MINERAL INTRUSION PROJECT FINAL DATA REPORT

by

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Kansas Geological Survey Open-File Report 96-24

With contributions from:

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Contents

I. Introduction

The Mineral Intrusion Project is a cooperative effort of the Kansas Geological Survey (KGS) and Big Bend Groundwater Management District No. 5 (GMD5). It has been supported by the Kansas Water Office (KWO) during Fiscal Years 1993-1996. The goal of the project is understanding and effective management of the problems associated with saltwater intrusion into the freshwater aquifer of eastern GMD5. The study area of the project is shown in Figure 1, as are the locations of the primary groundwater and surface water sampling and study sites identified in the data sets.

This report presents printed versions of the files of data collected or assembled by the project. These data files have been archived at KGS as Excel 5.0 spreadsheets, and have been distributed to GMD5 and KWO in electronic form. They are available from KGS electronically either on diskette or via ftp. For further information contact Janice Sorensen, Survey Librarian at (913)864-3965, or e-mail: jsorensen@pcmail.kgs.ukans.edu. Geophysical well logs (natural gamma and EM) have been archived in the KGS Geoscience Data Resources and are available in LAS format on disk, tape, or via ftp. For further information contact Susan Bolton at the above number or e-mail: sbolton@pcmail.kgs.ukans.edu.

This is a data compendium and does not address methods, interpretations or conclusions of the project. These may be found in the project publications, listed in section II of this report.

Section III of the report contains subsections presenting the various types of data assembled by the project. Each set of data file printouts is accompanied, as appropriate, by information describing the format, identifying the source, agency, or individuals contributing to it, and providing references to the topical reports dealing with the methods or results related to the data set.

The authors gratefully acknowledge the support of the Kansas Water Office, and the assistance of the technical and clerical staffs of KGS and GMD5 and of the project's Technical and Public Advisory Committees.

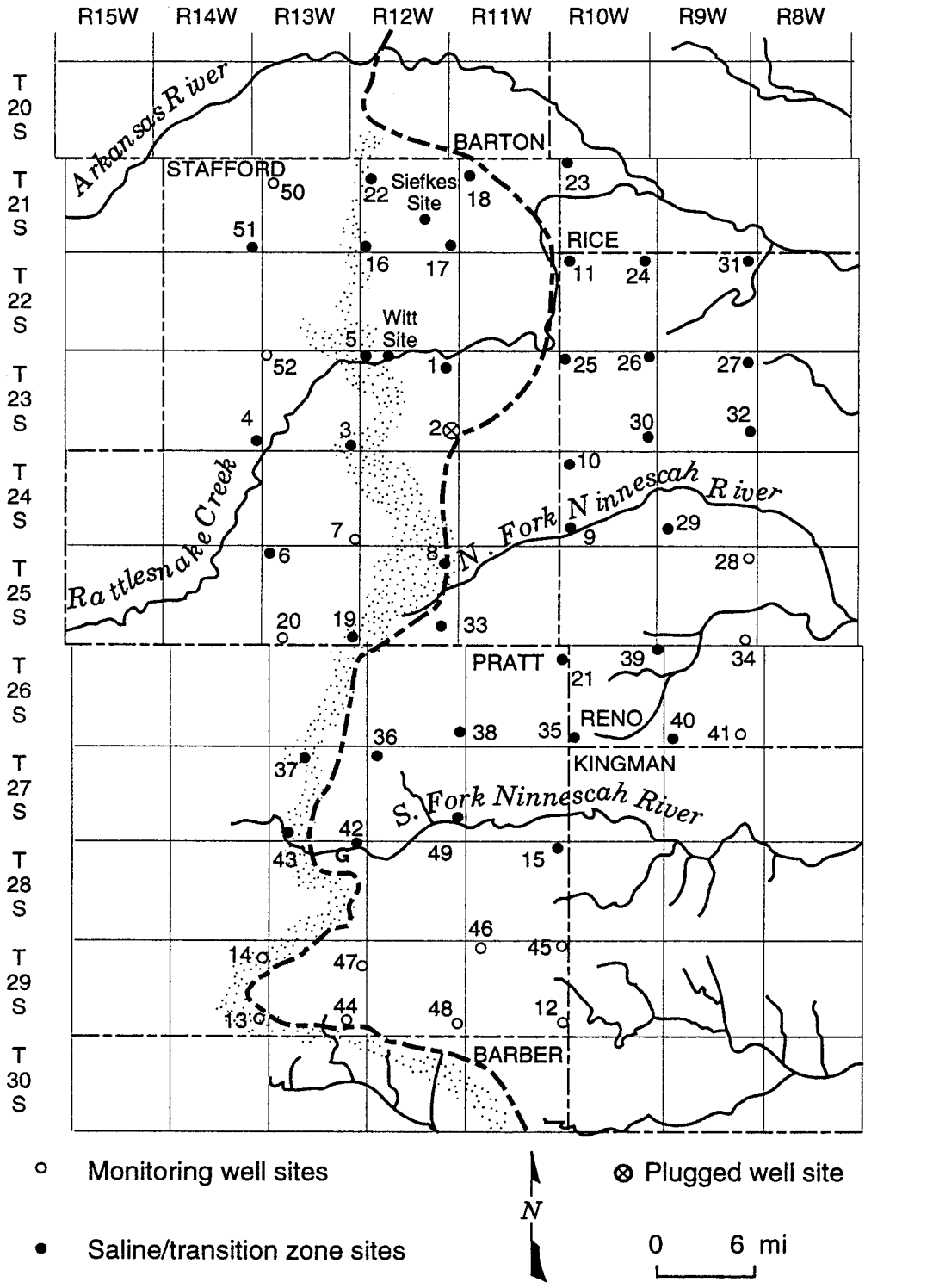


Figure 1. Monitoring well sites and site numbers, indicating the saline transition zone sites.

II. Project-related publications

A. Project reports and publications

Buddemeier, R. W., Sophocleous, M. A., and Whittemore, D. O., 1992. Mineral Intrusion: Investigation of Salt Contamination of Groundwater in the Eastern Great Bend Prairie Aquifer. Kansas Geological Survey Open-File Report 92-25, 45 p.

Buddemeier, R. W., Garneau, G., Healey, J. M., Ma, T-S., Sophocleous, M. A., Whittemore, D. O., Young, D., and Zehr, D., 1993. The Mineral Intrusion Project: Report of Progress during Fiscal Year 1993. Kansas Geological Survey Open-File Report 93-23, 55 p. plus appendices.

Buddemeier, R. W., Young, D. P., and Garneau, G. W., 1994. The mineral intrusion project, Progress and activities during fiscal year 1994: Aquifer Characteristics and Hydrogeology. Kansas Geological Survey Open-File Report 94-28d, 19 p.

Buddemeier, R. W., Garneau, G. W., and Young, D. P., 1994. The mineral intrusion project, Progress and activities during fiscal year 1994: Saltwater Inventories and Budgets. Kansas Geological Survey Open-File Report 94-28e, 12 p.

Buddemeier, R. W. and Falk, S., 1994. The mineral intrusion project, Progress and activities during fiscal year 1994: Mineral Intrusion Issues and Implications for Monitoring and Management. Kansas Geological Survey Open-File Report 94-28g, 5 p.

Buddemeier, R. W., 1994. The mineral intrusion project, Progress and activities during fiscal year 1994: Overview and Summary of FY94 Mineral Intrusion Studies. Kansas Geological Survey Open-File Report 94-28a, 13 p.

Buddemeier, R. W., Sawin, R. S., Whittemore, D. O., and Young, D. P., 1995. Salt Contamination of Ground Water in South-central Kansas. Kansas Geological Survey Public Information Circular 2, 4 p.

Buddemeier, R. W. and Quinodoz, H., 1996. Salt budgets and fluxes, Groundwater Management District No. 5. Kansas Geological Survey Open-File Report 96-25 (to be completed).

Butler, J. J., Jr., Liu, W. Z., and Young, D. P., 1993. Analysis of October 1993, slug tests in Stafford, Pratt, and Reno counties, south-central Kansas. Kansas Geological Survey Open-File Report 93-52, 70 p.

Garneau, G. W. and Buddemeier, R. W., 1992. Detection of the Saltwater Interface in the Great Bend Prairie Aquifer, South-Central Kansas, Using Focused Induction Conductivity Logging. Kansas Geological Survey Open-File Report 92-43, 13 p.

Garneau, G. W., Buddemeier, R. W., and Young, D. P., 1994. The mineral intrusion project, Progress and activities during fiscal year 1994: Characterization of the Saltwater Interface and Related Parameters. Kansas Geological Survey Open-File Report 94-28b, 23 p.

Garneau, G. W., Buddemeier, R. W., and Young, D. P., 1994. Natural and Induced Perched Salt-water Systems in the Great Bend Prairie Aquifer, South-central Kansas (abs.). EOS, Trans. Amer. Geophys. Union, Fall Meeting Supplement, p. 250.

Garneau, G. W., Buddemeier, R. W., and Young, D. P., 1994. Freshwater-saltwater Interface Detection and Transition Zone Characterization: Great Bend Prairie Aquifer, South-central Kansas (abs.). Geological Society of America, South-central Section, Little Rock, Arkansas, 1994 Program, p. 7.

Garneau, G. W., Young, D. P., and Buddemeier, R. W., 1995. The mineral intrusion project, Progress and activities during fiscal year 1995: Freshwater-saltwater interface and related transition zone parameter characterization in the mineral intrusion area of south-central Kansas. Kansas Geological Survey Open-File Report 95-45a, 23 p.

Garneau, G. W., 1995. Detection and characterization of the distribution of mineral intrusion in the Great Bend Prairie aquifer, south-central Kansas. Kansas Geological Survey Open-File Report 95-35, 119 p.

Ma, T-S. and Sophocleous, M.A., 1994. The mineral intrusion project, Progress and activities during fiscal year 1994: Simulations of saltwater upconing in the Great Bend Prairie unconfined aquifer. Kansas Geological Survey Open-File Report 94-28f, 123 p.

Ma, T-S. and Sophocleous, M.A., 1995. Numerical simulation of saltwater upconing at the Siefkes site, Stafford County, Kansas. Kansas Geological Survey Open-File Report 95-40, 71 p.

Ma, T-S. and Sophocleous, M.A., 1996. Dynamic simulation of saltwater intrusion at the Siefkes site, Stafford County, Kansas. Kansas Geological Survey Open-File Report 96-18.

Rubin, H. and Buddemeier, R. W., 1995. Initial Characterization of Groundwater Mineralization due to Seepage of Saline Water through Semiconfining Layers. Manuscript in preparation.

Rubin, H. and Buddemeier, R. W., 1995. Application of the Top Specified Boundary Layer (TSBL) Approximation to Initial Characterization of an Inland Aquifer Mineralization. Part 1: Direct Contact between Fresh and Saltwater. Journal of Contaminant Hydrology (submitted for publication).

Rubin, H. and Buddemeier, R. W., 1995. Application of the Top Specified Boundary Layer (TSBL) Approximation to Initial Characterization of an Inland Aquifer Mineralization. Part 2: Seepage of Saltwater through Semi-Confining Layers. Journal of Contaminant Hydrology (submitted for publication).

Rubin, H. and Buddemeier, R. W., 1996. A Top Specified Boundary Layer Approximation Approach for the Simulation of Groundwater Contamination Processes. Journal of Hydrology, vol. 22, p. 123-144.

Sophocleous, M. A. and Chung, C., 1993. Conceptual simulations of saltwater upconing with the USGS SUTRA model. Kansas Geological Survey Open-File Report 93-29, 55 p.

Whittemore, D. O., 1993. Ground-water geochemistry in the mineral intrusion area of Groundwater Management District No. 5, south-central Kansas. Kansas Geological Survey Open-File Report 93-2, 107 p. and 3 plates.

Whittemore, D. O., Young, D. P., and Buddemeier, R.W., 1994. Variations in multiple natural and anthropogenic contamination sources in a seasonally pumped well. Geol. Soc. Amer., Abstracts with Programs, vol. 26, no. 7, p. A-412.

Whittemore, D. O. Ground-water geochemistry in the mineral intrusion area of the Great Bend Prairie, south-central Kansas. Kansas Geological Survey Technical Series 6 (in review).

Young, D. P., 1993. Mineral Intrusion: geohydrology of Permian bedrock underlying the Great Bend Prairie aquifer in south-central Kansas. Kansas Geological Survey Open-File Report 92-44, 47 p.

Young, D. P., Garneau, G. W., Buddemeier, R. W., Zehr, D., and Lanterman, J., 1993. Elevation and variability of the freshwater-saltwater interface in the Great Bend Prairie aquifer, south-central Kansas. Kansas Geological Survey Open-File Report 93-55, 59 p. plus appendices.

Young, D. P., Garneau, G. W., Whittemore, D. O., Zehr, D., and Lanterman, J., 1994. The mineral intrusion project, Progress and activities during fiscal year 1994: Temporal variations in the amount and distribution of saltwater and freshwater. Kansas Geological Survey Open-File Report 94-28c, 66 p.

Young, D. P., Garneau, G. W., Buddemeier, R. W., Zehr, D., and Lanterman, J., 1995. The mineral intrusion project, Progress and activities during fiscal year 1995: Variability of freshwater-saltwater transition zone characteristics and related parameters in the Great Bend Prairie aquifer, south-central Kansas. Kansas Geological Survey Open-File Report 95-45b, 20 p. plus appendices.

Young, D. P., 1995. The mineral intrusion project, Progress and activities during fiscal year 1995: Effects of groundwater pumpage on freshwater-saltwater transition zone characteristics, water quality and water levels at the Siefkes intensive study site, Stafford County, Kansas. Kansas Geological Survey Open-File Report 95-45c, 23 p.

Young, D. P., Healey, J. M., and Whittemore, D. O., 1995. The mineral intrusion project, Progress and activities during fiscal year 1995: Initial monitoring results and installation details from the Witt intensive study site on Rattlesnake Creek, Stafford County, Kansas. Kansas Geological Survey Open-File Report 95-45d, 19 p. plus appendices.

Young, D. P., 1995. Comparison of surface and downhole electromagnetic induction measurements in the Great Bend Prairie, Kansas: notes on vertical interpretations of EM34 measurements. Kansas Geological Survey Open-File Report 95-49b, 27 p.

Young, D. P. and Healey, J. M., 1995. Rattlesnake Creek conductivity survey, Stafford County, Kansas, May 1995. Kansas Geological Survey Open-File Report 95-49c. 6 p. and 2 plates.

B. Related and derivative publications

Buddemeier, R. W., Pouch, G. W., Sophocleous, M. A., Mitchell, J. E., 1995. Hydrologic Applications of Radar-based Precipitation Estimates: A Final Report on the Results of National Science Foundation Grant EAR-9321721, "Use of a High-Resolution analysis of a Natural Extreme Event to Characterize Hydrologic System Dynamics."

Buddemeier, R. W., 1995. Kansas water research and data needs, 1995-2000. Kansas Geological Survey Open-File Report 95-46.

Cobb, P. M., Colarullo, S. J., Heidari, M., 1982. A groundwater flow model for the Great Bend aquifer, south-central Kansas. Kansas Geological Survey Open-File Report 82-20, 29 p.

Gillespie, J. B., Hargadine, G. D.1993. Geohydrology and saline ground-water discharge to the South Fork Ninnescah River in Pratt and Kingman counties, south-central Kansas. Kansas Geological Survey Water-Resources Investigations Report 93-4177, 51 p.

KCC, 1986. Report of the committee concerning disposal of oil field brine into Permian formations in south central Kansas. Unpublished report by Oil and Gas Advisory Committee.

Rohs, C. R. and Kruger, J. M., 1995. EM 34-3 Geophysical survey of apparent ground conductivity in the Rattlesnake Creek subbasin, Kansas. Kansas Geological Survey Open-File Report 95-49a.

Rubin, H., 1994. Approximate Methods for the Simulation of Groundwater contamination Processes. Kansas Geological Survey Open-File Report 94-7.

Rubin, H., 1994. Numerical Schemes Applicable in Contaminant Hydrology Calculations. Kansas Geological Survey Open-File Report 94-8.

Rubin, H, Buddemeier, R.W., 1996. Transverse dispersion of contaminants in fractured permeable formations. Journal of Hydrology, vol. 176, p. 133-151.

Sophocleous, M. A., 1992. Modifications and improvements on the Lower Rattlesnake Creek-Quivira Marsh Stream-Aquifer numerical model. Kansas Geological Survey Open-File Report 92-37, 15 p.

Sophocleous, M. A., Stern, A., 1993. Eighteen GIS hydrologic maps of the Big Bend Ground-water management District No. 5 (GMD5). Kansas Geological Survey Open-File Report 93-3, 11 p.

Sophocleous, M. A., Perkins, S. P., Pourtakdoust, S., 1993. Stream-aquifer numerical modeling of the Kinsley to Great Bend reach of the Arkansas River in central Kansas: final report. Kansas Geological Survey Open-File Report 93-21, 106 p. plus appendices.

Sophocleous, M. A., Stern, A., Perkins, S. P., 1996. Hydrologic impact of the Great Flood of 1993 in south-central Kansas. Journal of Irrigation and Drainage Engineering, American Society of Civil Engineers, vol. 122, no. 4, in press.

Young, D. P., 1995. Comparison of surface and downhole electromagnetic induction measurements for saltwater interface detection. Proceedings of the 16th Annual American Geophysical Union Hydrology Days, April 15-18, 1995, Fort Collins, Colorado, p. 535-546.

III. Data sets

Below is a listing of data files for the Mineral Intrusion project, followed by printouts of the data sheets. Filenames are listed in capital letters and are followed by a description of the contents. All files are saved as Excel 5.0 spreadsheets.

Locations of monitoring sites are shown in Figure 1. Legal locations of the sites are given in the file WL_HIST.XLS. A more detailed map of the Siefkes intensive study area is provided in Figure 2; locations and descriptions of wells at the Siefkes site are given in Table 1. A map of the Witt intensive study area is provided in Figure 3, and a cross section in Figure 4. Information for wells at the Witt site is listed in Table 2.

Some data collected by and for the project were not used in primary analyses or output and will not be included in this report. Examples are fluid conductivity logs and pressure transducer measurements collected at some monitoring sites. These are being used in an innovative approach of characterizing vertical head gradients in variable-density groundwater systems. Work is still in progress on the approach and application. Interested parties should contact the first author.

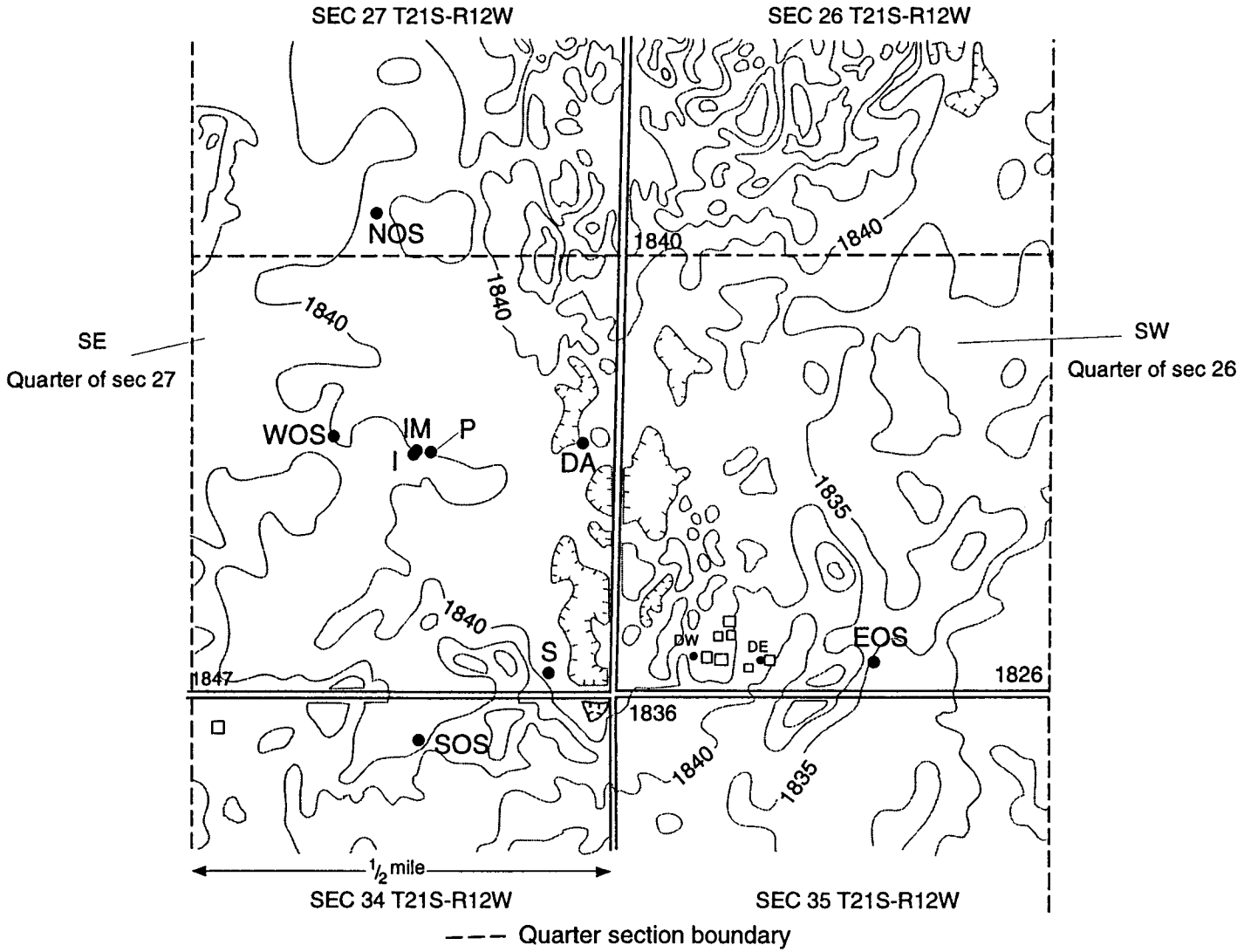


Figure 2. Wells in Siefkes intensive study area. See table 1 for well identification and characteristics. Contours indicate approximate elevation of land surface (feet above mean sea level).

Table 1: Information for wells in the Siefkes intensive study area.

Legal location	Well	Description	Screen (bls)	Depth (bls)	Land surface elev.	Elev. top of screen	Elev. bottom of well
21-12-27DACC	I	Irrigation well near center of SE Sec. 27 T21S-R12W	60-80 90-120	120	1840.7	1780.7	1720.7
21-12-27DBDC	WOS	Oil-field supply well west of irrigation well	65-85	85	1839.4	1774.4	1754.4
21-12-27DACC	IM	2" monitoring well near irrigation well	--	60	1840.7	--	1780.7
21-12-27ACDD	NOS	Oil-field supply well north of irrigation well	100-120	120	1839.0	1739.0	1719.0
21-12-27DDDC	S	Stock well southeast of irrigation well	80-90	90	1836.3	1756.3	1746.3
21-12-34AAB	SOS	Oil-field supply well south of irrigation well	80-100	100	1841.0	1761.0	1741.0
21-12-26CDCC	EOS	Oil-field supply well east of irrigation well	80-100	100	1832.9	1752.9	1732.9
21-12-27DACC	P	KGS Permian monitoring well	198-228	228	1839.6	1641.6	1611.6
21-12-27DADD	DA	KGS deep aquifer monitoring well	157-167	167	1839.8	1682.8	1672.8

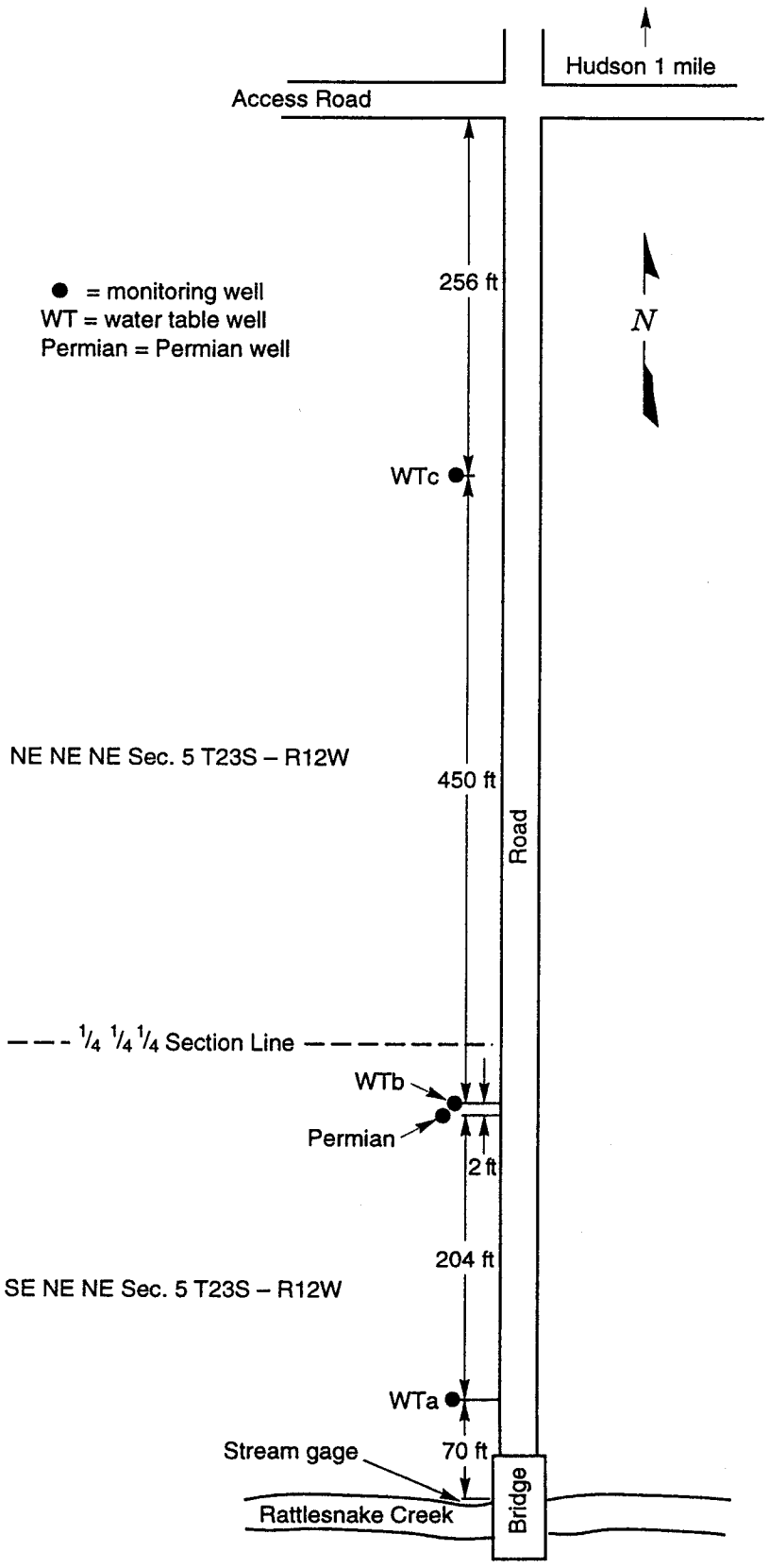


Figure 3. Plan of Witt Intensive Study Site.

Table 2. Information for wells at the Witt Intensive Study Site.

ID	Location	Elev. (ft)	Depth (ft)	Screen (ft)
WTa	NE SE NE NE Sec 5 T23-R12	1841.1	37	32 – 37
WTb	NE SE NE NE Sec 5 T23-R12	1843.7	38	33 – 38
WTc	NE NE NE NE Sec 5 T23-R12	1842.2	36.5	31.5 – 36.5
Permian	NE SE NE NE Sec 5 T23-R12	1843.7	179	159 – 179

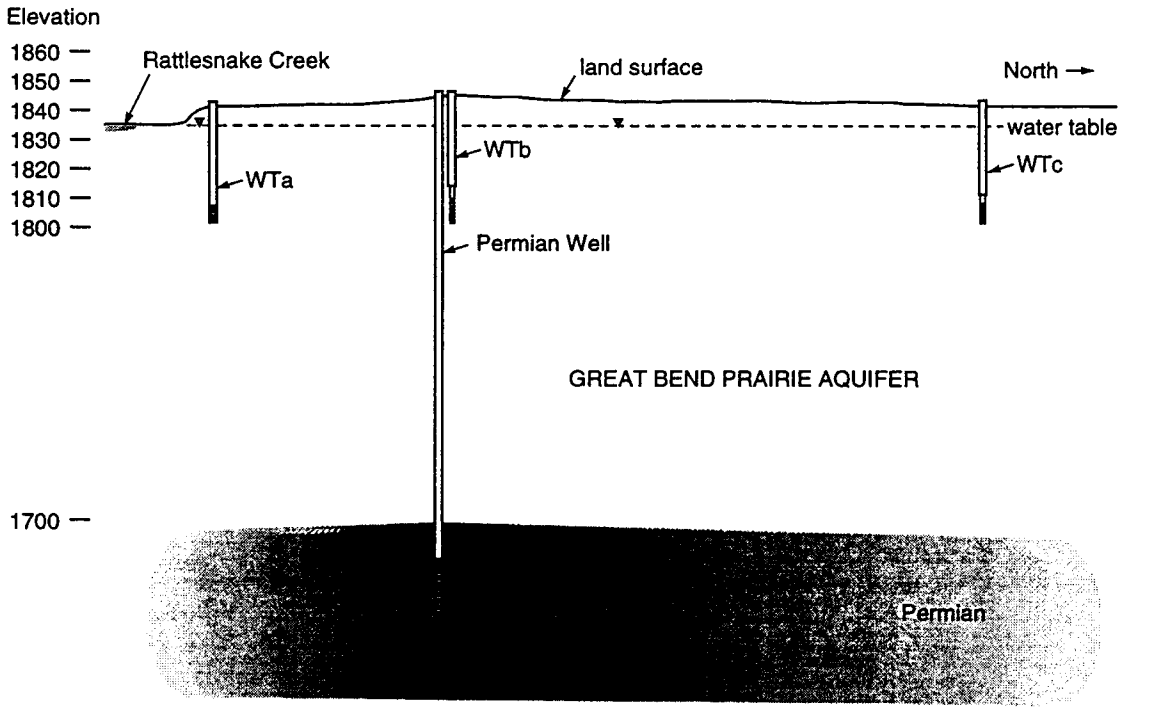


Figure 4. Cross section of Witt Intensive Study Site. Vertical exaggeration: 2.5x.

A. Groundwater levels

WL_HYD.XLS

This file contains combined GMD5 and KGS water level measurements from Mineral Intrusion monitoring well sites from January 1993 through June 1996. The data are grouped by site number. At each site, well 1 is the deepest and is normally completed in Permian bedrock. Well 2 is normally completed at or near the base of the Great Bend Prairie (alluvial) aquifer. At most sites, well 3 is the shallowest, completed at shallow to intermediate depths in the unconsolidated Quaternary aquifer; at a few sites there are four wells, the number 4 well is the shallowest and the number 3 well is at an intermediate depth between the number 2 and 4 wells.

The data presented in the "well" columns are depths to water (from local ground level) in feet on the dates indicated in the left-hand column. The "500 mg/L" column includes depth to the 500 mg/L chloride level, estimated from processed EM logs, for sites with a freshwater/saltwater transition zone. See Garneau (1995) for log processing methods.

This spreadsheet, containing the most comprehensive compilation of water level measurements for the period of the study, contains well hydrographs as embedded charts. In addition to water levels in wells, these hydrographs show the depth to the 500 mg/L chloride level on dates that well logs were collected. Some examples are included as printouts.

WL_GMD5.XLS

GMD5's quarterly (and monthly where available) water level measurements from January 1993 through May 1996. This spreadsheet summarizes recent water level information for the Mineral Intrusion monitoring well sites, with emphasis on 1993-96 observations and summary comparison data for the period 1987-93.

The data presented in the "well" columns are depths to water (from local ground level) in feet on the dates indicated in the left-hand column. The right-hand group of columns (labeled 1-2, etc.) give the differences (in feet) between the water levels of the indicated wells. A negative number indicates that the deeper well has a higher water level elevation than the shallower well, creating a potential for the upward flow of water. These differences are calculated on the assumption that ground level is at the same elevation for all wells at the same site; this is a reasonable approximation, but is not strictly accurate and the actual elevations may differ by up to a foot at some sites.

The rows labeled AVG 93-96 and STD 93-96 for each site give the appropriate elevation and difference averages and standard deviations for 1993-96 measurements, respectively. The rows labeled AVG 87-93 and STD 87-93 give the averages and standard deviations, respectively, for all measurements during the years 1987-93. These values are included to give a longer term perspective on the values and variabilities, since 1993 was an unusually high recharge year. In the interest of saving space and trees, only the AVG and STD rows are included in the printout. However, the water level measurements are included in the WL_HYD.XLS printout.

WL_HIST.XLS

This file contains GMD5's quarterly (and monthly where available) water level measurements from the monitoring well network from inception through May 1996. Bacause it is background information and voluminous, a printout will not be included in this data report. The 1993-96 data is included in WL_HYD.XLS and WL_GMD5.XLS.

SIEFWL96.XLS

Contains two sheets: SIEFWLS and PUMP CYCLE.

SIEFWLS sheet contains water level and water use information from the Siefkes intensive study site near an irrigation well; it also includes the 500 mg/L chloride elevation estimated from processed logs (see Garneau, 1995). Well hydrographs are included as embedded charts.

PUMP CYCLE sheet includes water levels from wells and specific conductance of pumped water during a single pumping cycle at the Siefkes site.

See Figure 2 and Table 1 for well locations and descriptions.

WITTWL96.XLS

Water level and stream level data from the Witt intensive study site on Rattlesnake Creek. Also includes 500 mg/L chloride level estimated from processed logs (see Garneau, 1995). Well and stream hydrographs are included as embedded charts. See Figures 3 and 4 and Table 2 for well locations and descriptions.

B. Groundwater quality (chemical analyses)

CHEM.XLS

Water chemistry data for all water samples collected and analyzed by KGS for the Mineral Intrusion project. Portions of these data are also listed in SIEFCHEM.XLS and WITTCHEM.XLS spreadsheets, which contain water chemistry data that are exclusively from the Siefkes and Witt sites, respectively.

SIEFCHEM.XLS

Water chemistry data for all water samples collected at the Siefkes site. These data are also listed in CHEM.XLS.

WITTCHEM.XLS

Water chemistry data from the Witt site. This file contains two sheets.
The FIELD sheet contains specific conductance and stream level data collected from Rattlesnake Creek in the field.
The LAB sheet contains results of water chemistry analyses from the KGS lab. These data are also listed in CHEM.XLS.

C. Well logs

Approximately 250 natural gamma and electromagnetic induction (EM) logs were collected by the Mineral Intrusion project. EM logs measure formation conductivity and were used to characterize and track the freshwater/saltwater interface in the Great Bend Prairie aquifer. Raw logs have been archived in the KGS Geoscience Data Resources and are available in LAS format on disk, tape, or via ftp. For further information contact Susan Bolton at (913)864-3965 or e-mail: sbolton@pcmail.kgs.ukans.edu. Some logs were published in previous MI reports.

LOG_DATA.XLS

This file lists data obtained from processed EM logs at sites with a freshwater/saltwater transition zone. See Garneau (1995) for log processing methods and definition of parameters. Data include the estimated depth to the 500 mg/L chloride level for all logs, and maximum chloride concentration and mean chloride concentration in the Great Bend Prairie aquifer for 1995-96 logs.

D. Aquifer characteristics

AQ_CHAR.XLS

Table 1 in this spreadsheet contains results of all known tests for hydraulic conductivity of the Permian bedrock in the study area, including both field (Kf) and lab (Kp) tests. Table 2 in this spreadsheet contains a less exhaustive summary of the hydrogeologic characteristics of the overlying Great Bend Prairie aquifer. Most of these listings have been reviewed previously by Young (1992) and/or Buddemeier et al. (1994). See Sophocleous et al. (1993) for more information on hydrogeologic properties of the Great Bend Prairie aquifer, including the Arkansas River alluvium.

E. Surface water data (flow and quality)

RSC.XLS

Contains data on flow and chloride concentrations at various stations on Rattlesnake Creek and various tributaries. Data were collected and compiled from various sources by Dan Zehr, GMD5.

NORTFORK.XLS

Contains data on flow and chloride concentrations at various stations on the North Fork of the Ninnescah River and various tributaries. Data were collected and compiled from various sources by Dan Zehr, GMD5.

A. Groundwater levels

WL_HYD.XLS
WL_GMD5.XLS
WL_HIST.XLS
SIEFWL96.XLS
WITTWL96.XLS

WL_HYD.XLS

This file contains combined GMD5 and KGS water level measurements from Mineral Intrusion monitoring well sites from January 1993 through June 1996. The data are grouped by site number. At each site, well 1 is the deepest and is normally completed in Permian bedrock. Well 2 is normally completed at or near the base of the Great Bend Prairie (alluvial) aquifer. At most sites, well 3 is the shallowest, completed at shallow to intermediate depths in the unconsolidated Quaternary aquifer; at a few sites there are four wells, the number 4 well is the shallowest and the number 3 well is at an intermediate depth between the number 2 and 4 wells.

The data presented in the "well" columns are depths to water (from local ground level) in feet on the dates indicated in the left-hand column. The "500 mg/L" column includes depth to the 500 mg/L chloride level, estimated from processed EM logs, for sites with a freshwater/saltwater transition zone. See Garneau (1995) for log processing methods.

This spreadsheet, containing the most comprehensive compilation of water level measurements for the period of the study, contains well hydrographs as embedded charts. In addition to water levels in wells, these hydrographs show the depth to the 500 mg/L chloride level on dates that well logs were collected. Some examples are included as printouts.

WL_HYD.XLS: Combined GMD5 and KGS water level measurements.
Data in the "well" columns are depth to water measurements (ft below land surface) in wells in the KGS/GMD5 monitoring well network on the dates indicated in the left-hand column.
The "500 mg/L" column includes depth to the 500 mg/L chloride level, estimated from processed EM logs. See Garneau (1995) for log processing methods.
Well hydrographs, which also show the depth to the 500 mg/L chloride level, are included as embedded charts to the right.

SITE 1	WELL 1	WELL 2	WELL 3				500 mg/L	
1/13/93	9.60	8.52	8.17			1/13/93		
3/26/93	6.80	5.70	5.30			3/26/93	94.60	
3/29/93	6.90	5.75	5.34			3/29/93		
7/1/93	4.90	3.60	3.02			7/1/93		
8/25/93	7.00	5.80	5.20			8/25/93		
10/5/93	7.82	6.70	6.25			10/5/93		
1/6/94	7.97	6.83	6.51			1/6/94		
3/23/94	7.96	6.85	6.49			3/23/94		
4/4/94	6.43	6.93	6.48			4/4/94		
4/15/94	6.02	6.51	6.35			4/15/94	94.10	
5/26/94	6.48	6.89	6.67			5/26/94		
6/28/94	7.94	8.45	8.00			6/28/94		
10/5/94	9.65	10.20	9.85			10/5/94		
1/23/95	9.26	9.77	9.38			1/23/95		
4/5/95	9.09	9.36	8.76			4/5/95		
4/25/95	8.77	9.24	8.88			4/25/95	95.52	
7/11/95	5.63	5.88	5.45			7/11/95		
10/3/95	7.84	8.54	8.12			10/3/95		
1/11/96	8.15	8.65	8.29			1/11/96		
4/12/96	8.04	8.53	8.15			4/12/96		

SITE 3	WELL 1	WELL 2					500 mg/L	
1/14/93	31.44	28.40				1/14/93		
2/19/93	30.64	27.86				2/19/93		
3/19/93	29.29	26.86				3/19/93		
4/19/93	28.31	25.73				4/19/93		
5/19/93	25.73					5/19/93	100.15	
6/16/93	24.97	21.75				6/16/93		
7/13/93	19.62	16.17				7/13/93		
8/10/93	17.17	13.56				8/10/93		
9/9/93	19.40	16.32				9/9/93		
10/5/93	21.05	18.00				10/5/93		
11/5/93	21.27	18.73				11/5/93		
12/1/93	21.60	18.90				12/1/93		
1/3/94	22.01	19.24				1/3/94		
2/2/94	22.40	19.55				2/2/94		
2/28/94	22.64	19.87				2/28/94		
3/28/94	23.04	20.24				3/28/94		
4/13/94	23.31	20.54				4/13/94	101.85	
5/5/94	23.52	20.64				5/5/94		

5/25/94	24.49	21.39				5/25/94		
7/6/94	26.84	23.81				7/6/94		
7/26/94	27.81	24.35				7/26/94		
8/25/94	28.31	24.94				8/25/94		
9/21/94	28.10	24.72				9/21/94		
10/19/94	28.03	24.88				10/19/94		
11/17/94	27.97	24.43				11/17/94		
12/13/94	27.84	24.60				12/13/94		
1/12/95	27.73	24.48				1/12/95		
2/9/95	27.85	24.47				2/9/95		
3/9/95	27.92	24.59				3/9/95		
4/6/95	27.89	24.54				4/6/95		
4/26/95	27.97	24.59				4/26/95	104.72	
5/5/95	27.98	24.59				5/5/95		
6/2/95	20.76	14.12				6/2/95		
6/27/95	20.28	15.68				6/27/95		
7/25/95	22.75	18.90				7/25/95		
8/29/95	25.87	22.21				8/29/95		
9/29/95	25.41	22.44				9/29/95		
10/11/95	25.96	22.70				10/11/95	104.96	
11/6/95	25.81	22.70				11/6/95		
12/6/95	26.19	22.79				12/6/95		
1/5/96	25.89	22.97				1/5/96		
2/13/96	26.19	22.88				2/13/96		
3/13/96	26.24	22.98				3/13/96		
4/9/96	26.48	23.44				4/9/96		
5/8/96	26.76	23.51				5/8/96		
SITE 4	WELL 1	WELL 2	WELL 3				500 mg/L	
1/14/93	6.00	6.72	9.74			1/14/93		
3/29/93	5.95	6.00	8.70			3/29/93		
4/22/93	5.80	5.80	8.70			4/22/93	65.14	
7/1/93	5.44	5.07	7.74			7/1/93		
10/5/93	5.38	4.57	8.98			10/5/93		
1/5/94	5.12	3.62	8.10			1/5/94		
4/6/94	5.29	3.33	8.25			4/6/94		
4/13/94	5.54	3.16	7.87			4/13/94	65.13	
7/6/94	5.18	4.16	9.90			7/6/94		
10/7/94	5.17	6.30	11.34			10/7/94		
1/18/95	5.23	5.65	10.20			1/18/95		
4/6/95	5.30	5.22	9.48			4/6/95		
5/4/95	5.19	5.04	9.14			5/4/95	66.62	
7/14/95	4.80	4.40	8.73			7/14/95		
10/3/95	5.06	5.77	10.06			10/3/95		
1/11/96	4.75	5.17	9.36			1/11/96		
4/9/96	4.39	4.58	8.97			4/9/96		
SITE 5	WELL 1	WELL 2	WELL 3				500 mg/L	SITE 5
1/14/93	2.61	4.77	3.32			1/14/93		9/17/93

2/9/93	1.55	3.75	2.25			2/9/93		10/16/93
3/8/93	0.97	3.15	1.64			3/8/93		4/19/94
3/29/93	1.43	3.60	2.09			3/29/93		7/6/94
4/19/93	1.33	3.55	2.06			4/19/93		8/10/94
5/20/93	0.75	3.00	1.50			5/20/93		10/6/94
6/16/93	1.95	4.16	2.68			6/16/93		4/25/95
7/15/93	-0.58	1.73	0.18			7/15/93		8/22/95
8/10/93	0.23	2.50	1.00			8/10/93		
9/10/93	1.00	3.26	1.77			9/10/93		
9/17/93	1.20					9/17/93	68.29	
10/7/93	1.29	3.50	2.00			10/7/93		
10/16/93	1.04					10/16/93	67.45	
11/3/93	0.93	3.16	1.65			11/3/93		
12/2/93	0.82	3.04	1.51			12/2/93		
1/3/94	0.73	3.01	1.47			1/3/94		
2/2/94	0.83	3.05	1.50			2/2/94		
2/28/94	0.80	3.01	1.49			2/28/94		
3/28/94	1.25	3.47	1.94			3/28/94		
4/19/94	1.53	3.60	2.08			4/19/94	68.91	
5/5/94	1.09	3.27	1.73			5/5/94		
5/25/94	2.26	4.37	2.91			5/25/94		
7/6/94	3.51	5.60	4.11			7/6/94	70.54	
7/26/94	3.67	5.85	4.22			7/26/94		
8/10/94	4.05	6.13	4.67			8/10/94	70.34	
8/25/94	4.34	6.35	4.91			8/25/94		
9/21/94	4.33	6.28	4.90			9/21/94		
10/6/94	3.98	6.03	4.54			10/6/94	70.34	
10/18/94	3.76	5.81	4.27			10/18/94		
11/17/94	3.50	5.56	4.03			11/17/94		
12/13/94	2.86	5.39	3.87			12/13/94		
1/12/95	2.92	5.12	3.58			1/12/95		
2/9/95	2.97	5.02	3.56			2/9/95		
3/9/95	2.83	4.96	3.38			3/9/95		
4/6/95	2.95	4.68	3.55			4/6/95		
4/25/95	2.68	4.80	3.27			4/25/95	70.65	
5/5/95	2.61	4.66	3.18			5/5/95		
6/1/95	0.67	2.79	1.22			6/1/95		
6/27/95	1.78	3.85	2.33			6/27/95		
7/25/95	2.45	4.57	3.06			7/25/95		
8/22/95	3.01	5.12	3.60			8/22/95	70.77	
8/31/95	3.39	5.47	3.99			8/31/95		
9/29/95	2.95	5.07	3.54			9/29/95		
11/9/95	2.73	4.87	3.37			11/9/95		
12/6/95	2.64	4.78	3.26			12/6/95		
1/11/96	2.37	4.54	3.00			1/11/96		
2/13/96	2.33	4.47	2.95			2/13/96		
3/15/96	2.25	4.41	2.85			3/15/96		
4/9/96	2.47	4.62	3.07			4/9/96		
5/10/96	2.06	4.24	2.69			5/10/96		

