

OPERATION, MAINTENANCE, MONITORING  
AND OPTIMIZATION REPORTING OF  
SOIL AND GROUNDWATER REMEDIATION SYSTEMS

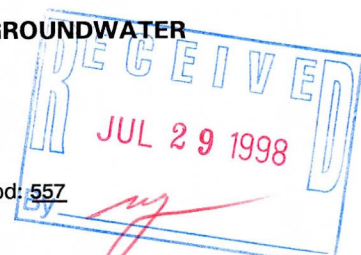
241 036840 Combo ERP/Last

NATURAL ATTENUATION (PASSIVE BIOREMEDIATION) IN GROUNDWATER

SITE NAME AND REPORTING PERIOD:

Site name: Milwaukee Plating Company

Reporting period from: June 19, 1996 To: December 28, 1997 Days in period: 557



A. EFFECTIVENESS EVALUATION:

1. If free product is not present, determine the single contaminant that requires the greatest percent reduction to achieve ch. NR 140 ES and PAL. Perform this calculation for all contaminants that were present at the site that have ch. NR 140 standards. Use the highest contaminant concentration measured in any sampling points during reporting period. If free product is present, write "FREE PRODUCT" in A.1.a.

- a. Contaminant: Free product
- b. Percent reduction necessary to reach ch. NR 140 ES and PAL: \_\_\_\_\_
- c. Maximum contaminant concentration level in any monitoring well ( $\mu\text{g/L}$ ): \_\_\_\_\_

2. Aquifer parameters:

- a. Hydraulic conductivity (cm/sec): See Explanation Sheet for GI-1, A.11
- b. Groundwater average linear velocity (ft/yr): See Explanation Sheet for GI-1, A.12

3. Is there a downgradient monitoring well that meets ch. NR 140 standards (Y/N): No

4. Based on water chemistry results, is the plume expanding, stabilized or contracting: Contracting

5. If the answer in 4. (above) is "expanding," is natural attenuation still the best option? (Y/N) If yes, explain: \_\_\_\_\_

6. Biodegradation parameters:

- a. Upgradient (or other site specific background) DO level (mg/L): NA
- b. DO levels in the part of the plume that is most heavily contaminated (mg/L): NA

7. Is site closure a viable option within 12 months from the date of this form? (Y/N): No

8. Are there any modifications that can improve cost effectiveness? (Y/N) If yes, explain: Not at this time

9. Have groundwater table fluctuations changed the contaminant level trends over time? (Y/N) If yes, explain: No

10. Has the direction of ground water flow changed during the reporting period? (Y/N) If yes, approximate change in degrees: No

B. ADDITIONAL ATTACHMENTS: Attach the following to this form:

- Groundwater contour map.
- Groundwater contaminant distribution map (may be combined with contour map).
- When contaminants are aerobically biodegradable, attach a dissolved oxygen in groundwater map (dissolved oxygen may be combined with the contaminant data on a single map).
- Graph of contaminant concentrations versus time for the contaminant listed in A.1.a. (above) for the monitoring point with the greatest level of contamination.
- Graph of contaminant concentrations versus distance.
- Groundwater contaminant chemistry table.
- Groundwater biological parameters.
- Groundwater elevations table.

## EXPLANATION SHEET

Page GI-1, A.11

Hydraulic conductivity: Based on hydraulic conductivity tests conducted on MW-7, MW-8, and MW-9, a value of  $1.5 \times 10^{-4}$  cm/sec was determined for wells MW-7 and MW-8 and a value of  $3.8 \times 10^{-4}$  cm/sec was determined for well MW-9.

An average hydraulic conductivity was calculated to be  $2.3 \times 10^{-4}$  cm/sec

Page GI-1, A.12

Average linear velocity of groundwater in ft/yr.

$$V = \frac{Ki}{0.30}$$

where:

$$K = 1.5 \times 10^{-4} \text{ cm/sec} - 3.8 \times 10^{-4} \text{ cm/sec (see GI-1, A.11)}$$

$$i = 0.046 \text{ ft/ft (see attached water table map)}$$

$$n = 0.30 \text{ (Freeze \& Cherry, 1979)}$$

$$\text{For } K = 1.5 \times 10^{-4} \text{ cm/sec} \quad V = \frac{(0.4 \text{ ft/day})(0.046 \text{ ft/ft})}{0.30} = 0.0613 \text{ ft/day} = 22.4 \text{ ft/yr}$$

$$\text{For } K = 3.8 \times 10^{-4} \text{ cm/sec} \quad V = \frac{(1.1 \text{ ft/day})(0.046 \text{ ft/ft})}{0.30} = 0.169 \text{ ft/day} = 61.6 \text{ ft/yr}$$

Page GW-1, B.3

A small accumulation of free product does occur at well MW-1 with an average recorded thickness in the well casing of 3.27 inches (0.28 feet) over the reporting period. Monitor well MW-1 is bailed of this product accumulation on a periodic basis as potential remedial options are being evaluated/considered. Over the course of the reporting period, free product was bailed from the well on 41 separate occasions, each time yielding approximately 2 gallons of fluid (water and product). Assuming an average product thickness of 0.28 feet, approximately 1 gallon of product has been removed. Product bailing record sheets are included as an attachment to this submittal.

Page GI-2, C.1

Other remedial options, such as dual extraction, have been considered. Currently, these issues are under discussion. During the last three years, concentrations of petroleum and chlorinated solvents impacts have decreased. This form is therefore being completed as a natural attenuation remedial site.

Page GI-2, D.1

All costs given in Section D are representative of activities from 1995 to present.

OPERATION, MAINTENANCE, MONITORING  
AND OPTIMIZATION REPORTING OF  
SOIL AND GROUNDWATER REMEDIATION SYSTEMS

GROUNDWATER PUMP AND TREAT SYSTEMS AND FREE PRODUCT RECOVERY SYSTEMS

SITE NAME AND REPORTING PERIOD:

Site name: Milwaukee Plating Company

Reporting period from: June 19, 1996

To: December 28, 1997

Days in period: 557

Date that the system was first started up: November 2, 1996

A. GROUNDWATER EXTRACTION SYSTEM OPERATION:

1. Total number of groundwater extraction wells or trenches available and the number in use during period: NA
2. Number of days of operation (only list the number of days the system actually operated, if unknown explain): NA
3. System utilization in percent (days of operation divided by reporting time period multiplied by 100). If < 80%, explain: NA
4. Quantity of groundwater extracted during this time period (gallons): NA
5. Average groundwater extraction rate (gpm): NA
6. Quantity of dissolved phase contaminants removed during this time period in pounds: NA

B. FREE PRODUCT RECOVERY SYSTEM OPERATION:

1. Is free product (nonaqueous phase liquid) being recovered at this site? (Y/N) If yes, list method: Yes, hand bailing
2. Quantity of free product extracted during this time period (gallons, enter none if none): Approx. 1 gallon (See Explanation Sheet)
3. Average free product extraction rate (gpd): 0.002 gpd

C. SYSTEM EFFECTIVENESS EVALUATION:

1. Is a contaminated groundwater plume fully contained in the capture zone? (Y/N) If no, explain: Not applicable
2. If free product is present, is the free product fully contained in capture zone? (Y/N) If no, explain: Not available
3. If free product is present in any wells at the site, but free product was not recovered during reporting period, explain.
4. If free product is not present, determine the single contaminant that requires the greatest percent reduction to achieve ch. NR 140 ES and PAL. Perform this calculation for all contaminants that were present at the site that have ch. NR 140 standards. Use the highest contaminant concentration measured in any sampling points during reporting period. If free product is present, write "FREE PRODUCT" in C.4.a.
  - a. Contaminant: Free product
  - b. Percent reduction necessary to reach ch. NR 140 ES and PAL: Not applicable
  - c. Maximum contaminant concentration level in any monitoring well of that contaminant ( $\mu\text{g/L}$ ): Not applicable
  - d. Maximum contaminant concentration level in any extraction well of that contaminant ( $\mu\text{g/L}$ ): Not applicable
  - e. If the maximum concentration in a monitoring well is more that one order of magnitude above the concentration measured in an extraction well, explain why the extracted groundwater contamination levels are significantly less than the levels at other locations within the aquifer.

D. ADDITIONAL ATTACHMENTS: Attach the following to this form:

- Most recent report to the DNR Wastewater Program, if applicable.
- Groundwater contour map with capture zone indicated.
- Groundwater contaminant distribution map (may be combined with contour map).
- Graph of cumulative contaminant removal, if both free product recovery and ground water extraction are used, provide separate graphs.
- Time versus groundwater contaminant concentration graphs for the contaminant listed in C.4.a. (above), as follows:
  - Graph of contaminant concentrations versus time for each extraction well in use during the period.
  - Graph of contaminant concentrations versus time for the monitoring well with the greatest level of contamination.
- Groundwater contaminant chemistry table.
- Groundwater elevations table.
- System operational data table.

