COOK COMPOSITES AND POLYMERS
• *Imagination* • *Innovation*

February 1, 1996

Mr. Tim Mulholland
Wisconsin Department of Natural Resources
Bureau of Solid Waste Management
P.O. Box 7921
101 South Webster Street
Madison, WI 53707-7921

HW/GWM
246004330

RE: 1995 ANNUAL GROUNDWATER RESULTS

Dear Tim:

Enclosed are two copies of the 1995 Annual Groundwater Report for Cook Composites and Polymers Co.'s (CCP's) Saukville facility. The report presents a summary of the analytical data collected during the four quarterly sampling events conducted at CCP in 1995, and provides an evaluation of water level and groundwater quality trends at the site. The data indicate that the remedial systems currently operating at CCP are effectively preventing groundwater contamination from migrating off-site. Volatile organic compound (VOC) concentration trends over the past 6 years suggest that the contamination is diminishing near the site boundaries and is being removed via the extraction wells and collection systems.

If you have any questions concerning this annual report, please contact me at (816) 391-6025.

Sincerely,
Cook Composites and Polymers Co.
Craig R. Bostwick
Craig R. Bostwick
Director Environmental Regulatory Safety

Enclosures

cc: Ms. Laura Lodisio - USEPA (2 copies)
Mr. Franklin Shultz - WDNR SE District (2 copies)
Mr. Christopher Lear - Village of Saukville (1 copy)
Mr. Eric Naimark - CCP, Saukville (1 copy)
Mr. James Rickun, RMT

CCP
P.O. Box 419389 Kansas City, MO 64141-6389
(816) 391-6000 Fax: (816) 391-6337

1995 ANNUAL REPORT

PREPARED FOR
COOK COMPOSITES AND POLYMERS
SAUKVILLE, WISCONSIN

PREPARED BY
RMT, INC.
MADISON, WISCONSIN

FEBRUARY 1996

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EXECUTIVE SUMMARY

Temporal trends in groundwater chemistry show that levels of Volatile Organic Compounds (VOCs) persist in groundwater in the glacial deposits and shallow dolomite at concentrations on the order of tens of thousands of μg/L. The persistent high levels of VOCs in groundwater suggest that light nonaqueous phase liquids (LNAPLS[1]) are present in the glacial deposits and shallow subsurface. The residual sources of contamination continue to leach VOCs into groundwater in the glacial deposits and in the shallow dolomite. However, VOC concentrations in the deep aquifer have decreased by two orders of magnitude since the groundwater extraction system was brought on-line 8 years ago, and continue to remain very low to nondetectable.

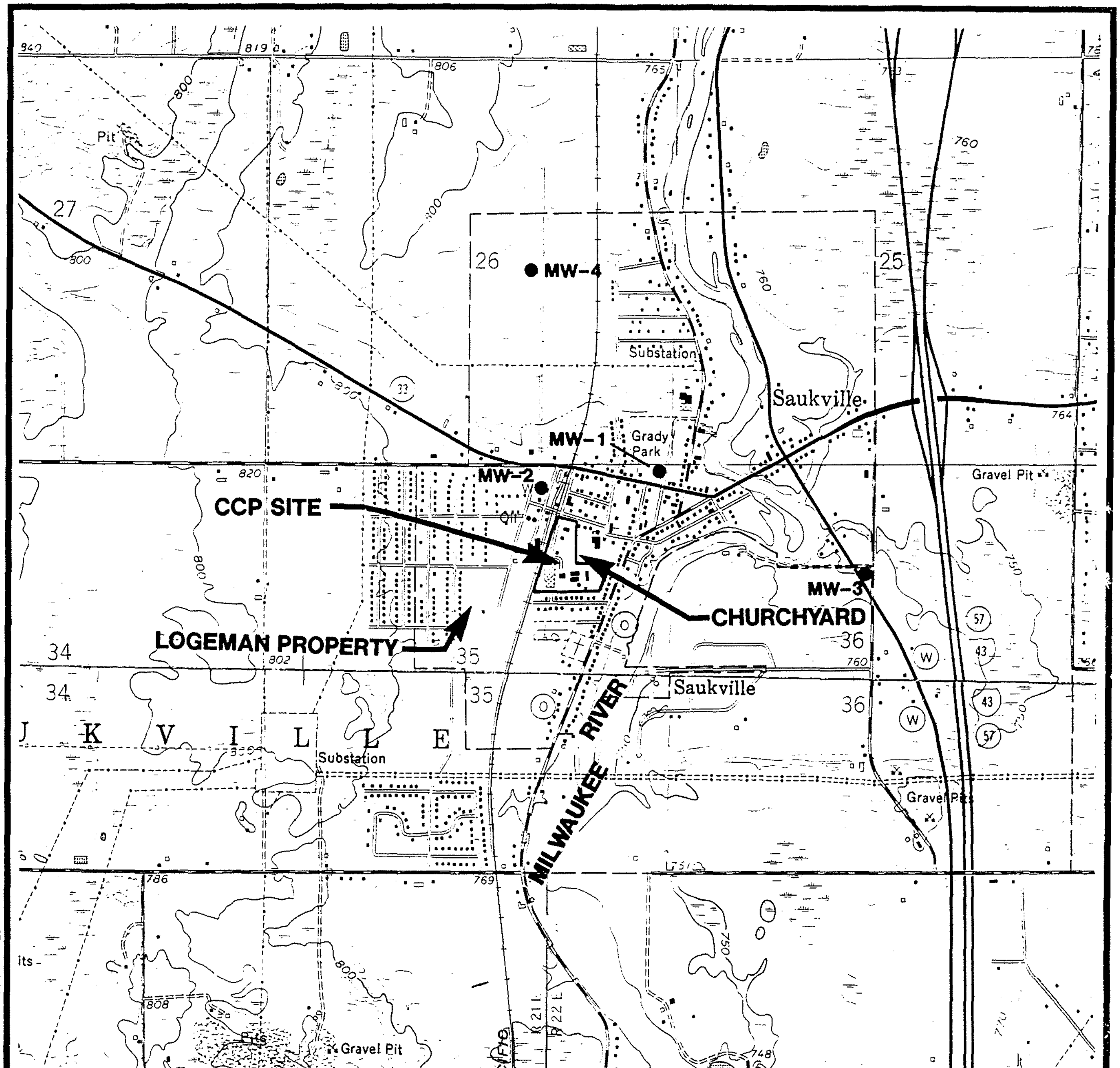
The groundwater extraction system minimizes vertical (downward) migration of contaminants from the glacial drift and shallow dolomite to the deep dolomite because continuous groundwater extraction has created dewatered zones in the glacial drift and shallow dolomite beneath the CCP property. Even though elevated concentrations of VOCs persist in groundwater beneath the facility, off-site migration of contaminants is being effectively controlled by the groundwater recovery systems in the glacial drift, shallow dolomite and deep dolomite aquifer.

1 LNAPLS are liquids with a density less than water and that are immiscible in water, i.e., petroleum products.

Section 1
INTRODUCTION

CCP operates a plant where alkyd, polyester and urethane resins are manufactured in Saukville, Wisconsin (Figure 1). Prior to 1991, the plant was owned and operated by Freeman Chemical Corporation.

In compliance with the 1987 Corrective Action Order on Consent (CAO) V-W-88-R-002, Freeman Chemical Corporation undertook interim corrective measures for groundwater contamination at their Saukville facility. The interim measures included installation of a groundwater remediation system and development of a groundwater monitoring program. The groundwater recovery system is discussed in detail in the RCRA Facility Investigation (RFI) report (RMT, 1995). In accordance with the Wisconsin Department of Natural Resources (WDNR) requirement to include analysis for parameters detected during Appendix IX monitoring conducted as part of the RFI (WDNR, 1995d), CCP completed four rounds of groundwater sampling and analysis in 1995. These rounds included January (winter), April (spring), July (summer), and October (fall) sampling events. The summer event comprised the annual sampling event. RMT, Inc. (RMT), in Madison, Wisconsin, conducted the groundwater sampling for the 1995 quarterly monitoring events. The groundwater samples were analyzed at RMT, Inc., Laboratories in Madison, Wisconsin. The field data and results of chemical analyses of groundwater were compiled by RMT, and were submitted in quarterly reports by CCP to the USEPA Region V and the WDNR. Volatile organic compound (VOC) exceedances of Wisconsin Administrative Code NR 140 Preventive Action Limits (PALs) or Enforcement Standards (ESs) were reported quarterly by CCP in accordance with NR 508. This report was prepared to summarize the results of groundwater monitoring over the last year.



STATE LOCATION

N

0 2000 4000

SCALE: 1" =2000'

SOURCE: BASE MAP FROM PORT WASHINGTON WEST AND CEDARBURG, WISCONSIN USGS QUADRANGLES.

SITE LOCATION, MUNICIPAL WELLS, AND OFF SITE AREAS OF CONCERN

COOK COMPOSITES AND POLYMERS
SAUKVILLE, WISCONSIN

RMT INC.

DWN. BY:	JRW
APPROVED BY:	ELM
DATE:	JANUARY 1996
PROJ. #	1832.91
FILE #	18329101.DWG

FIGURE 1

PLOT DATA
Drawing Name: J:\01832\91\18329101.DWG
Operator Name: JRW
Scale: 1"=2000'
Dwg Size: 28417 Bytes
Plot Date: Wednesday, January 24, 1996
Plot Time: 07:20.5008 AM
Attached Xref's: No xref's Attached.

Section 2

PURPOSE AND SCOPE

This document presents a summary of the data collected during the four quarterly groundwater sampling events that were conducted at CCP in 1995, and provides an evaluation of water level and groundwater quality trends at the site. Since the water quality data have been submitted to the USEPA and the WDNR in the quarterly reports, they will not be reproduced in this document.

The scope of this report includes the following:

- A summary of water levels that were measured in on-site monitoring wells in 1995, and potentiometric surface maps of the glacial drift and shallow dolomite hydrogeologic units
- An evaluation of groundwater flow directions in the glacial drift and shallow dolomite hydrogeologic units, and the effects of groundwater extraction on these patterns of groundwater flow
- A summary of the site groundwater monitoring program and the quarterly total VOC concentrations by well
- Isoconcentration maps for total VOCs in groundwater in the glacial drift and shallow dolomite wells
- Time-concentration plots of total VOCs in groundwater in selected wells
- An evaluation of the trends in groundwater quality for each monitoring well group for 1995
- An evaluation of the effectiveness of plume containment by on-site groundwater extraction, based on groundwater flow and quality data

Section 3
SUMMARY OF RESULTS

3.1 Groundwater Monitoring Program Summary

The groundwater monitoring program at the CCP Saukville site includes 44 monitoring points composed of: 20 glacial drift wells, 12 shallow dolomite wells, six deep dolomite wells, three Ranney collectors (essentially French drains), and 3 publicly owned treatment works (POTW) sampling points. The monitoring points are grouped according to four sampling objectives: receptor, perimeter, remediation progress, and groundwater elevation monitoring. The organization of wells by monitoring objective is presented in Table 1.

Receptor points include four municipal water supply wells (MW-1 through MW-4); POTW influent, effluent, and sludge monitoring points; and the Ranney collectors (RC-1, RC-2, and RC-3). The Ranney collectors are monitored because they discharge to the sanitary sewer and yield a portion of the data needed to estimate VOC extraction rates in groundwater. Perimeter points are monitoring wells on- and off-site that are located at or beyond the edge of the VOC plume. These wells provide the necessary information to define the lateral extent of the plume. Remediation progress points are monitoring wells that are located within the VOC plume. These wells provide information concerning the effectiveness of the on-site remedial systems. Groundwater elevation monitoring wells are located both on- and off-site and provide data on groundwater flow patterns and the effectiveness of on-site pumping wells.

Each of these well groupings is further subdivided into glacial drift, shallow dolomite, and deep dolomite hydrogeologic units. This subdivision allows for a more effective evaluation of on-site groundwater flow and quality trends.

3.2 Groundwater Flow

3.2.1 Description of Hydrogeologic Units

The glacial drift hydrogeologic unit consists of a complex succession of fill and glaciolacustrine deposits that is underlain by till. The lake deposits and other materials have been extensively used as fill on-site. Both the till and glaciolacustrine deposits are considered to be part of a partially-confining hydrostratigraphic unit (RMT, 1995d).

TABLE 1

SUMMARY OF 1995 GROUNDWATER SAMPLING PROGRAM
COOK COMPOSITES AND POLYMERS

Monitoring Objective/ Well Group	Unit Monitored	Sampling Point	Sampling Frequency and EPA Method Number		
			Quarterly	Semiannually[1]	Annually[2]
Receptor	Glacial drift	RC-1	8021		
		RC-2	8021		
		RC-3	8021		
	Deep dolomite	MW-1	8260		
		MW-2[3]			8260
		MW-3	8260		
		MW-4	8260		
	POTW	POTW-I	8260		
		POTW-E	8260		
		POTW-S	8260		
Perimeter	Glacial drift	W-01A		8260	
		W-03B		8260	
		W-04A		8260	
		W-08R		8260	
		W-20		8260	
		W-27		8260	
	Shallow dolomite	W-03A		8260	
		W-07		8260	
		W-22		8260	
		W-23		8260	
		W-25		8260	
	Deep dolomite	PW-08		8260	

TABLE 1 (CONTINUED)

SUMMARY OF 1995 GROUNDWATER SAMPLING PROGRAM
COOK COMPOSITES AND POLYMERS

Monitoring Objective/ Well Group	Unit Monitored	Sampling Point	Sampling Frequency and EPA Method Number		
			Quarterly	Semiannually[1]	Annually[2]
Remediation progress	Glacial drift	W-06A			8260, 8270, 7060, 6010
		W-19A			8021
		W-37			8021
		W-41			8021
		W-42			8021
		W-43			8260, 8270, 7060, 6010
		W-47			8260, 8270, 7060, 6010, 8080
	Shallow dolomite	W-21A			8260, 8270, 7060, 6010
		W-24A			8260, 8270, 7060, 6010
		W-28			8260, 8270, 7060, 6010
		W-29			8260, 8270, 7060, 6010
		W-38			8021
	Deep dolomite	W-30			8260, 8270, 7060, 6010
Groundwater Elevation Monitoring	Glacial drift	W-14B	Quarterly water level measurements only.		
		W-16A	Quarterly water level measurements only.		
		W-18A	Quarterly water level measurements only.		
		W-44	Quarterly water level measurements only.		
		W-45	Quarterly water level measurements only.		
		W-46	Quarterly water level measurements only.		
		W-48	Quarterly water level measurements only.		
	Shallow dolomite	W-39	Quarterly water level measurements only.		
		W-40	Quarterly water level measurements only.		

NOTES:

1 Semiannual samples were collected in April and October.
2 Annual samples were collected in July.
3 MW-2 is only monitored annually because it is not used for water supply purposes.

The total thickness of the unconsolidated deposits typically varies between 10 and 30 feet beneath the site area, but is generally on the order of 10 feet at the CCP facility. Glaciolacustrine deposits are up to 20 feet thick on the western side of the site, and consist of interbedded sand, silt, and clay that is soft to medium hard, gray, and plastic to slightly plastic. Between 5 and 25 feet of till is present beneath the eastern side of the site. The till is composed of interbedded silty sand to sandy gravel that ranges from loose to very dense, is brown to gray in color, and is typically well-graded (RMT, 1995).

The stratigraphic order of the deposits from the ground surface downward is typically sand and silt overlying a laterally continuous layer of laminated silt and clay (glaciolacustrine deposits) above dense clay (glacial till). A thin layer of sand and gravel (glacial outwash) lies between this till unit and bedrock.

The glacial deposits are unconformably underlain by fractured, massive to thinly bedded Silurian dolomite, with a total thickness of approximately 700 feet in the site area, which includes the deep Dolomite Aquifer.

The uppermost 100 feet of the Silurian dolomite in the Saukville area tends to have a lower permeability than the underlying deep Dolomite Aquifer. Occasionally, transmissive zones are encountered in the shallow dolomite, such as at well W-24A, which extracts groundwater at 40 gallons per minute, and yet shows little drawdown. The permeability contrast between the shallow dolomite and the deep Dolomite Aquifer is the basis for combining the shallow dolomite with the overlying soil into a single hydrostratigraphic unit, the partially confining unit (RMT, 1995d).

The deep Dolomite Aquifer is defined as the Silurian dolomite from 100 feet to 700 feet below grade. The dominant lithology in the deep Dolomite Aquifer in the Saukville area is the Racine Formation. Municipal wells in the study area are typically cased to approximately 100 feet below grade, and are completed in the Silurian dolomite to depths in the range of 450 to 550 feet below grade. Groundwater flow within the Silurian dolomite appears to be fracture-controlled beneath the study area (RMT, 1995d).

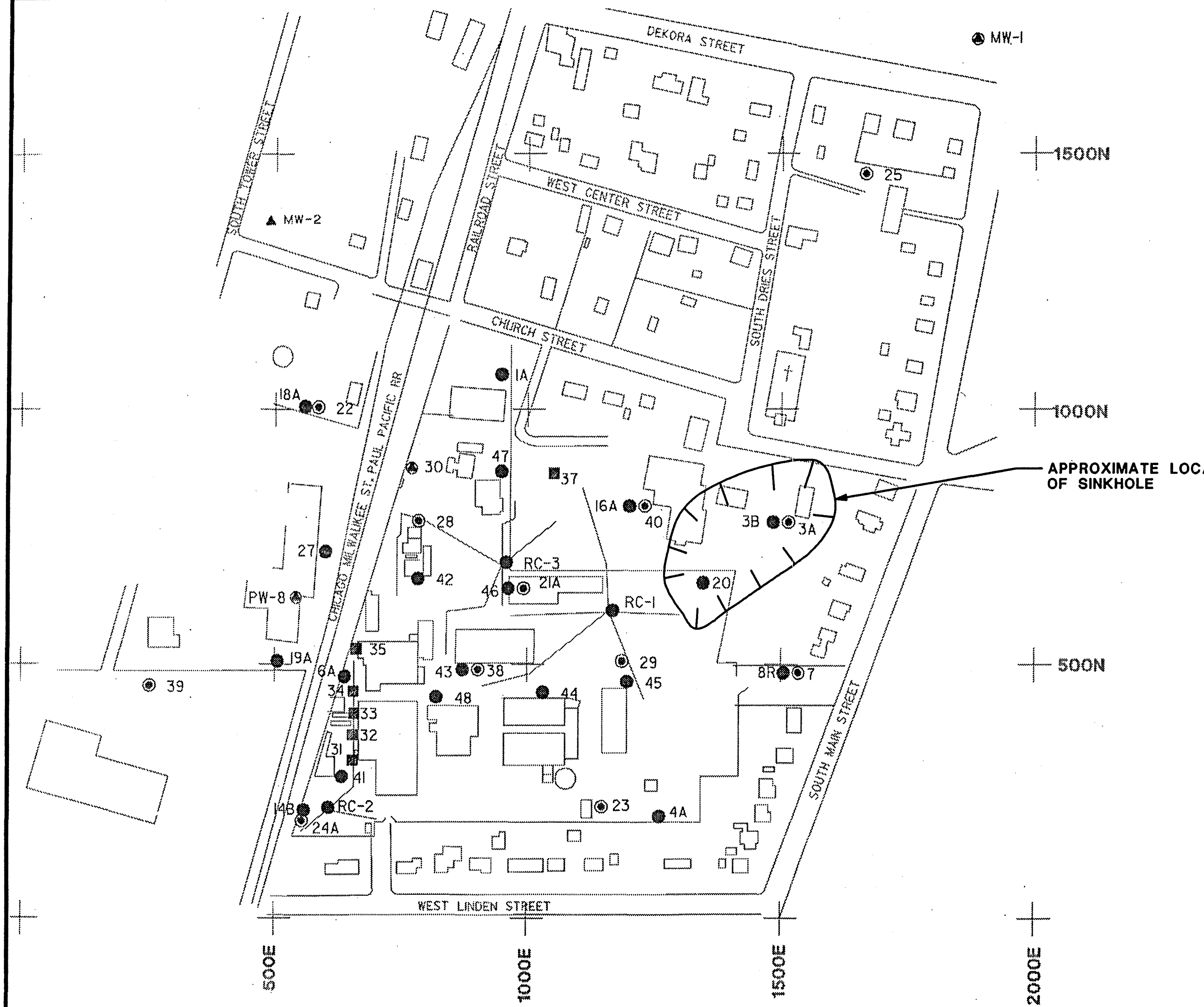
A sinkhole filled with glacial deposits, extending to a depth of approximately 200 feet below grade, was encountered on the eastern edge of the CCP site during the installation of wells W-3A, W-3B, and W-20. The areal extent of the sinkhole was further delineated (Figure 2) based on a seismic refraction survey performed by Minnesota Geophysical Associates (MGA, 1989).

3.2.2 Groundwater Levels and Flow Patterns in 1995

Groundwater levels in site monitoring wells were measured prior to purging during quarterly sampling events. Table 2 presents a summary of water levels for each quarter, and Figure 2 shows the locations of site monitoring wells. The water level data for 1995 were used to construct quarterly water table maps for the glacial drift unit, and quarterly potentiometric surface maps for the shallow dolomite unit (Appendix A).

The Glacial Drift Hydrogeologic Unit

The water table occurs in the glacial drift unit, as shown on Figures 3a through 3d (Appendix A). The depth to the water table at the site is approximately 10 feet below grade. Water table elevations appear to be higher in the spring due to enhanced recharge resulting from snowmelt and rainfall. Well W-20 is completed as a piezometer within the glacial drift present in the sinkhole in the northeastern portion of the site (Figure 2), and the hydraulic head within this well is representative of groundwater flow in the shallow dolomite unit. Therefore, water levels from well W-20 were not used to construct the water table maps on Figures 3a through 3d, but have been used to construct the potentiometric surface maps for the shallow dolomite unit (Figures 4a through 4d).



LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.

0 200 400

SCALE: 1"=200'

MONITORING WELL LOCATION MAP

COOK COMPOSITES AND POLYMERS
SAUKVILLE, WISCONSIN

RMT INC.

Dwn.By:	JRW
Approved By:	ELH
Date:	JANUARY 1996
Proj.#:	1832.91
File #:	18329113

FIGURE 2

TABLE 2
COOK COMPOSITES AND POLYMERS
SUMMARY OF WATER LEVELS, 1995 (FEET, MSL)

GEOLOGIC UNIT	SAMPLE ID	01/95	04/95	07/95	10/95
Glacial	W-01A	756.64	759.02	756.81	756.05
Glacial	W-03B	732.97	731.25	733.81	731.73
Glacial	W-04A	<748.08	754.76	746.72	<748.08
Glacial	W-06A	765.57	766.77	764.43	764.5
Glacial	W-08R	745.52	749.47	745.59	745.55
Glacial	W-14B	764.15	768.08	763.58	762.95
Glacial	W-16A	<752.06	752.58	755.28	<752.06
Glacial	W-18A	766.62	770.58	766.89	766.67
Glacial	W-19A	764.47	768.26	764.26	763.9
Glacial	W-20	728.87	725.99	728.51	726.65
Glacial	W-27	767.82	770.63	766.07	766.61
Glacial	W-37	NM *	NM *	NM *	NM *
Glacial	W-41	757.39	759.55	760.06	758.29
Glacial	W-42	753.9	758.53	757.75	754.34
Glacial	W-43	758.78	765.78	764	760.84
Glacial	W-44	754.46	757.05	757.54	755.63
Glacial	W-45	<752.27	<752.27	<752.27	<752.27
Glacial	W-46	761.42	762.27	759.68	761.42
Glacial	W-47	759.18	761.46	758.51	758.59
Glacial	W-48	763.17	762.89	762.76	762.93
Shallow Dolomite	W-03A	732.34	730.55	733.02	730.88
Shallow Dolomite	W-07	741.89	744.7	742.13	742.23
Shallow Dolomite	W-21A	705.87	700.85	707.2	715.49
Shallow Dolomite	W-22	728.33	730.88	729.18	728.53
Shallow Dolomite	W-23	738.38	738.12	738.47	737.66
Shallow Dolomite	W-24A	757.25	760.51	757.95	747.59
Shallow Dolomite	W-25	743.43	744.68	746.34	744.4
Shallow Dolomite	W-28	734.25	730.56	731.97	717.1
Shallow Dolomite	W-29	712.33	704.99	727.95	718.69
Shallow Dolomite	W-38	747.81	748.4	749.43	747.63
Shallow Dolomite	W-39	756.01	758.44	756.8	755.92
Shallow Dolomite	W-40	735.59	734.53	737.93	735.96
Deep Dolomite	MW-01	491	493	498	481
Deep Dolomite	MW-02	NM	NM	NM	NM
Deep Dolomite	MW-03	NM	NM	NM	NM
Deep Dolomite	MW-04	NM	NM	NM	NM
Deep Dolomite	PW-08	733.49	734.4	737.01	730.42
Deep Dolomite	W-30	673.9	633.01	633.01	665.35

NM = NOT MEASURED
NM * = WATER ELEVATIONS FOR W-37 ARE NOT REPORTED DUE TO A DISCREPENCY IN THE REFERENCE ELEVATION FOR THIS WELL. THE REFERENCE ELEVATION FOR W-37 WILL BE REMEASURED IN JANUARY, 1996.

NOTE: WATER LEVELS IN RANNEY COLLECTORS (RC-1 THROUGH RC-3) AND WITHDRAWL WELLS W-31 THROUGH W-35 ARE NOT MEASURED.

The water table beneath the CCP facility generally slopes gradient to the east, toward the Milwaukee River with a hydraulic gradient of 0.02 ft, based on summer of 1995 water level data (Appendix B). However, on-site, shallow groundwater flow is deflected toward the Ranney collectors, through the on-site groundwater recovery system.

Hydrographs of representative water table wells (W-18A, W-46, and W-47) for the period from 1985 to the present are shown on Figure 5. Water levels in upgradient well W-18A are similar to water levels in on-site wells W-46 and W-47 in 1985, prior to activation of the on-site groundwater recovery system. After pumping began in 1987, the water levels in wells W-46 and W-47 decreased and then stabilized at a level approximately 2 to 6 feet lower than the pre-pumping level. On the other hand, for upgradient well W-18A, water levels have increased on the order of 5 feet since 1985. The decreasing trend in water levels in the on-site wells, coupled with the increasing trend in water levels in the upgradient well, indicates that on-site groundwater extraction is dewatering the on-site glacial deposits. Based on the available data, the shallow groundwater extraction system is controlling off-site migration of groundwater in the glacial drift.

A vertically downward hydraulic gradient continues to be present between the glacial drift and the shallow dolomite. The magnitude of the downward gradients was on the order of 0.9 (downward, at wells W-18A/W-22)to 0.4 (downward, at wells W-43/W-38) (Appendix B).

The Shallow Dolomite Hydrogeologic Unit

The potentiometric surface in the shallow dolomite unit for the winter, spring, summer, and fall quarters of 1995 is shown on Figures 4a, 4b, 4c, and 4d (Appendix A). Because the piezometers constructed at the site have been completed at varying

TABLE 3

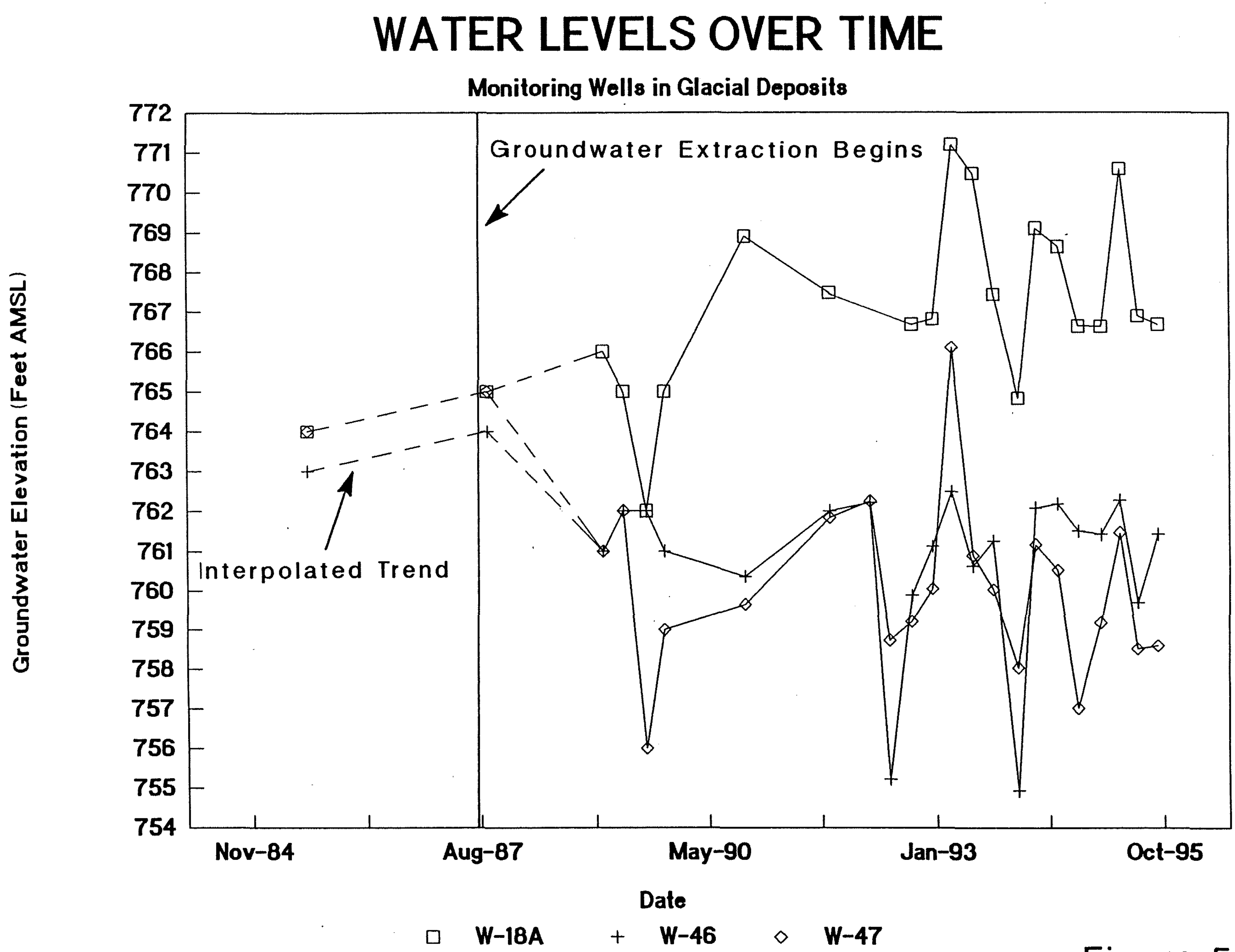
SUMMARY OF WELL RUNNING TIMES (1995)

Hydrogeologic Unit	Well I.D.	Monthly Running Time (hours) Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Total (hours)	Comments
Glacial drift 751.57	W-31	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	Dewatering of glacial drift due to pumping at RC-2 has affected groundwater elevation
	W-32	0.1	0.0	0.0	0.6	0.5	0.0	0.0	0.0	0.0	0.0	4.2	0.0	5.4	Dewatering of glacial drift due to pumping at RC-2 has affected groundwater elevation
	W-33	10.0	8.0	8.6	15.2	9.6	1.7	1.6	7.4	1.6	8.7	10.5	9.2	92.1	Dewatering of glacial drift due to pumping at RC-2 has affected groundwater elevation
	W-34	838.4	666.8	671.7	673.6	784.6	671.3	624.6	837.4	671.7	838.5	647.1	698.0	8623.7	Continued pumping assists in controlling off-site migration of contaminants within the glacial drift
	W-35	1.3	0.8	1.0	1.2	1.6	1.1	1.0	1.8	1.6	1.8	1.7	1.6	16.5	Continued pumping assists in controlling off-site migration of contaminants within the glacial drift
	W-37	8.7	7.0	6.0	2.4	0.0	0.8	0.0	0.0	0.0	0.1	0.0	0.0	25.0	Continued pumping assists in controlling off-site migration of contaminants within the glacial drift
	RC-1	11.7	3.0	45.8	134.6	357.4	0.1	0.0	0.0	69.3	51.6	56.4	65.2	795.1	Pumping has dewatered a large area within the glacial drift
	RC-2	797.1	579.0	549.3	581.6	0.0	547.8	671.5	595.3	672.4	615.4	655.6	664.6	6929.6	Pumping has dewatered an area within the glacial drift that fluctuates in size
	RC-3	0.4	0	29.9	102.3	93.1	17	0.3	25.7	12.2	29.6	46.6	28.4	385.5	Pumping has only shown some dewatering during the spring quarter.
Shallow dolomite	W-21A	57.3	54.0	39.6	32.4	42.7	55.5	48.5	56.9	36.8	38.9	55.4	63.7	581.7	Pumping is contributing to the creation of a large dewater zone within the dolomite
	W-24A	53.6	64.9	20.6	8.3	131.8	16.1	6.3	6.9	6.3	36.8	27.2	51.7	430.5	Continued pumping assists in controlling flow of contaminants within the dolomite
	W-28	528.7	326.9	335.4	188.8	268.4	365.3	124.3	100.5	100.8	84.3	26.2	37.0	2486.6	Continued pumping assists in controlling flow of contaminants within the dolomite
	W-29	167.7	136.4	71.4	80.2	74.2	42.2	46.3	49.7	52.6	95.7	157.6	118.6	1092.6	Continued pumping assists in controlling flow of contaminants within the dolomite

Notes: The pumping wells at CCP are on automatic switches which turn the pumps on when the water in the wells reaches a specified level. The pumps are inspected daily, including weekends, to insure proper operation.

