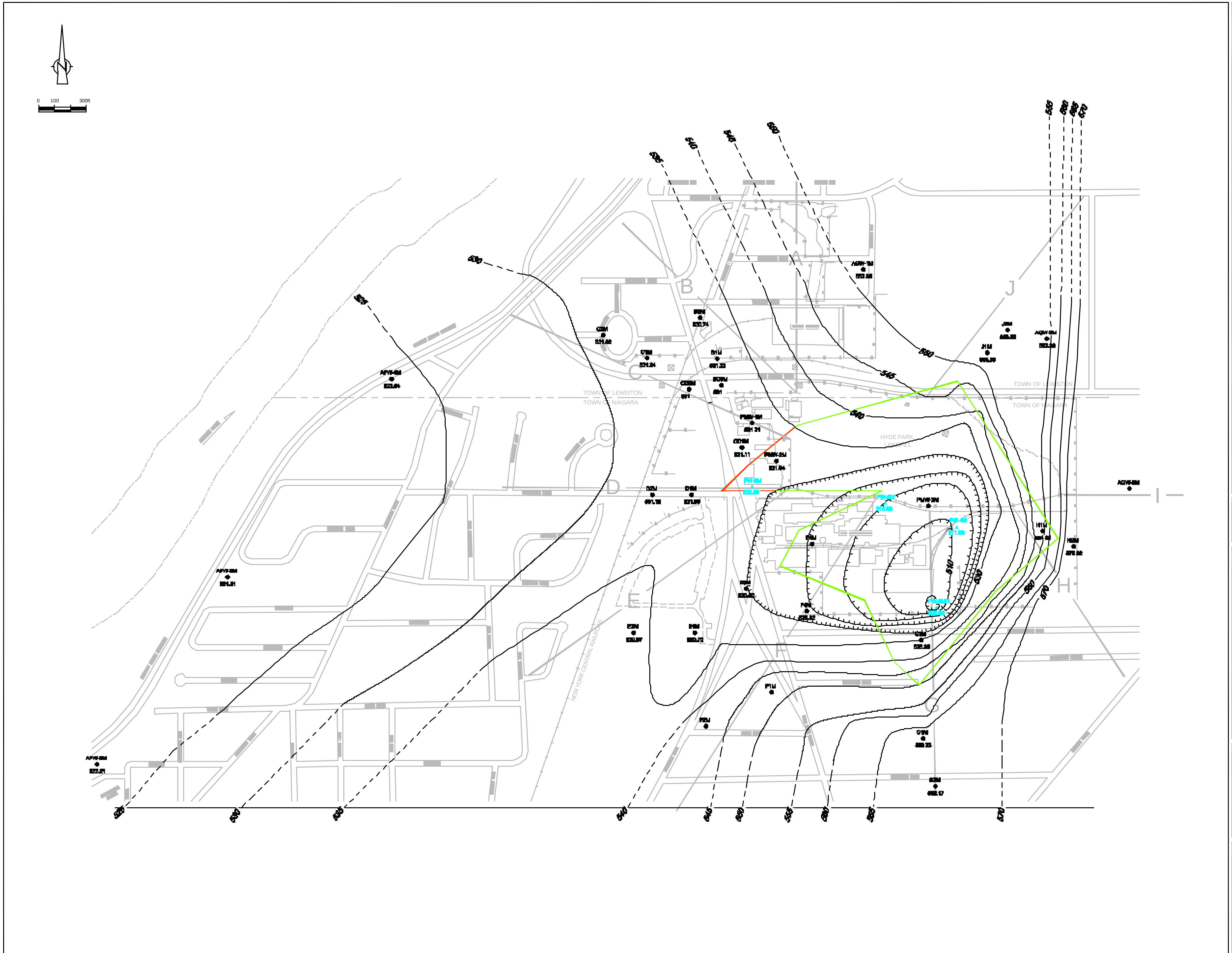
UPPER BEDROCK WATER LEVELS MARCH 1, 2001

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

Project Manager:	Reviewed By:	Date: JUNE 2001	
Scale: 1"=300'	Project No. 01069-20	Report No. 295	Drawing No. 010

01069-20(295)GN-NF010 JUL 19/2001



No.	Revision	Date	Initial

LEGEND

SWALE

POWER TOWER

RAILWAY

MIDDLE BEDROCK PURGE WELL

MIDDLE BEDROCK MONITORING WELL

MIDDLE BEDROCK NAPL PLUME WERE CAPTURED ACHIEVED

MIDDLE BEDROCK NAPL PLUME WERE CAPTURED NOT ACHIEVED

GROUNDWATER ELEVATION CONTOUR

FULLY ENCIRCLED GROUNDWATER ELEVATION CONTOUR TICKS INDICATED ELEVATION DIRECTION CHANGES INFERRED GROUNDWATER CONTOURS

INFERRED GROUNDWATER ELEVATION CONTOUR

AQUIFER SURVEY VECTOR

NOTES:

1. THE FOLLOWING WELLS WERE NOT USED FOR GROUNDWATER ELEVATION CONTOURING

PMW-3M - NOT USED INCONSISTENTLY HIGH WATER LEVEL ELEVATION (583.47FT. AMSL)
E4M - NOT USED INCONSISTENTLY HIGH WATER LEVEL ELEVATION (537.76FT. AMSL)
AGW - 3M - NOT MEASURED, BURIED
F1M - NOT MEASURED, NO ACCESS
F2M - NOT MEASURED, ACCESS

2. THE NAPL PLUME BOUNDARY IS AN ESTIMATION BASED ON PREVIOUS INVESTIGATIONS INCLUDING THE 1999 DRILLING PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

OCCIDENTAL CHEMICAL CORPORATION

HYDE PARK RRT PROGRAM

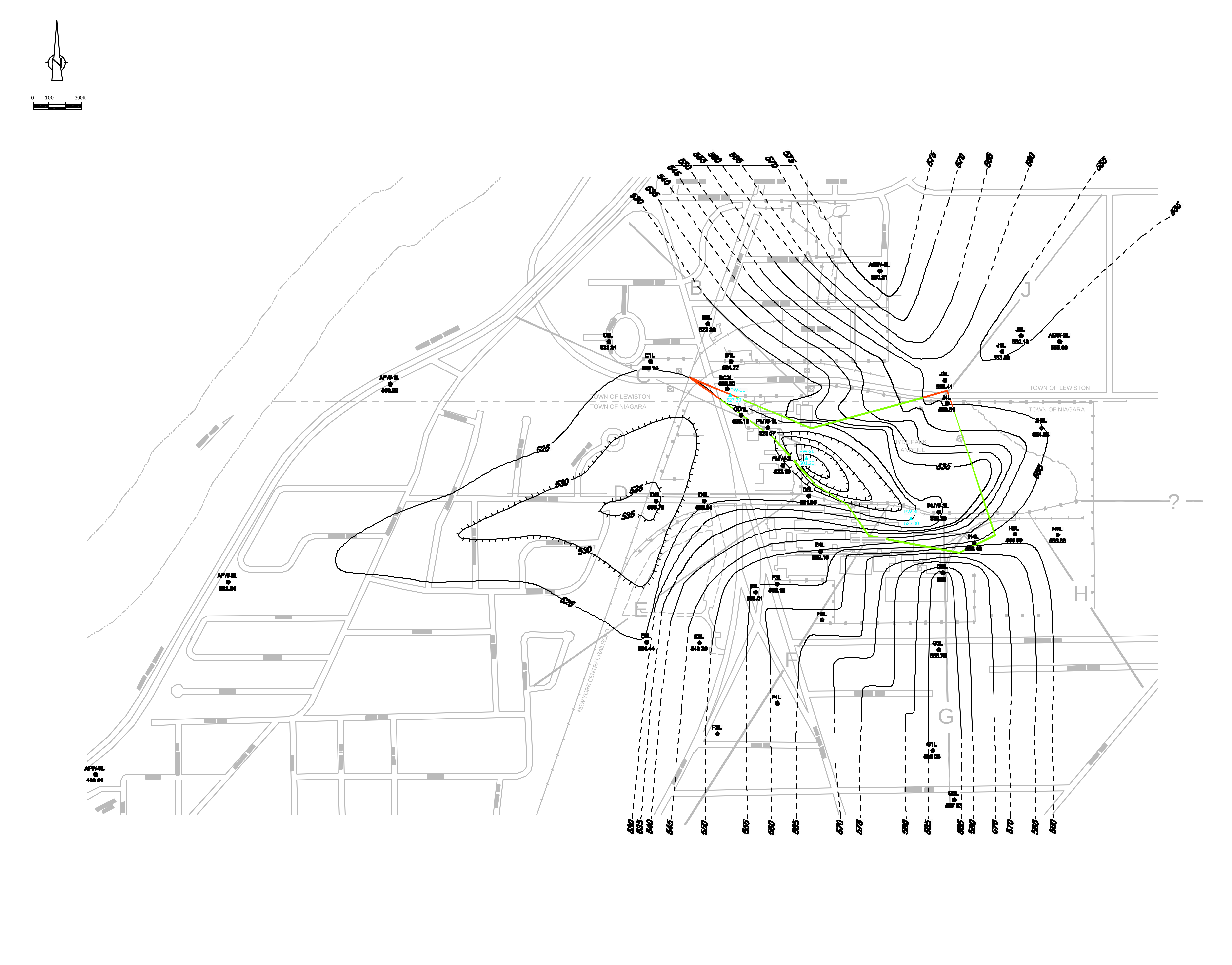
MIDDLE BEDROCK WATER LEVELS
MARCH 1, 2001

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

Project Manager:	Reviewed By:	Date: JUNE 2001	
Scale: 1"=300'	Project No.: 01069-20	Report No.: 295	Drawing No.: 011

01069-20(295)GN-NF011 JUL 19/2001



N	Revision	Date	Initial

LEGEND

- SWALE
- POWER TOWER
- RAILWAY
- LOWER BEDROCK PURGE WELL
- LOWER BEDROCK MONITORING WELL
- LOWER BEDROCK NAPL PLUME WERE CAPTURED ACHIEVED
- LOWER BEDROCK NAPL PLUME WERE CAPTURED NOT ACHIEVED
- GROUNDWATER ELEVATION CONTOUR
- FULLY ENCIRCLED GROUNDWATER ELEVATION CONTOUR TICKS INDICATED ELEVATION DIRECTION CHANGES INFERRED GROUNDWATER CONTOURS
- INFERRED GROUNDWATER ELEVATION CONTOUR
- B — AQUIFER SURVEY VECTOR

NOTES:

1. THE FOLLOWING WELLS WERE NOT USED FOR GROUNDWATER ELEVATION CONTOURING

PMW-3L - NOT USED INCONSISTENTLY HIGH WATER LEVEL ELEVATION (559.26FT. AMSL)
F3L - NOT USED INCONSISTENTLY HIGH WATER LEVEL ELEVATION (592.26FT. AMSL)
F4L - NOT MEASURED, FLOODED
F1L - NOT MEASURED, NO ACCESS
F2L - NOT MEASURED, ACCESS
AGW - 3L - NOT MEASURED, BURIED
F2L - NOT USED INCONSISTENTLY LOW WATER LEVEL ELEVATION (517.37FT. AMSL)

2. THE NAPL PLUME BOUNDARY IS AN ESTIMATION BASED ON PREVIOUS INVESTIGATIONS INCLUDING THE 1999 DRILLING PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

OCCIDENTAL CHEMICAL CORPORATION

HYDE PARK RRT PROGRAM

LOWER BEDROCK WATER LEVELS
MARCH 1, 2001

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

Project Manager:	Reviewed By:	Date: JUNE 2001	
Scale: 1"=300'	Project N: 01069-20	Report N: 295	Drawing N: 012

01069-20(295)GN-NF012 JUL 19/2001

APPENDIX B

S.S. PAPADOPULOS AND ASSOCIATES, INC., MEMORANDUM

S. S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

Memorandum

Date: April 11, 2001

From: M.A. Kuhl and C.J. Neville

To: Hyde Park Technical Team

SSPA Project: SSP-610

Subject: **Hyde Park Landfill: Simulation of First Quarter 2001 Conditions**

This memorandum presents the evaluation of the pumping data from the First Quarter of 2001. Our evaluation includes an analysis of NAPL plume containment during the quarter.

1. Summary of changes in pumping

The following table summarizes the average pumping rates during the First Quarter of 2001. The table also includes the average rates for March 1999-March 2000, to indicate changes in pumping relative to our base case analysis.

	Average Pumping Rate (gpm)	
Purge Well	**First Quarter 2001**	**March 1999 to March 2000**
PW-1L	6.1	8.1
PW-1U	0.4	0.3
PW-2L	1.3	3.0
PW-2M	26.5	20.5
PW-2UR	1.2	1.5
PW-3L	5.2	6.6
PW-3M	0.6	0.4
PW-4M	0.0	0.7
PW-4U	0.6	0.7
PW-5UR	4.1	5.7
PW-6MR	3.9	4.1
PW-6UR	2.9	1.1
TOTAL	52.8	52.7

207 KING STREET S., WATERLOO, ONTARIO N2J 1R1 • TEL. (519) 579-2100 • FAX (519) 579-9779
WWW.SSPA.COM

2. Comments on changes in pumping

The average total pumping rate for the First Quarter of 2001 is 52.8 gpm. This is almost the same as the average total rate for March 1999-March 2000.

The pumping rates of the majority of the wells are unchanged, however, three significant changes are noted:

- The pumping rate at PW-1L decreased from 8.1 gpm to 6.1 gpm;
- The pumping rate at PW-2M increased from 20.5 gpm to 26.5 gpm; and
- The pumping rate at PW-2L decreased from 3.0 gpm to 1.3 gpm.

Complete time histories of the cumulative purge well pumping rate and the individual purge well pumping rates are assembled in the attachment to this memorandum. The plots have been updated to include the data from the First Quarter of 2001. We recommend that these plots be updated monthly and reviewed to assess significant changes in well performance.

3. Performance of the model

The average water levels over the First Quarter of 2001 were applied as calibration targets for the groundwater flow model. The calculated and observed water levels are plotted in Figure 1. The calibration residuals and residual statistics for the individual wells are presented in the attached Table 1. The mean residual is –0.32 ft and the mean absolute residual is 4.93 ft. The mean residual is identical to the March 1999-March 2000 calibration and the mean absolute residual is slightly higher than the previously value of 4.72 ft.

4. Changes in capture zones

The capture zones for First Quarter 2001 conditions are presented on Figures 2, 3, and 4 for the Upper, Middle, and Lower bedrock, respectively. The overall capture within the Upper and Middle bedrock is increased slightly, and overall capture in the Lower bedrock is unchanged. The percentage capture of the NAPL plume boundaries is presented in the following table:

Bedrock Zone	Percentage of Captured NAPL Plume Area (%)	
	First Quarter 2001	March 1999 to March 2000
Upper	52.1	49.3
Middle	90.4	87.0
Lower	98.8	98.8
Total	74.4	71.8

The Total Capture statistic reported in this table is determined as the sum of the captured areas divided by the total NAPL plume areas in the three bedrock zones.

The capture zone for purge well PW-2M is increased in the Upper and Middle bedrock because of the increased pumping at this well. The capture zone for purge well PW-1L has decreased in size due to the decreased pumping at this well.

Mark Kuhl.

CJNeville

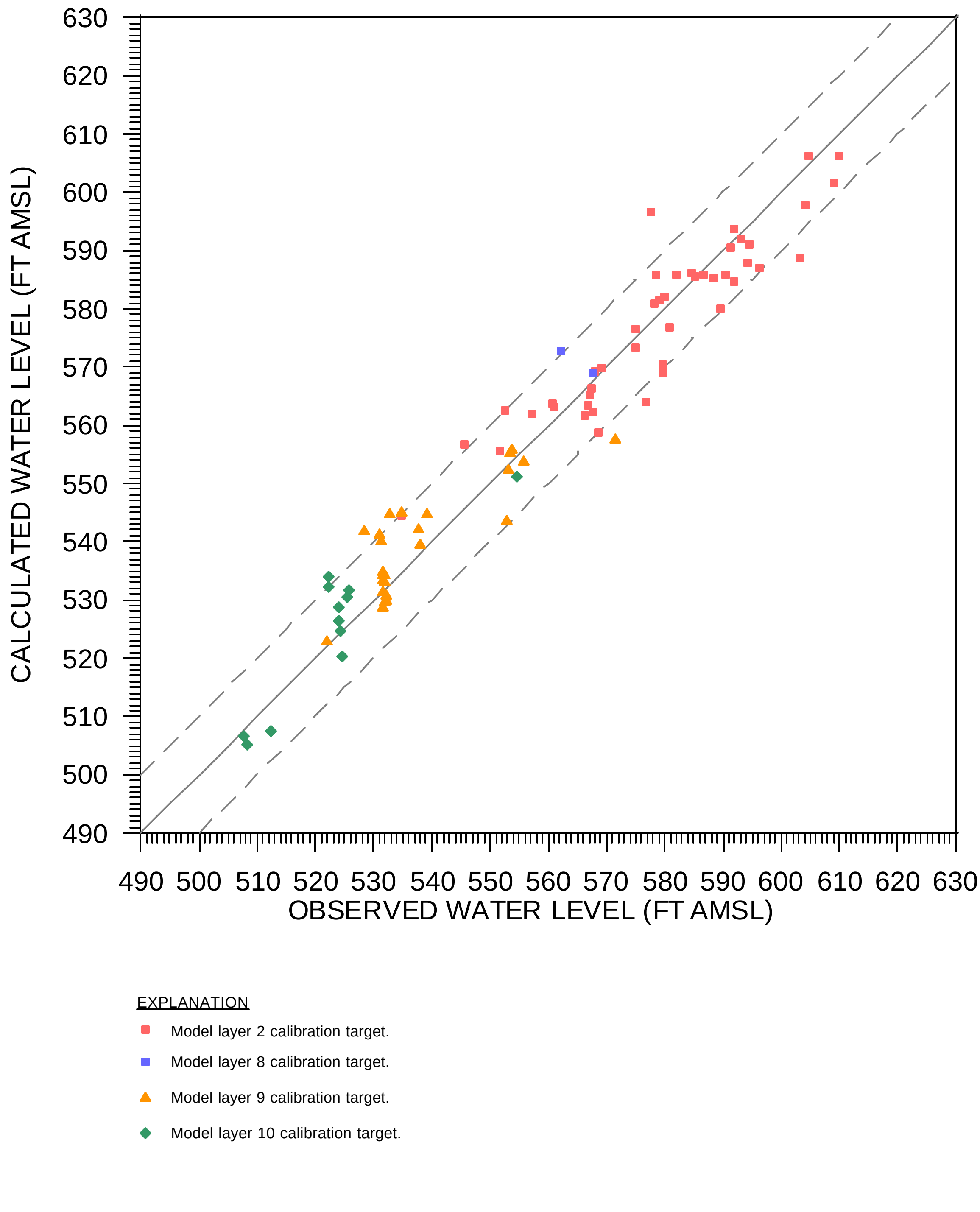
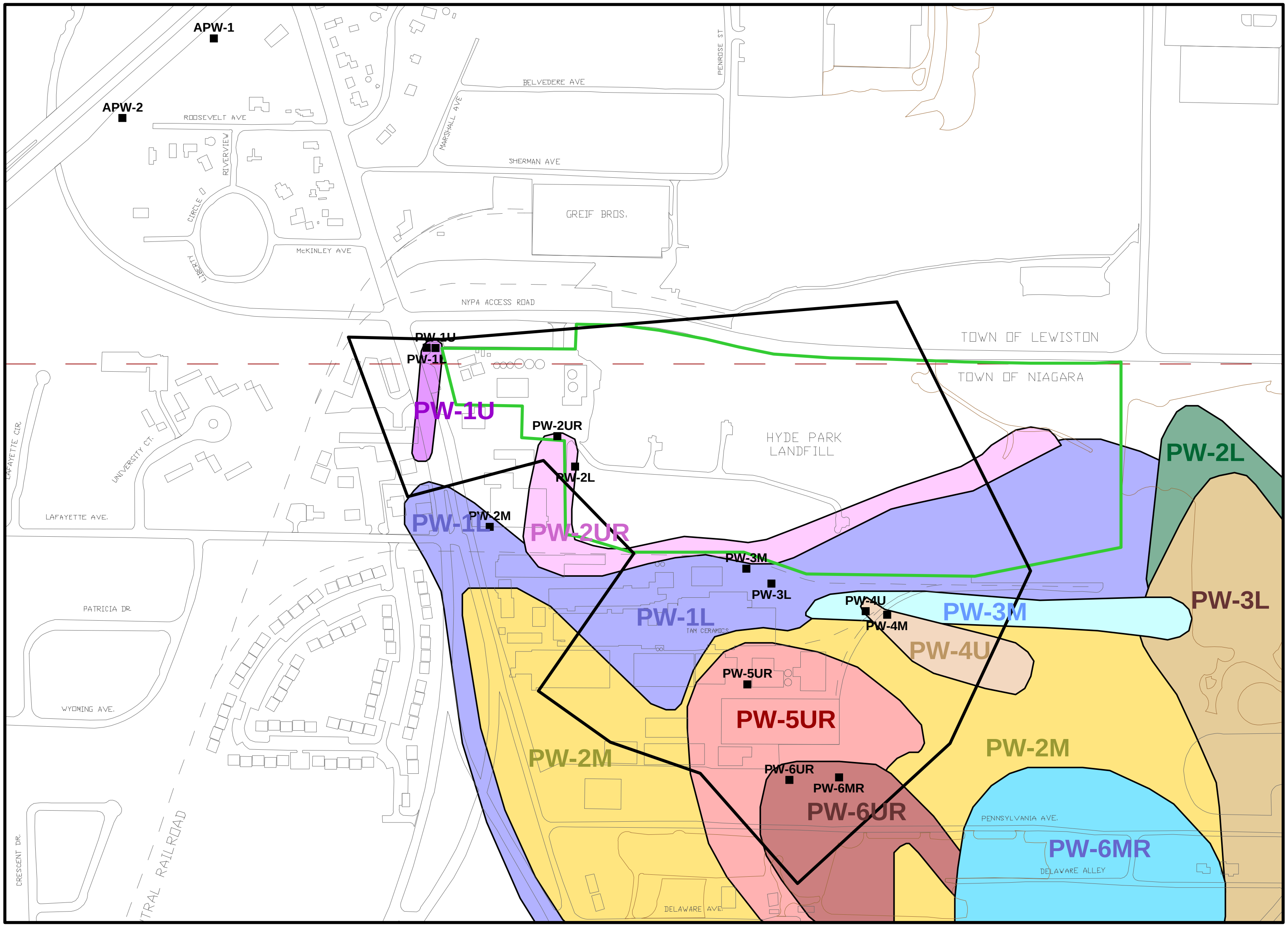


Figure 1 - First Quarter 2001 Conditions: Calculated versus Observed Water Levels

HP017I



Purge Well	Pumping Rate (gpm)	Percent Capture (%)
PW-1U	0.4	2.0
PW-1L	6.1	16.6
PW-2UR	1.2	2.6
PW-2M	26.5	10.3
PW-2L	1.3	0.0
PW-3M	0.6	1.6
PW-3L	5.2	0.0
PW-4U	0.6	2.2
PW-4M	0.0	0.0
PW-5UR	4.1	11.6
PW-6UR	2.9	4.9
PW-6MR	3.9	0.2
TOTALS	52.8	52.1

EXPLANATION

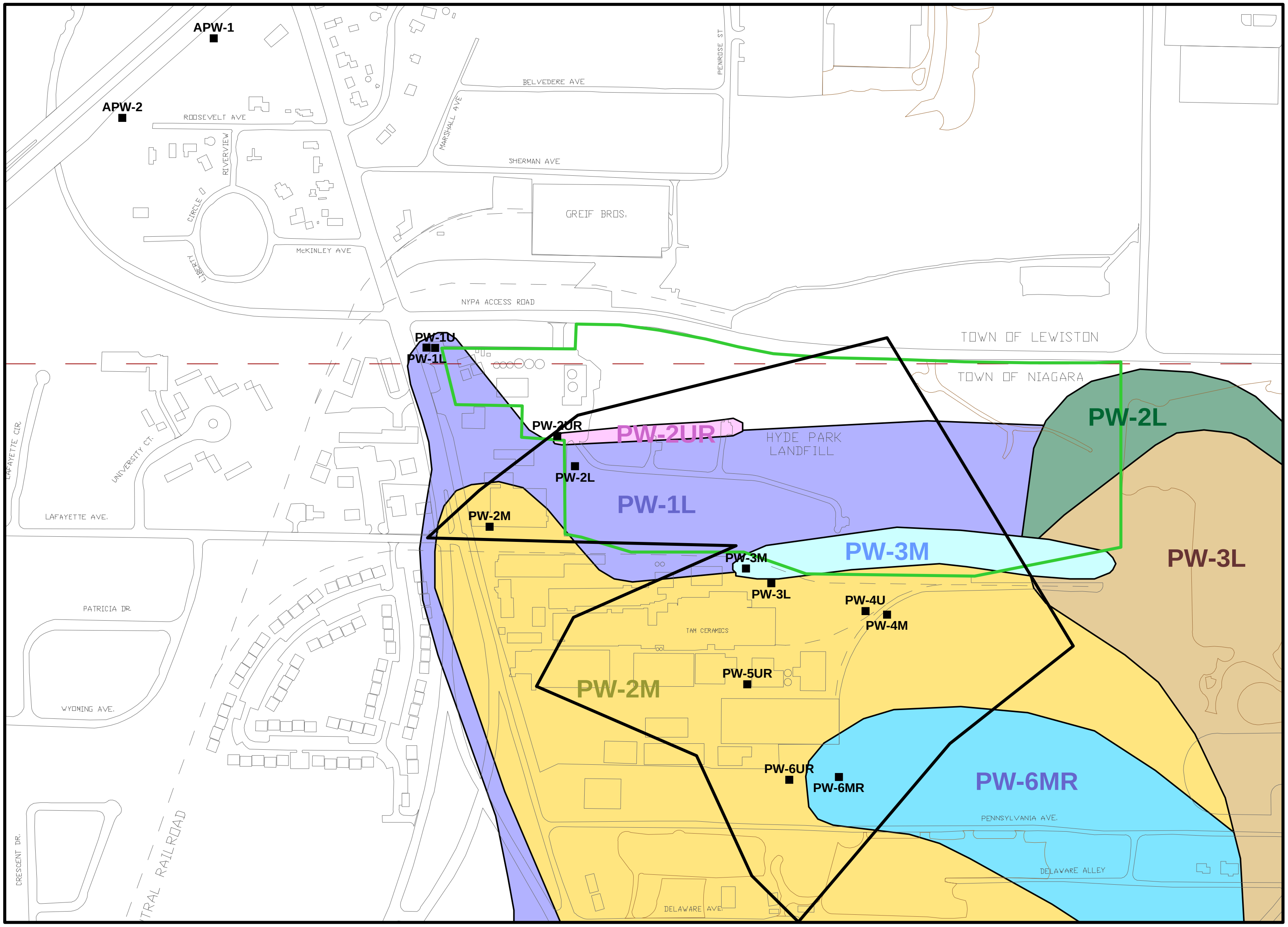
1999 NAPL Boundary

Capture Zone

0 250 500 ft

Figure 2 - First Quarter 2001 Conditions: Upper Bedrock Capture Zones

HP017I 10-Apr-2001



Purge Well	Pumping Rate (gpm)	Percent Capture (%)
PW-1U	0.4	0.0
PW-1L	6.1	26.3
PW-2UR	1.2	2.0
PW-2M	26.5	50.1
PW-2L	1.3	0.0
PW-3M	0.6	4.5
PW-3L	5.2	0.1
PW-4U	0.6	0.1
PW-4M	0.0	0.3
PW-5UR	4.1	0.4
PW-6UR	2.9	0.0
PW-6MR	3.9	6.6
TOTALS	52.8	90.4

EXPLANATION

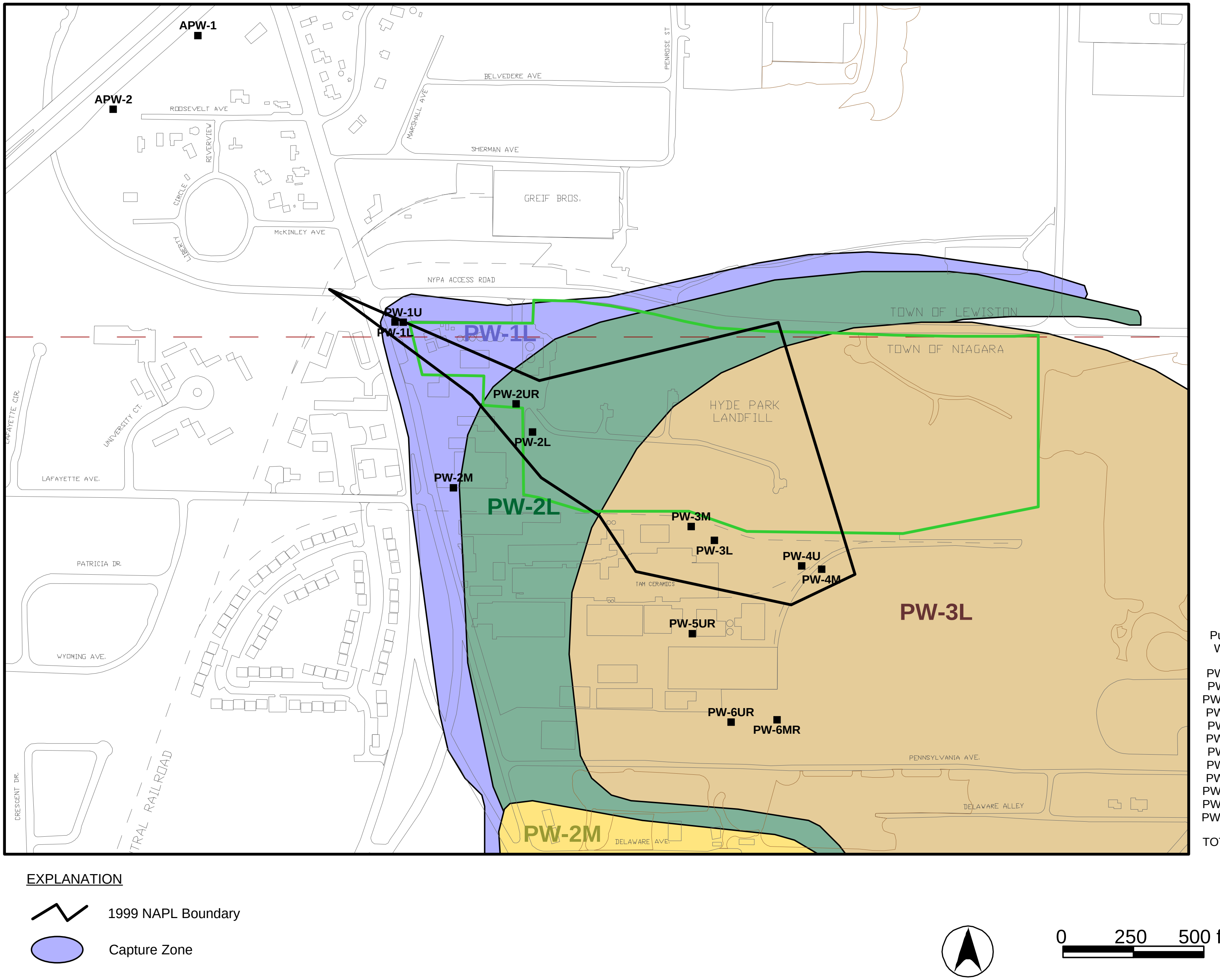
1999 NAPL Boundary

Capture Zone

0 250 500 ft

Figure 3 - First Quarter 2001 Conditions: Middle Bedrock Capture Zones

HP017I 10-Apr-2001



Purge Well	Pumping Rate (gpm)	Percent Capture (%)
PW-1U	0.4	0.0
PW-1L	6.1	5.5
PW-2UR	1.2	0.0
PW-2M	26.5	0.0
PW-2L	1.3	32.0
PW-3M	0.6	1.2
PW-3L	5.2	59.9
PW-4U	0.6	0.0
PW-4M	0.0	0.3
PW-5UR	4.1	0.0
PW-6UR	2.9	0.0
PW-6MR	3.9	0.0
TOTALS	52.8	98.8

Figure 4 - First Quarter 2001 Conditions: Lower Bedrock Capture Zones

HP017I 10-Apr-2001

TABLE 1
CALIBRATION RESIDUALS - SIMULATION OF FIRST QUARTER 2001 CONDITIONS

Monitoring Well	Observed Groundwater Level (ft AMSL)	Simulated Hydraulic Head (ft AMSL)	Residual Difference (ft)	Layer
A1U	579.75	570.46	9.29	2
A2U	579.78	569.07	10.71	2
ABP-1	545.57	556.82	-11.25	2
ABP-2	551.61	555.45	-3.84	2
ABP-3	566.92	563.43	3.49	2
ABP-4	552.69	562.66	-9.97	2
ABP-5	566.35	561.70	4.65	2
ABP-7	534.81	544.34	-9.53	2
AFW-3U	568.68	558.62	10.06	2
AGW-2U	591.83	593.75	-1.92	2
B1U	567.53	566.33	1.20	2
B2U	567.83	562.26	5.57	2
BC3U	568.12	569.21	-1.09	2
BR-1	576.87	564.13	12.74	2
BR-2	560.61	563.85	-3.24	2
BR-3	561.13	563.20	-2.07	2
BR-4	557.30	561.85	-4.55	2
C1U	567.18	565.13	2.05	2
CD1U	575.09	576.64	-1.55	2
CD3U	569.19	569.77	-0.58	2
D1U	579.99	581.96	-1.97	2
D2U	579.20	581.46	-2.26	2
D3U	578.23	580.75	-2.52	2
D4U	580.91	576.89	4.02	2
E1U	578.45	585.95	-7.50	2
E2U	581.92	585.88	-3.96	2
E3U	586.59	585.74	0.85	2
E4U	588.50	585.32	3.18	2
E5U	590.52	585.80	4.72	2
F1U	593.12	592.05	1.07	2
F2U	577.74	596.48	-18.74	2
F4U	584.61	586.22	-1.61	2
F5UR	585.24	585.62	-0.38	2
G1U	604.82	606.12	-1.30	2
G3U	594.28	587.90	6.38	2
G4U	603.34	588.72	14.62	2
G5U	594.57	591.11	3.46	2
H1U	609.21	601.65	7.56	2
H2U	609.98	606.10	3.88	2
H3U	604.25	597.76	6.49	2
J1U	596.17	587.03	9.14	2
J2U	591.36	590.43	0.93	2
J3U	589.66	580.10	9.56	2
PMW-1U	574.90	573.24	1.66	2
PMW-3U	591.96	584.80	7.16	2
G1M	567.77	568.81	-1.04	8
G2M	562.17	572.83	-10.66	8

