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Appendices

URS Greiner Woodward Clyde (URSGWC) has completed the fall water quality sampling and data analysis for the monitoring wells at the DeZurik Closed Hazardous Waste Landfill Lagoon No. 3 located in Sartell, Minnesota. The fall sampling completes the year of monitoring and comprises this Annual Report submitted to the Minnesota Pollution Control Agency per Part B of the reissued permit from September 29, 1994.

According to laboratory results and the statistical analysis, releases of target contaminants (arsenic, barium, cadmium, lead, and selenium) were not above background concentrations at the Dezurik Lagoon No. 3 in 1998. Overall, the monitoring well network is in good condition and correctly placed to monitor potential releases from the Facility.

1.1 BACKGROUND

This background information was obtained from the reissued Part B Permit Application submitted by RMT, Inc. and approved by the MPCA in September of 1994. DeZurik Lagoon No. 3 (Facility) is located in the northwest corner of the city of Sartell, Minnesota and is approximately 0.2 acres in size (Figure 1). The Facility is contained within the limits of the City of Sartell Landfill. Sludges were disposed of from various DeZurik operations in the Facility. The Facility was closed in 1987 with a multi-layer 6 foot cover system.

1.2 PURPOSE AND SCOPE

This report presents the sampling results from the two groundwater sampling rounds performed in 1998. Sampling was performed in accordance with Part B of the permit and is discussed in detail in Groundwater Monitoring Program Section 2.2.1. The 1998 groundwater monitoring results are compared to historical data for the site, in addition to state and federal water quality standards.

This report incorporates the same information that was included in the semiannual report presented to the MPCA in July 1998. The correspondence regarding the semiannual report is presented in Appendix A. This annual report also includes the following information:

- A narrative describing the effects which the Facility is exerting on surrounding groundwater quality and any changes made or maintenance needed in the monitoring network.
- A description of sampling dates and procedures.
- Results of appropriate statistical procedures.
- Water level monitoring data and potentiometric maps for the year.
- Calculation of groundwater flow rates.
- Laboratory analytical reports.
- Graphics showing concentration versus time for all parameters found above background.
- Data summary tables showing concentration and water elevation data for each well sampled to date.

2.1 HYDROGEOLOGIC SETTING

A detailed description of the geology and hydrogeology of the site is provided in the Part B Permit Application (RMT, Inc., 1994). The information below has been summarized from the application.

The general geology of the area in which the Facility is located consists of unconsolidated glacial deposits (approximately 80 to 100 feet) that overlie Precambian granitic bedrock. Previous studies indicated there are three geologic/hydrogeologic units underneath the Facility that affect groundwater movement and flow. The surficial unit consists of silty fine grained sands that soil borings indicate are approximately 15 feet thick. Outwash deposits are contained below the fine sands that consist of silty sands and gravel. This layer is considered the upper most aquifer and is located 70 to 80 feet below ground surface (bgs). The third layer consists of clayey weathered bedrock located approximately 90 feet bgs which acts as an aquitard restricting the downward flow of groundwater into the bedrock.

Groundwater conditions are characterized by the network of monitoring wells located on-site. Groundwater elevations and data are given in Table 1. Figures 2 and 3 show the interpreted flow directions for each sampling event. Further details are discussed in Section 2.2.4 (Groundwater Elevations and Flow Rates).

2.2 GROUNDWATER MONITORING PROGRAM

2.2.1 Sampling and Network Evaluation

The wells that comprise the monitoring network for the facility are located on Figures 2 and 3. Samples were obtained from a total of four wells. Well P-13 is the upgradient well and wells P-5R, P-9R, and P-12R are the downgradient wells. As Permit B states, during sampling events, the upgradient well is sampled four times and the downgradient wells are sampled once each.

Groundwater samples were obtained in 1998 by Minnesota Valley Testing Laboratory (MVTL) of New Ulm, Minnesota. MVTL also performed all laboratory analyses. The spring sampling round was completed on April 9-10 and 13, 1998 and the fall sampling round was completed on October 5-6, 1998.

Prior to the sampling of the monitoring wells (in both the spring and fall), the water level was recorded and the general condition of the well was noted. All of the wells were in good condition including locked, labeled, straight, protected, state ID tag, and grout seal intact except for the notations below.

- Well P-13 grout seal does not appear to be intact and it does not have a state ID tag.
- Well P-9R does not have a state ID tag.

2.2.2 Results

Analytical results and field notes are presented in Appendix B. Groundwater quality data for the site is statistically analyzed and is also compared to various and state water quality standards. The pertinent standards are described below.

- Maximum Contaminant Level (MCL) – The MCL's are enforceable standards which apply to public water systems, as established in the National Interim Primary Drinking Water Standards for the United States.
- Secondary Maximum Containment Level (SMCL) – The SMCL applies to public water systems. The standards are established primarily for taste, odor, and aesthetic reasons, not due to adverse health affects.
- Health Risk Limits (HRL) – The HRL's are risk based levels for parameters in groundwater. The HRL are determined by the Minnesota Department of Health and are enforceable under Minnesota Rules 4717.7100 to 4717.7800.

Background concentrations are established at the upgradient well P-13. Four samples are obtained during each sampling event for statistical analyses. The background data during the spring round of sampling remained consistent with past data (Table 2). The background concentration results for the fall sampling event remained consistent except for barium. Barium was found below the 1994 QAPP Reporting limit of 50 µg/L at 27 µg/L in well P-13A, however P-13B, P-13C and P-13D had concentrations of barium at 101 µg/L, 180 µg/L and 135µg/L, respectively. The elevated results are higher than concentrations recorded to date but are below the 2000 µg/L MCL and HRL for barium. The other analytes listed in Table 2 that exceeded a MCL and/or HRL are in bold type.

Other results from both the spring and fall sampling events are similar. Dissolved boron and total dissolved solids (TDS) level exceeded federal or state water quality standards in the spring and fall in at least one monitoring well.

Boron (dissolved) was measured in P-5R at 1.04 mg/L and 0.69 mg/L for the spring and fall sampling events, respectively. The HRL for boron is 0.6 mg/L. P-5A is located sidegradient of the Facility and has had historical boron results ranging from 0.4 to 2.6 mg/L with a relatively steady downward trend since the November 1990 sampling event. RMT Inc., suggested in a correspondence dated February 17, 1998, that there may be an upgradient boron source or that naturally occurring variability could affect groundwater quality at the Facility.

TDS exceeded the SMCL of 500 mg/L in wells P-5R and P-9R for both the spring and fall sampling events. Well P-5R readings were 684 mg/L in the spring and 624 mg/L in the fall. Well P-9R readings were 517 mg/L in the spring and 535 mg/L in the fall. The TDS level has historically exceeded the SMCL at P-5R but the level has generally been decreasing since October 1990.

2.2.3 Statistical Analysis

The statistical analysis is performed on the results of the sampling events to determine if detection's in downgradient wells (P-5R, P-9R, P-12R) are above background concentrations in the upgradient well (P-13). The statistical analysis was completed in accordance with the Part B Permit reissued in September 1994. The analysis is based on dissolved concentrations of arsenic, barium, cadmium, lead and selenium (also given in Table 2).

The tolerance interval was calculated for each analyte based on historical levels in the upgradient well P-13. The Poisson Distribution was used to estimate the population mean and variance for arsenic, cadmium, lead and selenium. Since more than two detects occurred for barium, the arithmetic mean and standard deviation were used to calculate the tolerance interval for barium. This calculation of the barium tolerance elevated the tolerance interval from 67 ug/L to 170 ug/L. Statistical analyses indicate results remaining below the historical 67 mg/L tolerance interval for barium. The assumed tolerance factor of 2.532 is based on a confidence factor of 95 percent with a typical set of background data (n=16). The following equation was used to calculate the tolerance: 2.523

$$T = U + (k * s)$$

Where:

T = Tolerance interval

U = Population mean

k = Tolerance factor

s = Standard deviation

As stated in the correspondence dated September 29, 1998 from DeZurik to the MPCA, even though laboratory detection limits are lower, tolerance levels continue to be calculated assuming the means are equal to the reporting limits identified in the November 1994 Quality Assurance Project Plan (QAPP) as long as the detects are less than the QAPP reporting limits.

The results for the 1998 sampling events were all below background concentrations. Graphs of concentration versus time for barium and cadmium are contained in Appendix C because both parameters have exceeded background concentrations in the past.

2.2.4 Groundwater Elevations and Flow

Groundwater elevations were determined for each of the sampling rounds performed in April and October. The water level data is summarized in Table 1. Groundwater flow occurs to the southeast which is consistent with historical results. The water table contour maps are presented in Figures 2 and 3. Appendix D contains graphs of water levels over time for each well.

The hydraulic gradient remains consistent for the area. In 1994 for the Part B Permit Application, the average gradient was reported by RMT, Inc. as 0.006 ft/ft. In 1997, the average hydraulic gradient calculated by RMT, Inc. for the fall sampling event was 0.005 ft/ft. The average gradients calculated in 1998 are 0.005 ft/ft and 0.006 ft/ft for spring and fall sampling events, respectively.

The average linear groundwater flow rates can be calculated using the following equation and assumptions:

$$V = K*I/N_e$$

Where:

V = Groundwater Velocity

K = Hydraulic Conductivity (assumed 0.39 ft/min)

I = Hydraulic Gradient (ft/ft)

N_e = Effective Porosity (assumed 25%)

11.2 - 13.5

The calculated linear flow rates based on the above equation and assumptions are 12 ft/day for the spring sampling event and 13 ft/day for the fall sampling event. These velocities are consistent with the previous velocities calculated by RMT, Inc. for previous sampling events which ranged from 13.5 ft/day in 1994 to 11 ft/day in 1997.

According to laboratory results and the statistical analysis, releases of target contaminants (arsenic, barium, cadmium, lead, and selenium) were not above background concentrations at the Dezurik Lagoon No. 3 in 1998. Overall, the monitoring well network is in good condition and correctly placed to monitor potential releases from the Facility.

In at least one well, a MCL, SMCL and/or HRL were exceeded in both the spring and fall sampling events. The SMCL was exceeded by both P-5R and P-9R for TDS and the HRL was exceeded by P-5R for boron. The overall trend of these constituents seems to be primarily downward.

The calculated groundwater flow rates remain consistent with past rates at 12 ft/day and 13 ft/day. URSGWC does not propose any changes to the groundwater monitoring system at the Dezurik Lagoon No. 3.

"Annual Groundwater Monitoring Report – Dezurik Lagoon No. 3," RMT, Inc., December 1997.

"Part B Permit Application for the Dezurik Lagoon No. 3," RMT Inc., August 1994.

"Spring 1998 Groundwater Monitoring Results for the Dezurik Closed Hazardous Waste Landfill Lagoon No. 3," URS Greiner Woodward Clyde, July 1998.

Table 1
Groundwater Elevation Data, 1998
Dezurik Hazardous Waste Lagoon #3

Well I.D.	Top of Casing Elevation (feet above MSL)	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
SPRING 1998			
P-5R	1099.04	74.20	1024.84
P-5A	1098.89	74.22	1024.67
P-7	1094.55	68.49	1026.06
P-9R	1102.09	77.40	1024.69
P-12R	1101.33	76.49	1024.84
P-13	1105.12	78.68	1026.44
FALL 1998			
P-5R	1099.04	74.42	1024.62
P-5A	1098.89	74.41	1024.48
P-7	1094.55	68.65	1025.90
P-9R	1102.09	77.62	1024.47
P-12R	1101.33	76.70	1024.63
P-13	1105.12	78.75	1026.37

Note: MSL, mean sea level, used as a vertical datum.