Differences in pumping times for the Ranney Collectors are due to differences in the type and size of the pumps servicing each Ranney Collector.

The pump in RC-2 was down for repairs during May.


WATER LEVELS OVER TIME
Monitoring Wells in Glacial Deposits
Groundwater Elevation (Feet AMSL)
772
771
770
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759
758
757
756
755
754
Groundwater Extraction Begins
Interpolated Trend
Nov-84
Aug-87
May-90
Jan-93
Oct-95
Date
W-18A
W-46
W-47

Figure 5

elevations in the dolomite, only those piezometers with bottom elevations between 680 and 710 feet above mean sea level (AMSL) were used in preparation of Figures 4a through 4d. The one exception to this is well W-30, which has a bottom elevation of approximately 215 feet AMSL, and extracts water from both the shallow and the deep dolomite. Pumping from W-30 has created a large cone of depression in the shallow dolomite, (thereby dewatering the shallow layer in which the wells cited above operate) and therefore, W-30 has been included on the potententiometric maps for the shallow dolomite.

Hydrographs for wells W-18 and W-22 for the period from 1985 to the present are shown on Figure 6. Prior to the activation of the on-site groundwater extraction system in 1987, water levels in the shallow dolomite wells were such that the dolomite was saturated. Water levels in the shallow dolomite have dropped on the order of 35 feet in some areas since the groundwater extraction system was activated. The drop has resulted in partial dewatering of the shallow dolomite. The dewatered rock is an elliptical zone whose long axis strikes northwest, and whose center is near well W-30, approximately parallel to the direction of regional jointing within the Silurian dolomite as discussed in the RFI (RMT, 1995d.) Groundwater flow within the shallow dolomite appears to be convergent on extraction wells W-21A and W-30. Convergent groundwater flow is one line of evidence that the groundwater extraction system is controlling groundwater flow beneath the site and thus controlling off-site migration of contaminated groundwater within the shallow dolomite.

The Deep Dolomite Hydrogeologic Unit

Based on the results of groundwater modelling conducted during the RCRA Facility Investigation (RFI), groundwater flow in the deep Dolomite Aquifer in the Saukville area is toward the on-site well (W-30) and toward the active Saukville municipal wells (MW-1, MW-3, and MW-4). Only one on-site data point is available to document flow directions within the deep Dolomite Aquifer, and that is pumping well W-30. Therefore, on-site data for the deep Dolomite Aquifer are inadequate to prepare potentiometric surface maps for the deep Dolomite Aquifer. Vertical groundwater flow at the site has a strong downward component from the glacial deposits and the shallow dolomite

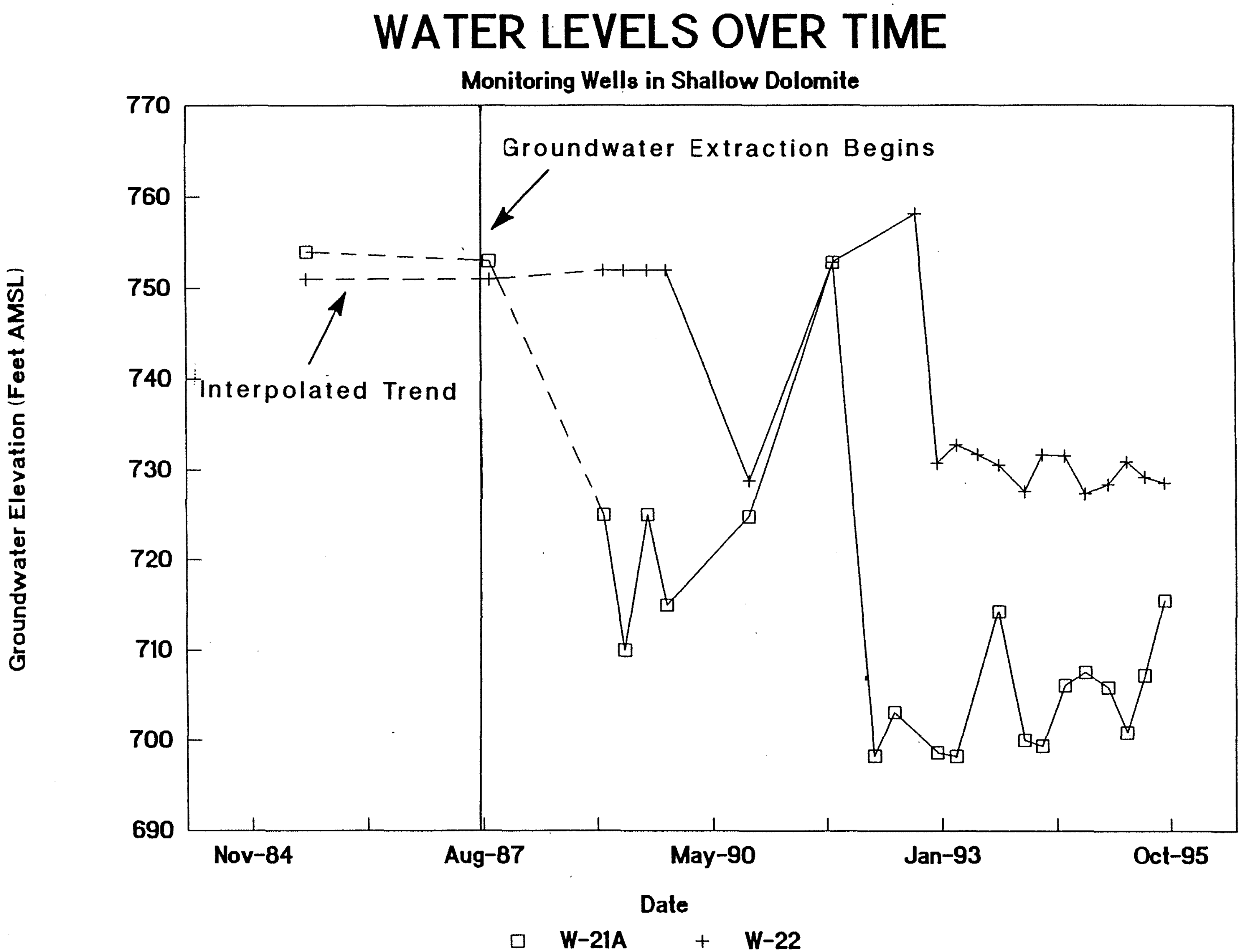
WATER LEVELS OVER TIME
Monitoring Wells in Shallow Dolomite
Groundwater Elevation (Feet AMSL)
770
760
750
740
730
720
710
700
690
Groundwater Extraction Begins
Interpolated Trend
Nov-84
Aug-87
May-90
Jan-93
Oct-95
Date
W-21A
W-22

Figure 6

toward the deep Dolomite Aquifer. Horizontal groundwater flow beneath the CCP facility, within the deep Dolomite Aquifer, is convergent on well W-30 (RMT, 1995d).

3.3 Groundwater Quality

3.3.1 Background

Table 1 presents the sampling schedule that was developed for 1995 groundwater monitoring, along with the VOC analysis method used each quarter. The parameters analyzed for in Methods 8260 and 8021 are listed in Table 4. The Ranney collectors are analyzed by Method 8021. The winter, spring, and fall quarter samples were analyzed for the full VOC list (8260), and the summer quarter samples were analyzed for either the full VOC list or the shorter aromatic VOC list (8021) as part of the annual sampling event. In addition, selected wells are analyzed during the annual monitoring round (summer) for parameters detected during the Appendix IX monitoring conducted during the RFI (Table 1).

3.3.2 Total VOC Data

The tabulated results of VOC concentrations in each well and the supporting laboratory data sheets were presented in the four quarterly reports (RMT, 1995a, 1995b, 1995c, and 1995e). Tables 5, 6, and 7 present a summary of total VOC concentrations in each well for the four quarters. The wells are organized by monitoring objective and hydrogeologic unit as described in Subsection 3.1 and Table 1. Figure 2 shows the locations of the monitoring wells. The lateral distribution of VOCs in the glacial drift unit and in the shallow dolomite unit for the year is depicted on two composite isoconcentration maps. Composite maps for 1995 were constructed using VOC concentration data from all four quarterly sampling rounds. The isoconcentration maps are included on Figures 7 and 8 of Appendix C.

VOC Patterns in the Glacial Drift Unit

The extent of VOC contamination in the glacial drift unit for 1995 is shown on Figure 7 of Appendix C. As noted in Subsection 3.2, well W-20 is completed in the glacial drift within the sinkhole and is more representative of water quality in the shallow dolomite aquifer. Isoconcentration contours in the glacial drift unit (Figure 7) do not include VOC detections in the Ranney collectors because these are composite groundwater

TABLE 4

SUMMARY OF ANALYTES AND METHODS
COOK COMPOSITES & POLYMERS

Volatile Organic Compounds by Method 8260		Aromatic Volatile Organic Compounds by Method 8021
Chloroethane	1,1,2,2-Tetrachloroethane	Benzene
Chloromethane	1,2-Dichloropropane	Toluene
Bromomethane	trans-1,2-Dichloropropene	Ethylbenzene
Vinyl chloride	Trichloroethene	Chlorobenzene
Methylene chloride	Dibromochloromethane	Xylenes (total)
Acetone	1,1,2-Trichloroethane	1,4-Dichlorobenzene
Carbon disulfide	Benzene	1,3-Dichlorobenzene
1,1-Dichloroethene	cis-1,3-Dichloropropene	1,2-Dichlorobenzene
1,1-Dichloroethane	Bromoform	
1,2-Dichloroethene (total)	2-Hexanone	
Chloroform	4-Methyl-2-Pentanone	
1,2-Dichloroethane	Tetrachloroethene	
2-Butanone	Toluene	
1,1,1-Trichloroethane	Chlorobenzene	
Carbon tetrachloride	Ethylbenzene	
Vinyl acetate	Styrene	
Bromodichloromethane	Xylenes (total)	
Semivolatile Organic Compounds by Method 8270	**Polychlorinated Biphenyls (PCBs) by Method 8080[1,2]**	**Metals by Methods 7060, 6010[1]**
1,4-Dioxane	Aroclor 1016	Arsenic
2,4-Dimethylphenol	Aroclor 1221	Barium
2-Methylnaphthalene	Aroclor 1232	
2-Methylphenol	Aroclor 1242	
4-Methylphenol	Aroclor 1248	
Acetophenone	Aroclor 1254	
Bis(2-ethylhexyl)phthalate	Aroclor 1260	
Naphthalene		
Phenanthrene		
Phenol		

NOTES:

1. Analyzed annually for wells W-06A, W-43, W-47, W-21A, W-24A, W-28, W-29, and W-30.
2. Only well W-47 is analyzed for PCBs.

TABLE 5
TOTAL VOCS DETECTED 1995, RECEPTOR GROUP

GLACIAL UNIT

SAMPLE ID	01/95		04/95		07/95		10/95	
RC-1	387.4	UG/L	18226	UG/L	345	UG/L	180	UG/L
RC-2	443.6	UG/L	13166	UG/L	ND	UG/L	183	UG/L
RC-3	33100	UG/L	126700	UG/L	34300	UG/L	43700	UG/L

DEEP DOLOMITE UNIT AND POTW

SAMPLE ID	01/95		04/95		07/95		10/95	
MW-01	ND	UG/L	ND	UG/L	ND	UG/L	ND	UG/L
MW-02					ND	UG/L		
MW-03	2	UG/L	ND	UG/L	ND	UG/L	ND	UG/L
MW-04	9	UG/L	ND	UG/L	ND	UG/L	ND	UG/L
MW-04 DUP	ND	UG/L	ND	UG/L	ND	UG/L	5	UG/L
POTW-E	10.2	UG/L	24	UG/L	3.6	UG/L	8.2	UG/L
POTW-I	196.5	UG/L	230	UG/L	99.8	UG/L	18.3	UG/L
POTW-S	148	UG/L	1502.3	UG/L	890	UG/L	125	UG/L

1. Ranney collectors RC-1, RC-2, and RC-3 are shallow groundwater drains sampled at the manhole, prior to discharge to the POTW. Wells MW-01, MW-02, MW-03, and MW-04 are screened in the deep dolomite. Well MW-02 is only sampled in July. Monitoring points POTW-E, POTW-I, and POTW-S are sampled at the wastewater treatment facility.

2. Blank entries indicate that a sample was not collected at the monitoring point during that quarter, typically because the well was dry.

3. Refer to summary tables in the quarterly reports (RMT, Inc., 1995a,b,c,e) for specific analytes detected. Typical VOC detections included benzene, toluene, ethylbenzene, xylenes, and acetone.

4. Total VOCs were calculated by summing all measured and estimated values, except those qualified with a "U", which are considered undetected because of associated blank contamination.

ND = None detected.

TABLE 7

TOTAL VOCS DETECTED 1995, REMEDIATION PROGRESS GROUP

GLACIAL UNIT

SAMPLE ID	07/95	
W-06A	177780	UG/L
W-19A	2.9	UG/L
W-19A DUP	2.7	UG/L
W-37	138240	UG/L
W-41	531.8	UG/L
W-42	12460	UG/L
W-43	16992	UG/L
W-47	102490	UG/L

SHALLOW DOLOMITE UNIT

SAMPLE ID	07/95	
W-21A	25710	UG/L
W-24A	6.3	UG/L
W-28	26	UG/L
W-29	3482	UG/L
W-30	6	UG/L
W-38	3224	UG/L
W-38 DUP	3079	UG/L

1. Well W-30 is a deep dolomite well.
2. Refer to summary tables in the quarterly reports (RMT, Inc., 1995a,b,c,e) for specific analytes detected. Typical VOC detections included benzene, toluene, ethylbenzene, and xylenes.
3. Total VOCs were calculated by summing all measured and estimated values, except those qualified with a "U", which are considered undetected because of associated blank contamination.

ND = None detected.

11-DEC-95:cksitvoc TAB7B.CLS

Municipal Wells (Deep Dolomite Wells)

VOC concentrations in the municipal wells (MW-1 through MW-4) were generally not detected or detected below the reporting limit for 1995, indicating that the Village water supply wells continue to be unaffected by the CCP site. The total VOC concentrations reported in Table 5 of 2 μg/L in well MW-3 and 9 μg/L in well MW-4 represent VOCs detected below the reporting limit. In addition, the groundwater flow modeling performed during the RFI (RMT, 1995d) showed that the zone of contribution for well MW-4 does not extend to the CCP facility, so it is very unlikely that groundwater affected by the CCP facility could reach MW-4.

Perimeter Monitoring

Glacial Drift Wells

VOC concentrations in the perimeter wells screened in the glacial drift in 1995 were typically low (< 10 μg/L) or nondetectable with the exception of the concentrations at upgradient well W-27. These concentrations are consistent with those of the past 3 years.

As in 1994, well W-27 exhibited exceedances of the Wisconsin Administrative Code NR 140 Enforcement Standard (ES) for trichloroethene, and exceedances of the Preventive Action Limit (PAL) for 1,2-dichloroethene. Well W-27 has consistently shown concentrations of chlorinated VOCs since 1988. W-27 is hydraulically upgradient of the CCP facility. Detections of chlorinated hydrocarbons in wells upgradient of the CCP are likely due to TCE sludge disposal activities at the former Northern Signal, which previously operated a facility just west (upgradient) of the CCP property (RMT, 1995d). Well W-01A (north of the facility) had one PAL exceedance for trichloroethene during 1995.

Dolomite Wells

Perimeter wells screened in the dolomite generally showed low or nondetectable levels for total VOCs. Exceptions include wells W-22, W-23, and W-25, which contained total VOCs ranging from 0.8 to 23.4 μg/L. Well W-22 had one PAL exceedance for 1,2-dichloroethane. Well W-23 contained vinyl chloride at levels exceeding its ES and also contained benzene at levels exceeding its PAL. There were no NR 140 exceedances noted in W-25.

Remediation Progress Monitoring

Glacial Drift Wells

The remediation progress wells in the glacial drift unit are only sampled annually. In general, VOC levels were consistent with historical ranges. Total VOC concentrations in remediation progress wells continue to remain in the range of tens of thousands to hundreds of thousands of μg/L. The persistently high levels of VOCs in groundwater suggest that non-aqueous phase liquids (NAPLs) are present in the glacial deposits and shallow subsurface. The residual sources of contamination continue to leach VOCs into groundwater in the glacial deposits and into the shallow dolomite.

Total VOC concentrations appear to have stabilized in wells W-06A, W-37, and W-41, and may be stabilizing in W-47. VOC concentrations for W-19A dropped to below the detection level in 1994, and were detected at less than 10 μg/L in 1995. VOC concentrations in W-42 have dropped slightly over the past three years. VOC concentrations in W-43 tend to be quite variable.

Several remediation progress wells screened in the glacial drift contained VOCs in excess of NR 140 ESs. These wells include W-06A, W-37, W-41, W-42, W-43, and W-47, which contained benzene, toluene, ethylbenzene, and xylenes (BTEX) above their respective ESs. The presence of BTEX compounds in groundwater is consistent with past site activities.

Chlorinated compounds have consistently been detected in well W-19A in past years, and occasionally have been detected in wells W-42 and W-6A. All of these remediation progress wells are located on the west side or just west (upgradient) of the site. Chlorinated compounds were also found in well W-47, located in the western part of the site. As stated above, the presence of chlorinated compounds appears to be associated with sludge disposal practices at Northern Signal, formerly located upgradient (west) of the CCP site.

Dolomite Wells

VOC levels in remediation progress wells screened in the dolomite generally displayed concentrations within ranges established over the past 3 years—generally in the tens of thousands of μg/L range. As with the remediation progress wells within the glacial drift, persistent high levels of VOCs in groundwater suggest that NAPLs are present in the glacial deposits and shallow dolomite. The residual sources of contamination continue to leach VOCs into groundwater present in the shallow dolomite.

W-21A shows little change in concentration over the last several years. Decreasing trends have been noted in wells W-29, W-30, and W-38. VOC concentrations in well W-28 have fluctuated between approximately 50,000 and 130,000 μg/L since the end of 1994. VOC concentrations in well W-24A have fluctuated from below the detection limit to several tens of thousands since 1990.

Several wells contained VOCs at concentrations exceeding either their ESs or PALs. The exceedances were for one or more of the BTEX compounds in wells W-21A, W-28, W-29, and W-38. These wells are located near the center of the site or just to the west of center. Remediation progress wells W-24A (located on the southwestern corner of the site) and 29 (located near the center of the site) also contained chlorinated compounds at levels exceeding the ES.

3.4 Plume Containment

The discussion in this section combines groundwater flow and quality trends from the receptor, perimeter, and remediation progress wells in the glacial drift and dolomite, to present an evaluation of the effectiveness of the plume containment in the remedial system at the Saukville site.

3.4.1 The Glacial Drift Unit

Portions of the glacial deposits in the area of the Ranney collectors (located near the sites of greatest contamination) appear to be dewatered. This, along with the generally low to non-detectable concentrations within the perimeter wells (Figure 7), indicate that off-site migration of contaminated groundwater within the glacial drift unit is being effectively controlled.

3.4.2 The Shallow Dolomite Unit

Over the past 3 years, VOC concentrations in the shallow dolomite have remained stable at levels near thousands to tens of thousands of mg/L in the remediation progress wells. Perimeter wells in this unit generally contained low (less than 10 μg/L) to nondetectable levels of VOCs, with the exception of W-27, which is located hydraulically upgradient of the CCP site. The remediation system has dewatered an elliptical zone within the shallow dolomite as documented in the RFI (RMT, 1995d). Dewatering portions of the glacial till and shallow dolomite due to groundwater extraction at the site has important implications for the efficiency of the groundwater extraction system at the site. Dewatering dolomite in these areas has decoupled groundwater flow from the till to the dolomite, thereby reducing the amount of contaminants that can migrate into the dolomite from the till. Based on the inward gradients toward recovery wells W-21A and W-30, and the lack of VOC detections and decreasing VOC concentration trends in the perimeter monitoring wells, migration of the contaminant plume in the shallow dolomite is being effectively controlled.

3.4.3 The Deep Dolomite Unit

VOC concentrations in the deep dolomite receptor and remediation progress wells (e.g., MW-1, MW-2, MW-3, MW-4, and W-30) continue to be near or below detection limits. VOC concentrations at PW-08 (located upgradient of the CCP site) have fluctuated over the past few years. VOC concentrations at W-30 have decreased by approximately two orders of magnitude since 1989. In addition, groundwater flow beneath the CCP facility is horizontally convergent on well W-30, as shown in the RFI (RMT, 1995d). Convergent flow toward the recovery wells, coupled with decreasing VOC concentrations in the extracted groundwater, demonstrate that off-site migration of groundwater within the deep Dolomite Aquifer is being effectively controlled by groundwater pumping.

3.4.4 Hydraulic Communication Between the Aquifers

Hydraulic head data, along with chemical results, indicate downward seepage is occurring from source areas in the glacial drift into the shallow dolomite through fractures in the upper portion of the bedrock. However, groundwater extraction has created dewatered zones within the glacial drift and shallow dolomite, thus reducing the potential for vertical migration of contaminants from the glacial drift to the shallow dolomite.

Section 4

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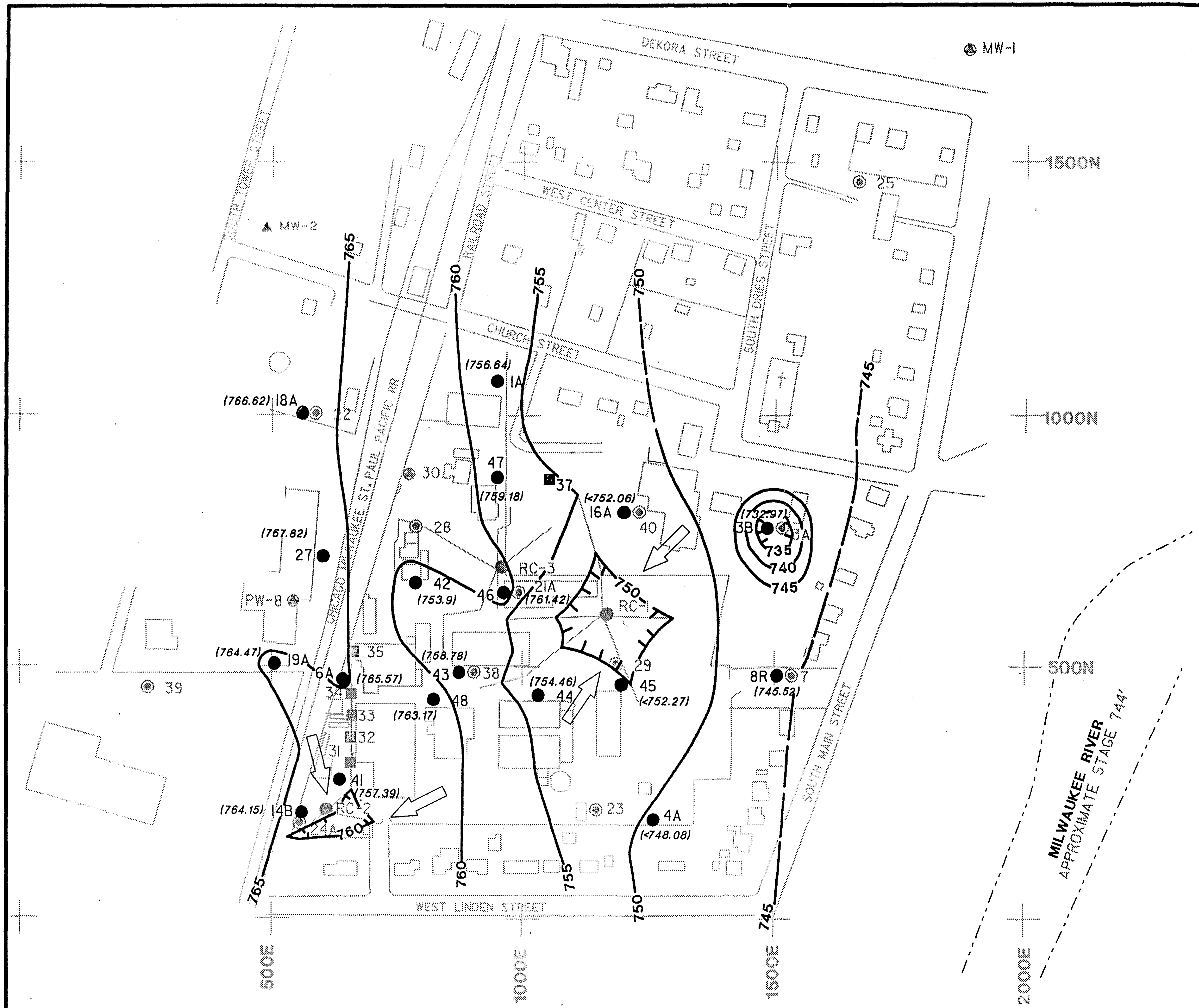
APPENDIX A

WATER TABLE AND POTENTIOMETRIC SURFACE MAPS

1/9



LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- (756.64) WATER TABLE ELEVATION
- 750 WATER TABLE CONTOUR (5-foot INTERVAL)
- GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. ELEVATIONS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
3. RANNEY COLLECTOR CONSTRUCTION DATA USED TO DEVELOP THIS MAP IS APPROXIMATE.

0 200 400

SCALE: 1"=200'

WATER TABLE MAP
GLACIAL DRIFT - WINTER 1995
COOK COMPOSITES AND POLYMERS SAUKVILLE, WISCONSIN

RMT INC.