TABLE 1
CALIBRATION RESIDUALS - SIMULATION OF FIRST QUARTER 2001 CONDITIONS

Monitoring Well	Observed Groundwater Level (ft AMSL)	Simulated Hydraulic Head (ft AMSL)	Residual Difference (ft)	Layer
AFW-1M	522.01	523.02	-1.01	9
AGW-1M	552.75	543.54	9.21	9
AGW-2M	553.31	555.30	-1.99	9
B1M	532.21	530.88	1.33	9
B2M	531.86	529.59	2.27	9
BC3M	531.68	531.42	0.26	9
C1M	532.09	529.99	2.10	9
C2M	531.67	528.74	2.93	9
CD1M	531.72	533.45	-1.73	9
CD2M	531.46	531.45	0.01	9
D1M	531.54	534.78	-3.24	9
D2M	531.50	534.30	-2.80	9
E1M	531.15	541.15	-10.00	9
E2M	537.75	542.08	-4.33	9
E3M	531.30	540.02	-8.72	9
E4M	538.02	539.65	-1.63	9
F1M	539.24	544.71	-5.47	9
F2M	532.84	544.86	-12.02	9
F4M	528.48	541.73	-13.25	9
G3M	534.85	544.95	-10.10	9
H1M	553.78	555.88	-2.10	9
H2M	571.65	557.60	14.05	9
J1M	553.21	552.29	0.92	9
J2M	555.72	553.76	1.96	9
PMW-1M	532.02	533.00	-0.98	9
PMW-2M	531.83	534.22	-2.39	9
AFW-1L	508.32	505.16	3.16	10
APW-1	507.65	506.74	0.91	10
APW-2	512.35	507.51	4.84	10
B1L	524.13	528.69	-4.56	10
B2L	524.02	526.36	-2.34	10
C1L	524.19	524.64	-0.45	10
C2L	524.51	520.34	4.17	10
CD1L	525.51	530.60	-5.09	10
D1L	522.20	533.86	-11.66	10
D4L	522.38	532.35	-9.97	10
JH1L	554.47	551.06	3.41	10
PMW-1L	525.65	531.73	-6.08	10

Residual Mean	-0.32	ft
Residual Standard Deviation	6.42	ft
Sum of Squares	3510.23	ft^2
Absolute Residual Mean	4.93	ft
Minimum Residual	-18.74	ft
Maximum Residual	14.62	ft
Head Range	102.33	ft
Residual Standard Deviation/Head Range	0.06	ft/ft

S.S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water Resource Consultants

Hyde Park Landfill

Bedrock Purge Wells Pumping Data
Current to March 31, 2001

Hyde Park Landfill
Niagara Falls, New York

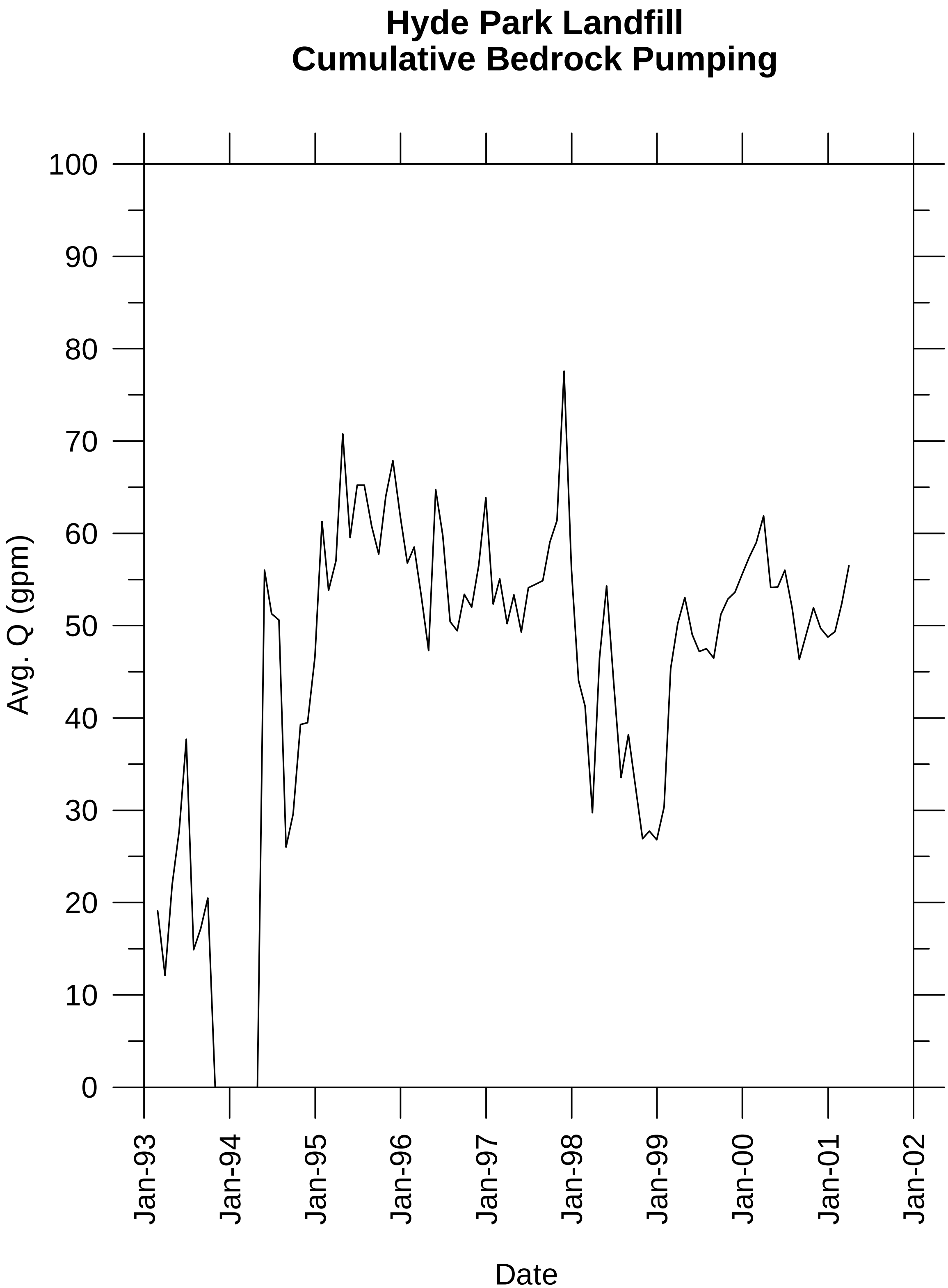
Bedrock Purge Well Pumping Rates
Current to March 31, 2001

Historically, 16 bedrock purge wells have operated at the Hyde Park Landfill Site. During the first quarter of 2001, 12 wells were active. The complete discharge histories for the 12 active wells are presented in the following order:

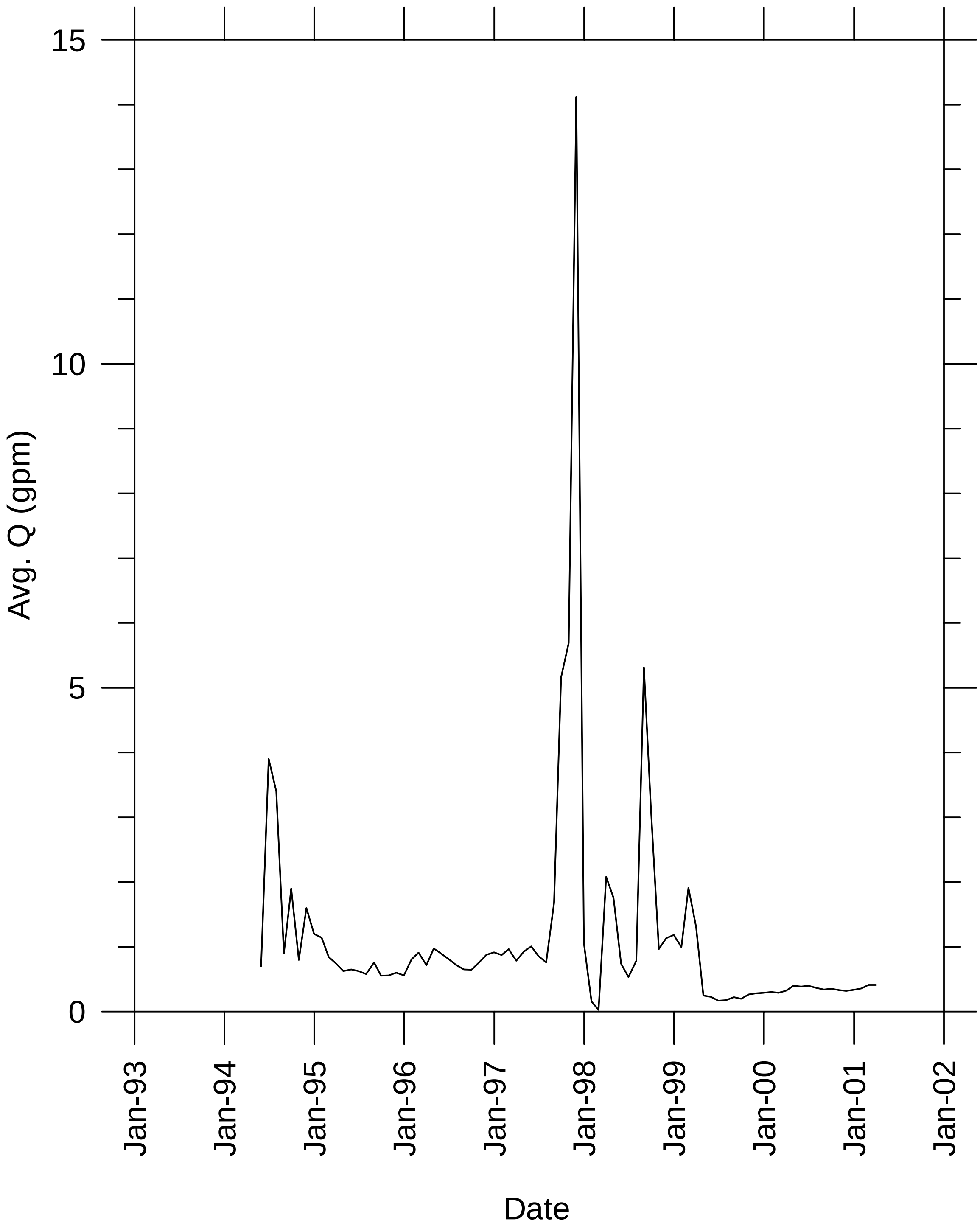
- PW-1U
- PW-1L
- PW-2UR
- PW-2M
- PW-2L
- PW-3L
- PW-3M
- PW-4U
- PW-4M
- PW-5UR
- PW-6UR
- PW-6MR

The active purge wells are grouped as follows: five Upper bedrock wells, four Middle bedrock wells, and three Lower bedrock wells.

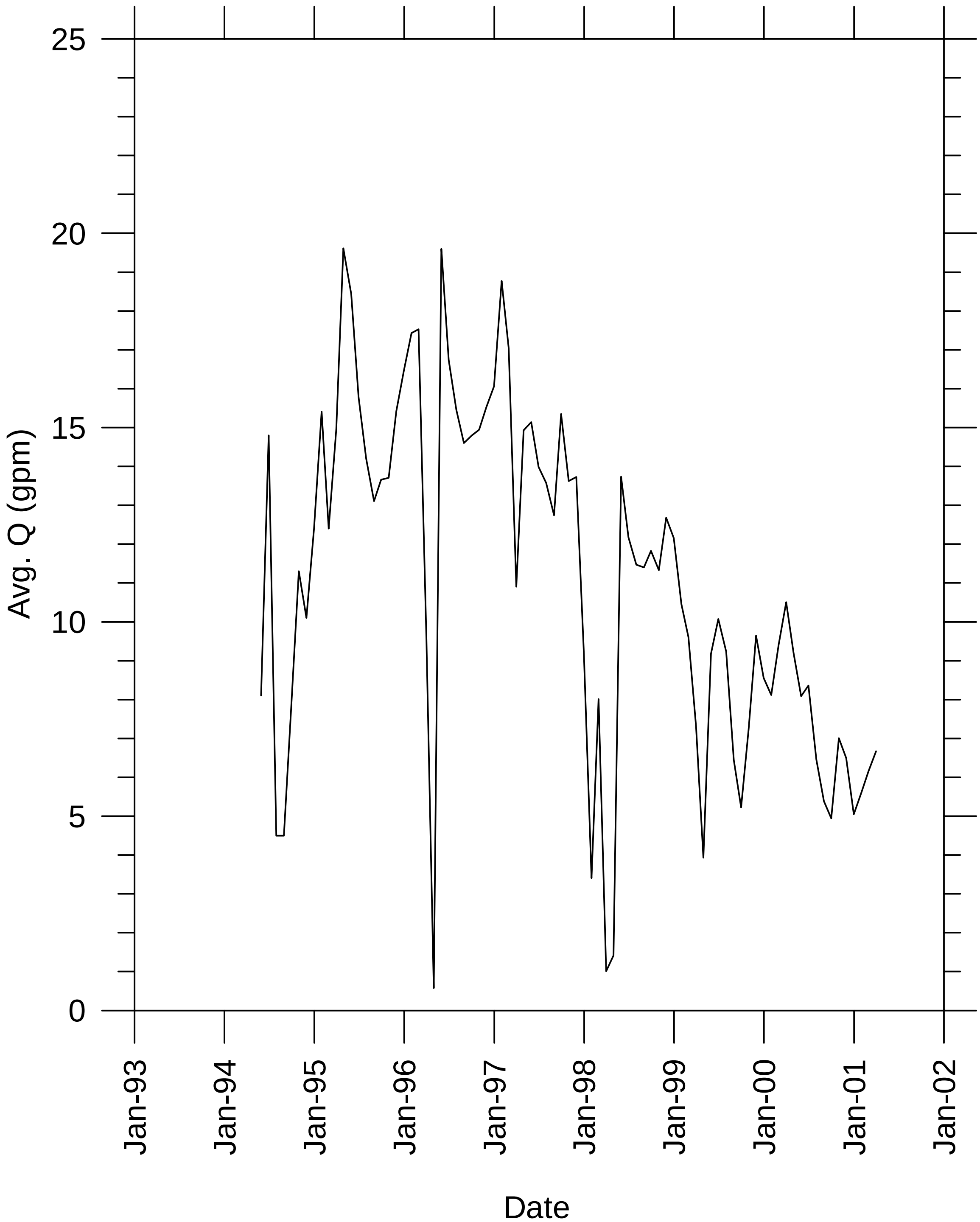
Pumping at wells PW-2U, PW-5U, and PW-6U was discontinued in 1996. Pumping was discontinued at PW-6UMR at the beginning of 1998.

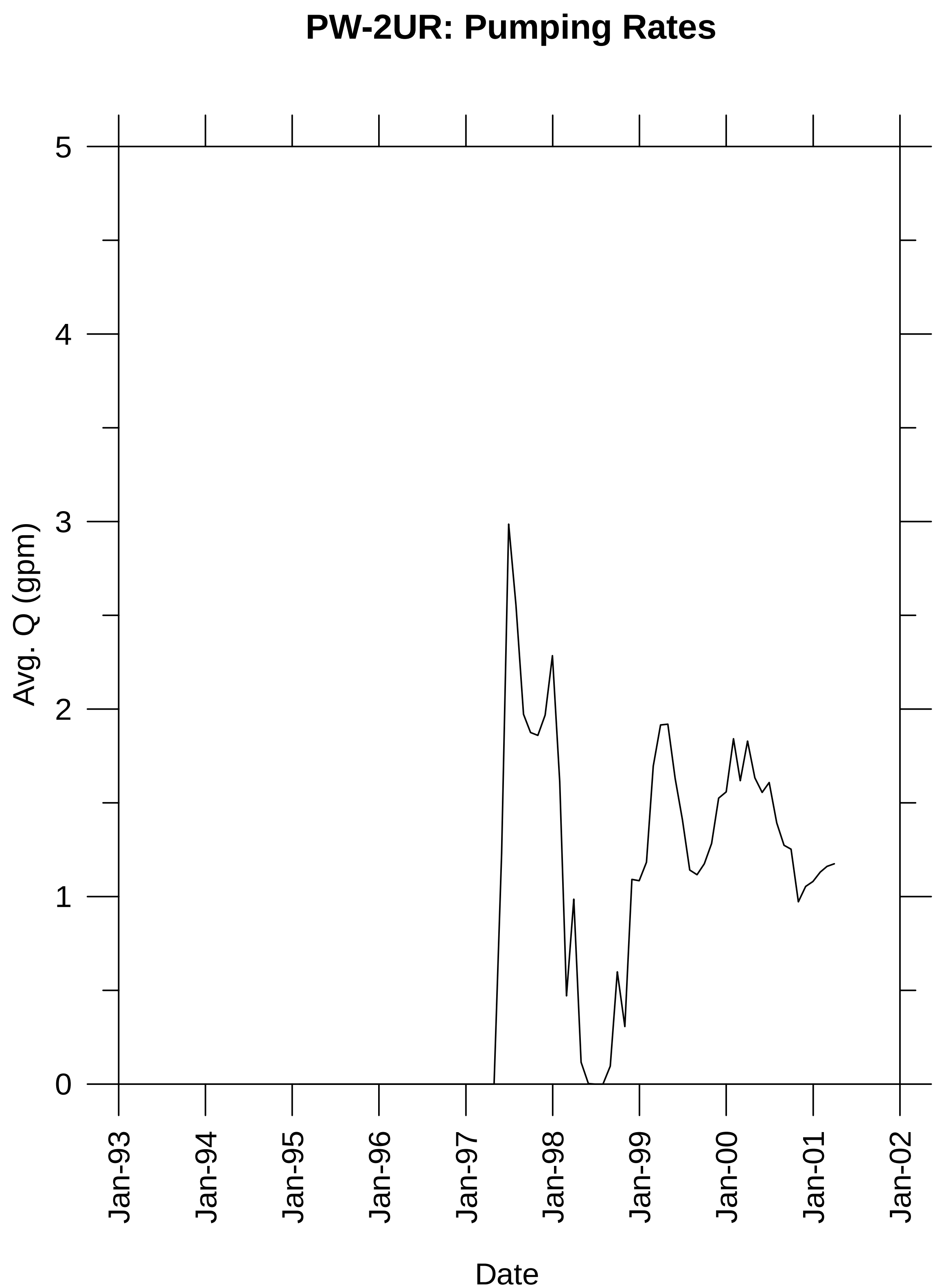

Hyde Park Landfill
Cumulative Bedrock Pumping
Avg. Q (gpm)
100
90
80
70
60
50
40
30
20
10
0
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Date

PW-1U Pumping Rates

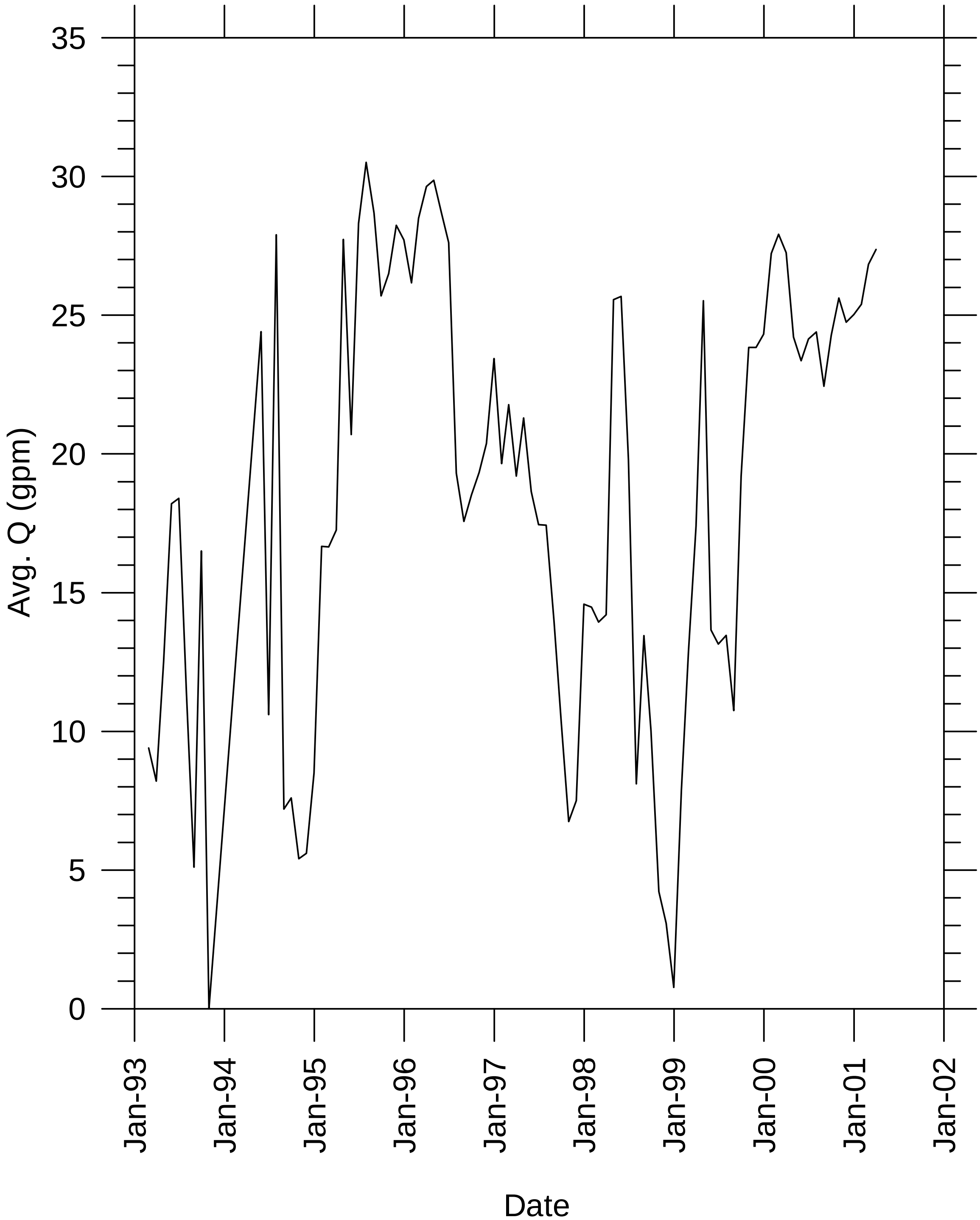


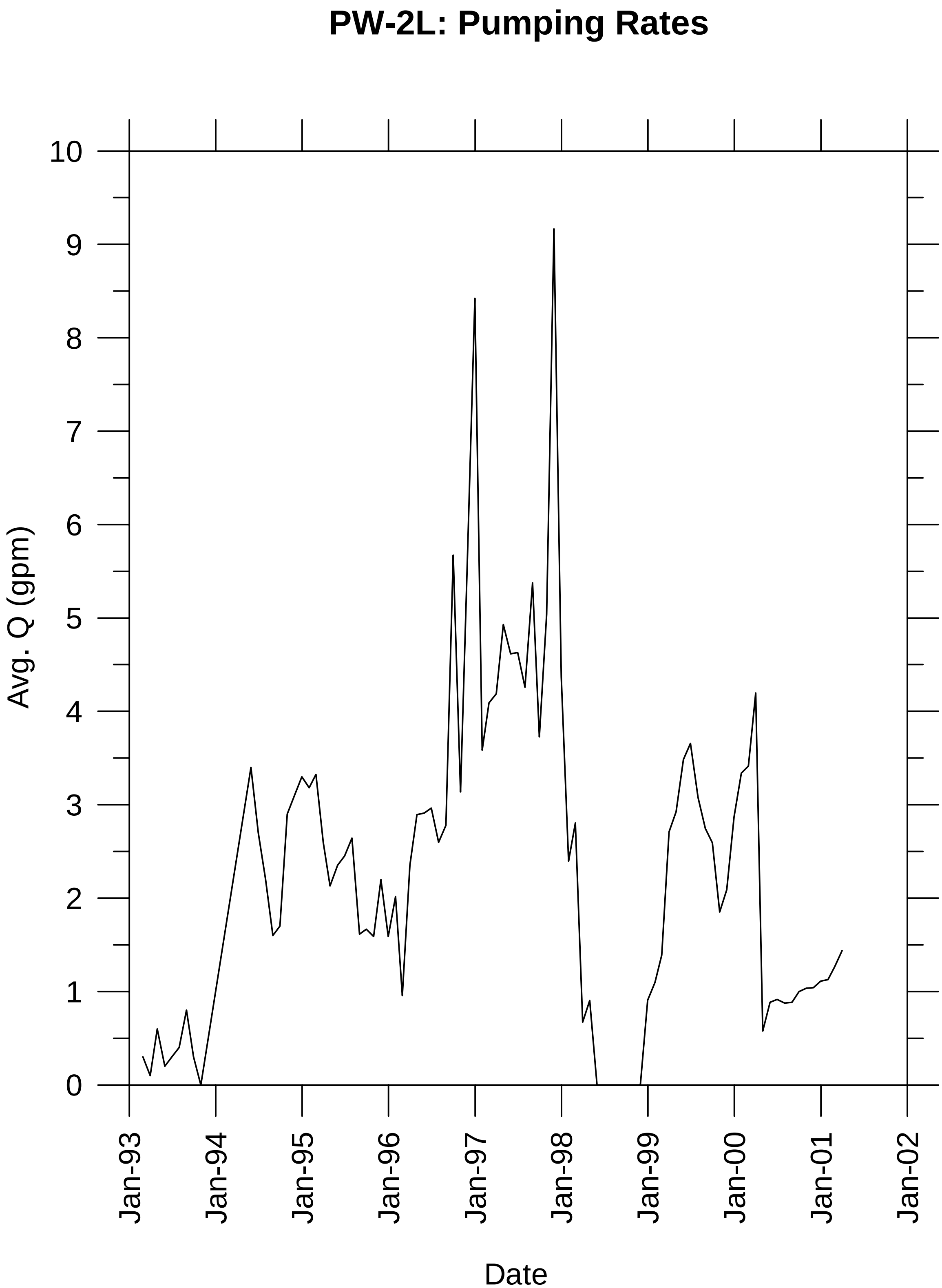
PW-1L: Pumping Rates

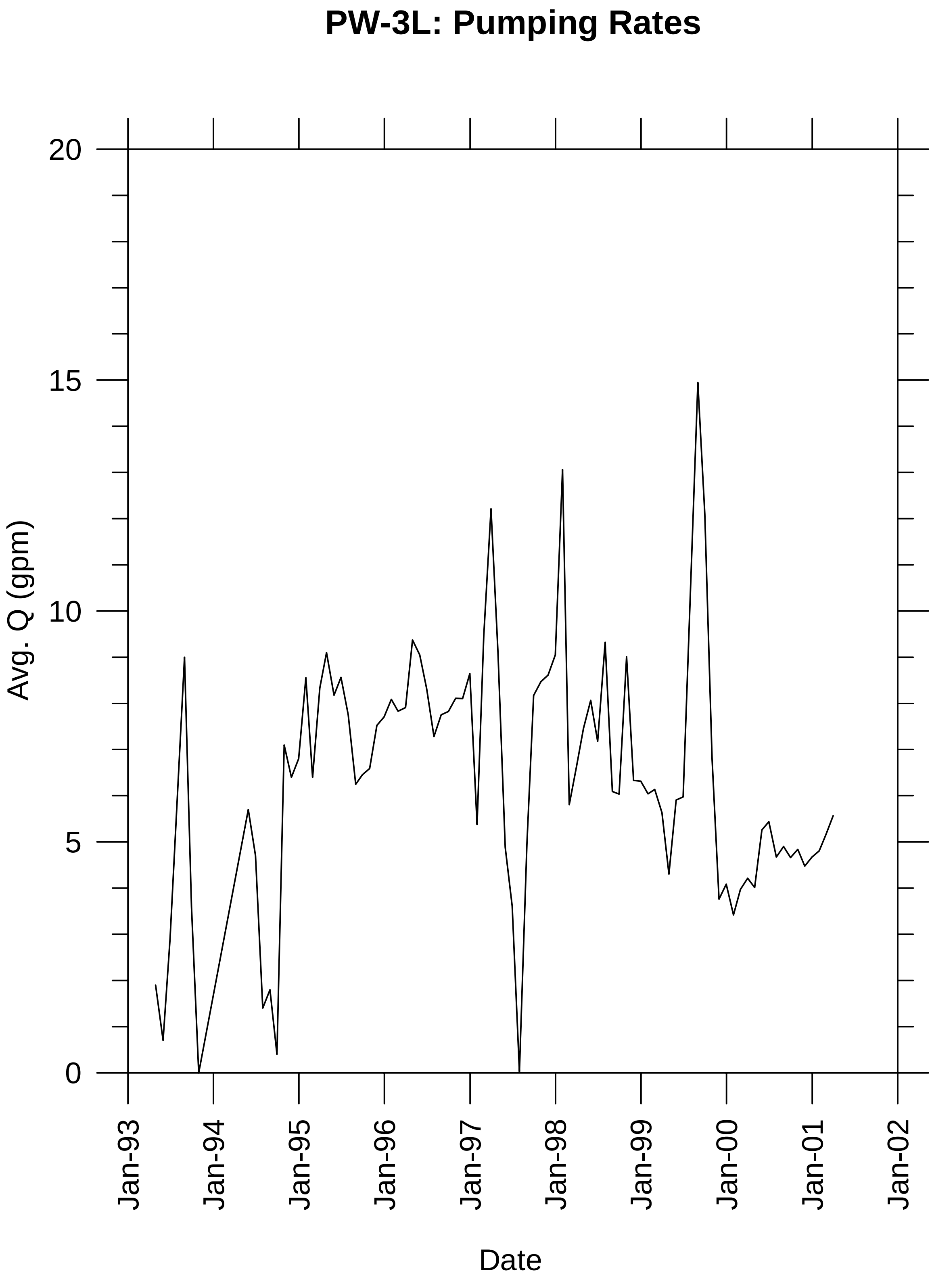


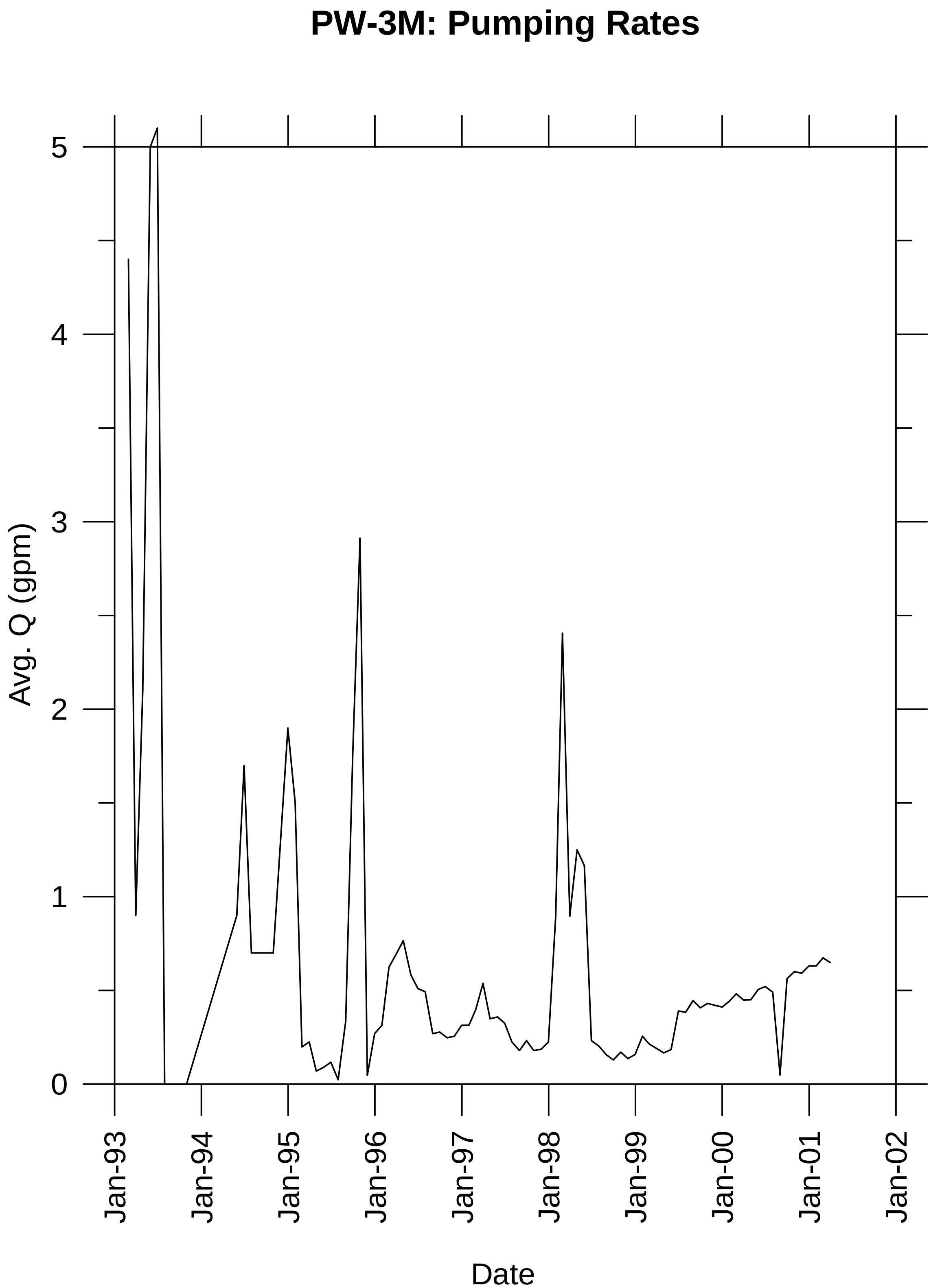

PW-2UR: Pumping Rates
Avg. Q (gpm)
0
1
2
3
4
5
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Date