SITE 6	WELL 1	WELL 2	WELL 3				500 mg/L	
1/4/93	22.22	15.48	19.84			1/4/93		
4/1/93	21.96	14.13	19.37			4/1/93		
4/19/93	21.90	13.80				4/19/93		
6/29/93	21.53	11.93	17.28			6/29/93		
8/26/93	21.60	26.80	15.80			8/26/93		
10/4/93	21.69	11.32	15.77			10/4/93		
10/20/93	21.80	10.50	15.70			10/20/93		
1/5/94	21.63	10.08	15.42			1/5/94		
4/6/94	21.80	10.70	15.45			4/6/94		
4/13/94	21.66	10.45	15.42			4/13/94	84.45	
6/29/94	21.98	33.95	16.16			6/29/94		
10/3/94	21.21	15.95	17.09			10/3/94		
1/18/95	22.25	13.95	17.52			1/18/95		
4/5/95	22.27	14.58	17.78			4/5/95		
5/4/95	22.25	14.01	17.90			5/4/95	86.38	
7/14/95	21.80	31.70	16.40			7/14/95		
10/5/95	21.79	13.63	16.73			10/5/95		
1/4/96	21.82	14.17	16.87			1/4/96		
4/12/96	21.99	14.69	17.15			4/12/96		
SITE 7	WELL 1	WELL 2	WELL 3					
1/4/93	39.94	21.23	24.14					
4/1/93	39.54	18.56	21.72					
4/18/93	39.40	18.20						
6/29/93	38.80	15.10	17.55					
10/4/93	38.65	12.48	15.80					
1/5/94	37.93	12.97	15.85					
3/21/94	38.04	13.85						
4/6/94	29.90	14.93	16.61					
4/21/94		15.75	16.92					
6/30/94	30.20	23.82	19.14					
10/4/94	31.29	20.60	20.89					
1/18/95	31.55	19.16	21.26					
4/6/95	31.53	19.47	21.74					
6/22/95	31.27	16.93	19.30					
10/5/95	31.91	18.88	20.76					
1/5/96	32.58	18.94	21.33					
4/15/96	33.33	19.35	21.79					
SITE 8	WELL 1	WELL 2	WELL 3	WELL 4			500 mg/L	
1/4/93	25.79	18.97	18.64	13.84		1/4/93		
4/1/93	25.11	15.84	15.52	8.94		4/1/93		
4/21/93	25.10	15.80	15.50	8.80		4/21/93	118.00	
6/29/93	23.93	14.00	13.67	5.68		6/29/93		
8/24/93	23.50	14.60	14.30	7.90		8/24/93		
10/4/93	23.38	15.69	15.36	8.28		10/4/93		
1/5/94	23.15	16.45	16.11	9.68		1/5/94		

4/7/94	23.52	17.19	16.86	11.10		4/7/94	118.00	
6/29/94	23.81	19.85	19.50	12.22		6/29/94		
10/3/94	24.77	20.94	20.62	16.46		10/3/94		
1/9/95	25.28	20.50	20.15	15.68		1/9/95		
4/6/95	25.34	20.18	19.85	15.65		4/6/95		
4/25/95	25.41	20.21	19.89	15.77		4/25/95	118.00	
7/20/95	25.04	18.70	18.39	15.28		7/20/95		
10/5/95	25.29	20.21	19.88	15.19		10/5/95		
1/5/96	25.99	20.26	19.92	15.50		1/5/96		
4/15/96	26.14	20.36	20.03	16.73		4/15/96		
SITE 9	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	9.78	9.66	9.84			1/6/93		
4/2/93	8.94	8.75	8.93			4/2/93		
4/18/93	8.87					4/18/93	50.86	
6/30/93	8.46	8.25	8.42			6/30/93		
10/4/93	9.10	8.93	9.10			10/4/93		
1/5/94	9.07	9.00	9.10			1/5/94		
4/4/94	9.40	9.17	9.35			4/4/94		
4/14/94	9.34	9.20	9.36			4/14/94	51.44	
7/1/94	10.44	10.34	10.48			7/1/94		
10/4/94	10.88	10.76	10.92			10/4/94		
1/23/95	10.29	10.16	10.33			1/23/95		
4/6/95	10.62	10.50	10.65			4/6/95		
5/4/95	10.65	10.52	10.69			5/4/95		
6/22/95	9.70	9.51	9.67			6/22/95	52.72	
10/6/95	10.38	10.26	10.42			10/6/95		
1/5/96	10.25	10.09	10.26			1/5/96		
4/15/96	10.70	10.53	10.69			4/15/96		
SITE 10	WELL 1	WELL 2	WELL 3	WELL 4			500 mg/L	
1/6/93	25.92	25.68	23.69	20.69		1/6/93		
3/29/93	23.89	23.71	21.77	19.25		3/29/93		
4/18/93	23.12	22.89				4/18/93		
4/25/93	22.90	22.70	20.80	18.30		4/25/93	109.23	
6/30/93	19.29	19.06	17.19	14.03		6/30/93		
10/4/93	17.72	17.48	15.45	11.31		10/4/93		
1/6/94	19.25	19.02	16.98	12.76		1/6/94		
4/7/94	20.40	20.16	18.12	13.75		4/7/94	110.99	
7/1/94	21.72	21.49	19.42	14.81		7/1/94		
10/4/94	22.88	22.68	20.62	16.17		10/4/94		
1/23/95	23.86	23.57	21.55	17.37		1/23/95		
4/6/95	24.26	24.05	22.03	18.00		4/6/95		
5/2/95	24.37	24.16	22.14	18.24		5/2/95	111.72	
7/12/95	20.59	20.44	18.47	16.05		7/12/95		
10/6/95	21.51	21.42	19.40	16.10		10/6/95		
1/10/96	22.45	22.41	20.37	16.77		1/10/96		
4/12/96	23.23	23.20	21.15	17.65		4/12/96		

SITE 11	WELL 1	WELL 2					500 mg/L	
1/6/93	33.20	17.10				1/6/93		
3/27/93	31.90	13.50				3/27/93	81.04	
3/29/93	31.89	13.47				3/29/93		
5/20/93	30.60	10.00				5/20/93	76.26	
6/30/93	29.74	8.89				6/30/93		
7/9/93	29.60	8.80				7/9/93	76.82	
7/30/93	29.10	7.80				7/30/93	77.10	
8/24/93	29.10	8.70				8/24/93		
9/22/93	29.10	9.40				9/22/93	74.61	
10/13/93	29.20	9.90				10/13/93	74.56	
1/6/94	29.29	10.59				1/6/94		
4/8/94	29.37	11.39				4/8/94	76.43	
5/26/94	29.51	10.72				5/26/94	77.72	
6/28/94	30.14	11.70				6/28/94		
7/6/94	30.22	11.85				7/6/94	80.71	
7/19/94	30.33	12.12				7/19/94	78.81	
8/12/94	30.86	12.88				8/12/94	78.09	
10/4/94	31.82	14.17				10/4/94		
10/6/94	31.74	14.06				10/6/94	80.65	
1/23/95	32.35	15.63				1/23/95		
4/7/95	32.33	15.97				4/7/95		
4/25/95	32.33	15.91				4/25/95	80.29	
7/11/95	30.49	8.96				7/11/95		
8/23/95	30.42	10.50				8/23/95	82.42	
10/6/95	30.72	11.87				10/6/95		
1/11/96	31.22	13.70				1/11/96		
4/12/96	31.52	14.27				4/12/96		
SITE 12	WELL 1	WELL 2	WELL 3					
1/5/93	25.27	23.03	23.70					
4/2/93	24.32	22.17	22.68					
5/23/93	23.80	21.50	22.20					
6/29/93	21.38	18.78	19.45					
10/1/93	21.60	19.20	19.60					
1/10/94	21.57	19.61	19.58					
4/20/94	22.04	19.87	20.25					
6/29/94	23.68	21.96	21.26					
10/3/94	24.83	23.23	23.27					
1/11/95	24.79	23.14	23.61					
4/5/95	24.90	23.13	23.64					
7/19/95	24.13	22.14	21.75					
10/6/95	23.27	21.17	21.72					
1/4/96	22.95	20.98	21.46					
4/15/96	23.30	21.39	21.78					
SITE 13	WELL 1	WELL 2	WELL 3					
1/4/93	37.34	34.89	34.94					
4/1/93	37.47	34.93	34.71					

4/23/93	37.40	34.80	34.70					
6/29/93	36.78	34.09	34.00					
8/25/93	36.20	33.40	33.30					
10/1/93	36.10	33.37	33.32					
1/10/94	36.12	33.44	33.41					
4/4/94	36.09	33.66	33.68					
6/29/94	36.42	33.82	33.91					
10/3/94	36.66	34.15	34.12					
1/17/95	36.80	34.45	34.41					
4/5/95	36.90	34.64	34.63					
7/20/95	36.16	33.34	33.19					
10/6/95	35.93	33.30	33.16					
1/4/96	36.07	33.23	33.44					
4/12/96	36.29	33.75	33.67					
SITE 14	WELL 1	WELL 2	WELL 3					
1/4/93	100.55	99.88	99.64					
4/1/93	100.55	99.83	99.74					
4/23/93	100.60	99.70	99.70					
6/30/93	100.45	99.68	99.57					
8/25/93	100.50	99.70	99.80					
10/1/93	100.43	99.70	99.56					
1/10/94	99.88	99.45	99.07					
4/4/94	100.11	99.30	99.18					
6/29/94	100.14	99.34	99.32					
10/3/94		99.60	99.55					
10/7/94			99.47					
10/18/94		99.66	99.50					
11/16/94	101.13	99.59	99.50					
12/16/94	101.10	99.72	99.54					
1/17/95	101.09	99.70	99.54					
2/8/95	101.14	99.70	99.52					
3/10/95	101.14	99.70	99.52					
4/5/95	100.88	99.57	99.51					
5/2/95	100.84	99.69	99.51					
5/30/95	100.80	99.73	99.55					
6/30/95	100.83	99.79	99.59					
7/25/95	100.90	99.80	99.58					
8/30/95	101.03	99.89	99.59					
9/29/95	101.03	99.83	99.63					
11/6/95	101.03	99.78	99.60					
12/5/95	101.02	99.93	99.61					
1/4/96	100.95	99.85	99.60					
2/12/96	101.02	99.80	99.57					
3/14/96	101.03	99.79	99.54					
4/12/96	100.89	99.74	99.53					
SITE 15	WELL 1	WELL 2	WELL 3				500 mg/L	
1/5/93	27.22	31.63	30.66			1/5/93		

4/2/93	26.78	30.81	30.00			4/2/93		
4/22/93	26.80	30.70	29.70			4/22/93	114.92	
6/30/93	26.70	28.08	26.99			6/30/93		
8/24/93	29.20	28.60	26.70			8/24/93		
10/4/93	25.76	28.17	26.87			10/4/93		
1/10/94	25.13	28.22	27.39			1/10/94		
4/14/94	25.19	29.16	28.02			4/14/94	115.10	
6/30/94	29.75	30.81	28.74			6/30/94		
10/3/94	28.09	31.14	29.97			10/3/94		
1/11/95	27.80	31.45	30.42			1/11/95		
4/5/95	28.12	31.65	30.66			4/5/95		
4/27/95	27.94	31.46	30.72			4/27/95	116.45	
7/17/95	31.03	31.65	29.82			7/17/95		
10/6/95	28.51	31.44	30.38			10/6/95		
1/5/96	27.79	31.49	30.52			1/5/96		
4/15/96	28.30	31.72	30.78			4/15/96		
SITE 16	WELL 1	WELL 2	WELL 3				500 mg/L	
1/13/93	30.44	21.93	14.99			1/13/93		
2/18/93	30.15	20.94	13.84			2/18/93		
3/18/93	29.20	19.25	11.98			3/18/93		
3/25/93	29.00	19.20				3/25/93	128.08	
4/16/93	28.32	18.52	11.26			4/16/93		
5/19/93	27.67	16.92	9.43			5/19/93	128.67	
6/16/93	26.79	16.75	9.42			6/16/93		
7/8/93	25.90	14.60				7/8/93	127.99	
7/15/93	25.57	14.10	6.86			7/15/93		
7/31/93	24.10	12.00				7/31/93	126.44	
8/11/93	23.64	12.30	4.98			8/11/93		
9/8/93	23.70	12.90	5.70			9/8/93	132.31	
10/7/93	20.21	13.52	6.23			10/7/93		
10/13/93		13.80	6.60			10/13/93		
10/21/93	20.27	13.82	6.55			10/21/93	126.41	
11/3/93	20.28	13.83	6.49			11/3/93		
12/1/93	20.34	14.05	6.82			12/1/93		
1/3/94	20.45	14.34	6.97			1/3/94		
2/2/94	20.53	14.53	7.23			2/2/94		
2/28/94	20.60	14.67	7.37			2/28/94		
3/28/94	20.75	14.98	7.68			3/28/94		
3/31/94	20.85	14.93	7.64			3/31/94	127.13	
4/26/94	20.61	14.97	7.74			4/26/94		
5/26/94	20.82	15.39	8.11			5/26/94	126.90	
6/23/94	21.25	16.22	8.78			6/23/94	126.86	
7/1/94	21.49	16.55	8.97			7/1/94		
7/20/94	21.63	16.37	9.13			7/20/94	129.26	
8/4/94	21.92	17.07	9.71			8/4/94		
8/11/94	22.15	17.30	9.95			8/11/94	128.95	
8/25/94	22.33	17.41	10.16			8/25/94		
9/21/94	22.53	17.77	10.51			9/21/94		

10/6/94	22.63	17.84	10.66			10/6/94	129.32	
10/18/94	22.28	18.07	10.90			10/18/94		
11/17/94	22.99	18.16	10.99			11/17/94		
12/13/94	23.30	18.57	11.42			12/13/94		
1/12/95	23.20	18.71	11.60			1/12/95		
2/10/95	23.46	18.88	11.79			2/10/95		
3/9/95	23.81	19.15	12.01			3/9/95		
4/6/95	24.00	19.24	12.13			4/6/95		
4/13/95	24.18	19.42	12.51			4/13/95	129.30	
5/5/95	24.50	19.52	12.44			5/5/95		
6/1/95	23.14	15.41	7.94			6/1/95		
6/26/95	22.12		7.63			6/26/95		
7/24/95	22.23	15.48	8.13			7/24/95		
8/23/95	22.58	16.39	8.96			8/23/95	127.78	
9/13/95	22.82	16.82	9.54	airlifted		9/13/95		
9/27/95	26.33	16.82	9.59			9/27/95	128.15	
9/29/95	26.32	16.80	9.55			9/29/95		
10/11/95	26.41	17.06	9.85			10/11/95		
11/7/95	26.51	17.42	10.19			11/7/95		
11/9/95	26.49					11/9/95		
12/4/95	26.58	17.66	10.22			12/4/95		
1/12/96	26.71	17.92	10.71			1/12/96		
2/13/96	26.85	18.10	10.84			2/13/96		
3/15/96	26.85	18.42	11.23			3/15/96		
4/9/96	26.93	18.34	11.42			4/9/96		
5/1/96	27.21	18.91	11.79			5/1/96	126.98	
5/10/96	27.16	18.69	11.79			5/10/96		
SITE 17	WELL 1	WELL 2	WELL 3				500 mg/L	
1/13/93	46.95	12.42	13.16			1/13/93		
2/18/93	46.41	11.53	12.27			2/18/93		
3/18/93	45.81	10.87	11.63			3/18/93		
3/24/93	45.70	10.80	11.60			3/24/93	65.05	
4/16/93	45.16	10.42	11.18			4/16/93		
5/18/93	44.73	9.68	10.47			5/18/93		
5/19/93	44.70					5/19/93	63.35	
6/15/93	44.61	10.60	11.35			6/15/93		
7/8/93	44.10					7/8/93	63.28	
7/15/93	43.91	8.68	9.50			7/15/93		
7/28/93	43.30					7/28/93	62.18	
8/11/93	43.41	9.12	9.94			8/11/93		
9/8/93	43.60	9.00	9.80			9/8/93	65.37	
9/10/93	43.46	9.15	10.03			9/10/93		
10/7/93	44.74	9.74	10.40			10/7/93		
10/21/93	44.55					10/21/93	64.84	
11/3/93	44.50	9.55	10.22			11/3/93		
12/1/93	44.25	9.53	10.18			12/1/93		
1/3/94	44.09	9.55	10.19			1/3/94		
2/2/94	44.03	9.58	10.22			2/2/94		

2/28/94	43.96	9.53	10.18			2/28/94		
3/28/94	43.97	9.83	10.51			3/28/94		
4/1/94	44.06	9.91	10.54			4/1/94	64.68	
4/26/94	43.86	10.08	10.74			4/26/94		
5/26/94	43.96	10.53	11.28			5/26/94	64.93	
6/28/94	44.90	12.46	12.99			6/28/94		
7/6/94	44.96	11.46	12.07			7/6/94	64.89	
7/19/94	45.01	11.26	11.88			7/19/94	63.98	
7/26/94	44.96	14.08	12.67			7/26/94		
8/11/94	45.41	12.69	13.25			8/11/94	63.55	
8/26/94	45.56	12.64	13.25			8/26/94		
9/21/94	45.59	12.81	13.41			9/21/94		
10/18/94	45.44	12.23	12.84			10/18/94		
10/26/94	45.46	12.28	12.89			10/26/94	63.91	
11/17/94	45.17	12.07	12.66			11/17/94		
12/13/94	44.96	11.90	12.53			12/13/94		
1/12/95	44.65	11.78	12.35			1/12/95		
2/9/95	44.61	11.78	12.36			2/9/95		
3/10/95	44.45	11.61	12.18			3/10/95		
4/5/95	44.30	11.65	12.25			4/5/95		
4/24/95	44.27	11.51	12.10			4/24/95	63.54	
5/5/95	44.13	11.51	12.03			5/5/95		
6/1/95	43.05	9.02	9.76			6/1/95		
6/26/95	42.61	9.11	9.73			6/26/95		
7/24/95	42.86	9.90	10.52			7/24/95		
8/22/95	43.28	11.93	12.45			8/22/95		
8/23/95	43.34	11.84	12.41			8/23/95	63.83	
8/31/95	43.49	12.23	12.80			8/31/95		
9/29/95	43.44	11.28	11.94			9/29/95		
11/9/95	43.37	11.34	11.95			11/9/95		
12/4/95	43.28	11.30	11.95			12/4/95		
1/12/96	43.10	11.18	11.80			1/12/96		
2/13/96	42.96	11.14	11.74			2/13/96		
3/15/96	42.77	11.23	11.79			3/15/96		
4/12/96	42.75	11.44	12.05			4/12/96		
5/10/96	42.81	11.13	11.74			5/10/96		
SITE 18	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	35.47	34.51	21.35			1/6/93		
1/21/93	35.32	34.34	21.25			1/21/93		
2/19/93	34.99	33.72	20.60			2/19/93		
3/18/93	34.32	32.76	19.25			3/18/93		
3/25/93	34.00	32.50				3/25/93	110.45	
4/14/93	32.60	31.70	17.66			4/14/93		
5/18/93	31.95	30.60	15.81			5/18/93		
5/21/93	31.80	30.40				5/21/93	108.77	
6/15/93	31.03	30.30	14.37			6/15/93		
7/9/93	30.60	29.20				7/9/93	109.91	
7/15/93	30.22	28.83	10.48			7/15/93		

7/29/93	26.90	26.60				7/29/93	109.22	
8/11/93	27.12	27.71	6.33			8/11/93		
9/9/93	27.28	26.12	7.74			9/9/93		
10/5/93	27.18	25.94	8.27			10/5/93		
10/14/93	27.20	26.10				10/14/93	109.55	
11/3/93	27.20	26.15	8.70			11/3/93		
12/1/93	27.16	26.18	9.34			12/1/93		
1/3/94	27.12	26.40	9.78			1/3/94		
2/2/94	27.08	26.60	10.20			2/2/94		
2/28/94	27.07	26.73	10.49			2/28/94		
3/28/94	26.44	26.97	11.02			3/28/94		
4/8/94	27.77	27.39				4/8/94	110.99	
4/26/94	27.69	28.09	11.36			4/26/94		
5/26/94	28.62	29.15	11.73	*		5/26/94	111.89	
6/28/94	32.87	33.34	13.43			6/28/94		
7/6/94	31.99	32.84				7/6/94	115.07	
7/20/94	30.59	31.38				7/20/94	114.08	
7/26/94	32.12	32.50	14.49			7/26/94		
8/10/94	33.87	34.45				8/10/94	113.82	
8/26/94	32.43	33.26	15.61			8/26/94		
9/22/94	32.08	32.66	16.03			9/22/94		
10/7/94	31.33	31.95				10/7/94	114.38	
10/18/94	30.70	31.46	15.94			10/18/94		
11/17/94	30.46	31.23	15.77			11/17/94		
12/13/94	30.28	31.09	15.99			12/13/94		
1/12/95	30.23	31.09	16.14			1/12/95		
2/9/95	30.34	31.14	16.22			2/9/95		
3/10/95	30.40	31.19	16.40			3/10/95		
4/7/95	30.33	31.20	16.51			4/7/95		
4/25/95	30.48	31.26	16.72			4/25/95	112.15	
5/3/95	30.42	31.23	16.64			5/3/95		
6/1/95	28.05	28.89	13.19			6/1/95		
6/26/95	27.82	28.65	12.33			6/26/95		
7/20/95	32.04	32.76	13.02			7/20/95	111.91	
7/24/95	29.90	30.79	12.99			7/24/95		
8/22/95	32.29	32.69	14.51			8/22/95	113.08	
8/31/95	33.62	34.19	15.00			8/31/95		
9/11/95	32.46	33.37	15.25	airlifted?		9/11/95		
9/27/95	30.58	30.66	15.10			9/27/95	111.37	
10/12/95	30.20	30.23	14.90			10/12/95		
11/9/95	30.13	30.26	14.56			11/9/95		
12/4/95	29.97	30.06	14.60			12/4/95		
1/12/96	29.95	29.98	14.89			1/12/96		
2/13/96	30.04	30.07	14.89			2/13/96		
3/15/96	30.59	30.55	15.13			3/15/96		
4/12/96	30.37	30.36	15.40			4/12/96		
5/9/96	31.16	31.27	15.82			5/9/96		
SITE 19	WELL 1	WELL 2	WELL 3				500 mg/L	

1/21/93	20.03	17.70	14.94			1/21/93		
2/19/93	19.92	16.60	13.44			2/19/93		
3/22/93	19.72	15.15	12.01			3/22/93		
4/16/93	19.52	14.59	11.65			4/16/93		
4/19/93	19.50	14.50				4/19/93	144.23	
5/20/93	19.21	12.66	10.25			5/20/93		
6/16/93	19.16	13.72	10.95			6/16/93		
7/15/93	18.77	11.75	9.45			7/15/93		
8/10/93	18.68	15.35	10.55			8/10/93		
8/25/93	18.80	17.00				8/25/93		
9/9/93	18.79	13.32	11.67			9/9/93		
10/6/93	18.65	13.60	11.73			10/6/93		
10/20/93	18.50	13.00				10/20/93		
11/4/93	18.49	12.97	11.59			11/4/93		
12/1/93	18.30	13.20	11.51			12/1/93		
1/4/94	18.15	13.16	11.56			1/4/94		
2/3/94	17.93	13.23	11.43			2/3/94		
3/1/94	17.92	13.32	11.49			3/1/94		
3/29/94		13.57	11.62			3/29/94		
4/7/94		13.60				4/7/94	143.54	
5/4/94	18.00	13.67	11.38			5/4/94		
5/26/94	18.02	15.59	12.03			5/26/94		
6/29/94	18.44	20.41	14.47			6/29/94		
7/26/94	18.78	23.19	15.87			7/26/94		
8/26/94	19.38	19.89	17.20			8/26/94		
9/23/94	19.64	18.81	16.82			9/23/94		
10/19/94	19.75	18.97	16.81			10/19/94		
11/16/94	19.88	18.74	16.41			11/16/94		
12/16/94	19.72	18.44	16.23			12/16/94		
1/13/95	19.80	18.37	16.14			1/13/95		
2/15/95	19.85	18.29	16.12			2/15/95		
3/10/95	19.82	18.27	16.01			3/10/95		
4/7/95	19.88	18.17	15.82			4/7/95		
5/4/95	19.78	18.14	15.70			5/4/95	143.98	
5/30/95	19.40	15.14	10.07			5/30/95		
6/30/95	19.20	14.27	9.85			6/30/95		
7/25/95	19.42	21.66	12.62			7/25/95		
8/31/95	20.03	21.34	15.48			8/31/95		
9/29/95	20.18	18.02	15.52			9/29/95		
10/11/95	20.22	20.32				10/11/95	144.76	
11/6/95	20.28	18.00	15.53			11/6/95		
12/5/95	20.32	18.98	15.51			12/5/95		
1/5/96	20.24	17.90	15.38			1/5/96		
2/13/96	20.30	17.81	15.41			2/13/96		
3/15/96	20.27	17.80	15.40			3/15/96		
4/16/96	20.24	17.87	15.37			4/16/96		
5/10/96	20.13	18.00	15.17			5/10/96		
SITE 20	WELL 1	WELL 2	WELL 3					

1/4/93	30.77	24.40	25.90					
4/1/93	30.05	21.08	22.06					
4/19/93	29.80	20.40						
6/29/93	28.79	18.10	18.52					
8/25/93	27.90	20.10	18.50					
10/4/93	27.54	18.66	18.61					
10/20/93	27.40	18.10	18.80					
1/12/94	26.60	17.69	18.88					
4/21/94	25.91	18.46	19.48					
6/29/94	26.01	27.88	22.97					
10/3/94	28.00	25.66	26.71					
1/18/95	28.95	24.70	26.13					
4/5/95	29.13	24.46	26.04					
5/4/95	29.20	24.44	26.12					
7/20/95	28.68	25.91	22.95					
10/5/95	29.34	24.56	26.16					
1/4/96	29.64	23.39	25.12					
4/12/96	29.40	23.38	25.11					
SITE 21	WELL 1	WELL 2	WELL 3				500 mg/L	
1/5/93	27.84	25.75	24.85			1/5/93		
4/2/93	26.70	24.43	23.24			4/2/93		
5/20/93	25.20	22.90	21.60			5/20/93	83.93	
6/30/93	24.83	22.50	21.24			6/30/93		
10/4/93	25.30	23.09	22.14			10/4/93		
1/6/94	25.52	23.49	22.74			1/6/94		
4/7/94	26.04	23.93	23.07			4/7/94	87.39	
6/30/94	27.59	25.41	24.61			6/30/94		
10/4/94	28.10	26.07	25.18			10/4/94		
1/23/95	28.26	26.12	25.48			1/23/95		
4/6/95	28.37	26.31	25.49			4/6/95		
4/27/95	28.51	26.46	25.65			4/27/95	87.71	
6/22/95	26.35	24.19	22.76			6/22/95		
10/5/95	27.88	25.78	24.85			10/5/95		
1/5/96	27.79	26.17	25.46			1/5/96		
4/15/96	28.50	26.46	25.75			4/15/96		
SITE 22	WELL 1	WELL 2	WELL 3				500 mg/L	
1/13/93	29.75	26.68	19.31			1/13/93		
2/18/93	29.87	26.13	18.02			2/18/93		
3/18/93	29.47	24.96	16.21			3/18/93		
3/25/93	29.30	24.70	16.10			3/25/93	140.15	
4/14/93	28.62	24.00	15.58			4/14/93		
5/18/93	28.03	23.17	14.46			5/18/93		
5/21/93	28.00	23.00				5/21/93	141.53	
6/16/93	27.52	22.50	14.14			6/16/93		
7/9/93	26.90	21.30				7/9/93	141.53	
7/15/93	26.70	20.79	10.93			7/15/93		
7/30/93	25.80	18.20				7/30/93	141.14	

8/11/93	25.22	18.36	9.26			8/11/93		
9/9/93	24.89	18.89	10.76			9/9/93		
10/5/93	24.79	19.22	11.47			10/5/93		
10/14/93	24.80	19.20				10/14/93	141.84	
11/3/93	24.81	19.36	11.70			11/3/93		
12/1/93	24.71	19.36	12.01			12/1/93		
1/3/94	24.62	19.57	11.67			1/3/94		
2/2/94	24.56	19.72	12.22			2/2/94		
2/28/94	24.50	19.79	12.36			2/28/94		
3/28/94	24.50	20.09	12.61			3/28/94		
3/31/94	24.57	20.11	12.71			3/31/94	142.30	
4/26/94	24.51	20.25	12.75			4/26/94		
5/26/94	24.60	20.55	13.21			5/26/94	139.56	
6/23/94	24.97	21.91	14.16			6/23/94	139.16	
7/1/94	25.05	22.37	14.42			7/1/94		
7/20/94	25.28	22.54	14.82			7/20/94	143.03	
7/26/94	25.79	22.75	14.86			7/26/94		
8/4/94	25.65	23.11	15.40			8/4/94	143.47	
8/24/94	25.01	23.74	15.96			8/24/94		
9/22/94	26.37	23.90	16.53			9/22/94		
10/7/94	26.47	23.83	16.69			10/7/94	140.48	
10/18/94	26.57	23.89	16.74			10/18/94		
11/17/94	27.45	23.65	16.53			11/17/94		
12/13/94	26.46	23.71	16.71			12/13/94		
1/12/95	26.32	23.64	16.66			1/12/95		
2/10/95	26.42	23.73	16.73			2/10/95		
3/9/95	26.63	23.81	16.79			3/9/95		
4/6/95	26.56	23.83	16.82			4/6/95		
4/24/95	26.57	23.91	16.85			4/24/95	141.10	
5/3/95	26.53	23.85	16.83			5/3/95		
6/1/95	25.83	21.48	12.13			6/1/95		
6/26/95	24.95	20.23	11.79			6/26/95		
7/24/95	24.71	20.89	12.81			7/24/95		
8/22/95	25.13	21.99	13.73			8/22/95	141.69	
8/29/95	25.25	22.37	14.11			8/29/95		
9/29/95	22.56	22.36	14.85			9/29/95		
10/11/95	25.68	22.38	15.03			10/11/95	141.38	
11/7/95	25.72	22.46	15.28			11/7/95		
11/16/95	25.80	22.45	15.35			11/16/95		
12/4/95	25.74	22.46	15.32			12/4/95		
1/12/96	25.84	22.51	15.40			1/12/96		
2/13/96	25.96	22.59	15.40			2/13/96		
3/15/96	25.95	22.67	15.60			3/15/96		
4/9/96	25.95	22.79	15.63			4/9/96		
5/9/96	26.12	23.25	15.99			5/9/96		
SITE 23	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	25.57	23.90	23.80			1/6/93		
3/29/93	24.22	22.99	21.42			3/29/93		

4/20/93	23.64	22.35				4/20/93	75.05	
7/1/93	22.44	20.87	19.54			7/1/93		
10/5/93	21.25	18.57	19.20			10/5/93		
1/6/94	22.89	20.37	21.40			1/6/94		
4/19/94	23.93	21.95	22.40			4/19/94	66.73	
6/28/94	23.52	22.64	23.04			6/28/94		
10/5/94	25.44	23.48	23.99			10/5/94		
1/23/95	25.95	24.38	24.48			1/23/95		
4/7/95	26.09	24.62	24.55			4/7/95		
5/3/95	26.06	24.65	24.52			5/3/95	68.01	
7/11/95	23.64	22.02	20.97			7/11/95		
10/6/95	24.28	22.19	22.68			10/6/95		
1/11/96	25.21	23.30	23.63			1/11/96		
4/12/96	25.67	23.97	24.12			4/12/96		
5/2/96	25.81	24.08	24.23			5/2/96	67.66	
SITE 24	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	33.02	31.56				1/6/93		
3/29/93	31.06	28.48				3/29/93		
4/20/93	30.00	27.30				4/20/93		
6/30/93	26.57	22.44	22.46			6/30/93		
10/5/93	23.18	20.75	20.50			10/5/93		
10/23/93	23.80	21.20	21.00			10/23/93	91.68	
1/6/94	24.59	22.64	22.36			1/6/94		
4/19/94	25.94	24.15	23.90			4/19/94	91.01	
7/7/94	26.74	25.19	24.98			7/7/94		
10/5/94	28.96	27.77	27.57			10/5/94		
1/23/95	30.52	29.79				1/23/95		
4/6/95	31.59	30.55				4/6/95		
5/3/95	31.73	30.65						
7/11/95	27.40	23.40	23.37			5/3/95	92.83	
10/6/95	27.22	25.62	25.41					
1/11/96	28.43	27.58	27.30					
4/12/96	30.01	28.87						
SITE 25	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	15.12	15.81	9.28			1/6/93		
3/28/93	11.40	12.00	6.30			3/28/93	9.83	
3/29/93	11.41	12.01	6.30			3/29/93		
6/30/93	7.00	7.67	2.81			6/30/93		
7/31/93	5.90	6.60	2.20			7/31/93	9.05	
9/14/93	8.30	9.20	4.30			9/14/93	8.58	
10/5/93	9.15	9.97	4.70			10/5/93		
10/13/93	9.40	10.20	4.80			10/13/93		
10/22/93	9.60	10.50	4.90			10/22/93	8.75	
1/6/94	10.53	11.69	5.54			1/6/94		
4/1/94	11.88	12.73	6.10			4/1/94	10.46	
7/7/94	12.27	13.12	7.02			7/7/94		
8/18/94	13.05	13.94	7.98			8/18/94	9.81	

10/4/94	14.11	15.02	8.79			10/4/94		
1/23/95	14.83	15.90	9.22			1/23/95		
4/7/95	15.13	15.93	9.04			4/7/95		
4/25/95	15.16	15.99	9.04			4/25/95	11.90	
6/23/95	7.01	7.67	3.10			6/23/95		
9/12/95	10.18	11.12	6.08			9/12/95	8.94	
9/27/95	10.78	11.67	6.19			9/27/95		
10/6/95	11.01	11.97	6.33			10/6/95		
1/11/96	12.45	13.65	7.28			1/11/96		
4/12/96	13.36	14.22	7.64			4/12/96		
SITE 26	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	20.66	16.35	12.15			1/6/93		
3/29/93	17.23	12.21	7.78			3/29/93		
4/20/93	16.20	11.10	6.80			4/20/93	73.56	
6/30/93	14.79	9.86	5.70			6/30/93		
10/5/93	15.21	10.83	7.50			10/5/93		
1/6/94	16.07	11.88	8.28			1/6/94		
4/15/94	16.72	12.61	8.76			4/15/94	67.19	
7/7/94	17.64	13.72	10.09			7/7/94	63.90	
10/4/94	19.44	15.63	12.24			10/4/94		
1/23/95	20.02	16.39	12.57			1/23/95		
4/6/95	20.10	16.38	12.29			4/6/95		
5/5/95	20.22	16.60	12.48			5/5/95	65.61	
7/12/95	14.92	10.42	6.47			7/12/95		
9/12/95	16.38	12.34	9.04			9/12/95	65.64	
10/6/95	17.31	13.15	9.62			10/6/95		
10/12/95	17.45	13.27	9.59			10/12/95		
1/11/96	18.34	14.49	10.60			1/11/96		
4/12/96	19.15	15.23	11.20			4/12/96		
SITE 27	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	13.81	13.36	13.45			1/6/93		
3/29/93	10.75	10.10	10.12			3/29/93		
4/20/93	9.95	9.36	9.20			4/20/93	61.05	
6/30/93	8.73	8.07	7.69			6/30/93		
10/5/93	9.80	9.29	9.46			10/5/93		
1/6/94	10.77	10.22	10.38			1/6/94		
4/15/94	11.52	11.05	11.22			4/15/94	58.79	
7/7/94	11.98	11.29	11.13			7/7/94		
10/4/94	13.38	12.83	12.71			10/4/94		
1/23/95	14.33	13.68	13.66			1/23/95		
4/6/95	14.66	14.08	14.02			4/6/95		
5/3/95	14.79	14.18	14.15			5/3/95	58.99	
7/11/95	12.39	11.69	11.40			7/11/95		
10/6/95	12.65	12.12	11.87			10/6/95		
1/11/96	13.50	12.97	13.01			1/11/96		
4/12/96	14.15	13.59	13.65			4/12/96		
5/2/96	14.36	13.77	13.79			5/2/96	59.37	

SITE 28	WELL 1	WELL 2	WELL 3					
1/6/93	25.77	25.60	25.52					
3/29/93	24.90	24.37	24.27					
6/30/93	22.47	21.46	21.37					
10/4/93	21.87	21.28	21.18					
1/6/94	22.03	21.83	21.72					
4/20/94	22.62	22.55	22.46					
7/1/94	22.22	23.21	23.10					
10/4/94	24.10	24.13	24.04					
1/23/95	24.61	24.65	24.57					
4/6/95	24.88	24.95	24.88					
7/12/95	23.62	22.74	22.65					
10/6/95	23.55	23.34	23.26					
1/10/96	23.92	23.82	23.73					
4/15/96	24.43	24.50	24.39					
SITE 29	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	50.99	38.56	39.25			1/6/93		
4/2/93	50.50	38.20	38.72			4/2/93		
4/25/93	50.30	38.00	38.60			4/25/93	100.64	
6/30/93	49.60	36.27	36.80			6/30/93		
10/4/93	49.29	35.09	35.66			10/4/93		
10/22/93	49.30	35.10	35.60			10/22/93		
1/6/94	49.20	35.14	35.73			1/6/94		
4/7/94	49.44	35.49	35.99			4/7/94	103.13	
7/1/94	49.77	35.88	36.42			7/1/94		
10/4/94	50.58	36.45	36.96			10/4/94		
1/23/95	50.60	37.15	37.59			1/23/95		
4/6/95	50.66	37.44	38.00			4/6/95		
5/4/95	50.72	37.61	38.13			5/4/95	101.93	
7/12/95	50.16	37.20	37.78			7/12/95		
10/6/95	50.38	36.97	37.52			10/6/95		
1/10/96	50.44	37.16	37.73			1/10/96		
4/15/96	50.56	37.50	38.03			4/15/96		
SITE 30	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	20.83	19.14	19.11			1/6/93		
3/29/93	17.30	14.57	14.54			3/29/93		
4/25/93	15.97	13.12	13.07			4/25/93	106.36	
6/29/93	14.86	11.95	11.93			6/29/93		
10/1/93	16.52	14.94	14.97			10/1/93		
1/6/94	17.60	16.47	16.53			1/6/94		
4/14/94	18.59	17.15	17.19			4/14/94	108.17	
7/1/94	19.61	18.86	18.89			7/1/94		
10/4/94	20.90	20.37	20.42			10/4/94		
1/23/95	21.64	21.04	21.06			1/23/95		
4/6/95	21.52	20.46	20.45			4/6/95		
5/4/95	21.42	20.42	20.45			5/4/95	109.85	

7/12/95	15.77	13.35	13.34			7/12/95		
10/6/95	18.98	18.30	18.32			10/6/95		
1/11/96	20.17	19.37	19.40			1/11/96		
4/12/96	20.84	20.05	20.07			4/12/96		
SITE 31	WELL 1	WELL 2	WELL 3				500 mg/L	
1/6/93	14.71	15.02	15.62			1/6/93		
3/29/93	13.43	13.78	13.65			3/29/93		
4/20/93	13.10	13.40				4/20/93	77.01	
6/30/93	12.28	12.66	12.25			6/30/93		
10/5/93	13.65	14.01	13.67			10/5/93		
10/23/93	13.70	14.10	14.00			10/23/93		
1/6/94	13.98	14.14	14.73			1/6/94		
4/15/94	14.30	14.60	15.06			4/15/94	78.35	
7/7/94	14.70	15.03	15.65			7/7/94		
10/4/94	15.15	15.42	16.29			10/4/94		
1/23/95	14.97	15.32	16.55			1/23/95		
4/6/95	15.08	15.42	16.60			4/6/95		
7/21/95	13.66	13.90	13.65			7/21/95	79.56	
10/6/95	14.67	14.95	15.25			10/6/95		
10/12/95	14.56	14.94	15.27			10/12/95		
1/11/96	14.72	15.06	15.88			1/11/96		
4/12/96	14.94	15.24	16.18			4/12/96		
5/2/96	14.96	15.31	16.23			5/2/96	81.35	
SITE 32	WELL 1	WELL 2	WELL 3	WELL 4			500 mg/L	
1/6/93	48.58	48.40	5.57	7.68		1/6/93		
3/29/93	45.83	45.88	1.48	2.60		3/29/93		
4/24/93	45.34	45.43	0.83	2.53		4/24/93	87.50	
6/30/93	44.77	44.95	0.69	3.21		6/30/93		
10/4/93	45.79	46.01	2.54	6.00		10/4/93		
1/6/94	46.84	47.08	4.10	8.00		1/6/94		
4/19/94	48.64	47.87	4.95	9.10		4/19/94	89.13	
7/1/94	48.31	48.58	6.00	10.11		7/1/94		
10/4/94	49.43	49.72	8.07	11.66		10/4/94		
10/18/94	49.67	49.80	8.26	11.99		10/18/94		
11/17/94	49.82	49.99	8.81	12.58		11/17/94		
12/13/94	49.89	50.12	9.04	13.11		12/13/94		
1/12/95	49.97	50.20	9.26	13.54		1/12/95		
2/8/95	50.15	50.34	9.56	13.96		2/8/95		
3/10/95	50.25	50.39	9.69	14.32		3/10/95		
4/6/95	50.20	50.39	9.65	14.22		4/6/95		
4/27/95	50.26	50.50	9.65	14.38		4/27/95	93.67	
5/5/95	50.24	50.47	9.60	14.44		5/5/95		
5/30/95	49.31	49.34	6.91	8.08		5/30/95		
6/30/95	47.29	47.32	3.35	4.93		6/30/95		
7/25/95	47.26	47.44	3.15	5.60		7/25/95		
8/30/95	47.28	47.44	4.10	6.93		8/30/95		
9/29/95	47.72	47.89	5.17	8.02		9/29/95		

11/6/95	48.26	48.46	6.19	9.14		11/6/95		
12/5/95	48.50	48.76	6.70	9.94		12/5/95		
1/11/96	48.75	48.97	6.99	10.49		1/11/96		
2/12/96	49.05	49.35	7.35	11.08		2/12/96		
3/11/96	49.20	49.41	7.60	11.40		3/11/96		
4/12/96	49.34	49.56	7.83	11.76		4/12/96		
5/2/96	49.50	49.71	8.01	11.99		5/2/96	93.69	
5/9/96	49.46	49.62	7.95	11.93		5/9/96		
SITE 33	WELL 1	WELL 2	WELL 3				500 mg/L	
1/5/93	35.94	35.17	35.58			1/5/93		
4/1/93	35.01	34.08	34.70			4/1/93		
5/20/93	34.18	32.99	33.91			5/20/93	130.41	
6/29/93	33.25	32.19	32.95			6/29/93		
10/4/93	32.10	31.12	31.20			10/4/93		
1/6/94	32.35	31.60	31.77			1/6/94		
4/7/94	32.88	32.09	32.23			4/7/94	134.38	
6/29/94	33.88	33.31	32.89			6/29/94		
10/3/94	35.01	34.43	34.14			10/3/94		
1/9/95	35.44	34.82	34.91			1/9/95		
4/6/95	35.77	35.14	35.39			4/6/95		
5/4/95	35.90	35.26	35.50			5/4/95	133.53	
7/19/95	34.66	33.97	34.28			7/19/95		
10/5/95	35.31	34.65	34.84			10/5/95		
1/5/96	35.66	34.92	35.18			1/5/96		
4/15/96	35.90	35.20	35.54			4/15/96		
SITE 34	WELL 1	WELL 2						
1/5/93	9.19	8.34						
4/2/93	7.82	6.94						
6/30/93	7.73	6.75						
10/4/93	8.89	7.83						
1/10/94	8.70	7.83						
4/20/94	9.09	8.26						
6/30/94	9.93	9.08						
10/4/94	10.61	9.74						
1/23/95	10.02	9.14						
4/6/95	9.58	8.85						
7/17/95	8.70	7.70						
10/6/95	9.48	8.54						
1/10/96	9.27	8.42						
4/15/96	9.64	8.83						
SITE 35	WELL 1	WELL 2	WELL 3				500 mg/L	
1/5/93	25.90	25.17	20.93			1/5/93		
4/2/93	24.88	23.95	19.39			4/2/93		
4/21/93	24.67	23.70	19.05			4/21/93	124.30	
6/30/93	22.79	21.74	16.34			6/30/93		
10/4/93	22.95	21.95	17.38			10/4/93		

1/10/94	22.95	21.98	17.89			1/10/94		
4/20/94	23.45	22.59	18.41			4/20/94	123.34	
6/30/94	25.32	24.59	19.54			6/30/94		
10/3/94	26.00	25.21	20.98			10/3/94		
1/23/95	26.00	25.26	21.32			1/23/95		
4/5/95	26.20	25.45	21.46			4/5/95		
4/27/95	26.35	25.56	21.65			4/27/95	123.22	
7/17/95	25.50	24.72	19.36			7/17/95		
10/6/95	25.98	25.12	20.67			10/6/95		
1/5/96	25.81	24.97	20.83			1/5/96		
4/15/96	26.09	25.30	21.27			4/15/96		
SITE 36	WELL 1	WELL 2	WELL 3	WELL 4			500 mg/L	
1/5/93	30.64	28.85	27.12	29.53	1/5/93	1/5/93		
4/1/93	30.05	27.96	26.19	28.12	4/1/93	4/1/93		
4/21/93	29.90	27.80	26.00	28.00	4/21/93	4/21/93	130.67	
6/29/93	28.68	26.59	24.79	26.77	6/29/93	6/29/93		
9/16/93	28.70	26.60	24.80	27.10	9/16/93	9/16/93	136.23	
10/4/93	28.64	27.66	24.80	27.14	10/4/93	10/4/93		
10/15/93	28.60	27.60	24.80	27.20	10/15/93	10/15/93		
1/12/94	28.36	27.61	24.78	27.10		1/12/94		
4/14/94	28.43	27.65	24.83	27.84		4/14/94	129.41	
6/30/94	29.66	28.93	25.10	28.76		6/30/94		
10/3/94	30.58	29.85	27.08	29.89		10/3/94		
1/9/95	30.78	29.97	27.22	29.77		1/9/95		
4/6/95	30.89	30.13	27.36	30.08		4/6/95		
4/27/95	30.88	30.31	27.52	30.12		4/27/95	131.87	
7/19/95	29.30	28.56	25.70	27.84		7/19/95		
10/6/95	30.22	29.77	27.08	29.25		10/6/95		
1/5/96	30.52	30.03	27.24	29.69		1/5/96		
4/15/96	30.87	30.32	27.55	30.05		4/15/96		
SITE 37	WELL 1	WELL 2	WELL 3	WELL 4			500 mg/L	
1/4/93	60.93		59.61	59.14		1/4/93		
4/1/93	60.84		59.06	58.63		4/1/93		
4/21/93	60.80		58.89	58.49		4/21/93	220.98	
6/29/93	60.16		58.77	58.26		6/29/93		
10/1/93	60.38		59.55	58.99		10/1/93		
1/12/94	59.58		58.09	57.65		1/12/94		
4/13/94	59.09		57.53	57.10		4/13/94	221.36	
6/29/94	59.51		61.89	59.32		6/29/94		
10/3/94	60.30		61.13	60.67		10/3/94		
1/17/95	60.77		60.19	59.77		1/17/95		
4/5/95	60.87		59.82	59.44		4/5/95		
4/27/95	60.91		60.00	59.59		4/27/95	220.71	
7/17/95	60.97	*	62.09	60.18		7/17/95		
10/6/95	61.46	*	61.93	61.52		10/6/95		
1/4/96	61.70		61.20	60.82		1/4/96		
4/12/96	61.77		61.09	60.28		4/12/96		