Dwn. By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj. #:	1832.91
File #:	18329107

FIGURE 3A

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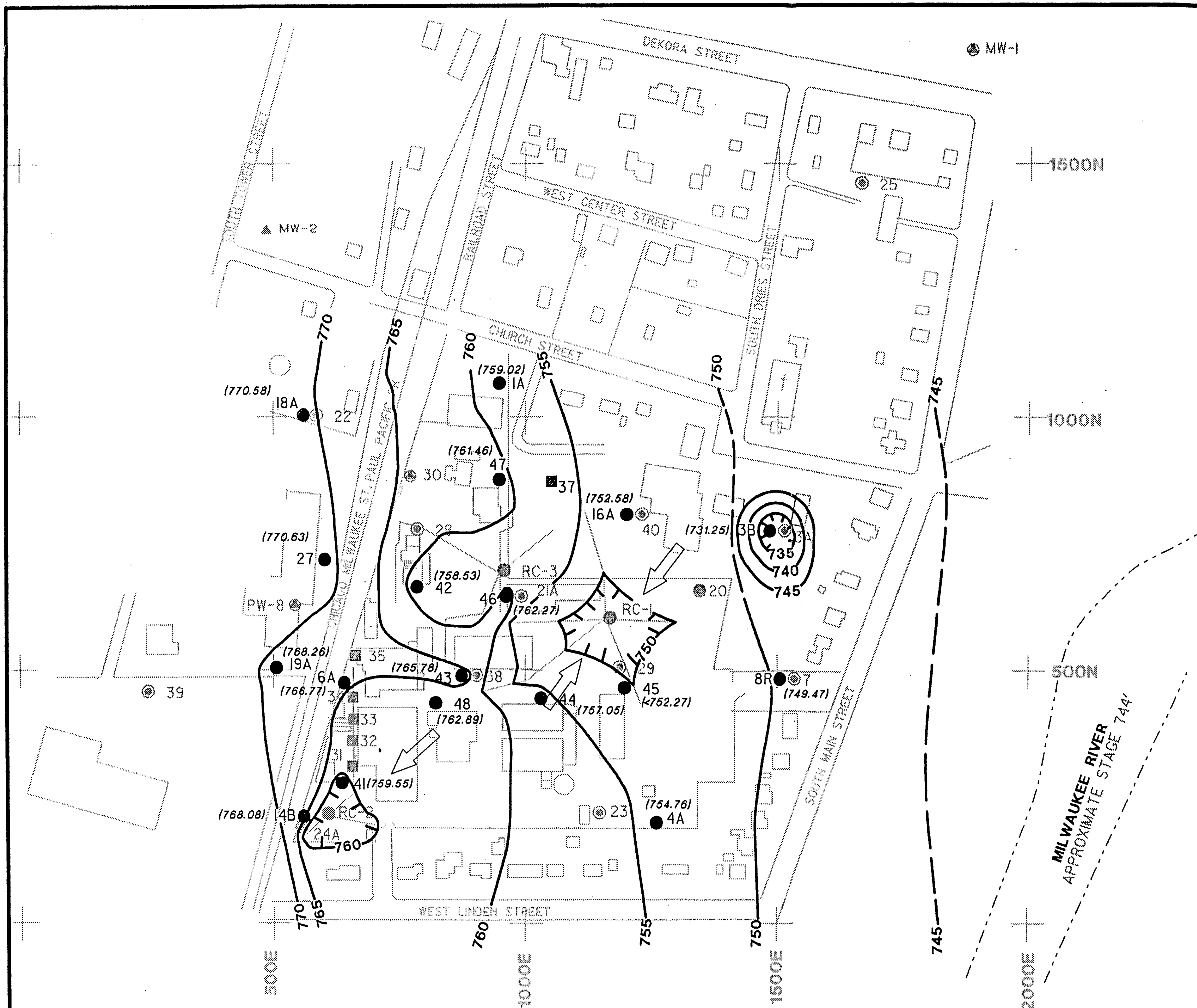


LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- (756.21) WATER TABLE ELEVATION
- 750 WATER TABLE CONTOUR (5-foot INTERVAL)
- GROUNDWATER FLOW DIRECTION
- (NM) NOT MEASURED

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. ELEVATIONS ARE EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
3. RANNEY COLLECTOR CONSTRUCTION DATA USED TO DEVELOP THIS MAP IS APPROXIMATE.

0 200 400

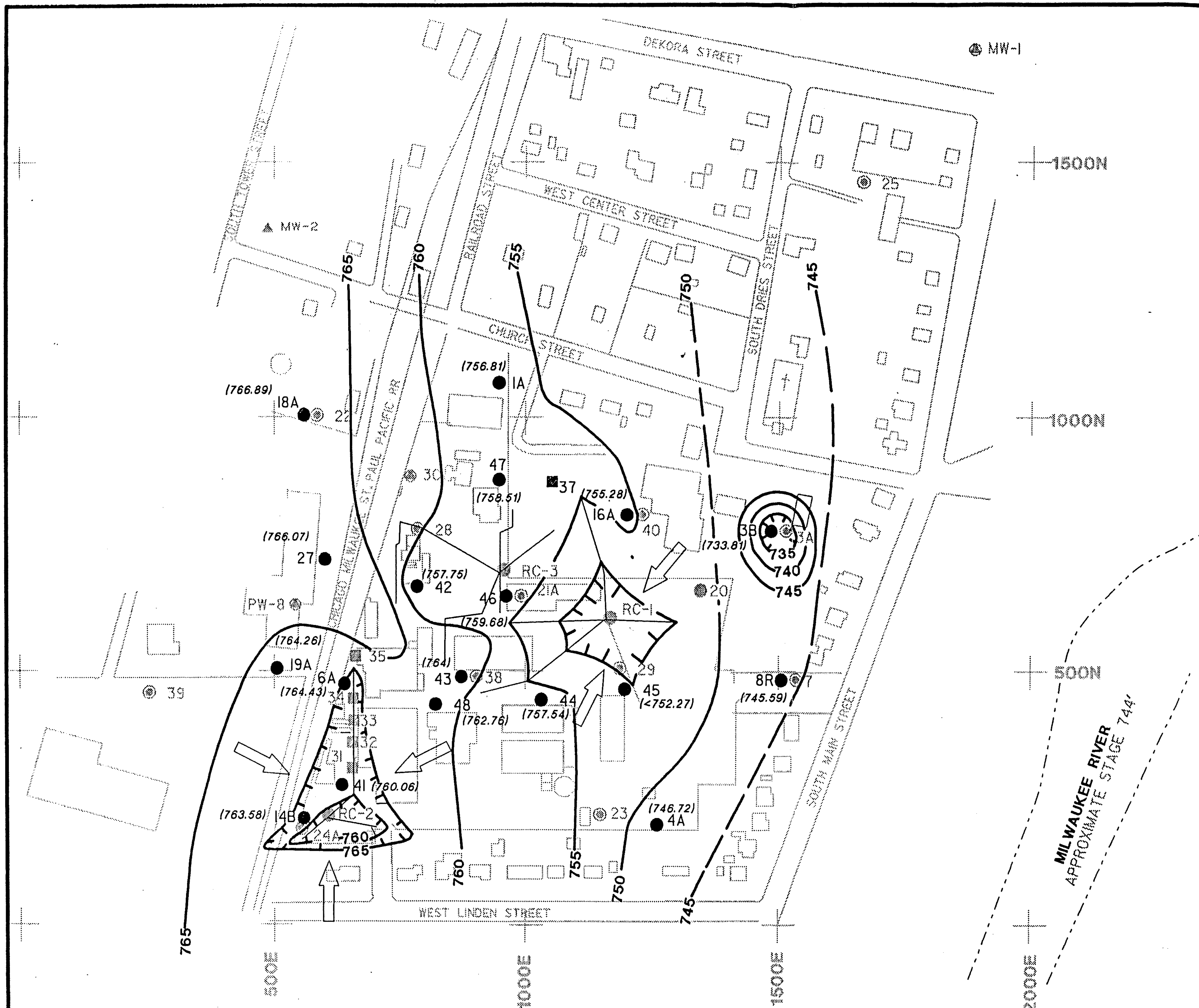
SCALE: 1"=200'

WATER TABLE MAP
GLACIAL DRIFT - SPRING 1995
COOK COMPOSITES AND POLYMERS SAUKVILLE, WISCONSIN

RMT INC.

Dwn. By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj.#:	1832.91
File #:	18329108

FIGURE 3B



LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- (756.81) WATER TABLE ELEVATION
- 750 WATER TABLE CONTOUR (5-foot INTERVAL)
- GROUNDWATER FLOW DIRECTION
- (NM) NOT MEASURED

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. ELEVATIONS ARE EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
3. RANNEY COLLECTOR CONSTRUCTION DATA USED TO DEVELOP THIS MAP IS APPROXIMATE.

0 200 400

SCALE: 1"=200'

WATER TABLE MAP
GLACIAL DRIFT - SUMMER 1995
COOK COMPOSITES AND POLYMERS SAUKVILLE, WISCONSIN

RMT INC.

Dwn.By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj.#:	1832.91
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FIGURE 3C

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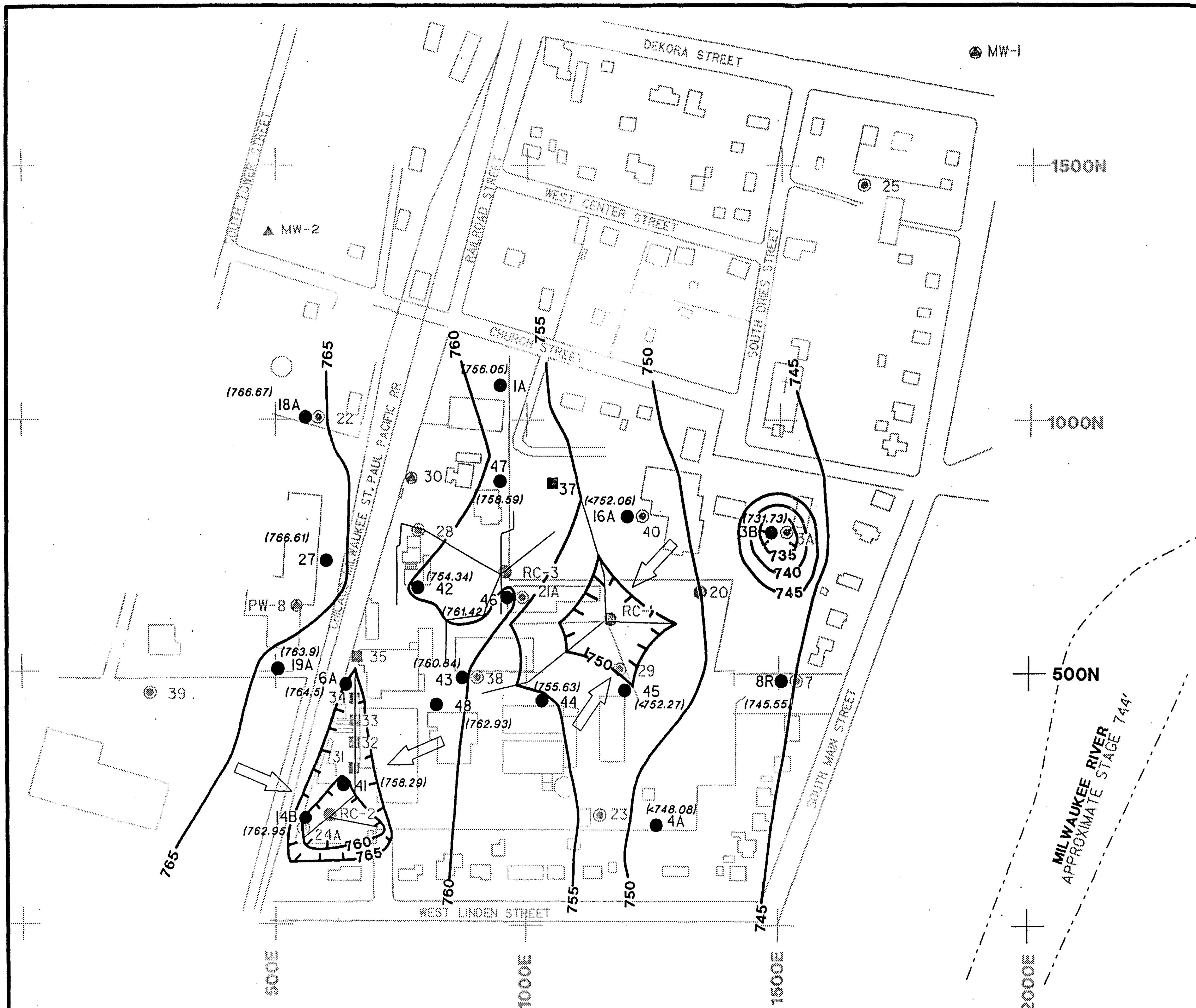

LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- (756.21) WATER TABLE ELEVATION
- 750 WATER TABLE CONTOUR (5-foot INTERVAL)
- GROUNDWATER FLOW DIRECTION
- (NM) NOT MEASURED

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. ELEVATIONS ARE EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
3. RANNEY COLLECTOR CONSTRUCTION DATA USED TO DEVELOP THIS MAP IS APPROXIMATE.

0 200 400

SCALE: 1"=200'

WATER TABLE MAP
GLACIAL DRIFT - FALL 1995
COOK COMPOSITES AND POLYMERS
SAUKVILLE, WISCONSIN

RMT INC.

Dwn. By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
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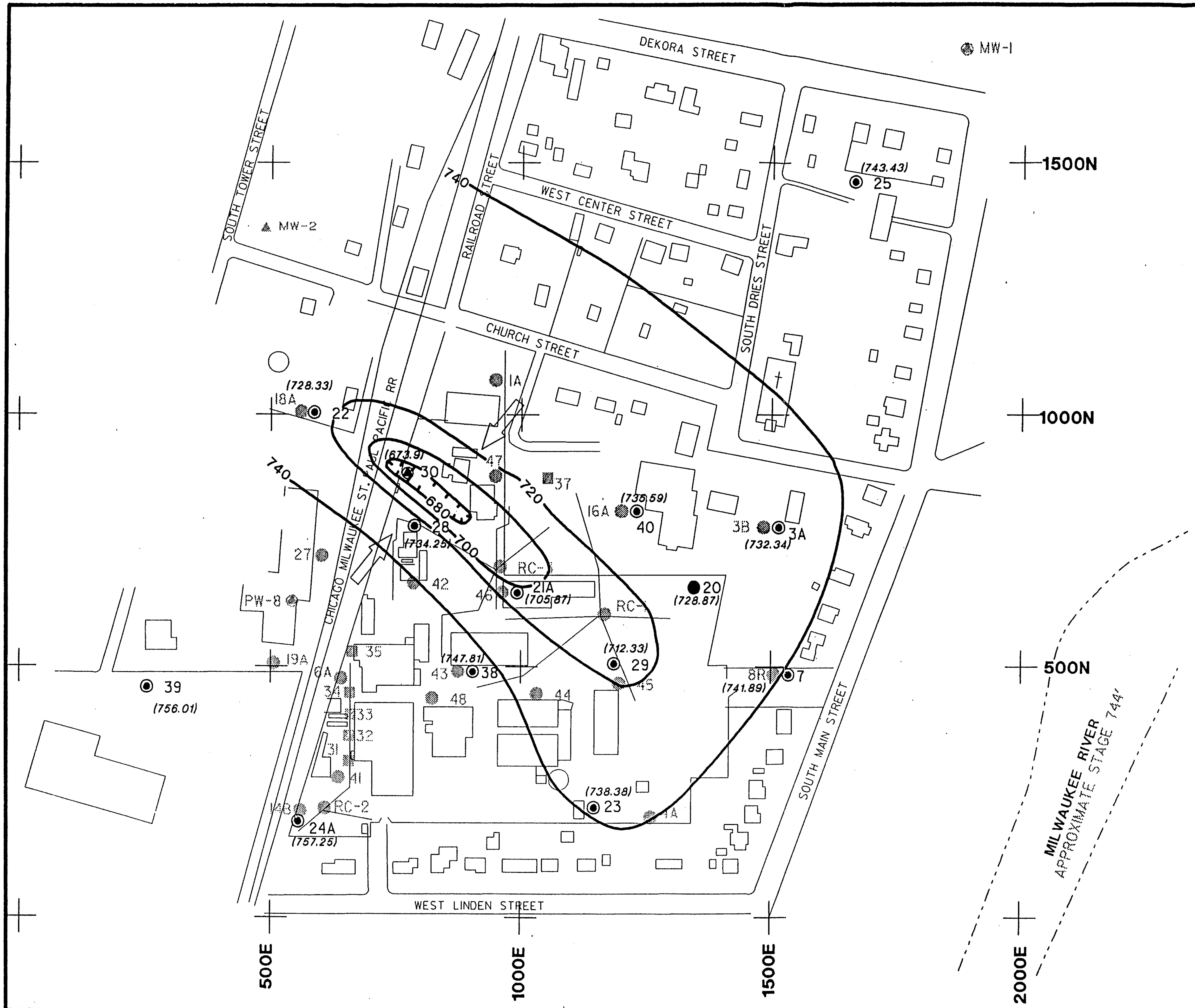

LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- (757.52) POTENTIOMETRIC ELEVATION
- 740 — POTENTIOMETRIC CONTOUR (20-foot INTERVAL)
- GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. ELEVATIONS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
3. THE ELEVATIONS OF THE BOTTOMS OF THE SHALLOW DOLOMITE WELLS USED TO CONSTRUCT THIS FIGURE ARE BETWEEN 680 AND 710 FEET ABOVE MSL.

POTENTIOMETRIC SURFACE MAP
SHALLOW DOLOMITE - WINTER 1995

COOK COMPOSITES AND POLYMERS
SAUKVILLE, WISCONSIN

RMT INC.

Dwn. By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj. #:	1832.91
File #:	18329103

FIGURE 4A

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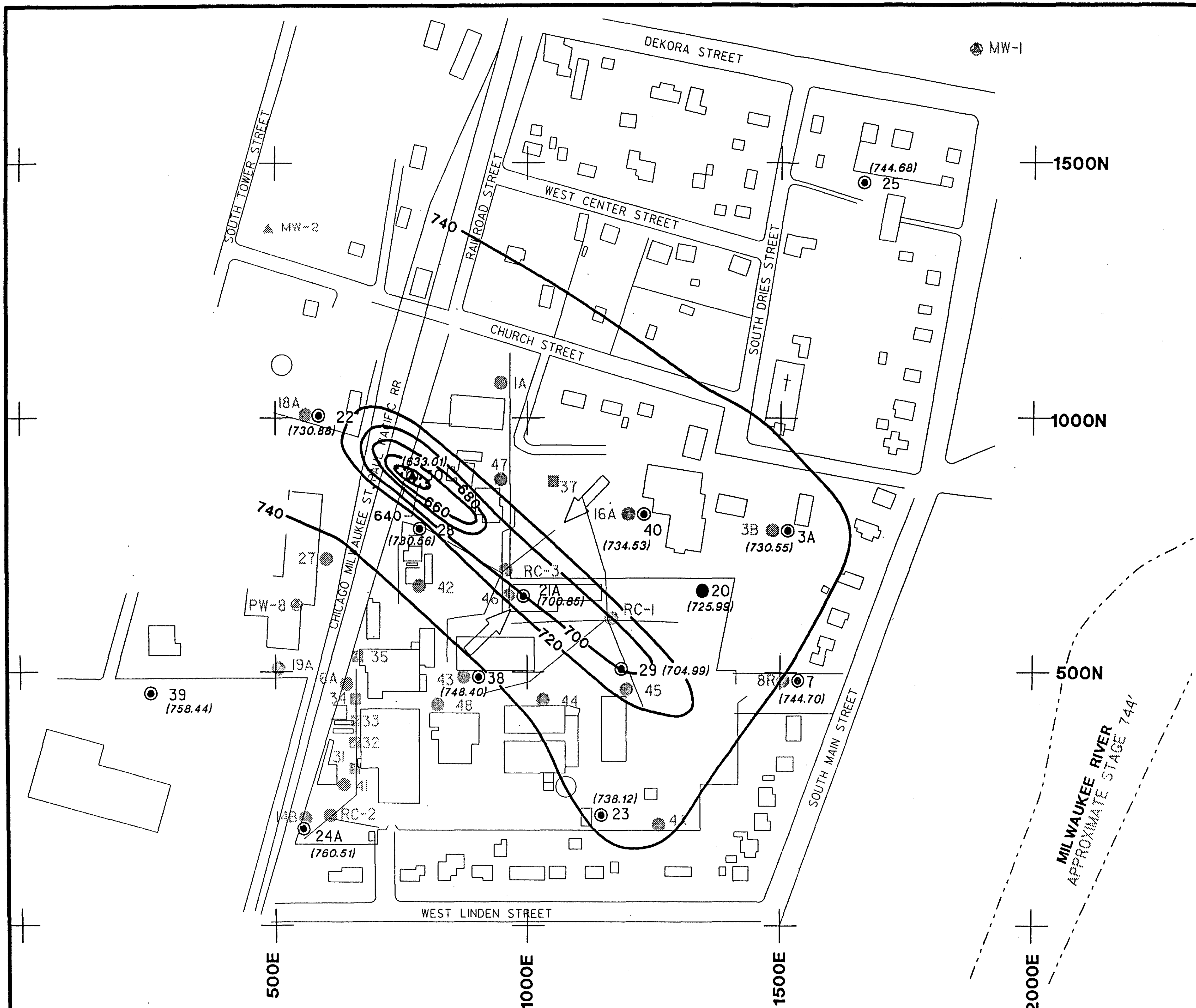

LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- (744.68) POTENTIOMETRIC ELEVATION
- 740 POTENTIOMETRIC CONTOUR (20-foot INTERVAL)
- GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. ELEVATIONS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
3. THE ELEVATIONS OF THE BOTTOMS OF THE SHALLOW DOLOMITE WELLS USED TO CONSTRUCT THIS FIGURE ARE BETWEEN 680 AND 710 FEET ABOVE MSL.

0 200 400

SCALE: 1"=200'

POTENTIOMETRIC SURFACE MAP
SHALLOW DOLOMITE - SPRING 1995

COOK COMPOSITES AND POLYMERS
SAUKVILLE, WISCONSIN

RMT INC.

Dwn. By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj.#:	1832.91
File #:	18329104

FIGURE 4B

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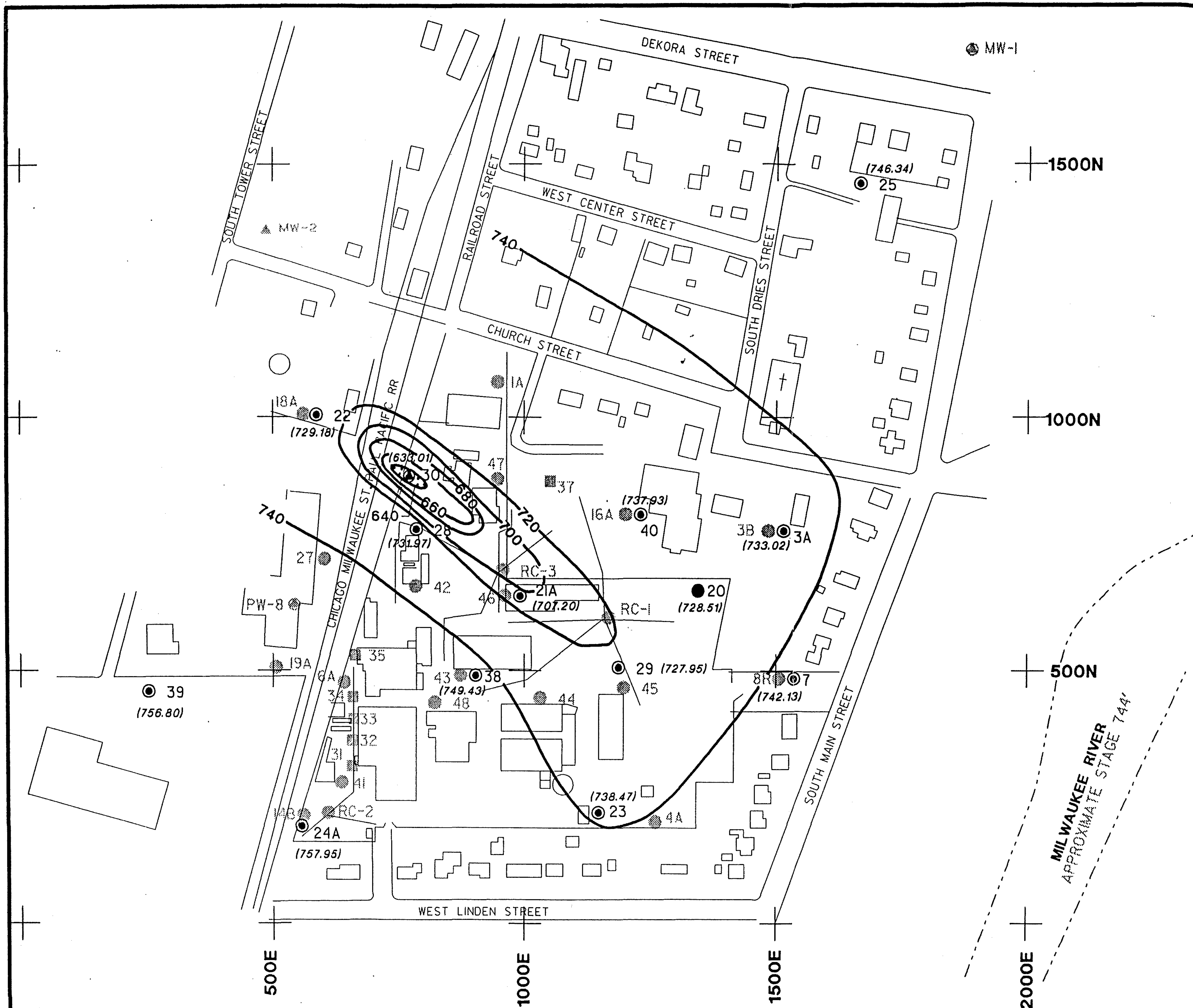

LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- (746.34) POTENTIOMETRIC ELEVATION
- 740 —— POTENTIOMETRIC CONTOUR (20-foot INTERVAL)
- GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. ELEVATIONS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
3. THE ELEVATIONS OF THE BOTTOMS OF THE SHALLOW DOLOMITE WELLS USED TO CONSTRUCT THIS FIGURE ARE BETWEEN 680 AND 710 FEET ABOVE MSL.

N

0 200 400

SCALE: 1"=200'

POTENTIOMETRIC SURFACE MAP SHALLOW DOLOMITE - SUMMER 1995

COOK COMPOSITES AND POLYMERS SAUKVILLE, WISCONSIN

RMT INC.

Dwn.By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj.#:	1832.91
File #:	18329105

FIGURE 4C

Design File = J:\01832\91\18329105.dgn
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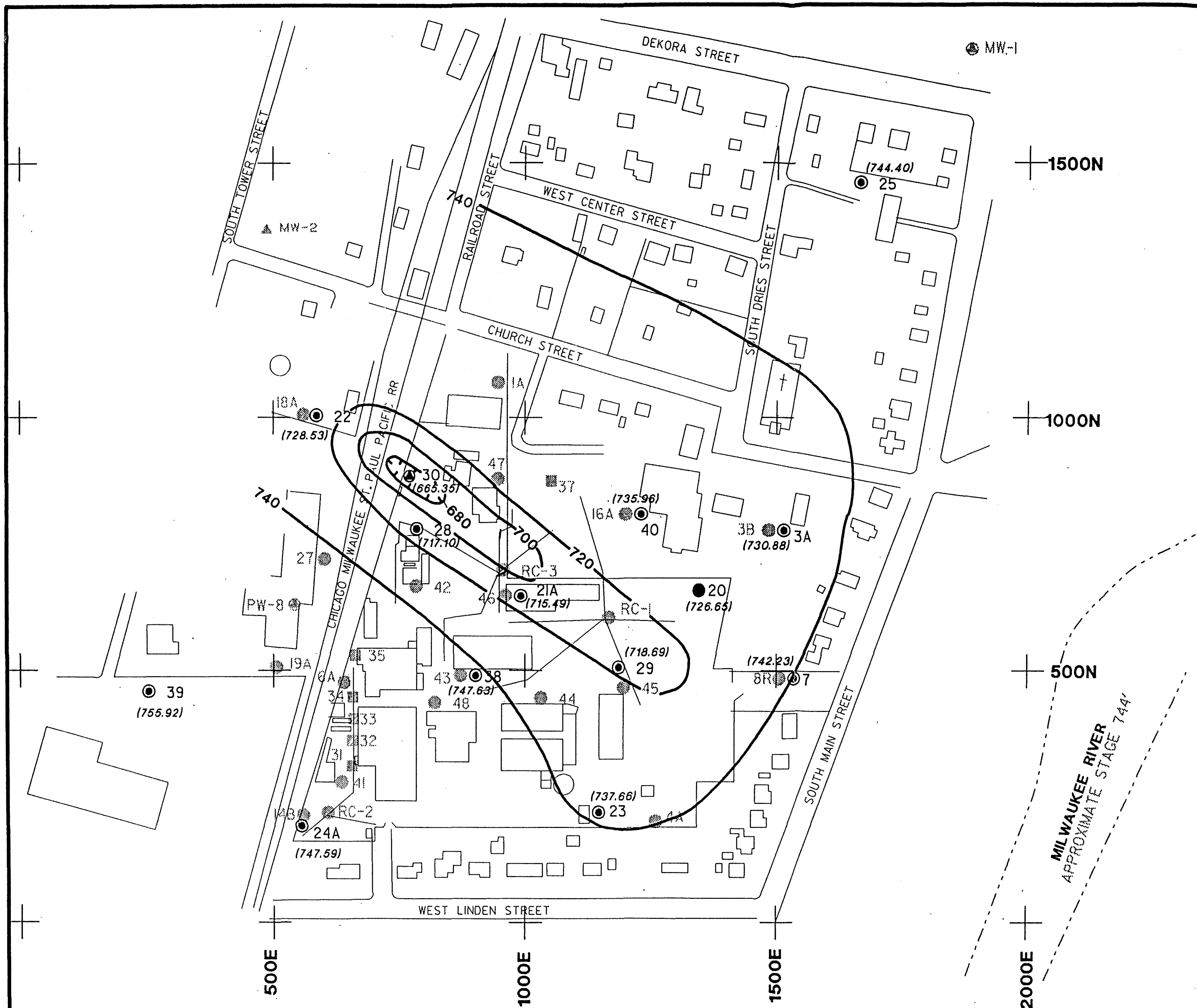

LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- (744.40) POTENTIOMETRIC ELEVATION
- 740 POTENTIOMETRIC CONTOUR (20-foot INTERVAL)
- GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. ELEVATIONS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
3. THE ELEVATIONS OF THE BOTTOMS OF THE SHALLOW DOLOMITE WELLS USED TO CONSTRUCT THIS FIGURE ARE BETWEEN 680 AND 710 FEET ABOVE MSL.

0 200 400
SCALE: 1"=200'

POTENTIOMETRIC SURFACE MAP SHALLOW DOLOMITE - FALL 1995

COOK COMPOSITES AND POLYMERS SAUKVILLE, WISCONSIN

RMT INC.