PW-2M: Pumping Rates

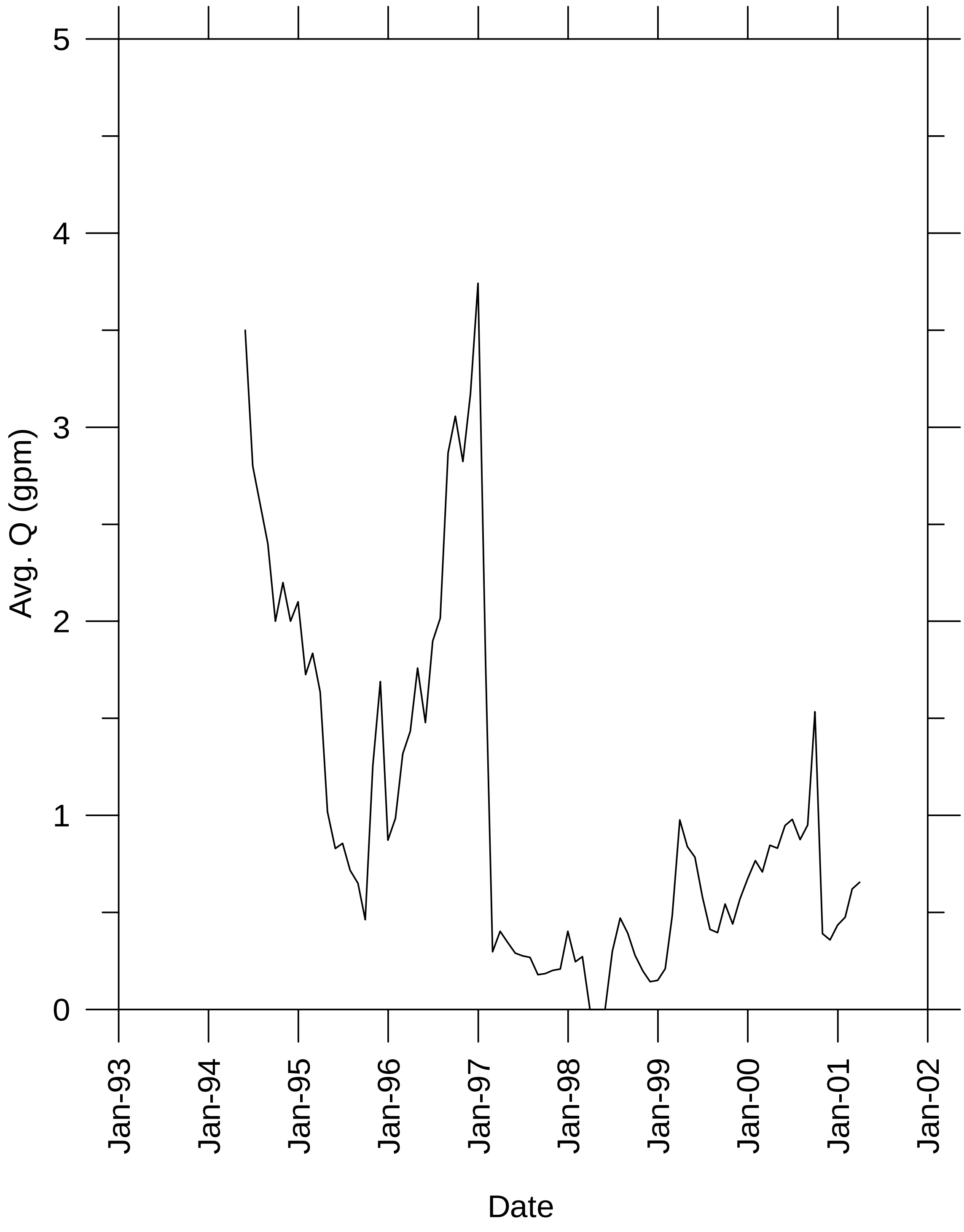



PW-2L: Pumping Rates
Avg. Q (gpm)
0
1
2
3
4
5
6
7
8
9
10
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Date

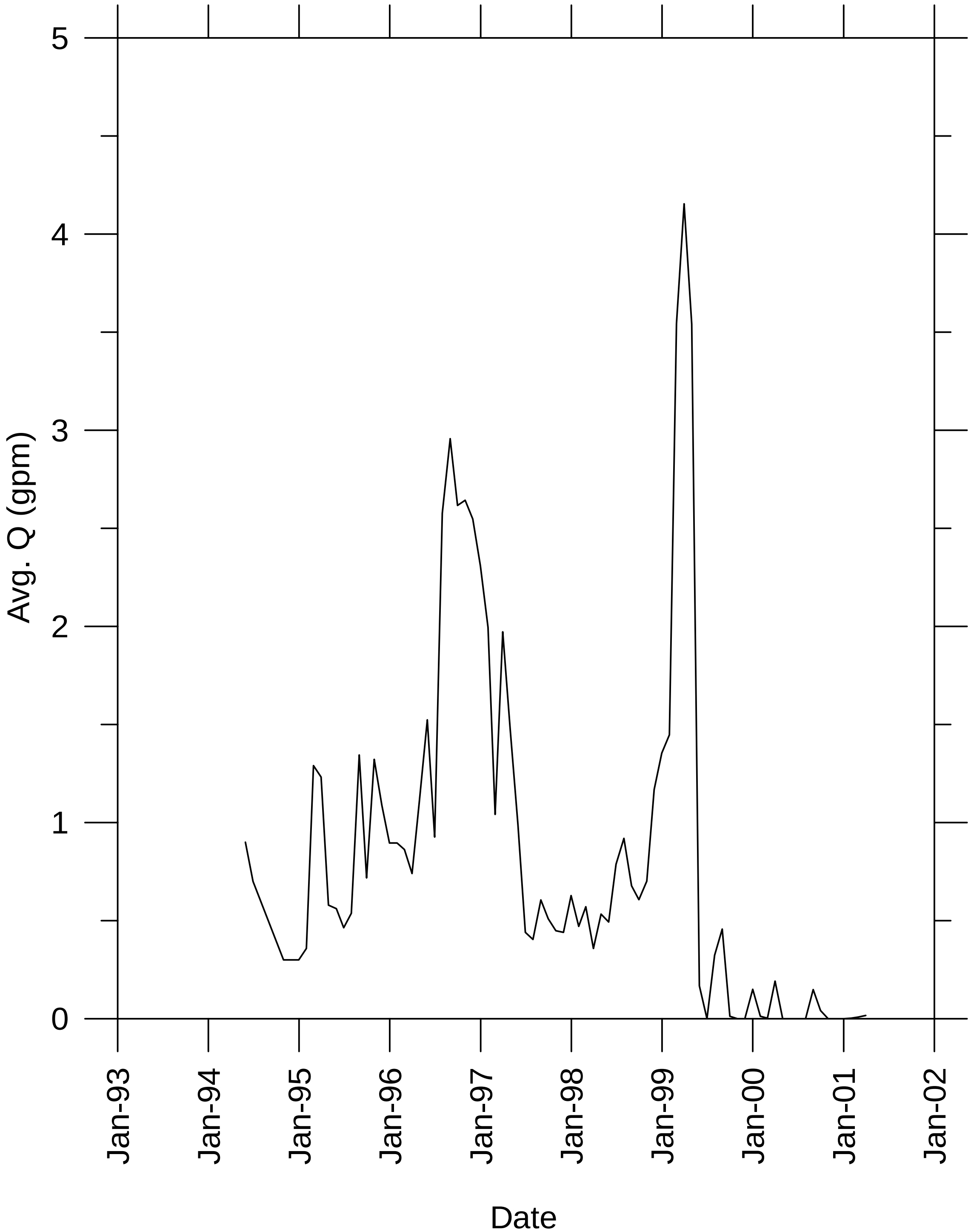

PW-3L: Pumping Rates
Avg. Q (gpm)
0
5
10
15
20
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Date

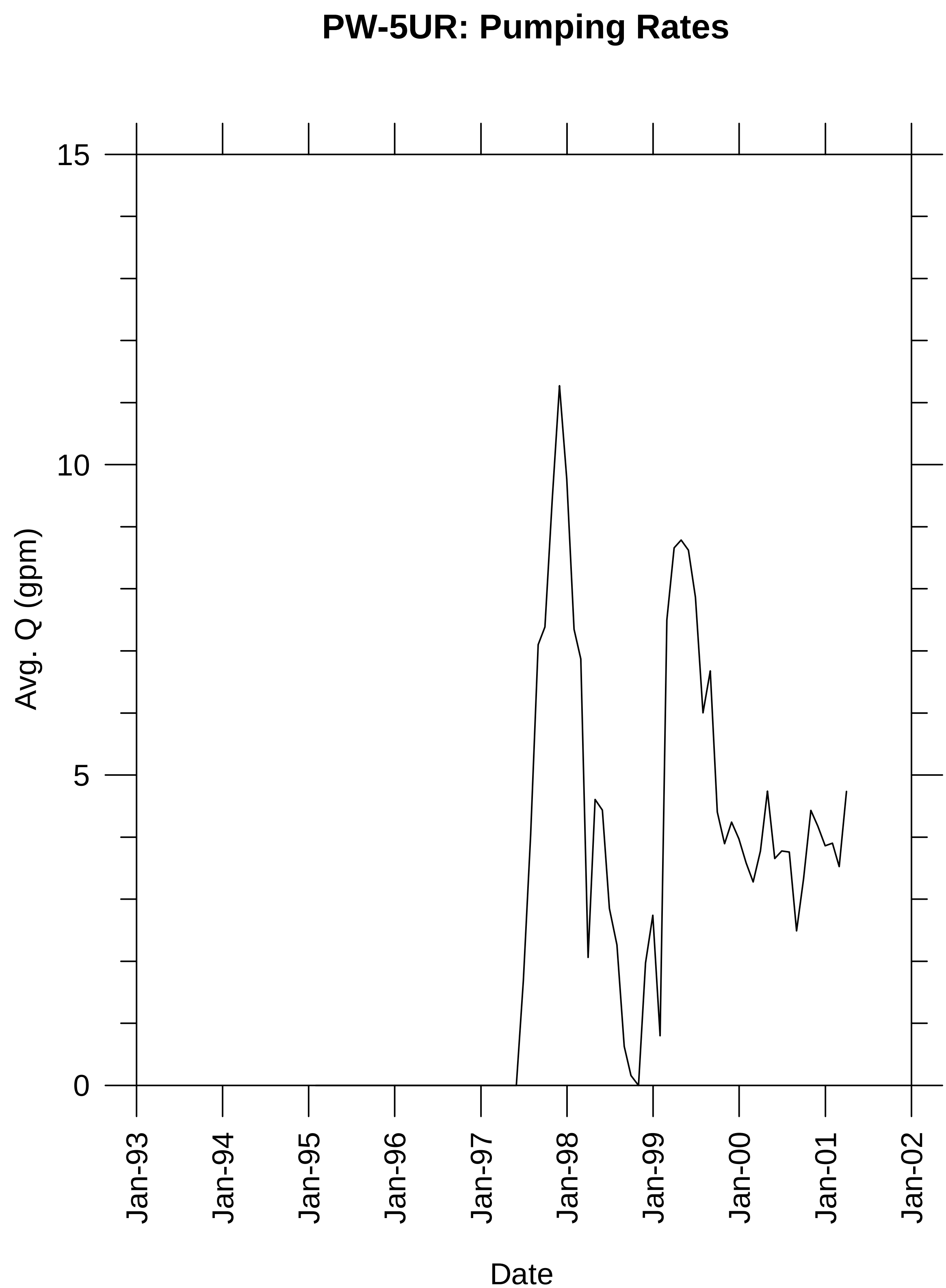

PW-3M: Pumping Rates
Avg. Q (gpm)
5
4
3
2
1
0
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Date

PW-4U: Pumping Rates

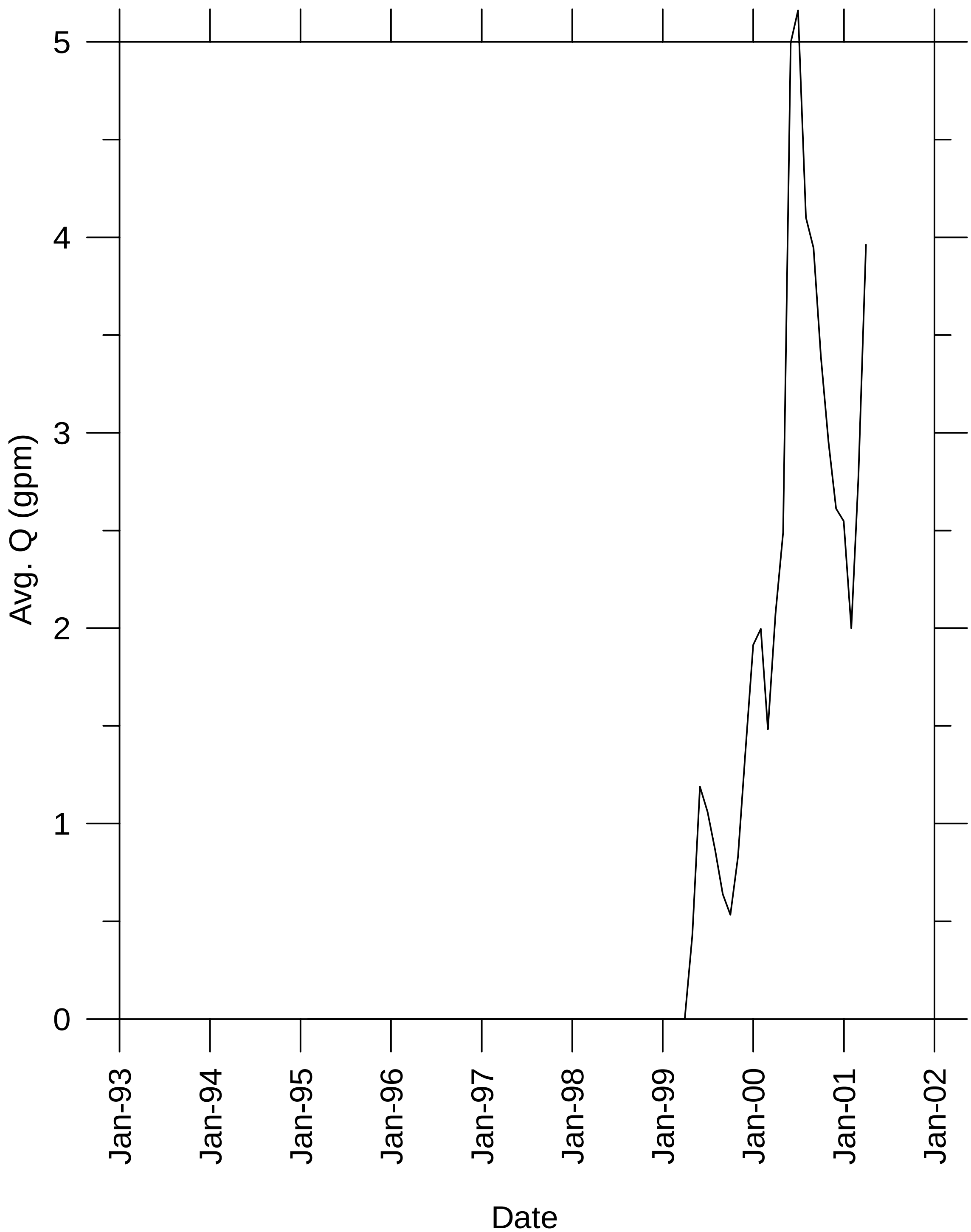


PW-4M: Pumping Rates

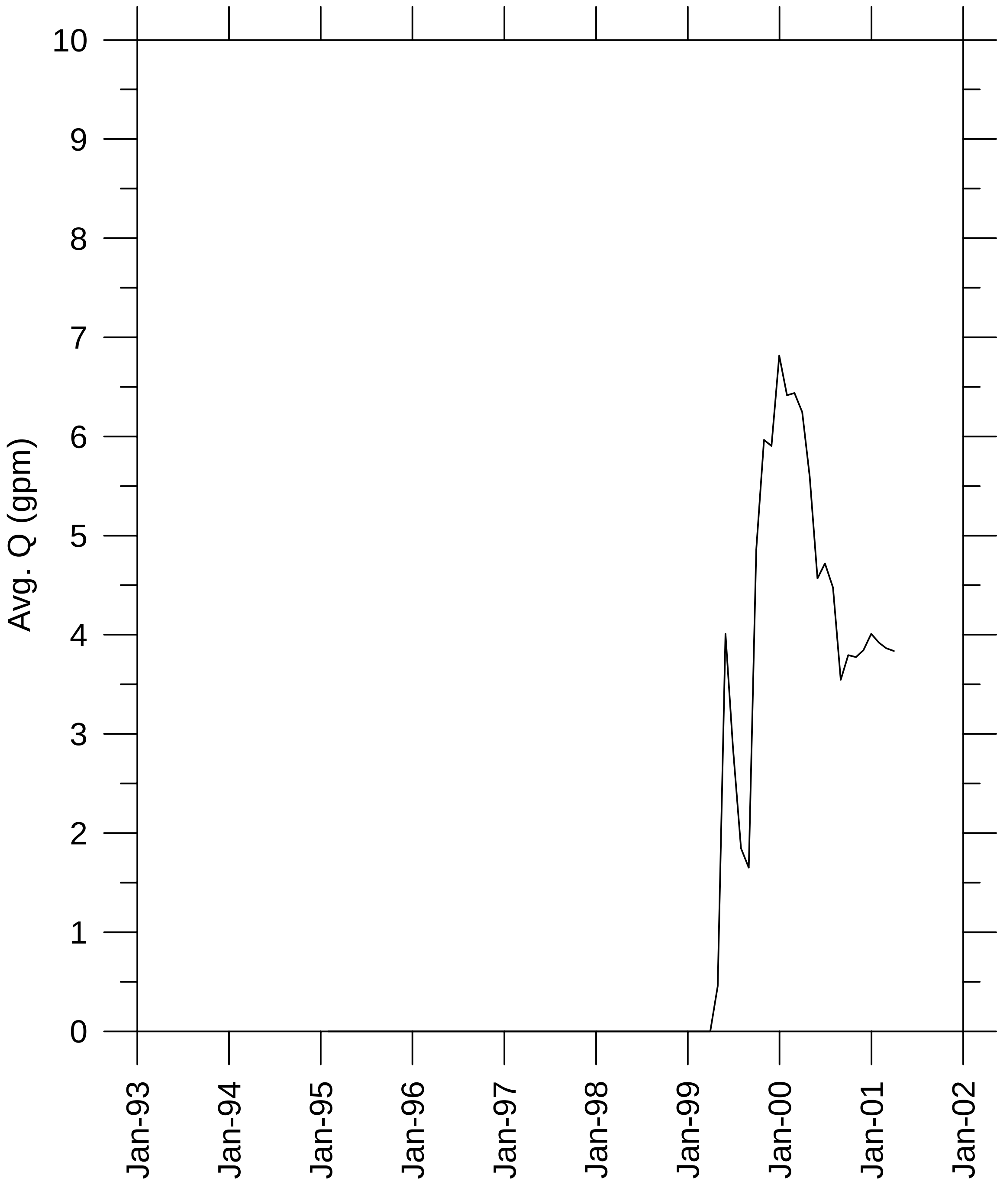



PW-5UR: Pumping Rates
15
10
5
0
Avg. Q (gpm)
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Date

PW-6UR: Pumping Rates

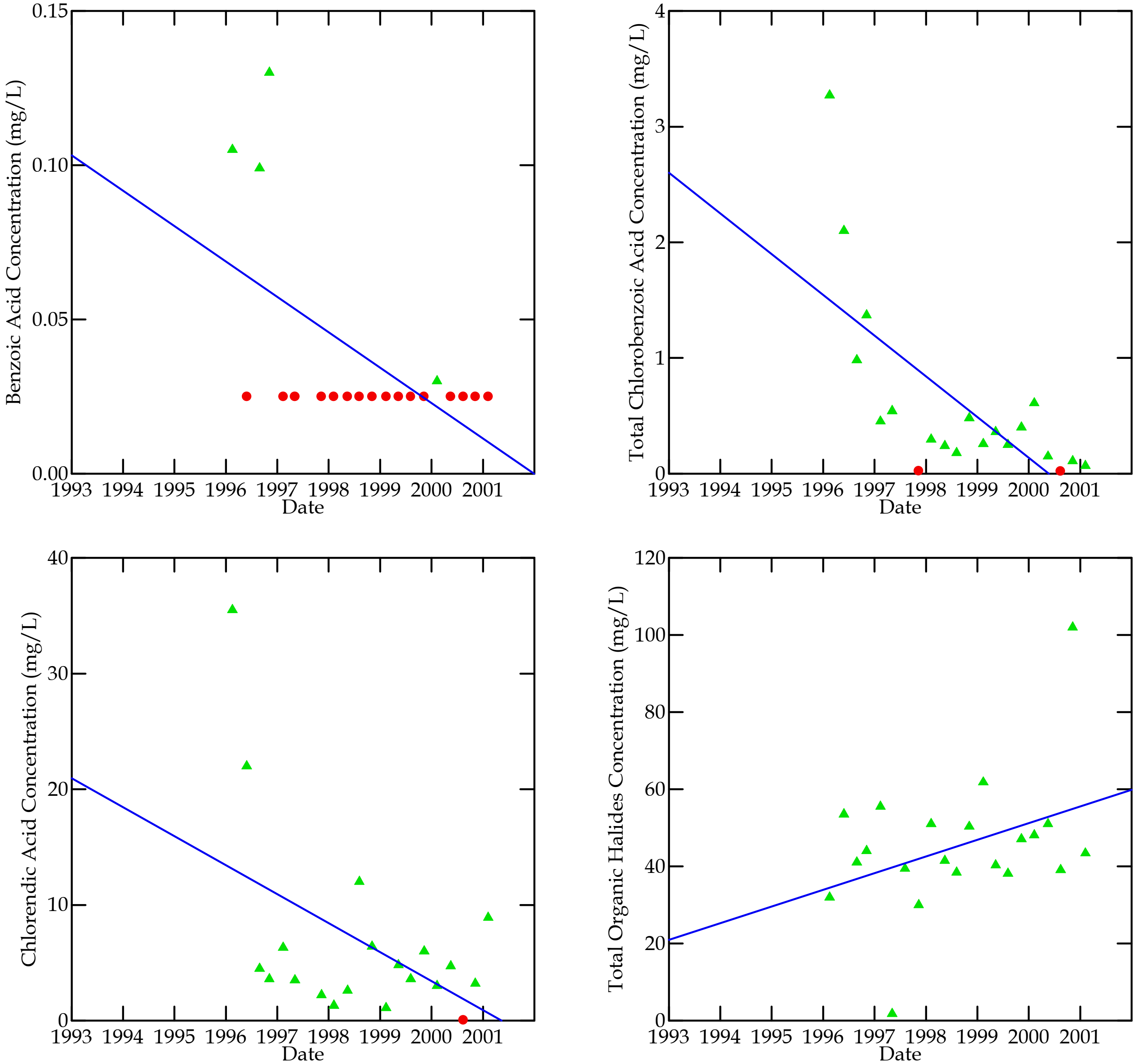


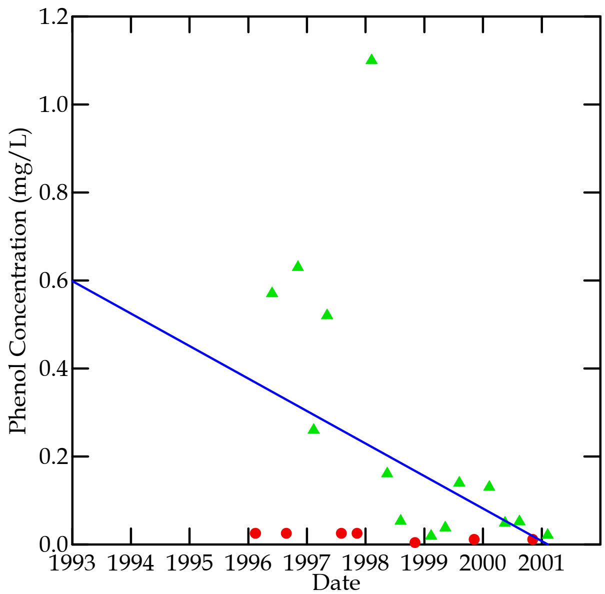
PW-6MR: Pumping Rates



APPENDIX C

WELL GRAPHS





Notes:

● Non-detect result

▲ Detected Result

figure 1

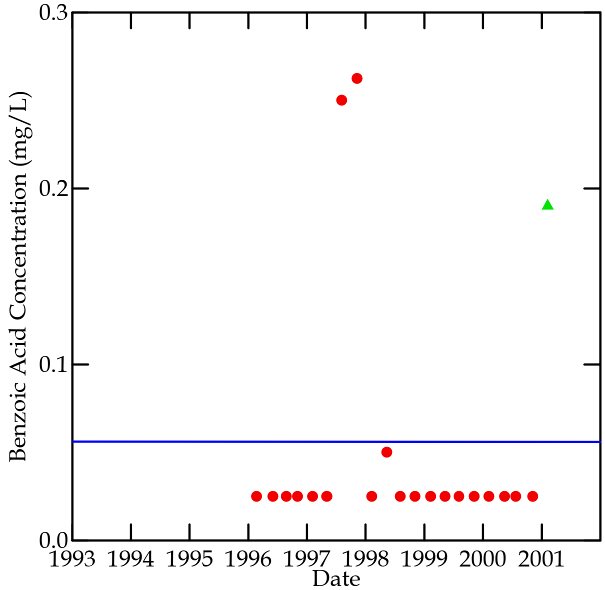
Well B1U

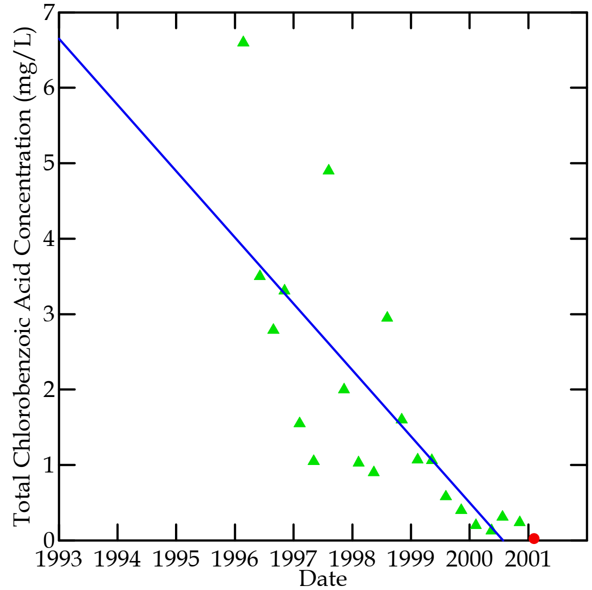
Analyte Concentration vs. Time

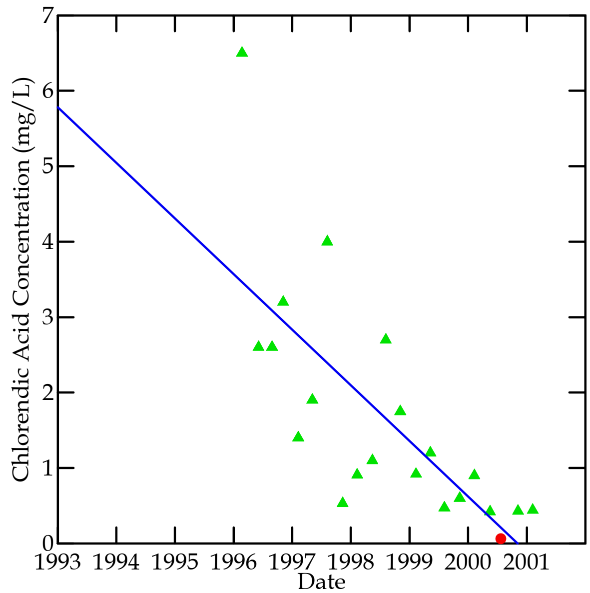
First Quarter 2001

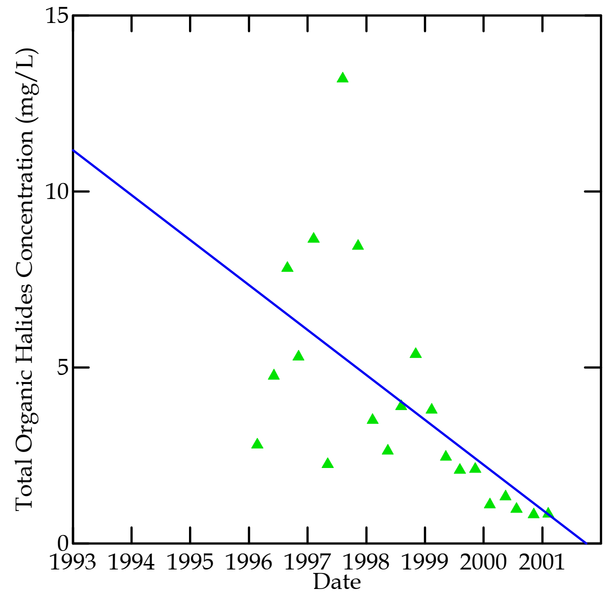
Hyde Park Landfill

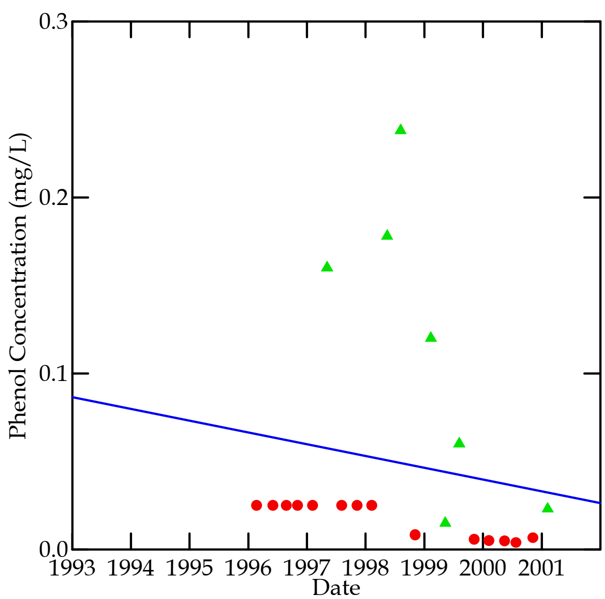
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 2

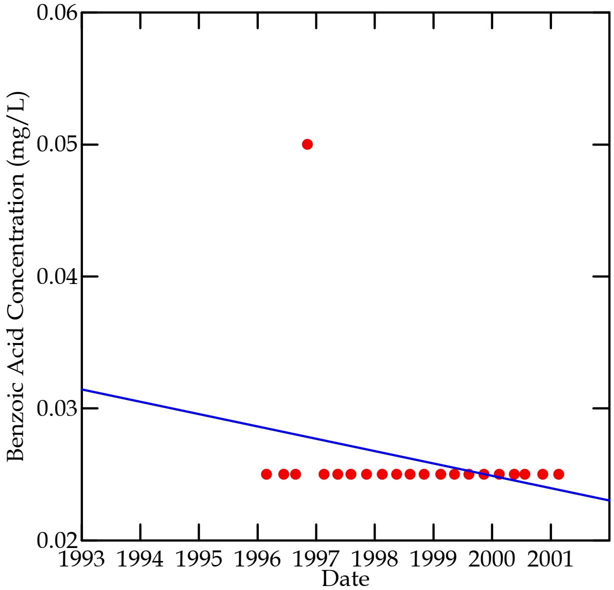
Well B1M

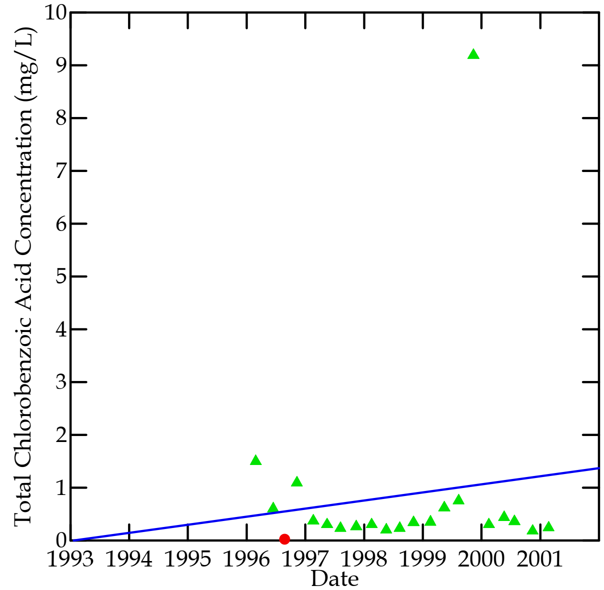
Analyte Concentration vs. Time

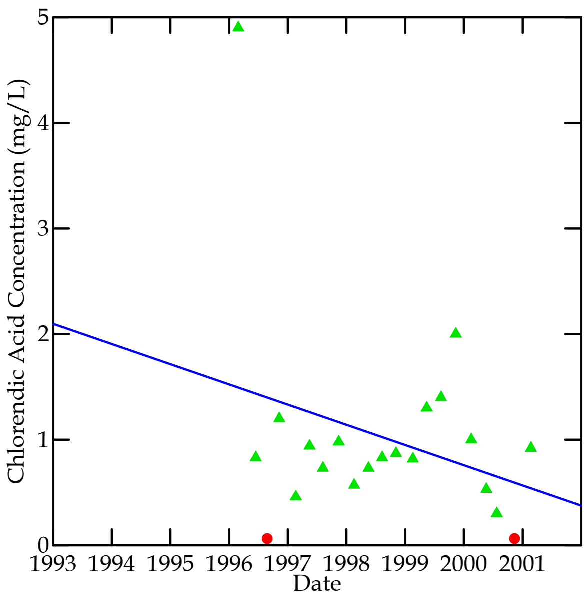
First Quarter 2001

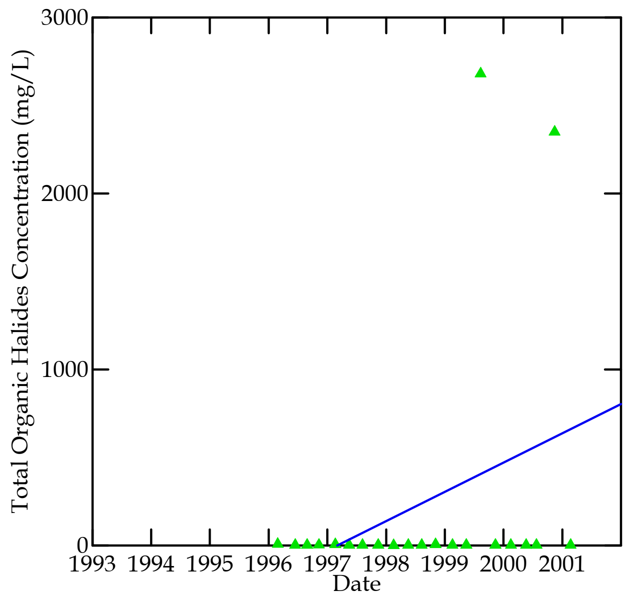
Hyde Park Landfill

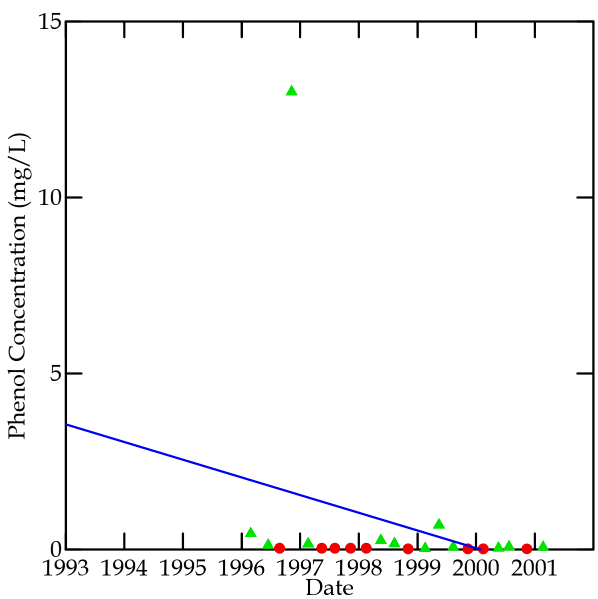
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 3

