GLENN SPRINGS HOLDINGS, INC.

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

George Luxbacher ***Telephone (606) 543-2159***
Director - Operations ***Facsimile (606) 543-2171***

December 9, 2002

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

Mr. Craig D. Jackson, P.E.
Technical Support Section
NYSDEC, Bureau of Western Remedial Action
50 Wolf Road, Room 222
Albany, NY 12233-7010

Re: Hyde Park Remedial Program
Bedrock and Overburden Monitoring Programs
First Quarter 2002 Monitoring Report

Dear Ms. Sosa and Mr. Jackson:

Pursuant to the report entitled "Future Monitoring and Assessment Requirements", attached please find the "Quarterly Monitoring Report – First Quarter 2002" for the bedrock and overburden monitoring programs.

An electronic copy of the full text, figures, tables, statistical summaries, and historic data associated with this report are included on the attached CD as Adobe Acrobat pdf files.

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

Sincerely,

George W. Luxbacher, P.E., Ph.D.
Vice President, Operations

Encl.
Cc: G. Sosa, EPA – 3
C. Jackson, DEC – 2
P. Buechi, DEC – 1
M. Forcucci, DOH – 1
M. Derby, TAMS – 1
D. Tubridy, MSRM – 1
S. Sayko, SEI - 1
R. Passmore, GSHI - 1
B. Downie, MSRM - 1
S. Parkhill, MSRM - 1
J. Williams, CRA - 1
J. Thornton, CRA - 1
Correspondence File

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

QUARTERLY MONITORING REPORT
FIRST QUARTER -- 2002

- **NAPL AND APL PLUME CONTAINMENT SYSTEMS**
- **OVERBURDEN BARRIER COLLECTION SYSTEM**
- **RESIDENTIAL COMMUNITY MONITORING PROGRAM**
- **LEACHATE TREATMENT SYSTEM**
- **NAPL ACCUMULATION AND RECOVERY**

HYDE PARK RRT PROGRAM
NIAGARA FALLS, NEW YORK

PRINTED ON:

DECEMBER 9, 2002

DECEMBER 2002
REF. NO. 1069 (317)

TABLE OF CONTENTS

Page

LIST OF FIGURES
(Following Text)

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

LIST OF TABLES
(Following Text)

LIST OF APPENDICES
(Following Report)

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. Monitoring reports for the NAPL and APL Plume Containment Systems as well as the OBCS have been submitted quarterly 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) "Long-Term Monitoring Manual, Hydraulic (Water Levels), Physical (NAPL Presence-Seeps), Chemical (Groundwater Sampling), Hyde Park Landfill Site", dated October 9, 1998.

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

This report has been prepared to present monitoring data collected during the first quarter (January through March) 2002. 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 operating 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 of the Site groundwater flow system are also presented in Section 2.0.
- **Section 3.0 APL Plume Containment System:** Section 3.0 presents APL purge well operating 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 of the APL Plume Containment System are also presented in Section 3.0.

- **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 4.0.
- **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 objective of the NAPL Plume Containment System as stated in the RRT is to design, install and monitor a system to contain, to the extent practicable, NAPL and APL within the NAPL Plume found in the Lockport Bedrock and to maximize collection of contained 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 17 NAPL Plume Containment Purge Wells (PWs) as shown on Figure 2.1 and 43 performance monitoring wells. The monitoring wells are installed at bedrock "unit" specific depths, or zones, within the Lockport bedrock formation. The zones are designated as upper, middle, and lower. The locations of the performance monitoring wells in the upper, middle and lower bedrock zones are shown on Figures 2.2 through 2.4, respectively.

2.1 PURGE WELL OPERATIONS

The PW system was generally operated continuously during the first quarter of 2002. A summary of the "shut-down" periods for the PWs is noted in Table 2.1.

Maintenance of the PW system was required during the first quarter of 2002 as noted below.

- PW-4M, pump and motor replaced twice in January 2002 due to plugging.
- PW-5UR, pump and motor replaced on February 4, 2002 due to plugging.
- PW-9U, pump and motor removed on February 20, 2002 to deepen well.
- PW-10U, pump and motor removed on February 20, 2002 to deepen well.
- PW-8U, pump and motor replaced on February 25, 2002.

The average operating pumping rates and set point elevations at each of the bedrock purge wells during the first quarter of 2002 are presented in Table 2.1.

The average operating pumping rate of the NAPL Plume Containment System during operation over the first quarter was 72.2 GPM, this flow rate represents an increase of approximately 15 GPM over the pumping rate from previous quarters. This increase in pumping rate is a result of the addition of the 5 new purge wells installed in 2001.

During the first quarter of 2002 a total of 8,928,797 gallons of groundwater were pumped from the NAPL Plume Containment System purge wells and treated. Treatment of the pumped groundwater resulted in the removal of approximately 288 pounds of chemical mass.

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 data to verify the effective performance of the NAPL Plume Containment System.

The hydraulic monitoring and data evaluation performed during this quarter are described in the following subsections.

2.2.1.1 WATER LEVEL MEASUREMENTS

Routine hydraulic monitoring was performed on January 10, February 28, and March 20, 2002 during PW operation. The measured water level depths were recorded on field data sheets and then entered into a Site water level database where they were 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 CD under the filename HIST.pdf.

2.2.1.2 HYDRAULIC GRADIENT EVALUATION

The RRT requires that the performance of the NAPL Plume 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, the groundwater modeling study, and recent characterization activities it was determined that the hydraulic gradient evaluation described in the RRT is not applicable in its present form. The majority of wells in the current monitoring network intercept multiple flow zones; therefore, water level measurements obtained from these wells represent weighted averages of the water levels in the individual intercepted flow zones. Nevertheless, the hydraulic gradient evaluation was conducted to meet the requirements of the RRT. MSRM/GSHI are continuing to evaluate monitoring programs that would be applicable, practical and satisfactory to the Governments.

Horizontal hydraulic gradient head differentials were calculated using the water level elevation data collected during the January, February and March 2002 hydraulic monitoring events. 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 representative well pairs in the three bedrock zones.

A summary of the horizontal hydraulic gradients recorded for the first quarter 2002 is provided below.

Upper Bedrock Zone

All monitoring wells in the upper bedrock zone have been used in this quarter's gradient evaluations.

The monitoring well pairs that are used for the gradient evaluations in the upper bedrock zone are: 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 eight of the nine monitoring well pairs (Vectors A, B, D, E, F, G, H, and J) during the first quarter 2002. The A-vector and the E-vector each exhibited inward gradients during the January monitoring event. The B, D, F, G, H, and J-vectors exhibited inward gradients during each of the three monitoring events. The C-vector did not exhibit any inward gradients during the three monitoring events.

Middle Bedrock Zone

All monitoring wells in the middle bedrock zone have been used for the gradient evaluations 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: 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 of 2002. The B-vector and the J-vector each exhibited inward hydraulic gradients during the January and March hydraulic monitoring events. The D-vector exhibited inward hydraulic gradients during the January and February monitoring events. The C, F, G, and H-vectors exhibited inward hydraulic gradients during each of the three monitoring events. The E-vector did not exhibit an inward hydraulic gradient during any of the three monitoring events.

Lower Bedrock Zone

The Non-Representative Wells Investigation classified lower bedrock zone monitoring wells G3L, H3L, H4L, J3L, and J4L as non-representative. Therefore, 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: 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 along the B and D-vectors during the first quarter of 2002. Inward hydraulic gradients were observed along the B-vector during each of the three monitoring events and along the D-vector during the February monitoring event. The C-vector did not exhibit an inward hydraulic gradient during any of the three monitoring events.

2.2.1.3 GROUNDWATER CAPTURE SIMULATION

The First Quarter 2001 Monitoring Report presented an assessment of capture using the Site groundwater flow model and the average flow rate data for the quarter. This assessment was not performed for the second and third quarters of 2001 due to the limited pumping that occurred as a result of the treatment plant upgrade during the second quarter and the geophysical logging program that was conducted during the third quarter.

During the fourth quarter of 2001 installation of five new NAPL Plume Containment System purge wells was completed. In December, commissioning and testing of each of these purge wells commenced with continuous operation of each individual purge well occurring following startup. It was anticipated that the commissioning and startups of these new purge wells would be completed during the fourth quarter and a capture simulation would be performed using the Site groundwater flow model. Three of the five new purge wells were started during the fourth quarter and a decision was made to wait to start the remaining two purge wells prior to performing the capture simulation. The remaining two purge wells were started during the first quarter of 2002, therefore, the capture simulation was also performed during the first quarter of 2002. A report of the results of the capture simulation was submitted to the agencies and is also contained in Appendix A of this report.

2.2.2 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 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. During the first quarter of 2002, 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 cumulative findings of the NAPL presence checks performed between 1998 and this reporting period.

2.2.2.2 NAPL ACCUMULATION 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 during the first quarter was made. Approximately 14.5 million gallons of APL were removed from the bedrock purge wells. During the same period, 752 gallons of NAPL were removed from the bedrock purge wells. The current NAPL / APL ratio (0.000052) and the ratios calculated from previous quarters are presented in Table 2.4. There is no apparent trend in the APL / NAPL ratio data.

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 monitoring 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 were used for the quarterly comparisons presented in Section 2.2.3.2 of this report. The analytical data are also used in the statistical analyses presented in Section 2.2.3.3 of this report. The chemical monitoring was conducted between February 13 and 22, 2002. A well purging and sampling summary for the February 2002 sampling event is presented in Table 2.5.

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 and disposal. Table 2.5 also 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 2002 chemical monitoring event are summarized in Table 2.6. 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.

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 of the NAPL Plume Containment Effectiveness Parameters (phenol, benzoic acid, chlorendic acid, total chlorobenzoic acid, and total organic halides [TOX]), was performed using the first quarter 2002 analytical data from the outer well of each gradient pair.

The first quarter 2002 groundwater monitoring data were assessed for trends (on an individual well basis) using either the Mann-Kendall trend test (if <50 percent non-detects) or logistic regression (for 50-99 percent non-detects). For the purposes of the first quarter 2002 data analysis, the analytical data from the 9 most recent sampling events (i.e. from February 2000 to present) were used. Analytes that were not detected at a given well (i.e., 100 percent non-detects) between February 2000 and the present were not evaluated. The results of the trend analyses are presented in Table 2.7. A memorandum presenting the first quarter 2002 statistical analyses, including descriptions of the statistical methods and concentration vs. time plots for each of the wells evaluated is contained in Appendix B of this report.

One statistically significant (P>0.05) increasing trend was identified, total chlorobenzoic acid at J2M. During the fourth quarter of 2001 this same trend was identified. Three statistically significant decreasing trends were identified; the decreasing trends were for TOX at B1U, C1U and C1M.

Table 2.8 presents a comparison of the statistical trend analyses performed using data from each quarter of 2001 and the first quarter of 2002. Only wells/analytes with a significant trend identified during at least one evaluation are presented. In 16 cases, the trends changed from statistically significantly decreasing to not significant or vice versa between the five quarters. Of note, two trends that were identified as statistically significantly increasing during the fourth quarter of 2001; chlorendic acid at B1U and total chlorobenzoic acid at J3L, have been identified as having no trend during the first quarter of 2002. Also of note, the detection of chemistry along the J-vector roughly corresponds to drilling by Niagara University and the New York Power Authority in the J-vector area. This drilling may have provided vertical pathways for chemical migration from the upper bedrock zone to the middle and lower bedrock zones for a brief period of time.

The variability in the data as shown on Table 2.8 and the appearance of a few statistically increasing parameters is likely an effect of the shutdown tests as well as the movement of contaminants due to the operation of the additional purge wells. Further evaluations will be provided in future Quarterly Reports.

2.3 NON-ROUTINE INVESTIGATIONS AND FIELD ACTIVITIES

Field activities associated with non-routine monitoring that were completed during the first quarter of 2002 with respect to the NAPL Plume Containment System were:

i) Commissioning of the newly installed Purge wells continued during the first quarter 2002. The commissioning of the purge wells was performed in accordance with the Work Plan entitled "Work Plan for Data Collection During the Start of Operation of the 2001 Purge Wells", dated November 25, 2001. During the first quarter 2002, two purge wells (PW-7U and PW-8M) were commissioned and subsequently placed into active operation.

ii) Two purge wells (PW-9U and PW-10U) were deepened during the first quarter of 2002. It was determined from the recent work conducted during the geologic characterization of the Site that each of these wells did not cross the dominant flow zone (FZ-6) of the upper bedrock zone in which they were installed. Therefore, to intersect this flow zone, PW-9U was deepened from 45.0 to 57.0 ft. BGS and PW-10U was deepened from 41.0 to 63.0 ft. BGS. This work was performed between February 20, 2002 and March 22, 2002. During this time period there was no pumping from either of these two purge wells.

No other investigations were performed with respect to the NAPL plume containment system during the first quarter of 2002.

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 2002. The average pumping rate for the system during operation over the first quarter was 72.2 GPM.

8,928,797 gallons of groundwater were pumped from the bedrock by the NAPL Plume Containment System purge wells and treated resulting in the removal of 288 pounds of chemical mass.

Even though MSRM/GSHI do not believe that the use of hydraulic gradient evaluation in its present form is appropriate, this evaluation was conducted to remain consistent with historic interpretation of the RRT. The evaluation indicated that eight of nine Upper Bedrock Zone monitoring well pairs and seven of eight Middle Bedrock Zone monitoring well pairs achieved inward horizontal gradients during January, February, and March 2002. In the lower bedrock zone an inward hydraulic gradient was observed at two of the three well pairs during the first quarter of 2002.

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

Chemical monitoring and statistical analyses indicate that chemical concentrations, where detected, are generally stable. There is limited variability in some parameters likely due to the impact of starting the recently installed purge wells.

2.5 ACTION ITEMS

There is currently one action item that needs to be performed with regards to the NAPL Plume Containment System.

- Review well construction and closure details for NYPA and Niagara University monitoring wells installed along the J-vector to verify proper closure.

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). The 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) oriented toward the west of the Site and located south of the remediated APL plume (as shown on Figure 3.2) monitor the remainder of the 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 OPERATIONS

During the first quarter of 2002, 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.

During the first quarter of 2002, 357,425 gallons of groundwater were pumped from the bedrock by the APL Plume Containment System purge wells and treated. Treatment of the pumped groundwater resulted in the removal of approximately 0.29 pounds of chemical mass.

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 operating periods of 2001 and the first quarter of 2002. The cumulative hydraulic monitoring data from March 1997 to present is included on the enclosed CD under the filename HIST.pdf.

The hydraulic monitoring and gradient comparisons performed for the APL Plume Containment System are subject to the same issues as the NAPL Plume Containment System as described in Section 2.2.1.2 of this report.

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 GRADIENT EVALUATION

As previously stated, water level measurements were collected weekly at the ABP monitoring wells. Eleven (11) sets of water level elevation data were collected from these wells during the first quarter of 2002. The calculated hydraulic head gradient differentials (referred to herein as hydraulic gradients) for the four ABP monitoring well pairs in the first quarter are presented in Table 3.1.

Monitoring well pairs ABP-3/ABP-4 and ABP-7/ ABP-8 maintained inward horizontal hydraulic gradients during each of the eleven monitoring events. Outward horizontal hydraulic gradients were observed at well pairs ABP-1/ABP-2 and ABP-5/ABP-6 during each of the eleven monitoring events of the first quarter.

The failure to maintain inward hydraulic gradients between monitoring well pairs ABP-1/ABP-2 and ABP-5/ABP-6 is likely due to the fact that these well pairs do not intersect the same flow zones within the bedrock.

3.2.3 SEEP FLOWS

The four gorge face seeps (GF-S1, GF-S2, GF-S3, and GF-S4 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. During the first quarter monitoring events the estimated gorge face seep flow rates were:

i) January - 0 GPM at GF-S1, 2 GPM at GF-S2, 0 GPM at GF-S3, and 3 GPM at GF-S4;

ii) February - 0 GPM at GF-S1, 1 GPM at GF-S2, 0 GPM at GF-S3, and 3 GPM at GF-S4; and

iii) March - 0 GPM at GF-S1, 0 GPM at GF-S2, 0 GPM at GF-S3, and 1 GPM at GF-S4.

Seep GF-S4 originates below the Rochester formation and is below any known Hyde Park influences.

3.2.4 CHEMICAL MONITORING

Analytical groundwater samples are collected 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 in February and August for analysis of the Collected Liquids Monitoring Parameters as described in Section 9.9 of the RRT. The quarterly and semi-annual chemical monitoring was conducted on February 14, 2002.

3.2.4.1 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 treatment.

3.2.4.2 AFW/APW FLUX COMPOSITE SAMPLING AND ANALYSES

In order to determine the APL flux to the Niagara River, a volume composite sample consisting of water from five AFW monitoring wells and the two APW purge wells is prepared. The required volume of the aliquot from each well for the composite sample is calculated prior to initiation of groundwater sample collection. The volumes required from each well are presented in Table 3.2. These volumes were calculated based on the percentage of cross-sectional contributing area of groundwater flow past each well as compared to the total groundwater flow toward the Niagara River Gorge Face represented by all seven wells.

Groundwater sampling was performed on February 14, 2002 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 3.2.

The composite sample was prepared by collecting an individual water sample from each of the wells included in the AFW / APW flux program. The volume of sample collected from each well is listed in Table 3.2. The individual samples were all 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 of the APL Plume Flux Parameters and APL Plume Monitoring Parameters defined in the RRT Stipulation (Sections 9.3 and 9.4) were performed by Ecology and Environment (E&E). 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 3.4.

3.2.4.3 APW CLMP/ACIDS SAMPLING AND ANALYSES

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 during the first and third quarters 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 14, 2002 in conjunction with the AFW / APW composite sampling described 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 3.5.

3.2.4.4 APL PLUME FLUX CALCULATIONS

As discussed previously, the performance criteria for the APL Plume Containment System beyond the boundary of the remediated APL Plume is based on no exceedance of the Flux Action Levels. When a parameter is reported at a concentration which exceeds its respective APL Plume Flux Parameter detection limit in the composite sample collected from the two APWs and five AFWs, the chemical flux of that parameter to the Niagara River from the Lockport bedrock must be calculated. The calculated flux in grams per year (g/year) or pounds per day (lbs/day) is then compared to its Flux Action Level as required under the RRT Stipulation.

The composite sample analysis indicated that the concentration of 2,3,7,8-TCDD during the first quarter of 2002 was 668 pg/L. This concentration exceeds the APL Plume Flux detection level of 500 pg/L, therefore, calculation of the flux of this parameter to the Niagara River is required.

The flux to the Niagara River for 2,3,7,8-TCDD was calculated using the following equation:

$$\textbf{Flux (g/year) = Q x 3.785 L/gal x Conc. x } \mathbf{10^{-12}} \textbf{ (g/pg) x 365 days/year}$$

Where:

Q = groundwater flow in gallons per day; and

Conc. = reported concentration of exceedent parameter in pg/L.

The groundwater flow (Q) is based on the cross-sectional area of the bedrock flow of the wells along the gorge (AFWs and APWs). The calculation of the flow used in the equation (60 GPD) was presented in the Third Quarter 1997 Bedrock Monitoring Report, Sections 3.4 and 3.5.

The resultant APL Plume Flux for the 2,3,7,8-TCDD reported concentration is 5.54×10^{-5} grams/year, which is considerably lower than the allowable APL Plume Flux Action value of 0.5 grams/year.

3.3 NON-ROUTINE INVESTIGATIONS AND ACTIVITIES

During the first quarter of 2002, there were no non-routine investigations or field activities conducted with regards to the APL Plume Containment System.

3.4 SUMMARY

357,425 gallons of groundwater were pumped from the bedrock by the APL Plume Containment System purge wells and treated resulting in the removal of approximately 0.29 pounds of chemical mass.

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. However, the reductions in flow at seeps GF-S3 and GF-S4 indicate that the APWs are working properly in reducing APL migration to the Niagara River.

The significant individual monitoring results from the APL Plume Containment System observed during this reporting period are:

i) inward horizontal gradients were achieved at two of the four ABP monitoring well pairs for all hydraulic monitoring events of this quarter; and

ii) during the first quarter, Gorge Face Seep flows remained lower than during historic monitoring events.

The AFW/APW flux composite sample prepared during future APL Plume Containment System monitoring events will be comprised of aliquots from the same five AFWs and two APWs used during this monitoring period.

3.5 ACTION ITEMS

One investigation/activity that was scheduled to be performed during 2001 was delayed due to outside issues. This investigation/activity is the installation of one APL Plume Containment System Purge Well (APW-3). The installation of APW-3 is dependant on access agreements with the applicable property owners. APW-3 will be installed later in 2002 once access has been granted for the well and forcemain installations.

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).

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.

During the first quarter of 2002, 4,666,786 gallons of groundwater were collected from the overburden by the OBCS System and treated. Treatment of this water resulted in the removal of approximately 15 pounds of chemical mass.

4.1.1 PERFORMANCE MONITORING

Hydraulic 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 or if a downward vertical gradient exists between the overburden and upper bedrock. 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 16 OMWs installed around the Hyde Park Landfill. Hydraulic monitoring of the 16 OMWs was performed weekly in January, February and March 2002. 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 first 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.

The data presented in Table 4.1 demonstrate that an inward horizontal hydraulic gradient within the overburden regime was achieved this quarter at five of the eight monitoring well pairs during each of the monitoring events. The well pairs in which inward horizontal hydraulic gradients were observed are:

i) OMW-1 / OMW-2;

ii) OMW-3 / OMW-4R;

iii) OMW-5R / OMW-6;

iv) OMW-10R / OMW-9; and

v) OMW-15 / OMW-16R

The data in Table 4.1 also indicate 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 conducted since 1998. NAPL was not observed in any of the overburden monitoring wells during the first quarter of 2002 or during any monitoring event.

4.2 RESIDENTIAL COMMUNITY MONITORING PROGRAM

Eleven pairs of Community Monitoring Wells (CMWs), each consisting of one overburden and one shallow bedrock well, are located in the residential areas around the Hyde Park Landfill Site. These wells provide an early warning for possible APL plume migration towards the 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) analyses of soil air samples where no overburden groundwater is present; and

iii) annual groundwater sampling and analysis of CMW-2OB.

4.2.1.1 HYDRAULIC MONITORING AND GRADIENT EVALUATION

For the first quarter of 2002 hydraulic monitoring of the CMWs was performed monthly in January, February, and March, 2002. 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 was present in the overburden. One overburden well, CMW-8OB, was dry for all of the first quarter and one overburden well, CMW-7OB was dry during two monitoring events. 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.

4.2.1.2 SOIL VAPOR 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 vapor samples are collected each quarter from the wells at these locations. Table 4.4 presents the analytical data for the soil vapor samples collected from CMW-7OB and CMW-8OB on March 5, 2002. 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 community monitoring well CMW-2OB is performed annually each year as an early warning of migration in the overburden. This sampling event is performed in conjunction with quarterly sampling activities during the third quarter (August through October) of each year. The next sampling event at CMW-2OB will occur during the third quarter of 2002.

4.3 NON-ROUTINE INVESTIGATIONS AND ACTIVITIES

During the first quarter of 2002, 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

4,666,786 gallons of groundwater were collected from the overburden by the OBCS System and treated which resulted in the removal of approximately 15 pounds of chemical mass.

A review of the hydraulic monitoring data for the first quarter of 2002 indicates that inward horizontal hydraulic gradients were present at five of the eight monitoring well pairs. Downward vertical gradients were present at the five 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 2002. One monitoring well, CMW-8OB remained dry for each of the monitoring events of the first quarter and one monitoring well, CMW-7OB was dry during two monitoring events of the first quarter. No analytes were detected in the soil vapor samples collected from these wells.

4.5 ACTION ITEMS

From the monitoring data obtained during the first quarter of 2002, 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 2002. 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 2,600 gallons of NAPL during the first quarter of 2002. 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 2002 was 2,508 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 2002, MSRM recovered 92 gallons of NAPL from monitoring wells CD1U, PMW-3U and PMW-3M.

6.3 INCINERATION

During the first quarter of 2002, there were no shipments of NAPL from the Hyde Park Site for incineration.

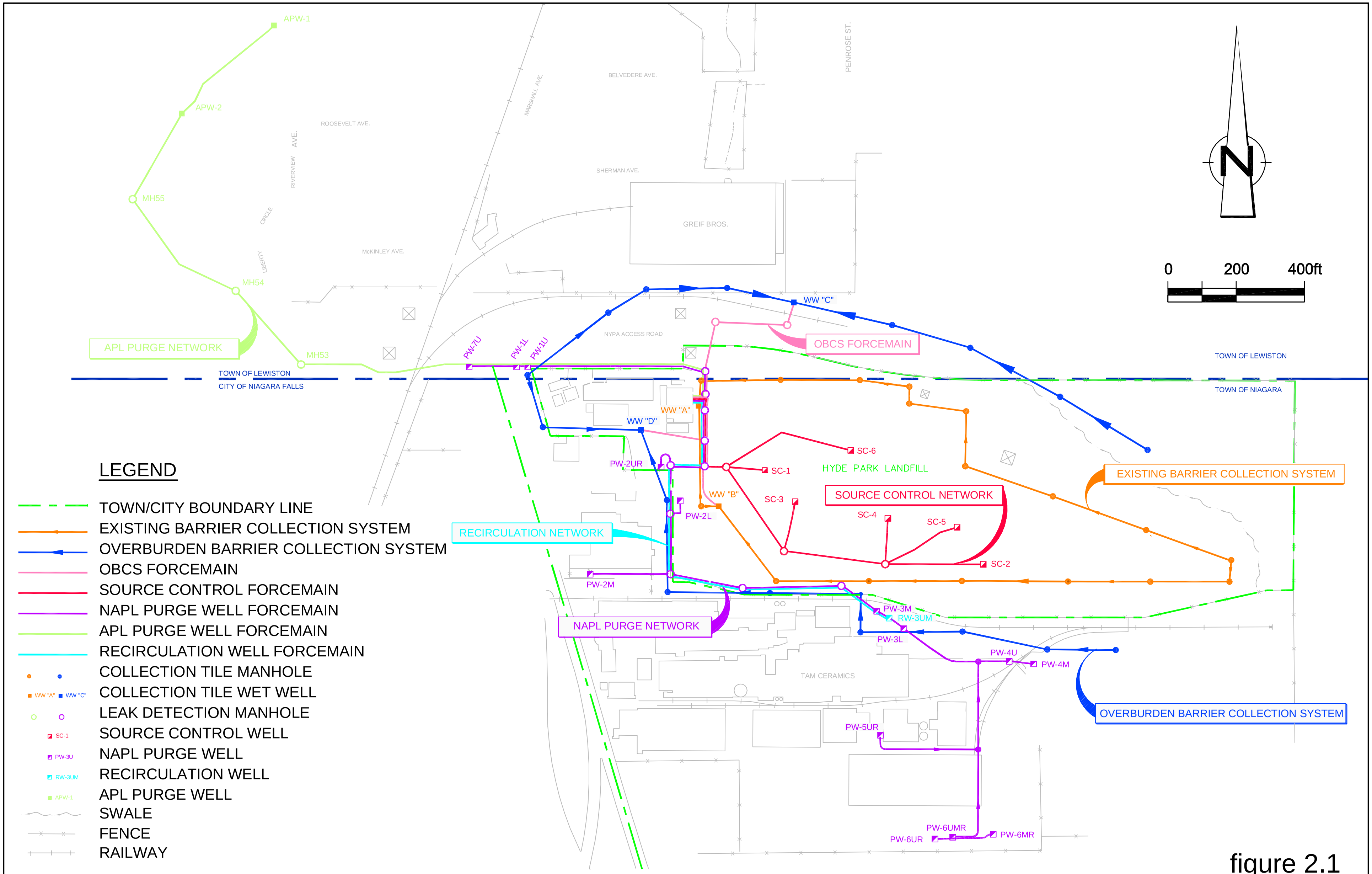


figure 2.1

APL/NAPL REMEDIAL ACTION ELEMENTS

Hyde Park RRT Program

01069-20(317)GN-NF001 SEP 25/2002

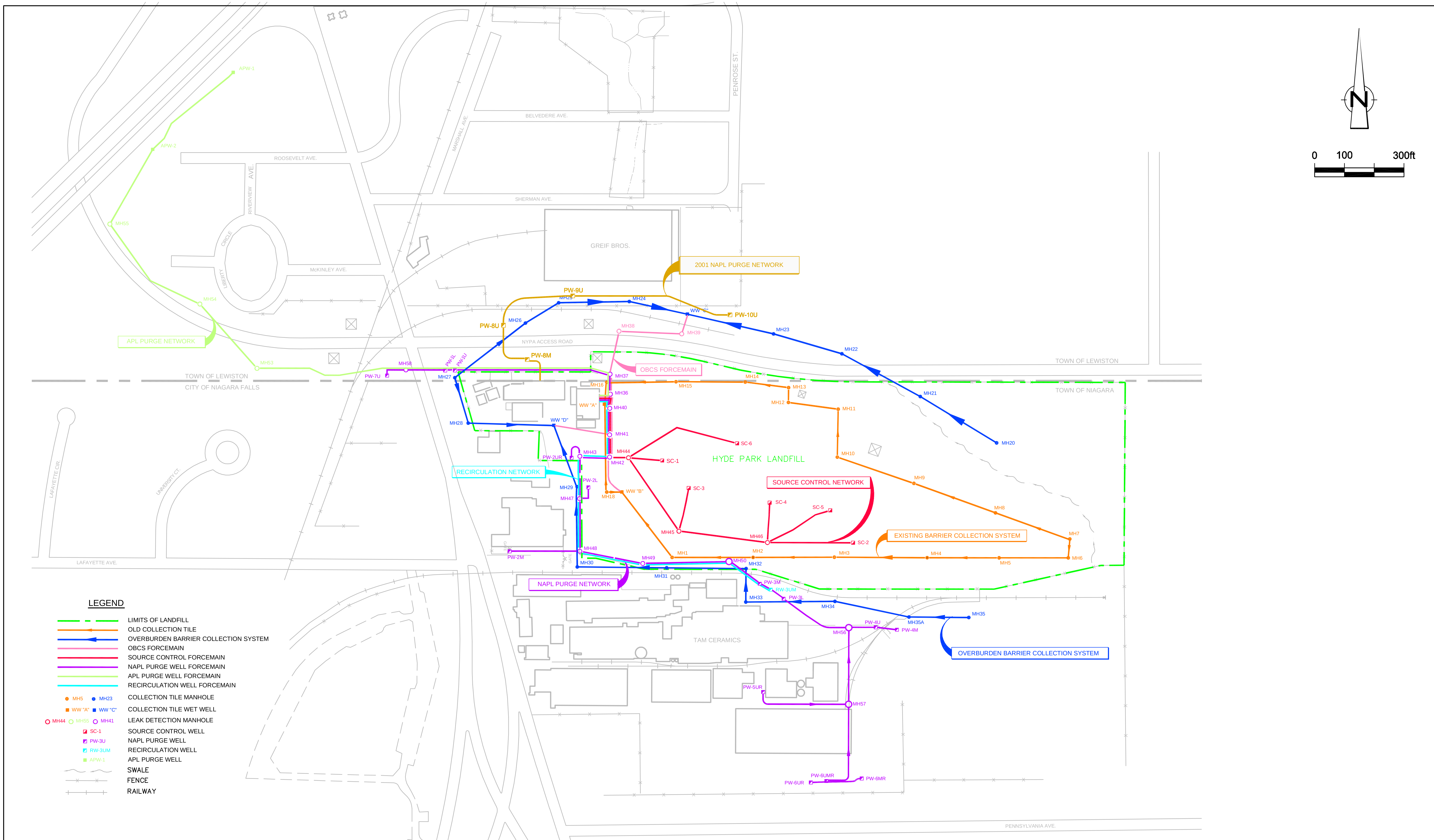


figure 2.1

APL/NAPL REMEDIAL ACTION ELEMENTS
HYDE PARK RRT SITE
Miller Springs Remediation Management