Dwn. By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj.#:	1832.91
File #:	18329106

FIGURE 4D

Design File = j:\01832\91\18329106.dgn
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Plot File = K:\PLT\MSPC\18329106.PRF
Plot Date = Fri Jan 19 11:07:40 1996
Pen Table =DEFAULT.TBL

APPENDIX B

HYDROGEOLOGIC CALCULATIONS
SUMMER 1995

APPENDIX B

HYDROGEOLOGIC CALCULATIONS
SUMMER 1995

Horizontal

Glacial Drift Unit:

$$I = \frac{dH}{dL} = \frac{\approx 760 - \approx 745}{800} \approx 0.02 \; (\textit{eastward})$$

Vertical Gradient

Between Glacial Drift Unit and Shallow Dolomite Unit

W18A/W22

center D = (772.53-66) + 1/2(40) = 726.53

$$I_v = \frac{WLS-WLD}{WLS-center\ D} = \frac{766.89-729.18}{766.89-726.53} = 0.9 \; (\textit{downward})$$

W-43/W-38

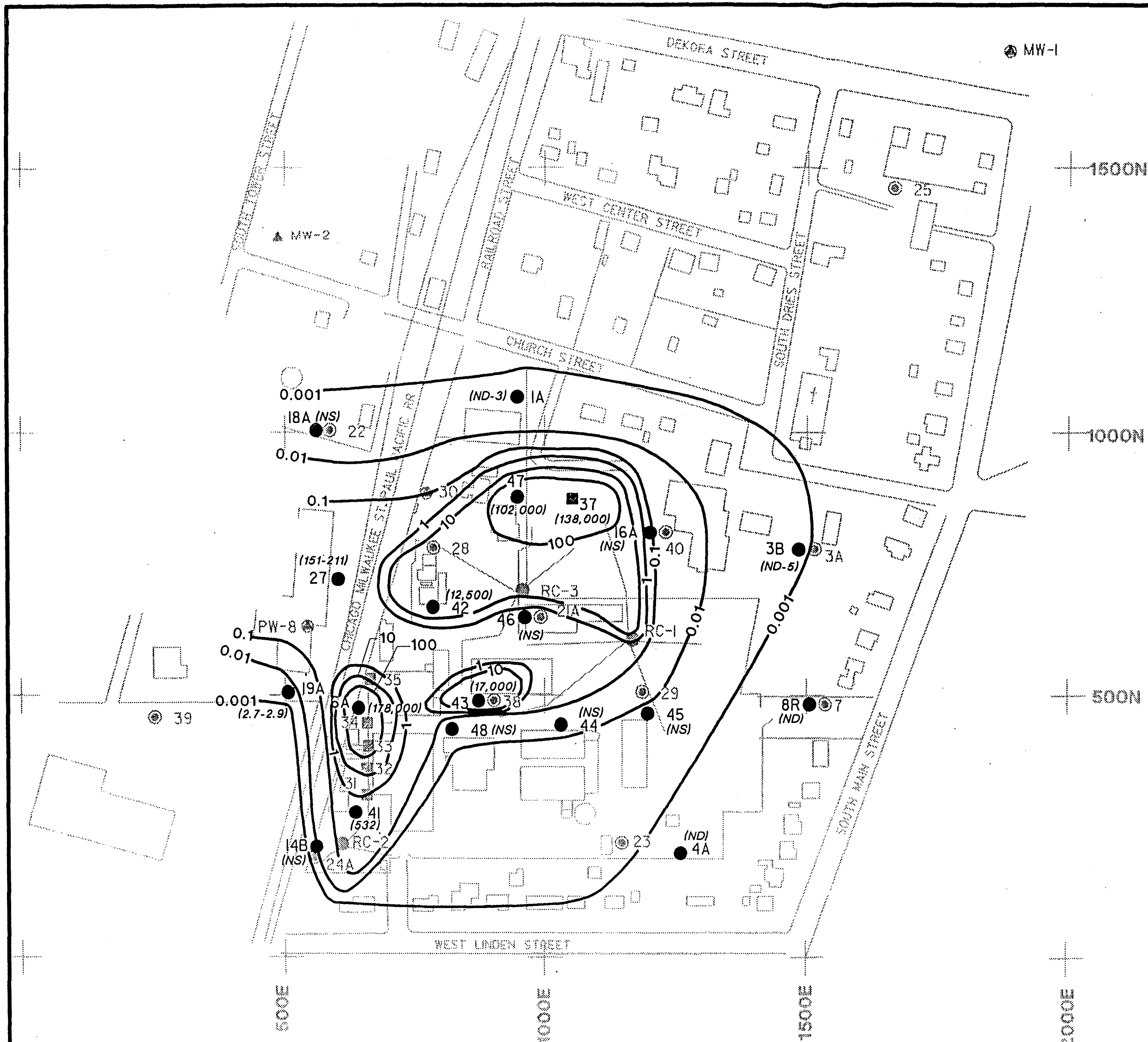
center D = (770.98-49.00) + 1/2(16.8) = 730.38'

$$I_v = \frac{WLS-WLD}{WLS-center\ D} = \frac{764.00-749.43}{764.00-730.38} = 0.4 \; (\textit{downward})$$

APPENDIX C

ISOCONCENTRATION MAPS

1/3



LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- *(ND-3.0)* TOTAL VOC CONCENTRATION (ug/L)
- —0.01 TOTAL VOC ISOCONCENTRATION CONTOUR (THOUSANDS OF ug/L) (LOGARITHMIC CONTOUR INTERVAL)
- *(ND)* NOT DETECTED
- *(NS)* NOT SAMPLED

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. FIGURE INCLUDES CONCENTRATION DATA FROM SEVERAL QUARTERLY GROUNDWATER MONITORING EVENTS IN 1995.

0 200 400
SCALE: 1"=200'

COMPOSITE 1995 TOTAL VOC CONCENTRATIONS - GLACIAL DRIFT WELLS

COOK COMPOSITES AND POLYMERS SAUKVILLE, WISCONSIN

RMT INC.

Dwn. By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj. #:	1832.91
File #:	18329111

FIGURE 7

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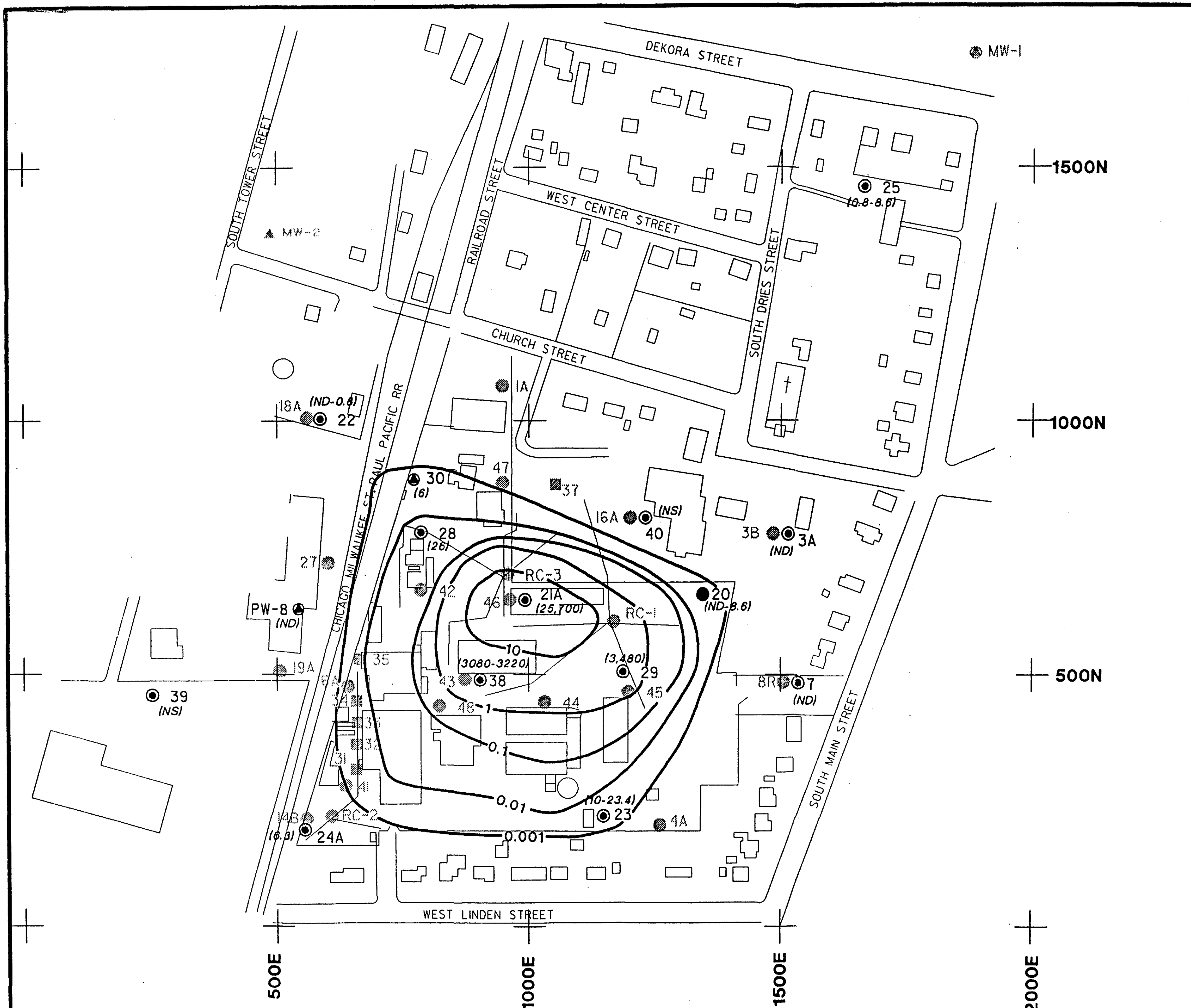


LEGEND

- DEEP DOLOMITE WELL
- SHALLOW DOLOMITE WELL
- GLACIAL OVERBURDEN WELL
- GLACIAL OVERBURDEN WITHDRAWAL WELL
- RANNEY COLLECTOR
- *(ND-0.8)* TOTAL VOC ISOCONCENTRATION (ug/L)
- 10 TOTAL VOC ISOCONCENTRATION CONTOUR (ug/L) (LOGARITHMIC CONTOUR INTERVAL)
- *(ND)* NOT DETECTED
- *(NS)* NOT SAMPLED

NOTES

1. BASE MAP WAS DEVELOPED FROM HATCHER-SAYRE, INC., 1992.
2. SHALLOW DOLOMITE WELLS PENETRATE UP TO APPROXIMATELY THE TOP 60' OF THE DOLOMITE UNIT.
3. FIGURE INCLUDES CONCENTRATION DATA FROM SEVERAL QUARTERLY GROUNDWATER MONITORING EVENTS IN 1995.

0 200 400

SCALE: 1"=200'

COMPOSITE 1995 TOTAL VOC CONCENTRATIONS SHALLOW DOLOMITE WELLS

COOK COMPOSITES AND POLYMERS SAUKVILLE, WISCONSIN

RMT INC.

Dwn.By:	JRW
Approved By:	ELM
Date:	JANUARY 1996
Proj.#:	1832.91
File #:	18329112

FIGURE 8

APPENDIX D

TREND ANALYSIS PLOTS

APPENDIX D

TREND ANALYSIS PLOTS

Glacial Drift Wells

Receptor:	RC-1, RC-2, RC-3
Perimeter:	W-01A, W-03B, W-04A, W-08, W-20, W-27
Remediation Progress:	W-06A, W-19A, W-37, W-41, W-42, W-43, W-47

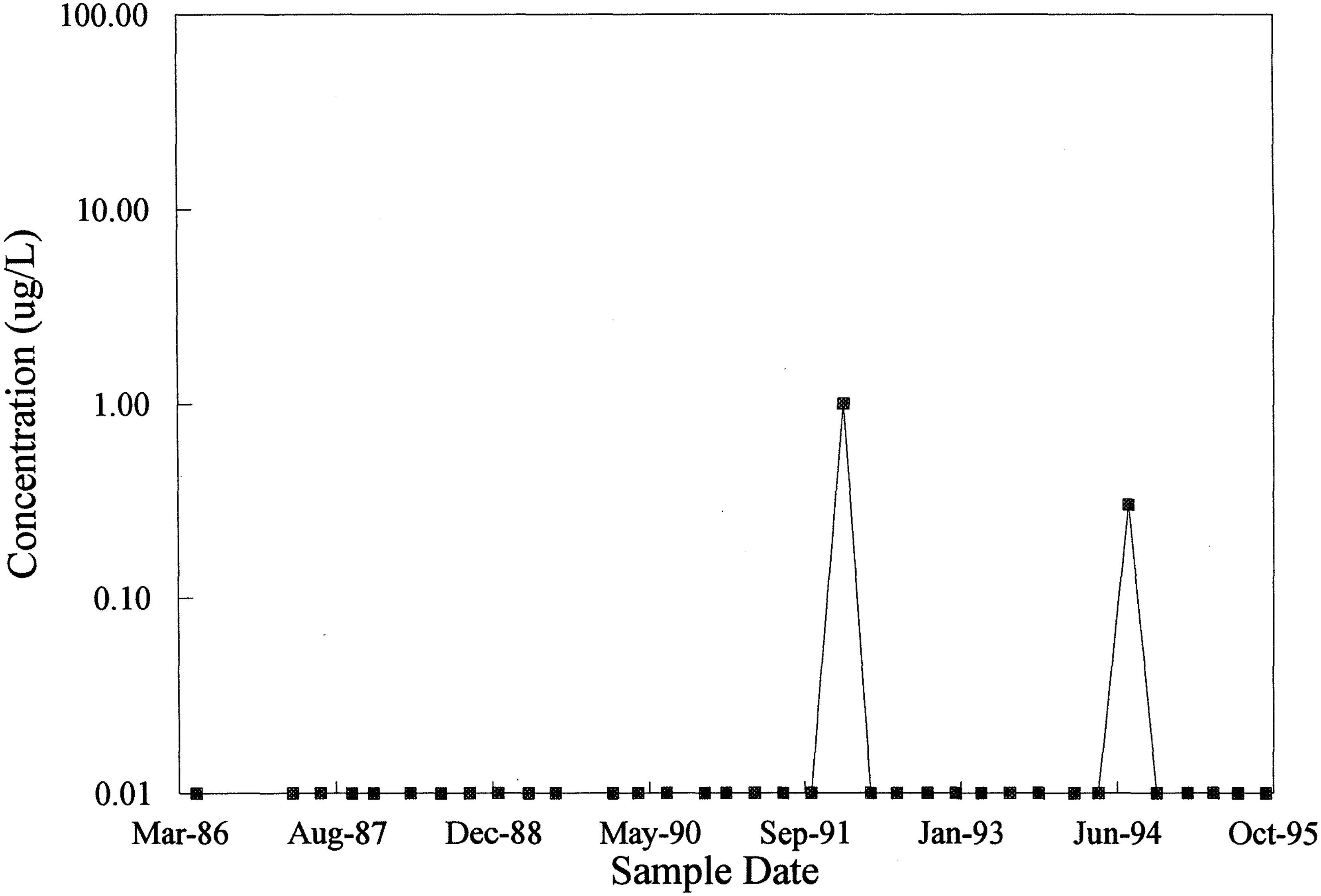
Dolomite Wells

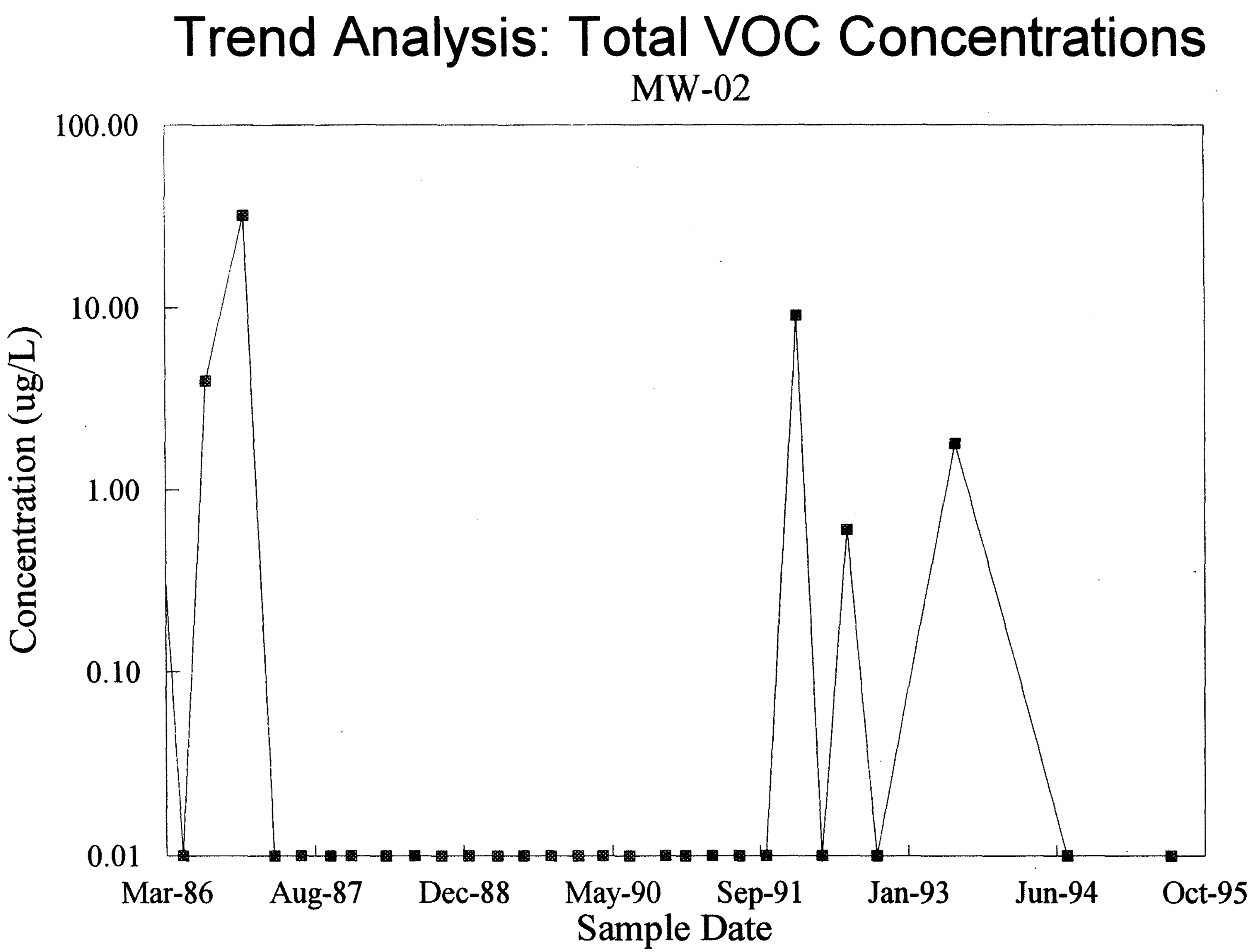
Receptor:	MW-1, MW-2, MW-3, MW-4
Perimeter:	W-03A, W-07, W-22, W-23, W-25, PW-08
Remediation Progress:	W-21A, W-24A, W-28, W-29, W-30, W-38

NOTES: When sample analyses indicate nondetectable levels of total VOCs, these events are depicted on the following plots by a symbolic value of 0.01 μg/L. Because of changes in laboratories, methods, and detection limits since 1983, this value does not represent the detection limit (or the absolute concentration).

Trend Analysis: Total VOC Concentrations

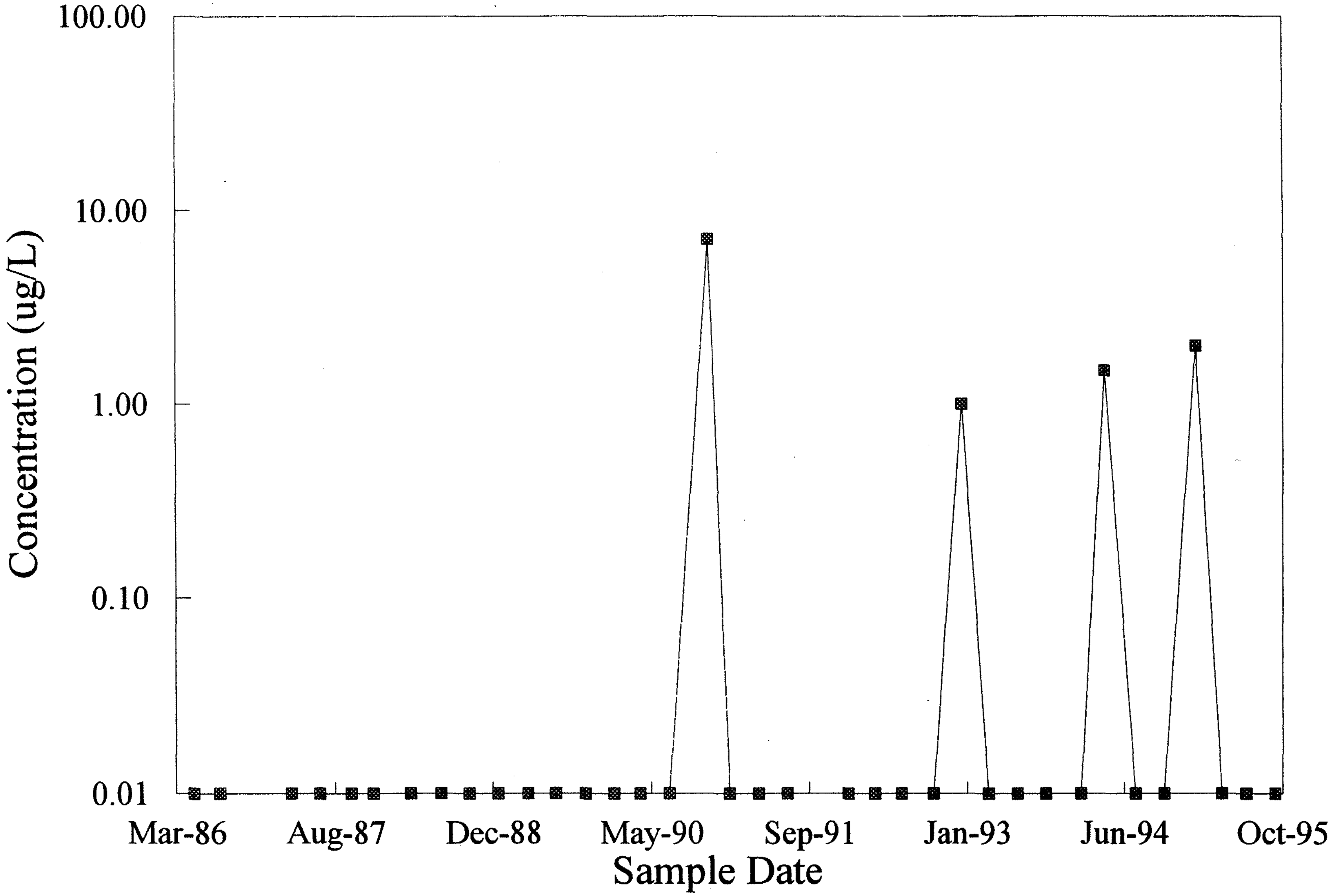
MW-01



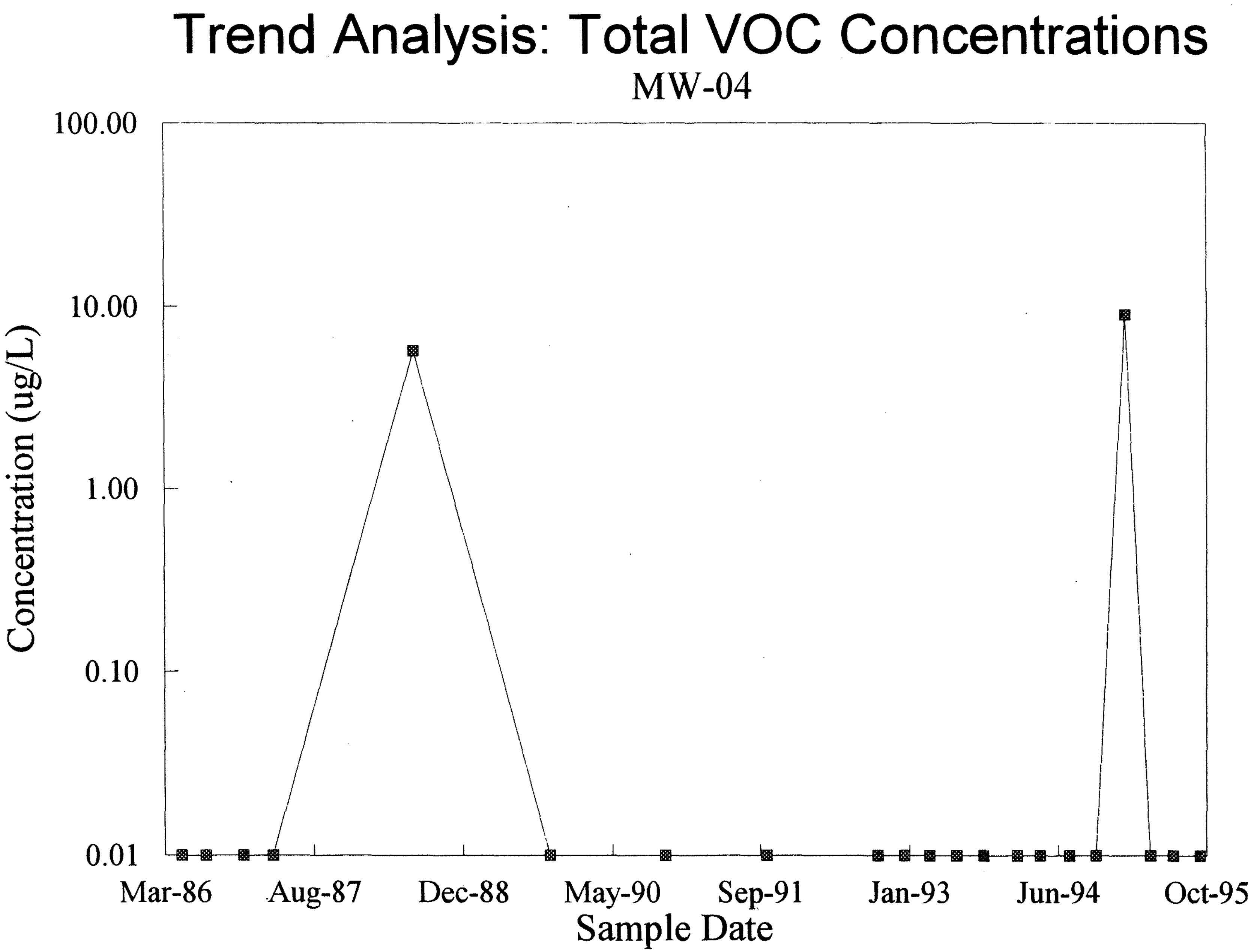

Trend Analysis: Total VOC Concentrations
MW-02
100.00
10.00
1.00
0.10
0.01
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

Trend Analysis: Total VOC Concentrations

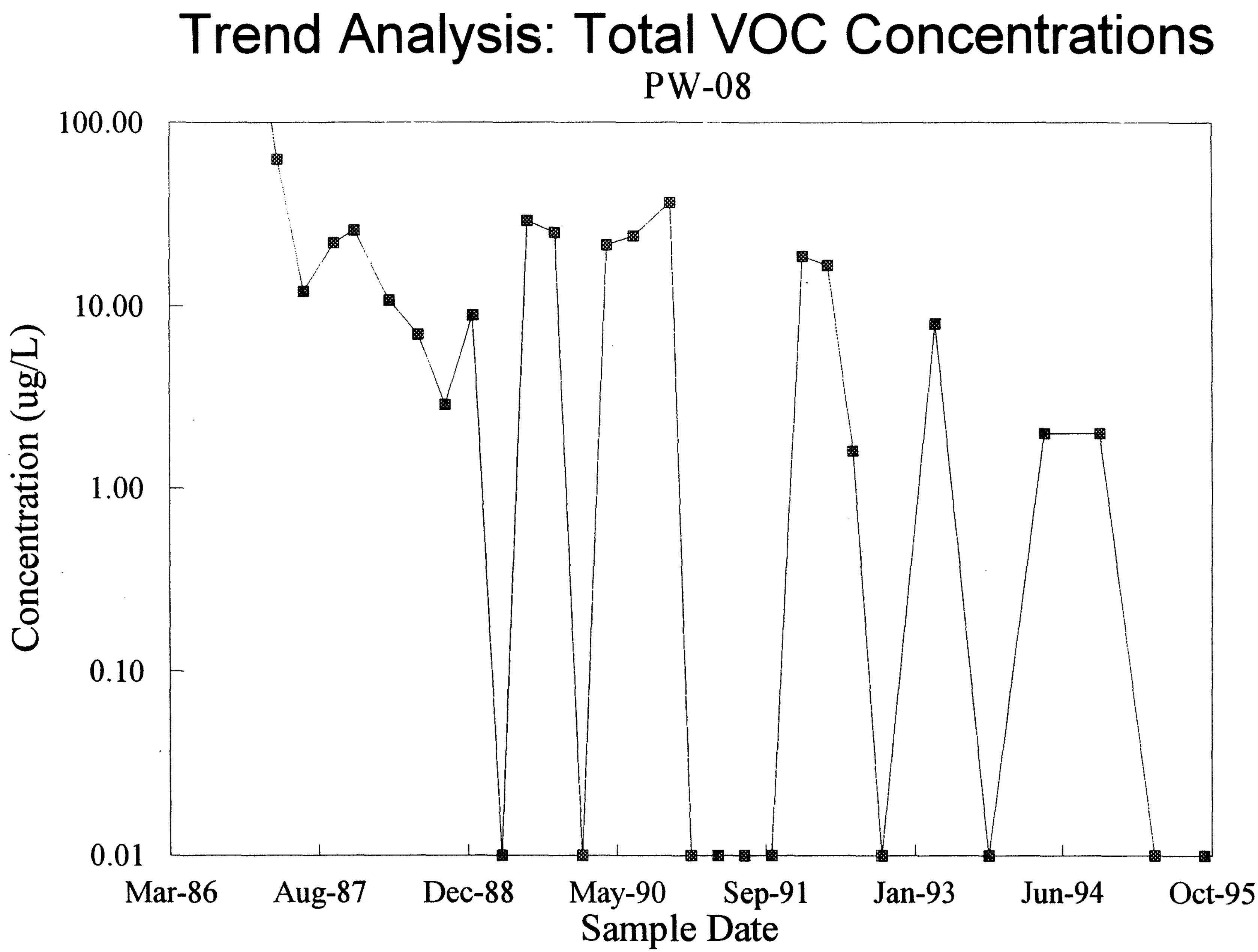
MW-03



51



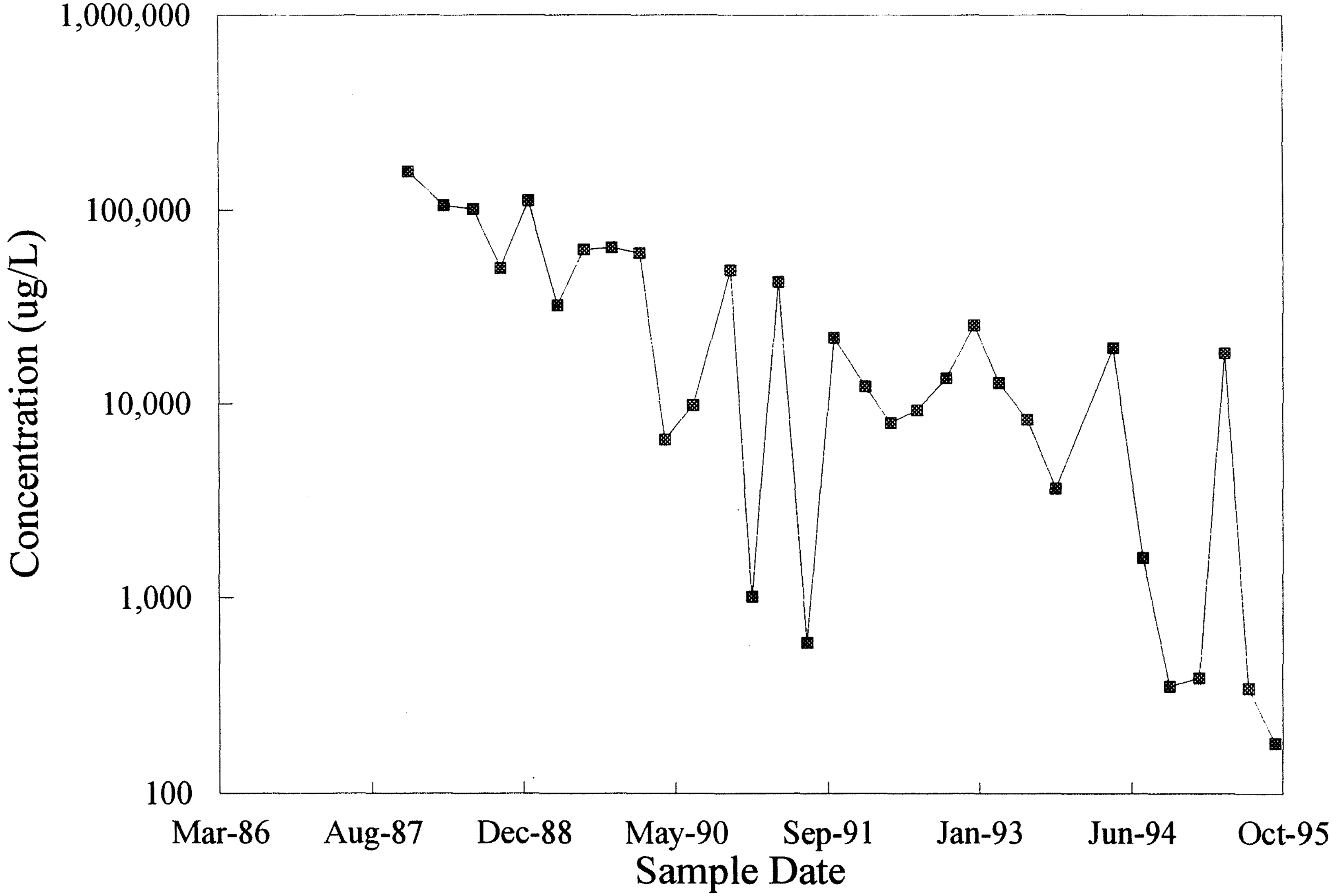
Trend Analysis: Total VOC Concentrations
MW-04
100.00
10.00
1.00
0.10
0.01
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