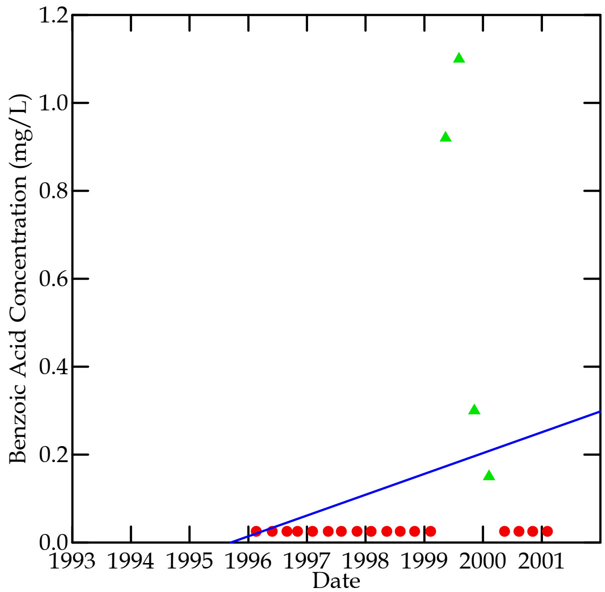
Well B1L

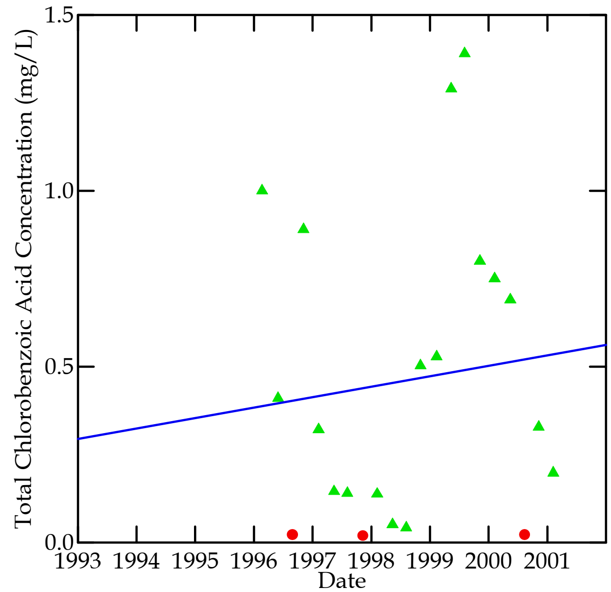
Analyte Concentration vs. Time

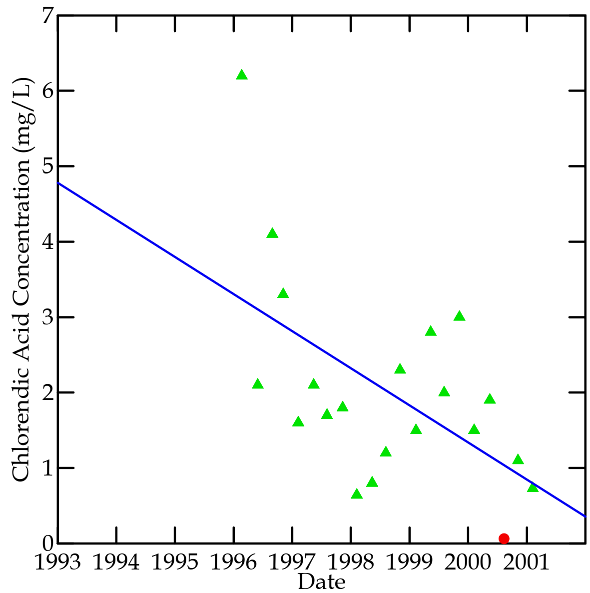
First Quarter 2001

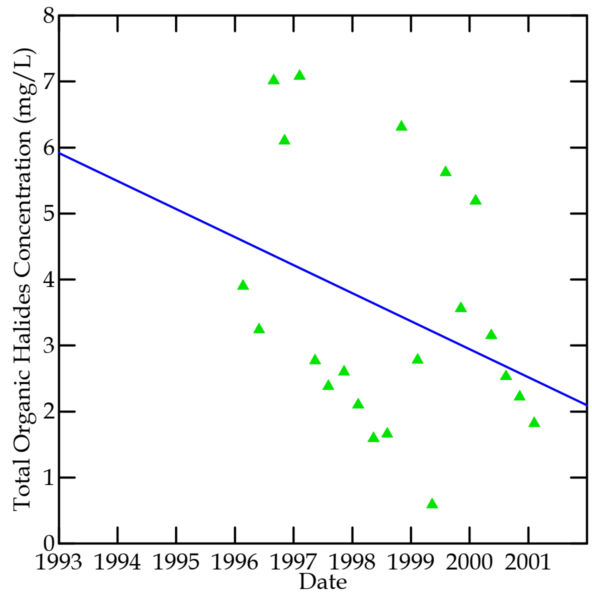
Hyde Park Landfill

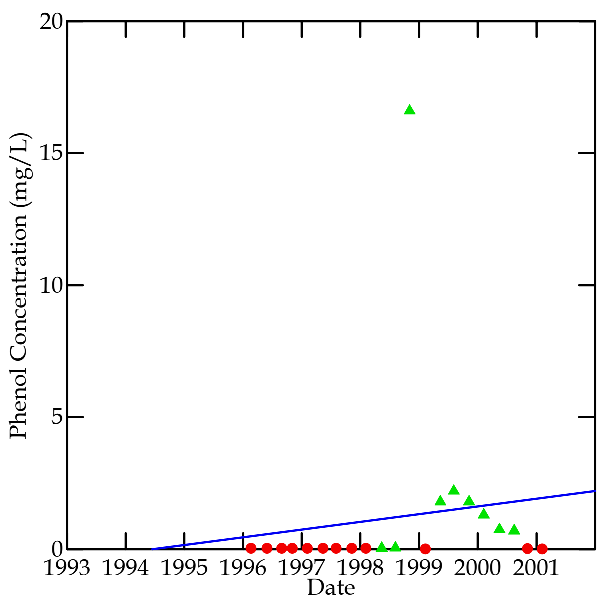
Niagara Falls, New York











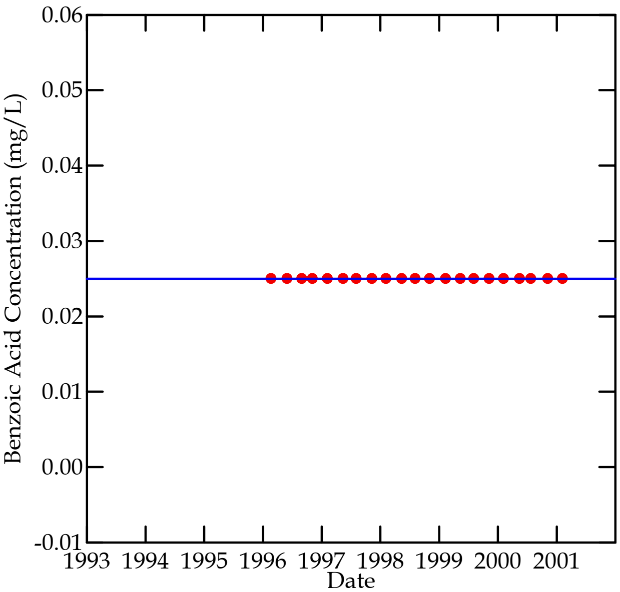
Notes:

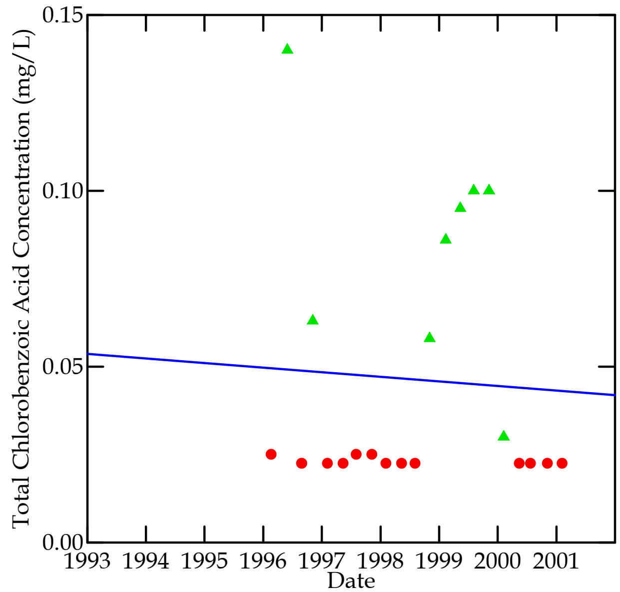
● Non-detect result

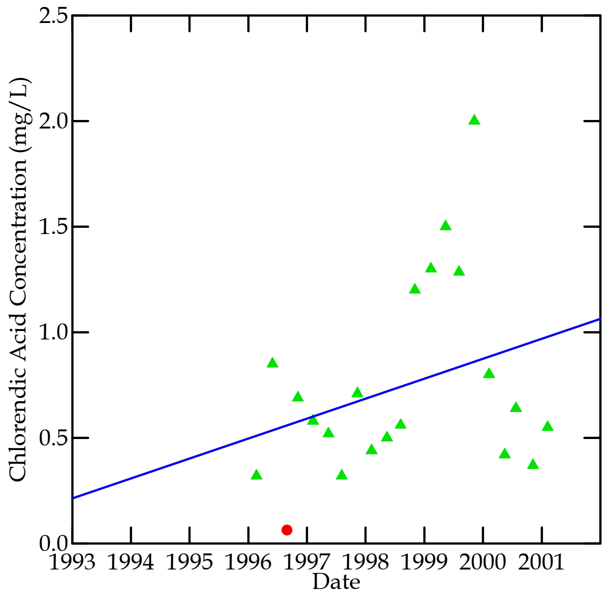
▲ Detected Result

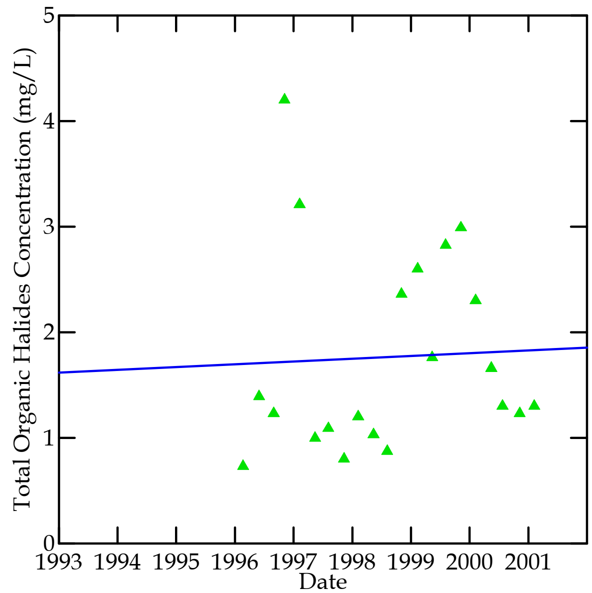
figure 4

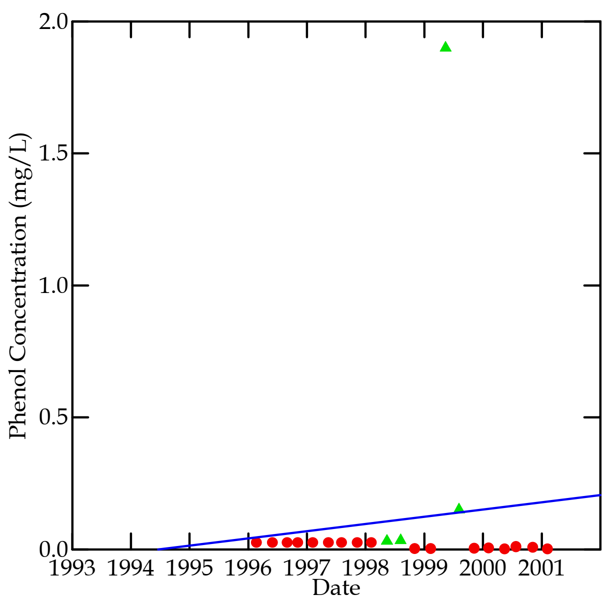
Well C1U
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York









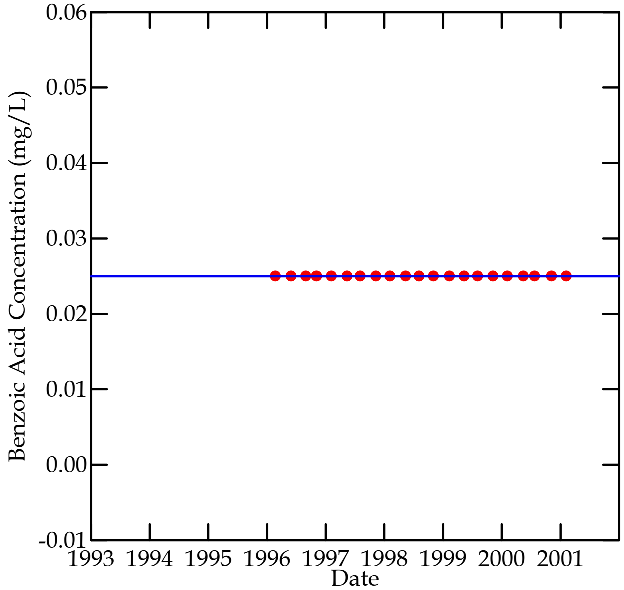


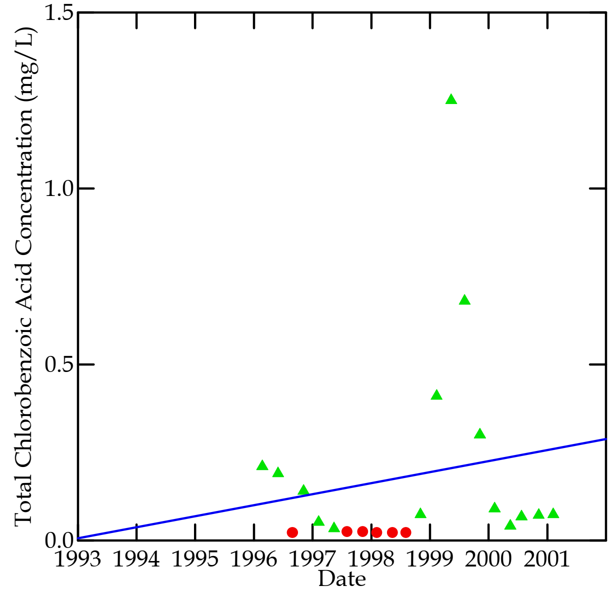
Notes:

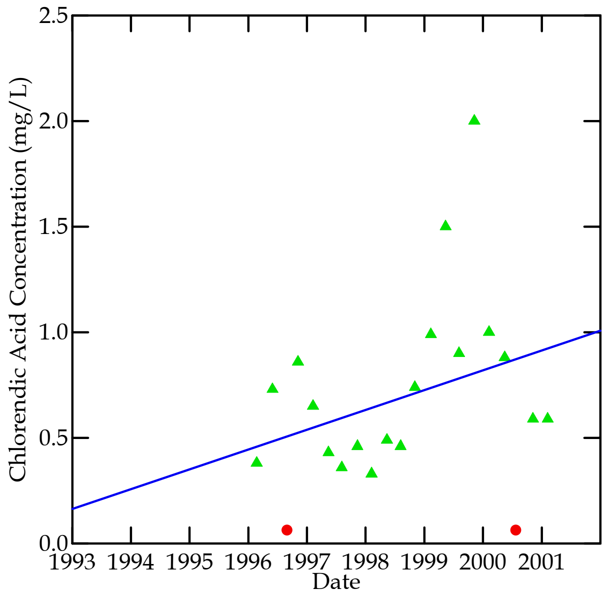
- ● Non-detect result
- ▲ Detected Result

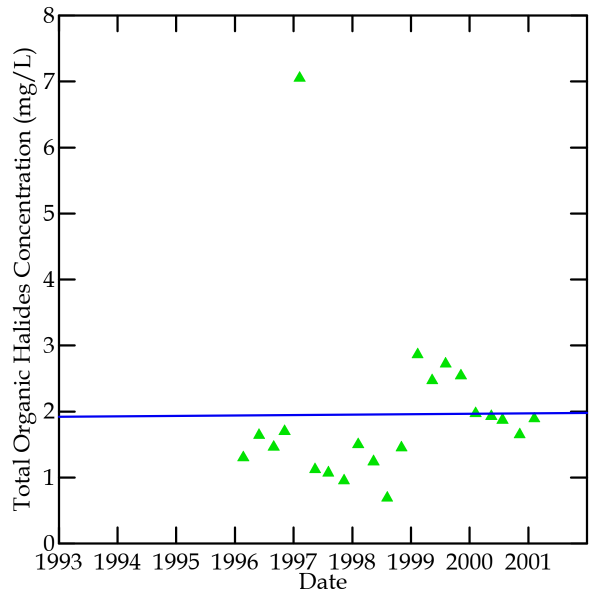
figure 5

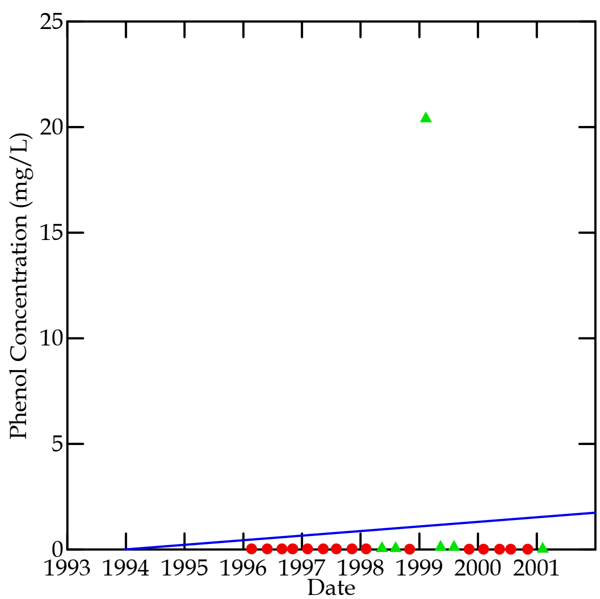
Well C1M
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 6

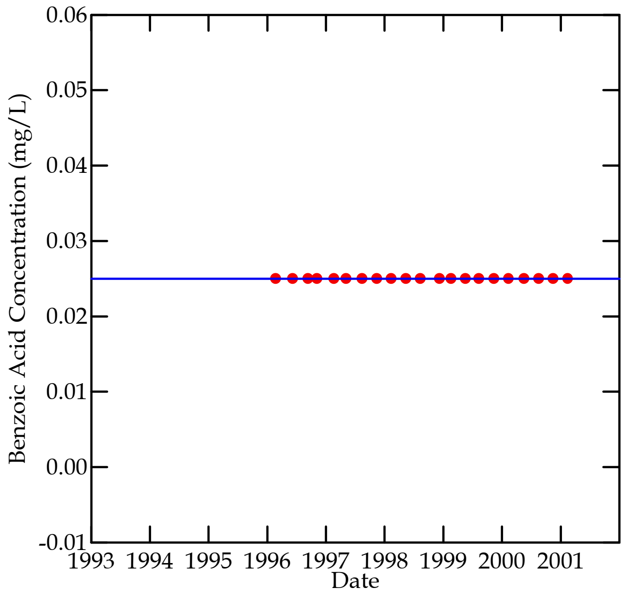
Well C1L

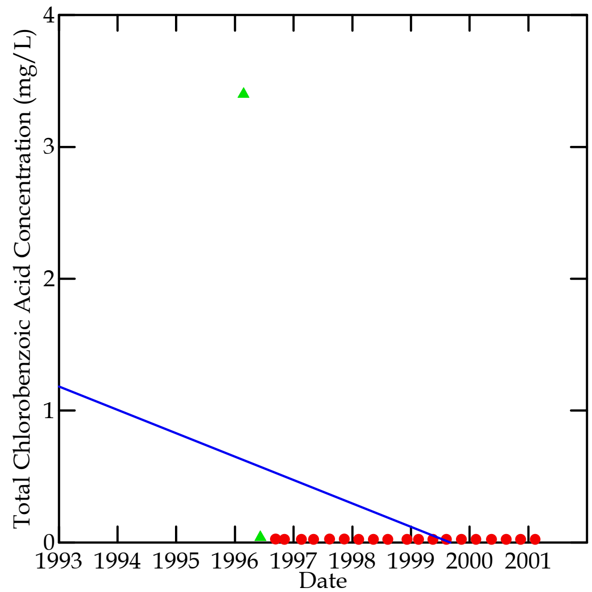
Analyte Concentration vs. Time

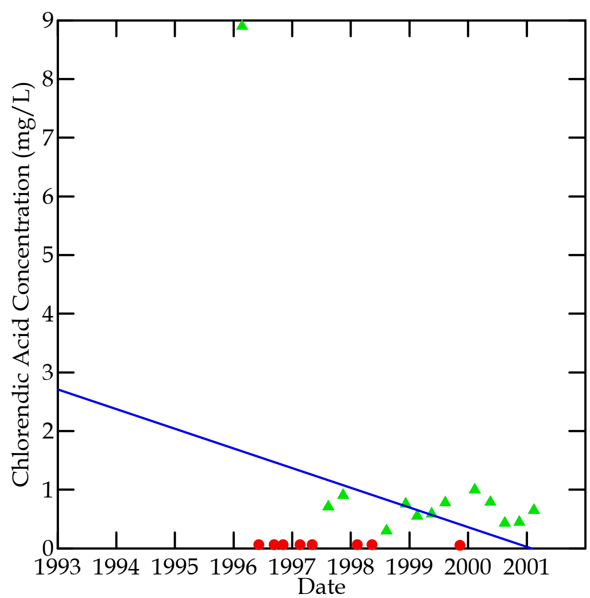
First Quarter 2001

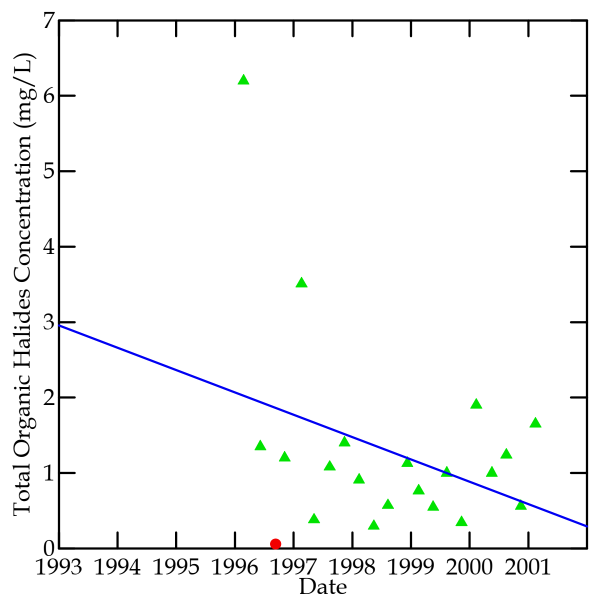
Hyde Park Landfill

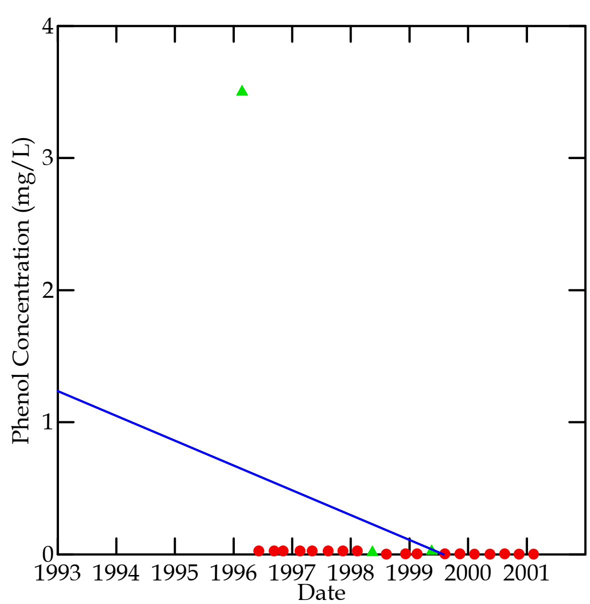
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 7

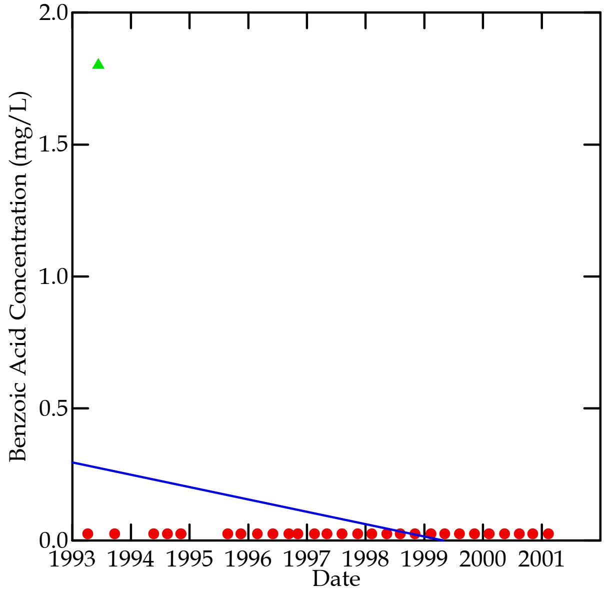
Well D3U

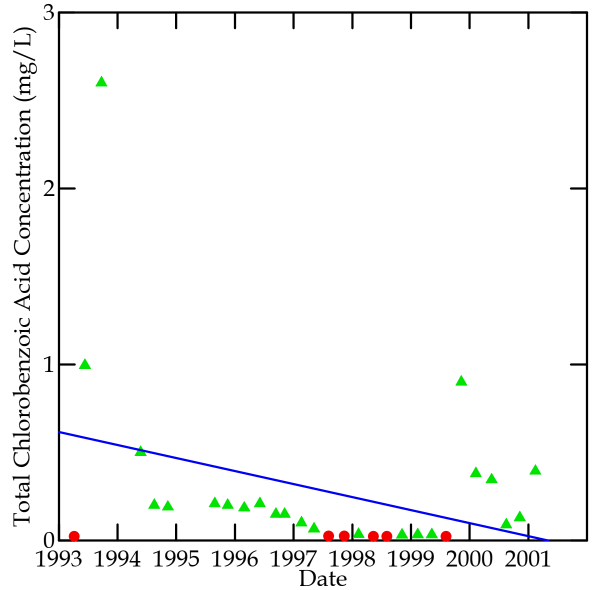
Analyte Concentration vs. Time

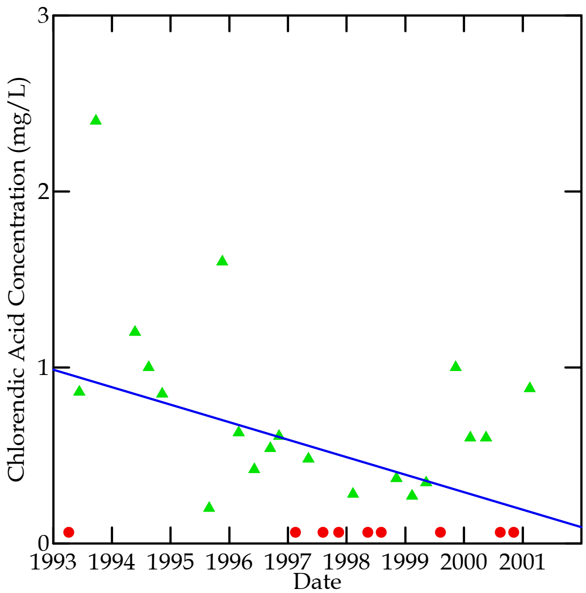
First Quarter 2001

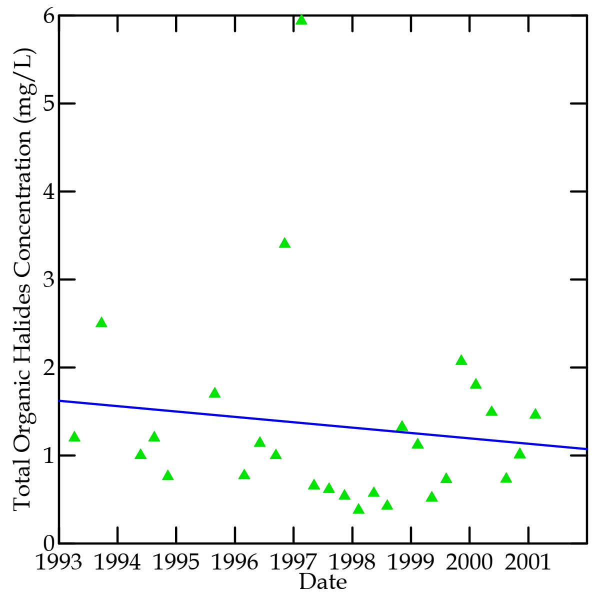
Hyde Park Landfill

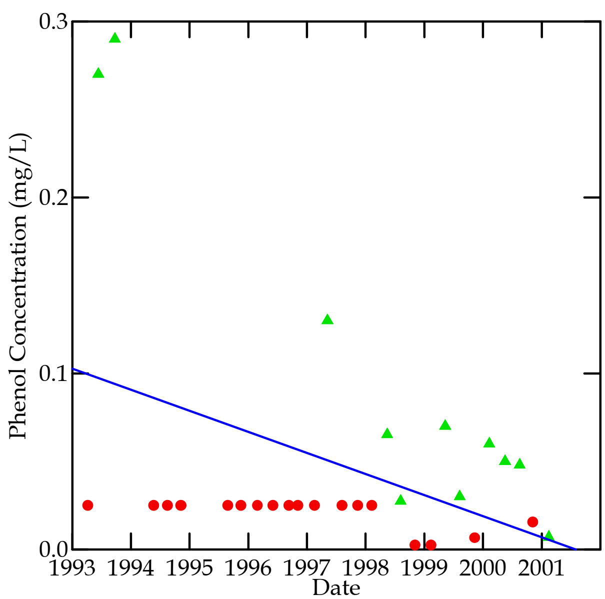
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 8