Table 2
Summary of Analytical and Statistical Analysis Results
DeZurik Closed Hazardous Waste Landfill Lagoon No. 3
(units = µg/L, dissolved)

WELL NUMBER	DATE	ARSENIC	BARIUM	CADMIUM	LEAD	SELENIUM
P-5A	12/27/89	ND	50	ND	ND	ND
P-5A	6/28/90	ND	ND	0.5	5	ND
P-5A	10/4/90	ND	110	ND	ND	ND
P-5A	12/18/90	ND	80	ND	ND	ND
P-5A	4/4/91	ND	60	0.4	ND	ND
P-5A	8/1/91	ND	67	ND	ND	ND
P-5A-1	10/31/91	ND	63	0.32	ND	ND
P-5A-2	10/31/91	ND	60	0.43	ND	ND
P-5A-3	10/31/91	ND	62	0.38	ND	ND
P-5A-4	10/31/91	ND	62	0.55	ND	ND
P-5A	4/23/92	ND	56	ND	ND	ND
P-5A	9/30/92	ND	ND	ND	ND	ND
P-5A	4/20/93	ND	ND	ND	ND	ND
P-5R	10/27/93	ND	78	1.4	ND	ND
P-5R	1/10/94	--	ND	--	--	--
P-5R	4/20/94	ND	ND	ND	ND	<6.02
P-5R	10/17/94	ND	ND	ND	ND	ND
P-5R	4/11/95	ND	ND	ND	ND	ND
P-5R	10/11/95	ND	52	ND	ND	ND
P-5R	4/17/96	ND	ND	ND	ND	ND
P-5R	10/16/96	< 3.0	47	0.36	< 3.0	< 3.0
P-5R	4/17/97	< 3.0	50	< 0.30	< 3.0	< 3.0
P-5R	10/16/97	<3.0	44	<0.30	<3.0	<3.0
P-5R	4/13/98	<2	16	<0.2	<1	<3
P-5R	10/6/98	<2	33	<0.2	<1	<3
P-9R	4/4/91	ND	ND	ND	ND	ND
P-9R	8/1/91	ND	ND	ND	ND	ND
P-9R-1	10/31/91	ND	ND	ND	ND	ND
P-94-2	10/31/91	ND	ND	ND	ND	ND
P-9R-3	10/31/91	ND	ND	0.3	ND	ND
P-9R-4	10/31/91	ND	ND	ND	ND	ND
P-9R	4/23/92	ND	ND	0.19	ND	ND
P-9R	9/30/92	ND	ND	ND	ND	ND
P-9R	4/20/93	ND	ND	ND	ND	ND
P-9R	10/27/93	ND	ND	0.7	ND	ND
P-9R	4/20/94	ND	ND	ND	ND	<6.02
P-9R	10/17/94	ND	ND	ND	ND	ND
P-9R	4/11/95	ND	ND	ND	ND	ND
P-9R	10/10/95	ND	ND	ND	ND	ND
P-9R	4/17/96	ND	ND	ND	ND	ND
P-9R	10/16/96	< 3.0	48	< 0.30	< 3.0	< 3.0
P-9R	4/16/97	< 3.0	53	< 0.30	< 3.0	< 3.0
P-9R	10/15/97	<3.0	61	1.4	<3.0	<3.0
P-9R	4/10/98	<2	17	0.7	2	<3
P-9R	10/6/98	<2	46	<0.2	<1	<3
P-12	4/4/91	ND	ND	ND	ND	ND
P-12	8/1/91	ND	ND	0.32	ND	ND

Table 2
Summary of Analytical and Statistical Analysis Results
DeZurik Closed Hazardous Waste Landfill Lagoon No. 3
(units = µg/L, dissolved)

WELL NUMBER	DATE	ARSENIC	BARIUM	CADMIUM	LEAD	SELENIUM
P-12-1	10/31/91	ND	ND	0.31	ND	ND
P-12-2	10/31/91	ND	ND	0.33	ND	ND
P-12-3	10/31/91	ND	ND	ND	ND	ND
P-12-4	10/31/91	ND	ND	ND	ND	ND
P-12	4/23/92	ND	ND	ND	ND	ND
P-12	9/30/92	ND	ND	ND	ND	ND
P-12	4/20/93	ND	ND	ND	ND	ND
P-12R	10/27/93	ND	ND	13	ND	ND
P-12R	1/10/94	--	--	ND	--	--
P-12R	4/20/94	ND	ND	ND	ND	<6.02
P-12R	10/17/94	ND	ND	ND	ND	ND
P-12R	4/11/95	ND	ND	ND	ND	ND
P-12R	10/10/95	ND	ND	ND	5.2	ND
P-12R	4/17/96	ND	ND	ND	ND	ND
P-12R	10/16/96	< 3.0	41	0.63	< 3.0	< 3.0
P-12R	4/17/97	< 3.0	44	< 0.30	< 3.0	< 3.0
P-12R	10/16/97	<3.0	44	<0.30	<3.0	<3.0
P-12R	4/13/98	<2	9	<0.2	<1	<3
P-12R	10/6/98	<2	30	<0.2	<1	<3
P-13	6/28/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13A	6/28/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13B	6/28/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13C	6/28/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13	10/4/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13A	10/4/90	< 3.0	60	< 0.3	< 3.0	< 3.0
P-13B	10/4/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13C	10/4/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13A	12/18/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13B	12/18/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13C	12/18/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13D	12/18/90	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13	4/4/91	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13	8/1/91	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13-1	10/31/91	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13-2	10/31/91	< 3.0	< 50	0.88	< 3.0	< 3.0
P-13-3	10/31/91	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13-4	10/31/91	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13-1	4/23/92	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13-2	4/23/92	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13-3	4/23/92	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13-4	4/23/92	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13	9/30/92	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13-1	10/8-9/92	< 3.0	< 100	<1	<2.3	<2.0
P-13-2	10/8-9/92	< 3.0	<100	<1	<1.3	<2.0
P-13-3	10/8-9/92	< 3.0	<100	<1	<1.3	<2.0
P-13A	4/20/93	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13B	4/20/93	< 3.0	< 50	< 0.3	< 3.0	< 3.0

Table 2
Summary of Analytical and Statistical Analysis Results
DeZurik Closed Hazardous Waste Landfill Lagoon No. 3
(units = µg/L, dissolved)

WELL NUMBER	DATE	ARSENIC	BARIUM	CADMIUM	LEAD	SELENIUM
P-13C	4/20/93	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13D	4/20/93	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13A	10/29/93	< 3.0	< 50	3.3*	< 3.0	< 3.0
P-13B	10/29/93	< 3.0	< 50	5.5*	< 3.0	< 3.0
P-13C	10/29/93	< 3.0	< 50	3.9*	< 3.0	< 3.0
P-13D	10/29/93	< 3.0	< 50	17*	< 3.0	< 3.0
P-13	4/20/94	< 3.0	< 50	< 0.3	< 3.0	< 6.02
P-13A	4/20/94	< 3.0	< 50	< 0.3	< 3.0	< 6.02
P-13B	4/20/94	< 3.0	< 50	0.31	< 3.0	< 6.02
P-13C	4/20/94	< 3.0	< 50	< 0.3	< 3.0	< 6.02
P-13	10/17/94	< 3.0	54	< 0.3	< 3.0	< 3.0
P-13A	10/18/94	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13B	10/18/94	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13C	10/18/94	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13	4/11/95	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13A	4/11/95	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13B	4/11/95	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13C	4/12/95	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13	10/11/95	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13A	10/11/95	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13B	10/11/95	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13C	10/11/95	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13	4/17/96	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13A	4/17/96	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13B	4/17/96	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13C	4/17/96	< 3.0	< 50	< 0.3	< 3.0	< 3.0
P-13	10/16/96	< 3.0	32	< 0.30	< 3.0	< 3.0
P-13A	10/16/96	<3.0	31	<0.30	<3.0	<3.0
P-13B	10/17/96	< 3.0	31	< 0.30	< 3.0	< 3.0
P-13C	10/17/96	<3.0	31	<0.30	<3.0	<3.0
P-13	4/16/97	< 3.0	35	< 0.30	< 3.0	< 3.0
P-13A	4/17/97	<3.0	34	<0.30	<3.0	<3.0
P-13B	4/17/97	< 3.0	35	< 0.30	< 3.0	< 3.0
P-13C	4/17/97	<3.0	35	<0.30	<3.0	<3.0
P-13	10/15/97	< 3.0	33	< 0.30	< 3.0	< 3.0
P-13A	10/16/97	< 3.0	34	< 0.30	< 3.0	< 3.0
P-13B	10/16/97	< 3.0	34	< 0.30	< 3.0	< 3.0
P-13C	10/16/97	< 3.0	34	< 0.30	< 3.0	< 3.0
P-13A	4/9/98	<2	<6	<0.2	<1	<3
P-13B	4/10/98	<2	<6	<0.2	<1	<3
P-13C	4/10/98	2.2	<6	<0.2	<1	<3
P-13D	4/13/98	<2	<6	<0.2	<1	<3
P-13A	10/5/98	<2	27	<0.2	<1	<3
P-13B	10/5/98	<2	101	<0.2	<1	<3
P-13C	10/6/98	<2	180	<0.2	<1	<3
P-13D	10/6/98	<2	135	<0.2	<1	<3

Table 2
Summary of Analytical and Statistical Analysis Results
DeZurik Closed Hazardous Waste Landfill Lagoon No. 3
(units = µg/L, dissolved)

WELL NUMBER DATE	ARSENIC	BARIUM	CADMIUM	LEAD	SELENIUM
Background Detection limit**	3	50	0.3	3	3
Background Mean#	3	65~66.6	0.3	3	3
Background Standard deviation#	1.732	39.635-38.56	0.548	1.732	1.732
$\kappa_{0.95}$	2.532	2.532-2.583	2.532	2.532	2.532
Tolerance level##**	7.4	170~164	1.7	7.4	7.4

ND Not detected.

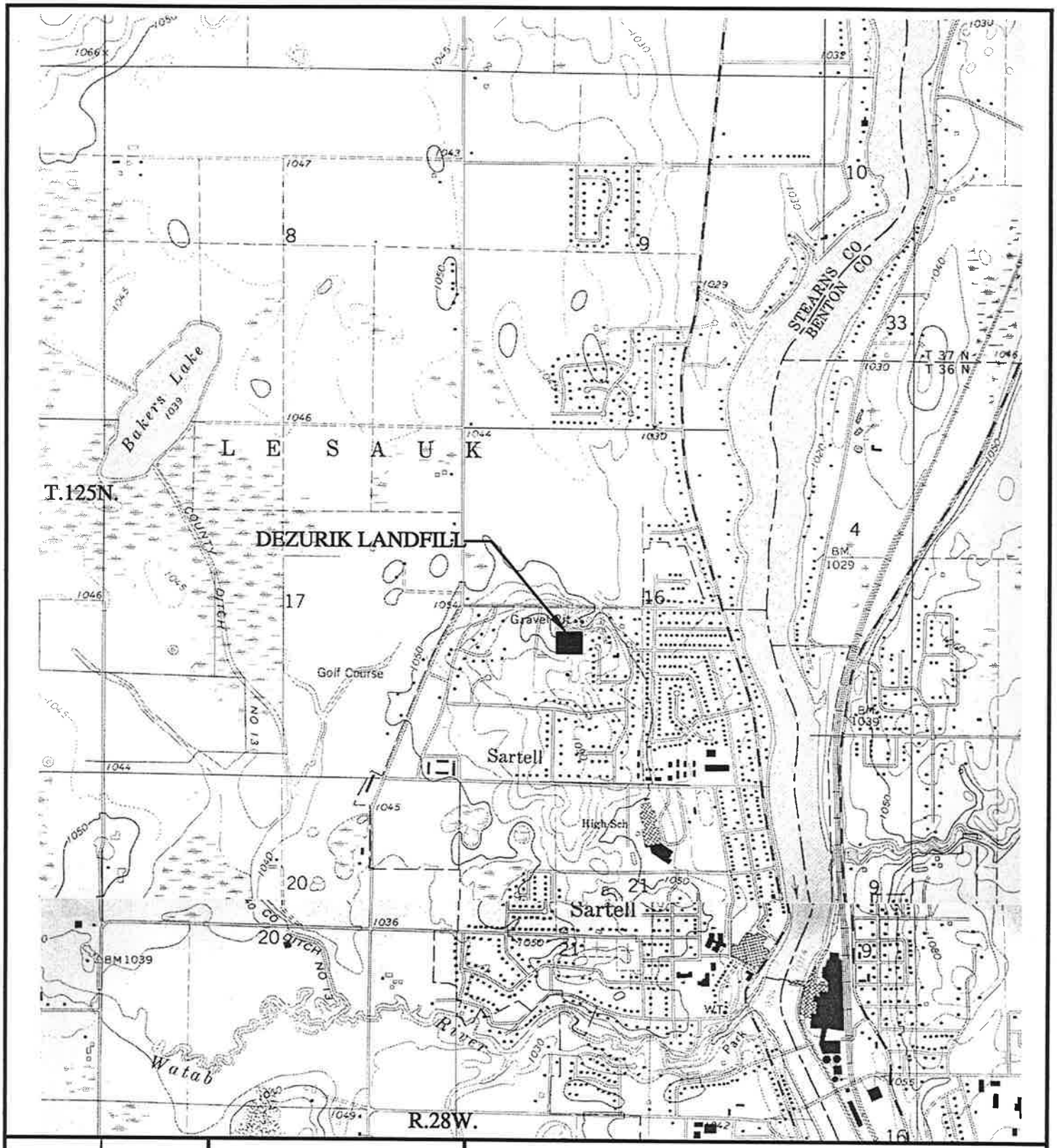
-- Not measured.