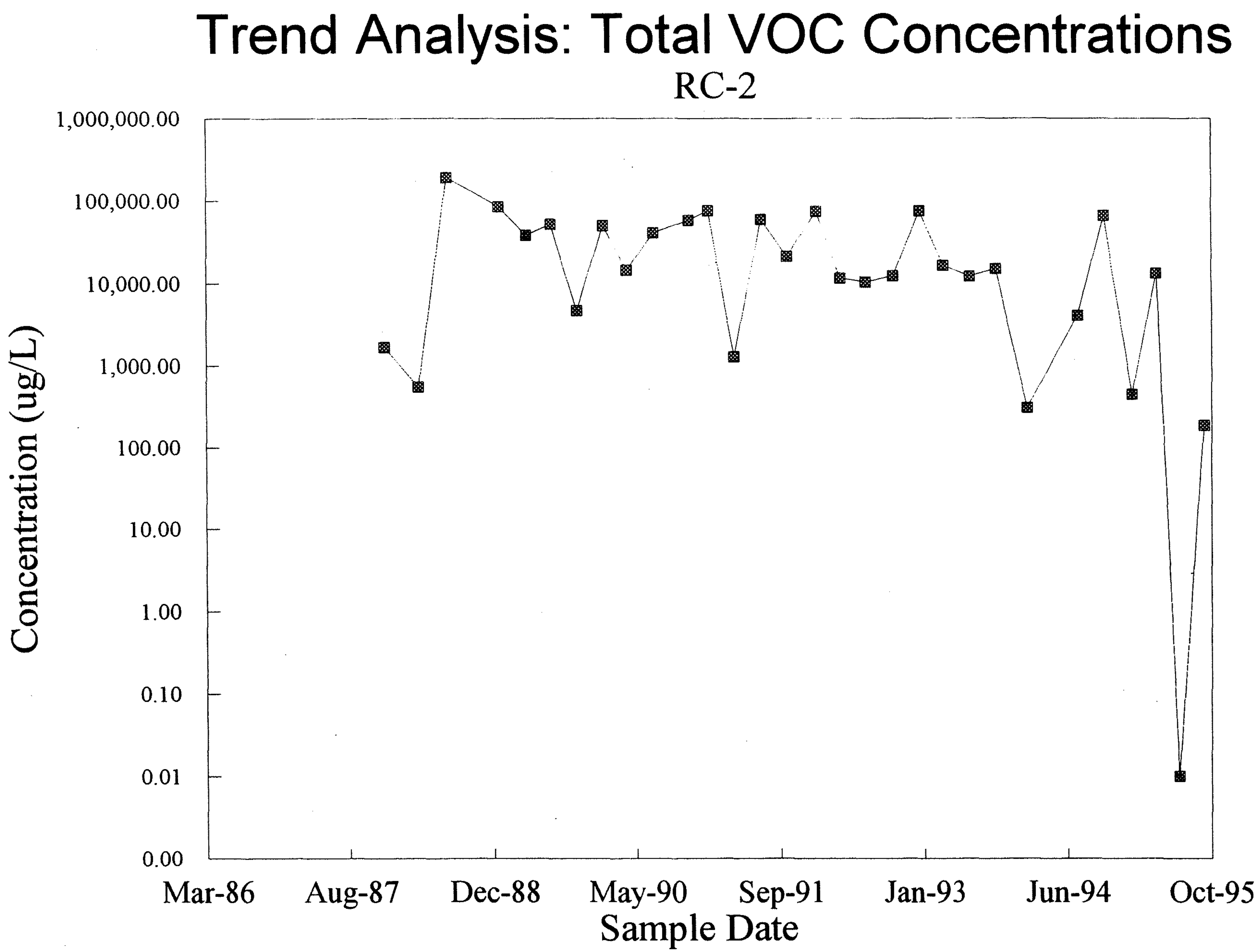


Trend Analysis: Total VOC Concentrations
PW-08
100.00
10.00
1.00
0.10
0.01
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

Trend Analysis: Total VOC Concentrations

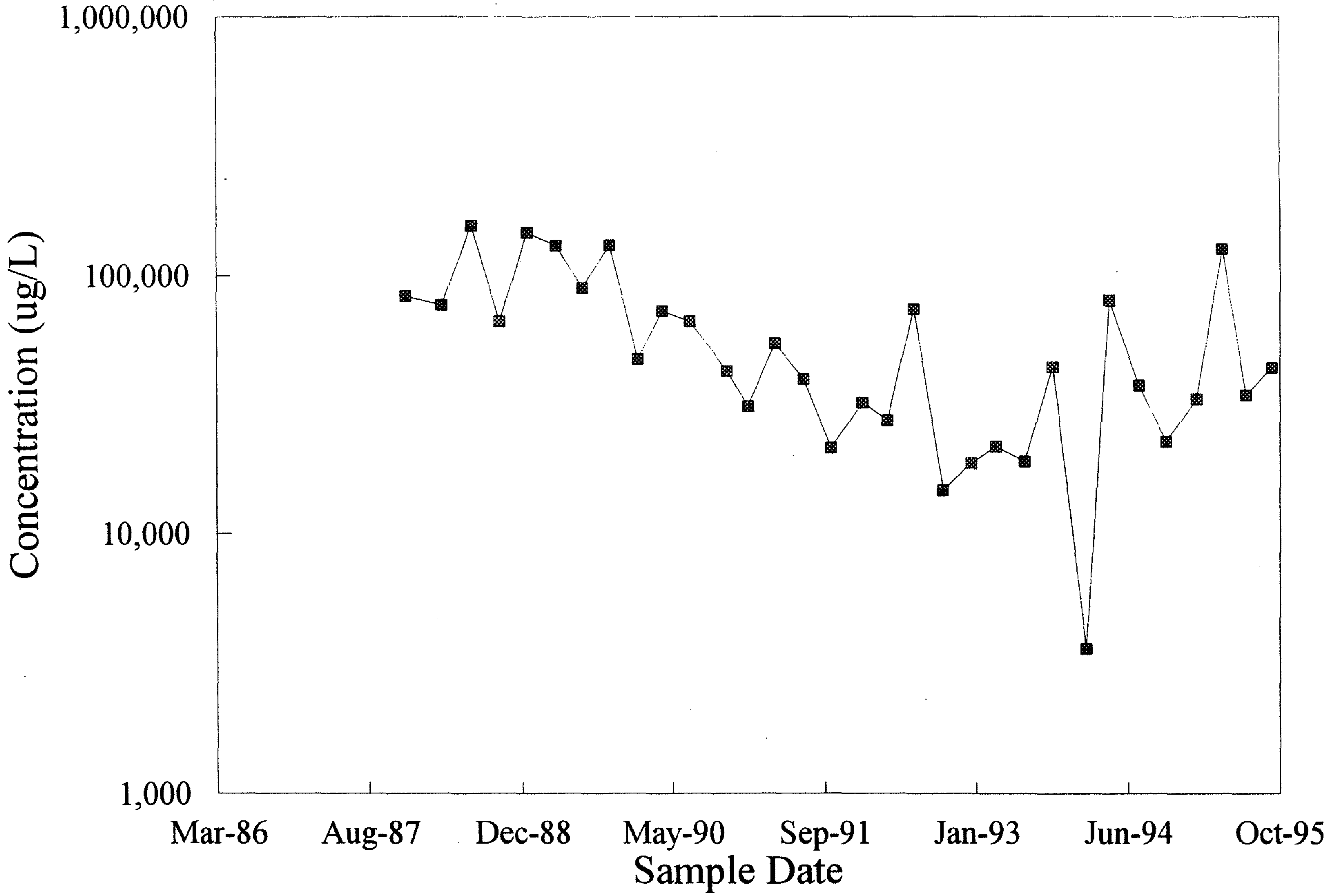
RC-1




Trend Analysis: Total VOC Concentrations
RC-2
1,000,000.00
100,000.00
10,000.00
1,000.00
100.00
10.00
1.00
0.10
0.01
0.00
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

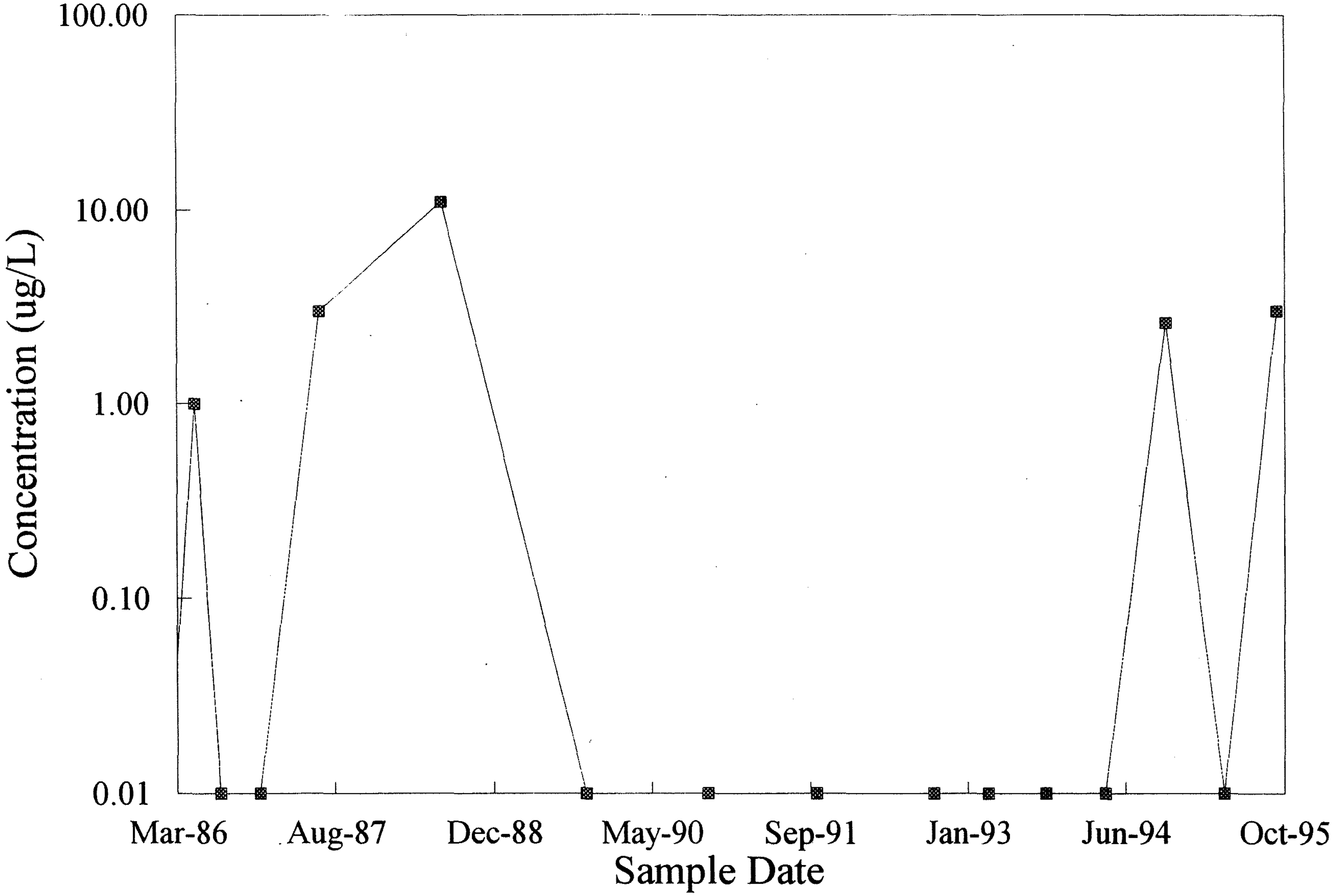
Trend Analysis: Total VOC Concentrations

RC-3



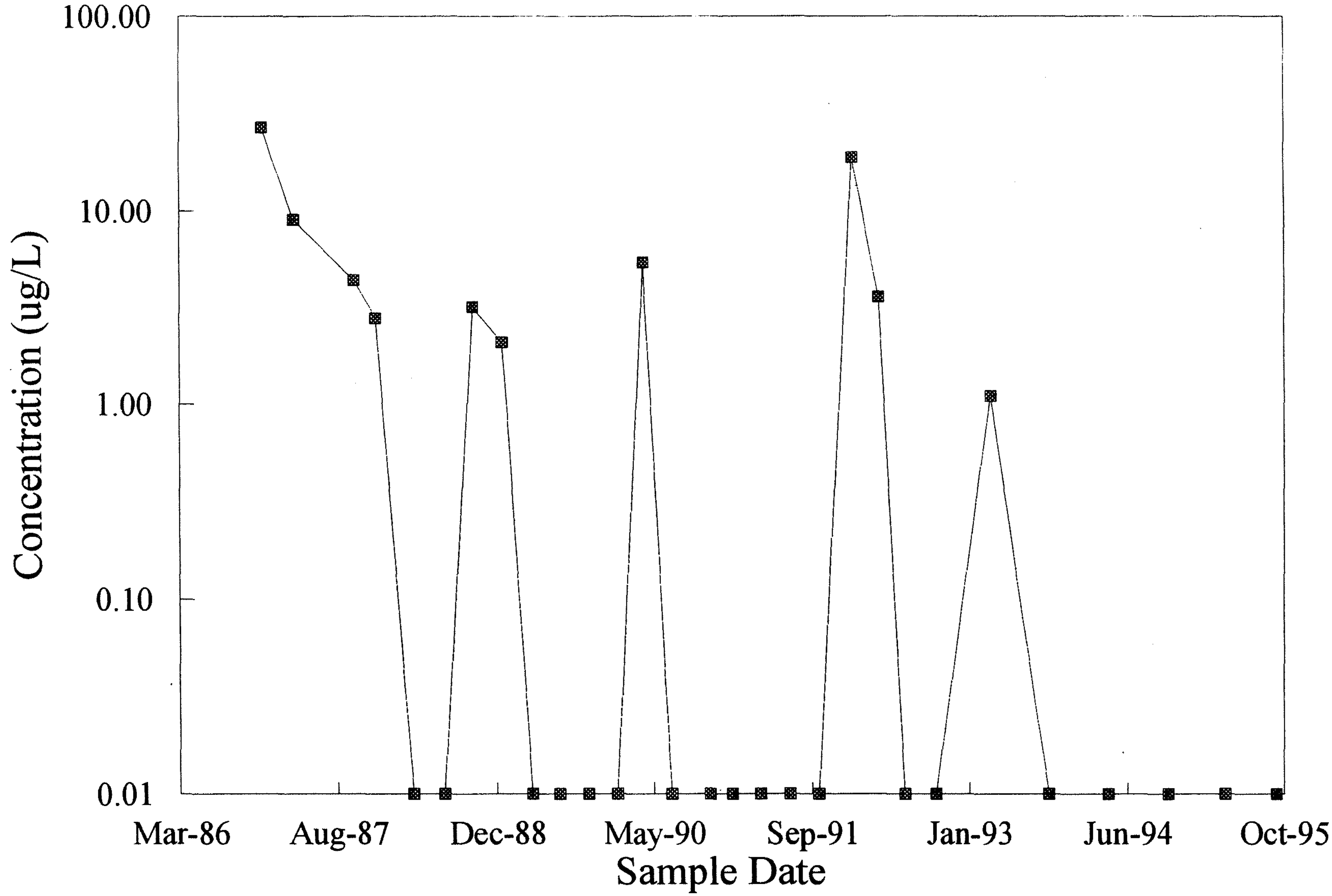
Trend Analysis: Total VOC Concentrations

W-01A



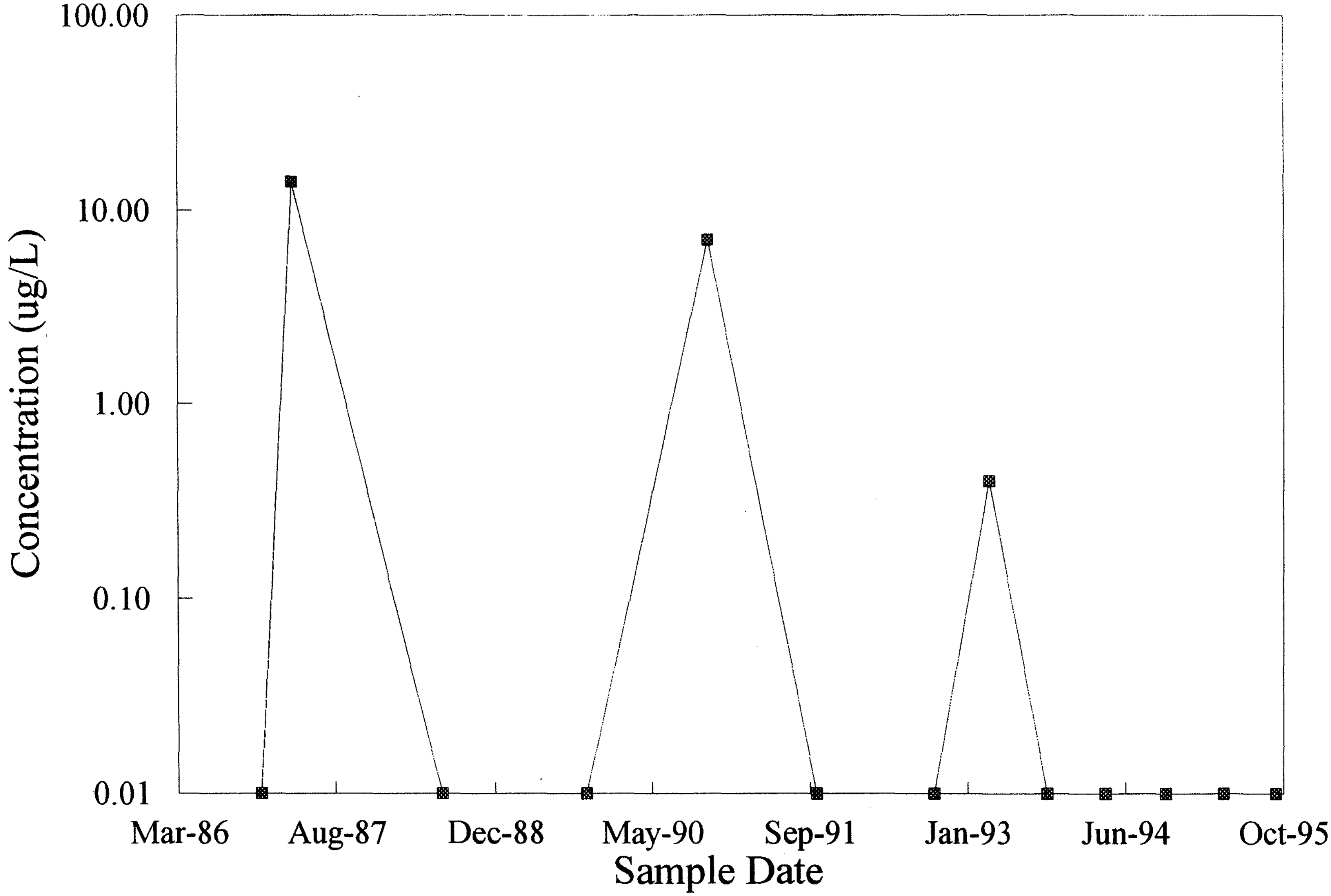
Trend Analysis: Total VOC Concentrations

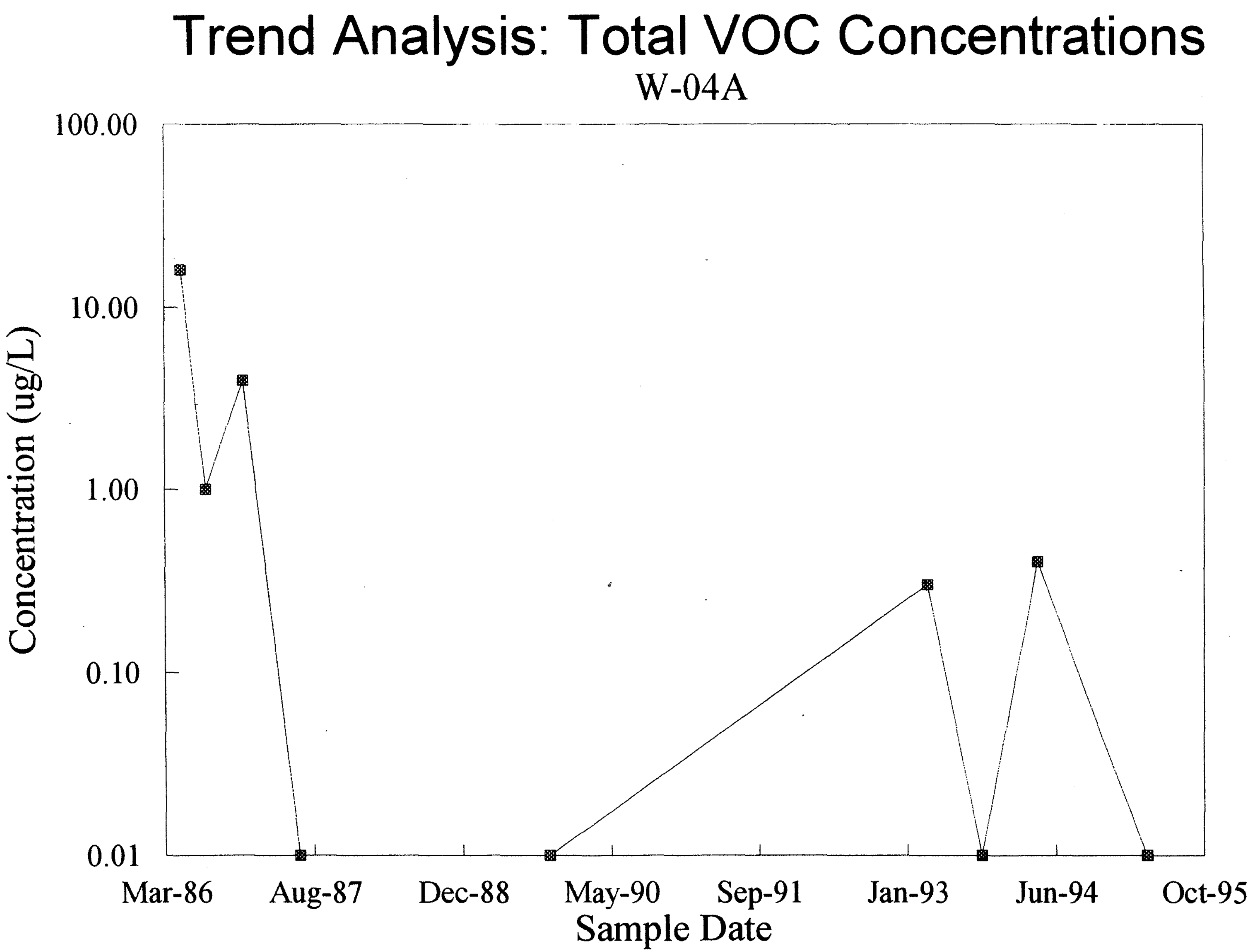
W-03A

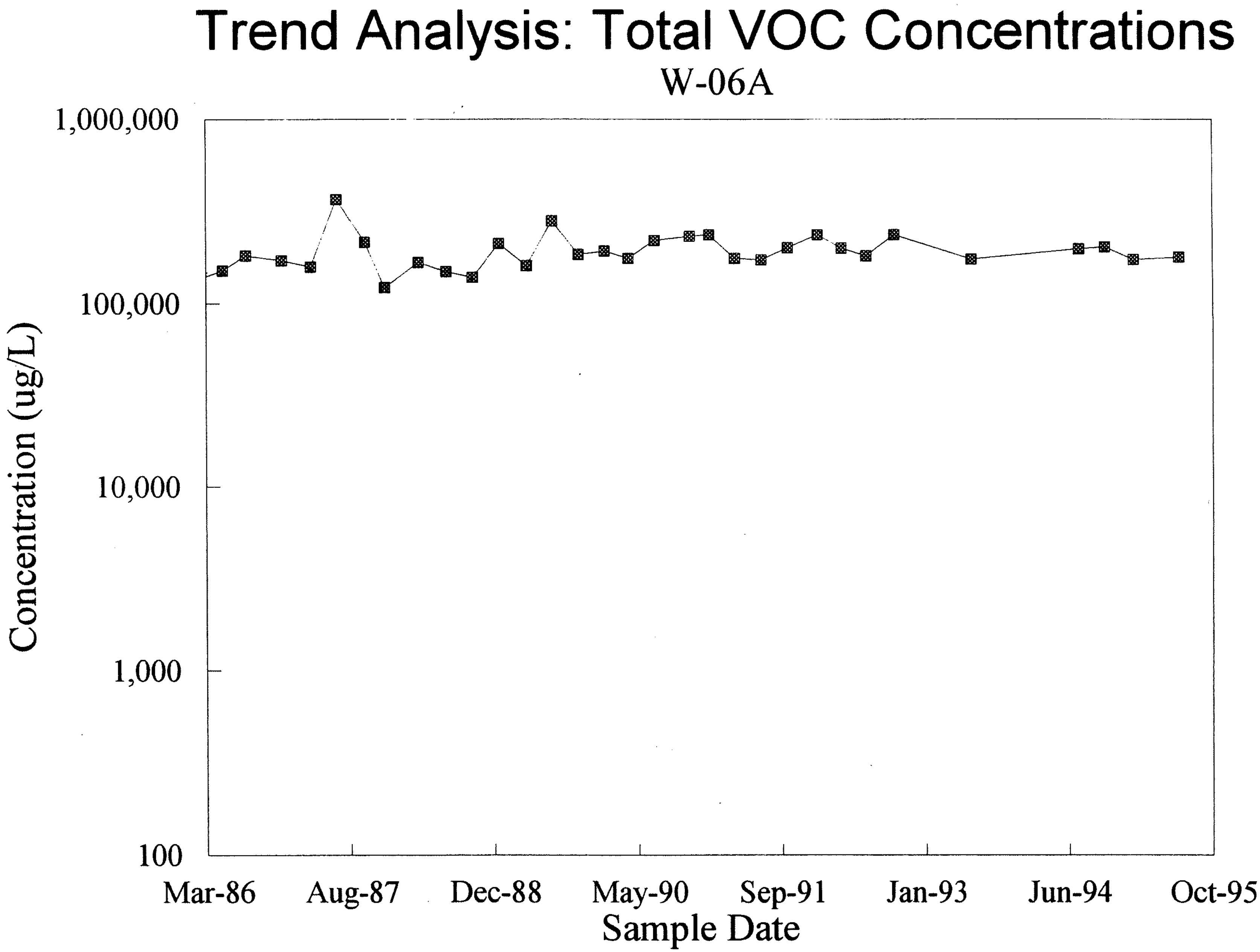


Trend Analysis: Total VOC Concentrations

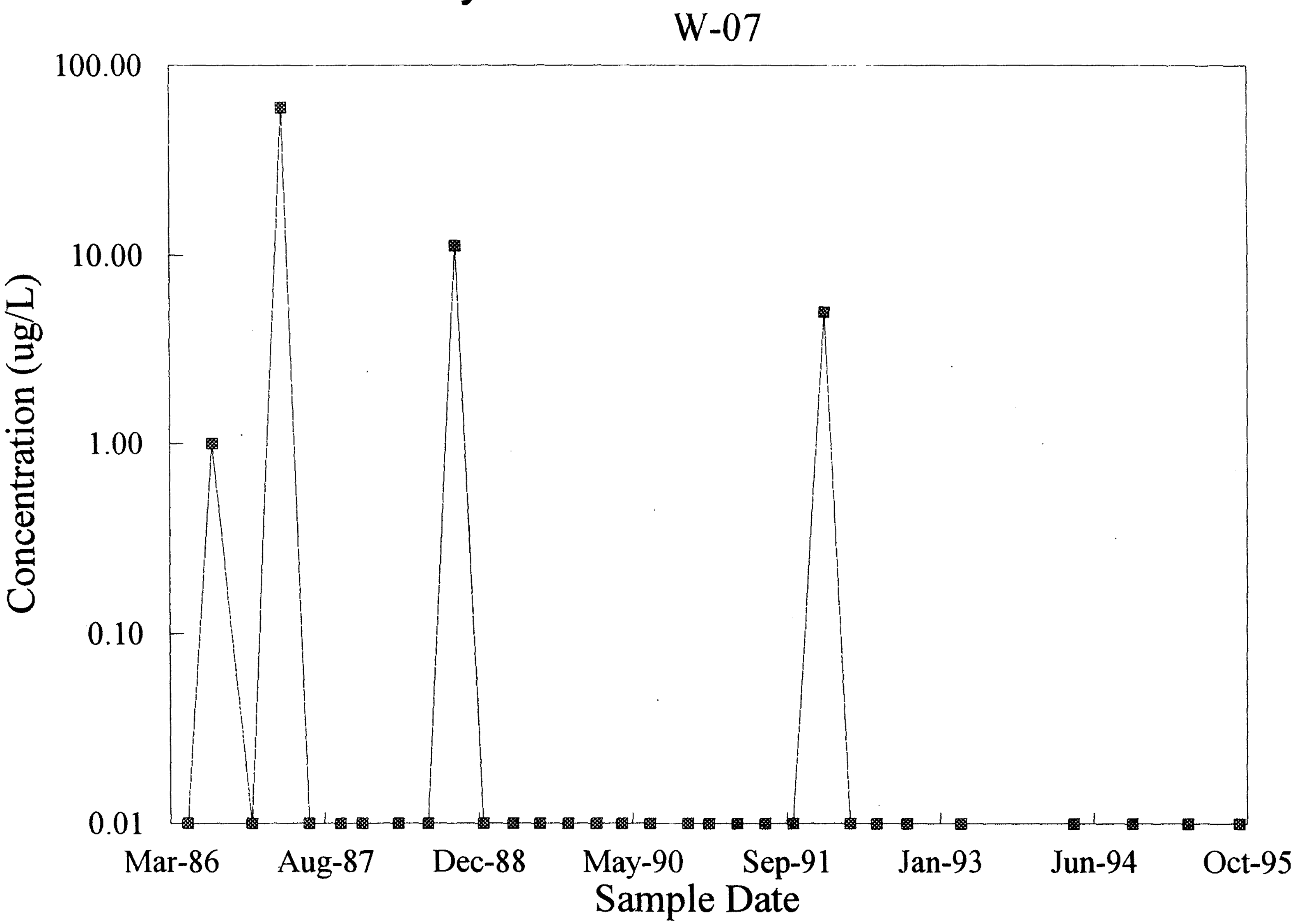
W-03B




Trend Analysis: Total VOC Concentrations
W-04A
100.00
10.00
1.00
0.10
0.01
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