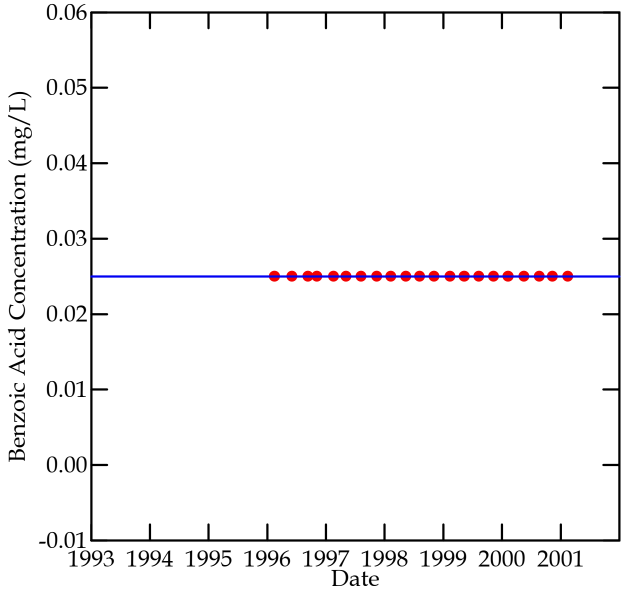
Well D2M

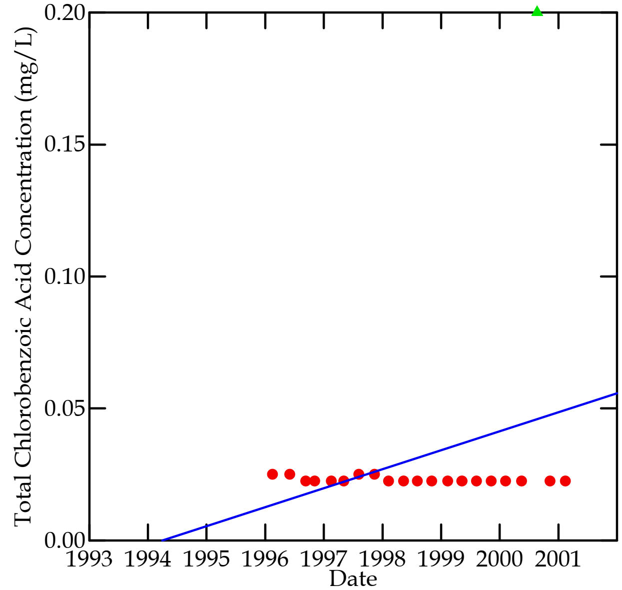
Analyte Concentration vs. Time

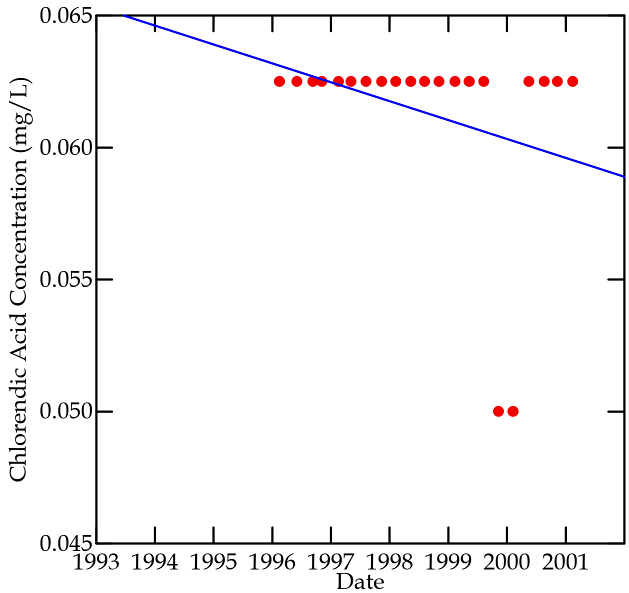
First Quarter 2001

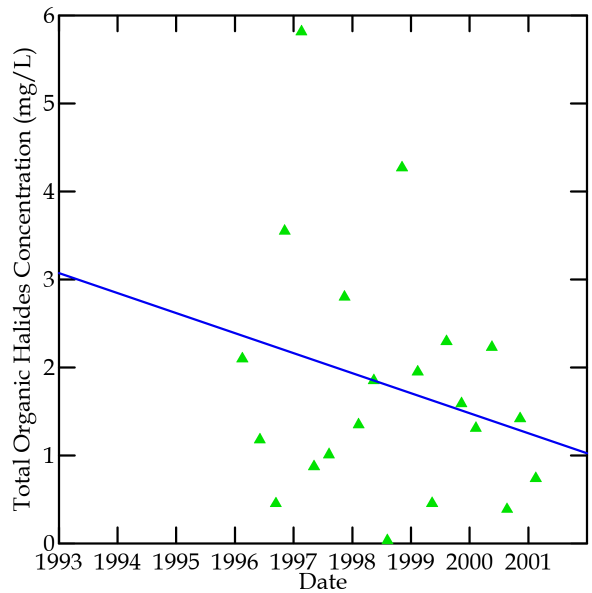
Hyde Park Landfill

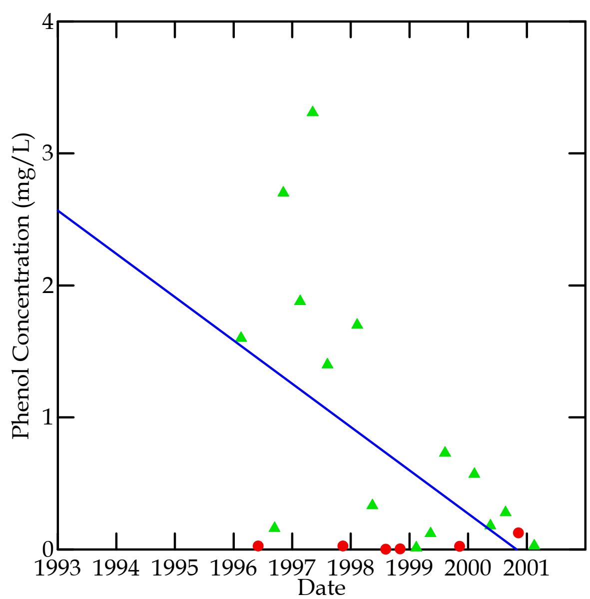
Niagara Falls, New York











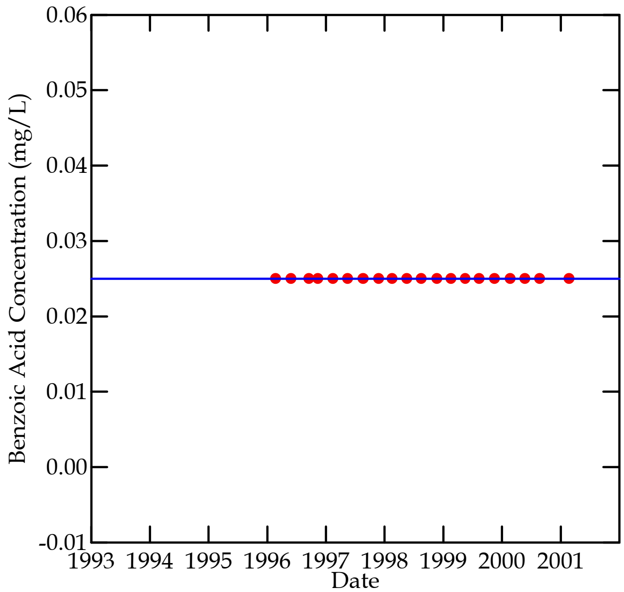
Notes:

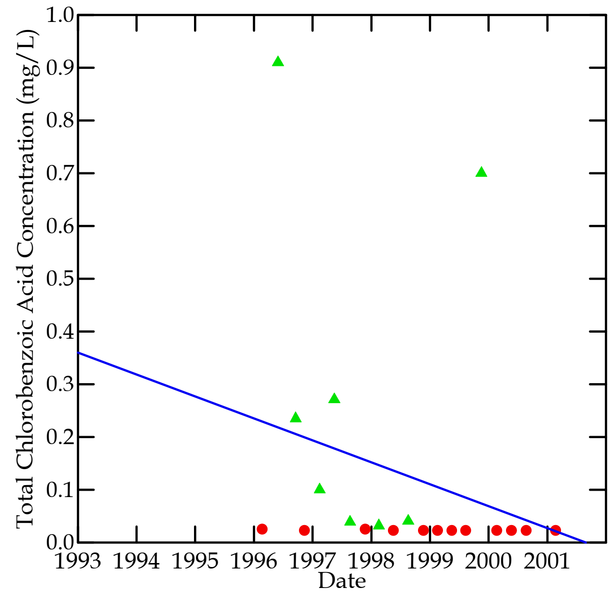
● Non-detect result

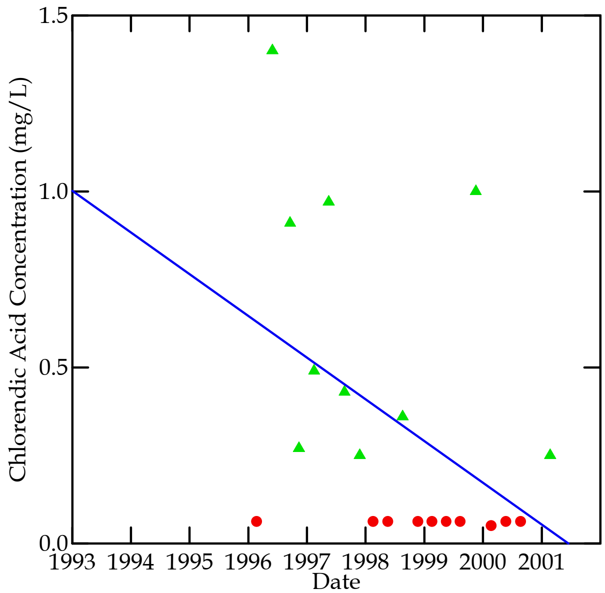
▲ Detected Result

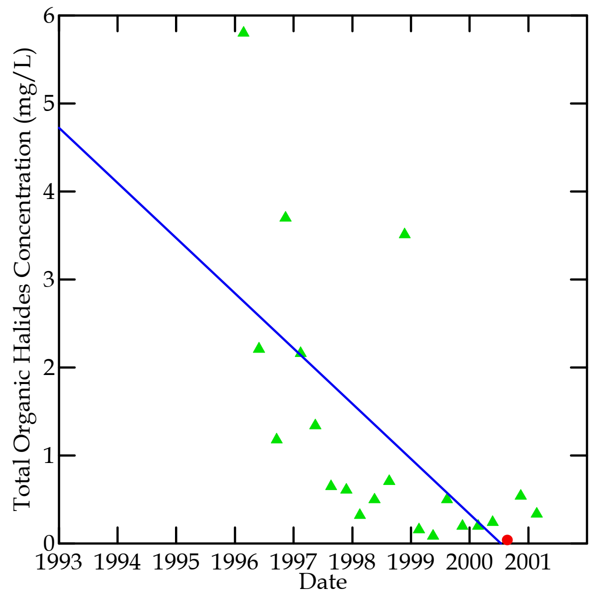
figure 9

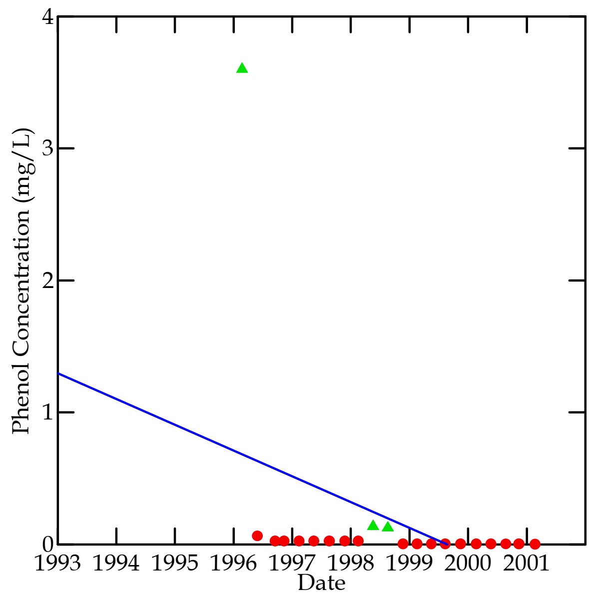
Well D1L
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 10

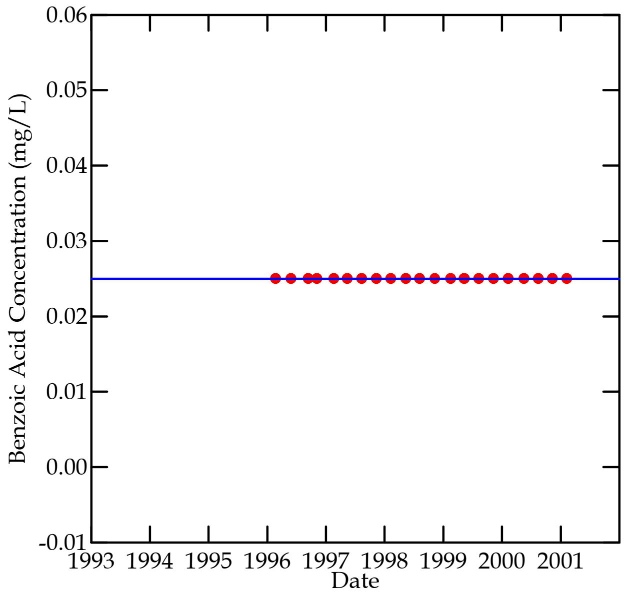
Well E3U

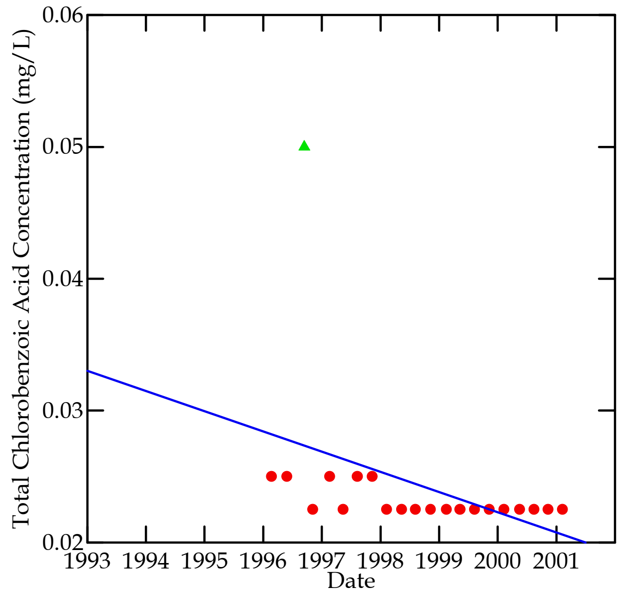
Analyte Concentration vs. Time

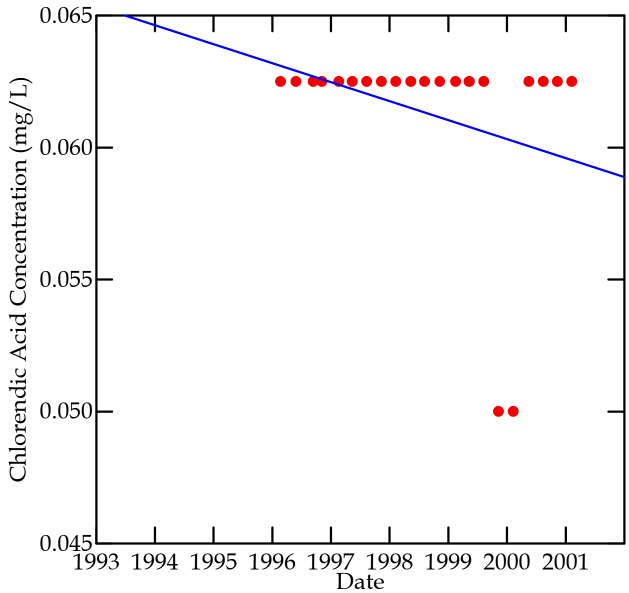
First Quarter 2001

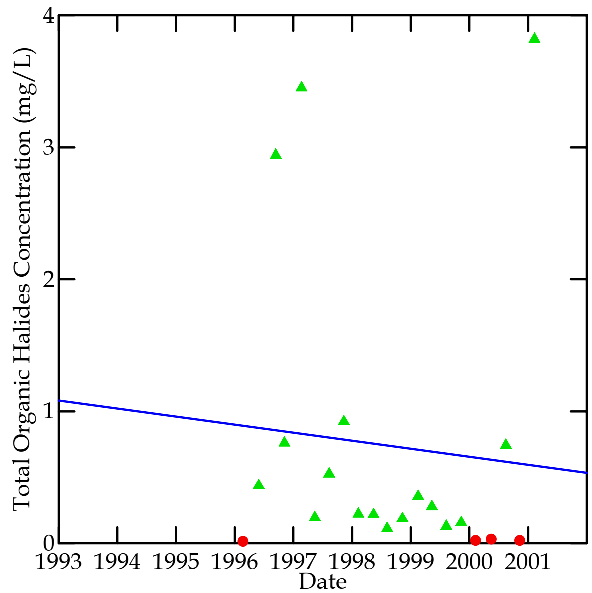
Hyde Park Landfill

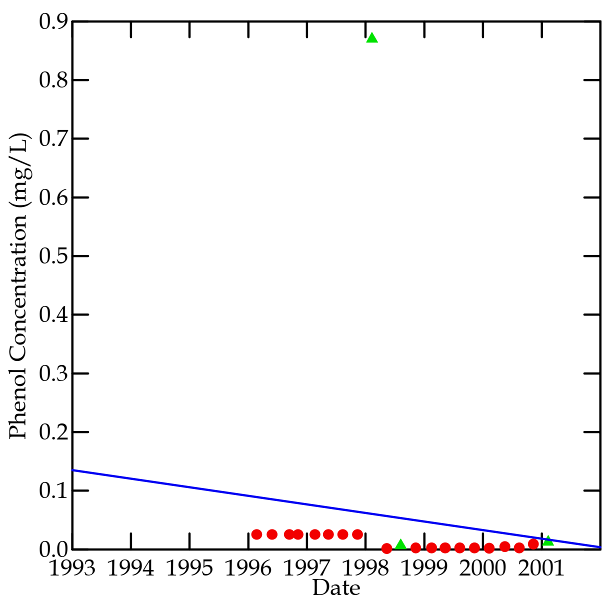
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 11

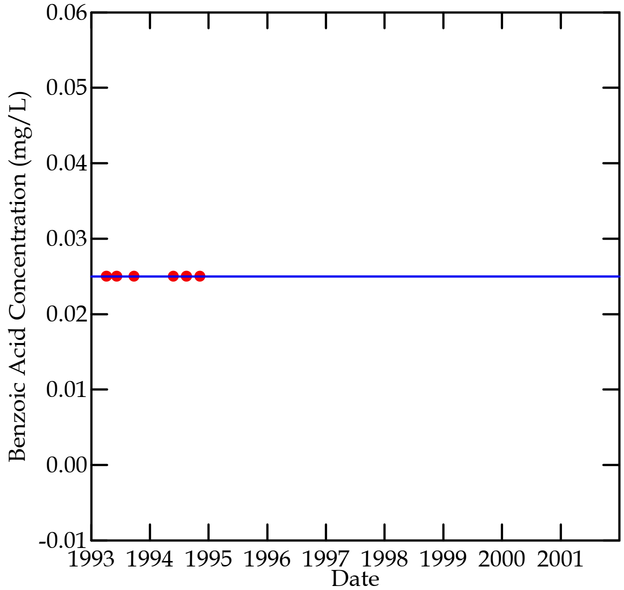
Well E3M

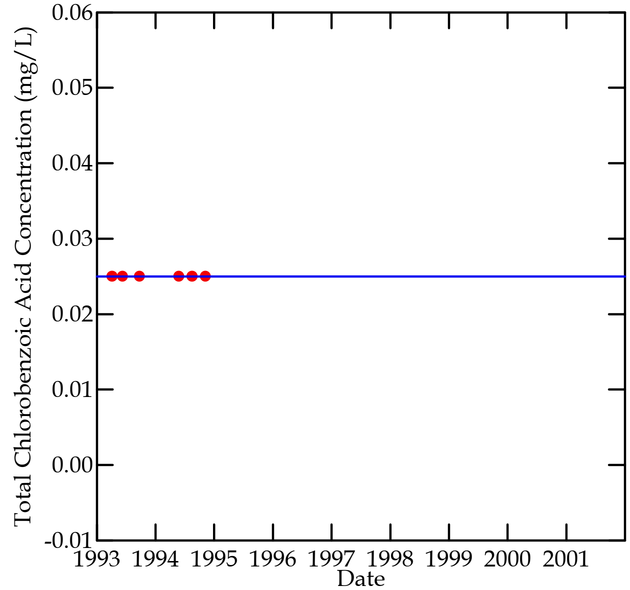
Analyte Concentration vs. Time

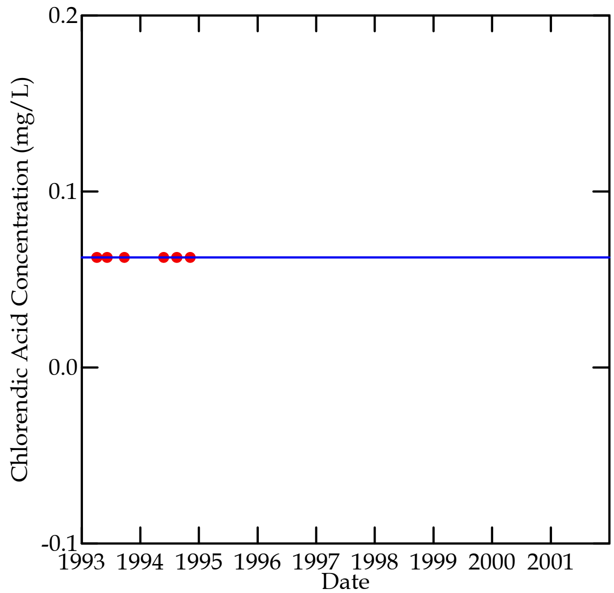
First Quarter 2001

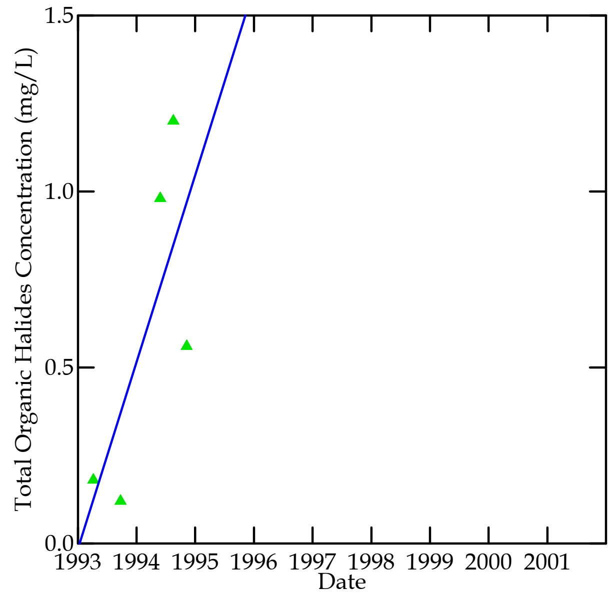
Hyde Park Landfill

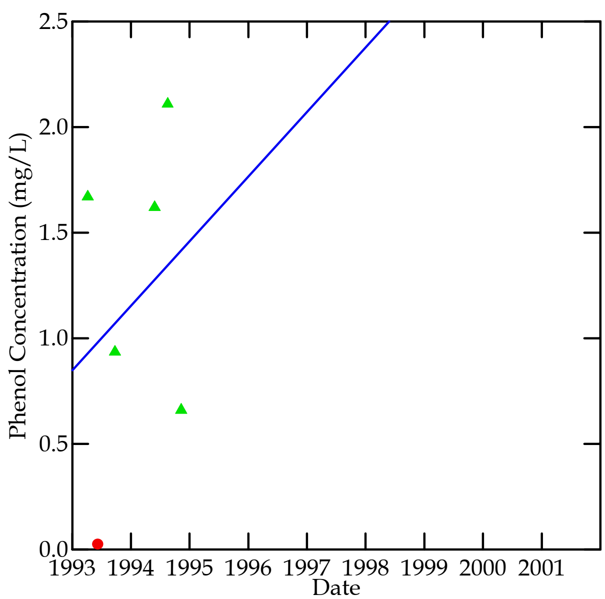
Niagara Falls, New York







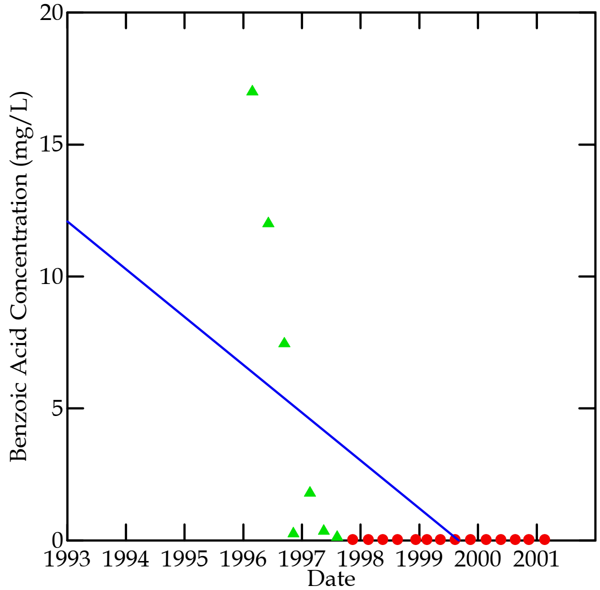


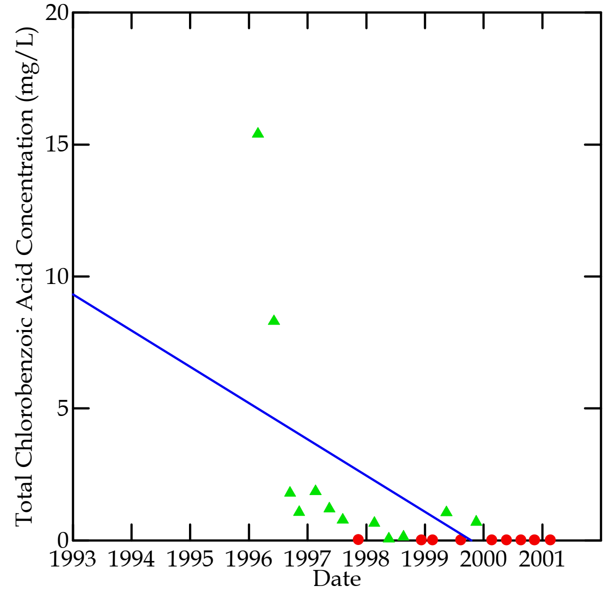


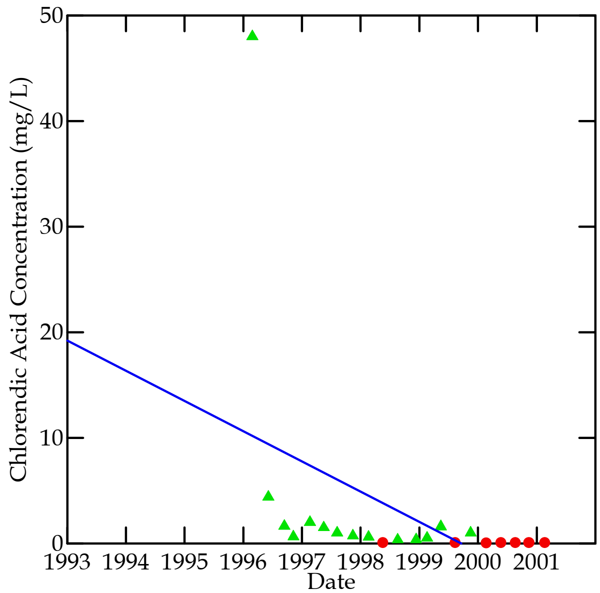
Notes:
- ● Non-detect result
- ▲ Detected Result

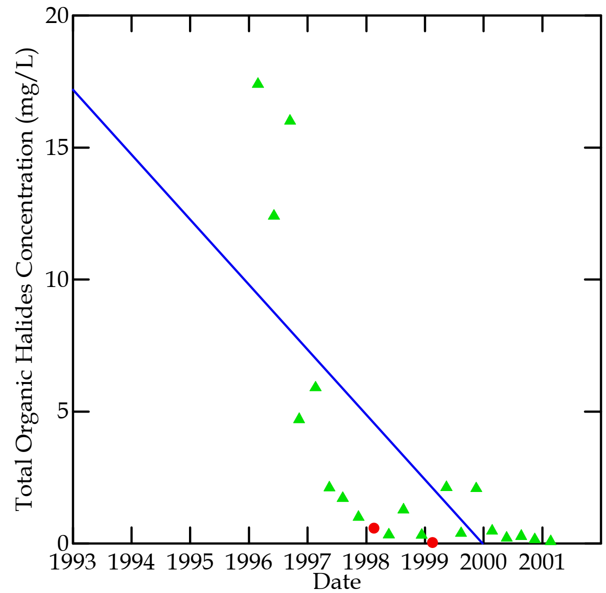
figure 12

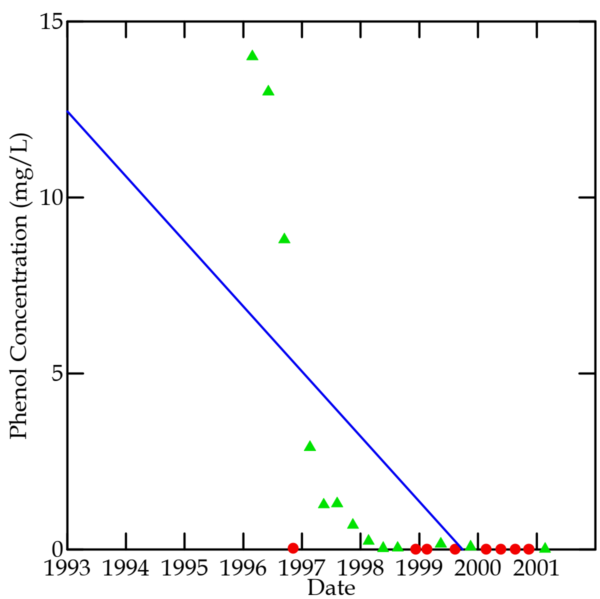
Well E2L
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York











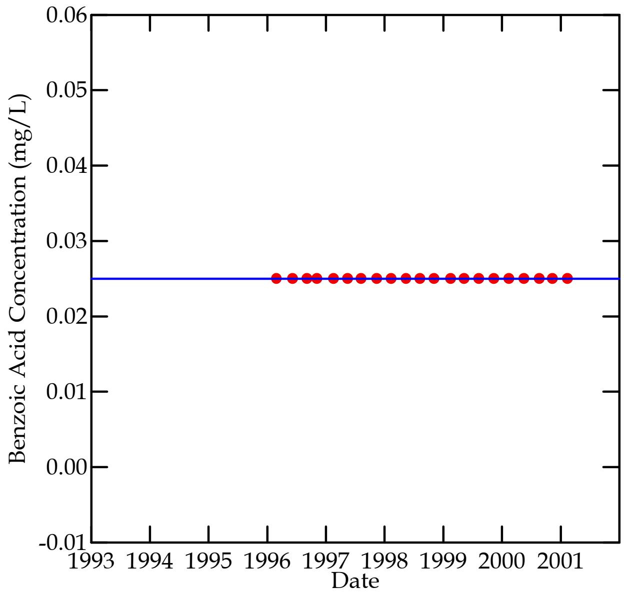
Notes:

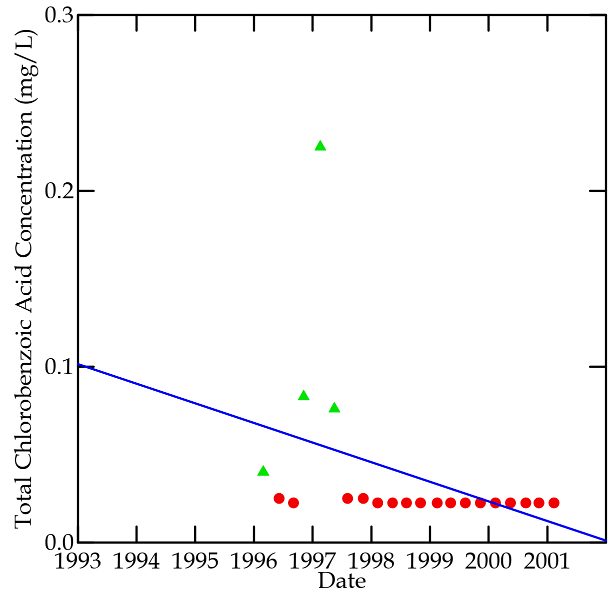
● Non-detect result

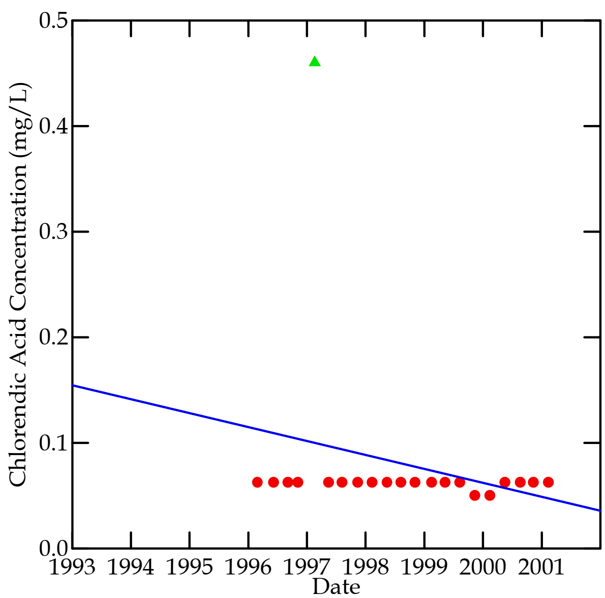
▲ Detected Result

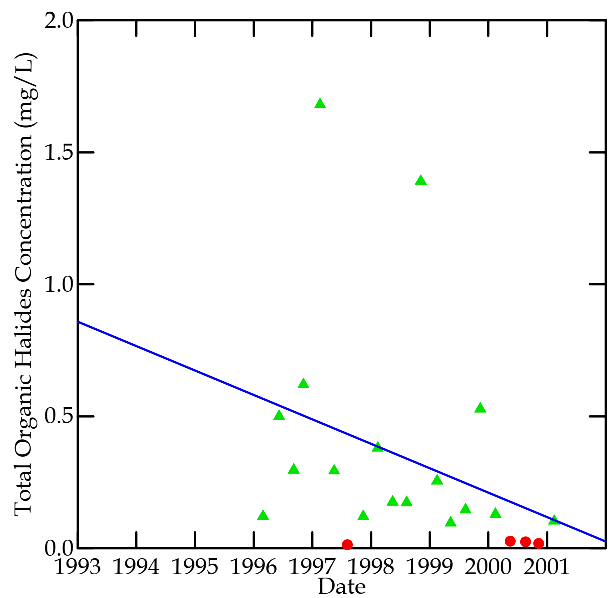
figure 13

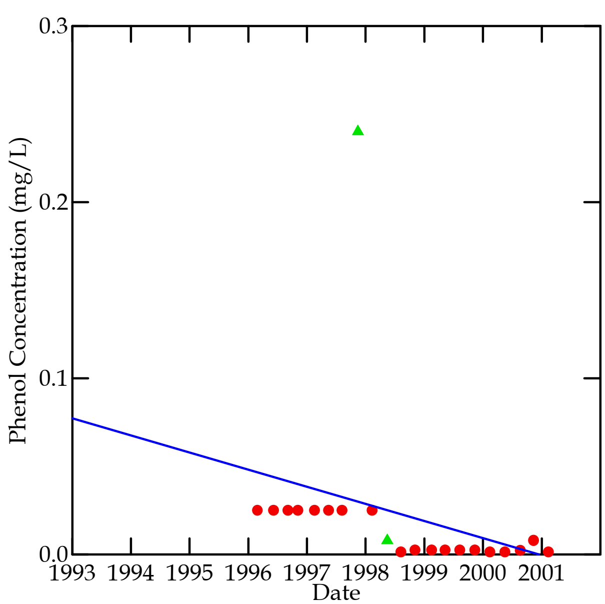
Well F4U
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York