SITE 38	WELL 1	WELL 2	WELL 3				500 mg/L	
1/5/93	33.48	32.96	28.20			1/5/93		
4/1/93	32.17	31.70	26.35			4/1/93		
4/21/93	31.91	31.32	25.95			4/21/93	154.60	
6/30/93	29.98	29.42	23.82			6/30/93		
10/4/93	29.94	29.41	24.37			10/4/93		
1/12/94	30.32	29.80	24.82			1/12/94		
4/14/94	30.95	30.42	25.81			4/14/94	154.80	
6/30/94	34.78	34.19	29.03			6/30/94		
10/3/94	33.46	32.96	28.51			10/3/94		
1/9/95	33.65	33.13	28.46			1/9/95		
4/6/95	34.03	33.51	29.08			4/6/95		
4/27/95	34.26	33.74	29.12			4/27/95	152.99	
6/22/95	31.20	30.65	25.13			6/22/95		
10/6/95	32.50	31.98	27.31			10/6/95		
1/5/96	32.96	32.43	27.72			1/5/96		
4/15/96	33.25	32.64	28.08			4/15/96		
SITE 39	WELL 1	WELL 2	WELL 3				500 mg/L	
1/5/93	6.10	4.15	2.92			1/5/93		
2/19/93	5.51	3.19	2.04			2/19/93		
3/22/93	5.14	3.00	2.00			3/22/93		
4/16/93	4.98	2.93	1.92			4/16/93		
5/20/93	4.70	2.05	1.15			5/20/93		
6/19/93	4.77	3.02	2.22			6/19/93		
7/15/93	4.95	2.50	1.13			7/15/93		
8/10/93	4.98	3.02	2.30			8/10/93		
9/9/93	5.50	3.99	3.15			9/9/93		
10/6/93	5.97	4.35	3.40			10/6/93		
10/22/93	6.12	4.33	3.18			10/22/93	55.00	
11/3/93	6.03	4.25	3.03			11/3/93		
12/1/93	5.96	4.14	2.92			12/1/93		
1/4/94	5.80	4.22	2.97			1/4/94		
2/3/94	5.92	4.24	2.98			2/3/94		
3/1/94	5.86	4.25	2.97			3/1/94		
3/29/94	5.98	4.48	3.22			3/29/94		
4/20/94	6.00	4.42	3.13			4/20/94	55.00	
5/4/94	5.95	4.30	3.04			5/4/94		
5/26/94	6.21	5.07	3.95			5/26/94		
6/30/94	6.82	6.06	4.92			6/30/94		
7/26/94	7.28	6.34	5.27			7/26/94		
8/26/94	7.78	6.95	5.86			8/26/94		
9/20/94	7.93	6.99	5.85			9/20/94		
10/6/94	7.95	6.97	5.94			10/6/94		
1/23/95	7.50	6.24	4.91			1/23/95		
4/6/95	6.97	5.50	4.04			4/6/95		
7/17/95	6.32	4.66	3.66			7/17/95		
10/6/95	7.09	5.93	4.95			10/6/95		

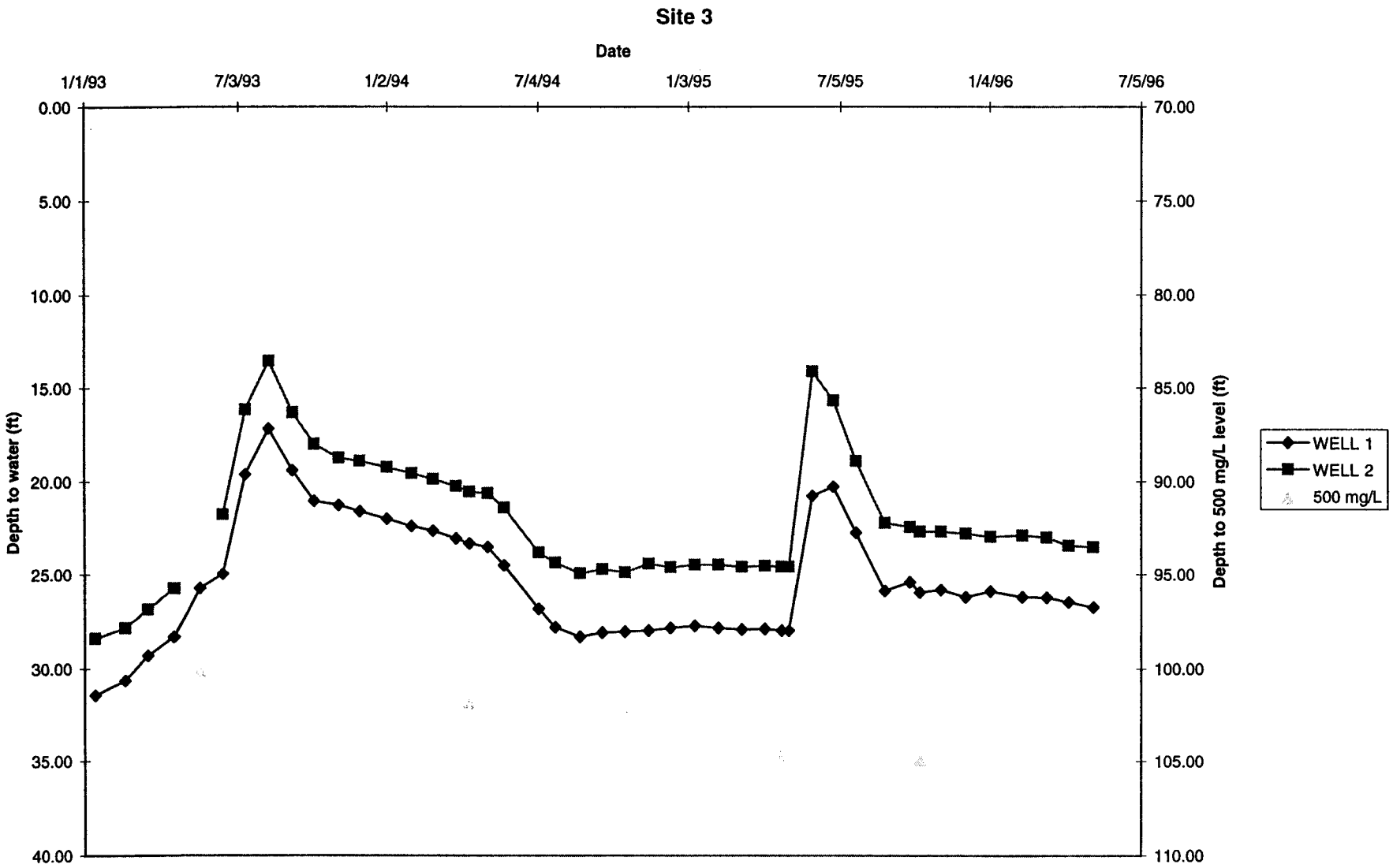
1/10/96	7.19	5.60	4.26			1/10/96		
4/15/96	6.82	5.42	4.08			4/15/96		
SITE 40	WELL 1	WELL 2	WELL 3					
1/5/93	58.46	58.44	58.57					
4/2/93	57.00	56.77	56.85					
6/30/93	54.60	54.45	54.47					
10/4/93	57.35	57.20	57.27					
1/10/94	53.52	53.43	53.39					
4/4/94	52.86	52.69	52.72					
4/20/94	53.55	53.41	53.31					
6/30/94	60.23	63.50	62.52					
10/4/94	60.07	59.95	60.45					
1/23/95	57.74	57.62	57.78					
4/6/95	56.89	56.80	56.79					
7/17/95	65.35	65.67	62.65					
10/6/95	60.07	59.95	60.45					
1/10/96	57.13	56.98	56.98					
4/15/96	56.74	56.64	56.63					
SITE 41	WELL 1	WELL 2	WELL 3					
1/5/93	4.27	4.23	4.03					
4/2/93	3.09	2.55	2.50					
6/30/93	0.40	0.29	0.63					
10/4/93	1.39	1.40	1.40					
1/10/94	1.09	1.42	1.70					
4/20/94	1.93	1.98	2.18					
6/30/94	2.63	2.54	2.93					
10/4/94	3.60	3.88	4.12					
1/23/95	3.87	3.83	3.70					
4/6/95	3.96	3.87	3.81					
7/17/95	1.97	1.98	2.30					
10/6/95	2.31	2.66	2.99					
1/10/96	2.63	2.94	3.20					
4/15/96	3.34	3.56	3.47					
SITE 42	WELL 1	WELL 2	WELL 3				500 mg/L	
1/5/93	21.59	20.68	13.46			1/5/93		
4/1/93	21.28	20.36	13.03			4/1/93		
4/22/93						4/22/93	102.91	
6/29/93	20.05	19.18	12.85			6/29/93		
10/1/93	19.34	18.47	13.13			10/1/93		
1/12/94	18.77	17.88	13.12			1/12/94		
4/14/94	18.48	17.61	13.01			4/14/94	103.74	
6/30/94	18.94	18.07	13.89			6/30/94		
10/3/94	19.01	18.12	13.61			10/3/94		
1/17/95	18.62	17.72	13.27			1/17/95		
4/5/95	18.33	17.48	13.35			4/5/95		
4/27/95	18.46	17.44	13.46			4/27/95	102.33	

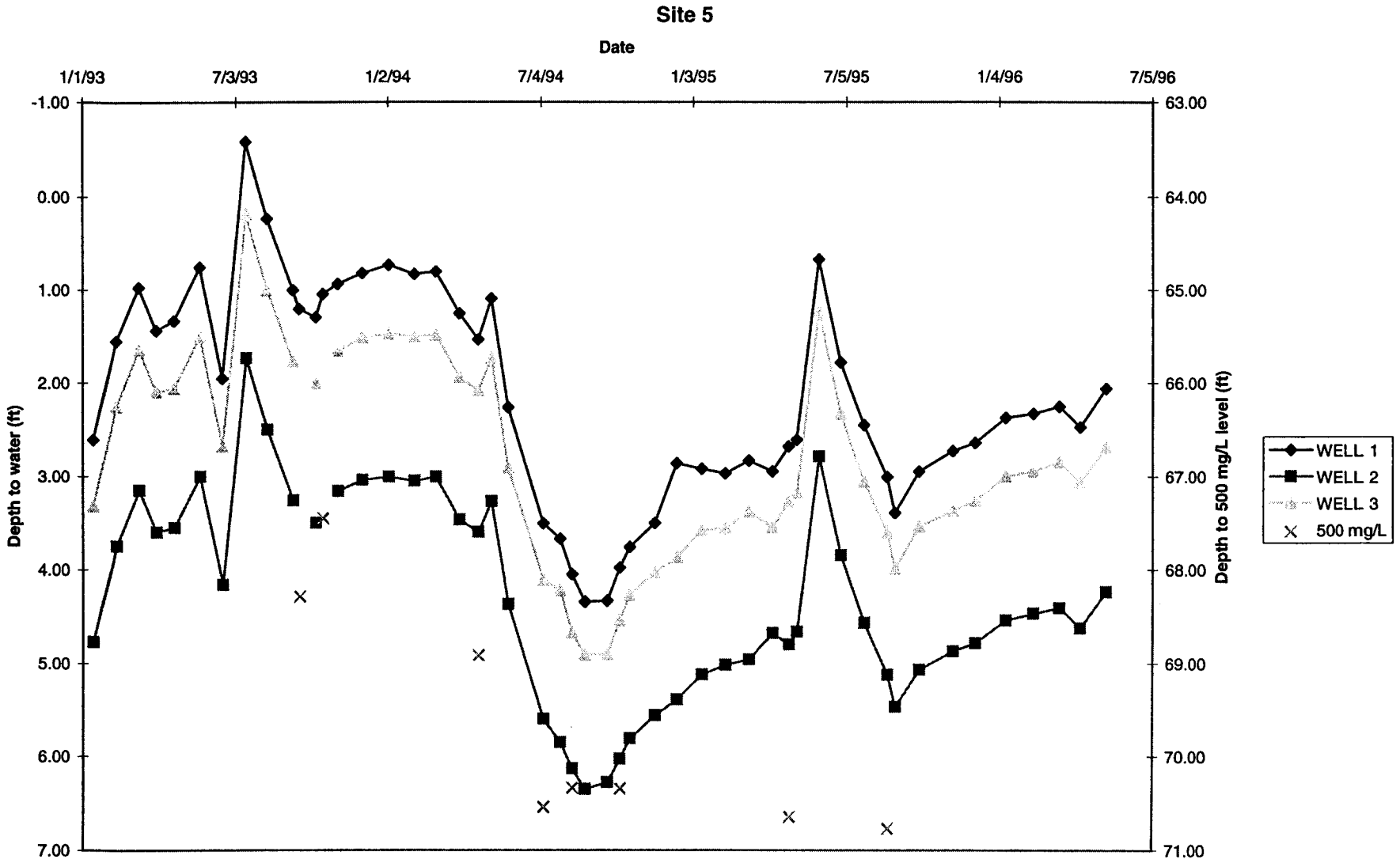
7/17/95	18.06	17.20	13.80			7/17/95		
10/6/95	18.23	17.33	13.21			10/6/95		
1/5/96	18.20	17.37	13.05			1/5/96		
4/12/96	18.04	17.22	13.53			4/12/96		
SITE 43	WELL 1	WELL 2					500 mg/L	
1/4/93	5.48	5.08				1/4/93		
4/1/93	5.40	4.87				4/1/93		
4/22/93	5.37	4.99				4/22/93	44.81	
6/29/93	5.32	5.20				6/29/93		
10/1/93	5.27	5.49				10/1/93		
1/12/94	5.23	5.18				1/12/94		
4/14/94	5.19	5.14				4/14/94	45.11	
4/19/94	5.19	5.14				4/19/94		
6/29/94	5.24	5.74				6/29/94		
10/3/94	5.27	5.69				10/3/94		
1/17/95	5.35	5.39				1/17/95		
4/5/95	5.37	5.30				4/5/95		
4/27/95		5.37				4/27/95	44.01	
7/17/95	5.36	5.37				7/17/95		
10/6/95	5.44	5.63				10/6/95		
1/4/96	5.52	5.38				1/4/96		
4/12/96	5.58	5.38				4/12/96		
SITE 44	WELL 1	WELL 2	WELL 3	WELL 4				
1/4/93	68.73	68.72	76.63	DRY				
4/1/93	68.57	68.55	76.48	DRY				
6/29/93	68.13	68.03	75.85	DRY				
10/1/93	67.52	67.42	75.28	75.15				
1/10/94	67.26	67.19	75.11	75.07				
4/21/94	67.30	67.25	75.36	75.43				
6/29/94	67.53	67.56	75.71	77.36				
10/3/94	68.05	68.06	76.15					
1/17/95	68.21	68.19	75.73					
4/5/95	68.30	68.25	76.35					
7/19/95	67.80	67.72	75.87	75.64				
10/6/95	67.64	67.63	75.58	75.69				
1/4/96	67.54	67.49	75.49	75.47				
4/12/96	67.58	67.55	75.58	75.72				
SITE 45	WELL 1	WELL 2	WELL 3					
1/5/93	49.42	49.42	48.58					
4/2/93	48.65	48.69	47.77					
6/29/93	47.23	47.30	46.44					
10/1/93	46.66	46.71	45.78					
1/10/94	46.49	46.54	45.62					
4/20/94	46.70	46.73	45.69					
6/29/94	46.97	47.03	45.94					
10/3/94	47.69	47.69	46.62					

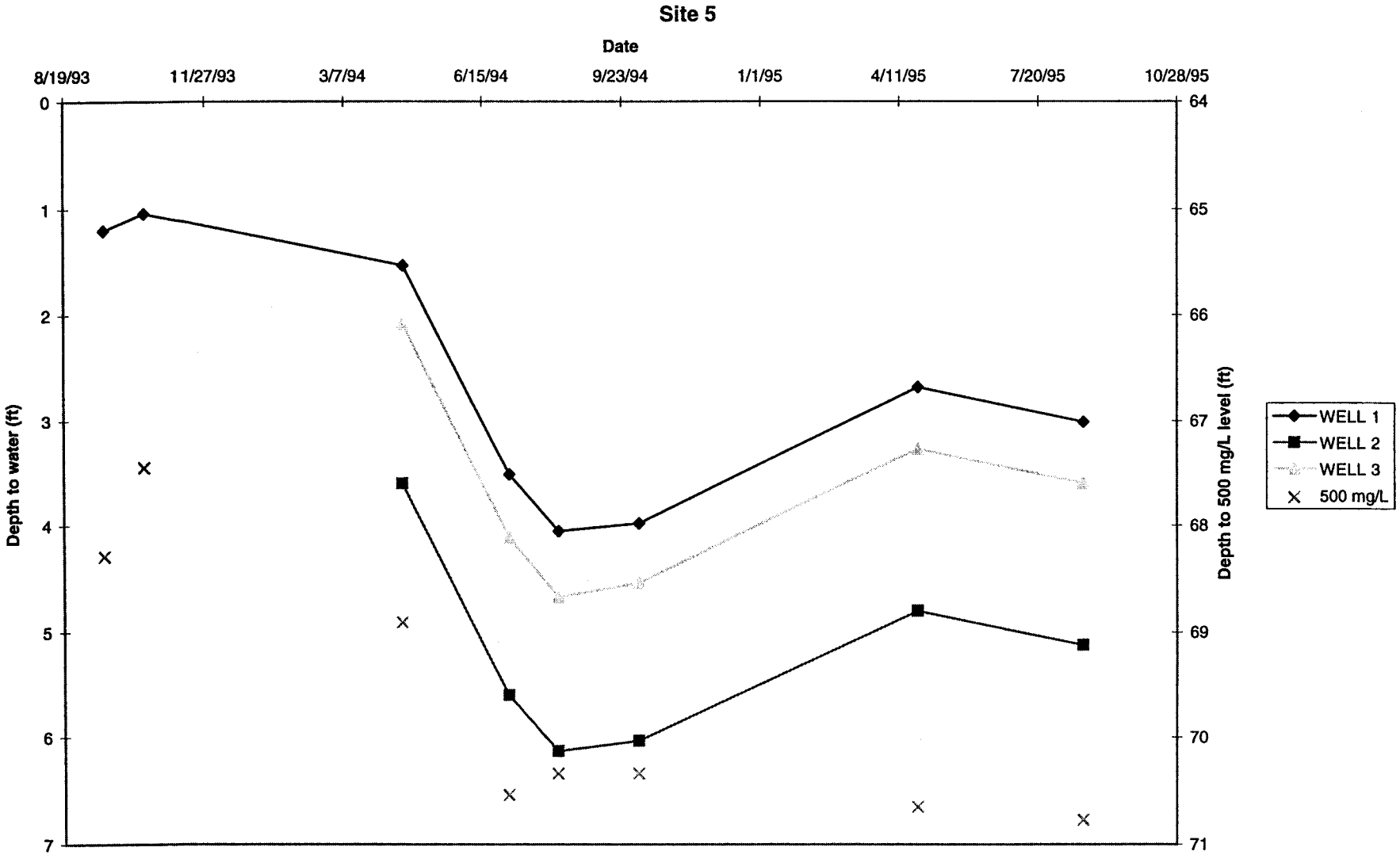
1/11/95	48.01	48.14	47.31					
4/5/95	48.48	48.55	47.43					
7/19/95	48.08	48.12	47.17					
10/6/95	48.18	48.22	47.29					
1/4/96	48.07	47.80	47.14					
4/15/96	48.38	48.40	47.44					
SITE 46	WELL 1	WELL 2	WELL 3					
1/5/93	52.03	47.89	47.83					
4/1/93	51.65	47.37	47.28					
6/29/93	50.74	45.17	45.13					
10/1/93	50.66	45.28	45.18					
1/10/94	50.07	44.55	44.48					
4/21/94	49.79	44.62	44.57					
6/29/94	50.18	45.94	45.73					
10/3/94	51.29	47.74	47.56					
10/18/94	51.29	47.63	47.55					
11/16/94	51.40	47.44	47.30					
12/16/94	51.35	47.43	47.38					
1/11/95	51.14	47.24	47.14					
2/8/95	51.49	47.38	47.23					
3/10/95	51.34	47.28	47.21					
4/5/95	51.28	47.22	47.16					
5/2/95	51.32	47.33	47.17					
5/30/95	51.15	47.03	47.03					
6/30/95	50.94	46.67	46.60					
7/17/95	50.97	46.50						
7/25/95	50.89	46.73	46.29					
8/30/95	51.08	46.86	46.73					
9/29/95	51.06	46.86	46.79					
11/6/95	51.08	46.56	46.52					
12/5/95	51.25	46.60	46.57					
1/4/96	51.07	46.39	46.35					
2/12/96	51.20	46.28	46.15					
3/11/96	50.94	46.19	46.12					
4/15/96	51.05	46.34	46.24					
5/9/96	51.04	46.60	46.49					
SITE 47	WELL 1	WELL 2	WELL 3					
1/4/93	77.11	71.94	71.51					
4/1/93	77.05	71.86	71.44					
6/29/93	77.21	71.36	70.93					
10/1/93	77.56	71.59	71.15					
1/10/94	77.67	71.17	70.74					
4/4/94	77.68	70.56	70.04					
6/29/94	77.48	70.97	70.46					
10/3/94	77.58	71.50	71.13					
1/17/95	77.48	71.41	71.10					
4/5/95	77.42	71.20	70.75					

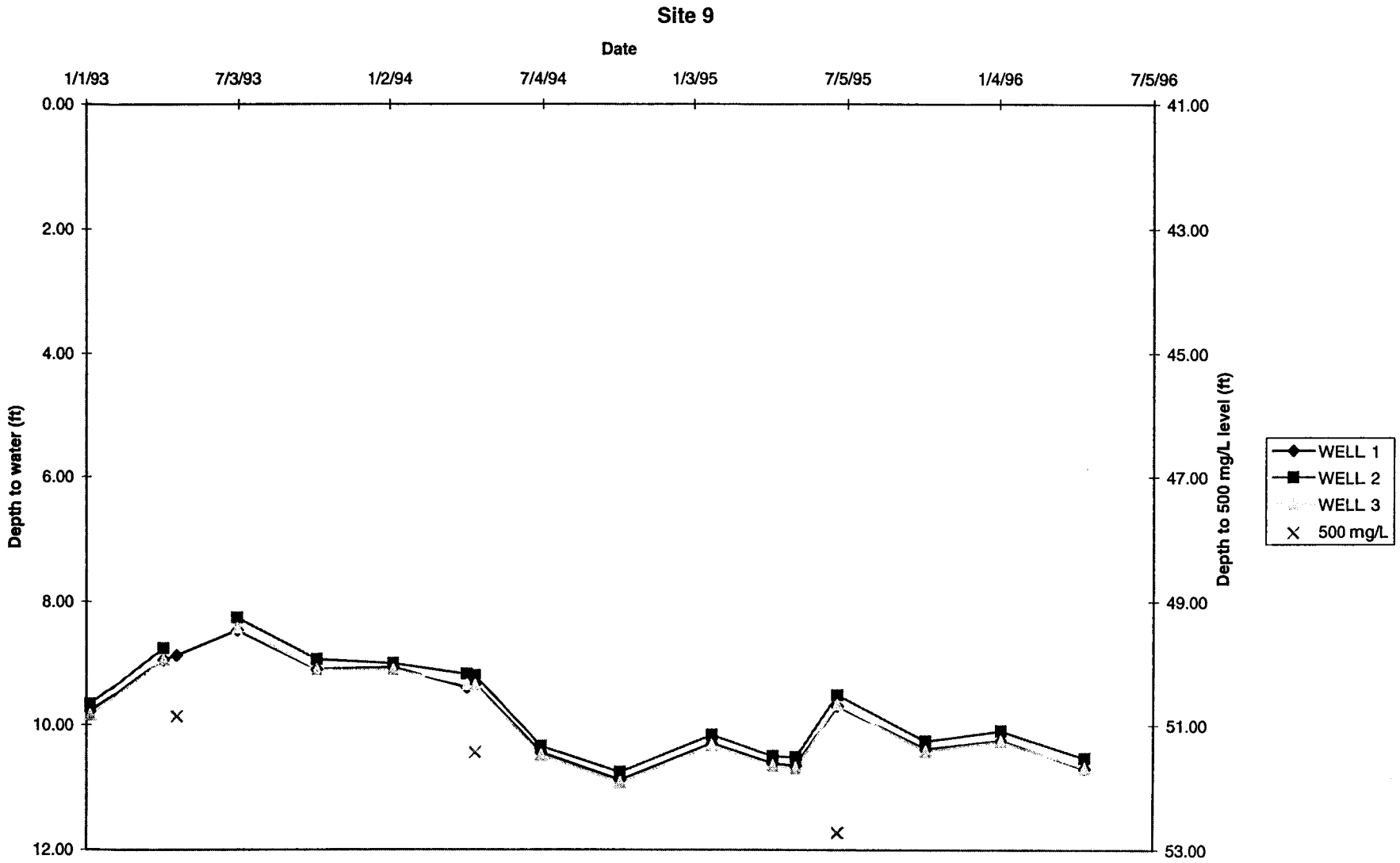
7/19/95	77.11	71.31	70.88					
10/6/95	77.27	71.89	71.53					
1/5/96	77.32	71.80	71.35					
4/12/96	77.10	71.33	70.87					
SITE 48	WELL 1	WELL 2	WELL 3					
1/5/93	62.86	56.40	56.54					
4/1/93	62.85	56.36	56.59					
6/29/93	62.87	55.74	55.83					
10/1/93	62.90	55.43	55.55					
1/10/94	62.57	54.96	54.96					
4/21/94	62.52	55.06	55.18					
6/29/94	62.73	55.81	55.78					
10/3/94	63.06	56.16	56.29					
1/11/95	62.98	56.03	56.25					
4/5/95	63.11	56.20	56.59					
7/19/95	63.01	56.32	56.30					
10/6/95	63.16	56.13	56.23					
1/4/96	63.05	55.67	55.81					
4/15/96	62.95	55.66	55.50					
SITE 49	WELL 1	WELL 2	WELL 3	WELL 4				
4/1/93	CAPPED	CAPPED	0.33	-0.75				
6/30/93	CAPPED	CAPPED	0.74	-0.75				
7/7/93	CAPPED	CAPPED	-0.27	-1.30				
10/1/93	CAPPED	CAPPED	1.60	0.56				
1/12/94	CAPPED	CAPPED	0.92	-0.08				
4/4/94	CAPPED	CAPPED	1.02	-0.02				
6/22/94			1.92	0.87				
6/30/94	**	**	2.06	1.04				
10/7/94			2.11	1.09				
1/17/95			1.41	0.42				
4/6/95			1.34	0.29				
7/20/95	**	**	1.44	0.38				
10/6/95	**	**	1.89	0.83				
1/5/96	**	**	1.51	0.47				
4/15/96			1.47	0.45				
SITE 50	WELL 1	WELL 2	WELL 3					
1/14/93	26.95	28.12	27.17					
3/29/93	25.94	26.09	26.15					
7/1/93	24.82	25.04	25.09					
9/22/93	22.60	22.84	22.96					
10/20/93	22.32	22.48	22.57					
1/5/94	21.91	22.08	22.09					
3/31/94	22.20	22.29	22.34					
5/26/94	22.96	23.23	23.07					
7/1/94	25.58	26.17	25.71					
7/20/94	24.80	25.04	25.10					

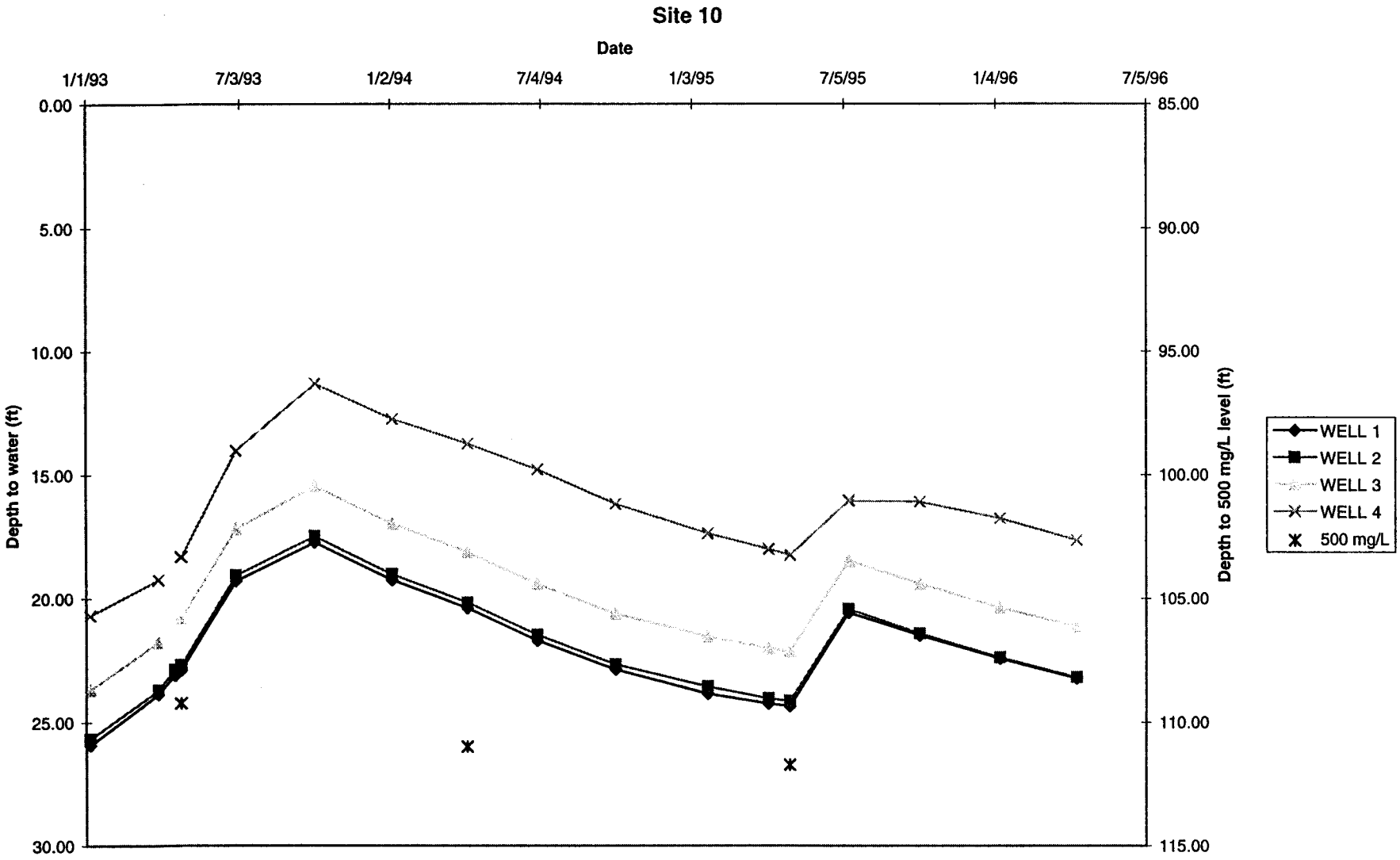
10/5/94	24.88	25.07	25.12					
1/18/95	24.65	24.75	24.78					
4/6/95	24.63	24.83	24.83					
4/13/95	24.74	24.82	24.87					
4/28/95	24.77	24.87	24.91					
6/21/95	23.52	23.65	23.73					
7/14/95	25.28	25.66	25.45					
8/22/95	26.05	26.66	26.39					
9/29/95	24.98	25.14	25.25					
10/3/95	24.91	25.07	25.18					
11/16/95	24.58	24.69	24.74					
1/11/96	24.52	24.65	24.69					
4/9/96	24.63	24.73	24.74					
5/3/96	25.45	25.51	25.48					
SITE 51	WELL 1	WELL 2						
1/14/93	19.57	19.00						
3/29/93	17.83	17.30						
7/1/93	15.94	15.59						
10/5/93	14.05	13.78						
1/5/94	13.74	13.28						
4/19/94	14.17	13.68						
7/1/94	15.95	15.32						
10/5/94	17.00	16.55						
1/18/95	16.92	16.42						
4/6/95	17.04	16.53						
5/5/95	17.05	16.60						
7/14/95	16.03	15.35						
10/3/95	16.95	16.55						
1/11/96	16.77	16.25						
4/9/96	16.92	16.42						
SITE 52	WELL 1	WELL 2						
1/14/93	31.40	31.53						
3/29/93	30.40	30.79						
7/1/93	27.87	28.64						
10/5/93	23.98	24.00						
1/5/94	23.40	23.30						
4/19/94	23.83	23.67						
7/6/94	26.57	25.17						
10/5/94	27.42	26.89						
1/18/95	27.28	27.09						
4/6/95	27.34	27.17						
4/25/95	27.33	27.19						
7/14/95	27.43	26.63						
10/3/95	27.94	27.76						
1/11/96	27.62	27.52						
4/9/96	27.55	27.45						

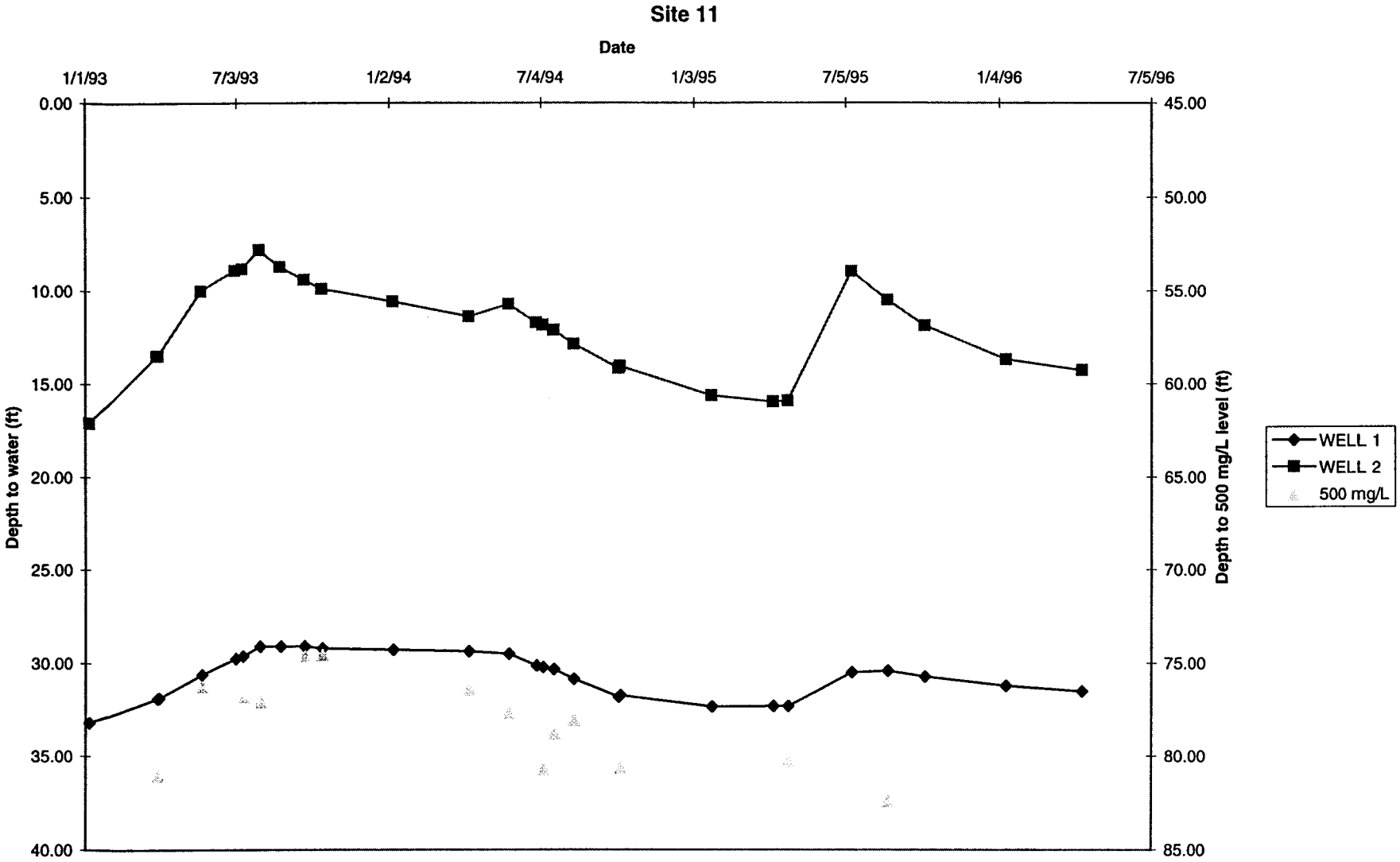

Site 3
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
70.00
75.00
80.00
85.00
90.00
95.00
100.00
105.00
110.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
500 mg/L

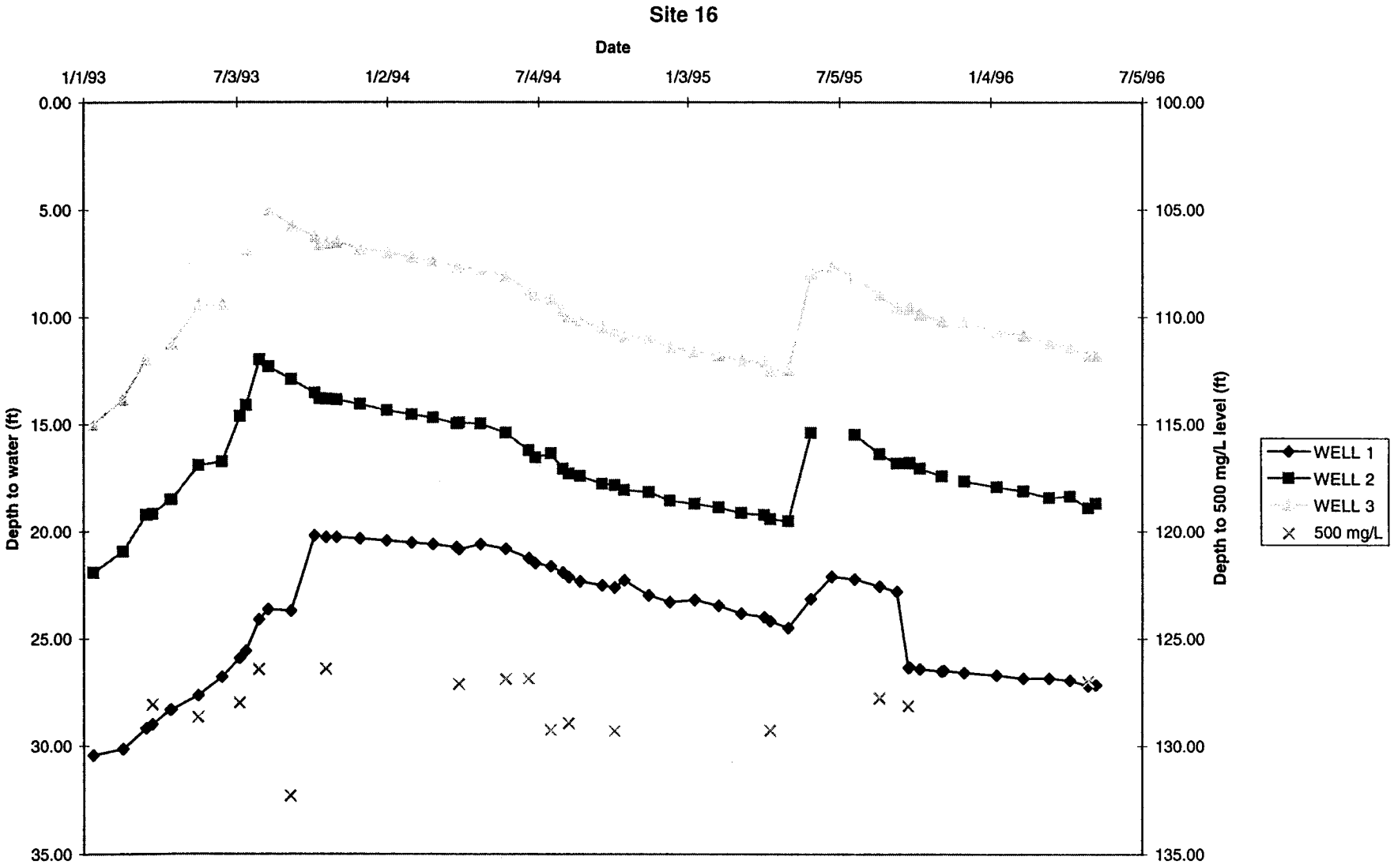

Site 5
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
63.00
64.00
65.00
66.00
67.00
68.00
69.00
70.00
71.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
WELL 3
500 mg/L

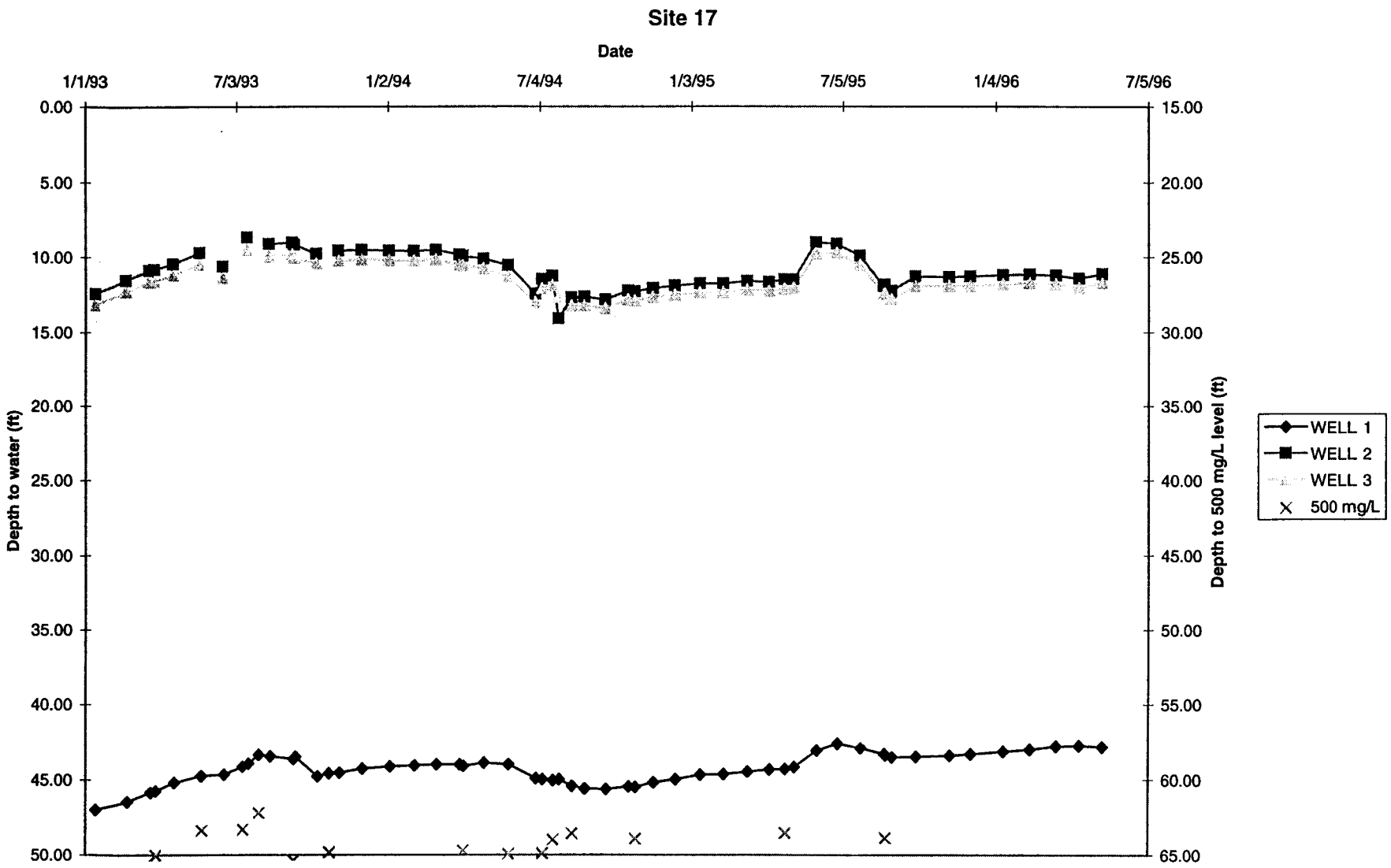

Site 5
Date
8/19/93
11/27/93
3/7/94
6/15/94
9/23/94
1/1/95
4/11/95
7/20/95
10/28/95
Depth to water (ft)
0
1
2
3
4
5
6
7
Depth to 500 mg/L level (ft)
64
65
66
67
68
69
70
71
WELL 1
WELL 2
WELL 3
500 mg/L