GENERAL SITE INFORMATION, CONTINUED

SITE NAME AND REPORTING PERIOD:

Site name: Milwaukee Plating Company

Reporting period from: June 19, 1996 To: December 28, 1997

Days in period: 557

**E. NAME(S), SIGNATURE(S) AND DATE OF PERSON(S) SUBMITTING FORM:** Legibly print name, date and sign. Only persons qualified to submit reports under ch. NR 712 Wis. Adm. Code are to sign this form.

Registered Professional Engineers:

I (print name) Gerald DeMers, P.E., hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Signature, title, P.E. number and date: Gerald L. Demers E-21773 6/8/98

Hydrogeologists:

I (print name) Richard R. Gnat, P.G., hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

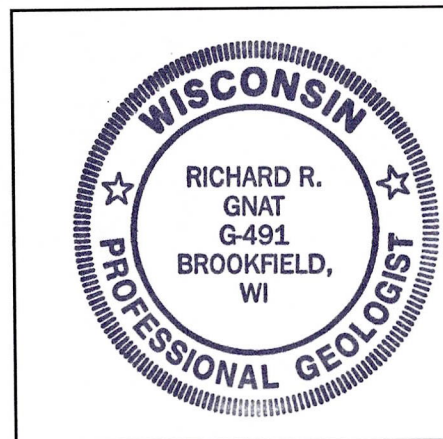
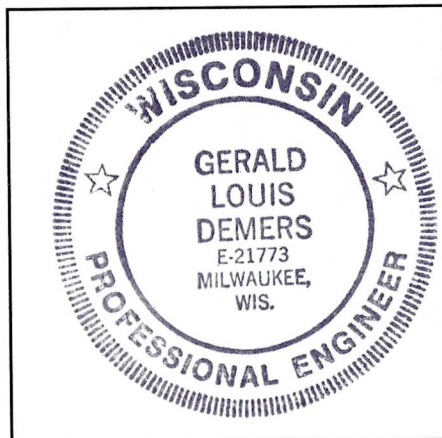
Signature, title and date: Richard R. Gnat, Sr. Hydrogeologist 6/4/98

Scientists:

I (print name) \_\_\_\_\_, hereby certify that I am a scientist as that term is defined in s. NR 712.03(3), Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Signature, title and date: \_\_\_\_\_

Professional Seal(s), if applicable:



OPERATION, MAINTENANCE, MONITORING  
AND OPTIMIZATION REPORTING OF  
SOIL AND GROUNDWATER REMEDIATION SYSTEMS

**PURPOSE AND APPLICABILITY OF THIS FORM:** Completion of this form is required under s. NR 724.13(e), Wis. Adm. Code. Use of this form is mandatory. Failure to submit this form as required is a violation of s. NR 724.13, Wis. Adm. Code, and is subject to the penalties in s. 144.99, Wis. Stats. This form must be submitted every six months for active soil and groundwater remediation projects and every twelve months for passive (natural attenuation) remediation projects that are regulated under the NR 700 series of Wis. Adm. Code. Specifically, for sites meeting any of the following criteria:

- Soil or groundwater remediation projects that report progress in accordance with s. NR 700.11(1), Wis. Adm. Code.
- Soil or groundwater remediation projects that report progress in accordance with s. NR 724.13(3), Wis. Adm. Code. (Note: s. NR 724.13(3) requires progress reports for operation and maintenance of active systems to be submitted every three months however the Department considers submittal of this form every six months to satisfy the requirements of the rules, unless otherwise directed by the Department on a site specific basis.)
- Soil or groundwater remediation projects that report progress in accordance with s. NR 724.17(3), Wis. Adm. Code. (Note: s. NR 724.17(3) requires progress reports every time that samples are collected however the Department considers submittal of this form every twelve months to satisfy the requirements of the rules for monitoring natural attenuation, unless otherwise directed by the Department on a site specific basis.)

Submittal of this form is not a substitute for reporting required by Department programs such as Wastewater or Air Management. Personally identifiable information on this form is not intended to be used for any other purpose than tracking progress of the remediation by the Bureau for Remediation and Redevelopment.

Please refer to the instructions that are attached to the back of these forms starting on page INS-1. In all cases, when asked to "explain," those explanations are to be included on separate sheets of paper. Explanations must include a title that refers to the page and item number, for example: Page GI-2, C.1.a.

**A. GENERAL INFORMATION:**

1. Site name: Milwaukee Plating Company
2. Reporting period from: June 19, 1996 To: December 28, 1997 Days in period: 557
3. Regulatory agency (enter DNR, DCOM, DATCP and/or other): DNR, DCOM
4. DNR issued site number: FID 241036840
5. State reimbursement fund claim number and fund name (if not applicable, enter NA): 53212-3888-34-PECFA
6. Site location:
  - a. DNR region and county: Southeast District, Milwaukee County
  - b. Street address and municipality: 1434 N. 4th Street, Milwaukee, Wisconsin
  - c. Township, range, section and quarter section: NW 1/4, SE 1/4 of Section 20, T7N, R22E
7. Responsible party:
  - a. Name: Mr. Al Mattacotti
  - b. Mailing address: 1434 N. 4th Street, Milwaukee, Wisconsin 53212
  - c. Phone number: 414-272-3433
8. Consultant:
  - a. Company name: HSI GeoTrans
  - b. Mailing address: 175 N. Corporate Drive, Suite 100, Brookfield, WI 53045
  - c. Phone number: 414-792-1282
9. Contaminants: Petroleum hydrocarbons and chlorinated solvents
10. Soil types (USCS or USDA): Primarily ML-CL with interlayers of SC and SP
11. Hydraulic conductivity (cm/sec): See Explanation Sheet
12. Average linear velocity of groundwater (ft/yr): See Explanation Sheet

OPERATION, MAINTENANCE, MONITORING  
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SOIL AND GROUNDWATER REMEDIATION SYSTEMS

GENERAL SITE INFORMATION, CONTINUED

SITE NAME AND REPORTING PERIOD:

Site name: Milwaukee Plating Company

Reporting period from: June 19, 1996 To: December 28, 1997

Days in period: 557

A. GENERAL INFORMATION (CONTINUED):

13. If soil is treated ex situ, is the treatment location off site? (Y/N) If yes, give location: No

a. DNR region and county: Not Applicable

b. Township, range, section and quarter section: \_\_\_\_\_

B. REMEDIATION METHOD: Only submit pages that apply to an individual site. Check all that apply:

- Groundwater extraction (submit a completed page GW-1).
- Free product recovery (submit a completed page GW-1).
- In situ air sparging (submit a completed page GW-2).
- Groundwater natural attenuation (submit a completed page GW-3).
- Other groundwater remediation method (submit a completed page GW-4).
- Soil venting (including soil vapor extraction and bioventing, submit a completed page IS-1).
- Soil natural attenuation (submit a completed page IS-2).
- Other in situ soil remediation method (submit a completed page IS-3).
- Biopiles (submit a completed page ES-1).
- Landspreading/thinspreading of petroleum contaminated soil (submit a completed page ES-2).
- Other ex situ soil remediation method (submit a completed page ES-3).






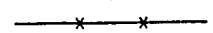




C. GENERAL EFFECTIVENESS EVALUATION FOR ALL ACTIVE SYSTEMS: If the remediation is active (not natural attenuation), complete this subsection.