The Poisson Distribution method was used for calculating the mean and standard deviation for background constituents with two or less reported results above the detection limit. For background constituents with three or more results above the detection limit, the arithmatic mean and standard deviation is calculated.

* Data collected is considered suspect.

** In 1998, new analytical equipment allowed the laboratory to obtain lower detection limits than that obtained in previous sampling years. These detection limits are lower than those required in the August 1994 Part B Permit Application for evaluating compliance of wells. Where the reported detection limit is lower than the required detection limit, the required detection limit is used for calculating the tolerance level to maintain continuity in evaluating compliance.

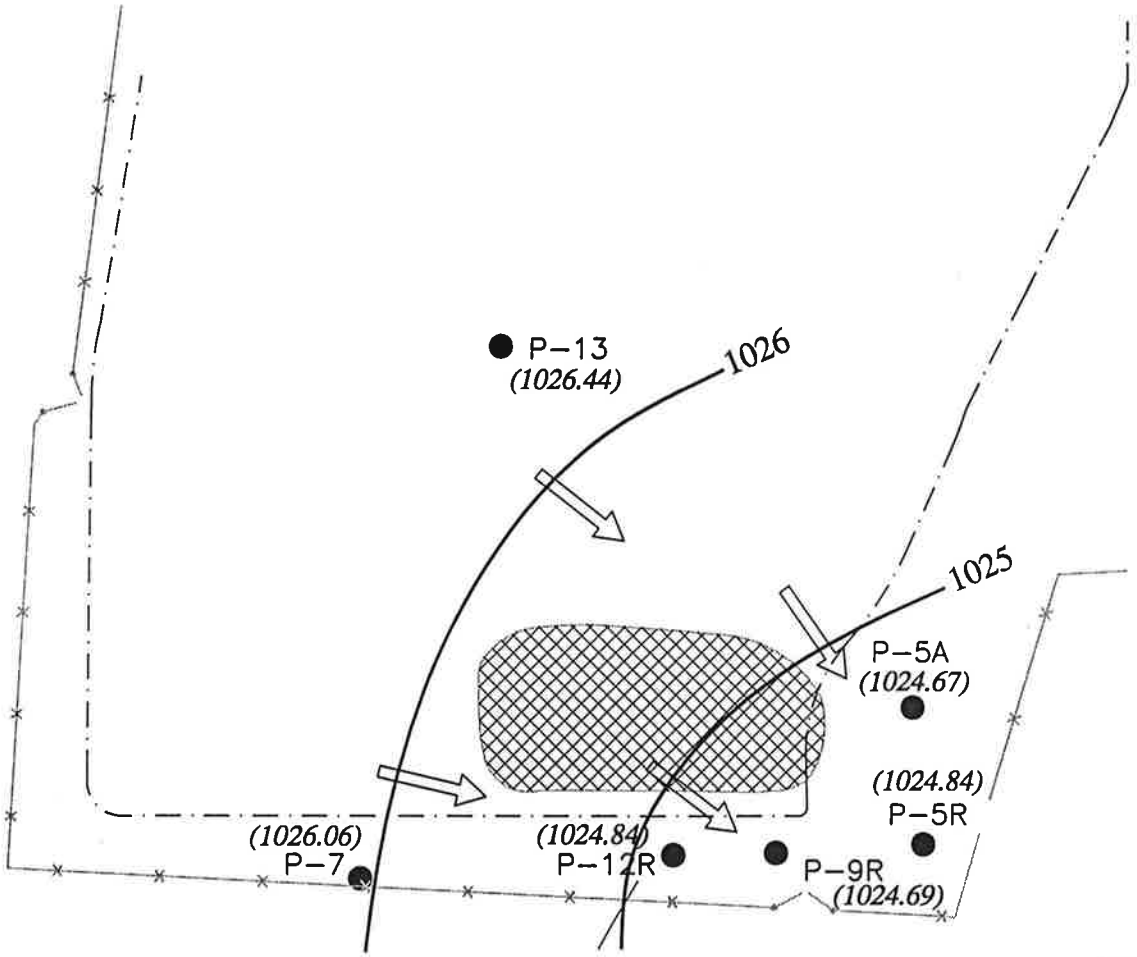
Note: Sample results in bold type exceed MCL and/or HRL



URS Greiner Woodward-Clyde

SITE LOCATION MAP
DEZURIK LANDFILL
SARTELL, MINNESOTA

DRN BY:	KAH	DATE:	12/98	PROJECT NO.	FIG. NO.
CHK'D BY:	DS	DATE:	12/98	8E13523A	1



LEGEND

- P-13 (1026.98) — GROUNDWATER MONITORING WELL LOCATION AND NUMBER WITH WATER TABLE ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- FENCE
- APPROXIMATE LIMIT OF LANDFILL WASTE
- APPROXIMATE LIMIT OF LAGOON
- 1025 — WATER TABLE CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION

0 100 200

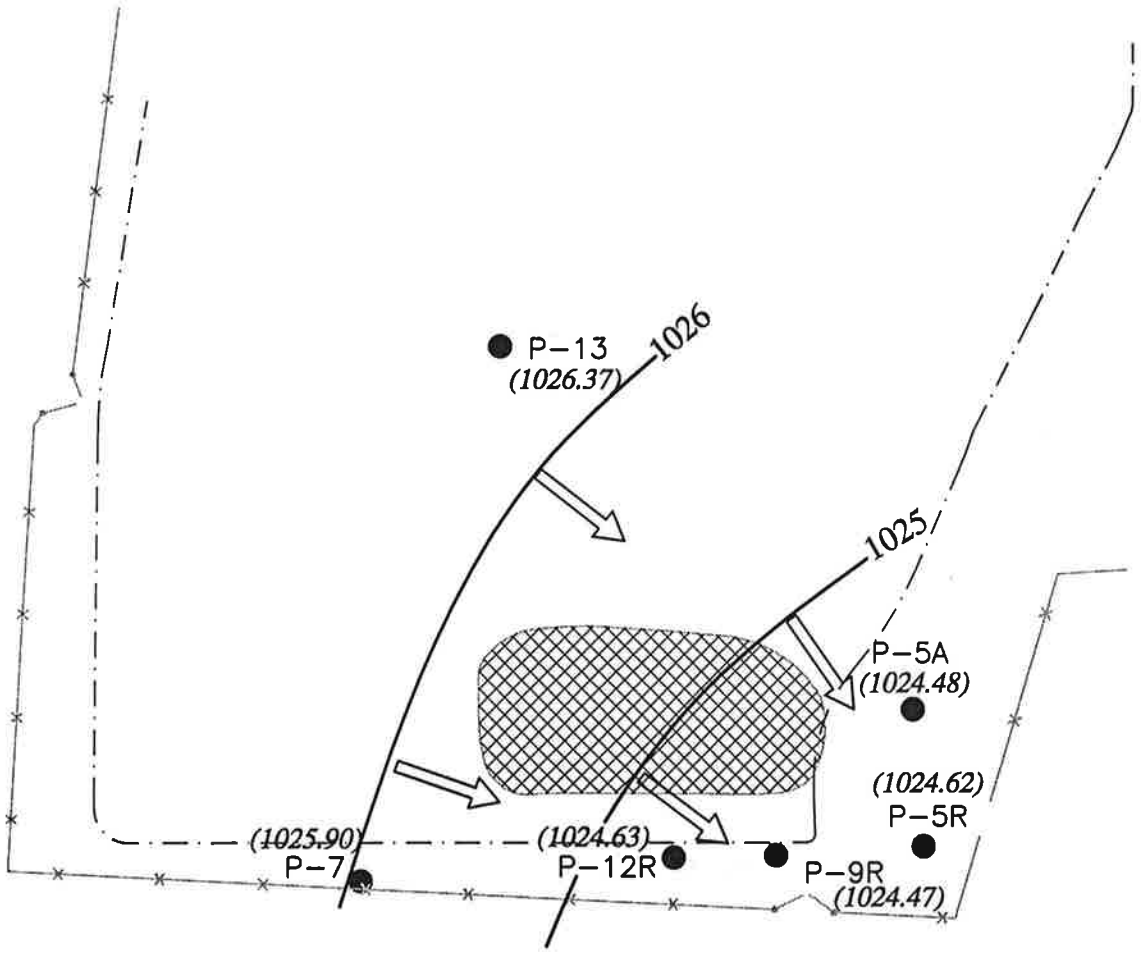
SCALE: 1"=100'

URS Greiner Woodward-Clyde

GROUNDWATER CONTOUR MAP, SPRING 1998
DEZURIK LANDFILL
SARTELL, MINNESOTA

DRN BY:	KAH	DATE:	12/98	PROJECT NO.	FIG. NO.
CHK'D BY:	DS	DATE:	12/98	8E13523A	2

8E13523 GW498.DWG



LEGEND

- P-13 (1026.98) — GROUNDWATER MONITORING WELL LOCATION AND NUMBER WITH WATER TABLE ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- FENCE
- APPROXIMATE LIMIT OF LANDFILL WASTE
- APPROXIMATE LIMIT OF LAGOON
- 1025 — WATER TABLE CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION

0 100 200

SCALE: 1"=100'

URS Greiner Woodward-Clyde

GROUNDWATER CONTOUR MAP, FALL 1998
DEZURIK LANDFILL
SARTELL, MINNESOTA

DRN BY:	KAH	DATE:	12/98	PROJECT NO. 8E13523A	FIG. NO. 3
CHK'D BY:	DS	DATE:	12/98		

8E13523 GW498.DWG

Appendix A
Spring Correspondence

Minnesota Pollution Control Agency

September 8, 1998

Mr. Lee Walz
DeZurik
250 Riverside Avenue North
Sartell, Minnesota 56377

RE: Laboratory Reporting Limits

Dear Mr. Walz:

As you know, I received two MVTL laboratory reports dated June 1 and July 14, 1998, for the same ground water samples collected from the Lagoon Number 3 monitoring wells. The reporting limits for Arsenic, Cadmium and Lead in the July 14 report had been increased from the original June 1, report. In a previous letter sent to you, I requested an explanation of the change in reporting limits. On August 31, 1998, I spoke with Mr. Dean Stockwell of Woodward-Clyde. Mr. Stockwell explained that the reporting limits in the lab report were changed to be consistent with previous reporting limits and with the reporting limits identified in the November 1994, Quality Assurance Project Plan (QAPP).

In all future laboratory reports and summary tables, the reporting limit for each monitoring parameter shall be equivalent to the Practical Quantification Limit (PQL) for that parameter's particular analytical method. MPCA staff require that, at a minimum, your labs PQL meet the reporting limits set up in the QAPP. For example, if the PQL is less than the reporting limit in the QAPP, the lower PQL should be used as the reporting limit. The results recorded on the summary tables should match the results given in the laboratory report for that particular sample.

MPCA staff request that you modify and resubmit summary Table 2 from the semiannual report to show the actual levels of Barium detected since the fourth quarter 1996 sampling event. Also, revise Table 2 to show that cadmium was detected in monitoring well P-9R at a level of 0.7 ug/l. Unless determined otherwise by MPCA staff, and as long as detects are less than the QAPP reporting limits, Tolerance Levels may continue to be calculated assuming the means are equal to the reporting limits identified in the QAPP.

Please address the above comments within thirty days of receipt of this letter. If you have any questions, please contact me at (651) 297-8377 or Tad Schindler at (651) 297-8378.