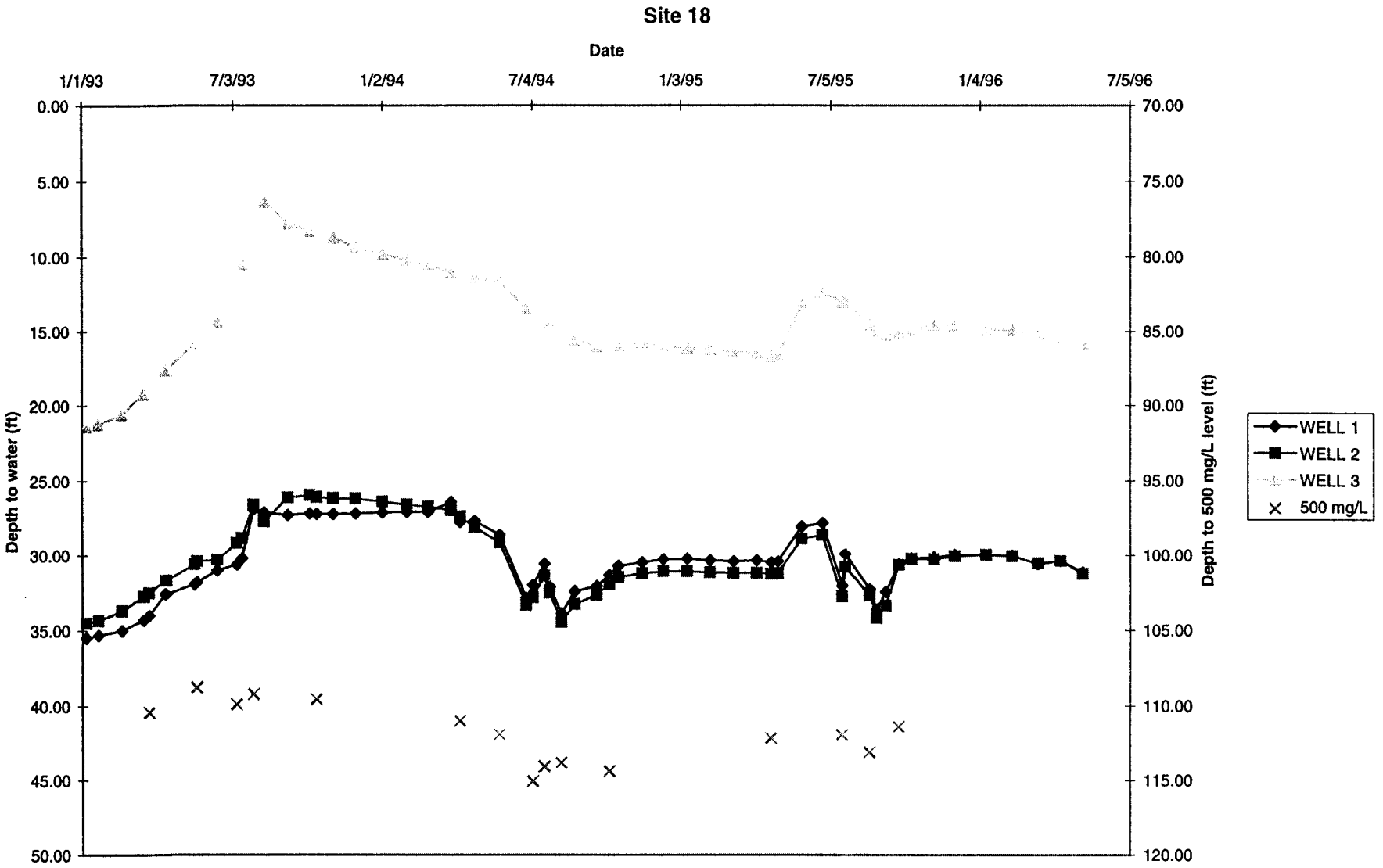

Site 9
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
0.00
2.00
4.00
6.00
8.00
10.00
12.00
41.00
43.00
45.00
47.00
49.00
51.00
53.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
WELL 3
500 mg/L

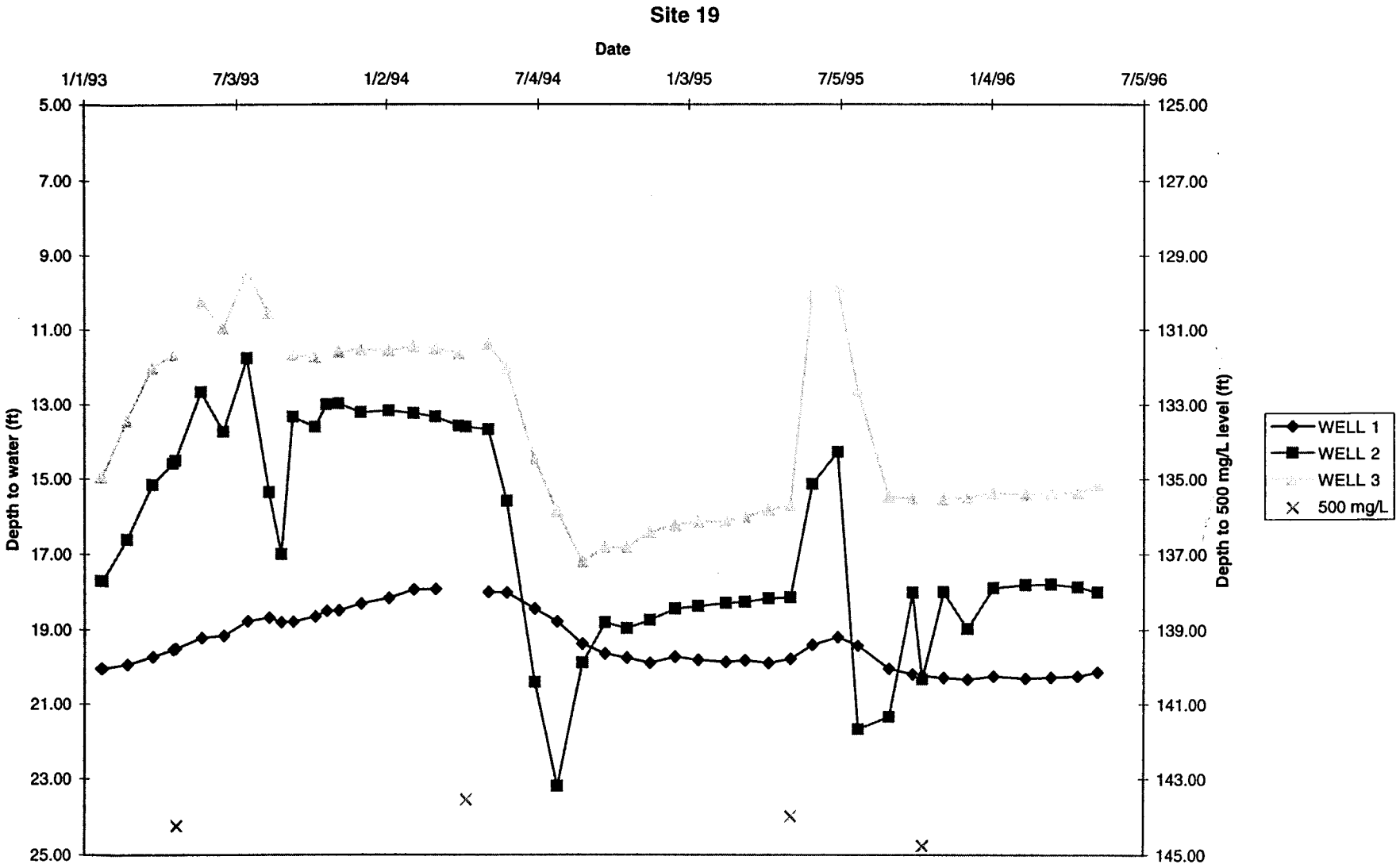

Site 10
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
0.00
5.00
10.00
15.00
20.00
25.00
30.00
85.00
90.00
95.00
100.00
105.00
110.00
115.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
WELL 3
WELL 4
500 mg/L

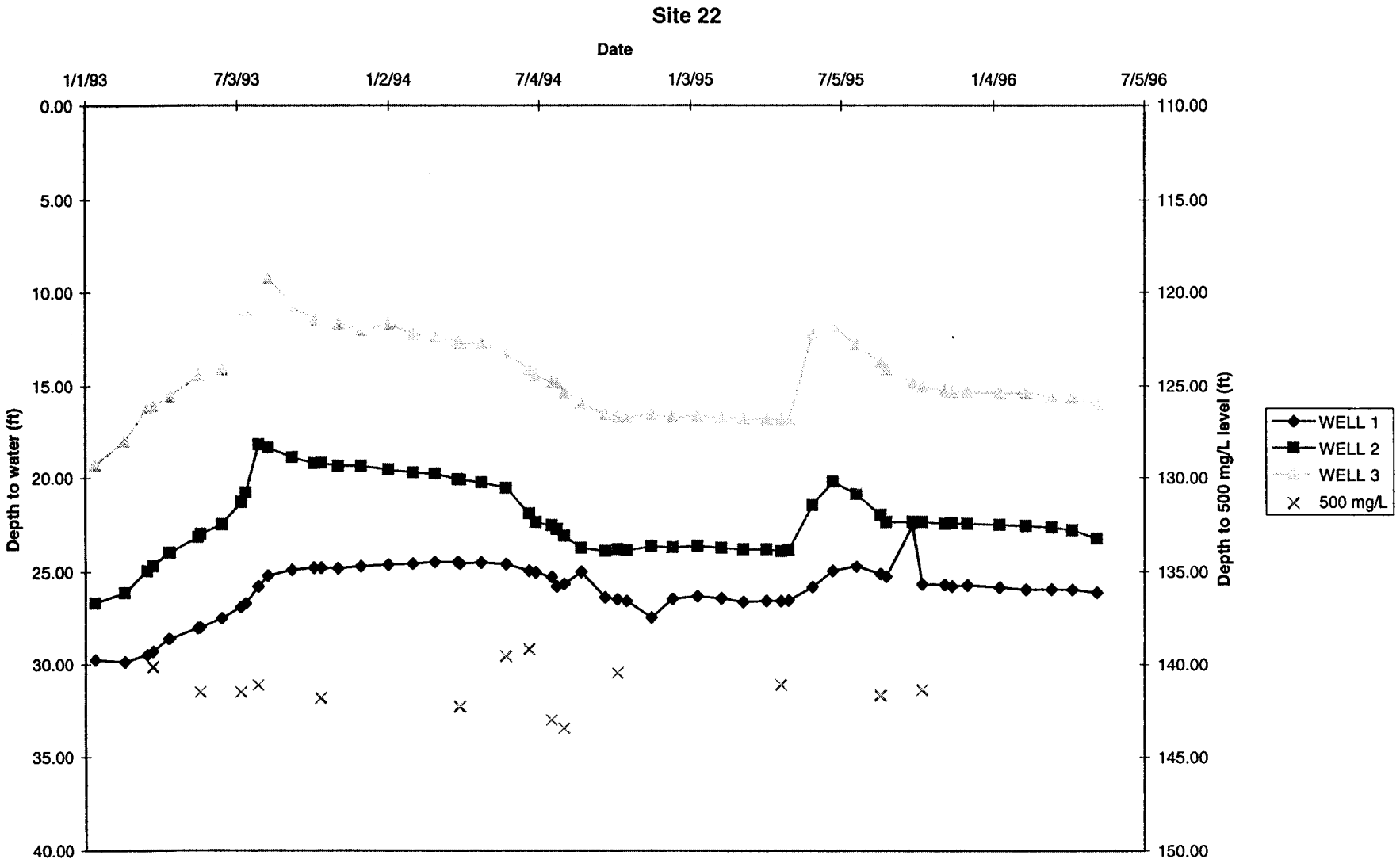

Site 11
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
80.00
85.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
500 mg/L

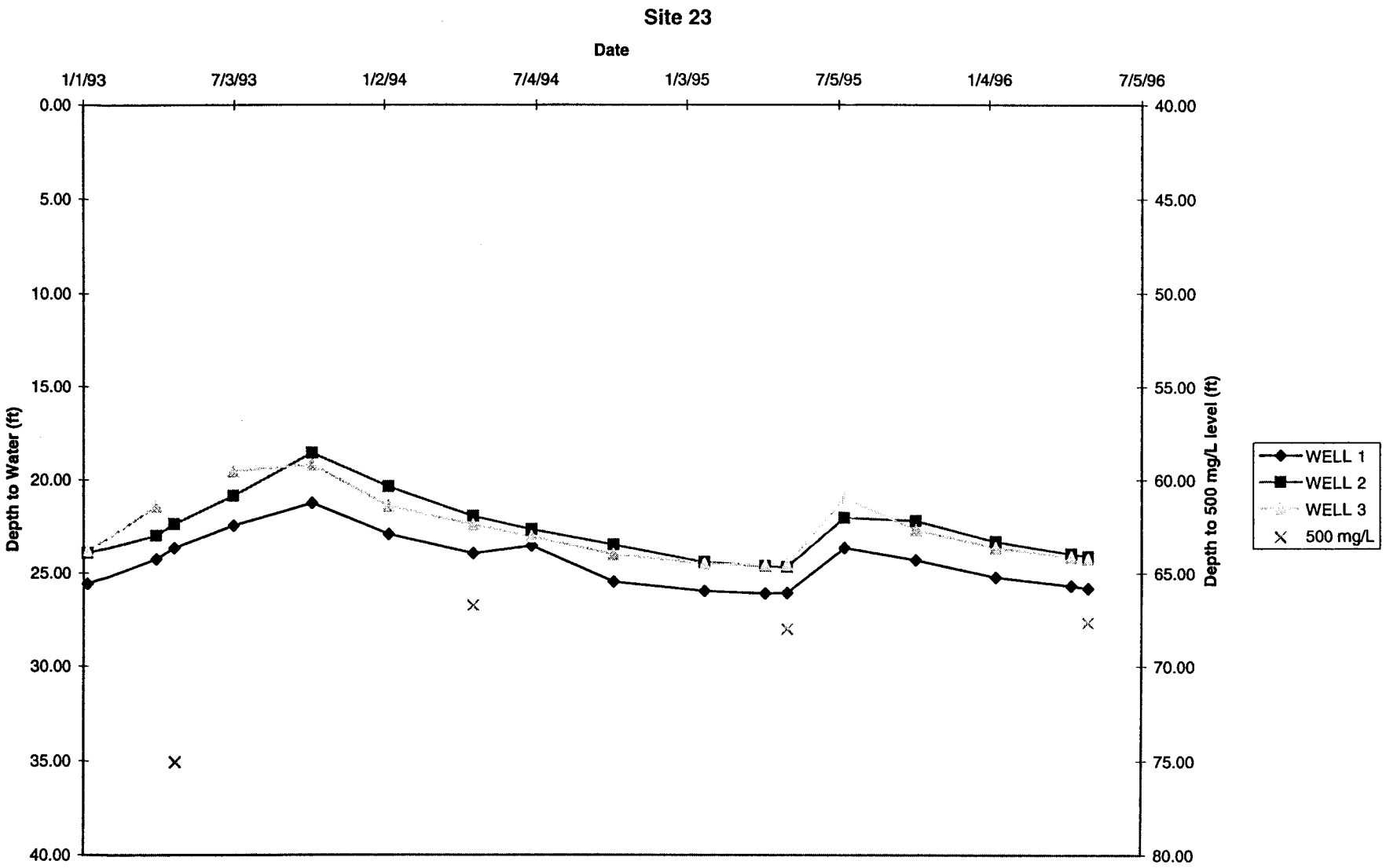

Site 16
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
100.00
105.00
110.00
115.00
120.00
125.00
130.00
135.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
WELL 3
500 mg/L

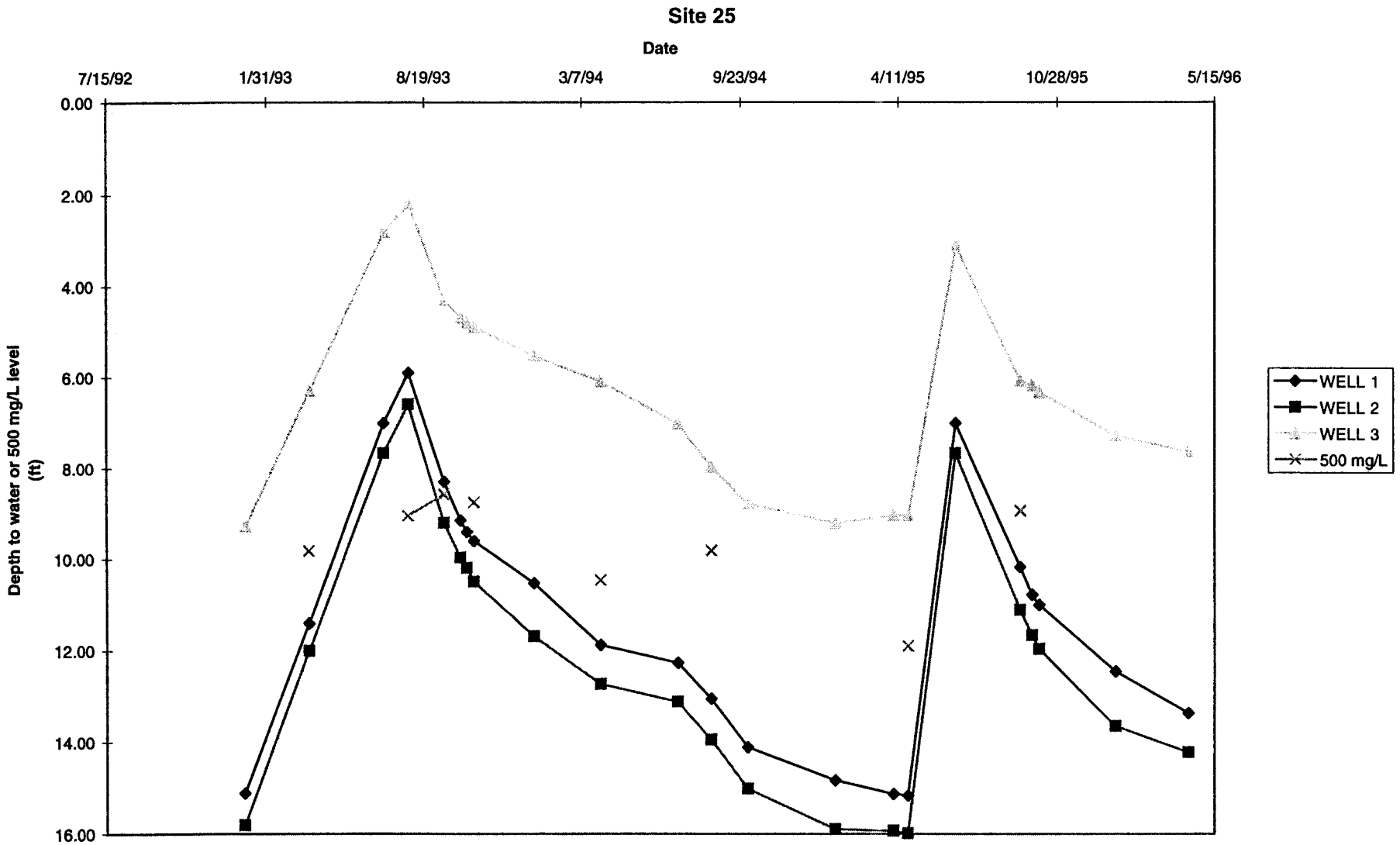

Site 17
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
Depth to water (ft)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
Depth to 500 mg/L level (ft)
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
WELL 1
WELL 2
WELL 3
500 mg/L

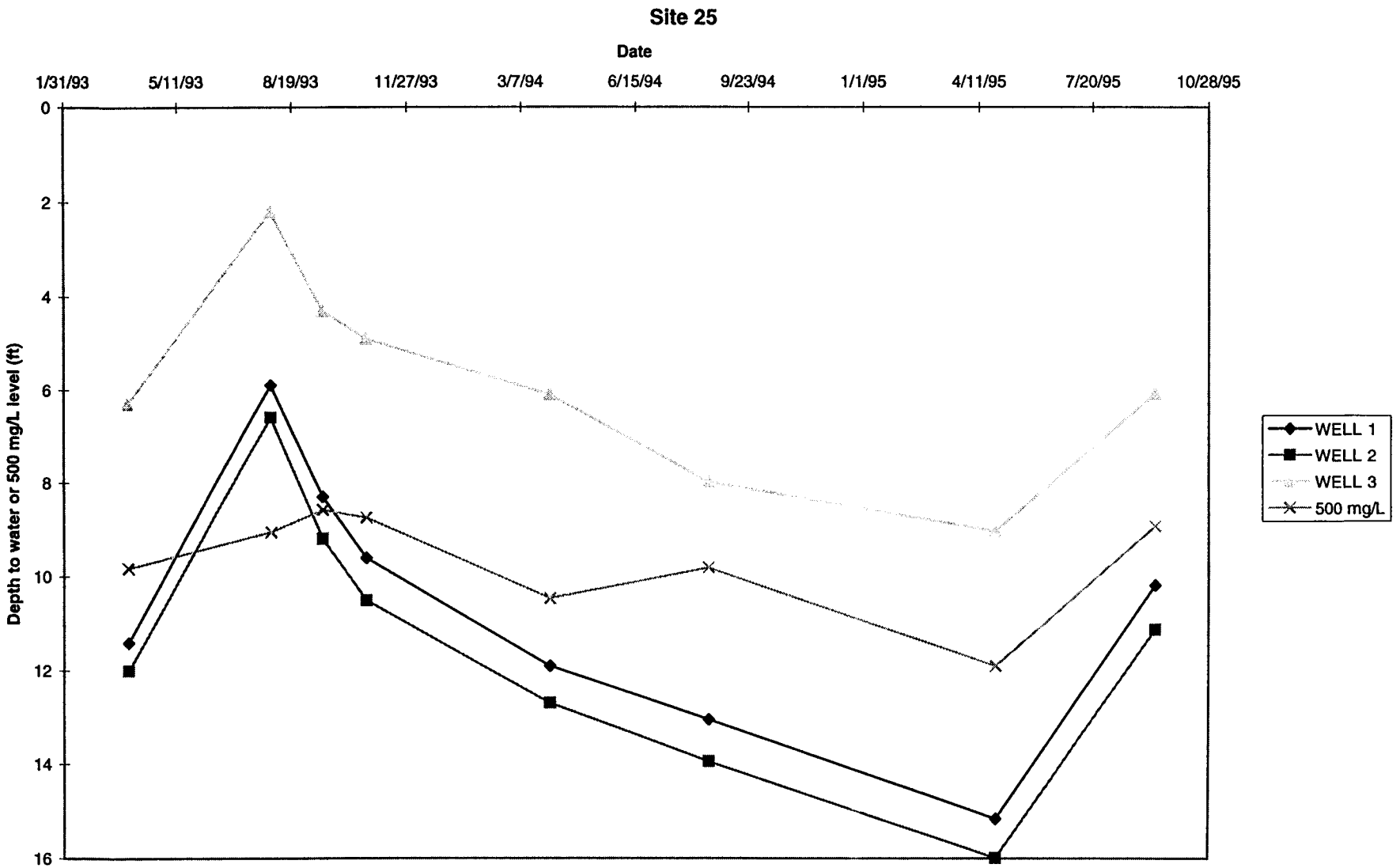

Site 18
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
Depth to water (ft)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
Depth to 500 mg/L level (ft)
70.00
75.00
80.00
85.00
90.00
95.00
100.00
105.00
110.00
115.00
120.00
WELL 1
WELL 2
WELL 3
500 mg/L

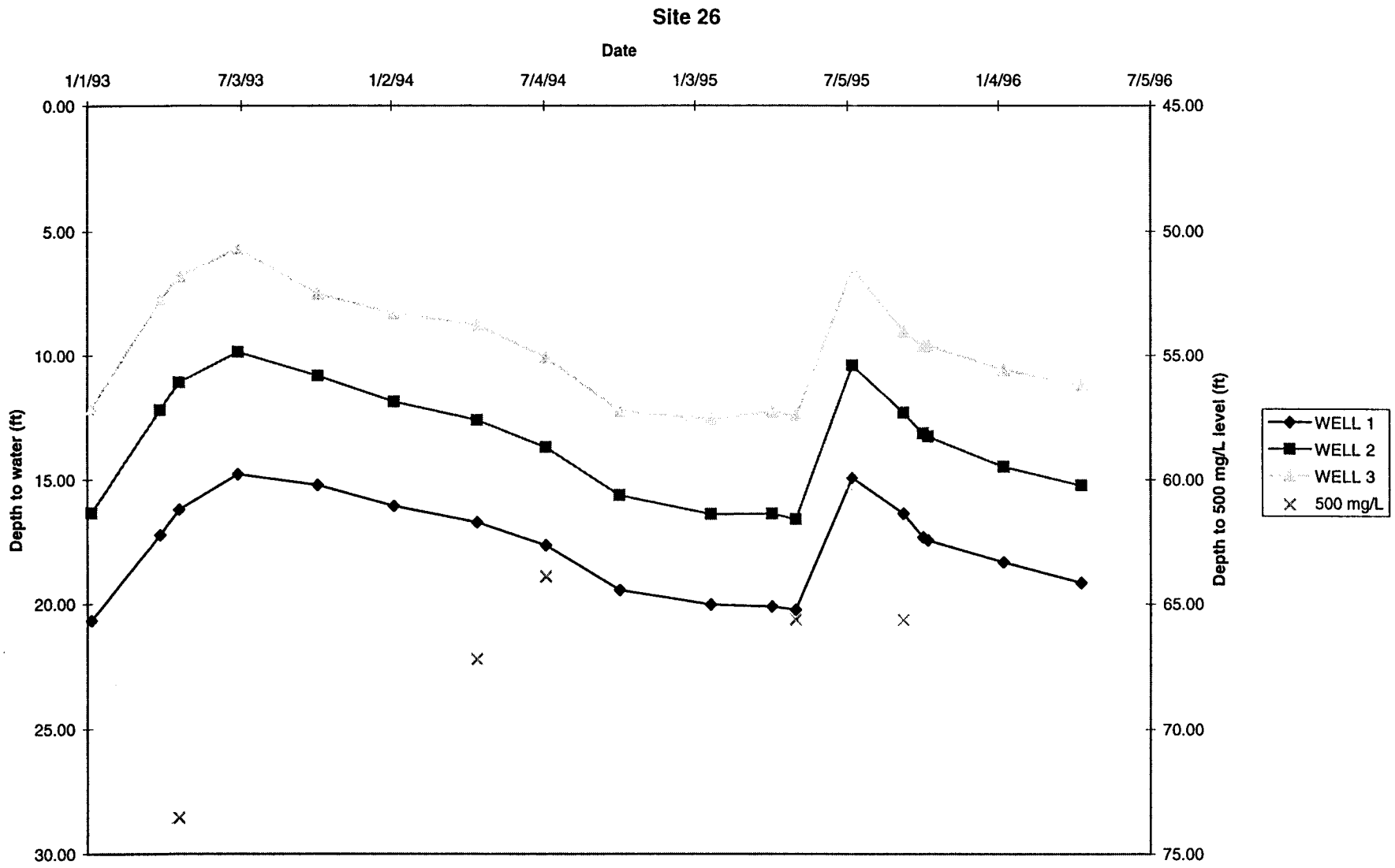

Site 19
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
Depth to water (ft)
5.00
7.00
9.00
11.00
13.00
15.00
17.00
19.00
21.00
23.00
25.00
Depth to 500 mg/L level (ft)
125.00
127.00
129.00
131.00
133.00
135.00
137.00
139.00
141.00
143.00
145.00
WELL 1
WELL 2
WELL 3
500 mg/L

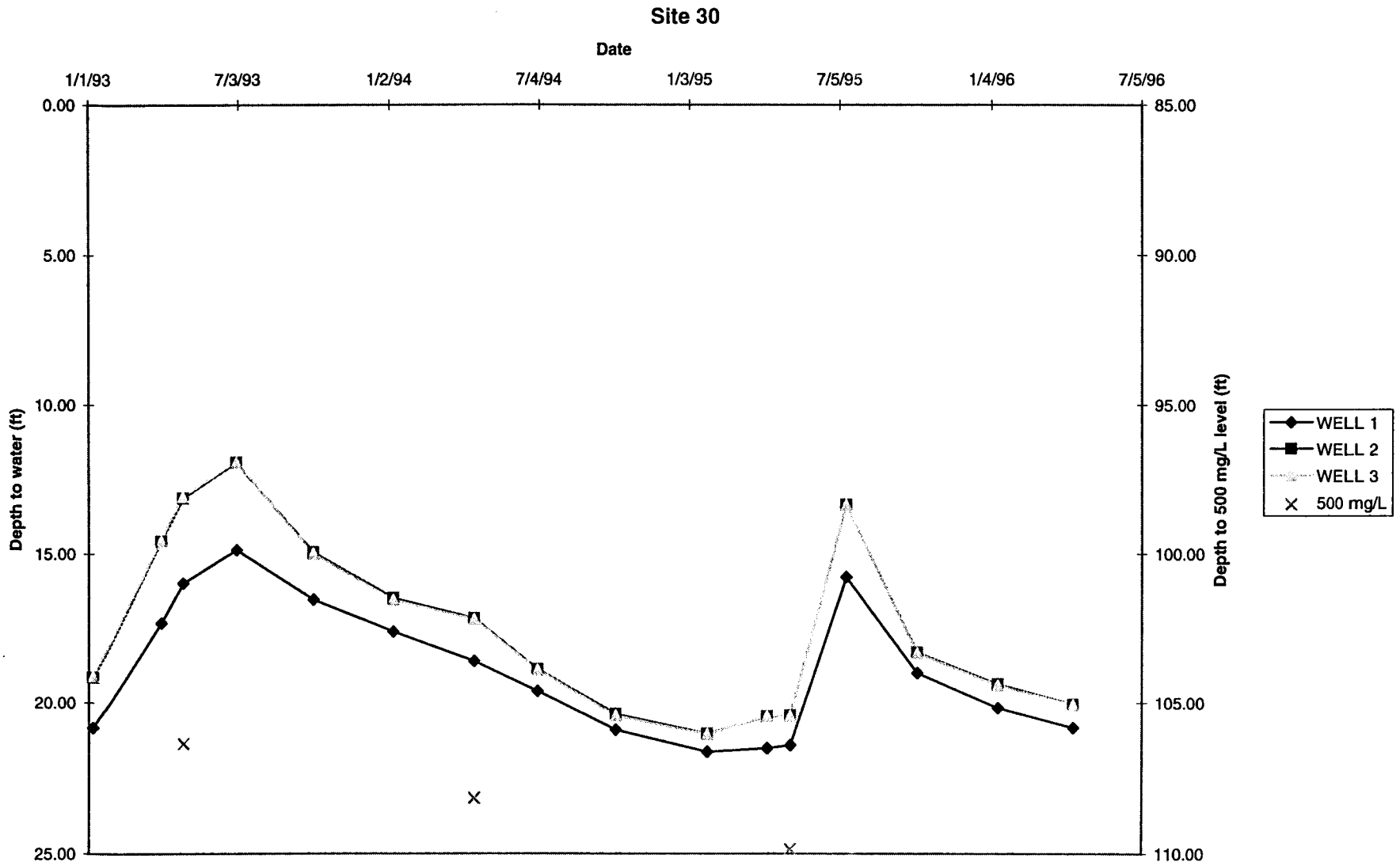

Site 22
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
Depth to water (ft)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
Depth to 500 mg/L level (ft)
110.00
115.00
120.00
125.00
130.00
135.00
140.00
145.00
150.00
WELL 1
WELL 2
WELL 3
500 mg/L

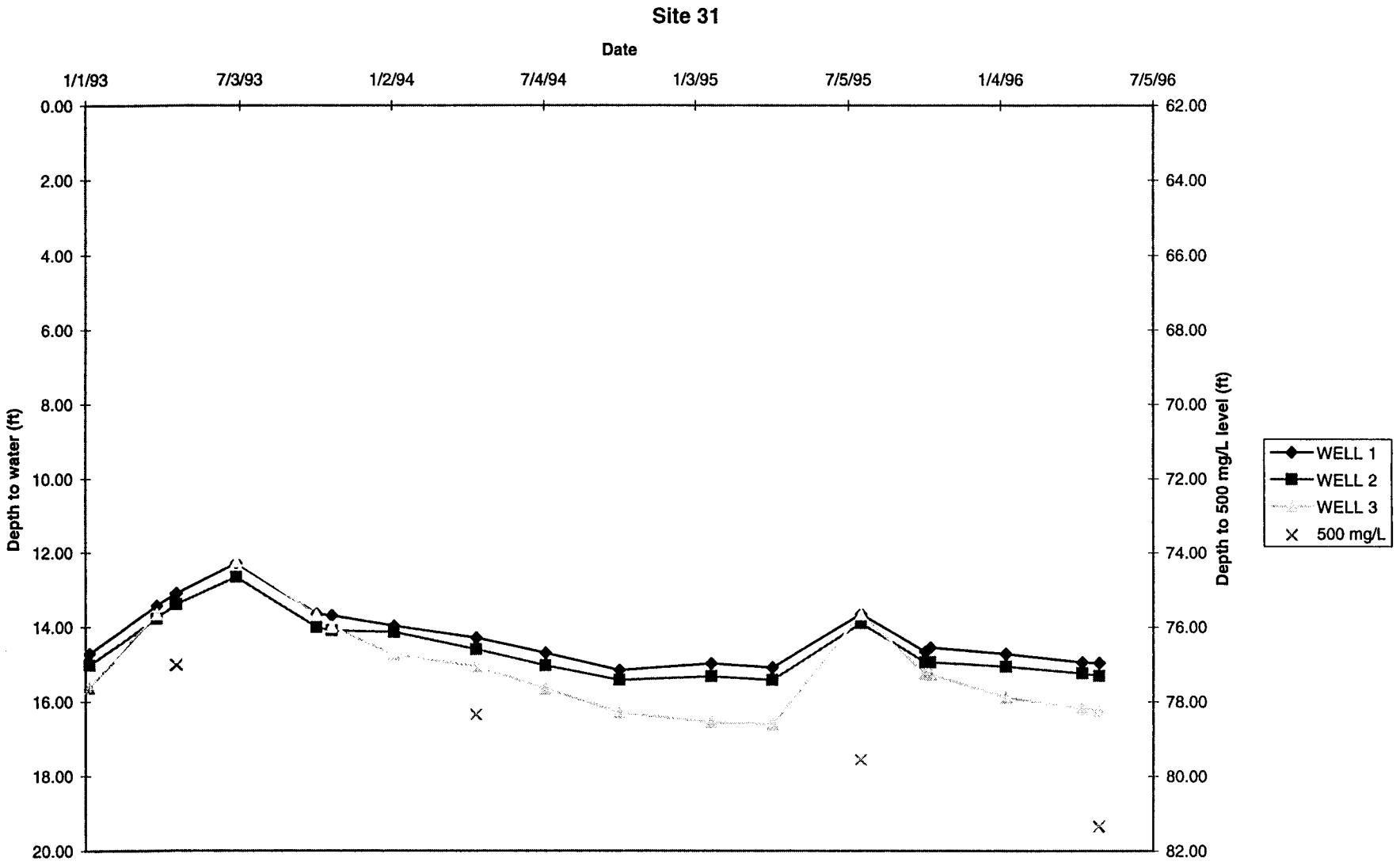

Site 23
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
Depth to Water (ft)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
Depth to 500 mg/L level (ft)
40.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
80.00
WELL 1
WELL 2
WELL 3
500 mg/L

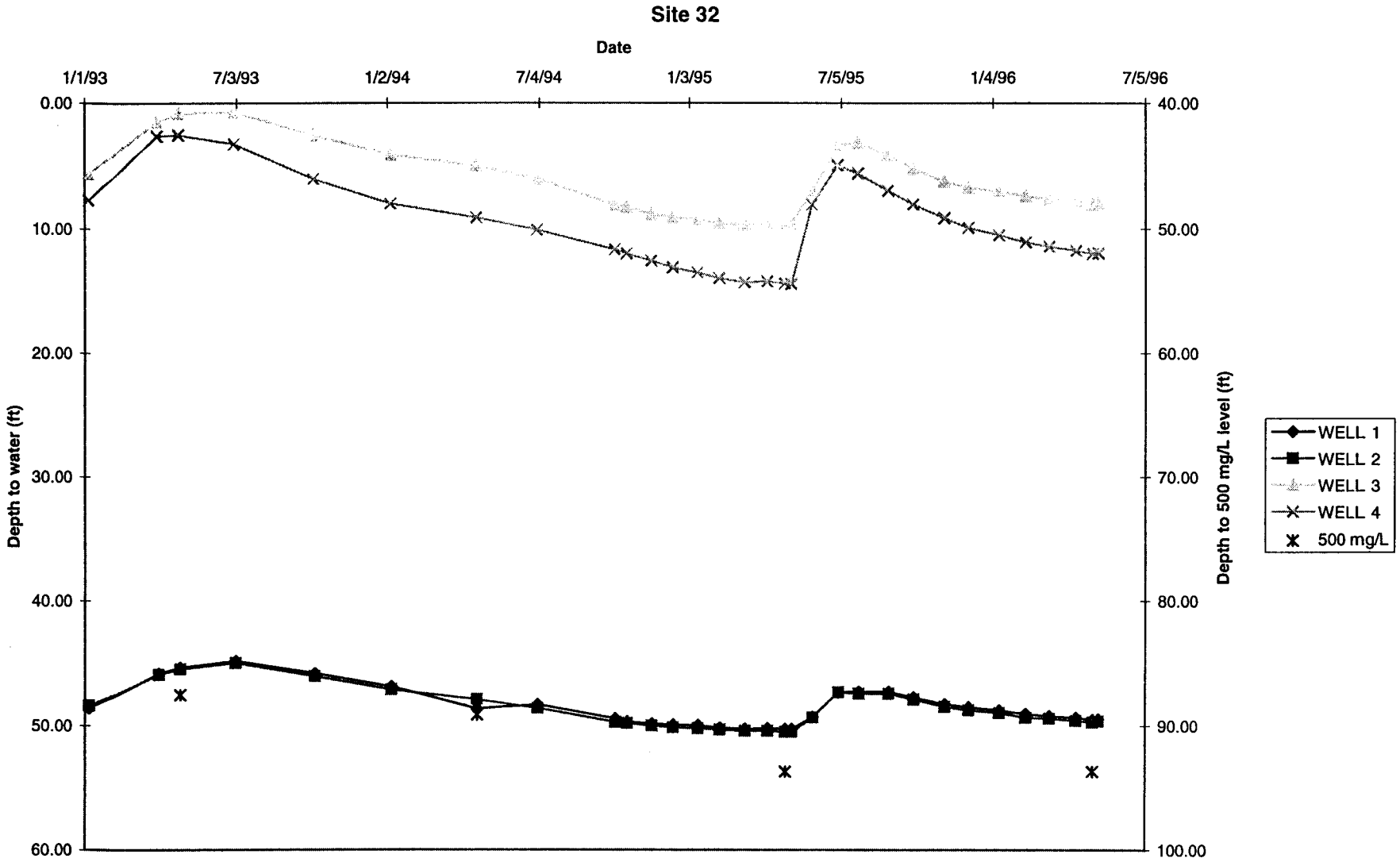

Site 25
Date
7/15/92
1/31/93
8/19/93
3/7/94
9/23/94
4/11/95
10/28/95
5/15/96
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
Depth to water or 500 mg/L level (ft)
WELL 1
WELL 2
WELL 3
500 mg/L


Site 25
Date
1/31/93
5/11/93
8/19/93
11/27/93
3/7/94
6/15/94
9/23/94
1/1/95
4/11/95
7/20/95
10/28/95
Depth to water or 500 mg/L level (ft)
0
2
4
6
8
10
12
14
16
WELL 1
WELL 2
WELL 3
500 mg/L


Site 26
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
0.00
5.00
10.00
15.00
20.00
25.00
30.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
WELL 3
500 mg/L


Site 30
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
0.00
5.00
10.00
15.00
20.00
25.00
85.00
90.00
95.00
100.00
105.00
110.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
WELL 3
500 mg/L


Site 31
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
Depth to water (ft)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
Depth to 500 mg/L level (ft)
62.00
64.00
66.00
68.00
70.00
72.00
74.00
76.00
78.00
80.00
82.00
WELL 1
WELL 2
WELL 3
500 mg/L


Site 32
Date
1/1/93
7/3/93
1/2/94
7/4/94
1/3/95
7/5/95
1/4/96
7/5/96
0.00
10.00
20.00
30.00
40.00
50.00
60.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
Depth to water (ft)
Depth to 500 mg/L level (ft)
WELL 1
WELL 2
WELL 3
WELL 4
500 mg/L

WL_GMD5.XLS

GMD5's quarterly (and monthly where available) water level measurements from January 1993 through May 1996. This spreadsheet summarizes recent water level information for the Mineral Intrusion monitoring well sites, with emphasis on 1993-96 observations and summary comparison data for the period 1987-93.

The data presented in the "well" columns are depths to water (from local ground level) in feet on the dates indicated in the left-hand column. The right-hand group of columns (labeled 1-2, etc.) give the differences (in feet) between the water levels of the indicated wells. A negative number indicates that the deeper well has a higher water level elevation than the shallower well, creating a potential for the upward flow of water. These differences are calculated on the assumption that ground level is at the same elevation for all wells at the same site; this is a reasonable approximation, but is not strictly accurate and the actual elevations may differ by up to a foot at some sites.

The rows labeled AVG 93-96 and STD 93-96 for each site give the appropriate elevation and difference averages and standard deviations for 1993-96 measurements, respectively. The rows labeled AVG 87-93 and STD 87-93 give the averages and standard deviations, respectively, for all measurements during the years 1987-93. These values are included to give a longer term perspective on the values and variabilities, since 1993 was an unusually high recharge year. In the interest of saving space and trees, only the AVG and STD rows are included in the printout. However, the water level measurements are included in the WL_HYD.XLS printout.

WL_GMD5.XLS: GMD5's quarterly (and monthly where available) water level measurements								
from January 1993 through May 1996. This spreadsheet summarizes recent water level								
information and includes summary comparison data for the period 1987-93.								
Data in the "well" columns are depth to water measurements (ft below land surface)								
in wells in the KGS/GMD5 monitoring well network on the dates indicated in the left-hand column.								
The columns labeled "1-2" etc. give the differences (in feet) between water levels of the								
indicated wells. A negative number indicates that the deeper well has a higher water level								
elevation than the shallower well.								
AVG and STD give the appropriate elevation and difference averages and standard deviations.								
These values are included to give a longer term perspective on values and variabilities.								
SITE 1	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
1/13/93	9.60	8.52	8.17		1.08	1.43	0.35	
3/29/93	6.90	5.75	5.34		1.15	1.56	0.41	
7/1/93	4.90	3.60	3.02		1.3	1.88	0.58	
10/5/93	7.82	6.70	6.25		1.12	1.57	0.45	
1/6/94	8.0	6.83	6.51		1.14	1.46	0.32	
4/15/94	6.0	6.51	6.35		-0.49	-0.33	0.16	
6/28/94	7.94	8.45	8		-0.51	-0.06	0.45	
10/5/94	9.65	10.2	9.85		-0.55	-0.2	0.35	
1/23/95	9.26	9.77	9.38		-0.51	-0.12	0.39	
4/5/95	9.09	9.36	8.76		-0.27	0.33	0.6	
7/11/95	5.63	5.88	5.45		-0.25	0.18	0.43	
10/3/95	7.84	8.54	8.12		-0.7	-0.28	0.42	
1/11/96	8.15	8.65	8.29		-0.5	-0.14	0.36	
4/12/96	8.04	8.53	8.15		-0.49	-0.11	0.38	
AVG 93-96	7.77	7.66	7.26		0.11	0.51	0.40	
STD 93-96	1.41	1.77	1.79		0.79	0.82	0.10	
AVG 87-93	10.27	9.04	8.67		1.23	1.60	0.37	
STD 87-93	2.04	2.09	2.09		0.60	0.57	0.20	
SITE 3	WELL 1	WELL 2			1-2			
1/14/93	31.44	28.40			3.04			
2/19/93	30.64	27.86			2.78			
3/19/93	29.29	26.86			2.43			
4/19/93	28.31	25.73			2.58			
5/20/93	25.61	21.99			3.62			
6/16/93	24.97	21.75			3.22			
7/13/93	19.62	16.17			3.45			
8/10/93	17.17	13.56			3.61			
9/9/93	19.40	16.32			3.08			
10/5/93	21.05	18.00			3.05			
11/5/93	21.27	18.73			2.54			
12/1/93	21.60	18.90			2.7			
1/3/94	22.01	19.24			2.77			
2/2/94	22.40	19.55			2.85			
2/28/94	22.64	19.87			2.77			
3/28/94	23.04	20.24			2.8			

This page included as an example of contents of the electronic file.