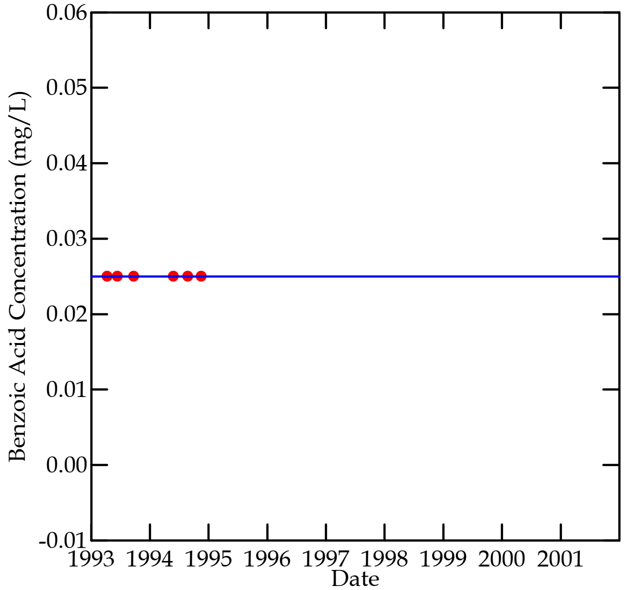


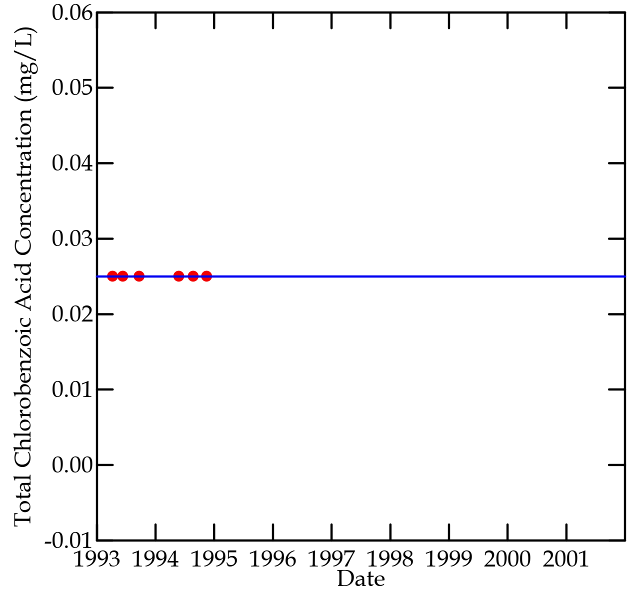


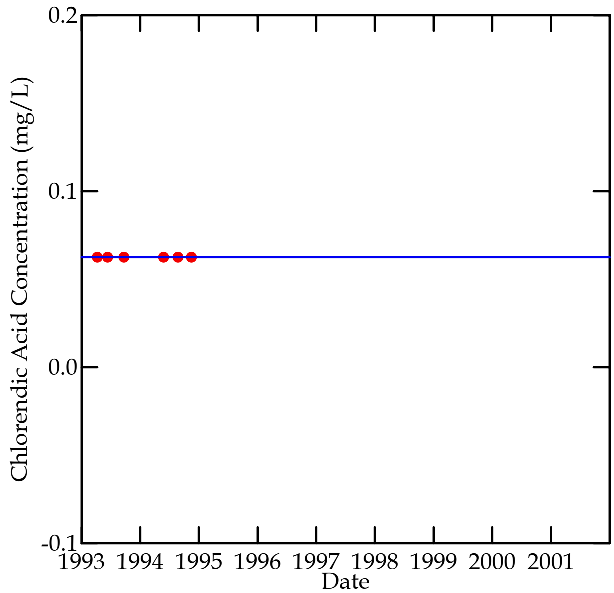
Notes:
● Non-detect result
▲ Detected Result

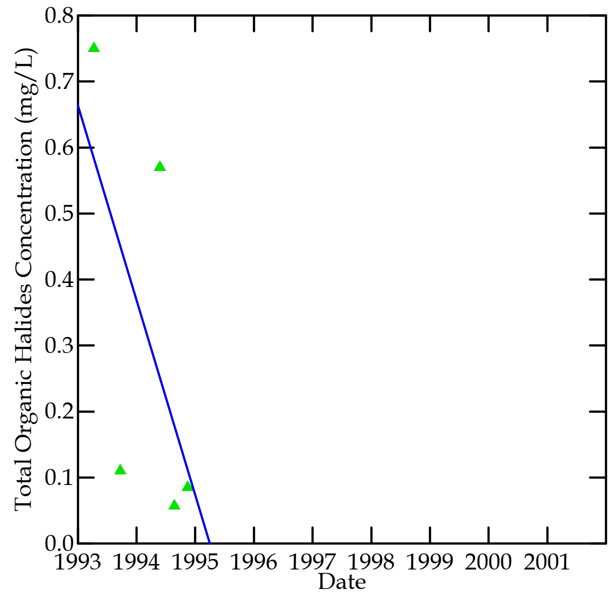
figure 14

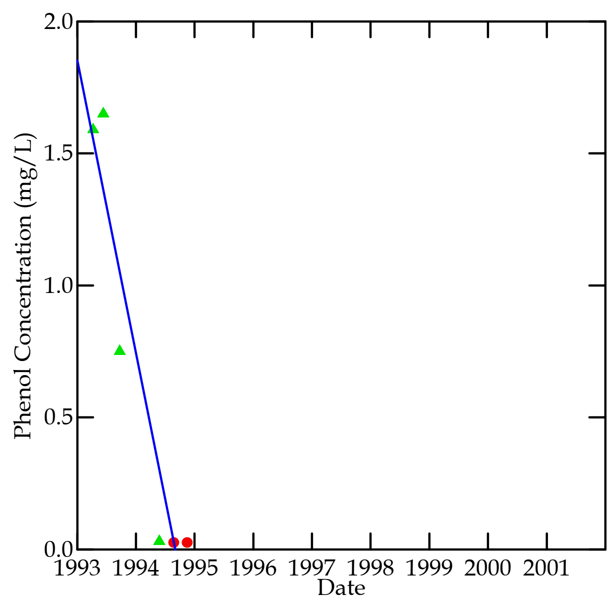
Well F1M
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York







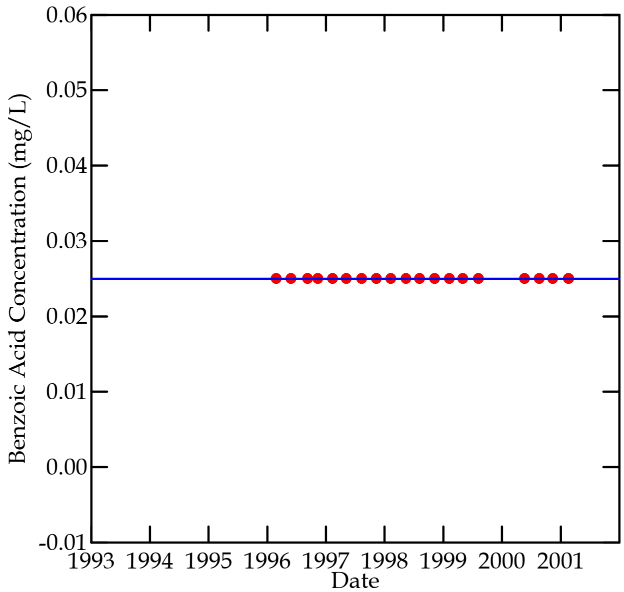


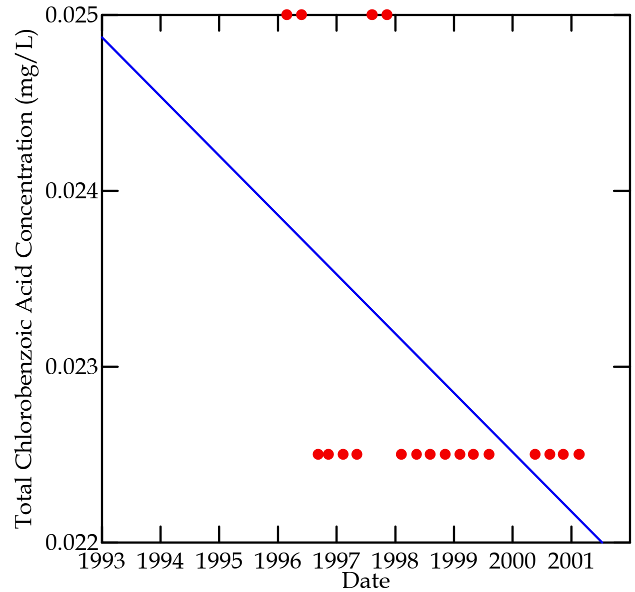


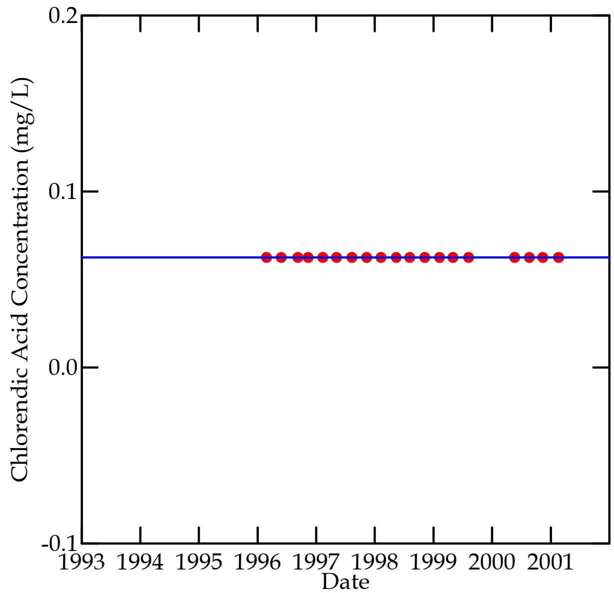
Notes:
- ● Non-detect result
- ▲ Detected Result

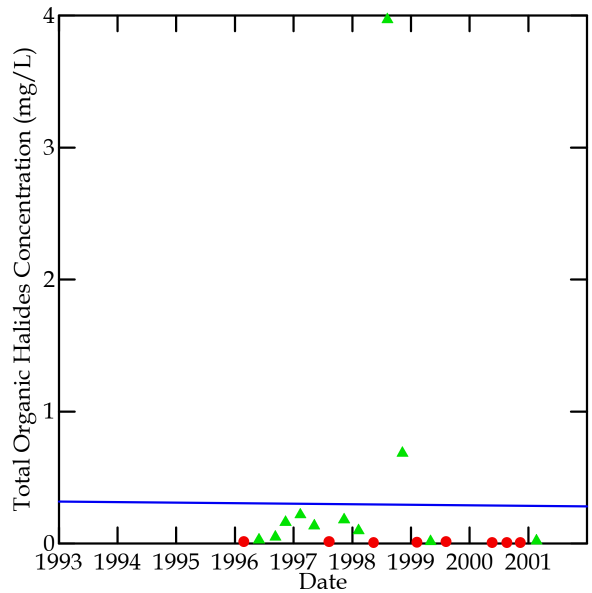
figure 15

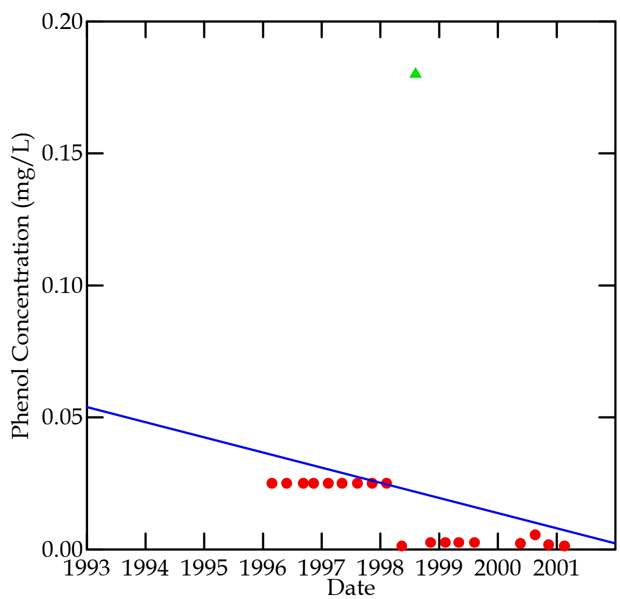
Well F2L
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York







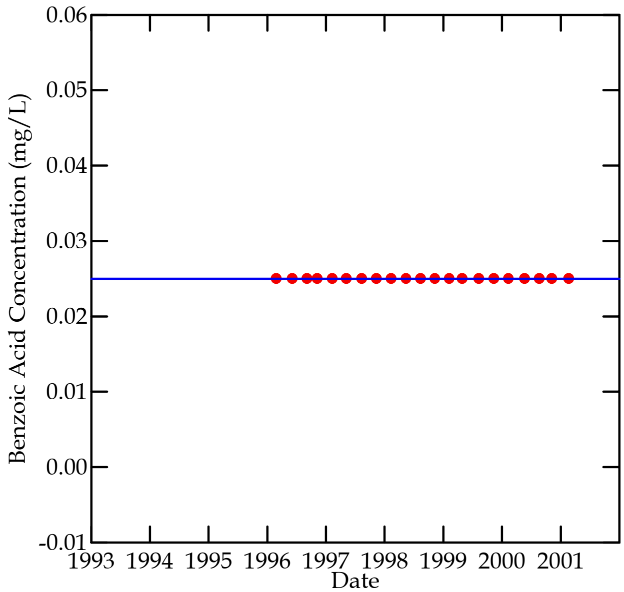


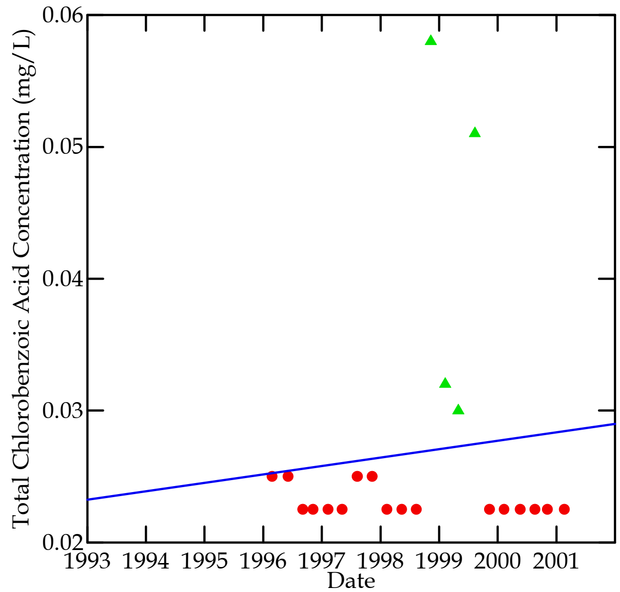


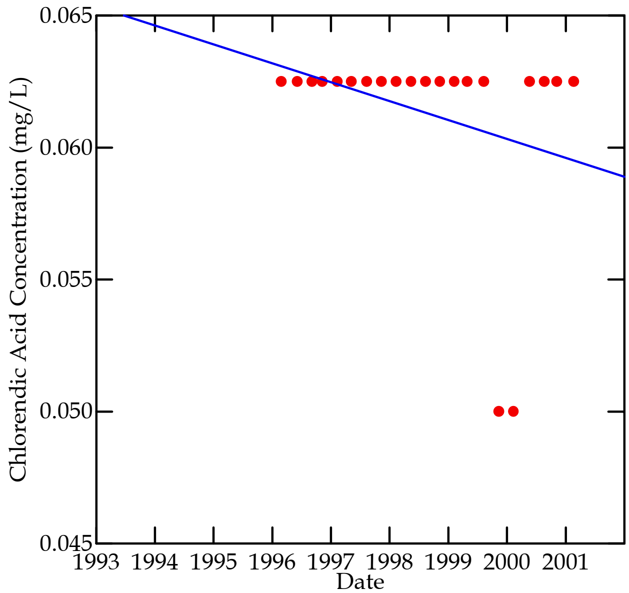
Notes:
● Non-detect result
▲ Detected Result

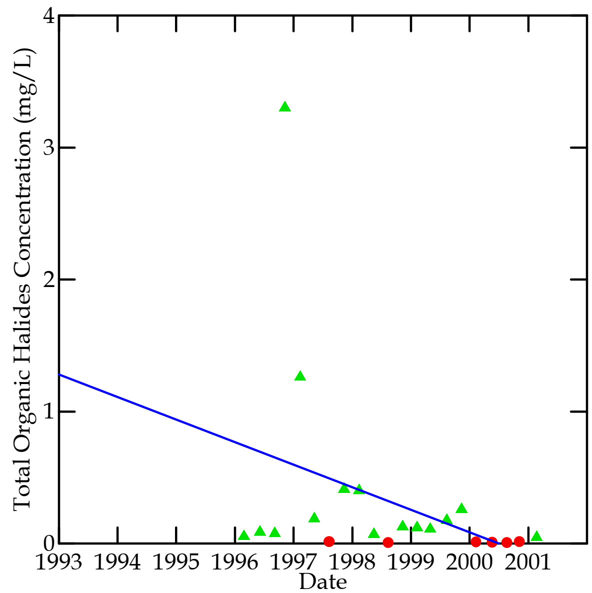
figure 16

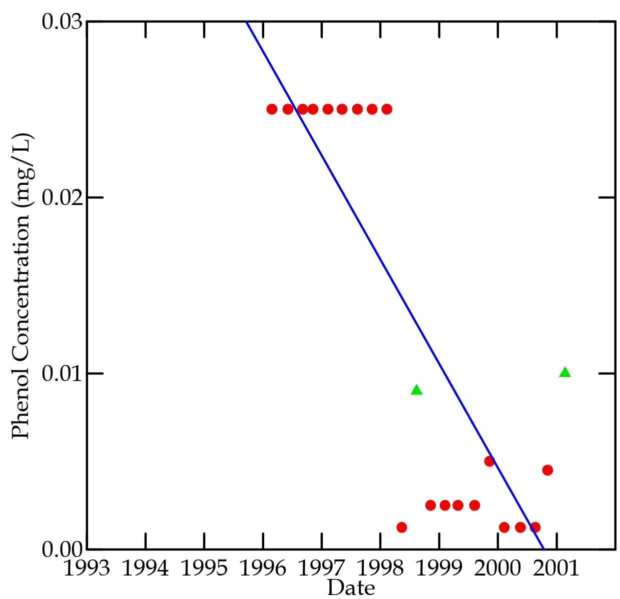
Well G4U
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York







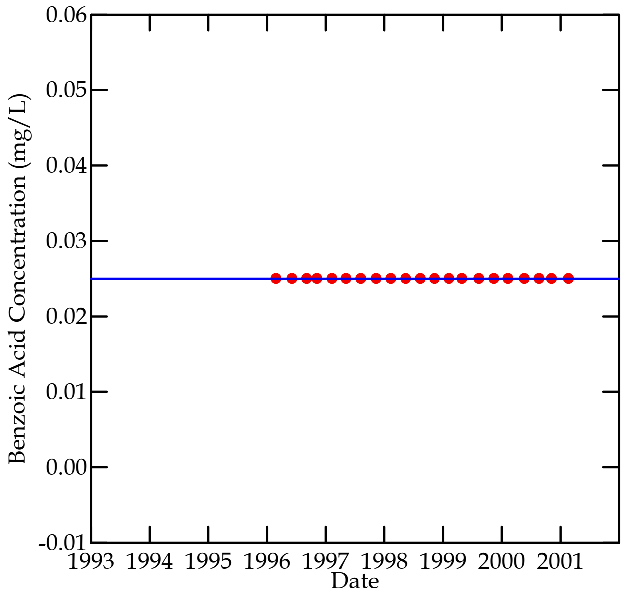


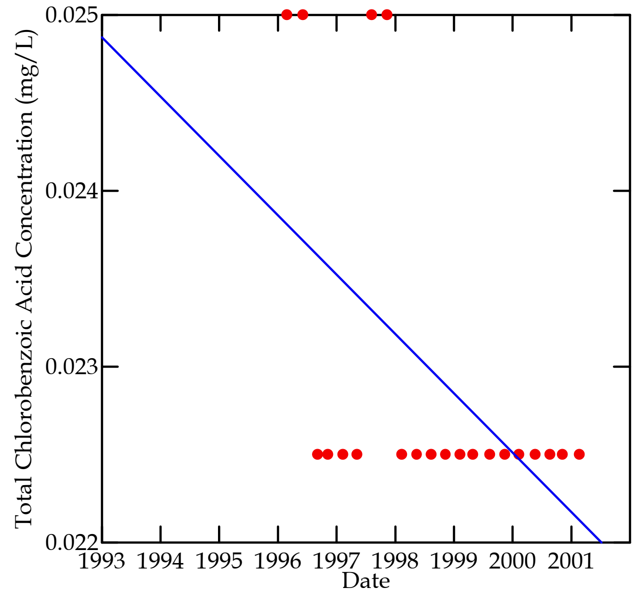


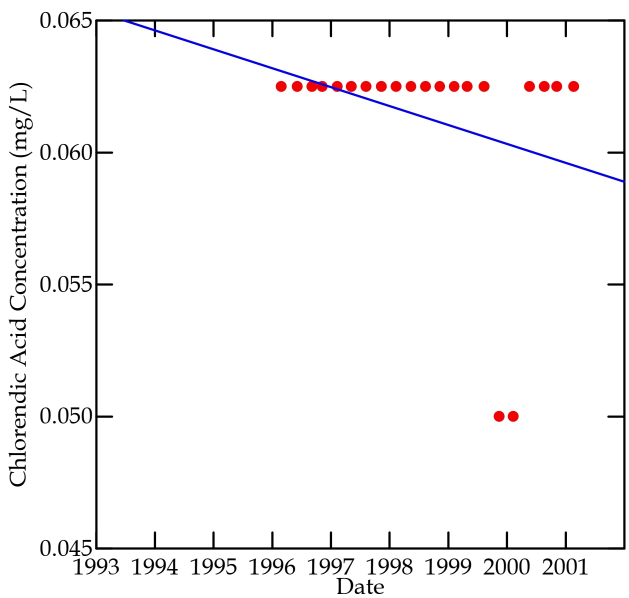
Notes:
● Non-detect result
▲ Detected Result

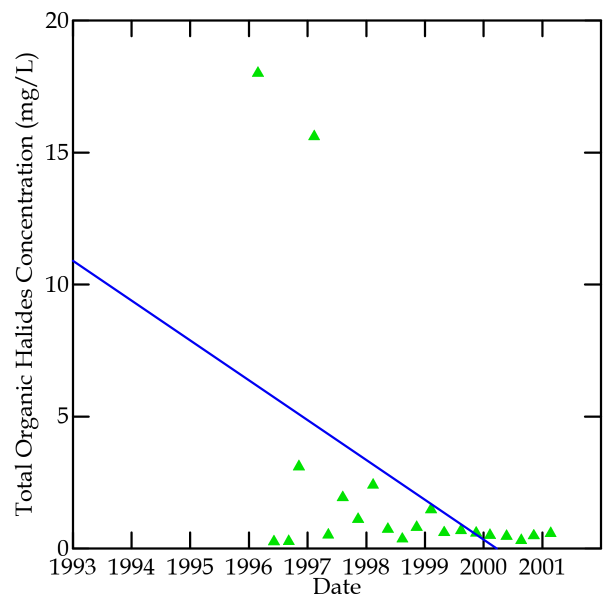
figure 17

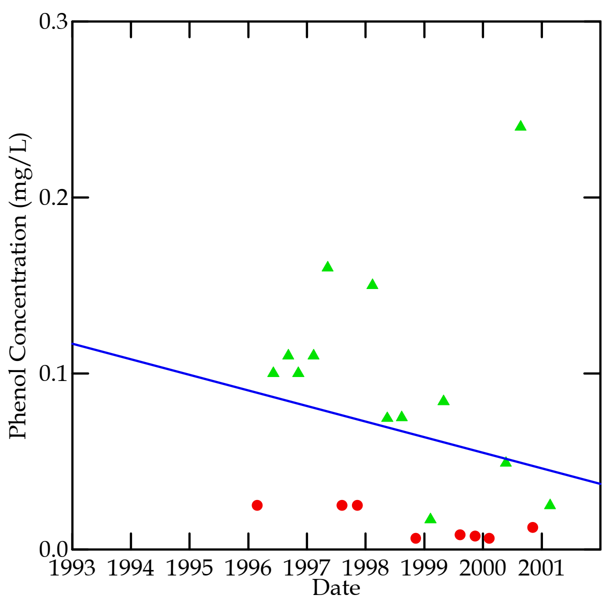
Well G1M
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 18

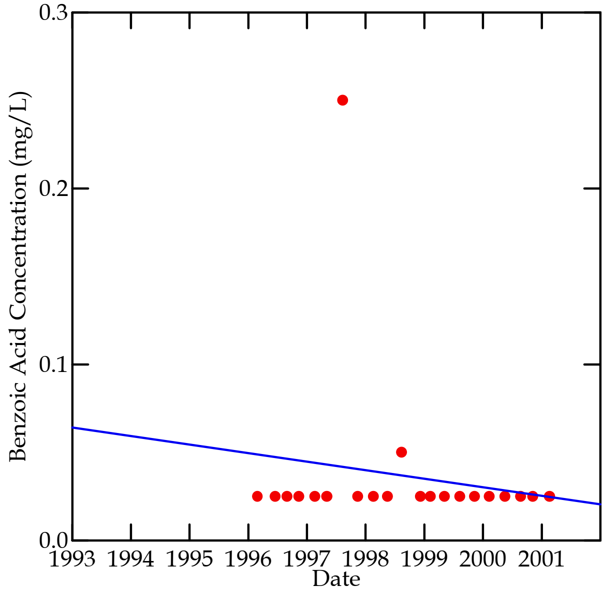
Well G1L

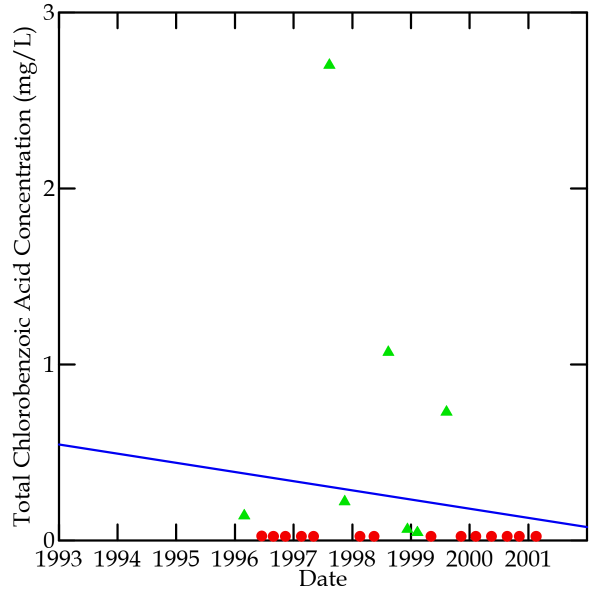
Analyte Concentration vs. Time

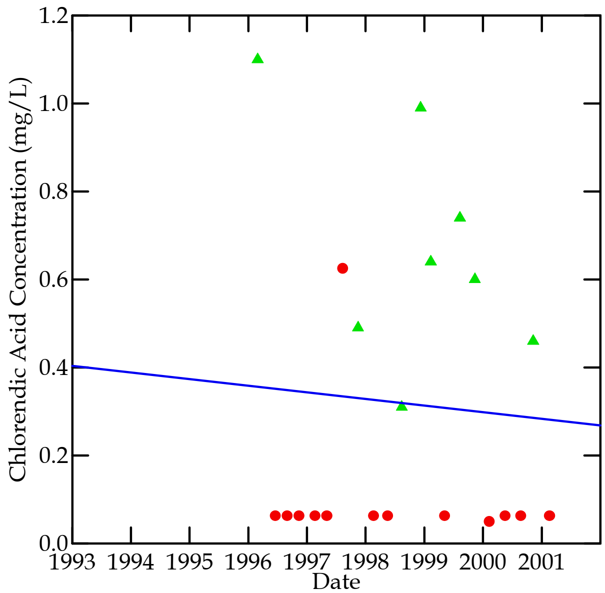
First Quarter 2001

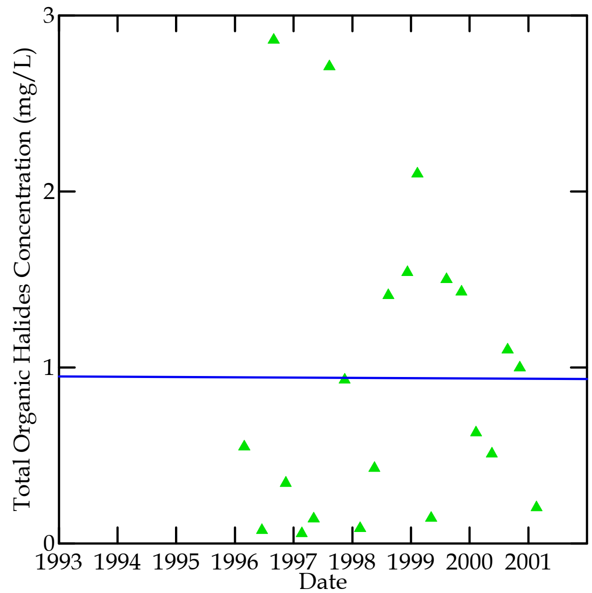
Hyde Park Landfill

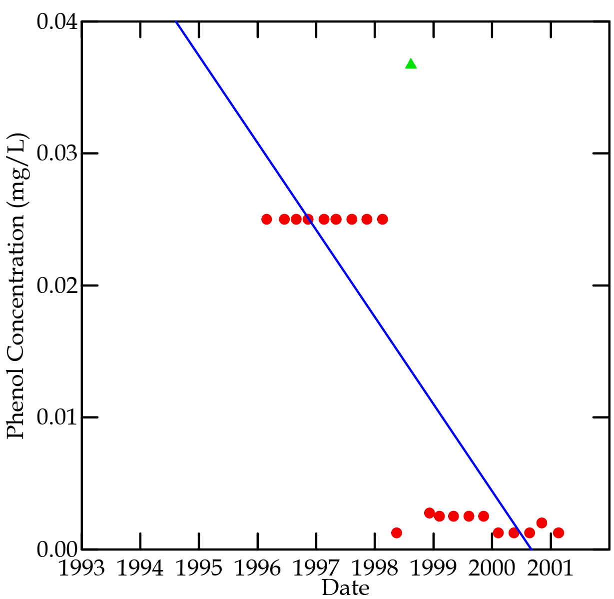
Niagara Falls, New York







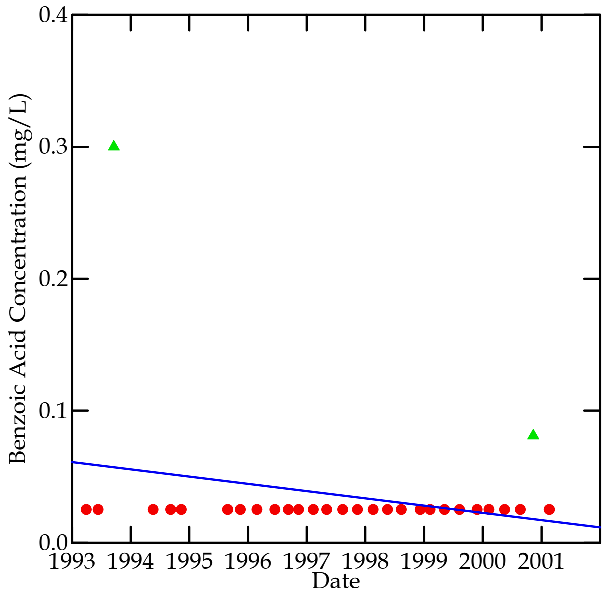


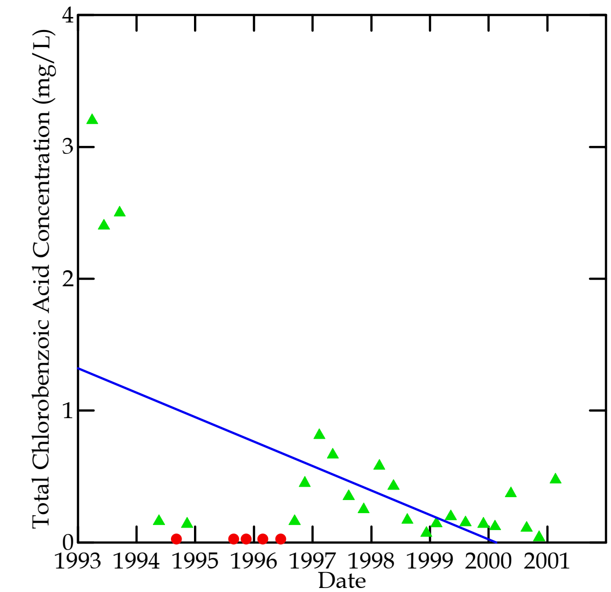


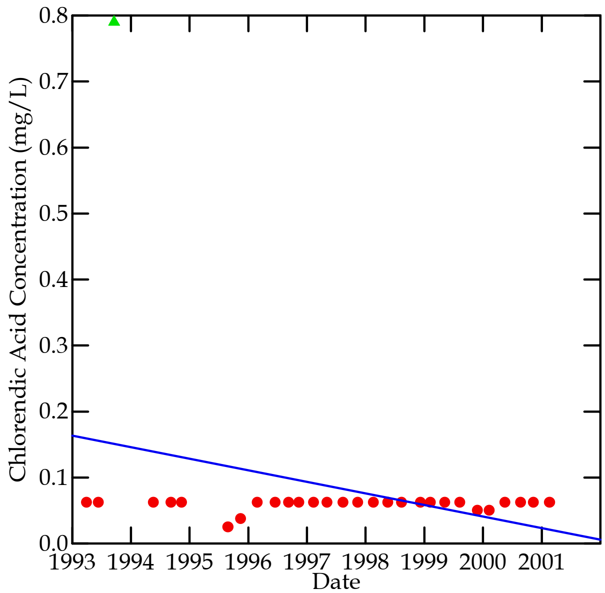
Notes:
● Non-detect result
▲ Detected Result

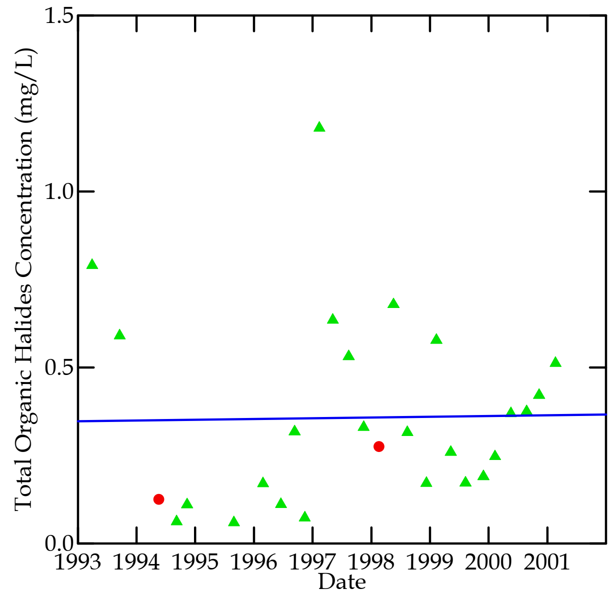
figure 19

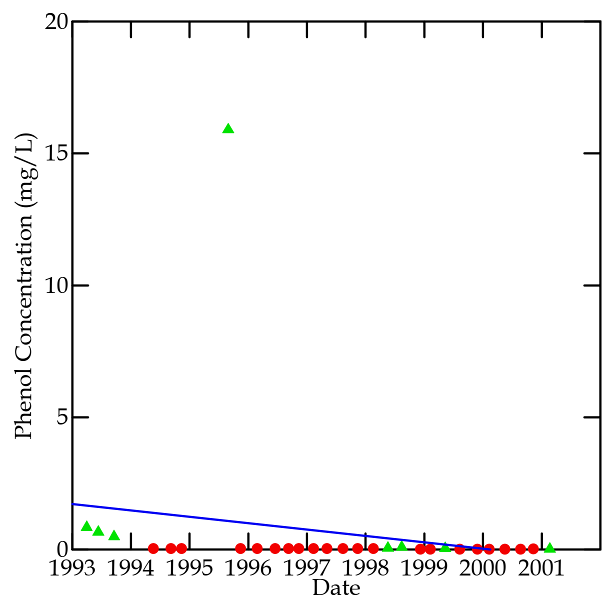
Well H1U
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York