Sincerely,

Crague C. Biglow
Senior Hydrogeologist
North District

CCB:lma

cc: Dean Stockwell, Woodward-Clyde, Minneapolis, MN
Bob Egan, U.S. EPA Region V, Chicago, IL

DeZURIK
A UNIT OF GENERAL SIGNAL

September 29, 1998

Mr. Crague Biglow
Senior Hydrogeologist
Minnesota Pollution Control Agency
520 Lafayette Road N.
St. Paul, MN 55155-4194

Re: Response to Comments
DeZurik/City of Sartell Hazardous Waste Landfill Lagoon Number 3

Dear Mr. Biglow:

DeZurik, in conjunction with our consultant, URS Griener Woodward-Clyde (Woodward-Clyde), has prepared this response to address your concerns detailed in letters dated August 31, 1998 and September 8, 1998 (attached).

A map depicting the potentiometric surface at the time of sampling will be prepared and submitted within 30 days as requested. This information was originally planned to be included in the Final Ground Water Monitoring Report scheduled for submittal prior to 90 days after the fall sampling event. Groundwater elevations documented during the spring sampling event were within historical levels.

As directed in your letter, a tolerance factor (k) of 2.523 with a population size of n=16 will be used in future statistical analysis.

In all future laboratory reports and summary tables, the reporting limit for each monitoring parameter will be equivalent to the Practical Quantification Limit (PQL) for that parameter's particular analytical method. Values in the summary table(s) will reflect the value given in the laboratory report for that particular sample.

Table 2 from the Spring 1998 Groundwater Monitoring Results sampling event will be modified to show the actual levels of Barium detected and show that Cadmium was detected in P-9R at a level of 0.7 ug/l. The modified table will be submitted along with the potentiometric surface map.

Tolerance levels will continue to be calculated assuming the means are equal to the reporting limits identified in the November, 1994 Quality Assurance Project Plan (QAPP) as long as the detects are less than the QAPP reporting limits.

If you have any questions regarding this response, please do not hesitate to contact either me (320) 259-2128 or Dean Stockwell at (612)593-5650.

Sincerely,

Lee Walz

Lee Walz
Senior Facilities Engineer

cc: Dean Stockwell, Woodward-Clyde
Bob Egan, U.S. EPA Region V

250 RIVERSIDE AVENUE NORTH • SARTELL, MN 56377-1743 • U.S.A.
PHONE 320-259-2000 • FAX 320-259-2227 • TELEX 29-0505

C:\Biglow\Walz\doc

Dean

Woodward-Clyde

Engineering & sciences applied to the earth & its environment

October 2, 1998

Mr. Crague Biglow
Senior Hydrogeologist
Minnesota Pollution Control Agency
520 Lafayette Road N.
St. Paul, Minnesota 55155-4194

Subject: Data for Response to Comments
DeZurik/City of Sartell Hazardous Waste Landfill Lagoon Number 3
Project No. 8E13523

Dear Mr. Biglow:

URS Greiner Woodward-Clyde has prepared this data packet to address your concerns detailed in letters dated August 31, 1998 and September 8, 1998.

A map depicting the potentiometric surface at the time of sampling has been developed and is attached. Also attached please find a revised copy of Table 2 and amended laboratory data.

Sincerely,

Dean Stockwell for

Dean Stockwell

DDS:sll

cc: Lee Walz - Dezurik

Woodward-Clyde Consultants • A subsidiary of Woodward-Clyde Group, Inc.
Park Place West Building, Suite 660 • 6465 Wayzata Blvd. • Minneapolis, MN 55426
612-593-5650 • Fax 612-593-0094

Minnesota Pollution Control Agency

August 31, 1998

Mr. Lee Walz
DeZurik
250 Riverside Avenue North
Sartell, Minnesota 56377-1743

RE: Spring Semiannual Ground Water Monitoring Report Dated July 20, 1998, for the DeZurik/City of Sartell, Lagoon Number 3, MND985668342, Sartell, Minnesota

Dear Mr. Walz:

The Minnesota Pollution Control Agency (MPCA) staff have completed their review of the above referenced report which was received in this office on July 21, 1998. With respect to the report, MPCA staff have the following comments:

1. The report did not include a map depicting the potentiometric surface at the time of the sampling event, as required by the Resource Conservation and Recovery Act (RCRA) permit. Please prepare a ground water potentiometric map for the site using the ground water elevation data collected during the spring 1998 sampling event and submit to this office and to my attention.

2. The MPCA staff received two different lab reports, dated June 1 and July 15, 1998, for the samples collected during the spring sampling event. The results and reporting limits for arsenic, cadmium and lead in the July 15 lab report, which was submitted to me, was modified from the June lab report, which was submitted to the city of Sartell. The MPCA staff are concerned about this practice and require a complete explanation.

3. The correct value for the tolerance factor (k) with a population size of n=16 is 2.523. Please use this value in future statistical calculations. The tolerance factor can be found in the EPA document titled Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities, April 1989, Table 5.

Please address the above comments within 30 days of receipt of this letter. If you have any questions, please contact me at (651)297-8377.

Sincerely,

Crague C. Biglow
Senior Hydrogeologist

CB:lma

cc: Dean Stockwell, Woodward-Clyde
Bob Egan, U.S. Environmental Protection Agency, Region V, Chicago

Appendix B
Analytical And Field Results

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

MEMBER ACIL

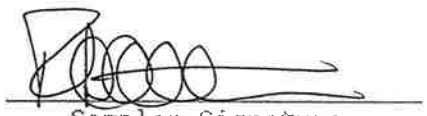
WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Date Reported: 7 Dec 1998

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Work Order #: 31-393
Account Number: 013138

Project Name: DEZURIK



Sampler Signature

RL = Reporting Limits
NQ = Not Present, Qualitative Only
PQ = Present, Qualitative Only
ND = Not Determined

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

MEMBER ACIL

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Report Date: 7 Dec 1998

Lab Number: 98-L24814
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 5 Oct 1998
Time Sampled: 12:09
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 13A

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Appearance, Field	Clear		NA	2110			PO
Water Elevation	78.73		NA	NA			PO
Temperature - Field	12.8	Degree C	NA	170.1			PO
Specific Conductance, Fld	648	umhos/cm	1.	120.1			PO
Specific Conductance	661.0	umhos/cm	0.1	120.1	10/12/98		BLS
pH, Field	7.2	units	1.0	150.1			PO
pH (Laboratory)	7.4	units	1.0	150.1	10/ 8/98	17:34	LF
Fluoride	< 0.1	mg/l	0.10	340.2	10/19/98	4:42	JD
Sulfate	28	mg/l	4	375.4	10/14/98	10:33	PG
Chloride	13.9	mg/l	3.0	325.2	10/14/98	13:35	PG
Nitrate+Nitrite	5.10	mg/l as N	0.01	353.2	10/19/98	15:34	PG
Nitrite	< 0.01	mg/l as N	0.01	EPA 353.2	10/ 8/98	9:35	PG
Phenolics, Total	< 5	ug/l	5	420.1	10/25/98	6:29	JD
Cyanide, Total	< 0.02	mg/l	0.02	335.2	10/21/98	5:23	JD
Chemical Oxygen Demand	< 5	mg/l	5	410.4	10/14/98		CR
Solids, Total Dissolved	388	mg/l	1	160.1	10/ 9/98	6:41	LF
Barium	0.238	mg/l	0.006	6010	10/23/98	8:16	CR
Chromium	< 0.012	mg/l	0.012	6010	10/19/98	9:51	CR

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

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Report Date: 7 Dec 1998

Lab Number: 98-L24814
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 5 Oct 1998
Time Sampled: 12:09
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 13A

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Iron	0.083	mg/L	0.008	6010	10/19/98	9:51	CR
Manganese	0.007	mg/L	0.003	6010	10/19/98	9:51	CR
Zinc	0.026	mg/L	0.003	6010	10/19/98	9:51	CR
Boron	< 0.1	mg/L	0.100	6010	10/20/98	9:13	CR
Barium, Dissolved	0.027	mg/L	0.006	6010	10/12/98	16:13	CR
Chromium, Dissolved	< 0.012	mg/L	0.012	6010	10/ 7/98	9:09	CR
Iron, Dissolved	< 0.008	mg/L	0.008	6010	10/ 7/98	9:09	CR
Manganese, Dissolved	< 0.003	mg/L	0.003	6010	10/ 7/98	9:09	CR
Zinc, Dissolved	< 0.003	mg/L	0.003	6010	10/ 7/98	9:09	CR
Boron, Dissolved	< 0.1	mg/L	0.10	6010	10/ 7/98	9:09	CR
Arsenic	< 2	ug/L	2.0	206.2	10/13/98	9:00	TB
Cadmium	< 0.2	ug/L	0.20	213.2	10/ 9/98	8:00	TB
Lead	< 1	ug/L	1.0	239.2	10/ 8/98	12:00	TB
Selenium	< 3	ug/L	3.00	270.2	10/ 9/98	14:37	TB
Arsenic, Dissolved	< 2	ug/L	2.0	206.2	10/ 7/98	14:00	TB
Cadmium, Dissolved	< 0.2	ug/L	0.20	213.2	10/ 9/98	8:00	TB
Lead, Dissolved	< 1	ug/L	1.0	239.2	10/ 8/98	12:00	TB
Selenium, Dissolved	< 3	ug/L	3.0	270.2	10/ 8/98	11:00	TB

Ol = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

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Report Date: 7 Dec 1998

Lab Number: 98-L24814
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 5 Oct 1998
Time Sampled: 12:09
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 13A

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Calcium	104	mg/L	0.20	215.1	11/24/98	16:02	CR
Magnesium	27.0	mg/L	0.03	242.1	11/24/98	15:35	CR
Sodium	4.30	mg/L	0.05	EPA 273.1	12/ 5/98	10:08	TB
Calcium, Dissolved	72.0	mg/L	0.20	215.1	11/24/98	10:16	TB
Magnesium, Dissolved	24.0	mg/L	0.03	242.1	10/22/98	10:46	TB
Sodium, Dissolved	4.20	mg/L	0.05	273.1	10/21/98	14:24	TB
Nitrate	5.10	mg/L as N	NA	353.2	10/19/98	15:34	Calculated
Carbon, Total Organic	1.3	mg/L	1.0	415.1	10/19/98		OL

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
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NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

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Report Date: 7 Dec 1998

Lab Number: 98-L24808
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 5 Oct 1998
Time Sampled: 16:21
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 13B

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Appearance, Field	Clear		NA	2110			PO
Water Elevation	78.75		NA	NA			PO
Temperature - Field	12.9	Degree C	NA	170.1			PO
Specific Conductance, Fld	659	umhos/cm	1.	120.1			PO
pH, Field	7.3	units	1.0	150.1			PO
Barium, Dissolved	0.101	mg/L	0.006	6010	10/12/98	16:13	CR
Arsenic, Dissolved	< 2	ug/L	2.0	206.2	10/ 7/98	14:00	TB
Cadmium, Dissolved	< 0.2	ug/L	0.20	213.2	10/ 9/98	8:00	TB
Lead, Dissolved	< 1	ug/L	1.0	239.2	10/ 8/98	12:00	TB
Selenium, Dissolved	< 3	ug/L	3.0	270.2	10/ 8/98	11:00	TB

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

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Report Date: 7 Dec 1998

Lab Number: 98-L24809
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 9:20
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 13C

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Appearance, Field	Clear		NA	2110			PO
Water Elevation	78.76		NA	NA			PO
Temperature - Field	12.8	Degree C	NA	170.1			PO
Specific Conductance, Fld	727	umhos/cm	1.	120.1			PO
pH, Field	7.1	units	1.0	150.1			PO
Barium, Dissolved	0.180	mg/L	0.006	6010	10/12/98	16:13	CR
Arsenic, Dissolved	< 2	ug/L	2.0	206.2	10/ 7/98	14:00	TB
Cadmium, Dissolved	< 0.2	ug/L	0.20	213.2	10/ 9/98	8:00	TB
Lead, Dissolved	< 1	ug/L	1.0	239.2	10/ 8/98	12:00	TB
Selenium, Dissolved	< 3	ug/L	3.0	270.2	10/ 8/98	11:00	TB