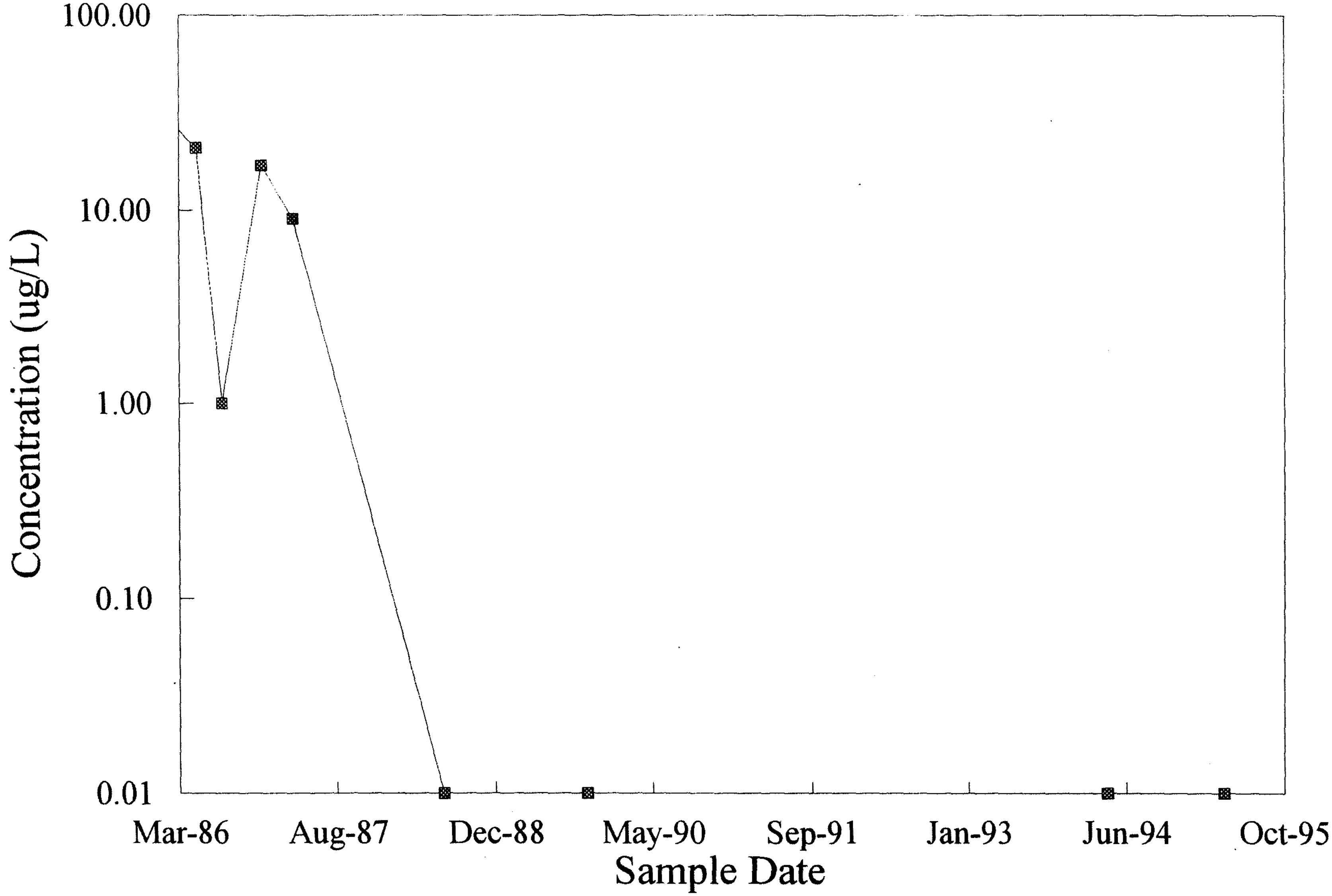

Trend Analysis: Total VOC Concentrations
W-06A
1,000,000
100,000
10,000
1,000
100
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

Trend Analysis: Total VOC Concentrations



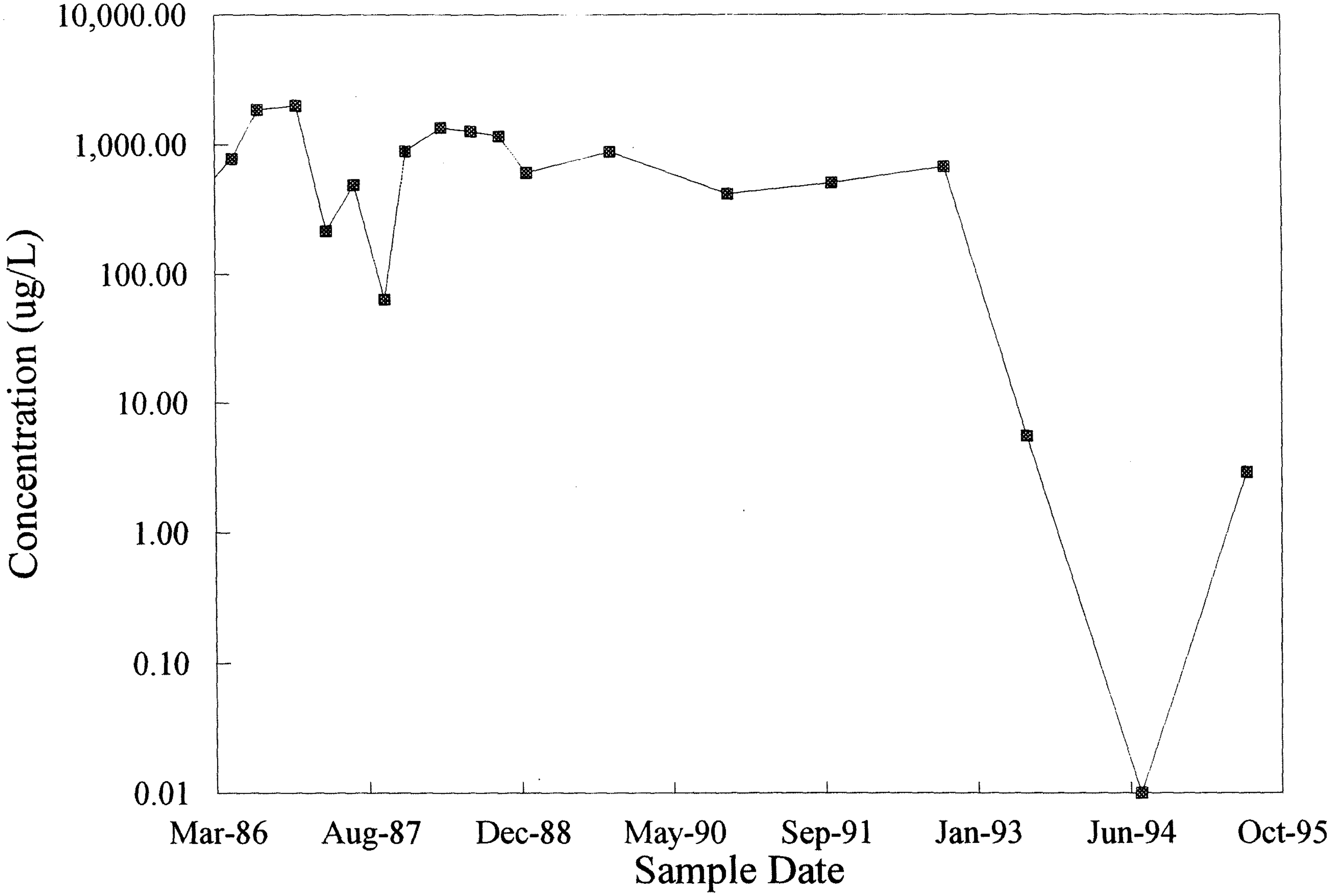
Trend Analysis: Total VOC Concentrations

W-08 and W-08R



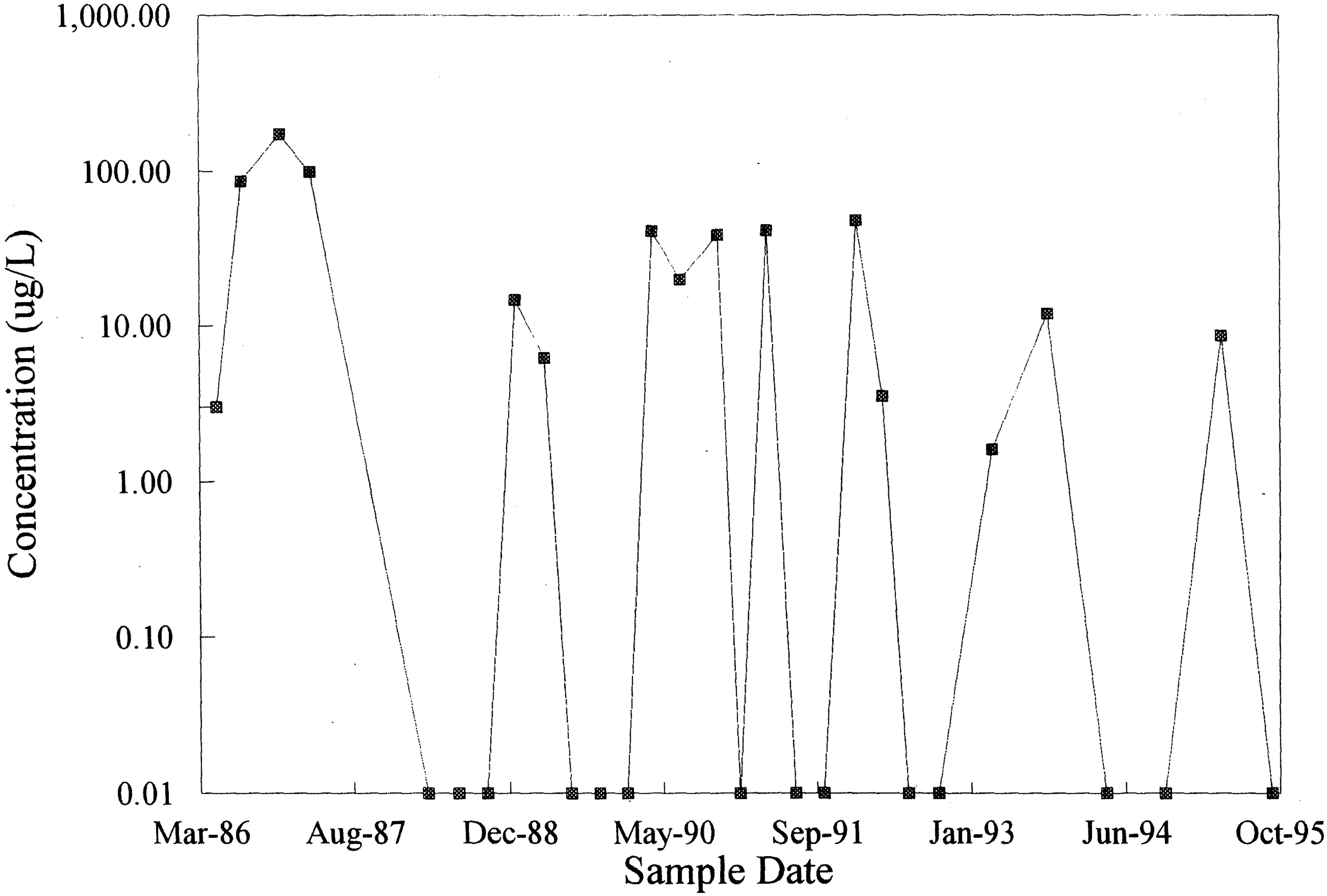
Trend Analysis: Total VOC Concentrations

W-19A



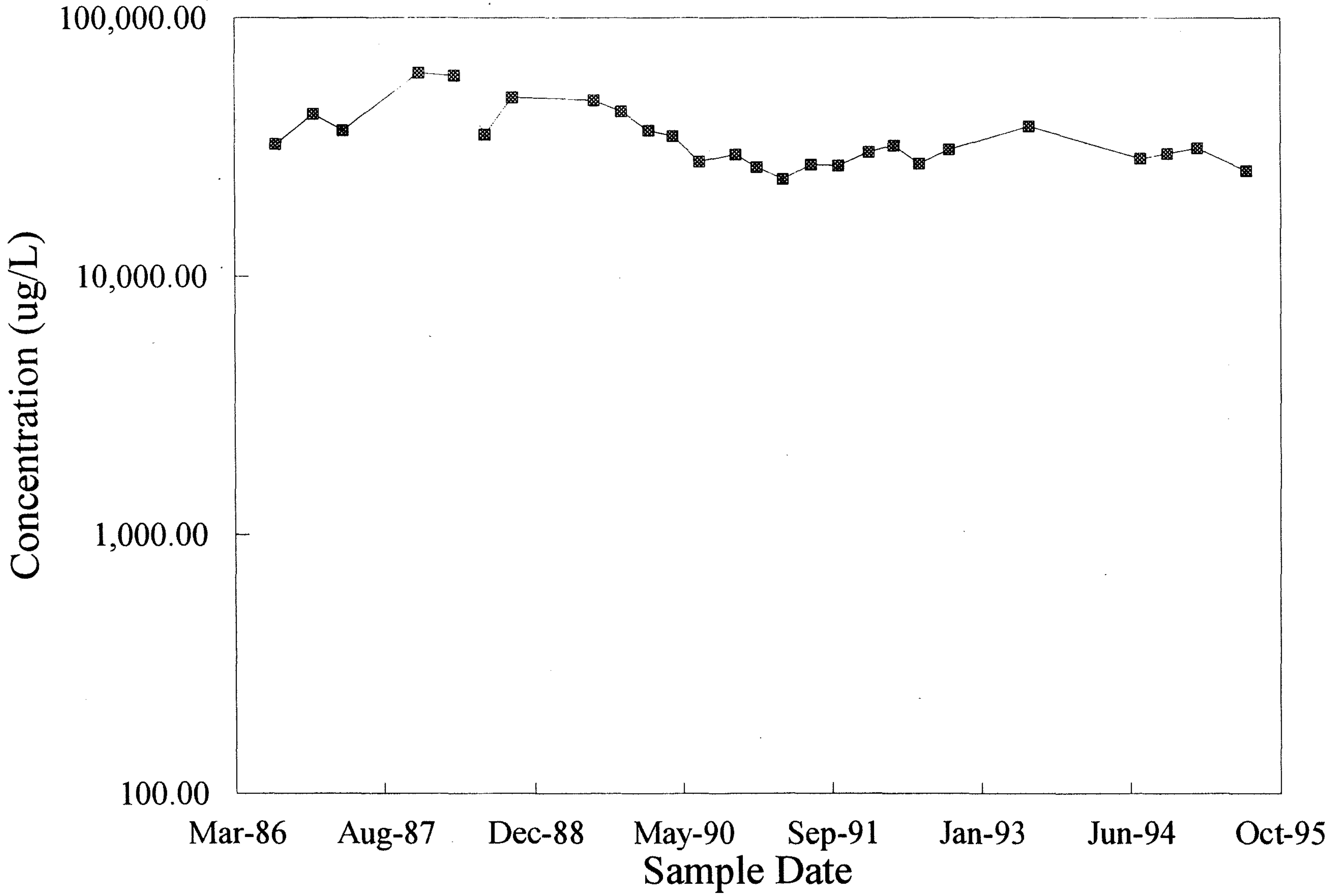
Trend Analysis: Total VOC Concentrations

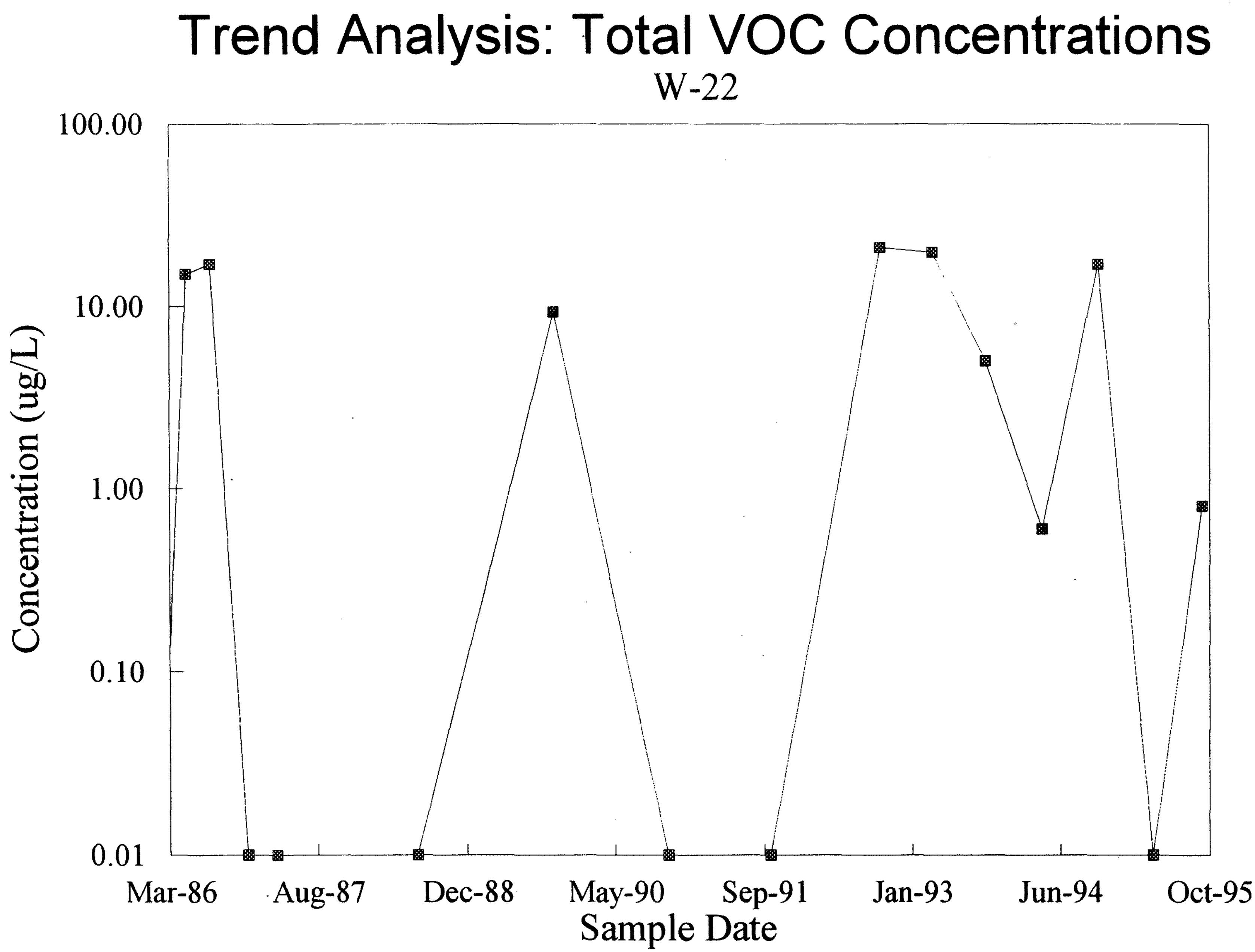
W-20



Trend Analysis: Total VOC Concentrations

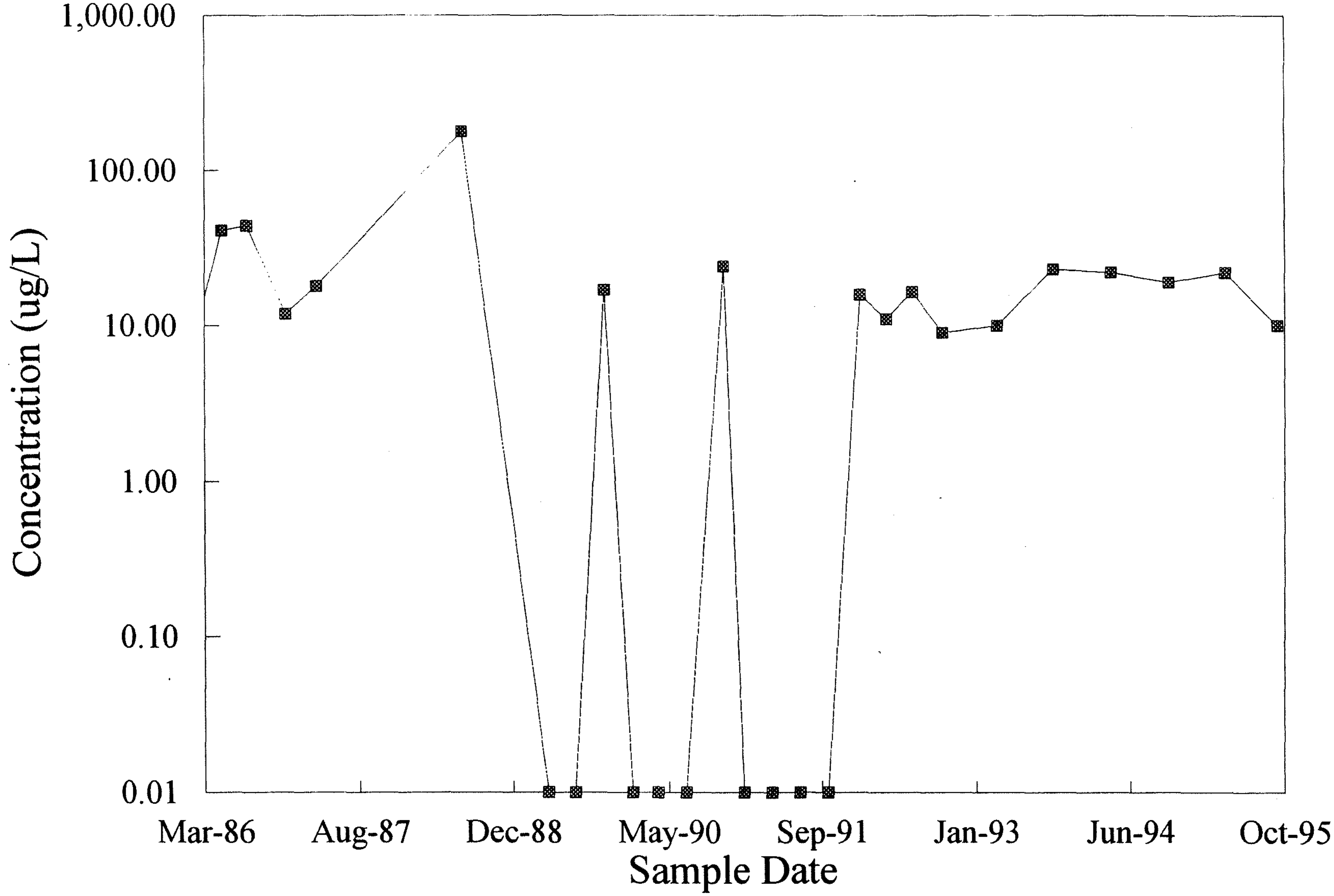
W-21A




Trend Analysis: Total VOC Concentrations
W-22
100.00
10.00
1.00
0.10
0.01
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

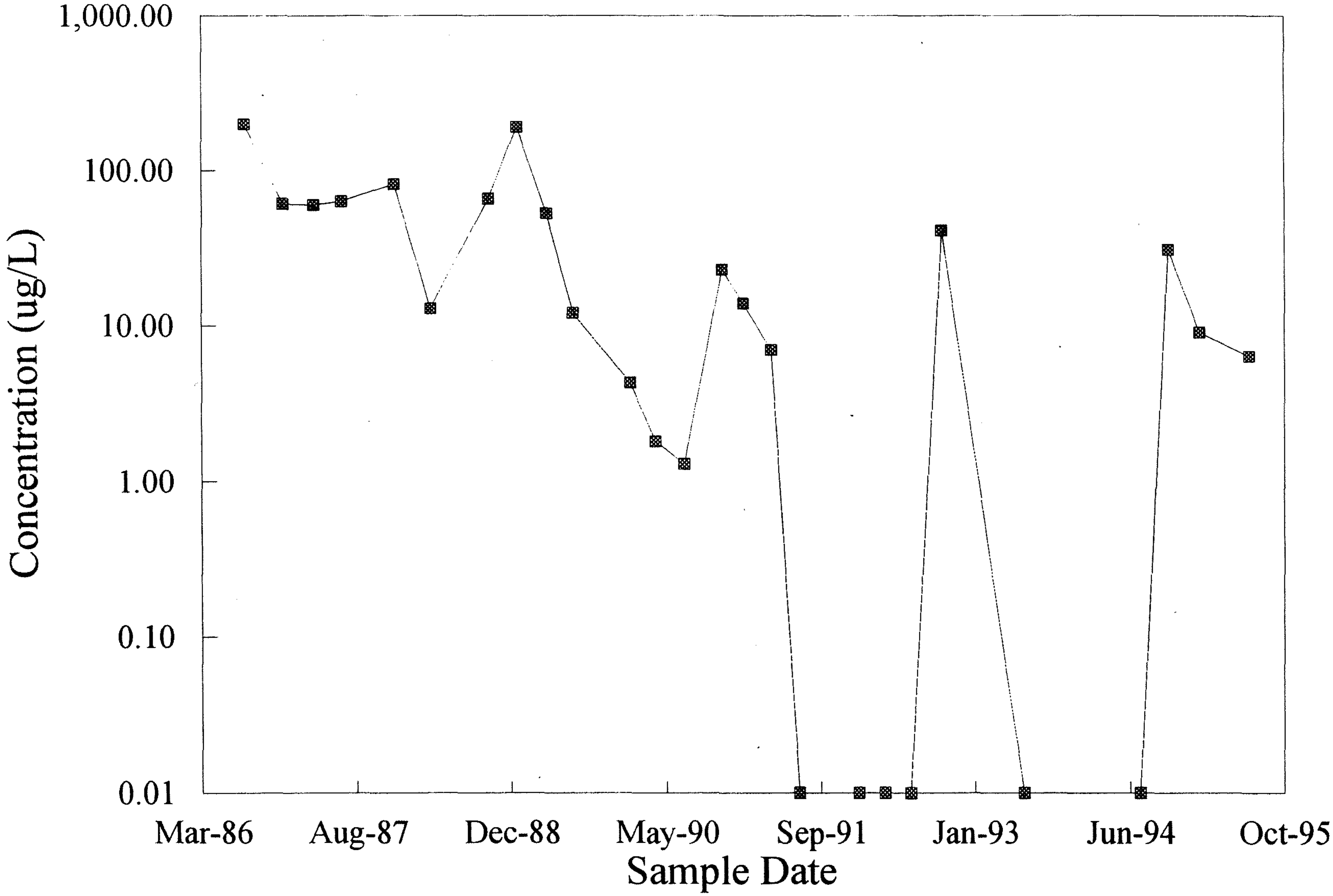
Trend Analysis: Total VOC Concentrations