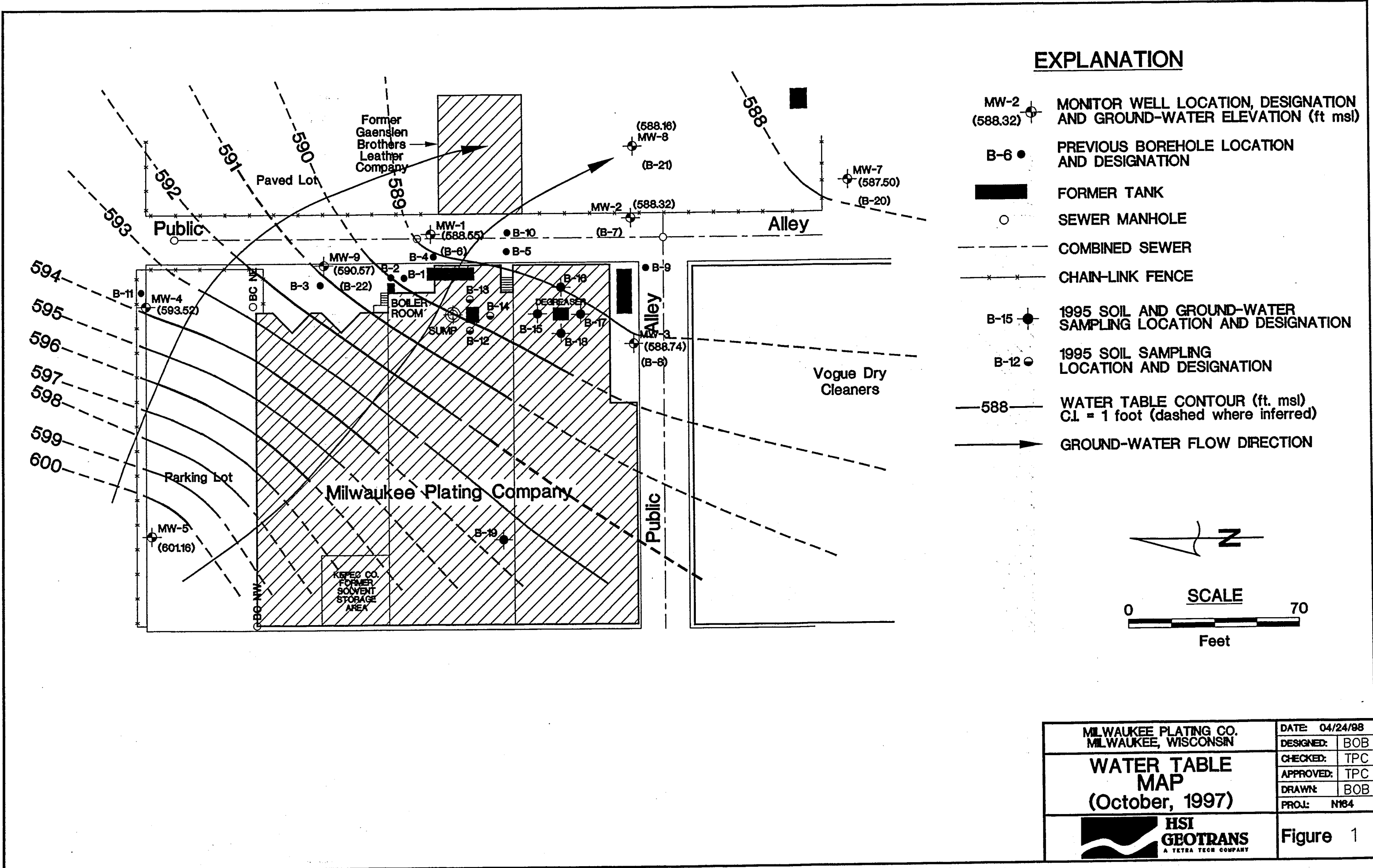
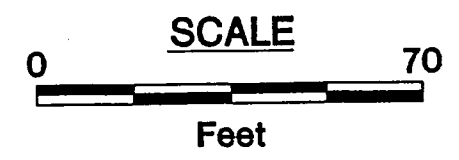
1. Is the system operating at design rates and specifications? (Y/N): No, See Explanation Sheet  
If the answer is no, explain whether or not modifications are necessary to achieve the goal that was previously established in design.
2. Are modifications to the system warranted to improve effectiveness? (Y/N) If yes, explain: NA
3. Is natural attenuation an effective low cost option at this time? (Y/N): Not enough data at this time
4. Is closure sampling warranted at this time? (Y/N): No
5. Are there any modifications that can be made to the remediation to improve cost effectiveness? (Y/N) If yes, explain: No, See Explanation Sheet for GI-2C.1


D. ECONOMIC AND COST DATA TO DATE:

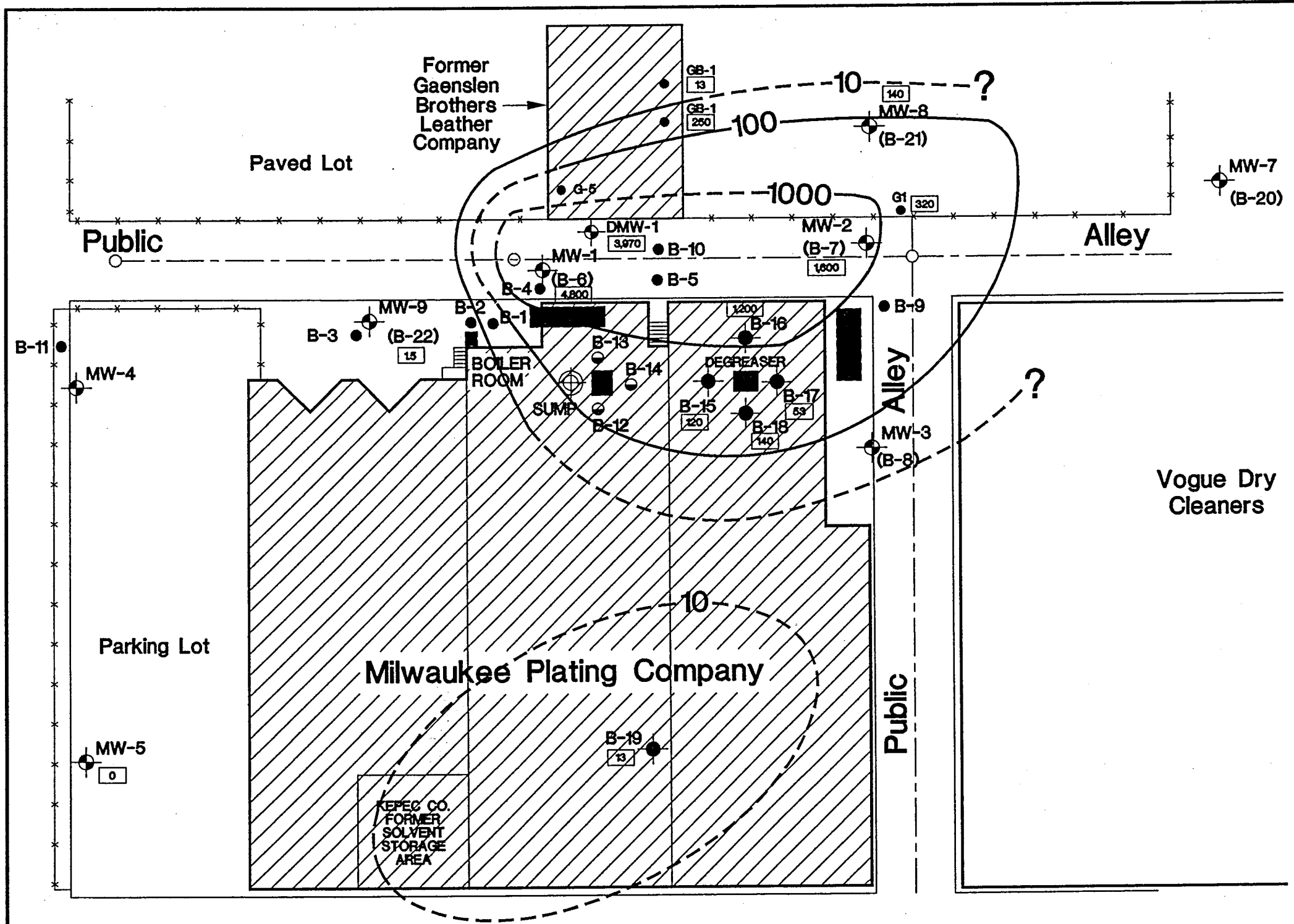
1. Total investigation costs (\$): ~40,000, See Explanation Sheet
2. Implementation costs (design, capital and installation costs, excluding investigation costs) (\$): 0.00
3. Total costs during the previous reporting period (\$): ~28,755
4. Total costs during this reporting period (\$): ~10,703
5. Total anticipated costs for the next reporting period (\$): ~3,300
6. Are any unusual or one-time costs listed in the reporting periods covered by D.3., D.4. or D.5. above? (Y/N) If yes explain: Yes, survey costs of \$650
7. If close out is anticipated within 12 months, estimated costs for project closeout (\$): NA

# EXPLANATION

- MW-2 (588.32)  MONITOR WELL LOCATION, DESIGNATION AND GROUND-WATER ELEVATION (ft msl)
- B-6  PREVIOUS BOREHOLE LOCATION AND DESIGNATION
-  FORMER TANK
-  SEWER MANHOLE
-  COMBINED SEWER
-  CHAIN-LINK FENCE
- B-15  1995 SOIL AND GROUND-WATER SAMPLING LOCATION AND DESIGNATION
- B-12  1995 SOIL SAMPLING LOCATION AND DESIGNATION
- 588  WATER TABLE CONTOUR (ft. msl)  
C.I. = 1 foot (dashed where inferred)
-  GROUND-WATER FLOW DIRECTION