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

MEMBER ACIL

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Report Date: 7 Dec 1998

Lab Number: 98-L24810
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 13:36
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 13D

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Appearance, Field	Clear		NA	2110			PO
Water Elevation	78.76		NA	NA			PO
Temperature - Field	12.9	Degree C	NA	170.1			PO
Specific Conductance, Fld	614	umhos/cm	1.	120.1			PO
pH, Field	7.2	units	1.0	150.1			PO
Barium, Dissolved	0.135	mg/l	0.006	6010	10/12/98	16:13	CR
Arsenic, Dissolved	< 2	ug/l	2.0	206.2	10/ 7/98	14:00	TB
Cadmium, Dissolved	< 0.2	ug/l	0.20	213.2	10/ 9/98	8:00	TB
Lead, Dissolved	< 1	ug/l	1.0	239.2	10/ 8/98	12:00	TB
Selenium, Dissolved	< 3	ug/l	3.0	270.2	10/ 8/98	11:00	TB

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

MEMBER ACIL

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Report Date: 7 Dec 1998

Lab Number: 98-L24811
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 10:41
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 5R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Appearance, Field	Clear		NA	2110			PO
Water Elevation	1025.02		NA	NA			PO
Temperature - Field	13.0	Degree C	NA	170.1			PO
Specific Conductance, Fld	1073	umhos/cm	1.	120.1			PO
Specific Conductance	936.0	umhos/cm	0.1	120.1	10/12/98		BLS
pH, Field	7.0	units	1.0	150.1			PO
pH (Laboratory)	7.3	units	1.0	150.1	10/ 8/98	17:34	LF
Fluoride	< 0.1	mg/L	0.10	340.2	10/19/98	4:42	JD
Sulfate	135	mg/L	4	375.4	10/14/98	10:33	PG
Chloride	20.6	mg/L	3.0	325.2	10/14/98	13:35	PG
Nitrate+Nitrite	4.58	mg/L as N	0.01	353.2	10/19/98	15:34	PG
Nitrite	< 0.01	mg/L as N	0.01	EPA 353.2	10/ 8/98	9:35	PG
Phenolics, Total	< 5	ug/L	5	420.1	10/25/98	6:29	JD
Cyanide, Total	< 0.02	mg/L	0.02	335.2	10/20/98		JD
Chemical Oxygen Demand	< 5	mg/L	5	410.4	10/14/98		CR
Solids, Total Dissolved	624	mg/L	1	160.1	10/ 9/98	6:41	LF
Barium	0.277	mg/L	0.006	6010	10/23/98	8:16	CR
Chromium	< 0.012	mg/L	0.012	6010	10/19/98	9:51	CR

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

MEMBER ACIL

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Report Date: 7 Dec 1998

Lab Number: 98-L24811
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 10:41
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 5R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Iron	0.671	mg/l	0.008	6010	10/19/98	9:51	CR
Manganese	0.072	mg/l	0.003	6010	10/19/98	9:51	CR
Zinc	0.058	mg/l	0.003	6010	10/19/98	9:51	CR
Boron	0.763	mg/l	0.100	6010	10/20/98	9:13	CR
Barium, Dissolved	0.033	mg/l	0.006	6010	10/12/98	16:13	CR
Chromium, Dissolved	< 0.012	mg/l	0.012	6010	10/ 7/98	9:09	CR
Iron, Dissolved	< 0.008	mg/l	0.008	6010	10/ 7/98	9:09	CR
Manganese, Dissolved	0.047	mg/l	0.003	6010	10/ 7/98	9:09	CR
Zinc, Dissolved	< 0.003	mg/l	0.003	6010	10/ 7/98	9:09	CR
Boron, Dissolved	0.69	mg/l	0.10	6010	10/ 7/98	9:09	CR
Arsenic	< 2	ug/l	2.0	206.2	10/13/98	9:00	TB
Cadmium	< 0.2	ug/l	0.20	213.2	10/ 9/98	8:00	TB
Lead	< 1	ug/l	1.0	239.2	10/ 8/98	12:00	TB
Selenium	5.50	ug/l	3.00	270.2	10/ 9/98	14:37	TB
Arsenic, Dissolved	< 2	ug/l	2.0	206.2	10/ 7/98	14:00	TB
Cadmium, Dissolved	< 0.2	ug/l	0.20	213.2	10/ 9/98	8:00	TB
Lead, Dissolved	< 1	ug/l	1.0	239.2	10/ 8/98	12:00	TB
Selenium, Dissolved	< 3	ug/l	3.0	270.2	10/ 8/98	11:00	TB

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MVTL LABORATORIES, Inc.
P.O. BOX 249, 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

MEMBER ACIL

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Report Date: 7 Dec 1998

Lab Number: 98-L24811
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 10:41
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 5R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Calcium	123	mg/L	0.20	215.1	10/21/98	16:02	CR
Magnesium	41.4	mg/L	0.03	242.1	11/24/98	15:35	CR
Sodium	22.8	mg/L	0.05	EPA 273.1	12/ 5/98	10:08	TB
Calcium, Dissolved	81.5	mg/L	0.20	215.1	11/24/98	10:16	TB
Magnesium, Dissolved	40.0	mg/L	0.03	242.1	10/22/98	10:46	TB
Sodium, Dissolved	20.9	mg/L	0.05	273.1	10/21/98	14:24	TB
Nitrate	4.58	mg/L as N	NA	353.2	10/19/98	15:34	Calculated
Carbon, Total Organic	1.9	mg/L	1.0	415.1	10/19/98		OL

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

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Report Date: 7 Dec 1998

Lab Number: 98-L24812
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 13:00
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 9R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Appearance, Field	Clear		NA	2110			PO
Water Elevation	1024.47		NA	NA			PO
Temperature - Field	12.3	Degree C	NA	170.1			PO
Specific Conductance, Fld	895	umhos/cm	1.	120.1			PO
Specific Conductance	809.0	umhos/cm	0.1	120.1	10/12/98		BLS
pH, Field	7.0	units	1.0	150.1			PO
pH (Laboratory)	7.4	units	1.0	150.1	10/ 8/98	17:34	LF
Fluoride	< 0.1	mg/L	0.10	340.2	10/19/98	4:42	JD
Sulfate	99	mg/L	4	375.4	10/14/98	10:33	PG
Chloride	21.3	mg/L	3.0	325.2	10/14/98	13:35	PG
Nitrate+Nitrite	4.04	mg/L as N	0.01	353.2	10/19/98	15:34	PG
Nitrite	< 0.01	mg/L as N	0.01	EPA 353.2	10/ 8/98	9:35	PG
Phenolics, Total	< 5	ug/L	5	420.1	10/25/98	6:29	JD
Cyanide, Total	< 0.02	mg/L	0.02	335.2	10/20/98		JD
Chemical Oxygen Demand	< 5	mg/L	5	410.4	10/14/98		CR
Solids, Total Dissolved	535	mg/L	1	160.1	10/ 9/98	6:41	LF
Barium	0.079	mg/L	0.006	6010	10/23/98	8:16	CR
Chromium	< 0.012	mg/L	0.012	6010	10/19/98	9:51	CR

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

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Report Date: 7 Dec 1998

Lab Number: 98-L24812
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 13:00
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 9R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Iron	0.173	mg/L	0.008	6010	10/19/98	9:51	CR
Manganese	0.020	mg/L	0.003	6010	10/19/98	9:51	CR
Zinc	< 0.003	mg/L	0.003	6010	10/19/98	9:51	CR
Boron	< 0.1	mg/L	0.100	6010	10/20/98	9:13	CR
Barium, Dissolved	0.046	mg/L	0.006	6010	10/12/98	16:13	CR
Chromium, Dissolved	< 0.012	mg/L	0.012	6010	10/ 7/98	9:09	CR
Iron, Dissolved	0.022	mg/L	0.008	6010	10/ 7/98	9:09	CR
Manganese, Dissolved	0.004	mg/L	0.003	6010	10/ 7/98	9:09	CR
Zinc, Dissolved	< 0.003	mg/L	0.003	6010	10/ 7/98	9:09	CR
Boron, Dissolved	< 0.1	mg/L	0.10	6010	10/ 7/98	9:09	CR
Arsenic	< 2	ug/L	2.0	206.2	10/13/98	9:00	TB
Cadmium	0.30	ug/L	0.20	213.2	10/ 9/98	8:00	TB
Lead	< 1	ug/L	1.0	239.2	10/ 8/98	12:00	TB
Selenium	< 3	ug/L	3.00	270.2	10/ 9/98	14:37	TB
Arsenic, Dissolved	< 2	ug/L	2.0	206.2	10/ 7/98	14:00	TB
Cadmium, Dissolved	< 0.2	ug/L	0.20	213.2	10/ 9/98	8:00	TB
Lead, Dissolved	< 1	ug/L	1.0	239.2	10/ 8/98	12:00	TB
Selenium, Dissolved	< 3	ug/L	3.0	270.2	10/ 8/98	11:00	TB

Ol = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

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Report Date: 7 Dec 1998

Lab Number: 98-L24812
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 13:00
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 9R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Calcium	110	mg/L	0.20	215.1	10/21/98	16:02	CR
Magnesium	39.0	mg/L	0.03	242.1	11/24/98	15:35	CR
Sodium	8.00	mg/L	0.05	EPA 273.1	10/21/98	10:08	TB
Calcium, Dissolved	97.0	mg/L	0.20	215.1	11/24/98	10:16	TB
Magnesium, Dissolved	38.1	mg/L	0.03	242.1	11/24/98	10:46	TB
Sodium, Dissolved	8.30	mg/L	0.05	273.1	10/21/98	14:24	TB
Nitrate	4.04	mg/L as N	NA	353.2	10/19/98	15:34	Calculated
Carbon, Total Organic	2.1	mg/L	1.0	415.1	10/19/98		OL

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

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Report Date: 7 Dec 1998

Lab Number: 98-L24813
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 12:15
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 12R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Appearance, Field	Clear		NA	2110			PO
Water Elevation	76.70		NA	NA			PO
Temperature - Field	12.8	Degree C	NA	170.1			PO
Specific Conductance, Fld	794	umhos/cm	1.	120.1			PO
Specific Conductance	685.0	umhos/cm	0.1	120.1	10/12/98		BLS
pH, Field	7.1	units	1.0	150.1			PO
pH (Laboratory)	7.4	units	1.0	150.1	10/ 8/98	17:34	LF
Fluoride	< 0.1	mg/L	0.10	340.2	10/19/98	4:42	JD
Sulfate	60	mg/L	4	375.4	10/14/98	10:33	PG
Chloride	13.5	mg/L	3.0	325.2	10/14/98	13:35	PG
Nitrate+Nitrite	3.21	mg/L as N	0.01	353.2	10/19/98	15:34	PG
Nitrite	< 0.01	mg/L as N	0.01	EPA 353.2	10/ 8/98	9:35	PG
Phenolics, Total	< 5	ug/L	5	420.1	10/25/98	6:29	JD
Cyanide, Total	< 0.02	mg/L	0.02	335.2	10/20/98		JD
Chemical Oxygen Demand	< 5	mg/L	5	410.4	10/14/98		CR
Solids, Total Dissolved	443	mg/L	1	160.1	10/ 9/98	6:41	LF
Barium	0.153	mg/L	0.006	6010	10/23/98	8:16	CR
Chromium	< 0.012	mg/L	0.012	6010	10/19/98	9:51	CR