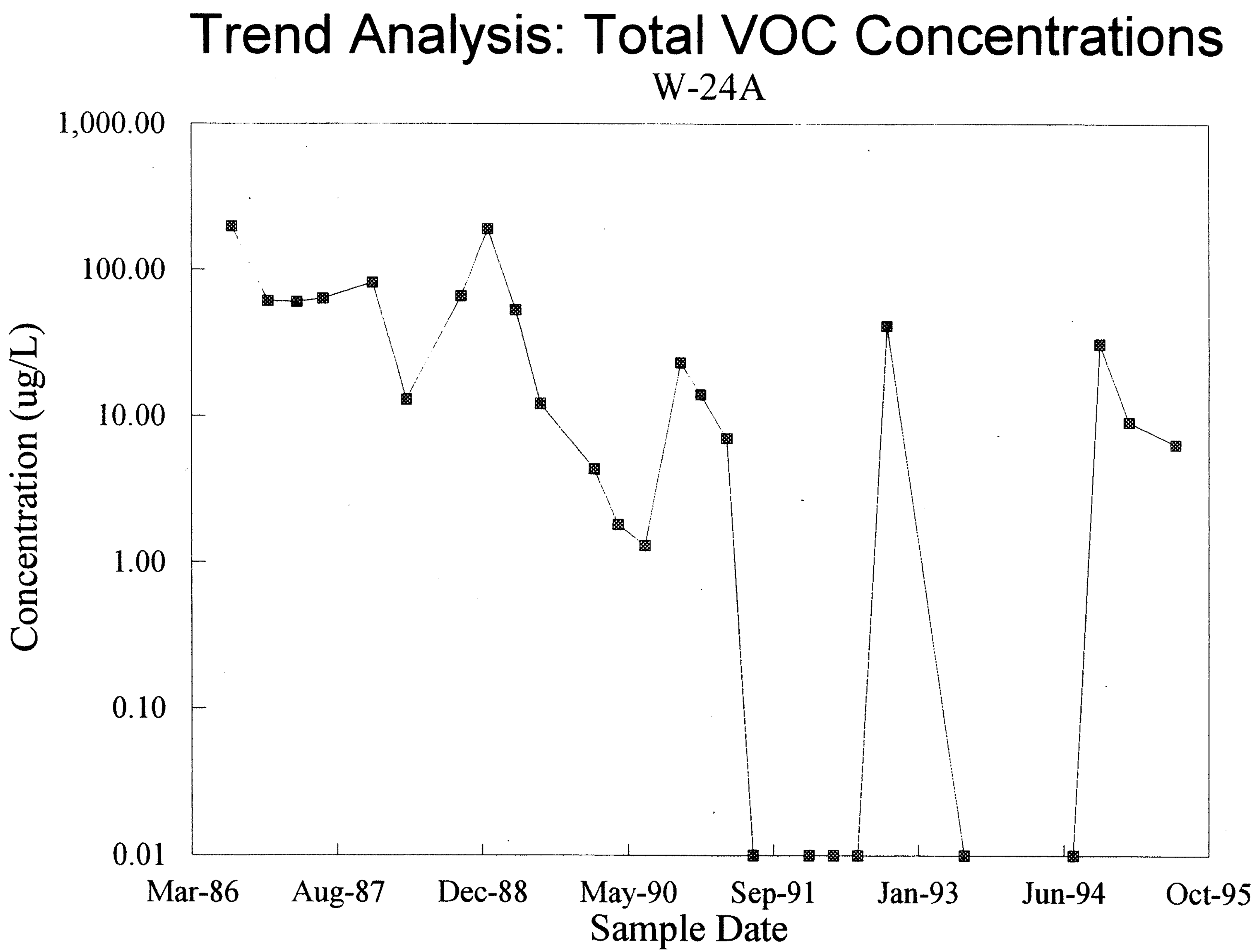
W-23



Trend Analysis: Total VOC Concentrations

W-24A

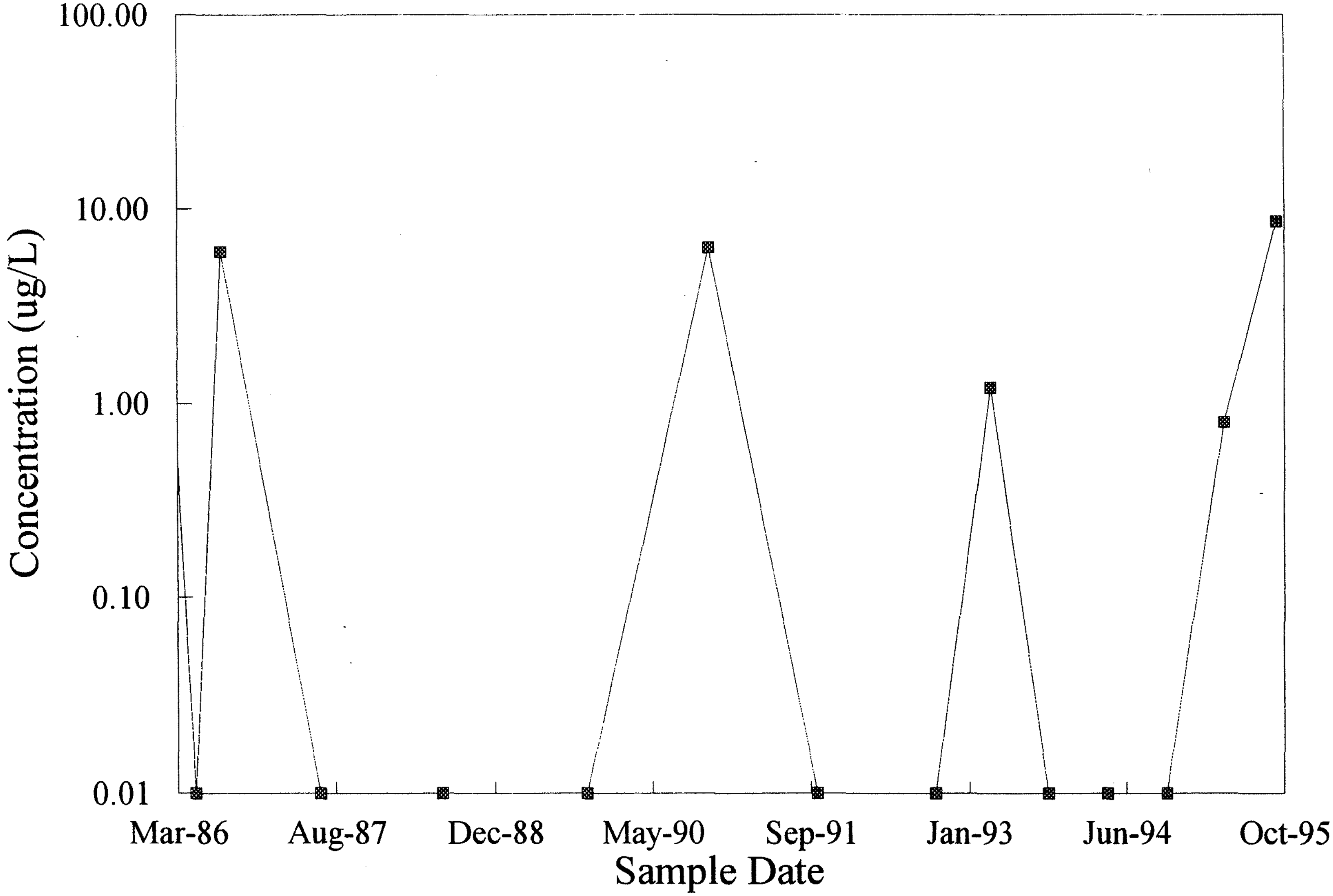




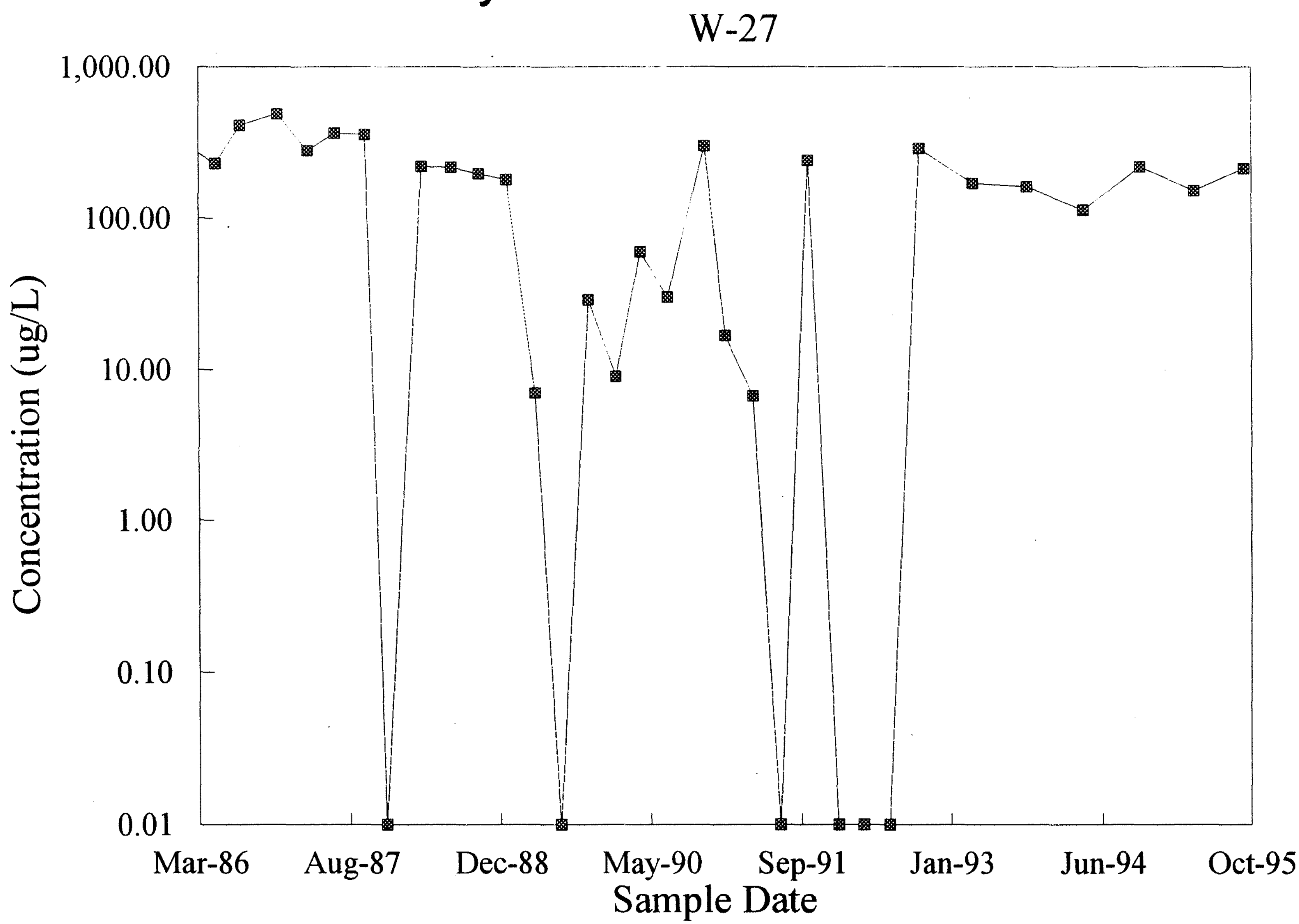
Trend Analysis: Total VOC Concentrations
W-24A
1,000.00
100.00
10.00
1.00
0.10
0.01
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

Trend Analysis: Total VOC Concentrations

W-25

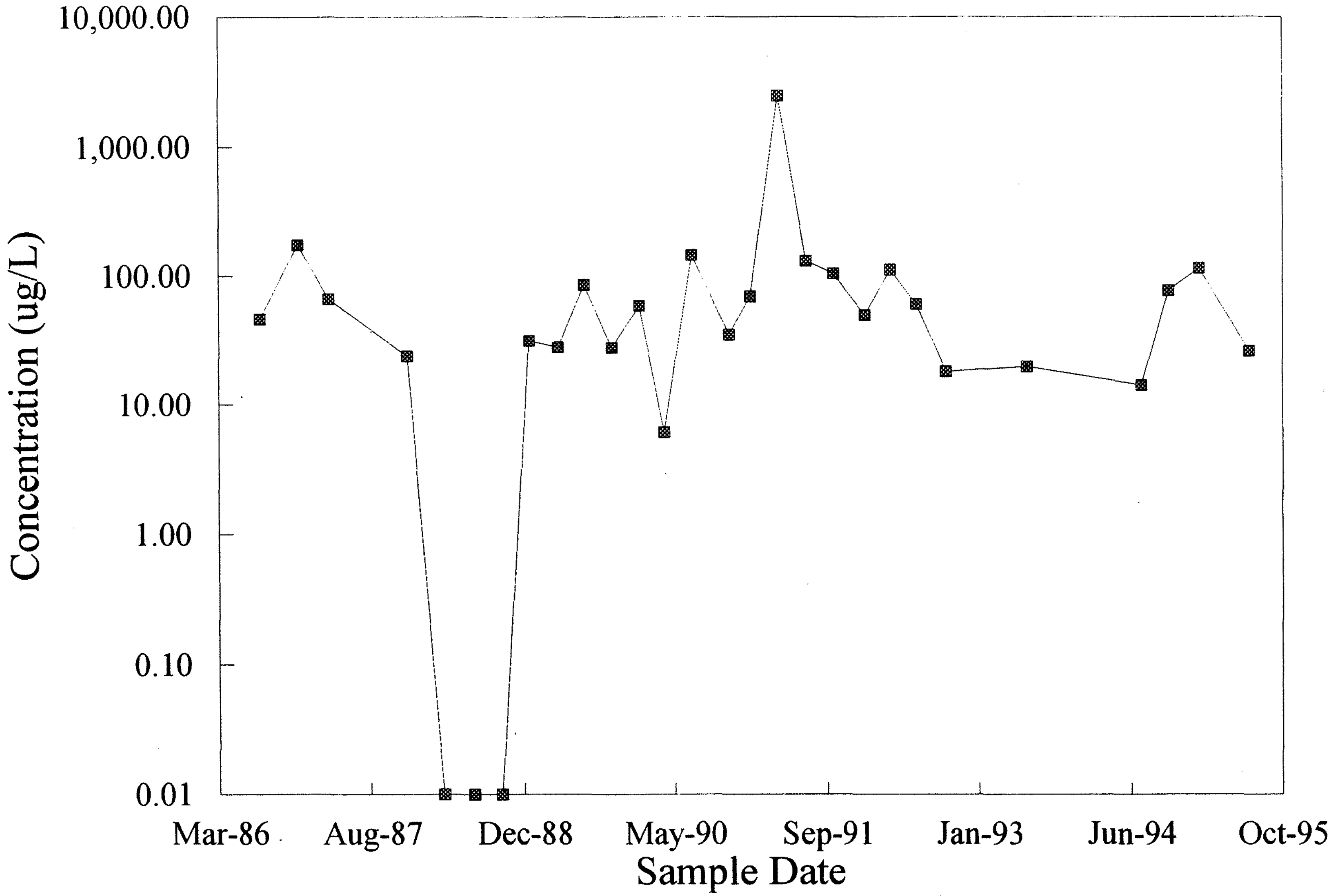


Trend Analysis: Total VOC Concentrations



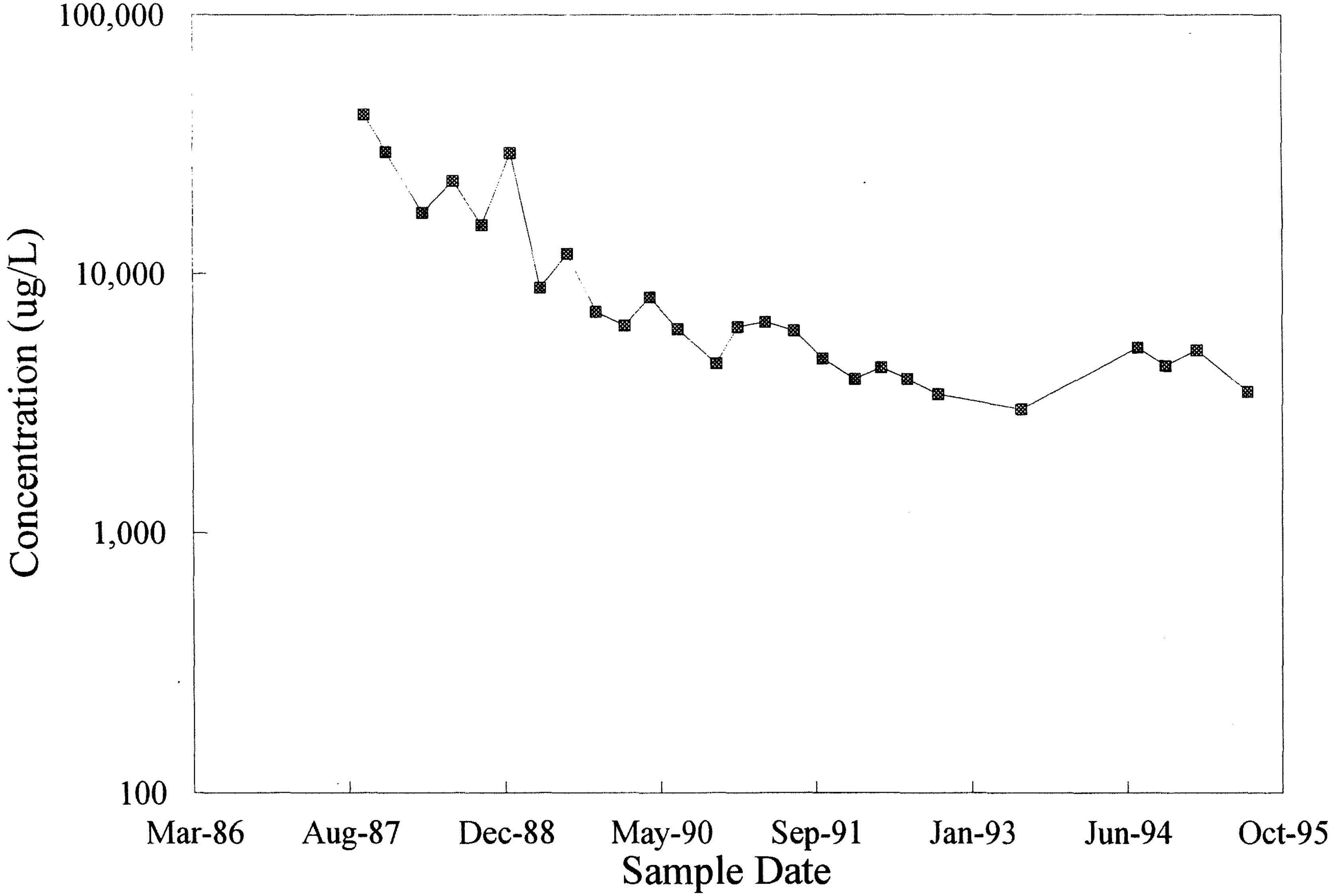
Trend Analysis: Total VOC Concentrations

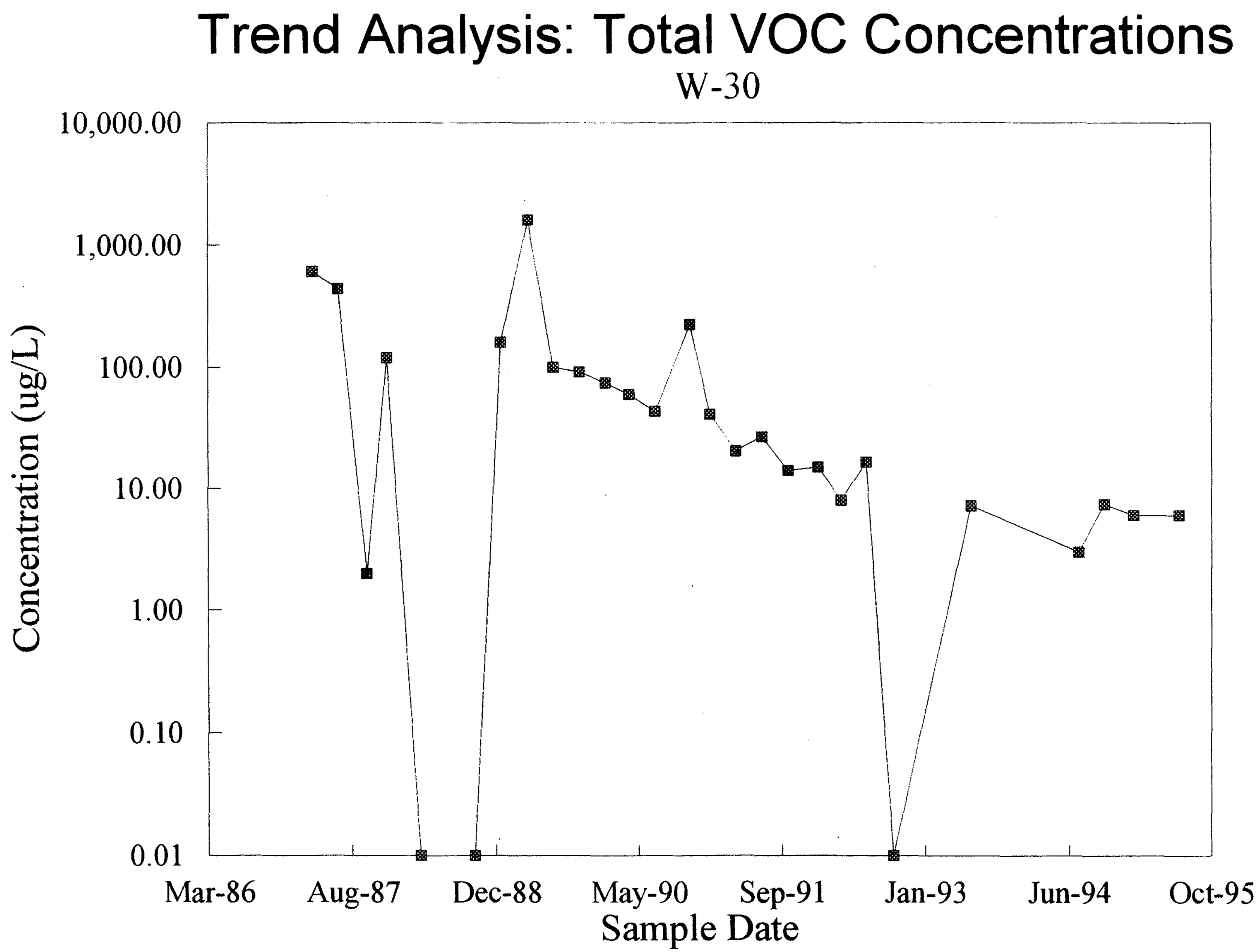
W-28



Trend Analysis: Total VOC Concentrations

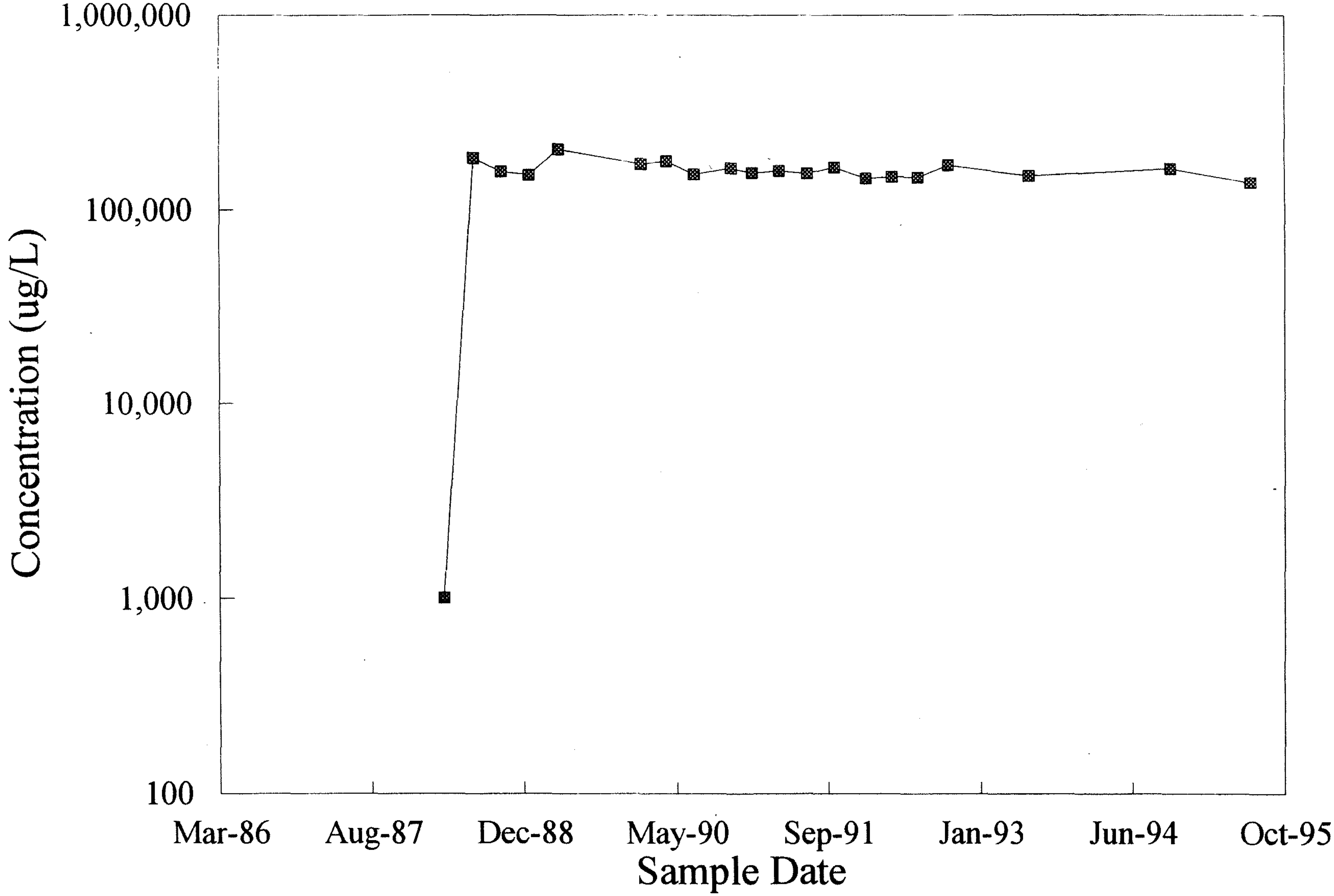
W-29




Trend Analysis: Total VOC Concentrations
W-30
10,000.00
1,000.00
100.00
10.00
1.00
0.10
0.01
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

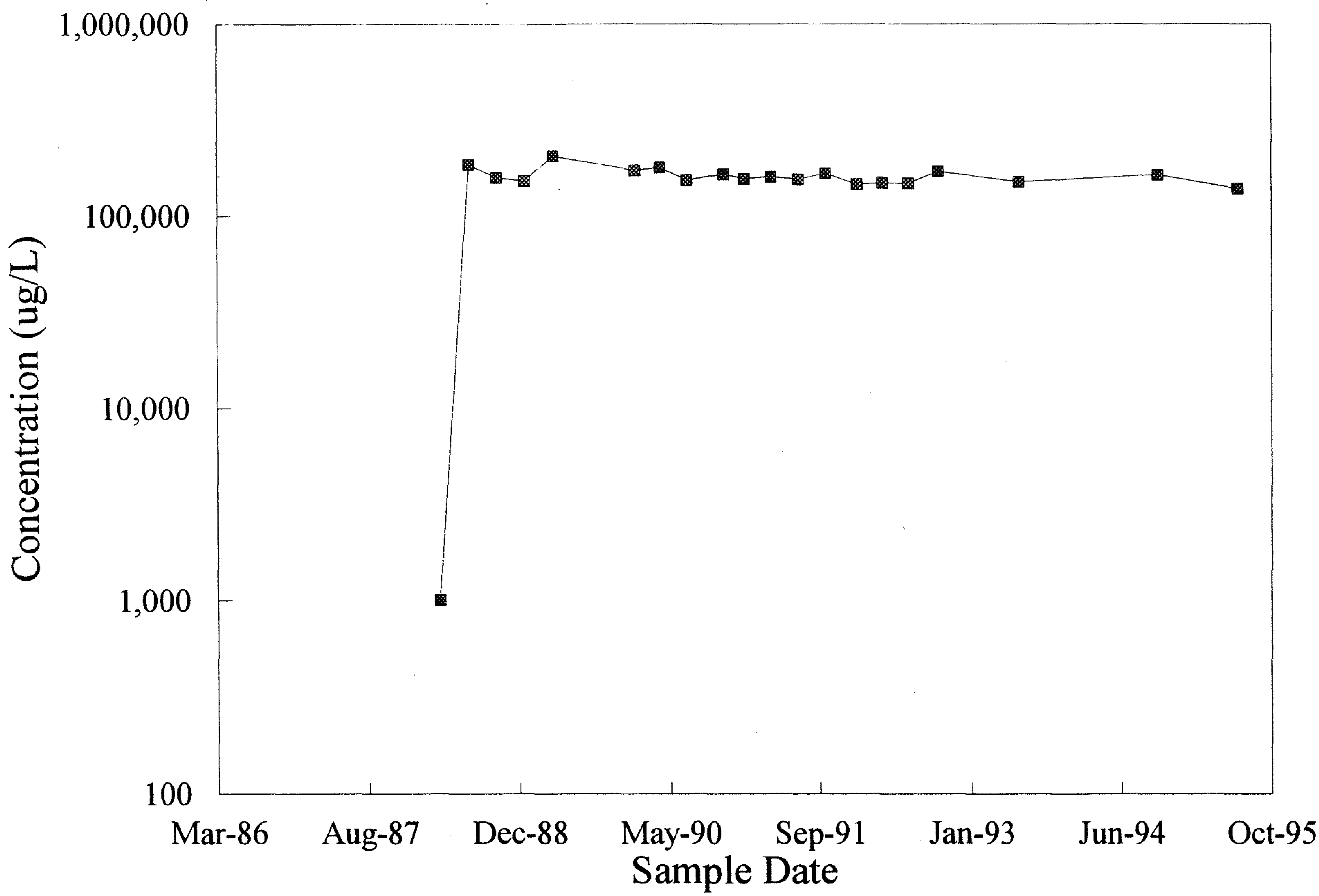
Trend Analysis: Total VOC Concentrations