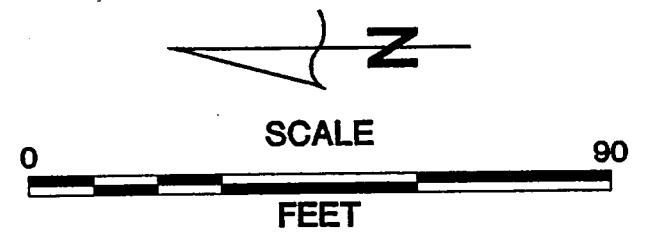
MILWAUKEE PLATING CO. MILWAUKEE, WISCONSIN	DATE: 04/24/98 DESIGNED: BOB
<b>WATER TABLE                  MAP</b> (October, 1997)	CHECKED: TPC APPROVED: TPC DRAWN: BOB
 HSI GEOTRANS <small>A TETRA TECH COMPANY</small>	PROJ: N164 <b>Figure 1</b>



**EXPLANATION**

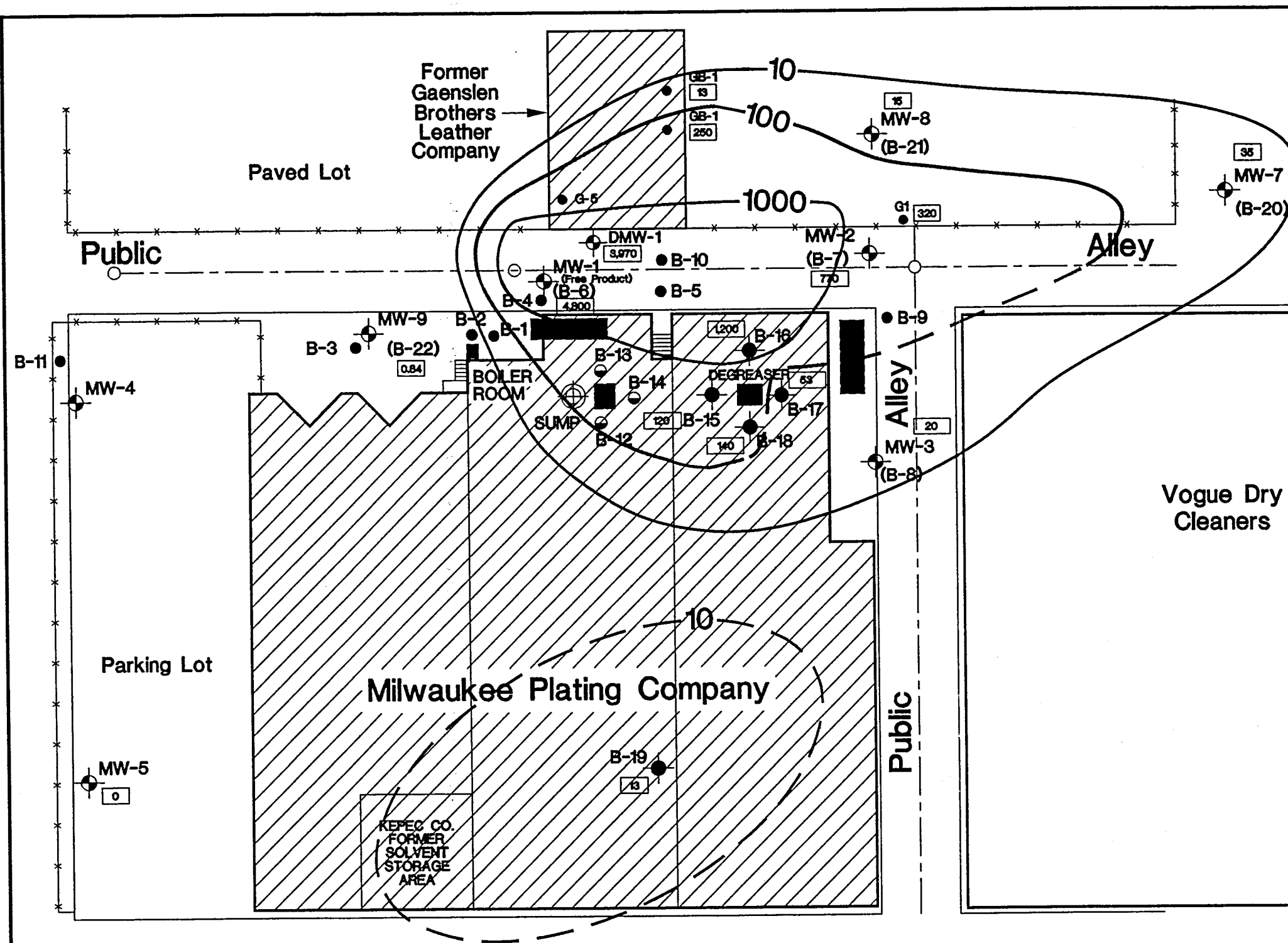
- MW-2 (B-20) MONITOR WELL LOCATION AND DESIGNATION
- B-6 PREVIOUS BOREHOLE LOCATION AND DESIGNATION
- FORMER TANK
- SEWER MANHOLE
- COMBINED SEWER
- CHAIN-LINK FENCE
- B-15 1995 SOIL AND GROUND-WATER SAMPLING LOCATION AND DESIGNATION
- B-12 1995 SOIL SAMPLING LOCATION AND DESIGNATION
- ESTIMATED CONCENTRATION OF BENZENE IMPACTS TO GROUNDWATER, DASHED WHERE INFERRED

**NOTE:**  
Benzene concentrations at GB-1, GB-2, DM-1, MW-1 and G-5 were from their only prior analyses, in 1991 or 1993.



MILWAUKEE PLATING CO. MILWAUKEE, WISCONSIN	DATE: 04/24/98
ESTIMATED EXTENT OF PETROLEUM IMPACTS IN GROUNDWATER 1995	DESIGNED: BOB
	CHECKED: TPC
	APPROVED: TPC
	DRAWN: BOB
	PROJ: N148
HSI GEOTRANS A TETRA TECH COMPANY	Figure 2