SITE 1	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	7.77	7.66	7.26		0.11	0.51	0.40	
STD 93-96	1.41	1.77	1.79		0.79	0.82	0.10	
AVG 87-93	10.27	9.04	8.67		1.23	1.60	0.37	
STD 87-93	2.04	2.09	2.09		0.60	0.57	0.20	
SITE 3	WELL 1	WELL 2			1-2			
AVG 93-96	25.23	21.97			3.25			
STD 93-96	3.24	3.44			0.65			
AVG 87-93	28.19	25.00			3.20			
STD 87-93	4.17	4.12			0.42			
SITE 4	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	5.27	5.08	9.19		0.19	-3.92	-4.11	
STD 93-96	0.43	0.97	0.94		0.90	1.08	0.86	
AVG 87-93	5.07	5.71	9.76		-0.64	-4.69	-4.05	
STD 87-93	1.74	1.41	1.29		0.90	1.33	0.81	
SITE 5	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	2.11	4.26	2.75		-2.15	-0.65	1.51	
STD 93-96	1.14	1.08	1.10		0.11	0.09	0.07	
AVG 87-93	2.77	4.92	3.58		-2.05	-0.71	1.34	
STD 87-93	1.52	1.60	1.51		0.63	0.12	0.64	
SITE 6	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	21.84	16.14	17.06		5.70	4.79	-0.91	
STD 93-96	0.29	7.04	1.26		7.00	1.15	7.24	
AVG 87-93	20.51	17.11	17.39		3.39	3.71	0.32	
STD 87-93	1.62	7.55	1.67		7.22	3.61	7.62	
SITE 7	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	34.17	18.03	19.85		16.23	14.40	-1.82	
STD 93-96	3.69	3.08	2.45		5.85	4.73	1.94	
AVG 87-93	37.65	20.14	21.84		17.51	15.75	-1.62	
STD 87-93	2.64	4.04	2.99		3.36	2.49	1.95	
SITE 8	WELL 1	WELL 2	WELL 3	WELL 4	1-2	1-3	2-3	1-4
AVG 93-96	24.75	18.51	18.18	12.87	6.24	4.94	1.35	11.88
STD 93-96	0.97	2.16	2.16	3.43	1.72	3.36	1.64	2.829576
AVG 87-93	24.58	18.05	17.74	12.53	6.53	6.84	0.31	
STD 87-93	1.25	2.20	2.19	3.70	1.54	1.55	0.04	

SITE 9	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	9.85	9.71	9.87		0.14	-0.02	-0.16	
STD 93-96	0.74	0.75	0.75		0.04	0.03	0.02	
AVG 87-93	10.14	10.00	10.20		0.14	-0.06	-0.20	
STD 87-93	0.82	0.94	0.88		0.24	0.19	0.32	
SITE 10	WELL 1	WELL 2	WELL 3	WELL 4	1-2	1-3	2-3	1-4
AVG 93-96	21.93	21.74	19.73	16.05	0.19	2.20	2.01	5.875714
STD 93-96	2.20	2.21	2.21	2.46	0.08	0.09	0.05	0.756068
AVG 87-93	24.96	24.71	22.71	19.50	0.25	2.25	2.00	
STD 87-93	2.45	2.45	2.44	2.54	0.05	0.06	0.05	
SITE 11	WELL 1	WELL 2			1-2			
AVG 93-96	30.94	12.68			18.26			
STD 93-96	1.24	2.52			1.51			
AVG 87-93	32.07	13.49			18.56			
STD 87-93	1.72	3.09			1.49			
SITE 12	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	23.43	21.41	21.70		2.02	1.73	-0.28	
STD 93-96	1.31	1.49	1.49		0.28	0.36	0.39	
AVG 87-93	22.23	20.13	20.48		2.11	1.75	-0.35	
STD 87-93	2.36	2.55	2.65		0.34	0.52	0.46	
SITE 13	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	36.51	33.94	33.90		2.58	2.61	0.04	
STD 93-96	0.47	0.58	0.57		0.16	0.19	0.10	
AVG 87-93	36.59	34.04	34.03		2.56	2.56	0.00	
STD 87-93	0.68	0.63	0.59		0.15	0.22	0.16	
SITE 14	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	100.75	99.72	99.53		1.03	1.22	0.19	
STD 93-96	0.35	0.16	0.15		0.26	0.27	0.08	
AVG 87-93	99.86	99.16	99.01		0.70	0.84	0.15	
STD 87-93	0.50	0.51	0.52		0.20	0.22	0.12	
SITE 15	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	27.58	30.53	29.37		-2.95	-1.79	1.16	
STD 93-96	1.59	1.39	1.41		1.13	1.42	0.35	
AVG 87-93	27.55	31.07	29.89		-3.52	-2.35	1.17	
STD 87-93	1.86	1.64	1.67		1.42	1.74	0.37	

SITE 16	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	24.10	16.91	9.62		7.08	14.33	7.24	
STD 93-96	2.91	2.19	2.27		2.15	2.14	0.14	
AVG 87-93	31.22	22.04	15.66		9.10	15.61	6.56	
STD 87-93	1.92	2.76	2.82		1.22	1.36	0.34	
SITE 17	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	44.21	10.88	11.49		33.33	32.73	-0.60	
STD 93-96	1.02	1.25	1.11		1.22	1.11	0.32	
AVG 87-93	46.05	13.73	14.42		32.35	31.80	-0.70	
STD 87-93	3.01	1.71	1.72		2.66	2.58	0.19	
SITE 18	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	30.24	30.22	14.16		0.02	16.08	16.07	
STD 93-96	2.38	2.41	3.46		0.79	1.80	1.76	
AVG 87-93	34.61	35.05	20.51		-0.45	13.80	14.16	
STD 87-93	2.27	2.89	4.07		1.84	1.98	1.75	
SITE 19	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	19.60	16.69	13.70		2.92	5.90	2.98	
STD 93-96	1.61	2.77	2.34		3.05	2.59	1.56	
AVG 87-93	18.01	15.40	12.10		2.61	5.61	2.99	
STD 87-93	1.69	2.79	2.38		2.37	1.96	1.34	
SITE 20	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	28.49	22.74	23.18		5.75	5.31	-0.45	
STD 93-96	1.43	3.20	3.05		3.18	2.55	1.89	
AVG 87-93	27.57	22.39	22.64		5.18	4.84	-0.18	
STD 87-93	2.72	4.01	3.95		3.14	2.48	1.58	
SITE 21	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	27.08	24.98	24.06		2.10	3.02	0.92	
STD 93-96	1.21	1.29	1.42		0.16	0.33	0.22	
AVG 87-93	27.03	25.07	23.94		1.97	3.09	1.12	
STD 87-93	1.22	1.40	1.34		0.38	0.41	0.44	
SITE 22	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	25.98	22.20	14.48		3.79	11.50	7.71	
STD 93-96	1.49	1.97	2.26		1.30	1.78	0.69	
AVG 87-93	30.18	27.80	20.17		2.38	10.32	8.01	
STD 87-93	1.68	2.95	2.94		1.46	2.41	1.56	

SITE 23	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	24.29	22.52	22.52		1.78	1.78	0.00	
STD 93-96	1.40	1.63	1.70		0.45	0.62	0.75	
AVG 87-93	25.26	23.98	23.79		1.28	1.48	0.19	
STD 87-93	1.29	1.55	1.73		0.67	1.08	0.96	
SITE 24	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	28.23	26.34	24.21		1.95	2.35	0.19	
STD 93-96	2.70	3.24	2.21		1.05	1.01	0.10	
AVG 87-93	31.03	29.39	24.78		1.64	2.58	0.15	
STD 87-93	3.00	3.57	3.11		0.82	0.70	0.09	
SITE 25	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	11.80	12.66	6.65		-0.86	5.15	6.01	
STD 93-96	2.61	2.66	2.04		0.18	0.63	0.68	
AVG 87-93	13.72	14.34	8.29		-0.62	5.42	6.05	
STD 87-93	3.21	3.20	2.53		0.22	0.72	0.74	
SITE 26	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	17.69	13.51	9.66		4.18	8.03	3.85	
STD 93-96	1.92	2.21	2.21		0.41	0.61	0.31	
AVG 87-93	20.17	15.61	11.39		4.56	8.78	4.22	
STD 87-93	2.55	2.69	2.78		0.46	0.81	0.43	
SITE 27	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	12.32	11.74	11.70		0.59	0.67	0.07	
STD 93-96	1.74	1.76	1.79		0.07	0.24	0.19	
AVG 87-93	13.14	12.41	12.51		0.73	0.65	-0.08	
STD 87-93	1.92	2.07	2.10		0.53	0.52	0.17	
SITE 28	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	23.64	23.46	23.37		0.18	0.28	0.09	
STD 93-96	1.19	1.30	1.30		0.47	0.47	0.01	
AVG 87-93	24.58	24.35	24.37		0.22	0.21	-0.02	
STD 87-93	1.35	1.60	1.53		0.35	0.34	0.24	
SITE 29	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	50.16	36.75	37.30		13.41	12.86	-0.55	
STD 93-96	0.56	1.04	1.05		0.58	0.60	0.05	
AVG 87-93	50.19	37.15	37.69		13.04	12.49	-0.55	
STD 87-93	0.93	1.52	1.55		0.69	0.71	0.05	

SITE 30	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	18.94	17.57	17.59		1.37	1.35	-0.01	
STD 93-96	2.14	2.79	2.80		0.78	0.80	0.03	
AVG 87-93	21.66	20.43	20.49		1.24	1.17	-0.06	
STD 87-93	2.50	3.14	3.19		0.86	0.95	0.21	
SITE 31	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	14.32	14.63	15.08		-0.32	-0.76	-0.45	
STD 93-96	0.77	0.76	1.26		0.05	0.54	0.55	
AVG 87-93	14.66	14.69	15.67		-0.03	-0.95	-0.94	
STD 87-93	1.05	0.89	1.33		0.29	0.44	0.59	
SITE 32	WELL 1	WELL 2	WELL 3	WELL 4	1-2	1-3	2-3	1-4
AVG 93-96	48.56	48.71	6.45	9.85	-0.14	42.12	42.26	38.71357
STD 93-96	1.45	1.48	2.56	3.31	0.20	1.18	1.12	2.026544
AVG 87-93	48.34	48.57	5.81	8.81	-0.23	42.54	42.76	
STD 87-93	1.69	1.86	2.96	3.51	0.42	1.47	1.31	
SITE 33	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	34.51	33.76	33.97		0.75	0.54	-0.21	
STD 93-96	1.31	1.39	1.43		0.14	0.22	0.30	
AVG 87-93	33.96	33.14	33.37		0.83	0.59	-0.24	
STD 87-93	1.28	1.44	1.49		0.42	0.46	0.24	
SITE 34	WELL 1	WELL 2			1-2			
AVG 93-96	9.19	8.30			0.89			
STD 93-96	0.77	0.81			0.08			
AVG 87-93	9.75	8.95			0.79			
STD 87-93	0.88	0.94			0.12			
SITE 35	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	24.99	24.14	19.70		0.84	5.29	4.45	
STD 93-96	1.28	1.37	1.59		0.10	0.51	0.47	
AVG 87-93	24.99	24.06	19.63		0.93	5.36	4.43	
STD 87-93	1.98	2.05	2.16		0.09	0.47	0.46	
SITE 36	WELL 1	WELL 2	WELL 3	WELL 4	1-2	1-3	2-3	1-4
AVG 93-96	29.83	28.85	26.20	28.70	0.98	3.63	2.65	1.127857
STD 93-96	0.93	1.16	1.10	1.16	0.55	0.33	0.53	0.41214
AVG 87-93	29.04	27.06	25.19	27.73	1.98	3.85	1.87	
STD 87-93	1.08	1.07	1.13	1.05	0.30	0.10	0.28	

SITE 37	WELL 1	WELL 2	WELL 3	WELL 4	1-3		3-4	1-4
AVG 93-96	60.60		60.14	59.41	0.46		0.73	1.182857
STD 93-96	0.78		1.41	1.20	1.17		0.64	0.782272
AVG 87-93	59.15		58.43	57.70	0.71	1.44	0.73	
STD 87-93	1.29		1.63	1.45	1.14	0.73	0.65	
SITE 38	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	32.33	31.80	26.91		0.53	5.43	4.89	
STD 93-96	1.54	1.53	1.75		0.03	0.38	0.37	
AVG 87-93	31.80	31.32	26.38		0.48	5.42	4.94	
STD 87-93	2.46	2.49	2.55		0.09	0.40	0.38	
SITE 39	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	6.20	4.60	3.46		1.60	2.73	1.14	
STD 93-96	0.92	1.32	1.28		0.45	0.47	0.18	
AVG 87-93	6.35	4.71	3.47		1.64	2.80	1.11	
STD 87-93	0.97	1.37	1.26		0.48	0.53	0.42	
SITE 40	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	57.76	57.92	57.72		-0.15	0.04	0.19	
STD 93-96	2.97	3.36	2.87		0.87	0.96	0.85	
AVG 87-93	57.22	57.10	56.86		0.12	0.36	0.24	
STD 87-93	3.49	3.48	3.18		0.40	0.71	0.74	
SITE 41	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	2.61	2.65	2.78		-0.05	-0.18	-0.13	
STD 93-96	1.12	1.11	1.01		0.23	0.36	0.20	
AVG 87-93	2.17	2.29	2.42		-0.11	-0.25	-0.13	
STD 87-93	1.74	1.72	1.60		0.21	0.36	0.28	
SITE 42	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	19.07	18.19	13.31		0.88	5.76	4.88	
STD 93-96	1.10	1.08	0.30		0.03	1.21	1.19	
AVG 87-93	19.43	18.54	13.37		0.89	6.06	5.17	
STD 87-93	0.83	0.69	0.56		0.41	1.07	0.88	
SITE 43	WELL 1	WELL 2						
AVG 93-96	5.36	5.35			0.01			
STD 93-96	0.11	0.23			0.27			
AVG 87-93	9.86	5.11			4.75			
STD 87-93	6.11	0.38			6.34			

SITE 44	WELL 1	WELL 2	WELL 3	WELL 4	1-2	1-3	2-3	1-4
AVG 93-96	67.87	67.83	75.80	75.69	0.04	-7.93	-7.97	
STD 93-96	0.45	0.46	0.44	0.67	0.04	0.17	0.16	
AVG 87-93	67.50	67.47	75.73	75.53	0.03	-8.24	-8.26	
STD 87-93	0.91	0.91	0.70	1.28	0.05	0.28	0.26	
SITE 45	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	47.79	47.81	46.87		-0.02	0.91	0.94	
STD 93-96	0.83	0.82	0.85		0.09	0.10	0.12	
AVG 87-93	46.68	46.66	45.75		0.02	0.93	0.91	
STD 87-93	1.99	2.02	2.06		0.04	0.16	0.14	
SITE 46	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	51.06	46.66	46.56		4.40	6.10	1.70	
STD 93-96	0.44	0.86	0.87		0.51	8.49	8.47	
AVG 87-93	49.51	44.80	44.72		4.71	4.79	0.08	
STD 87-93	1.96	2.65	2.63		0.79	0.77	0.04	
SITE 47	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	77.36	71.42	70.99		5.94	6.37	0.43	
STD 93-96	0.21	0.37	0.40		0.52	0.55	0.05	
AVG 87-93	76.25	70.74	70.30		5.51	5.95	0.44	
STD 87-93	0.66	0.80	0.82		0.26	0.27	0.04	
SITE 48	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	62.90	55.85	55.96		7.05	6.94	-0.10	
STD 93-96	0.18	0.45	0.51		0.35	0.40	0.13	
AVG 87-93	61.03	53.72	53.79		7.32	7.24	-0.07	
STD 87-93	1.25	1.78	1.80		0.78	0.80	0.25	
SITE 49	WELL 1	WELL 2	WELL 3	WELL 4			3-4	
AVG 93-96			1.30	0.23			1.06	
STD 93-96			0.64	0.68			0.12	
AVG 87-93			1.06	-0.01			1.07	
STD 87-93			0.57	0.61			0.12	
SITE 50	WELL 1	WELL 2	WELL 3		1-2	1-3	2-3	
AVG 93-96	24.52	24.80	24.72		-0.28	-0.20	0.08	
STD 93-96	1.38	1.55	1.38		0.28	0.06	0.28	
AVG 87-93	26.28	26.55	26.50		-0.27	-0.22	0.05	
STD 87-93	1.61	1.67	1.56		0.22	0.14	0.24	

SITE 51	WELL 1	WELL 2			1-2			
AVG 93-96	16.35	15.86			0.49			
STD 93-96	1.51	1.48			0.10			
AVG 87-93	19.22	18.51			0.52			
STD 87-93	1.94	2.08			0.11			
SITE 52	WELL 1	WELL 2			1-2			
AVG 93-96	27.15	26.97			0.17			
STD 93-96	2.17	2.33			0.49			
AVG 87-93	29.02	28.80			0.22			
STD 87-93	2.55	2.49			0.43			

SIEFWL96.XLS

Contains two sheets: SIEFWLS and PUMP CYCLE.

SIEFWLS sheet contains water level and water use information from the Siefkes intensive study site near an irrigation well; it also includes the 500 mg/L chloride elevation estimated from processed logs (see Garneau, 1995). Well hydrographs are included as embedded charts.

PUMP CYCLE sheet includes water levels from wells and specific conductance of pumped water during a single pumping cycle at the Siefkes site.

See Figure 2 and Table 1 for well locations and descriptions.

SIEFWL96.XLS: 1993-96 water use and water levels in wells at the Siefkes site.									
			A. Depth to water (ft)						
DATE	I*	USE**	P	DA	IM	WOS	SOS	EOS	NOS
3/24/93					15.2	14.2			16.8
3/26/93								18.6	
4/17/93			23.0	22.6					
5/20/93			22.2	20.9					
5/25/93			22.0	20.7	12.8	11.2	14.8	16.0	13.8
7/7/93			21.7	19.5	11.4	9.5	13.4	15.0	12.5
7/8/93			20.9	18.8	10.8	8.9	12.7	14.4	11.8
7/27/93			19.1	18.5	10.0	8.1	11.5	13.5	
7/29/93	x		21.2	23.0	43.9	16.9	16.2	16.3	
8/17/93	x		21.1	21.6	45.0	17.1	15.8	16.5	15.6
8/23/93					13.4		15.4	16.4	
8/24/93	x		22.4	23.4	45.9	17.8	17.3	17.2	
8/25/93			22.5	22.2	44.4	17.4	16.4	16.5	
9/10/93			18.7	17.4	10.2	8.7	11.8	13.1	
9/18/93			18.1	16.4	9.0	7.0	10.7	12.5	
10/12/93	x		18.4	19.6	42.2	13.9	13.1	14.0	
10/13/93			19.1	17.5	10.4	8.2	11.9	13.5	10.7
10/14/93			18.0	17.0					
10/21/93			17.3	16.6	9.8	7.5	11.2	12.9	10.0
3/4/94		0		17.5	10.8		12.2	13.8	11.1
3/5/94		0	17.9		10.8	8.6			
3/23/94		0				8.8			11.4
3/24/94		0	18.4	18.3	11.4	9.2	12.7	14.4	
3/30/94		0	18.4	18.0	11.3	9.0	12.6	14.2	11.5
3/31/94	x	0	18.1	19.2	37.9	13.0	13.3	14.4	12.6
4/1/94	x	680	18.8	20.4	42.4	15.0	14.2	15.0	13.3
4/8/94		3476				9.6			
4/13/94		4050	18.4	17.9	11.4	9.0	12.6	14.1	11.4
4/19/94		4050	18.6	18.4	11.7	9.3	12.8	14.5	12.0
4/21/94	x	4426	18.9	21.4	42.6		14.9	15.8	
4/22/94	x	5183	20.4	22.8	44.7	17.3	17.2	17.0	
5/16/94		5772	18.6	18.1	11.4			14.3	11.6
5/19/94			19.4	19.8	13.0	11.3	14.2	15.5	13.8
5/26/94		9293	20.2	19.8	12.8			15.8	
6/21/94		16236	25.9	26.9	20.1	17.8	20.5	21.3	20.4
6/23/94			24.3	25.0	17.2		19.0	20.0	
7/5/94		21775	22.0	21.5	14.7	13.0	16.1	17.2	15.6
7/8/94	x	21842	22.8	25.6	45.0		19.1	19.6	19.0
7/19/94		27488	21.6	20.5	13.4	11.2	14.7	16.4	14.4
7/20/94		27488	21.5	20.5	13.4			16.4	
7/21/94	x	27545	21.0	23.3	44.1	16.8	17.0	17.8	
8/3/94		35398	25.3	25.3	17.5	16.1	19.5	20.4	
8/4/94	x	36078	25.8	28.1	47.4	22.6	20.4	21.1	
8/9/94		39955	27.8	28.2	19.0	17.2	19.8	21.3	

8/10/94	x	40690	26.9	28.5	47.6	23.2	21.0	21.5	
8/12/94	x	41224	25.5	27.2	46.8	21.3	20.7	21.1	
8/17/94		45373	28.6	28.6	21.1	19.8	22.2	22.7	22.8
8/18/94			26.7	24.8		15.0	18.9	20.4	
8/24/94	x	48915	27.0	27.0	47.2			20.3	
9/16/94	x	56063	25.0	26.1	47.2	20.1	19.5	19.7	18.8
10/6/94		58658	23.4	22.3	14.8	12.6	16.1	17.8	15.7
10/13/94		59328	23.8	23.2	15.6				
10/26/94		59328	23.2	22.2	14.8	12.7	16.2	17.8	
11/9/94		59328	23.1	22.2	14.8	12.7	16.3	17.8	15.6
11/16/94		59328	23.0	22.1	14.8				
11/17/94		59328	22.9	22.0	14.7	12.6	16.1	17.6	15.5
3/7/95		0	23.3	22.4	15.2	13.2	16.7	18.0	
3/10/95		0	23.2	22.3	15.2	13.2	16.7	18.0	16.0
3/17/95		0	23.3	22.4	15.3	13.2			
4/6/95		0	23.2	22.4	15.1	13.2			
4/12/95		0	23.4	22.5	15.2	13.3	16.9	18.1	16.2
4/14/95		0	23.3	22.4	15.2	13.2	16.8	18.0	16.1
4/24/95		0	23.4	22.5	15.2	13.2		18.1	
4/26/95		0	23.3	22.4	15.1				
4/28/95		0	23.3	22.4	15.1	13.2	16.9	18.0	16.1
5/1/95		0	23.3	22.4	15.1	13.2			
5/2/95		0	23.3	22.4	15.1	13.2	16.8	18.0	16.1
5/5/95		0	23.4	22.4	15.1	13.2	16.9	18.0	16.2
5/15/95		0	22.7	21.6	13.6	12.0	15.9	17.1	15.2
5/16/95		0	22.4	21.3		11.5			14.4
5/17/95		0			12.6		15.3	16.6	
5/19/95		0	22.3	20.8	12.0	10.7	15.1	16.2	
6/19/95		0	20.4	19.7	11.6	10.8	14.2	14.9	13.5
6/20/95	x	780	20.9	22.0	42.9	16.1	15.6	15.6	14.9
6/21/95	x	1435	21.5	22.0	43.1	16.0	15.6	15.8	
7/19/95	x	10841	25.3	27.0	45.2	20.2	20.2	20.0	19.8
7/20/95		10890	24.1	21.7	12.9				
7/21/95		10890	22.7	20.1	11.6	9.8	14.2	15.6	13.4
8/21/95	x	27968	28.6	30.0	46.0	23.0			
8/23/95	x	28893	26.8	28.4	45.9	22.2			
9/11/95	x	42210	26.8	27.2	46.0	22.0			
9/12/95		42215	24.9	22.4		12.5			
9/13/95	x	43018	24.9	24.8	45.8	19.0	18.1	18.6	
9/15/95		43127	23.4	21.2	13.8	11.6	15.4	16.9	14.9
9/28/95		44801	22.1	20.6	13.1	11.0			
10/10/95		44801	22.0	20.5	13.0	10.9	14.9	16.3	14.1
11/15/95		51347	21.9	20.7	13.4	11.2	15.2	16.4	14.3
5/1/96		11621	23.7	22.8	15.6	13.4	18.2	18.5	16.2
5/23/96	x	14513	25.0	26.8	45.7	20.7	21.1	20.5	19.5
5/24/96	#	15458	27.4	28.8	22.6	20.9			
*-- x indicates irrigation well pumping									
**-- annual water use in thousands of gallons (no data available for 1993)									
#--irrigation well was turned off for 1 hour and 25 minutes, then restarted to collect water samples.									

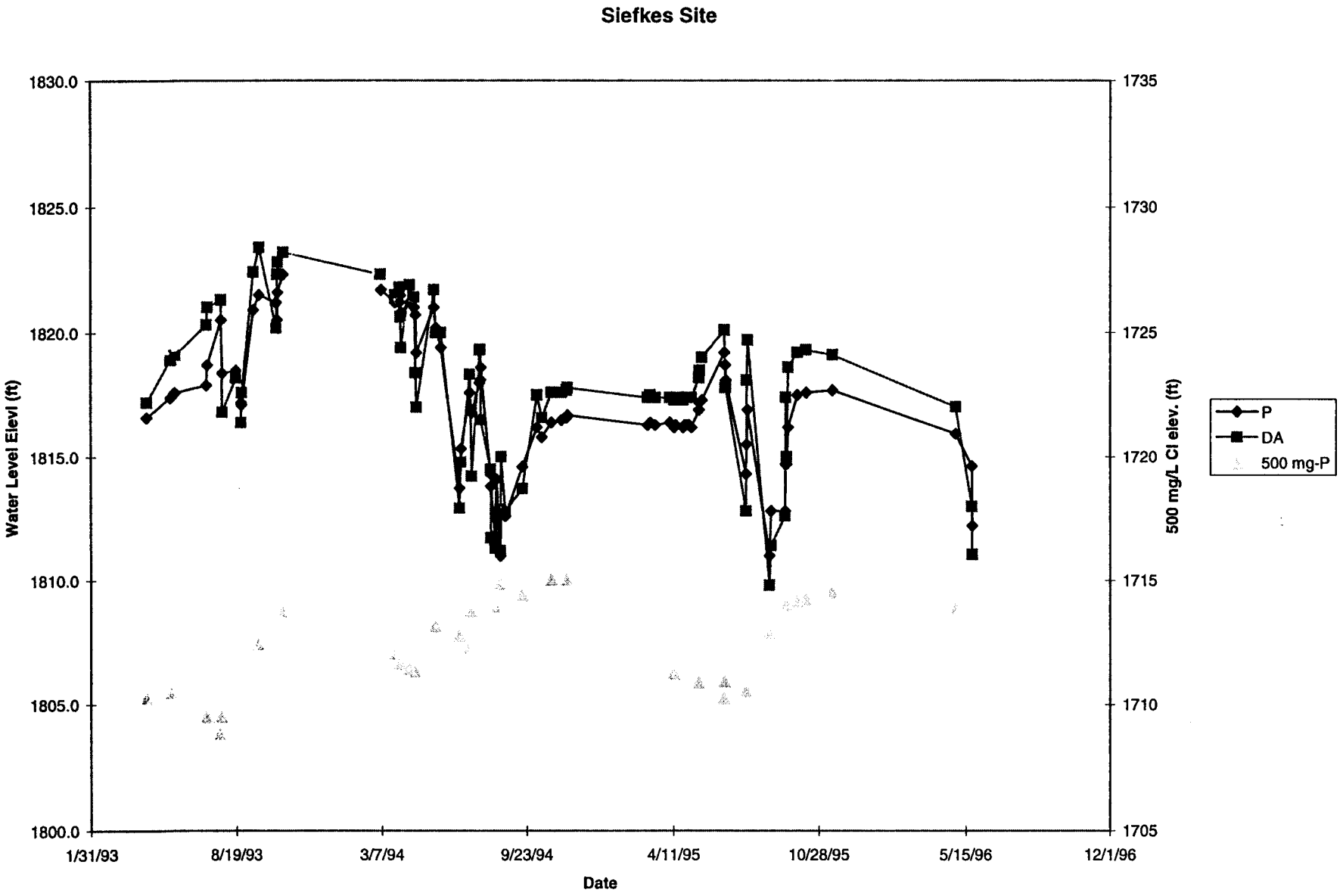
SIEFWL96.XLS: 1993-96 water use and water levels in wells at the Siefkes site.									
			B. Water level elevations (ft above mean sea level)						
DATE	I*	USE**	P	DA	IM	WOS	SOS	EOS	NOS
3/24/93					1825.5	1825.2			1822.2
3/26/93								1814.3	
4/17/93			1816.6	1817.2					
5/20/93			1817.4	1818.9					
5/25/93			1817.6	1819.1	1827.9	1828.2	1826.2	1816.9	1825.2
7/7/93			1817.9	1820.3	1829.3	1829.9	1827.6	1817.9	1826.5
7/8/93			1818.7	1821.0	1829.9	1830.5	1828.3	1818.5	1827.2
7/27/93			1820.5	1821.3	1830.7	1831.3	1829.5	1819.4	
7/29/93	x		1818.4	1816.8	1796.8	1822.5	1824.8	1816.6	
8/17/93	x		1818.5	1818.2	1795.7	1822.3	1825.2	1816.4	1823.4
8/23/93					1827.3		1825.6	1816.5	
8/24/93	x		1817.2	1816.4	1794.8	1821.6	1823.7	1815.7	
8/25/93			1817.1	1817.6	1796.3	1822.0	1824.6	1816.4	
9/10/93			1820.9	1822.4	1830.5	1830.7	1829.2	1819.8	
9/18/93			1821.5	1823.4	1831.7	1832.4	1830.3	1820.4	
10/12/93	x		1821.2	1820.2	1798.5	1825.5	1827.9	1818.9	
10/13/93			1820.5	1822.3	1830.3	1831.2	1829.1	1819.4	1828.3
10/14/93			1821.6	1822.8					
10/21/93			1822.3	1823.2	1830.9	1831.9	1829.8	1820.0	1829.0
3/4/94		0		1822.3	1829.9		1828.8	1819.1	1827.9
3/5/94		0	1821.7		1829.9	1830.8			
3/23/94		0				1830.6			1827.6
3/24/94		0	1821.2	1821.5	1829.3	1830.2	1828.3	1818.5	
3/30/94		0	1821.2	1821.8	1829.4	1830.4	1828.4	1818.7	1827.5
3/31/94	x	0	1821.5	1820.6	1802.8	1826.4	1827.7	1818.5	1826.4
4/1/94	x	680	1820.8	1819.4	1798.3	1824.4	1826.8	1817.9	1825.7
4/8/94		3476				1829.8			
4/13/94		4050	1821.2	1821.9	1829.3	1830.4	1828.4	1818.8	1827.6
4/19/94		4050	1821.0	1821.4	1829.0	1830.1	1828.2	1818.4	1827.0
4/21/94	x	4426	1820.7	1818.4	1798.1		1826.1	1817.1	
4/22/94	x	5183	1819.2	1817.0	1796.0	1822.1	1823.8	1815.9	
5/16/94		5772	1821.0	1821.7	1829.3			1818.6	1827.4
5/19/94			1820.2	1820.0	1827.7	1828.1	1826.8	1817.4	1825.2
5/26/94		9293	1819.4	1820.0	1827.9			1817.1	
6/21/94		16236	1813.7	1812.9	1820.6	1821.6	1820.5	1811.6	1818.6
6/23/94			1815.3	1814.8	1823.5		1822.0	1812.9	
7/5/94		21775	1817.6	1818.3	1826.1	1826.4	1824.9	1815.7	1823.4
7/8/94	x	21842	1816.8	1814.2	1795.7		1821.9	1813.3	1820.0
7/19/94		27488	1818.0	1819.3	1827.3	1828.2	1826.3	1816.5	1824.6
7/20/94		27488	1818.1	1819.3	1827.3			1816.5	
7/21/94	x	27545	1818.6	1816.5	1796.6	1822.6	1824.0	1815.1	
8/3/94		35398	1814.3	1814.5	1823.2	1823.3	1821.5	1812.5	
8/4/94	x	36078	1813.8	1811.7	1793.3	1816.8	1820.6	1811.8	
8/9/94		39955	1811.8	1811.6	1821.7	1822.2	1821.2	1811.6	

8/10/94	x	40690	1812.7	1811.3	1793.1	1816.2	1820.0	1811.4	
8/12/94	x	41224	1814.1	1812.6	1793.9	1818.1	1820.3	1811.8	
8/17/94		45373	1811.0	1811.2	1819.6	1819.6	1818.8	1810.2	1816.2
8/18/94			1812.9	1815.0		1824.4	1822.1	1812.5	
8/24/94	x	48915	1812.6	1812.8	1793.5			1812.6	
9/16/94	x	56063	1814.6	1813.7	1793.5	1819.3	1821.5	1813.2	1820.2
10/6/94		58658	1816.2	1817.5	1825.9	1826.8	1824.9	1815.1	1823.3
10/13/94		59328	1815.8	1816.6	1825.1				
10/26/94		59328	1816.4	1817.6	1825.9	1826.7	1824.8	1815.1	
11/9/94		59328	1816.5	1817.6	1825.9	1826.7	1824.7	1815.1	1823.4
11/16/94		59328	1816.6	1817.7	1825.9				
11/17/94		59328	1816.7	1817.8	1826.0	1826.8	1824.9	1815.3	1823.5
3/7/95		0	1816.3	1817.4	1825.5	1826.2	1824.3	1814.9	
3/10/95		0	1816.4	1817.5	1825.5	1826.2	1824.3	1814.9	1823.0
3/17/95		0	1816.3	1817.4	1825.4	1826.2			
4/6/95		0	1816.4	1817.4	1825.6	1826.2			
4/12/95		0	1816.2	1817.3	1825.5	1826.1	1824.1	1814.8	1822.8
4/14/95		0	1816.3	1817.4	1825.5	1826.2	1824.2	1814.9	1822.9
4/24/95		0	1816.2	1817.3	1825.5	1826.2		1814.8	
4/26/95		0	1816.3	1817.4	1825.6				
4/28/95		0	1816.3	1817.4	1825.6	1826.2	1824.1	1814.9	1822.9
5/1/95		0	1816.3	1817.4	1825.6	1826.2			
5/2/95		0	1816.3	1817.4	1825.6	1826.2	1824.2	1814.9	1822.9
5/5/95		0	1816.2	1817.4	1825.6	1826.2	1824.1	1814.9	1822.8
5/15/95		0	1816.9	1818.2	1827.1	1827.4	1825.1	1815.8	1823.8
5/16/95		0	1817.2	1818.5		1827.9			1824.6
5/17/95		0			1828.1		1825.7	1816.3	
5/19/95		0	1817.3	1819.0	1828.7	1828.7	1825.9	1816.7	
6/19/95		0	1819.2	1820.1	1829.1	1828.6	1826.8	1818.0	1825.5
6/20/95	x	780	1818.7	1817.8	1797.8	1823.3	1825.4	1817.3	1824.1
6/21/95	x	1435	1818.1	1817.8	1797.6	1823.4	1825.4	1817.1	
7/19/95	x	10841	1814.3	1812.8	1795.5	1819.2	1820.8	1812.9	1819.2
7/20/95		10890	1815.5	1818.1	1827.8				
7/21/95		10890	1816.9	1819.7	1829.1	1829.6	1826.8	1817.3	1825.6
8/21/95	x	27968	1811.0	1809.8	1794.7	1816.4			
8/23/95	x	28893	1812.8	1811.4	1794.8	1817.2			
9/11/95	x	42210	1812.8	1812.6	1794.7	1817.4			
9/12/95		42215	1814.7	1817.4		1826.9			
9/13/95	x	43018	1814.7	1815.0	1794.9	1820.4	1822.9	1814.3	
9/15/95		43127	1816.2	1818.6	1826.9	1827.8	1825.6	1816.0	1824.1
9/28/95		44801	1817.5	1819.2	1827.6	1828.4			
10/10/95		44801	1817.6	1819.3	1827.7	1828.5	1826.1	1816.6	1824.9
11/15/95		51347	1817.7	1819.1	1827.3	1828.2	1825.8	1816.5	1824.7
5/1/96		11621	1815.9	1817.0	1825.1	1826.0	1822.8	1814.4	1822.8
5/23/96	x	14513	1814.6	1813.0	1795.0	1818.7	1819.9	1812.4	1819.5
5/24/96	#	15458	1812.2	1811.0	1818.1	1818.5	1841.0	1832.9	1839.0
*-- x indicates irrigation well pumping									
**-- annual water use in thousands of gallons (no data available for 1993)									
#--irrigation well was turned off for 1 hour and 25 minutes, then restarted to collect water samples.									

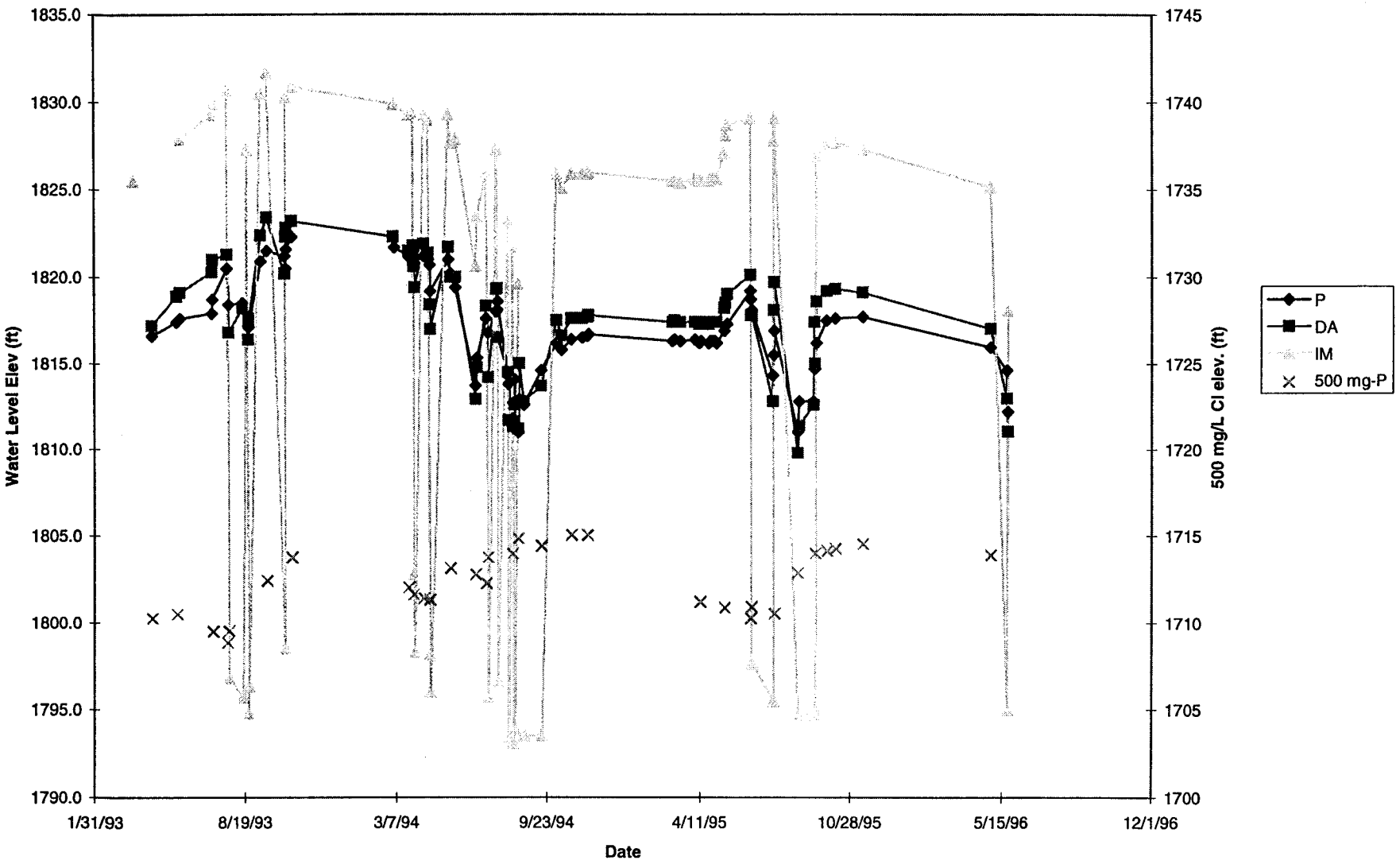
SIEFWL96.XLS: 1993-96 water use, water levels, and the 500 mg/L Cl elevation at the Siefkes site.									
			C. Elevations (ft above mean sea level)						
						Permian	DA		
Date	I*	USE**	P	DA	IM	500 mg/L	500mg/L		
3/24/93					1825.5				
4/17/93			1816.6	1817.2		1710.26	1710.26		
5/20/93			1817.4	1818.9		1710.48	1710.34		
5/25/93			1817.6	1819.1	1827.9				
7/7/93			1817.9	1820.3	1829.3				
7/8/93			1818.7	1821.0	1829.9	1709.48	1710.61		
7/27/93			1820.5	1821.3	1830.7	1708.83	1709.49		
7/29/93	x		1818.4	1816.8	1796.8	1709.51	1710.15		
8/17/93	x		1818.5	1818.2	1795.7				
8/23/93					1827.3				
8/24/93	x		1817.2	1816.4	1794.8				
8/25/93			1817.1	1817.6	1796.3				
9/10/93			1820.9	1822.4	1830.5				
9/18/93			1821.5	1823.4	1831.7	1712.41	1710.07		
10/12/93	x		1821.2	1820.2	1798.5				
10/13/93			1820.5	1822.3	1830.3				
10/14/93			1821.6	1822.8					
10/21/93			1822.3	1823.2	1830.9	1713.77	1710.31		
3/4/94		0		1822.3	1829.9				
3/5/94		0	1821.7		1829.9				
3/24/94		0	1821.2	1821.5	1829.3	1712.03			
3/30/94		0	1821.2	1821.8	1829.4				
3/31/94		0	1821.5	1820.6	1802.8	1711.63	1710.48		
4/1/94		680	1820.8	1819.4	1798.3				
4/13/94		4050	1821.2	1821.9	1829.3	1711.42	1710.29		
4/19/94		4050	1821.0	1821.4	1829.0				
4/21/94		4426	1820.7	1818.4	1798.1	1711.33	1710.65		
4/22/94		5183	1819.2	1817.0	1796.0				
5/16/94		5772	1821.0	1821.7	1829.3				
5/19/94			1820.2	1820.0	1827.7	1713.15	1710.02		
5/26/94		9293	1819.4	1820.0	1827.9				
6/21/94		16236	1813.7	1812.9	1820.6	1712.78	1709.34		
6/23/94			1815.3	1814.8	1823.5				
7/5/94		21775	1817.6	1818.3	1826.1	1712.28	1708.07		
7/8/94		21842	1816.8	1814.2	1795.7	1713.77	1709.47		
7/19/94		27488	1818.0	1819.3	1827.3				
7/20/94		27488	1818.1	1819.3	1827.3				
7/21/94		27545	1818.6	1816.5	1796.6				
8/3/94		35398	1814.3	1814.5	1823.2				
8/4/94		36078	1813.8	1811.7	1793.3				
8/9/94		39955	1811.8	1811.6	1821.7	1713.96			
8/10/94		40690	1812.7	1811.3	1793.1				
8/12/94		41224	1814.1	1812.6	1793.9				

8/17/94		45373	1811.0	1811.2	1819.6	1714.87	1709.29		
8/18/94			1812.9	1815.0					
8/24/94		48915	1812.6	1812.8	1793.5				
9/16/94		56063	1814.6	1813.7	1793.5	1714.41	1709.29		
10/6/94		58658	1816.2	1817.5	1825.9	.			
10/13/94		59328	1815.8	1816.6	1825.1				
10/26/94		59328	1816.4	1817.6	1825.9	1715.03			
11/9/94		59328	1816.5	1817.6	1825.9				
11/16/94		59328	1816.6	1817.7	1825.9	1715.04			
11/17/94		59328	1816.7	1817.8	1826.0				
3/7/95		0	1816.3	1817.4	1825.5				
3/10/95		0	1816.4	1817.5	1825.5				
3/17/95		0	1816.3	1817.4	1825.4				
4/6/95		0	1816.4	1817.4	1825.6				
4/12/95		0	1816.2	1817.3	1825.5	1711.22	1708.36		
4/14/95		0	1816.3	1817.4	1825.5				
4/24/95		0	1816.2	1817.3	1825.5				
4/26/95		0	1816.3	1817.4	1825.6				
4/28/95		0	1816.3	1817.4	1825.6				
5/1/95		0	1816.3	1817.4	1825.6				
5/2/95		0	1816.3	1817.4	1825.6				
5/5/95		0	1816.2	1817.4	1825.6				
5/15/95		0	1816.9	1818.2	1827.1	1710.87	1708.87		
5/16/95		0	1817.2	1818.5					
5/17/95					1828.1				
5/19/95			1817.3	1819.0	1828.7				
6/19/95		0	1819.2	1820.1	1829.1	1710.25	1708		
6/20/95		550	1818.7	1817.8	1797.8	1710.91			
6/21/95		1435	1818.1	1817.8	1797.6				
7/19/95	x	10841	1814.3	1812.8	1795.47				
7/20/95		10890	1815.5	1818.1	1827.8	1710.53	1708.94		
7/21/95		10890	1816.9	1819.7	1829.1				
8/21/95	x	27968	1811	1809.8	1794.7	1712.87	1709.42		
8/23/95	x	28893	1812.8	1811.4	1794.8				
9/11/95	x	42210	1812.8	1812.6	1794.7				
9/12/95		42215	1814.7	1817.4					
9/13/95	x	43018	1814.7	1815	1794.9	1714.01	1709.86		
9/15/95		43127	1816.2	1818.6	1826.9				
9/28/95		44801	1817.5	1819.2	1827.6	1714.15	1709.77		
10/10/95		44801	1817.6	1819.3	1827.7	1714.26	1709.58		
11/15/95		51347	1817.7	1819.1	1827.3	1714.54	1708.43		
5/1/96		11621	1815.94	1817.02	1825.12	1713.9	1709.73		
5/23/96	x	14513	1814.62	1812.97	1794.99				
5/24/96	#	15458	1812.2	1811.03	1818.1				
*-- x indicates irrigation well pumping									
**-- annual water use in thousands of gallons (no data available for 1993)									
#--irrigation well was turned off for 1 hour and 25 minutes, then restarted to collect water samples.									
See Table 1 for well information.									
See CHEM.XLS and/or SIEFCHEM.XLS for results of water chemistry analyses.									

SIEFWLS Chart 51



Siefkes Site



PUMP CYCLE

SIEFWL96.XLS: Data from a single pumping cycle beginning 9/12/95 at the Siefkes site.

Purpose: Monitor irrigation well water quality during a pumping cycle.
Secondary: Monitor water levels in nearby wells.

Baseline Info: Previous pumping cycle ended 9/11/95 at 14:30 hours.

9/12/95 Time	Gallons Pumped			Depth to water (ft) P	DA	IM	WOS	Meter x1000 gal
16:01	0				22.37			126890
16:10	0						12.52	126890
~16:25	5000			24.9*		16.7*		126895

*IRR turned on accidentally by landowner and pumped ~5000 gallons before it was turned off.
Therefore the above DTWs for P and IM are not baseline.
IRR was restarted at 16:35 hours.

