2003 Annual and Five Year Review Report:

OPERATIONS, MAINTENANCE, AND MONITORING AT THE CHERRY FARM SITE (NYSDEC SITE NO. 9-15-063) RIVER ROAD SITE (NYSDEC SITE NO. 9-15-031)

Tonawanda, New York

Submitted To:

New York State Department of Environmental Conservation Division of Hazardous Waste Remediation

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EXECUTIVE SUMMARY

INTRODUCTION

This Annual and Five-Year Review Report for the Cherry Farm/River Road Site (Site) summarizes the monitoring and maintenance activities conducted from January 1, 2003 through December 31, 2003. It also provides an overview of monitoring data from the startup of the groundwater extraction system in August 1997 through December 2003. The work was conducted as part of the required post-construction operations, maintenance, and monitoring (OM&M) program to monitor and evaluate groundwater and surface water quality, determine the effectiveness of both the shallow and intermediate/deep groundwater extraction systems, and monitor and maintain the integrity of the landfill, including offshore barrier islands and shoreline wetlands.

PROGRAM METHODOLOGY

Sumps in the shallow aquifer and monitoring wells in the intermediate/deep aquifer were sampled in June and December 2003, as required in the January 2000 OM&M Manual. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), TCL pesticides/PCBs, and target analyte list (TAL) metals. Surface water was present at only one of the surface water sampling locations during the sampling events.

Water level monitoring was conducted monthly on the monitoring wells, extraction wells, sumps, and observation wells. Water level data were used to construct groundwater contour maps and hydrographs.

Maintenance was performed on various components of the groundwater extraction and treatment systems throughout the year. The maintenance operations were performed either as part of scheduled preventive maintenance, or as needed to mitigate problems or make improvements. A Wildlife and Habitat report related to the constructed wetlands along the shoreline was completed, and has been included with this report.

MONITORING SUMMARY

In general, the quality of groundwater in the intermediate/deep zone beneath the Site was similar or slightly improved in the 2003 sampling events, relative to the previous sampling periods. The quality of shallow groundwater was similar during this reporting period as compared to previous sampling events.

In the intermediate/deep groundwater samples, only two VOCs (benzene and total xylenes) were detected at concentrations above NYSDEC Class GA groundwater standards or guidance values. No polycyclic aromatic hydrocarbons (PAHs) were detected at concentrations exceeding groundwater standards. Also, only two non-PAH

SVOCs (2,4-dimethylphenol and 2-methylphenol) were detected above groundwater standards. No pesticides exceeded standards, and no PCBs were detected in any of the monitoring wells in either sampling round. Concentrations for seven TAL metals exceeded standards or guidance values, including arsenic, chromium, iron, lead, magnesium, manganese, and sodium.

Shallow groundwater samples collected from onsite sumps contained a total of five SVOCs, six PAHs, seven pesticides, two PCBs, and nine TAL metals which were detected at concentrations above groundwater standards. No VOCs were detected above groundwater standards. The greatest concentrations and frequency of detections occurred in S-1, where a thin layer of light non-aqueous phase liquid (LNAPL) was observed throughout this reporting period.

SYSTEM EFFECTIVENESS

The intermediate/deep groundwater extraction system has historically produced sufficient drawdown to create a barrier to offsite migration of groundwater, from its inception in August 1997 through October 2002. The extraction wells were temporarily turned off in October 2002 to complete a groundwater upwelling study.

The shallow collection trench system is operating as planned, with flows approximating those predicted during the design phase. No surface overflows were observed from the trench during the reporting period.

GROUNDWATER UPWELLING STUDY SUMMARY

Based upon the results of this one year study, the discontinuation of the intermediate/deep groundwater extraction system will not have a negative impact on the quality of the groundwater upwelling to the Niagara River. Detailed results of the upwelling study were provided in quarterly reports and a final report, submitted separately from this annual OM&M report.

CONCLUSIONS

- Impacts from the Site on groundwater quality in the intermediate/deep zone are minor. Concentrations of organic compounds were below groundwater standards in most samples, and near the limits in other samples throughout the sampling history. Metals concentrations exceeded groundwater standards in some samples, but were lower than the background well (MW-2) for the majority of the metals.
- Results from the groundwater upwelling study, completed in December 2003, indicated that the intermediate/deep groundwater is upwelling to the Niagara River, but chemical indicator compounds are not migrating to the river via groundwater from the Site.
- Shallow groundwater samples collected from sumps during the 2003 sampling events showed that there is a greater impact to the shallow groundwater

quality than to the intermediate/deep zone. The most notable impacts were in samples collected from sump S-1, likely due to the presence of LNAPL. When compared to prior sampling events, the shallow groundwater quality improved throughout 2003. The shallow groundwater sample results from 2003, and historically, indicated that VOCs were typically not present. Constituents detected above groundwater standards included PAHs and PCBs.

- In the single surface water sample collected from an onsite drainage ditch during the current reporting period, no VOCs, SVOCs, pesticides, or PCBs were detected in exceedance of surface water standards. Only two metals (aluminum and magnesium) exceeded the surface water standards. Additional surface water samples were not collected in 2003 due to the lack of water during sampling events. The low flows observed at the surface water sampling locations, and the historically low chemical concentrations indicate that surface water in the vicinity of the Site does not appear to be impacted.
- Groundwater contour maps of the intermediate/deep zone throughout the project history indicated that sufficient drawdown was maintained during the operation of the intermediate/deep groundwater extraction system (with occasional interruptions) to prevent migration of groundwater to the Niagara River. The extraction wells were shut down in October 2002 to begin the upwelling study. Water levels have returned to near static (pre-pumping) conditions.
- The shallow collection trench system operated as designed, with flow rates approximating those calculated during the design phase. Annual flushing of the discharge lines is conducted routinely to remove accumulation of sediment and scale deposits in the pump and piping systems.
- The wooded upland and wetland habitats were inspected routinely. The constructed shoreline vegetation is continuing to grow and propagate, and wildlife usage of the created habitats is readily apparent. The December 2003 quarterly inspection completes the final year of required monitoring under the USACE permit.

RECOMMENDATIONS

- **Discontinue operation of the intermediate/deep groundwater extraction system.** The upwelling study has successfully quantified and characterized the chemical concentrations of the groundwater that is upwelling from the Site to the Niagara River. Based on the results of the groundwater upwelling study, the discontinued use of the intermediate/deep groundwater extraction system will not have an adverse impact on the quality of the groundwater upwelling to the Niagara River. Permanent shut-down of the deep extraction system, which has not been operational since October 2002, should proceed. The deep groundwater extraction wells and the associated equipment should be decommissioned, to reduce the potential for interconnection between the

shallow and deep groundwater zones. This will include the removal of the electrical and control system and the closure of the extraction wells.

- **Reduce the chemical analytical parameters list for the intermediate/deep groundwater samples.** The concentrations of SVOCs, PCBs and pesticides in the intermediate/deep groundwater were consistently below the groundwater standards/guidelines throughout the sampling history. The concentrations of metals in the groundwater, while exceeding the Class GA standard in some cases, are consistent with the results from the background samples. In addition, the only VOCs that have been detected are benzene, ethylbenzene, toluene, and xylene (BTEX). The analytical list for the intermediate/deep groundwater samples should be reduced to BTEX compounds only. Sampling for BTEX as an indicator of intermediate/deep groundwater quality will be sufficient to meet the ongoing objectives of the OM&M program. No changes are proposed to the chemical parameter list for the shallow groundwater analysis at this time.

- **Reduce the groundwater sampling frequency in the shallow and intermediate/deep groundwater systems from semi-annual to annual.** Analytical data from 1997 through 2003 illustrates that there is not a significant fluctuation of chemical concentrations in either the shallow or the intermediate/deep groundwater. Sampling and analysis on an annual basis will provide a sufficient quantity of data to evaluate any continuing impacts to groundwater.

- **Eliminate surface water sampling.** Chemical constituents other than the metals antimony, iron, magnesium, and sodium have not been detected in surface water samples since the November 1999 event. Based on the intermittent nature of the surface water flow and absence of elevated chemical concentrations the sampling of surface water can be eliminated.

- **Reduce Water Level Monitoring Frequency from Monthly to Quarterly.** Groundwater levels have been measured on a monthly basis to monitor the capture zones that were created in the deep/intermediate groundwater by the extraction system. The shut down of the extraction system eliminates this need. The collection of groundwater level data on a quarterly basis is sufficient to monitor shallow groundwater migration at the site.

- **Eliminate wetlands and shoreline habitat monitoring.** The April 2004 Wildlife and Habitat Report documents the fifth and final year of monitoring for the wetlands and the wooded upland mitigation areas. This report completes the requirements of the Nationwide Permit. The degree to which the habitat areas continue to grow and self propagate indicates that further monitoring is not warranted.

SECTION 1
INTRODUCTION

1.1 PURPOSE

Parsons has prepared this Annual and Five Year Review Report to summarize the monitoring and maintenance activities conducted from January 1, 2003 through December 31, 2003 at the Cherry Farm/River Road Site (Site) (Figure 1.1). The report also provides an overview of monitoring data from the startup of the groundwater extraction system in August 1997 through December 2003.

The work was conducted as part of the required post-construction operations, maintenance, and monitoring (OM&M) program to monitor and evaluate groundwater and surface water quality, determine the effectiveness of both the shallow and intermediate/deep groundwater extraction systems, and monitor and maintain the integrity of the landfill, including offshore barrier islands and shoreline wetlands. The field efforts and reporting tasks were prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) approved Post Construction OM&M Manual, dated January 2000.

The scope of services defined in the OM&M Manual can be divided into the following tasks:

- Task 1 – Groundwater treatment plant and groundwater extraction system operation and maintenance.
- Task 2 – Inspection and maintenance of the landfill and shoreline improvements, including wetlands;
- Task 3 - Groundwater quality monitoring;
- Task 4 - Surface water quality monitoring;
- Task 5 - Water level monitoring; and
- Task 6 - Evaluation of monitoring data.

Also, a summary of groundwater analytical results from 1997 to 2003 is provided to assist NYSDEC in their five year project review. At this juncture (more than five years of monitoring since completion of remedial construction), recommendations are made regarding the deep extraction wells, and regarding the types of and frequency of chemical analysis to be conducted on the monitoring wells (see Section 5).

1.2 BACKGROUND

A groundwater extraction system, which began operating on August 18, 1997, was installed as part of the Site Remedial Action Plan.

The extraction system consists of a series of eleven recovery wells used to pump groundwater from the intermediate/deep aquifer. The intermediate/deep groundwater extraction system complements a groundwater trench which collects shallow groundwater and any associated light non-aqueous phase liquids (LNAPL) (Figure 1.2). Groundwater collected from the recovery wells and the extraction trench is treated onsite, and discharged to the Town of Tonawanda Wastewater Treatment Facility. In October 2002, the intermediate/deep groundwater collection system was turned off in order to complete a groundwater upwelling study. Although the field work for the upwelling study was completed in December 2003, the collection system remains turned off pending completion of the study report and review of the data by NYSDEC.

As part of remedial construction, groundwater monitoring wells were installed in upgradient and downgradient locations. These wells were intended to provide the data needed to evaluate the effectiveness of the groundwater extraction system. The environmental monitoring system for groundwater and surface water includes the following:

- A total of seven intermediate/deep groundwater monitoring wells (two upgradient and five downgradient) to assess groundwater quality and efficiency of the groundwater extraction system;
- Nine observation wells to measure the hydraulic gradient of shallow groundwater, as it enters the shallow interceptor trenches;
- Four sumps, located in the shallow trenches, to assess the shallow groundwater quality, and to collect LNAPL, if present; and
- Three surface water sampling points to assess surface water quality.

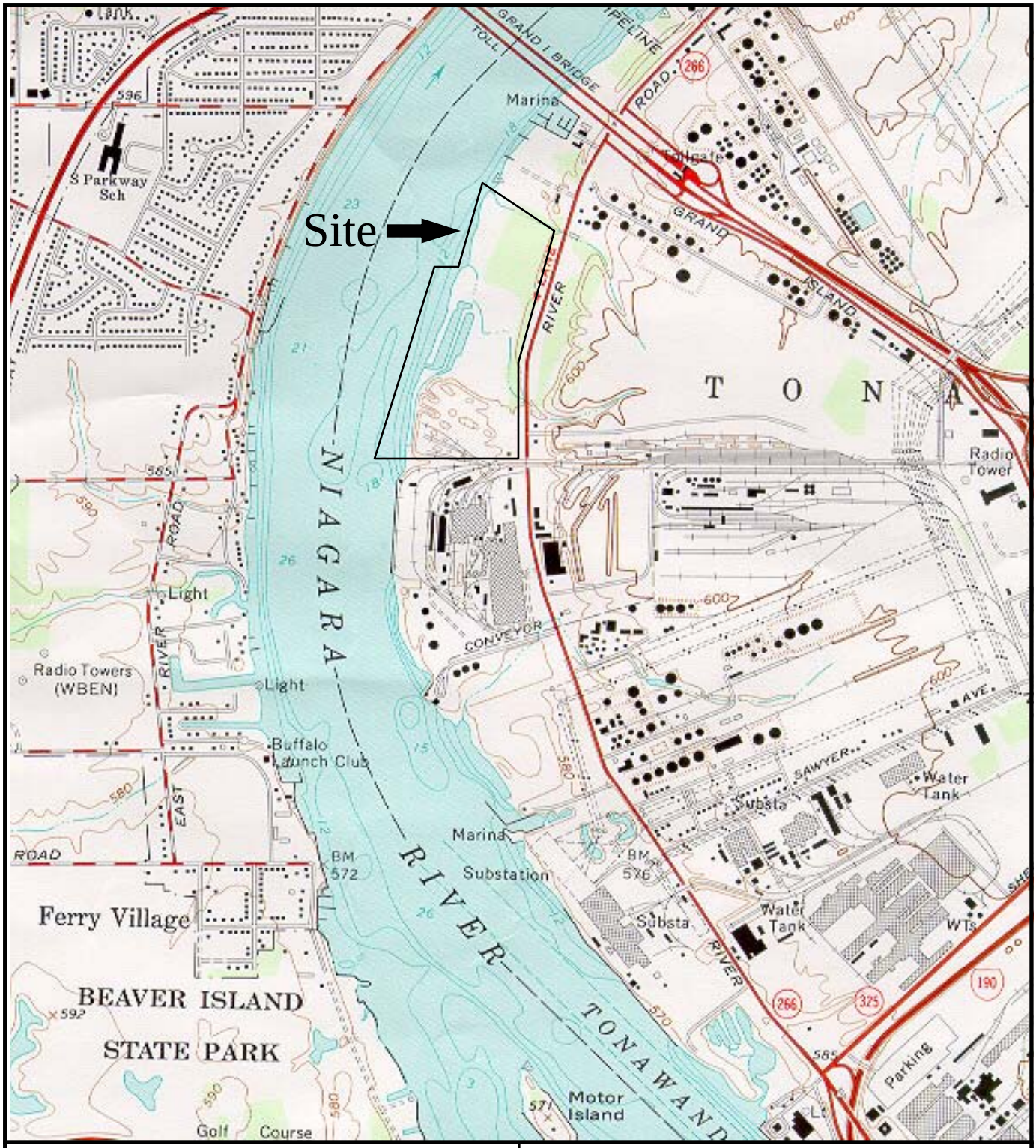
Two upgradient intermediate/deep zone monitoring wells were installed to provide representative samples of groundwater from areas expected to be outside the influence of the landfill. The five downgradient wells were designed to detect releases from the landfill during the operation of the groundwater recovery system. Sampling and analysis of groundwater from the upgradient and downgradient monitoring wells was performed quarterly for the first year of operations, but was reduced to semi-annually during the second and subsequent years, in accordance with the OM&M Manual.

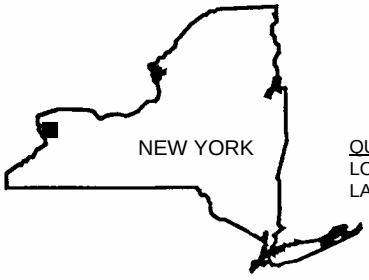
Observation wells were installed to monitor the hydraulic gradient of shallow groundwater and LNAPL in the vicinity of the shallow collection trench. These observation wells are hydraulically upgradient of the collection trenches, at the locations shown on Figure 1.2. They were located and constructed to provide hydraulic data needed to confirm adequate performance of the shallow collection trenches. No groundwater samples are collected from the shallow observation wells for chemical analysis.

1.3 REPORT ORGANIZATION

This report has been organized into the following five sections:

- Section 1 - Introduction - Scope of work and background information.
- Section 2 - Program Methodology - contains information pertaining to the samples collected, dates collected, analyses performed, and sampling protocols followed during the sampling events. Also, this section summarizes the completion of construction activities, and annual maintenance activities performed during the year.
- Section 3 - Monitoring Summary - presents the semi-annual analytical data, monthly water level data, discussion of groundwater and surface water quality, plots of temporal changes in chemical concentrations in groundwater, effectiveness of the recovery well and shallow extraction systems, and the results of the groundwater upwelling study
- Section 4 - Summary and Conclusions- Includes an overall summary for 2003 and for the period from August 1997 through December 2003.
- Section 5 - Provides recommendations for continuing activities at the site.





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QUADRANGLE LOCATION
LONGITUDE: 78º 52' 30"
LATITUDE: 42º 52' 30"

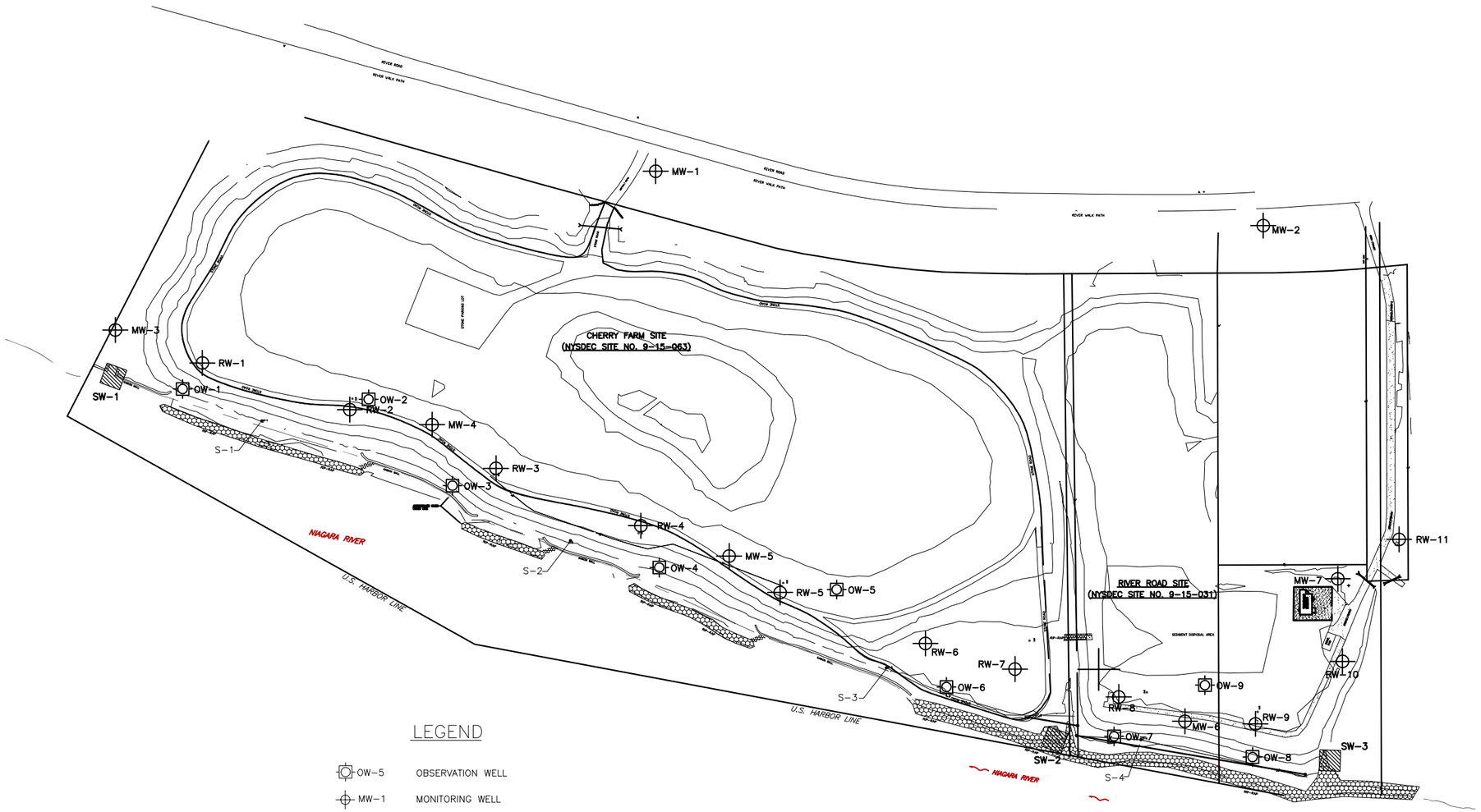
SOURCE: U.S.G.S. 7.5 SERIES BUFFALO NW, New York-Ont (TOPOGRAPHIC), 1965

Figure 1.1

Cherry Farm/River Road Site PRP Group
Cherry Farm/River Road Site

SITE LOCATION MAP

PARSONS
180 LAWRENCE BELL DRIVE - SUITE 104 * WILLIAMSVILLE, N.Y. 14221 * 716 / 633-7074



LEGEND

OW-5	OBSERVATION WELL
MW-1	MONITORING WELL
RW-1	RECOVERY WELL AND VAULT
	SHALLOW GROUNDWATER INTERCEPTOR TRENCH
	GROUNDWATER CONVEYANCE PIPING
575	PROPOSED FINAL GRADE INDEX CONTOUR
SW-1	SURFACE WATER SAMPLE COLLECTION AREA
	RIP-RAP

300 150 0 300 600

SCALE: 1"=300'

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XREFs: CONT-TXT.DWG, 26671C01.DWG, TOP.DWG

FIGURE 1.2

CHERRY FARM/RIVER ROAD SITE
ANNUAL GROUNDWATER MONITORING REPORT

EXTRACTION SYSTEM LOCATION MAP

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SECTION 2
PROGRAM METHODOLOGY

2.1 GROUNDWATER QUALITY MONITORING

Groundwater quality in the intermediate/deep zone was monitored at seven locations, including two upgradient and five downgradient wells. Also, four sumps located in the collection trenches were sampled to monitor shallow groundwater quality. The monitoring wells and sumps were sampled semi-annually as follows:

- First Round – June 23, 24, and 25, 2003
- Second Round – December 15, 16, and 18, 2003.

All monitoring wells and sumps were sampled during the two semi-annual monitoring events. Sample results are summarized in the analytical data summary tables in Section 3. Complete results, including quality assurance/quality control (QA/QC) sample results, are provided in Appendix A. Analytical summaries of all monitoring performed from 1997 through 2003, are provided in Appendix B.

The monitoring wells and sumps were sampled in accordance with the January 2000 OM&M Manual. The samples were analyzed in accordance with NYSDEC Analytical Services Protocol (ASP) for Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semi-volatile organic compounds (SVOCs), TCL pesticides/polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) metals. Associated QA/QC samples were collected during each sampling event, including one field duplicate, one matrix spike, one matrix spike duplicate, three trip blanks, and one equipment blank. The purge water and decontamination water was contained and treated in the onsite water treatment plant.