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Lab Number: 98-L24813
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DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 12:15
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 12R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Iron	2.433	mg/L	0.008	6010	10/19/98	9:51	CR
Manganese	0.030	mg/L	0.003	6010	10/19/98	9:51	CR
Zinc	0.015	mg/L	0.003	6010	10/19/98	9:51	CR
Boron	< 0.1	mg/L	0.100	6010	10/20/98	9:13	CR
Barium, Dissolved	0.030	mg/L	0.006	6010	10/12/98	16:13	CR
Chromium, Dissolved	< 0.012	mg/L	0.012	6010	10/ 7/98	9:09	CR
Iron, Dissolved	0.173	mg/L	0.008	6010	10/ 7/98	9:09	CR
Manganese, Dissolved	0.006	mg/L	0.003	6010	10/ 7/98	9:09	CR
Zinc, Dissolved	< 0.003	mg/L	0.003	6010	10/ 7/98	9:09	CR
Boron, Dissolved	< 0.1	mg/L	0.10	6010	10/ 7/98	9:09	CR
Arsenic	< 2	ug/L	2.0	206.2	10/13/98	9:00	TB
Cadmium	< 0.2	ug/L	0.20	213.2	10/ 9/98	8:00	TB
Lead	< 1	ug/L	1.0	239.2	10/ 8/98	12:00	TB
Selenium	< 3	ug/L	3.00	270.2	10/ 9/98	14:37	TB
Arsenic, Dissolved	< 2	ug/L	2.0	206.2	10/ 7/98	14:00	TB
Cadmium, Dissolved	< 0.2	ug/L	0.20	213.2	10/ 9/98	8:00	TB
Lead, Dissolved	< 1	ug/L	1.0	239.2	10/ 8/98	12:00	TB
Selenium, Dissolved	< 3	ug/L	3.0	270.2	10/ 8/98	11:00	TB

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

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MEMBER ACIL

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Report Date: 7 Dec 1998

Lab Number: 98-L24813
Work Order #: 31-393
Account #: 013138

DEAN STOCKWELL
WOODWARD CLYDE
6465 WAYZATA BLVD
MINNEAPOLIS MN 55426-1711

Date Received: 6 Oct 1998
Date Sampled: 6 Oct 1998
Time Sampled: 12:15
Temperature at Receipt: 3.2C

Project Name: DEZURIK
Sample Description: P 12R

Analyte	Result		RL	Method	Date Analyzed	Time Analyzed	Analyst
Calcium	90.0	mg/L	0.20	215.1	10/21/98	16:02	CR
Magnesium	28.2	mg/L	0.03	242.1	11/24/98	15:35	CR
Sodium	16.8	mg/L	0.05	EPA 273.1	12/ 5/98	10:08	TB
Calcium, Dissolved	71.0	mg/L	0.20	215.1	11/24/98	10:16	TB
Magnesium, Dissolved	27.5	mg/L	0.03	242.1	11/24/98	10:46	TB
Sodium, Dissolved	16.4	mg/L	0.05	273.1	10/21/98	14:24	TB
Nitrate	3.21	mg/L as N	NA	353.2	10/19/98	15:34	Calculated
Carbon, Total Organic	1.7	mg/L	1.0	415.1	10/19/98		OL

OL = Analysis Performed by an Outside Laboratory

MINNESOTA LAB # 027-015-125
WISCONSIN LAB ID # 999447680

All data for this report has been approved by MVTL Laboratory Management.

MINNESOTA VALLEY TESTING LABORATORIES, INC.
New Ulm, MN 56073 (507) 354-8517

Field Service

CHAIN OF CUSTODY RECORD

Project Name: DeZurik	Name of Samplers: Pete Otterness T. J. Newkirk	
Report To: Woodward Clyde Address: Dean Stockwell	Carbon Copy 1:	Carbon Copy 2:
Phone: Fax:	Work Order Number: 31-393 L24808-14	

"HOT"	Sample ID	Date	Time	Sample Type	Sample Location	Analysis
14	P-13A	5 Oct 98	12:10	H2O		See
L24808	P13B	5 Oct 98	4:27			Sheet
09	P13C	6 Oct 98	9:21			
11	P5R		10:42			
13	P12R		12:16			
12	P9R		1:01			
10	P13D		1:37			

"HOT" Sample is ≥ 100 ug/L Volatile Organic Chemicals (VOC's)

Comments:

Samples Relinquished by:	Date/Time: 6 Oct 98 4:30 Temp: 3.2	Received By: Alice Lueder	Date/Time: 10/6/98 16:00 Temp:
Samples Relinquished by:	Date/Time: Temp:	Received By:	Date/Time: Temp:

Means of Delivery: Samplers MVTL Courier Other:_____	Seals Intact? Yes No NA

MINNESOTA VALLEY TESTING LABORATORIES, INC.

New Ulm, MN 56073 (507) 354-8517

Groundwater Assessment

Site: DETROIT

Sampling Personnel: PETE OTTERNESS, T.J. NEWKIRK

Solid Waste Permit #:

Date: 05 OCT 98

Well Number: P13B

WELL INFORMATION

Well Depth: 86.90

Constructed Depth:

Casing Diameter: 4"

Well Volume: 5.1 Gallons

Water Depth Before: 78.75

Screen Interval:

Well Casing Elev:

Static Elevation:

Previous Static:

Water Depth After: 78.76

WELL CONDITION

Well Locked?: (Yes) / No

Well Labelled?: (Yes) / No

Casing Straight?: (Yes) / No

Protective Posts?: (Yes) / No

State ID Tag?: Yes / (No)

Grout Seal Intact?: Yes / (No)

SAMPLING INFORMATION

Sampling Method: Bladder / Bailer / (Grundfos) / Whale / Grab / Other:

Dedicated Equipment: Yes / (No)

Pumping Rate: 2.25 GPM.

Weather Conditions: 50 RAIN

Well Purged Dry?: Yes / (No)

Time Pumping Began: 4:12

Time Purged Dry: —

Time of Sampling: 4:22

Amount of Water Removed: 20.25 Gallons

Sample Appearance: CLEAR

Duplicate Sample?: Yes / (No) ID: —

Sample EH/ORP: —

Time	pH	Specific Cond.	Temp (Deg.Cel)	D.O. (mg/L)	Turbidity (NTU)	Water Removed (Gallons)
4:15	7.31	652	12.79	NA	NA	6.75
4:18	7.32	650	12.85			13.50
4:21	7.30	659	12.88			20.25

Comments:

Exceptions to Protocol:

8

MINNESOTA VALLEY TESTING LABORATORIES, INC.

New Ulm, MN 56073 (507) 354-8517

Groundwater Assessment

Site: DEZURIK

Sampling Personnel:
PETE OTTERNESS
T.J. NEWKIRK

Solid Waste Permit #:

Date: 06 OCT 98

Well Number: P 13C

WELL INFORMATION

Well Depth: 86.96

Constructed Depth:

Casing Diameter: 4"

Well Volume: 5.1 Gallons

Water Depth Before: 78.76

Screen Interval:

Well Casing Elev:

Static Elevation:

Previous Static:

Water Depth After: 78.80

WELL CONDITION

Well Locked?: (Yes) / No

Well Labelled?: (Yes) / No

Casing Straight?: (Yes) / No

Protective Posts?: (Yes) / No

State ID Tag?: Yes / (No)

Grout Seal Intact?: Yes / (No)

SAMPLING INFORMATION

Sampling Method: Bladder / Bailer / (Grundfos) / Whale / Grab / Other:

Dedicated Equipment: Yes / (No)

Pumping Rate: 1.5 GPM.

Weather Conditions: 44° CLOUDY

Well Purged Dry?: Yes / (No)

Time Pumping Began: 9:00

Time Purged Dry: —

Time of Sampling: 9:21

Amount of Water Removed: 30.0 Gallons

Sample Appearance: CLEAR

Duplicate Sample?: Yes / (NO) ID: —

Sample EH/ORP: —

Time	pH	Specific Cond.	Temp (Deg.Cel)	D.O. (mg/L)	Turbidity (NTU)	Water Removed (Gallons)
9:04	6.41	708	12.90	NA	NA	6.0
9:08	6.85	703	12.89	↓	↓	12.0
9:12	7.01	703	12.85	↓	↓	18.0
9:16	7.12	713	12.85	↓	↓	24.0
9:20	7.14	727	12.85	↓	↓	30.0

Comments:

Exceptions to Protocol:

MINNESOTA VALLEY TESTING LABORATORIES, INC.

New Ulm, MN 56073 (507) 354-8517

Groundwater Assessment Site: DEZURIK

Sampling Personnel: PETE OTTERNESS, T.J. NEWKIRK

Solid Waste Permit #:

Date: 06 Oct 96

Well Number: P13D

WELL INFORMATION

Well Depth: 86-96

Constructed Depth: ~~86-96~~

Casing Diameter:

Well Volume: 5.1 Gallons

Water Depth Before: 78.76

Screen Interval:

Well Casing Elev:

Static Elevation:

Previous Static:

Water Depth After: 78.70

WELL CONDITION

Well Locked?: (Yes) / No

Well Labelled?: (Yes) / No

Casing Straight?: (Yes) / No

Protective Posts?: (Yes) / No

State ID Tag?: Yes / (No)

Grout Seal Intact?: Yes / (No)

SAMPLING INFORMATION

Sampling Method: Bladder / Bailer / (Grundfos) / Whale / Grab / Other:

Dedicated Equipment: Yes / (No)

Pumping Rate: 1.5 GPM.

Weather Conditions: 48°, Cloudy

Well Purged Dry?: Yes / (No)

Time Pumping Began: 1:24

Time Purged Dry: —

Time of Sampling: 1:37

Amount of Water Removed: 18.0 Gallons

Sample Appearance: Clear

Duplicate Sample?: Yes / (No) ID: —

Sample EH/ORP: —

Time	pH	Specific Cond.	Temp (Deg.Cel)	D.O. (mg/L)	Turbidity (NTU)	Water Removed (Gallons)
1:28	7.27	601	12.73	NA	NA	6.0
1:32	7.30	600	12.85	↓	↓	12.0
1:36	7.17	614	12.87	↓	↓	18.0
				↓	↓	

Comments:

Exceptions to Protocol:

MINNESOTA VALLEY TESTING LABORATORIES, INC.

New Ulm, MN 56073 (507) 354-8517

Groundwater Assessment Site: DEZURIK

Sampling Personnel: PETE OTTERNESS, T.J. NEWKIRK

Solid Waste Permit #:

Date: 06 OCT 98

Well Number: P 5R

WELL INFORMATION

Well Depth: 81.38

Constructed Depth:

Casing Diameter: 4"

Well Volume: 4.4 Gallons

Water Depth Before: 74.42

Screen Interval:

Well Casing Elev: 1099.44

Static Elevation: 1025.02

Previous Static:

Water Depth After: 74.76

WELL CONDITION

Well Locked?: (Yes) / No

Well Labelled?: (Yes) / No

Casing Straight?: (Yes) / No

Protective Posts?: (Yes) / No

State ID Tag?: (Yes) / No

Grout Seal Intact?: (Yes) / No

SAMPLING INFORMATION

Sampling Method: Bladder / Bailer / (Grundfos) / Whale / Grab / Other:

Dedicated Equipment: Yes / (No)

Weather Conditions: 48°, Cloudy

Well Purged Dry?: Yes / (No)

Time Purged Dry: —

Amount of Water Removed: 22.5 Gallons

Duplicate Sample?: Yes / (No) ID: —

Pumping Rate: 1.5 GPM.

Time Pumping Began: 10:26

Time of Sampling: 10:42

Sample Appearance: clear

Sample EH/ORP: —

Time	pH	Specific Cond.	Temp (Deg.Cel)	D.O. (mg/L)	Turbidity (NTU)	Water Removed (Gallons)
10:29	6.65	1006	13.24	NA	NA	4.5
10:32	6.84	1007	13.18			9.0
10:35	6.98	1050	13.07			13.5
10:38	7.02	1076	13.00			18.0
10:41	7.05	1073	12.96			22.5

Comments:

Exceptions to Protocol:

MINNESOTA VALLEY TESTING LABORATORIES, INC.

New Ulm, MN 56073 (507) 354-8517

Groundwater Assessment Site: DEZURIK

Sampling Personnel: PETE OTTERNESS, T.J. NEWKIRK

Solid Waste Permit #:

Date: 06 Oct 98

Well Number: P-12R

WELL INFORMATION

Well Depth: 86.88

Constructed Depth:

Casing Diameter: 4"

Well Volume: 6.4 Gallons

Water Depth Before: 76.70

Screen Interval:

Well Casing Elev:

Static Elevation:

Previous Static:

Water Depth After: 76.71

WELL CONDITION

Well Locked?: (Yes) / No

Well Labelled?: (Yes) / No

Casing Straight?: (Yes) / No

Protective Posts?: (Yes) / No

State ID Tag?: Yes / (No)

Grout Seal Intact?: (Yes) / No

SAMPLING INFORMATION

Sampling Method: Bladder / Bailer / (Grundfos) / Whale / Grab / Other:

Dedicated Equipment: Yes / (No)

Pumping Rate: 1.5 GPM.