Pumping Cycle Data:

Time 9/12/95	Gallons Pumped	SpC (uS/cm)	Water Sample*	Depth to water (ft) P	DA	IM	WOS	Meter x1000 gal
16:36		1030	IRR					
16:44	11000					38.15		126901
16:50	16000	1050				40.15		126906
17:00	24000	1070				41.4		126914
17:05				24.44				
17:10	31000	1130				42.21		126921
17:15				24.34				
17:20	40000	1240				42.77		126930
17:00		1290	IRR					
17:30	47000	1330				43.15		126937
17:35				24.25				
17:40	55000	1410				43.49		126945
17:45							15.82	
17:50	63000	1480				43.76		126953
17:55	67000	1500	IRR			43.89		126957
18:00				24.19				
18:05					23.28			
9/13/95								
7:50					24.82			
8:05	725000	1540	IRR			45.75		127615
8:10				24.94				
8:16							18.95	
8:45		(1190)	STOCK					
9:52	808000	1540	IRR			45.76		127698
10:50					24.85			

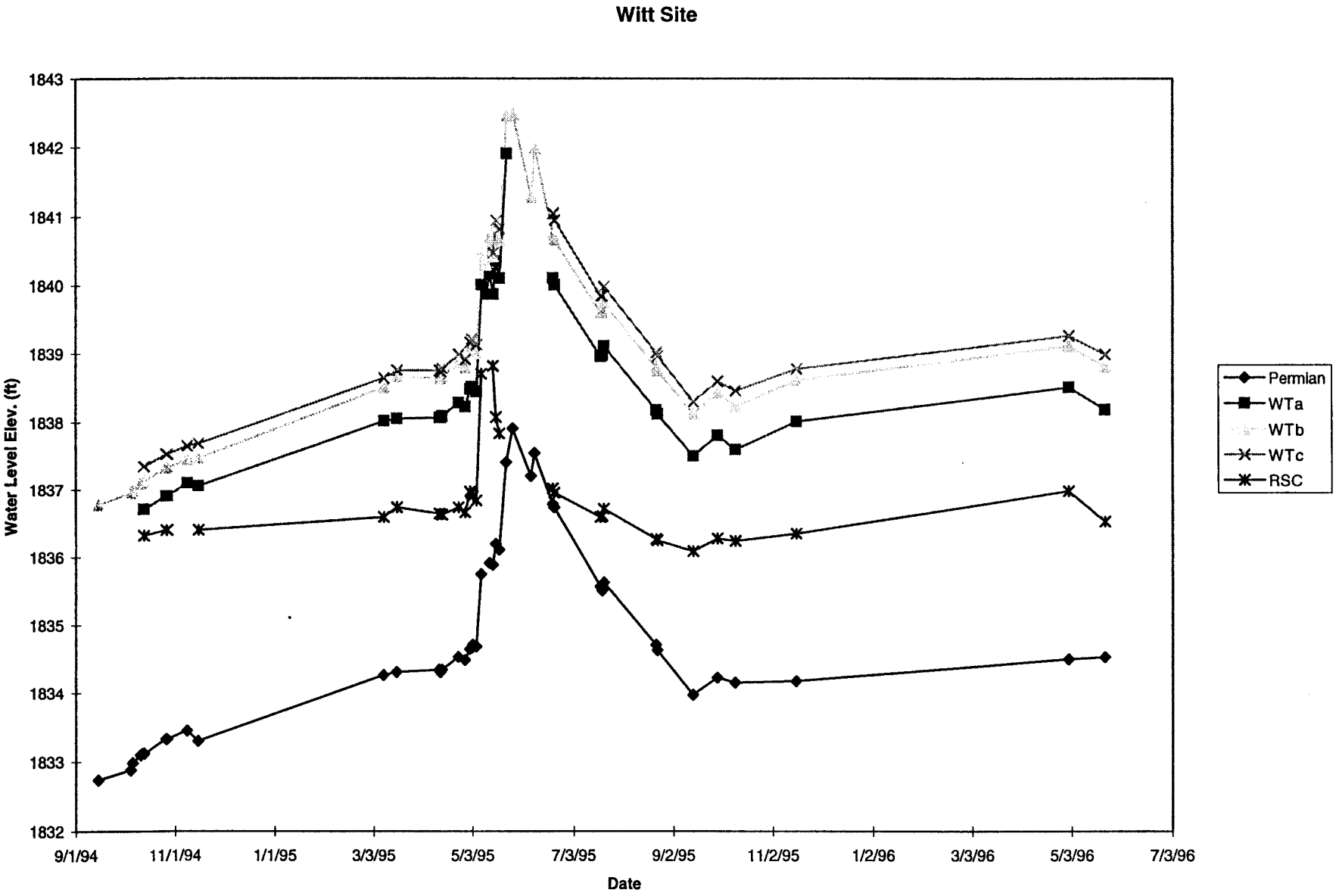
Notice that biggest & most rapid increase in specific conductance occured in first hour and a half.
*See CHEM.XLS and/or SIEFCHEM.XLS for results of water chemistry analyses.

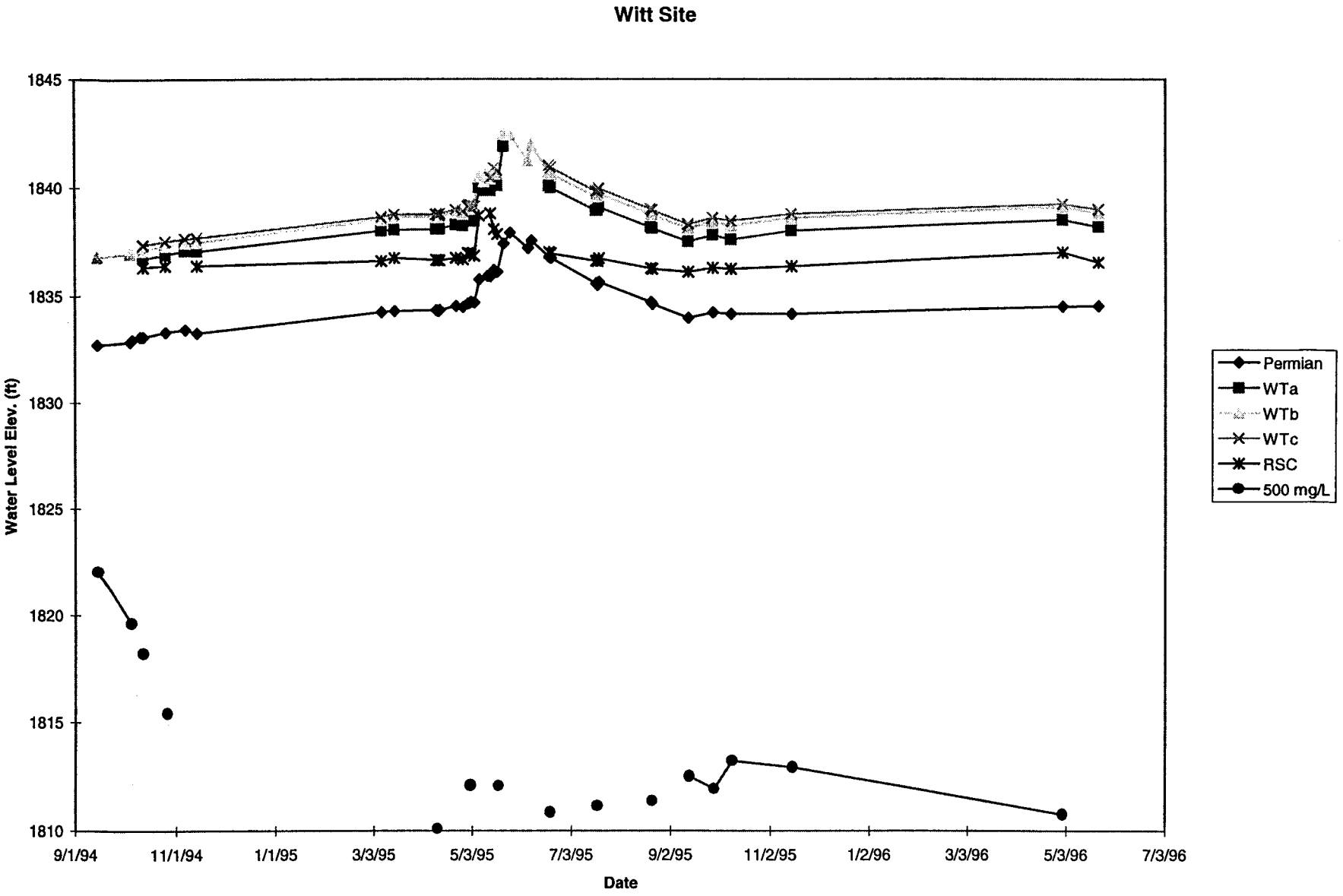
WITTWL96.XLS

Water level and stream level data from the Witt intensive study site on Rattlesnake Creek. Also includes 500 mg/L chloride level estimated from processed logs (see Garneau, 1995). Well and stream hydrographs are included as embedded charts. See Figures 3 and 4 and Table 2 for well locations and descriptions.

WITTWL96.XLS: Witt site water levels.								
	A. Depth to water (ft)							
					RSC	RSC		
Date	Permian	WTa	WTb	WTc	BRIDGE	GAGE		
9/15/94	10.96		6.86					
10/5/94	10.82		6.69					
10/6/94	10.72		6.65					
10/11/94	10.60		6.55					
10/12/94	10.58		6.54					
10/13/94	10.58	4.40	6.51	4.84				
10/27/94	10.37	4.20	6.31	4.66				
11/8/94	10.25	4.01	6.19	4.54				
11/15/94	10.40	4.05	6.17	4.50				
3/9/95	9.43	3.09	5.19	3.54	8.25			
3/17/95	9.39	3.05	5.04	3.43	8.11			
4/12/95	9.35	3.04	5.05	3.43	8.20	2.94		
4/13/95	9.39	3.04	5.06	3.45	8.21	2.95		
4/14/95	9.35	3.02	5.03	3.40	8.22	2.96		
4/24/95	9.16	2.82	4.83	3.20	8.11	2.86		
4/28/95	9.21	2.88	4.90	3.27		2.93		
5/1/95	9.05	2.63	4.65	3.02	7.87	2.64		
5/2/95	9.03	2.59	4.62	2.98		2.65		
5/3/95	8.98	2.60	4.62	2.99	7.94	2.69		
5/5/95	9.01	2.66	4.69	3.06	8.01	2.77		
5/8/95	7.95	1.10	3.19			0.89		
5/11/95		1.24	3.40			1.67		
5/13/95	7.78	0.94	3.00			0.89		
5/15/95	7.81	1.24	3.28	1.72	6.03			
5/17/95	7.50	0.76	2.84	1.25	6.77			
5/19/95	7.59	1.01	3.04	1.37	7.01			
5/23/95	6.29	-0.80	1.24					
5/27/95	5.79		1.22					
6/7/95	6.49		2.42					
6/9/95	6.15		1.72					
6/20/95	6.91	1.01	2.96	1.15	7.83	2.55		
6/21/95	6.96	1.10	3.04	1.24	7.89	2.62		
7/19/95	8.13	2.15	4.10	2.35	8.25	2.96		
7/20/95	8.19	2.13	4.10	2.35	8.24	2.95		
7/21/95	8.07	2.00	3.96	2.21	8.13	2.87		
8/22/95	8.98	2.93	4.90	3.17	8.58	3.31		
8/23/95	9.06	2.99	4.95	3.22	8.60	3.32		
9/14/95	9.72	3.60	5.57	3.89	8.76	3.46		
9/29/95	9.47	3.30	5.27	3.59		3.32		
10/10/95	9.54	3.51	5.46	3.73	8.60	3.36		
11/16/95	9.52	3.10	5.09	3.41		3.25		
5/1/96	9.19	2.60	4.59	2.93	7.86	2.59		
5/23/96	9.16	2.92	4.89	3.20		3.07		
RSC = Rattlesnake Creek								

WITTWL96.XLS: Witt site water levels.								
	B. Water level elevation (ft above mean sea level)							
Date	Permian	WTa	WTb	WTc	RSC	500 mg/L		
9/15/94	1832.74		1836.78			1822.04		
10/5/94	1832.88		1836.95			1819.64		
10/6/94	1832.98		1836.99					
10/11/94	1833.10		1837.09					
10/12/94	1833.12		1837.10			1818.22		
10/13/94	1833.12	1836.71	1837.13	1837.35	1836.32			
10/27/94	1833.33	1836.91	1837.33	1837.53	1836.40	1815.4		
11/8/94	1833.45	1837.10	1837.45	1837.65				
11/15/94	1833.30	1837.06	1837.47	1837.69	1836.40			
3/9/95	1834.27	1838.02	1838.51	1838.65	1836.60			
3/17/95	1834.31	1838.06	1838.66	1838.76	1836.74			
4/12/95	1834.35	1838.07	1838.65	1838.76	1836.65	1810.09		
4/13/95	1834.31	1838.07	1838.64	1838.74	1836.64			
4/14/95	1834.35	1838.09	1838.67	1838.79	1836.63			
4/24/95	1834.54	1838.29	1838.87	1838.99	1836.74			
4/28/95	1834.49	1838.23	1838.80	1838.92	1836.67			
5/1/95	1834.65	1838.48	1839.05	1839.17	1836.98			
5/2/95	1834.67	1838.52	1839.08	1839.21	1836.95	1812.1		
5/3/95	1834.72	1838.51	1839.08	1839.20	1836.91			
5/5/95	1834.69	1838.45	1839.01	1839.13	1836.84			
5/8/95	1835.75	1840.01	1840.51		1838.71			
5/11/95		1839.87	1840.30					
5/13/95	1835.92	1840.17	1840.70					
5/15/95	1835.89	1839.87	1840.42	1840.47	1838.82			
5/17/95	1836.20	1840.35	1840.86	1840.94	1838.08			
5/19/95	1836.11	1840.10	1840.66	1840.82	1837.84	1812.06		
5/23/95	1837.41	1841.91	1842.46					
5/27/95	1837.91		1842.48					
6/7/95	1837.21		1841.28					
6/9/95	1837.55		1841.98					
6/20/95	1836.79	1840.10	1840.74	1841.04	1837.02	1810.84		
6/21/95	1836.74	1840.01	1840.66	1840.95	1836.96			
7/19/95	1835.57	1838.96	1839.60	1839.84	1836.60	1811.16		
7/20/95	1835.51	1838.98	1839.60	1839.84	1836.61			
7/21/95	1835.63	1839.11	1839.74	1839.98	1836.72			
8/22/95	1834.72	1838.18	1838.80	1839.02	1836.27	1811.387		
8/23/95	1834.64	1838.12	1838.75	1838.97	1836.25			
9/14/95	1833.98	1837.51	1838.13	1838.30	1836.09	1812.511		
9/29/95	1834.23	1837.81	1838.43	1838.60	1836.28	1811.925		
10/10/95	1834.16	1837.60	1838.24	1838.46	1836.24	1813.21		
11/16/95	1834.18	1838.01	1838.61	1838.78	1836.35	1812.912		
5/1/96	1834.51	1838.51	1839.11	1839.26	1836.99	1810.749		
5/23/96	1834.54	1838.19	1838.81	1838.99	1836.53			
RSC = Rattlesnake Creek								


Witt Site
Water Level Elev. (ft)
1843
1842
1841
1840
1839
1838
1837
1836
1835
1834
1833
1832
9/1/94
11/1/94
1/1/95
3/3/95
5/3/95
7/3/95
9/2/95
11/2/95
1/2/96
3/3/96
5/3/96
7/3/96
Date
Permian
WTa
WTb
WTc
RSC


Witt Site
1845
1840
1835
1830
1825
1820
1815
1810
Water Level Elev. (ft)
9/1/94
11/1/94
1/1/95
3/3/95
5/3/95
7/3/95
9/2/95
11/2/95
1/2/96
3/3/96
5/3/96
7/3/96
Date
Permian
WTa
WTb
WTc
RSC
500 mg/L

B. Groundwater quality (chemical analyses)

CHEM.XLS
SIEFCHEM.XLS
WITTCHEM.XLS

CHEM.XLS

Water chemistry data for all water samples collected and analyzed by KGS for the Mineral Intrusion project. Portions of these data are also listed in SIEFCHEM.XLS and WITTCHEM.XLS spreadsheets, which contain water chemistry data that are exclusively from the Siefkes and Witt sites, respectively.

CHEM.XLS: spreadsheet of chemical data for the Mineral Intrusion project.
SS = Siefkes site; WS = Witt site. See note at bottom.

KGS Lab No.	Sample ID	Location	Location name	Well depth ft	Date collected	Sample time or information
930186	MI-SS-WOS	21S-12W-27DBDC	Oil field supply well W	84.4	03-23-93	
930187	MI-SS-S	21S-12W-27DDDC	Siefkes stock well	90	03-23-93	
930202	MI-SS-DE	21S-12W-26CC	Siefkes domestic well E	90	04-15-93	
930203	MI-SS-DW	21S-12W-26CC	Siefkes domestic well W	96	04-15-93	
930204	MI-SS-IM	21S-12W-27DACC	Siefkes irrigation obs. well	60	04-13-93	
930205	MI-SS-EOS	21S-12W-26CDCC	Oil field supply well E	100.0	04-15-93	
930206	MI-SS-NOS	21S-12W-27ACDD	Oil field supply well N	120.0	04-15-93	
930207	MI-SS-P	21S-12W-27DACC	Permian observation well	227.8	04-14-93	200 gal*
930208	MI-SS-P	"	Permian observation well	227.8	04-15-93	300 gal*
930209	MI-SS-DA	21S-12W-27DADD	Aquifer base observ. well	167.0	04-15-93	200 gal*
930210	MI-SS-DA	"	Aquifer base observ. well	167.0	04-15-93	400 gal*
930435	MI-SS-P	21S-12W-27DACC	Permian observation well	227.8	06-02-93	
930556	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	07-28-93	11:45
930557	"	"	Siefkes irrigation well	120	07-28-93	14:45
930558	"	"	Siefkes irrigation well	120	07-28-93	18:05
930559	"	"	Siefkes irrigation well	120	07-29-93	10:00
930653	MI-SS-OB1	21S-12W-34A	Oil field brine		08-25-93	
930654	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	08-23-93	9:00
930655	"	"	Siefkes irrigation well	120	08-24-93	9:15
930656	"	"	Siefkes irrigation well	120	08-24-93	13:55
930657	"	"	Siefkes irrigation well	120	08-25-93	13:50
930716	"	"	Siefkes irrigation well	120	10-12-93	
940184	MI-SS-EOS	21S-12W-26CDCC	Oil field supply well E	100	03-24-94	
940185	MI-SS-NOS	21S-12W-27ACDD	Oil field supply well N	120	03-24-94	
940186	MI-SS-WOS	21S-12W-27DBDC	Oil field supply well W	85	03-24-94	
940187	MI-SS-S	21S-12W-27DDDC	Siefkes stock well	90	03-24-94	

KGS Lab No.	Sample ID	Location	Location name	Well depth ft	Date collected	Sample time or information
940188	GMD5 7-2	24S-13W-36DDDD	Observation well 7-2	154	03-24-94	
940189	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	03-31-94	
940190	"	21S-12W-27DACC	Siefkes irrigation well	120	04-01-94	
940191	MI-SS-IM	21S-12W-27DACC	Siefkes irrigation obs. well	60	03-31-94	
910192	MI-SS-I	"	Siefkes irrigation well	120	04-08-94	
940193	GMD5 19-1	25S-13W-36DCCC	Observation well 19-1	185	04-07-94	
940203	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	04-21-94	
940204	"	"	Siefkes irrigation well	120	04-22-94	
940239	MI-SS-WI	21S-12W-27C	Irrigation well W		05-19-94	
940240	MI-SS-SI	21S-12W-34A	Irrigation well S		05-18-94	
940269	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	06-04-94	
940270	MI-SS-WI	21S-12W-27C	Irrigation well W		06-23-94	
940271	MI-SS-WI3	21S-12W-28A	Irrigation well		06-23-94	
940272	MI-SS-WI2	21S-12W-28D	Irrigation well		06-23-94	
940273	MI-SS-SI	21S-12W-34A	Irrigation well S		06-23-94	
940274	MI-SS-S	21S-12W-27DDDC	Siefkes stock well	90	06-23-94	
940310	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	07-08-94	
940325	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	07-21-94	
940373	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	07-27-94	
940374	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	08-01-94	
940375	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	08-04-94	
940415	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	08-10-94	
940416	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	08-12-94	
940417	MI-SS-SI*	21S-12W-34A	Irrigation well S, center pivot		08-11-94	
940418	MI-SI-SI2	21S-12W-34ADC	Irrigation well S, well to pivot		08-11-94	
940419	MI-SS-WI	21S-12W-27C	Irrigation well W		08-12-94	
940420	Seep	23S-13W-1	Saline seep to Rattlesnake Cr		08-11-94	
940421	RSC-seep	23S-13W-1	Upstream seep to Rattlesnake Cr		08-11-94	

KGS Lab No.	Sample ID	Location	Location name	Well depth ft	Date collected	Sample time or information
940461	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	08-24-94	
940462	MI-SS-P	21S-12W-27DACC	Permian observation well	227.8	08-24-94	
940463	MI-SS-DA	21S-12W-27DADD	Aquifer base observ. well	167.0	08-24-94	
940501	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	09-16-94	
940502	MI-SS-P	21S-12W-27DACC	Permian observation well	227.8	09-15-94	
940503	MI-SS-DA	21S-12W-27DADD	Aquifer base observ. well	167.0	09-15-94	
940504	MI-WS-P	23S-12W-5AADA	Witt Permian observation well	179	09-15-94	
940505	MI-WS-WTb	23S-12W-5AADA	Witt water table observation well		09-15-94	
940506	MI-WS-RSC	23S-12W-5AA	Rattlesnake Cr near Witt site		09-15-94	
940508	MI-SS-S	21S-12W-27DDDC	Siefkes stock well	90	10/13/94	
940509	MI-WS-WTa	23S-12W-5AADA	Witt water table observation well	37	10/12/94	
940510	MI-WS-WTc	23S-12W-5AAAA	Witt water table observation well	36.5	10/13/94	
940511	MI-WS-SW	23S-12W-5AA	Witt south well		10/13/94	
940512	MI-WS-RSC	23S-12W-5AA	Rattlesnake Cr near Witt site		10/13/94	
940554	MI-WS-P	23S-12W-5AADA	Witt Permian observation well	179	11/9/94	
950026	MI-WS-WTa	23S-12W-5AADA	Witt water table observation well	37	3/16/95	
950027	MI-WS-WTb	23S-12W-5AADA	Witt water table observation well	38	3/16/95	
950028	MI-WS-WTc	23S-12W-5AAAA	Witt water table observation well	36.5	3/17/95	
950029	MI-WS-RSC	23S-12W-5AA	Rattlesnake Cr near Witt site		3/16/95	
950091	MI-SS-P	21S-12W-27DACC	Permian observation well	227.8	5/17/95	
950092	MI-SS-DA	21S-12W-27DADD	Aquifer base observ. well	167.0	5/16/95	
950093	MI-SS-IM	21S-12W-27DACC	Siefkes irrigation obs. well	60	5/17/95	
950094	MI-WS-P	23S-12W-5AADA	Witt Permian observation well	179	5/17/95	
950110	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	6/19/95	21:00
950111	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	6/20/95	08:50
950112	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	6/20/95	13:45
950113	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	6/21/95	10:50

KGS Lab No.	Sample ID	Location	Location name	Well depth ft	Date collected	Sample time or information
950114	MI-SS-WI	21-12W-27C	Irrigation well W		6/19/95	13:30
950115	MI-SS-WI2	21-12W-28D	Irrigation well		6/19/95	14:00
950116	MI-SS-S	21S-12W-27DDDC	Siefkes stock well	90	6/19/95	14:20
950160	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	7/19/95	
950278	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	8/21/95	
950279	MI-SS-SI*	21S-12W-34A	Irrigation well S, center pivot		8/21/95	
950280	MI-SS-WI	21-12W-27C	Irrigation well W		8/21/95	
950281	MI-SS-WI2	21-12W-28D	Irrigation well		8/21/95	
950303	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	9/11/95	13:50
950304	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	9/12/95	16:36
950305	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	9/12/95	17:25
950306	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	9/12/95	17:55
950307	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	9/13/95	8:05
950308	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	9/13/95	9:52
950309	MI-SS-S	21S-12W-27DDDC	Siefkes stock well	90	9/13/95	8:45
960052	DWR-PUMP	23S-13W-16A	Heyen pumping well	65	5/21/96	16:26
960053	DWR-PUMP	23S-13W-16A	Heyen pumping well	65	5/22/96	16:26
960054	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	5/23/96	12:10
960055	RSC-PUMP	23S-13W-16A	Rattlesnake Creek-Heyen site		5/23/96	16:20
960056	MI-SS-I	21S-12W-27DACC	Siefkes irrigation well	120	5/24/96	10:45

Chemistry data from the Siefkes site may also be found in SIEFCHEM.XLS.
Chemistry data from the Witt site may also be found in WITTCHEM.XLS.

Sample ID	Field Sp.C. uS/cm	Lab Sp.C. uS/cm	Lab pH	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	Sr mg/L	HCO3 mg/L	Cl mg/L	SO4 mg/L	NO3 mg/L
MI-SS-WOS	730	750								95.6	11.1	130.0
MI-SS-S	1202	1130								238.2	10.1	26.6
MI-SS-DE	880	820								116.0	14.5	47.9
MI-SS-DW	820	770								125.7	8.0	17.4
MI-SS-IM	720	680								90.6	9.3	107.0
MI-SS-EOS	1370	1320								308.4	14.2	10.2
MI-SS-NOS	810	680								95.0	14.4	29.8
MI-SS-P		55600								20960.0	2540	3.0
MI-SS-P		60600	9.55							25240.0	2870	1.6
MI-SS-DA		37300								13620.0	1500	0.9
MI-SS-DA		38400	7.80	347	162.0	8880.0	<12	3.20	292	13940.0	1530	0.6
MI-SS-P		70800	7.85	711	370.0	17800.0	<25	14.10	277	26670.0	3180	0.2
MI-SS-I		1085	7.60	136	9.5	53.2	3.4	0.52	157	203.1	15.3	89.2
"		1085								206.7	15.6	86.4
"		1105								210.8	16.2	84.1
"		1135	7.55	132	9.4	68.3	3.7	0.51	164	220.9	17.0	78.2
MI-SS-OB1		93300	7.45	2670	1140.0	18400.0	152.0	429.00	456	36350	230	
MI-SS-I		1315	7.60	131	10.1	102.0	4.3	0.55	194	279.0	21.8	55.8
"		1350								292.9	22.7	53.6
"		1345								291.6	22.8	53.8
"		1350	7.60	128	10.2	114	4.4	0.55	182	292.9	22.8	53.2
"		1315	7.65	126	9.9	105	4.3	0.55	182	283.8	21.4	52.3
MI-SS-EOS		1283								291	13.8	8.7
MI-SS-NOS		665								91.8	12.6	33.9
MI-SS-WOS		840								115	12.0	151
MI-SS-S		1262								290	13.1	23.9

Sample ID	Field Sp.C. uS/cm	Lab Sp.C. uS/cm	Lab pH	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	Sr mg/L	HCO3 mg/L	Cl mg/L	SO4 mg/L	NO3 mg/L
GMD5 7-2		937	8.10	26.9	4.3	166	1.9	0.23	243	146	34.4	15.5
MI-SS-I		900	7.60	129	9.2	21.3	3.3	0.50	133	135	13.2	126
"		1083								203	15.7	
MI-SS-IM		835								130	10.0	130
MI-SS-I		1220		132	9.9	84.9	4.1	0.55		253	18.7	64.9
GMD5 19-1		19300	7.80	581	153	3510	12.5	8.91	55.2	6213	796	3.2
MI-SS-I		1110								212	16.7	75.4
"		1280								266	20.6	60.5
MI-SS-WI		920	7.60	123	10.1	30.7	4.0	0.52	170	162.7	18.8	46.8
MI-SS-SI		532	7.80	69.9	4.6	31.7	3.8	0.27	233	33.4	13.8	25.0
MI-SS-I		1418	7.60	131	10.3	122	4.4	0.57	183	306	23.8	49.1
MI-SS-WI		800	7.80	104	7.6	34.6	3.7	0.43	186	126.9	15.8	36.2
MI-SS-WI3		1050	7.75	101	7.1	91.3	5.2	0.42	241	186.9	21.4	22.6
MI-SS-WI2		700	7.80	76.6	5.3	55.8	3.7	0.29	214	88.1	19.4	24.4
MI-SS-SI		775	7.85	74	4.9	77.8	4.1	0.29	235	105.5	19.6	20.4
MI-SS-S		1285	7.80	172	17.6	36.7	1.6	0.94	177	292	13.3	23.6
MI-SS-I		900	7.60	133	9.4	23.1	3.4	0.52	143	134.3	13.6	122
MI-SS-I		913								134.8	13.9	121
MI-SS-I		1480								331.6	25.8	43.5
MI-SS-I		1480								334.3	25.7	42.5
MI-SS-I		1480	7.70	127	10.3	141	4.4	0.57	194	330.2	25.8	42.9
MI-SS-I		1480								331.2	25.8	42.1
MI-SS-I		1460								323.6	25.1	43.9
MI-SS-SI*		1015	7.70	74.9	5.5	124	4.3	0.31	230	178.0	26.0	19.9
MI-SI-SI2		563	7.60	77.5	4.8	28.9	4.3	0.29	226	45.3	14.8	23.6
MI-SS-WI		770								118.1	16.4	30.2
Seep		30200	8.20	286	118	6560	13.0	5.14	207	10360	1037	1.9
RSC-seep		5760								1642	175	3.2

Sample ID	Field Sp.C. uS/cm	Lab Sp.C. uS/cm	Lab pH	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	Sr mg/L	HCO3 mg/L	Cl mg/L	SO4 mg/L	NO3 mg/L
MI-SS-I		1495								335	26.6	40.8
MI-SS-P		68400	9.05						27.2	25850	2918	2.6
MI-SS-DA		39400	7.95	345	170	9360	16.7	6.45	298	13880	1557	0.4
MI-SS-I		1430	7.80	129	10.2	135	4.4	0.58	194	316	24.5	44.8
MI-SS-P		70100	8.05	653	359	17500	34.7	13.4	247	26790	3209	1.2
MI-SS-DA		39400								13820	1559	0.5
MI-WS-P		97300	8.10	899	417	25800	49.2	17.5	140	39230	3968	1.2
MI-WS-WTb	1150	1145	8.20	20.3	2.4	220	2.1	0.10	256	220	19.8	3.5
MI-WS-RSC	9980	10200	8.10	96.6	38.9	2080	6.5	1.56	187	3175	317	0.4
MI-SS-S		1225								277	13.2	23.9
MI-WS-WTa	2850	2830	8.1	14.7	3.6	586	2.2	0.13	250	749	68.8	3.4
MI-WS-WTc	1360	1335	7.85	71.5	7.6	186	4	0.3	250	279	29.2	3.4
MI-WS-SW		2180	7.75	101	14.8	324	3.4	0.69	249	539	55.4	10.9
MI-WS-RSC	8800	9030								2736	281	3.1
MI-WS-P		97500								39640	3645	1.6
MI-WS-WTa		3120								823	76.1	3.3
MI-WS-WTb		985								176	19	6.4
MI-WS-WTc	1370	1335								276	28.5	3.5
MI-WS-RSC	4080	4090								1121	147	1.8
MI-SS-P		70200								26550	3178	0.9
MI-SS-DA		38800								13640	1530	0.4
MI-SS-IM		923	7.85	128	9	24.6	3.4	0.51	96.2	145	9.9	146
MI-WS-P		99100								40110	4052	1.7
MI-SS-I		1022								162	14.3	142
MI-SS-I	1110	1110	7.80	149	10.5	39.3	3.6	0.58	144	199	15.9	117
MI-SS-I	1120	1135								211	16.3	105
MI-SS-I	1160	1165								226	17.0	91.8

Sample ID	Field Sp.C. uS/cm	Lab Sp.C. uS/cm	Lab pH	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	Sr mg/L	HCO3 mg/L	Cl mg/L	SO4 mg/L	NO3 mg/L
MI-SS-WI		965								179	18.4	51.2
MI-SS-WI2		642								68.6	18.0	43.6
MI-SS-S		1225								273	14.4	24.6
MI-SS-I	1370	1390	7.70	136	10.6	113	4.4	.60	184	302	22.6	57.2
MI-SS-I	1470	1530	7.8	133	10.7	141.0	4.54	0.59	195	336	26.0	48.1
MI-SS-SI*	1600	1670	8	81.7	7.16	243.0	4.64	0.37	240	362	45.1	16.7
MI-SS-WI	770	804									17.3	33.3
MI-SS-WI2	720	758									22.1	23.6
MI-SS-I	1500	1520										
MI-SS-I	1030	1040	7.6	148	10.7	24.0	3.3	0.57	142	169	13.3	137
MI-SS-I	1290	1270								258	19.6	67.1
MI-SS-I	1500	1470								323	25.2	48.5
MI-SS-I	1540	1515								337	26.4	45.3
MI-SS-I	1540	1515	7.7	127	10.4	146.0	4.4	0.57	198	338	26.4	45
MI-SS-S	1190	1180								260	13.6	25.2
DWR-PUMP	640	687								53.6	28.0	27.1
DWR-P	690	696	7.6	83.2	8.8	45.3	2.8	0.51	272	54.1	29.4	31.3
MI-SS-I	1500	1520								336	25.3	50.2
RSC-PUMP	590	587	8.4	68.4	7.8	40.2	4.8	0.46	230	49.5	36.2	3.8
MI-SS-I	1240	1180								211	15.5	111

Sample ID	NO3-N mg/L	SiO2 mg/L	B mg/L	Br mg/L	I mg/L	Na/Cl	SO4/Cl	Br/Cl x 10E4	I/Cl x 10E6
MI-SS-WOS	29.37			0.096	0.001		0.1161	10.04	10.5
MI-SS-S	6.01			0.860	0.005		0.0424	36.10	21.0
MI-SS-DE	10.82			0.320	0.003		0.1250	27.59	24.1
MI-SS-DW	3.93			0.390	0.002		0.0636	31.03	15.1
MI-SS-IM	24.17			0.087	0.001		0.1026	9.60	12.1
MI-SS-EOS	2.30			0.910	0.002		0.0460	29.51	7.8
MI-SS-NOS	6.73			0.240	0.003		0.1516	25.26	26.3
MI-SS-P	0.68						0.1212		
MI-SS-P	0.36			3.840	0.081		0.1137	1.52	3.2
MI-SS-DA	0.20			2.150	0.049		0.1101	1.58	3.6
MI-SS-DA	0.14			2.220	0.050	0.6370	0.1098	1.59	3.6
MI-SS-P	0.05			4.140	0.108	0.6674	0.1192	1.55	4.0
MI-SS-I	20.15			0.328	0.002	0.2619	0.0753	16.15	9.8
"	19.52			0.337	0.001		0.0755	16.30	4.8
"	19.00			0.343	0.001		0.0769	16.27	4.7
"	17.67			0.352	0.001	0.3092	0.0770	15.93	4.5
MI-SS-OB1				137.100	5.560	0.5062	0.0063	37.72	153.0
MI-SS-I	12.61			0.424	0.002	0.3656	0.0781	15.20	7.2
"	12.11			0.432	0.002		0.0775	14.75	6.8
"	12.15			0.430	0.002		0.0782	14.75	6.9
"	12.02			0.436	0.002	0.3892	0.0778	14.89	6.8
"	11.81			0.429	0.002	0.3700	0.0754	15.12	7.0
MI-SS-EOS	1.97			0.910	0.0019			31.27	6.5
MI-SS-NOS	7.66			0.249	0.0020			27.12	21.8
MI-SS-WOS	34.11			0.121	0.0009			10.52	7.8
MI-SS-S	5.40			1.016	0.0048		0.0452	35.03	16.6

Sample ID	NO3-N mg/L	SiO2 mg/L	B mg/L	Br mg/L	I mg/L	Na/Cl	SO4/Cl	Br/Cl x 10E4	I/Cl x 10E6
GMD5 7-2	3.50		0.151	0.064	0.0040	1.1370	0.2356	4.38	27.4
MI-SS-I	28.46		0.113	0.118	0.0010	0.1578	0.0978	8.74	7.4
"				0.357	0.0012		0.0773	17.59	5.9
MI-SS-IM	29.37			0.103	0.0008		0.0769	7.92	6.2
MI-SS-I	14.66		0.081	0.438	0.0014	0.3356	0.0739	17.31	5.5
GMD5 19-1	0.72		0.763	1.154	0.0510	0.5649	0.1281	1.86	8.2
MI-SS-I	17.03			0.383	0.0017		0.0788	18.07	8.0
"	13.67			0.462	0.0016		0.0774	17.37	6.0
MI-SS-WI	10.57		0.036	0.512	0.0035	0.1887	0.1156	31.47	21.5
MI-SS-SI	5.65		0.029	0.033	0.0009	0.9491	0.4132	9.88	26.9
MI-SS-I	11.09		0.030	0.470	0.0025	0.3987	0.0778	15.36	8.2
MI-SS-WI	8.18		0.029	0.364	0.0033	0.2727	0.1245	28.68	26.0
MI-SS-WI3	5.11		0.044	0.234	0.0031	0.4885	0.1145	12.52	16.6
MI-SS-WI2	5.51		0.035	0.141	0.0033	0.6334	0.2202	16.00	37.5
MI-SS-SI	4.61		0.038	0.042	0.0021	0.7374	0.1858	3.98	19.9
MI-SS-S	5.33		0.014	1.039	0.0050	0.1257	0.0455	35.58	17.1
MI-SS-I	27.56		0.027	0.112	0.001	0.1720	0.1013	8.34	7.4
MI-SS-I	27.33			0.114	0.0009		0.1031	8.46	6.7
MI-SS-I	9.83			0.443	0.0020		0.0778	13.36	6.0
MI-SS-I	9.60			0.445	0.0023		0.0769	13.31	6.9
MI-SS-I	9.69		0.030	0.448	0.0020	0.4270	0.0781	13.57	6.1
MI-SS-I	9.51			0.440	0.0023		0.0779	13.29	6.9
MI-SS-I	9.92			0.442	0.0021		0.0776	13.66	6.5
MI-SS-SI*	4.50			0.052	0.0021	0.6966	0.1461	2.92	11.8
MI-SI-SI2	5.33			0.036	0.0012	0.6380	0.3267	7.95	26.5
MI-SS-WI	6.82			0.324	0.0036		0.1389	27.43	30.5
Seep	0.43			1.650	0.0310		0.1001	1.59	3.0
RSC-seep	0.72			0.278	0.0620		0.1066	1.69	37.8

Sample ID	NO3-N mg/L	SiO2 mg/L	B mg/L	Br mg/L	I mg/L	Na/Cl	SO4/Cl	Br/Cl x 10E4	I/Cl x 10E6
MI-SS-I	9.22						0.0794		
MI-SS-P	0.59						0.1129		
MI-SS-DA	0.09	19.1	1.26	2.180	0.0550	0.6744	0.1122	1.57	4.0
MI-SS-I	10.12	23.0	0.037	0.438	0.0020	0.4272	0.0775	13.86	6.3
MI-SS-P	0.27	15.0	2.26	4.090	0.0610	0.6532	0.1198	1.53	2.3
MI-SS-DA	0.11			2.200	0.0500		0.1128	1.59	3.6
MI-WS-P	0.27	13.3	2.66	6.280	0.1300	0.6577	0.1011	1.60	3.3
MI-WS-WTb	0.79	23.6	0.065	0.056	0.0037	1.0000	0.0900	2.55	16.8
MI-WS-RSC	0.09	16.0	0.303	0.462	0.0138	0.6551	0.0998	1.46	4.3
MI-SS-S	5.40			0.97	0.0049		0.0477	35.02	17.7
MI-WS-WTa	0.77	20.6	0.129	0.143	0.0085	0.7824	0.0919	1.91	11.3
MI-WS-WTc	0.77	21.8	0.061	0.072	0.0027	0.6667	0.1047	2.58	9.7
MI-WS-SW	2.46	22.5	0.048	0.155	0.0048	0.6011	0.1028	2.88	8.9
MI-WS-RSC	0.70			0.44	0.0104		0.1027	1.61	3.8
MI-WS-P	0.36			6.12	0.109		0.0920	1.54	2.7
MI-WS-WTa	0.75			0.1599	0.0103		0.0925	1.94	12.5
MI-WS-WTb	1.45			0.0487	0.0023		0.1080	2.77	13.1
MI-WS-WTc	0.79			0.0694	0.002		0.1033	2.51	7.2
MI-WS-RSC	0.41			0.1543	0.008		0.1311	1.38	7.1
MI-SS-P	0.20						0.1197		
MI-SS-DA	0.09						0.1122		
MI-SS-IM	32.98	23.8	0.029			0.1697	0.0683		
MI-WS-P	0.38						0.1010		
MI-SS-I	32.1	24.2		0.1472	0.0017		0.0883	9.09	10.5
MI-SS-I	26.4			0.2538	0.0013	0.1975	0.0799	12.75	6.5
MI-SS-I	23.7			0.3218	0.0015		0.0773	15.25	7.1
MI-SS-I	20.7			0.3715	0.0017		0.0752	16.44	7.5

Sample ID	NO3-N mg/L	SiO2 mg/L	B mg/L	Br mg/L	I mg/L	Na/Cl	SO4/Cl	Br/Cl x 10E4	I/Cl x 10E6
MI-SS-WI	11.6			0.5688	0.004		0.1028	31.78	22.3
MI-SS-WI2	9.8			0.1097	0.0016		0.2624	15.99	23.3
MI-SS-S	5.6			0.9128	0.0045		0.0527	33.44	16.5
MI-SS-I	12.9	22.6	0.054	0.4649	0.0016	0.3742	0.0748	15.39	5.3
MI-SS-I	10.9	22.9	0.038	0.4745	0.0021	0.4196	0.0774	14.12	6.3
MI-SS-SI*	3.8	21.4	0.062	0.0788	0.0026	0.6713	0.1246	2.18	7.2
MI-SS-WI	7.5			0.3278	0.0031				
MI-SS-WI2	5.3			0.1552	0.0031				
MI-SS-I									
MI-SS-I	30.9	25.5	< .025	0.1348	0.0009	0.1420	0.0787	7.98	5.3
MI-SS-I	15.2			0.3738	0.0014		0.0760	14.49	5.4
MI-SS-I	11.0			0.4245	0.0018		0.0780	13.14	5.6
MI-SS-I	10.2			0.4317	0.0018		0.0783	12.81	5.3
MI-SS-I	10.2	22.3	0.039	0.4333	0.002	0.4320	0.0781	12.82	5.9
MI-SS-S	5.7			0.8986	0.0039		0.0523	34.56	15.0
				*Note: Uncorrected Br Data					
DWR-PUMP	6.1								
DWR-P	7.1	23.9	0.047						
MI-SS-I	11.3								
RSC-PUMP	.9	15.3	0.051					(CO3 = 3.7 mg/L)	
MI-SS-I	25.1								

SIEFCHEM.XLS

Water chemistry data for all water samples collected at the Siefkes site. These data are also listed in CHEM.XLS.