01069-20(317)GN-NF010 SEP 25/2002

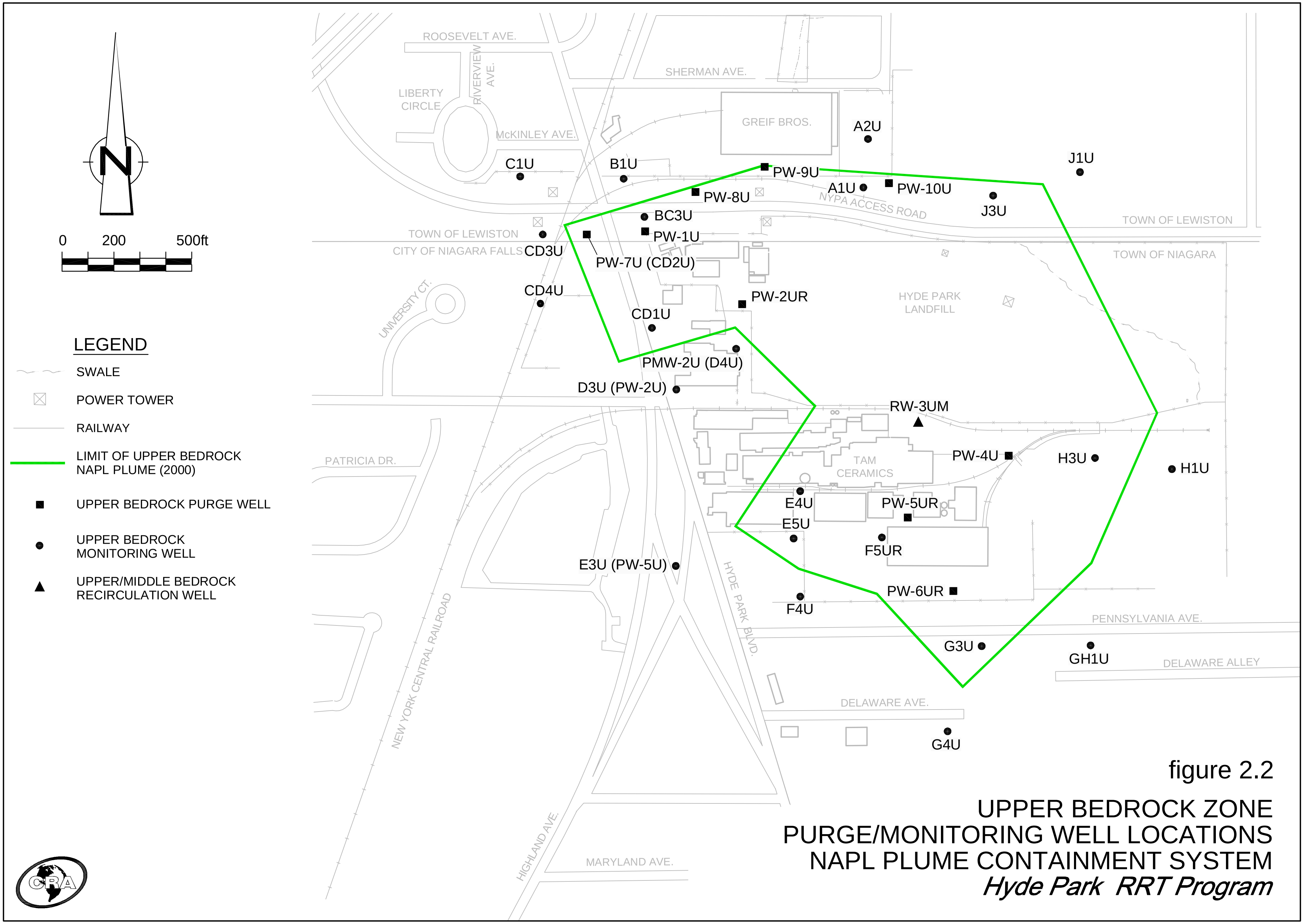


figure 2.2

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

01069-20(317)GN-NF002 SEP 25/2002

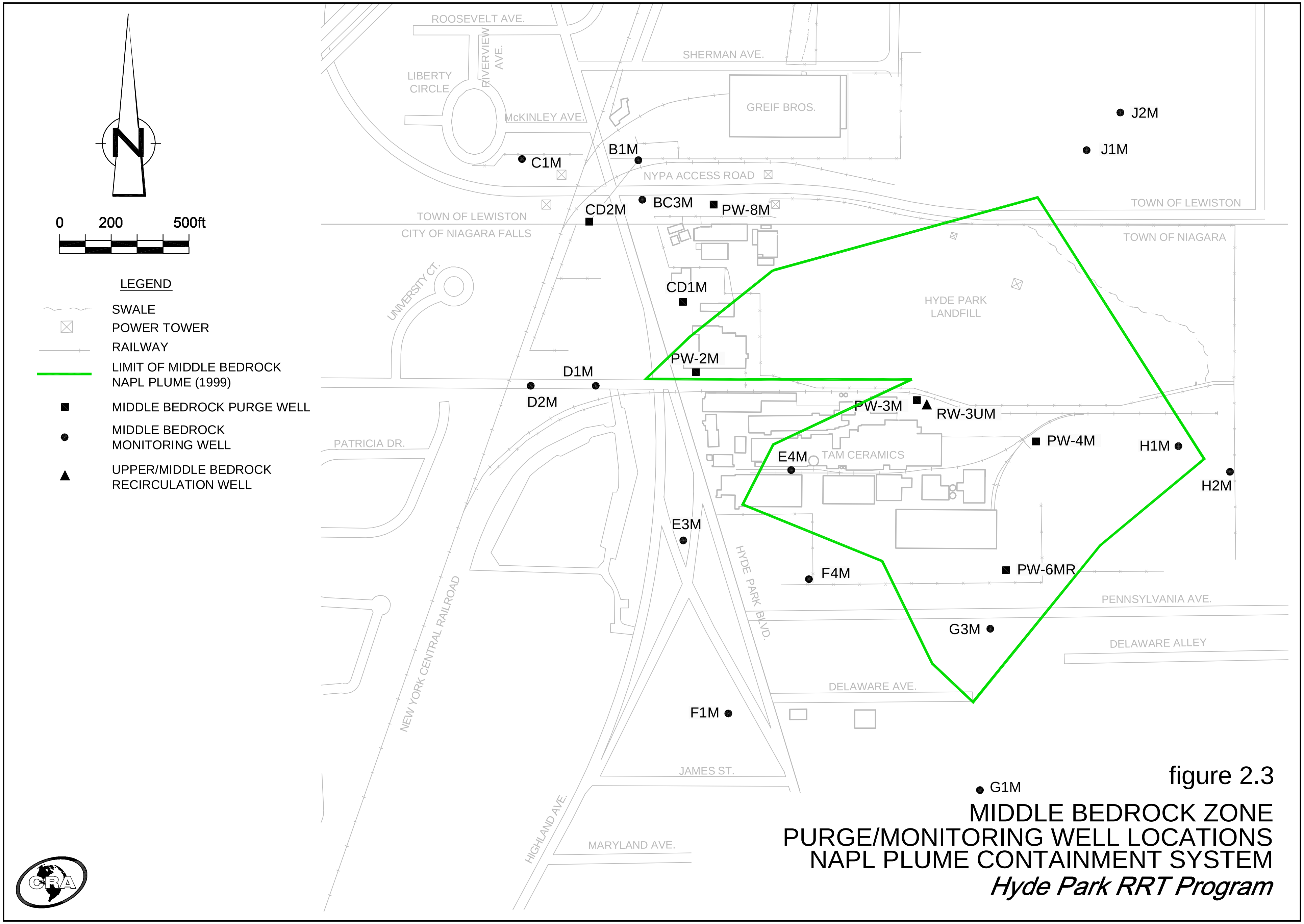


figure 2.3

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

01069-20(317)GN-NF003 SEP 25/2002

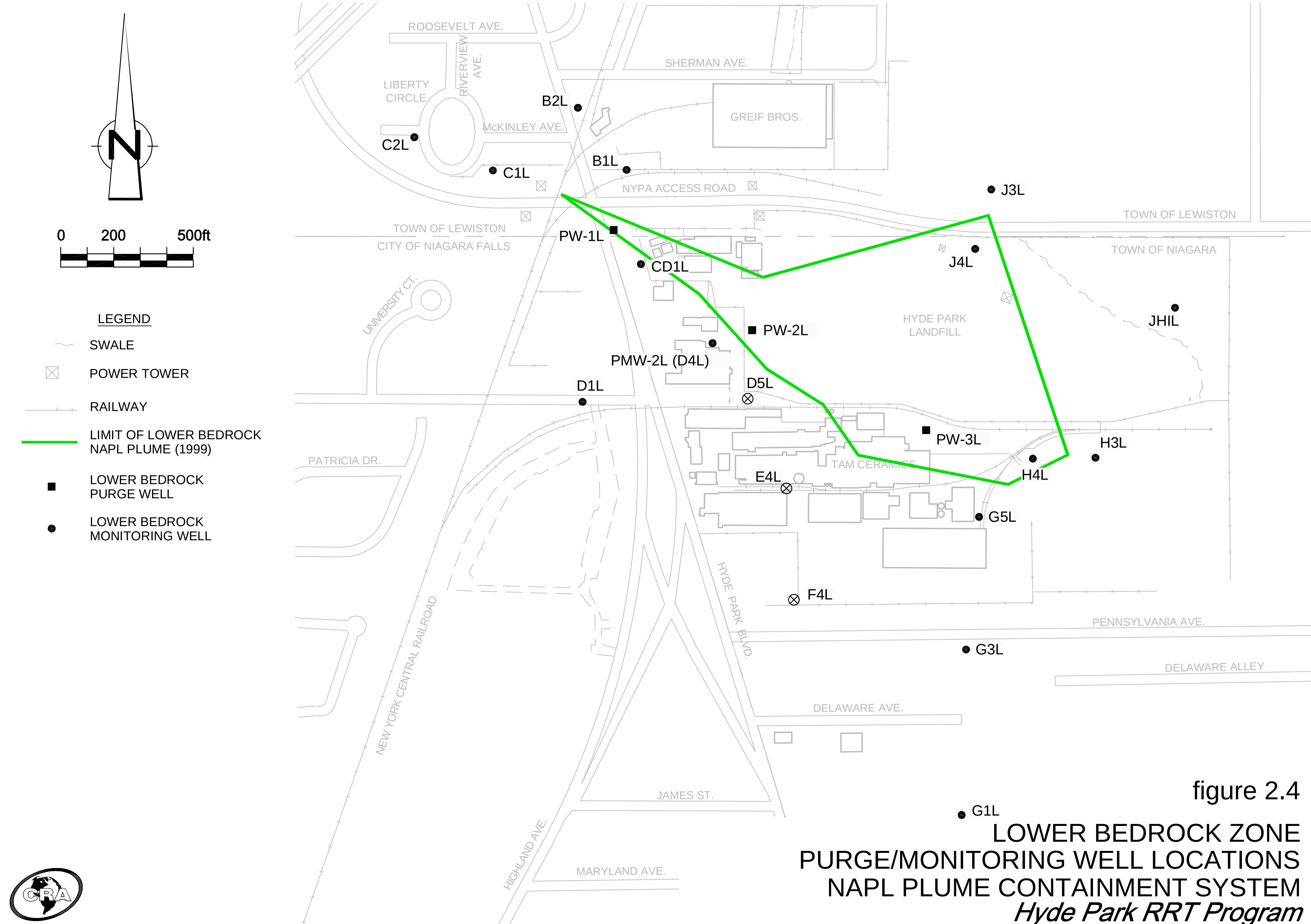


figure 2.4

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

01069-20(317)GN-NF004 SEP 25/2002

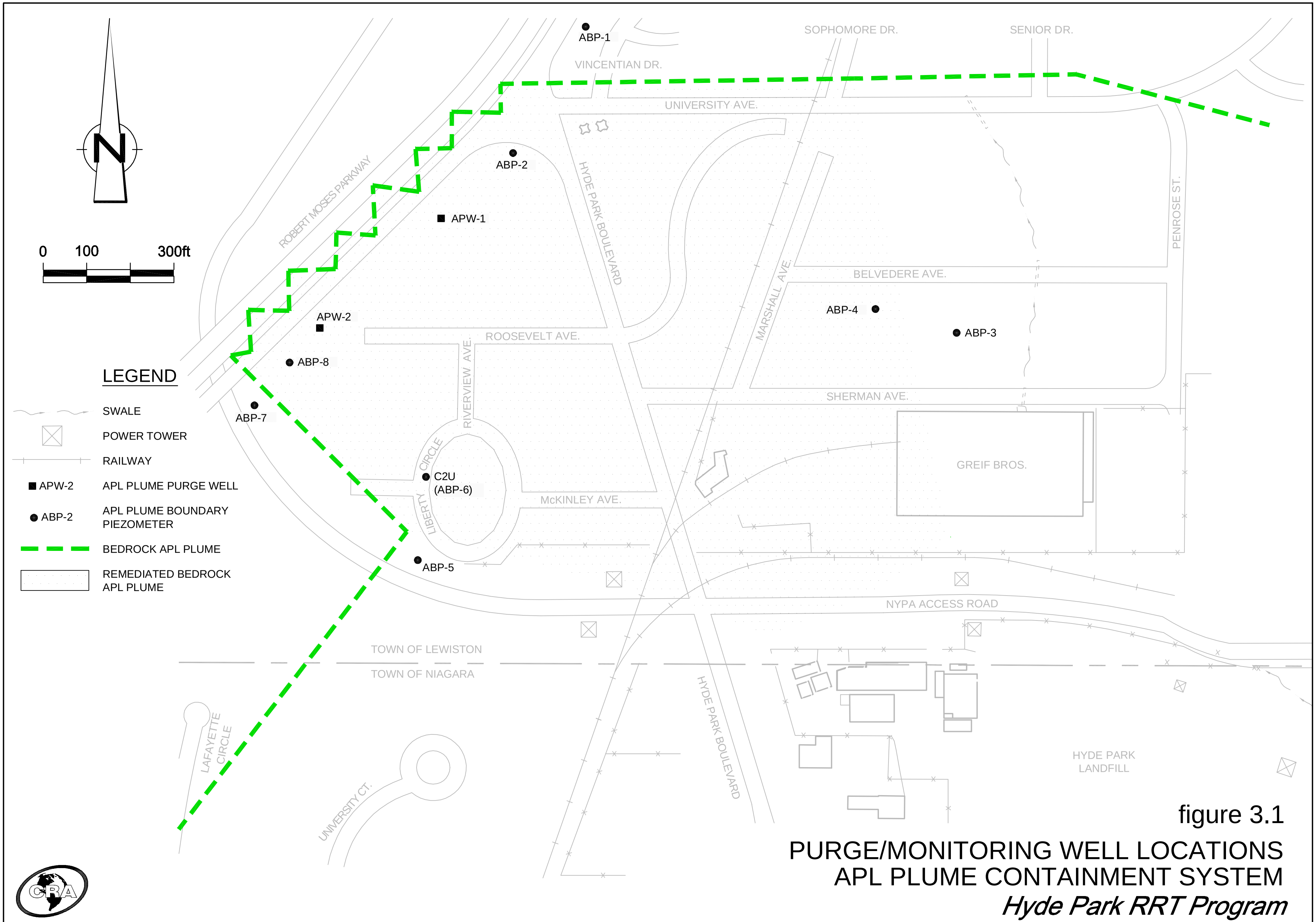


figure 3.1

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

01069-20(317)GN-NF005 SEP 25/2002

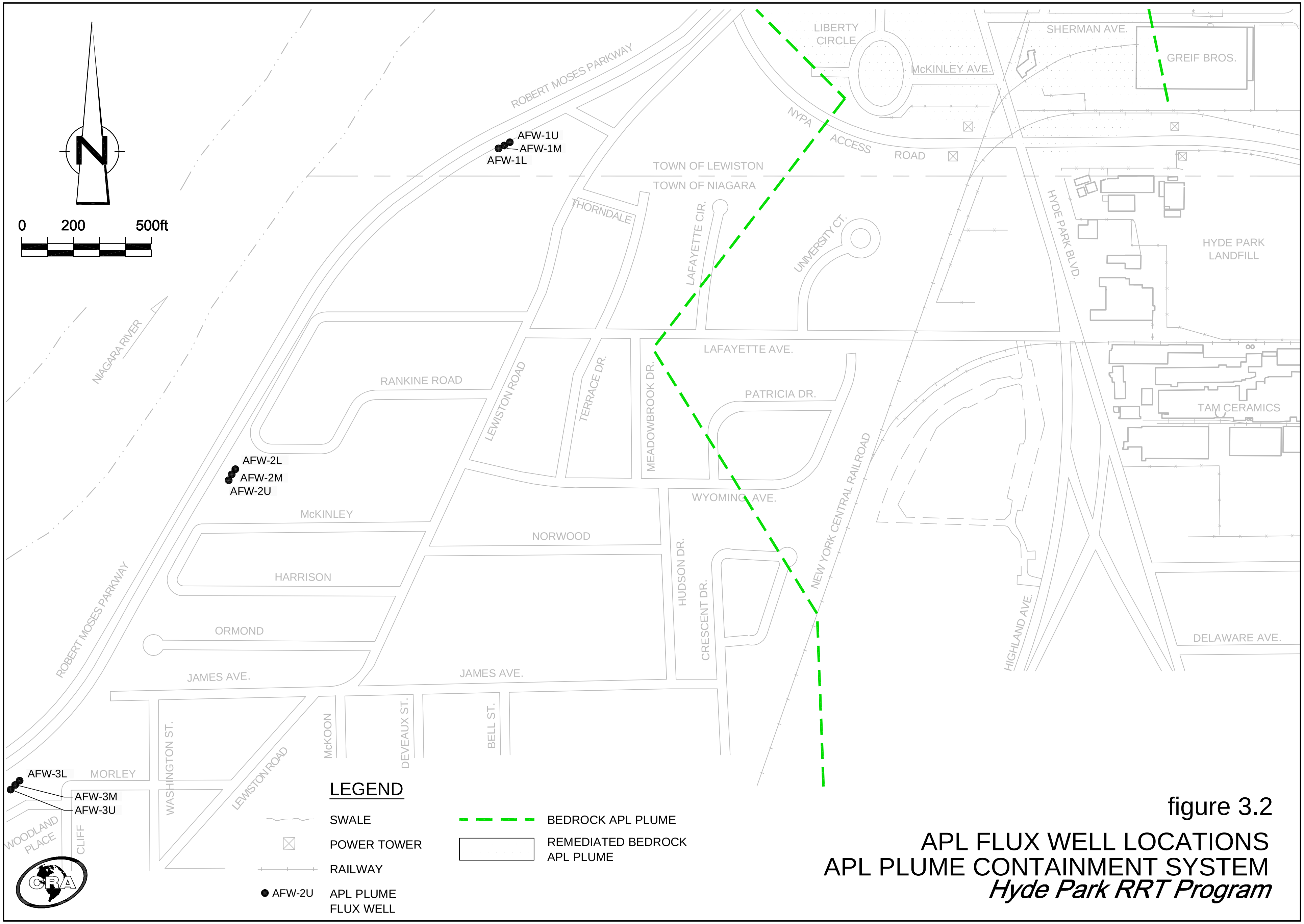


figure 3.2

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

01069-20(317)GN-NF006 SEP 25/2002

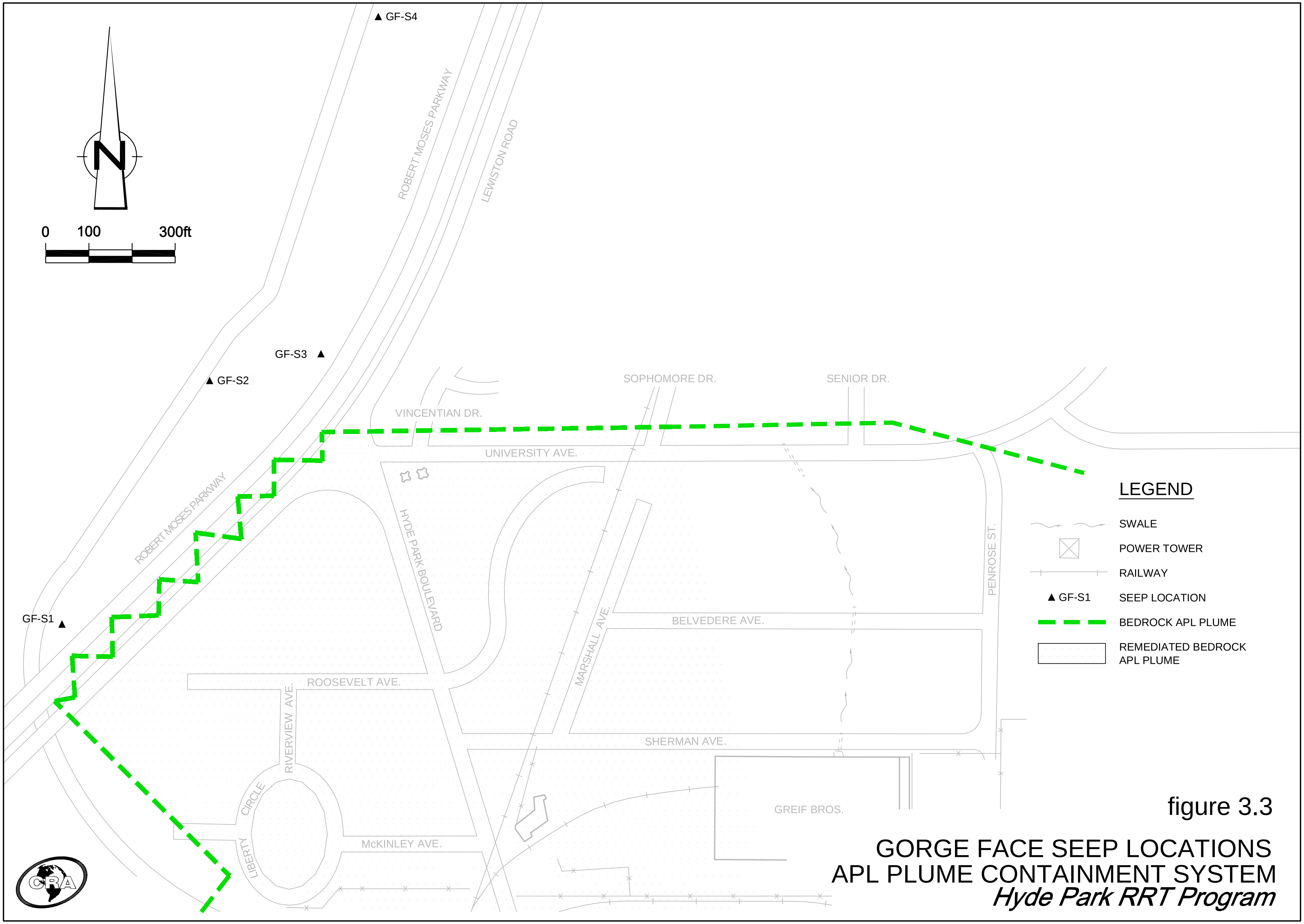


figure 3.3

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

01069-20(317)GN-NF007 SEP 25/2002

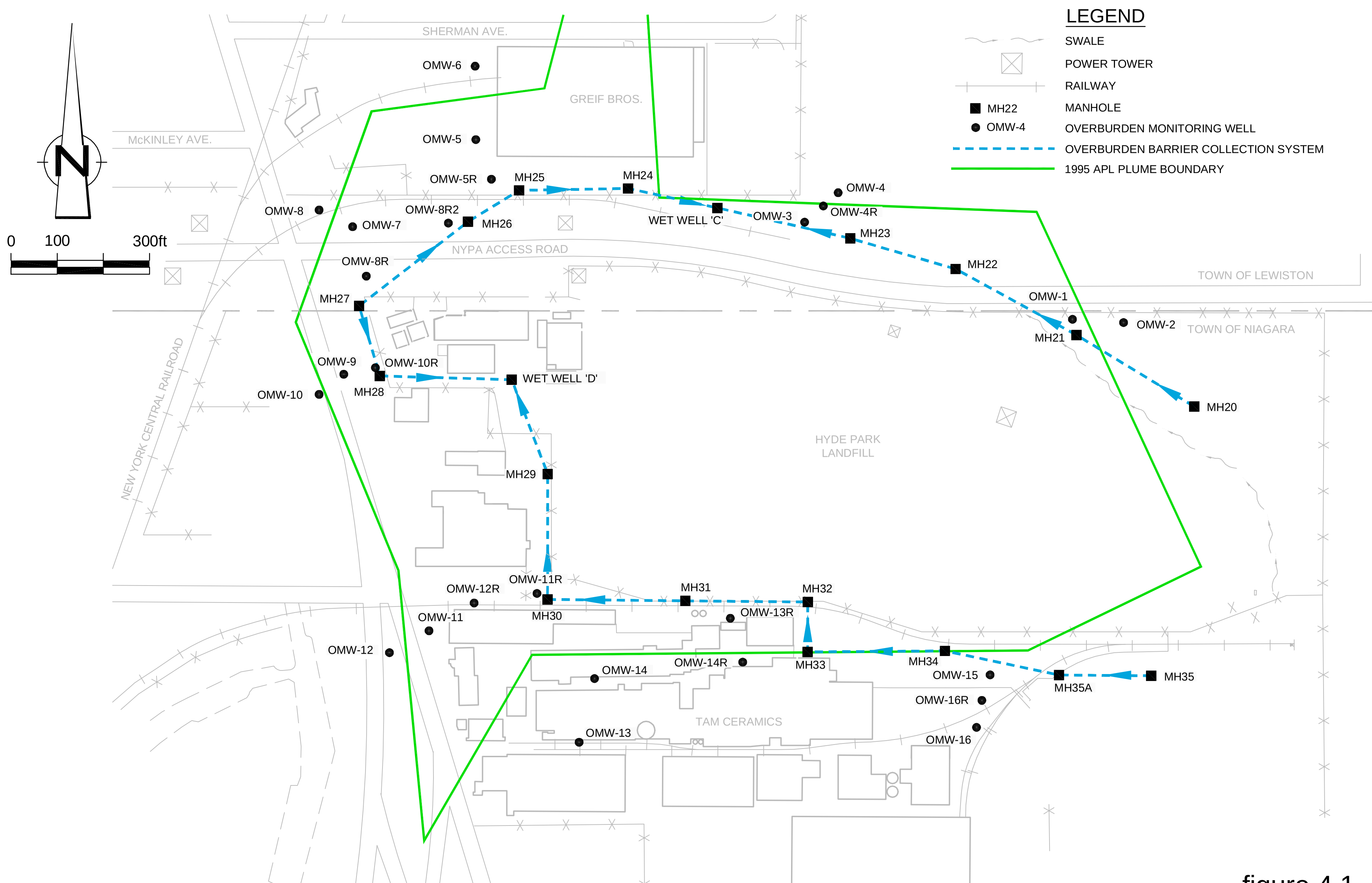


figure 4.1

OBCS MONITORING WELL LOCATIONS

Hyde Park RRT Program

01069-20(317)GN-NF008 SEP 25/2002

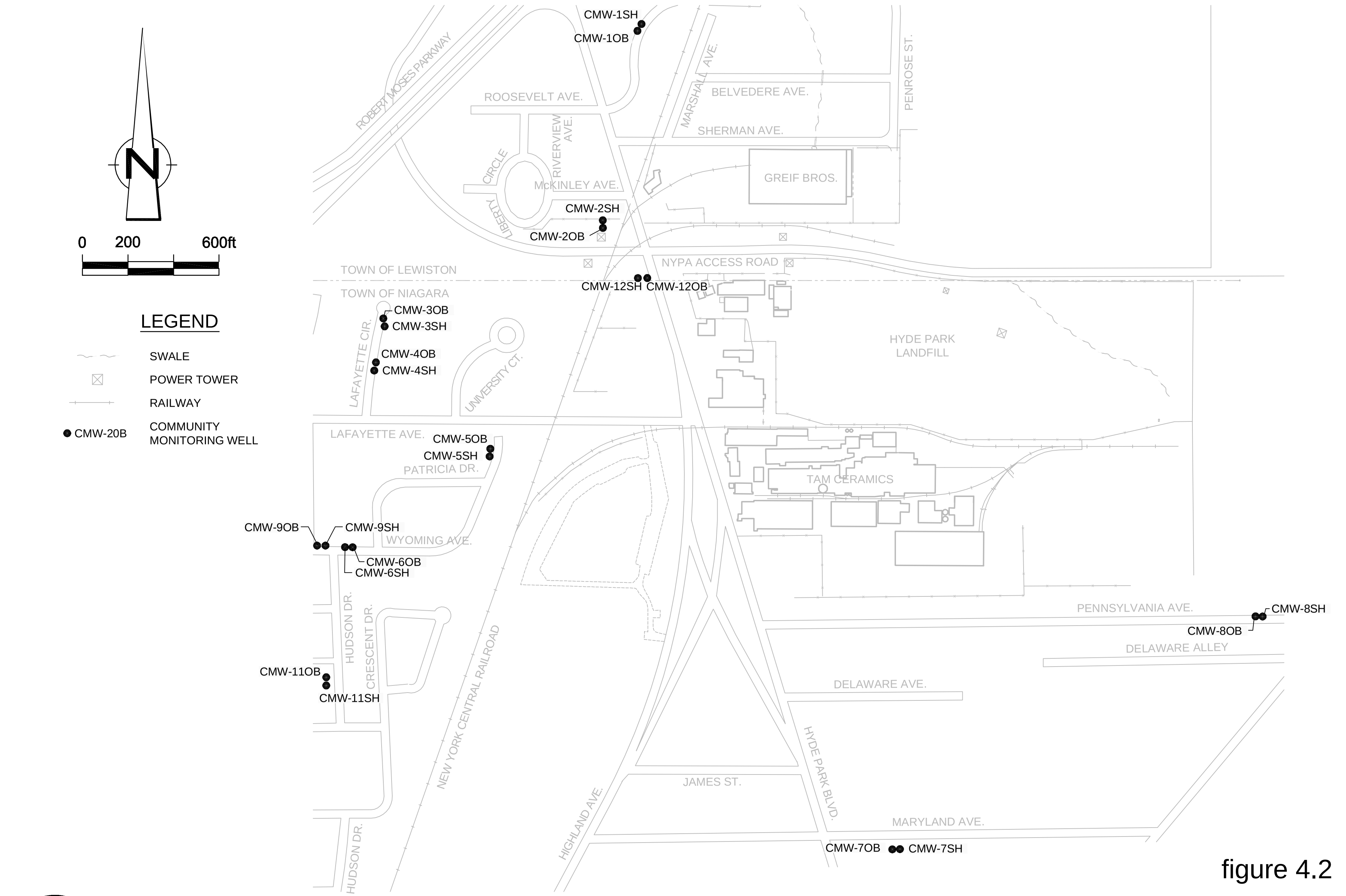


figure 4.2

COMMUNITY MONITORING WELL LOCATIONS
Hyde Park RRT Program

01069-20(317)GN-NF009 SEP 25/2002

TABLE 2.1

MONTHLY AVERAGE PURGE WELL PUMPING RATES (GPM)
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Bedrock Purge Wells	*Set Points (Ft. AMSL)*	*Jan 2002*	*Feb 2002*	*Mar 2002*	*Monthly Average*
PW-1U	549	0.4	0.5	0.4	0.4
PW-1L	527	7.0	8.2	8.6	0.9
PW-2UR	559	0.8	1.0	0.9	0.9
PW-2M	532	29.9	34.5	37.6	6.6
PW-2L	505	1.3	2.1	0.8	1.4
PW-3M	522	0.0	0.0	0.1	2.8
PW-3L	525	6.1	7.0	6.7	6.6
PW-4U	573	0.5	0.5	0.6	0.5
PW-4M	522	0.0 (1)	0.0	0.0	0.0
PW-5UR	555	3.5	5.3 (3)	5.8	4.9
PW-6UR	560	2.5	2.9	3.1	2.8
PW-6MR	505	4.8	4.6	4.4	4.6
PW-7U	540	1.3 (2)	2.2	3.0	2.2
PW-8M	520	3.5	3.9	5.4	4.3
PW-8U	546	1.0	0.0 (5)	0.4	0.5
PW-9U	542	0.0	0.0 (4)	0.0	0.0
PW-10U	542	1.5	1.3 (4)	0.7	1.2
Individual Total		64.2	74.0	78.4	72.2
Combined Meter		52.4	62.1	120.1	78.2

Notes:
(1) PW-4M replaced twice plugging problems January-2002
(2) PW-7U placed into service January-2002
(3) PW-5UR Replaced pump / motor February 4th (plugged)
(4) PW-9U & 10U Pulled February 20th, to be drilled deeper.
(5) PW-8U replaced February 25th.
GPM Gallons per Minute
N / A Not Available

TABLE 2.2

HYDRAULIC GRADIENT SUMMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well Pair	*January 2002*			*February 2002*			*March 2002*		
	Inner Elevation (feet AMSL)	*Outer Elevation (feet AMSL)*	*Hydraulic Gradient(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradient(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradient(1)*
Upper									
A1U-A2U	575.72	575.73	-0.01	579.06	578.41	0.65	579.97	578.63	1.34
BC3U-B1U	565.84	567.4	-1.56	565.93	567.27	-1.34	564.81	567.44	-2.63
CMW-12SH-CD3U	568.08	566.43	1.65	567.88	566.89	0.99	568.19	567.00	1.19
D4U-D3U	579.54	586.32	-6.78	580.70	586.36	-5.66	581.17	586.90	-5.73
E5U-E3U	584.67	589.98	-5.31	590.34	585.20	5.14	590.55	585.46	5.09
F5UR-F4U	585.5	590.82	-5.32	585.97	589.88	-3.91	586.28	592.60	-6.32
G3U-G4U	595.93	602.61	-6.68	593.33	605.09	-11.76	594.23	605.41	-11.18
H3U-H1U	604.5	609.98	-5.48	604.96	611.21	-6.25	605.78	612.27	-6.49
J3U-J1U	586.85	592.29	-5.44	588.38	595.01	-6.63	590.05	594.06	-4.01
Middle									
BC3M-B1M	520.7	520.91	-0.21	520.94	519.71	1.23	521.10	521.36	-0.26
BC3M-C1M	520.7	522.14	-1.44	520.94	521.13	-0.19	521.10	523.08	-1.98
D1M-D2M	520.79	520.85	-0.06	521.06	521.09	-0.03	521.38	521.30	0.08
E4M-E3M	532.03	518.27	13.76	524.11	521.25	2.86	524.47	521.59	2.88
F4M-F1M	523.47	535.77	-12.3	524.26	537.11	-12.85	521.06	537.50	-16.44
G3M-G1M	522.85	565.06	-42.21	523.14	564.57	-41.43	525.36	564.87	-39.51
H1M-H2M	550.74	572.62	-21.88	553.93	573.10	-19.17	552.51	574.14	-21.63
J1M-J2M	550.44	551.38	-0.94	554.58	553.96	0.62	552.49	553.93	-1.44
Lower									
B1L-B2L	515.04	515.33	-0.29	516.83	517.06	-0.23	516.92	517.78	-0.86
C1L-C2L	518.95	515.45	3.5	517.72	516.72	1.00	517.93	516.80	1.13
D4L-D1L	514.95	514.49	0.46	515.27	516.17	-0.90	516.57	516.39	0.18

Note:
(1) - Negative number indicates an inward gradient measured in feet.
N / A - Not available.
AMSL - Above Mean Sea Level.

TABLE 2.3

NAPL PRESENT CHECK NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well I.D.	*1st Quarter 1998*	*2nd Quarter 1998*	*3rd Quarter 1998*	*4th Quarter 1998*	*1st Quarter 1999*	*2nd Quarter 1999*	*3rd Quarter 1999*	*4th Quarter 1999*	*1st Quarter 2000*	*2nd Quarter 2000*	*3rd Quarter 2000*	*4th Quarter 2000*	*1st Quarter 2001*	*2nd Quarter 2001*	*3rd Quarter 2001*	*4th Quarter 2001*	*1st Quarter 2002*
A1U	-	-	-	-	-	-	NO	NO	NO	**YES**	NO	**YES**	YES	YES	YES	YES	YES
A2U	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
B1L	NO	NO	NO	NO	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	NO	NO	NO	NO
B1U	NO	NO	NO	NO	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	NO	NO	NO	NO
BC3M	NO	NO	NO	NO	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	NO	NO	NO	NO
C1L	NO	NO	NO	NO	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	NO	NO	NO	NO
C1U	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CD1L	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CD1M	-	-	-	-	-	-	NO	NO	NO	NO	NO	-	NO	NO	NO	NO	NO
CD1U	-	-	-	-	-	-	**YES**	NO	NO	**YES**	NO	**YES**	YES	YES	YES	YES	YES
CD2U	-	-	-	-	-	-	-	-	NO	**YES**	NO	**YES**	YES	YES	NO	NO	NO
CD3U	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO
D1L	NO	NO	NO	NO	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	NO	NO	NO	NO
D2M	NO	NO	NO	NO	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	NO	NO	NO	NO
D4L	NO	NO	NO	NO *	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	NO	NO	NO	NO
D5L	NO	NO	NO	NO *	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	NO	NO	NO	NO
E3U	NO	NO	NO	NO	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	NO	NO	NO	NO
E4U	**YES**	**YES**	**YES**	NO *	NO	**YES**	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
E5U	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO
F1M	NO	NO	NO	NO	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	NO	NO	NO	NO
F4M	NO	NO	NO	NO *	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	NO	NO	NO	NO
F5UR (2)	**YES**	NO	NO	NO *	NO	NO	**YES**	**YES**	**YES**	**YES**	**YES**	NO	NO	NO	NO	NO	NO
G1L	NO	NO	NO	NO	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	NO	NO	NO	NO
G3L	NO	NO	NO	NO	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	NO	NO	NO	NO
G3U	NO	NO	NO	NO	**YES**	**YES**	**YES**	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G4U	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

TABLE 2.3

NAPL PRESENT CHECK NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well I.D.	***1st Quarter 1998***	***2nd Quarter 1998***	***3rd Quarter 1998***	***4th Quarter 1998***	***1st Quarter 1999***	***2nd Quarter 1999***	***3rd Quarter 1999***	***4th Quarter 1999***	***1st Quarter 2000***	***2nd Quarter 2000***	***3rd Quarter 2000***	***4th Quarter 2000***	***1st Quarter 2001***	***2nd Quarter 2001***	***3rd Quarter 2001***	***4th Quarter 2001***	***1st Quarter 2002***
GH1U	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
H1L	-	NO	NO	NO	NO	NO	NO	NO	NO	-	-	NO	NO	NO	NO	NO	NO
H1M	NO	NO	NO	NO	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	NO	NO	NO	NO
H2L	-	NO	NO	NO	NO	NO	NO	NO	NO	-	-	NO	NO	NO	NO	NO	NO
H2M	NO	NO	NO	NO *	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	NO	YES	YES	YES
J1M	NO	NO	NO	NO	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	NO	NO	NO	NO
J2M	NO	NO	NO	NO	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	NO	NO	NO	NO
J3U	NO	NO	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	NO	**YES**	**YES**	**YES**	YES	YES	YES	YES	YES
J4L	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW-10R	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW-11R	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO
OMW-12R	NO	NO	NO	NO *	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	NO	NO	NO	NO
OMW14R	NO	NO	NO	NO *	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	NO	NO	NO	NO
OMW-16R	NO	NO	NO	NO *	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	NO	NO	NO	NO
OMW-3	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW-5	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW-6	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW-8R	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW-8R2	-	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO
OMW-9	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
PMW-1L	-	-	-	-	-	-	-	-	-	NO	**YES**	**YES**	YES	YES	YES	YES	YES
PMW-3M	-	-	-	-	-	-	-	-	NO	**YES**	**YES**	**YES**	YES	YES	NO	YES	YES
PW-2L	-	-	-	-	-	-	-	-	-	NO	NO	NO	NO	NO	YES	NO	NO
PW-3UM	-	-	-	-	-	-	-	-	-	**YES**	-	**YES**	YES	YES	YES	YES	YES
PW-6UMR	-	-	-	-	-	-	**YES**	**YES**	NO	**YES**	NO	NO	YES	YES	NO	NO	NO

TABLE 2.3

NAPL PRESENT CHECK NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well I.D.	*1st Quarter 1998*	*2nd Quarter 1998*	*3rd Quarter 1998*	*4th Quarter 1998*	*1st Quarter 1999*	*2nd Quarter 1999*	*3rd Quarter 1999*	*4th Quarter 1999*	*1st Quarter 2000*	*2nd Quarter 2000*	*3rd Quarter 2000*	*4th Quarter 2000*	*1st Quarter 2001*	*2nd Quarter 2001*	*3rd Quarter 2001*	*4th Quarter 2001*	*1st Quarter 2002*

Notes:
- \- Not Available
- * Wells checked on 12/10/98, strike at TAM (wells located on TAM property).
  Manual NAPL recoveries listed in Table 6.1 of this report.

LNAPL Light Aqueous Phase Liquid.
NAPL Non-Aqueous Phase Liquid.
YES NAPL Observed
NO NAPL Not Observed.

TABLE 2.4

NAPL/APL RATIO
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
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
Second Quarter 2001	0	5,692,242	0.000000
Third Quarter 2001	1,632	4,829,806	0.000338
Fourth Quarter 2001	0	7,614,982	0.000000
First Quarter 2002	752	14,549,000	0.000052
Second Quarter 2002			
Third Quarter 2002			
Fourth Quarter 2002			

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

TABLE 2.5

WELL PURGING AND SAMPLING SUMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well I.D.	Sample I.D.	Sample Date	Sample Tme	Initial Water Level (ft. BTOC)	Depth of Well (ft. BTOC)	Standing Well Volume (Gallons)	Purge Volume (Gallons)	Sample Parameters pH (s.u.)	Cond (uS/cm)	Temp (°C)	Turbidity (NTU)	Final Water Quality	Comments
A2U	A2U202	02/19/02	18:30	13.39	-	25.0	125	7.35	1900	12.6	CLEAR	CLEAR SULFUR ODOR	
B1L	B1L202	02/21/02	18:05	91.62	104	18.0	90	6.82	36400	12	28	CLEAR/ODORLESS	
B1M	B1M202	02/15/02	9:45	69.06	83	9.0	45	6.78	3290	10.5	11	CLEAR/ODORLESS	
B1M	L3U202	02/15/02	8:30	69.06	83	9.0	45	6.78	3290	10.5	11	-	Duplicate
B1U	B1U202	02/15/02	10:30	25.60	57	21.4	107	6.85	2340	11	6.7	CLEAR/ODORLESS	
C1L	C1L202	02/15/02	12:00	76.30	104	19.0	95	7.48	3330	11.5	CLEAR	CLEAR/ODORLESS	
C1M	C1M202	02/15/02	11:00	71.95	81.5	7.0	35	7.45	2160	11.8	CLEAR	CLEAR/SULFUR ODOR	
C1U	C1U202	02/15/02	9:55	28.15	55.5	18.0	90	7.52	920	11.9	CLEAR	CLEAR/ODORLESS	
CD3U	CD3U202	02/21/02	14:40	44.45	-	21.5	107.5	7.4	664	11.3	CLEAR	CLEAR/ODORLESS	
D1L	D1L202	02/21/02	9:30	77.05	110	22.0	110	6.26	92500	11.6	BLACK	CLOUDY/BLACK	
D1U	D1U202	02/19/02	17:05	18.80	50.1	24.0	120	7.36	847	12.9	CLEAR	CLEAR/ODORLESS	
D2M	D2M202	02/21/02	9:00	67.65	85.8	11.0	55	7.37	2910	13.1	CLEAR	CLEAR/ODORLESS	MS/MSD
D3U	D3U202	02/13/02	9:00	44.00	48.3	210.0	1250	7.71	1552	11	CLEAR	CLEAR/ODORLESS	MS/MSD
E1U	E1U202	02/19/02	16:50	17.90	55.6	25.0	125	6.91	1800	11.7	9.8	CLEAR/ODORLESS	
E3M	E3M202	02/19/02	17:20	72.38	94	14.0	70	6.88	2900	11.8	5.8	CLEAR/ODORLESS	
E3U	E3U202	02/22/02	9:45	7.06	46.7	257.0	1285	7.2	3030	10.3	CLEAR	CLEAR/ODORLESS	
F1M	F1M202	02/20/02	17:45	66.95	110	27.0	135	7.2	2890	12	CLEAR	CLEAR/ODORLESS	
F4U	F4U202	02/21/02	10:20	36.32	69.2	40.0	200	7.83	1030	13.9	CLEAR	CLEAR/ODORLESS	
G1L	G1L202	02/22/02	11:55	49.70	147	72.0	360	6.76	41500	9.9	CLEAR	CLEAR/ODORLESS	
G1L	NPWRIN2202	02/22/02	6:00	-	147	-	-	-	-	-	-	-	Rinse Blank
G1M	G1M202	02/22/02	10:55	51.87	124	47.0	235	7.03	2220	10	22.4	CLEAR/ODORLESS	
G1M	NPWRIN1202	02/22/02	6:00	-	124	-	-	-	-	-	-	-	Rinse Blank
G4U	G4U202	02/20/02	17:20	14.45	-	27.0	145	7.23	756	9.8	CLEAR	CLEAR/ODORLESS	
H1U	H1U202	02/20/02	16:30	14.45	57	31.0	155	715	691	10.4	CLEAR	CLEAR/ODORLESS	
H2M	H2M202	02/20/02	14:40	62.15	129	54.0	270	6.95	3240	10.7	6.6	CLEAR/ODORLESS	
H3L	H3L202	02/21/02	10:50	60.22	138	52.0	260	6.92	16400	10.3	13	CLEAR/ODORLESS	
J1U	J1U202	02/13/02	8:55	16.42	45.4	20.0	100	7.17	618	11.4	22	CLEAR/ODORLESS	
J1U	L1U202	02/13/02	8:00	16.42	45.4	20.0	100	7.17	618	11.4	22	CLEAR/ODORLESS	Duplicate
J2M	J2M202	02/20/02	17:24	55.20	101	30.0	150	6.73	2220	11.4	7.8	CLEAR/ODORLESS	
J3L	J3L202	02/21/02	16:30	77.35	120.5	46.0	230	6.48	76800	10.3	26	CLEAR/ODORLESS	

Notes:
(1) All wells are 4"ϕ, except D3U and E3U (former purge wells PW-2U and PW-5U) which are 12"ϕ.
Cond Specific Conductivity.
ft. BTOC Feet Below Top of Casing.
MS/MSD Matrix Spike / Matrix Spike Duplicate.
NTU Normal Turbidity Units.
s.u. Standard pH Units.
Temp Temperature.

TABLE 2.6

ANALYTICAL RESULTS SUMMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Sample Location:		***A2U***	***B1L***	***B1M***	***B1M***	***B1U***	***C1M***	***C1U***	***C1U***	***CD3U***	***D1L***	***D1U***	***D2M***	***D3U***
Sample ID:		***A2U202***	***B1L202***	***B1M202***	***L3U202***	***B1U202***	***CIM202***	***C1L202***	***CIU202***	***CD3U202***	***D1L202***	***D1U202***	***D2M202***	***D3U202***
Sample Date:		***02/19/02***	***02/21/02***	***02/15/02***	***02/15/02***	***02/15/02***	***02/15/02***	***02/15/02***	***02/15/02***	***02/21/02***	***02/21/02***	***02/19/02***	***02/21/02***	***02/13/02***
					Duplicate									
Parameter	***Unit***													
Acids														
2-Chlorobenzoic acid	mg/L	0.775	0.318	0.475	0.463	0.421	0.0250 U	0.0250 U	0.116	0.0903	0.0250 U	0.0250 U	0.0693	0.0250 U
3-Chlorobenzoic acid	mg/L	0.215	0.0300 U	0.0300 U	0.0300 U	0.179	0.0300 U	0.0300 U	0.0855	0.0677	0.0300 U	0.0300 U	0.0300 U	0.0300 U
4-Chlorobenzoic acid	mg/L	0.0222	0.005 U	0.005 U	0.005 U	0.154 J	0.005 UJ	0.005 U	0.100	0.0858	0.005 U	0.005 U	0.005 U	0.005 U
Benzoic acid	mg/L	0.0578	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U
Chlorendic acid	mg/L	0.610	0.838	0.606	0.566	1.06	0.535	1.15	0.878	0.364	0.0500 U	0.102	0.429 J	0.168
General Chemistry														
Total Organic Halides (TOX)	ug/L	4240	1610	771	772	6370	637	1260	1070	639	3270	63.4	502	209
Phenolics (Total)	mg/L	0.124 UJ	0.401 U	0.0941 U	0.116 U	0.190 U	0.0226 U	0.104 U	0.0985 U	0.547 U	3.02	0.0900 U	0.377 U	0.0109 UJ

Sample Location:		***E1U***	***E3M***	***E3U***	***F1M***	***F4U***	***G1L***	***G1L***	***G1M***	***G1M***	***G4U***	***H1U***	***H2M***	***H3L***
Sample ID:		***E1U202***	***E3M202***	***E3U202***	***F1M202***	***F4U202***	***G1L202***	***'PWRIN22(***	***G1M202***	***'PWRIN12(***	***G4U202***	***H1U202***	H2M202	H3L202
Sample Date:		***02/19/02***	***02/19/02***	***02/22/02***	***02/20/02***	***02/21/02***	***02/22/02***	***02/22/02***	***02/22/02***	***02/22/02***	***02/20/02***	***02/20/02***	***02/20/02***	***02/21/02***
Parameter	***Unit***													
Acids														
2-Chlorobenzoic acid	mg/L	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.335	0.0290
3-Chlorobenzoic acid	mg/L	0.0300 U	0.0300 U	0.0300 U	0.0300 U	0.0300 U	0.0300 U	0.0300 U	0.0300 U	0.0300 U	0.0300 U	0.0300 U	0.0586	0.0300 U
4-Chlorobenzoic acid	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0810	0.00740
Benzoic acid	mg/L	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U	0.0250 U
Chlorendic acid	mg/L	0.162	0.0500 U	0.255	0.0500 U	0.0513	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0611	0.0500 U	0.0500 U
General Chemistry														
Total Organic Halides (TOX)	ug/L	147	91.0	329 U	96.5	273	1490 U	1060	126 U	30.0 U	51.1	96.2	393	417
Phenolics (Total)	mg/L	0.0823 U	0.0903 U	0.237 U	0.220 U	0.222 U	0.299 U	0.183	0.252 U	0.180	0.236 U	0.214 U	0.461 U	0.322 U

TABLE 2.6

ANALYTICAL RESULTS SUMMARY
NAPL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Sample Location:		***J1U***	***J1U***	***J2M***	***J3L***
Sample ID:		***J1U202***	***L1U202***	***J2M202***	***J3L202***
Sample Date:		***02/13/02***	***02/13/02***	***02/20/02***	***02/21/02***
			Duplicate		
Parameter	***Unit***				
Acids					
2-Chlorobenzoic acid	mg/L	0.0250 U	0.0250 U	3.13	1.12
3-Chlorobenzoic acid	mg/L	0.0300 U	0.0300 U	0.631	0.354
4-Chlorobenzoic acid	mg/L	0.005 U	0.005 U	0.234	0.297
Benzoic acid	mg/L	0.0250 U	0.0250 U	4.23	0.680
Chlorendic acid	mg/L	0.0500 U	0.0500 U	0.567	0.100 U
General Chemistry					
Total Organic Halides (TOX)	ug/L	42.8	30.0 U	15700	2360
Phenolics (Total)	mg/L	0.0901 U	0.0808 U	1.42	1.22

Notes:
xU - Non-detect at or above x.
J-Estimated.

TABLE 2.7

RESULTS OF STATISTICAL TREND ANALYSES MONITORING EVALUATION
FIRST QUARTER 2002
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

Location	*Analyte*	*Number of Observations*	*Percentage Non-Detect*	*Trend Test*			
				Method	*Test Statistic*	*Probability*	*Conclusion*
B1U	Benzoic Acid	9	89%	Logistic	-0.24	0.94	NST
	Chlorendic Acid	9	11%	Mann-Kendall	12	0.25	NST
	Phenolics	9	33%	Mann-Kendall	-6	0.60	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	12	0.25	NST
	Total Organic Halides	9	0%	Mann-Kendall	-26	**0.01**	Decreasing
B1M	Benzoic Acid	9	78%	Logistic	0.0013	0.70	NST
	Chlorendic Acid	9	22%	Mann-Kendall	6	0.60	NST
	Phenolics	9	67%	Logistic	0.0038	0.28	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	12	0.25	NST
	Total Organic Halides	9	0%	Mann-Kendall	0	1.00	NST
B1L	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	22%	Mann-Kendall	-8	0.47	NST
	Phenolics	9	33%	Mann-Kendall	12	0.25	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	-12	0.25	NST
	Total Organic Halides	9	0%	Mann-Kendall	-18	0.08	NST
C1U	Benzoic Acid	9	89%	Logistic	-0.24	0.94	NST
	Chlorendic Acid	9	11%	Mann-Kendall	2	0.92	NST
	Phenolics	9	44%	Mann-Kendall	-15	0.14	NST
	Total Chlorobenzoic Acid	9	33%	Mann-Kendall	-15	0.14	NST
	Total Organic Halides	9	0%	Mann-Kendall	-24	**0.02**	Decreasing
C1M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	11%	Mann-Kendall	-6	0.60	NST
	Phenolics	9	78%	Logistic	0.01	0.25	NST
	Total Chlorobenzoic Acid	9	78%	Logistic	-0.0022	0.54	NST
	Total Organic Halides	9	0%	Mann-Kendall	-31	**0.0018**	Decreasing
C1L	Benzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	8	25%	Mann-Kendall	1	1.00	NST
	Phenolics	8	63%	Logistic	0.01	0.14	NST
	Total Chlorobenzoic Acid	8	13%	Mann-Kendall	8	0.39	NST
	Total Organic Halides	8	0%	Mann-Kendall	-12	0.17	NST
D3U	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	0%	Mann-Kendall	0	1.00	NST
	Phenolics	9	89%	Logistic	0.01	0.35	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	0%	Mann-Kendall	-12	0.25	NST
D2M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	22%	Mann-Kendall	2	0.92	NST
	Phenolics	9	33%	Mann-Kendall	-12	0.25	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	-8	0.47	NST
	Total Organic Halides	9	0%	Mann-Kendall	-14	0.18	NST
D1L	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	11%	Mann-Kendall	9	0.40	NST
	Total Chlorobenzoic Acid	9	89%	Logistic	-0.0041	0.46	NST
	Total Organic Halides	9	11%	Mann-Kendall	0	1.00	NST

TABLE 2.7

RESULTS OF STATISTICAL TREND ANALYSES MONITORING EVALUATION
FIRST QUARTER 2002
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

Location	*Analyte*	*Number of Observations*	*Percentage Non-Detect*	*Trend Test*			
				Method	*Test Statistic*	*Probability*	*Conclusion*
E3U	Benzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	8	50%	Logistic	0.01	0.13	NST
	Phenolics	9	78%	Logistic	0.01	0.21	NST
	Total Chlorobenzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	33%	Mann-Kendall	-4	0.75	NST
E3M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	78%	Logistic	0.0032	0.40	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	44%	Mann-Kendall	8	0.47	NST
E2L	Benzoic Acid	--	--	--	--	--	--
	Chlorendic Acid	--	--	--	--	--	--
	Phenolics	--	--	--	--	--	--
	Total Chlorobenzoic Acid	--	--	--	--	--	--
	Total Organic Halides	--	--	--	--	--	--
F4U	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	89%	Logistic	0.24	0.94	NST
	Phenolics	9	78%	Logistic	0.0033	0.40	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	11%	Mann-Kendall	-14	0.18	NST
F1M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	89%	Logistic	0.01	0.35	NST
	Total Chlorobenzoic Acid	9	89%	Logistic	0.0044	0.45	NST
	Total Organic Halides	9	44%	Mann-Kendall	0	1.00	NST
F2L	Benzoic Acid	--	--	--	--	--	--
	Chlorendic Acid	--	--	--	--	--	--
	Phenolics	--	--	--	--	--	--
	Total Chlorobenzoic Acid	--	--	--	--	--	--
	Total Organic Halides	--	--	--	--	--	--
G4U	Benzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	8	100%	Non-Detect	ND	ND	ND
	Phenolics	8	88%	Logistic	0.01	0.36	NST
	Total Chlorobenzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	8	50%	Logistic	0.01	0.12	NST
G1M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	56%	Logistic	0.00060	0.89	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	56%	Logistic	0.00073	0.87	NST
G1L	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	33%	Mann-Kendall	13	0.21	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	11%	Mann-Kendall	16	0.12	NST

TABLE 2.7

RESULTS OF STATISTICAL TREND ANALYSES MONITORING EVALUATION
FIRST QUARTER 2002
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

Location	Analyte	Number of Observations	Percentage Non-Detect	Trend Test: Method	Trend Test: Test Statistic	Trend Test: Probability	Trend Test: Conclusion
H1U	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	44%	Mann-Kendall	13	0.21	NST
	Phenolics	9	89%	Logistic	0.01	0.35	NST
	Total Chlorobenzoic Acid	9	67%	Logistic	0.01	0.15	NST
	Total Organic Halides	9	11%	Mann-Kendall	-12	0.25	NST
H2M	Benzoic Acid	9	89%	Logistic	-0.0021	0.66	NST
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	67%	Logistic	0.0039	0.28	NST
	Total Chlorobenzoic Acid	9	0%	Mann-Kendall	14	0.18	NST
	Total Organic Halides	9	11%	Mann-Kendall	4	0.75	NST
H3L	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	67%	Logistic	0.0039	0.28	NST
	Total Chlorobenzoic Acid	9	44%	Mann-Kendall	-9	0.40	NST
	Total Organic Halides	9	11%	Mann-Kendall	-4	0.75	NST
J1U	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	89%	Logistic	0.01	0.35	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	67%	Logistic	-0.24	0.94	NST
J2M	Benzoic Acid	9	56%	Logistic	0.0039	0.24	NST
	Chlorendic Acid	9	56%	Logistic	0.19	0.96	NST
	Phenolics	9	11%	Mann-Kendall	8	0.47	NST
	Total Chlorobenzoic Acid	9	0%	Mann-Kendall	24	**0.02**	Increasing
	Total Organic Halides	9	0%	Mann-Kendall	18	0.08	NST
J3L	Benzoic Acid	9	11%	Mann-Kendall	9	0.40	NST
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	11%	Mann-Kendall	-4	0.75	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	16	0.12	NST
	Total Organic Halides	9	0%	Mann-Kendall	-12	0.25	NST

Notes:

ND: Parameter not detected at this location. No trend analysis performed.
NST: No statistically significant ($P<0.05$) trend detected.
Increasing: Statistically significant ($P<0.05$) increasing trend detected.
Decreasing: Statistically significant ($P<0.05$) decreasing trend detected.
Logistic: Logistic regression used for trend test (>= 50%ND).
Mann-Kendall: Mann Kendall method used for trend test (<50%ND).
--: No data collected at wells E2L and F2L during the past 2 years.
Data used for the statistical tests include monitoring events from 1999 to present.

TABLE 2.8

COMPARSION OF STATISTICAL TREND ANALYSES
(FOUR QUARTERS OF YEAR 2001 AND FIRST QUARTER OF 2001 EVALUATIONS)
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

		First Quarter 2001		*Second Quarter 2001*		*Third Quarter 2001*		*Fourth Quarter 2001*		*First Quarter 2002*	
Location	***Analyte***	***Number of Samples***	***Conclusion***	***Number of Samples***	***Conclusion***	***Number of Samples***	***Conclusion***	***Number of Samples***	***Conclusion***	***Number of Samples***	***Conclusion***
B1U	Chlorendic Acid	9	NST	10	NST	11	NST	8	Increasing	9	NST
	Total Organic Halides	9	NST	10	NST	11	NST	8	Decreasing	9	Decreasing
B1M	Total Chlorobenzoic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Total Organic Halides	9	Decreasing	10	Decreasing	11	NST	8	NST	9	NST
B1L	No Trends	--	--	--	--	--	--	--	--	--	--
C1U	Phenolics	9	NST	10	Decreasing	11	Decreasing	8	NST	9	NST
	Total Organic Halides	9	NST	10	NST	11	NST	8	NST	9	Decreasing
C1M	Chlorendic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Total Chlorobenzoic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Total Organic Halides	9	NST	10	NST	11	NST	8	Decreasing	9	Decreasing
C1L	Total Chlorobenzoic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Total Organic Halides	9	Decreasing	10	Decreasing	11	Decreasing	8	NST	9	NST
D3U	No Trends	--	--	--	--	--	--	--	--	--	--
D2M	Phenolics	9	NST	10	NST	11	NST	8	Decreasing	9	NST
D1L	No Trends	--	--	--	--	--	--	--	--	--	--
E3U	No Trends	--	--	--	--	--	--	--	--	--	--
E3M	No Trends	--	--	--	--	--	--	--	--	--	--
E2L	No Data	--	--	--	--	--	--	--	--	--	--
F4U	Total Organic Halides	9	NST	10	NST	11	Decreasing	8	Decreasing	9	NST
F1M	Total Organic Halides	9	NST	10	NST	11	Decreasing	8	NST	9	NST
F2L	No Data	--	--	--	--	--	--	--	--	--	--
G4U	No Trends	--	--	--	--	--	--	--	--	--	--
G1M	No Trends	--	--	--	--	--	--	--	--	--	--
G1L	Total Organic Halides	9	Decreasing	10	Decreasing	11	NST	8	NST	9	NST
H1U	No Trends	--	--	--	--	--	--	--	--	--	--
H2M	Total Organic Halides	9	Decreasing	10	NST	11	NST	8	NST	9	NST
H3L	Total Organic Halides	9	Decreasing	10	Decreasing	11	Decreasing	8	NST	9	NST
J1U	No Trends	--	--	--	--	--	--	--	--	--	--

TABLE 2.8

COMPARSION OF STATISTICAL TREND ANALYSES
(FOUR QUARTERS OF YEAR 2001 AND FIRST QUARTER OF 2001 EVALUATIONS)
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

		First Quarter 2001		*Second Quarter 2001*		*Third Quarter 2001*		*Fourth Quarter 2001*		*First Quarter 2002*	
Location	*Analyte*	*Number of Samples*	*Conclusion*	*Number of Samples*	*Conclusion*	*Number of Samples*	*Conclusion*	*Number of Samples*	*Conclusion*	*Number of Samples*	*Conclusion*
J2M	Benzoic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Phenolics	9	Decreasing	10	Decreasing	11	NST	8	NST	9	NST
	Total Chlorobenzoic Acid	9	Decreasing	10	NST	11	NST	8	Increasing	9	Increasing
	Total Organic Halides	9	Decreasing	10	NST	11	NST	8	NST	9	NST
J3L	Total Chlorobenzoic Acid	9	NST	10	NST	11	NST	8	Increasing	9	NST

Notes:

No Trends: No statistically significant trends identified to date for any of the analytes.
No Data: No data collected at this well for the year 2001 sampling rounds.
NST: No statistically significant ($P<0.05$) trend detected.
Increasing: Statistically significant ($P<0.05$) increasing trend detected.
Decreasing: Statistically significant ($P<0.05$) decreasing trend detected.

TABLE 3.1

HYDRAULIC GRADIENT SUMMARY
APL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well Pair	01/02/02			01/10/02			01/16/02			01/24/02		
	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)
ABP-2-ABP-1	549.10	539.88	9.22	551.19	539.95	11.24	552.60	539.78	12.82	551.62	539.91	11.71
ABP-4-ABP-3	551.41	566.51	-15.10	549.45	556.51	-7.06	551.71	556.91	-5.20	552.70	567.22	-14.52
ABP-6-ABP-5	565.81	564.34	1.47	567.52	564.08	3.44	567.01	564.24	2.77	567.13	564.55	2.58
ABP-8-ABP-7	521.83	533.81	-11.98	521.83	535.51	-13.68	521.93	535.96	-14.03	521.94	535.91	-13.97

Well Pair	01/29/02			02/13/02			02/20/02			02/28/02		
	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)
ABP-2-ABP-1	551.90	539.78	12.12	553.10	529.68	23.42	553.30	539.18	14.12	551.85	540.16	11.69
ABP-4-ABP-3	552.01	567.31	-15.30	551.71	567.31	-15.60	552.91	567.91	-15.00	552.36	567.00	-14.64
ABP-6-ABP-5	567.11	564.44	2.67	568.31	564.64	3.67	567.71	565.34	2.37	567.25	564.70	2.55
ABP-8-ABP-7	522.43	535.31	-12.88	521.63	536.01	-14.38	521.93	536.01	-14.08	522.01	536.00	-13.99

Well Pair	03/07/02			03/20/02			03/27/02		
	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)	Inner Elevation (feet AMSL)	Outer Elevation (feet AMSL)	Hydraulic Gradient(1)
ABP-2-ABP-1	553.80	539.68	14.12	553.95	539.53	14.42	552.70	539.38	13.32
ABP-4-ABP-3	553.61	567.21	-13.60	552.45	567.51	-15.06	550.91	567.11	-16.20
ABP-6-ABP-5	567.51	564.84	2.67	567.54	564.76	2.78	568.01	564.94	3.07
ABP-8-ABP-7	521.93	535.71	-13.78	521.89	535.34	-13.45	521.83	535.41	-13.58

Note:
(1) - Negative number indicates an inward gradient measured in feet.
AMSL - Above Mean Sea Level.