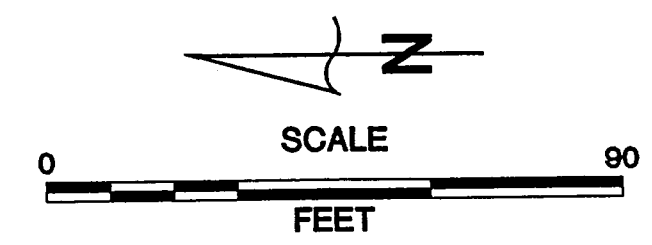




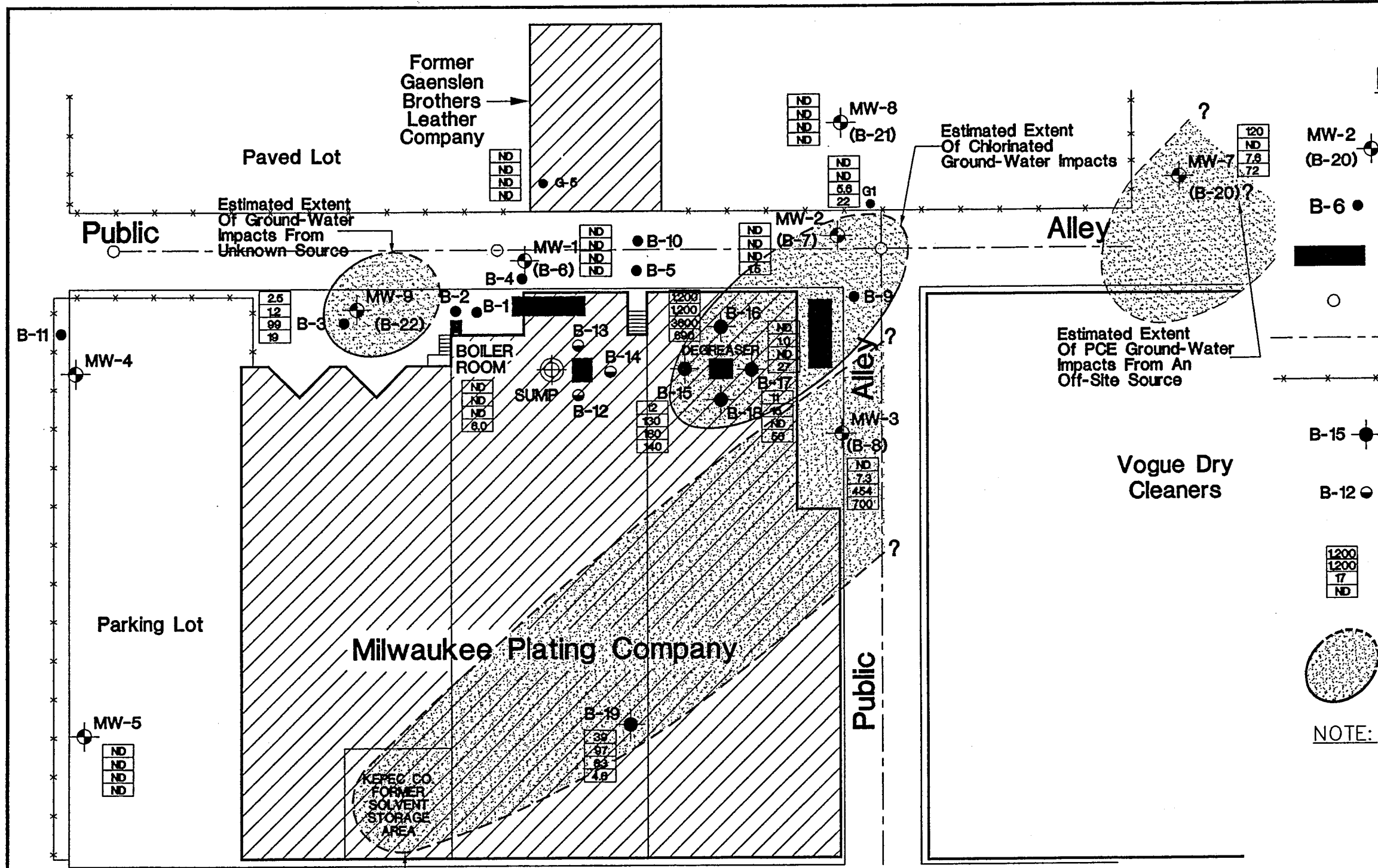
### EXPLANATION

- MW-2 (B-20) ● MONITOR WELL LOCATION AND DESIGNATION
- B-6 ● PREVIOUS BOREHOLE LOCATION AND DESIGNATION
- FORMER TANK
- SEWER MANHOLE
- - - COMBINED SEWER
- \* \* \* CHAIN-LINK FENCE
- B-15 ● 1995 SOIL AND GROUND-WATER SAMPLING LOCATION AND DESIGNATION
- B-12 ○ 1995 SOIL SAMPLING LOCATION AND DESIGNATION
- 10 ESTIMATED CONCENTRATION OF BENZENE IMPACTS TO GROUNDWATER, DASHED WHERE INFERRED

**NOTE:**  
Benzene concentrations at GB-1, GB-2, DMW-1, MW-1 and G-5 were from their only prior analyses, in 1991 or 1993.



MILWAUKEE PLATING CO. MILWAUKEE, WISCONSIN	DATE: 04/27/98
ESTIMATED EXTENT OF PETROLEUM IMPACTS IN GROUNDWATER 1997	DESIGNED: BOB
	CHECKED: TPC
	APPROVED: TPC
	DRAWN: BOB
	PROJ: N148
Figure 3	



### EXPLANATION

- MW-2 (B-20) ● MONITOR WELL LOCATION AND DESIGNATION
- B-6 ● PREVIOUS BOREHOLE LOCATION AND DESIGNATION
- FORMER TANK
- SEWER MANHOLE
- - - COMBINED SEWER
- \* \* \* CHAIN-LINK FENCE
- B-15 ● 1995 SOIL AND GROUND-WATER SAMPLING LOCATION AND DESIGNATION
- B-12 ○ 1995 SOIL SAMPLING LOCATION AND DESIGNATION
- 1200  
1200  
17  
ND  
TETRACHLOROETHENE, TRICHLOROETHENE, DICHLOROETHENE AND VINYL CHLORIDE CONCENTRATIONS (in parts per billion.)
- ESTIMATED EXTENT OF SHALLOW GROUND-WATER IMPACTS, DASHED WHERE INFERRED

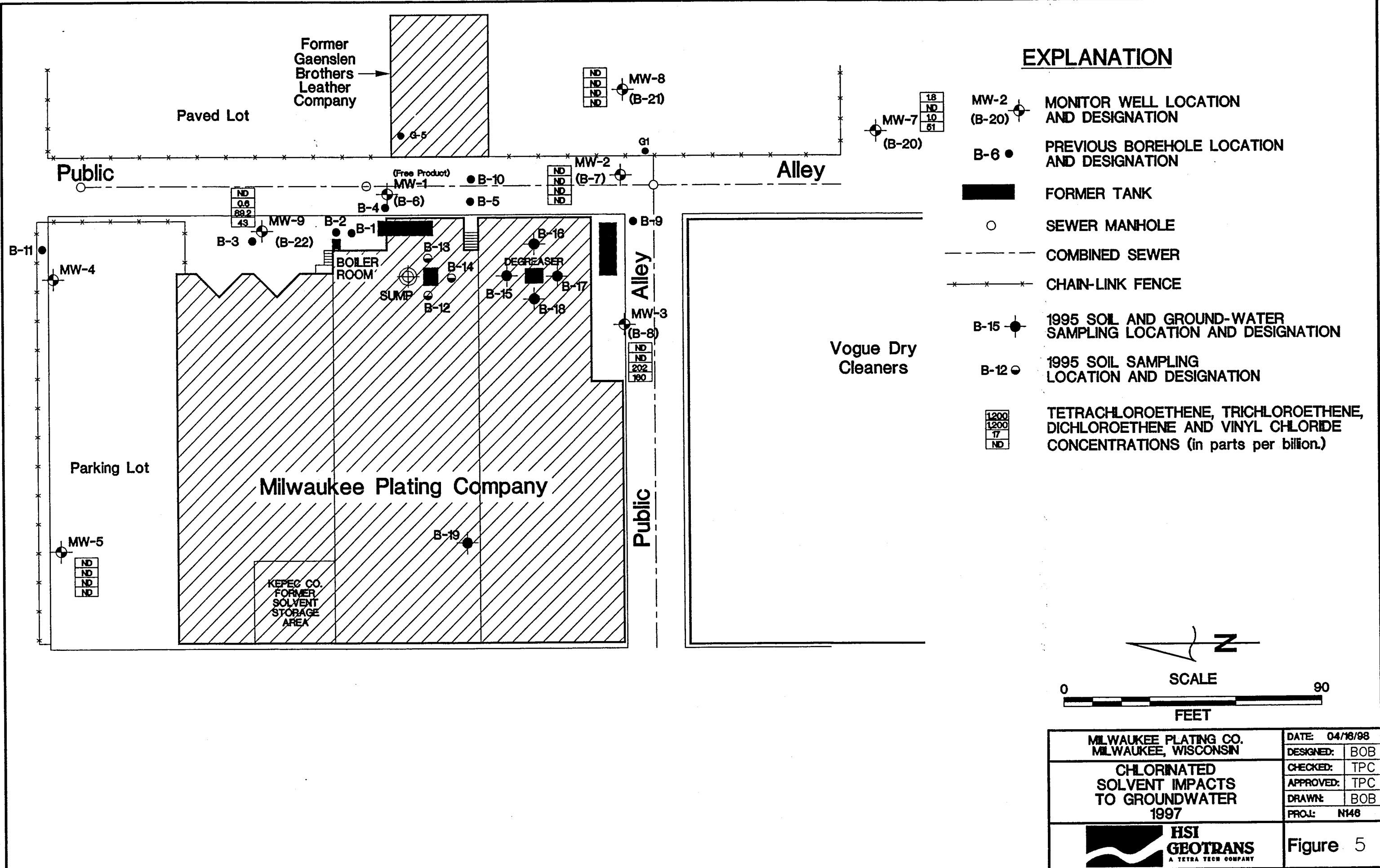
NOTE: G-1 and G-5 samples collected in October 1991. Detection limits for G-5 sample are 50 ppb for PCE, TCE and DCE and 250 ppb for vinyl chloride.



Estimated Extent Of Ground-Water Impacts From Solvent Storage Area

Note:  
The plume shown represents a possible explanation of chlorinated contaminants in B-19, MW-3 and MW-7. Further testing may indicate other sources or explanations for the chlorinated solvent impacts at these locations.