Following collection, the samples were packed in ice and shipped via same-day or overnight delivery to an approved laboratory in accordance with chain-of-custody procedures. Both rounds of groundwater sample analysis were performed by O'Brien & Gere Laboratories, Inc. (OB&G) of Syracuse, New York.

2.2 SURFACE WATER QUALITY MONITORING

One surface water sample was collected during the current reporting period. A sample was collected from location SW-1 during the December 2003 sampling event. Location SW-1 is in the northwest corner of the site, along the Niagara River (Figure 1.2). The surface water was collected directly into sample containers. The surface water sample was analyzed for the same chemical parameters as the groundwater samples. Sample results are presented in Section 3 and Appendix A.

2.3 WATER LEVEL MONITORING

Monthly water level monitoring was completed to evaluate whether pumping from the extraction wells and the shallow trench was producing a sufficient hydraulic gradient to prevent upwelling into the Niagara River. In addition to the water level measurements, the characteristics of the LNAPL, if present, were described, and the thickness measured. An electronic water level indicator was used to measure levels, with an accuracy of approximately 0.01 feet.

Groundwater levels were measured at each of the following locations:

- Seven groundwater monitoring wells (MW-1 through MW-7);
- Nine observations wells (OW-1 through OW-9);
- Four sumps (S-1 through S-4); and
- Eleven extraction wells (RW-1 through RW-11).

The database of water level measurements collected during the year is summarized in Table 2.1.

2.4 ANNUAL SITE MAINTENANCE

Remedial construction was concluded in July 1999, and the required quarterly site inspections began in September 1999. During this reporting period, inspections were conducted on February 6, May 8, August 13, and November 13, 2003. Any items requiring attention were addressed.

- During the February 2003 site inspection, no damage to the fencing, access gates, signage, roads, treatment building, or exterior lighting at the treatment building was observed. No problems with the vegetative cover, settlement, erosion, drainage controls, or dumping were observed. Monitoring, recovery, observation wells, and interceptor trench sumps were observed to be in good condition.
- During the May 2003 site inspection, the fencing, access gates, signage, roads, treatment building, and the exterior lighting at the treatment building were in acceptable condition. There were no problems noted with the vegetative cover, settlement, erosion, drainage controls, or dumping. Monitoring, recovery, and observation wells and sumps were in good condition.
- Animal trapping was used during the year to decrease the groundhog and muskrat population on the Site, and minimize penetration of the cover soil. Trapping was primarily conducted in the fall, spring, and summer. No animal trapping was conducted during November or December due to snow cover. There were a total of 23 muskrats and 14 groundhogs trapped during 2003.
- During the August 2003 site inspection, no animal burrows were noted. Erosion was observed in two locations: approximately 75 feet northeast of

RW-6; and approximately 475 feet northwest of MW-1 on the River Road Site.

- During the November 2003 inspection, there were no animal burrows noted. There were no signs of erosion noted in any of the areas. No significant problems were noted in the wetlands areas of the Site.
- During the past two years, minor erosion of the rounded cobbles has been observed on the river (west) side of the middle barrier island. The riprap beneath the cobbles remains in place. It appears that erosion has not progressed, based on observations made during a quarterly site inspection in February 2004. No action is recommended at this time, other than continued monitoring.

As part of the continuing operation of the annual maintenance program, the water transfer piping from the shallow groundwater collection sumps to the treatment building was cleaned in June 2003. A high pressure flush is used to mitigate the effect of sediment buildup and scaling.

As part of the maintenance activities, the wooded upland and wetland habitats were inspected routinely. In general, the constructed shoreline vegetation is continuing to grow and propagate, and wildlife usage of the created habitats is readily apparent. A detailed wildlife and habitat report was completed in accordance with the US Army Corps of Engineers permit (Appendix C). This completes the fifth and final year of wetlands and habitat utilization monitoring required under the permit.

2.5 GROUNDWATER TREATMENT SYSTEM MAINTENANCE

Maintenance was performed on various components of the groundwater treatment system throughout the year. The maintenance operations were either scheduled preventive maintenance, or as needed to mitigate problems or make improvements. The primary non-routine maintenance operations performed between January 1 and December 31, 2003 are summarized in Table 2.2. The most notable maintenance activity was the replacement of water-damaged electrical components in the well vaults (RW-2 and RW-6) to restore power to two sumps in the shallow groundwater trench.

Table 2.1
Cherry Farm/River Road Site
Water Level Summary

WELL NAME	Original ELEV. TOC	8/8/1997 ELEV. (FEET)	8/19/1997 ELEV. (FEET)	8/20/1997 ELEV. (FEET)	8/21/1997 ELEV. (FEET)	8/22/1997 ELEV. (FEET)	8/25/1997 ELEV. (FEET)	9/4/1997 ELEV. (FEET)	9/12/1997 ELEV. (FEET)	10/3/1997 ELEV. (FEET)	10/13/1997 ELEV. (FEET)	11/21/1997 ELEV. (FEET)	12/5/1997 ELEV. (FEET)
MW-1	577.68	566.13	566.10	566.07	566.28	566.45	566.18	565.90	565.94	566.30	566.18	566.36	566.20
MW-2	578.76	565.99	565.85	565.82	566.10	566.32	565.93	565.56	565.67	565.99	565.78	565.63	565.92
MW-3	571.16	565.58	565.56	565.41	565.80	565.93	565.62	565.24	565.49	565.82	565.59	565.87	565.59
MW-4	583.83	566.07	565.96	565.79	565.01		565.70	565.58	565.58	565.98	565.89	565.63	565.87
MW-5	584.14	565.79	565.64	565.08	565.31	565.35	565.12	564.96	565.09	565.54	565.40	565.67	565.03
MW-6	585.70	565.75	565.63	565.02	565.31	565.41	565.09	565.02	565.00	565.58	565.01	564.86	564.98
MW-7	586.40	566.10	566.00	565.36	565.49	565.69	565.38	565.31	565.28	566.05	565.50	565.31	565.40
OW-1	573.63	565.58	565.42	565.25	565.58	565.65	565.33	565.03	565.19	565.48	565.34	565.43	565.15
OW-2	584.14	568.62	567.56	568.66	568.69	568.66	568.66	568.54	568.53	568.57	568.59	568.69	568.52
OW-3	576.25	565.66	565.60	565.53	565.46	565.57	565.55	565.37	565.14	565.55	565.45	565.56	565.25
OW-4	572.21	565.66	565.56	565.51	565.72	565.81	565.57	565.26	564.86	565.60	565.44	565.54	565.28
OW-5	584.16	568.24	568.12	568.29	568.40	568.28	568.04	567.94	567.91	567.80	567.76	567.41	567.41
OW-6	572.12	566.07	566.02	565.93	565.94	565.90	565.82	565.64	565.63	565.97	565.85	566.03	565.82
OW-7	574.84	566.10	566.05	565.92	565.96	565.87	565.74	565.54	565.56	566.03	565.79	565.88	565.92
OW-8	571.31	565.94	565.89	565.81	562.89	565.93	565.70	565.51	565.51	565.87	565.71	565.72	565.78
OW-9	588.32	566.90	566.86	566.86	566.82	566.81	566.84	566.72	566.70	566.82	566.90	567.24	567.70
S-1	571.84	563.04	565.78	564.80	564.17	563.95	563.74	563.34	564.09	565.67	565.79	564.87	564.04
S-2	571.81	561.32	565.66	565.55		565.65	565.58			565.66	565.50	565.61	565.30
S-3	571.84	561.19	565.89	565.81		565.79	565.68	565.48	565.44	565.84	565.66	565.88	565.56
S-4	571.51	562.77	566.12	565.96	565.96	564.90	565.75	565.56	565.59	566.11	565.79	565.86	565.94
RW-1	581.82	565.57	565.50	559.62								565.69	559.65
RW-2	581.82	565.91	565.83	559.64								565.97	559.72
RW-3	582.30	565.93	565.82	565.64								572.00	559.67
RW-4	581.83	565.88	565.74	559.58								562.77	554.06
RW-5	582.05		565.68	559.65								565.66	544.38
RW-6	570.76	565.87	565.71	559.74								565.55	560.71
RW-7	570.67	565.89	565.74	559.62								565.76	560.12
RW-8	583.83	565.91	565.76	560.69								561.44	561.32
RW-9	583.86	565.98	565.86	559.76								559.81	560.50
RW-10	583.28	566.19	566.07	559.73								559.81	559.89
RW-11	581.22	566.12	566.04	560.94								560.27	560.98
SG	568.89												

Table 2.1
Cherry Farm/River Road Site
Water Level Summary

WELL NAME	12/24/1997 ELEV. (FEET)	1/6/1998 ELEV. (FEET)	2/2/1998 ELEV. (FEET)	2/18/1998 ELEV. (FEET)	4/1/1998 ELEV. (FEET)	4/27/1998 ELEV. (FEET)	5/27/1998 ELEV. (FEET)	6/25/1998 ELEV. (FEET)	7/31/1998 ELEV. (FEET)	8/27/1998 ELEV. (FEET)	9/28/1998 ELEV. (FEET)	10/21/1998 ELEV. (FEET)	11/23/1998 ELEV. (FEET)
MW-1	565.89	566.20	566.06	566.15	566.58	566.34	566.31	566.18	566.10	566.03	565.93	565.73	565.27
MW-2	565.58	565.96	565.95	565.94	566.40	566.19	566.07	566.07	565.85	565.92	565.80	565.65	565.09
MW-3	565.29	565.71	565.71	565.68	566.04	565.85	565.66	565.57	565.37	565.26	565.20	565.08	564.70
MW-4	565.73	563.66		565.77	565.81	565.93	565.83	565.84	565.74	565.65	565.65	565.38	564.96
MW-5	564.95	565.23	565.32	565.10	565.45	565.36	566.10	565.49	565.41	565.66	565.54	565.22	564.78
MW-6	564.67	565.27	565.36	564.90	565.40	565.60	565.32	565.42	565.22	565.77	565.38	565.40	564.56
MW-7	565.25	565.60	565.83	565.48	565.79	565.77	565.62	565.63	565.35	565.99	565.62	565.40	564.70
OW-1	564.87	565.21	565.25	565.13	565.65	565.55	565.38	565.40	565.22	565.33	565.25	564.94	564.49
OW-2	568.57	568.37	568.34	568.52	568.26	568.15	568.21	568.33	568.10	568.14	568.20	568.20	568.20
OW-3	565.18	565.45	565.67	565.33	565.70	565.62	565.65	565.34	565.70	566.22	566.15	565.83	565.45
OW-4	565.14	565.45	565.59	565.31	565.76	565.73	565.61	565.41	565.68	566.30	566.05	565.80	565.33
OW-5	567.10	567.06	567.05	567.24	567.00	566.74	566.83	566.77	566.63	567.10	567.20	567.10	567.21
OW-6	565.76	566.15	566.42	566.09	566.30	566.11	565.90	565.56	565.87	567.84	567.67	567.09	566.48
OW-7	565.80	566.33	566.61	566.34	566.54	566.26	565.86	565.58	565.89	567.22	568.44	567.59	566.77
OW-8	565.71	566.04	566.16	566.00	566.09	565.97	565.60	565.57	565.54	566.62	567.39	566.08	565.95
OW-9	567.40	567.60	567.96	567.84	568.00	567.76	567.20	566.77			570.89	569.69	568.24
S-1	563.77	565.44	565.39	564.16	566.00	565.85	565.84	564.28	564.52	564.98	566.09	564.14	564.61
S-2	565.20	565.53	565.74	565.43	565.80	565.71	565.67	565.41	565.73	566.44	566.22	565.93	565.52
S-3	565.51	565.96	566.21	565.81	566.09	565.90	565.74	565.37	565.83	567.33	567.04	566.61	566.06
S-4	565.83	566.41	566.95	566.72	566.59	566.23	565.68	565.72	565.88	566.00	568.49	568.09	566.81
RW-1	559.65	560.64	565.54	562.40	560.31	560.51	560.62	560.29	560.54	560.74	559.97	556.47	564.59
RW-2	560.45	559.87	559.97	560.50	560.21	559.78	559.89	560.45	560.27	560.29	560.42	556.21	555.81
RW-3	559.60	562.53	560.34	560.01	559.62	560.20	560.18	560.06	559.65	560.71	560.11	555.75	555.53
RW-4	553.38	553.37	560.32	553.53	553.36	559.88	560.71	559.88	560.02	559.75	560.31	557.32	557.30
RW-5	559.61	559.77	560.35	560.58	548.07	559.78	560.54	563.68	560.03	559.77	560.30	556.63	544.43
RW-6	559.83	560.62	559.86	560.30	560.36	560.57	560.21	562.71	560.34	560.64	565.40	555.56	556.53
RW-7	559.61	560.20	559.88	559.82	560.27	560.02	560.44	565.41	560.62	560.30	550.87	555.70	564.95
RW-8	560.74	565.36	565.43	561.57	561.15	561.20	561.23	565.43	565.38	561.60	561.14	556.71	557.13
RW-9	560.28	565.41	565.49	560.28	562.11	565.74	565.46	565.62	565.36	566.15	559.93	565.55	556.63
RW-10	559.76	559.78	560.83	560.46	560.30	560.25	560.02	565.73	559.92	560.49	559.93	559.97	559.76
RW-11	561.13	560.27	560.39	561.13	560.94	560.09	560.64	563.38		560.90	560.15	560.48	560.01
SG													

Table 2.1
Cherry Farm/River Road Site
Water Level Summary

WELL NAME	12/29/1998 ELEV. (FEET)	1/28/1999 ELEV. (FEET)	2/22/1999 ELEV. (FEET)	3/29/1999 ELEV. (FEET)	4/19/1999 ELEV. (FEET)	5/28/1999 ELEV. (FEET)	6/25/1999 ELEV. (FEET)	7/25/1999 ELEV. (FEET)	8/27/1999 ELEV. (FEET)	9/27/1999 ELEV. (FEET)	10/25/1999 ELEV. (FEET)	11/8/1999 ELEV. (FEET)
MW-1	565.05	565.35	565.03	565.36	565.51	565.60	565.20	565.47	565.48	565.27	565.46	564.95
MW-2	564.81	565.01	564.87	565.01	565.20	565.33	564.95	565.36	565.31	565.05	565.21	564.54
MW-3	564.11	564.70	564.47	564.66	565.19	565.04	564.70	564.91	565.00	564.38	565.04	564.62
MW-4	564.53	564.76	564.71	564.99	565.12	565.25	564.91	565.11	565.27	565.11	565.24	564.74
MW-5	564.40	564.43	564.35	564.53	564.64	564.87	564.63	564.84	564.90	564.75	564.90	564.18
MW-6	564.01	564.05	564.02	564.12	564.33	564.36	564.38	564.80	564.68	564.45	564.46	563.75
MW-7	564.27	564.67	564.64	564.66	564.79	564.76	564.62	564.89	564.88	564.67	564.75	564.38
OW-1	563.97	564.24	564.07	564.27	564.74	564.72	564.51	565.02	564.85	564.33	564.62	564.05
OW-2	568.14	567.93	567.79	568.11	567.71	567.81	567.72	567.91	567.78	567.74	567.57	567.55
OW-3	564.87	565.00	564.96	564.98	564.99	565.10	564.77	564.96	564.91	564.90	564.92	564.88
OW-4	564.74	564.92	564.87	564.93	564.97	565.08	564.76	565.04	564.95	564.82	564.95	564.76
OW-5	566.84	566.36	566.08	566.21	565.99	565.94	566.03	565.98	565.92	565.73	565.71	565.65
OW-6	565.35	565.61	565.49	565.45	565.35	565.34	565.06	565.21	565.16	565.08	565.18	565.23
OW-7	565.22	565.61	565.42	565.31	565.23	565.35	564.85	565.11	565.03	564.94	564.88	564.91
OW-8	564.88	565.15	565.05	564.95	564.99	565.00	564.50	564.91	564.86	564.68	564.55	564.50
OW-9					566.68	566.57	566.38	566.30	566.35	566.21	566.44	566.65
S-1	563.89	564.16	564.23	564.08	564.13	564.22	564.25	564.17	564.19	564.24	564.32	564.04
S-2	564.89	565.04	565.01	565.03	565.04	565.16	564.80	565.03	564.99	564.86	565.09	564.90
S-3	565.14	565.43	563.50	565.31	565.23	565.24	564.93	565.11	565.02	565.05	565.13	565.10
S-4	564.90	565.54	565.38	565.23	565.19	565.12	564.56	565.14	565.18	565.07	564.46	564.48
RW-1	554.67	546.27	546.91	551.42	564.97	556.02	564.58	565.01	555.92	555.47		564.34
RW-2	555.94	555.50	556.01	556.12	556.42	556.17	556.42	555.42	556.31	564.74	564.72	556.31
RW-3	543.98	555.87	555.59	555.79	555.63	555.79	555.78	545.72	565.11	564.95	555.05	555.05
RW-4	564.54	556.58	556.92	556.62	556.52	557.17	564.71	560.20	559.01	559.38	558.88	564.31
RW-5	556.44	556.37	544.21	544.48	544.37	556.02	544.20	544.34	555.51	556.09	564.74	546.10
RW-6	556.13	564.44	564.47	556.26	555.36	555.28	564.49	555.50	555.45	555.82	555.57	564.09
RW-7	548.55	555.72	555.77	556.60	555.71		555.84	555.70	555.77	557.29	546.64	555.75
RW-8	557.71	557.26	557.72	557.21	556.93	557.56	564.54	557.56	557.52	564.61	557.46	556.93
RW-9	564.23	556.21	556.08	556.69	556.31		564.54	556.61	556.56	564.57	556.81	556.54
RW-10	560.63	560.17	560.25	559.72	559.83	559.92	559.95	560.21	560.08	560.24	560.43	560.40
RW-11	558.10	558.45	558.36	557.99	558.27	558.25	558.45	557.76	557.82	557.95	558.46	557.94
SG												

Table 2.1
Cherry Farm/River Road Site
Water Level Summary

WELL NAME	12/22/1999 ELEV. (FEET)	1/27/2000 ELEV. (FEET)	2/25/2000 ELEV. (FEET)	3/24/2000 ELEV. (FEET)	4/26/2000 ELEV. (FEET)	5/26/2000 ELEV. (FEET)	6/26/2000 ELEV. (FEET)	7/21/2000 ELEV. (FEET)	8/28/2000 ELEV. (FEET)	9/29/2000 ELEV. (FEET)	11/1/2000 ELEV. (FEET)	11/30/2000 ELEV. (FEET)
MW-1	565.13	566.02	564.96	564.92	565.13	565.43	565.71	565.82	565.54	565.54	565.01	564.77
MW-2	564.77	565.85	564.56	564.44	564.71	565.06	565.33	565.44	565.20	565.19	564.62	564.30
MW-3	564.76	565.65	564.32	564.44	564.41	564.87	565.41	565.48	565.12	564.74	564.32	564.44
MW-4	564.56	564.66	565.43	564.49	564.76	568.78	567.31	567.60	566.41	565.03	564.48	570.33
MW-5	564.31	564.62	564.07	564.09	564.21	564.68	565.07	565.32	565.12	564.29	564.21	563.78
MW-6	564.17	564.60	563.69	563.66	564.18	564.35	564.68	565.17	564.56	564.62	564.05	563.75
MW-7	564.61	564.70	564.20	564.29	564.69	564.93	565.28	565.62	565.01	565.07	564.45	564.05
OW-1	564.23	565.18	563.91	563.98	563.91	564.48	564.95	565.11	564.79	564.49	564.21	564.03
OW-2	567.66	568.33	567.56	567.66	567.51	567.42	567.55	567.71	567.66	567.76	567.73	567.42
OW-3	564.92	565.05	564.72	564.91	564.99	565.07	565.46	565.50	565.37	565.04	564.60	564.40
OW-4	564.83	565.00	564.77	564.79	564.86	565.06	565.48	565.48	565.31	564.94	564.38	564.02
OW-5	565.58	565.69	565.55	565.73	565.88	565.95	566.25	566.45	566.46	566.48	566.18	565.89
OW-6	565.24	565.55	565.00	565.23	565.27	565.42	565.95	565.93	565.63	565.19	564.75	564.57
OW-7	565.06	565.23	565.06	564.81	565.13	565.41	566.08	565.96	565.57	564.49	564.12	564.60
OW-8	564.64	564.98	564.59	564.44	564.82	565.00	565.27	565.28	564.98	564.30	563.97	564.38
OW-9	566.60	566.70	566.33	566.54	566.81	566.84	567.12	567.11	566.67	566.44	566.21	566.10
S-1	564.33	564.82	563.99	564.19	564.13	564.05	563.99	564.37	564.06	564.23	564.21	564.29
S-2	564.95	565.30	564.87	564.98	565.03	565.21	565.64	565.66	565.46	565.02	564.46	564.12
S-3	565.11	565.25	565.03	565.16	565.16	565.29	565.85	565.81	565.57	564.99	564.32	564.06
S-4	564.47	564.65	564.63	564.36	564.79	565.37	565.90	565.90	565.55	563.70	563.60	564.48
RW-1	564.47	564.16	547.15	564.22	556.18	556.14	565.21	565.25		548.77	564.44	565.25
RW-2	545.50	545.52	556.55	556.30	555.91	555.87	556.36	565.45		555.77	556.37	556.00
RW-3	545.09	545.20	554.07	554.43	559.21	562.47	562.62	565.48		544.08	546.24	543.83
RW-4	559.38	558.81	559.40	559.51	559.34	560.05	559.92	565.37		564.95	555.98	555.23
RW-5	556.30	556.74	556.05	551.64	556.40	555.85	555.58	565.31		544.99	544.22	545.55
RW-6	564.27	564.17	563.88	563.92	555.59	561.00	564.94	565.28		555.33	555.68	551.28
RW-7	555.71	556.23	556.17	543.78	556.67	556.39	556.43	565.30		564.83	556.37	556.57
RW-8	557.62	557.72	557.50	557.16	557.46	557.51	557.20	565.28	564.98	564.88	557.51	557.53
RW-9	564.35	564.56	556.18	556.76	564.42	556.28	556.76	565.36	562.31	564.91	564.36	563.95
RW-10	560.20	560.08	560.03	559.90	560.45	560.65	560.99	561.61	561.03	560.03	560.24	560.58
RW-11	558.00	558.02	557.88	557.97	558.42	558.51	557.86	557.90	557.80	558.13	558.44	557.78
SG									564.62	564.54	563.95	564.19