TABLE 3.2

WELL PURGING AND SAMPLING EVENT
APL PLUME CONTAINMENT SYSTEM
FIRST QUARTER 2002
HYDE PARK RRT PROGRAM

Well I.D.	*Sample I.D.*	*Sample Date*	*Sample Tme*	*Initial Water Level (ft. BTOC)*	*Depth of Well (ft. BTOC)*	*Standing Well Volume (Gallons)*	*Purge Volume (Gallons)*	*Purge Method*	*Sample Parameters*				*Final Water Quality*	*Comp Cont (%)*	*Comments*
									pH (s.u.)	*Cond (uS/cm)*	*Temp (°C)*	*Turbidity (NTU)*			
AFW-1U	AFW-1U202	02/14/02	12:30	18.85	-	6.6	14	-	7.78	1070	10.5	-	cloudy	11	
AFW-1M	AFW-1M202	02/14/02	11:30	48.75	-	5.2	10.2	-	7.91	2110	10.6	-	cloudy	13	
AFW-2U	AFW-2U202	02/14/02	10:30	15.35	-	29.0	114	-	7.88	1240	9.9	-	clear	24.1	
AFW-3U	AFW-3U202	02/14/02	9:30	18.58	-	19.0	95	-	7.47	989	11.7	-	clear, odorless	17.6	
AFW-3L	AFW-3L202	02/14/02	8:30	97.20	-	5.2	26	-	7.23	2230	10.6	-	cloudy, slight odor	11.1	
APW-1	APW-1202	02/14/02	14:30	-	-	-	-	-	7.73	2880	9.6	-	clear	13.9	
APW-2	APW-2202	02/14/02	13:30	-	-	-	-	-	7.77	2480	10.7	-	clear	9	

Notes:

Comp Cont	Composite Contribution. Portion of Composite Sample from indicated well.
Cond	Specific Conductivity.
Cont	Contribution.
Dup	Duplicate Sample.
ft. BTOC	Feet Below Top of Casing.
MS/MSD	Matrix Spike / Matrix Spike Duplicate.
NTU	Normal Turbidity Units.
s.u.	Standard pH Units.
Temp	Temperature.

TABLE 3.3

COMPOSITE SAMPLE VOLUME DETERMINATION
APL PLUME CONTAINMENT SYSTEM
FIRST QUARTER - 2002
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

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

	Sample Location:		***#1COMP***
	Sample ID:		***#1COMP202***
	Sample Date:		***02/14/02***
	Unit	***Monitoring Level***	
APL Plume Monitoring Parameter			
Phenolics (Total)	ug/L	50	1.23
2,4,5-Trichlorophenol	ug/L	10	ND 10
2,4-Dichlorophenol	ug/L	10	ND 10
2-Chlorophenol	ug/L	10	ND 10
Benzene	ug/L	10	ND 10
Hexachlorocyclohexanes*	ug/L	10	ND 10
Hexachlorocyclohexanes*	ug/L	10	ND 10
		Detection Level	
APL Flux Parameters			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/l	500	668
Decachlorobiphenyl	ppb		-
Polychlorobiphenyls as Aroclor 1248**	ug/L	1	ND 0.01
Perchloropentacyclodecane (Mirex)	ug/L	1	ND 1
Chloroform	ug/L	10	ND 5
Perchlorobiphenyls (Aroclor 1248**)	ppb	1.0	-
Perchloropentacyclodecane (Mirex)	ug/L	1.0	-
Chloroform	ug/L	1.0	-

Notes:
NDx - Not detected at or above x
* - Analyzed for alpha-, beta-, gamma-, and delta-Hexachlorocyclohexanes.
** - Analyzed for tri-, tetra-, and penta-chlorobiphenyls and reported as Aroclor 1248.

TABLE 3.5

ANALYTICAL RESULTS SUMMARY
APL PLUME CONTAINMENT SYSTEM - APW COLLECTED APL MONITORING
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

	Sample Location:		***APW-1***	***APW-2***
	Sample ID:		***APW1202***	***APW2202***
	Sample Date:		***02/14/02***	***02/14/02***
	Unit	***Monitoring Level***		
Collected Liquids Monitoring Parameters				
Chloride	mg/L	1000	1400	1300
Total Organic Carbon (TOC)	mg/L	200	1.5	1.7
Phenolics (Total)	mg/L	10	0.182	0.0603
Total Organic Halides (TOX)	ug/L	500	644 J	328 J
alpha-BHC	ug/L	10	2.50 U	2.50 U
beta-BHC	ug/L	10	2.50 U	2.50 U
delta-BHC	ug/L	10	2.50 U	2.50 U
gamma-BHC (Lindane)	ug/L	10	2.50 U	2.50 U
Mirex	ug/L		-	-
2-Chlorotoluene	ug/L	10	4.44	9.54
3-Chlorotoluene	ug/L	10	3.00 U	3.00 U
4-Chlorotoluene	ug/L	10	3.00 U	3.20
Chlorobenzene	ug/L	10	18.8	16.3
m-Monochlorobenzotrifluoride	ug/L	10	3.00 U	3.00 U
o-Monochlorobenzotrifluoride	ug/L	10	3.00 U	3.00 U
p-Monochlorobenzotrifluoride	ug/L	10	3.00 U	5.04
1,2,3,4-Tetrachlorobenzene	ug/L	10	5.00 U	5.00 U
1,2,3-Trichlorobenzene	ug/L	10	3.00 U	3.00 U
1,2,4,5-Tetrachlorobenzene	ug/L	10	5.00 U	5.00 U
1,2,4-Trichlorobenzene	ug/L	10.0	3.00 U	3.00 U
1,3,5-Trichlorobenzene	ug/L	10.0	3.00 U	3.00 U
2,4,5-Trichlorophenol	ug/L	10.0	10.0 U	10.0 U
Octachlorocyclopentene	ug/L	10	10.0 U	10.0 U
Acids				
2-Chlorobenzoic acid	mg/L	100	0.0250 U	0.0250 U
3-Chlorobenzoic acid	mg/L	100	0.0300 U	0.0300 U
4-Chlorobenzoic acid	mg/L	100	0.005 U	0.005 U
Benzoic acid	mg/L	100	0.0250 U	0.0250 U
Chlorendic acid	mg/L	250	0.435	0.108

Notes:
xU - Not detected at or above x
* - Analyzed for alpha-, beta-, gamma-, and delta-Hexachlorocyclohexanes.
** - Analyzed for tri-, tetra-, and penta-chlorobiphenyls and reported as Aroclor 1248.

TABLE 4.1

HYDRAULIC GRADIENT SUMMARY
OVERBURDEN BARRIER COLLECTION SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well Pair	*01/02/02*			*01/10/02*			*01/16/02*			*01/24/02*		
	Inner Elevation (feet AMSL)	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*
OMW-1-OMW-2	600.07	603.69	-3.62	601.89	603.43	-1.54	601.57	604.39	-2.82	601.47	602.50	-1.03
OMW-3-OMW-4R	dry	589.33	NA	dry	590.09	NA	dry	590.33	NA	dry	590.45	NA
OMW-5R-OMW-6	582.25	585.67	-3.42	582.61	586.27	-3.66	582.75	586.22	-3.47	582.97	585.99	-3.02
OMW-8R2-OMW-7	586.81	584.89	1.92	587.05	585.08	1.97	587.21	585.04	2.17	587.16	585.24	1.92
OMW-10R-OMW-9	586.69	587.37	-0.68	586.83	588.06	-1.23	586.79	587.97	-1.18	586.71	587.92	-1.21
OMW-11R-OMW-12R	590.77	590.15	0.62	591.47	590.81	0.66	591.67	591.30	0.37	592.08	591.17	0.91
OMW-13R-OMW-14R	592.24	591.52	0.72	592.99	591.54	1.45	592.79	591.52	1.27	593.33	591.37	1.96
OMW-15-OMW-16R	601.64	603.93	-2.29	602.54	605.00	-2.46	601.74	604.03	-2.29	602.79	604.34	-1.55

Well Pair	*01/29/02*			*02/13/02*			*02/20/02*			*02/28/02*		
	Inner Elevation (feet AMSL)	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*
OMW-1-OMW-2	601.27	604.29	-3.02	601.57	604.29	-2.72	601.17	604.39	-3.22	601.48	602.62	-1.14
OMW-3-OMW-4R	587.07	590.53	-3.46	588.07	590.33	-2.26	587.77	590.83	-3.06	dry	590.61	NA
OMW-5R-OMW-6	583.05	586.07	-3.02	583.05	586.17	-3.12	583.25	586.27	-3.02	583.07	586.06	-2.99
OMW-8R2-OMW-7	587.31	584.99	2.32	587.41	584.99	2.42	587.31	585.09	2.22	587.14	585.20	1.94
OMW-10R-OMW-9	586.49	587.67	-1.18	586.69	587.97	-1.28	586.69	587.87	-1.18	586.68	587.93	-1.25
OMW-11R-OMW-12R	592.07	591.25	0.82	592.07	592.05	0.02	592.37	592.15	0.22	592.06	591.23	0.83
OMW-13R-OMW-14R	593.24	591.32	1.92	593.04	592.62	0.42	593.64	591.92	1.72	593.38	591.31	2.07
OMW-15-OMW-16R	602.94	604.03	-1.09	603.24	604.23	-0.99	603.24	604.13	-0.89	602.79	604.31	-1.52

TABLE 4.1

HYDRAULIC GRADIENT SUMMARY
OVERBURDEN BARRIER COLLECTION SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well Pair	*03/07/02*			*03/20/02*			*03/27/02*		
	Inner Elevation (feet AMSL)	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Inner Elevation (feet AMSL)*	*Outer Elevation (feet AMSL)*	*Hydraulic Gradients(1)*
OMW-1-OMW-2									
OMW-3-OMW-4R	600.97	604.39	-3.42	600.54	604.36	-3.82	600.57	604.29	-3.72
OMW-5R-OMW-6	587.77	591.03	-3.26	589.20	590.77	-1.57	588.17	590.63	-2.46
OMW-8R2-OMW-7	582.85	586.27	-3.42	582.74	586.00	-3.26	582.45	586.07	-3.62
OMW-10R-OMW-9	587.31	584.89	2.42	587.11	584.77	2.34	587.01	584.89	2.12
OMW-11R-OMW-12R	586.49	587.87	-1.38	586.59	587.69	-1.10	586.69	588.37	-1.68
OMW-13R-OMW-14R	592.17	591.95	0.22	592.08	591.13	0.95	591.67	591.65	0.02
OMW-15-OMW-16R	593.34	591.32	2.02	593.53	591.33	2.20	593.14	591.22	1.92
	603.24	604.13	-0.89	603.12	604.07	-0.95	602.94	604.13	-1.19

Well Pair	*January 2002*			*February 2002*			*March 2002*		
	Bedrock Elevation (feet AMSL)	*Overburden Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Bedrock Elevation (feet AMSL)*	*Overburden Elevation (feet AMSL)*	*Hydraulic Gradients(1)*	*Bedrock Elevation (feet AMSL)*	*Overburden Elevation (feet AMSL)*	*Hydraulic Gradients(1)*
AB1U-OMW-6	553.34	586.27	-32.93	555.24	586.06	-30.82	553.73	586.00	-32.27
B1U-OMW-8R2	567.40	587.05	-19.65	567.27	587.14	-19.87	567.44	587.11	-19.67
B1U-OMW-9	567.40	585.08	-17.68	567.27	585.20	-17.93	567.44	584.77	-17.33
D1U-OMW-11R	579.56	591.47	-11.91	579.88	592.06	-12.18	580.06	592.08	-12.02
E4U-OMW-14R	588.86	591.54	-2.68	589.03	591.31	-2.28	588.85	591.33	-2.48

Notes:
(1) - Negative number indicates an inward / downward gradient measured in feet.
NA - not applicable.
AMSL - Above Mean Sea Level.

TABLE 4.2

OVERBURDEN BARRIER COLLECTION SYSTEM
NAPL PRESENCE MONITORING
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well I.D.	*1st Quarter 1998*	*2nd Quarter 1998*	*3rd Quarter 1998*	*4th Quarter 1998*	*1st Quarter 1999*	*2nd Quarter 1999*	*3rd Quarter 1999*	*4th Quarter 1999*	*1st Quarter 2000*	*2nd Quarter 2000*	*3rd Quarter 2000*	*4th Quarter 2000*	*1st Quarter 2001*	*2nd Quarter 2001*	*3rd Quarter 2001*	*4th Quarter 2001*	*1st Quarter 2002*
OMW1	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW3	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW5	NO	NO	NO	NO	NO	-	-	-	-	-	-	-	-	-	-	-	-
OMW5R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW6	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW8	NO	NO	NO	NO	NO	-	-	-	-	-	-	-	-	-	-	-	-
OMW8R	-	-	-	-	-	NO	-	-	-	-	-	-	-	-	-	-	-
OMW8R2	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW9	NO	NO	NO	NO	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	NO	NO	NO	NO
OMW11	NO	NO	NO	NO *	NO	NO	NO	NO	-	-	-	-	-	-	-	-	-
OMW11R	-	-	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW12	NO	NO	NO	NO *	NO	-	-	-	-	-	-	-	-	-	-	-	-
OMW12R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW13	NO	NO	NO	NO *	NO	NO	-	-	-	-	-	-	-	-	-	-	-
OMW13R	-	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW14	NO	NO	NO	NO *	NO	-	-	-	-	-	-	-	-	-	-	-	-
OMW14R	-	-	-	-	-	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
OMW15	NO	NO	NO	NO *	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	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.
NO Not Observed.

TABLE 4.3

HYDRAULIC GRADIENT SUMMARY
COMMUNITY MONITORING PROGRAM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Well Pair	***January 2002***			***February 2002***			***March 2002***		
	Bedrock Elevation (feet AMSL)	***Overburden Elevation (feet AMSL)***	***Hydraulic Gradients(1)***	***Bedrock Elevation (feet AMSL)***	***Overburden Elevation (feet AMSL)***	***Hydraulic Gradients(1)***	***Bedrock Elevation (feet AMSL)***	***Overburden Elevation (feet AMSL)***	***Hydraulic Gradients(1)***
CMW-1SH-CMW-1OB	564.33	572.26	-7.93	565.02	572.74	-7.72	565.27	572.85	-7.58
CMW-2SH-CMW-2OB	567.24	588.60	-21.36	567.09	589.28	-22.19	566.91	589.15	-22.24
CMW-3SH-CMW-3OB	550.36	573.62	-23.26	550.49	573.72	-23.23	550.36	576.89	-26.53
CMW-4SH-CMW-4OB	566.95	572.95	-6.00	567.33	572.93	-5.60	566.98	574.35	-7.37
CMW-5SH-CMW-5OB	577.32	579.01	-1.69	578.01	579.73	-1.72	577.91	580.14	-2.23
CMW-6SH-CMW-6OB	562.38	570.81	-8.43	562.89	570.37	-7.48	563.94	570.99	-7.05
CMW-7SH-CMW-7OB	599.74	606.66	-6.92	600.10	dry	N / A	600.76	dry	N / A
CMW-8SH-CMW-8OB	609.21	dry	N / A	611.57	dry	N / A	611.36	dry	N / A
CMW-9SH-CMW-9OB	560.62	570.12	-9.50	560.60	570.04	-9.44	560.49	569.61	-9.12
CMW-11SH-CMW-11OB	565.54	570.79	-5.25	565.66	571.10	-5.44	565.56	571.31	-5.75
CMW-12SH-CMW-12OB	568.08	576.36	-8.28	567.88	582.45	-14.57	568.19	586.97	-18.78

Notes:
(1) - Negative number indicates an inward / downward gradient measured in feet.
N / A - not applicable.
AMSL - Above Mean Sea Level.

TABLE 4.4

QUARTERLY SOIL AIR MONITORING ANALYTICAL RESULTS
COMMUNITY MONITORING PROGRAM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

	Sample Location:	*CMW-7OB*	*CMW-8OB*
	Sample ID:	*CMW7302*	*CMW8302*
	Sample Date:	*03/05/02*	*03/05/02*
Parameter	***Unit***		
2-Chlorotoluene	mg/m3	0.0013 U	0.0013 U
Chlorobenzene	mg/m3	0.0013 U	0.0013 U
m-Monochlorobenzotrifluoride	mg/m3	0.0013 U	0.0013 U
o-Monochlorobenzotrifluoride	mg/m3	0.0013 U	0.0013 U
p-Monochlorobenzotrifluoride	mg/m3	0.0013 U	0.0013 U

Notes:
xU-Non-detect at associated value.

TABLE 5.1

LEACHATE TREATMENT SYSTEM DAILY EFFLUENT MONITORING DATA
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

	Operating	TOC* - mg/L						PHENOL** - mg/L						Effluent		
Date	Hours	C.B. Feed	1st Instg.	2nd Instg.	3rd Instg.	4th Instg.	Effluent	C.B. Feed	1st Instg.	2nd Instg.	3rd Instg.	4th Instg.	Effluent	pH	Gallons	Comments
01/01/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/02/02	10	-	-	-	-	-	2.9	-	0.0462 J	0.0300 J	-	-	0.314 J	7.34	207,000	
01/03/02	10	-	-	-	-	-	1.5	-	0.0352 J	-	-	-	0.0171 J	7.42	350,000	
01/04/02	10	-	-	-	-	-	1.0 U	-	0.139 J	-	-	-	0.0207 J	7.53	43,000	
01/05/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/06/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/07/02	10	-	-	-	-	-	3.0	-	0.164 J	0.0217 J	-	-	0.0182 J	7.74	201,000	
01/08/02	10	-	-	-	-	-	2.5	-	0.0215 J	-	-	-	0.00570 J	7.35	226,000	
01/09/02	10	-	-	-	-	-	2.2	-	0.0261 J	-	-	-	0.356 J	7.32	185,000	
01/10/02	10	-	-	-	-	-	1.8	-	0.0236 J	-	-	-	0.00573 J	7.55	216,000	
01/11/02	10	-	-	-	-	-	2.1	-	0.0370 J	-	-	-	0.00852 J	7.56	194,000	
01/12/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/13/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/14/02	10	-	-	-	-	-	1.9	-	0.0234 J	0.0162 J	-	-	0.0228 J	7.78	180,000	
01/15/02	10	-	-	-	-	-	3.5	-	0.0228 J	-	-	-	0.00687 J	7.5	195,000	
01/16/02	10	-	-	-	-	-	1.3	-	0.0123 J	-	-	-	0.0112 J	7.3	162,000	
01/17/02	10	-	-	-	-	-	2.1	-	0.0117 J	-	-	-	0.0175 J	7.4	138,000	
01/18/02	10	-	-	-	-	-	1.2	-	0.0166 J	-	-	-	0.0114 J	7.38	176,000	
01/19/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/20/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/21/02	10	-	-	-	-	-	3.2	-	0.0489 J	0.0135 J	-	-	0.0121 J	7.63	197,000	
01/22/02	10	-	-	-	-	-	2.6	-	0.0136 J	-	-	-	0.0130 J	7.8	218,000	
01/23/02	10	-	-	-	-	-	1.0 U	-	0.0199 J	-	-	-	0.0193 J	7.73	207,000	
01/24/02	10	-	-	-	-	-	1.0 U	-	0.0378 J	-	-	-	0.220 J	7.72	212,000	
01/25/02	10	-	-	-	-	-	1.0 U	-	0.310 J	-	-	-	0.192 J	7.68	213,000	
01/26/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/27/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
01/28/02	10	-	-	-	-	-	1.6	-	0.310 J	0.224 J	-	-	0.194 J	7.57	342,000	
01/29/02	10	-	-	-	-	-	1.0	-	0.0161 J	-	-	-	0.196 J	7.12	208,000	
01/30/02	10	-	-	-	-	-	3.1 J	-	0.247 J	-	-	-	0.220 J	7.59	179,000	
01/31/02	10	-	-	-	-	-	1.2 U	-	0.0452 J	-	-	-	0.233 J	7.23	206,000	
02/01/02	10	-	-	-	-	-	1.8	-	0.125	-	-	-	0.0950	7.23	208,000	
02/02/02	10	-	-	-	-	-	1.2	-	0.215	-	-	-	0.0716	7.34	216,000	
02/03/02	10	-	-	-	-	-	1.0 U	-	0.102	-	-	-	0.0147	7.32	206,000	
02/04/02	10	-	-	-	-	-	1.0 U	-	0.0157	0.183	-	-	0.220	7.4	195,000	
02/05/02	10	-	-	-	-	-	2.3	-	0.162	0.124	-	-	0.0769	7.52	212,000	

TABLE 5.1

LEACHATE TREATMENT SYSTEM DAILY EFFLUENT MONITORING DATA
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

	Operating	TOC* - mg/L						PHENOL** - mg/L						Effluent		
Date	Hours	C.B. Feed	1st Instg.	2nd Instg.	3rd Instg.	4th Instg.	Effluent	C.B. Feed	1st Instg.	2nd Instg.	3rd Instg.	4th Instg.	Effluent	pH	Gallons	Comments
02/06/02	10	-	-	-	-	-	2.1	-	0.118	-	-	-	0.0602	7.44	213,000	
02/07/02	10	-	-	-	-	-	2.7	-	0.127	-	-	-	0.0737	7.41	213,000	
02/08/02	10	-	-	-	-	-	3.0	-	0.135	-	-	-	0.0715	6.74	207,000	
02/09/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
02/10/02	10	-	-	-	-	-	2.5	-	0.0782	-	-	-	0.0517	7.85	187,000	
02/11/02	10	-	-	-	-	-	2.9	-	0.714	0.158	-	-	0.0450	7.71	335,000	
02/12/02	10	-	-	-	-	-	1.8	-	0.143	-	-	-	0.0771	7.57	323,000	
02/13/02	10	-	-	-	-	-	1.0 U	-	0.108	-	-	-	0.0668	7.5	221,000	
02/14/02	10	-	-	-	-	-	1.0 U	-	0.0616	-	-	-	0.144	7.61	217,000	
02/15/02	10	-	-	-	-	-	1.1	-	0.0305	-	-	-	0.296	7.68	217,000	
02/16/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
02/17/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
02/18/02	20	-	-	-	-	-	1.3	-	0.135	0.0537	-	-	0.0702	7.65	161,000	
02/19/02	20	-	-	-	-	-	1.5	-	0.325	-	-	-	0.0763	7.62	247,000	
02/20/02	20	-	-	-	-	-	1.0 U	-	0.0707	-	-	-	0.0456	7.05	318,000	
02/21/02	20	-	-	-	-	-	2.2	-	0.348	-	-	-	0.0942	7.15	301,000	
02/22/02	20	-	-	-	-	-	1.9	-	0.378	-	-	-	0.127	7.12	309,000	
02/23/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
02/24/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
02/25/02	20	-	-	-	-	-	1.9	-	0.372	0.137	-	-	0.154	7.29	299,000	
02/26/02	20	-	-	-	-	-	1.9	-	0.306	-	-	-	0.153	7.44	319,000	
02/27/02	20	-	-	-	-	-	1.9	-	3.13	-	-	-	0.203	7.48	242,000	
02/28/02	20	-	-	-	-	-	1.7	-	3.67	-	-	-	0.125	7.48	161,000	
03/01/02	10	-	-	-	-	-	2.3	-	0.213	-	-	-	0.0500 U	7.57	153,000	
03/02/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
03/03/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
03/04/02	12	-	-	-	-	-	1.9	-	0.0331	0.194	-	-	0.0269	7.27	270,000	
03/05/02	20	-	11	4.6	-	-	3.2	-	0.353	0.189	-	-	0.235	7.44	328,000	
03/06/02	20	-	-	-	-	-	1.5	-	-	-	-	-	0.134	7.21	315,000	
03/07/02	20	-	-	-	-	-	1.3	-	0.439	-	-	-	0.172	6.9	283,000	
03/08/02	20	-	-	-	-	-	1.0 U	-	0.0274	-	-	-	0.163	7.21	186,000	
03/09/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
03/10/02	10	-	-	-	-	-	2.1	-	0.385	-	-	-	0.181	7.01	156,000	
03/11/02	10	-	-	-	-	-	2.5	-	1.63	0.310	-	-	0.144	7.1	301,000	
03/12/02	10	-	-	-	-	-	1.8	-	0.263	-	-	-	0.174	7.1	233,000	

TABLE 5.1

LEACHATE TREATMENT SYSTEM DAILY EFFLUENT MONITORING DATA
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

	Operating	TOC* - mg/L						PHENOL** - mg/L						Effluent		
Date	Hours	C.B. Feed	1st Instg.	2nd Instg.	3rd Instg.	4th Instg.	Effluent	C.B. Feed	1st Instg.	2nd Instg.	3rd Instg.	4th Instg.	Effluent	pH	Gallons	Comments
03/13/02	10	-	-	-	-	-	2.3	-	0.332	-	-	-	0.202	7.03	120,000	
03/14/02	10	-	-	-	-	-	3.3	-	0.482	-	-	-	0.138	7.15	153,000	
03/15/02	10	-	-	-	-	-	2.6	-	0.164	-	-	-	0.228	7.13	141,000	
03/16/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
03/17/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
03/18/02	20	-	-	-	-	-	2.4	-	0.0305	0.198	-	-	0.114	7.05	209,000	
03/19/02	20	-	-	-	-	-	1.8	-	0.481	-	-	-	0.159	7.13	201,000	
03/20/02	20	-	-	-	-	-	3.6	-	0.237	-	-	-	0.147	6.94	201,000	
03/21/02	20	-	-	-	-	-	2.2	-	0.237	-	-	-	0.0633	7	185,000	
03/22/02	20	-	-	-	-	-	2.4	-	0.283	-	-	-	0.204	6.91	133,000	
03/23/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
03/24/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
03/25/02	20	-	-	-	-	-	1.9	-	0.245	0.234	-	-	0.0790	7.2	188,000	
03/26/02	20	-	-	-	-	-	1.9	-	0.388	-	-	-	0.140	7.05	178,000	
03/27/02	20	-	-	-	-	-	2.7	-	0.0289	-	-	-	0.124	7.12	189,000	
03/28/02	20	-	-	-	-	-	2.8 U	-	0.0500 U	-	-	-	0.119	7.05	195,000	
03/29/02	20	-	-	-	-	-	2.2 U	-	0.712	-	-	-	0.101	7.16	204,000	
03/30/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
03/31/02	4	-	-	-	-	-	-	-	-	-	-	-	-	7.25	45,000	

Notes:
(1) TOC treatment level = 1000 mg/L.
(2) Phenol treatment level = 1 mg/L.
xU Not detected at the associated value
TOC Total Organic Carbon.

TABLE 5.2

ANALYTICAL RESULTS SUMARY
WEEKLY EFFLUENT COMPOSITE SAMPLES - LEACHATE TREATMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

Parameter	*Units*	*Treatment Level*	*01/04/02*	*01/11/02*	*01/18/02*	*01/31/02*	*02/08/02*	*02/15/02*	*02/22/02*	*03/08/02*
2-Chlorotoluene	ug/L	10	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U	3.00 U	3.00 U
3-Chlorotoluene	ug/L	10	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U	3.00 U	3.00 U
4-Chlorotoluene	ug/L	10	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U	3.00 U	3.00 U
Chlorobenzene	ug/L	10	10.0 UJ	10.0 UJ	10.0 U	1.00 UJ	10.0 U	10.0 U	10.0 U	10.0 U
m-Monochlorobenzotrifluoride	ug/L	10	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U	3.00 U	3.00 U
o-Monochlorobenzotrifluoride	ug/L	10	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U	3.00 U	3.00 U
p-Monochlorobenzotrifluoride	ug/L	10	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U	3.00 U	3.00 U
Tetrachloroethene	ug/L	10	10.0 UJ	10.0 UJ	10.0 U	1.00 UJ	10.0 U	10.0 U	10.0 U	10.0 U
Trichloroethene	ug/L	10	10.0 UJ	10.0 UJ	10.0 U	1.00 UJ	10.0 U	10.0 U	10.0 U	10.0 U

Parameter	*Units*	*Treatment Level*	*03/15/02*	*03/22/02*	*03/29/02*
2-Chlorotoluene	ug/L	10	3.00 U	3.00 U	3.00 U
3-Chlorotoluene	ug/L	10	3.00 U	3.00 U	3.00 U
4-Chlorotoluene	ug/L	10	3.00 U	3.00 U	3.00 U
Chlorobenzene	ug/L	10	10.0 U	10.0 U	10.0 U
m-Monochlorobenzotrifluoride	ug/L	10	3.00 U	3.00 U	3.00 U
o-Monochlorobenzotrifluoride	ug/L	10	3.00 U	3.00 U	3.00 U
p-Monochlorobenzotrifluoride	ug/L	10	3.00 U	3.00 U	3.00 U
Tetrachloroethene	ug/L	10	10.0 U	10.0 U	10.0 U
Trichloroethene	ug/L	10	10.0 U	10.0 U	10.0 U

Notes:
J Associated value is estimated.
xU Non-detect at associated value.

TABLE 5.3

ANALYTICAL RESULTS SUMARY
MONTHLY EFFLUENT COMPOSITE SAMPLES - LEACHATE TREATMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

		Treatment							
	Units	***Level***	***January 2002***	***January 2002***	***January 2002***	***January 2002***	***January 2002***	***February 2002***	***February 2002***
Sample Date:			***01/03/02***	***01/04/02***	***01/11/02***	***01/18/02***	***01/31/02***	***02/08/02***	***02/15/02***
Parameter									
1,2,3,4-Tetrachlorobenzene	ug/L	10	5.00 U	-	-	-	5.00 U	-	-
1,2,3-Trichlorobenzene	ug/L	10	-	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U
1,2,4,5-Tetrachlorobenzene	ug/L	10	5.00 U	-	-	-	5.00 U	-	-
1,2,4-Trichlorobenzene	ug/L	10	-	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U
1,3,5-Trichlorobenzene	ug/L	10	-	3.00 UJ	3.00 UJ	3.00 U	1.00 UJ	3.00 U	3.00 U
2,4,5-Trichlorophenol	ug/L	10	10.0 U	-	-	-	10.0 U	-	-
Hexachlorobenzene	ug/L	10	3.00 U	-	-	-	3.00 U	-	-
Hexachlorobutadiene	ug/L	10	10.0 U	-	-	-	10.0 U	-	-
Hexachlorocyclopentadiene	ug/L	10	10.0 U	-	-	-	10.0 U	-	-
Octachlorocyclopentene	ug/L		3.00 U	-	-	-	3.00 U	-	-
Pesticides									
alpha-BHC	ug/L	10	2.50 U	-	-	-	2.50 U	-	-
beta-BHC	ug/L	10	2.50 U	-	-	-	2.50 U	-	-
delta-BHC	ug/L	10	2.50 U	-	-	-	2.50 U	-	-
gamma-BHC (Lindane)	ug/L	10	2.50 U	-	-	-	2.50 U	-	-

Notes:
- \- Not available/not applicable.
- J Associated value is estimated.
- xU Non-detect at associated value.

TABLE 5.3

ANALYTICAL RESULTS SUMARY
MONTHLY EFFLUENT COMPOSITE SAMPLES - LEACHATE TREATMENT SYSTEM
FIRST QUARTER - 2002
HYDE PARK RRT PROGRAM

	Units	***Treatment Level***	***February 2002***	***February 2002***	***March 2002***	***March 2002***	***March 2002***	***March 2002***
Sample Date:			***02/22/02***	***02/28/02***	***03/08/02***	***03/15/02***	***03/22/02***	***03/29/02***
Parameter								
1,2,3,4-Tetrachlorobenzene	ug/L	10	-	5.00 U	-	-	-	5.00 U
1,2,3-Trichlorobenzene	ug/L	10	3.00 U	-	3.00 U	3.00 U	3.00 U	3.00 U
1,2,4,5-Tetrachlorobenzene	ug/L	10	-	5.00 U	-	-	-	5.00 U
1,2,4-Trichlorobenzene	ug/L	10	3.00 U	-	3.00 U	3.00 U	3.00 U	3.00 U
1,3,5-Trichlorobenzene	ug/L	10	3.00 U	-	3.00 U	3.00 U	3.00 U	3.00 U
2,4,5-Trichlorophenol	ug/L	10	-	10.0 U	-	-	-	10.0 U
Hexachlorobenzene	ug/L	10	-	3.00 U	-	-	-	3.00 U
Hexachlorobutadiene	ug/L	10	-	10.0 U	-	-	-	10.0 U
Hexachlorocyclopentadiene	ug/L	10	-	10.0 U	-	-	-	10.0 U
Octachlorocyclopentene	ug/L		-	3.00 U	-	-	-	3.00 U
Pesticides								
alpha-BHC	ug/L	10	-	2.50 U	-	-	-	2.50 U
beta-BHC	ug/L	10	-	2.50 U	-	-	-	2.50 U
delta-BHC	ug/L	10	-	2.50 U	-	-	-	2.50 U
gamma-BHC (Lindane)	ug/L	10	-	2.50 U	-	-	-	2.50 U

Notes:
- \- Not available / not applicable.
- J Associated value is estimated.
- xU Non-detect at associated value.

TABLE 6.1

MONTHLY NAPL ACCUMULATION
QUARTERLY MONITORING REPORT
HYDE PARK RRT PROGRAM

	NAPL Volume Per Decanter (Gallons)			*Manually Recovered NAPL (Gallons)*		*NAPL Removed (Gallons)*				*Disposed Total Shipped (Gallons)*
						Decanter			*Total*	
	1	*2*	*3*			*1*	*2*	*3*		
Dec-01	0	1628	1252							
Jan-02	752	1,880	1,504	25	(1)	0	0	0	0	0
Feb-02	752	3,132	1,316	23	(2)	0	0	0	0	0
Mar-02	752	3,132	1,504	44	(3)	0	0	0	0	0
1st Quarter	752	1,504	252	92		0	0	0	0	0
Apr-02	-	-	-	-		-	-	-	-	-
May-02	-	-	-	-		-	-	-	-	-
Jun-02	-	-	-	-		-	-	-	-	-
2nd Quarter	-	-	-	0		0	0	0	0	-
Jul-02	-	-	-	-		-	-	-	-	-
Aug-02	-	-	-	-		-	-	-	-	-
Sep-02	-	-	-	-		-	-	-	-	-
3rd Quarter	-	-	-	0		0	0	0	0	0
Oct-02	-	-	-	-		-	-	-	-	-
Nov-02	-	-	-	-		-	-	-	-	-
Dec-02	-	-	-	-		-	-	-	-	-
4th Quarter	-	-	-	0		0	0	0	0	0
			Year to Date:	92		0	0	0	0	0

Notes:
Manual Recoveries:
(1) January 11: PMW-3U 25.0 gals.
(2) February 7: CD1U 3.0 gals; and PMW-3U 20.0 gals.
(3) March 8: PMW-3M 4.0 gals; and PMW-3U 22.0 gals.
March 28: PMW-3U 18 gals.

APPENDIX A

INITIAL PERFORMANCE OF THE 2001 BEDROCK PURGE WELLS

Hyde Park Landfill Site
Niagara Falls, New York

Initial Performance of the 2001 Bedrock Purge Wells

Prepared For:

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

Prepared By:

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

February 8, 2002

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

Table of Contents

Page

List of Figures

Section 1
Introduction

Five new extraction wells were installed in the vicinity of the Hyde Park Landfill Site in 2001. The wells were installed to supplement the existing network of bedrock purge wells for containment of the Upper, Middle, and Lower bedrock NAPL plumes. The locations of the wells are shown on Figure 1. Four of the wells are completely new installations. Well PW-7U is a retrofit of an existing NAPL removal well.

As indicated on Figure 1, monitoring wells were also installed close to the new purge wells to monitor water level response during initial testing. Brief constant-rate pumping tests were conducted after the pilot holes for the new purge wells were completed. The tests were conducted to determine whether the 3-$^{7}/_{8}$-inch diameter pilot holes should be enlarged to a final diameter of 12 inches. The criterion for acceptance of the candidate locations was the observation of at least 0.1 feet of drawdown at the nearby monitoring wells. The criterion was satisfied at each well location, and the wells were subsequently completed and connected to the water treatment facilities.

The conceptual design basis for the wells is described in a memorandum accompanying a letter submitted to the U.S. EPA and New York State DEC on June 6, 2001 (Luxbacher, 2001). The proposed well locations were determined with the support of the numerical groundwater model of the Site (SSP&A, 2000; 2001a, 2001b).

The wells were installed in accordance with the work plan included in a letter submitted by R. Passmore to the Agencies on June 15, 2001 (Passmore, 2001). Groundwater levels and pumping rates were monitored during commissioning of each well, following the procedures outlines in SSP&A (2001c). The initial start-up of each purge well was executed as a step test, with the wells operated at three successive levels, with the third step corresponding to the final operating levels. These data are still being compiled and reviewed. After the reliability of the data has been established, the results will be used to improve the characterization of the area north of the landfill.

This report summarizes the early performance of the 2001 purge wells. In particular, the report summarizes the pumping rates observed during the first period of full operation of the wells, January 17 to January 30, 2002. The results of a simulation analysis conducted with the existing Site model and the average January 2002 pumping rates are also presented.

Section 2
2001 Purge Well Details

Final purge well locations

The final locations of the 2001 purge wells are listed below.

Purge Well	Easting	Northing
PW-7U	1026223.72	1141543.65
PW-8U	1026603.26	1141704.94
PW-9U	1026842.54	1141789.33
PW-10U	1027386.41	1141725.67
PW-8M	1026685.00	1141602.21

The final locations are close to those proposed on Figure 1 of Luxbacher (2001). In some cases, wells were moved slightly (± 25 feet) to avoid utility lines. The original location of PW-9U was deemed non-waterbearing during the NAPL presence test, and the well was moved to its final location. The borehole at the original location of PW-9U was retained as monitoring well MW-7-2001.

Purge well completion details

The open intervals of the 2001 purge wells were selected based on the existing designations of Upper, Middle, and Lower bedrock zones. The elevations of the tops and bottoms of the open intervals are indicated below.

Purge Well	Elevation, Top of Open Interval	Elevation, Bottom of Open Interval
PW-7U	564.7	532.7
PW-8U	562.7	538.8
PW-9U	561.4	547.1
PW-10U	579.8	564.8
PW-8M	553.0	512.2

Section 3
2001 Purge Well Initial Performance

Pumping from the 2001 purge wells proceeded in phases, beginning with the operation of PW-10U in November 2001. Full operation of the five new purge wells began on January 16, 2002. The startup schedule is indicated in the following table.

Well	Start of operation
PW-10U	November 11, 2001
PW-8U	December 6, 2001
PW-9U	December 11, 2001
PW-7U	January 9, 2002
PW-8M	January 16, 2002

For the purpose of evaluating containment of the NAPL plume with the augmented purge well network, pumping data have been considered for the interval from January 17 to January 30, 2002. Average daily flow rates have been determined from totalizing flowmeter measurements. We have found that the totalizing flowmeter data yield the most reliable impression of average pumping rates.

The total average daily pumping rate from the purge wells is plotted on Figure 2. The records for the individual wells are plotted on Figures 3 through 17. The average total pumping rate between January 17 and January 30, 2002 has been about 82 gpm. This is slightly larger than the total of 80.9 gpm specified in the analysis of the recommended remedial alternative (Luxbacher, 2001).

The average pumping rate at PW-10U of 1.7 gpm is relatively close to the rate of 1.1 gpm assumed in the conceptual design analysis. The remaining new Upper purge wells are pumping at rates that are lower than assumed. The observed pumping rate at PW-9U is particularly low. The factors that may have affected the yield are discussed in the Section 4 - Evaluation.

The average pumping rate at PW-8M of 9.5 gpm is somewhat greater than the rate of 7.8 gpm assumed in the conceptual design analysis. The close agreement between the assumed and observed rates lends confidence to the predictions of the existing Site groundwater model of the Middle zone.

Of particular importance for containment are the pumping rates at PW-2M and PW-1L. Well PW-2M has recently been pumping at a rate that is significantly higher than historical averages. We have reviewed both the pumping and water level records from this well extending back to the beginning of November, 2001, and it appears that an average rate of nearly 40 gpm is sustainable, compared with a historical rate of about 20 gpm.

The observed average pumping rate at PW-1L is about 9 gpm, less than half the rate assumed for the analysis of the recommended remedial alternative (20.0 gpm). It is important to remember that the rate assumed for the analysis was estimated based on our determination that it may be feasible to increase the capacity of the existing well. The average rate observed during January 17-30, 2002 is in fact slightly larger than the historical rate of 8.1 gpm (SSP&A, 2001a). The set point for the pump is currently set at an elevation of 497 ft, but the pumping level is approximately 521 ft. This suggests that it may be possible to obtain a significantly higher yield if a larger pump is installed.

Section 4
Analysis of Containment

The pumping records for the individual wells were inspected to estimate a representative rate during January 17 and 30, 2002. The average rates are listed below. For the containment analysis, the average pumping rates from January 17 to 30 were specified as input to the existing groundwater model of the Site. No other changes were made to the model.

Well	Average pumping rate (gpm)
PW-1U	0.38
PW-1L	8.75
PW-2UR	0.80
PW-2M	36.30
PW-2L	1.30
PW-3M	0.00
PW-3L	7.50
PW-4U	0.52
PW-4M	0.00
PW-5UR	4.70
PW-6UR	2.65
PW-6MR	4.90
PW-7U	2.30
PW-8U	1.20
PW-8M	9.50
PW-9U	0.05
PW-10U	1.70
Total	**82.55**

Results

The results of the containment analysis are presented on Figures 18, 19, and 20. The capture statistics are summarized in the table below. For purposes of comparison, the summary also includes the capture statistics for the average pumping rates between March 1999 and March 2000.

Containment of NAPL plume	January 2002 analysis % capture	1999-2000 analysis % capture
Upper	88.8	49.3
Middle	100.0	87.0
Lower	99.1	98.8

1. As shown on Figure 18, our analysis suggests that there has been a significant improvement in the containment in the Upper zone, from 49% to 89%.

2. The results presented on Figure 19 indicated that 100% containment has been achieved in the Middle zone.

3. As shown on Figure 20, our analysis indicates that containment has essentially been achieved in the Lower zone, with a slight increase from 98.8 to 99.1%.

Evaluation

1. The pumping rates being achieved from PW-7U, PW-8U, PW-9U, and PW-10U are somewhat lower than assumed in our conceptual design analyses. However, our analysis indicates that PW-7U, PW-8U, and PW-9U have important capture zones. The lower pumping rates at PW-7U and PW-8U are reflected on Figure 18 in existence of a gap in the capture between the two wells.

2. As indicated on Figure 18, a gap also remains in the Upper zone capture in the vicinity of purge well PW-9U. The observed pumping at PW-9U is negligible, and in our current model its performance is critical to attaining the last piece of capture to the north.

3. Although the data from the initial commissioning of the new Upper wells are still being evaluated, our preliminary review suggests that the yields from the final 12-inch diameter wells have been relatively low. There are at least three possible explanations for the low well yields:

   - The enlargement of the pilot holes may have resulted in a reduction of permeability in the vicinity of the wells.

   - NAPL may cause local reductions in the transmissivity near PW-9U. At the initial location of this well, a pocket of NAPL was encountered that could not be removed by pumping. Although a new location was selected for PW-9U, it is likely that NAPL occupies some portions of the fracture network in the vicinity of this well.

   - Both PW-9U and PW-10U were terminated above transmissive flow zones. The depths selected for completing the 12-inch wells were consistent with the criteria for Upper wells established in *Identification of the Major Hydraulic Units of the Lockport Formation* (CRA, 1993). However, the results from recent characterization studies at the Site have suggested that the two wells were terminated above an important flow zone in the Upper bedrock. The relations between the open intervals, the bedrock flow zones, and the well yields are shown on Figure 21. The recent studies provide clear evidence that flow zone FZ-6 is a key zone of elevated transmissivity. As indicated on this figure, only the very bottom of the open interval of PW-9U intersects this flow zone. The open interval of the well does not intersect any other flow zones. PW-10U is terminated above FZ-6, but the open interval does intersect the higher flow zones FZ-2, FZ-3, and FZ-4.

4. The results shown on Figures 18 and 19 indicate that the new Middle purge well, PW-8M, has extensive capture zones in the Upper and Middle zones.

5. A key difference between the purge well operations observed in January 2002 and those considered for the analysis of "Current Conditions" (March 1999 to March 2000) is the increased pumping from PW-2M. Records extending back to November 2001 confirm that PW-2M has been operating consistently at a rate almost double its historical rate.

6. The analysis of the recommended remedial alternative assumed that the pumping rate at PW-1L could be increased from about 8 gpm to 20 gpm. The results presented here suggest that the containment objectives may be achieved by increased pumping from PW-2M instead of increased pumping at PW-1L.

Section 5
Recommendations

Based on the results of the initial pumping of the new purge wells, we recommend the following.

1. The 12-inch diameter open interval of purge well PW-9U should be extended to an elevation of 535 ft AMSL (to a depth of 57 ft below ground surface, an extension of 12 ft).

2. The 12-inch diameter open interval of purge well PW-10U should be extended to an elevation of 535 ft AMSL (to a depth of 63 ft below ground surface, an extension of 22 ft).

3. After PW-9U and PW-10 should be re-developed after they have been extended.

Section 6
References

CRA, 1993. Drilling Summary Report. RRT Well Installations, Hyde Park RRT Program. Ref. No. 1069(147).

Luxbacher, G.W., 2001:
Letter from G.W. Luxbacher (Glenn Springs Holdings, Inc.) to G.M. Sosa (U.S. EPA) and C.D. Jackson (New York State DEC), June 11, 2001: *Hyde Park Remedial Program, June 6, 2001 Meeting Agreement*. This letter includes S.S. Papadopulos & Associates, Inc. memorandum dated June 6, 2001, *Simulation of proposed purge well installations following the meeting with the Agencies on June 6, 2001.*

Passmore, R., 2001:
Letter from R. Passmore (Glenn Springs Holdings, Inc.) to G.M. Sosa (U.S. EPA) and C.D. Jackson (New York State DEC), June 15, 2001: Hyde Park Remedial Program, *Purge Well Scope of Work Summary*.

S.S. Papadopulos & Associates, Inc., 2000: *Groundwater Modeling Study: Data Review and Conceptual Model*, Hyde Park Landfill Site, Niagara Falls, New York, prepared for Miller Springs Remediation Management, Inc., and Glenn Springs Holdings, Inc., October 30, 2000.

S.S. Papadopulos & Associates, Inc., 2001a: *Groundwater Modeling Study: Final Model Report*, Hyde Park Landfill Site, Niagara Falls, New York, prepared for Miller Springs Remediation Management, Inc., and Glenn Springs Holdings, Inc., February 19, 2001.

S.S. Papadopulos & Associates, Inc., 2001b: *Groundwater Modeling Study: Conceptual Evaluation of NAPL Plume Containment*, Hyde Park Landfill Site, Niagara Falls, New York, prepared for Miller Springs Remediation Management, Inc., and Glenn Springs Holdings, Inc., March 15, 2001.

S.S. Papadopulos & Associates, Inc., 2001c: *Work Plan for Data Collection During the Start of Operation of the 2001 Purge Wells*, Hyde Park Landfill Site, Niagara Falls, New York, prepared for Miller Springs Remediation Management, Inc., and Glenn Springs Holdings, Inc., March 15, 2001.