Weather Conditions: Cloudy, 48°

Well Purged Dry?: Yes / (No)

Time Pumping Began: 11:50

Time Purged Dry: ✓

Time of Sampling: 12:16

Amount of Water Removed: 37.5 Gallons

Sample Appearance: CLEAR

Duplicate Sample?: Yes / (No) ID: —

Sample EH/ORP: —

Time	pH	Specific Cond.	Temp (Deg.Cel)	D.O. (mg/L)	Turbidity (NTU)	Water Removed (Gallons)
11:55	5.57	745	12.04	NA	NA	7.5
12:00	6.63	721	12.05	↓	↓	15.0
12:05	6.96	763	12.06			22.5
12:10	7.32	770	~~11.89~~ 12.01 TJ			30.0
12:15	7.13	794	12.85			37.5

Comments:

Exceptions to Protocol:

MINNESOTA VALLEY TESTING LABORATORIES, INC.

New Ulm, MN 56073 (507) 354-8517

Groundwater Assessment

Site: DeZurik

Sampling Personnel: Pete Ottelness

T.J. Newkirk

Solid Waste Permit #:

Date: 05 OCT 98

Well Number: P13A

WELL INFORMATION

Well Depth: 86.96

Constructed Depth:

Casing Diameter: 4"

Well Volume: ~~4~~ ~~1.6~~ 5.1 Gallons

Water Depth Before: ~~78~~ 78.73

Screen Interval:

Well Casing Elev:

Static Elevation:

Previous Static:

Water Depth After: 78.85

WELL CONDITION

Well Locked?: (Yes) / No

Well Labelled?: (Yes) / No

Casing Straight?: (Yes) / No

Protective Posts?: (Yes) / No

State ID Tag?: Yes / No

Grout Seal Intact?: Yes / (No)

SAMPLING INFORMATION

Sampling Method: Bladder / Bailer / (Grundfos) / Whale / Grab / Other:

Dedicated Equipment: Yes / (No)

Pumping Rate: 2.25 GPM.

Weather Conditions: 53°, RAINY,

Well Purged Dry?: Yes / (No)

Time Purged Dry: —

Time Pumping Began: 12:00

Time of Sampling: 12:10

Amount of Water Removed: 20.25 Gallons

Sample Appearance: Clear

Duplicate Sample?: Yes / (No) ID: —

Sample EH/ORP: —

Time	pH	Specific Cond.	Temp (Deg.Cel)	D.O. (mg/L)	Turbidity (NTU)	Water Removed (Gallons)
12:03	7.23	650	12.79	NA	NA	6.75
12:06	7.17	648	12.85	↓	↓	13.50
12:09	7.23	648	12.85	↓	↓	20.25

Comments:

8.27

Exceptions to Protocol:

MINNESOTA VALLEY TESTING LABORATORIES, INC.

New Ulm, MN 56073 (507) 354-8517

Groundwater Assessment

Site: SARGENT / DETURK

Sampling Personnel:
PETE OTTERNESS
T.J. NEWKIRK

Solid Waste Permit #:

Date: 06 OCT 98

Well Number: P-9R

WELL INFORMATION

Well Depth: ~~85.97~~ 86.25 TJN

Constructed Depth:

Casing Diameter: 4"

Well Volume: 5.4 Gallons

Water Depth Before: 77.62

Screen Interval:

Well Casing Elev: 1102.09

Static Elevation: 1024.47

Previous Static:

Water Depth After: 77.62

WELL CONDITION

Well Locked?: (Yes) / No

Well Labelled?: (Yes) / No

Casing Straight?: (Yes) / No

Protective Posts?: (Yes) / No

State ID Tag?: Yes / No

Grout Seal Intact?: (Yes) / No

SAMPLING INFORMATION

Sampling Method: Bladder / Bailer / (Grundfos) / Whale / Grab / Other:

Dedicated Equipment: Yes / (No)

Weather Conditions: Cloudy 49°

Well Purged Dry?: Yes / (No)

Time Purged Dry: —

Amount of Water Removed: 30.0 Gallons

Duplicate Sample?: Yes / (No) ID: —

Pumping Rate: 1-5 GPM.

Time Pumping Began: 12:40

Time of Sampling: 1:01

Sample Appearance: CLEAR

Sample EH/ORP: -28.6

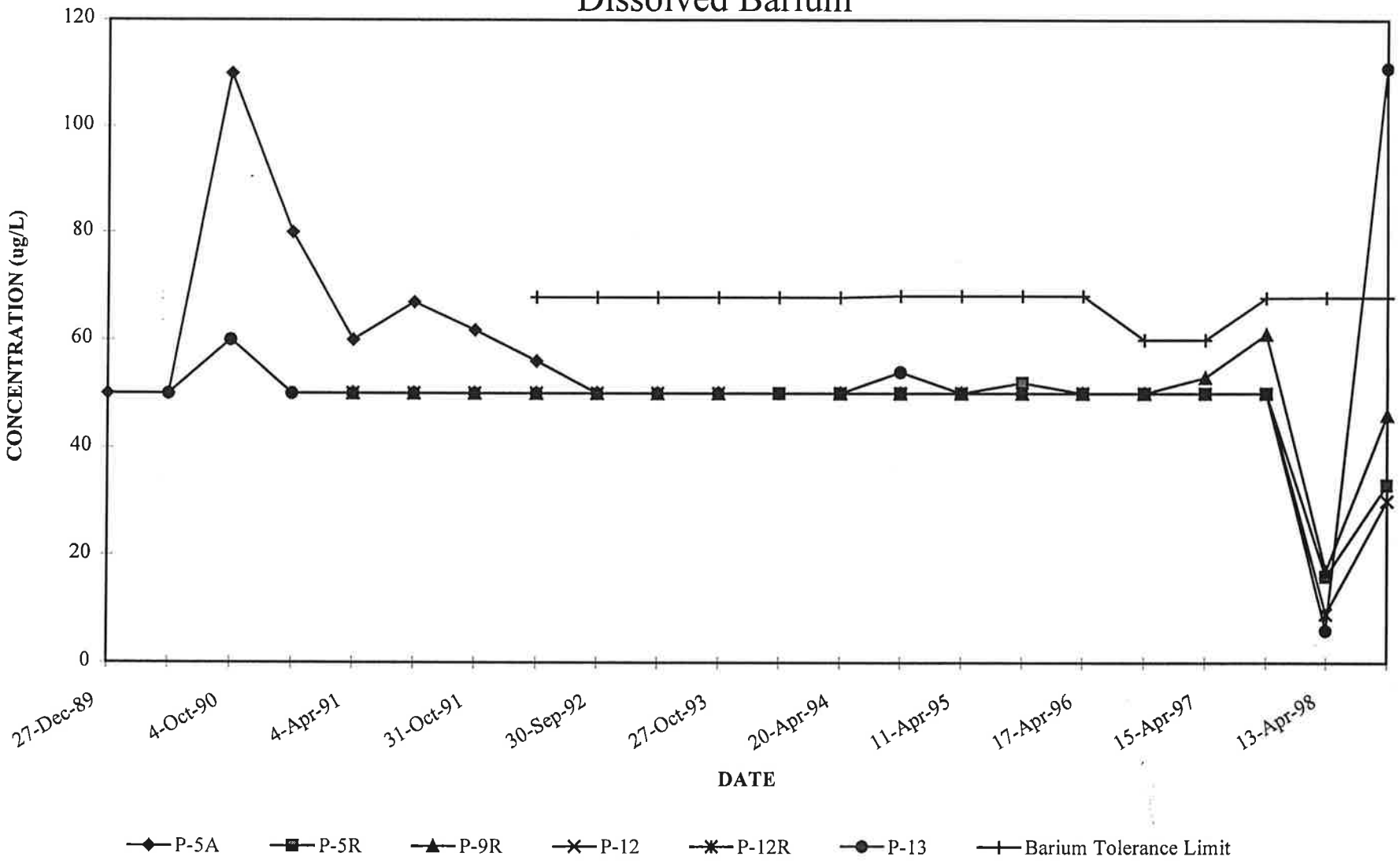
Time	pH	Specific Cond.	Temp (Deg.Cel)	D.O. (mg/L)	Turbidity (NTU)	Water Removed (Gallons)
12:44	5.96	770	12.36	NA	NA	6.0
12:48	6.14	839	12.37			12.0
12:52	6.75	927	12.31			18.0
12:56	6.92	890	12.29			24.0
1:00	6.94	895	12.28	↓	↓	30.0

Comments: —

Exceptions to Protocol:

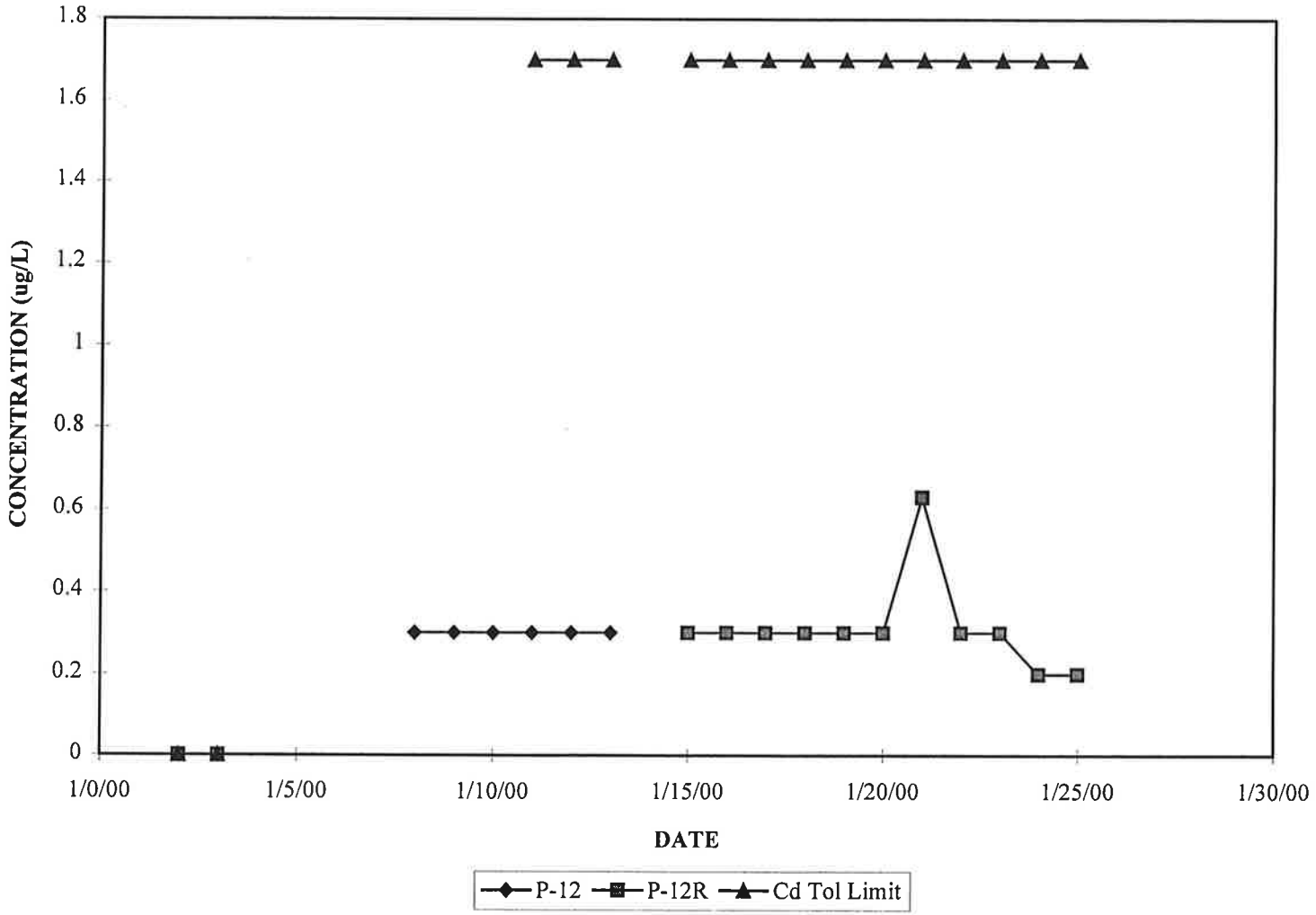
Appendix C
Groundwater Analytical Results Graphs