Table 2.1
Cherry Farm/River Road Site
Water Level Summary

WELL NAME	12/11/2000 ELEV. (FEET)	1/22/2001 ELEV. (FEET)	2/27/2001 ELEV. (FEET)	3/16/2001 ELEV. (FEET)	4/20/2001 ELEV. (FEET)	5/30/2001 ELEV. (FEET)	6/18/2001 ELEV. (FEET)	8/1/2001 ELEV. (FEET)	8/24/2001 ELEV. (FEET)	9/25/2001 ELEV. (FEET)	10/22/2001 ELEV. (FEET)	12/11/2001 ELEV. (FEET)
MW-1	564.66	564.72	565.10	564.91	565.38	565.57	565.46	565.05	564.89	565.01	565.01	564.70
MW-2	564.13	564.44	564.65	564.31	565.01	565.15	565.07	564.83	564.63	564.86	564.68	564.26
MW-3	563.77	564.13	564.26	564.20	564.95	565.14	564.95	564.15	564.13	564.11	564.40	563.85
MW-4	564.96	564.14	564.51	564.44	564.83	565.00	564.96	564.61	564.31	564.32	571.56	569.38
MW-5	563.79	563.87	564.10	564.02	564.52	564.72	564.77	564.59	564.34	564.47	564.37	563.91
MW-6	563.52	563.86	563.94	563.36	564.29	564.45	564.49	564.38	564.23	564.27	564.05	563.78
MW-7	564.11	564.29	564.58	564.27	564.80	564.96	564.93	564.64	564.59	564.51	564.48	564.34
OW-1	563.50	563.66	563.85	563.88	564.53	564.73	564.64	564.03	563.96	564.10	564.04	563.53
OW-2	567.73	567.41	567.51	574.30	567.54	567.55	567.37	567.43	569.47	567.48	569.03	568.96
OW-3	564.48	564.42	564.62	564.78	564.83	565.04	565.09	564.58	564.54	564.46	564.80	564.80
OW-4	564.38	564.23	564.54	564.61	564.70	565.01	565.06	564.48	564.53	564.49	564.71	564.68
OW-5	565.85	565.58	565.68	565.63	565.92	565.91	566.02	566.00	565.92	565.84	565.64	565.51
OW-6	564.72	564.71	565.01	565.17	565.17	565.47	565.45	564.83	564.86	564.78	565.07	565.11
OW-7	564.41	564.56	564.94	565.19	565.11	565.46	565.46	564.72	564.67	564.54	564.97	564.93
OW-8	564.17	564.39	564.80	564.77	564.82	564.91	564.86	564.50	564.40	564.33	564.52	564.39
OW-9	566.12	566.29	566.62	566.59	566.67	566.65	566.54	566.20	566.15	565.95	566.26	566.42
S-1	564.22	564.25	563.89	564.27	564.16	564.19	564.28	564.31	564.57	564.58	565.28	563.63
S-2	564.50	564.32	564.72	564.85	564.87	565.25	565.26	564.64	564.66	564.58	564.90	564.90
S-3	564.43	564.31	564.74	564.94	564.93	565.38	565.37	564.55	564.71	564.57	564.93	564.99
S-4	564.18	564.51	565.00	565.19	565.05	565.43	565.63	564.95	564.92	564.80	565.06	564.79
RW-1	555.32	546.17	547.43	564.00	564.77	565.11	564.87	548.60	554.78	549.31	548.70	545.97
RW-2	556.21	555.53	555.92	555.88	555.75	566.67	556.37	556.13	564.32	556.51	556.39	556.32
RW-3	544.96	548.00	553.85	561.20	553.16	551.74	551.72	553.69	547.17	550.11	559.65	548.19
RW-4	555.56	556.38	556.36	563.86	556.43	556.35	556.06	564.57	555.50	555.48	564.37	555.67
RW-5	544.64	544.35	553.50	559.78	560.23	561.04	561.54	561.47	559.10	558.05	557.15	556.56
RW-6	547.86	554.36	557.62	559.47	560.52	564.68	564.70	555.99	564.36	556.46	556.05	555.41
RW-7	551.12	563.97	564.16	563.77	552.32	556.12	555.79	556.24	564.38	555.68	555.75	563.92
RW-8	563.65	557.75	564.47	557.74	564.97	556.98	565.37	564.50	557.42	564.45	564.28	557.38
RW-9	563.73	564.08	556.71	556.34	556.44	555.85	556.82	564.54	564.41	556.63	556.60	564.09
RW-10	560.46	559.95	560.66	560.33	560.52	560.82	560.54	560.64	564.54	559.95	560.25	560.73
RW-11	558.37	557.52	557.61	557.54	557.57	558.32	558.46	558.15	557.69	557.86	557.73	557.67
SG	564.2	563.9	563.9	563.9	564.3	563.9	564.5	564.43	564.24	564.51	564.19	563.89

Table 2.1
Cherry Farm/River Road Site
Water Level Summary

WELL NAME	1/23/2002 ELEV. (FEET)	2/20/2002 ELEV. (FEET)	3/28/2002 ELEV. (FEET)	4/24/2002 ELEV. (FEET)	5/23/2002 ELEV. (FEET)	6/17/2002 ELEV. (FEET)	7/25/2002 ELEV. (FEET)	8/20/2002 ELEV. (FEET)	9/18/2002 ELEV. (FEET)	10/18/2002 ELEV. (FEET)	11/22/2002 ELEV. (FEET)	12/16/2002 ELEV. (FEET)
MW-1	565.10	565.20	565.20	565.61	565.81	565.78	565.23	565.40	565.24	565.28	564.88	565.02
MW-2	564.65	564.85	564.80	565.28	565.51	565.50	564.96	565.19	565.14	565.11	564.46	564.51
MW-3	564.12	564.41	564.27	564.65	564.87	564.95	564.27	564.35	564.21	564.92	564.55	564.61
MW-4	575.33	567.81	567.32	565.28	565.19	565.02	564.58	564.81	564.71	565.07	564.78	564.78
MW-5	564.26	564.47	564.43	564.89	565.10	565.04	564.58	564.83	564.62	564.91	564.13	564.10
MW-6	563.89	564.06	564.14	564.74	564.83	564.89	564.48	564.68	564.48	564.68	563.89	563.85
MW-7	564.66	564.97	564.80	565.50	565.67	565.46	564.85	565.05	564.90	564.95	564.39	564.51
OW-1	563.86	564.08	563.96	564.35	564.81	564.70	566.21	564.35	564.32	564.77	564.12	564.08
OW-2	568.93	567.85	567.73	568.77	567.97	568.08	567.94	567.84	567.92	569.02	568.05	567.72
OW-3	565.10	565.41	565.39	565.78	565.88	565.67	565.42	565.38	565.17	564.99	565.00	564.56
OW-4	565.00	565.23	565.27	565.60	565.68	565.58	565.27	565.29	565.13	564.97	564.77	564.59
OW-5	566.15	566.47	566.46	566.76	567.01	566.86	566.75	566.77	566.59	566.37	566.32	566.16
OW-6	565.58	565.98	565.90	566.40	566.55	566.24	565.72	565.64	565.39	565.23	565.37	565.39
OW-7	565.61	566.13	565.97	566.53	566.77	566.37	565.82	565.63	565.36	565.31	565.02	565.22
OW-8	564.85	565.29	565.13	565.54	565.76	565.44	564.91	565.01	564.73	564.67	564.61	564.73
OW-9	566.94	567.40	567.05	567.55	567.84	567.25	566.64	566.45	566.25	566.15	566.38	566.57
S-1	563.89	563.94	564.12	566.02	565.99	565.69	565.65	565.69	565.92	565.89	563.89	564.19
S-2	565.24	565.50	565.51	565.92	565.98	565.80	565.48		565.21	565.06	564.84	564.71
S-3	565.44	565.86	565.81	566.30	566.42	566.16	565.73	565.57	565.30	565.15	565.28	565.32
S-4	565.35	566.12	565.87	566.44	566.79	566.28	565.80	565.53	565.25	565.09	564.57	564.51
RW-1	547.37	555.04	547.71	549.43	550.57	555.57	548.11	547.52	547.60	564.71	569.97	572.90
RW-2	556.25	556.21	555.50	556.35	555.42	556.47	555.83	555.32	564.47	564.92	565.76	566.86
RW-3	550.35	552.05	553.28	556.20	553.03	552.20	551.02	550.10	548.41	564.95	569.25	564.91
RW-4	564.28	555.89	564.38	565.28	565.08	555.98	555.86	564.79	555.48	564.82	564.42	564.42
RW-5	564.30	564.57	558.24	558.50	559.90	559.52	554.85	554.44	546.90	564.76	565.90	564.38
RW-6	562.47	563.28	563.15	555.96	556.64	555.95	559.69	555.81	556.15	564.65	564.51	564.41
RW-7	555.92	555.77	556.17	556.24	556.36	555.72	555.72	555.88	555.89	564.69	566.46	564.26
RW-8	557.13	557.76	556.80	564.88	557.07	564.78	564.65	564.84	564.71	564.78	564.31	564.18
RW-9	556.71	556.79	556.95	565.05	555.94	556.15	555.76	555.45	556.22	564.85	564.64	565.12
RW-10	560.23	560.40	560.08	565.39	565.43	565.35	561.93	565.13	564.79	564.82	564.47	564.60
RW-11	558.00	557.63	558.10	565.84	558.41	565.61	558.71	558.11	557.67	564.85	564.67	564.85
SG	563.89	563.89	563.89	564.29	564.54	564.54	564.54	564.54	564.69	564.54	563.89	563.89

* note that depth to water data collected from RW-1 on 10/18/02, 11/22/02, and 12/16/02 and RW-2 11/22/02 is questionable.

Table 2.1
Cherry Farm/River Road Site
Water Level Summary

WELL NAME	1/30/2003 ELEV. (FEET)	2/28/2003 ELEV. (FEET)	3/11/2003 ELEV. (FEET)	4/15/2003 ELEV. (FEET)	5/28/2003 ELEV. (FEET)	6/23/2003 ELEV. (FEET)	7/18/2003 ELEV. (FEET)	8/29/2003 ELEV. (FEET)	9/24/2003 ELEV. (FEET)	10/24/2003 ELEV. (FEET)	11/25/2003 ELEV. (FEET)	12/15/2003 ELEV. (FEET)
MW-1	564.91	565.05	565.19	565.69	565.77	566.00	565.50	565.28	565.29	565.07	565.47	565.12
MW-2	564.26	564.25	564.52	565.08	565.17	565.46	565.08	565.01	565.08	564.66	565.00	564.72
MW-3	564.07	564.20	564.48	565.00	565.08	565.34	564.87	564.68	564.80	564.66	564.91	564.68
MW-4				565.33	565.45	565.71	565.32	565.23	565.25	565.02	567.46	566.15
MW-5		563.99	564.18	564.87	564.97	565.31	564.97	564.84	564.93	564.46	564.88	564.42
MW-6	563.82	563.66	563.89	564.59	564.68	565.03	564.55	564.62	564.61	564.22	564.40	564.25
MW-7	564.40	564.31	564.55	565.29	565.13	565.47	565.12	564.93	564.87	564.67	565.17	564.87
OW-1	563.81	563.80	564.00	564.60	564.89	565.08	564.66	564.52	564.58	564.25	564.72	564.31
OW-2		567.99	567.76	567.88	567.94	567.99	567.79	567.93	568.03	567.80	568.05	567.93
OW-3	564.72	564.42	564.34	565.06	565.15	565.25	565.27	564.69	564.44	564.51	565.12	565.04
OW-4	564.49	564.11	564.41	564.95	564.99	565.18	565.13	564.35	564.39	564.34	565.06	564.91
OW-5		566.18	566.04	566.32	566.52	566.56	566.70	566.65	566.52	566.21	566.60	566.77
OW-6	565.27	565.05	565.20	565.77	565.56	565.65	565.71	565.07	564.91	565.00	565.55	565.51
OW-7	564.67	564.42	565.11	565.95	567.45	565.61	565.32	564.20	564.41	564.47	565.57	565.13
OW-8	564.36	564.11	564.56	565.25	564.95	565.10	564.86	564.20	564.54	564.43	565.16	564.80
OW-9	566.54	566.44	566.51	567.13	566.73	566.64	566.53	566.30	566.21	566.36	566.69	567.01
S-1	564.14	564.32	564.72	564.32	564.39	564.09	564.86	563.99	564.10	563.89	564.12	564.39
S-2		564.27	564.75	565.19	565.17	565.41	565.43	564.60	564.35	564.45	565.25	565.14
S-3		565.01	565.34	565.69	565.49	565.74	565.84	565.49	564.92	564.80	565.69	565.50
S-4	563.93	563.69	565.03	565.95	565.16	565.34	564.45	562.57	564.16	563.90	565.59	564.49
RW-1	564.22	564.29	564.65	565.17	565.13	565.62	565.17	564.73	564.77	564.85	566.71	564.64
RW-2	564.42	564.51	564.57	564.51	565.15	565.61	565.35	564.97	565.05	564.97	565.52	564.92
RW-3	564.40	564.44	564.62	565.23	565.12	565.70	565.91	565.13	565.27	564.99	566.18	564.80
RW-4	564.33	564.29	564.32	565.06	565.27	565.56	565.15	565.11	564.08	564.72	565.05	564.62
RW-5	564.25	564.23	564.33	564.98	565.02	565.47	565.17	564.95	565.15	564.80	565.40	564.55
RW-6	564.26	564.09	564.27	564.88	564.99	565.42	565.01	564.88	564.92	564.55	565.14	564.58
RW-7	564.27	564.15	564.52	565.02	564.90	565.45	565.00	564.96	564.95	564.58	565.17	564.56
RW-8	564.23	564.05	565.16	564.98	565.02	565.40	564.96	565.01	565.02	564.62	564.83	563.62
RW-9		566.09	564.33									
RW-10		564.40	563.60	565.37	565.36	565.63	565.14	565.13	565.10	564.82	565.18	564.98
RW-11				565.64	565.37	565.79	565.40	565.14	565.31	565.08	565.57	565.20
SG	563.89	563.89	563.89	563.89	563.89	563.89	563.89	563.89	563.89	563.89	563.89	563.89

Table 2.2
Cherry Farm/River Road O&M
Non-routine Maintenance Items for 2003

Date	Non-routine Maintenance Item
January 2003	Repaired pre-amplifier (sends signal to pH probe)
March 2003	Constructed trenches around two recovery well vaults to divert infiltrating surface water.
March 2003	Replace water-damaged electrical components in well vaults (RW-2 and RW-6) to restore power to two sumps in the shallow groundwater trench.
April 2003	Replaced in-line reducer for the caustic chemical feed pump
April 2003	Acid treated Sump No. 4
May 2003	Began to develop means to prevent recurrence of the recent water leakage into the extraction well vaults.
June 2003	Repaired clearwell pump
July 2003	Rebuilt portions of the caustic pump (diaphragm, 3-way valves, check valve).
July 2003	Treated all four sumps with acid due to low flows.
August 2003	Replaced caustic tank heating element.
November 2003	Replaced acid feed lines
November 2003	Installed a new chemical transfer pump for caustic
November 2003	Installed new gasket in the clearwell flow meter to stop leak
December 2003	Removed check-ball weight in clearwell flow meter (was responsible for leaking)
December 2003	Replaced acid feed line to equalization tank

SECTION 3
MONITORING SUMMARY

3.1 GROUNDWATER QUALITY

Semi-annual sampling included the collection of groundwater samples from monitoring wells to assess intermediate/deep groundwater quality, and from the sumps located in the shallow collection trenches, to assess shallow groundwater quality. Groundwater samples were collected from seven groundwater monitoring wells (MW-1 through MW-7) and four sumps (S-1 through S-4).

The 2003 groundwater and surface water analytical data is summarized in Tables 3.1, 3.2, and 3.3. Groundwater sample results were compared to the Class GA Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations found in the NYSDEC Technical and Operational Guidance Series (1.1.1). Surface water samples results were compared to Class A type H(WS) criteria. Complete sampling results for the current reporting period are included in Appendix A. Summary tables of all samples collected to date are in Appendix B, and are arranged by sampling location to facilitate comparison of concentrations at each sampling point over time.

In general, impacts from the Site on groundwater quality in the intermediate/deep zone were relatively minor. Concentrations of organic compounds were below groundwater standards in most of the samples. Several metals exceeded groundwater standards, but most metals were observed to have the highest concentrations in the background well (MW-2).

Shallow groundwater quality showed greater impacts from the Site than the intermediate/deep zone samples. The most notable impacts were observed in sump S-1, likely due to the presence of a measurable thickness of LNAPL throughout the reporting period.

3.1.1 Intermediate/Deep Groundwater Quality

June 2003

During the June 2003 sampling event, only two VOCs were detected above groundwater standards or guidance values, and were only detected in samples collected from MW-5. The benzene standard (1.0 ug/L) was exceeded at a concentration of 38 ug/L, and the total xylene standard (5.0 ug/L) was exceeded at a concentration of 7.0 ug/L.

Only two SVOCs were detected above groundwater standards, and only in samples collected from MW-5. 2,4-dimethylphenol was detected at an estimated concentration of 7.0 ug/L, and 4-methylphenol at an estimated concentration of 2.0 ug/L.

No pesticides or PCBs were detected in any of the deep groundwater samples collected from the June 2003 sampling event.

A totally of seven metals were detected in samples collected during June 2003. Arsenic concentrations exceeded the standard (25 ug/L) in background well MW-1 with a concentration of 35.6 ug/L and in MW-2 at a concentration of 50.8 ug/L. Chromium and lead concentrations exceeding the standard were only detected in samples collected from background well MW-2. Iron (standard of 300 ug/L) was exceeded in all samples collected during the June event. Sample concentrations ranged from 582 ug/L in MW-4 to 59,400 ug/L in MW-2. Magnesium was detected above the standard (35,000 ug/L) in MW-2 at a concentration of 143,000 ug/L, in MW-5 at 35,100 ug/L, and in MW-6 at 25,600 ug/L. Manganese was detected above the standard (300 ug/L) in MW-2 at 1,570 ug/L, MW-3 at 495 ug/L, MW-4 at 1,040 ug/L, and MW-6 at 1,530 ug/L. Sodium has a groundwater standard of 20,000 ug/L and was detected above this limit in all samples except MW-2 during the June sampling. Concentrations exceeding the standard ranged from 26,700 ug/L in MW-7 to 70,200 ug/L in MW-5. Note that the New York State Department of Health (NYSDOH) recommends a value of 270,000 ug/L as a drinking water value for persons on moderately restricted sodium diets, and the more stringent 20,000 ug/L for persons on a severely restricted sodium diet.

December 2003

During the December 2003 sampling event, only one VOC was detected. Benzene was the detected at a concentration of 10 ug/L in MW-5, exceeding the groundwater standard of 1.0 ug/L.

There were no SVOCs detected during this sampling round.

There were no pesticides or PCBs detected above groundwater standards in any samples collected during the December 2003 sampling There were a total of seven metals detected in exceedance of the standard during this sampling event. Iron was detected in all of the wells with a concentration ranging from 6,900 ug/L in MW-4 to 69,500 ug/L in MW-2. Magnesium was detected in four wells above the groundwater standard of 35,000 ug/L. The concentrations ranged from 36,900 ug/L in MW-6 to 143,000 ug/L in MW-2. Manganese was detected above the standard of 300 ug/L in four monitoring wells during this sampling event. Concentrations ranged from 479 ug/L in MW-3 to 1,940 ug/L in MW-1. Sodium was detected in five wells above the groundwater standard or guidance value of 20,000 ug/L. Detections ranged from 27,700 ug/L in MW-7 to 60,500 ug/L in MW-5. Arsenic, chromium, and lead were also detected but in relatively low concentrations compared to the standard. Overall, samples collected from MW-2 (background location) have had the most detected compounds above groundwater standards

A summary of the analytical data from the June and December 2003 groundwater sampling events is included on Table 3.1.

3.1.2 Shallow Groundwater Quality

Detected compounds were generally found at similar to slightly lower concentrations compared to previous reporting periods during the 2003 sampling. A summary of the analytical data from the June and December 2003 groundwater sampling events is included on Table 3.2.

June 2003

Analytical results indicated that there were no VOCs detected above groundwater standards during the June 2003 sampling event.

A total of five SVOCs (excluding PAHs) were detected at concentrations exceeding groundwater standards during the June 2003 event. 4-methylphenol exceeded groundwater standards in S-2. Detected concentrations of 2,4-dimethylphenol (standard of 1 ug/L) ranged from 3 to 6 ug/L, with the exceedances occurring in samples collected from S-2 and S-4. Bis(2-ethylhexyl)phthalate exceeded the groundwater standard (5 ug/L) in S-1 (100 ug/L) and S-3 (140 ug/L). 4-chloro-3-methylphenol exceeded the standard (1 ug/L) in the sample from S-4 (36 ug/L). 2-methylphenol (groundwater standard of 1.0 ug/L) was detected at 1.0 ug/L in sampled collected from S-2 and S-4.

Six PAHs were detected above groundwater standards in June 2003. Similar to slightly lower concentrations than in previous reporting periods were observed. Sump S-1 and S-3 contained the greatest number of PAHs, and at the greatest concentrations for all detected PAHs. Benzo(a)anthracene exceeded groundwater standards (0.002 ug/L) in samples from S-1 (90 ug/L) and S-3 (94 ug/L). Benzo(b)fluoranthene exceeded standards of 0.002 ug/L in samples collected from S-1 (110 ug/L) and S-3 (110 ug/L). Benzo(k) fluoranthene (groundwater standard of 0.002 ug/L) was exceeded in S-1 at 58 ug/L and in S-3 at 92 ug/L. Chrysene was exceeded in S-1 at a concentration of 83 ug/L and in S-3 at a concentration of 90 ug/L. Fluoranthene, with a groundwater standard of 50 ug/L, was detected in S-1 at an estimated value of 230 ug/L and in S-3 at an estimated value of 210 ug/L. The groundwater standard for pyrene (50 ug/L) was exceeded in samples from S-1 and S-3, with concentrations of 270 and 290 ug/L, respectively.

A total of seven pesticides were detected at concentrations exceeding the groundwater standards during the June 2003 sampling event. The greatest number of pesticides exceeding standards (6) occurred in S-1 and S-3. Alpha-BHC, with a standard of 0.01 ug/L, was exceeded in S-1 (0.072 ug/L) and in S-4 (0.013 ug/L). The alpha-chlordane standard of 0.05 ug/L was exceeded in S-1 (0.11 ug/L) and in S-3 (0.39 ug/L). The 4, 4'-DDD standard of 0.3 ug/L was exceeded in S-1 (2.3 ug/L) and S-3 (8.0 ug/L). 4, 4'-DDE was exceeded (standard of 0.2 ug/L) in S-1 at a concentration of 1.0 ug/L, and in S-3 at a concentration of 2.8 ug/L. Dieldrin was detected above the groundwater standards/guidance value (0.004 ug/L) in all samples collected, with concentrations ranging from 0.0045 ug/L in S-2 to 2.4 ug/L in S-3. Heptachlor was detected above groundwater standards (0.04 ug/L) in all samples, with the exception of S-2.

Concentrations ranged from 0.0057 ug/L in S-4 to 0.85 ug/L in S-3. Heptachlor epoxide was only detected above the standard/guidance value of 0.03 ug/L in S-3, at an estimated value of 0.2 ug/L.

The concentrations of PCBs during this reporting period were generally similar to the previous reporting period sample results. During the June 2003 sampling, two PCB aroclors were detected above the groundwater standard. Aroclor 1248 was detected in S-1 at a concentration of 62 ug/L, and in S-3 at a concentration of 130 ug/L. Aroclor 1260 was detected above the standard of 0.09 ug/L (total PCBs) in S-1 at a concentration of 38 ug/L, and in S-3 at a concentration of 2.1 ug/L.

A total of six metals were detected above groundwater standards in samples collected during June 2003. Antimony was detected at a concentration of 3.7 ug/L (above the standard of 3.0 ug/L) in S-1. Arsenic was also detected above the standard (25 ug/L) in S-1 at a concentration of 33.7 ug/L. Iron was detected above the 300 ug/L standard in S-1 at a concentration of 32,600 ug/L, S-2 at 438 ug/L, and S-4 at 1,380 ug/L. Lead was exceeded (25 ug/L) only in samples collected from S-1 at a concentration of 33.2 ug/L. Manganese (300 ug/L standard) was exceeded in samples collected from S-1 at 2,370 ug/L, and in S-4 at 729 ug/L. Sodium (20,000 ug/L) was exceeded in all samples collected during the June 2003 event. Exceedances ranged from 64,400 ug/L in S-2 to 108,000 ug/L in S-1.