Figures

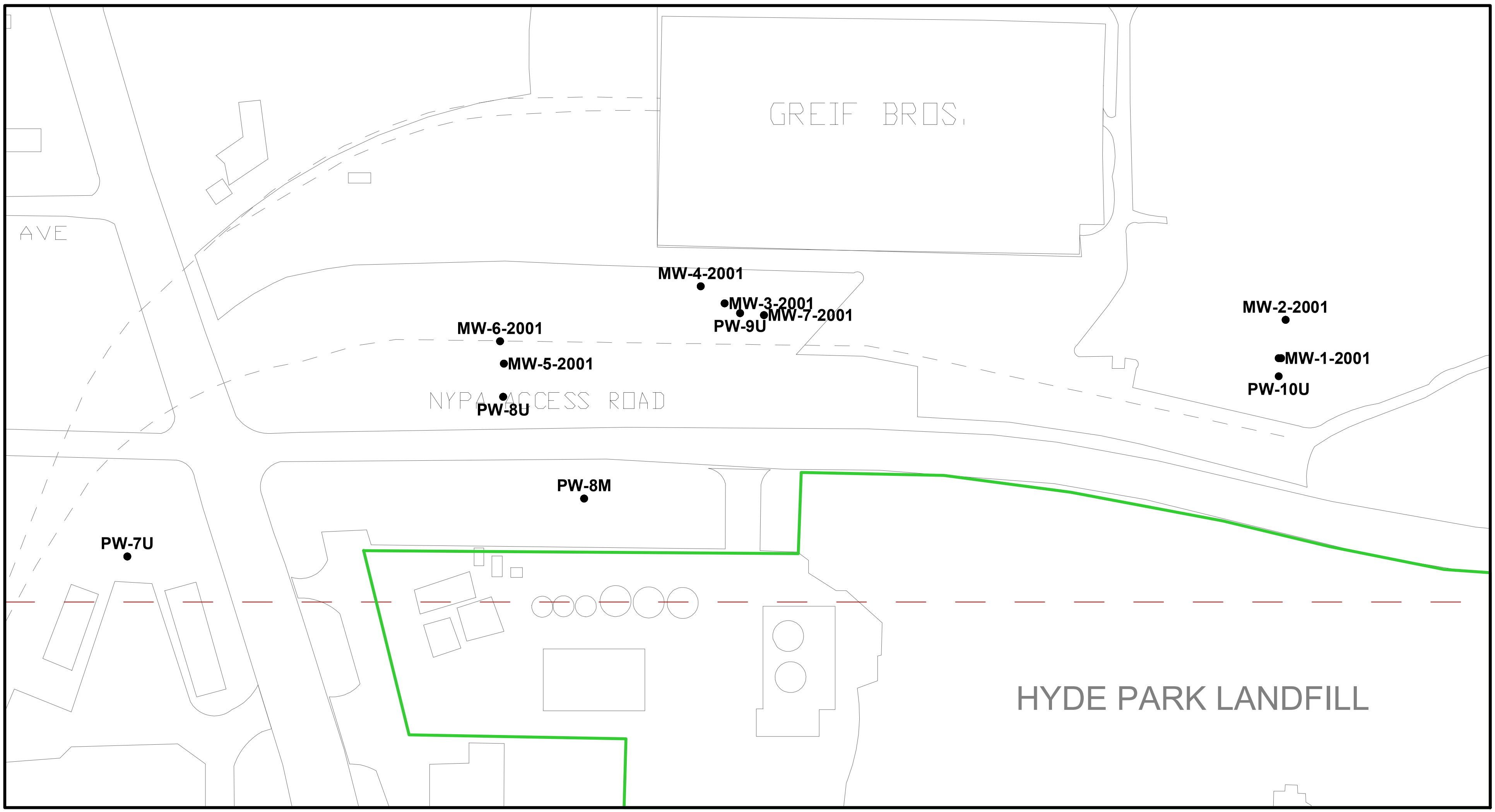


Figure 1 - 2001 Purge Well and Monitoring Well Locations

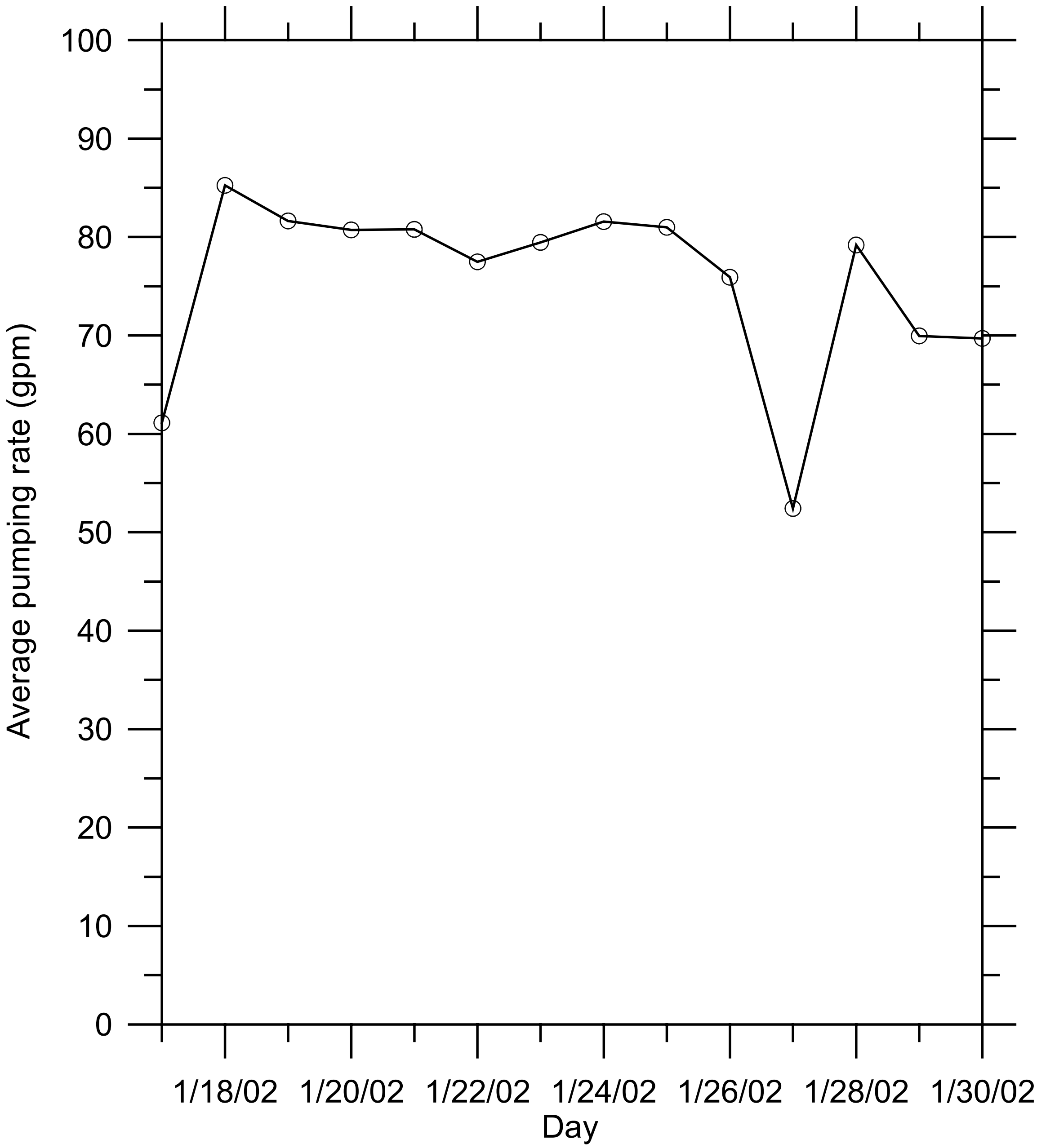


Figure 2. Total NAPL plume containment pumping, January 17-30, 2002

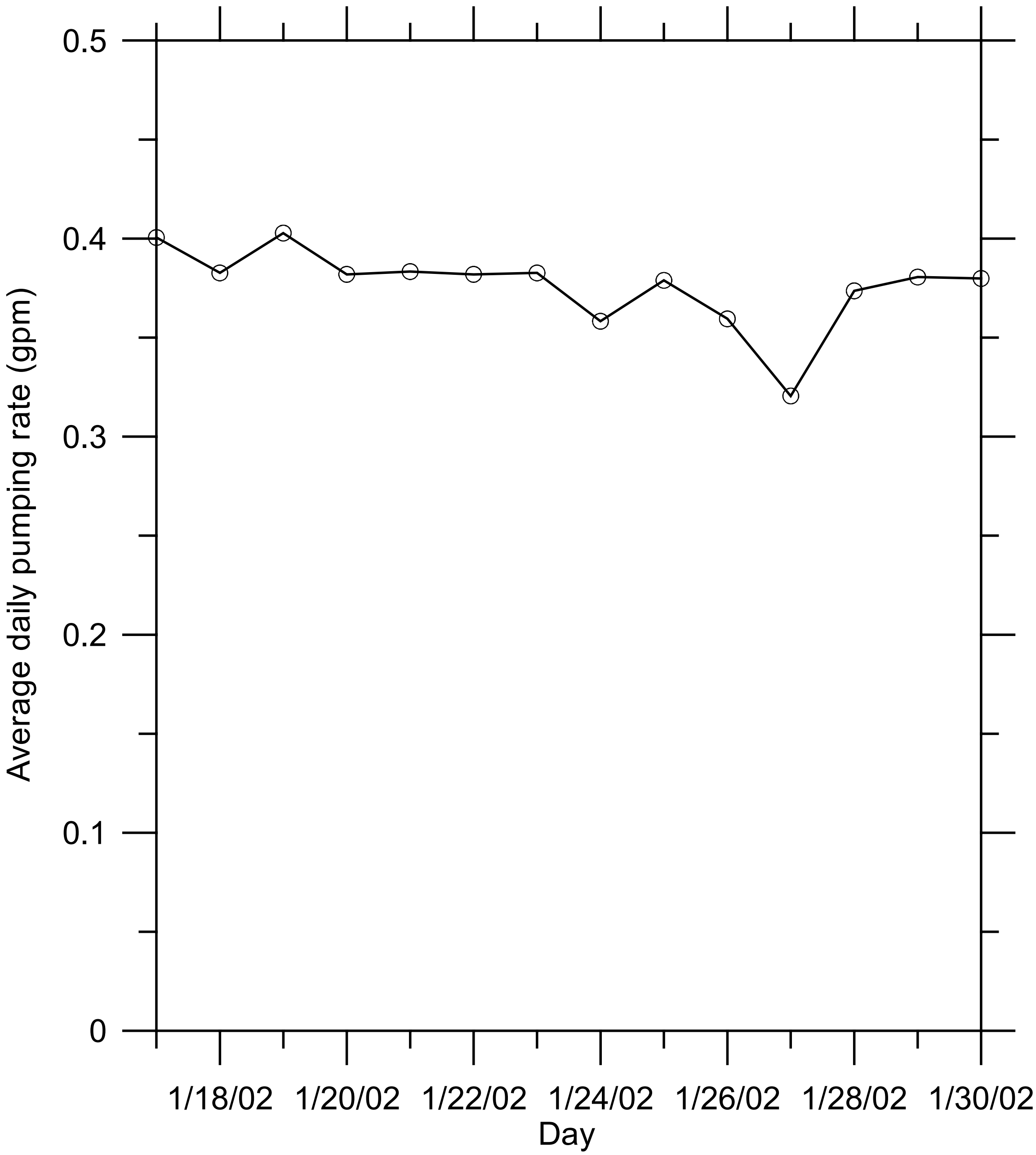


Figure 3. PW-1U pumping record, January 17-30, 2002

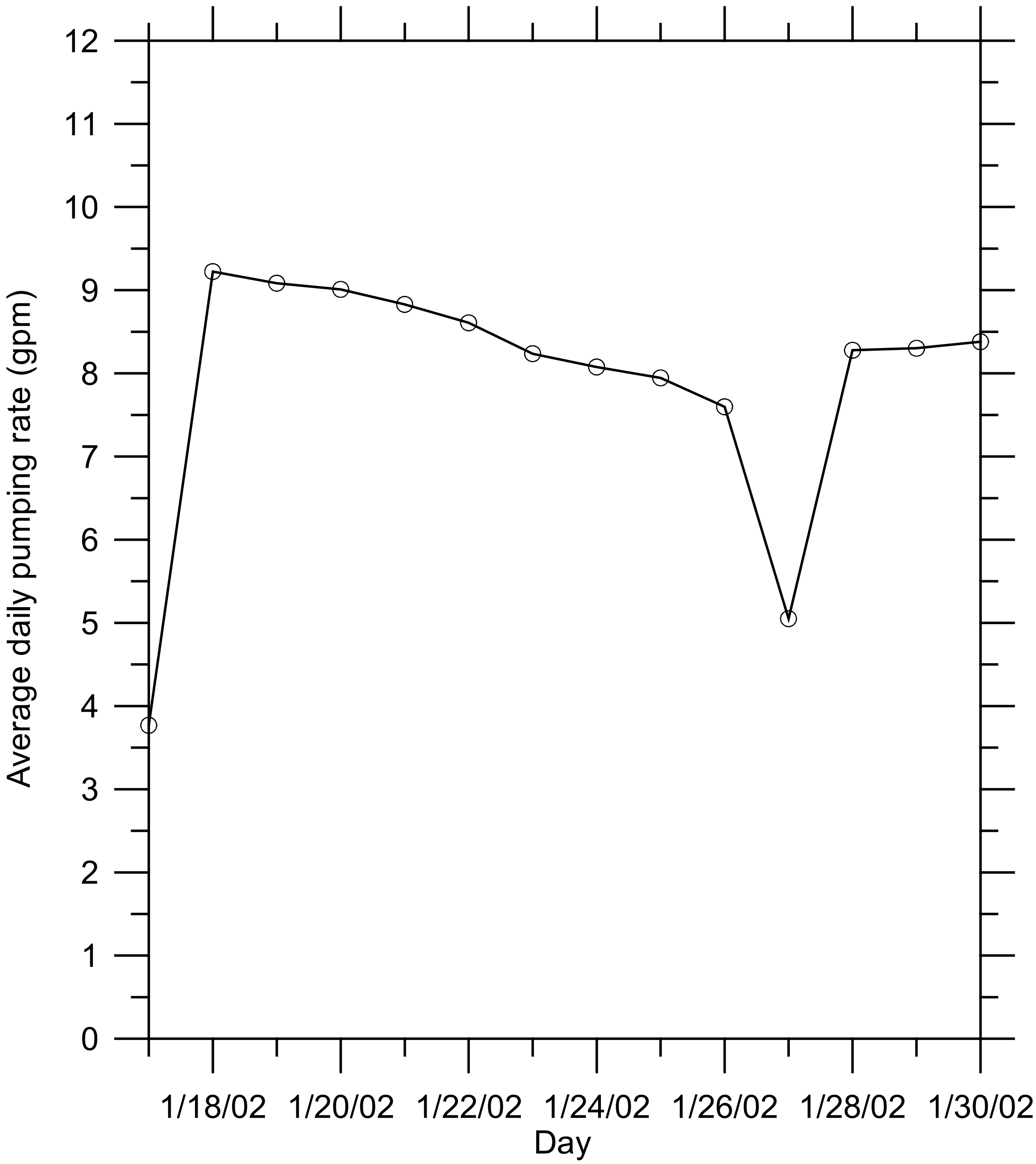


Figure 4. PW-1L pumping record, January 17-30, 2002

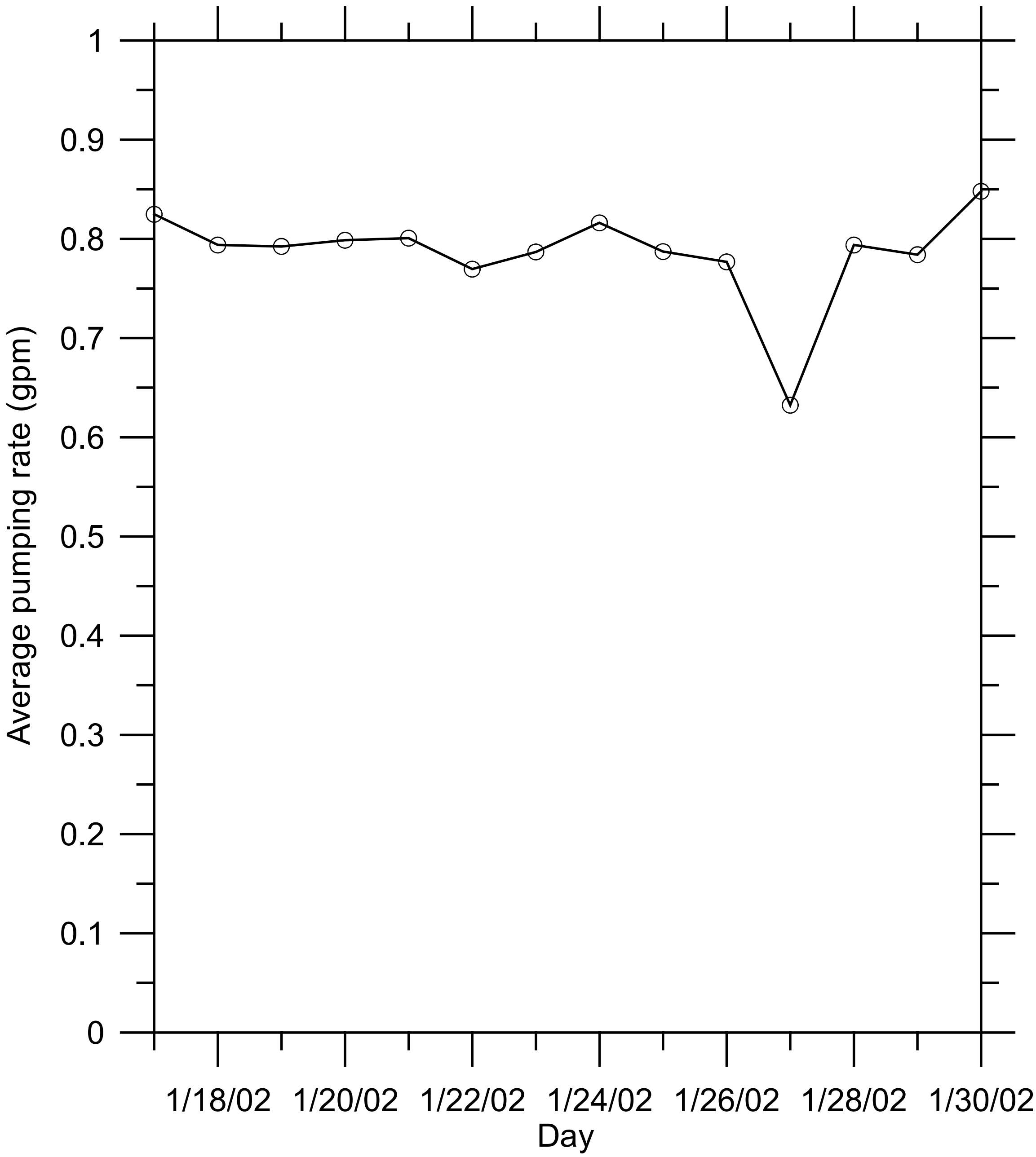


Figure 5. PW-2UR pumping record, January 17-30, 2002

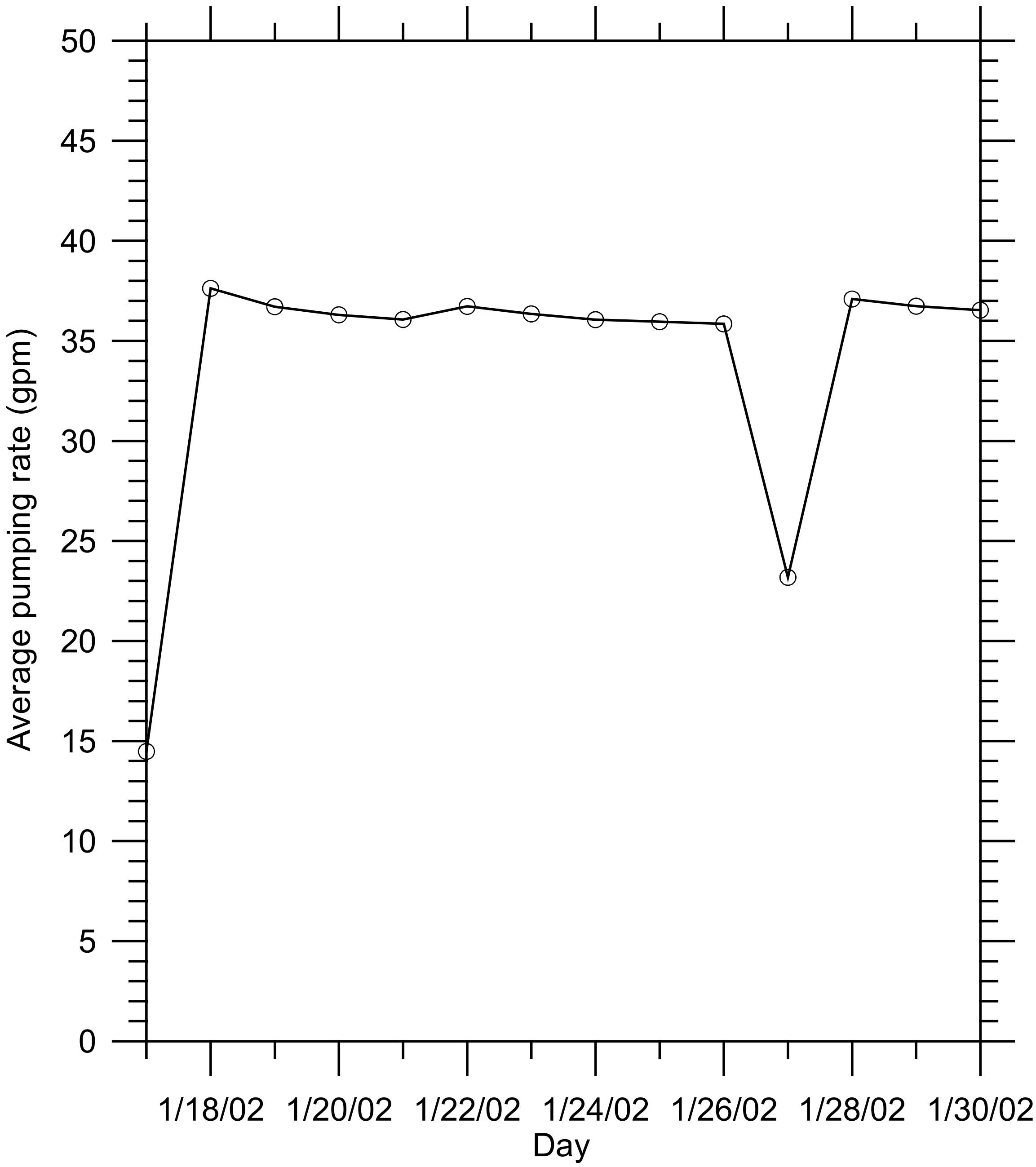


Figure 6. PW-2M pumping record, January 17-30, 2002

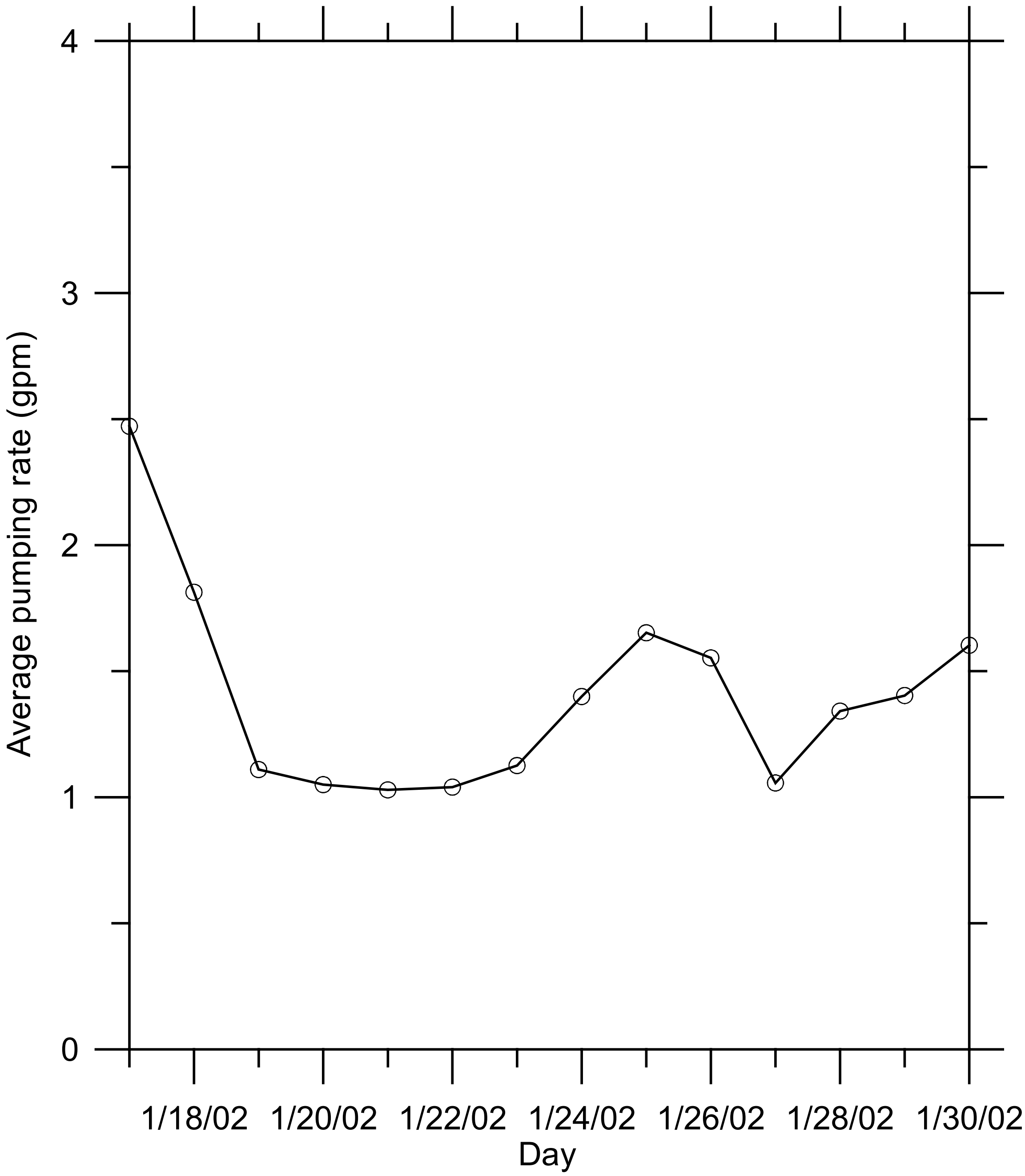


Figure 7. PW-2L pumping record, January 17-30, 2002

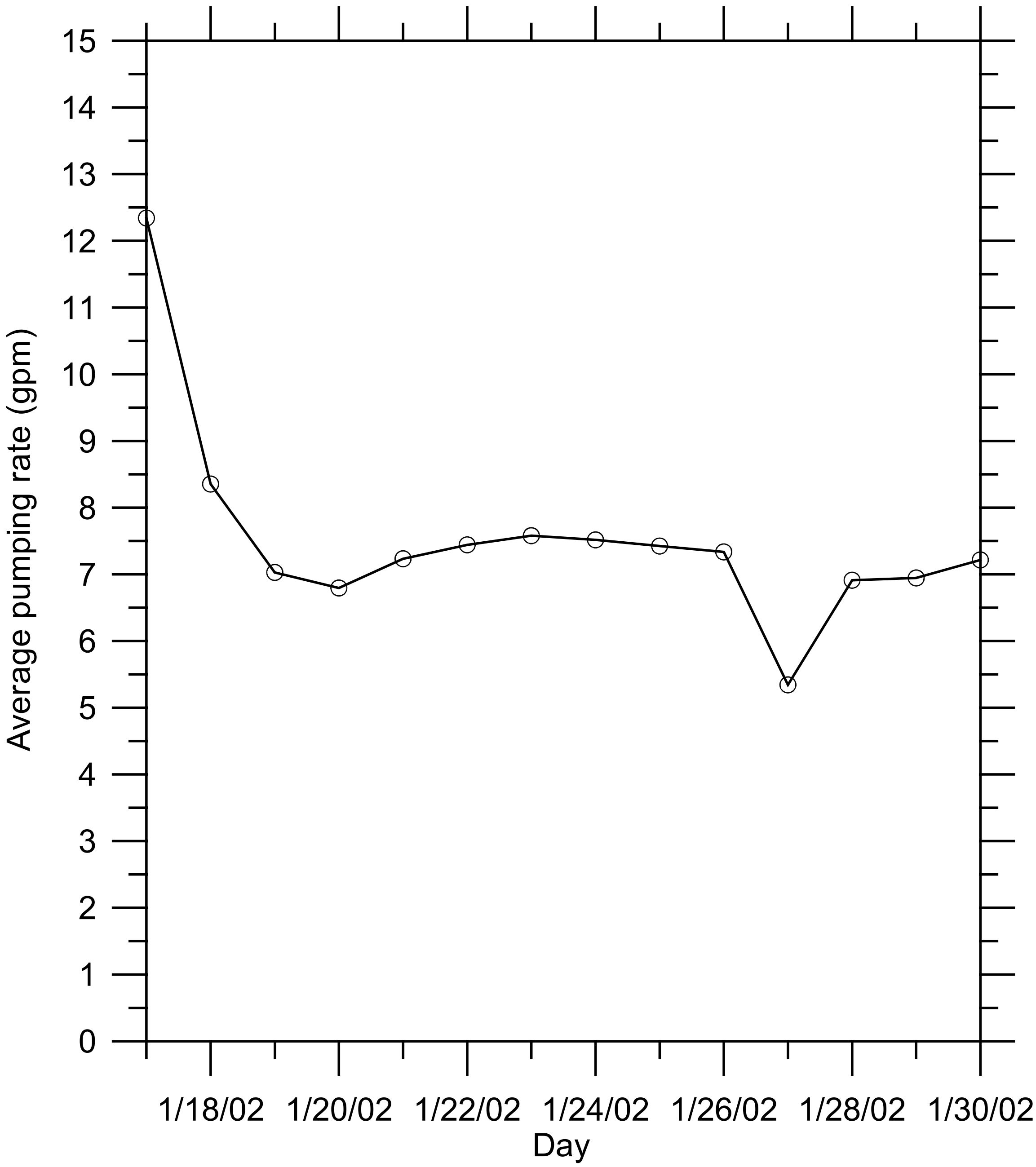


Figure 8. PW-3M pumping record, January 17-30, 2002

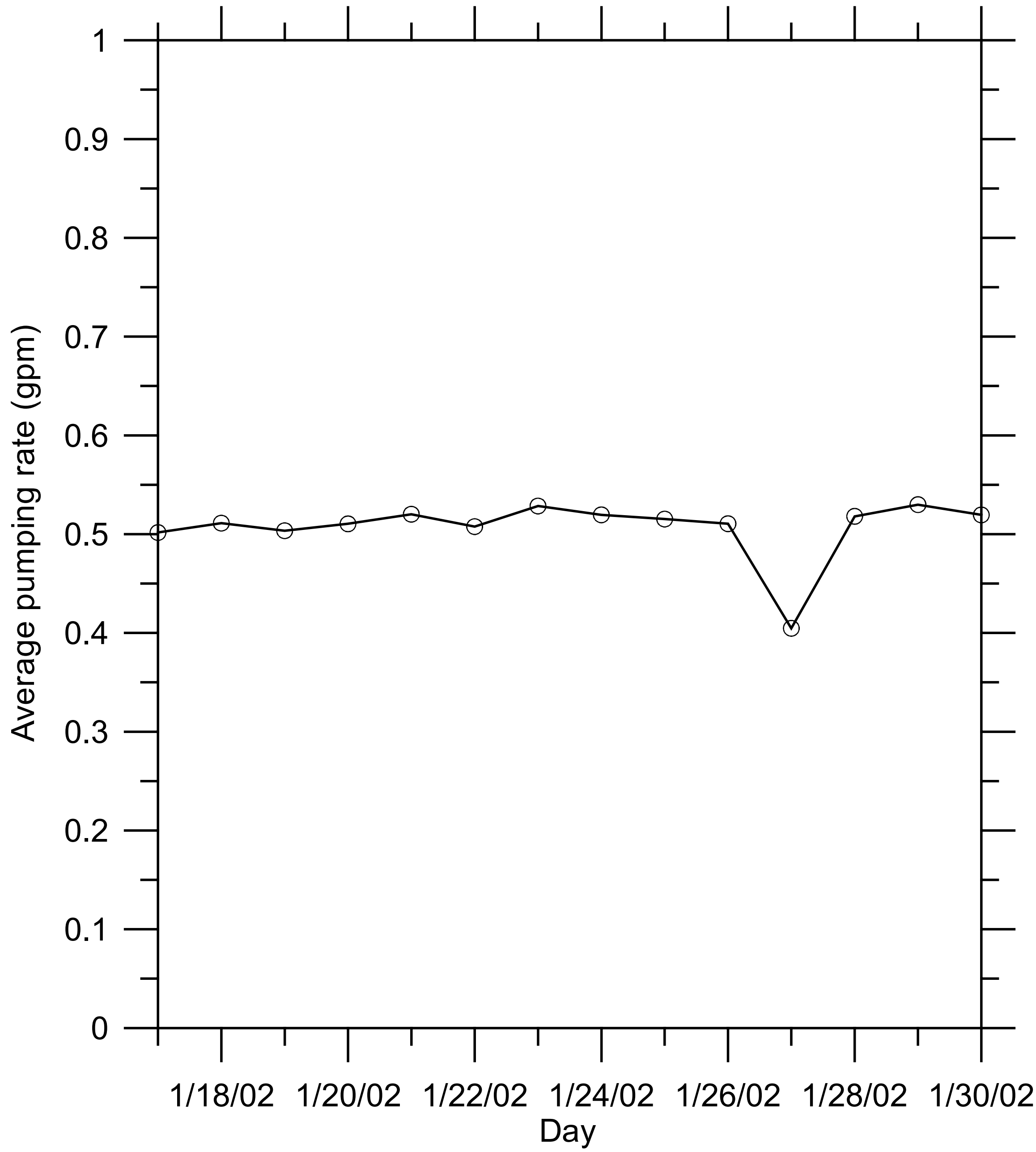


Figure 9. PW-4U pumping record, January 17-30, 2002

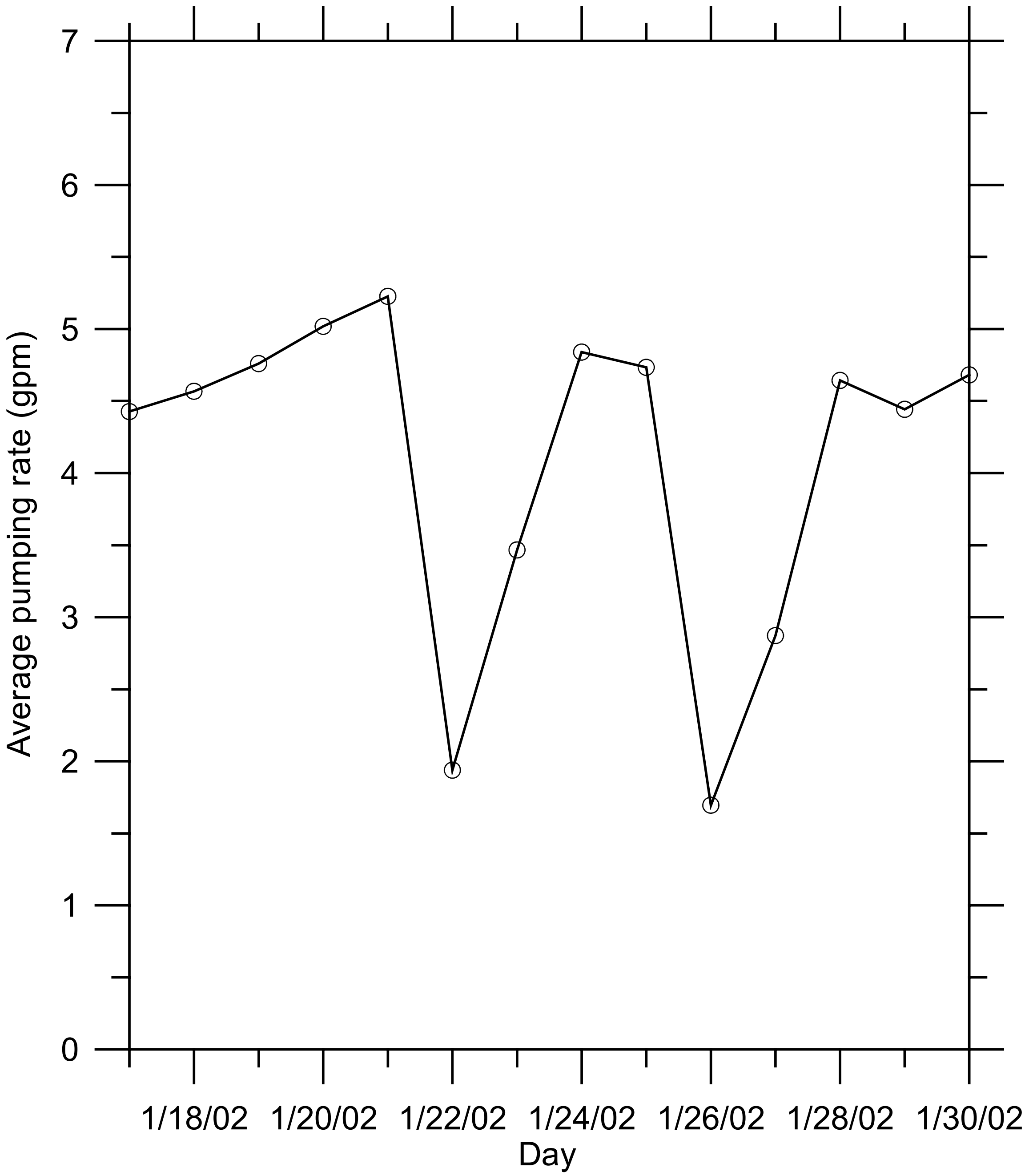


Figure 10. PW-5UR pumping record, January 17-30, 2002

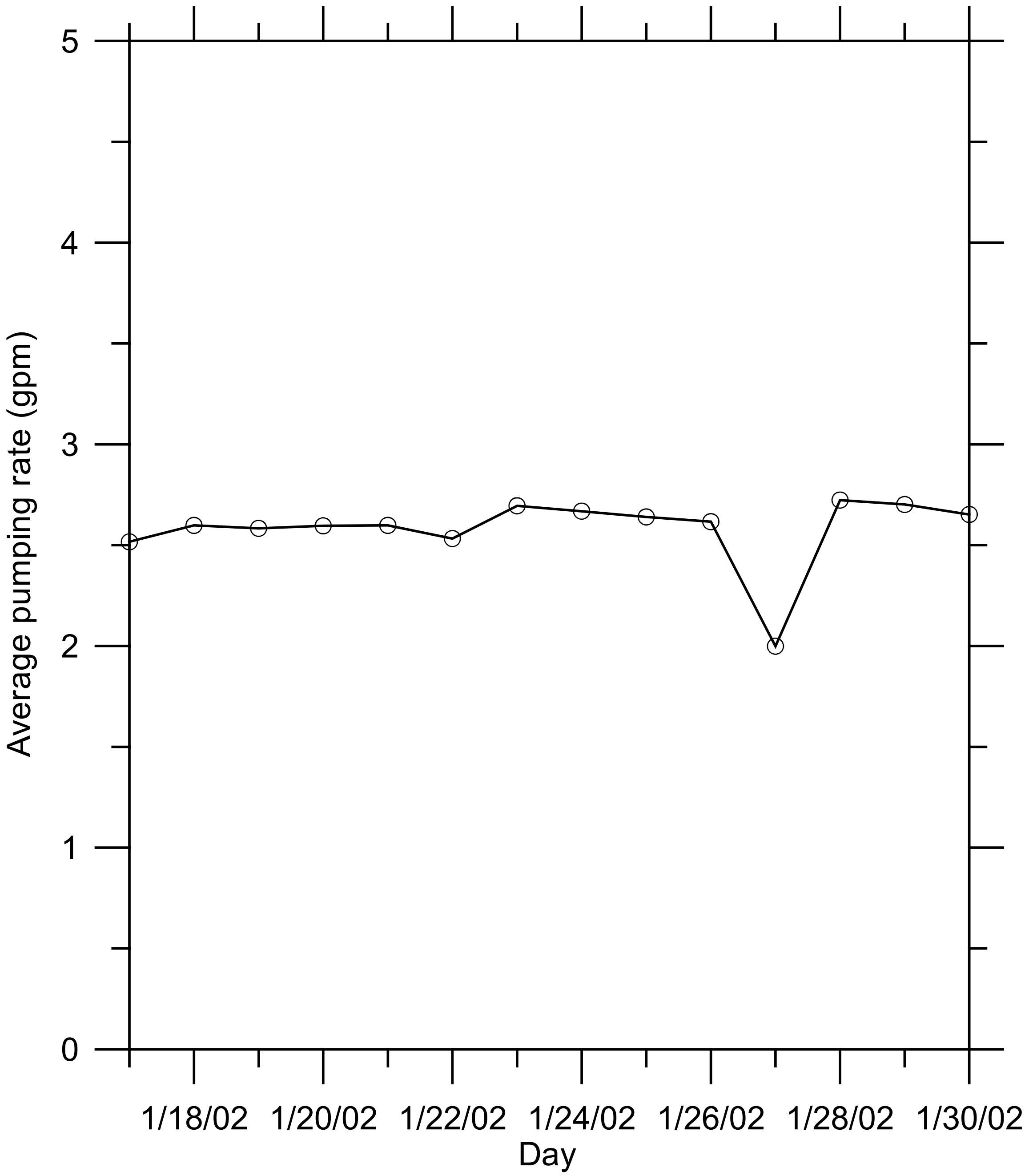


Figure 11. PW-6UR pumping record, January 17-30, 2002

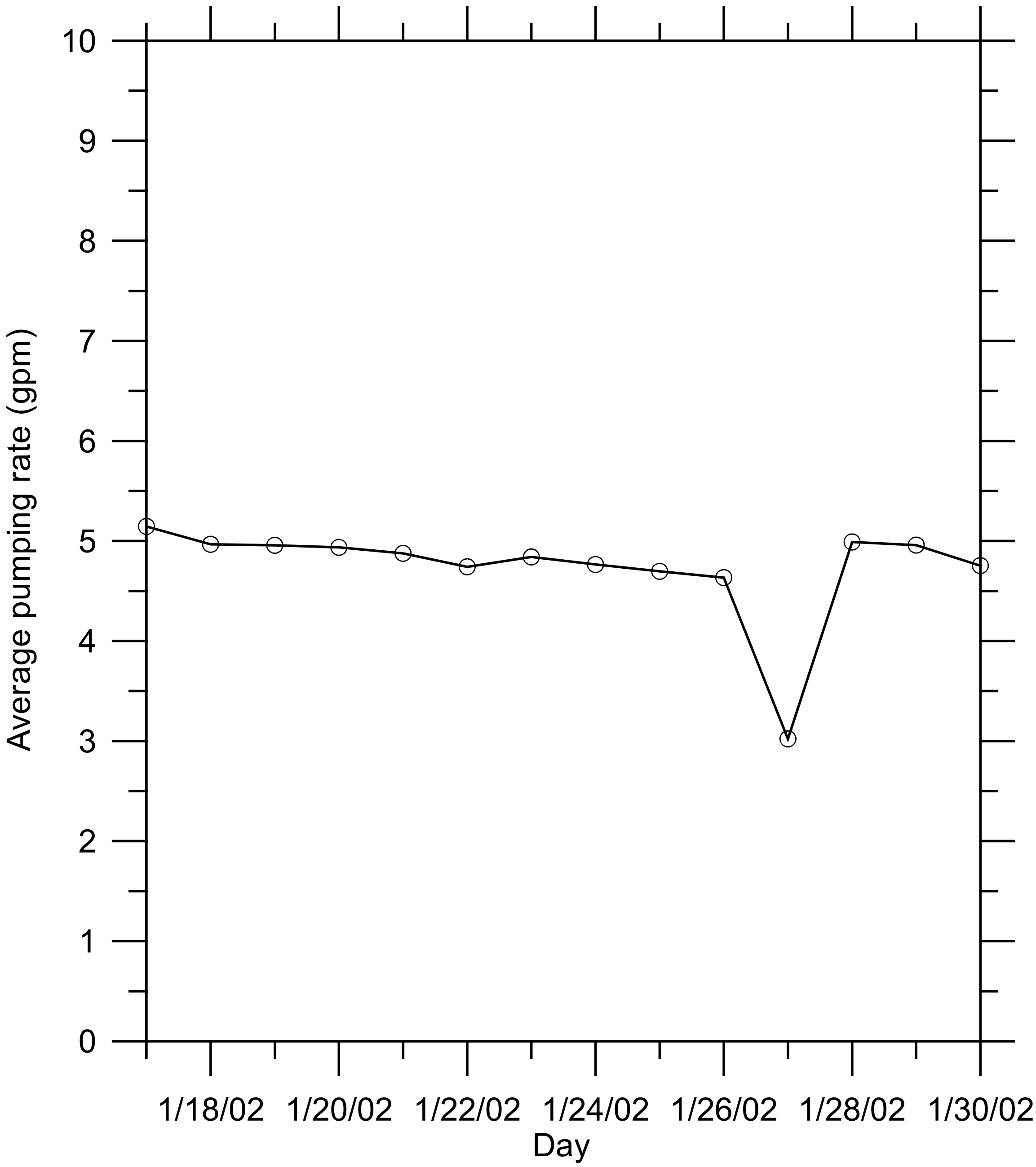


Figure 12. PW-6MR pumping record, January 17-30, 2002

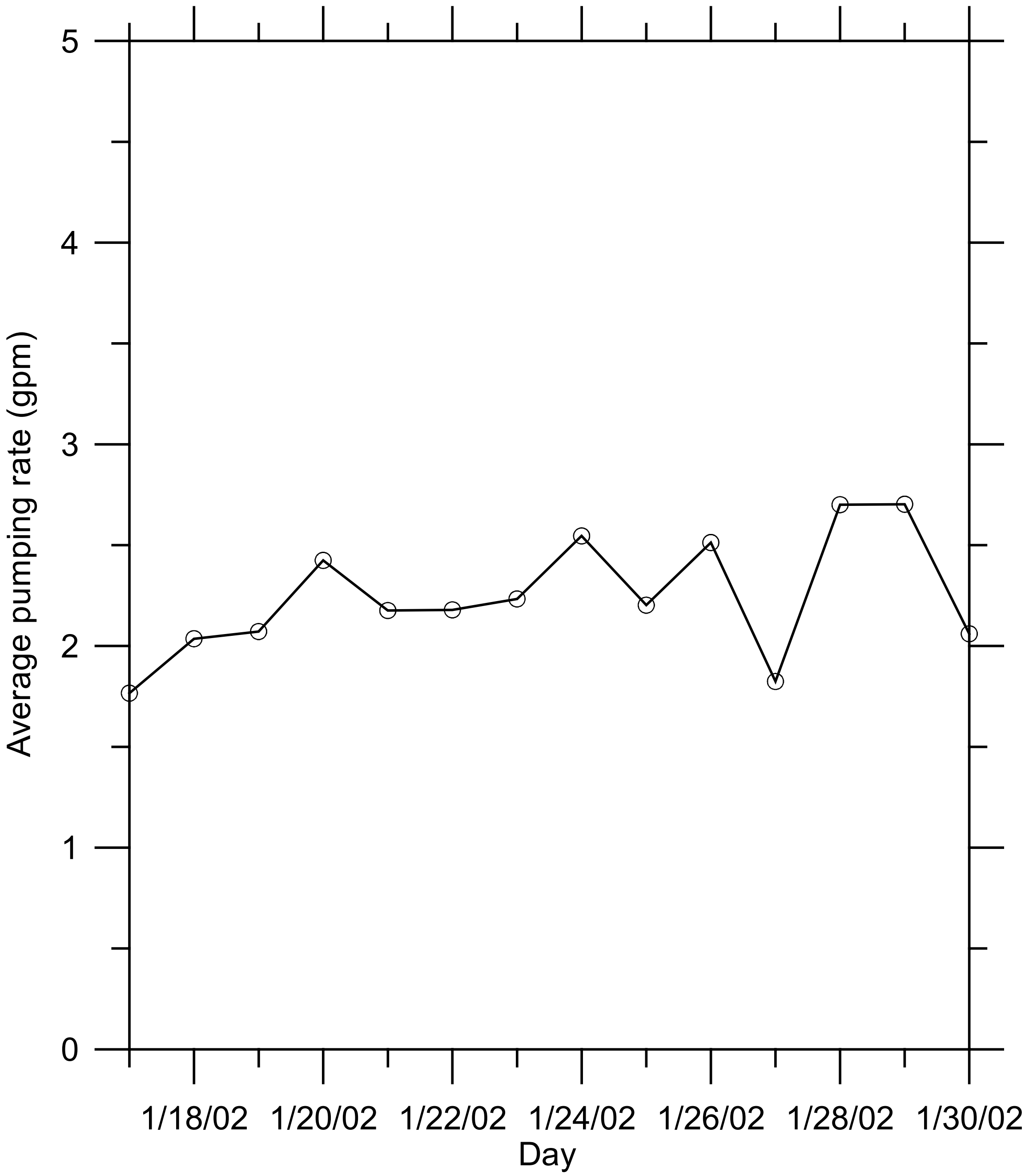


Figure 13. PW-7U pumping record, January 17-30, 2002

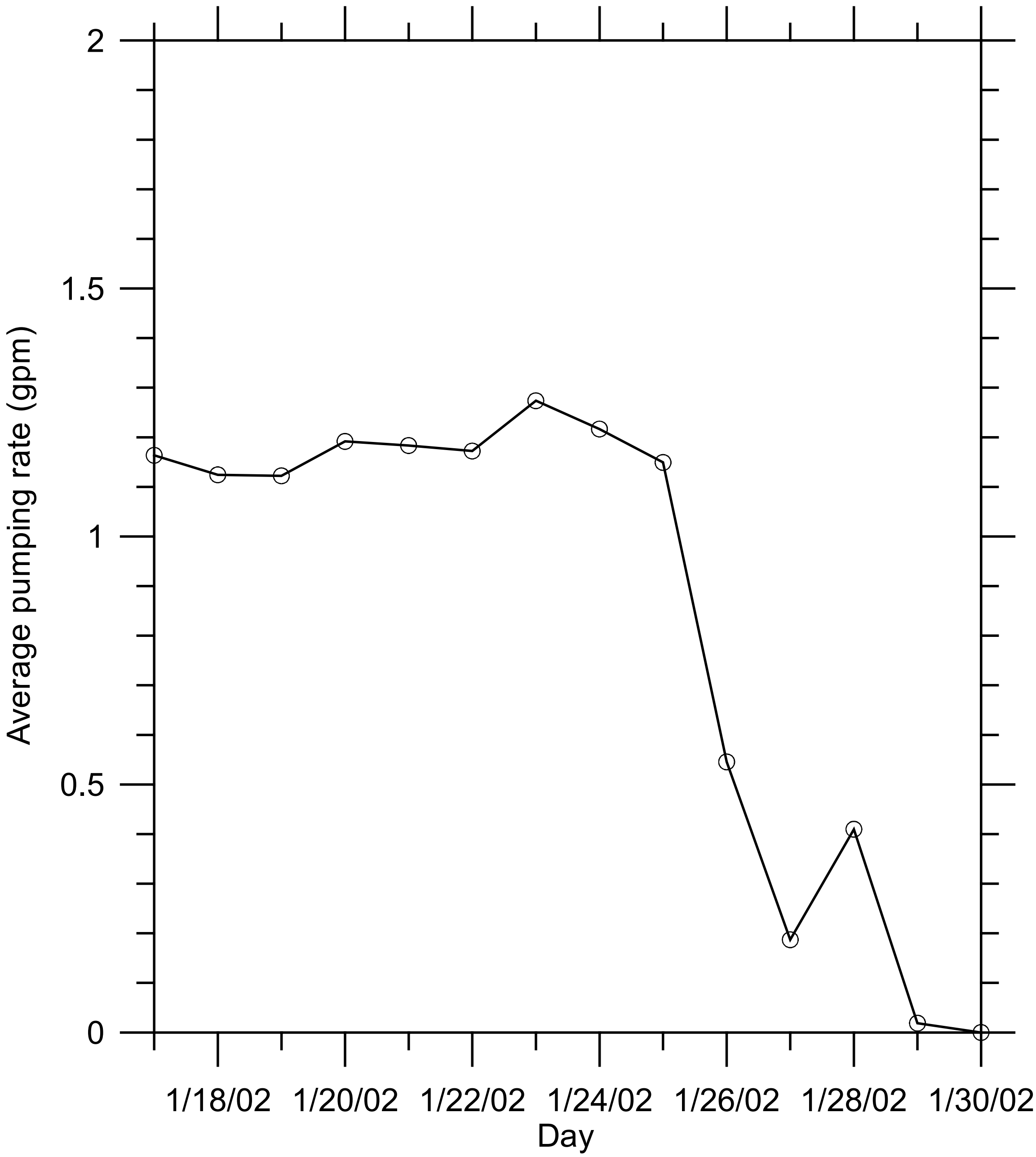


Figure 14. PW-8U pumping record, January 17-30, 2002

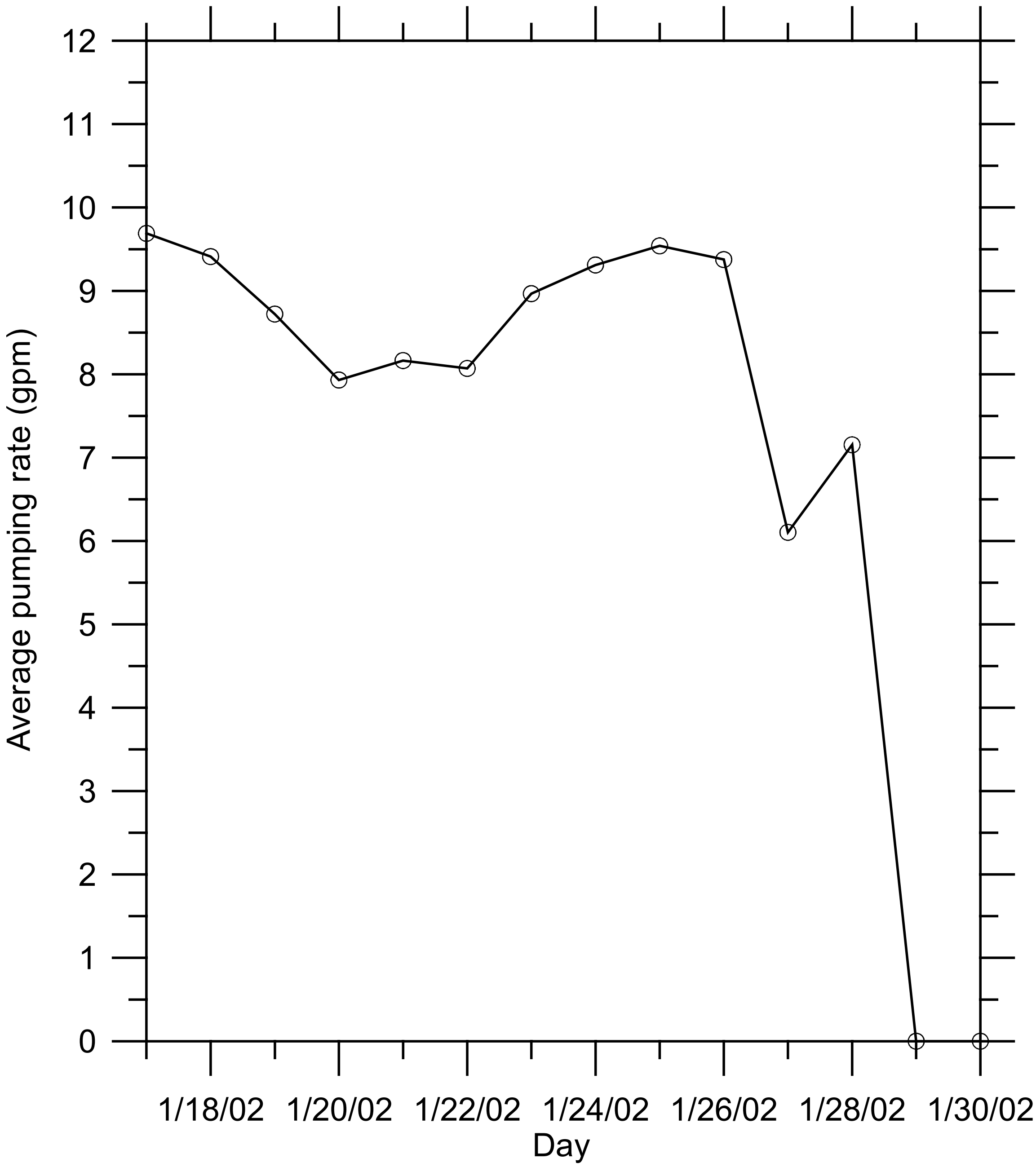


Figure 15. PW-8M pumping record, January 17-30, 2002

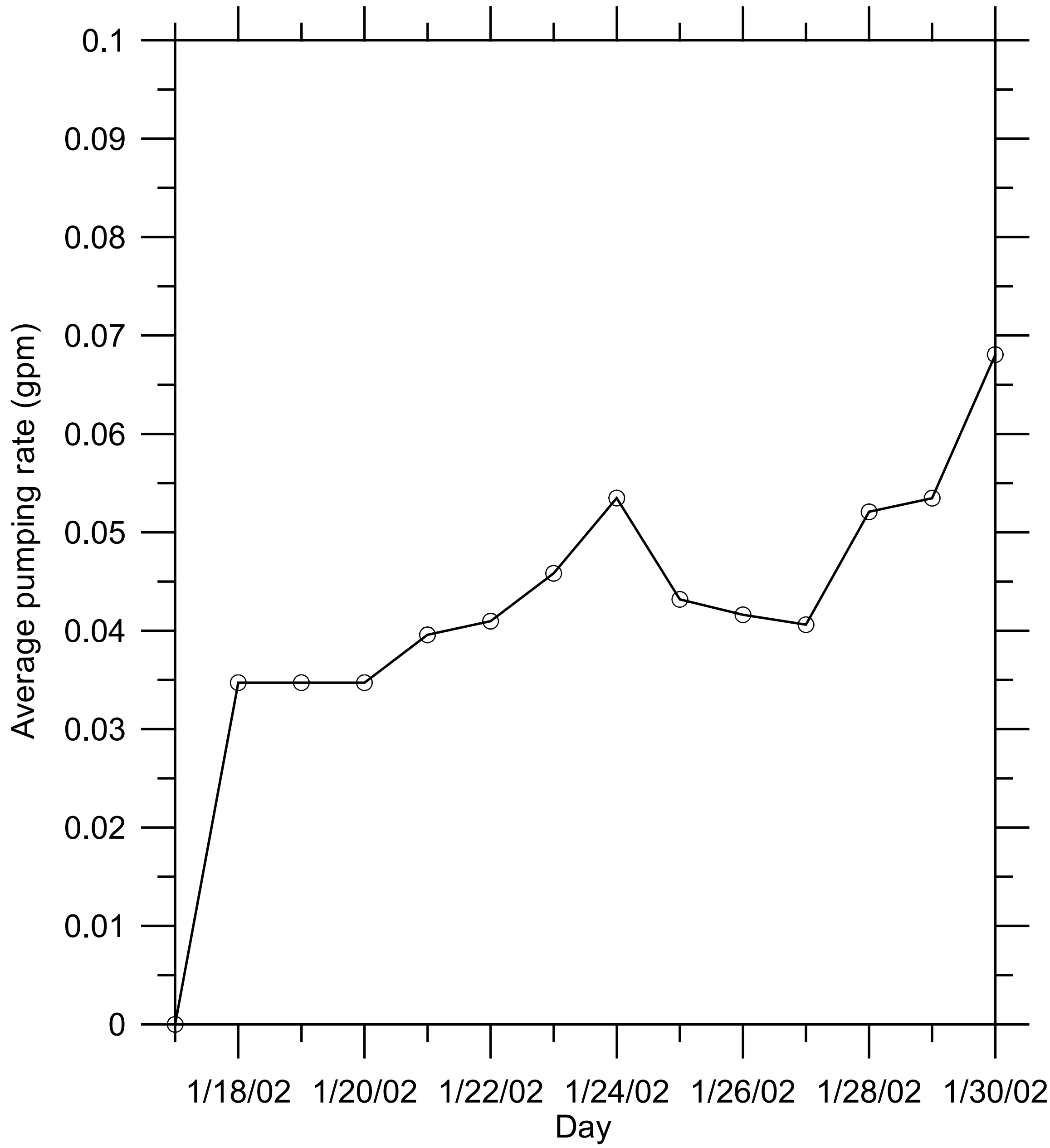


Figure 16. PW-9U pumping record, January 17-30, 2002

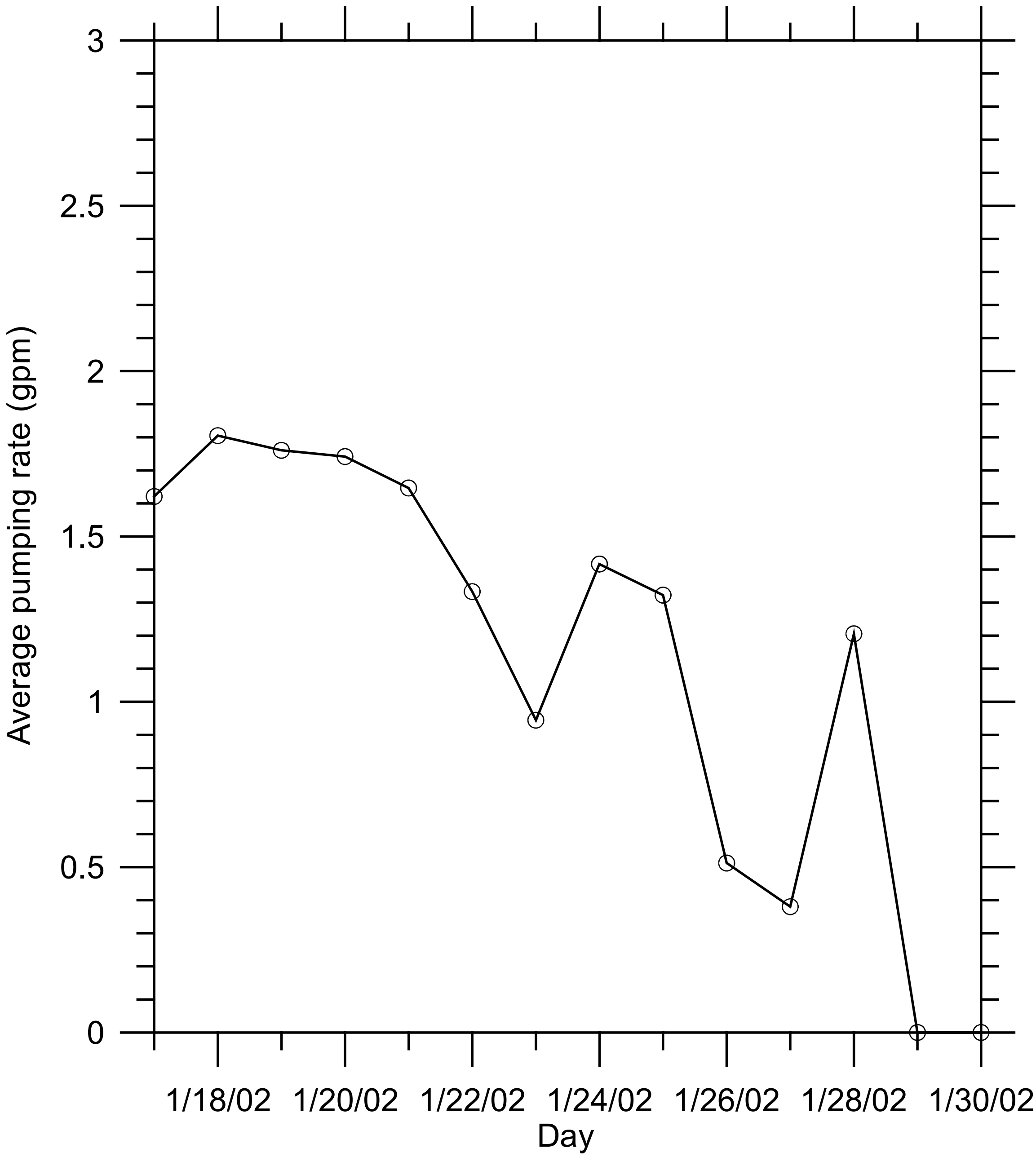
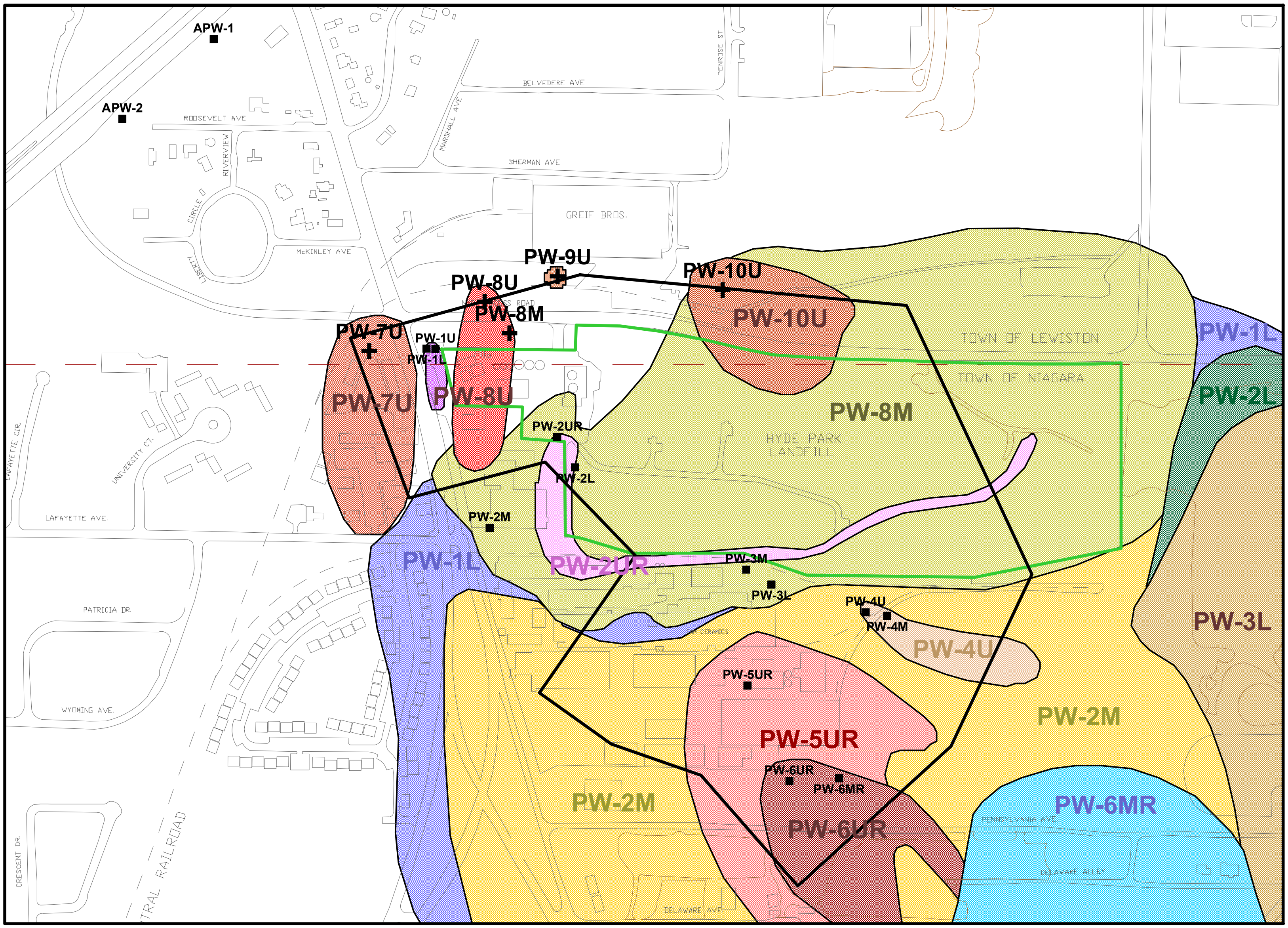


Figure 17. PW-10U pumping record, January 17-30, 2002



Purge Well	Pumping Rate (gpm)	Percent Capture (%)
PW-1U	0.4	0.5
PW-1L	8.8	0.8
PW-2UR	0.8	1.0
PW-2M	36.3	15.3
PW-2L	1.3	0.0
PW-3M	0.0	0.0
PW-3L	7.5	0.0
PW-4U	0.5	1.9
PW-4M	0.0	0.0
PW-5UR	4.7	11.8
PW-6UR	2.7	4.4
PW-6MR	4.9	0.0
PW-7U	2.3	2.7
PW-8U	1.2	3.5
PW-8M	9.5	41.7
PW-9U	0.1	0.0
PW-10U	1.7	5.3
TOTALS	82.6	88.8

EXPLANATION

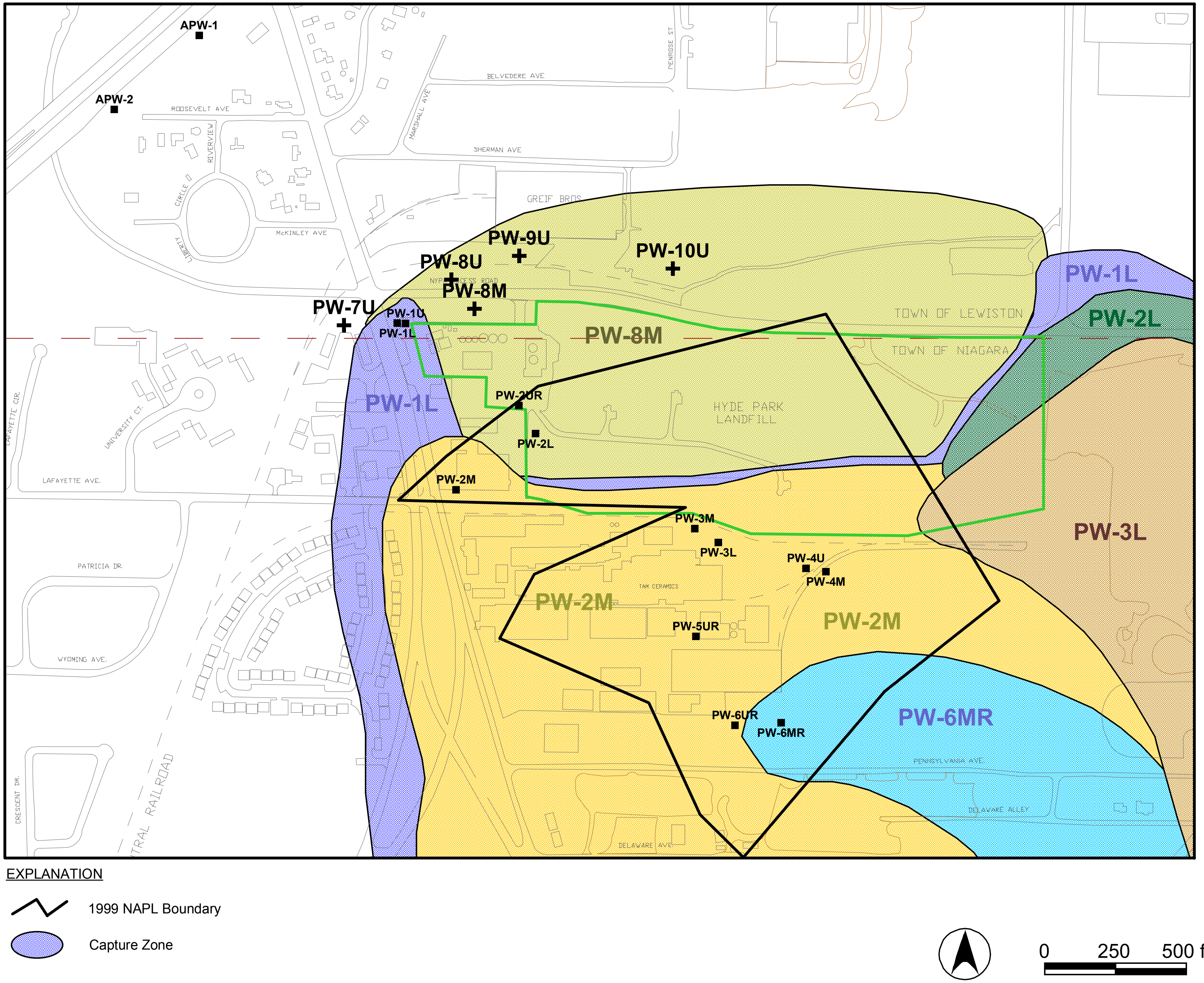
2000 NAPL Boundary

Capture Zone

0 250 500 ft

Figure 18 - Upper Bedrock Capture Zones - January 2002 Pumping

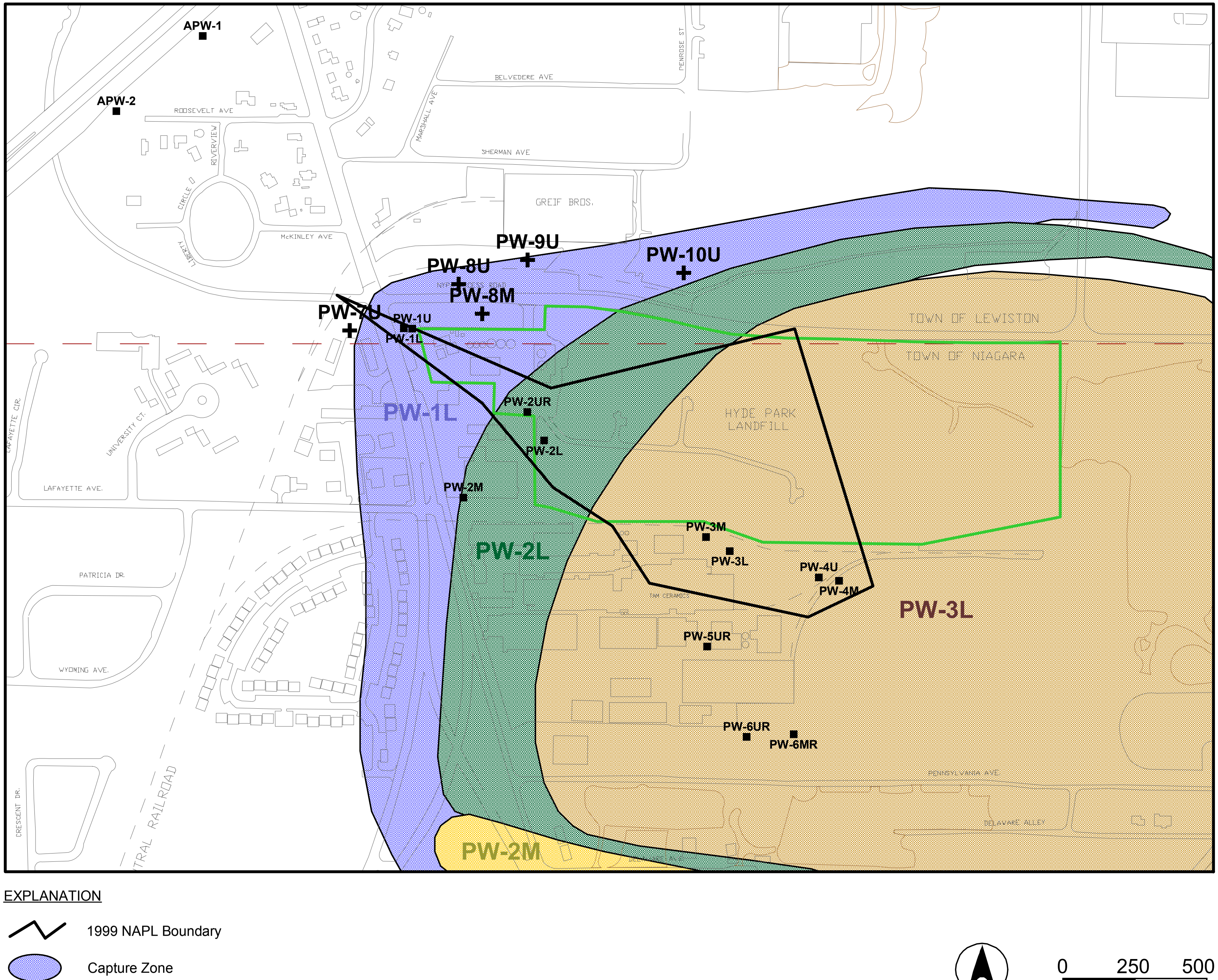
HP022b 4-Feb-2002



Purge Well	Pumping Rate (gpm)	Percent Capture (%)
PW-1U	0.4	0.5
PW-1L	8.8	1.9
PW-2UR	0.8	0.8
PW-2M	36.3	60.4
PW-2L	1.3	0.1
PW-3M	0.0	0.0
PW-3L	7.5	0.8
PW-4U	0.5	0.1
PW-4M	0.0	0.0
PW-5UR	4.7	0.3
PW-6UR	2.7	0.0
PW-6MR	4.9	7.7
PW-7U	2.3	0.0
PW-8U	1.2	0.0
PW-8M	9.5	27.5
PW-9U	0.1	0.0
PW-10U	1.7	0.0
TOTALS	82.6	100.0

Figure 19 - Middle Bedrock Capture Zones - January 2002 Pumping

HP022b 4-Feb-2002



Purge Well	Pumping Rate (gpm)	Percent Capture (%)
PW-1U	0.4	0.0
PW-1L	8.8	5.8
PW-2UR	0.8	0.0
PW-2M	36.3	0.0
PW-2L	1.3	23.0
PW-3M	0.0	0.0
PW-3L	7.5	70.3
PW-4U	0.5	0.0
PW-4M	0.0	0.0
PW-5UR	4.7	0.0
PW-6UR	2.7	0.0
PW-6MR	4.9	0.0
PW-7U	2.3	0.0
PW-8U	1.2	0.0
PW-8M	9.5	0.0
PW-9U	0.1	0.0
PW-10U	1.7	0.0
TOTALS	82.6	99.1

Figure 20 - Lower Bedrock Capture Zones - January 2002 Pumping

HP022b 4-Feb-2002

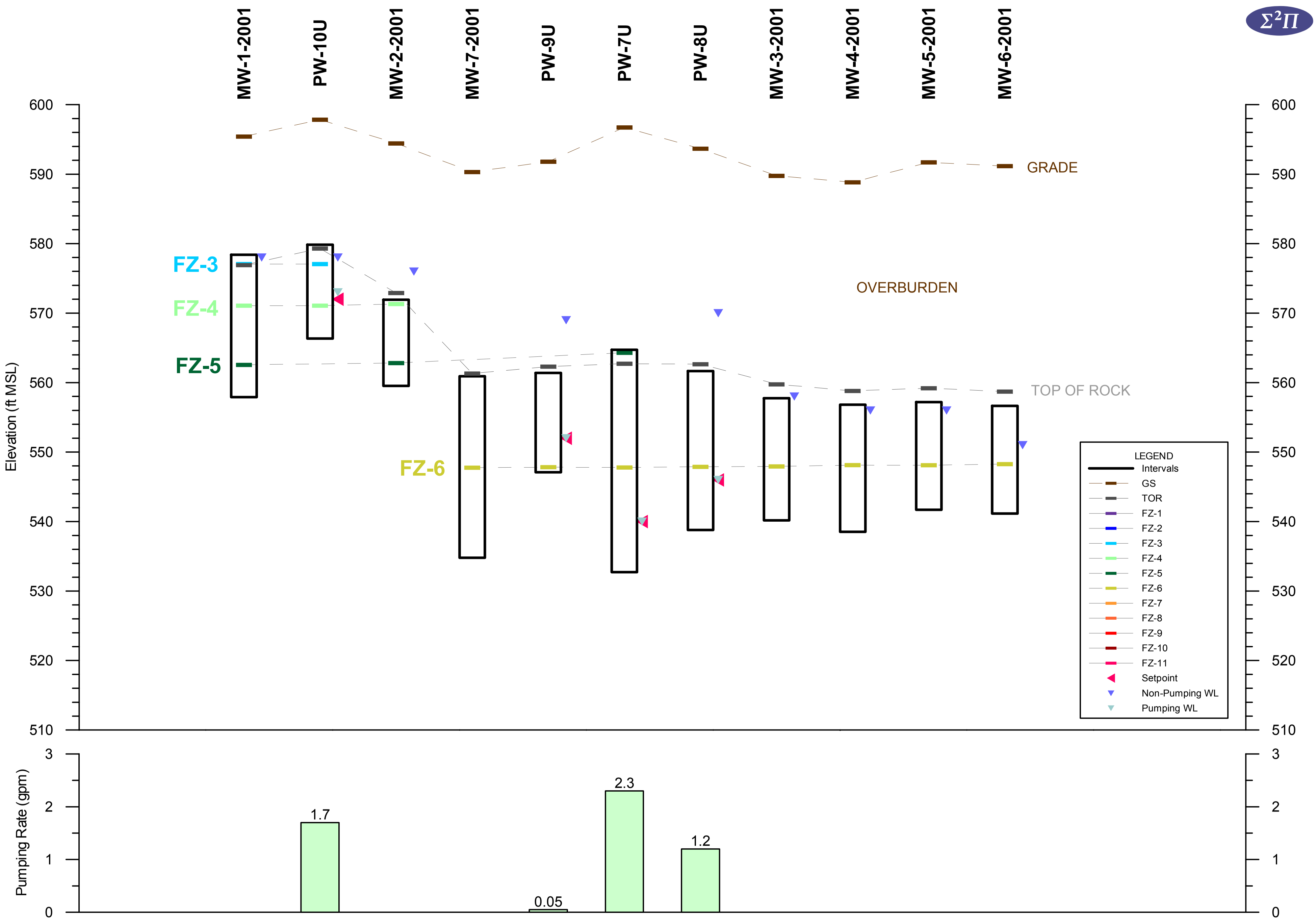


Figure 21 - 2001 Upper purge wells: Relations between open intervals and flow zones

07-Feb-2002 D:\sspa\projects\ssp610\Revised Site Characterization\Flow Zones\MatrixInterception\f21_2001_U_PWs.grf

APPENDIX B

STATISTICAL TREND ANALYSIS OF GROUNDWATER MONITORING DATA
FIRST QUARTER 2002 MONITORING

CONESTOGA-ROVERS & ASSOCIATES

651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

MEMORANDUM

TO:	Mike Mateyk; Jon Williams	REF. NO.:	01069-20 / pw / 21
FROM:	Naz Syed-Ritchie; Wesley Dyck	DATE:	April 10, 2002

RE: **Statistical Trend Analysis of Groundwater Monitoring Data**
First Quarter 2002 Monitoring
Hyde Park Landfill
Niagara Falls, New York

1.0 INTRODUCTION

Groundwater at the Hyde Park Landfill in Niagara Falls, New York (Site) is sampled quarterly and analyzed for indicator parameters including benzoic acid, chlorendic acid, phenolics, total chlorobenzoic acids, and total organic halides (TOX). As part of the evaluation of the quarterly monitoring data, a statistical analysis is performed to look for any evidence of increasing trends in indicator parameters at a given well over time.

This memorandum reports the findings of statistical evaluations of the Site groundwater monitoring data up to and including the first quarter 2002 samples.

2.0 STATISTICAL TREND ANALYSES

Helsel and Hirsch (1992) recommend a number of statistical trend analysis methods for application to environmental data sets. A typical pattern in groundwater constituent concentrations is a rapid decline in concentration immediately following a remedial action, which then slows and observed concentrations fluctuate up and down at a much lower level. This type of pattern has been observed at a number of Site monitoring wells, and may be observed in the concentration vs. time plots (Attachment A).

A recommended statistical procedure for trend assessment commonly applied to environmental monitoring data is the Mann-Kendall trend test. The Mann-Kendall test is a non-parametric (rank-based) method that evaluates a set of data for a monotonic (unidirectional) trend. The procedure makes no assumptions regarding the shape of the trend (e.g., linear, log-linear…), except that it is in a single direction (i.e., either consistently upward or downward). However, the Mann-Kendall procedure loses sensitivity if a large proportion of non-detected results is present.

For data sets with large proportions (> 50 percent) of censored data, logistic regression is recommended by Helsel and Hirsch. In this procedure, the numerical values of the monitoring data are not used, but instead the presence or absence of a detectable concentration of the analyte of interest is considered. Thus, the hypothesis tested as a measure of trend by logistic regression is that more detectable results are occurring later than earlier (increasing trend), or earlier than later (decreasing trend).

The Site groundwater monitoring data were assessed for trends on an individual well basis using either the Mann-Kendall trend test (if < 50 percent non-detects) or logistic regression (for 50-99 percent non-detects). Analytes that were not detected at a given well (i.e., 100 percent non-detects) during the time period of interest were not statistically evaluated.

3.0 SCOPE OF DATA

The approach most applicable to assessing current trends in groundwater quality at the Site is to apply a given test to analytical data representative of the current groundwater conditions at the Site. This is accomplished for the Site by treating calendar years as a unit (i.e. either keeping or removing the four quarters of monitoring data for a calendar year) and ensuring that a minimum of 8 data points and maximum of 11 data points are used for the statistical evaluation. In the case of the first quarter 2002 data analysis, the analytical data include nine sampling events from 2000 to present. This data scope approach provides a moving two to three year comparison window.

For the concentration vs. time plots (Attachment A), all historical data are included (1993 to present).

4.0 RESULTS

The results of the trend analyses are presented in Table 1. One statistically significant ($P<0.05$) increasing trend was identified for total chlorobenzoic acid at J2M. Three statistically significant ($P<0.05$) decreasing trends were observed for TOX at wells B1U, CIU, and C1M.

Table 2 presents the comparison of the statistical trend analyses performed following the first, second, third and fourth quarters of 2001 and the first quarter of 2002. Only wells/analytes with a significant trend identified during at least one evaluation are presented. In 22 cases, the trends changed from statistically significantly decreasing to not significant or vice versa between the five quarters. TOX was identified to be statistically significantly decreasing at C1U for the first quarter evaluation of 2002. No significant trends had been identified for this well/parameter combination in the previous evaluations.