SIEFCHEM.XLS: Chemical Properties and Constituent Concentrations in Water Samples Collected from the Siefkes site.																
	These data also included in CHEM.XLS; see Table 1 and/or CHEM.XLS for well or sample identification.															
		Field	Lab													
	Date	Sp.C.	Sp.C.	Lab	Ca	Mg	Na	K	Sr	HCO3	Cl	SO4	NO3	NO3-N	Br	I
Well ID	collected	uS/cm	uS/cm	pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WOS	3/23/93	730	750								95.6	11.1	130	29.37	0.096	0.001
S	3/23/93	1202	1130								238.2	10.1	26.6	6.01	0.86	0.005
DE	4/15/93	880	820								116	14.5	47.9	10.82	0.32	0.003
DW	4/15/93	820	770								125.7	8	17.4	3.93	0.39	0.002
IM	4/13/93	720	680								90.6	9.3	107	24.17	0.087	0.001
EOS	4/15/93	1370	1320								308.4	14.2	10.2	2.3	0.91	0.002
NOS	4/15/93	810	680								95	14.4	29.8	6.73	0.24	0.003
P	4/14/93		55600								20960	2540	3	0.68		
P	4/15/93		60600	9.55							25240	2870	1.6	0.36	3.84	0.081
DA	4/15/93		37300								13620	1500	0.9	0.2	2.15	0.049
DA	4/15/93		38400	7.8	347	162	8880	<12	3.2	292	13940	1530	0.6	0.14	2.22	0.05
P	6/2/93		70800	7.85	711	370	17800	<25	14.1	277	26670	3180	0.2	0.05	4.14	0.108
I	7/28/93		1085	7.6	136	9.5	53.2	3.4	0.52	157	203.1	15.3	89.2	20.15	0.328	0.002
"	7/28/93		1085								206.7	15.6	86.4	19.52	0.337	0.001
"	7/28/93		1105								210.8	16.2	84.1	19	0.343	0.001
"	7/29/93		1135	7.55	132	9.4	68.3	3.7	0.51	164	220.9	17	78.2	17.67	0.352	0.001
OB1	8/25/93		93300	7.45	2670	1140	18400	152	429	456	36350	230			137	5.56
I	8/23/93		1315	7.6	131	10.1	102	4.3	0.55	194	279	21.8	55.8	12.61	0.424	0.002
"	8/24/93		1350								292.9	22.7	53.6	12.11	0.432	0.002
"	8/24/93		1345								291.6	22.8	53.8	12.15	0.43	0.002
"	8/25/93		1350	7.6	128	10.2	114	4.4	0.55	182	292.9	22.8	53.2	12.02	0.436	0.002
"	10/12/93		1315	7.65	126	9.9	105	4.3	0.55	182	283.8	21.4	52.3	11.81	0.429	0.002
EOS	3/24/94		1283								291	13.8	8.7	1.97	0.91	0.0019
NOS	3/24/94		665								91.8	12.6	33.9	7.66	0.249	0.002
WOS	3/24/94		840								115	12	151	34.11	0.121	0.0009
S	3/24/94		1262								290	13.1	23.9	5.4	1.016	0.0048
I	3/31/94		900	7.6	129	9.2	21.3	3.3	0.5	133	135	13.2	126	28.46	0.118	0.001
"	4/1/94		1083								203	15.7			0.357	0.0012
IM	3/31/94		835								130	10	130	29.37	0.103	0.0008
I	4/8/94		1220		132	9.9	84.9	4.1	0.55		253	18.7	64.9	14.66	0.438	0.0014

Well ID	Date collected	Field Sp.C. uS/cm	Lab Sp.C. uS/cm	Lab pH	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	Sr mg/L	HCO3 mg/L	Cl mg/L	SO4 mg/L	NO3 mg/L	NO3-N mg/L	Br mg/L	I mg/L
I	4/21/94		1110								212	16.7	75.4	17.03	0.383	0.0017
I	4/22/94		1280								266	20.6	60.5	13.67	0.462	0.0016
WI	5/19/94		920	7.6	123	10.1	30.7	4	0.52	170	162.7	18.8	46.8	10.57	0.512	0.0035
SI	5/18/94		532	7.8	69.9	4.6	31.7	3.8	0.27	233	33.4	13.8	25	5.65	0.033	0.0009
I	6/4/94		1418	7.6	131	10.3	122	4.4	0.57	183	306	23.8	49.1	11.09	0.47	0.0025
WI	6/23/94		800	7.8	104	7.6	34.6	3.7	0.43	186	126.9	15.8	36.2	8.18	0.364	0.0033
WI3	6/23/94		1050	7.75	101	7.1	91.3	5.2	0.42	241	186.9	21.4	22.6	5.11	0.234	0.0031
WI2	6/23/94		700	7.8	76.6	5.3	55.8	3.7	0.29	214	88.1	19.4	24.4	5.51	0.141	0.0033
SI	6/23/94		775	7.85	74	4.9	77.8	4.1	0.29	235	105.5	19.6	20.4	4.61	0.042	0.0021
S	6/23/94		1285	7.8	172	17.6	36.7	1.6	0.94	177	292	13.3	23.6	5.33	1.039	0.005
I	7/8/94		900	7.6	133	9.4	23.1	3.4	0.52	143	134.3	13.6	122	27.56	0.112	0.001
I	7/21/94		913								134.8	13.9	121	27.33	0.114	0.0009
I	7/27/94		1480								331.6	25.8	43.5	9.83	0.443	0.002
I	8/1/94		1480								334.3	25.7	42.5	9.6	0.445	0.0023
I	8/4/94		1480	7.7	127	10.3	141	4.4	0.57	194	330.2	25.8	42.9	9.69	0.448	0.002
I	8/10/94		1480								331.2	25.8	42.1	9.51	0.44	0.0023
I	8/12/94		1460								323.6	25.1	43.9	9.92	0.442	0.0021
SI	8/11/94		1015	7.7	74.9	5.5	124	4.3	0.31	230	178	26	19.9	4.5	0.052	0.0021
SI*	8/11/94		563	7.6	77.5	4.8	28.9	4.3	0.29	226	45.3	14.8	23.6	5.33	0.036	0.0012
WI	8/12/94		770								118.1	16.4	30.2	6.82	0.324	0.0036
I	8/24/94		1495								335	26.6	40.8	9.22		
P	8/24/94		68400	9.05						27.2	25850	2918	2.6	0.59		
DA	8/24/94		39400	7.95	345	170	9360	16.7	6.45	298	13880	1557	0.4	0.09	2.18	0.055
I	9/16/94		1430	7.8	129	10.2	135	4.4	0.58	194	316	24.5	44.8	10.12	0.438	0.002
P	9/15/94		70100	8.05	653	359	17500	34.7	13.4	247	26790	3209	1.2	0.27	4.09	0.061
DA	9/15/94		39400								13820	1559	0.5	0.11	2.2	0.05
S	10/13/94		1225								277	13.2	23.9	5.4	0.97	0.0049
DA	5/16/95		38800								13640	1530	0.4	0.09		
P	5/17/95		70200								26550	3178	0.9	0.2		
IM	5/17/95		923	7.85	128	9	24.6	3.4	0.51	96.2	145	9.9	146	32.98	0.1277	0.0021

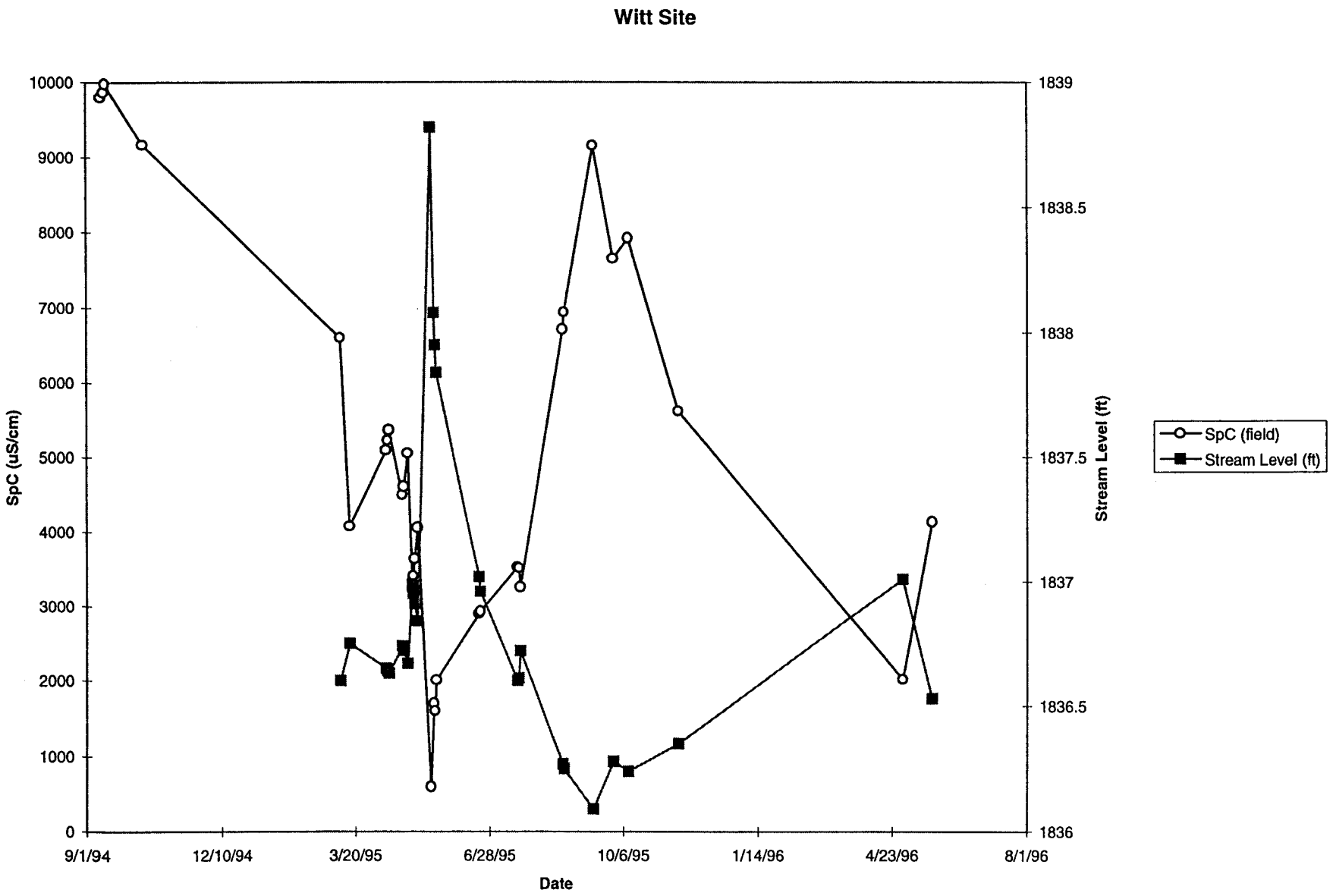
SIEFCHEM.XLS (cont.)																
		Field	Lab													
	Date	Sp.C.	Sp.C.	Lab	Ca	Mg	Na	K	Sr	HCO3	Cl	SO4	NO3	NO3-N	Br	I
Well ID	collected	uS/cm	uS/cm	pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	6/19/95		1022								162	14.3	142	32.1	0.1472	0.0017
I	6/20/95	1110	1110	7.80	149	10.5	39.3	3.6	0.58	144	199	15.9	117	26.4	0.2538	0.0013
I	6/20/95	1120	1135								211	16.3	105	23.7	0.3218	0.0015
I	6/21/95	1160	1165								226	17.0	91.8	20.7	0.3715	0.0017
WI	6/19/95		965								179	18.4	51.2	11.6	0.5688	0.004
WI2	6/19/95		642								68.6	18.0	43.6	9.8	0.1097	0.0016
S	6/19/95		1225								273	14.4	24.6	5.6	0.9128	0.0045
I	7/19/95	1370	1390	7.70	136	10.6	113	4.4	.60	184	302	22.6	57.2	12.9	0.4649	1.6
I	8/21/95	1470	1530	7.8	133	10.7	141.0	4.54	0.59	195	336	26.0	48.1	10.9	0.4745	0.0021
SI*	8/21/95	1600	1670	8	81.7	7.16	243.0	4.64	0.37	240	362	45.1	16.7	3.8	0.0788	0.0026
WI	8/21/95	770	804									17.3	33.3	7.5	0.3278	0.0031
WI2	8/21/95	720	758									22.1	23.6	5.3	0.1552	0.0031
I	9/11/95	1500	1520													
I	9/12/95	1030	1040	7.6	148	10.7	24.0	3.3	0.57	142	169	13.3	137	30.9	0.1348	0.0009
I	9/12/95	1290	1270								258	19.6	67.1	15.2	0.3738	0.0014
I	9/12/95	1500	1470								323	25.2	48.5	11.0	0.4245	0.0018
I	9/13/95	1540	1515								337	26.4	45.3	10.2	0.4317	0.0018
I	9/13/95	1540	1515	7.7	127	10.4	146.0	4.4	0.57	198	338	26.4	45	10.2	0.4333	0.002
S	9/13/95	1190	1180								260	13.6	25.2	5.7	0.8986	0.0039
															*Note: Uncorrec	
I	5/23/96	1500	1520								336	25.3	50.2	11.3		
I	5/24/96	1240	1180								211	15.5	111	25.1		
* sample collected from upright--mix from two wells.																
OB1-oil field brine collected from tank near disposal well 21S-12W-34A.																

WITTCHEM.XLS

Water chemistry data from the Witt site. This file contains two sheets.
The FIELD sheet contains specific conductance and stream level data collected from Rattlesnake Creek in the field.
The LAB sheet contains results of water chemistry analyses from the KGS lab. These data are also listed in CHEM.XLS.

WITTCHEM.XLS: Specific conductance (SpC) and stream level for Rattlesnake Creek at the Witt Site

Date	SpC (field) (uS/cm)	Stream Level (ft)
9/12/94	9800	
9/14/94	9870	
9/15/94	9980	
10/13/94	9170	
3/9/95	6600	1836.6
3/16/95	4080	1836.75
4/12/95	5090	1836.65
4/13/95	5220	1836.64
4/14/95	5360	1836.63
4/24/95	4500	1836.74
4/25/95	4610	1836.72
4/28/95	5050	1836.67
5/1/95	3340	1836.98
5/2/95	3410	1836.95
5/3/95	3640	1836.91
5/5/95	4060	1836.84
5/15/95	600	1838.82
5/17/95	1700	1838.08
5/18/95	1600	1837.95
5/19/95	2010	1837.84
6/20/95	2900	1837.02
6/21/95	2930	1836.96
7/19/95	3530	1836.6
7/20/95	3520	1836.61
7/21/95	3260	1836.72
8/22/95	6710	1836.27
8/23/95	6940	1836.25
9/14/95	9160	1836.09
9/29/95	7650	1836.28
10/10/95	7920	1836.24
11/16/95	5620	1836.35
5/1/96	2020	1837.01
5/23/96	4140	1836.53


Witt Site
SpC (uS/cm)
Stream Level (ft)
Date
SpC (field)
Stream Level (ft)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1839
1838.5
1838
1837.5
1837
1836.5
1836
9/1/94
12/10/94
3/20/95
6/28/95
10/6/95
1/14/96
4/23/96
8/1/96

WITTCHEM.XLS: chemical properties and constituent concentrations in water samples collected at the Witt site.									
	These data also included in CHEM.XLS								
Sample ID	Location	Location name	Well depth ft	Date collected	Field Sp.C. uS/cm	Lab Sp.C. uS/cm	Lab pH	Ca mg/L	Mg mg/L
WTa	23S-12W-5AADA	Witt water table observation well	37	10/12/94	2850	2830	8.1	14.7	3.6
WTa	23S-12W-5AADA	Witt water table observation well	37	3/16/95		3120			
WTb	23S-12W-5AADA	Witt water table observation well		9/15/94	1150	1145	8.20	20.3	2.4
WTb	23S-12W-5AADA	Witt water table observation well	38	3/16/95		985			
WTc	23S-12W-5AAAA	Witt water table observation well	36.5	10/13/94	1360	1335	7.85	71.5	7.6
WTc	23S-12W-5AAAA	Witt water table observation well	36.5	3/17/95	1370	1335			
Permian	23S-12W-5AADA	Witt Permian observation well	179	9/15/94		97300	8.10	899	417
Permian	23S-12W-5AADA	Witt Permian observation well	179	11/9/94		97500			
Permian	23S-12W-5AADA	Witt Permian observation well	179	5/17/95		99100			
S. well	23S-12W-5AA	Witt south well		10/13/94		2180	7.75	101	14.8
RSC	23S-12W-5AA	Rattlesnake Cr near Witt site		9/15/94	9980	10200	8.10	96.6	38.9
RSC	23S-12W-5AA	Rattlesnake Cr near Witt site		10/13/94	8800	9030			
RSC	23S-12W-5AA	Rattlesnake Cr near Witt site		3/16/95	4080	4090			

WITTCHEM.XLS: chemical properties and constituent concentrations in water samples collected at the Witt site.															
Na	K	Sr	HCO3	Cl	SO4	NO3	NO3-N	SiO2	B	Br	I			Br/Cl	I/Cl
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Na/Cl	SO4/Cl	x 10E4	x 10E6
-------	-----	-----	----	----------	----------	----------	----------	--------	--------	--------	------	------	------	------	------
586	2.2	0.13	250	749	68.8	3.4	0.77	20.6	0.129	0.143	0.0085	0.7824	0.0919	1.91	11.3
				823	76.1	3.3	0.75			0.1599	0.0103		0.0925	1.94	12.5
220	2.1	0.10	256	220	19.8	3.5	0.79	23.6	0.065	0.056	0.0037	1.0000	0.0900	2.55	16.8
				176	19	6.4	1.45			0.0487	0.0023		0.1080	2.77	13.1
186	4	0.3	250	279	29.2	3.4	0.77	21.8	0.061	0.072	0.0027	0.6667	0.1047	2.58	9.7
				276	28.5	3.5	0.79			0.0694	0.002		0.1033	2.51	7.2
25800	49.2	17.5	140	39230	3968	1.2	0.27	13.3	2.66	6.280	0.1300	0.6577	0.1011	1.60	3.3
				39640	3645	1.6	0.36			6.12	0.109		0.0920	1.54	2.7
				40110	4052	1.7	0.38						0.1010		
324	3.4	0.69	249	539	55.4	10.9	2.46	22.5	0.048	0.155	0.0048	0.6011	0.1028	2.88	8.9
2080	6.5	1.56	187	3175	317	0.4	0.09	16.0	0.303	0.462	0.0138	0.6551	0.0998	1.46	4.3
				2736	281	3.1	0.70			0.44	0.0104		0.1027	1.61	3.8
				1121	147	1.8	0.41			0.1543	0.008		0.1311	1.38	7.1

C. Well logs

Approximately 250 natural gamma and electromagnetic induction (EM) logs were collected by the Mineral Intrusion project. EM logs measure formation conductivity and were used to characterize and track the freshwater/saltwater interface in the Great Bend Prairie aquifer. Raw logs have been archived in the KGS Geoscience Data Resources and are available in LAS format on disk, tape, or via ftp. For further information contact Susan Bolton at (913)864-3965 or e-mail: sbolton@pcmail.kgs.ukans.edu. Some logs were published in previous MI reports.

LOG_DATA.XLS

This file lists data obtained from processed EM logs at sites with a freshwater/saltwater transition zone. See Garneau (1995) for log processing methods and definition of parameters. Data include the estimated depth to the 500 mg/L chloride level for all logs, and maximum chloride concentration and mean chloride concentration in the Great Bend Prairie aquifer for 1995-96 logs.

LOG_DATA.XLS: Transition zone data estimated from EM logs collected by the Mineral Intrusion project.
See bottom of spreadsheet for more information.

Site	Date	D1	D2	M0	M1	R	D500	Cl max	Cl mean
1	3/26/93	90	127.7	133.18	17.07	0.9909	94.6		
1	4/15/94	90	127.7	134.54	17.894	0.9892	94.1		
1	4/25/95	90	127.7	135.04	17.476	0.98619	95.519	14194	1449
3	5/19/93	94	119	197.41	43.008	0.8229	100.15		
3	4/13/94	94	119	192.14	39.927	0.8102	101.85		
3	4/26/95	94	119	175.17	31.153	0.79875	104.72	3859	276
3	10/10/95	94	119	173.16	30.156	0.8039	104.96	3882	270
4	4/22/93	80	100	177.57	49.714	0.764	65.144		
4	4/13/94	80	100	165.23	44.262	0.8814	65.127		
4	5/4/95	80	100	167.48	44.599	0.81951	66.619	15302	1616
5	9/17/93	66	106	98.876	12.641	0.972	68.288		
5	10/16/93	66	106	96.891	13.018	0.9755	67.452		
5	4/19/94	66	106	97.269	12.539	0.9754	68.912		
5	7/6/94	66	106	97.057	11.724	0.97142	70.542		
5	8/10/94	66	106	97.396	11.963	0.97299	70.341		
5	10/6/94	66	106	97.18	11.867	0.97203	70.344		
5	4/25/95	66	106	97.811	12.011	0.97382	70.648	37061	11559
5	8/22/95	66	106	97.936	12.013	0.97673	70.768	36982	11674
6 bad	4/19/93								
6	4/13/94	78	97	156.2	31.731	0.88445	84.445		
6	5/4/95	78	97	137.14	22.445	0.78373	86.381		
8	4/18/93						118		
8	4/7/94						118		
8	4/25/95						118	2403	678
9	4/18/93	40	79.5	90.065	17.336	0.5944	50.859		
9	4/14/94	40	79.5	88.037	16.182	0.5655	51.442		
9	5/4/95	40	79.5	84.717	14.147	0.53264	52.724	13612	1310
10	4/18/93	111	126	164.71	24.533	0.81843	109.23		
10	4/7/94	111	126	160.34	21.824	0.82634	110.99		
10	5/2/95	111	126	161.34	21.943	0.84105	111.72	2169	542
11	3/27/93	82	167.1	216.97	60.108	0.9277	81.038		
11	5/20/93	82	167.1	221.95	64.422	0.9289	76.259		
11	7/9/93	82	167.1	220.58	63.57	0.9286	76.819		
11	7/30/93	82	167.1	220.22	63.285	0.9279	77.103		
11	9/22/93	82	167.1	221.78	65.076	0.9276	74.611		
11	10/13/93	82	167.1	221.69	65.06	0.9291	74.56		
11	4/8/94	82	167.1	226.16	66.184	0.912	76.429		
11	5/26/94	82	167.1	222.89	64.193	0.91631	77.715		
11	7/6/94	82	167.1	220.27	61.708	0.91444	80.713		
11	7/19/94	82	167.1	223.05	63.782	0.91581	78.807		
11	8/12/94	82	167.1	223.38	64.246	0.91709	78.092		
11	10/6/94	82	167.1	218.48	60.946	0.91707	80.65		
11	4/25/95	82	167.1	223.89	63.498	0.92236	80.286	7497	1988
11	8/23/95	82	167.1	221.78	61.621	0.9208	82.422	7444	1896
15	4/22/93	100	123	175.37	26.731	0.65753	114.92		

Site	Date	D1	D2	M0	M1	R	D500	Cl max	Cl mean
15	4/14/94	100	123	166.59	22.772	0.65556	115.1		
15	4/27/95	100	123	177.94	27.187	0.68896	116.45		
16	3/25/93	122	187	176.97	21.62	0.9691	128.08		
16	5/19/93	122	187	177.19	21.454	0.9695	128.67		
16	7/8/93	122	187	177.19	21.757	0.9686	127.99		
16	7/31/93	122	187	176.88	22.301	0.9734	126.44		
16	9/8/93	122	187	176.03	19.329	0.9773	132.31		
16	10/21/93	122	187	176.88	22.319	0.9704	126.41		
16	3/31/94	122	187	176.63	21.89	0.974	127.13		
16	5/26/94	122	187	176.87	22.098	0.97604	126.9		
16	6/23/94	122	187	176.81	22.09	0.97455	126.86		
16	7/20/94	122	187	177.63	21.387	0.97324	129.26		
16	8/12/94	122	187	176.7	21.115	0.97523	128.95		
16	10/6/94	122	187	177.2	21.174	0.97164	129.32		
16	4/13/95	122	187	177.94	21.508	0.9694	129.3	36296	7645
16(GMD5	4/13/95	122	187	178.35	23.084	0.97234	126.15		
16	8/23/95	122	187	177.99	22.203	0.97016	127.78	36303	7596
16	9/27/95	122	187	177.98	22.034	0.96949	128.15	36290	7787
16	5/1/96	122	187	177.92	22.522	0.96945	126.98	36303	7948
17	3/24/93	61	100	111.1	20.366	0.9412	65.046		
17	5/19/93	61	100	112.15	21.578	0.9446	63.348		
17	7/8/93	61	100	112.49	21.759	0.9447	63.281		
17	7/28/93	61	100	112.95	22.45	0.9455	62.178		
17	9/8/93	61	100	111.01	20.179	0.9384	65.372		
17	10/21/93	61	100	111.08	20.447	0.9409	64.843		
17	4/1/94	61	100	111.02	20.488	0.9395	64.681		
17	5/26/94	61	100	110.87	20.314	0.93957	64.929		
17	7/6/94	61	100	110.9	20.346	0.93851	64.892		
17	7/19/94	61	100	111.55	21.037	0.94186	63.978		
17	8/11/94	61	100	111.73	21.303	0.94094	63.554		
17	10/26/94	61	100	111.48	21.034	0.94098	63.907		
17	4/24/95	61	100	113.03	21.883	0.94487	63.537	8786	2468
17	8/23/95	61	100	112.8	21.653	0.94067	63.831	8684	2434
18	3/25/93	107	172	182.26	31.753	0.8504	110.45		
18	5/21/93	107	172	183.84	33.194	0.8618	108.77		
18	7/9/93	107	172	183.09	32.716	0.85	109.1		
18	7/29/93	107	172	183	32.624	0.844	109.22		
18	10/14/93	107	172	182.55	32.282	0.8482	109.55		
18	4/8/94	107	172	181.63	31.233	0.8407	110.99		
18	5/26/94	107	172	181.28	30.684	0.84729	111.89		
18	7/6/94	107	172	177.75	27.738	0.83438	115.07		
18	7/20/94	107	172	179.06	28.73	0.83941	114.08		
18	8/10/94	107	172	179.64	29.102	0.83505	113.82		
18	10/7/94	107	172	178.39	28.301	0.84471	114.38		
18	4/25/95	107	172	183.08	31.362	0.84795	112.15	14582	4148
18	7/20/95	107	172	183.26	31.551	0.84757	111.91	14590	4075
18	8/22/95	107	172	181.9	30.435	0.84447	113.08	14671	4105
18	9/27/95	107	172	183.56	31.92	0.84489	111.37	14699	1452

Site	Date	D1	D2	M0	M1	R	D500	Cl max	Cl mean
19	4/19/93	142	174	237.37	41.181	0.78367	144.23		
19	4/7/94	142	174	237.49	41.545	0.78048	143.54		
19	5/4/95	142	174	251.03	47.336	0.83768	143.98	4470	611
19	10/11/95	142	174	242.14	43.062	0.8039	144.76	4484	638
21	5/20/93	80	136.1	161.27	34.198	0.9653	83.934		
21	4/7/94	80	136.1	160.13	32.164	0.9642	87.387		
21	4/27/95	80	136.1	162.38	33.02	0.96396	87.708	15675	1769
22	3/25/93	133	204	198.15	25.648	0.9338	140.15		
22	5/21/93	133	204	197.44	24.721	0.944	141.53		
22	7/9/93	133	204	197.91	24.926	0.9262	141.53		
22	7/30/93	133	204	197.93	25.114	0.9271	141.14		
22	10/14/93	133	204	197.08	24.427	0.938	141.84		
22	3/31/94	133	204	197.82	24.549	0.9523	142.3		
22	5/26/94	133	204	197.17	25.474	0.93199	139.56		
22	6/23/94	133	204	197.13	25.637	0.92303	139.16		
22	7/20/94	133	204	197.7	24.173	0.94928	143.03		
22	8/4/94	133	204	198.52	24.341	0.9374	143.47		
22	10/7/94	133	204	197.12	25.045	0.93326	140.48		
22	4/24/95	133	204	198.45	25.362	0.93596	141.1	25285	4043
22	8/22/95	133	204	198.59	25.162	0.93118	141.69	24924	3915
22	10/11/95	133	204	198.22	25.137	0.93215	141.38	25316	4005
23	4/20/93	52.5	82	123.87	21.585	0.5614	75.05		
23	4/19/94	52.5	82	158.41	40.539	0.6778	66.732		
23	5/3/95	52.5	82	143.25	33.27	0.63166	68.008	7045	598
23	5/2/96	52.5	82	145.33	34.347	0.69746	67.655	6899	631
24	10/23/93	88	112	146.88	24.408	0.86403	91.68		
24	4/19/94	88	112	148.55	25.444	0.8805	91.008		
24	5/3/95	88	112	148.27	24.515	0.89022	92.829	26470	2197
25	3/28/93	8	38	35.675	11.43	0.9346	9.827		
25	7/31/93	8	38	34.896	11.427	0.901	9.053		
25	9/14/93	8	38	34.9	11.64	0.8947	8.577		
25	10/22/93	8	38	34.91	11.568	0.8944	8.748		
25	4/1/94	8	38	35.56	11.099	0.9477	10.46		
25	8/18/94	8	38	35.814	11.5	0.95474	9.8067		
25	4/25/95	8	38	35.326	10.357	0.96946	11.903	25345	14391
25	9/12/95	8	38	35.093	11.565	0.95401	8.9377	25399	14145
26	4/20/93	64	102	102.11	12.625	0.9278	73.56		
26	4/15/94	64	102	106.61	17.432	0.9788	67.19		
26	7/7/94	64	102	108.2	19.586	0.98397	63.903		
26	5/5/95	64	102	108.93	19.155	0.98166	65.614	15502	5973
26	9/12/95	64	102	109.62	19.45	0.98511	65.636	15397	5751
27	4/20/93	53	66	78.229	7.5943	0.9907	61.054		
27	4/15/94	53	66	84.086	11.187	0.9905	58.788		
27	5/3/95	53	66	85.361	11.66	0.98732	58.991	2200	1071
27	5/2/96	53	66	84.695	11.2	0.98847	59.367	2150	1025
29	4/25/93	94	150	254.31	67.954	0.634	100.64		
29	4/7/94	94	150	248.73	64.379	0.6457	103.13		
29	5/4/95	94	150	248.33	64.735	0.58363	101.93	2612	687

Site	Date	D1	D2	M0	M1	R	D500	Cl max	Cl mean
30	4/25/93	85	132	216.98	48.91	0.5368	106.36		
30	4/14/94	85	132	204.65	42.662	0.4906	108.17		
30	5/4/95	85	132	198.67	39.274	0.48003	109.85	1444	332
31	4/20/93	73	90	196.27	52.737	0.8467	77.008		
31	4/15/94	73	90	192	50.257	0.8138	78.345		
31	7/21/95	73	90	188.58	48.209	0.83767	79.56	1902	425
31	5/2/96	73	90	184.33	45.539	0.84249	81.347	1841	404
32	4/24/93	75	135	158.26	31.292	0.6085	87.497		
32	4/19/94	75	135	151.87	27.745	0.551	89.126		
32	4/27/95	75	135	147.06	23.608	0.53067	93.67	4114	1389
32	5/2/96	75	135	147.02	23.583	0.53342	93.687	4052	1379
33	5/20/93	120	139	191.41	26.976	0.794	130.41		
33	4/7/94	120	139	176.71	18.718	0.8117	134.38		
33	5/4/95	120	139	179.48	20.322	0.75274	133.53	2186	272
35	4/21/93	115	142	186.37	27.447	0.8686	124.3		
35	4/20/94	115	142	188.79	28.937	0.8685	123.34		
35	4/27/95	115	142	196.5	32.407	0.86728	123.22	1874	380
36	4/21/93	121	188	202.18	31.618	0.9544	130.67		
36	9/17/93	121	188	199.77	28.096	0.9635	136.23		
36	4/14/94	121	188	203.65	32.828	0.9462	129.41		
36	4/27/95	121	188	204.73	32.218	0.95512	131.87	17402	2441
37	4/21/93	212	233	260.55	17.497	0.902	220.98		
37	4/13/94	212	233	259.04	16.663	0.9271	221.36		
37	4/27/95	212	233	263.92	19.108	0.90916	220.71	2544	510
38	4/21/93	150	177	198.04	19.209	0.8461	154.6		
38	4/14/94	150	177	197.33	18.805	0.8577	154.8		
38	4/27/95	150	177	204.38	22.721	0.85736	152.99	2872	709
39	10/22/93						55		
39	4/20/94						55		
42	4/22/93	74	149	187.52	37.412	0.93	102.91		
42	4/14/94	74	149	188.01	37.263	0.9392	103.74		
42	4/27/95	74	149	193.14	40.154	0.93284	102.33	4387	991
43	4/22/93	40	55	61.092	7.1996	0.9387	44.81		
43	4/14/94	40	55	60.55	6.8257	0.938	45.113		
43	4/27/95	40	55	62.361	8.1126	0.9252	44.014	4390	1159
49	6/22/94	40	70	87.128	17.603	0.9264	47.139		
SP	4/17/93	123	180	167.41	16.836	0.97614	129.34		
SP	5/20/93	123	180	166.76	16.647	0.97414	129.12		
SP	7/8/93	123	180	166.35	16.02	0.97034	130.12		
SP	7/27/93	123	180	166.32	15.718	0.97175	130.77		
SP	7/29/93	123	180	166.35	16.034	0.97393	130.09		
SP	9/18/93	123	180	166.68	17.462	0.96892	127.19		
SP	10/21/93	123	180	166.53	17.995	0.9648	125.83		
SP	3/24/94	123	180	166.18	17.069	0.97529	127.57		
SP	3/31/94	123	180	166.21	16.911	0.97632	127.97		
SP	4/13/94	123	180	166.6	16.988	0.97741	128.18		
SP	4/21/94	123	180	166.28	16.807	0.977	128.27		
SP	5/19/94	123	180	166.33	17.633	0.97606	126.45		

Site	Date	D1	D2	M0	M1	R	D500	CI max	CI mean
SP	6/21/94	123	180	166.41	17.503	0.97491	126.82		
SP	7/5/94	123	180	166.47	17.314	0.97185	127.32		
SP	7/8/94	123	180	166.47	17.971	0.97307	125.83		
SP	8/9/94	123	180	166.42	18.031	0.96552	125.64		
SP	8/17/94	123	180	166.65	18.539	0.96358	124.73		
SP	9/16/94	123	180	166.3	18.178	0.96089	125.19		
SP	10/26/94	123	180	166.26	18.434	0.96091	124.57		
SP	11/16/94	123	180	166.25	18.431	0.95999	124.56		
SP	4/12/95	123	180	166.97	17.067	0.97678	128.38	26952	4491
SP	5/15/95	123	180	166.84	16.852	0.97816	128.73	27062	4498
SP	6/19/95	123	180	166.87	16.59	0.97598	129.35	26897	4381
SP	6/20/95	123	180	166.57	16.748	0.97525	128.69	27016	4599
SP	7/20/95	123	180	166.9	16.724	0.97765	129.07		
SP	8/21/95	123	180	167.04	17.824	0.97347	126.73	26853	4774
SP	9/13/95	123	180	167.03	18.325	0.96742	125.59	26888	4708
SP	9/28/95	123	180	167.07	18.404	0.96626	125.45	26856	4496
SP	10/10/95	123	180	167.07	18.45	0.96369	125.34	26900	4513
SP	11/15/95	123	180	166.95	18.524	0.95939	125.06	26924	4549
SP	5/1/96	123	180	167.01	18.268	0.96795	125.7	26865	4561
SD	4/17/93	123	155.8	165.63	15.956	0.83722	129.54		
SD	5/20/93	123	155.8	164.05	15.296	0.84618	129.46		
SD	7/8/93	123	155.8	163.87	15.334	0.85122	129.19		
SD	7/27/93	123	155.8	163.33	14.602	0.83302	130.31		
SD	7/29/93	123	155.8	163.63	15.026	0.84281	129.65		
SD	9/18/93	123	155.8	163.79	15.061	0.86172	129.73		
SD	10/21/93	123	155.8	164.27	15.379	0.8613	129.49		
SD	3/31/94	123	155.8	164.27	15.454	0.80825	129.32		
SD	4/13/94	123	155.8	163.98	15.241	0.82066	129.51		
SD	4/21/94	123	155.8	164.18	15.492	0.8096	129.15		
SD	5/19/94	123	155.8	164.31	15.265	0.81592	129.78		
SD	6/21/94	123	155.8	163.81	14.744	0.8291	130.46		
SD	7/5/94	123	155.8	163.45	14.028	0.84395	131.73		
SD	7/8/94	123	155.8	163.81	14.806	0.83947	130.33		
SD	8/17/94	123	155.8	163.78	14.708	0.86707	130.51		
SD	9/16/94	123	155.8	163.86	14.744	0.86097	130.51		
SD	4/12/95	123	155.8	163.15	14.02	0.83917	131.44		
SD	5/15/95	123	155.8	163.83	14.547	0.80844	130.93		
SD	6/19/95	123	155.8	162.55	13.595	0.83305	131.8		
SD	7/20/95	123	155.8	162.3	13.903	0.84104	130.86		
SD	8/21/95	123	155.8	162.82	14.343	0.87711	130.38		
SD	9/13/95	123	155.8	162.61	14.446	0.88284	129.94		
SD	9/28/95	123	155.8	162.95	14.554	0.87752	130.03		
SD	10/10/95	123	155.8	162.95	14.472	0.86302	130.22		
SD	11/15/95	123	155.8	161.9	13.501	0.80921	131.37		
SD	5/1/96	123	155.8	162.99	14.558	0.84625	130.07		
WP	9/15/94	12	140	93.891	31.993	0.98326	21.652		
WP	10/7/94	12	140	93.055	30.507	0.9818	24.063		
WP	10/12/94	12	140	93.091	29.896	0.98129	25.482		

Site	Date	D1	D2	M0	M1	R	D500	Cl max	Cl mean
WP	10/27/94	12	140	92.91	28.571	0.97957	28.296		
WP	4/12/95	12	140	94.702	27.012	0.98033	33.613	41031	15426
WP	5/2/95	12	140	94.255	27.703	0.9808	31.605	41031	15383
WP	5/19/95	12	140	94.112	27.626	0.98031	31.636	41213	15383
WP	6/20/95	12	140	94.233	27.139	0.98119	32.857	41273	15426
WP	7/19/95	12	140	93.936	27.148	0.98027	32.54	41277	15540
WP	8/22/95	12	140	94.181	27.357	0.97765	32.313	41194	15558
WP	9/14/95	12	140	94.009	27.778	0.97766	31.189	41189	15672
WP	9/29/95	12	140	93.797	27.425	0.97841	31.775	41083	15734
WP	10/10/95	12	140	93.79	27.99	0.97641	30.49	41205	15703
WP	11/16/95	12	140	93.331	27.655	0.97864	30.788	41338	15826
WP	5/1/96	12	140	93.707	26.865	0.98028	32.951	41047	15713
Data from logs processed by the methods of Garneau (1995).									
D1, D2, M0, M1, and R defined in that report.									
D500 = estimated depth to 500 mg/L chloride level.									
Cl max = estimated maximum chloride concentration in the Great Bend Prairie aquifer.									
Cl mean = estimated mean chloride concentration in the Great Bend Prairie aquifer.									
At sites 1, 5, 9, and 11, logs do not go to bedrock because of well obstructions.									

D. Aquifer characteristics

AQ_CHAR.XLS

Table 1 in this spreadsheet contains results of all known tests for hydraulic conductivity of the Permian bedrock in the study area, including both field (Kf) and lab (Kp) tests. Table 2 in this spreadsheet contains a less exhaustive summary of the hydrogeologic characteristics of the overlying Great Bend Prairie aquifer. Most of these listings have been reviewed previously by Young (1992) and/or Buddemeier et al. (1994). See Sophocleous et al. (1993) for more information on hydrogeologic properties of the Great Bend Prairie aquifer, including the Arkansas River alluvium.

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TABLE 1: BEDROCK PERMEABILITY DETERMINATIONS

LOCATION	SITE. WELL	SURF ELEV	BR ELEV	SAMPLE ELEV	Kf (ft/day)	Kp (ft/day)	NOTES	REF
23S12W12BAAA	1.1	1827	1681	1681	14.7+			C
23S12W06BBB	5.1	1855	1674	1662	4.9			C
25S13W06BCBC	6.1	1950	1802	1734	0.03			C
					0.04			C
24S13W36DDDD	7.1	1906	1756	1676	0.2			C
					0.5			C
25S12W11AAAD	8.1	1848	1730	1611	0.35			C
24S10W06DCCC	10.1	1790	1634	1630	1			C
					9.4			C
29S14W12ADDD	14.1	1989	1751	1725		.0096+	HORIZ	A
						.017+	VERT	A
28S11W01AAAD	15.1	1725	1597	1590	0.01			C
					0.01			C
				1581		0.0012	HORIZ	A
						0.0002	VERT	A
21S12W31CCCB	16.1	1872	1652	1629	0.01			B
21S12W36DDCC	17.1	1804	1690	1675	0.0037			B
					0.009			C
21S11W07BBBA	18.1	1810	1596	1579	0.006			C
					1.8			B*
25S13W36DCCC	19.1	1902	1902	1902	0.008			C
25S13W31DDAA	20.1	1960	1762	1735		0.0011	HORIZ	A
						0.0002	VERT	A
23S10W06BBAB	25.1	1780	1682	1660		+		A
					0.044			B
23S10W01AAA	26.1	1738	1561	1548	0.29			B*
23S09W01ADAA	27.1	1685	1581	1561		1.197+	HORIZ	A
						0.001	VERT	A
27S12W06BAAB	36.1	1892	1697	1682	+			B
					12			B*
21S12W27DACC	SP	1840	1654	1642	0.139			B
				1637		0.017	HORIZ	A
						0.0038	VERT	A
				1615		0.96	HORIZ	A
						0.65	VERT	A

LOCATION	SITE.	SURF	BR	SAMPLE	Kf	Kp		
	WELL	ELEV	ELEV	ELEV	(ft/day)	(ft/day)	NOTES	REF
23S12W05AADA	WP	1843	1696	1682		0.406		A
						0.337		A
				1673		0.0022		A
						0.003		A
				1665		0.082		A
						0.074		A
22S23W35A	NA				1.4			K
	NA				0.04			K
27S11W30CCDD	NA				0.7		FLOW	G
27S11W31ADDD	NA				0.2			G
27S11W33BBBB	NA				0.7			G
27S12W25ADDA	NA				0.5			G
27S12W25DBBC	NA				0.4			G
(+) MEASUREMENT FAILURE OR SUSPECT VALUE (PROBABLY HIGH)								
SAMPLE ELEV = SCREEN FOR SLUG TEST, CORE DEPTH FOR LAB								
REFS:								
A = P&P RESULTS FROM COMMERCIAL LAB (AVAILABLE ON REQUEST)								
B = BUTLER ET AL. (1993)								
C = COBB ET AL. (1982)								
G = GILLESPIE AND HARGADINE (1993)								
K = KCC (1986)								
B* = UNPUBLISHED SLUG TEST RESULTS FROM BUTLER ET AL. THESE TEST RESULTS								
SHOULD BE CONSIDERED AS LOWER BOUND ESTIMATES OF THE ACTUAL HYDRAULIC								
CONDUCTIVITY OF THE FORMATION IN THE VICINITY OF THE TEST WELL. WELL								
DEVELOPMENT METHODS WERE NOT COMPLETELY SUCCESSFUL AT SEVERAL OF THE								
PERMIAN BEDROCK WELLS. THUS, MANY OF THE TESTS ARE BEING AFFECTED BY A								
LOW-PERMEABILITY SKIN.								

TABLE 2: GREAT BEND PRAIRIE AQUIFER PERMEABILITY DETERMINATIONS								
	SITE.	BR	TEST	Kf	TEST			
LOCATION	WELL	ELEV	ELEV	(ft/day)	TYPE	NOTES	REF	
21S12W31CCCB	16.2	1652	1674	31.6	SLUG		B	
21S12W31CCCB	16.3	1652	1792	56.8	SLUG		B	
27S12W06BAAB	36.2	1697	1701	88.1	SLUG		B	
27S12W06BAAB	36.3	1697	1746	57.9	SLUG		B	
27S12W06BAAB	36.4	1697	1807	10.8	SLUG	7.8-13.8	B	
27S13W21ACA1				155	PUMP		G	
28S11W10A				200	PUMP		G	
28S11W32A				200	PUMP		G	
28S13W26DCB1				200	PUMP		G	
N STAFFORD CO				78	MODEL	MAX	S	
N STAFFORD CO				130	MODEL	MAX	S	
REFS AS IN TABLE 1, S = SOPHOCLEOUS (1992)								

E. Surface water data (flow and quality)

RSC.XLS
NORTFORK.XLS

RSC.XLS

Contains data on flow and chloride concentrations at various stations on Rattlesnake Creek and various tributaries. Data were collected and compiled from various sources by Dan Zehr, GMD5.

RSC.XLS: This workbook contains data on flow and chloride concentrations at various stations on the Rattlesnake Creek and various tributaries.
Data were collected and compiled from various sources by Dan Zehr, GMD5.
Some worksheets have had chloride load columns added, calculated as kg Cl/day:
kg Cl/day = cu.ft./sec. x 1699 = L/min. x mg/L = mg/min. x 1440 min./day = mg/day/1000000mg/kg = kg/day, or 2.45 x cfs x mg Cl/L = kg Cl/day.