W-37



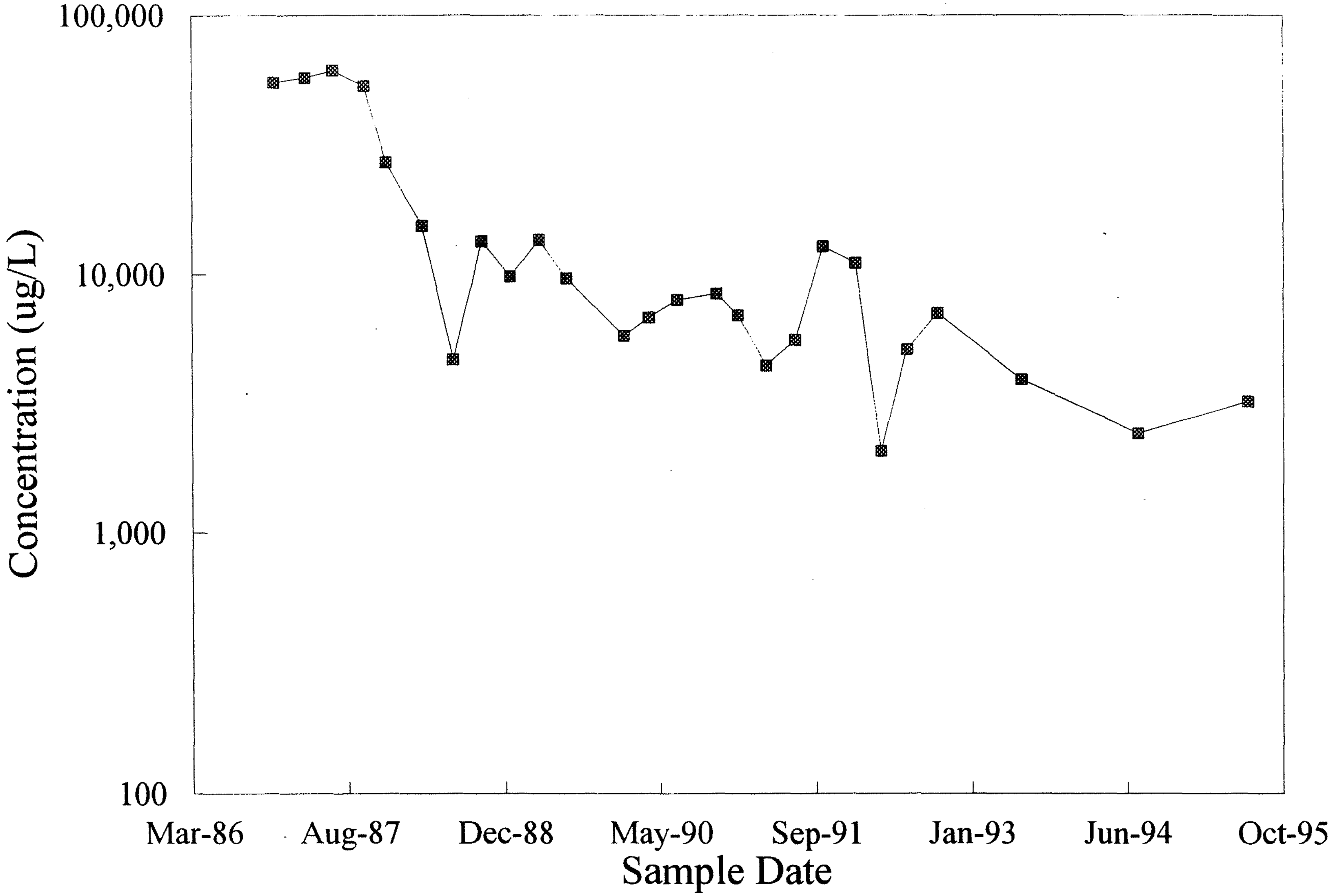
Trend Analysis: Total VOC Concentrations

W-37



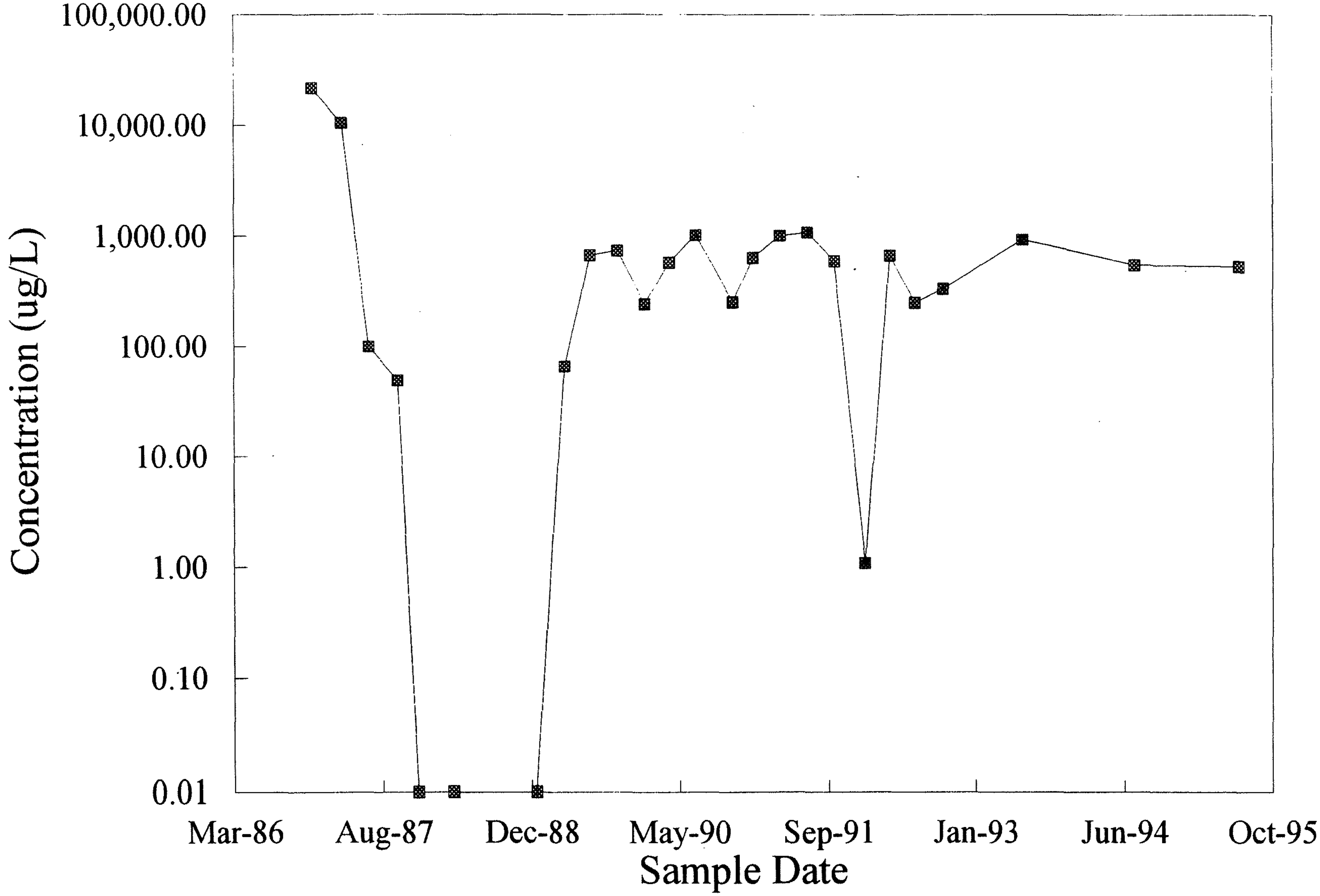
Trend Analysis: Total VOC Concentrations

W-38



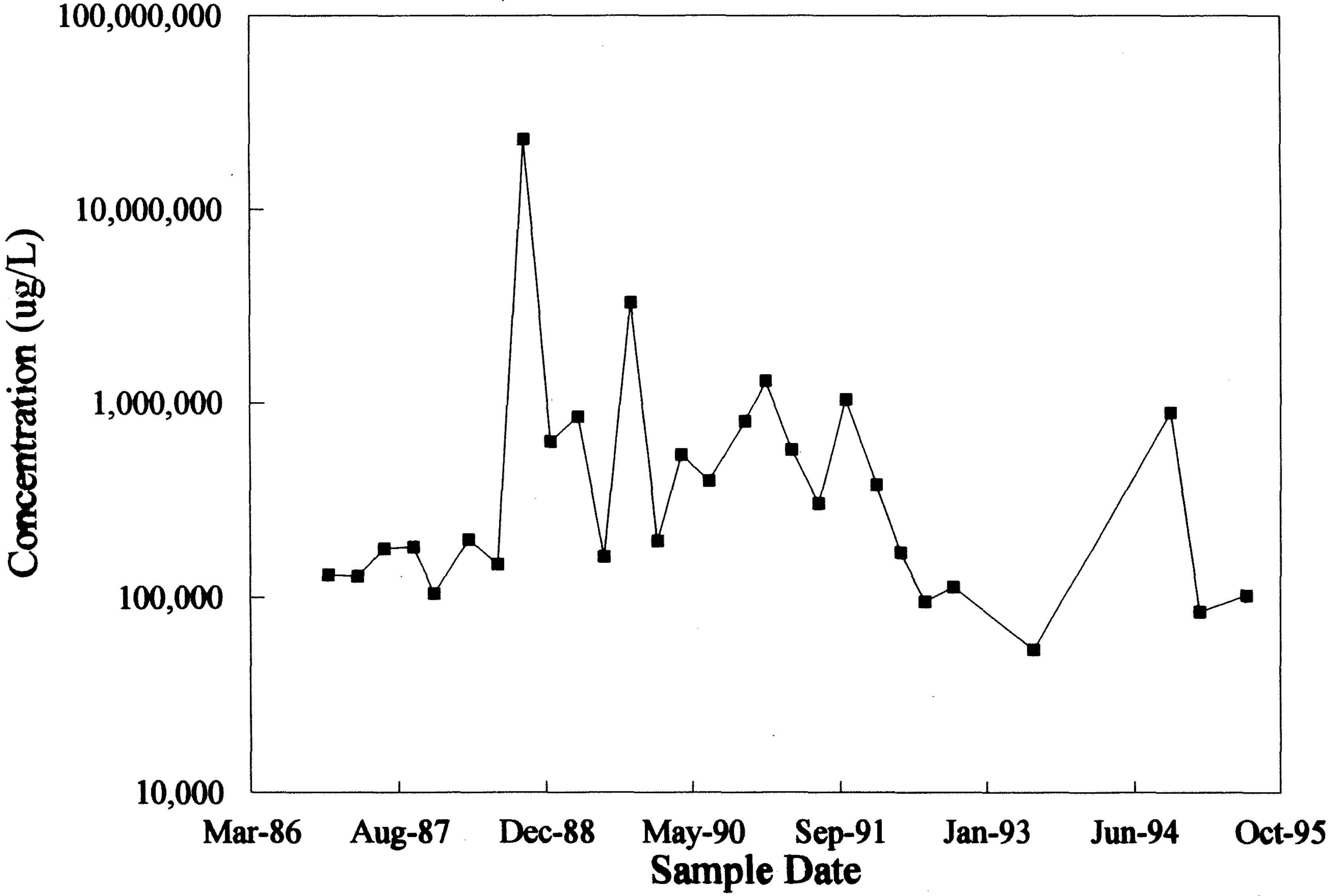
Trend Analysis: Total VOC Concentrations

W-41

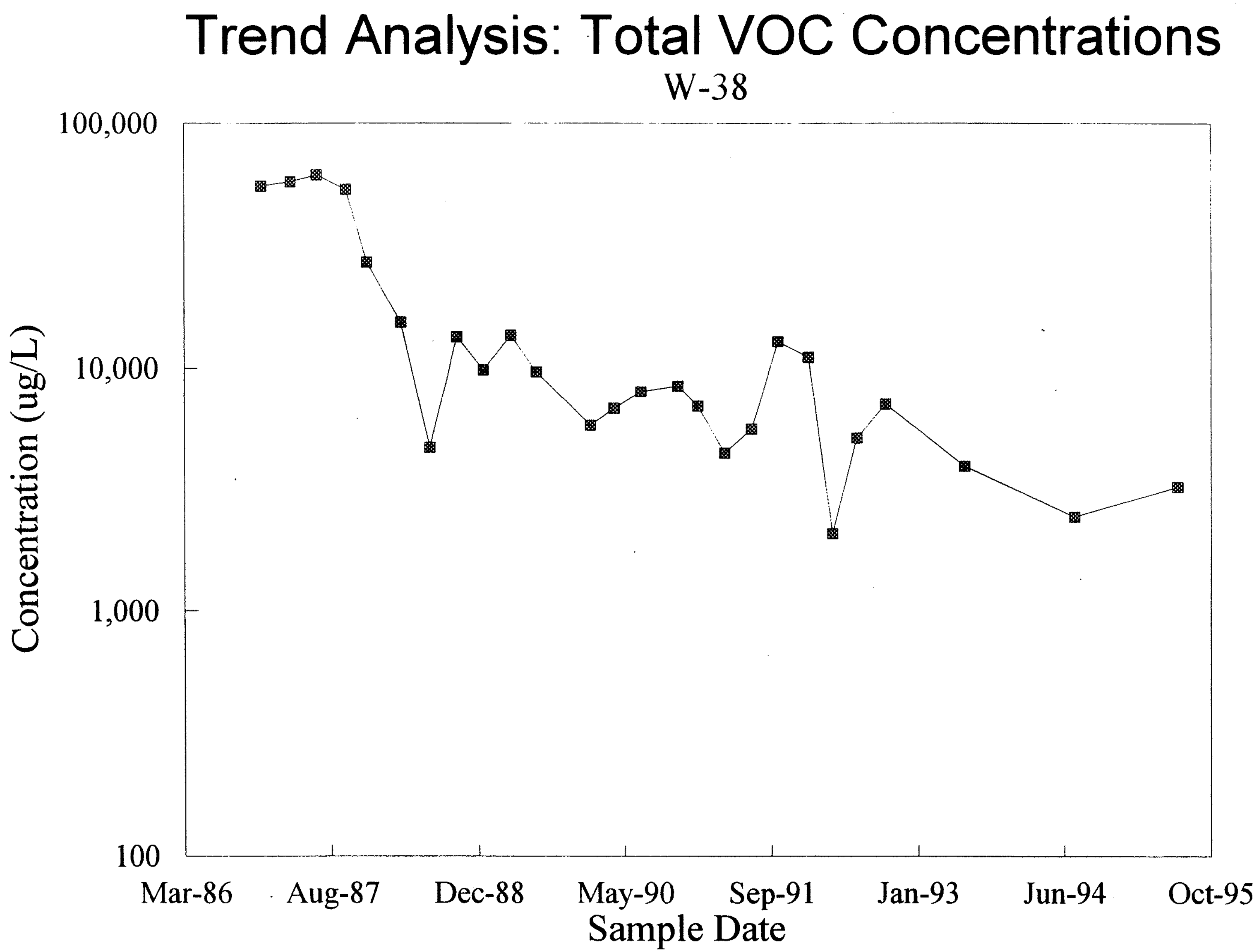


Trend Analysis: Total VOC Concentrations

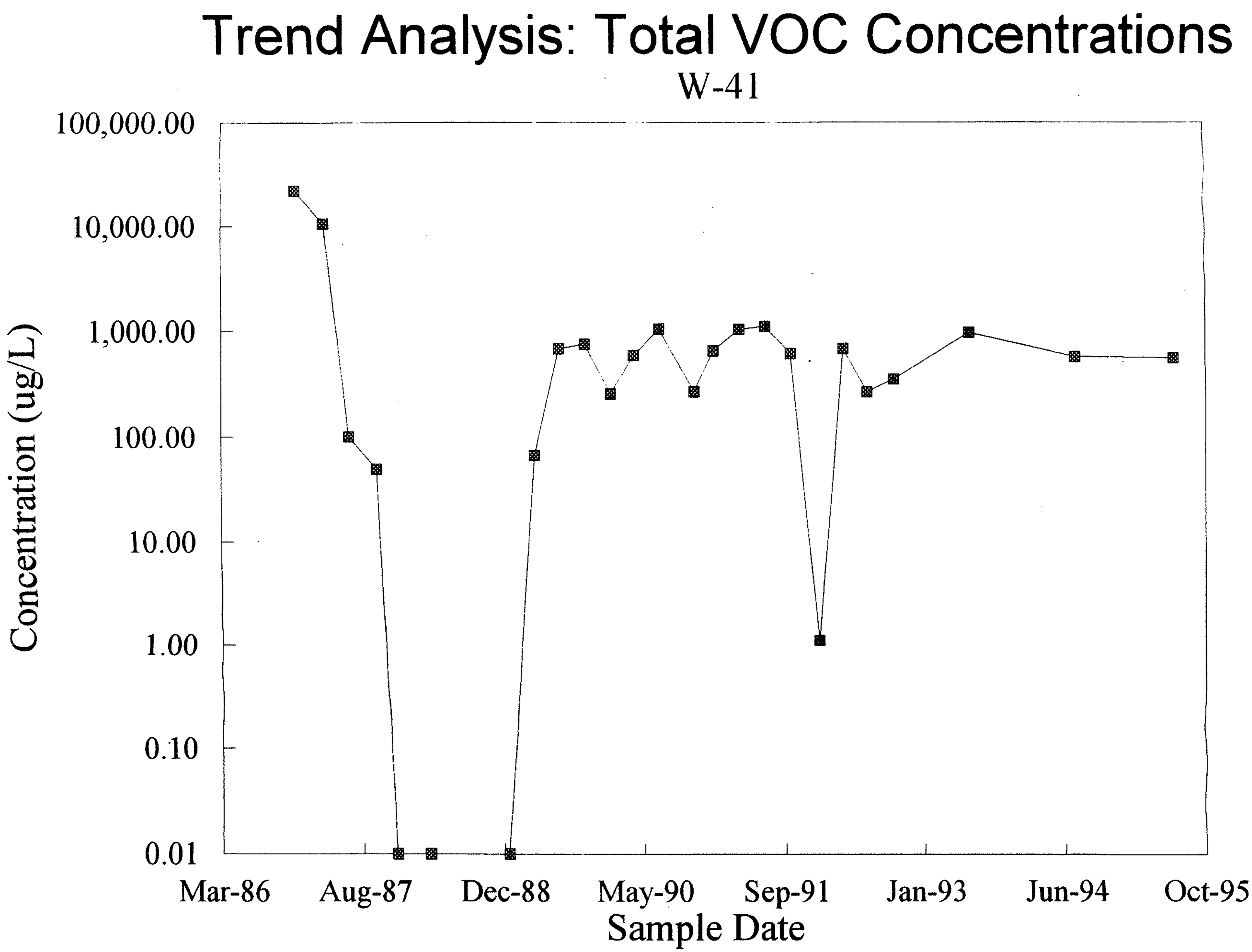
W-47



35/35

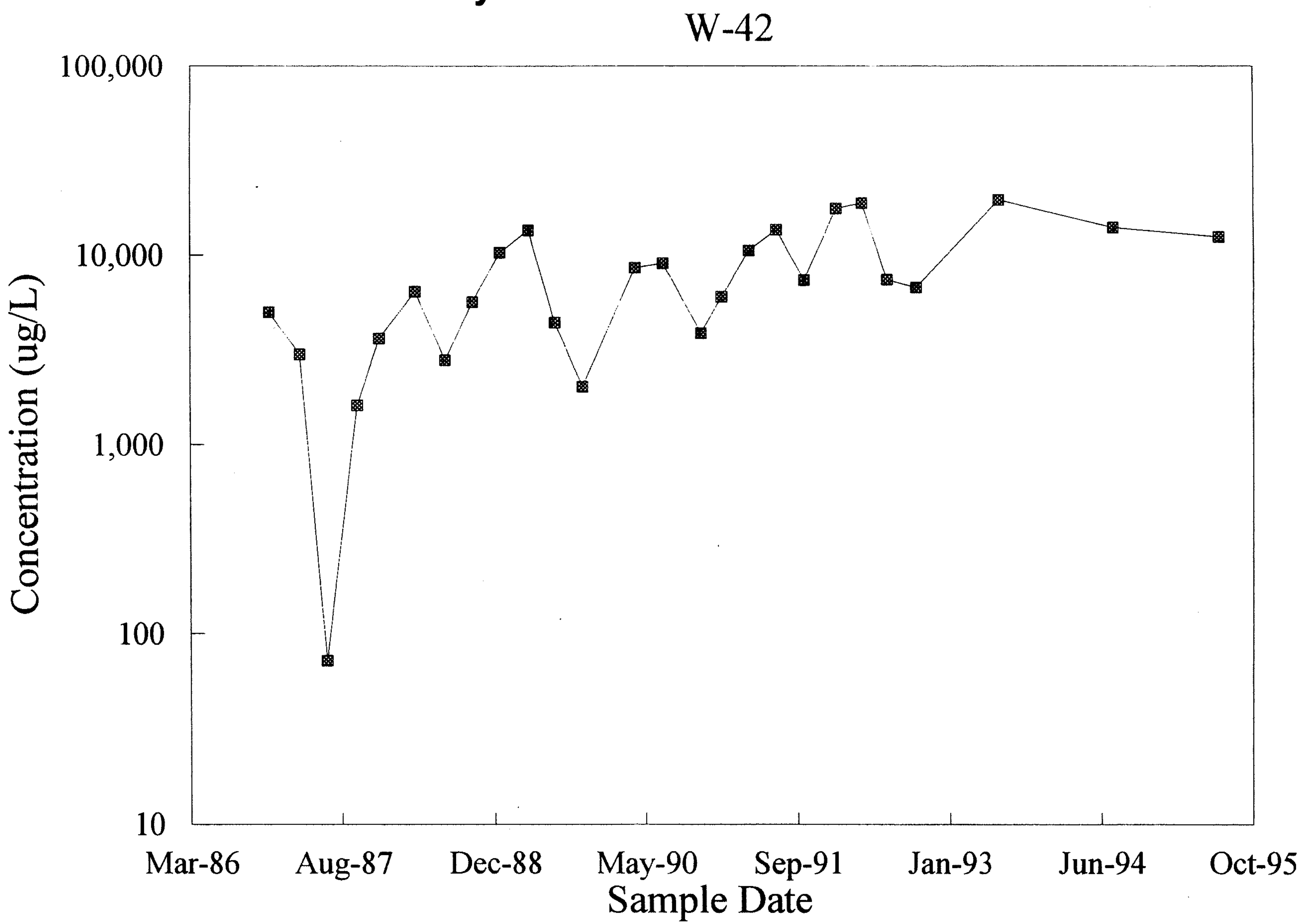


Trend Analysis: Total VOC Concentrations
W-38
100,000
10,000
1,000
100
Concentration (ug/L)
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date


Trend Analysis: Total VOC Concentrations
W-41
Concentration (ug/L)
100,000.00
10,000.00
1,000.00
100.00
10.00
1.00
0.10
0.01
Mar-86
Aug-87
Dec-88
May-90
Sep-91
Jan-93
Jun-94
Oct-95
Sample Date

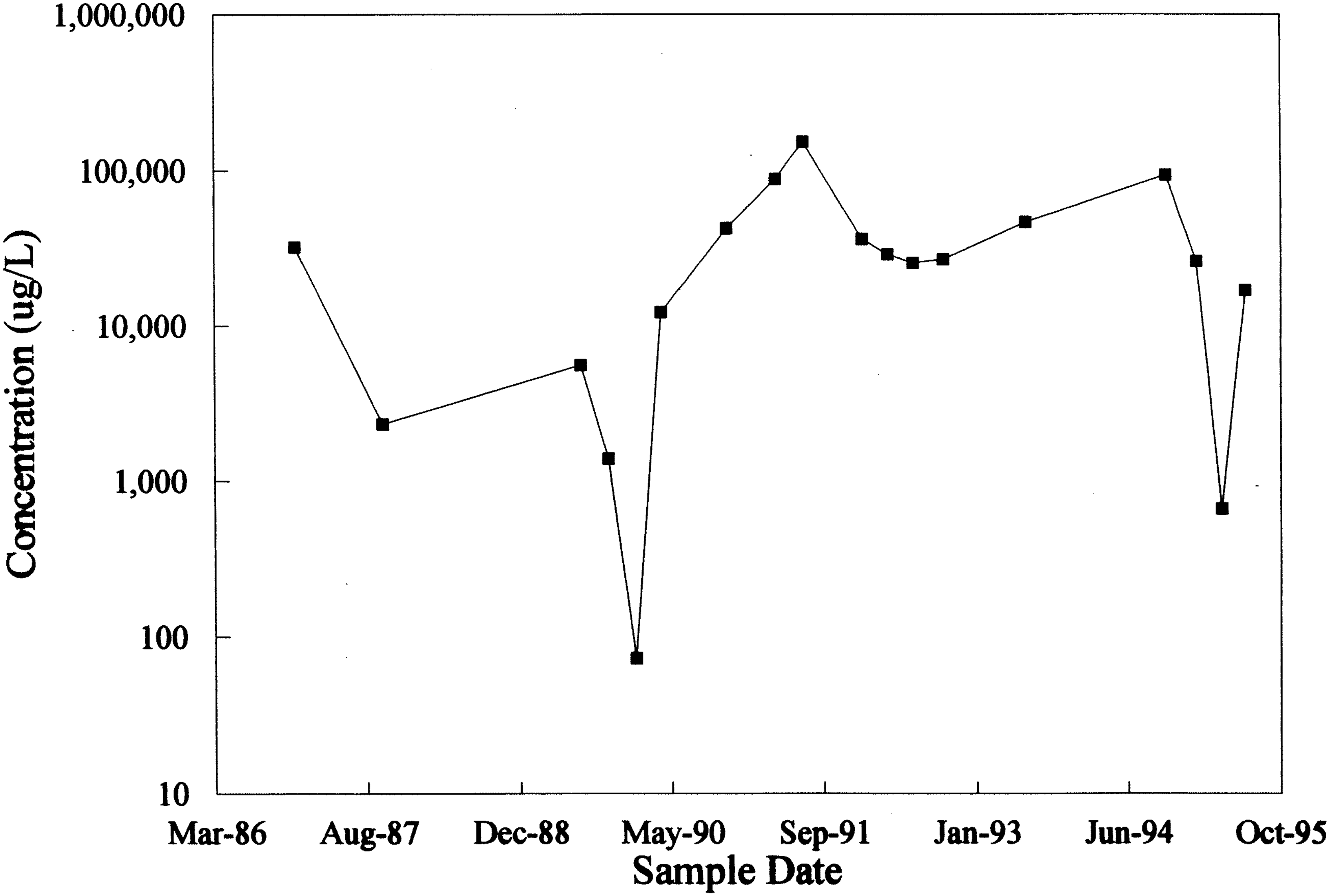
32

Trend Analysis: Total VOC Concentrations



Trend Analysis: Total VOC Concentrations

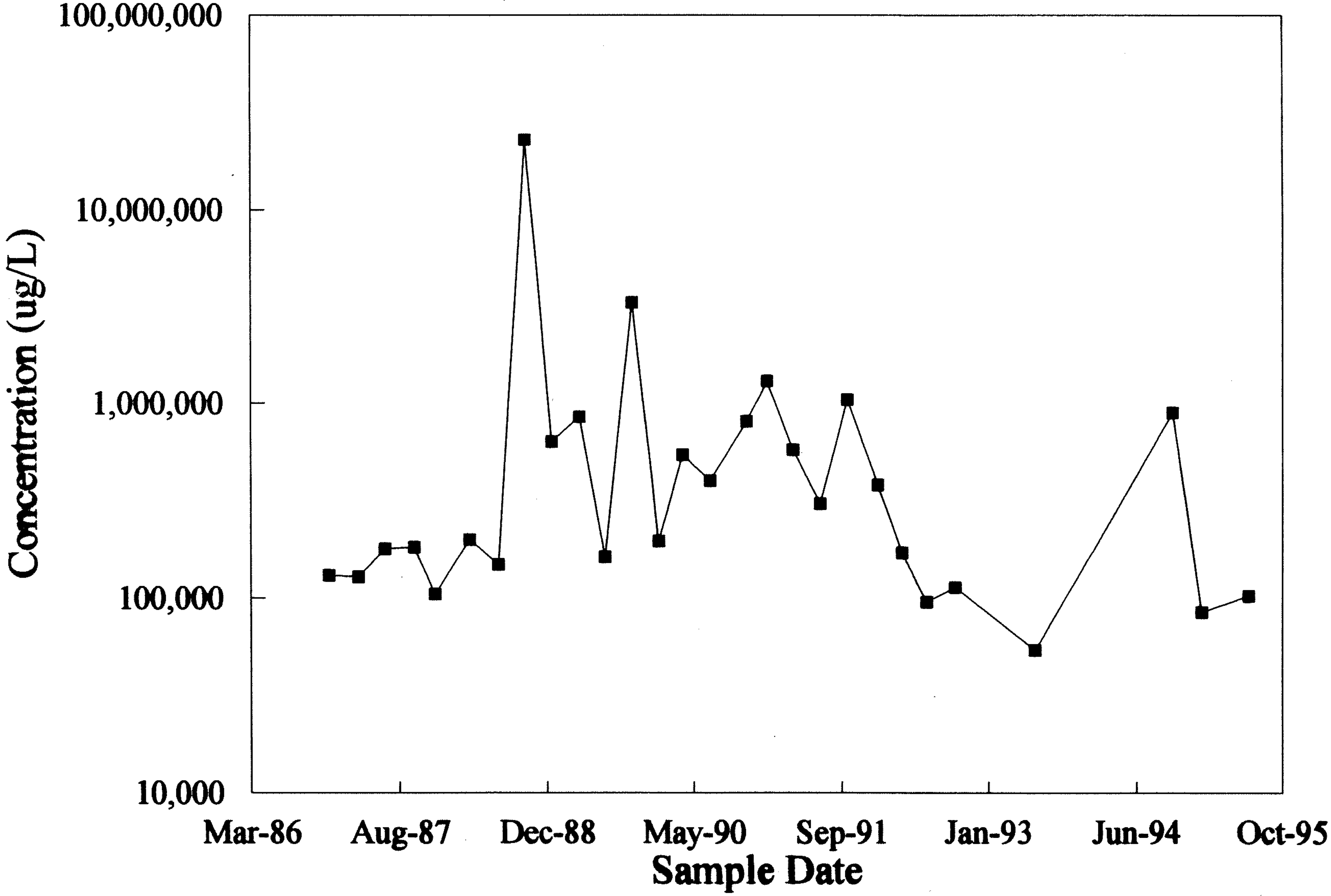
W-43



34

Trend Analysis: Total VOC Concentrations

W-47



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