Statistically significantly increasing trends were identified for total chlorobenzoic acid at J2M for the fourth quarter 2001 and first quarter 2002 evaluations. This well/parameter combination had a statistically significant decreasing trend during the first quarter 2001 evaluation and no significant trends were identified during the second and third quarter 2001 evaluations. Statistically significant increasing trends were identified for chlorendic acid at B1U and total chlorobenzoic acid at J3L during the fourth quarter 2001 evaluation. However, there were no statistically significant trends identified during the first quarter 2002 evaluation or during previous evaluations.

TOX was identified to be statistically significantly decreasing for the fourth quarter 2001 and first quarter 2002 evaluations at B1U and C1M and for the first quarter 2002 evaluation for C1U. For sixteen cases, statistically significant decreasing trends had been identified during at least one of the previous evaluations but no significant trends were identified during the first quarter 2002 evaluation (see Table 2).

5.0 CONCLUSIONS

Statistical trend evaluations of Site groundwater monitoring data following the first quarter 2002 monitoring unit were carried out using either the Mann-Kendall trend test or logistic regression (depending on proportion of non-detect values present) to evaluate all data sets except those consisting entirely of non-detect results.

One statistically significant increasing trend and three statistically significant decreasing trends were identified as noted in Section 4.0 and on Table 1.

6.0 REFERENCE

Helsel, D.R. & R.M. Hirsch, 1992. Statistical Methods in Water Resources. Amsterdam: Elsevier.

TABLE 1

RESULTS OF STATISTICAL TREND ANALYSES MONITORING EVALUATION
FIRST QUARTER 2002
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

Location	*Analyte*	*Number of Observations*	*Percentage Non-Detect*	*Trend Test*			
				Method	*Test Statistic*	*Probability*	*Conclusion*
B1U	Benzoic Acid	9	89%	Logistic	-0.24	0.94	NST
	Chlorendic Acid	9	11%	Mann-Kendall	12	0.25	NST
	Phenolics	9	33%	Mann-Kendall	-6	0.60	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	12	0.25	NST
	Total Organic Halides	9	0%	Mann-Kendall	-26	**0.01**	Decreasing
B1M	Benzoic Acid	9	78%	Logistic	0.0013	0.70	NST
	Chlorendic Acid	9	22%	Mann-Kendall	6	0.60	NST
	Phenolics	9	67%	Logistic	0.0038	0.28	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	12	0.25	NST
	Total Organic Halides	9	0%	Mann-Kendall	0	1.00	NST
B1L	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	22%	Mann-Kendall	-8	0.47	NST
	Phenolics	9	33%	Mann-Kendall	12	0.25	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	-12	0.25	NST
	Total Organic Halides	9	0%	Mann-Kendall	-18	0.08	NST
C1U	Benzoic Acid	9	89%	Logistic	-0.24	0.94	NST
	Chlorendic Acid	9	11%	Mann-Kendall	2	0.92	NST
	Phenolics	9	44%	Mann-Kendall	-15	0.14	NST
	Total Chlorobenzoic Acid	9	33%	Mann-Kendall	-15	0.14	NST
	Total Organic Halides	9	0%	Mann-Kendall	-24	**0.02**	Decreasing
C1M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	11%	Mann-Kendall	-6	0.60	NST
	Phenolics	9	78%	Logistic	0.01	0.25	NST
	Total Chlorobenzoic Acid	9	78%	Logistic	-0.0022	0.54	NST
	Total Organic Halides	9	0%	Mann-Kendall	-31	**0.0018**	Decreasing
C1L	Benzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	8	25%	Mann-Kendall	1	1.00	NST
	Phenolics	8	63%	Logistic	0.01	0.14	NST
	Total Chlorobenzoic Acid	8	13%	Mann-Kendall	8	0.39	NST
	Total Organic Halides	8	0%	Mann-Kendall	-12	0.17	NST
D3U	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	0%	Mann-Kendall	0	1.00	NST
	Phenolics	9	89%	Logistic	0.01	0.35	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	0%	Mann-Kendall	-12	0.25	NST
D2M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	22%	Mann-Kendall	2	0.92	NST
	Phenolics	9	33%	Mann-Kendall	-12	0.25	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	-8	0.47	NST
	Total Organic Halides	9	0%	Mann-Kendall	-14	0.18	NST
D1L	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	11%	Mann-Kendall	9	0.40	NST
	Total Chlorobenzoic Acid	9	89%	Logistic	-0.0041	0.46	NST
	Total Organic Halides	9	11%	Mann-Kendall	0	1.00	NST

TABLE 1

RESULTS OF STATISTICAL TREND ANALYSES MONITORING EVALUATION
FIRST QUARTER 2002
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

Location	*Analyte*	*Number of Observations*	*Percentage Non-Detect*	*Trend Test*			
				Method	*Test Statistic*	*Probability*	*Conclusion*
E3U	Benzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	8	50%	Logistic	0.01	0.13	NST
	Phenolics	9	78%	Logistic	0.01	0.21	NST
	Total Chlorobenzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	33%	Mann-Kendall	-4	0.75	NST
E3M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	78%	Logistic	0.0032	0.40	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	44%	Mann-Kendall	8	0.47	NST
E2L	Benzoic Acid	--	--	--	--	--	--
	Chlorendic Acid	--	--	--	--	--	--
	Phenolics	--	--	--	--	--	--
	Total Chlorobenzoic Acid	--	--	--	--	--	--
	Total Organic Halides	--	--	--	--	--	--
F4U	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	89%	Logistic	0.24	0.94	NST
	Phenolics	9	78%	Logistic	0.0033	0.40	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	11%	Mann-Kendall	-14	0.18	NST
F1M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	89%	Logistic	0.01	0.35	NST
	Total Chlorobenzoic Acid	9	89%	Logistic	0.0044	0.45	NST
	Total Organic Halides	9	44%	Mann-Kendall	0	1.00	NST
F2L	Benzoic Acid	--	--	--	--	--	--
	Chlorendic Acid	--	--	--	--	--	--
	Phenolics	--	--	--	--	--	--
	Total Chlorobenzoic Acid	--	--	--	--	--	--
	Total Organic Halides	--	--	--	--	--	--
G4U	Benzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	8	100%	Non-Detect	ND	ND	ND
	Phenolics	8	88%	Logistic	0.01	0.36	NST
	Total Chlorobenzoic Acid	8	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	8	50%	Logistic	0.01	0.12	NST
G1M	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	56%	Logistic	0.00060	0.89	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	56%	Logistic	0.00073	0.87	NST
G1L	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	33%	Mann-Kendall	13	0.21	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	11%	Mann-Kendall	16	0.12	NST

TABLE 1

RESULTS OF STATISTICAL TREND ANALYSES MONITORING EVALUATION
FIRST QUARTER 2002
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

Location	*Analyte*	*Number of Observations*	*Percentage Non-Detect*	*Trend Test*			
				Method	*Test Statistic*	*Probability*	*Conclusion*
H1U	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	44%	Mann-Kendall	13	0.21	NST
	Phenolics	9	89%	Logistic	0.01	0.35	NST
	Total Chlorobenzoic Acid	9	67%	Logistic	0.01	0.15	NST
	Total Organic Halides	9	11%	Mann-Kendall	-12	0.25	NST
H2M	Benzoic Acid	9	89%	Logistic	-0.0021	0.66	NST
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	67%	Logistic	0.0039	0.28	NST
	Total Chlorobenzoic Acid	9	0%	Mann-Kendall	14	0.18	NST
	Total Organic Halides	9	11%	Mann-Kendall	4	0.75	NST
H3L	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	67%	Logistic	0.0039	0.28	NST
	Total Chlorobenzoic Acid	9	44%	Mann-Kendall	-9	0.40	NST
	Total Organic Halides	9	11%	Mann-Kendall	-4	0.75	NST
J1U	Benzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	89%	Logistic	0.01	0.35	NST
	Total Chlorobenzoic Acid	9	100%	Non-Detect	ND	ND	ND
	Total Organic Halides	9	67%	Logistic	-0.24	0.94	NST
J2M	Benzoic Acid	9	56%	Logistic	0.0039	0.24	NST
	Chlorendic Acid	9	56%	Logistic	0.19	0.96	NST
	Phenolics	9	11%	Mann-Kendall	8	0.47	NST
	Total Chlorobenzoic Acid	9	0%	Mann-Kendall	24	**0.02**	Increasing
	Total Organic Halides	9	0%	Mann-Kendall	18	0.08	NST
J3L	Benzoic Acid	9	11%	Mann-Kendall	9	0.40	NST
	Chlorendic Acid	9	100%	Non-Detect	ND	ND	ND
	Phenolics	9	11%	Mann-Kendall	-4	0.75	NST
	Total Chlorobenzoic Acid	9	11%	Mann-Kendall	16	0.12	NST
	Total Organic Halides	9	0%	Mann-Kendall	-12	0.25	NST

Notes:

ND: Parameter not detected at this location. No trend analysis performed.
NST: No statistically significant (P<0.05) trend detected.
Increasing: Statistically significant (P<0.05) increasing trend detected.
Decreasing: Statistically significant (P<0.05) decreasing trend detected.
Logistic: Logistic regression used for trend test (>= 50%ND).
Mann-Kendall: Mann Kendall method used for trend test (<50%ND).
--: No data collected at wells E2L and F2L during the past 2 years.
Data used for the statistical tests include monitoring events from 1999 to present.