December 2003

During the December 2003 sampling event, there were no VOCs detected above groundwater standards or guidance values. A total of five non-PAH SVOCs were detected. 2,4-dimethylphenol (standard of 1.0 ug/L) was detected in all samples ranging in concentration from 2.0 ug/L in S-2 to 14 ug/L in S-1. Bis(2-ethylhexyl)phthalate was detected in S-1 at 77 ug/L, exceeding the standard of 5.0 ug/L. 1,4-dichlorobenzene was detected above groundwater standards (3.0 ug/L) in S-1 at 7.0 ug/L. 2-methylphenol was detected in S-4 at 2.0 ug/L above the groundwater standard of 1.0 ug/L. 4-methylphenol was detected in S-3 at a concentration of 4.0 ug/L above the standard of 1.0 ug/L.

A total of six PAHs were detected in December 2003, all of which were detected in samples from S-1. Benzo(a)anthracene, with a groundwater standard of 20 ug/L, was detected at 56 ug/L. Benzo(b)fluoranthene was detected at 84 ug/L in S-1, and benzo(k)fluoranthene at 31 ug/L. Chrysene was detected above the standard of 0.002 ug/L at 46 ug/L. Fluoranthene was detected at 120 ug/L, exceeding the standard of 50 ug/L. Pyrene was detected at 170 ug/L in S-1, exceeding the groundwater standard of 50 ug/L. Benzo(b)fluoranthene was detected in S-3 at a concentration of 2.0 ug/L.

A total of four pesticides were detected during this sampling event, in S-1 and S-3. 4,4'-DDD was detected in S-1 with a concentration of 0.53 ug/L, and in S-3 at 8.0 ug/L (above the standard of 0.3 ug/L). 4,4'-DDE (groundwater standard of 0.02 ug/L) was detected in S-1 at an estimated value of 0.71 ug/L. Dieldrin was detected in S-1 at an estimated concentration of 0.42 ug/L, exceeding a standard of 0.004 ug/L. Heptachlor

(standard of 0.04 ug/L) was detected in S-1 at an estimated concentration of 0.3 ug/L, and in S-3 at an estimated concentration of 0.041 ug/L.

PCBs were only detected in samples collected from S-1 and S-3. The total PCB concentration in the sample from S-1 was 49.0 ug/L, and the PCB concentration in the sample from S-3 was 7.3 ug/L.

A total of nine metals were detected during the December 2003 sampling event in exceedance of groundwater standards. Sodium was detected in all four sumps. Concentrations ranged from 45,700 ug/L in S-4 to 91,800 ug/L in S-1. Antimony was detected in all samples collected except from S-4. Concentrations exceeding the standard of 3.0 ug/L ranged from 3.2 ug/L in S-3 to 9.2 ug/L in S-1. Iron was detected in samples collected from S-1 (73,300 ug/L) and in S-4 (848 ug/L) above the groundwater standard of 300 ug/L. Manganese was detected in samples from S-1 (2,260 ug/L) and S-4 (317 ug/L), exceeding the groundwater standard of 300 ug/L. The remaining six metals were only detected in samples collected from S-1. Arsenic was detected at 96.1 ug/L, exceeding the groundwater standard of 25 ug/L. Chromium was detected at a concentration of 87.9 ug/L, exceeding the standard of 50 ug/L. Copper was detected at 318 ug/L, above the groundwater standard of 200 ug/L. Lead was detected at 148 ug/L exceeding the groundwater standard of 25 ug/L. Nickel (groundwater standard of 100 ug/L) was detected at a concentration of 310 ug/L.

3.1.3 Surface Water Quality

Surface water was not present at the SW-2 and SW-3 sampling locations during either the June or December sampling events. At sampling location SW-1, surface water was only available for sample collection during the December 2003 event.

A sample from location SW-1 was obtained in December 2003. SW-1 is in the northeast corner of the site, on the Niagara River. One VOC (methylene chloride) with an estimated value of 2.0 ug/L, and one pesticide (beta-BHC) with an estimated concentration of 0.020 ug/L were detected above the Class A (Type H(WS)) standard. Two metals were detected above the standard in SW-1: aluminum at an estimated value of 152 ug/L (standard of 100 ug/L) and magnesium at 38,400 ug/L (standard of 35,000 ug/L). There were no SVOCs or pesticides detected above standards during this reporting period. Results are summarized on Table 3.3.

3.1.4 Five Year Groundwater Analytical Summary

Intermediate/Deep Groundwater

Between 1997 and 2003, groundwater samples were collected from monitoring wells on a routine basis in accordance with the OM&M plan. Impacts to the intermediate/deep groundwater zone from the Site have been relatively minor throughout this period. A time trend analysis is presented in Section 3.4.

During this time, VOCs have not been detected in exceedance of the New York State Ambient Water Quality Standards in any monitoring wells other than MW-5. Benzene

has been detected, with concentrations ranging from non-detect to a maximum of 110 ug/L in April 1999. Ethylbenzene has been detected above the standard of 5 ug/L, with concentrations ranging from non-detect to 10 ug/L in October 1998 and April 1999. Toluene has been detected above the standard (5.0 ug/L) with concentrations ranging from non-detect to a high of 35 ug/L in the May 1998 reporting. Xylene (total) concentrations have exceeded the 5 ug/L standard with concentrations ranging from non-detect to a high of 42 ug/L in May 1998.

Other than the samples from MW-5, SVOCs were not detected at concentrations in exceedance of the Class GA Standards and Guidance Values. Exceptions included naphthalene (12 ug/L) in MW-1, phenol (4 ug/L) in MW-2, and phenol (2 ug/L) in MW-7 during the August 1997 sampling event. MW-4 also had an exceedance for 4-methylphenol (2 ug/L) in June 2001. The groundwater samples from MW-7 collected in December 2002 also had a number of SVOCs detected at concentrations above standards. The SVOCs detected in MW-5 with concentrations in exceedance of the standard included 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol and phenol.

Pesticides have not been detected with concentrations in excess of the groundwater standard during the sampling history with the following exceptions. Dieldrin was detected in MW-4 (0.0074ug/L) in December 2001. Dieldrin was also found in MW-5 in February 1998 (0.0095 ug/L), November 1999 (0.0071ug/L) and December 2001 (0.012 ug/L).

The number of metals detected above groundwater standards has remained fairly constant (seven or eight in total). During any given reporting period, samples collected from a background well (MW-2) have contained all of the seven or eight metals detected above the groundwater standard at similar concentrations. Thallium concentrations decreased to non-detect over the sampling period except in samples from MW-2. Compared to MW-2, samples from the remaining six monitoring wells have had similar to lower concentrations and in some cases, were non-detect.

Shallow Groundwater

The shallow groundwater quality over the sampling history was assessed based on the results of samples collected from the interceptor trench collection sumps.

The VOC and SVOC concentrations in the shallow groundwater have decreased over time. No individual VOC (with the exception of 1,1-dichloroethane in 2003) has been identified with a concentration in exceedance of standards since the November 1999 sampling event.

SVOCs were most prevalent in S-1, but concentrations have generally decreased over time. During the first sampling event, (November 1997), a total of fourteen SVOCs were detected. Since then, the number of compounds detected has decreased to eight.

The total organic concentrations (VOCs and SVOCs) have fallen under the 100 ug/L standard in S-2, S-3, and S-4. Total organics in S-2 have not exceeded the 100 ug/L standard since October 1998. Samples from S-3 did not exceed the standard between November 1999 and December 2003. The April 1999 event was the last time in which samples from S-4 were found to be in exceedance of the standard.

In samples collected from S-1, total PCBs ranged from non-detect in November 1997, to 980 ug/L in February 1998. Total PCB concentrations for S-2 ranged from non-detect to 0.48 ug/L in October 1998. Samples collected from S-3 show total PCB detections to range from not detected to 31.5 ug/L in December 2002. Total PCBs in samples collected from S-4 ranged from non-detect to 1.5 ug/L in April 1999.

Pesticides have predominantly been detected in samples collected from S-1. The total number of pesticides detected ranged from two in 1998 to nine compounds in 2002. Samples collected from S-2 have generally been between non-detect to two compounds detected above groundwater standards. S-3 concentrations have ranged from non-detect in 1997 to three compounds detected in 2002. No pesticides have exceeded standards in samples collected from S-4.

The number of metals detected in each sump generally remained the same with some fluctuation throughout the sampling history. While some metals were more dominant in particular sampling locations, the concentrations did not fluctuate with any regularity during the monitoring period. The metals that have most regularly been detected in shallow groundwater samples include iron, manganese, sodium, and antimony. Other metals that have been detected in exceedance of the Class GA standard include thallium, lead, magnesium, barium, nickel, chromium, copper, arsenic, and selenium.

Surface Water

There have been no VOCs or SVOCs detected above the surface water standards in SW-1, SW-2, or SW-3 since sampling was initiated.

Pesticides have generally not been detected above Class A Type H(WS) Surface Water Standards. Dieldrin was detected at 0.0064 ug/L in a sample collected during the 1999 reporting period from S-3. Dieldrin was not detected in exceedance of surface water criteria (0.004 ug/L) in any samples collected after 1999. PCBs were not detected in any surface water samples.

In samples collected from SW-1, iron, magnesium, and sodium were the dominant detected metals over the last five years. Concentrations have been fairly consistent from year to year, with a trace detection of antimony above surface water standards in 1997. In SW-2, only iron was detected at a concentration of 1,080 ug/L, exceeding the surface water standard of 300 ug/L. Samples collected from SW-3 showed an exceedance of iron, manganese, and sodium. Concentrations have generally remained the same throughout the sampling history.

3.2 EFFECTIVENESS OF THE EXTRACTION WELL SYSTEM

The intermediate/deep groundwater extraction system achieved the objective of providing groundwater capture, and minimizing migration of groundwater in this zone to the Niagara River.

As part of this evaluation, groundwater level monitoring was conducted on a monthly basis. In addition, a groundwater upwelling study to evaluate the potential for discharge of chemicals of concern to the Niagara River with the recovery system off was completed in November of 2003. The final upwelling study report was submitted to the NYSDEC in March 2004. As part of the study, the extraction well system was shut down on October 14, 2002. This section discusses the effectiveness of the system (while it was in operation), and presents water level and operational field data supporting this conclusion.

3.2.1 System Description

The intermediate/deep groundwater extraction system consists of 11 extraction wells, with screens penetrating the intermediate/deep zone. The purpose of the extraction system is to prevent migration of intermediate/deep groundwater to adjoining properties and the Niagara River. Screen lengths vary from approximately 15 to 20 feet. Screen bottom elevations range from 534 to 547 National Geodetic Vertical Datum (NGVD), and screen top elevations range from 550 to 557 NGVD. Details concerning the extraction system are provided in the Parsons October 1999 Cherry Farm/River Road Construction Certification Report.

The water level in each extraction well was designed to be maintained at an elevation of approximately 560 to 561 feet NGVD by conductivity water level sensors. Following the review of the Parsons 1998 Annual Post-Construction Groundwater Monitoring Report, the NYSDEC requested that drawdown be increased in certain areas adjacent to the river. To increase drawdown and capture zone areas adjacent to the river, the water level sensors were lowered by approximately four feet in RW-1 through RW-9 on October 19, 1998.

As mentioned above, the extraction system has been out of operation since October 14, 2002 and has remained off through the present. The upwelling study was completed in November 2003, with subsequent reporting and recommendations provided in a March 2004 report, and in this 2003 Annual and Five Year Review Report.

3.2.2 System Effectiveness

Pre-extraction water levels of all extraction and monitoring wells indicated a relatively flat hydraulic gradient, with less than a one-foot drop in water levels from the east side to the west side of the Site, over a distance of 1,000 feet. Water level contours paralleled the river shoreline, indicating that groundwater flows directly to the river. A staff gauge was installed in the river in August 2000 to measure river levels concurrently with groundwater levels. Based on staff gauge data, the river elevation has varied from

approximately 563.9 to 564.7 feet above sea level between August 2000 and December 2003. The flat gradient between the eastern portion of the Site and the river is conducive to creating a capture zone, because even relatively small amounts of drawdown near the river are sufficient to alter the natural gradient, preventing offsite migration of groundwater in this zone.

A deep/intermediate zone groundwater contour map has been developed based August 29, 2003 water levels (Figure 3.1). Previous annual reports have included a groundwater contour map for each quarter; however, because the extraction system was turned off for all of 2003 the data from all quarters in the current reporting period was similar. Prior to October 2002, drawdown was adequate to maintain capture, but following shut down of the extraction wells, gradients have returned to near pre-existing conditions. Sufficient drawdown was generally maintained throughout the entire OM&M period (prior to extraction system shutdown in October 2002) to create a barrier to offsite migration of groundwater.

Extraction well water level hydrographs for the entire OM&M period are shown on Figures 3.2a through 3.2c. Water level data for the extraction wells, monitoring wells, sumps, and observation wells are presented as Table 2.1. Water levels in the extraction wells, on average, were being maintained at an elevation between 556 and 557 feet NGVD, between nine to ten feet below the pre-extraction water levels measured on August 8, 1997. Occasionally, water levels deviated from these elevations due to maintenance of the pumps, lines, or groundwater treatment facility; or due to intermittent mechanical outages. Water levels returned to pre-operational static elevations after the system was shut down in October of 2002.

Monitoring well hydrographs, presented on Figures 3.3a, 3.3b, and 3.3c provide further indication that the recovery wells were producing drawdown in the surrounding formation. Following the lowering of the water levels within the recovery wells in October 1998, water levels showed a distinct decline and generally remained below the original design water levels (until October of 2002, when the system was shut down).

3.3 EFFECTIVENESS OF THE SHALLOW COLLECTION TRENCH

3.3.1 System Description

The shallow collection trench consists of a series of four shallow trenches filled with a granular drainage material (silica filter sand), and lined with an impermeable geomembrane on the downgradient (river side) trench wall. The system was designed as a groundwater sink to capture shallow groundwater and LNAPL. Four sumps, located within the trenches, pump groundwater into a conveyance pipeline. This pipeline then conveys the water to an oil-water separator at the onsite treatment plant. The sumps were pumped at a rate of approximately 3 gpm each, or a total of 12 gpm, and are continuing to operate.

Eleven observation wells were installed to monitor groundwater elevations and hydraulic gradients in the vicinity of the trenches. Six observation wells (OW-1, OW-3,

OW-4, OW-6, OW-7, and OW-8) were installed adjacent to the trench system on the upgradient side. Observation wells OW-2 and OW-5 were installed further upgradient, at 14 feet (elevation) above the trenches. OW-9 was installed 15 feet above the trenches, adjacent to the former sediment disposal area (SDA).

3.3.2 System Effectiveness

The shallow collection trench system is operating as planned, with flow rates very close to those predicted during the design phase. No surface overflows were observed from the trench during the reporting period. Hydraulic gradients from east to west were maintained between the Site and the trench, as designed, resulting in continuous groundwater flow into the collection trench. In order to improve the flow efficiency of the collection system, a high pressure flush is completed on a yearly basis.

Hydrographs of the sumps and shallow observation wells are included as Figures 3.4 and 3.5a and 3.5b. The water levels in a majority of the observation wells were within one foot of each other, and responded similarly to fluctuations in water levels from precipitation and seasonal variations. Water levels in OW-2, OW-5, and OW-9 were measurably higher than the sump levels and the observation wells adjacent to the trench, as expected, due to their higher elevations. As mentioned in the 1999 Annual Report, OW-6, OW-7, OW-8, and OW-9 were influenced by water seeping from the SDA during dredging activities from August through November 1998. Once dredging activities were concluded in November 1998, the water levels returned to normal.

LNAPL was observed in S-1 during all monitoring events, ranging in thickness from approximately 0.5 inches to 1.5 inches. Periodically during site inspections, LNAPL is removed from S-1 using absorbent pads, bailing, or by manually running the sump pump and drawing the water level/product interface down to the bottom of the sump.

3.4 TIME TRENDS

3.4.1 Deep Groundwater

Groundwater chemical data from monitoring wells for the period 1997 through 2003 were compiled and used to create time trend plots (Figures 3.6a and 3.6b). Total VOCs and total SVOC concentrations versus time are shown in the plots provided in Figure 3.6a and 3.6b for the groundwater monitoring wells. The concentrations of total VOCs have been relatively low throughout the O&M period. VOCs in MW-5 fluctuated between 7 ug/L and 200 ug/L through the project history. In each of the other wells, the sum of VOCs in a sample ranged from below the detection limits to 10 ug/l. The only exceptions to this were the April 1999 data, where total VOCs approached 25 ug/L, and November 1999, in which VOCs were above 40 ug/L.

SVOCs followed a similar pattern; with concentrations totaling less than 10 ug/L in each well, with the exception of MW-5, and the SVOC total for MW-7 in June 2002. SVOC Totals for MW-5 have generally been between non-detect and 50 ug/L throughout

the sampling history. There were no SVOCs detected in samples collected from MW-7 during June 2003.

3.4.2 Shallow Groundwater

Figure 3.6c and 3.6d show trends for the shallow groundwater samples collected from the sumps between 1997 and 2003. Overall, the total VOC concentrations decreased between 1997 and November of 1999. Since November of 1999, total VOC concentrations have been relatively stable and below 15 ug/L in all four sumps, with the exception of the June 2002 sample from S-1. The total VOC concentrations in the June and December 2003 events were less than 10 ug/L at each sump, and were similar to slightly higher than the June 2002 sample event results. In summary, detections of VOCs, with a few exceptions that appear to be anomalous, did not typically exceed groundwater standards. Concentrations and the number of detections have decreased over the years.

Total SVOCs concentrations also decreased through time. The concentration of total SVOCs, particularly PAHs, in the shallow groundwater from S-1 has been consistently higher than in the other three sumps. This is in part due to the presence of LNAPL in the sump. Concentrations of SVOCs in sumps other than S-1 have generally been low or non-detect throughout the sampling history.

3.5 GROUNDWATER UPWELLING STUDY SUMMARY

A one year groundwater upwelling study was conducted to assess the impact that the permanent shutdown of the extraction system would have on the Niagara River. This study consisted of installing piezometers and sampling stations beneath the river, and the collection and laboratory analysis of groundwater samples from the sampling stations, onsite wells, and the river surface water. This study was conducted in accordance with the July 2002 NYSDEC-approved work plan. A final report was submitted to the NYSDEC in March 2004.

As part of the study, the pumps in the eleven deep zone groundwater extraction wells were turned off on October 14, 2002. The pumps and piping from each of the recovery wells was removed, cleaned, and placed in storage. The piping system for the deep and shallow recovery systems was flushed to remove accumulated deposits. During the upwelling study, only the pumps in the shallow groundwater collection trench remained active.

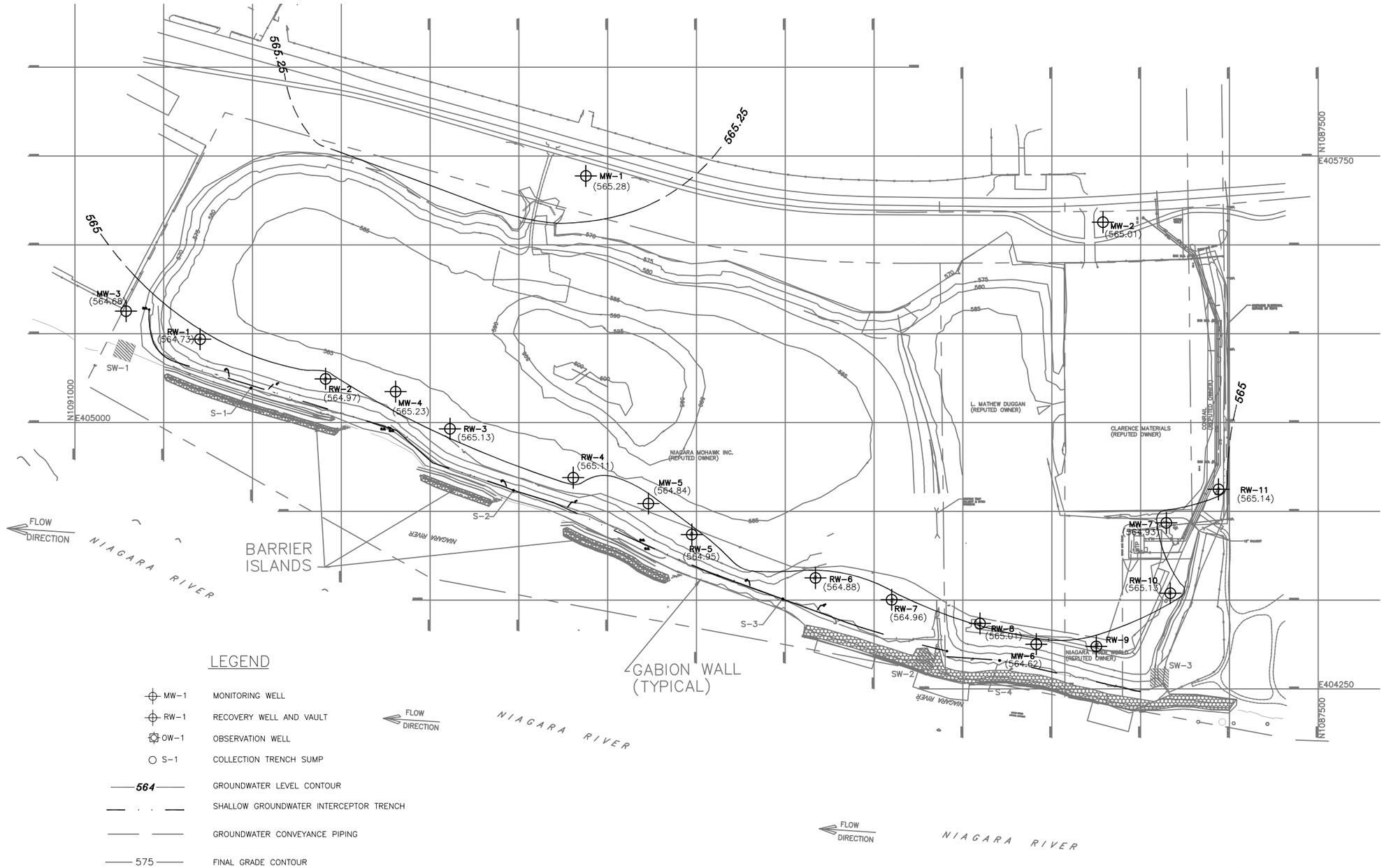
Prior to the shut down of the extraction system, and quarterly between December 2002 and October 2003, groundwater samples were collected and analyzed for the presence of benzene, toluene, ethylbenzene, xylene, semi-volatile organic compounds, polychlorinated biphenyls, and the major cation and anions. Water level and temperature data were collected on a regular basis. Following each quarterly monitoring event, data reports were submitted to the NYSDEC for review.

The sampling results for major anions and cations, integrated with the water level and temperature data, confirm that there is a clear distinction between surface water samples and samples collected from the groundwater monitoring points installed below the river. Thus, it appears that the river station samples are not being influenced by river water, and that there was no leakage from the surface water to the sampling pumps.

The water level results from the nearshore stations consistently showed an upward hydraulic gradient during the study. The offshore monitoring stations either exhibited a neutral or downward gradient. The strong upward gradients at the nearshore piezometer locations indicate that most of the groundwater discharge is near-shore.