MILWAUKEE PLATING CO. MILWAUKEE, WISCONSIN	DATE: 04/16/98
<b>CHLORINATED SOLVENT IMPACTS TO GROUNDWATER 1995</b>	DESIGNED: BOE
	CHECKED: TPC
	APPROVED: TPC
	DRAWN: BOE
	PROJ: N148
Figure 4	



MILWAUKEE PLATING CO. MILWAUKEE, WISCONSIN	DATE: 04/18/88
CHLORINATED SOLVENT IMPACTS TO GROUNDWATER 1997	DESIGNED: BOB
	CHECKED: TPC
	APPROVED: TPC
	DRAWN: BOB
	PROJ: N146
HSI GEOTRANS A TETRA TECH COMPANY	Figure 5

Table 1: Previous Ground-Water Sampling Results

Parameter	Hydro-Search										Dames & Moore DM-1 4/93	Giles				Gas Tank Sump 1/94
	MW-1		MW-2			MW-3			MW-5			G-1 9/91	G-5 9/91	GB1 10/91	GB2 10/91	
	1/91	1/94	1/91	3/91	1/94	1/91	7/92	1/94	7/92	1/94						
Benzene	4800	5500	450	3	900	570	250	60	<1	<1	3970	320	2600	13	250	2,600
Ethylbenzene	840	<1000	12	<1	25	3.5	<1	<5	<1	<1	154	16	430	<5	<10	96
Methyl-t-butyl-ether	--	<1000	--	--	<50	--	--	<5	--	<1	9.68	<1	<50	--	--	<5
Toluene	360	<1000	19	8	<50	10	1	<5	<1	<1	71.3	6.2	110	<5	<10	320
1,2,4 Trimethylbenzene	--	<840	--	--	42	--	--	<5	--	<1	57.5	36	400	--	--	89
1,3,5 Trimethylbenzene	--	<1000	--	--	<50	--	--	<5	--	<1	194	11	50	--	--	52
Xylenes	2800	<3000	10	12	<150	4.8	<1	<15	<1	<1	552	51.4	980	<5	<10	400
Chloroform	--	<1000	--	<1	<50	--	<1	<5	<1	<1	--	2.7	170	--	--	<5
Vinyl Chloride	--	<1000	--	<10	<150	--	140	130	<1	<3	--	22	<250	--	--	<15
cis-1,2 Dichloroethene	--	<1000	--	--	<50	--	540	150	<1	<1	--	5.6	<50	--	--	19
trans 1,2 Dichloroethene	--	<1000	--	<1	<50	--	19	12	<1	<1	--	--	--	--	--	<5
Methylene Chloride	--	<5000	--	<1	<250	--	<1	<25	<1	<5	--	8.8	360	--	--	<25
Isopropylbenzene	--	<1000	--	--	<50	--	<1	<5	<1	<1	--	7.2	<50	--	--	<5
N-propylbenzene	--	<1000	--	--	<50	--	<1	<5	<1	<1	--	6.7	160	--	--	10
2,2 Dichloropropane	--	<1000	--	--	<50	--	260	<5	<1	<1	--	<1	<50	--	--	<5
Trichloroethene	--	<1000	--	<1	<50	--	14	<5	<1	<1	--	<1	<50	--	--	<5
Butylbenzenes	--	1300	--	--	<50	--	<1	<5	<1	<1	--	2.7	120	--	--	51
Naphthalene	--	1900	--	--	<50	--	<1	<5	<1	<1	--	2.9	<50	--	--	25
DRO	--	--	--	--	--	--	<.1	--	<.1	--	.609	--	--	--	--	--
GRO	--	--	--	--	--	--	0.6	--	<.1	--	10.6	--	--	--	--	--
TPH	110	--	8	14	--	--	--	--	--	--	--	--	--	--	--	--

Note: Floating product was observed in MW-1 on 3/91 and 7/92 and a product sheen was observed on MW-2 on 7/92  
 All detects are µg/l except for DRO, GRO, and TPH which are mg/l.  
 -- Not analyzed  
 Shaded values denote a NR140 Enforcement Standard Exceedance  
 Underlined values denote a Preventive Action Limit Exceedance

Chemical Compound	NR140 PAL	NR140 ES	Groundwater Sample Identification									
			MW-2			MW-3			MW-5			
			7/95	9/96	10/97	10/97 Dup	7/95	9/96	10/97	7/95	9/96	10/97
Volatile Organic Compounds												
Benzene	0.5	5	1,600	920	770	720	93	50	20			
n-Butylbenzene	None	None	1.2		0.95	1:1						
sec-Butylbenzene	None	None	4.2		1.80	2.0						
tert-Butylbenzene	None	None										
Chloroethane	80	400										
cis-1,2-Dichloroethene	7	70					440	180	190			
trans-1,2-Dichloroethene	20	100					14	14	12			
Ethylbenzene	140	700	17		1.2	1.6						
Isopropylbenzene	None	None	12	8.3	5.2	6.2						
p-Isopropyl toluene	None	None	1.5		0.36	0.45						
Methylene Chloride	15	150										
Naphthalene	8	40			0.70	1.0						
n-Propylbenzene	None	None	6.3	6.0	3.7	4.7						
Tetrachloroethene	0.5	5										
Toluene	68.6	343	5.6	8.0	2.5	2.8						
Trichloroethene	0.5	5					7.3					
1,2,4-Trimethylbenzene	None	None	27		3.6	4.8						
1,3,5-Trimethylbenzene	None	None	1.6									
Vinyl Chloride	0.02	0.2	1.5				700	140	160			
Xylenes, Total	124	620	18.3	17	10	13						
Total VOCs			1696.2	959.3	800	757.65	1254.3	384	382	0	0	0
Percentage Change since 7/95			NA	-43	-53	-55	NA	-69	-70	NA	NA	NA
Percentage Change since 9/96			NA	NA	-17	-21	NA	NA	1	NA	NA	NA

HSI GEOTRANS

- Notes:
- ◆ All concentrations in parts per billion.
  - ◆ Blank entries mean no detection above laboratory quantification limits.
  - ◆ Shaded values denote an NR140 Enforcement Standard exceedance.
  - ◆ Underlined values denote Preventive Action Limit exceedance.
  - ◆ Samples collected June 19 and 20, 1995, September 19, 1996, and October 8, 1997. Monitor well MW-1 contained free product and MW-4 was dry.
  - ◆ NA - Not applicable

Table 2 Analytical Summary for Groundwater Chemistry / Milwaukee Plating Company

Chemical Compound	NR140 PAL	NR140 ES	Groundwater Sample Identification								
			MW-7			MW-8			MW-9		
			7/95	9/96	10/97	7/95	9/96	10/97	7/95	9/96	10/97
Volatile Organic Compounds											
Benzene	0.5	5	43	48	35	140	60	15	1.5	1.4	0.84
n-Butylbenzene	None	None	140	1.0	1.2						
sec-Butylbenzene	None	None	130	3.7	3.8	5.1	1.4	1.2			
tert-Butylbenzene	None	None	26		1.3						
Chloroethane	80	400		7.9							
cis-1,2-Dichloroethene	7	70	<u>7.6</u>	5.2	1.0				91	100	85
trans-1,2-Dichloroethene	20	100							7.7	6.7	4.2
Ethylbenzene	140	700	6.4			1.7					
Isopropylbenzene	None	None	55	2.2	1.8	14	2.3	1.5			
p-Isopropyl toluene	None	None	35								
Methylene Chloride	15	150									
Naphthalene	8	40	<u>10</u>								
n-Propylbenzene	None	None	60	1.4	1.9	8.2					
Tetrachloroethene	0.5	5	120	<u>1.8</u>					2.5		
Toluene	68.6	343				6.7					
Trichloroethene	0.5	5							1.2		0.6
1,2,4-Trimethylbenzene	None	None	350	1.1	2.2	5.5					
1,3,5-Trimethylbenzene	None	None	240		0.84	1.7					
Vinyl Chloride	0.02	0.2	72	110	51				19	41	43
Xylenes, Total	124	620	44.6			32					
Total VOCs			1339.6	182.3	100.04	214.9	63.7	17.7	122.9	149.1	133.64
Percentage Change since 7/95			NA	-86	-93	NA	-70	-92	NA	+21	+9
Percentage Change since 9/96			NA	NA	-45	NA	NA	-46	NA	NA	-10

- Notes: ♦ All concentrations in parts per billion.  
 ♦ Blank entries mean no detection above laboratory quantification limits.  
 ♦ Shaded values denote an NR140 Enforcement Standard exceedance.  
 ♦ Underlined values denote Preventive Action Limit exceedance.  
 ♦ Samples collected June 19 and 20, 1995, September 19, 1996, and October 8, 1997. Monitor well MW-1 contained free product and MW-4 was dry.  
 ♦ NA - Not applicable