No. #	Legal	S-Twn-Rg	RSC Locations Description
1	SESWSW	10-23-13w	25' upstream Wildhorse confluence
2	SWSWSW	2-23-13w	east side of abandond bridge dead-end
3	SESENE	2-23-13w	upstream bridge
3A	SWSWNW	1-23-13w	seep (east of bridge and north of creek
4	NESENE	1-23-13w	upstream bridge (south of WQ Site 5)
5	SESENE	6-23-12w	upstream bridge (blacktop SW Hudson
6	SENENE	5-23-12w	upstream bridge "Witt Site"
7	NWNWNW	1-23-12w	downstream bridge "Stafford Road"
8	SWSWSW	31-22-11w	downstream bridge
9	SWSWNW	33-22-11w	downstream bridge
10	SWSWSW	26-22-11w	downstream bridge "USGS Zenith Gage"
11	NENESE	3-23-12w	upstream bridge
12	SESWSE	1-22-11w	downstream bridge "Quivira Road"
13	NWNWSW	36-21-11w	bridge (upstream of USFW diversion)
14	SWSWSE	23-21-11w	bridge (downstream USFW diversion)
15	SWNWSW	17-21-10w	downstream bridge (Quivira exit)
16	SWNWNW	15-21-10w	bridge "USGS Raymond Gage"
17	NENENW	7-22-11w	upstream bridge (flowing tributary)
18	SESESW	5-22-11w	Artesian Well (north of oil well)
19	NWNWNW	9-22-11w	Artesian Well (along Quivira road)
20	NWSESW	25-22-11w	Little Marsh spillway
21	SESENW	27-21-11w	Big Marsh
22	SESESE	9-23-13w	Wildhorse Creek
23	SWSWNW	18-21-10w	Stafford-Reno county line
24	NE	13-24-14w	bridge (DWR=SE 12-24-14w)
25	SWNENE	13-22-11w	Lake Darrynane spillway
26	SWNWSE	22-21-11w	Salt Creek at Big Marsh
27	NW	11-26-16w	bridge (Edwards County)
28	NWNWSW	27-25-15w	bridge (DWR locality)

29										
30	SESESE	31-24-14W	bridge							
31	NE	13-24-14w	Spring Creek							
32	SESESW	31-23-13w	bridge							
33	NWSWSW	16-25-14w	bridge "USGS Macksville Gage"							
34	NENENE	14-21-10w								
35	NWNWNW	19-21-09w								
36	SWSWNW	32-25-15w	DWR locality							
37	NWSWSW	17-26-16w	DWR locality (Edwards County)							
38	SWNWNW	10-27-17w								

RSC.XLS: See Index Sheet for general information, locations of station numbers, etc.													
Note: the numerical order is chronologic, not geographic													
		Loc #											
Date	Gp ID	cfs	Cl	cfs	Cl	cfs	Cl	cfs	Cl	cfs	Cl	cfs	Cl
		#1	#1	#2	#2	#3	#3	#3A	#3A	#4	#4	#5	#5
10/2/42	KGS					cfs n/a	Cl 400						
10/10/42	KGS												
7/10/44	KGS												
12/19/45	KGS												
11/00/59	DWR												
4/00/60	DWR												
9/28/60	?USGS												
11/2/60	?USGS												
11/00/60	DWR												
4/00/62	DWR												
11/00/62	DWR												
3/00/63	DWR												
11/19/63	Stramel												
7/21/64													
10/26/64	Stramel												
11/10/65	Stramel												
5/19/66	Stramel												
5/26/66	Stramel												
6/4/66	Stramel												
6/6/66	Stramel		Cl 70			cfs n/a	Cl 466						
6/12/66	Stramel												
6/13/66	Stramel												
6/14/66	Stramel												
6/17/66	Stramel												
6/27/66	Stramel												
7/17/66	Stramel												
7/21/66	Stramel												
8/1/66	Stramel												
8/5/66	Stramel												
8/9/66	Stramel												
8/16/66	Stramel		Cl 60										
8/27/66	Stramel		Cl 60										

Date	Gp ID	cfs #6	Cl #6	cfs #7	Cl #7	cfs #8	Cl #8	cfs #9	Cl #9	cfs #10	Cl #10	cfs #11	Cl #11
10/2/42	KGS			cfs n/a	Cl 1220					cfs n/a	Cl 1355		
10/10/42	KGS												
7/10/44	KGS												
12/19/45	KGS												
11/00/59	DWR			cfs 58.87	Cl n/a								
4/00/60	DWR			cfs 70.7	Cl n/a								
9/28/60	?USGS									estcfs 14	Cl 695		
11/2/60	?USGS												
11/00/60	DWR			cfs 46.2	Cl n/a								
4/00/62	DWR			cfs 48.03	Cl n/a								
11/00/62	DWR			cfs 44.82	Cl n/a								
3/00/63	DWR			cfs 40.7	Cl n/a								
11/19/63	Stramel												
7/21/64				cfs 3.92	Cl n/a								
10/26/64	Stramel												
11/10/65	Stramel												
5/19/66	Stramel												
5/26/66	Stramel												
6/4/66	Stramel												
6/6/66	Stramel	cfs n/a	Cl 1195	cfs n/a	Cl 1255								
6/12/66	Stramel												
6/13/66	Stramel												
6/14/66	Stramel												
6/17/66	Stramel												
6/27/66	Stramel												
7/17/66	Stramel												
7/21/66	Stramel												
8/1/66	Stramel												
8/5/66	Stramel												
8/9/66	Stramel												
8/16/66	Stramel												
8/27/66	Stramel												

Date	Gp ID	cfs #12	Cl #12	cfs #13	Cl #13	cfs #14	Cl #14	cfs #15	Cl #15	cfs #16	Cl #16	cfs #17	Cl #17
10/2/42	KGS												
10/10/42	KGS											cfs n/a	Cl 1690
7/10/44	KGS												
12/19/45	KGS												
11/00/59	DWR												
4/00/60	DWR												
9/28/60	?USGS							estcfs 10	Cl 1740				
11/2/60	?USGS												
11/00/60	DWR												
4/00/62	DWR												
11/00/62	DWR												
3/00/63	DWR												
11/19/63	Stramel												
7/21/64													
10/26/64	Stramel												
11/10/65	Stramel												
5/19/66	Stramel												
5/26/66	Stramel												
6/4/66	Stramel												
6/6/66	Stramel												
6/12/66	Stramel												
6/13/66	Stramel												
6/14/66	Stramel												
6/17/66	Stramel												
6/27/66	Stramel												
7/17/66	Stramel												
7/21/66	Stramel												
8/1/66	Stramel												
8/5/66	Stramel												
8/9/66	Stramel												
8/16/66	Stramel												
8/27/66	Stramel												

Date	Gp ID	GPM	Cl	cfs	Cl	cfs	Cl	cfs	Cl	cfs	Cl	cfs	Cl
		#18	#18	#19	#19	#20	#20	#21	#21	#22	#22	#23	#23
10/2/42	KGS					cfs n/a	Cl 1440					cfs n/a	Cl 1810
10/10/42	KGS							cfs n/a	Cl 4060				
7/10/44	KGS							cfs n/a	Cl 5900				
12/19/45	KGS												
11/00/59	DWR					cfs 56.58	Cl n/a						
4/00/60	DWR					cfs 70.33	Cl n/a						
9/28/60	?USGS					estcfs 20	Cl 915						
11/2/60	?USGS												
11/00/60	DWR					cfs 45.8	Cl n/a						
4/00/62	DWR					cfs 47.38	Cl n/a						
11/00/62	DWR					cfs 43.51	Cl n/a						
3/00/63	DWR					cfs *16.3	Cl n/a						
11/19/63	Stramel					cfs 29.1	Cl 515						
7/21/64													
10/26/64	Stramel												
11/10/65	Stramel					cfs 18.9	Cl 970						
5/19/66	Stramel												
5/26/66	Stramel												
6/4/66	Stramel												
6/6/66	Stramel									cfs n/a	Cl 50		
6/12/66	Stramel												
6/13/66	Stramel												
6/14/66	Stramel												
6/17/66	Stramel												
6/27/66	Stramel												
7/17/66	Stramel												
7/21/66	Stramel												
8/1/66	Stramel												
8/5/66	Stramel												
8/9/66	Stramel												
8/16/66	Stramel												
8/27/66	Stramel												

Date	Gp ID	cfs #24	Cl #24	cfs #25	Cl #25	cfs #26	Cl #26	cfs #27	Cl #27	cfs #28	Cl #28	cfs #29	Cl #29
10/2/42	KGS	cfs n/a	Cl 14										
10/10/42	KGS												
7/10/44	KGS												
12/19/45	KGS												
11/00/59	DWR												
4/00/60	DWR												
9/28/60	?USGS			estcfs 20	Cl 1220								
11/2/60	?USGS					estcfs 2	Cl 2740						
11/00/60	DWR												
4/00/62	DWR												
11/00/62	DWR												
3/00/63	DWR												
11/19/63	Stramel												
7/21/64													
10/26/64	Stramel												
11/10/65	Stramel												
5/19/66	Stramel												
5/26/66	Stramel												
6/4/66	Stramel												
6/6/66	Stramel	cfs n/a	Cl 65					cfs n/a	Cl 17	cfs n/a	Cl 17	cfs n/a	Cl 25
6/12/66	Stramel												
6/13/66	Stramel												
6/14/66	Stramel												
6/17/66	Stramel												
6/27/66	Stramel												
7/17/66	Stramel												
7/21/66	Stramel												
8/1/66	Stramel												
8/5/66	Stramel												
8/9/66	Stramel												
8/16/66	Stramel												
8/27/66	Stramel												

Date	Gp ID	cfs #30	Cl #30	cfs #31	Cl #31	cfs #32	Cl #32	cfs #33	Cl #33	cfs #34	Cl #34	cfs #35	Cl #35
10/2/42	KGS												
10/10/42	KGS												
7/10/44	KGS												
12/19/45	KGS											cfs n/a	Cl 1510
11/00/59	DWR												
4/00/60	DWR												
9/28/60	?USGS												
11/2/60	?USGS												
11/00/60	DWR												
4/00/62	DWR												
11/00/62	DWR												
3/00/63	DWR												
11/19/63	Stramel							cfs 26	Cl 17				
7/21/64													
10/26/64	Stramel							cfs 12	Cl 19				
11/10/65	Stramel							cfs 16	Cl 21				
5/19/66	Stramel							cfs n/a	Cl 25				
5/26/66	Stramel							cfs n/a	Cl 30				
6/4/66	Stramel							cfs n/a	Cl 30				
6/6/66	Stramel	cfs n/a	Cl 30	cfs n/a	Cl 242	cfs n/a	Cl 75	cfs	Cl 30				
6/12/66	Stramel							cfs	Cl 35				
6/13/66	Stramel							cfs	Cl 30				
6/14/66	Stramel							cfs	Cl 30				
6/17/66	Stramel							cfs	Cl 30				
6/27/66	Stramel							cfs	Cl 30				
7/17/66	Stramel							cfs	Cl 30				
7/21/66	Stramel							cfs	Cl 25				
8/1/66	Stramel							cfs	Cl 30				
8/5/66	Stramel							cfs	Cl 35				
8/9/66	Stramel							cfs	Cl 40				
8/16/66	Stramel												
8/27/66	Stramel												

Date	Gp ID	cfs #36	Cl #36	cfs #37	Cl #37	cfs #38	Cl #38
10/2/42	KGS						
10/10/42	KGS						
7/10/44	KGS						
12/19/45	KGS						
11/00/59	DWR						
4/00/60	DWR						
9/28/60	?USGS						
11/2/60	?USGS						
11/00/60	DWR						
4/00/62	DWR						
11/00/62	DWR						
3/00/63	DWR						
11/19/63	Stramel						
7/21/64							
10/26/64	Stramel						
11/10/65	Stramel						
5/19/66	Stramel						
5/26/66	Stramel						
6/4/66	Stramel						
6/6/66	Stramel						
6/12/66	Stramel						
6/13/66	Stramel						
6/14/66	Stramel						
6/17/66	Stramel						
6/27/66	Stramel						
7/17/66	Stramel						
7/21/66	Stramel						
8/1/66	Stramel						
8/5/66	Stramel						
8/9/66	Stramel						
8/16/66	Stramel						
8/27/66	Stramel						

		#1	#1	#2	#2	#3	#3	#3A	#3A	#4	#4	#5	#5
9/9/66	Stramel		Cl 40										
10/4/66	Stramel		Cl 80		Cl 155								
10/19/66	Stramel												
10/21/66	Sramel		Cl 75										
11/7/66	DWR												
4/00/71	KGS												
10/18/71	DWR												
10/19/71	DWR												
10/20/71	DWR												
8/31/90	KGS												
3/12/91	KGS												
6/21/91	KGS												
8/30/91	GMD												
9/20/91	KGS												
10/7/91	GMD												
10/18/91	GMD			Flow	Cl 310					Flow	Cl 1460	Flow	Cl 1990
10/27/91	GMD												
4/6/92	GMD	ponded	Cl 80	Flow	Cl 124	Flow	Cl 950			Flow	Cl 1490	cfs 4.86	Cl 1750
7/13/92	GMD	cfs 5.12	Cl 44	Flow	Cl 76	Flow	Cl 496			Flow	Cl 856	cfs 11.12	Cl 1028
10/1/92	GMD	cfs 0.84	Cl 65	Flow	Cl 130	Flow	Cl 975			Flow	Cl 1660	cfs 3.53	Cl 2000
3/26/93	GMD	*Vrlrg flow	Cl 52	Flow	Cl 65	Flow	Cl 276			Flow	Cl 660	cfs 31.89	Cl 790
7/13/93	GMD	*lrg flow	Cl 43	*Lrg flow	Cl 52	*Lrg flow	Cl 235			*Lrg flow	Cl 655	*Lrg flow	Cl 750
10/1/93	GMDWR	cfs 18.41	Cl 38	Flow	Cl 58	Flow	Cl 522			Flow	Cl 950	cfs 25.64	Cl 1220
10/27/93	DWR	cfs 21.6	Cl n/a	Flow	Cl n/a	Flow	Cl n/a			Flow	Cl n/a	cfs 28.0	Cl n/a
11/17/93	GMDWR	cfs 28.6	Cl 38	Flow	Cl n/a	Flow	Cl n/a			Flow	Cl n/a	cfs 39.9	Cl 1060
3/23/94	GMDWR	cfs 26.4	Cl 38	Flow	Cl 63	Flow	Cl 360			Flow	Cl 720	cfs 32.4	Cl 1230
5/18/94	GMDWR	cfs 20.6	Cl 36	Flow	Cl n/a	Flow	Cl n/a			Flow	Cl n/a	cfs 26.16	Cl 1480
7/7/94	GMDWR	cfs 1.17	Cl 65	Flow	Cl 190	Flow	Cl 2980			Flow	Cl 3900	cfs 6.44	Cl 4580
9/21/94	GMDWR	cfs 0.69	Cl 67	Flow	Cl n/a	Flow	Cl n/a			Flow	Cl n/a	cfs 3.53	Cl 2870
9/22/94	GMDWR												
11/9/94	GMDWR	cfs 1.39	Cl 63	Flow	Cl 213	Flow	Cl 1484			Flow	Cl 2330	cfs 6.2	Cl 2710
3/21/95	GMDWR	cfs 7.4	Cl 57	Flow	Cl 76	Flow	Cl 573			Flow	Cl 853	cfs 12.1	Cl 1220
7/11/95	GMDWR	cfs 32.28	Cl 43									cfs 39.21	Cl 680
9/26/95	GMDWR	cfs 2.08	Cl 77		Cl 146		Cl 1350				Cl 1950	cfs 8.34	Cl 2440
12/26/95	GMDWR	cfs 7.30	Cl 51		Cl 116		Cl 740				Cl 1150	cfs 13.00	Cl 1490
3/18/96	GMDWR	cfs 12.90	Cl 50									cfs 19.40	Cl 1020

		#6	#6	#7	#7	#8	#8	#9	#9	#10	#10	#11	#11
9/9/66	Stramel												
10/4/66	Stramel												
10/19/66	Stramel												
10/21/66	Sramel			cfs n/a	Cl 805								
11/7/66	DWR									cfs 15.86	Cl n/a		
4/00/71	KGS												
10/18/71	DWR	cfs 21.33	Cl n/a							cfs 3.5	Cl n/a	cfs 0.16	Cl n/a
10/19/71	DWR											lrg. flow	Cl n/a
10/20/71	DWR											cfs *45.75	Cl n/a
8/31/90	KGS							cfs	*spc 9570				
3/12/91	KGS							cfs	Cl 2220				
6/21/91	KGS							cfs	Cl 2110				
8/30/91	GMD							Sm flow	Cl 4560	No Flow			
9/20/91	KGS							Sm flow	Cl 4820	No Flow			
10/7/91	GMD			No flow				Sm flow	Cl n/a	No Flow			
10/18/91	GMD	Sm flow	Cl 1980	Ponded	Cl 2340								
10/27/91	GMD									Sm flow	Cl n/a		
4/6/92	GMD			cfs 5.25	Cl 1810					cfs* 6.4	Cl 2020		
7/13/92	GMD			cfs 11.95	Cl 900					cfs* 25.0	Cl 1124		
10/1/92	GMD			cfs 2.88	Cl 2090					cfs* 3.8	Cl 2520		
3/26/93	GMD			cfs 34.94	Cl 850					cfs	Cl 1080		
7/13/93	GMD			*Lrg flow	Cl 880					cfs	Cl 930		
10/1/93	GMDWR			cfs 24.29	Cl 1340					Bck water	Cl 1450		
10/27/93	DWR			cfs 29.4	Cl n/a			cfs 29.4	Cl n/a	Bck water	Cl n/a		
11/17/93	GMDWR			cfs 41.6	Cl 1230			cfs 46.5	Cl 1200	Bck water	Cl 1220		
3/23/94	GMDWR			cfs 34.2	Cl 1360			cfs 35.8	Cl 1490	Bck water	Cl 1480		
5/18/94	GMDWR			cfs 30.78	Cl n/a			cfs 27.64	Cl n/a	Bck water	Cl n/a		
7/7/94	GMDWR			cfs 6.49	Cl 4560			cfs 6.57	Cl 4630	cfs 7.06	Cl 4610		
9/21/94	GMDWR	Flow	Cl 2950	cfs 1.3	Cl 3210			cfs 1.4	Cl 3830	cfs 1.3	Cl 3650		
9/22/94	GMDWR												
11/9/94	GMDWR	Flow	Cl 2800	cfs 5.75	Cl 3190			cfs 6.23	Cl 3470	cfs 6.72	Cl 3660		
3/21/95	GMDWR	Flow	Cl 1350	cfs 14.9	Cl 1420			cfs 17.7	Cl 1580	cfs 18.4	Cl 1630		
7/11/95	GMDWR		Cl 720	cfs 37.47	Cl 760			cfs 41.25	Cl 920	cfs 46.18	Cl 890		
9/26/95	GMDWR		Cl 2480	cfs 6.23	Cl 2470			cfs 7.23	Cl 2710	cfs 7.38	Cl 2760		
12/26/95	GMDWR		Cl 1500	cfs 12.80	Cl 1600			cfs 16.40	Cl 1770				
3/18/96	GMDWR			cfs 21.40	Cl 1210			cfs 21.30	Cl 1350	cfs 20.30	Cl 1320		

		#12	#12	#13	#13	#14	#14	#15	#15	#16	#16	#17	#17
9/9/66	Stramel												
10/4/66	Stramel												
10/19/66	Stramel												
10/21/66	Sramel												
11/7/66	DWR	Dry		Dry		Dry		vsml flow	Cl n/a	cfs 1.31	Cl n/a		
4/00/71	KGS							cfs n/a	Cl 1790				
10/18/71	DWR												
10/19/71	DWR												
10/20/71	DWR												
8/31/90	KGS							cfs	spc22300				
3/12/91	KGS							cfs	Cl 7480				
6/21/91	KGS					Dry		cfs	Cl 7920				
8/30/91	GMD												
9/20/91	KGS							Flow	Cl 6170				
10/7/91	GMD												
10/18/91	GMD												
10/27/91	GMD												
4/6/92	GMD	Sm flow	Cl n/a	Sm flow	Cl n/a	Dry		Flow	Cl 7030	cfs* 2.7		*4/30/94	Cl 1650
7/13/92	GMD	Sm flow	Cl n/a	Sm flow	Cl n/a	Dry		Flow	Cl 6900	cfs* 8.8		Flow	Cl 1480
10/1/92	GMD	No flow	Cl n/a	Ponded	Cl n/a	Vsm flow	Cl n/a	Flow	Cl 8200	cfs* 2.2		Flow	Cl 2350
3/26/93	GMD	Flow	Cl n/a	Flow	Cl n/a	Flow	Cl 1070	Flow	Cl 1770	cfs*		Flow	Cl 1520
7/13/93	GMD	Flow	Cl n/a	Flow	Cl n/a	Flow	Cl 1030	Flow	Cl 1580	cfs*		Flow	Cl 1800
10/1/93	GMDWR	Flow	Cl n/a	Flow	Cl n/a	Flow	Cl 1550	Flow	Cl 3960	cfs*		Flow	Cl 2200
10/27/93	DWR									cfs*			
11/17/93	GMDWR									cfs*			
3/23/94	GMDWR	Flow	Cl n/a	Flow	Cl n/a	Flow	Cl 1670	Flow	Cl 2150	cfs*		Flow	Cl 2320
5/18/94	GMDWR									cfs*			
7/7/94	GMDWR					Flow	Cl 3300	Flow	Cl 6250	cfs*		Flow	Cl 3020
9/21/94	GMDWR									cfs*			
9/22/94	GMDWR									cfs*			
11/9/94	GMDWR							Flow	Cl 7070	cfs*		Flow	Cl 2530
3/21/95	GMDWR			Sm flow	Cl n/a	Dry		Flow	Cl 5550	cfs*		Flow	Cl 1780
7/11/95	GMDWR					Flow	Cl 610	Flow	Cl 900			Flow	Cl 1120
9/26/95	GMDWR			flow	Cl 1650	Flow	Cl 1930	Flow	Cl 5780			Flow	Cl 1230
12/26/95	GMDWR			flow	Cl 1800	Flow	Cl 1940	Flow	Cl 6680			Flow	Cl 2690
3/18/96	GMDWR												

		#18	#18	#19	#19	#20	#20	#21	#21	#22	#22	#23	#23
9/9/66	Stramel												
10/4/66	Stramel												
10/19/66	Stramel												
10/21/66	Sramel												
11/7/66	DWR					divrtg all	Cl n/a						
4/00/71	KGS												
10/18/71	DWR												
10/19/71	DWR												
10/20/71	DWR												
8/31/90	KGS					cfs n/a	spc 9020	cfs n/a	spc14460				
3/12/91	KGS					cfs	Cl 2980	cfs	Cl 5250				
6/21/91	KGS					cfs	Cl 2470	cfs	Cl 6020				
8/30/91	GMD												
9/20/91	KGS					Dry							
10/7/91	GMD					Dry			Cl 19700				
10/18/91	GMD												
10/27/91	GMD												
4/6/92	GMD												
7/13/92	GMD		Cl 140										
10/1/92	GMD		Cl 137										
3/26/93	GMD	4.69 GPM	Cl 150										
7/13/93	GMD	6.68 GPM	Cl 157		Cl 83								
10/1/93	GMDWR	7.16 GPM	Cl 151										
10/27/93	DWR									cfs 0.05	Cl n/a		
11/17/93	GMDWR									cfs 0.12	Cl n/a		
3/23/94	GMDWR	6.47 GPM	Cl 159		Cl 82		Flow			cfs 0.16	Cl n/a		
5/18/94	GMDWR												
7/7/94	GMDWR		Cl 167										
9/21/94	GMDWR	6.10 GPM	Cl 165										
9/22/94	GMDWR												
11/9/94	GMDWR												
3/21/95	GMDWR		Cl 159		Cl 82								
7/11/95	GMDWR												
9/26/95	GMDWR												
12/26/95	GMDWR												
3/18/96	GMDWR												

		#24	#24	#25	#25	#26	#26	#27	#27	#28	#28	#29	#29
9/9/66	Stramel												
10/4/66	Stramel												
10/19/66	Stramel												
10/21/66	Sramel	cfs n/a	Cl 75										
11/7/66	DWR												
4/00/71	KGS												
10/18/71	DWR												
10/19/71	DWR												
10/20/71	DWR												
8/31/90	KGS												
3/12/91	KGS												
6/21/91	KGS												
8/30/91	GMD												
9/20/91	KGS												
10/7/91	GMD												
10/18/91	GMD												
10/27/91	GMD												
4/6/92	GMD	Dry											
7/13/92	GMD												
10/1/92	GMD												
3/26/93	GMD												
7/13/93	GMD												
10/1/93	GMDWR												
10/27/93	DWR	cfs 17.3	Cl n/a							cfs 10.5	Cl n/a		
11/17/93	GMDWR	cfs 24.0	Cl n/a							cfs 13.7	Cl n/a		
3/23/94	GMDWR	cfs 19.9	Cl n/a							cfs 10.9	Cl n/a		
5/18/94	GMDWR												
7/7/94	GMDWR												
9/21/94	GMDWR												
9/22/94	GMDWR												
11/9/94	GMDWR	Dry											
3/21/95	GMDWR	cfs 4.6	Cl n/a										
7/11/95	GMDWR												
9/26/95	GMDWR												
12/26/95	GMDWR												
3/18/96	GMDWR												

		#30	#30	#31	#31	#32	#32	#33	#33	#34	#34	#35	#35
9/9/66	Stramel												
10/4/66	Stramel												
10/19/66	Stramel							cfs	Cl 40				
10/21/66	Sramel	cfs n/a	Cl 30	cfs n/a	Cl 185	cfs n/a	Cl 75						
11/7/66	DWR									gage flo ie	Cl n/a		
4/00/71	KGS									cfs n/a	Cl 1780		
10/18/71	DWR												
10/19/71	DWR												
10/20/71	DWR												
8/31/90	KGS												
3/12/91	KGS												
6/21/91	KGS												
8/30/91	GMD												
9/20/91	KGS												
10/7/91	GMD												
10/18/91	GMD												
10/27/91	GMD												
4/6/92	GMD					Ponded		Ponded					
7/13/92	GMD												
10/1/92	GMD												
3/26/93	GMD												
7/13/93	GMD												
10/1/93	GMDWR												
10/27/93	DWR			cfs 0.01		Bck water		cfs 16.2					
11/17/93	GMDWR			cfs 0.23		cfs 25.2		cfs 19.0					
3/23/94	GMDWR			cfs 0.21		cfs 22.2		cfs 17.0					
5/18/94	GMDWR												
7/7/94	GMDWR												
9/21/94	GMDWR												
9/22/94	GMDWR												
11/9/94	GMDWR					cfs 0.05		Bck water					
3/21/95	GMDWR					cfs 4.2		cfs 3.2					
7/11/95	GMDWR					cfs 28.50	Cl 35	cfs 23.79	Cl 30				
9/26/95	GMDWR					cfs 1.61	Cl 43	cfs 4.55	Cl 32				
12/26/95	GMDWR					cfs 4.44	Cl 44	cfs 7.95	Cl 32				
3/18/96	GMDWR					cfs 11.20	Cl 60	cfs 7.29	Cl 32				

		#36	#36	#37	#37	#38	#38
9/9/66	Stramel						
10/4/66	Stramel						
10/19/66	Stramel						
10/21/66	Sramel						
11/7/66	DWR						
4/00/71	KGS						
10/18/71	DWR						
10/19/71	DWR						
10/20/71	DWR						
8/31/90	KGS						
3/12/91	KGS						
6/21/91	KGS						
8/30/91	GMD						
9/20/91	KGS						
10/7/91	GMD						
10/18/91	GMD						
10/27/91	GMD						
4/6/92	GMD						
7/13/92	GMD						
10/1/92	GMD						
3/26/93	GMD						
7/13/93	GMD						
10/1/93	GMDWR						
10/27/93	DWR						
11/17/93	GMDWR						
3/23/94	GMDWR						
5/18/94	GMDWR						
7/7/94	GMDWR						
9/21/94	GMDWR						
9/22/94	GMDWR						
11/9/94	GMDWR						
3/21/95	GMDWR						
7/11/95	GMDWR						
9/26/95	GMDWR						
12/26/95	GMDWR						
3/18/96	GMDWR						

RSC.XLS: "Load" sites-- upstream to downstream									
This worksheet contains only those site records in which at least some concurrent flow and Cl concentrations									
Loc #	#33	#33	#32	#32	#1	#1	#5	#5	#9
Date	cfs	Cl	cfs	Cl	cfs	Cl	cfs	Cl	cfs
9/28/60									
11/2/60									
11/19/63	26	17							
7/21/64									
10/26/64	12	19							
11/10/65	16	21							
4/6/92	P		P		p	80	4.86	1750	
7/13/92					5.12	44	11.12	1028	
10/1/92					0.84	65	3.53	2000	
3/26/93					VL	52	31.89	790	
7/13/93					L	43	L	750	
10/1/93					18.41	38	25.64	1220	
10/27/93	16.2		B		21.6	n/a	28	n/a	29.4
11/17/93	19		25.2		28.6	38	39.9	1060	46.5
3/23/94	17		22.2		26.4	38	32.4	1230	35.8
5/18/94					20.6	36	26.16	1480	27.64
7/7/94					1.17	65	6.44	4580	6.57
9/21/94					0.69	67	3.53	2870	1.4
11/9/94	B		0.05		1.39	63	6.2	2710	6.23
3/21/95	3.2		4.2		7.4	57	12.1	1220	17.7
7/11/95	23.79	30	28.5	35	32.28	43	39.21	680	41.25
9/26/95	4.55	32	1.61	43	2.08	77	8.34	2440	7.23
12/26/95	7.95	32	4.44	44	7.3	51	13	1490	16.4
3/18/96	7.29	32	11.2	60	12.9	50	19.4	1020	21.3
Notes:	p=ponded								
	L=large								
	VL=very large								
	B=backwater								
	f=flowing								
	n/a=not analyzed								
	bold #=estimated								

vere recorded								
#9	#10	#10	#20	#20	#25	#25	#15	#15
Cl	cfs	Cl	cfs	Cl	cfs	Cl	cfs	Cl
	14	695	20	915	20	1220	10	Cl 1740
			29.1	515				
			18.9	970				
	6.4	2020					Flow	7030
	25	1124					Flow	6900
	3.8	2520					Flow	8200
		1080					Flow	1770
		930					Flow	1580
	B	1450					Flow	3960
n/a	B	n/a						
1200	B	1220						
1490	B	1480		F			Flow	2150
n/a	B	n/a						
4630	7.06	4610					Flow	6250
3830	1.3	3650						
3470	6.72	3660					Flow	7070
1580	18.4	1630					Flow	5550
920	46.18	890					Flow	900
2710	7.38	2760					Flow	5780
1770							Flow	6680
1350	20.3	1320						

NORTFORK.XLS

Contains data on flow and chloride concentrations at various stations on the North Fork of the Ninnescah River and various tributaries. Data were collected and compiled from various sources by Dan Zehr, GMD5.

NORTFORK.XLS: This workbook contains data on flow and chloride concentrations at various stations on the North Fork of the Ninnescah River and various tributaries, Red Rock, Goose, and Silver Creeks.
Data were collected and compiled from various sources by Dan Zehr, GMD5.
Some worksheets have had chloride load columns added, calculated as kg Cl/day:
kg Cl/day = cu.ft./sec. x 1699 = L/min. x mg/L = mg/min. x 1440 min./day = mg/day/1000000mg/kg = kg/day, or 2.45 x cfs x mg Cl/L = kg Cl/day.

No #	Legal	Sec-T & R	USGS #	Name	Description	12/1/94		2/2/95		3/29/95		9/7/95	
						cfs	ml/g - cl	cfs	mg/l - cl	cfs	mg/l - cl	cfs	mg/l - cl
1	NESENE	13-25-12		Stafford	100 ft. upstream bridge	1.18	313	3.20	232	2.81	234	0.2807	no sample
2	SESESE	35-24-11		Zenith	upstream bridge	5.92	366	10.26	281	11.40	280	1.9843	
3	NWNWNW	27-24-10	7144590	Sylvia	200 ft downstream bridge	12.59	392	20.79	320	22.30	318	5.8976	
4	NENESE	17-24-9		Plevna	upstream bridge	20.67	310	41.37	273	34.67	288	10.83	
5	NWNWNW	30-24-8		Kanza Rd	downstream bridge	24.80	265	45.47	252	43.25	264	16.985	
6	NWNWSW	2-25-8		at Arling	downstream bridge	32.57	245	49.11	213	61.54	230	17.4	
7	NENENE	26-25-8	7144620	So Arling	above confluence w/ Silver Ck	36.71	237	55.62	224	69.61	220	18.2	
8	SESWSE	25-25-8		GMD 1.25	below confluence w/ Silver Ck	49.20	271	80.30	285	123.05	265	21.3	
9	NWSWNW	22-25-7		GMD 2	at Partridge road	47.70	282	83.20		127.30	248	21	
10	NWSWNW	20-25-6		GMD 3	at Whiteside road	52.70	270	87.60	259	133.55	250	21.2	
11	SWNESW	25-25-6	7144780	Cheney	upstream Cheney gage	55.33							
12	SESENE	7-26-9	7144640	Silver west	upstream bridge	4.11	657	6.33	565	13.66	428	0.1392	
13	NESESE	28-25-8	7144660	Silver east	bridge at K14	9.26	505	17.36	443	38.72	342	0.83455	
14	NENENE	4-26-8	7144680	Goose	bridge at K14	1.63	172	3.89	153	7.95	138	1.5349	
15	SWNWSW	5-25-6	7144740	GMD 1	Red Rock, downstream bridge	1.41	43	1.88	32	7.45	44	0.74	
SF 1		27-27-11 DDD		South Fork Ninnescah 2 mi. W of Dist. Boundary; 100' upstream.									
CC 1		12-20-9 B		Cow Creek @ entrance to District; 60' downstream.									
CC 2		23-20-8 A		Cow Creek SE of Lyons; 150' upstream from N-S bridge.									
CC 3		25-21-7 D		Cow Creek @ exit from District; 200' upstream.									

See Index Sheet for general information							
NF Ninnescah @ Stafford Rd.				Notes		NESENE 13-25-12	
Date	CFS	Velocity (Av	Width	Cl-	kgCl-/da	Comments	
12/3/98	1.18	0.283	8.5	313	906		
2/3/99	3.20	0.681	7.5	232	1817		
3/30/99	2.81	0.698	10	234	1611		
See Index Sheet for general information							
NF Ninnescah @ Zenith Rd.				Notes		SESESE 35-24-11	
Date	CFS	Velocity (Av	Width	Cl-	kgCl-/da	Comments	
12/2/98	5.92	0.581	19	366	5312		
2/3/99	10.26	0.9	19.5	281	7066		
3/30/99	11.40	0.798	23.6	280	7820		
See Index Sheet for general information							
NF Ninnescah SW of Plevna				Notes		NENESE 17-24-9	
Date	CFS	Velocity (Av	Width	Cl-	kgCl-/da	Comments	
12/2/98	20.67	1.10	23.7	310	15698.865		
2/3/99	41.37	1.38	23.5	273	27666.9803		
3/30/99	34.67	1.21	27	288	24461.8466		
See Index Sheet for general information							
NF Ninnescah SW of Abbyville				Notes		NWNWNW 30-24-8	
Date	CFS	Velocity (Av	Width	Cl-	kgCl-/da	Comments	
7/22/98	29.25						
8/19/98	19.99						
9/22/98	13.49						
10/21/98	9.88						
12/2/98	24.80	0.89	40.5	265	16101.4		
2/3/99	45.47	1.26	42	252	28073.178		
3/30/99	43.25	1.109	53.5	264	27972.5477		
See Index Sheet for general information							
NF Ninnescah at Arlington				Notes		NWNWSW 2-25-8	
Date	CFS	Velocity (Av	Width	Cl-	kgCl-/da	Comments	
12/2/98	32.57	1.12	38.5	245	19550.1425		
2/3/99	49.11	1.5	36	213	25628.0535		
3/30/99	61.54	1.36	55	230	34677.79		

See Index Sheet for general information							
NF Ninnescah Nr. Arlington				Notes		SESWSE 25-25-8	
Date	CFS	Velocity (Av	Width	Cl-	kgCl-/da	Comments	
12/2/98	49.20	1	116	271	32666.34		
2/3/99	80.30	1.16	130	285	56069.475		
3/30/99	123.05	1.44	146	265	79890.2125		
See Index Sheet for general information							
NF Ninnescah @ Partridge Rd.				Notes		NWSWNW 22-25-7	
Date	CFS	Velocity (Av	Width	Cl-	kgCl-/da	Comments	
12/2/98	47.70	1.05	87	282	32955.93		
2/3/99	83.20	1.39	81				
3/30/99	127.30	1.347	86	248	77347.48		
See Index Sheet for general information							
NF Ninnescah @ Whiteside Rd.				Notes		NWSWNW 20-25-6	
Date	CFS	Velocity (Av	Width	Cl-	kgCl-/da	Comments	
12/2/98	52.70	1.1	89	270	34861.05		
2/3/99	87.60	1.19	137	259	55586.58		
3/30/99	133.55	1.28	143	250	81799.375		
See Index Sheet for general information							
NF Ninnescah above Cheney				Notes	SWNESW 25-25-6		USGS 07144780
Date	CFS	Velocity (Av	Width	Cl-	Comments		
12/2/98	55.33	0.89	113				

See Index Sheet for general information							
NF Ninnescah @ Sylvia Rd.							NWNWNW 27-24-10 USGS 07144590
Date	J. Date	CFS	Cl-	kgCl-/da	SpCon	Lab Spc	Comments
3/14/68	68073	13.00	340	10829	1540		
6/17/69	69168	1.50	320	1176	1500		
3/20/70	70079	32.00	290	22736	1450		
9/9/71	71252	1.90	450	2094.75	1950		
12/17/71	71351	14.00	370	12691	1710		
3/3/72	72062	12.00	350	10290	1630		
6/6/72	72157	6.10	430	6426.35	1840		
8/8/72	72220	5.40	450	5953.5	1850		
2/15/73	73046	5.30	300	3895.5	1450		
12/14/73	73348	40.00	240	23520	1250		
2/8/74	74039	40.00	330	32340	1510		
7/2/74	74183	9.20	440	9917.6	1920		
10/4/74	74277	12.00	400	11760	1840		
12/3/74	74337	20.00	360	17640	1680		
2/7/75	75038	30.00	320	23520	1530		
5/1/75	75121	15.00	340	12495	1590		
8/11/75	75223	49.00	490	58824.5	2000		
10/8/75	75281	5.90	470	6793.85	2040		
8/10/76	76222	5.80	450	6394.5	1830		
4/14/77	77104	19.00	350	16292.5	1590		
8/1/78	78213		470		1750		
8/9/78	78221	5.70	460	6423.9	1680		
11/1/78	78305	6.10	420	6276.9	1620		
9/13/79	79256	4.90	450	5402.25	1870		
12/11/79	79345	24.00	340	19992	1630		
9/12/80	80255	6.90					
11/7/80	80311	10.00	430	10535			
8/25/82	82237	7.40	460	8339.8		1720	
12/8/82	82342	12.00	370	10878			
8/31/83	83243	3.60	460	4057.2		1730	
12/14/83	83348	16.00	340	13328		1530	
9/25/84	84268	4.40	470	5066.6	1830	1960	
3/13/85	85072	19.00	300	13965	1170	1490	
5/29/85	85149	13.00	350	11147.5	1480	1600	
6/24/85	85175	11.00	340	9163	1500	1560	
8/6/85	85218	12.00	370	10878	1590	1630	
9/4/85	85247	4.40	440	4743.2	1840	1810	
12/4/85	85338	19.00	340	15827	1780	1640	
2/20/86	86051	22.00	270	14553	1410	1380	
6/24/86	86175	13.00	330	10510.5	1710	1550	
8/6/86	86218	12.00	390	11466	1420	1670	
10/23/86	86296	53.00	200	25970	1170	969	
2/11/87	87042	24.00	280	16464	1060	1390	
5/5/87	87125	71.00	210	36529.5	1140	1160	
8/10/87	87222	21.00	240	12348	1190	1530	
12/9/87	87343	27.10	360	23902.2	1660	1460	
2/29/88	88059	34.10	250	20886.3	1340		
6/23/88	88174	9.34	390	8924.37	1810		
12/1/94	94335	12.59	392	12088.6			
2/2/95	95033	20.79	320	16295.4			
3/29/95	95088	22.30	318	17373.9			

See Index Sheet for general information							
NF Ninnescah Nr. Arlington							NENENE 26-25-8 USGS 07144620
Date	J. Date	CFS	Cl-	kgCl-/da	SpCon	Lab SpC	Comments
12/17/71	71351	41.00	260	26117	1330		
3/2/72	72062	34.00	250	20825	1250		
6/6/72	72157	16.00	270	10584	1220		
8/8/72	72220	17.00	260	10829	1140		
2/15/73	73046	53.00	220	28567	1190		
12/15/73	73349	83.00	210	42704	1130		
7/2/74	74183	21.00	260	13377	1230		
10/4/74	74277	28.00	260	17836	1280		
12/4/74	74338	50.00	250	30625	1280		
2/12/75	75043	68.00	240	39984	1250		
5/1/75	75121	41.00	230	23104	1190		
8/12/75	75224	9.70	250	5941.3	1190		
10/8/75	75281	15.00	260	9555	1280		
8/11/76	76223	12.00	260	7644	1190		
4/14/77	77104	49.00	220	26411	1140		
8/2/78	78214		240		1020		
8/9/78	78221	15.00	260	9555	1080		
10/31/78	78304	25.00	260	15925	1120		
9/13/79	79256	13.00	240	7644	1070		
12/12/79	79346	54.00	230	30429	1250		
9/12/80	80255	20.00	250	12250			
11/7/80	80311	30.00	240	17640			
8/25/82	82237	2.30	230	1296.1		1030	
12/8/82	82342	36.00	240	21168			
8/31/83	83243	14.00	210	7203		923	
12/14/83	83348	46.00	240	27048		1160	
9/25/84	84268	13.00	320	10192	1290	1410	
3/13/85	85072	52.00	220	28028	1050	1150	
5/29/85	85149	36.00	250	22050	1150	1190	
6/24/85	85175	28.00	250	17150	1090	1120	
8/6/85	85218	33.00			1150		
9/4/85	85247	15.00	220	8085	957	1010	
11/21/85	85325	57.00	220	30723	1220	1220	
2/20/86	86051	56.00	210	28812	1170	1150	
6/25/86	86176	35.00	230	19723	1130	1030	
8/6/86	86218	37.00	220	19943		1020	
10/22/86	86295	66.00	160	25872	1040	920	
2/11/87	87042	61.00	210	31385	1320	1080	
5/5/87	87125	182.00	140	62426	898	908	
8/11/87	87223	36.00	240	21168	1100	1490	
12/8/87	87342	62.20	220	33526	1260	1210	
3/1/88	88060	65.80	210	33854	1220		
6/23/88	88174	21.10	260	13441	1040		
8/30/88	88242	17.20	240	10114	1110		
12/19/88	88353	17.30	250	10596	1310		
3/29/89	89088	51.20	240	30106	1360		
6/20/89	89171	41.30	160	16190	1090		
9/26/89	89269	40.60	220	21883	1280		
12/13/89	89347	53.50	250	32769	660		
3/29/90	90088	62.80	78	12001	1160		
6/21/90	90172	24.30	260	15479	1190		
9/7/90	90250	16.80	200	8232	1010		
11/29/90	90333	34.50	28	2366.7	784		

3/5/91	91064	37.70	220	20320	1100		
6/19/91	91170	25.30	240	14876	1060		
9/3/91	91246	20.70	230	11664	993		
12/4/91	91338	27.10	250	16599	1260		
3/4/92	92063	44.90	200	22001	1020		
5/19/92	92139	31.80	240	18698	1220		
12/1/94	94335	36.71	237	21313			
2/2/95	95033	55.62	224	30523			
3/29/95	95088	69.61	220	37520			

See Index Sheet for general information							
Red Rock Creek @ Whiteside Rd.							SWNWSW 5-25-6 USGS 07144740
Date	J. Date	CFS	Cl-	kgCl-/da	SpCon	Lab SpC	Comments
9/9/71	71252	0.05	25	3	600		
12/17/71	71351	1.80	48	212	720		
3/3/72	72062	1.30	47	150	620		
6/6/72	72157	0.13	43	14	680		
2/15/73	73046	4.60	58	654	800		
12/14/73	73348	5.00	46	564	740		
2/7/74	74038	3.40	50	417	670		
7/2/74	74183	0.94	36	83	650		
10/4/74	74277	0.93	38	87	670		
12/3/74	74337	2.00	47	230	700		
2/7/75	75038	4.70	48	553	700		
5/1/75	75121	2.70	48	318	740		
8/12/75	75224	0.49	33	40	690		
10/8/75	75281	5.30	36	467	610		
8/11/76	76223	0.28	30	21	630		
4/14/77	77104	4.40	51	550	710		
8/2/78	78214		36		550		
8/9/78	78221	0.64	36	56	500		
10/31/78	78304	0.75	38	70	580		
9/13/79	79256	0.60	34	50	600		
12/12/79	79346	4.80	45	529	780		
9/12/80	80255	0.72	34	60			
11/13/80	80317	1.40	38	130			
9/14/81	81257	1.10					
12/1/94	94335	1.41	43	149			
2/2/95	95033	1.88	32	147			
3/29/95	95088	7.45	44	803			

See Index Sheet for general information							
Goose Creek @ K-14							NENENE 4-26-8 USGS 07144680
Date	J. Date	CFS	Cl-	kgCl-/d	SpCon	Lab SpC	Comments
9/9/71	71252	0.08	1400	274	5080		
12/17/71	71351	3.50	190	1629	1090		
3/2/72	72033	3.00	170	1250	980		
6/6/72	72157	0.60	260	382	1290		
8/8/72	72220	0.89	170	371	1000		
2/15/73	73046	6.30	250	3859	1340		
12/15/73	73349	9.90	190	4608	1100		
2/8/74	74039	7.70	190	3584	1120		
7/2/74	74183	2.00	170	833	1040		
10/4/74	74277	2.20	150	809	910		
12/4/74	74338	4.70	160	1842	1010		
2/11/75	75042	8.30	170	3457	1020		
5/1/75	75121	5.00	190	2328	1140		
8/12/75	75224	0.93	390	889	1850		
10/8/75	75281	1.00	210	515	1070		
8/11/76	76223	0.73	360	644	1650		
4/13/77	77103	4.10	140	1406	880		
8/1/78	78213		290		1290		
8/9/78	78221	0.63	270	417	1150		
11/1/78	78305	1.50	170	625	860		
9/13/79	79256	0.77	210	396	1090		
12/12/79	79346	8.80	200	4312	1190		
9/12/80	80255	0.23	330	186			
11/12/80	80315	2.10	140	720			
9/14/81	81257	1.10					
12/1/94	94335	1.63	172	686			
2/2/95	95033	3.89	153	1457			
3/29/95	95088	7.95	138	2690			

See Index Sheet for general information								
Silver Creek SW of Langdon							SESENE 7-26-9 USGS 07144640	
Date	J. Date	CFS	Cl-	kgCl-/d	SpCon	Lab SpC		
9/9/71	71252	0.10	340	83	1600			
12/17/71	71351	7.70	640	12074	2600			
3/2/72	72061	4.40	580	6252	2320			
6/6/72	72157	1.50	580	2132	2400			
8/8/72	72220	0.79	520	1006	2040			
2/15/73	73046	7.50	470	8636	2000			
12/15/73	73349	14.00	370	12691	1680			
2/8/74	74039	9.50	370	8612	1710			
7/2/74	74183	1.00	380	931	1530			
10/4/74	74277	3.10	480	3646	2020			
12/4/74	74338	8.10	460	9129	2110			
2/10/75	75041	15.00	410	15068	1760			
5/1/75	75121	5.80	420	5968	1890			
8/12/75	75224	0.27	400	265	1750			
10/8/75	75281	1.10	570	1536	2240			
8/11/76	76223	0.92	390	879	1700			
4/13/77	77103	10.00	590	14455	2420			
8/1/78	78213		370		1410			
8/9/78	78221	0.52	400	510	1410			
11/1/78	78305	2.40	550	3234	1950			
9/12/79	79255	0.11	320	86	1380			
12/13/79	79347	10.00	390	9555	1790			
9/12/80	80255	0.30	410	301				
11/12/80	80316	3.50	570	4888				
8/26/82	82238	2.30	570	3212		2060		
12/9/82	82343	6.40	530	8310				
9/1/83	83244	0.80	460	902		1730		
12/15/83	83349	4.80	560	6586		2180		
9/25/84	84268	0.55	390	526	1680	1690		
3/13/85	85072	13.00	400	12740	1620	1800		
5/28/85	85148	5.50	430	5794	1580	1760		
6/24/85	85175	3.70	420	3807	1740	1810		
8/6/85	85218	8.90	380	8286	1580	1690		
9/4/85	85247	0.95	400	931	1650	1590		
11/21/85	85325	12.00	430	12642		1930		
2/19/86	86050	14.00	390	13377	1820	1820		
6/26/86	86177	3.10	440	3342	1770	1900		
8/6/86	86218	1.40	470	1612	1790	1900		
10/22/86	86295	32.00	350	27440	1660	1580		
2/11/87	87042	12.00	410	12054	2230	1820		
5/4/87	87124	9.40	340	7830	1640	1640		
8/11/87	87223	2.30	290	1634	1330	1660		
12/8/87	87342	11.00	480	12936	1940	1910		
3/1/88	88060	10.00	370	9065	1930			
6/23/88	88174	1.30	410	1306	1680			
8/30/88	88242	0.89	520	1134	2040			
12/19/88	88353	5.10	600	7497	2610			
3/29/89	89088	17.00	640	26656	2670			
6/21/89	89172	4.90	260	3121	2110			
9/26/89	89269	4.60	460	5184	2250			
12/13/89	89347	9.00	500	11025	1150			
3/28/90	90087	10.00	81	1985	1980			
6/20/90	90171	5.00	130	1593	2080			

9/7/90	90250	0.06	430	63	1260			
12/1/94	94335	4.11	657	6616				
2/2/95	95033	6.33	565	8762				
3/29/95	95088.00	13.66	428	14321				

Silver Creek @ K-14						NESESE 28-25-8 USGS 07144660
See Index Sheet for general information						
Date	J. Date	CFS	Cl-	kgCl-/d	SpCon	Comments
12/17/71	71351	19.00	520	24206	2280	
3/2/72	72061	13.00	490	15607	2090	
6/6/72	72157	3.90	520	4968.6	2170	
8/8/72	72220	2.80	510	3498.6	2090	
2/15/73	73046	27.00	410	27122	1890	
12/15/73	73349	35.00	330	28298	1540	
2/8/74	74039	28.00	330	22638	1580	
7/2/74	74183	2.80	390	2675.4	1760	
10/4/74	74277	4.90	450	5402.3	1910	
12/4/74	74338	18.00	390	17199	1800	
2/12/75	75043	38.00	370	34447	1630	
5/1/75	75121	15.00	380	13965	1730	
8/12/75	75224	0.43	390	410.87	1850	
10/8/75	75281	1.90	500	2327.5	2040	
8/11/76	76223	1.90	450	2094.8	1980	
4/14/77	77104	27.00	430	28445	1890	
8/1/78	78213		370		1590	
8/9/78	78221	8.30	390	7930.7	1510	
11/1/78	78305	4.60	470	5296.9	1680	
9/13/79	79256	0.18	400	176.4	1690	
12/12/79	79346	32.00	340	26656	1680	
9/12/80	80255	0.57	450	628.43		
11/12/80	80316	6.10	490	7323.1		
9/15/81	81258	8.60				
12/1/94	94335	9.26	505	11461		
2/2/95	95033	17.36	443	18837		
3/29/95	95088	38.72	342	32447		