DEZURIK GROUNDWATER ANALYTICAL RESULTS



DEZURIK GROUNDWATER ANALYTICAL RESULTS

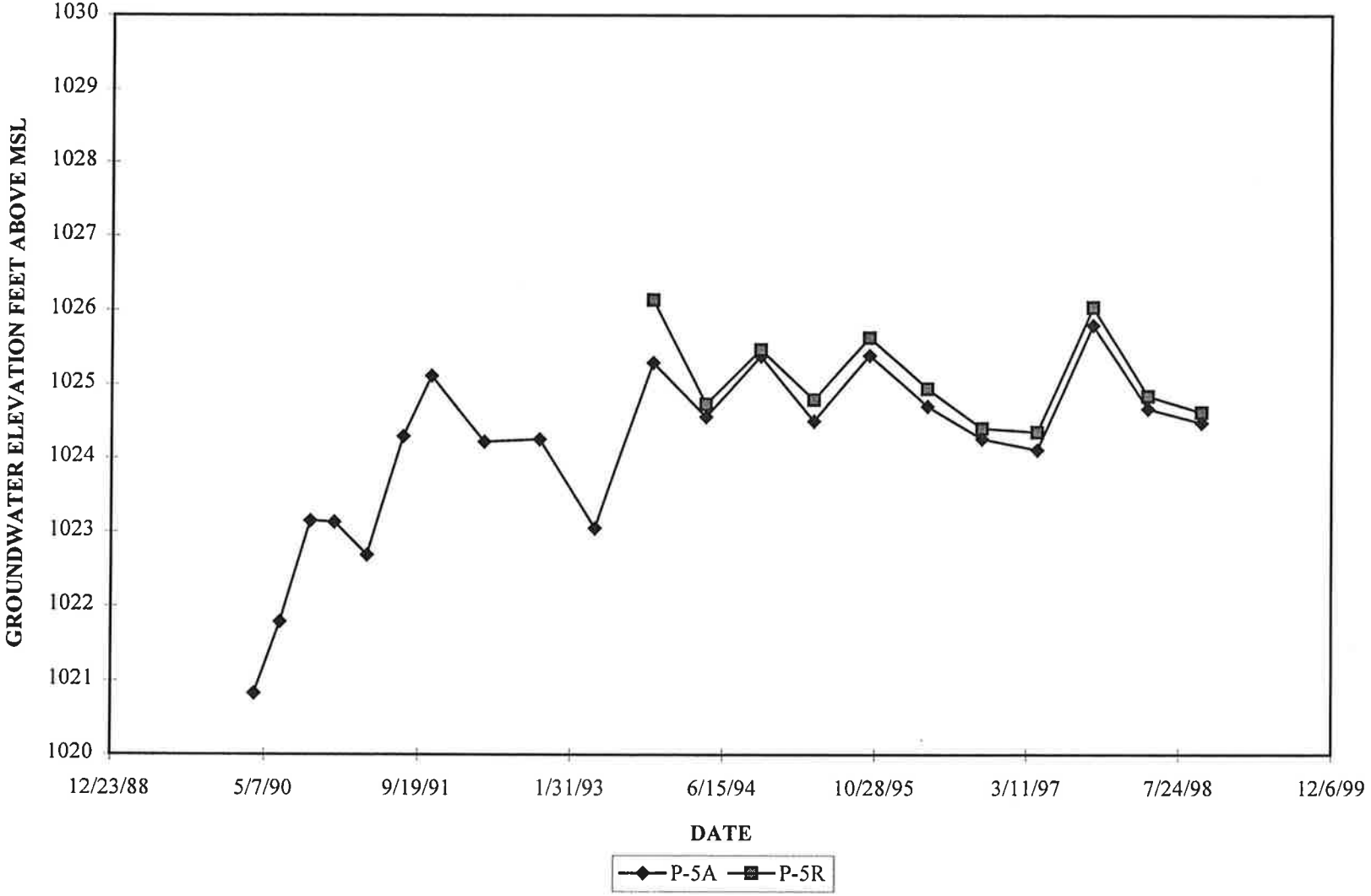
Dissolved Cadmium



Appendix D
Groundwater Elevation Graphs

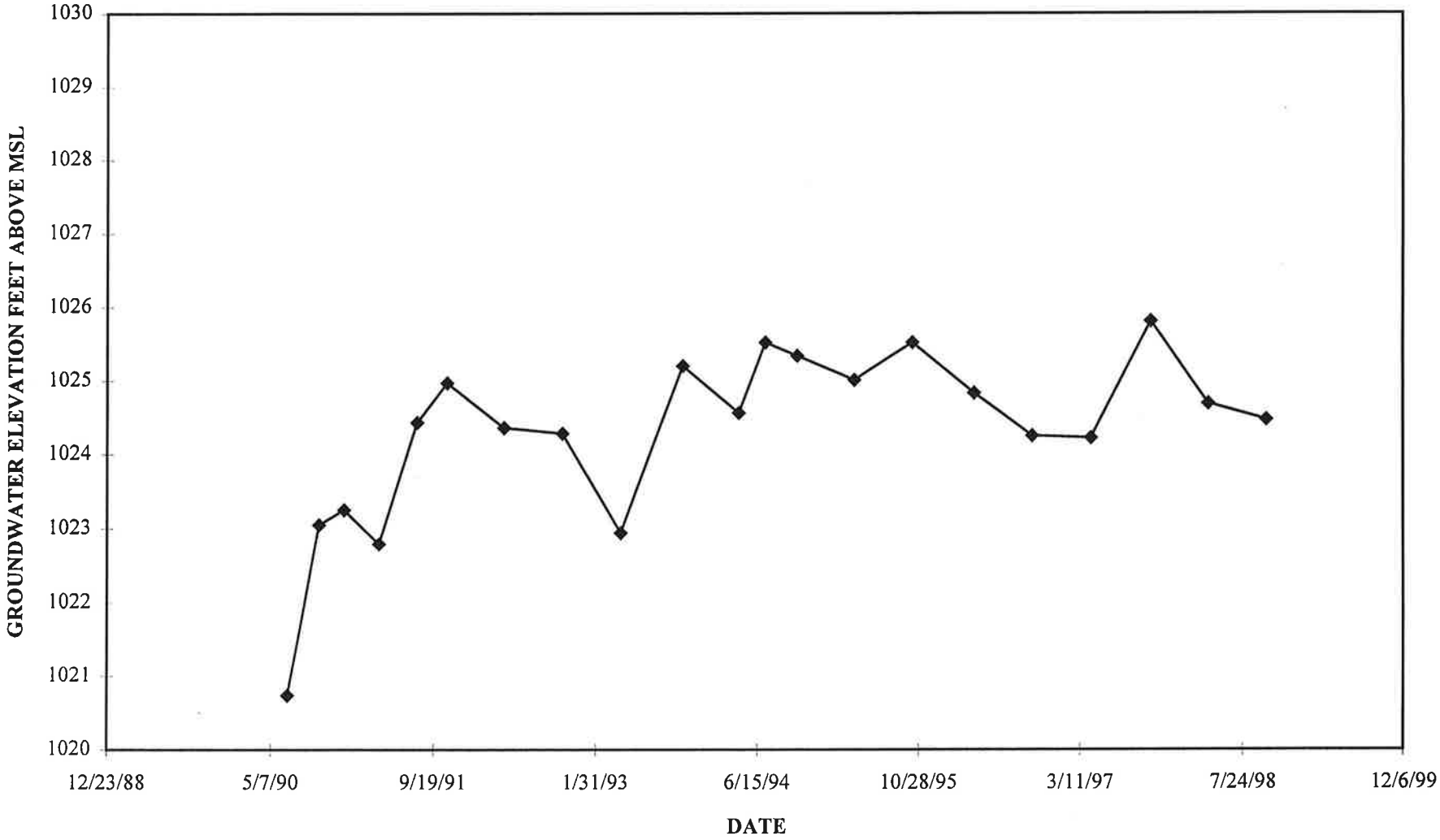
DEZURIK GROUNDWATER ELEVATION DATA

WELLS P-5A/5R



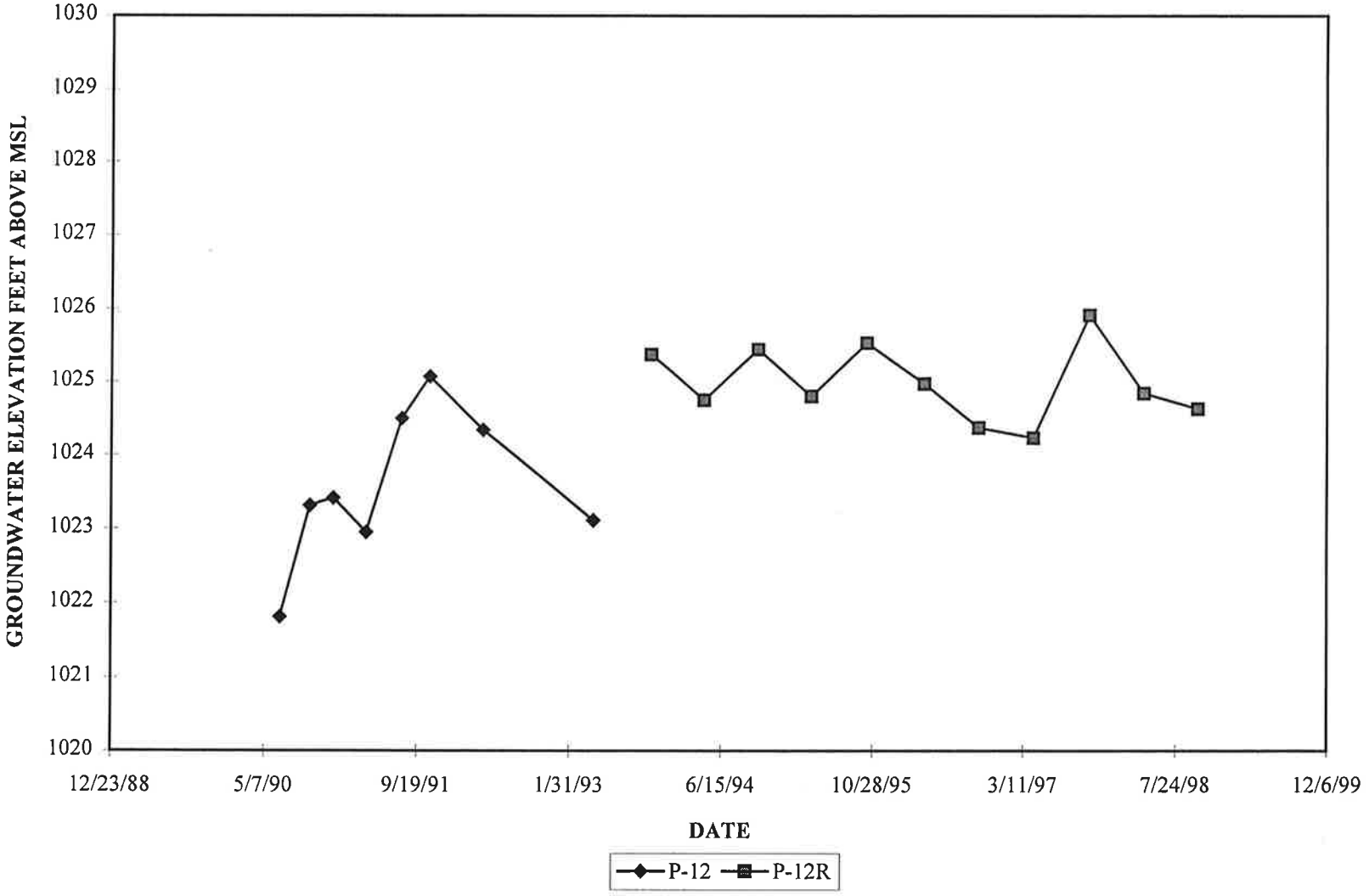
DEZURIK GROUNDWATER ELEVATION DATA

WELL P-9R



DEZURIK GROUNDWATER ELEVATION DATA

WELL P-12/12R



DEZURIK GROUNDWATER ELEVATION DATA

WELL P-13