Indicator compounds, as expected, were detected in the intermediate/deep groundwater underlying the Site. With the exception of a single detection of benzene at 1 ug/L in one sample, however, these compounds were not detected in the samples collected from the river monitoring stations.

The purpose of the groundwater upwelling study was to determine whether the deep groundwater extraction system could be permanently shut down, without having an adverse impact on the chemistry of the Niagara River. Based upon the results of this one year study, the discontinuation of the intermediate/deep groundwater extraction system will not have a negative impact on the quality of the groundwater upwelling to the Niagara River.



APPROXIMATE RIVER ELEVATION 563.89'

MW	ELEV IN FEET
1	565.28
2	565.01
3	564.68
4	565.23
5	564.84
6	564.62
7	564.93

RW	ELEV IN FEET
1	564.73
2	564.97
3	565.13
4	565.11
5	564.95
6	564.88
7	564.96
8	565.01
9	–
10	565.13
11	565.14

LEGEND

- MW-1 — MONITORING WELL
- RW-1 — RECOVERY WELL AND VAULT
- OW-1 — OBSERVATION WELL
- S-1 — COLLECTION TRENCH SUMP
- 564 — GROUNDWATER LEVEL CONTOUR
- SHALLOW GROUNDWATER INTERCEPTOR TRENCH
- GROUNDWATER CONVEYANCE PIPING
- 575 — FINAL GRADE CONTOUR
- RIPRAP SHORELINE

300 150 0 300 600

SCALE: 1"=300'

FIGURE 3.1

CHERRY FARM/RIVER ROAD SITE

GROUNDWATER ELEVATION CONTOUR MAP AUGUST 29, 2003

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

P:\441155\cad\SK-441155-G12.dwg, 04/27/04 at 16:32, MAB, 1=1
XREFs: X39187TOP.DWG, X39187C01.DWG

Figure 3.2a
Cherry Farm/River Road Site
Recovery Well Hydrographs (RW-1,2,3)

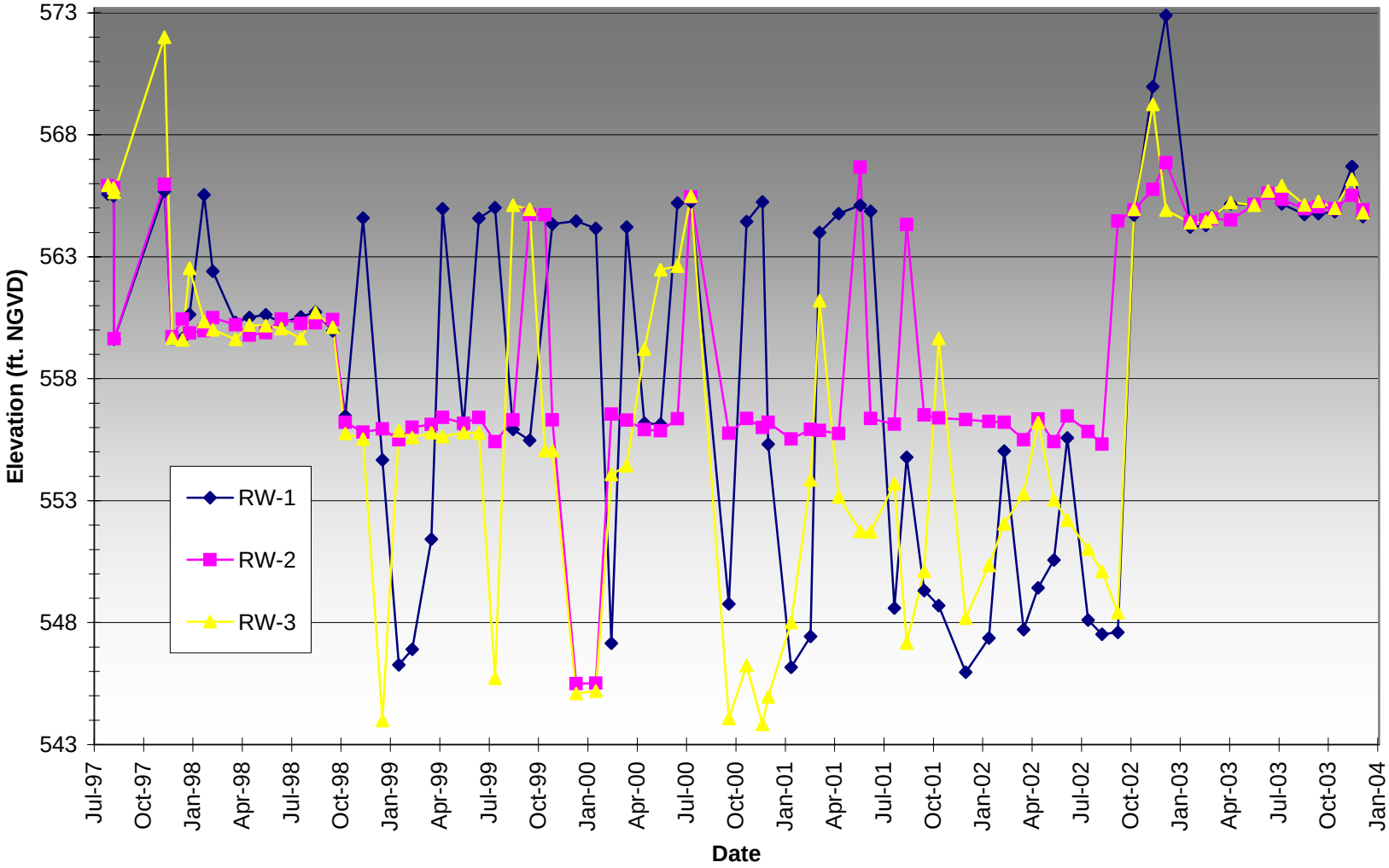


Figure 3.2b
Cherry Farm/River Road Site
Recovery Well Hydrographs (RW-4,5,6,7)

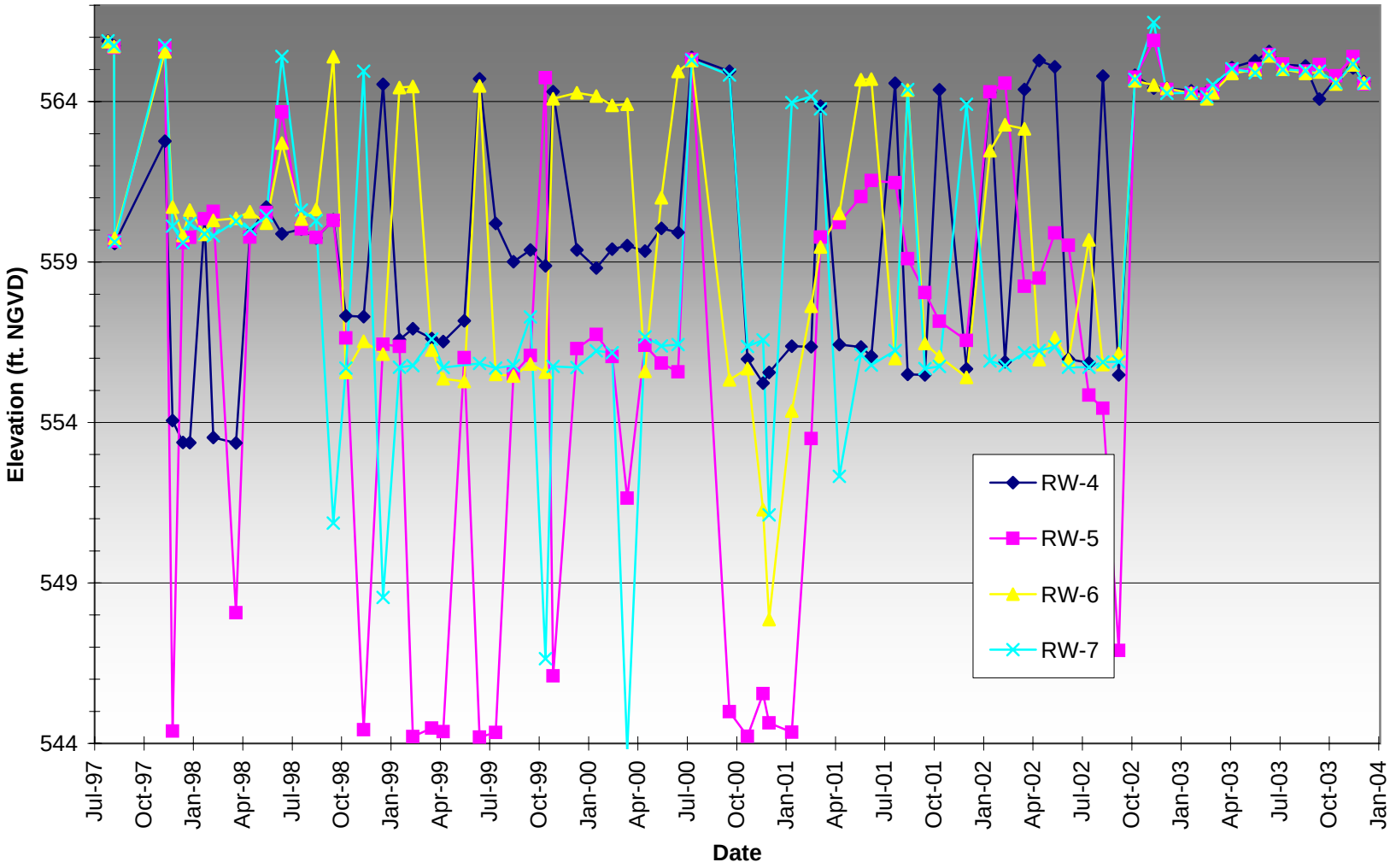


Figure 3.2c
Cherry Farm/River Road Site
Recovery Well Hydrographs (RW-8,9,10,11)

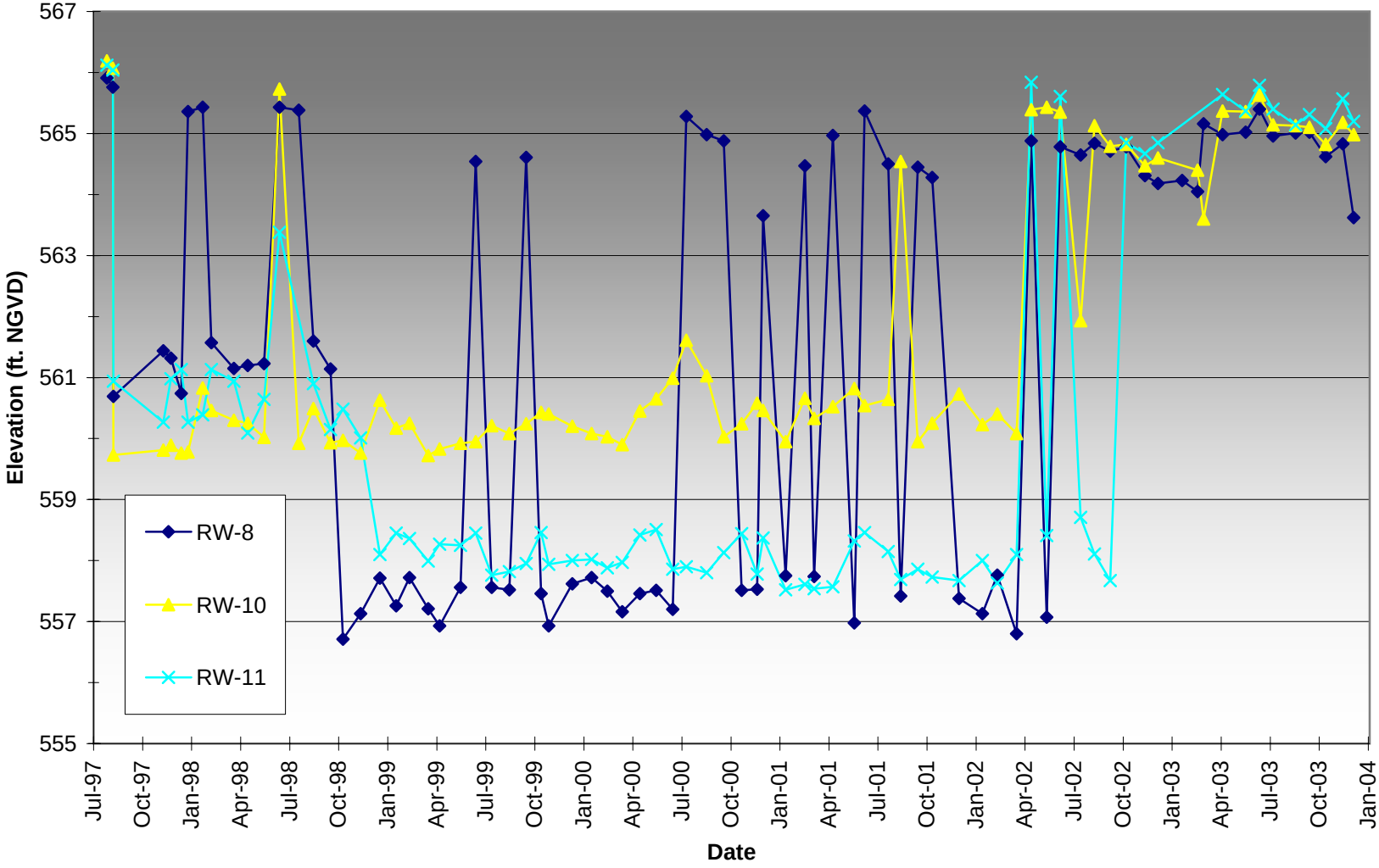


Figure 3.3a
Cherry Farm/River Road Site
Monitoring Well Hydrographs MW-1,2,3

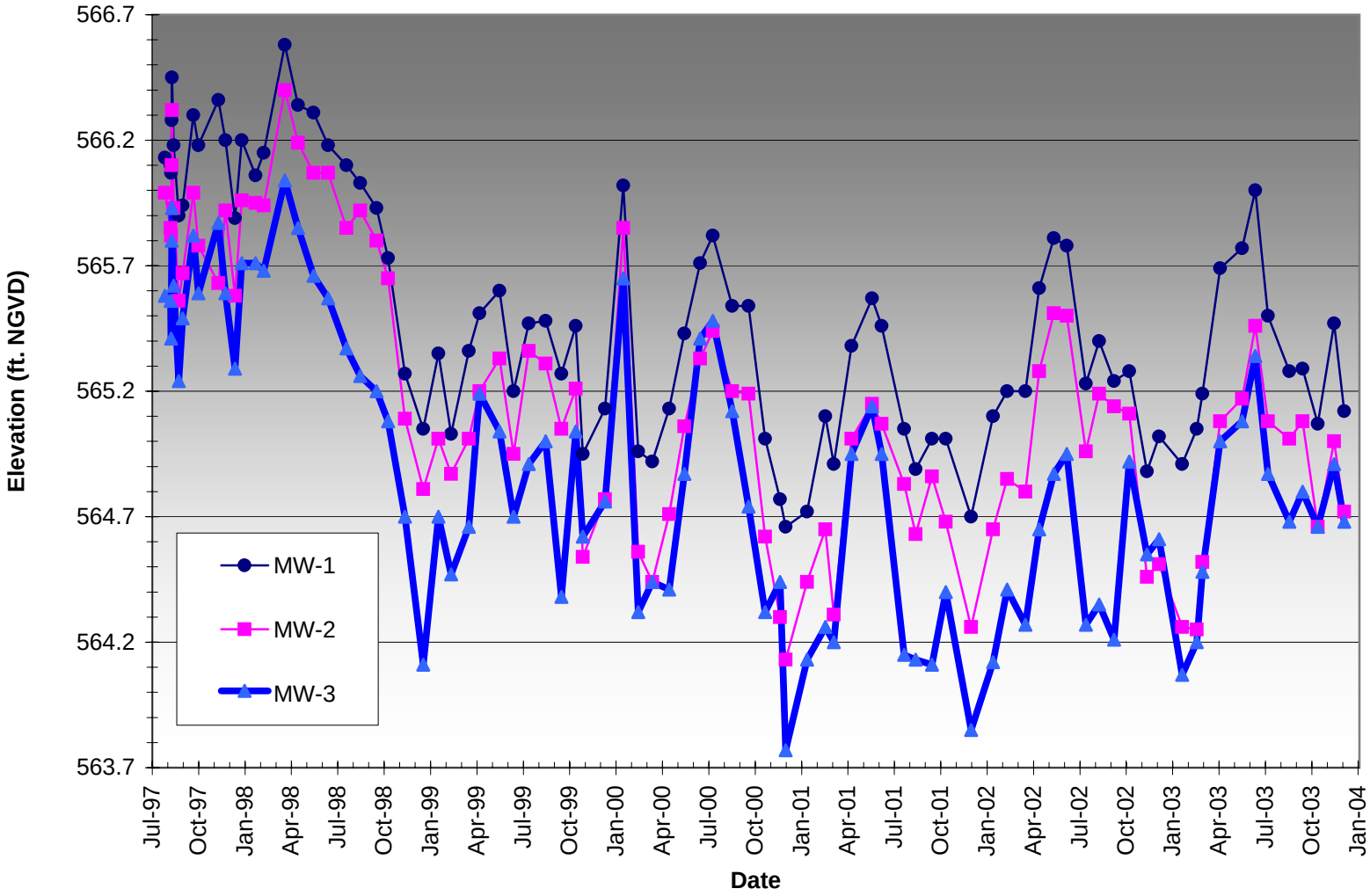


Figure 3.3b
Cherry Farm/River Road Site
Monitoring Well Hydrographs MW-4,5

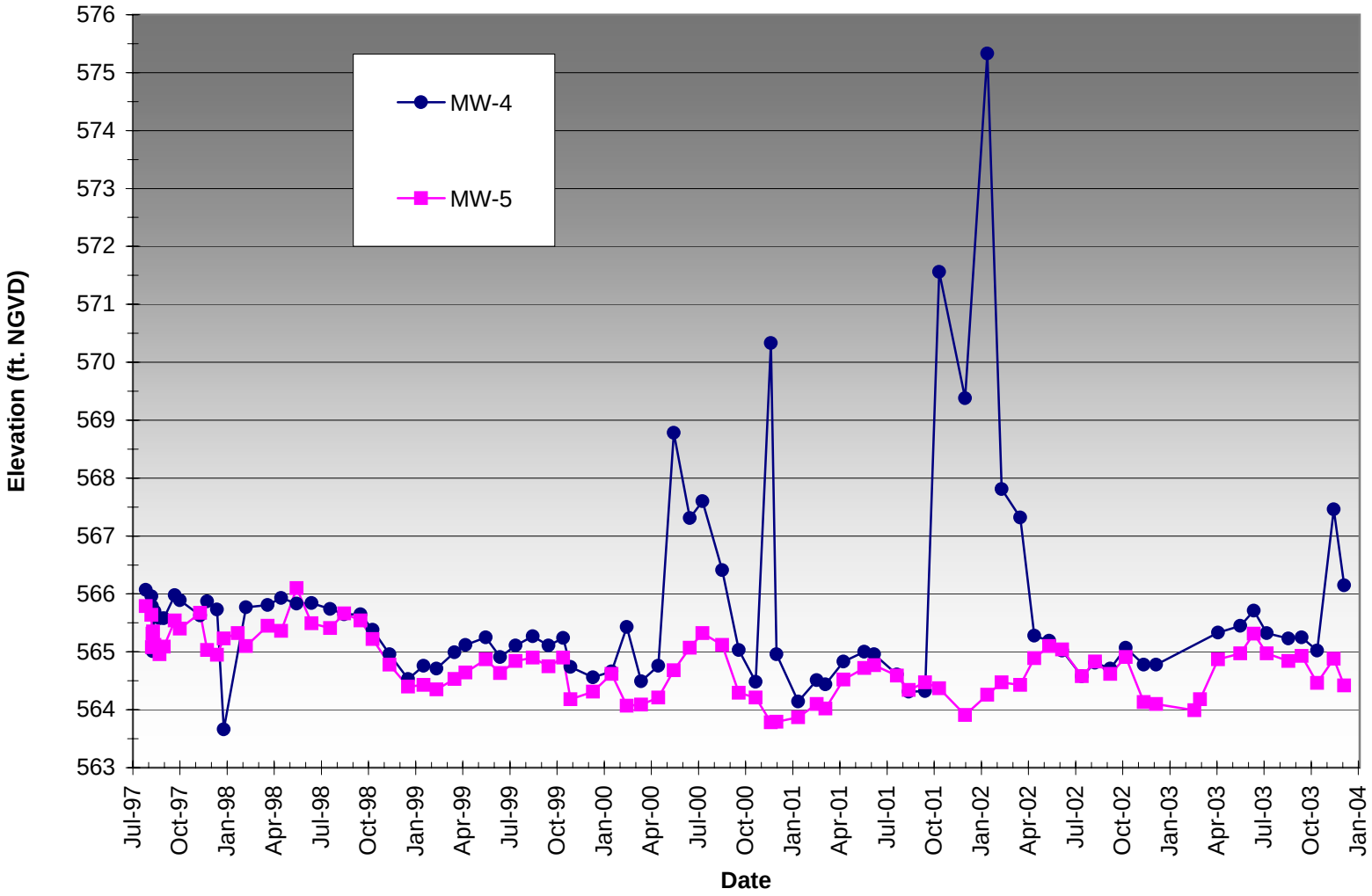


Figure 3.3c
Cherry Farm/River Road Site
Monitoring Well Hydrographs MW-6,7

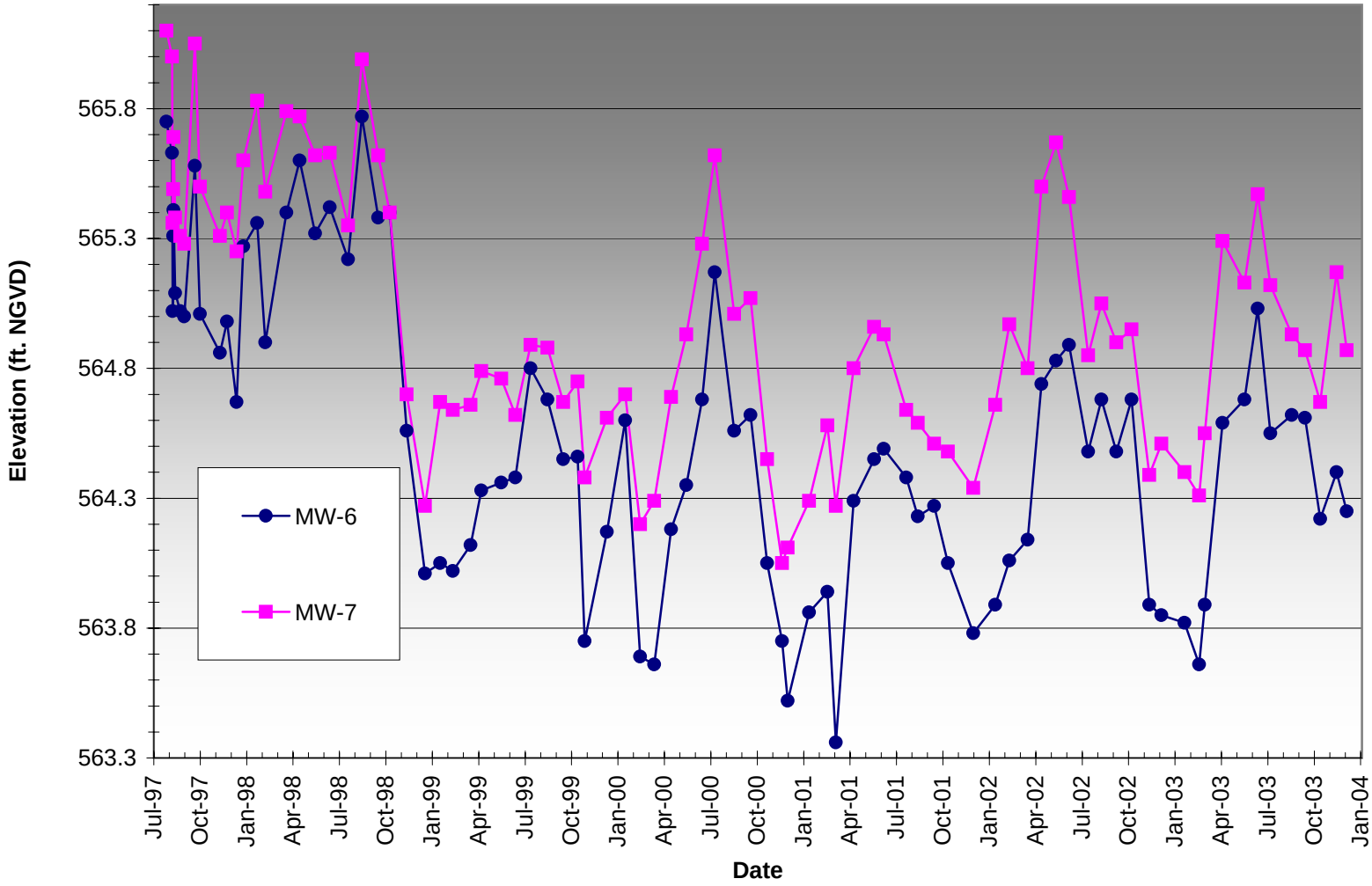


Figure 3.4
Cherry Farm/River Road Site
Sump Hydrographs (S-1,2,3,4)