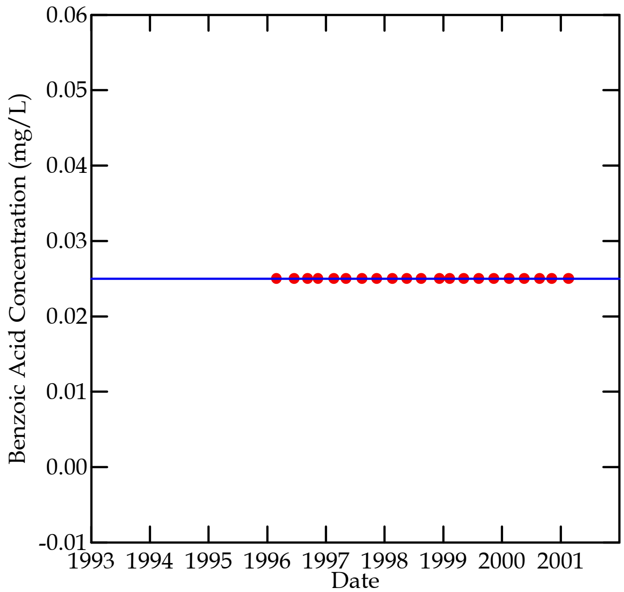


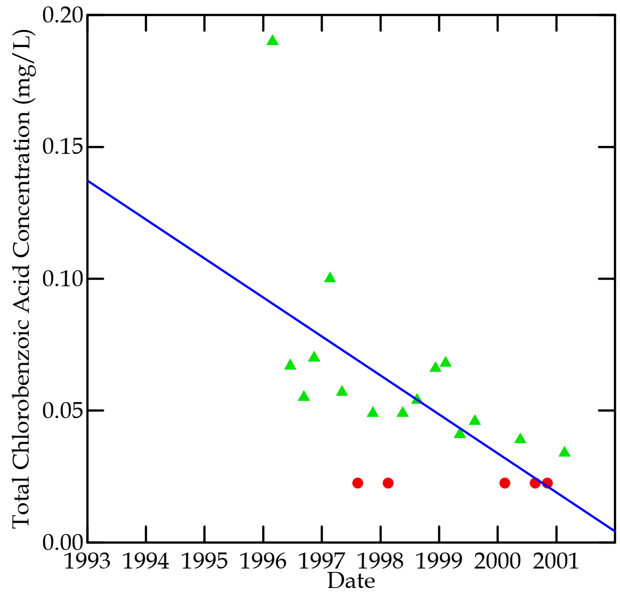
Notes:

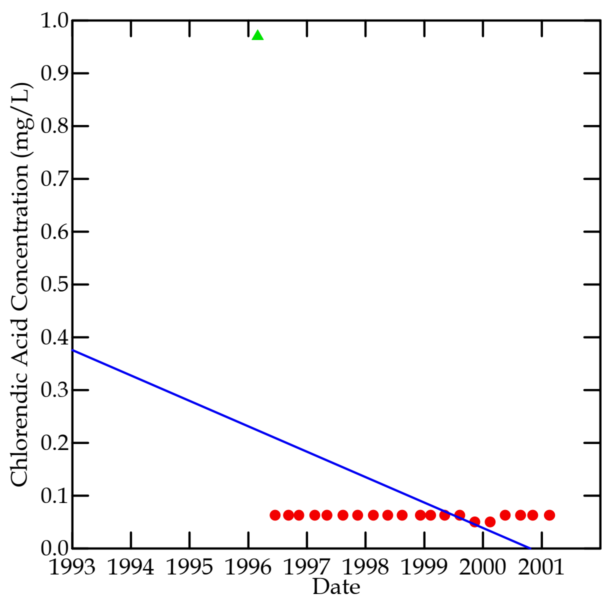
- ● Non-detect result
- ▲ Detected Result

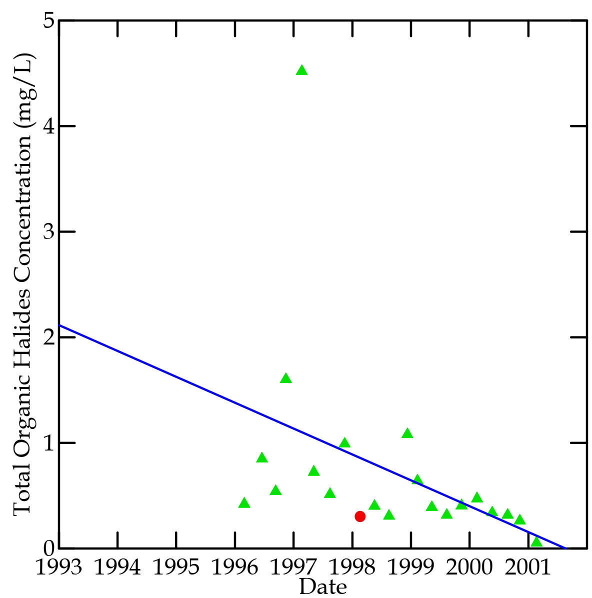
figure 20

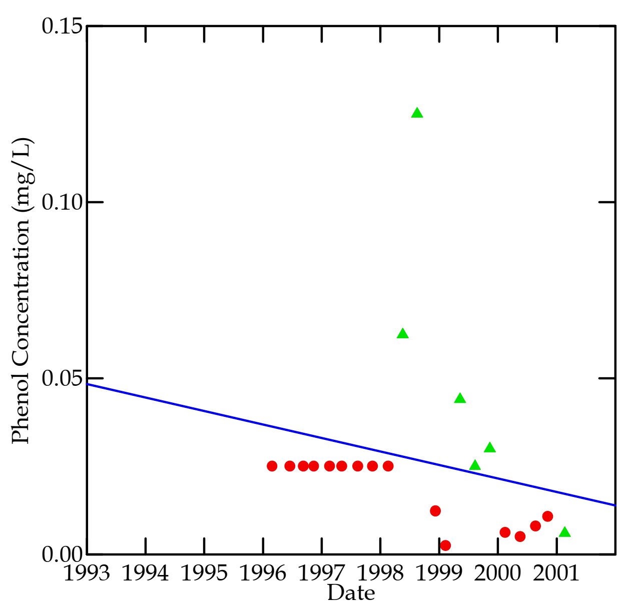
Well H2M
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York











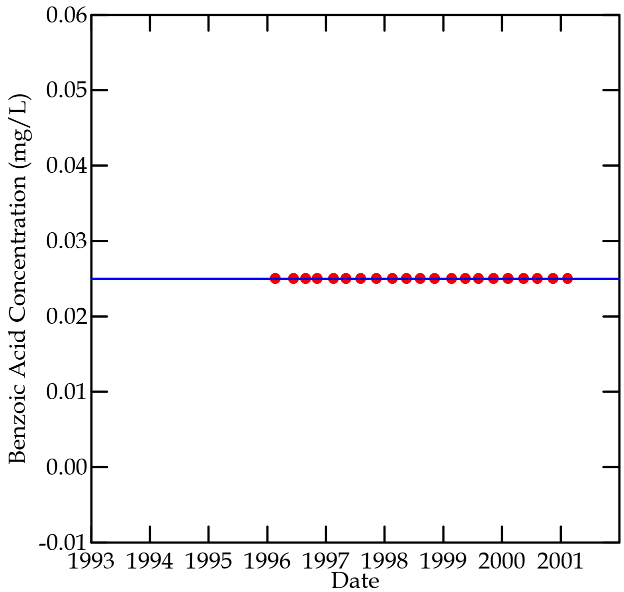
Notes:

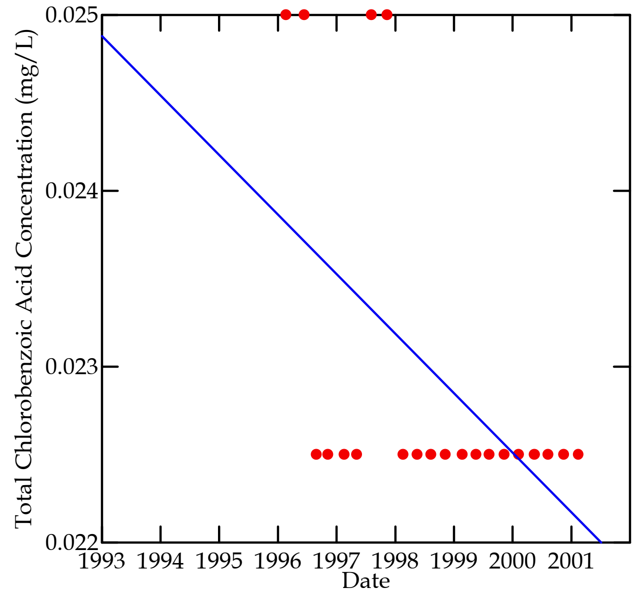
● Non-detect result

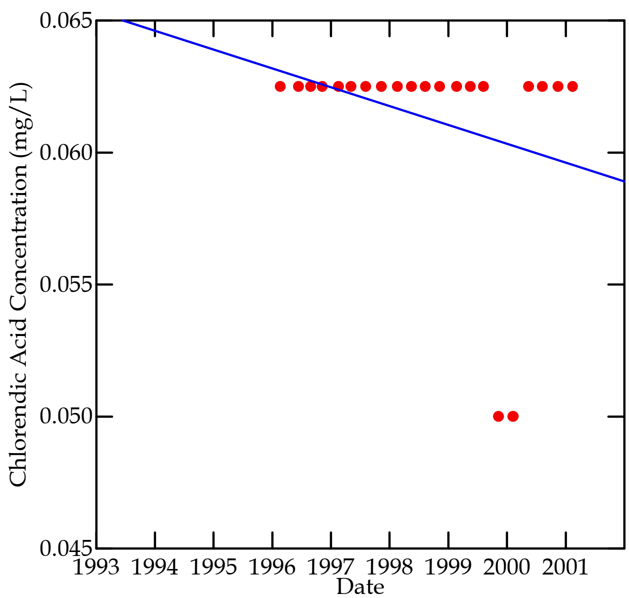
▲ Detected Result

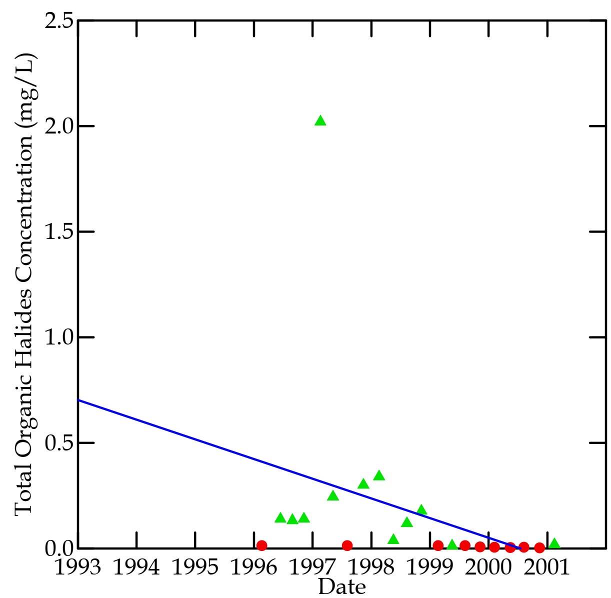
figure 21

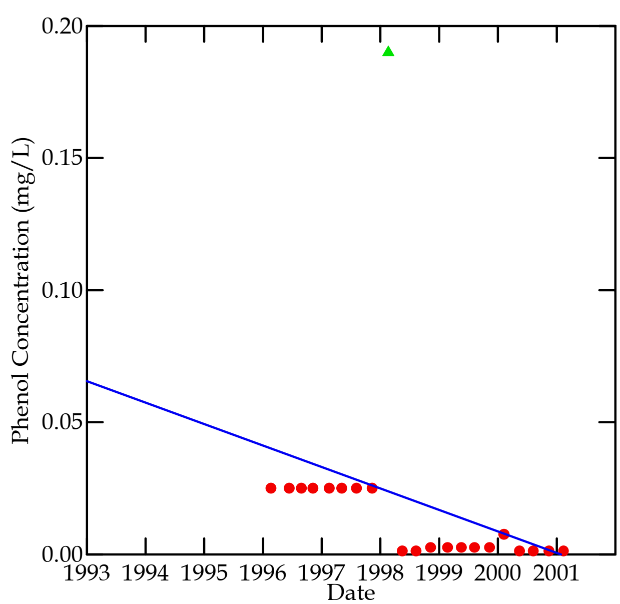
Well H3L
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York









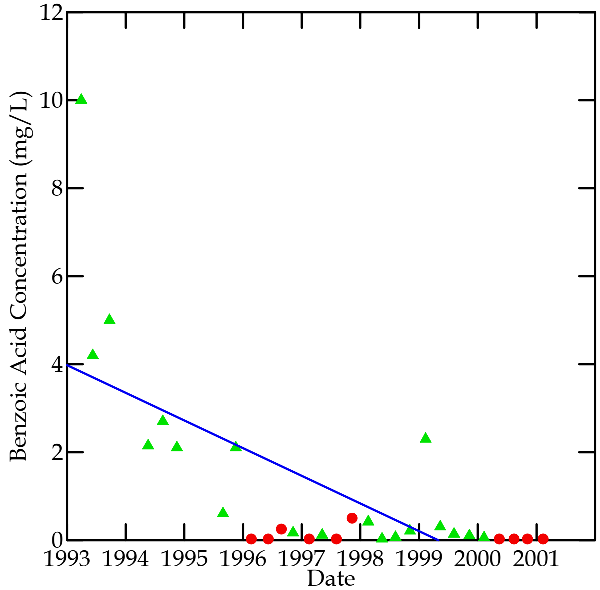


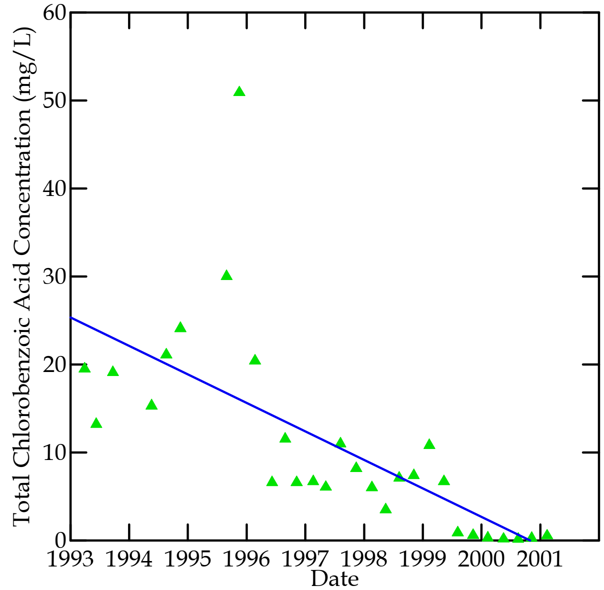
Notes:

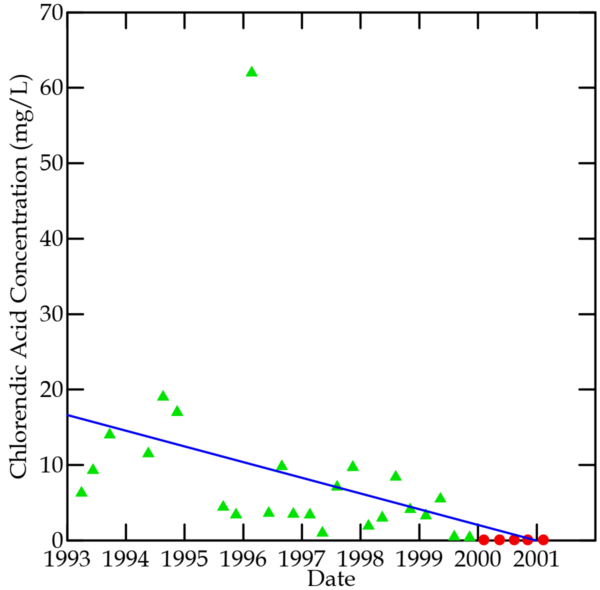
- ● Non-detect result
- ▲ Detected Result

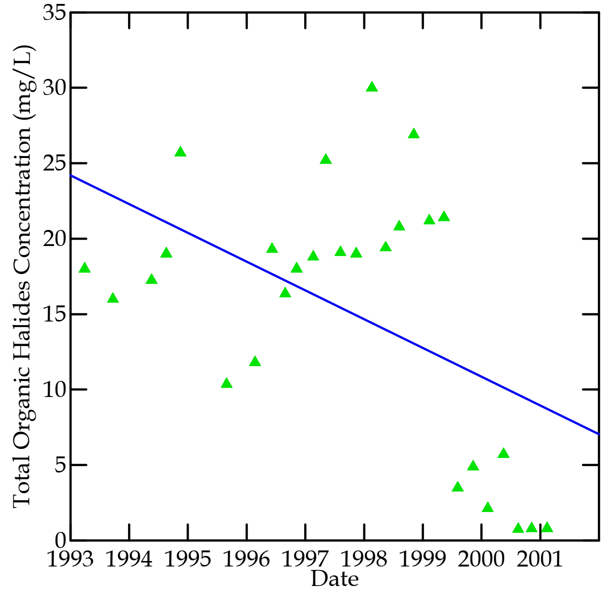
figure 22

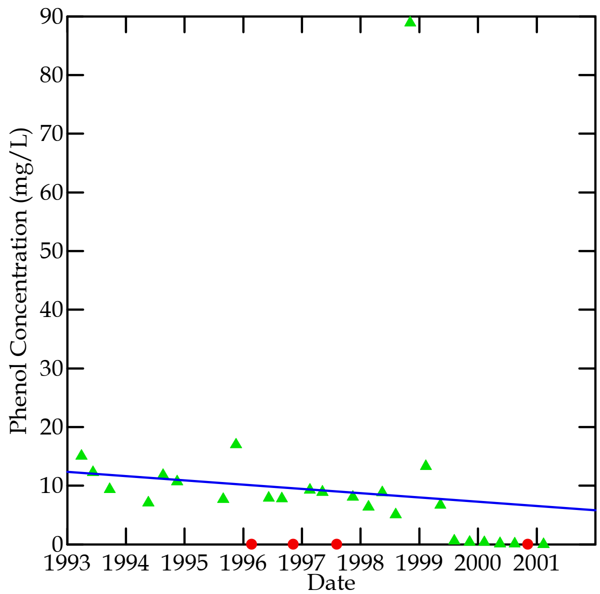
Well J1U
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York











Notes:

● Non-detect result

▲ Detected Result

figure 23

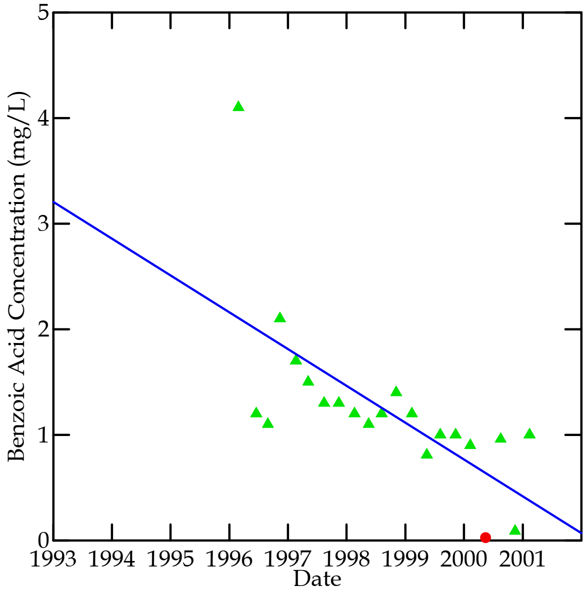
Well J2M

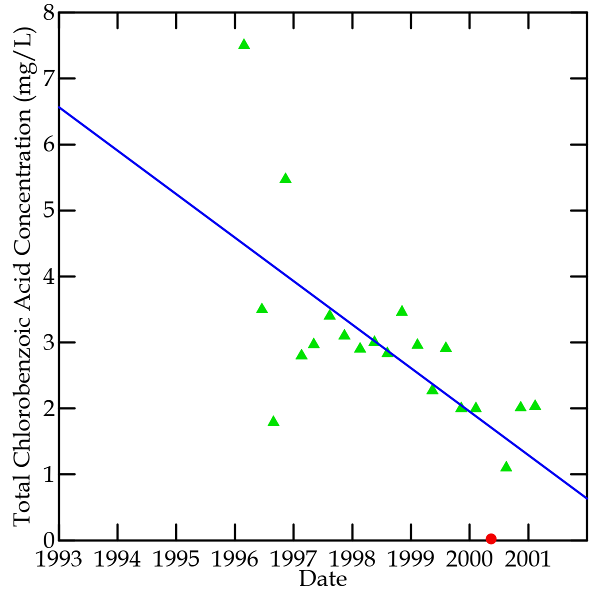
Analyte Concentration vs. Time

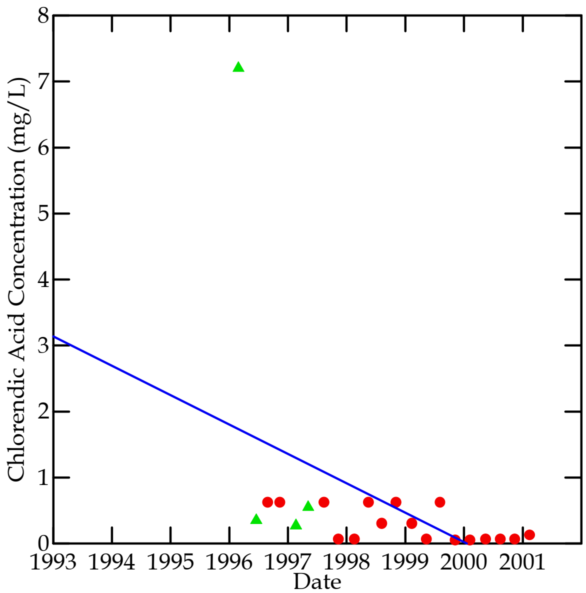
First Quarter 2001

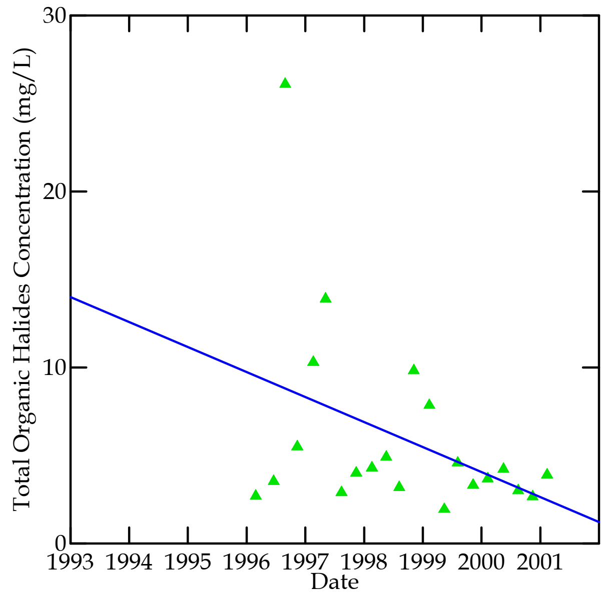
Hyde Park Landfill

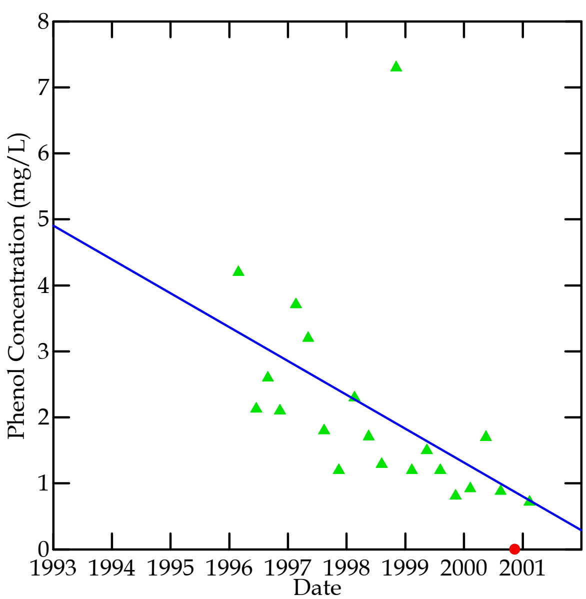
Niagara Falls, New York











Notes:
● Non-detect result
▲ Detected Result

figure 24

Well J3L
Analyte Concentration vs. Time
First Quarter 2001
Hyde Park Landfill
Niagara Falls, New York

APPENDIX D

GLENN SPRINGS HOLDINGS, INC. WORK PLAN LETTER DATED MARCH 16, 2001

GLENN SPRINGS HOLDINGS, INC.

2480 Fortune Dr. - Suite 300 - Lexington, KY 40509

George W. Luxbacher
Director - Operations

Telephone (859) 543-2159
Facsimile (859) 543-2171

March 16, 2001

Ms. Gloria M. Sosa
Site Investigation & Compliance Branch
U.S. EPA, Region II
290 Broadway, 20th Floor
New York, New York 10007-1866

Mr. Craig D. Jackson, P.E.
Technical Support Section
Bureau of Western Remedial Action
Dept. of Environmental Conservation
50 Wolf Road, Room 222
Albany, New York 12233-7010

Re: Hyde Park Remedial Program
Short Duration Pumping Test

Dear Ms. Sosa and Mr. Jackson:

As you know, Miller Springs Remediation Management, Inc. (MSRM) has developed a ground water flow model for the Hyde Park Landfill Site. We presented preliminary modeling results at the review meeting at the CRA offices in Niagara Falls on December 12, 2000. As our understanding of the groundwater flow regime has changed during the development of the model, it has become obvious that our monitoring program will require significant modification to accurately reflect site conditions. As a result, we plan to conduct a short-duration pumping test to aid in developing the monitoring program modifications. More specifically, the purpose of the test will be to gather data that will assist in assessing the capability of the Site groundwater model to simulate correctly hydraulic gradients, and to verify that the model may be applied for the development of a groundwater-monitoring program.

The results of this test will aid in determining the following:

i) if existing monitoring wells are appropriate for use in developing a new monitoring program;
ii) if existing monitoring wells need to be reconstructed to monitor specific flow zones;
iii) if new monitoring wells need to be constructed; or
iv) if the groundwater flow model requires further calibration.

The test is intended to be a rapid and relatively low-cost data collection effort. Based on the results of the data evaluation, recommendations may be made for additional testing.

We believe that the short duration test described above is necessary to support our understanding of the site and ability to simulate ground water flow with a model. Although we are not planning on a purge well shutdown for a time period exceeding the duration that requires notification, we wanted to provide notice of the shutdown and our data collection activities. Although the exact dates of the tests have not been established, we will notify M. Derby and G. Pietraszek as scheduling progresses, should they wish to observe our work.

If you have any questions please feel free to contact me.

Sincerely,

for

George W. Luxbacher, P.E., Ph.D.
Director, Operations

Encl.

c.c.: G. Sosa, EPA – 2
C. Jackson, DEC – 2
M. Derby – 1
G. Pietraszek - 1

WORK PLAN
SHORT-DURATION PUMPING TEST
HYDE PARK RRT PROGRAM

PURPOSE

The purpose of the test is to gather data that will assist in assessing the capability of the Site groundwater model to simulate correctly hydraulic gradients, and to verify that the model may be applied for the development of a groundwater-monitoring program.

The results of this test will aid in determining the following:

i) if existing monitoring wells are appropriate for use in developing a new monitoring program;
ii) if existing monitoring wells need to be reconstructed to monitor specific flow zones;
iii) if new monitoring wells need to be constructed; or
iv) if the groundwater flow model requires further calibration.

The test is intended to be a rapid and relatively low-cost data collection effort. Based on the results of the data evaluation, recommendations may be made for additional testing.

DISCUSSION

A Hyde Park project review meeting was held on December 12, 2000. This meeting was attended by representatives of Glenn Springs Holdings, Inc. (GSHI), United States Environmental Protection Agency (USEPA), New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), S.S. Papadopulos and Associates, Inc. (SSP&A), Sayko Environmental Data Analysis (SEDA) and Conestoga-Rovers and Associates, Inc. (CRA). The principal purpose of this meeting was the presentation of the preliminary results of the Site groundwater model developed by SSP&A. In general, all parties present were satisfied with the preliminary results of the model. However, the USEPA and NYSDEC indicated that regardless of the model results, performance of the containment system would have to be demonstrated with a gradient-monitoring program.

The Site groundwater model will be used to guide the development of a new monitoring program. Therefore, the precision with which the model can simulate gradient changes in response to pumping must be tested. The pumping test described in this Work Plan involves continuous monitoring of several wells and comparing head differentials and the change in head differential between wells under pumping versus non-pumping conditions. Head differentials will be evaluated both in the horizontal and vertical directions. The observed gradient monitoring will be compared to gradients simulated by the model.

Several factors may potentially impact on the test results and the design of an appropriate field-monitoring program, including:

i) most of the existing monitoring wells monitor more than one flow zone and the water levels represent a composite of the zones monitored;
ii) the composite water levels in the observations wells are local composite levels, influenced by localized variability in hydraulic conductivity; and
iii) the model does not simulate individual flow zones monitored by the existing wells.

These factors will be considered in the data evalutation.

SCOPE OF WORK

The following Scope of Work will be conducted under this Work Plan.

Overview

The short-duration pumping test will be conducted as follows:

i) Pre-Shutdown: Continuous level monitoring will begin at the "C" vector gradient monitoring well pair (C1U, C1M, C1L, C2U, C2M, and C2L) 48 hours prior to the shutdown of PW-2M. Water levels will be monitored in the "C" vector wells by hand at 48, 24, and 2 hours prior to shutdown.

ii) Shutdown: PW-2M will be shutdown for 48 hours with continuous monitoring at the "C" vector gradient pair. Water levels will be monitored in the "C" vector wells by hand at 2, 24, and48 hours after shutdown.

iii) Restart: Following the 48 hours of shutdown, PW-2M will be restarted. Continuous water level monitoring will be maintained at the "C" vector gradient pair for an additional 48 hours. Water levels will be monitored in the "C" vector wells by hand at 2, 24, and 48 hours following the restart of pumping.

With the exception of the PW-2M shutdown, normal pumping system operation will be maintained during the entire test period. Pumping rates and levels in all recovery wells will be recorded during the test period and provided in the test report. Either the pre- or post-test monitoring period will occur during a weekend to allow for observation of different aquifer stress conditions on weekdays versus weekends.

Task 1 – Test Operation

Continuous water level monitoring will be accomplished with the use of electronic water level recorders (Telogs). Each of the Telogs will be programmed to record the minimum, maximum and average water level head pressures in real time at 5-minute intervals. The Telogs will use a 10 psi transducer to monitor water level changes. Each of the Telogs will be scaled to record the water level head pressure as feet below top of casing (ft. BTOC) for ease in comparing manual water level measurements to the continuous measurements. Telogs will be installed in each of the monitoring wells using the following procedure:

i) With a laptop computer connected to the Telog and the Telog software displaying the recorders current reading, the pressure transducer will be lowered into the monitoring well. The transducer will be lowered until the current reading of the recorder is either 20% or 7.2 mA (depending on type of transducer) or until the bottom of the well is encountered. In the event that the bottom of the well is encountered the transducer will be raised 2 feet. Once the transducer has been lowered to the appropriate depth the cable will be secured to the well;

ii) The operational parameters for the Telog will be programmed (recorder I.D., time at recorder, values being saved, averaging period, sample rate, excitation time, and storage capacity). The recorder I.D. will be programmed as the name of the monitoring well (e.g., C1U), time at recorder will be programmed to reset, values being saved will be programmed to minimum, maximum, and average, the averaging period will be 5 minutes, the sample rate will be 5 minutes, the excitation time will be 15 milliseconds, and the storage capacity will be set to the largest available;

iii) Once the recorder has been programmed, the current reading will be obtained and a manual water level will be measured in the monitoring well. These two values will be used to scale the recorder data to ft. BTOC;

iv) With the current reading displayed, the transducer will be raised to two different levels. The current reading will be checked (and recorded) at each of these levels to confirm the response of the Telog, the computer display and Telog depth should be within 0.01 feet; and

v) The computer will be disconnected and the next Telog will be installed.

During the entire monitoring period, manual water level measurements will be as described above. At the same time that the water levels are being collected, data from the Telog recorders will be downloaded and saved to a computer disk using either a laptop computer or a Telog data transfer unit (DTU).

Following the completion of each water level monitoring event, the Telog data will be checked to verify that it was downloaded properly and that the recorder is functioning properly. The manual water level measurements will also be checked against the Telog data to verify accuracy of the recorded data.

Water level elevations, pump setpoints, and flow rates will be recorded from each of the operating purge wells for the duration of the test and for one week prior to the start of the test.

Task 2 – Model Simulations

SSP&A will use the pumping rates from the purge wells and water levels collected from the purge wells and observation wells during the test period to develop two simulations of groundwater conditions. The first simulation will consider steady conditions preceding the shutdown of PW-2M. The second simulation will consider transient conditions during the shutdown and restart periods to predict water level changes between pumping and non-pumping conditions.

Task 3 – Data Evaluation

The objective of the test is to evaluate the ability of the model to simulate gradient changes resulting from pumping. The test results will be evaluated by comparing the head differentials between observations measured during the short-duration test to head differentials predicted by the model simulations for both pumping and non-pumping conditions. Conceptually, the head differential between two wells is constant for one pumping condition. When pumping conditions change, the head relationship between the wells will be reestablished at a new constant head differential. The goal of the evaluation will be to determine the change in head differential between stable conditions before shutdown and after shutdown.

The following information will be developed:

- Hydrographs for the duration of the test, including the continuous levels and the hand measurements (accuracy of the Telog data will be assessed by comparison with hand measurements, and the magnitude of ambient fluctuations in water levels can be observed);
- Graphs for the head difference between two wells, e.g. C1M and C2M, versus time (change in head differential will be determined from these graphs).
- A table comparing the observed change in head differential with the change predicted by the model.

Task 4 - Reporting

A draft report summarizing the data evaluation will be prepared and distributed to the MSRM project team for review. Based on a team review of the test results, conclusions and recommendations will be developed. A final report will be prepared including these conclusions and recommendations.

RESOURCES

Personnel from CRA, MSRM, SEDA, and SSP&A will perform the activities described above. The recommended allocation of resources for each of the activities is presented below.

Task	*Description*	*Lead*	*Support*
1.	Test Operation	CRA	MSRM
2.	Model Simulations	SSP&A	
3.	Data Evaluation	SEDA	CRA/SSP&A
4.	Reporting	SEDA	MSRM/CRA/SSP&A

All water level and Telog data will be provided to the project team in an electronic data format.