TABLE 2

COMPARSION OF STATISTICAL TREND ANALYSES
(FOUR QUARTERS OF YEAR 2001 AND FIRST QUARTER OF 2001 EVALUATIONS)
HYDE PARK LANDFILL
NIAGARA FALLS, NEW YORK

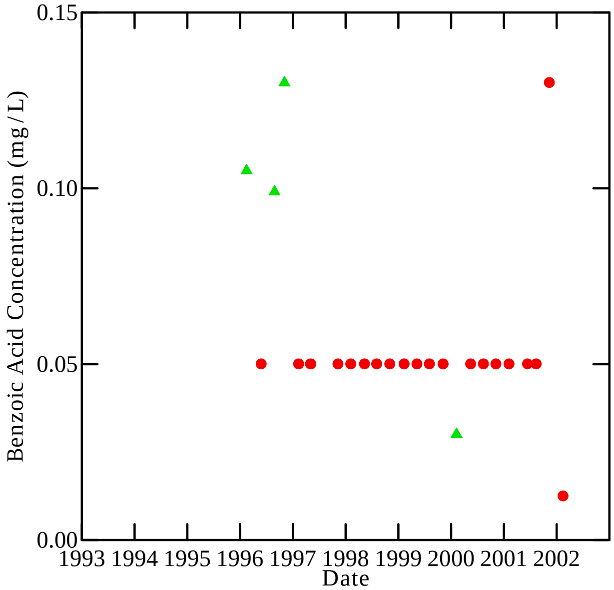
Location	*Analyte*	*First Quarter 2001*		*Second Quarter 2001*		*Third Quarter 2001*		*Fourth Quarter 2001*		*First Quarter 2002*	
		Number of Samples	*Conclusion*	*Number of Samples*	*Conclusion*	*Number of Samples*	*Conclusion*	*Number of Samples*	*Conclusion*	*Number of Samples*	*Conclusion*
B1U	Chlorendic Acid	9	NST	10	NST	11	NST	8	Increasing	9	NST
	Total Organic Halides	9	NST	10	NST	11	NST	8	Decreasing	9	Decreasing
B1M	Total Chlorobenzoic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Total Organic Halides	9	Decreasing	10	Decreasing	11	NST	8	NST	9	NST
B1L	No Trends	--	--	--	--	--	--	--	--	--	--
C1U	Phenolics	9	NST	10	Decreasing	11	Decreasing	8	NST	9	NST
	Total Organic Halides	9	NST	10	NST	11	NST	8	NST	9	Decreasing
C1M	Chlorendic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Total Chlorobenzoic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Total Organic Halides	9	NST	10	NST	11	NST	8	Decreasing	9	Decreasing
C1L	Total Chlorobenzoic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Total Organic Halides	9	Decreasing	10	Decreasing	11	Decreasing	8	NST	9	NST
D3U	No Trends	--	--	--	--	--	--	--	--	--	--
D2M	Phenolics	9	NST	10	NST	11	NST	8	Decreasing	9	NST
D1L	No Trends	--	--	--	--	--	--	--	--	--	--
E3U	No Trends	--	--	--	--	--	--	--	--	--	--
E3M	No Trends	--	--	--	--	--	--	--	--	--	--
E2L	No Data	--	--	--	--	--	--	--	--	--	--
F4U	Total Organic Halides	9	NST	10	NST	11	Decreasing	8	Decreasing	9	NST
F1M	Total Organic Halides	9	NST	10	NST	11	Decreasing	8	NST	9	NST
F2L	No Data	--	--	--	--	--	--	--	--	--	--
G4U	No Trends	--	--	--	--	--	--	--	--	--	--
G1M	No Trends	--	--	--	--	--	--	--	--	--	--
G1L	Total Organic Halides	9	Decreasing	10	Decreasing	11	NST	8	NST	9	NST
H1U	No Trends	--	--	--	--	--	--	--	--	--	--
H2M	Total Organic Halides	9	Decreasing	10	NST	11	NST	8	NST	9	NST
H3L	Total Organic Halides	9	Decreasing	10	Decreasing	11	Decreasing	8	NST	9	NST
J1U	No Trends	--	--	--	--	--	--	--	--	--	--
J2M	Benzoic Acid	9	Decreasing	10	NST	11	NST	8	NST	9	NST
	Phenolics	9	Decreasing	10	Decreasing	11	NST	8	NST	9	NST
	Total Chlorobenzoic Acid	9	Decreasing	10	NST	11	NST	8	Increasing	9	Increasing
	Total Organic Halides	9	Decreasing	10	NST	11	NST	8	NST	9	NST
J3L	Total Chlorobenzoic Acid	9	NST	10	NST	11	NST	8	Increasing	9	NST

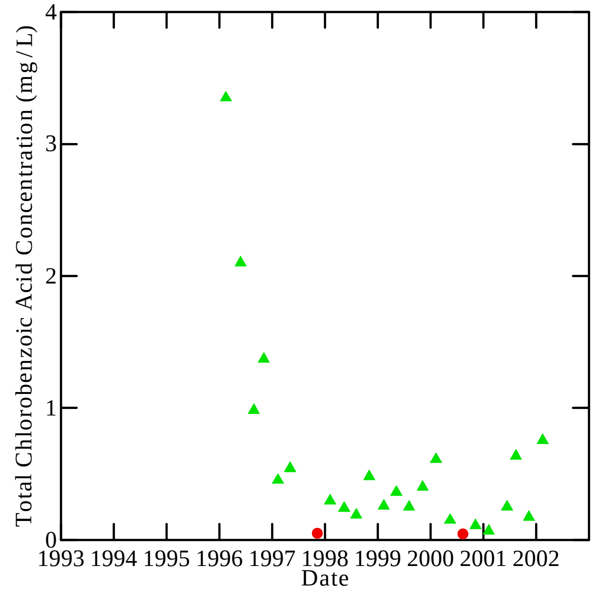
Notes:

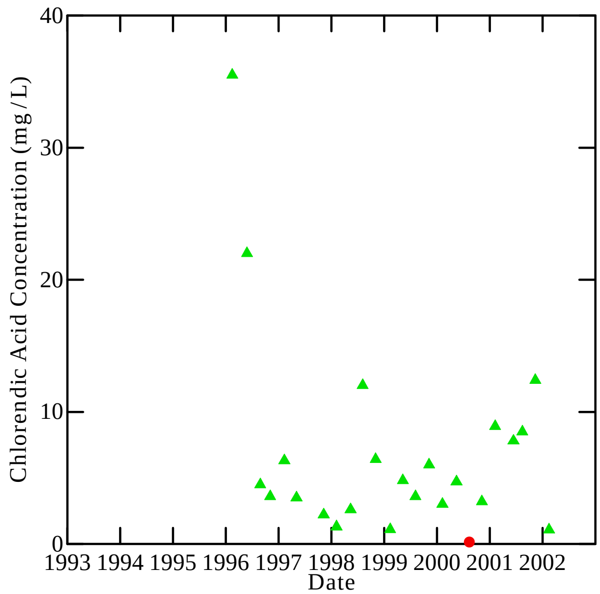
No Trends: No statistically significant trends identified to date for any of the analytes.
No Data: No data collected at this well for the year 2001 sampling rounds.
NST: No statistically significant ($P<0.05$) trend detected.
Increasing: Statistically significant ($P<0.05$) increasing trend detected.
Decreasing: Statistically significant ($P<0.05$) decreasing trend detected.

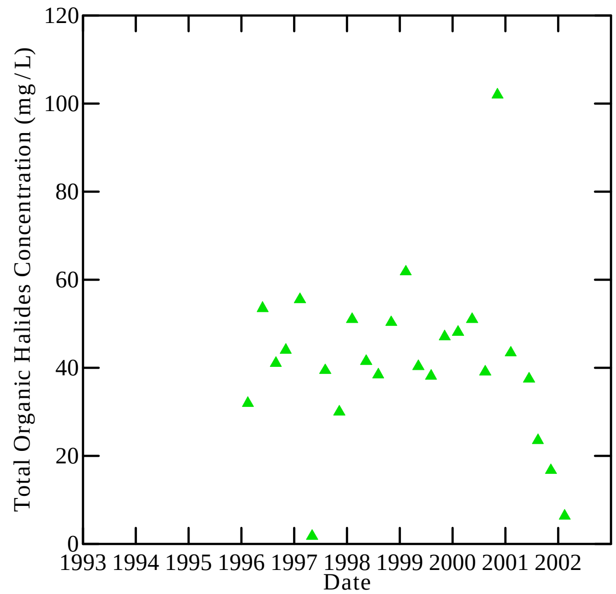
ATTACHMENT A

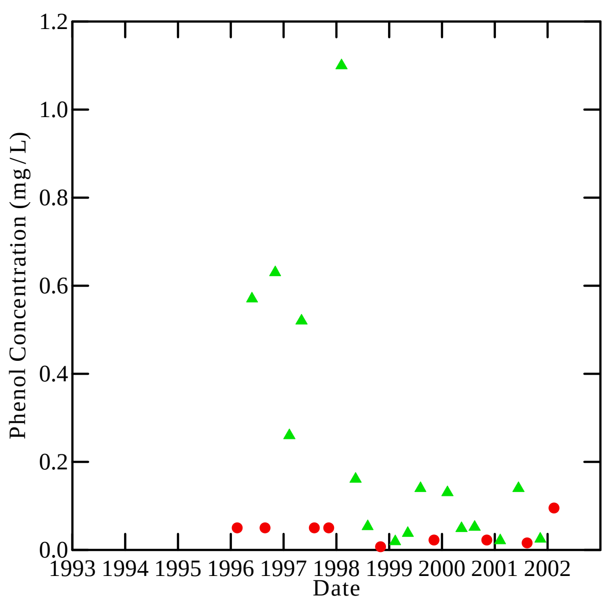
PLOTS







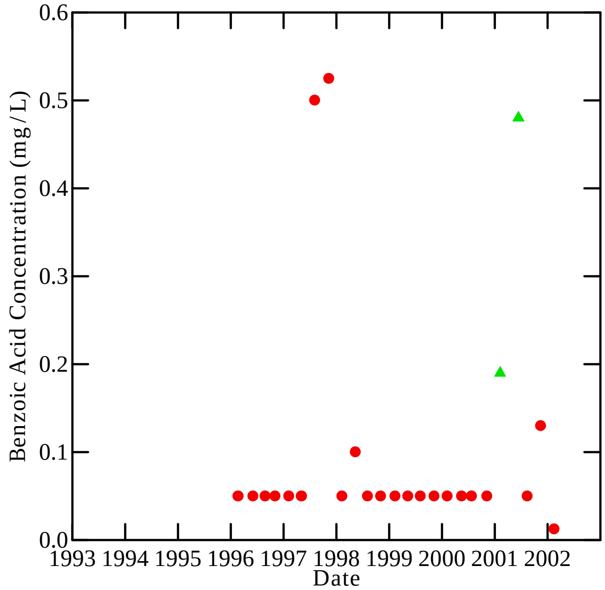


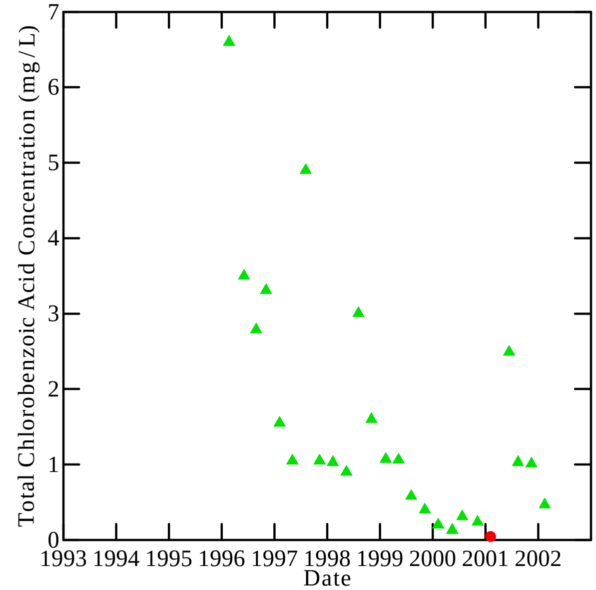


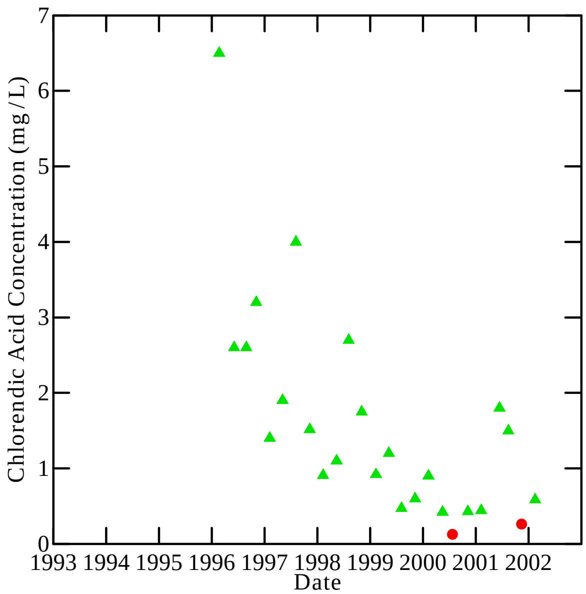
Notes:
- ● Non-detect result
- ▲ Detected result

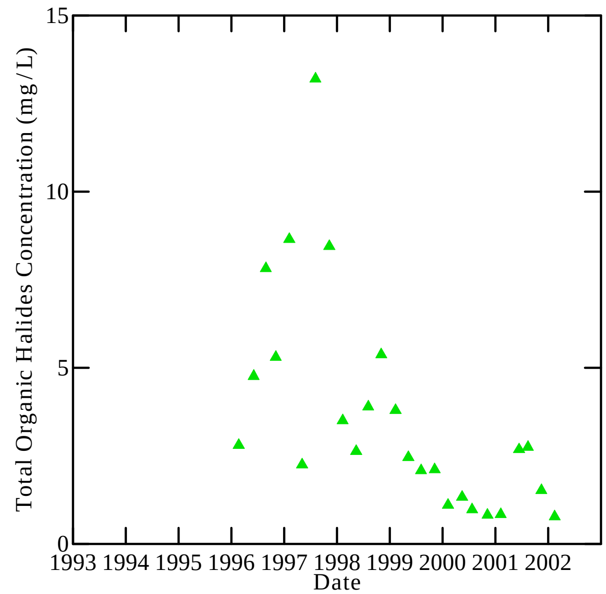
figure 1

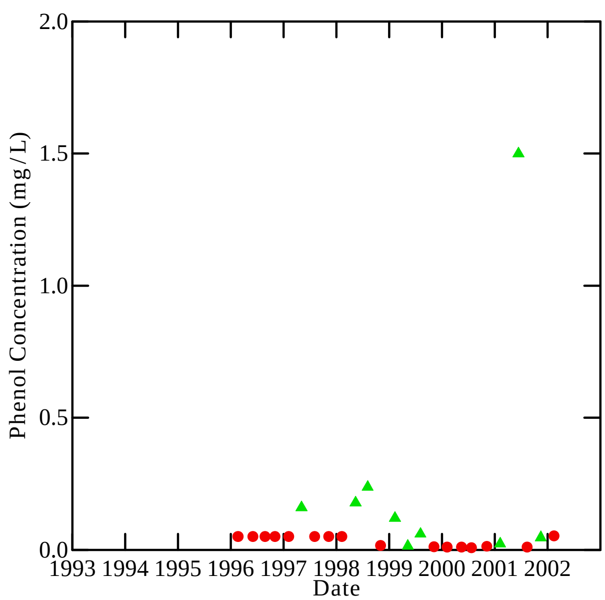
Well B1U
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill











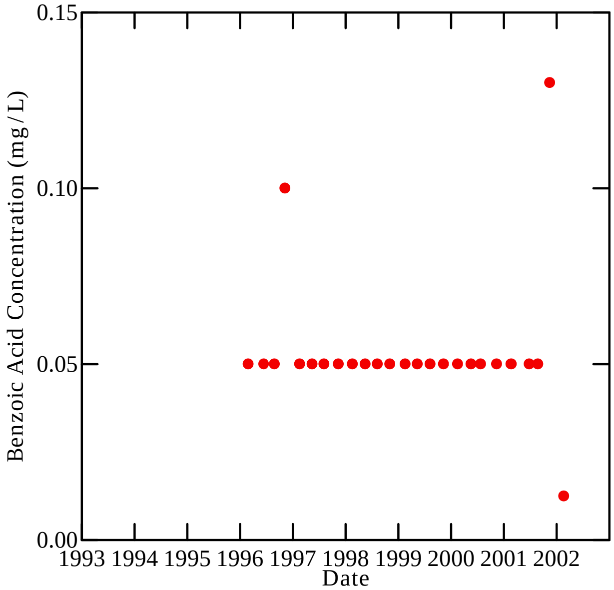
Notes:

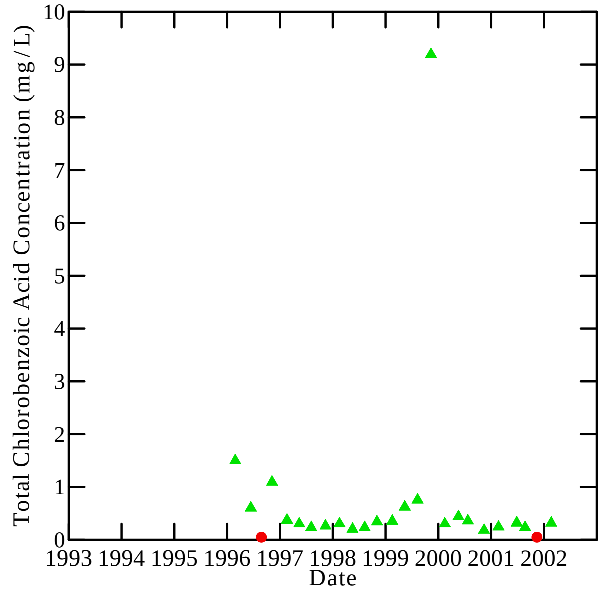
● Non-detect result

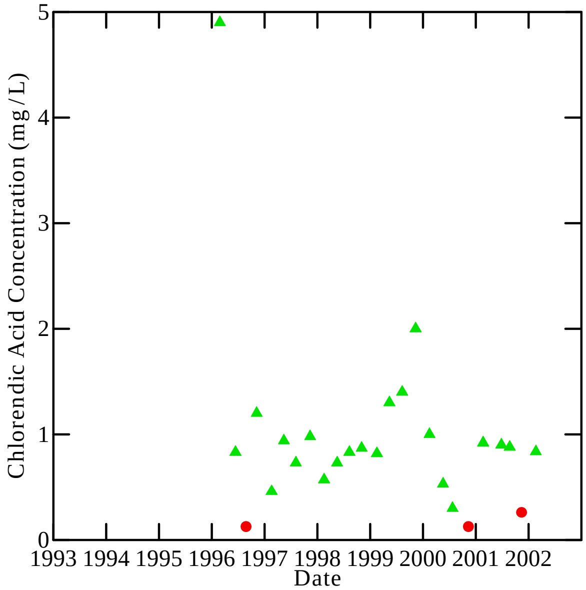
▲ Detected result

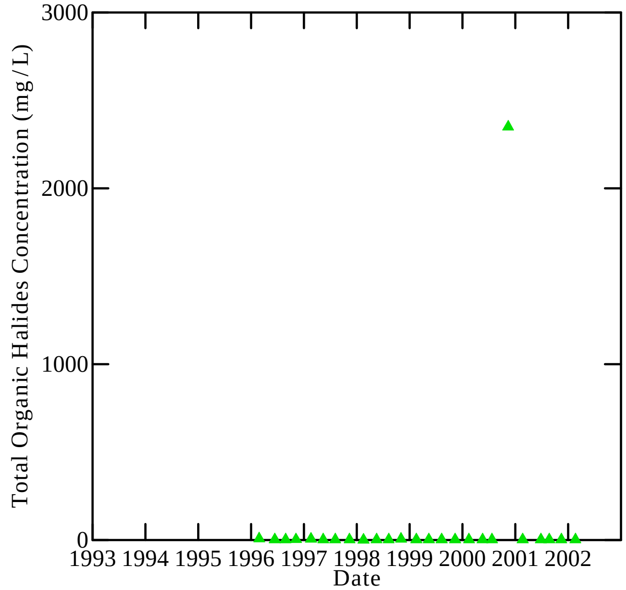
figure 2

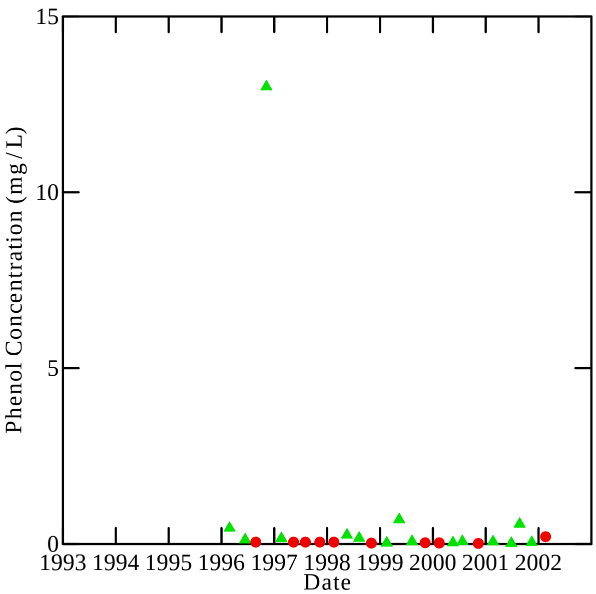
Well B1M
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill











Notes:

● Non-detect result

▲ Detected result

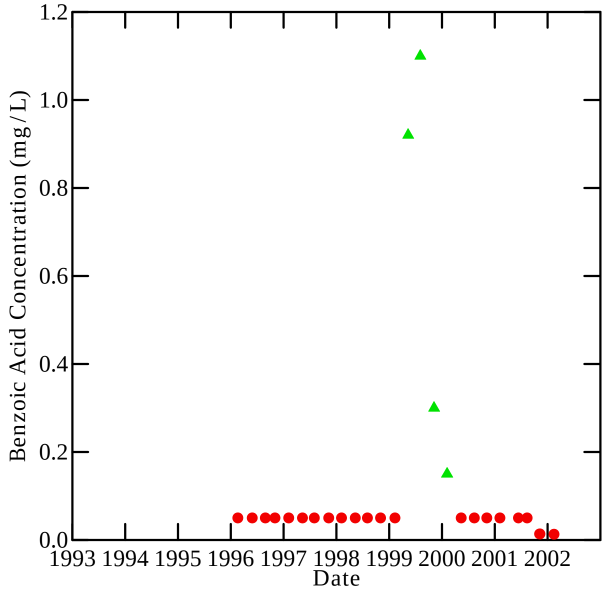
figure 3

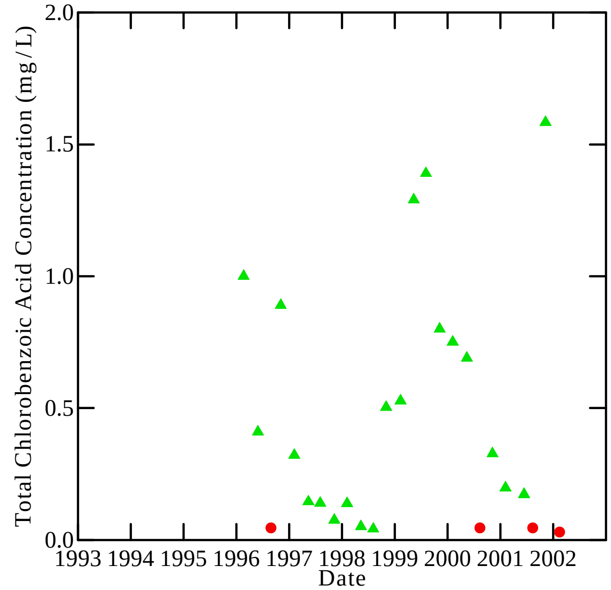
Well B1L

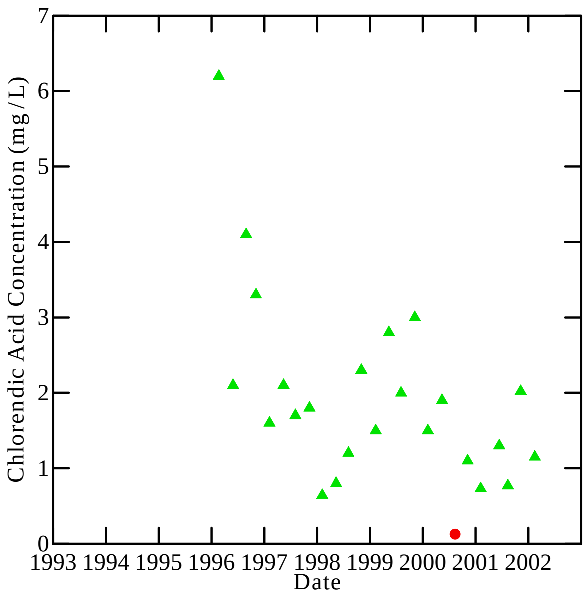
Analyte Concentration vs. Time

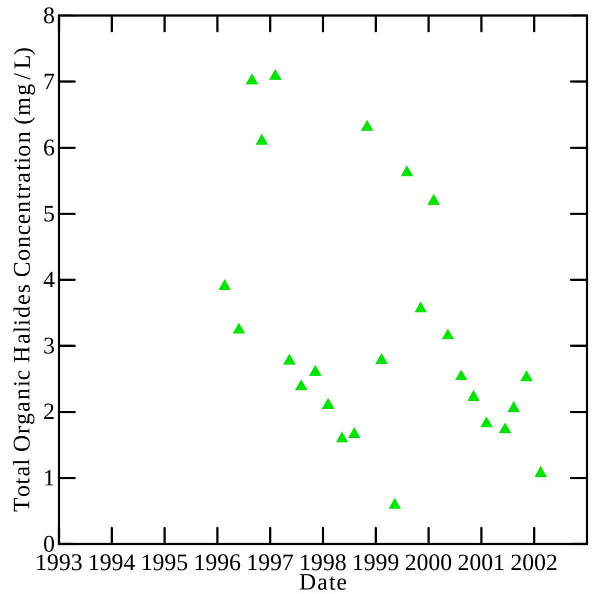
First Quarter 2002

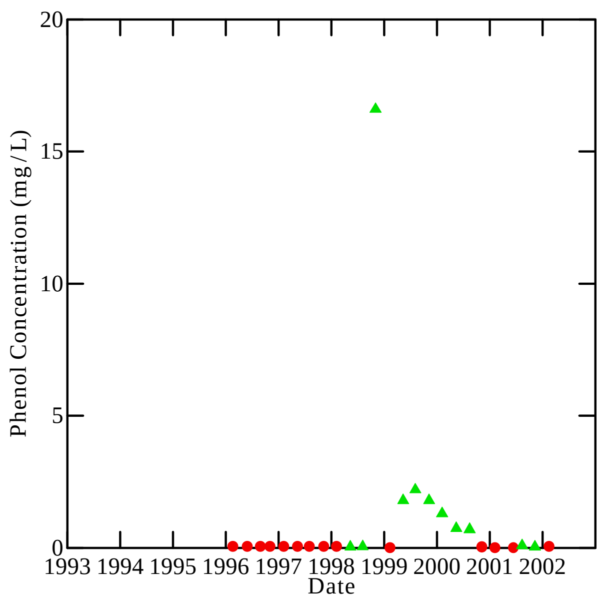
Hyde Park Landfill









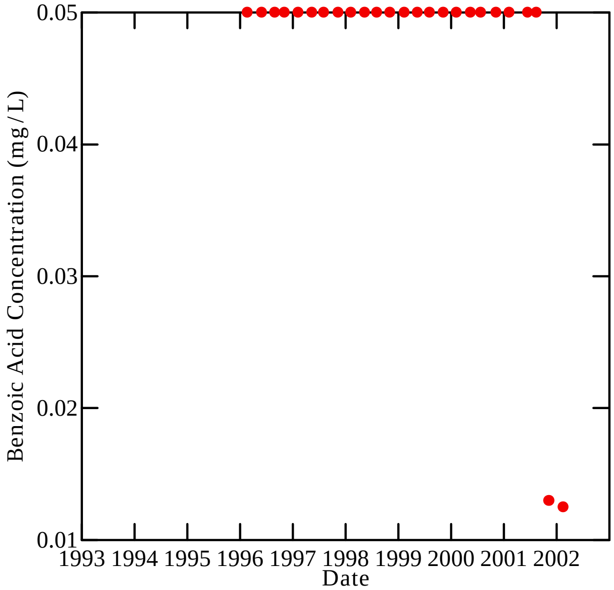


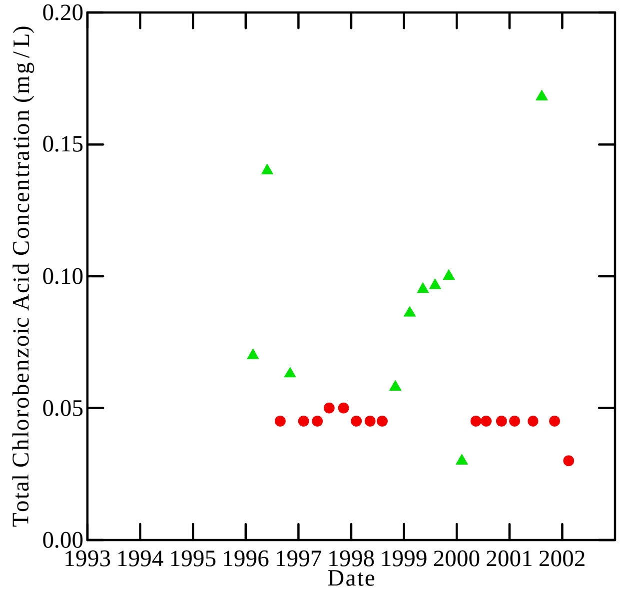
Notes:

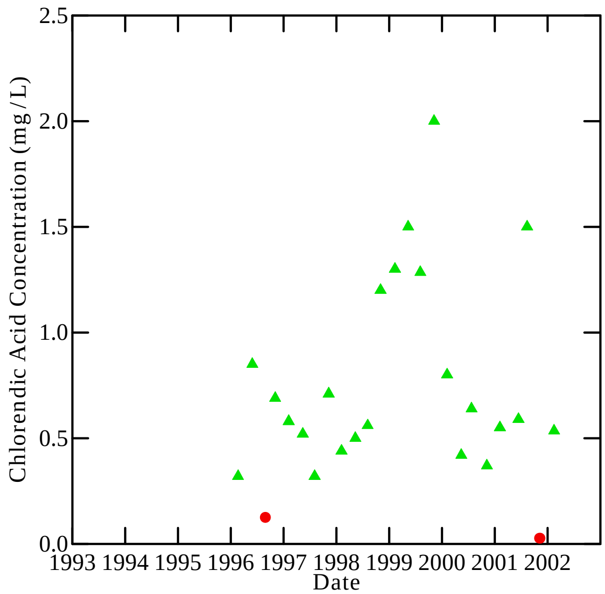
- ● Non-detect result
- ▲ Detected result

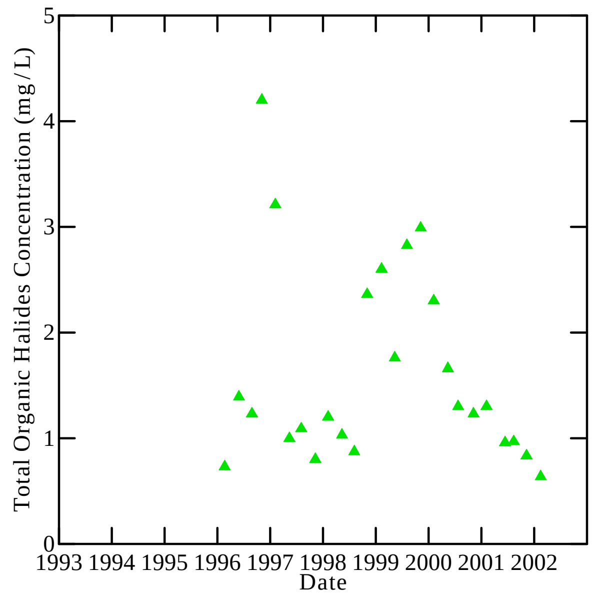
figure 4

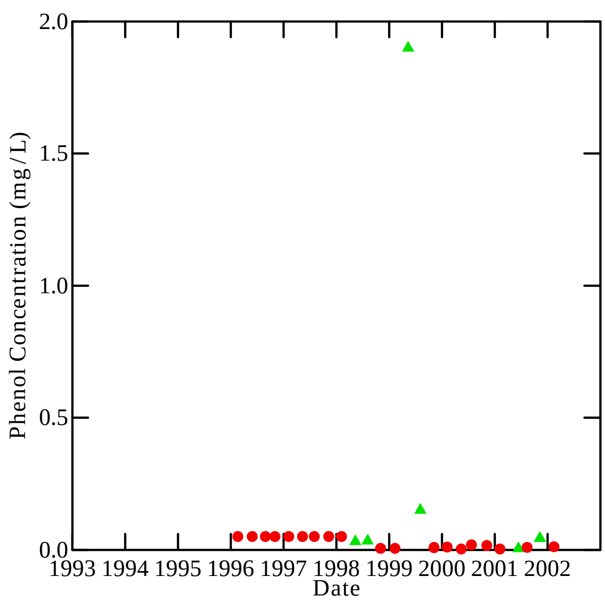
Well C1U
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill









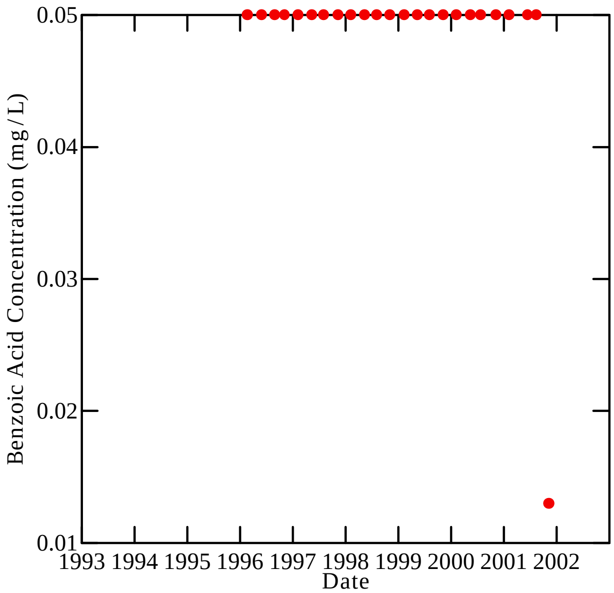


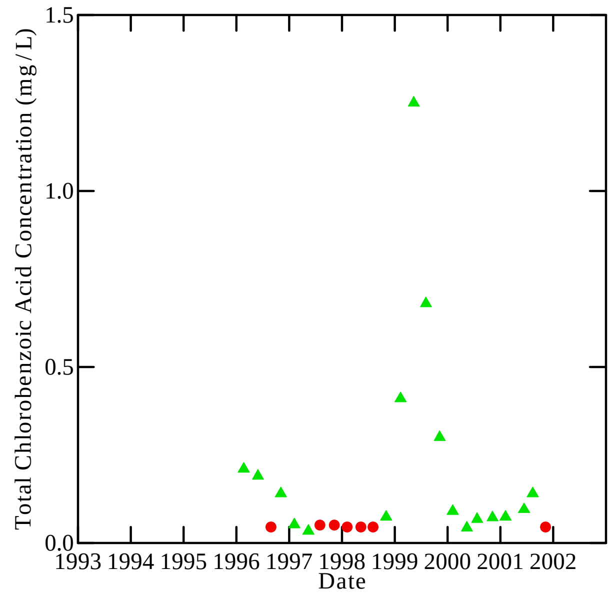
Notes:

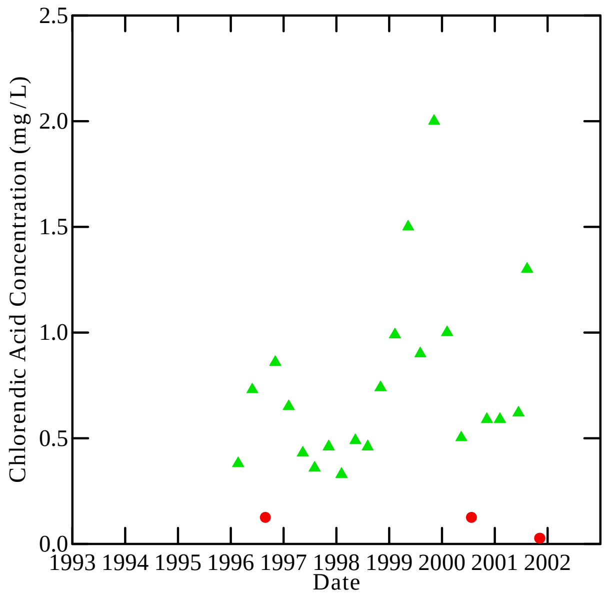
- ● Non-detect result
- ▲ Detected result

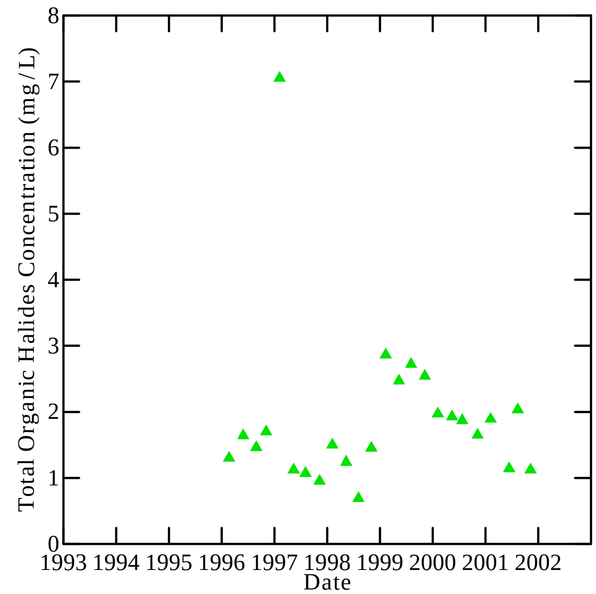
figure 5

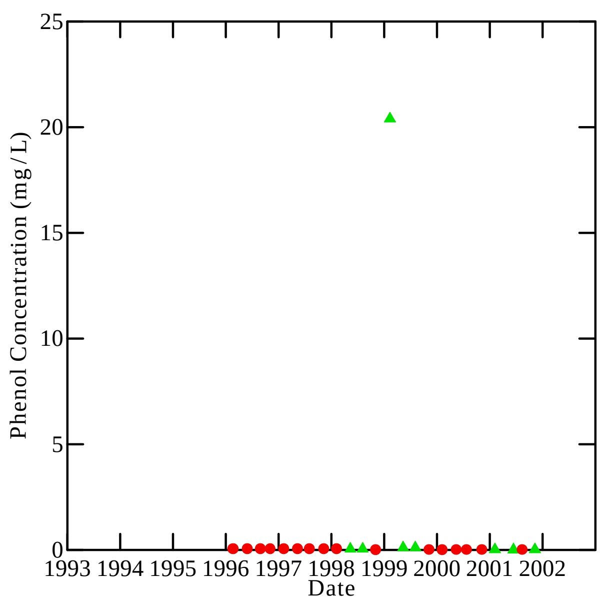
Well C1M
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill









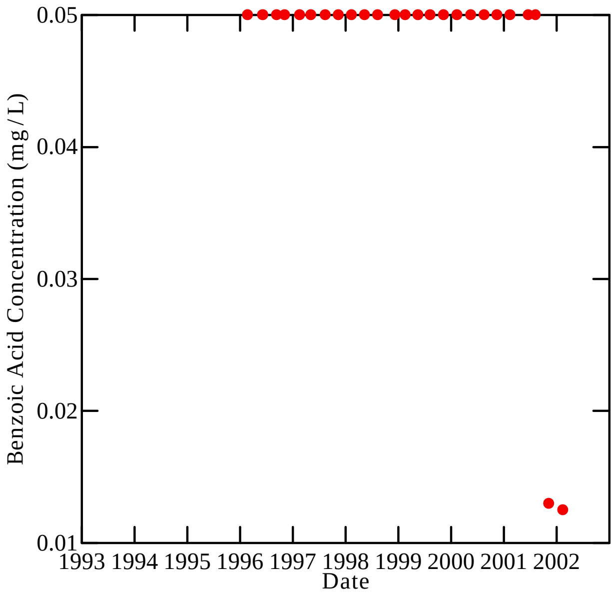


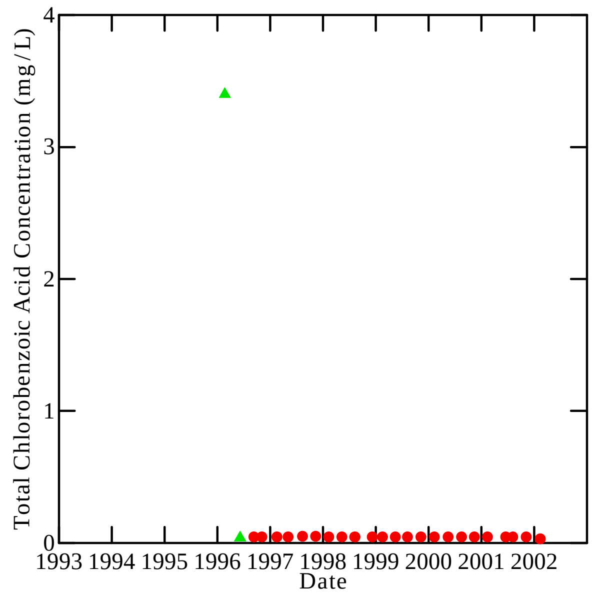
Notes:

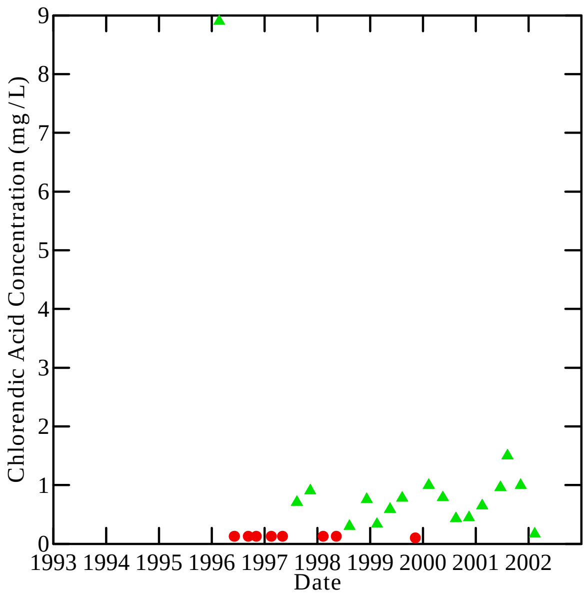
- ● Non-detect result
- ▲ Detected result

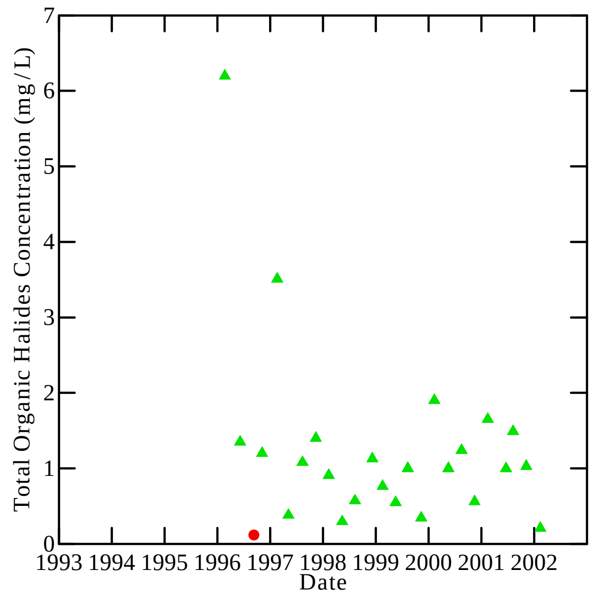
figure 6

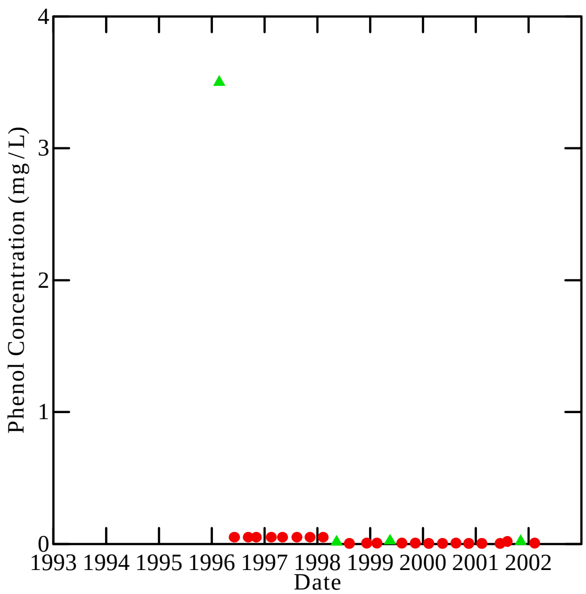
Well C1L
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill











Notes:

● Non-detect result

▲ Detected result

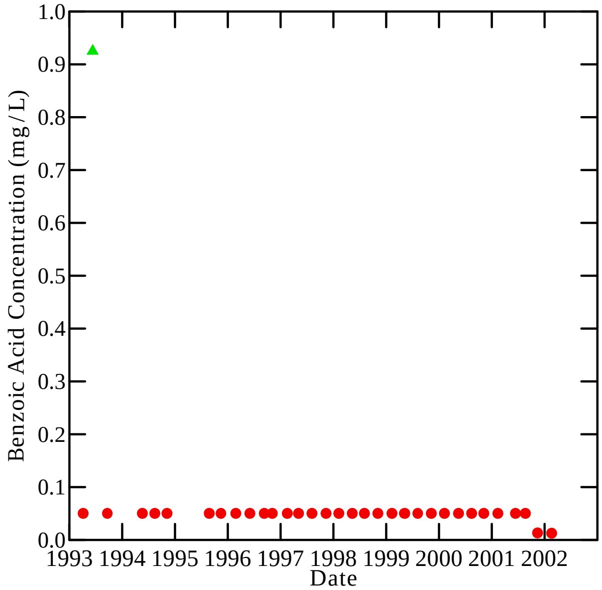
figure 7

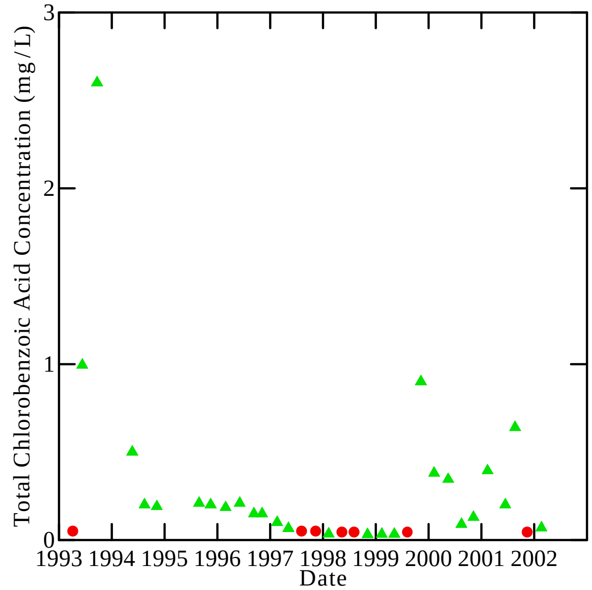
Well D3U

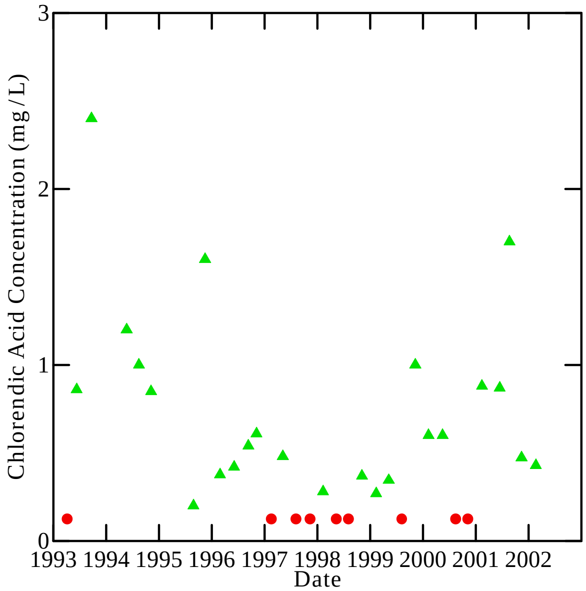
Analyte Concentration vs. Time

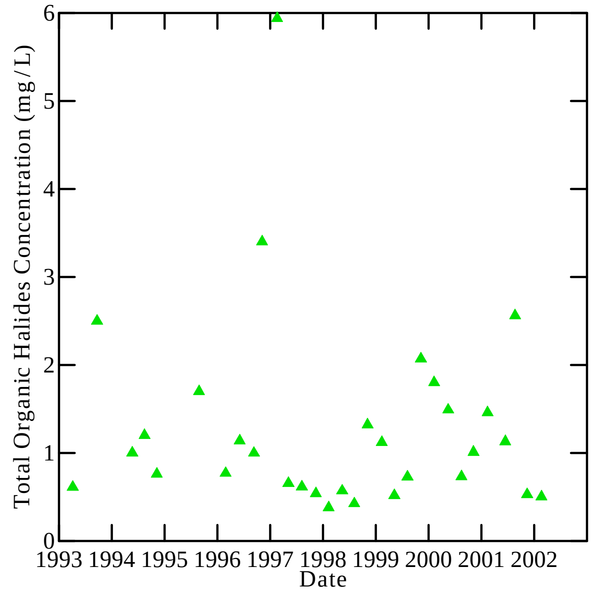
First Quarter 2002

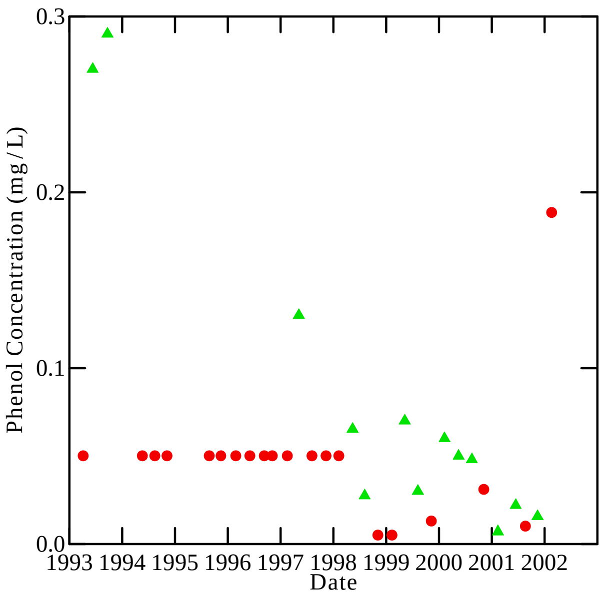
Hyde Park Landfill











Notes:

● Non-detect result

▲ Detected result

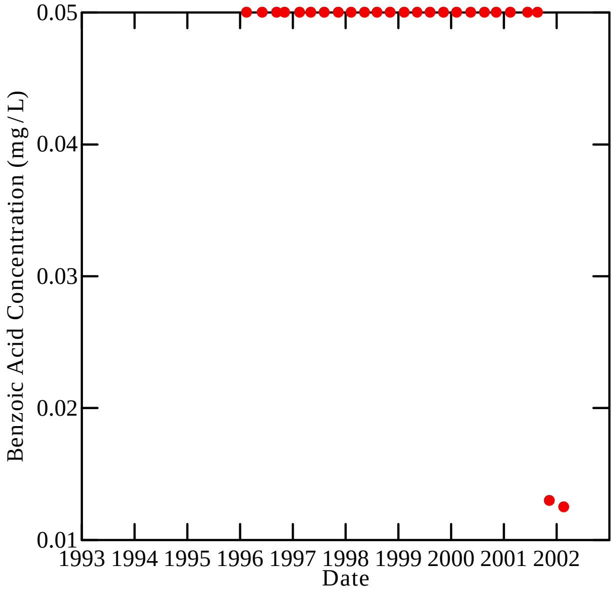
figure 8

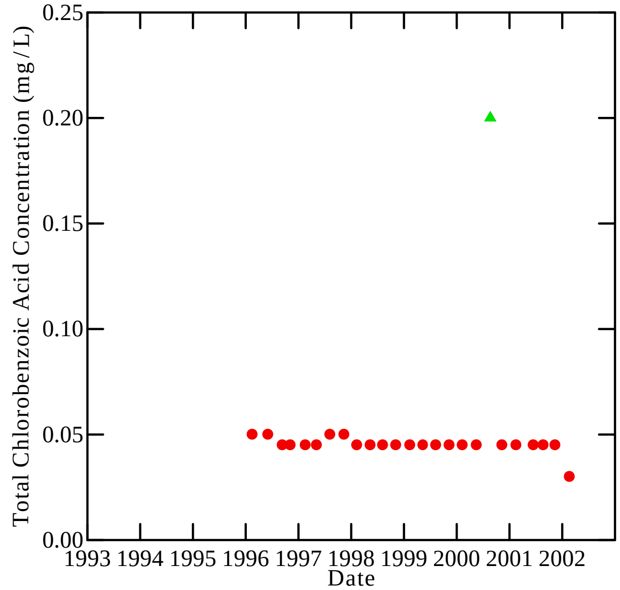
Well D2M

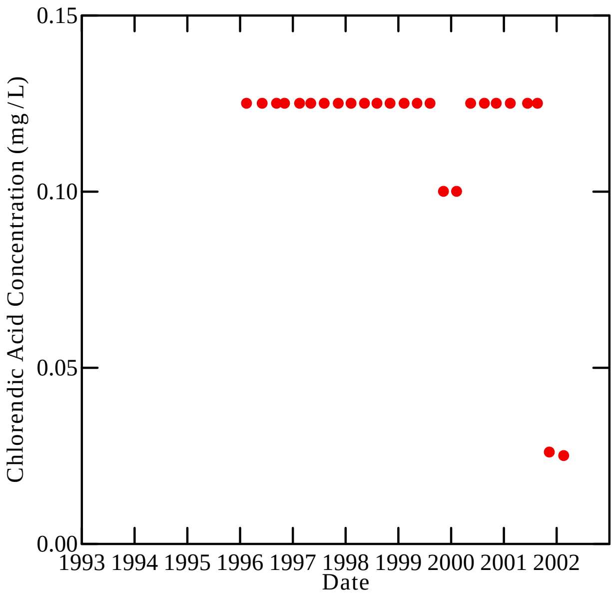
Analyte Concentration vs. Time

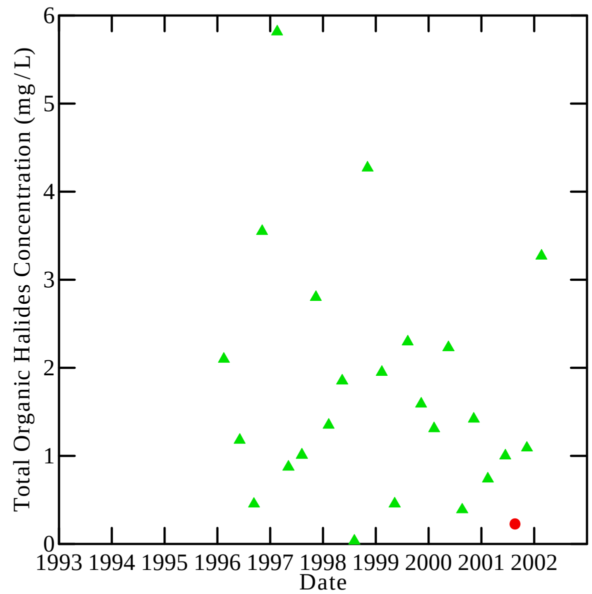
First Quarter 2002

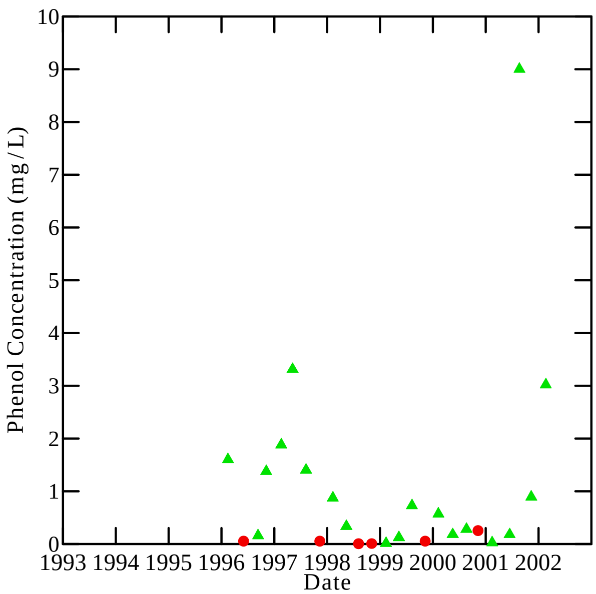
Hyde Park Landfill











Notes:

● Non-detect result

▲ Detected result

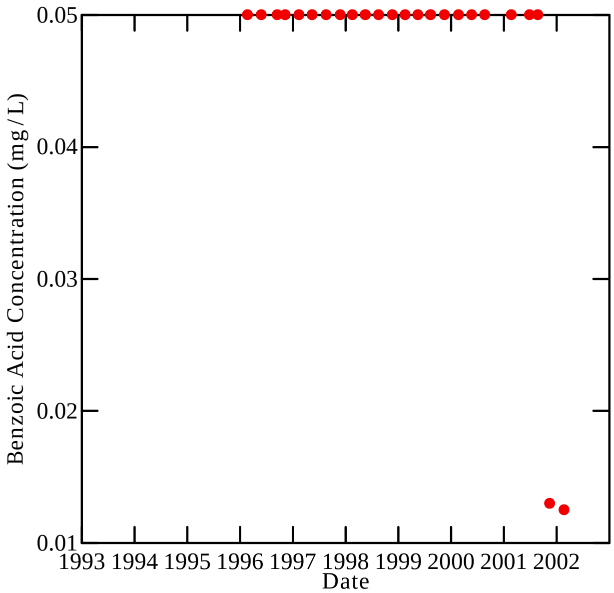
figure 9

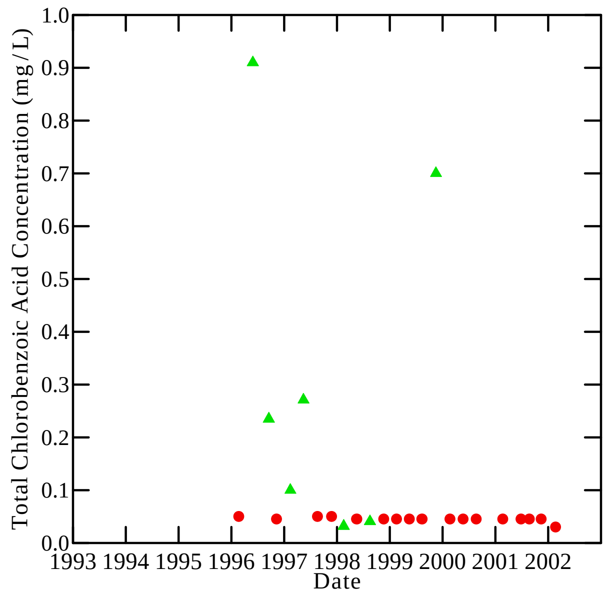
Well D1L

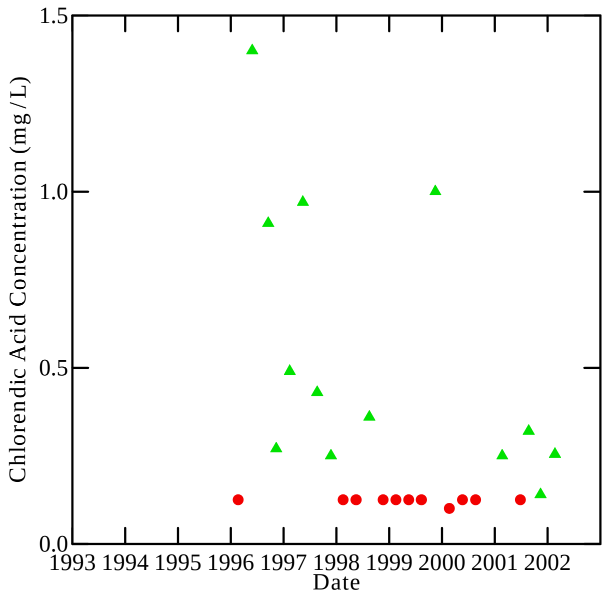
Analyte Concentration vs. Time

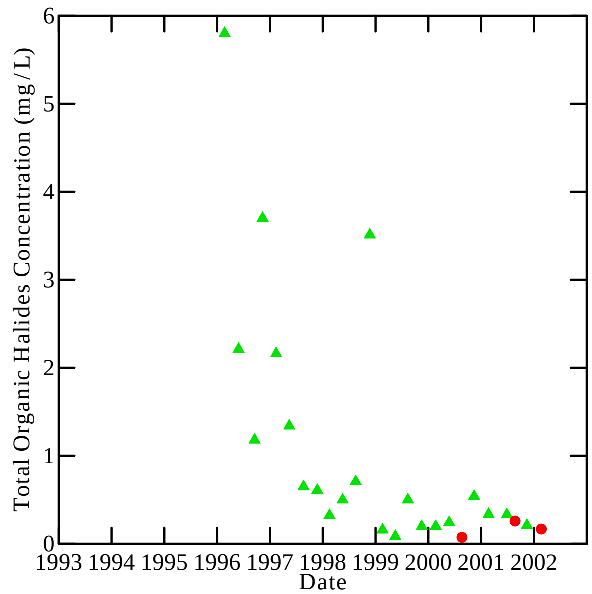
First Quarter 2002

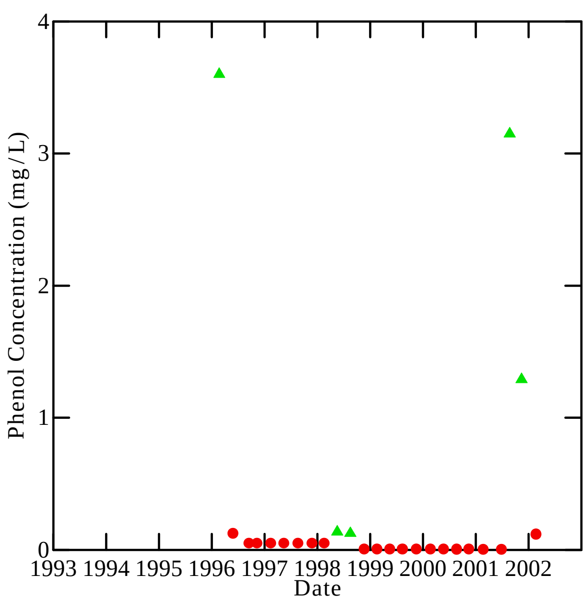
Hyde Park Landfill









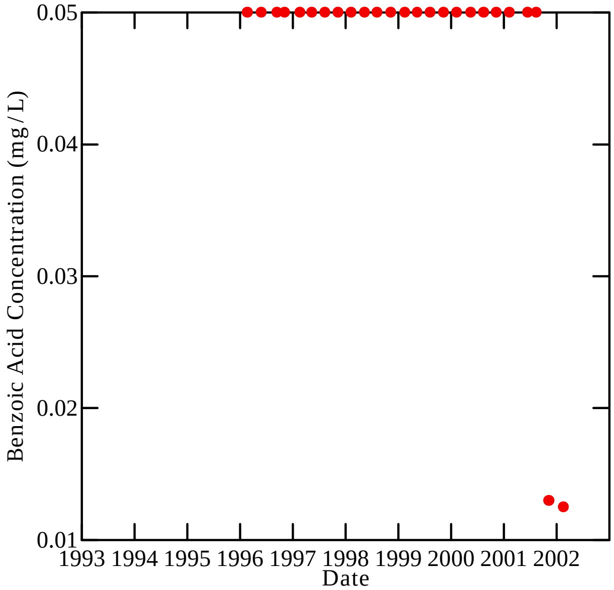


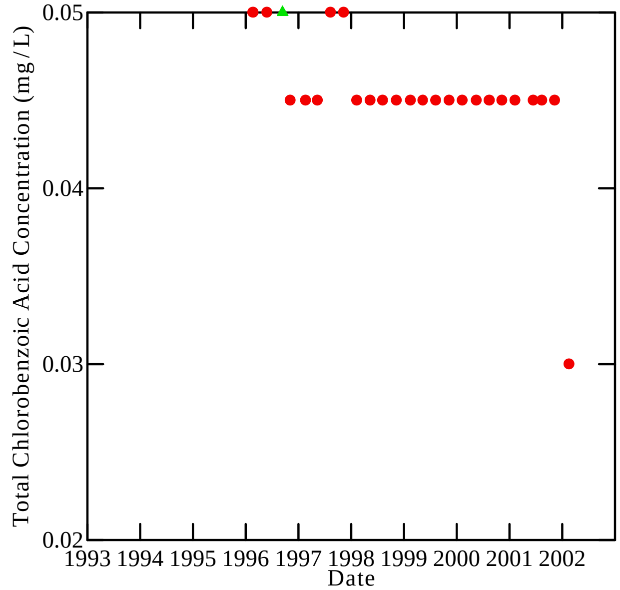
Notes:

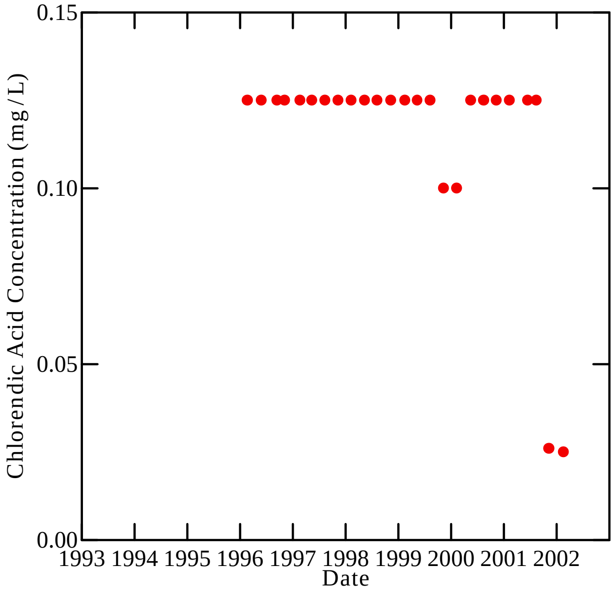
- ● Non-detect result
- ▲ Detected result

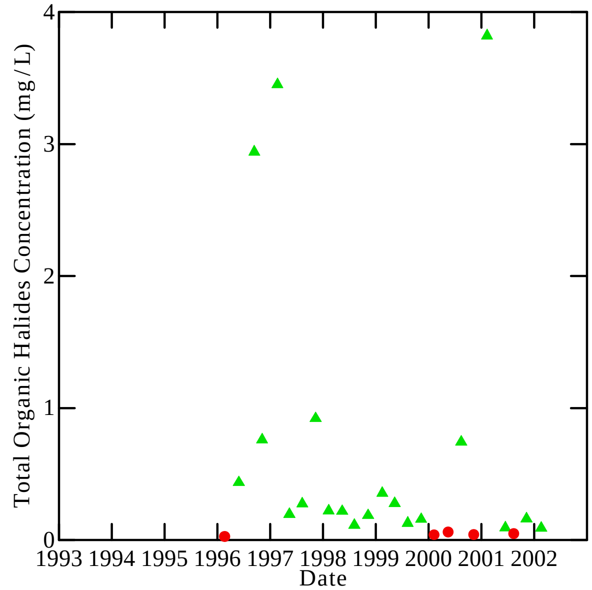
figure 10

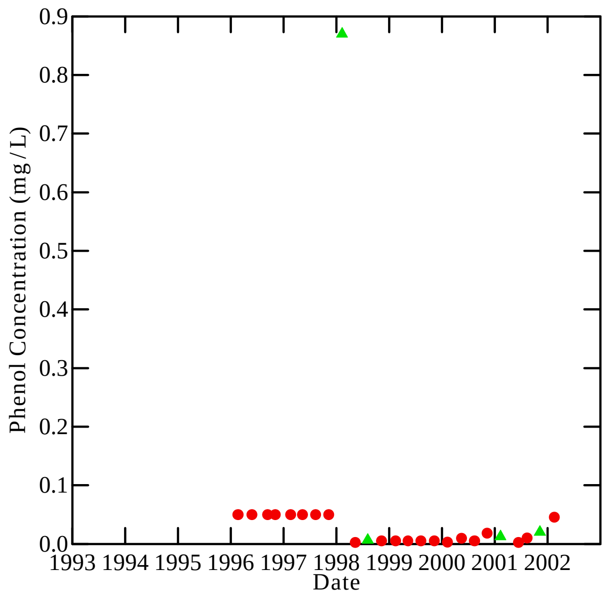
Well E3U
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill









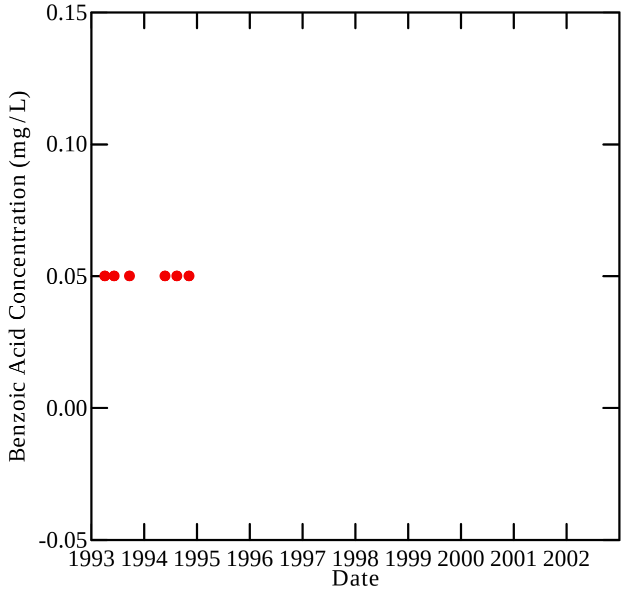


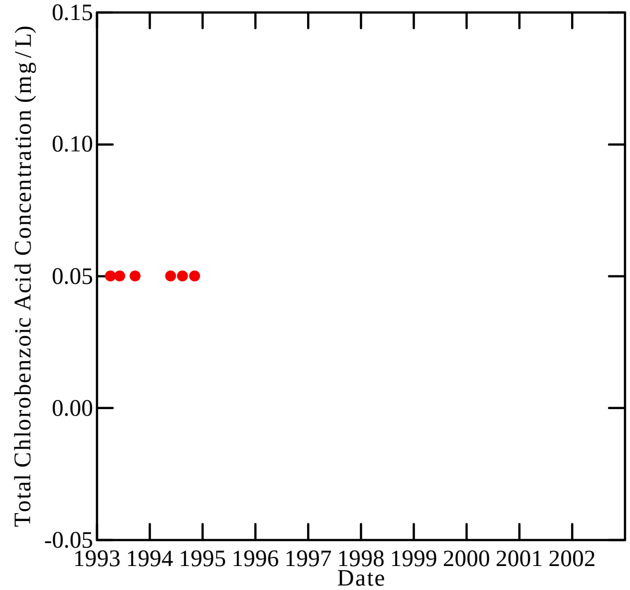
Notes:

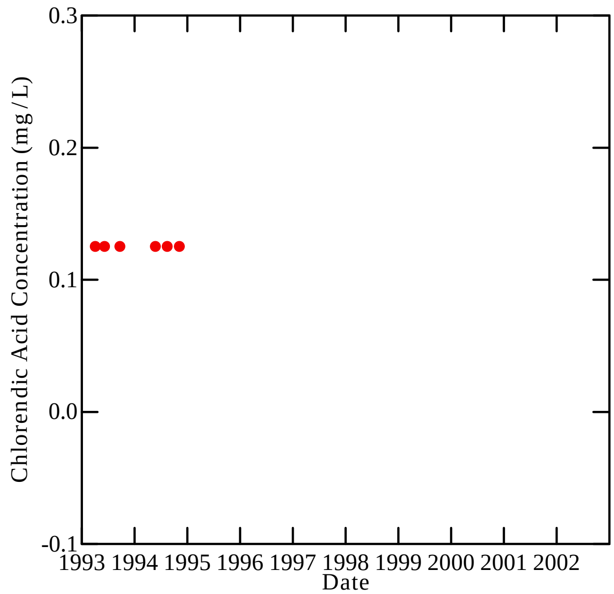
- ● Non-detect result
- ▲ Detected result

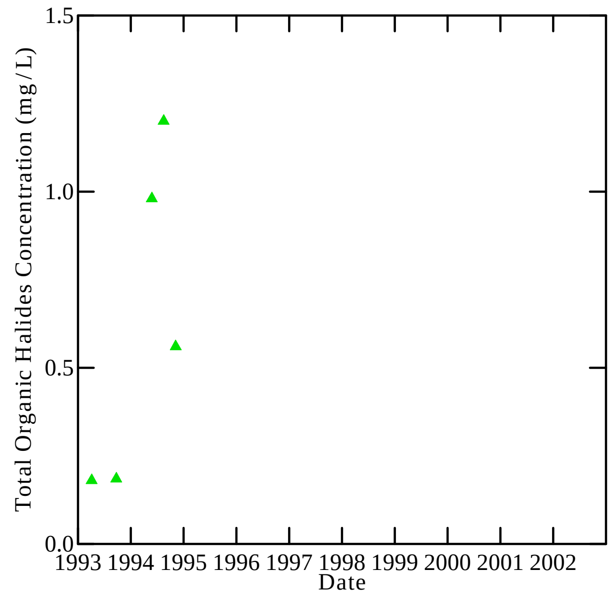
figure 11

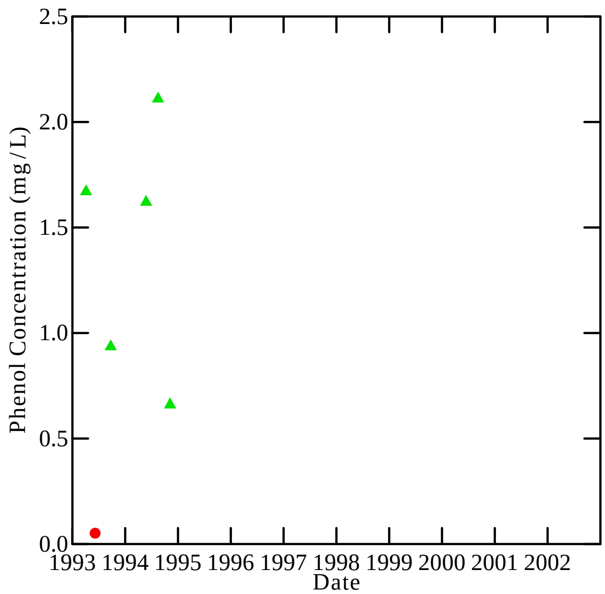
Well E3M
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill









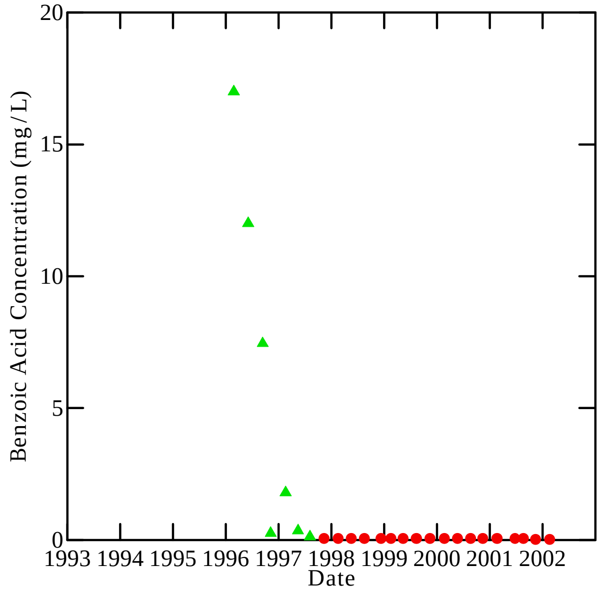


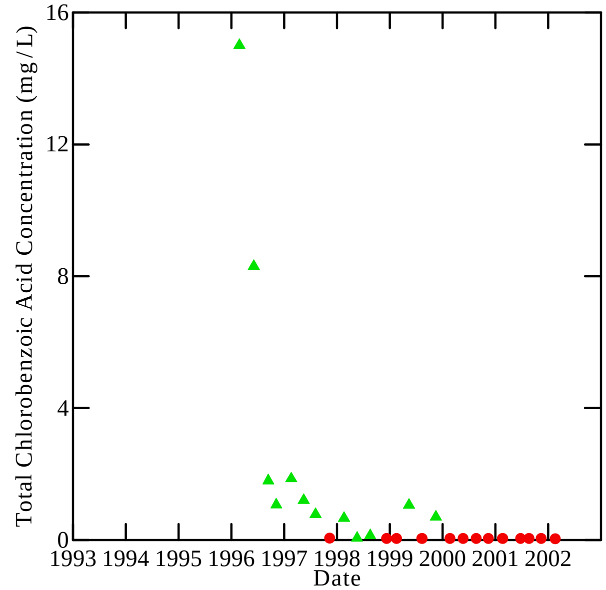
Notes:

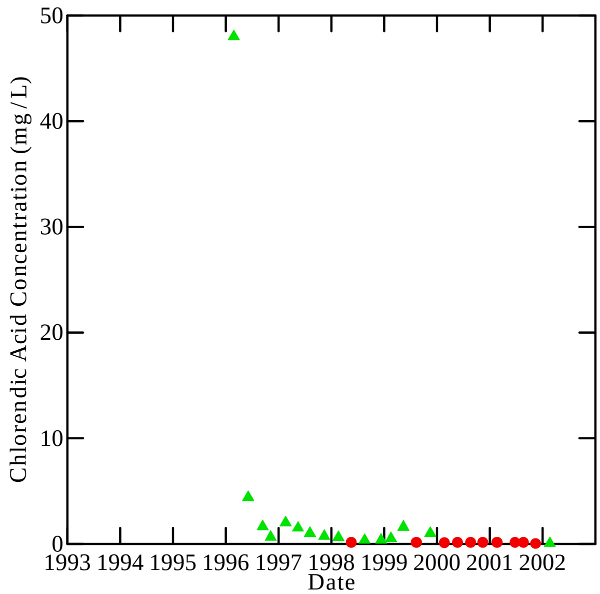
- ● Non-detect result
- ▲ Detected result

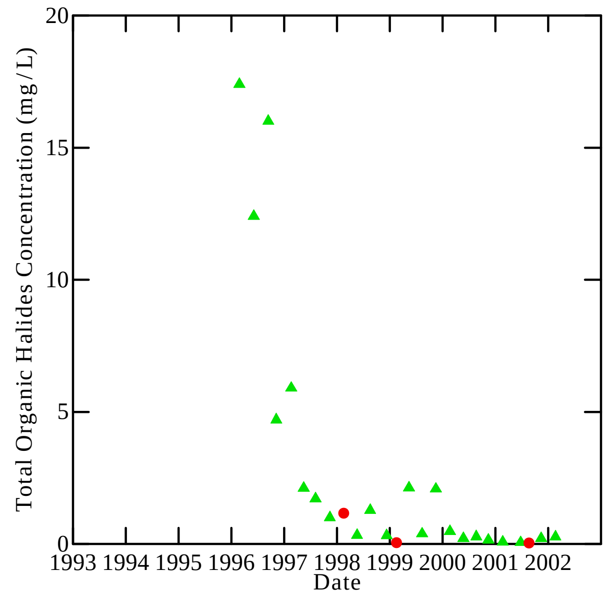
figure 12

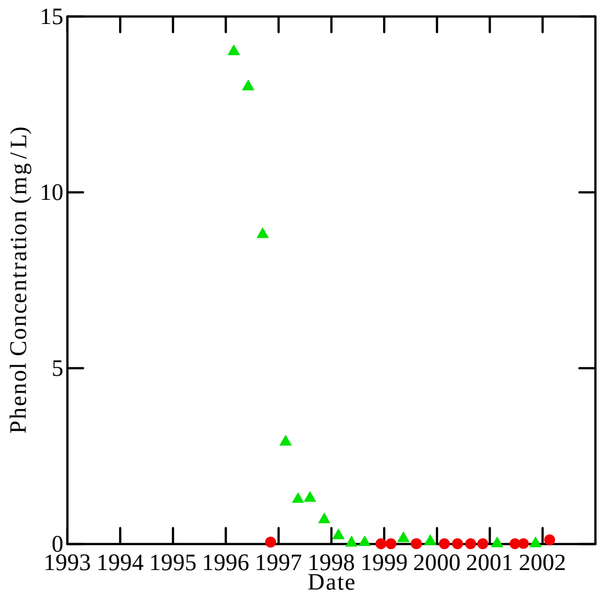
Well E2L
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill











Notes:

● Non-detect result

▲ Detected result

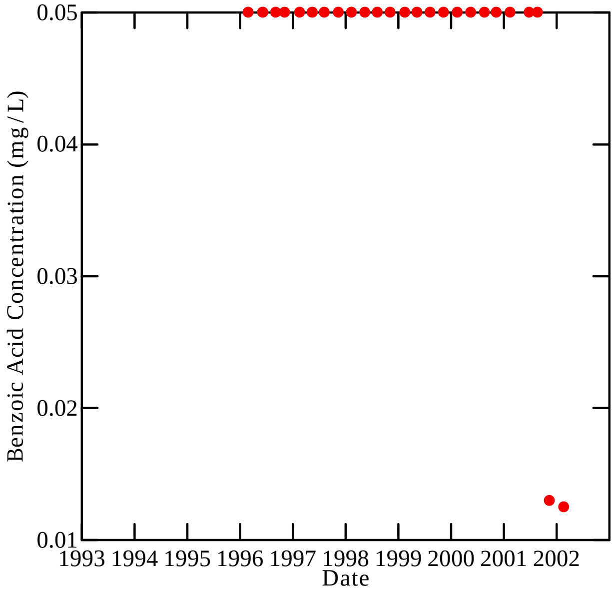
figure 13

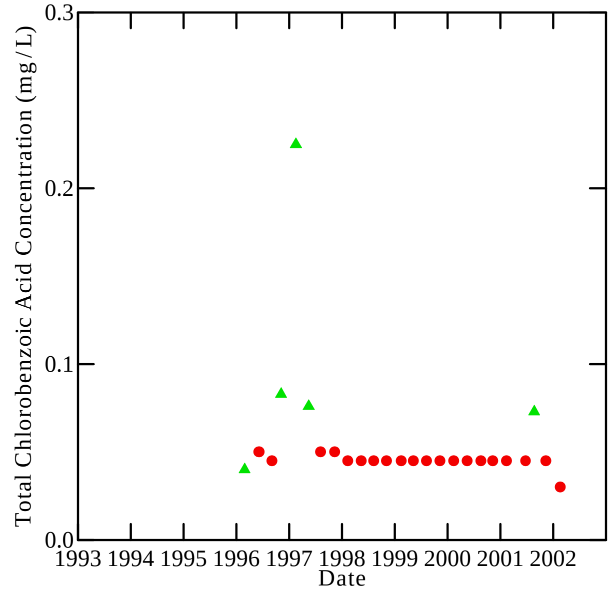
Well F4U

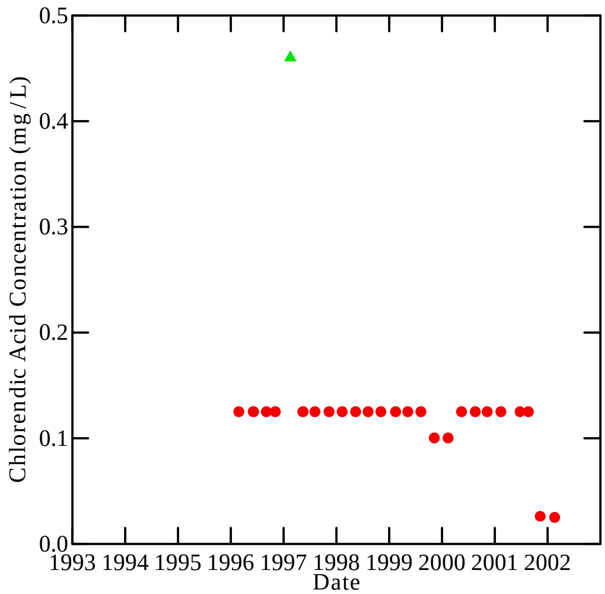
Analyte Concentration vs. Time

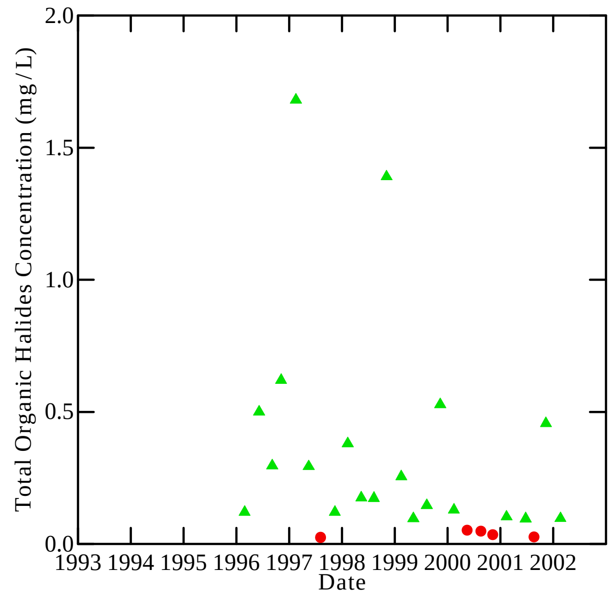
First Quarter 2002

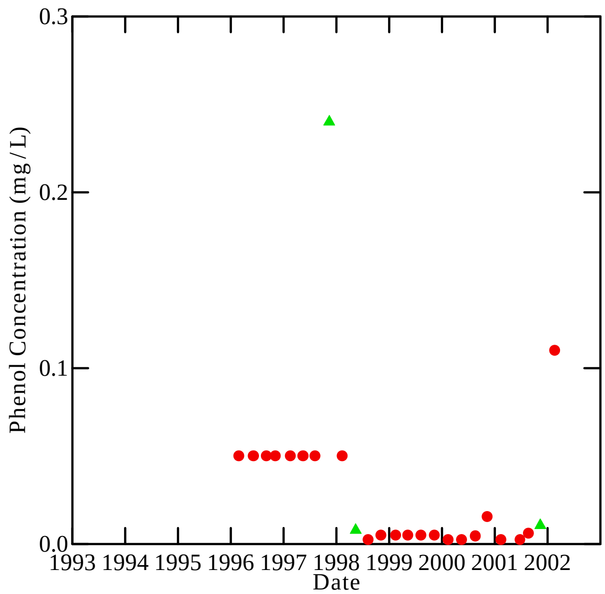
Hyde Park Landfill











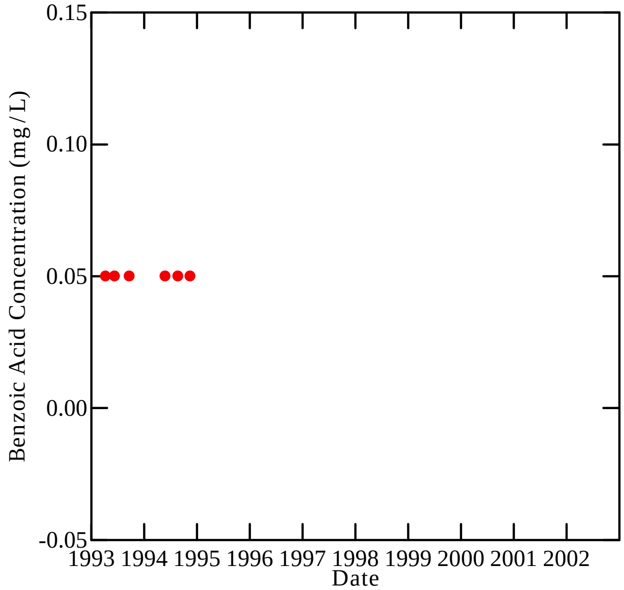
Notes:

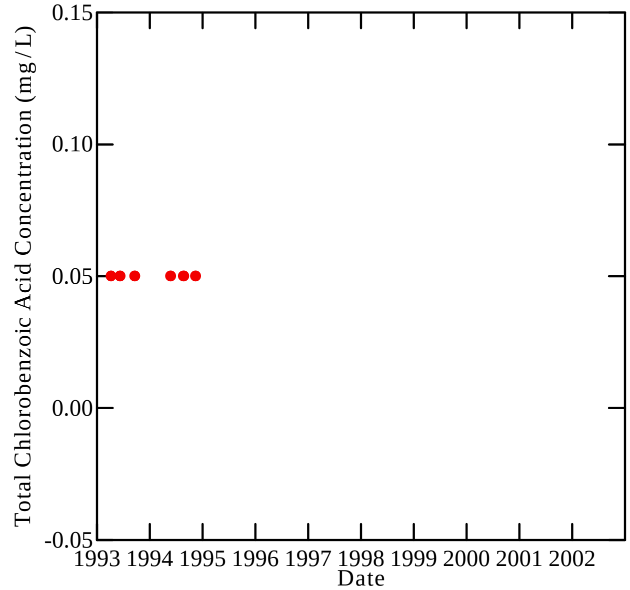
● Non-detect result

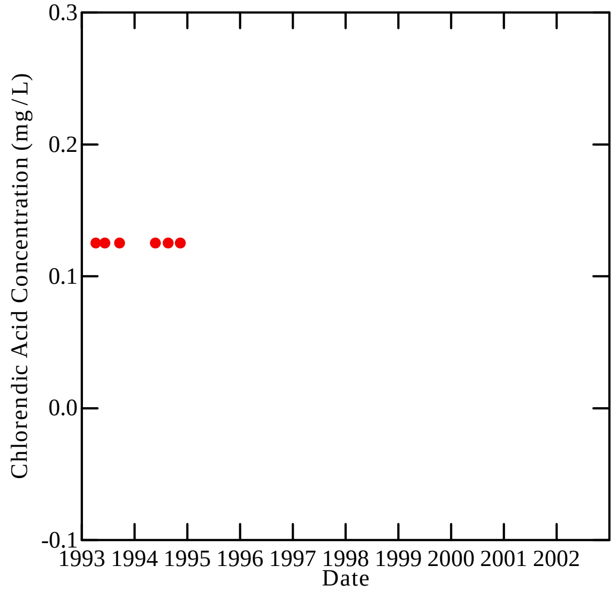
▲ Detected result

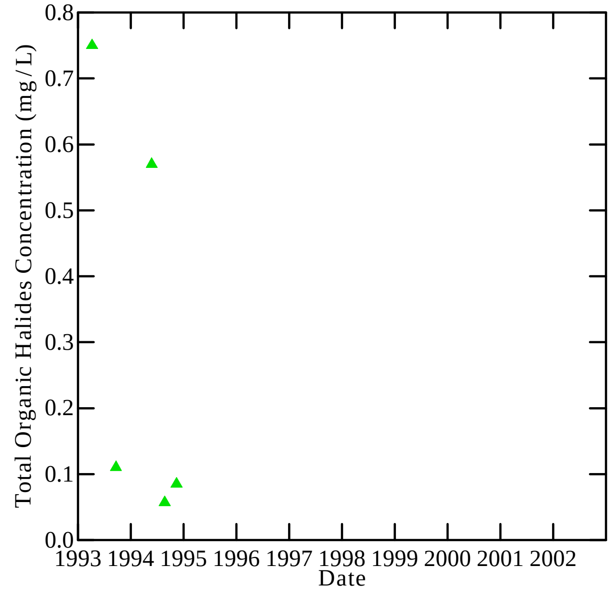
figure 14

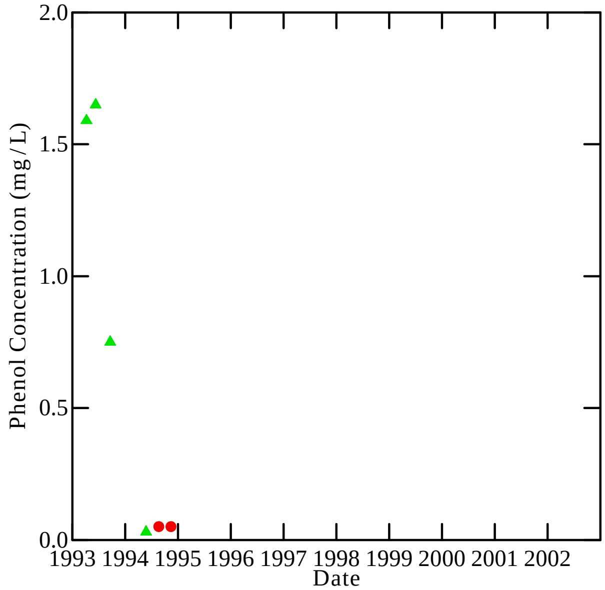
Well F1M
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill











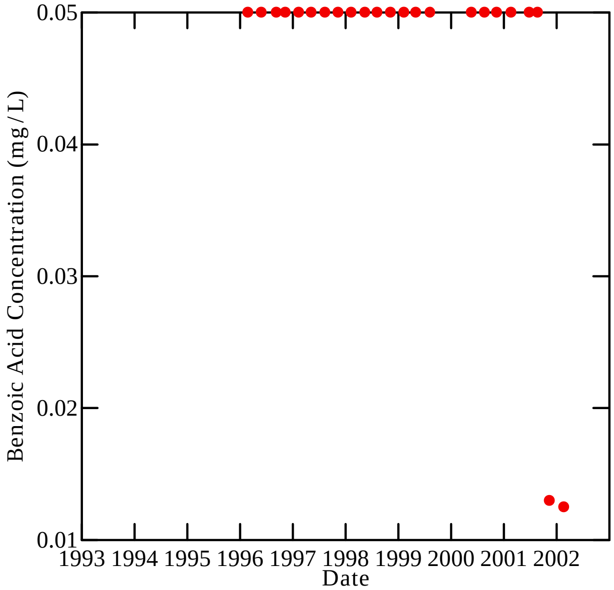
Notes:

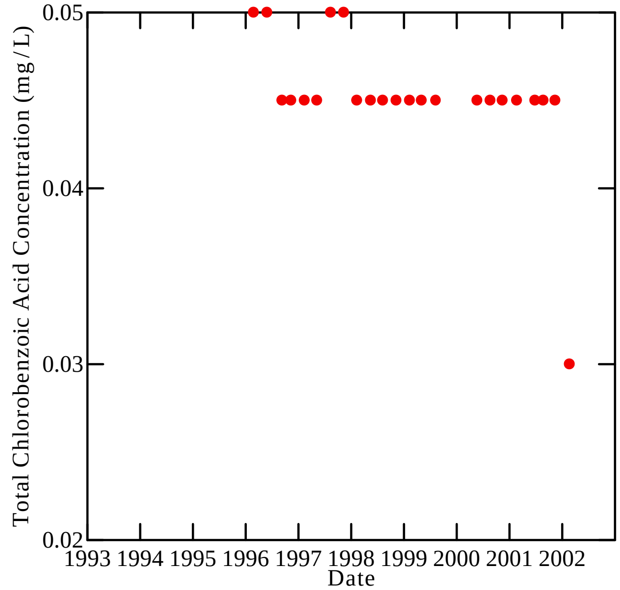
● Non-detect result

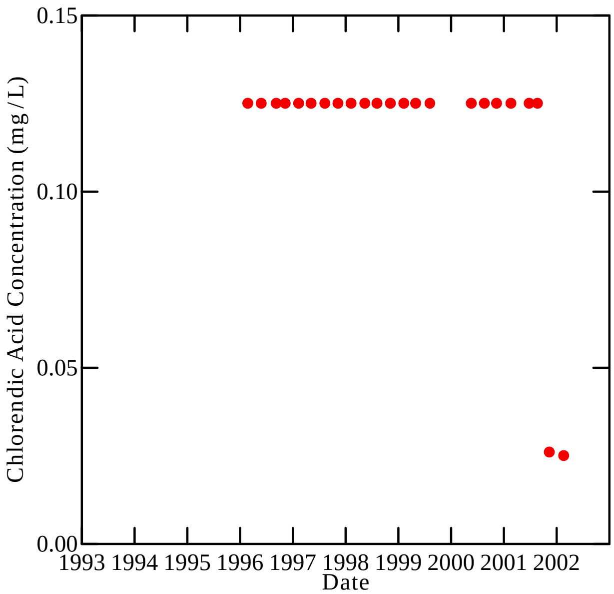
▲ Detected result

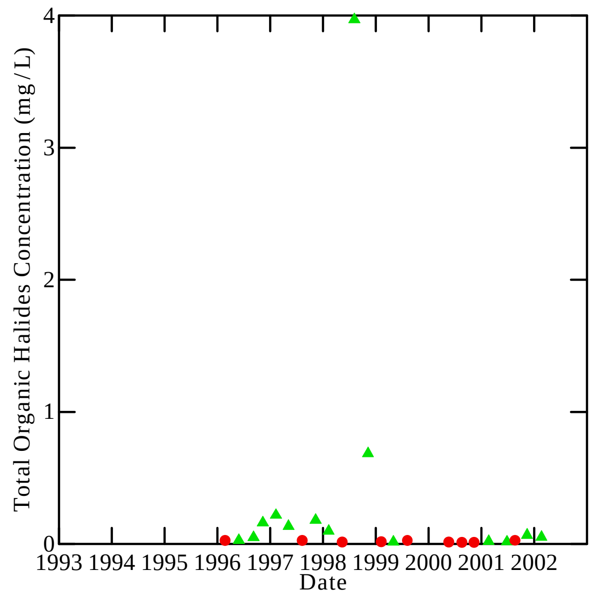
figure 15

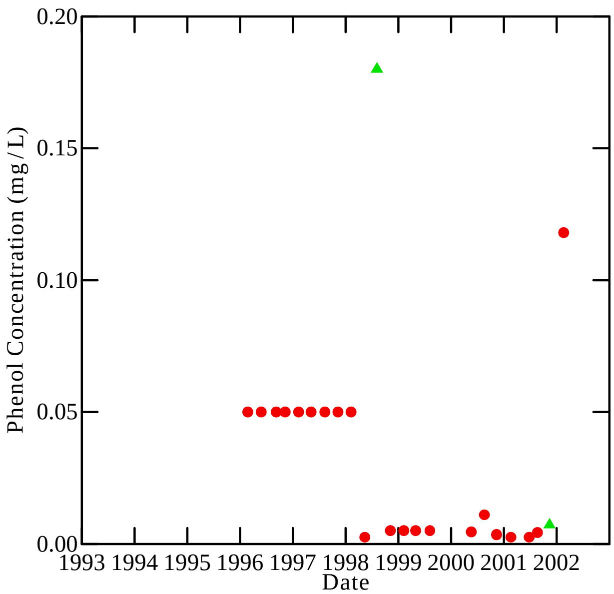
Well F2L
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill