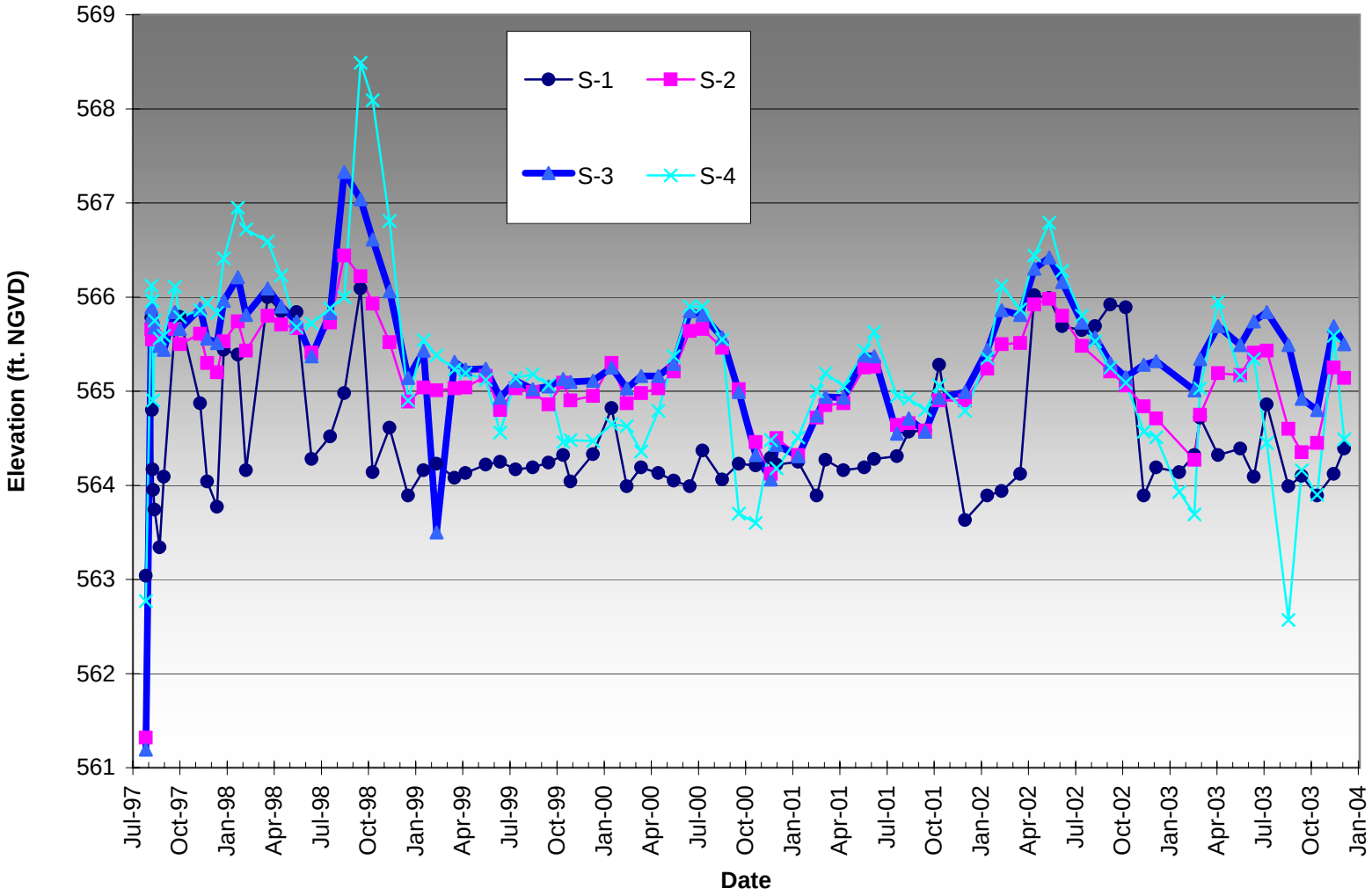


Figure 3.5a
Cherry Farm/River Road Site
Observation Well (OW-1,2,3,4) and Staff Gauge Hydrographs