HSI GEOTRANS

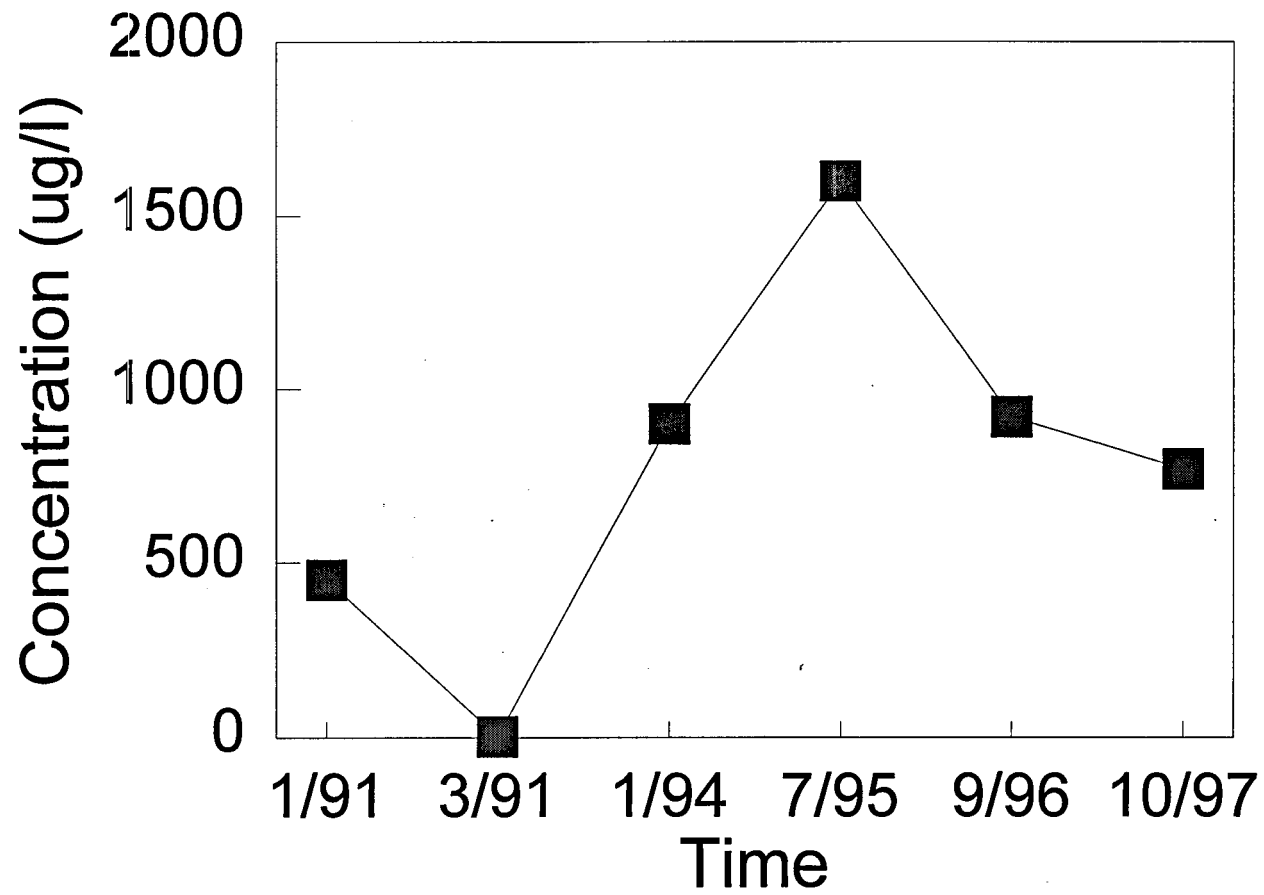
Table 3 Ground water Elevations Table (1995-1997)

Well ID	Ground Surfacc Elevation	Top of PVC casing Elevation	7/95	9/96	10/97
MW-1	602.8	602.97			589.11
MW-2	599.7	599.6	588.72	588.1	588.32
MW-3	600.7	600.38	589.27	587.98	588.74
MW-4	613.6	613.35	593.59	593.53	593.52
MW-5	616.8	616.62	601.71	601.22	601.16
MW-7	599	598.64	587.84	587.42	587.5
MW-8	599.9	599.44	588.57	588.06	588.16
MW-9	605.8	605.57	591.32	590.67	590.57

**CONCENTRATION  
VS  
TIME  
GRAPHS**

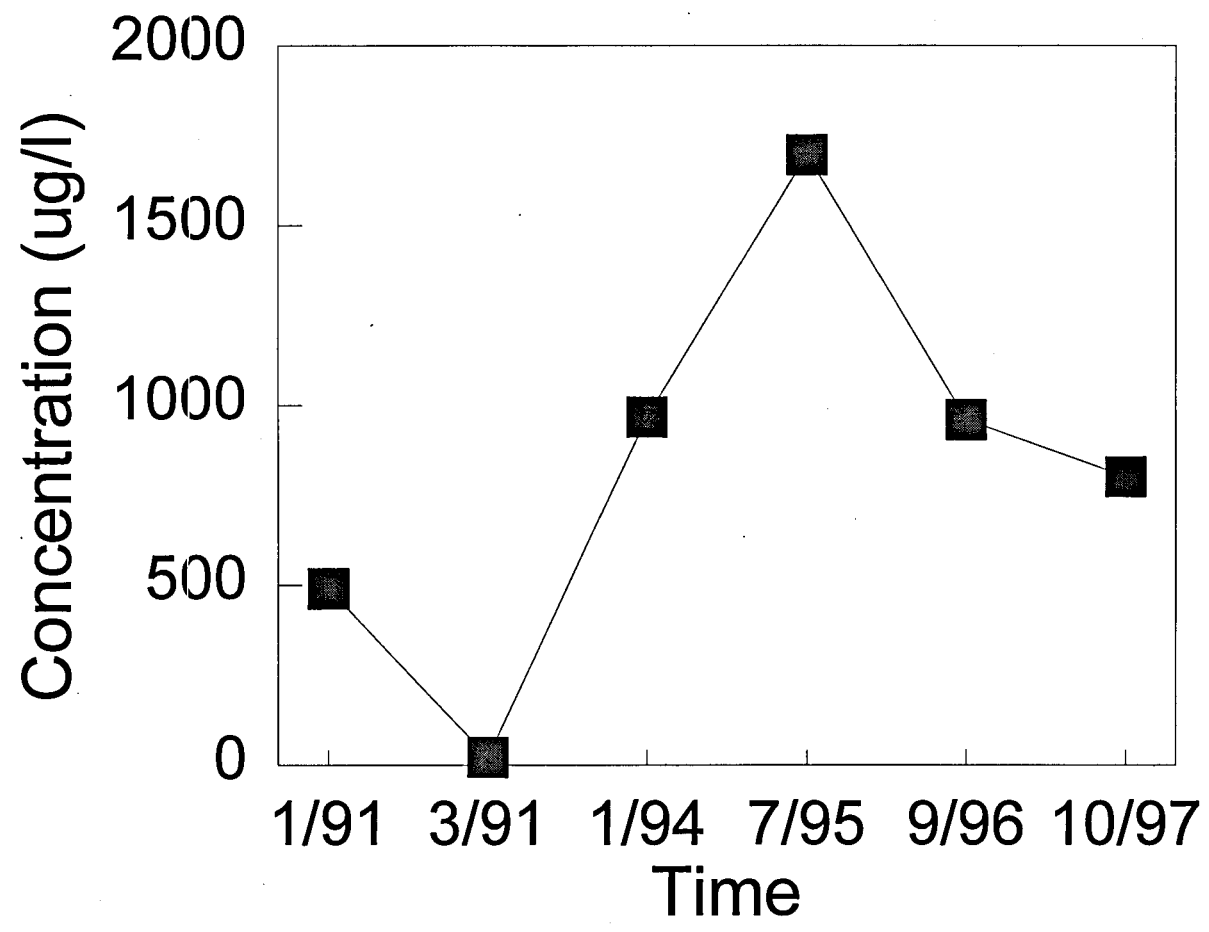


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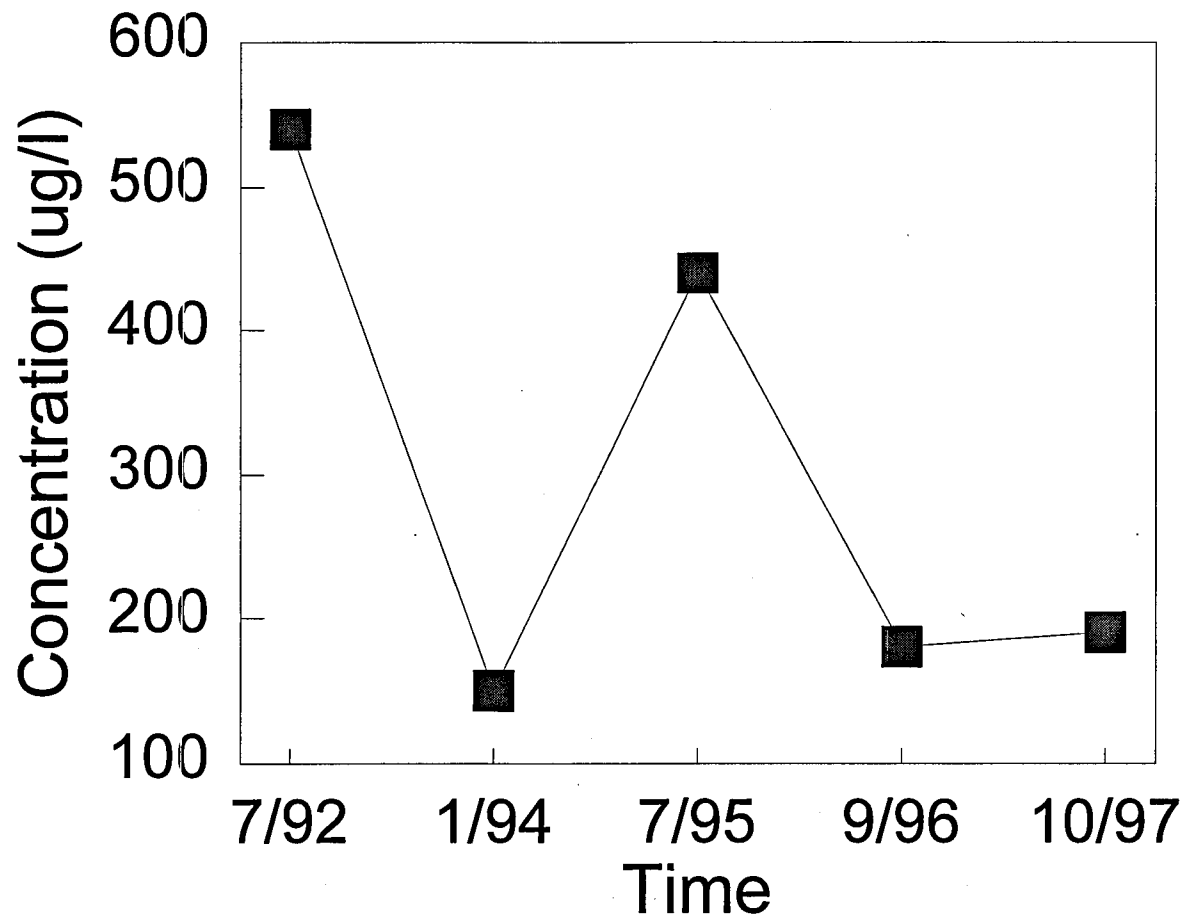
■ Benzene