SCHEDULE

It is anticipated that all associated work involved with this pumping test can be completed within four weeks from the start of the test. The Telog installation and data collection portion of this pumping test and model simulations will be completed in one week. The data evaluation, including graphing of the data and head differential determinations is expected to require one week. The data analysis and report preparation is expected to require between one and two weeks, depending on the test results.

APPENDIX E

SHUTDOWN MONITORING PROGRAM WORK PLAN

Hyde Park Landfill Site
Niagara Falls, New York

Work Plan for Monitoring of Groundwater Levels During the System Shutdown

Prepared For:

Miller Springs Remediation Management Inc. and
Glenn Springs Holdings, Inc.

Prepared By:

S.S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water Resource Consultants

April 12, 2001

207 King Street South, Waterloo, Ontario N2J 1R1 (519) 579-2100

Table of Contents

Page

List of Figures

List of Tables

Section 1
Introduction

The bedrock purge well system at the Hyde Park Landfill will be shutdown on May 3, 2001 for approximately two weeks. The system is being shutdown as part of the upgrade of the water treatment capacity to 400 gpm. The system shutdown represents an invaluable opportunity to collect data that can be used to support further evaluation of SSP&A's groundwater flow model of the Site. This document outlines a plan for monitoring hydrogeologic conditions during the shutdown period.

Purpose of monitoring groundwater levels during the shutdown period

The extended shutdown of the bedrock purge well system represents an unprecedented opportunity to obtain a detailed impression of water levels in the absence of pumping. Pre-pumping scenarios were considered during the model calibration; however, many observation wells have been added to the monitoring network since the last complete data set was collected, January 25, 1994. The January 1994 data set included water level measurements from 69 wells (23 Upper; 24 Middle; 22 Lower). In contrast, the monthly water level monitoring program presently includes 116 bedrock wells (45 Upper; 32 Middle; 39 Lower). We should be able to obtain a much more detailed characterization of water level changes caused by the pumping system.

Continuous monitoring of water levels in a network of wells during the shutdown period will also provide important information to gauge the significance of transient flow processes occurring at the Site, for example the effects of fluctuations in the NYPA forebay.

The water level data obtained during the shutdown period will provide a unique opportunity for a comprehensive test of the groundwater model of the Site. The data will be important for confirming the reliability of the model.

Immediate objectives of the shutdown monitoring

The immediate objectives of the shutdown monitoring will be:

- to collect data that can be used to assess the predictive capability of the model; and
- to ensure that the data collected are reliable.

Outline of the work plan

The Work Plan is divided into five main sections:

- Selection of observation wells
- Measurements with pressure transducers
- Measurements of other parameters
- Shutdown and restart pumping sequences
- Assignment of responsibilities

Section 2
Selection of Observation Wells

Groundwater levels will be measured by a combination of manual (electric tape) and continuous (pressure transducer) methods. The monitoring network and combination of monitoring methods has been designed to enable both detailed steady-state and transient interpretations of the shutdown data.

1. Wells for manual water level monitoring

Water levels are measured monthly at approximately 120 wells at the Site. The water levels are measured manually with electric tapes. We refer to the monthly measurements as "comprehensive rounds". The most recent rounds typically include 116 observation wells: 45 Upper wells, 32 Middle wells, and 39 Lower wells.

Three comprehensive rounds of water levels be taken over the course of the shutdown period: one round before the system shutdown, one round during the shutdown period, and one round after the system restart. Results from monthly comprehensive water level measurement rounds were reported for January 11, February 1, and March 1, 2001. We anticipate that one of the three rounds will be considered as the monthly round for May 2001. Therefore, our work plan effectively requires two additional comprehensive rounds.

Intensive manual measurement of water levels

In addition to the three comprehensive rounds of manual water level measurements, a subset of the wells will be monitored intensively. Water levels in these wells will be measured twice daily. We have identified a total of 47 wells to be monitored intensively: 22 Upper, 9 Middle; and 16 Lower bedrock wells. The wells are listed in the following Tables 1, 2 and 3. The locations of the wells to be monitored intensively manually are shown on Figures 1, 2 and 3 for the Upper, Middle, and Lower bedrock zones, respectively.

Table 1: Upper Monitoring Wells for Intensive Manual Monitoring

Bedrock Zone	Number	Well
Upper	1	AGW-1U
	2	AGW-2U
	3	B2U
	4	D2U
	5	E1U
	6	F2U
	7	G1U
	8	B1U
	9	C1U
	10	E3U
	11	E4U
	12	F4U
	13	G3U
	14	H2U
	15	H3U
	16	J1U
	17	PMW-1U
	18	PMW-2U
	19	PMW-3U
	20	A1U
	21	ABP-3
	22	C2U

Table 2: Middle Monitoring Wells for Intensive Manual Monitoring

Bedrock Zone	Number	Well
Middle	1	AGW-2M
	2	B2M
	3	C2M
	4	F2M
	5	B1M
	6	D2M
	7	E3M
	8	F4M
	9	G1M

Table 3: Lower Monitoring Wells for Intensive Manual Monitoring

Bedrock Zone	Number	Well
Lower	1	AGW-1L
	2	AGW-2L
	3	B2L
	4	D2L
	5	E1L
	6	E3L
	7	F2L
	8	F4L
	9	H2L
	10	B1L
	11	E4L
	12	G1L
	13	G3L
	14	H3L
	15	J1L
	16	PMW-1L

2. Wells for continuous water level monitoring

We propose monitoring continuous water levels at 14 wells. The wells selected for continuous monitoring are listed in Table 4. The locations of the wells to be monitored continuously with transducers are shown on Figures 4, and 5 for the Middle and Lower bedrock zones.

Table 4: Monitoring Wells for Continuous Monitoring

Bedrock Zone	Number	Well
Middle	1	C1M
Middle	2	E1M
Middle	3	E4M
Middle	4	PMW-3M
Middle	5	G3M
Middle	6	H1M
Middle	7	J1M
Middle	8	J2M
Middle	9	AGW-1M
Lower	10	C1L
Lower	11	C2L
Lower	12	D4L
Lower	13	E2L
Lower	14	PMW-3L

Notes on the selection of wells for continuous monitoring

1. In general, the wells we have selected are arranged along four rays, directed outwards from the landfill. Ray 1 will monitor water level changes between the Site and the NYPA forebay (J1M, J2M, AGW-1M). Ray 2 will monitor water level changes between the Site and the Niagara River gorge (C1M, C1L, C2M, C2L, ABP-7). We had previously considered including BC3M along this ray, but our review of the data from this well suggests that it responds slowly to pumping so that its transient data may not be useful. Rays 3 and 4 will monitor water level changes in directions upgradient from the Site (Ray 3: E4M, E3M, E1M, E2M, E2L; Ray 4: PMW-3M, PMW-3L, H1M, H2M).

2. In addition to the wells along the rays, we have specified continuous monitoring at D4L and G3M. This will ensure that the representative monitoring well that is closest to each of the Middle and Lower bedrock purge wells will be monitored continuously.

3. Wells identified by SEDA as "non-representative" have been avoided.

4. Continuous monitoring at Upper wells is not deemed necessary due to limited responses to pumping observed during previous Upper purge well testing.

5. The water levels in the purge wells are presently monitored continuously. It is our understanding that there will be no power available for these monitoring points when the system is shutdown. The water levels in the purge wells will be measured manually twice each day of the shutdown period.

6. Water levels are currently monitored continuously at two of the wells listed in Table 1, C1M and C1L. Therefore, our monitoring plan requires 17 additional Telog transducers. Water levels will continue to be monitored continuously at C1U, BC3U, BC3M, and BC3L. Jon Williams, CRA, has indicated to us that he has recently made sure that the data from these wells are downloaded monthly. The data from these wells will be downloaded prior to the start of the shutdown test and during the middle of the shutdown interval.

Duration and frequency of continuous water level monitoring

The pressure transducers will be installed and begin monitoring at least one week prior to shutdown. Continuous monitoring should be continued for at least a week after pumping resumes.

During the period of intensive monitoring, transducer readings should be recorded every 5 minutes.

Section 3
Measurements with Pressure Transducers

Continuous water level monitoring will be carried out with electronic water level recorders (Telogs). Each of the Telogs will be programmed to record the minimum, maximum, and average water pressures at 5-minute intervals. The Telogs will use 10-psi pressure transducers to monitor the height of water above the transducer tip. The Telogs recordings will be scaled so that the pressure is reported in feet of water below the top of each well casing. This will simplify comparing the continuous and manual water levels.

1. Installation of pressure transducers

The Telogs will be installed in each of the monitoring wells with the following procedure developed by J. Williams, CRA:

1. With a laptop computer connected to the Telog, and the Telog software displaying the recorder's current reading, the pressure transducer will be lowered into the monitoring well. The transducer will be lowered until the current reading of the recorder is either 29% or 7.2 ma (depending on the transducer type), or until the bottom of the well is reached. If the bottom of the well is reached then the transducer will be raised 2 feet. Once the transducer has been lowered to the appropriate depth, the cable will be secured to the well.

2. The following operational parameters for the Telog will be programmed: recorder I.D., time at recorder, values being saved, averaging period, sample rate, excitation time, and storage capacity.
   - The recorder I.D. will be programmed as the name of the monitoring well (for example, C1U);
   - Time at the recorder will be programmed to reset;
   - Values being saved will be programmed to minimum, maximum, and average;
   - The averaging period will be 5 minutes;
   - The sample rate will be 5 minutes;
   - The excitation time will be 15 milliseconds; and
   - The storage capacity will be set to the largest available.

3. Once the recorder has been programmed, the current reading will be obtained and a manual water level will be measured in the monitoring well. These two values will be used to scale the recorder data to feet below top of casing (ft BTOC). The next step will be the first of the quality assurance measures described in the next section.

2. Quality assurance of pressure transducer measurements

To ensure the reliability of the continuous water level data, it is essential that pressure transducer calibrations be checked in the field. The initial check will be performed after the transducer has been secured to the well and the recorder data scaled to ft BTOC. Additional quality assurance measures are described below.

1. After the recorder data has been scaled, the transducer will be raised to two different levels. The current reading will be checked and recorded at each of these levels to confirm the response of the Telog. The computer display and Telog depth should be within 0.01 ft. After the reliability of the Telog is confirmed, the computer will be disconnected and the next Telog will be installed.

2. The Telog data will be downloaded daily. At the time the Telog data are downloaded, the level in the well will be checked manually with an electric tape.

3. Following the downloading of the Telog data, the data will be checked to verify that it was recorded correctly and that the recorder is functioning properly.

Section 4
Measurements of Other Parameters

Four parameters in addition to water levels and pumping rates will be monitored during the shutdown test:

- Precipitation;
- Barometric pressure;
- Discharges at the gorge seeps; and
- Water levels in the NYPA forebay.

1. Precipitation

Short-term precipitation data are important for identifying and correcting for trends in the water levels in shallow wells and discharges at seep. CRA have helped us to maintain long-term monthly precipitation records for Buffalo (we have coordinated with Scott Bruce in the Waterloo office). We have recently been provided with daily data from the Site weather station; these data start September 27, 2000. The daily measurements will be continued through the shutdown test.

2. Barometric pressure

Barometric pressure must be monitored continuously at the Site during the shutdown test. Barometric pressure fluctuations affect water levels in wells; if they are not accounted for then their influence can confound the interpretations of water level differences caused by changes in pumping. Barometric pressures are generally monitored by “sacrificing” one of the pressure transducers by suspending below the top of the casing of a well, above the water surface. If the weather station is capable of providing a continuous record of barometric pressure then it will not be necessary to use a transducer.

3. Discharges at the gorge seeps

It is our understanding that discharges are currently estimated at four gorge seeps, on a monthly basis. In order to assess qualitatively the effects of purge well pumping, the discharge at the seeps will be estimated three times during the shutdown test.

Measurement 1: Prior to the shutdown of the purge wells.

Measurement 2: During the middle of the shutdown period.

Measurement 3: One week after the restart of the purge wells.

4. Water levels in the NYPA forebay

Water levels in the NYPA forebay are monitored continuously. Jon Williams will obtain the data during the shutdown period from NYPA.

Section 5
Shutdown and Restart Pumping Sequences

1. Shutdown sequence

We understand that the pumping system will be shutdown essentially instantaneously. This approach will ensure that the data are not affected by complexities associated with a phased shutdown.

2. Restart sequence

It is crucial that the restart be monitored so that the schedule of operations and pumping data are recorded for our subsequent use. The wells be reactivated in the following order:

Day	Active wells
1	**PW-1L**
2	PW-1L, **PW-2L**
3	PW-1L, PW-2L, **PW-3L**
4	PW-1L, PW-2L, PW-3L, **PW-2M**
5	PW-1L, PW-2L, PW-3L, PW-2M, **PW-3M**, **PW-4M**, **PW-6MR**
6	PW-1L, PW-2L, PW-3L, PW-2M, PW-3M, PW-4M, PW-6MR, **PW-1U, PW-2UR, PW-4U, PW-5UR, PW-6UR**

The wells indicated in bold are added on each successive day.

Section 6
Assignment of Responsibilities

1. Overall responsibility

The successful implementation of the shutdown monitoring will require the close cooperation of staff from GHSI/MSRI, CRA, SEDA, and SSP&A. However, the project does require a leader, and Steve Sayko, SEDA, be assigned overall responsibility for the shutdown monitoring. SSP&A will work diligently with Mr. Sayko, but we are specialist groundwater modelers and we defer to his expertise in the collection of hydrogeologic data. Mr. Sayko will be the lead contact for agency observers, assisted by SSP&A.

2. Field operations

The field activities will include:

- Shutting down and restarting the pumping system;
- Manual measurements of water levels;
- Installation and verification of Telog transducers;
- Downloading and checking of Telog data.

CRA will be responsible for the scheduling of field operations. CRA will be responsible for collecting and programming the Telog transducers. SEDA and SSP&A will be on-site to assist in the calibration of the transducers. Jon Williams will coordinate with GHSI/MSRI personnel for scheduling the rounds of water level measurements.

3. Quality assurance

The planned shutdown of the purge well system represents a unique opportunity to collect data for Site characterization and assessment of the groundwater model. We believe that it is essential that we not only take full advantage of this opportunity, but that we ensure that the data being collected are reliable. This will require vigilant checking. CRA, SEDA, and SSP&A will work together to achieve near real-time reduction of the monitoring data. SSP&A will assist Jon Williams in data compilation and checking of downloads from the Telog transducers.

SSP&A will be on-site to assist in the installation of the Telogs, and at the start of the shutdown and restart of the pumping systems. SSP&A will also be available to visit the Site daily. We expect that SEDA will assist in the installation of the Telogs, and will visit the Site at least once during the shutdown period.

4. Data interpretation

SEDA and SSP&A will examine the test data to develop the following information:

- Hydrographs for the duration of the test, including the continuous and manual measurements;
- Accuracy assessments of the Telogs; and
- Plots of head profiles at selected well pairs.

SSP&A will develop simulations of the shutdown and restart phases of the test, and will use the results to:

- Prepare plots of simulated water levels during the shutdown period, with the observations superimposed;
- Prepare plots comparing observed and simulated water levels;
- Prepare plots comparing observed and simulated recoveries and drawdowns; and
- Assemble tables comparing the observed and simulated changes in water levels at the individual observations wells.

SEDA and SSP&A will prepare a draft report summarizing the data collection and evaluation. The draft report will be distributed to the Hyde Park Technical Team for review. Based on a team review of the results and analyses, conclusions and recommendations will be developed. A final report will be prepared after the team review.

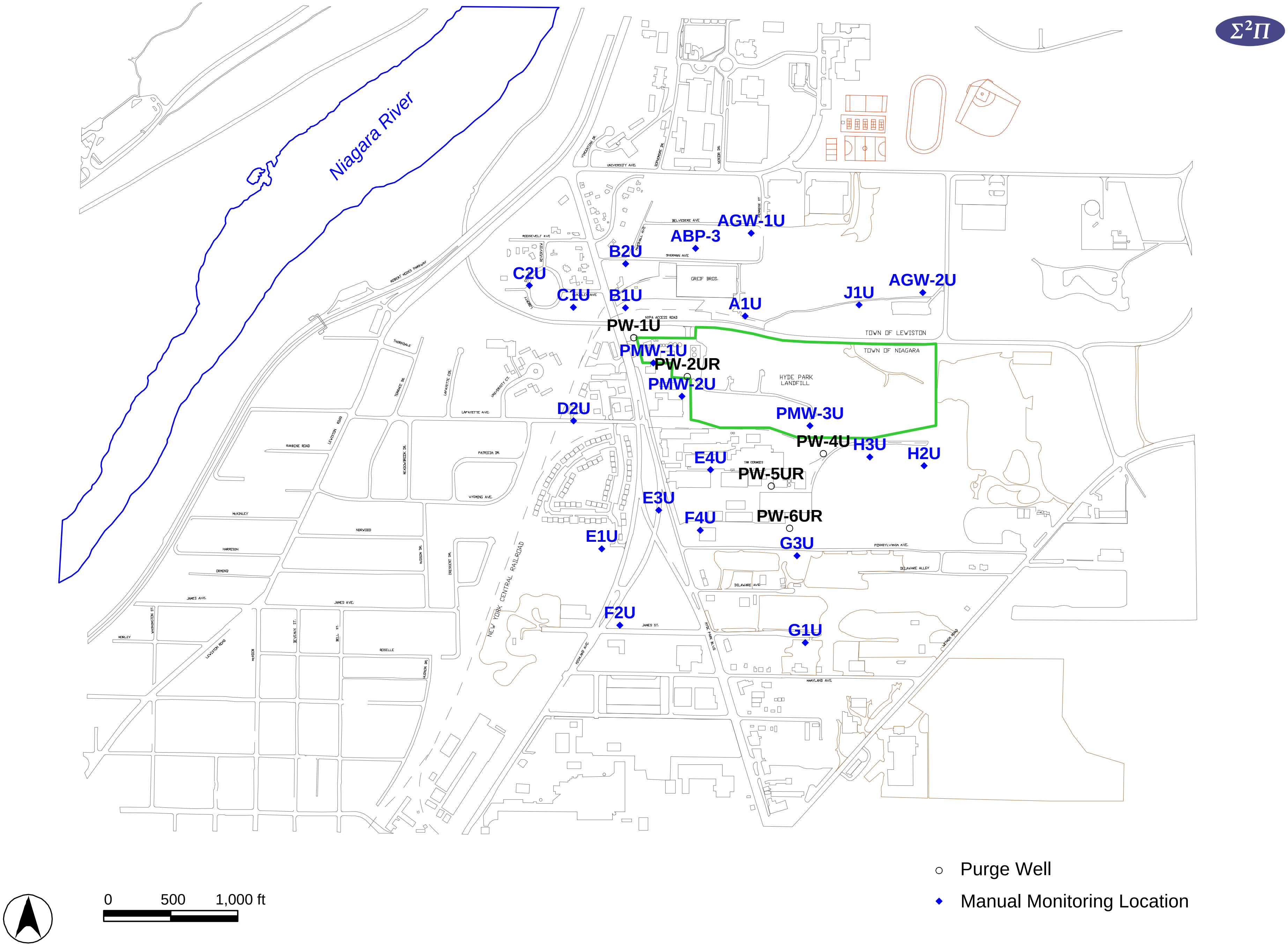


Figure 1 - Upper Wells for Intensive Manual Monitoring

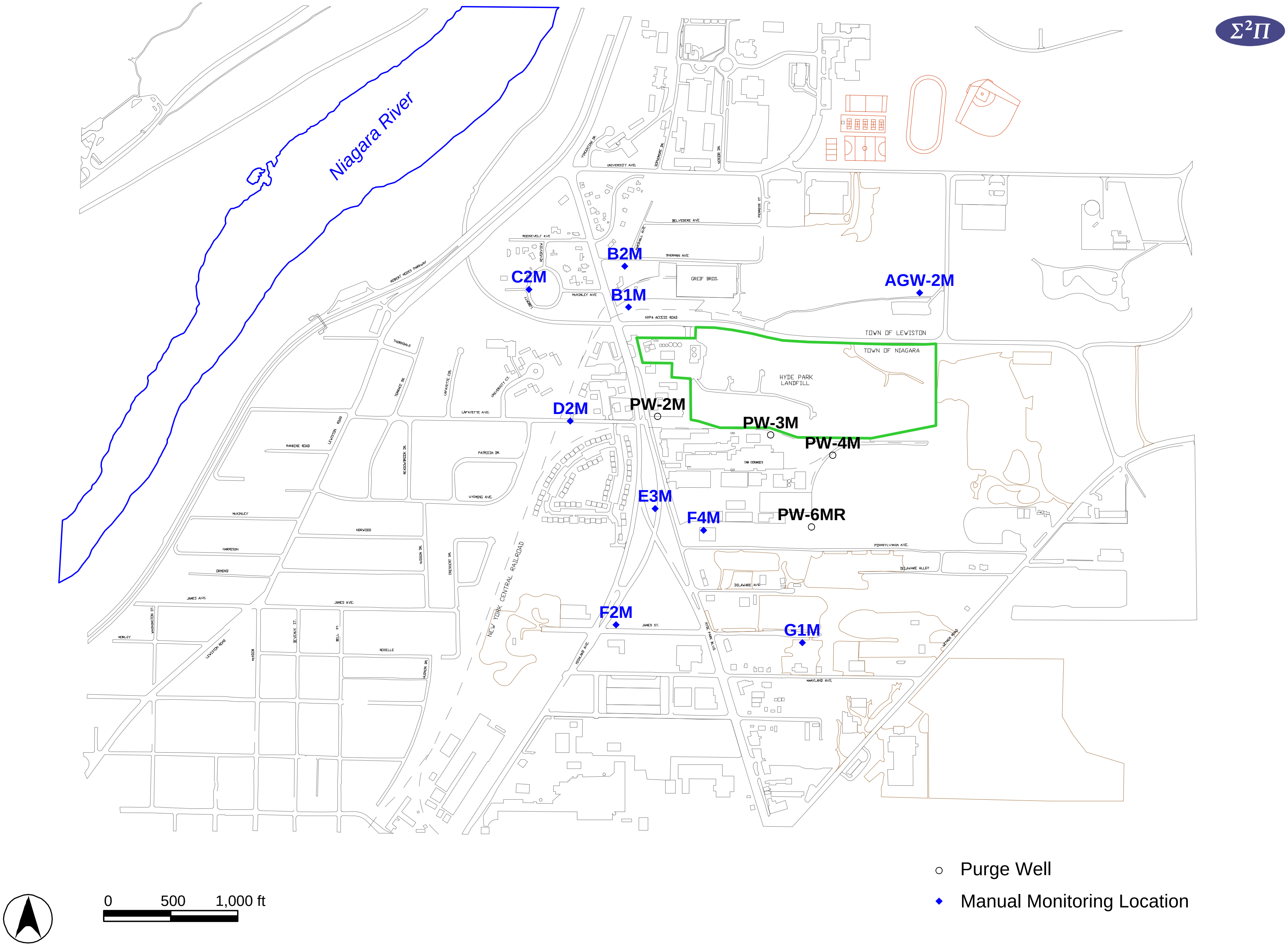


Figure 2 - Middle Wells for Intensive Manual Monitoring

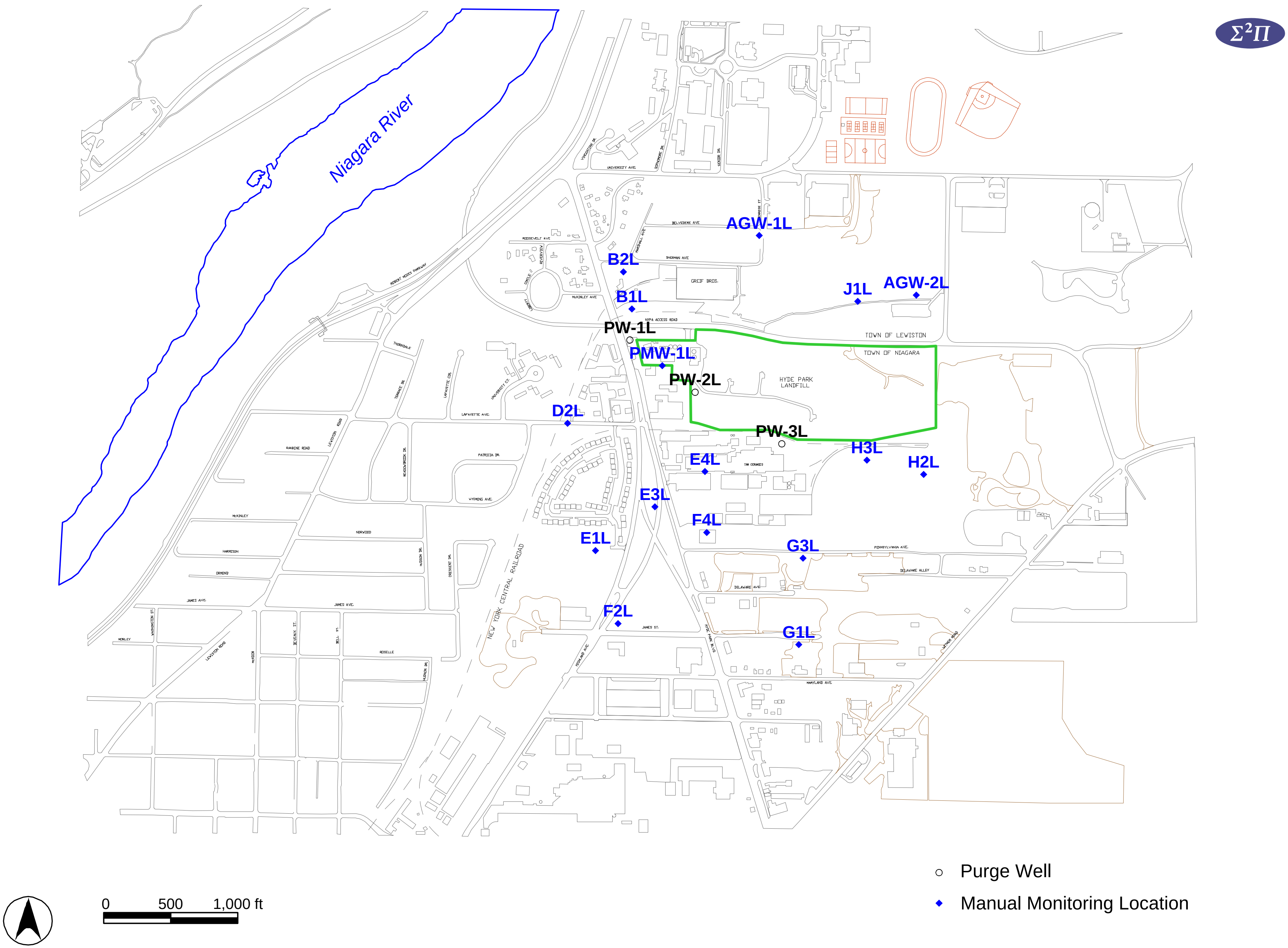


Figure 3 - Lower Wells for Intensive Manual Monitoring

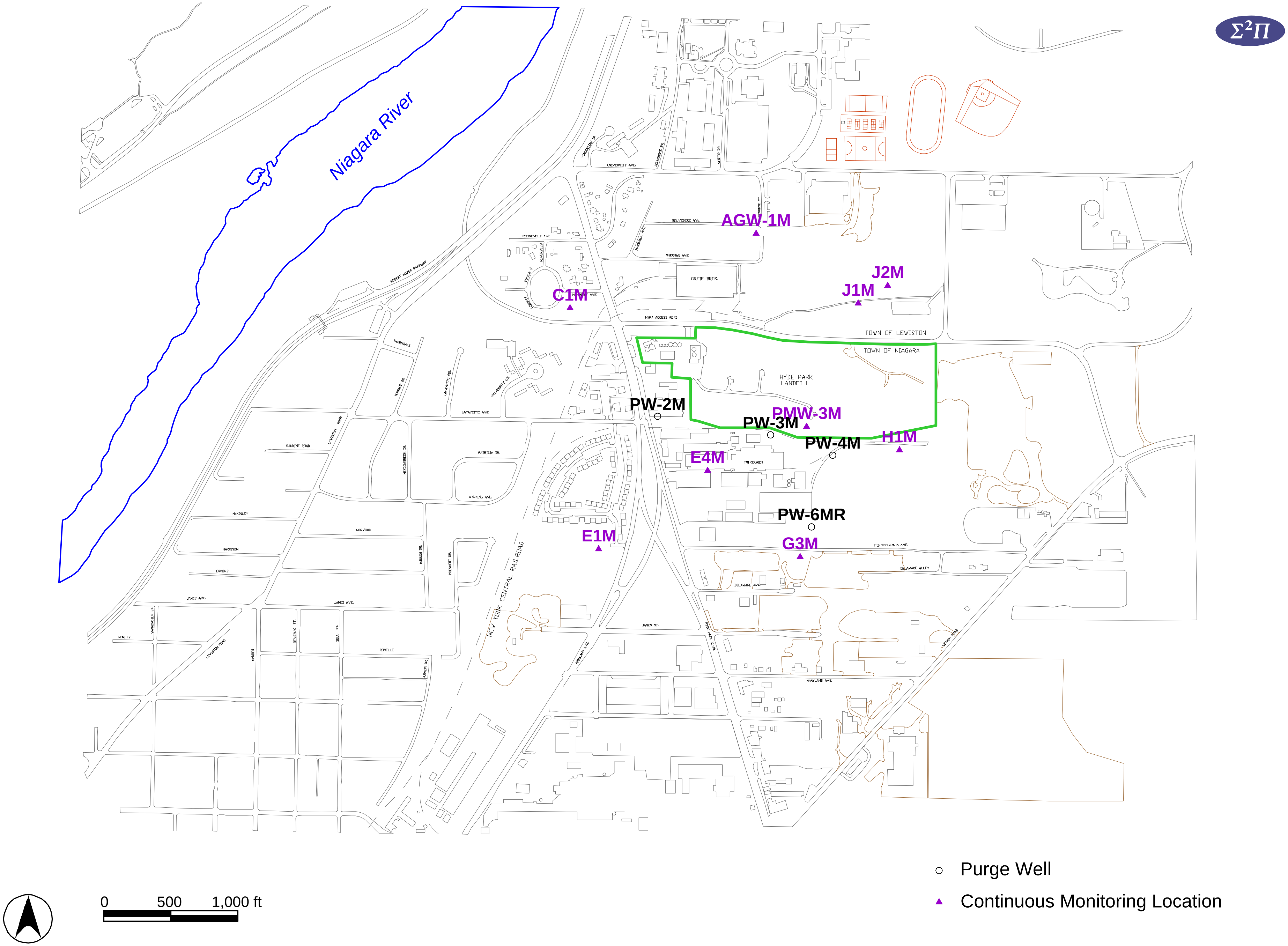


Figure 4 - Middle Wells for Continuous Monitoring

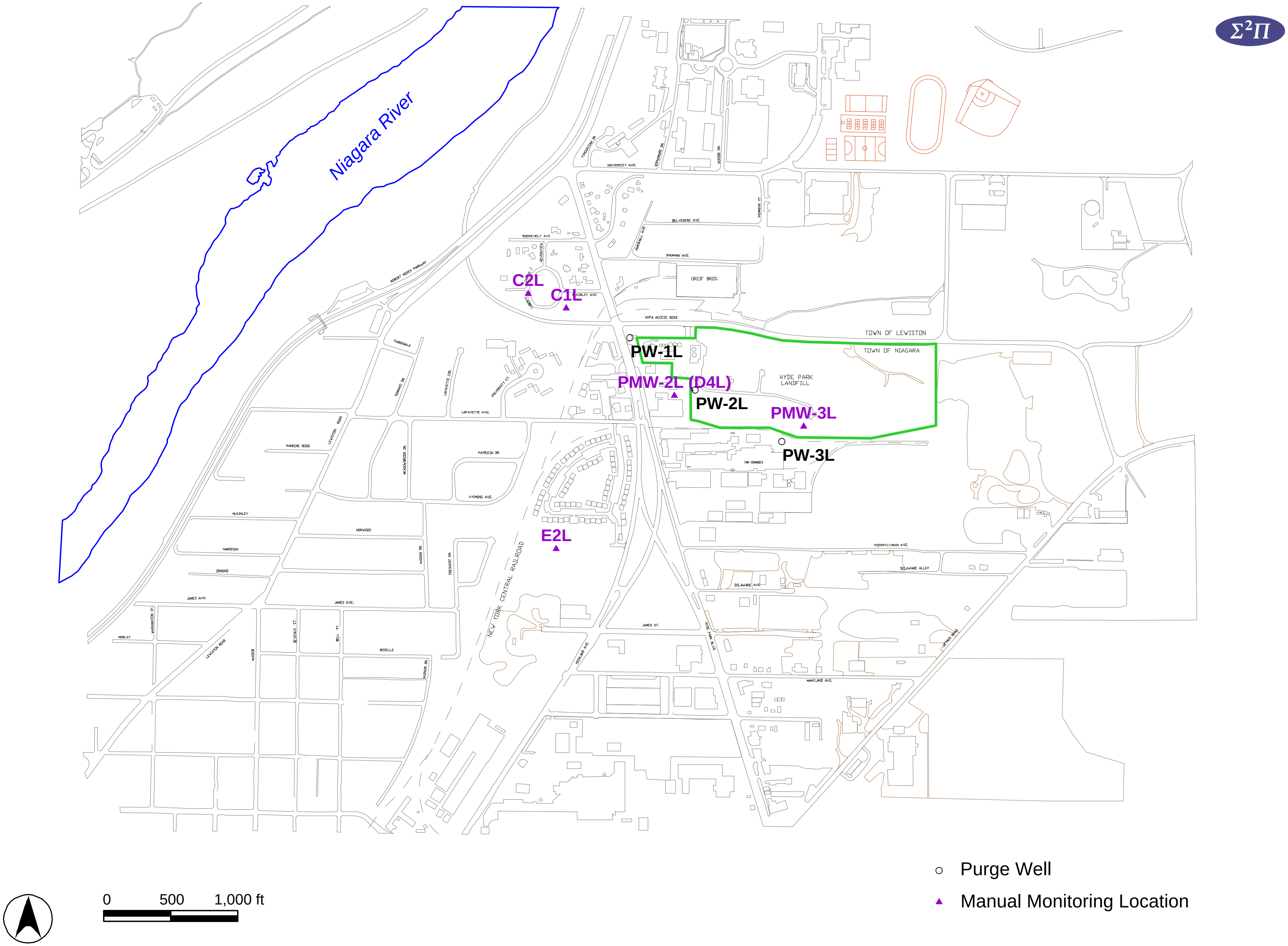


Figure 5 - Lower Wells for Continuous Monitoring