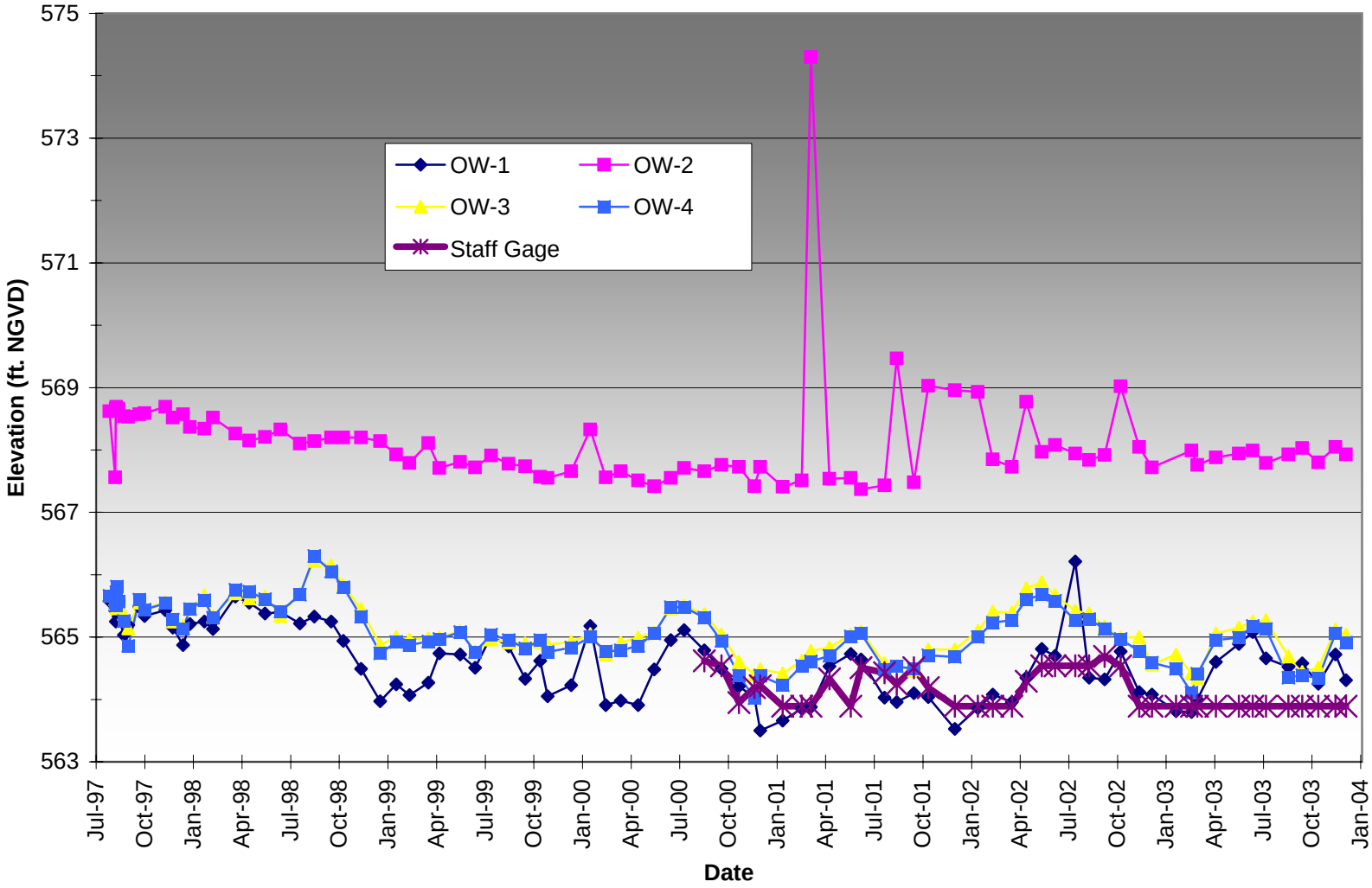


Figure 3.5b
Cherry Farm/River Road Site
Observation Well Hydrographs

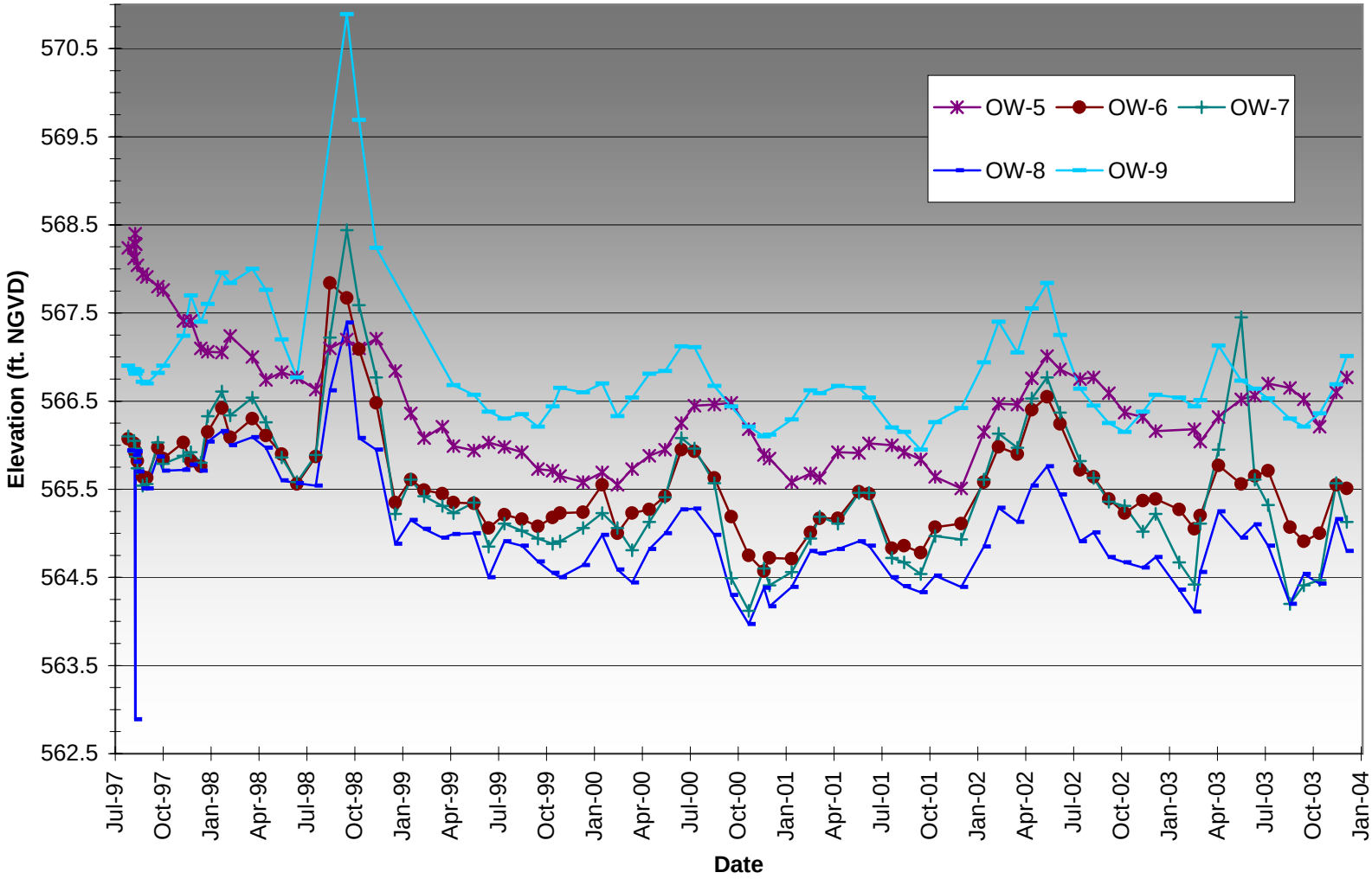


Figure 3.6a: Total VOC Concentration vs. Time in Monitoring Well Samples

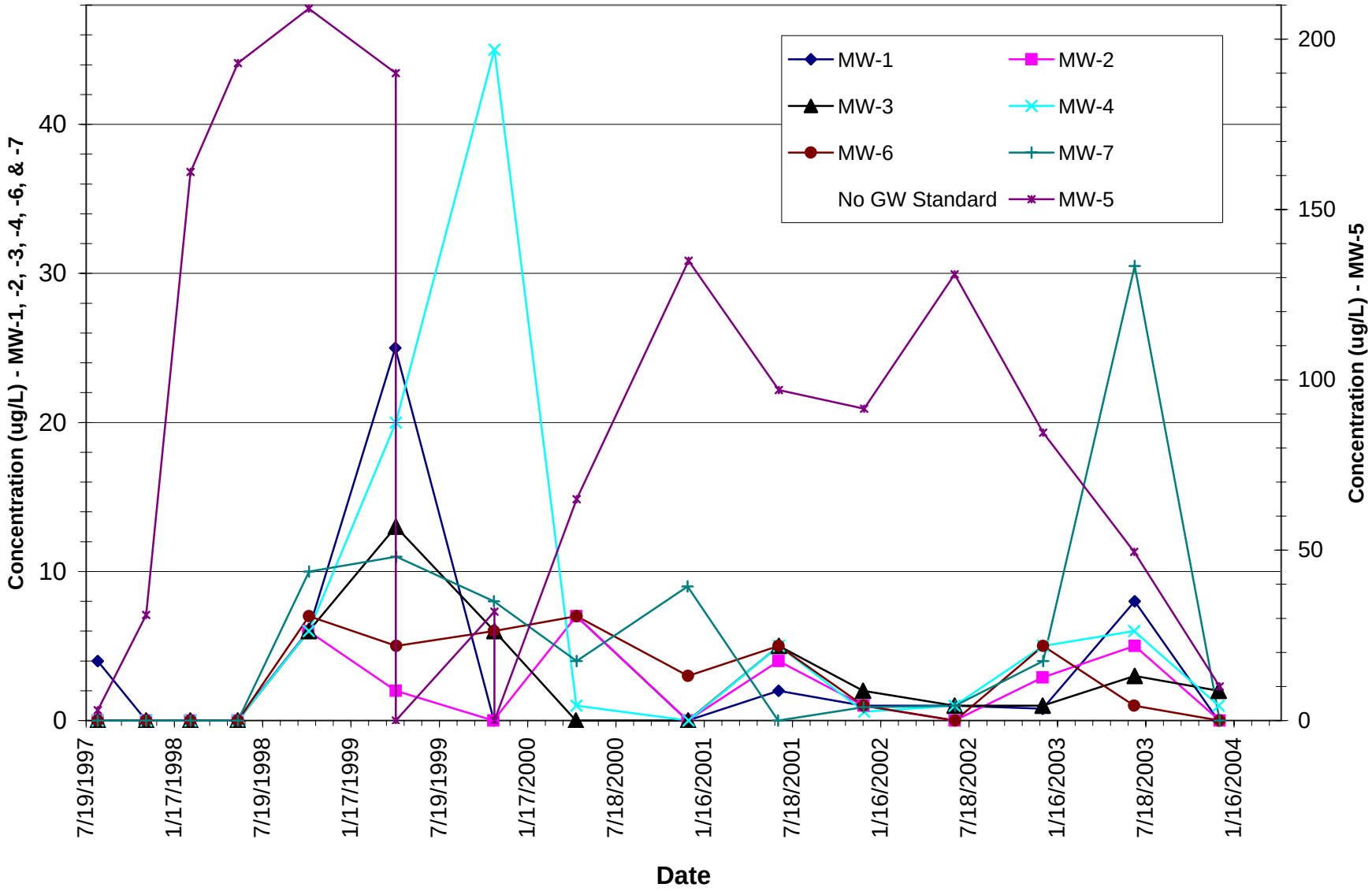


Figure 3.6b: Total SVOC Concentrations vs. Time in Monitoring Well Samples

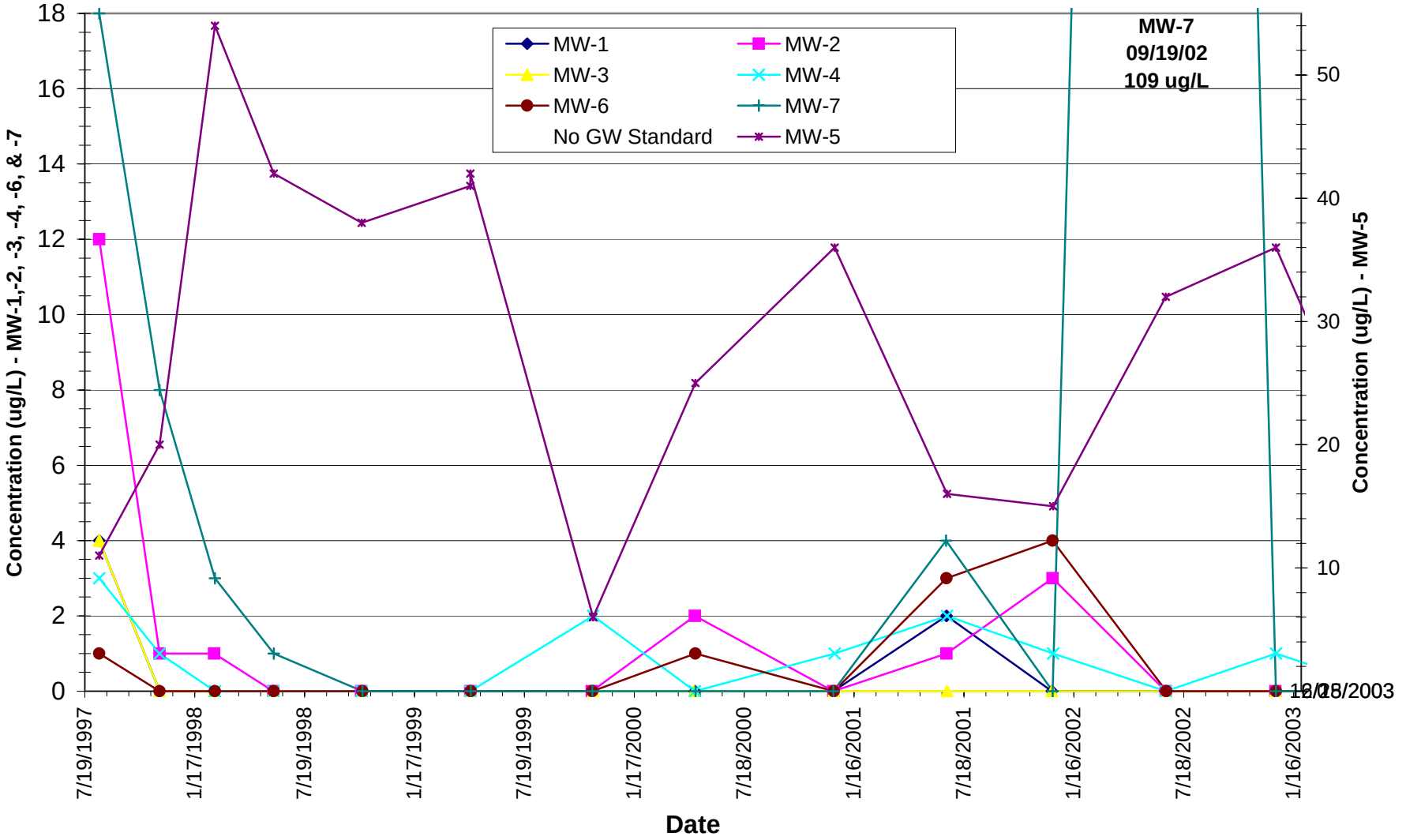


Figure 3.6c: Total VOC Concentration in Sump Samples

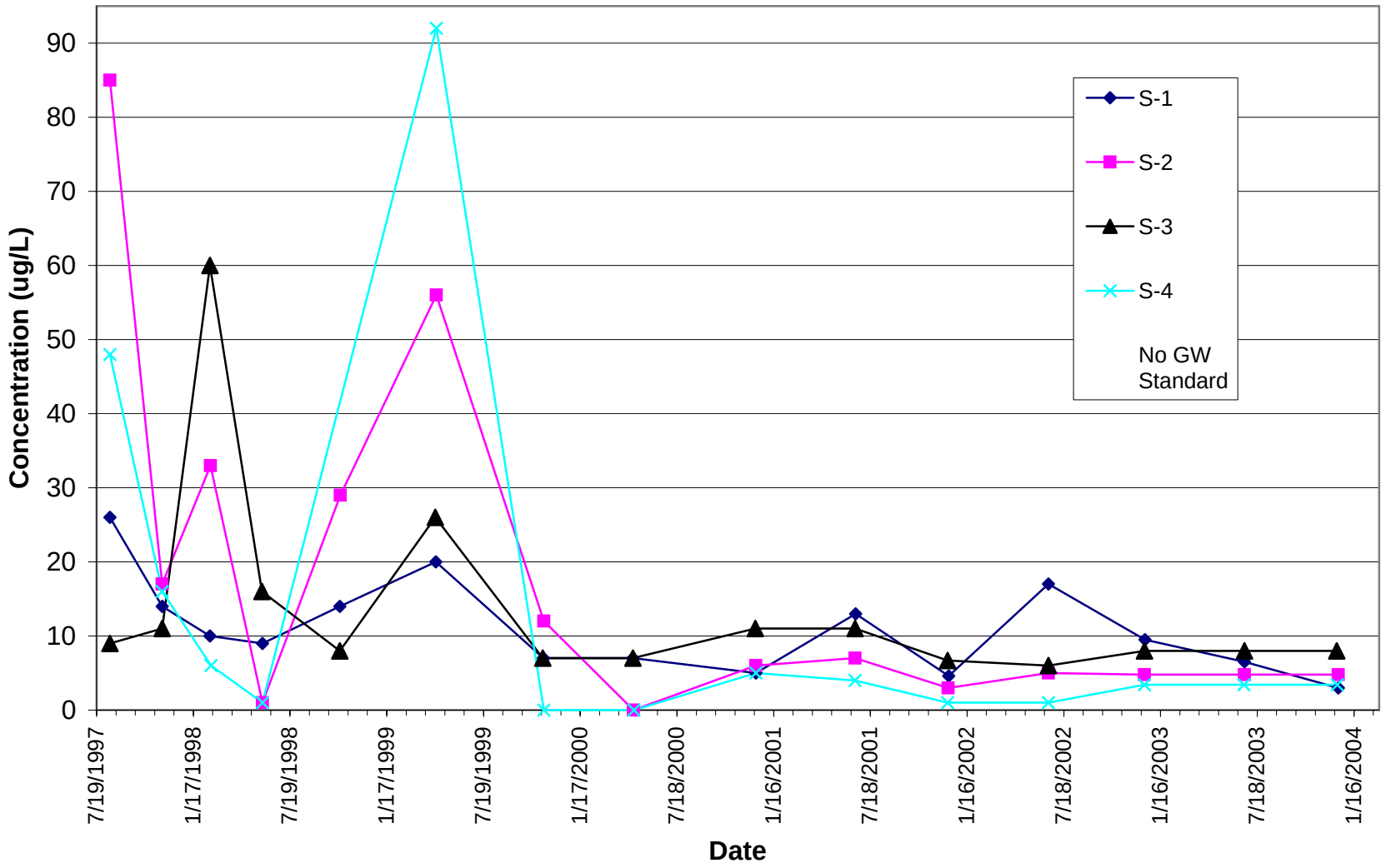


Figure 3.6d: Total SVOC Concentration in Sump Samples

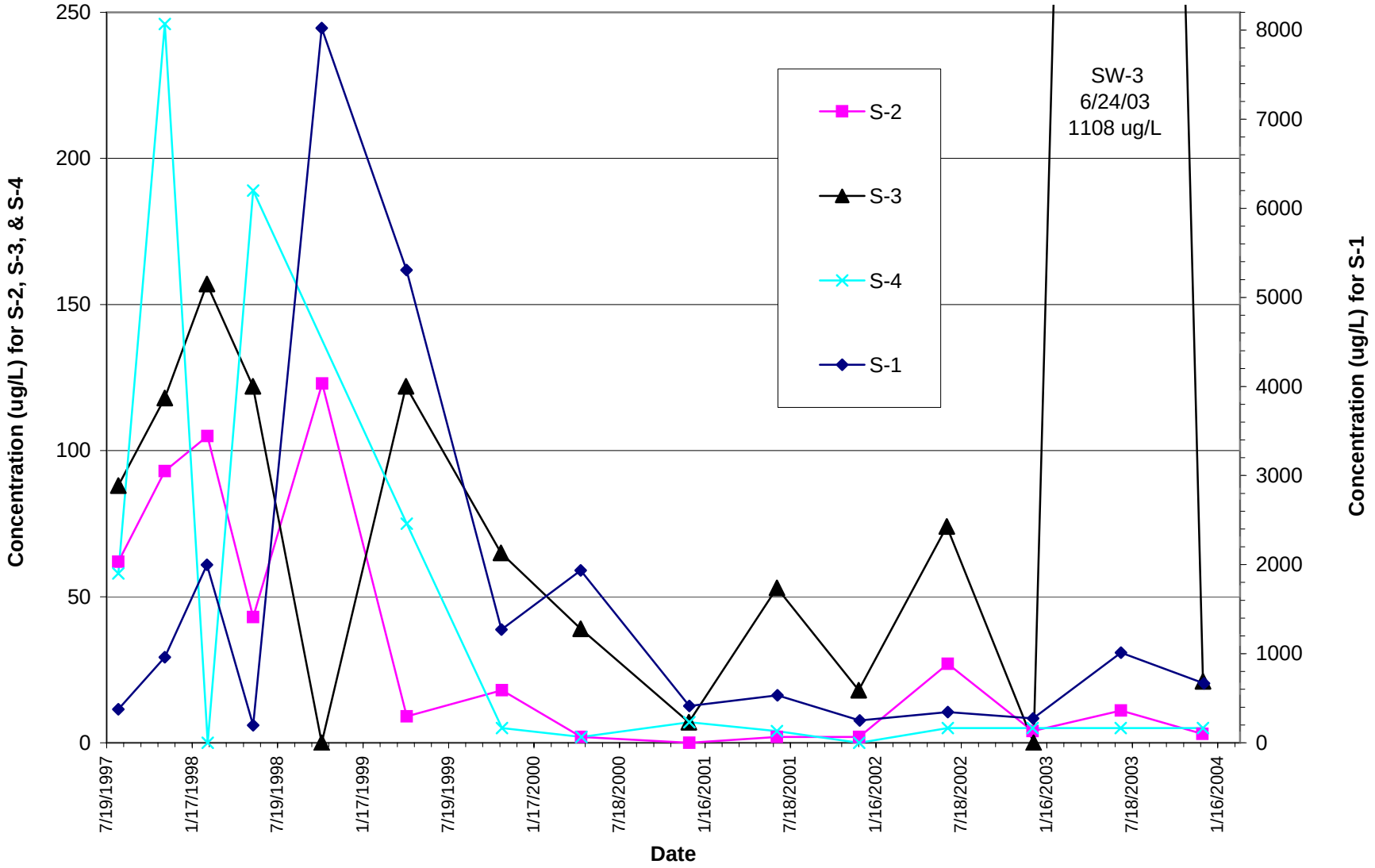


TABLE 3.1
Detected Compound Summary
Monitoring Well Samples

Cherry Farm Groundwater Analytical Data Year 2003 Detected Compund Summary		NYSDEC Class GA Groundwater Standards/ Guidance Values	Sample ID: Lab Sample Depth: Source: SDG: Matrix: Sampled: Validated:	MW-1 A7549 OB 5716 Water 6/25/2003	MW-1 B4250 OB 6968 Water 12/15/2003	MW-2 A7550 OB 5716 Water 6/25/2003	MW-2 B4506 OB 6968 Water 12/18/2003	MW-3 A7551 OB 5716 Water 6/25/2003
CAS NO.	COMPOUND		UNITS:					
	VOLATILES							
67-64-1	Acetone	50 (G)	ug/L	10 U	10 U	10 U	10 U	10 U
71-43-2	Benzene	1	ug/L	10 U	10 U	10 U	10 U	10 U
75-15-0	Carbon disulfide	60 (G)	ug/L	8 J	10 U	5 J	10 U	3 J
100-41-4	Ethylbenzene	5	ug/L	10 U	10 U	10 U	10 U	10 U
75-09-2	Methylene chloride	5	ug/L	10 U	10 U	10 U	10 U	10 U
100-42-5	Styrene	5	ug/L	10 U	10 U	10 U	10 U	10 U
108-88-3	Toluene	5	ug/L	10 U	10 U	10 U	10 U	10 U
1330-20-7	Xylene (total)	5	ug/L	10 U	10 U	10 U	10 U	10 U
	SEMIVOLATILES							
117-81-7	bis(2-Ethylhexyl)phthalate	5	ug/L	10 U	10 U	10 U	10 U	10 U
105-67-9	2,4-Dimethylphenol	1	ug/L	10 U	10 U	10 U	10 U	10 U
95-48-7	2-Methylphenol	1	ug/L	10 U	10 U	10 U	10 U	10 U
106-44-5	4-Methylphenol	1	ug/L	10 U	10 U	10 U	10 U	10 U
91-20-3	Naphthalene	10 (G)	ug/L	10 U	10 U	10 U	10 U	10 U
	PESTICIDES							
319-84-6	alpha-BHC	0.01	ug/L	0.051 U	0.051 U	0.052 U	0.051 U	0.052 U
319-85-7	beta-BHC	0.04	ug/L	0.051 U	0.015 JP	0.052 U	0.051 U	0.052 U
959-98-8	Endosulfan I	NS	ug/L	0.0038 JP	0.051 U	0.052 U	0.051 U	0.0045 JP
1031-07-8	Endosulfan sulfate	NS	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.0062 JP
72-20-8	Endrin	ND	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.026 JP
7421-93-4	Endrin aldehyde	5	ug/L	0.005 BJ	0.1 U	0.0046 BJP	0.1 U	0.1 U
53494-70-5	Endrin ketone	5	ug/L	0.0037 JP	0.1 U	0.1 U	0.1 U	0.1 U
5103-74-2	gamma-Chlordane	0.05	ug/L	0.015 JP	0.051 U	0.0073 J	0.051 U	0.0054 JP
1024-57-3	Heptachlor epoxide	0.03	ug/L	0.051 U	0.051 U	0.052 U	0.051 U	0.014 JP
	PCBS							
12674-11-2	Aroclor-1016	Sum PCB's	ug/L	1 U	1 U	1 U	1 U	1 U
11104-28-2	Aroclor-1221	of 0.09	ug/L	2 U	2 U	2 U	2 U	2 U
11141-16-5	Aroclor-1332		ug/L	1 U	1 U	1 U	1 U	1 U
53469-21-9	Aroclor-1242		ug/L	1 U	1 U	1 U	1 U	1 U
12672-29-6	Aroclor-1248		ug/L	1 U	1 U	1 U	1 U	1 U
11096-82-5	Aroclor-1254		ug/L	1 U	1 U	1 U	1 U	1 U
11096-82-5	Aroclor-1260		ug/L	1 U	1 U	1 U	1 U	1 U
	INORGANICS							
7429-90-5	Aluminum	NS	ug/L	4090	3680	29800	36400	558
7440-38-2	Arsenic	25	ug/L	**35.6**	**28.7**	**50.8**	**57.1**	3.1 B
7440-39-3	Barium	1000	ug/L	731	650	501	567	229
7440-41-7	Beryllium	3 (G)	ug/L	0.1 B	0.1 B	1.4 B	1.8 B	0.1 B
7440-43-9	Cadmium	5	ug/L	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
7440-70-2	Calcium	NS	ug/L	217000	230000	479000	524000	111000
7440-47-8	Chromium	50	ug/L	9.3 B	8.5 B	**83.3**	**79.8**	14
7440-48-4	Cobalt	NS	ug/L	1.4 U	2 U	18.5 B	22.8 B	1.4 U
7440-50-8	Copper	200	ug/L	7.4 B	6.8 B	72.2	85.5	6 B
7439-89-6	Iron	300	ug/L	**14700**	**14700**	**59400**	**69500**	**15300**
7439-92-1	Lead	25	ug/L	2.7 B	1.7 U	**52.8**	**60.6**	1.3 U
7439-95-4	Magnesium	35000 (G)	ug/L	**57000**	**56300**	**143000**	**143000**	30200
7439-96-5	Manganese	300	ug/L	210	191	**1570**	**1940**	**495**
7440-02-0	Nickel	100	ug/L	5.5 B	6.5 B	61.6	70.5	5.6 B
7440-09-7	Potassium	NS	ug/L	3080 B	2990 B	10200	10700	9720
7782-49-2	Selenium	10	ug/L	3.2 U	2.7 B	3.2 U	4 B	3.2 U
7440-23-5	Sodium	20000	ug/L	**40500**	**44000**	17100	17400	**54600**
7440-62-2	Vanadium	NS	ug/L	8 B	6.2 B	59.8	67.6	4.4 B
7440-66-6	Zinc	2000 (G)	ug/L	47.5	18 B	235	248	28.5
57-12-5	Cyanide	200	ug/L	4.4 B	10 U	6.1 B	10 U	4.9 B

Notes: NYSDEC June 1998 Ambient Water Quality Standards and Guidance Values for Groundwater Class GA
(G) = Guidance Value
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B = The Analyte was found in the associated blank, as well as in the sample
J = Indicates an estimated value
P = Used for Pesticide/Aroclor target Analytes where there is greater than 25% difference for detected concnetrations between the two GC columns

TABLE 3.1
Detected Compound Summary
Monitoring Well Samples

Cherry Farm Groundwater Analytical Data Year 2003 Detected Compund Summary		NYSDEC Class GA Groundwater Standards/ Guidance Values	Sample ID: Lab Sample Depth: Source: SDG: Matrix: Sampled: Validated:	MW-3 B4288 OB 6968 Water 12/16/2003	MW-4 Dup B4291 OB 6968 Water 12/16/2003	MW-4 A7432 OB 5716 Water 6/24/2003	MW-4 B4292 OB 6968 Water 12/16/2003	MW-5 A7431 OB 5716 Water 6/24/2003
CAS NO.	COMPOUND		UNITS:					
	VOLATILES							
67-64-1	Acetone	50 (G)	ug/L	10 U	10 U	10 U	10 U	3 J
71-43-2	Benzene	1	ug/L	10 U	10 U	10 U	10 U	**38**
75-15-0	Carbon disulfide	60 (G)	ug/L	10 U	10 U	6 J	10 U	2 J
100-41-4	Ethylbenzene	5	ug/L	10 U	10 U	10 U	10 U	2 J
75-09-2	Methylene chloride	5	ug/L	2 JB	10 U	10 U	1 JB	10 U
100-42-5	Styrene	5	ug/L	10 U	10 U	10 U	10 U	0.5 J
108-88-3	Toluene	5	ug/L	10 U	10 U	10 U	10 U	4 J
1330-20-7	Xylene (total)	5	ug/L	10 U	10 U	10 U	10 U	**7 J**
	SEMIVOLATILES							
117-81-7	bis(2-Ethylhexyl)phthalate	5	ug/L	10 U	1 J	10 U	10 U	10 U
105-67-9	2,4-Dimethylphenol	1	ug/L	10 U	10 U	10 U	10 U	**7 J**
95-48-7	2-Methylphenol	1	ug/L	10 U	10 U	10 U	10 U	1 J
106-44-5	4-Methylphenol	1	ug/L	10 U	10 U	10 U	10 U	**2 J**
91-20-3	Naphthalene	10 (G)	ug/L	10 U	10 U	10 U	10 U	5 J
	PESTICIDES							
319-84-6	alpha-BHC	0.01	ug/L	0.051 U	0.051 U	0.0057 JP	0.053 U	0.05 U
319-85-7	beta-BHC	0.04	ug/L	0.051 U	0.051 U	0.05 U	0.053 U	0.05 U
959-98-8	Endosulfan I	NS	ug/L	0.051 U	0.051 U	0.05 U	0.053 U	0.0066 JP
1031-07-8	Endosulfan sulfate	NS	ug/L	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U
72-20-8	Endrin	ND	ug/L	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U
7421-93-4	Endrin aldehyde	5	ug/L	0.1 U	0.1 U	0.1 U	0.11 U	0.015 BJP
53494-70-5	Endrin ketone	5	ug/L	0.1 U	0.1 U	0.0033 JP	0.11 U	0.1 U
5103-74-2	gamma-Chlordane	0.05	ug/L	0.051 U	0.051 U	0.01 J	0.053 U	0.0092 J
1024-57-3	Heptachlor epoxide	0.03	ug/L	0.051 U	0.051 U	0.05 U	0.053 U	0.05 U
	PCBS							
12674-11-2	Aroclor-1016	Sum PCB's	ug/L	1 U	1 U	1 U	1 U	1 U
11104-28-2	Aroclor-1221	of 0.09	ug/L	2 U	2 U	2 U	2 U	2 U
11141-16-5	Aroclor-1332		ug/L	1 U	1 U	1 U	1 U	1 U
53469-21-9	Aroclor-1242		ug/L	1 U	1 U	1 U	1 U	1 U
12672-29-6	Aroclor-1248		ug/L	1 U	1 U	1 U	1 U	1 U
11096-82-5	Aroclor-1254		ug/L	1 U	1 U	1 U	1 U	1 U
11096-82-5	Aroclor-1260		ug/L	1 U	1 U	1 U	1 U	1 U
	INORGANICS							
7429-90-5	Aluminum	NS	ug/L	265	6820	803	4790	181 B
7440-38-2	Arsenic	25	ug/L	2.4 U	7 B	14.8	6.6 B	9.4 B
7440-39-3	Barium	1000	ug/L	234	83.1 B	96.4 B	80.2 B	169 B
7440-41-7	Beryllium	3 (G)	ug/L	0.12 U	0.3 B	0 B	0.2 B	0 B
7440-43-9	Cadmium	5	ug/L	0.35 U	3.2 B	0.35 U	2.6 B	0.35 U
7440-70-2	Calcium	NS	ug/L	111000	90600	112000	89000	143000
7440-47-8	Chromium	50	ug/L	6 B	16.4	5.1 B	12.3	3.7 B
7440-48-4	Cobalt	NS	ug/L	2 U	2.3 B	1.4 U	2 U	1.4 U
7440-50-8	Copper	200	ug/L	2.1 U	9.3 B	2.3 B	6.3 B	6.7 B
7439-89-6	Iron	300	ug/L	**13300**	**10300**	**5820**	**6900**	**25700**
7439-92-1	Lead	25	ug/L	1.7 U	9.7	1.3 B	6.4	2.8 B
7439-95-4	Magnesium	35000 (G)	ug/L	30100	27700	31900	27000	**35100**
7439-96-5	Manganese	300	ug/L	**479**	**1380**	**1040**	**1810**	198
7440-02-0	Nickel	100	ug/L	3.4 B	11.4 B	3.4 B	8.7 B	1.2 U
7440-09-7	Potassium	NS	ug/L	10300	3700 B	4290 B	3240 B	12700
7782-49-2	Selenium	10	ug/L	2.9 B	2.9 B	3.3 B	2.9 B	3.2 U
7440-23-5	Sodium	20000	ug/L	**57000**	3470 B	**65200**	3450 B	**70200**
7440-62-2	Vanadium	NS	ug/L	3.1 B	11.8 B	6.7 B	8.4 B	3.7 B
7440-66-6	Zinc	2000 (G)	ug/L	3.9 B	66.1	23.8	49	18.3 B
57-12-5	Cyanide	200	ug/L	10 U	10 U	10 U	10 U	11

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TABLE 3.1
Detected Compound Summary
Monitoring Well Samples

Cherry Farm Groundwater Analytical Data Year 2003 Detected Compund Summary		NYSDEC Class GA Groundwater Standards/ Guidance Values	Sample ID: Lab Sample Depth: Source: SDG: Matrix: Sampled: Validated:	MW-5 B4468 OB 6968 Water 12/18/2003	MW-6 A7433 OB 5716 Water 6/24/2003	MW-6 B4508 OB 6968 Water 12/18/2003	MW-7 A7552 OB 5716 Water 6/25/2003	MW-7 B4509 OB 6968 Water 12/18/2003
CAS NO.	COMPOUND		UNITS:					
	VOLATILES							
67-64-1	Acetone	50 (G)	ug/L	10 U	10 U	10 U	10 U	10 U
71-43-2	Benzene	1	ug/L	**10 J**	10 U	10 U	10 U	10 U
75-15-0	Carbon disulfide	60 (G)	ug/L	10 U	1 J	10 U	30	10 U
100-41-4	Ethylbenzene	5	ug/L	10 U	10 U	10 U	10 U	10 U
75-09-2	Methylene chloride	5	ug/L	10 U	10 U	10 U	0.5 JB	10 U
100-42-5	Styrene	5	ug/L	10 U	10 U	10 U	10 U	10 U
108-88-3	Toluene	5	ug/L	10 U	10 U	10 U	10 U	10 U
1330-20-7	Xylene (total)	5	ug/L	10 U	10 U	10 U	10 U	10 U
	SEMIVOLATILES							
117-81-7	bis(2-Ethylhexyl)phthalate	5	ug/L	10 U	10 U	10 U	10 U	10 U
105-67-9	2,4-Dimethylphenol	1	ug/L	10 U	10 U	10 U	10 U	10 U
95-48-7	2-Methylphenol	1	ug/L	10 U	10 U	10 U	10 U	10 U
106-44-5	4-Methylphenol	1	ug/L	10 U	10 U	10 U	10 U	10 U
91-20-3	Naphthalene	10 (G)	ug/L	10 U	10 U	10 U	10 U	10 U
	PESTICIDES							
319-84-6	alpha-BHC	0.01	ug/L	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U
319-85-7	beta-BHC	0.04	ug/L	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U
959-98-8	Endosulfan I	NS	ug/L	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U
1031-07-8	Endosulfan sulfate	NS	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
72-20-8	Endrin	ND	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
7421-93-4	Endrin aldehyde	5	ug/L	0.1 U	0.0056 BJ	0.1 U	0.004 BJ	0.1 U
53494-70-5	Endrin ketone	5	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
5103-74-2	gamma-Chlordane	0.05	ug/L	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U
1024-57-3	Heptachlor epoxide	0.03	ug/L	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U
	PCBS							
12674-11-2	Aroclor-1016	Sum PCB's	ug/L	1 U	1 U	1 U	1 U	1 U
11104-28-2	Aroclor-1221	of 0.09	ug/L	2 U	2 U	2 U	2 U	2 U
11141-16-5	Aroclor-1332		ug/L	1 U	1 U	1 U	1 U	1 U
53469-21-9	Aroclor-1242		ug/L	1 U	1 U	1 U	1 U	1 U
12672-29-6	Aroclor-1248		ug/L	1 U	1 U	1 U	1 U	1 U
11096-82-5	Aroclor-1254		ug/L	1 U	1 U	1 U	1 U	1 U
11096-82-5	Aroclor-1260		ug/L	1 U	1 U	1 U	1 U	1 U
	INORGANICS							
7429-90-5	Aluminum	NS	ug/L	116 B	30.6 B	74 B	315	224
7440-38-2	Arsenic	25	ug/L	7 B	1.5 U	2.4 U	15.8	20.9
7440-39-3	Barium	1000	ug/L	166 B	107 B	110 B	360	348
7440-41-7	Beryllium	3 (G)	ug/L	0.12 U	0.05 U	0.12 U	0.05 U	0.12 U
7440-43-9	Cadmium	5	ug/L	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
7440-70-2	Calcium	NS	ug/L	170000	148000	158000	109000	108000
7440-47-8	Chromium	50	ug/L	2.6 B	2.1 B	2.6 B	5.7 B	1.7 U
7440-48-4	Cobalt	NS	ug/L	2 U	1.4 U	2 U	1.4 U	2 U
7440-50-8	Copper	200	ug/L	2.1 U	0.76 U	2.1 U	0.9 B	2.1 U
7439-89-6	Iron	300	ug/L	**29600**	**27000**	**26600**	**22800**	**23900**
7439-92-1	Lead	25	ug/L	1.7 U	1.3 U	1.7 U	1.3 U	1.7 U
7439-95-4	Magnesium	35000 (G)	ug/L	**41000**	**35600**	**36900**	13600	12200
7439-96-5	Manganese	300	ug/L	202	**1530**	**1420**	282	277
7440-02-0	Nickel	100	ug/L	0.84 U	1.2 U	0.84 U	1.7 B	0.84 U
7440-09-7	Potassium	NS	ug/L	6010	14600	13200	10700	12000
7782-49-2	Selenium	10	ug/L	3.2 B	3.2 U	2.7 B	3.2 U	3 B
7440-23-5	Sodium	20000	ug/L	**60500**	**35300**	**35000**	**26700**	**27700**
7440-62-2	Vanadium	NS	ug/L	1.5 B	1.2 B	1.1 U	1.4 B	1.1 U
7440-66-6	Zinc	2000 (G)	ug/L	1.6 U	15.4 B	3.3 B	31.6	1.8 B
57-12-5	Cyanide	200	ug/L	10 U	8.3 B	10.6	14	13.4