Notes:

● Non-detect result

▲ Detected result

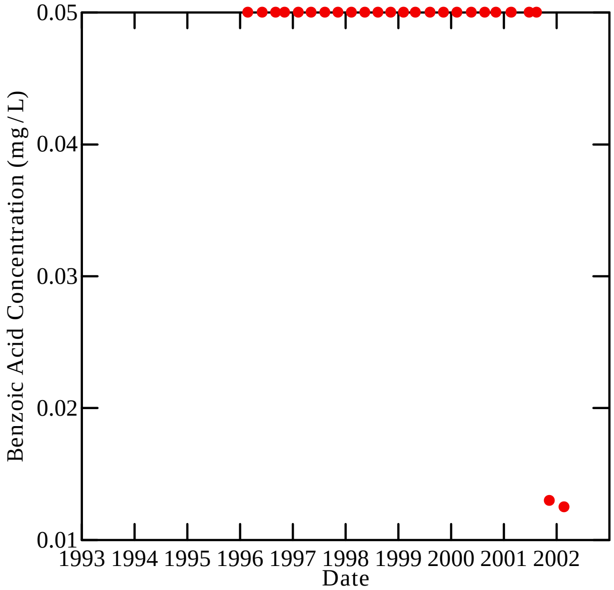
figure 16

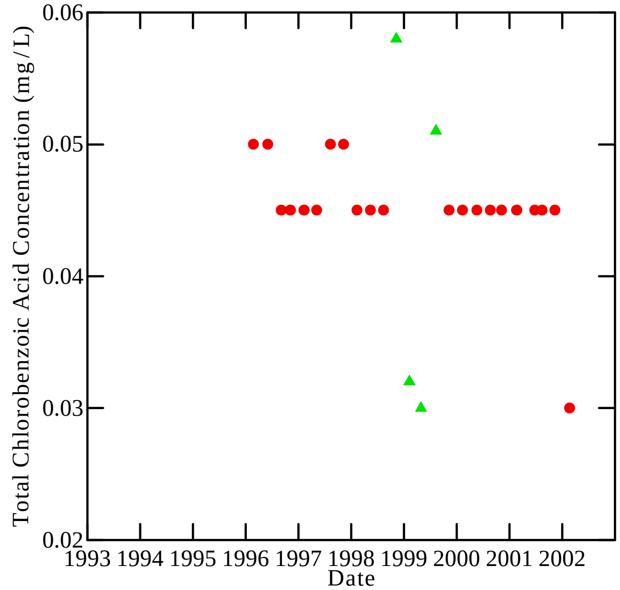
Well G4U

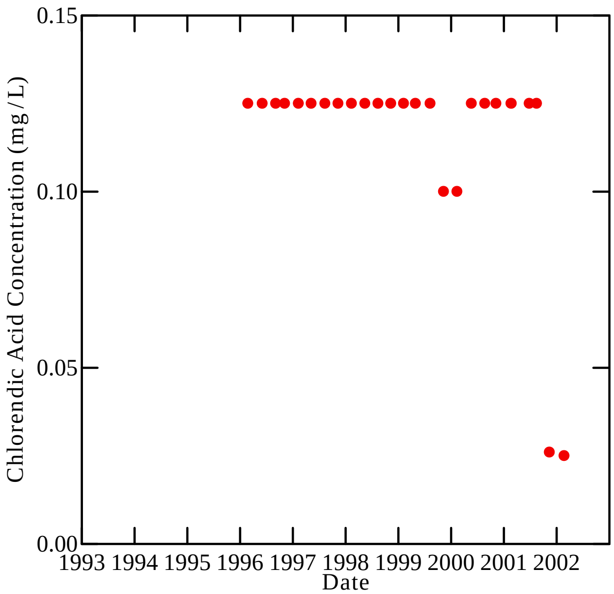
Analyte Concentration vs. Time

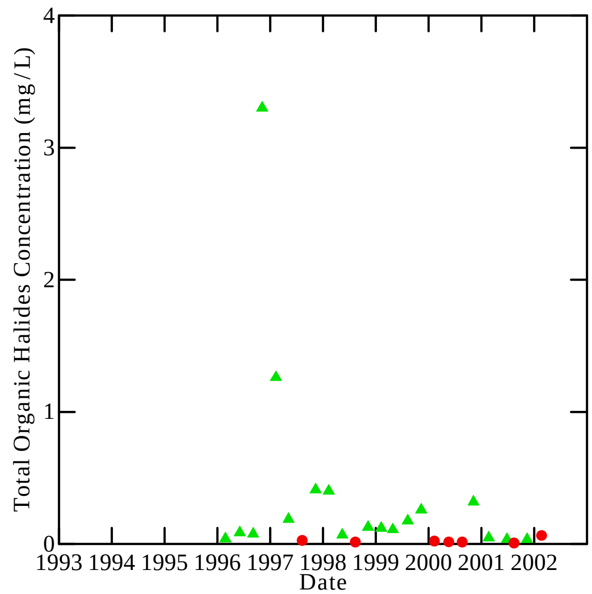
First Quarter 2002

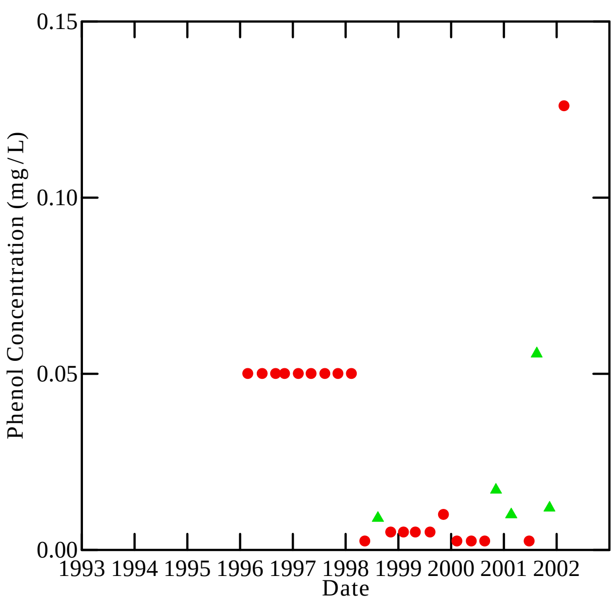
Hyde Park Landfill









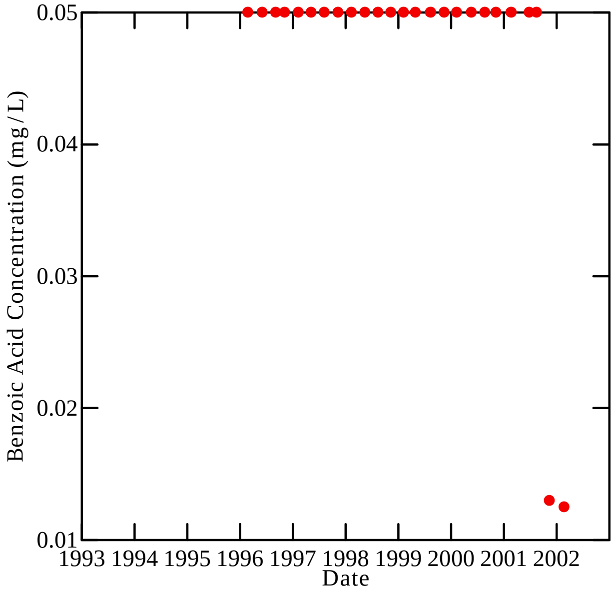


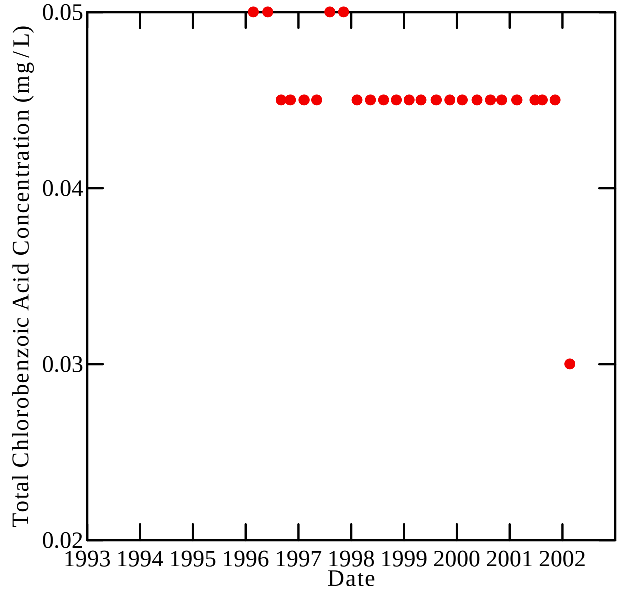
Notes:

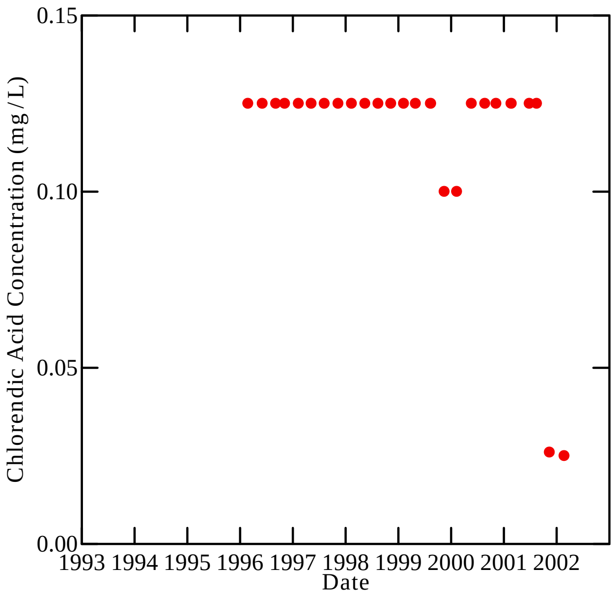
- ● Non-detect result
- ▲ Detected result

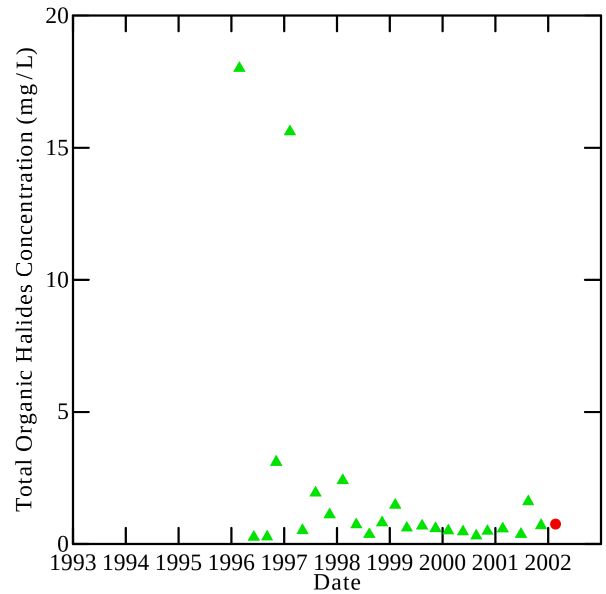
figure 17

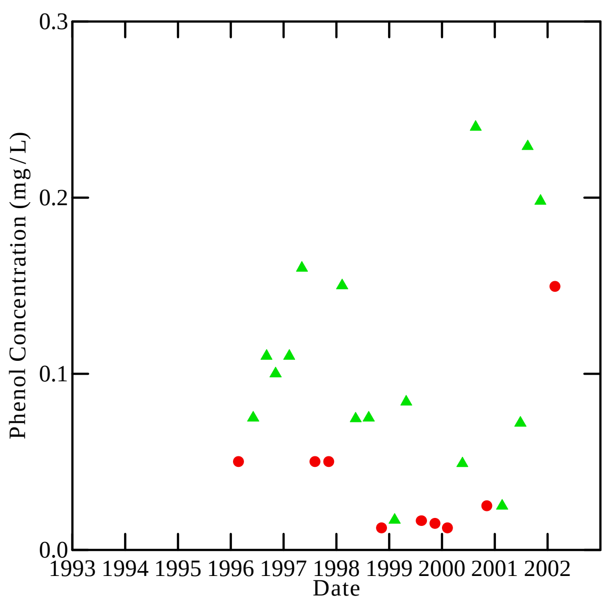
Well G1M
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill







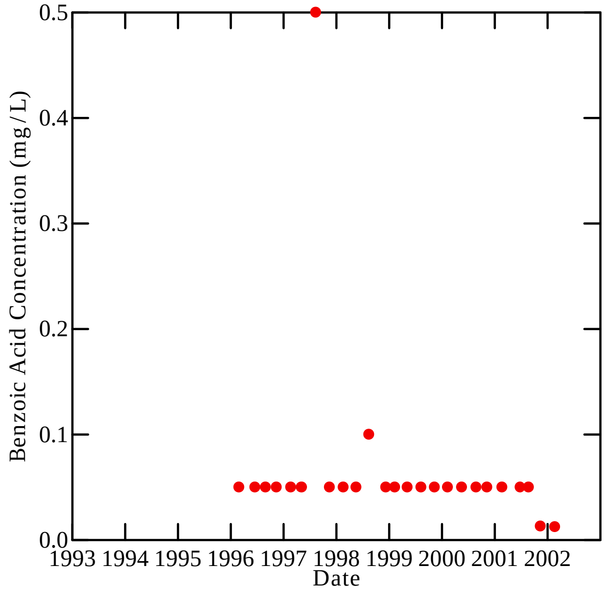


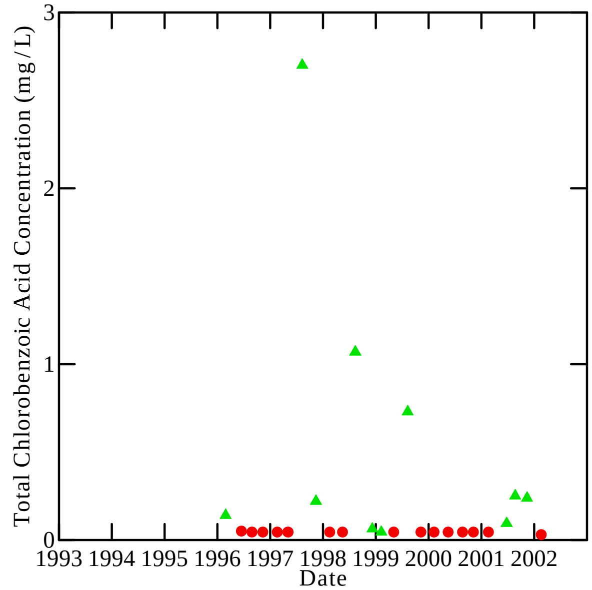


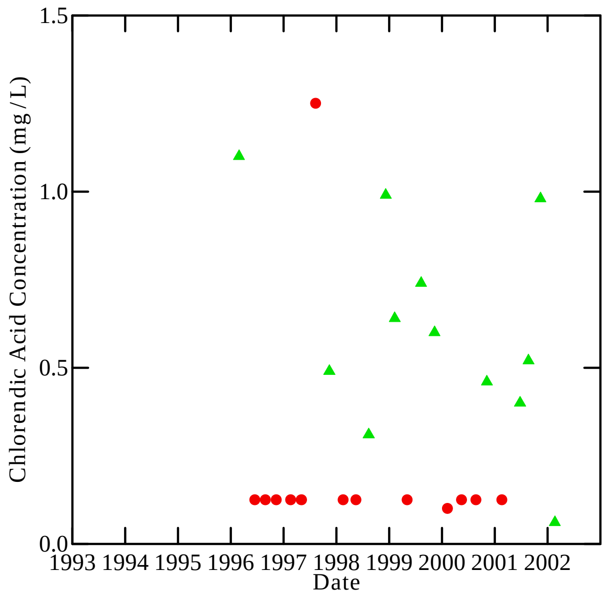
Notes:
- ● Non-detect result
- ▲ Detected result

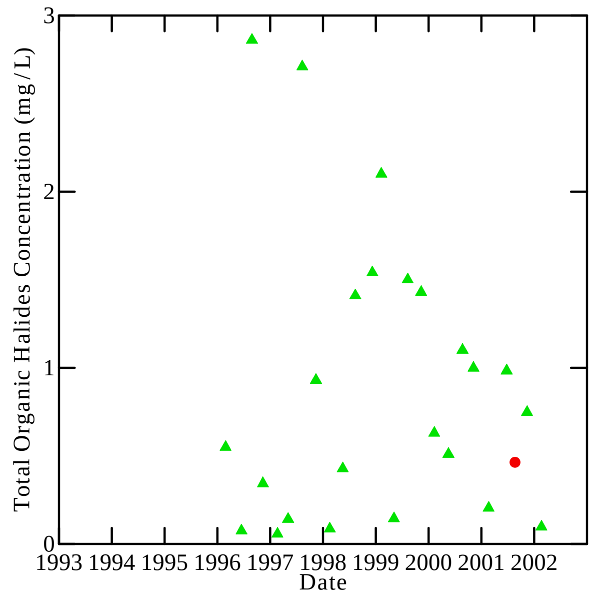
figure 18

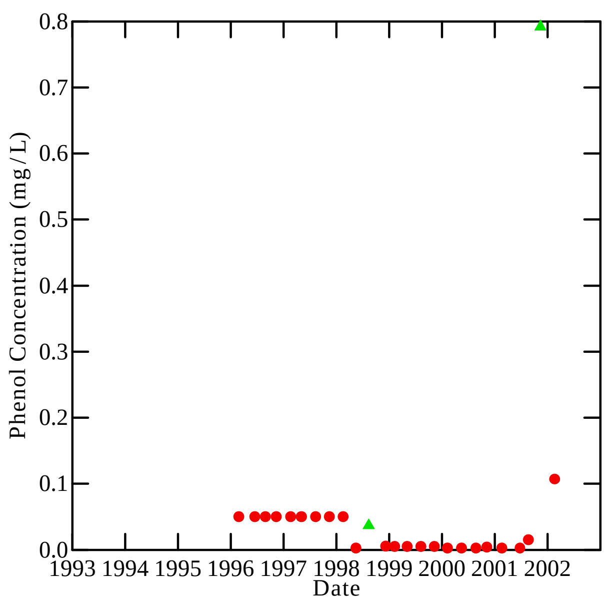
Well G1L
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill











Notes:

● Non-detect result

▲ Detected result

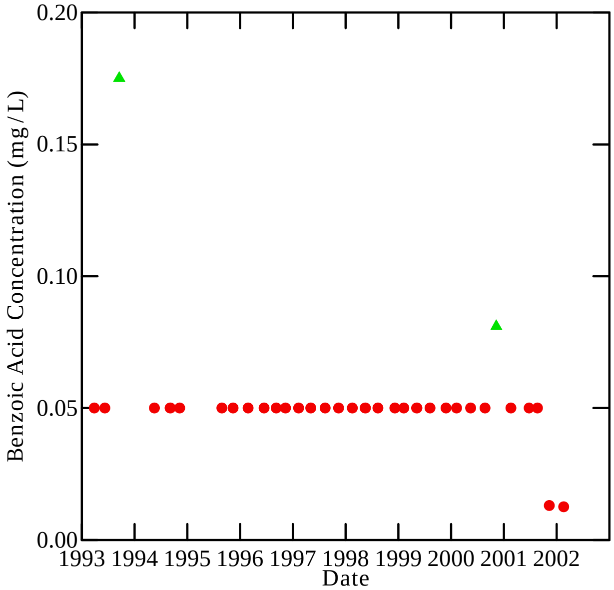
figure 19

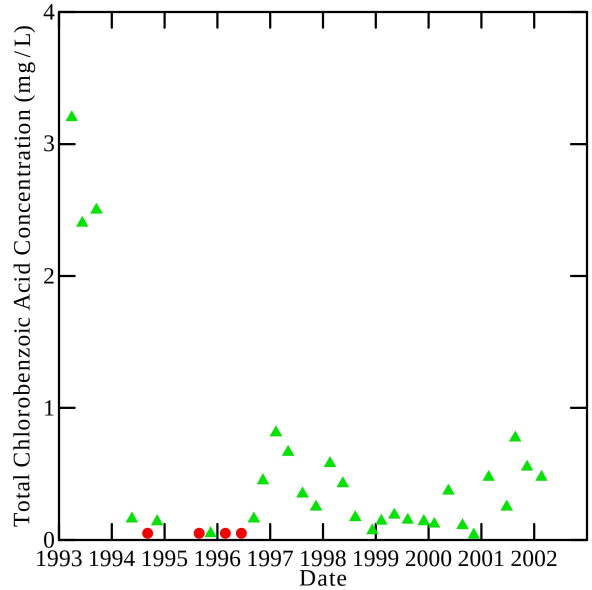
Well H1U

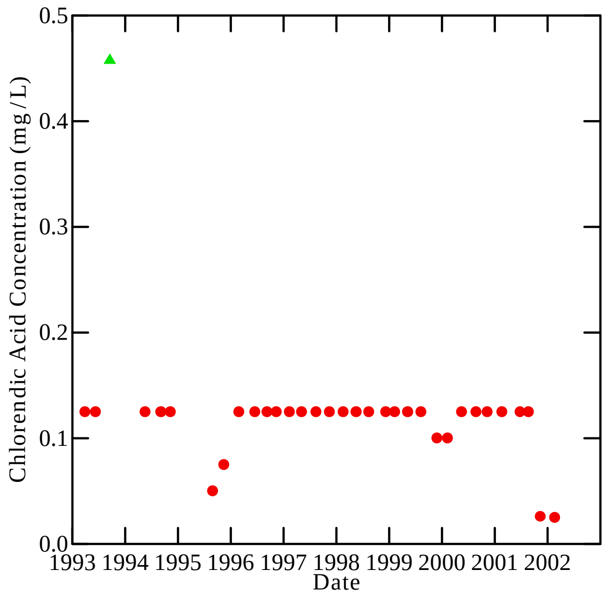
Analyte Concentration vs. Time

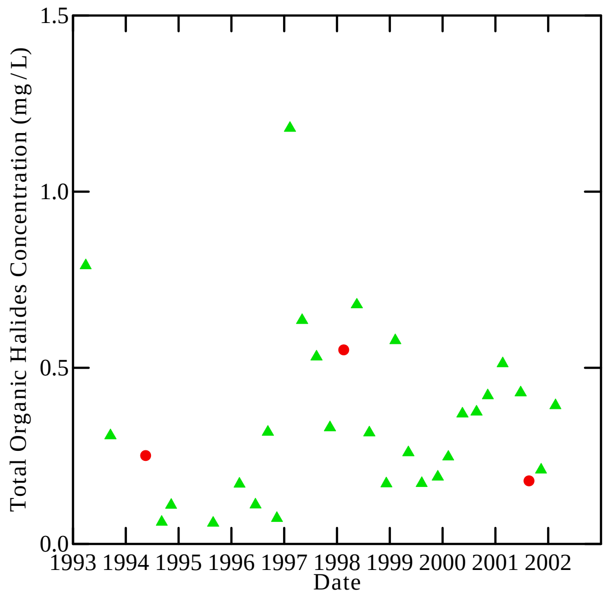
First Quarter 2002

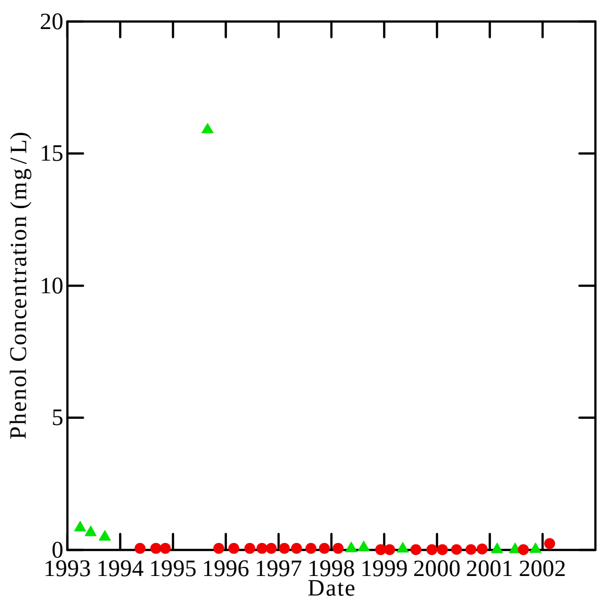
Hyde Park Landfill











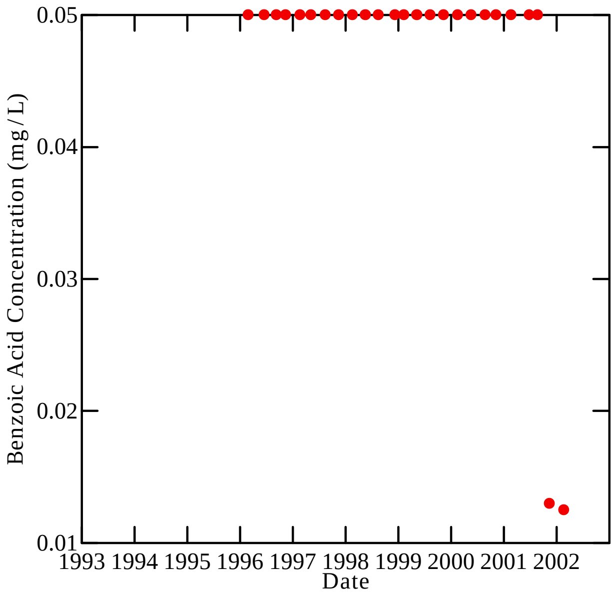
Notes:

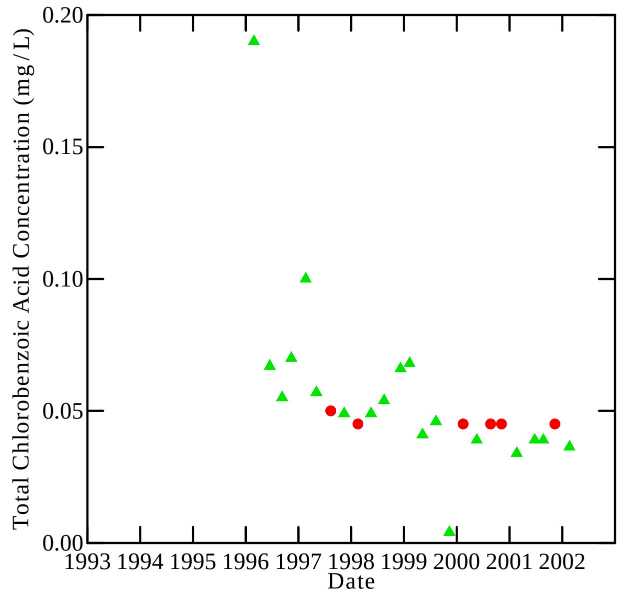
● Non-detect result

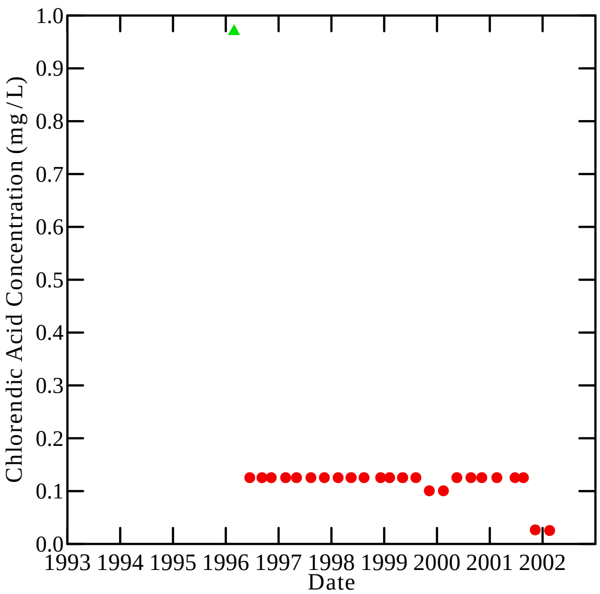
▲ Detected result

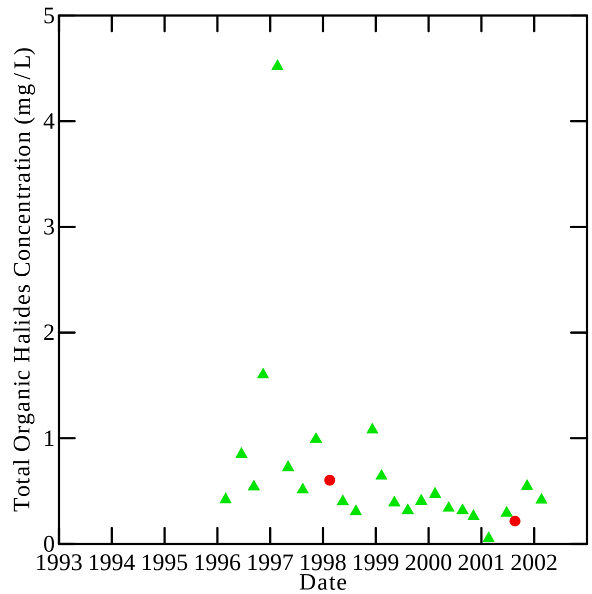
figure 20

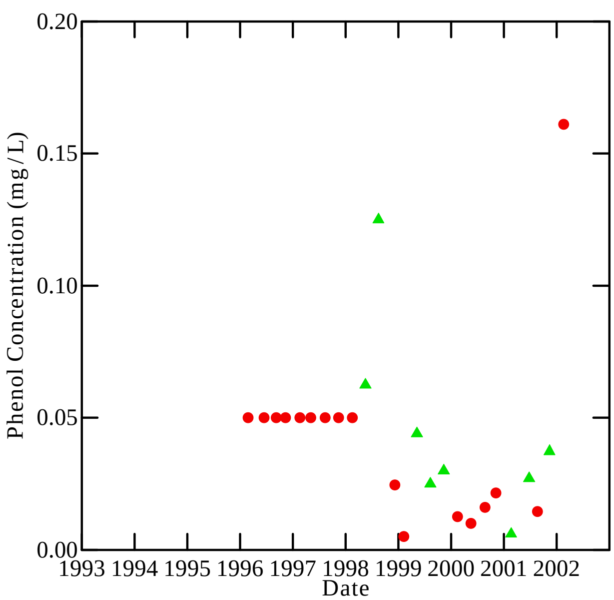
Well H2M
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill









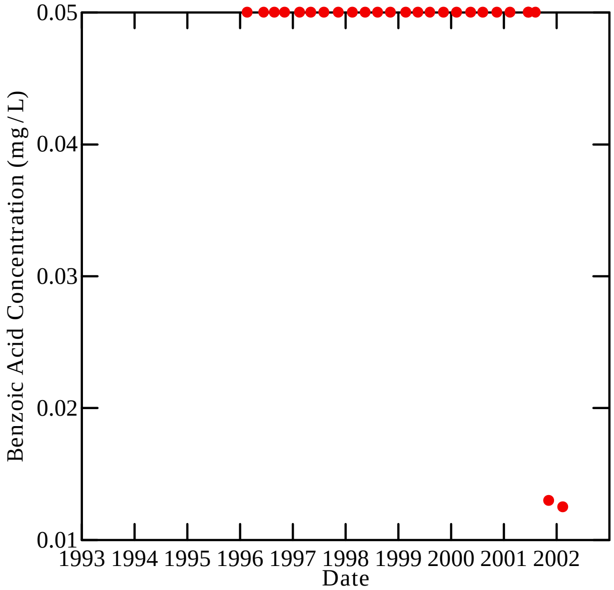


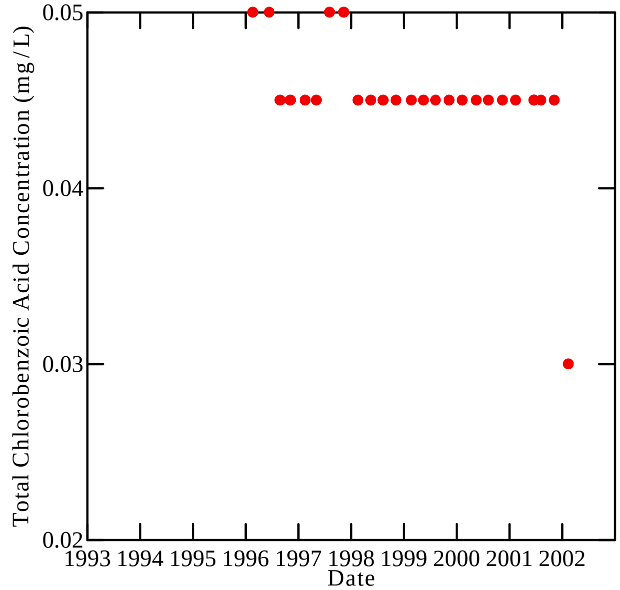
Notes:

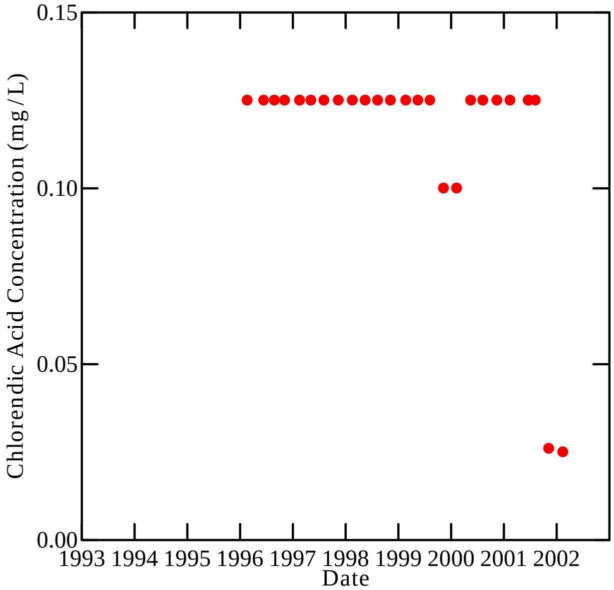
- ● Non-detect result
- ▲ Detected result

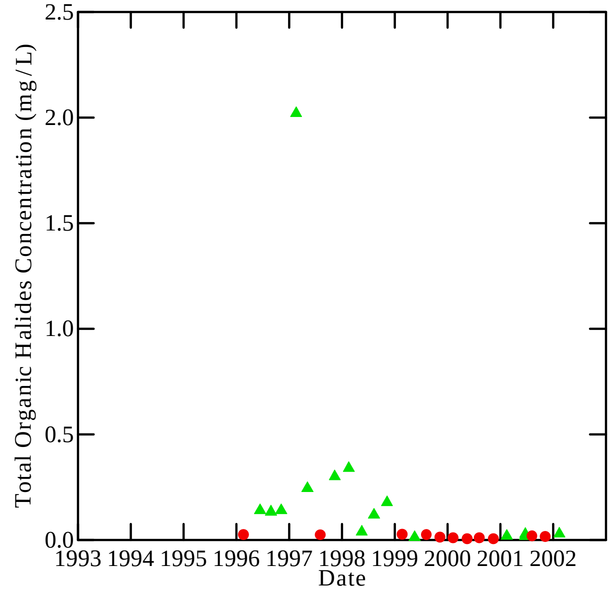
figure 21

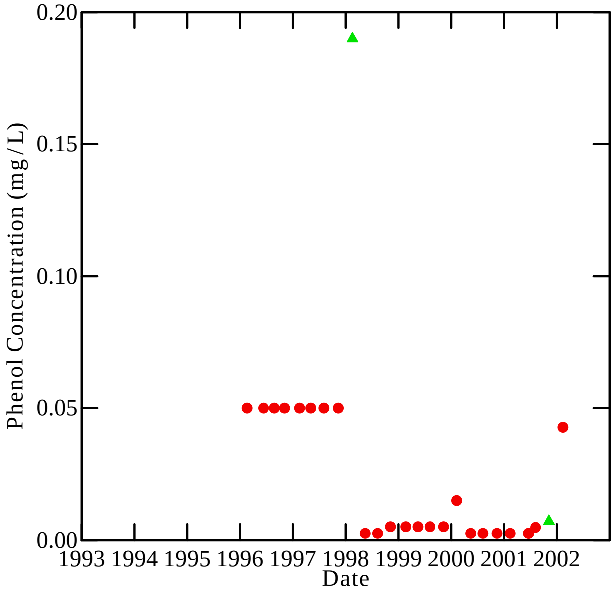
Well H3L
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill











Notes:

● Non-detect result

▲ Detected result

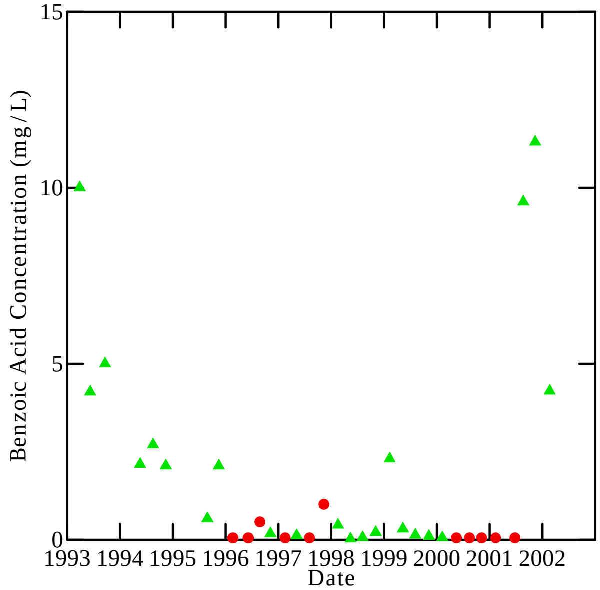
figure 22

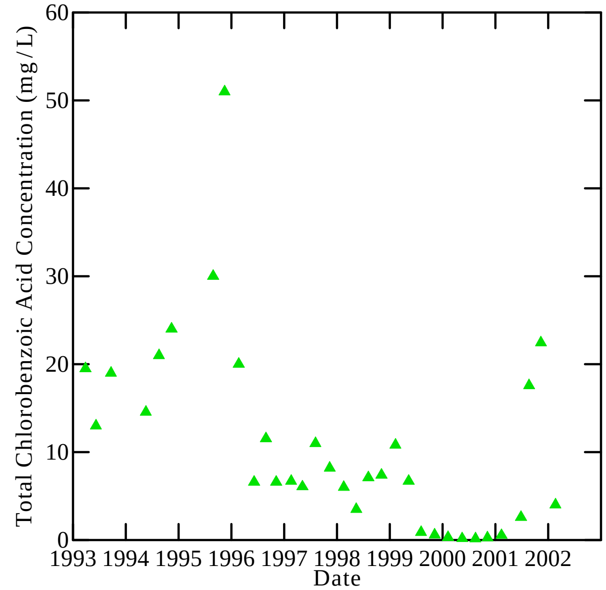
Well J1U

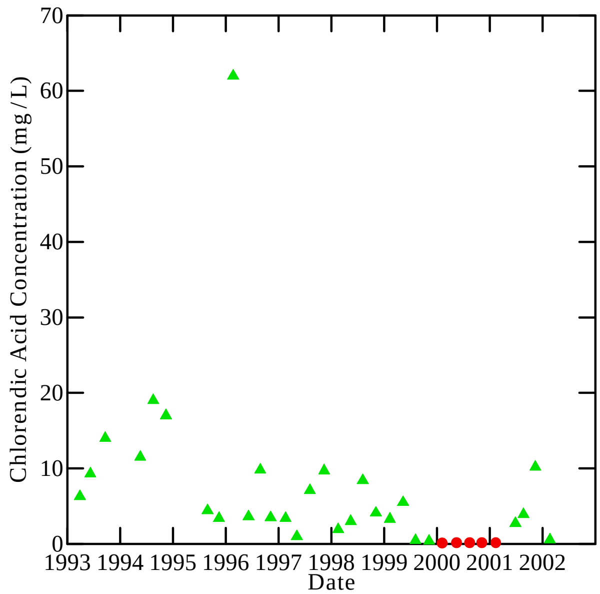
Analyte Concentration vs. Time

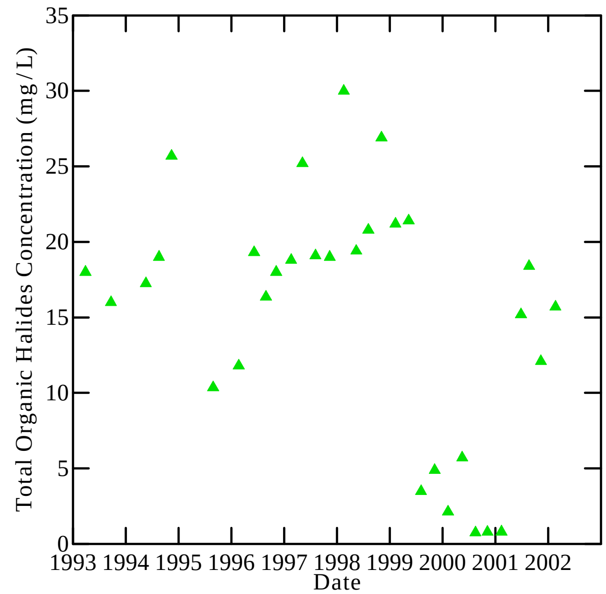
First Quarter 2002

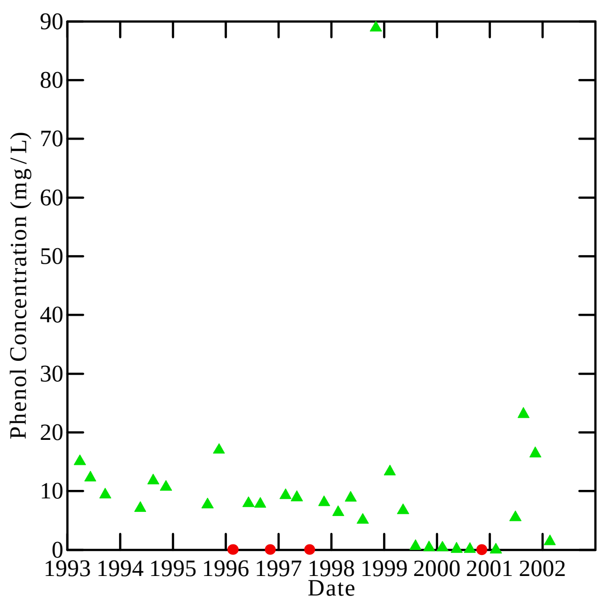
Hyde Park Landfill











Notes:
● Non-detect result
▲ Detected result

figure 23

Well J2M
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill

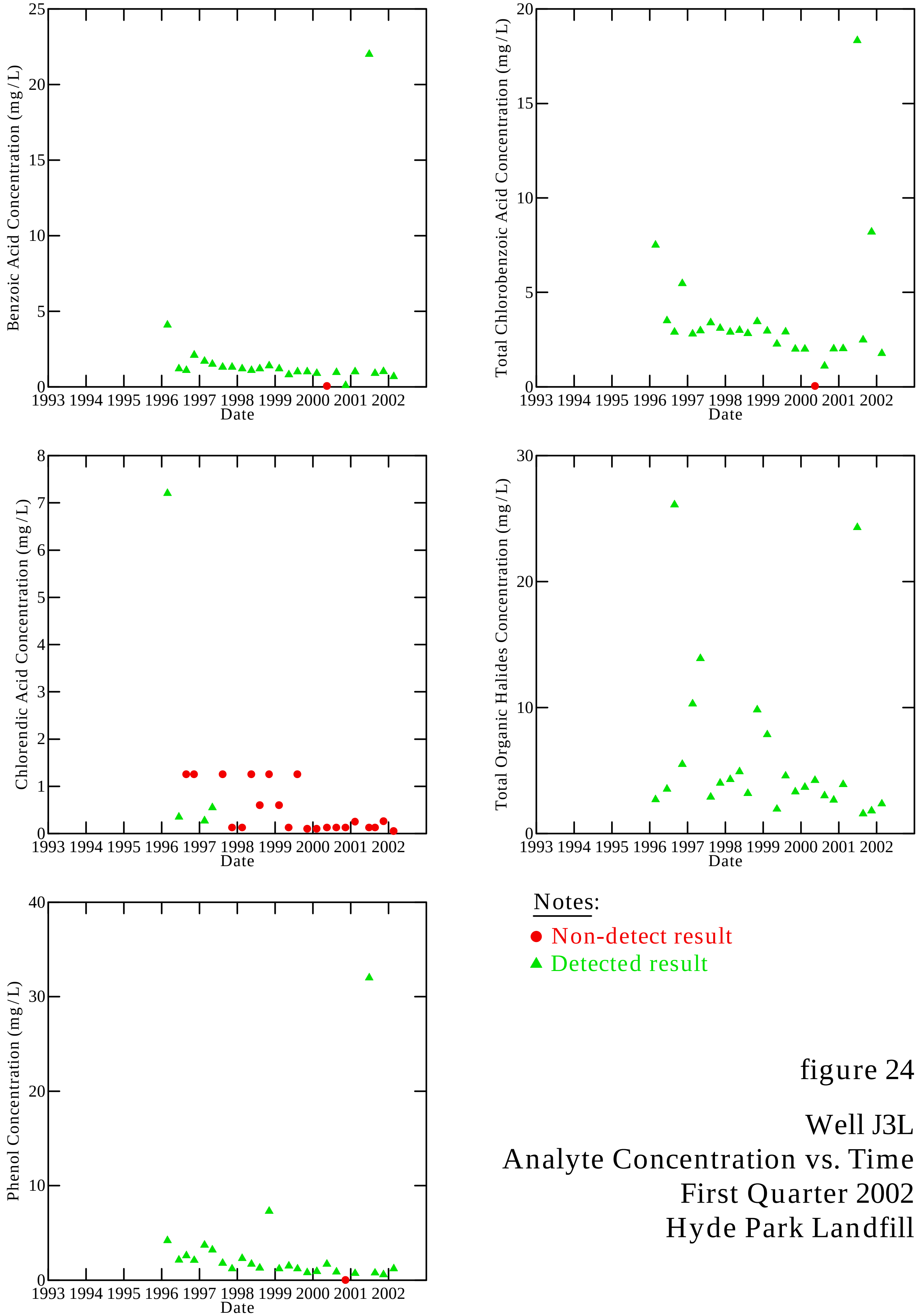


figure 24

Well J3L
Analyte Concentration vs. Time
First Quarter 2002
Hyde Park Landfill