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TABLE 3.2
Detected Compound Summary
Sump Samples

Cherry Farm Groundwater Analytical Data Year 2003 Detected Compund Summary		NYSDEC Class GA Groundwater Standards/ Guidance Values	Sample ID: Lab Sample Depth: Source: SDG: Matrix: Sampled: Validated:	S-1 A7429 OB 5716 Water 6/24/2003	S-1 B4467 OB 6968 Water 12/18/2003	S-1 DL B4467DL OB 6998 Water 12/18/2003
CAS NO.	COMPOUND		UNITS:			
	VOLATILES					
67-64-1	Acetone	50 (G)	ug/L	6 J	10 U	
71-43-2	Benzene	1	ug/L	10 U	10 U	
108-90-7	Chlorobenzene	5	ug/L	10 U	3 J	
156-59-2	cis-1,2-Dichloroethene	5	ug/L	10 U	10 U	
75-34-3	1,1-Dichloroethane	0.6	ug/L	10 U	10 U	
75-09-2	Methylene chloride	5	ug/L	0.5 J	10 U	
108-88-3	Toluene	5	ug/L	10 U	10 U	
1330-20-7	Xylene (total)	5	ug/L	10 U	10 U	
	SEMIVOLATILES					
83-32-9	Acenaphthene		ug/L	500 U	10 JD	500 U
56-55-3	Benzo[a]anthracene	0.002 (G)	ug/L	**90 JD**	**56 D**	**64 JD**
50-32-8	Benzo[a]pyrene	ND	ug/L	72 JD	53 D	53 JD
205-99-2	Benzo[b]fluoranthene	0.002 (G)	ug/L	**110 JD**	**84 D**	**85 JD**
207-08-9	Benzo[k]fluoranthene	0.002 (G)	ug/L	**58 JD**	**31 JD**	500 U
117-81-7	bis(2-Ethylhexyl)phthalate	5	ug/L	**100 JD**	**77 D**	**86 JD**
59-50-7	4-Chloro-3-methylphenol	1	ug/L	500 U	50 U	500 U
218-01-9	Chrysene	0.002 (G)	ug/L	**83 JD**	**46 JD**	500 U
106-46-7	1,4-Dichlorobenzene	3	ug/L	500 U	**7 JD**	500 U
105-67-9	2,4-Dimethylphenol	1	ug/L	500 U	**14 JD**	500 U
206-44-0	Fluoranthene	50 (G)	ug/L	**230 JD**	**120 D**	**120 JD**
86-73-7	Fluorene	50	ug/L	500 U	50 U	500 U
95-48-7	2-Methylphenol	1	ug/L	500 U	50 U	500 U
106-44-5	4-Methylphenol	1	ug/L	500 U	50 U	500 U
91-20-3	Naphthalene	10 (G)	ug/L	500 U	50 U	500 U
85-01-8	Phenanthrene	50	ug/L	500 U	50 U	500 U
129-00-0	Pyrene	50 (G)	ug/L	**270 JD**	**170 D**	**150 JD**
	PESTICIDES					
319-84-6	alpha-BHC	0.01	ug/L	**0.072 JP**	0.25 U	2.5 U
5103-71-9	alpha-Chlordane	0.05	ug/L	**0.096 JP**	0.25 U	2.5 U
319-85-7	beta-BHC	0.04	ug/L	0.25 U	0.25 U	2.5 U
72-54-8	4,4'-DDD	0.3	ug/L	**2.3 P**	**0.053 JP**	5 U
72-55-9	4,4'-DDE	0.02	ug/L	**1 P**	**0.61 P**	**0.71 JPD**
50-29-3	4,4'-DDT	0.02	ug/L	0.5 U	0.5 U	5 U
60-57-1	Dieldrin	0.004	ug/L	**1 P**	**0.42 JP**	**0.34 JPD**
959-98-8	Endosulfan I	NS	ug/L	0.84 P	0.25 U	2.5 U
33213-65-9	Endosulfan II	NS	ug/L	0.5 U	0.046 JP	5 U
72-20-8	Endrin	ND	ug/L	0.5 U	2.6	2.7 JD
7421-93-4	Endrin aldehyde	5	ug/L	0.38 BJP	0.5 U	5 U
53494-70-5	Endrin ketone	5	ug/L	0.46 JP	0.87 P	0.88 JPD
5103-74-2	gamma-Chlordane	0.05	ug/L	0.25 U	0.25 U	2.5 U
76-44-8	Heptachlor	0.04	ug/L	**0.26 P**	**0.41 P**	**0.3 JPD**
1024-57-3	Heptachlor epoxide	0.03	ug/L	0.25 U	0.25 U	2.5 U
72-43-5	Methoxychlor	35	ug/L	1.3 JP	2.5 U	25 U
	PCBS					
12672-29-6	Aroclor-1248	Sum PCBs of 0.09	ug/L	**62 P**	**33 P**	**43 JPD**
11096-82-5	Aroclor-1260		ug/L	**38 P**	**16**	**20 JD**
	INORGANICS					
7429-90-5	Aluminum	NS	ug/L	4920	23300	
7440-36-0	Antimony	3	ug/L	**3.7 B**	**9.2 B**	
7440-38-2	Arsenic	25	ug/L	**33.7**	**96.1**	
7440-39-3	Barium	1000	ug/L	441	519	
7440-41-7	Beryllium	3 (G)	ug/L	0.2 B	1 B	
7440-43-9	Cadmium	5	ug/L	0.3 B	4.3 B	
7440-70-2	Calcium	NS	ug/L	308000	297000	
7440-47-8	Chromium	50	ug/L	13	**87.9**	
7440-48-4	Cobalt	5	ug/L	2.3 B	**17.1 B**	
7440-50-8	Copper	200	ug/L	66.4	**318**	
7439-89-6	Iron	300	ug/L	**36200**	**73300**	
7439-92-1	Lead	25	ug/L	**33.2**	**148**	
7439-95-4	Magnesium	35000 (G)	ug/L	16500	23800	
7439-96-5	Manganese	300	ug/L	**2370**	**2260**	
7439-97-6	Mercury	0.7	ug/L	0.05 U	0 B	
7440-02-0	Nickel	100	ug/L	35.7 B	**310**	
7440-09-7	Potassium	NS	ug/L	24400	24000	
7782-49-2	Selenium	10	ug/L	3.2 U	9.5	
7440-23-5	Sodium	20000	ug/L	**108000**	**91800**	
7440-62-2	Vanadium	NS	ug/L	43.4 B	76.3	
7440-66-6	Zinc	2000 (G)	ug/L	270	1200	
57-12-5	Cyanide	200	ug/L	5.5 B	10 U	

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P = Used for Pesticide/Aroclor target Analytes where there is greater than 25% difference for detected concentrations between the two columns

TABLE 3.2
Detected Compound Summary
Sump Samples

Cherry Farm Groundwater Analytical Data Year 2003 Detected Compund Summary		NYSDEC Class GA Groundwater Standards/ Guidance Values	Sample ID: Lab Sample Depth: Source: SDG: Matrix: Sampled: Validated:	S-2 A7430 OB 5716 Water 6/24/2003	S-2 B4251 OB 6968 Water 12/15/2003	S-3 A7428 OB 5716 Water 6/24/2003	S-3 B4290 OB 6968 Water 12/16/2003	S-4 A7427 OB 5716 Water 6/23/2003	S-4 B4293 OB 6968 Water 12/16/2003
CAS NO.	COMPOUND		UNITS:						
	VOLATILES								
67-64-1	Acetone	50 (G)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U
71-43-2	Benzene	1	ug/L	10 U	10 U	10 U	10 U	10 U	1 J
108-90-7	Chlorobenzene	5	ug/L	10 U	10 U	10 U	10 U	10 U	10 U
156-59-2	cis-1,2-Dichloroethene	5	ug/L	10 U	10 U	10 U	10 U	1 J	2 J
75-34-3	1,1-Dichloroethane	0.6	ug/L	**1 J**	**2 J**	**2 J**	**2 J**	**1 J**	**1 J**
75-09-2	Methylene chloride	5	ug/L	10 U	10 U	0.5 J	10 U	10 U	1 JB
108-88-3	Toluene	5	ug/L	10 U	10 U	0.7 J	10 U	10 U	10 U
1330-20-7	Xylene (total)	5	ug/L	1 J	10 U	1 J	0.9 J	2 J	5 J
	SEMIVOLATILES								
83-32-9	Acenaphthene		ug/L	10 U	10 U	500 U	10 U	10 U	10 U
56-55-3	Benzo[a]anthracene	0.002 (G)	ug/L	10 U	10 U	**94 JD**	**1 J**	10 U	10 U
50-32-8	Benzo[a]pyrene	ND	ug/L	10 U	10 U	**79 JD**	10 U	10 U	10 U
205-99-2	Benzo[b]fluoranthene	0.002 (G)	ug/L	10 U	10 U	**110 JD**	**2 J**	10 U	10 U
207-08-9	Benzo[k]fluoranthene	0.002 (G)	ug/L	10 U	10 U	**93 JD**	10 U	10 U	10 U
117-81-7	bis(2-Ethylhexyl)phthalate	5	ug/L	10 U	1 J	**140 JD**	2 J	10 U	10 U
59-50-7	4-Chloro-3-methylphenol	1	ug/L	10 U	10 U	500 U	10 U	**36**	10 U
218-01-9	Chrysene	0.002 (G)	ug/L	10 U	10 U	**92 JD**	10 U	10 U	10 U
106-46-7	1,4-Dichlorobenzene	3	ug/L	10 U	10 U	500 U	10 U	10 U	10 U
105-67-9	2,4-Dimethylphenol	1	ug/L	**6 J**	**2 J**	500 U	**6 J**	**3 J**	**3 J**
206-44-0	Fluoranthene	50 (G)	ug/L	10 U	10 U	**210 JD**	2 J	10 U	10 U
86-73-7	Fluorene	50	ug/L	10 U	10 U	500 U	10 U	10 U	1 J
95-48-7	2-Methylphenol	1	ug/L	1 J	10 U	500 U	1 J	1 J	**2 J**
106-44-5	4-Methylphenol	1	ug/L	**4 J**	10 U	500 U	**4 J**	10 U	10 U
91-20-3	Naphthalene	10 (G)	ug/L	10 U	10 U	500 U	10 U	10 U	5 J
85-01-8	Phenanthrene	50	ug/L	10 U	10 U	500 U	10 U	10 U	1 J
129-00-0	Pyrene	50 (G)	ug/L	10 U	10 U	**290 JD**	3 J	10 U	10 U
	PESTICIDES								
319-84-6	alpha-BHC	0.01	ug/L	0.0032 JP	0.051 U	0.25 U	0.051 U	**0.013 JP**	0.0091 J
5103-71-9	alpha-Chlordane	0.05	ug/L	0.052 U	0.051 U	**0.39 P**	0.051 U	0.05 U	0.053 U
319-85-7	beta-BHC	0.04	ug/L	0.052 U	0.051 U	0.25 U	0.024 JP	0.05 U	0.053 U
72-54-8	4,4'-DDD	0.3	ug/L	0.1 U	0.1 U	**8 P**	0.1 U	0.1 U	0.11 U
72-55-9	4,4'-DDE	0.02	ug/L	0.1 U	0.1 U	**2.8 P**	**0.092 JP**	0.1 U	0.11 U
50-29-3	4,4'-DDT	0.02	ug/L	0.1 U	0.1 U	0.5 U	0.1 U	0.0026 JP	0.11 U
60-57-1	Dieldrin	0.004	ug/L	**0.0045 JP**	0.1 U	**2.4 P**	0.1 U	**0.0097 J**	0.11 U
959-98-8	Endosulfan I	NS	ug/L	0.015 J	0.051 U	2.2 P	0.025 JP	0.0099 JP	0.053 U
33213-65-9	Endosulfan II	NS	ug/L	0.1 U	0.1 U	1.6 P	0.1 U	0.0052 JP	0.11 U
72-20-8	Endrin	ND	ug/L	0.1 U	0.1 U	0.5 U	0.1 U	0.1 U	0.11 U
7421-93-4	Endrin aldehyde	5	ug/L	0.0088 BJP	0.1 U	0.72 BP	0.1 U	0.0081 BJP	0.11 U
53494-70-5	Endrin ketone	5	ug/L	0.1 U	0.1 U	0.5 U	0.1 P	0.1 U	0.11 U
5103-74-2	gamma-Chlordane	0.05	ug/L	0.052 U	0.051 U	0.25 U	0.051 U	0.0062 JP	0.053 U
76-44-8	Heptachlor	0.04	ug/L	0.052 U	0.051 U	**0.85 P**	**0.041 JP**	0.0057 J	0.053 U
1024-57-3	Heptachlor epoxide	0.03	ug/L	0.0063 JP	0.051 U	**0.2 JP**	0.051 U	0.05 U	0.053 U
72-43-5	Methoxychlor	35	ug/L	0.52 U	0.51 U	2.5 U	0.51 U	0.5 U	0.53 U
	PCBS								
12672-29-6	Aroclor-1248	Sum PCBs of 0.09	ug/L	1 U	1 U	**130 P**	**5.2 P**	1 U	1.1 U
11096-82-5	Aroclor-1260		ug/L	1 U	1 U	**62 P**	**2.1**	1 U	1.1 U
	INORGANICS								
7429-90-5	Aluminum	NS	ug/L	266	215	536	489	12.8 B	21.7 B
7440-36-0	Antimony	3	ug/L	2.6 B	**3.5 B**	2 B	**3.2 B**	1.7 U	1.4 U
7440-38-2	Arsenic	25	ug/L	4.7 B	3 B	3.7 B	2.6 B	2.4 B	4.4 B
7440-39-3	Barium	1000	ug/L	48.5 B	37.6 B	37.6 B	31.1 B	51.2 B	28.8 B
7440-41-7	Beryllium	3 (G)	ug/L	0.05 U	0.12 U	0.05 U	0.12 U	0.1 B	0.12 U
7440-43-9	Cadmium	5	ug/L	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
7440-70-2	Calcium	NS	ug/L	116000	88400	107000	85100	307000	196000
7440-47-8	Chromium	50	ug/L	1.6 U	1.7 U	1.6 U	1.7 U	1.6 U	1.7 U
7440-48-4	Cobalt	5	ug/L	1.4 U	2 U	1.4 U	2 U	1.4 U	2 U
7440-50-8	Copper	200	ug/L	1.8 B	2.1 U	1.2 B	2.1 U	6.8 B	2.1 U
7439-89-6	Iron	300	ug/L	**438**	34.6 B	127	120	**1380**	**848**
7439-92-1	Lead	25	ug/L	1.3 U	1.7 U	1.3 U	1.7 U	1.3 U	1.7 U
7439-95-4	Magnesium	35000 (G)	ug/L	175 B	18.5 U	131 B	182 B	3520 B	3090 B
7439-96-5	Manganese	300	ug/L	27.7	0.31 U	4.5 B	5.1 B	**729**	**317**
7439-97-6	Mercury	0.7	ug/L	0.05 U	0.02 U	0.06 B	0.02 U	0.05 U	0.02 U
7440-02-0	Nickel	100	ug/L	1.2 U	1.2 B	1.2 U	3.4 B	1.2 U	1.8 B
7440-09-7	Potassium	NS	ug/L	44300	36900	44600	37400	63300	51800
7782-49-2	Selenium	10	ug/L	6.6	4.4 B	6	3.3 B	5 B	8.7
7440-23-5	Sodium	20000	ug/L	**64400**	**50100**	**64800**	**52200**	**46900**	**45700**
7440-62-2	Vanadium	NS	ug/L	14.6 B	25.6 B	16 B	16 B	2.2 B	14.6 B
7440-66-6	Zinc	2000 (G)	ug/L	5 B	1.6 U	17 B	35.6	11.8 B	1.6 U
57-12-5	Cyanide	200	ug/L	49	50	40.2	40.6	29	32.2

Notes: NYSDEC June 1998 Ambient Water Quality Standards and Guidance Values for Groundwater Class GA
(G) = Guidance Value
NS = No Standard
U = Indicates compound was analyzed for, but not detected at or above the reporting lim
B = The Analyte was found in the associated blank, as well as in the sample
J = Indicates an estimated value
P = Used for Pesticide/Aroclor target Analytes where there is greater than 25% difference for detected concentrations between the two columns

TABLE 3.3
Detected Compound Summary
Surface Water Samples

Cherry Farm Groundwater Analytical Data Year 2003 Detected Compound Summary		NYSDEC Class A Surface Water Standards/ Guidance Values	Sample ID: Lab Sample Depth: Source: SDG: Matrix: Sampled: Validated:	SW-1 B4289 OB 6968 Water 12/16/2003
CAS NO.	COMPOUND		UNITS:	
	VOLATILES			
75-09-2	Methylene chloride	5	ug/L	2 JB
	SEMIVOLATILES			
	None Detected			
	PESTICIDES			
319-85-7	beta-BHC	0.04	ug/L	0.02 J
	PCBs			
	None Detected			
	INORGANICS			
7429-90-5	Aluminum	100	ug/L	**152 B**
7440-36-0	Antimony	3	ug/L	2.6 B
7440-38-2	Arsenic	50	ug/L	3.4 B
7440-39-3	Barium	1000	ug/L	40.6 B
7440-70-2	Calcium	NS	ug/L	152000
7440-47-8	Chromium	50	ug/L	4.1 B
7439-89-6	Iron	300	ug/L	188
7439-95-4	Magnesium	35000	ug/L	**38400**
7439-96-5	Manganese	300	ug/L	7.8 B
7440-02-0	Nickel	100	ug/L	1.5 B
7440-09-7	Potassium	NS	ug/L	28500
7782-49-2	Selenium	10	ug/L	3.8 B
7440-23-5	Sodium	NS	ug/L	67700
7440-62-2	Vanadium	14	ug/L	2.3 B
7440-66-6	Zinc	2000 (G)	ug/L	5.3 B

SECTION 4
SUMMARY AND CONLUSIONS

The objectives of the post-construction monitoring program were to monitor and evaluate the Site groundwater and surface water quality, and the effectiveness of both the shallow and intermediate/deep groundwater extraction systems. The primary conclusions derived from the monitoring program are summarized below.

- Impacts from the Site on groundwater quality in the intermediate/deep zone are minor. Concentrations of organic compounds were below groundwater standards in most samples, and near the limits in other samples throughout the sampling history. Metals concentrations exceeded groundwater standards in some samples, but were lower than the background well (MW-2) for the majority of the metals.

- Results from the groundwater upwelling study, completed in December 2003, indicated that the intermediate/deep groundwater is upwelling to the Niagara River, but chemical indicator compounds are not migrating to the river via groundwater from the Site.

- Shallow groundwater samples collected from sumps during the 2003 sampling events showed that there is a greater impact to the shallow groundwater quality than to the intermediate/deep zone. The most notable impacts were in samples collected from sump S-1, likely due to the presence of LNAPL. When compared to prior sampling events, the shallow groundwater quality improved throughout 2003. The shallow groundwater sample results from 2003, and historically, indicated that VOCs were typically not present. Constituents detected above groundwater standards included PAHs and PCBs.

- In the single surface water sample collected from an onsite drainage ditch during the current reporting period, no VOCs, SVOCs, pesticides, or PCBs were detected in exceedance of surface water standards. Only two metals (aluminum and magnesium) exceeded the surface water standards. Additional surface water samples were not collected in 2003 due to the lack of water during sampling events. The low flows observed at the surface water sampling locations, and the historically low chemical concentrations indicate that surface water in the vicinity of the Site does not appear to be impacted.

- Groundwater contour maps of the intermediate/deep zone throughout the project history indicated that sufficient drawdown was maintained during the operation of the intermediate/deep groundwater extraction system (with occasional interruptions) to prevent migration of groundwater to the Niagara River. The extraction wells were shut down in October 2002 to begin the upwelling study. Water levels have returned to near static (pre-pumping) conditions.

- The shallow collection trench system operated as designed, with flow rates approximating those calculated during the design phase. Annual flushing of the discharge lines is conducted routinely to remove accumulation of sediment and scale deposits in the pump and piping systems.
- The wooded upland and wetland habitats were inspected routinely; the constructed shoreline vegetation is continuing to grow and propagate, and wildlife usage of the created habitats is readily apparent. The December 2003 quarterly inspection completes the final year of required monitoring under the USACE permit.

SECTION 5
RECOMMENDATIONS

Based on a review of the water level and analytical data collected between August 1997 and December 2003, and the result of the Groundwater Upwelling Study, changes to the current OM&M program are warranted. The following recommendations are offered for consideration by NYSDEC.

- **Discontinue operation of the intermediate/deep groundwater extraction system.** The upwelling study has successfully quantified and characterized the chemical concentrations of the groundwater that is upwelling from the Site to the Niagara River. Based on the results of the groundwater upwelling study, the discontinued use of the intermediate/deep groundwater extraction system will not have an adverse impact on the quality of the groundwater upwelling to the Niagara River. Permanent shut-down of the deep extraction system, which has not been operational since October 2002, should proceed. The deep groundwater extraction wells and the associated equipment should be decommissioned, to reduce the potential for interconnection between the shallow and deep groundwater zones. This will include the removal of the electrical and control system and the closure of the extraction wells.

- **Reduce the chemical analytical parameters list for the intermediate/deep groundwater samples.** The concentrations of SVOCs, PCBs and pesticides in the intermediate/deep groundwater were consistently below the groundwater standards/guidelines throughout the sampling history. The concentrations of metals in the groundwater, while exceeding the Class GA standard in some cases, are consistent with the results from the background samples. In addition, the only VOCs that have been detected are benzene, ethylbenzene, toluene, and xylene (BTEX). The analytical list for the intermediate/deep groundwater samples should be reduced to BTEX compounds only. Sampling for BTEX as an indicator of intermediate/deep groundwater quality will be sufficient to meet the ongoing objectives of the OM&M program. No changes are proposed to the chemical parameter list for the shallow groundwater analysis at this time.

- **Reduce the groundwater sampling frequency in the shallow and intermediate/deep groundwater systems from semi-annual to annual.** Analytical data from 1997 through 2003 illustrates that there is not a significant fluctuation of chemical concentrations in either the shallow or the intermediate/deep groundwater. Sampling and analysis on an annual basis will provide a sufficient quantity of data to evaluate any continuing impacts to groundwater.

- **Eliminate surface water sampling.** Chemical constituents other than the metals antimony, iron, magnesium, and sodium have not been detected in

surface water samples since the November 1999 event. Based on the intermittent nature of the surface water flow and absence of elevated chemical concentrations the sampling of surface water can be eliminated.

- **Reduce Water Level Monitoring Frequency from Monthly to Quarterly.** Groundwater levels have been measured on a monthly basis to monitor the capture zones that were created in the deep/intermediate groundwater by the extraction system. The shut down of the extraction system eliminates this need. The collection of groundwater level data on a quarterly basis is sufficient to monitor shallow groundwater migration at the site.
- **Eliminate wetlands and shoreline habitat monitoring.** The April 2004 Wildlife and Habitat Report documents the fifth and final year of monitoring for the wetlands and the wooded upland mitigation areas. This report completes the requirements of the Nationwide Permit. The degree to which the habitat areas continue to grow and self propagate indicates that further monitoring is not warranted.