# MW-2



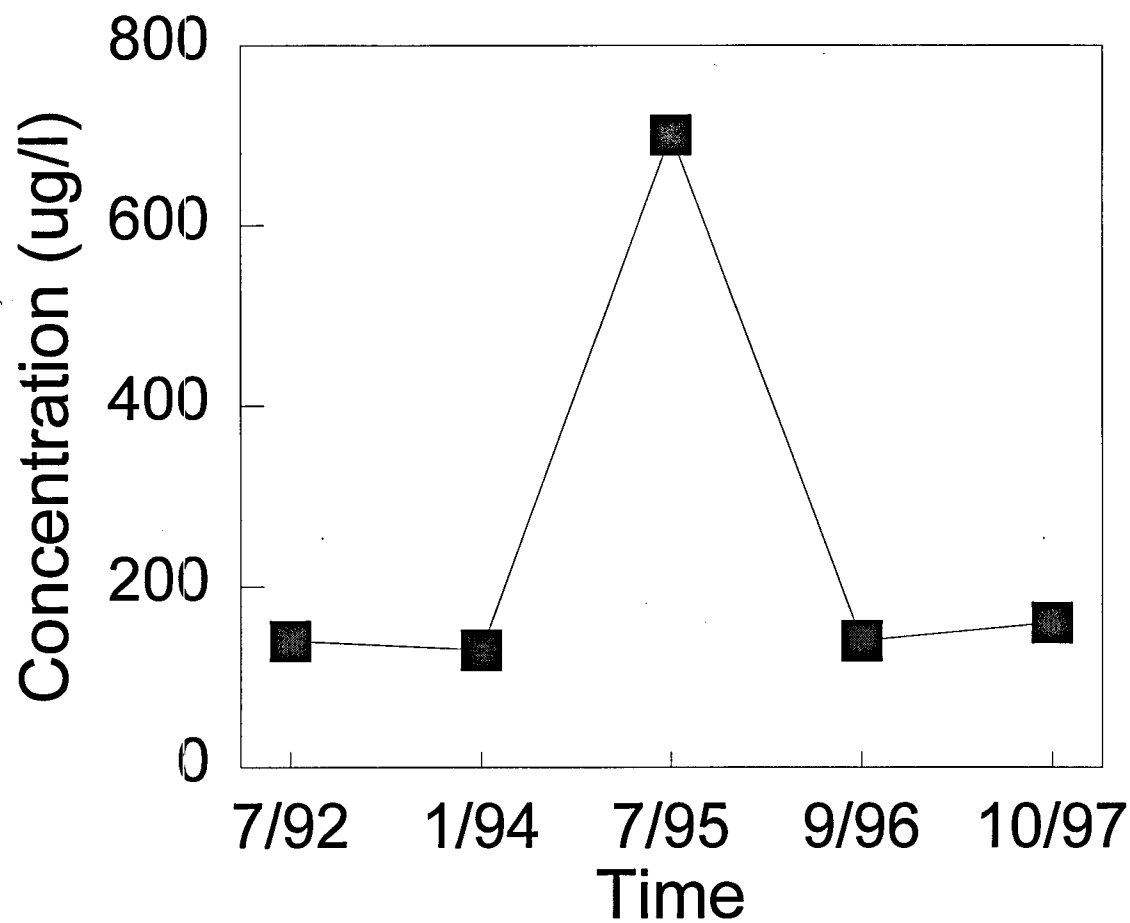
■ Total VOCs

# MW-3



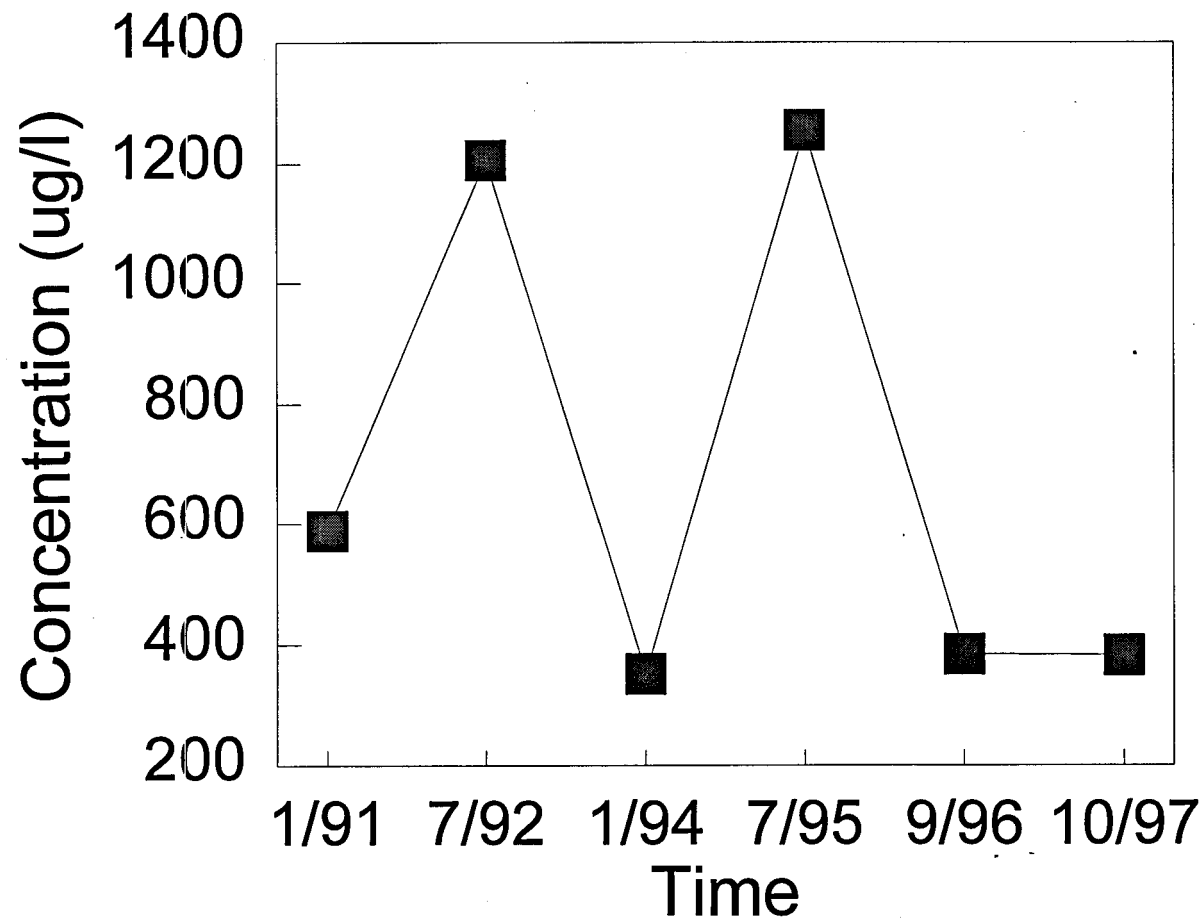
■ cis-1,2-DCE

# MW-3



■ Vinyl Chloride

# MW-3

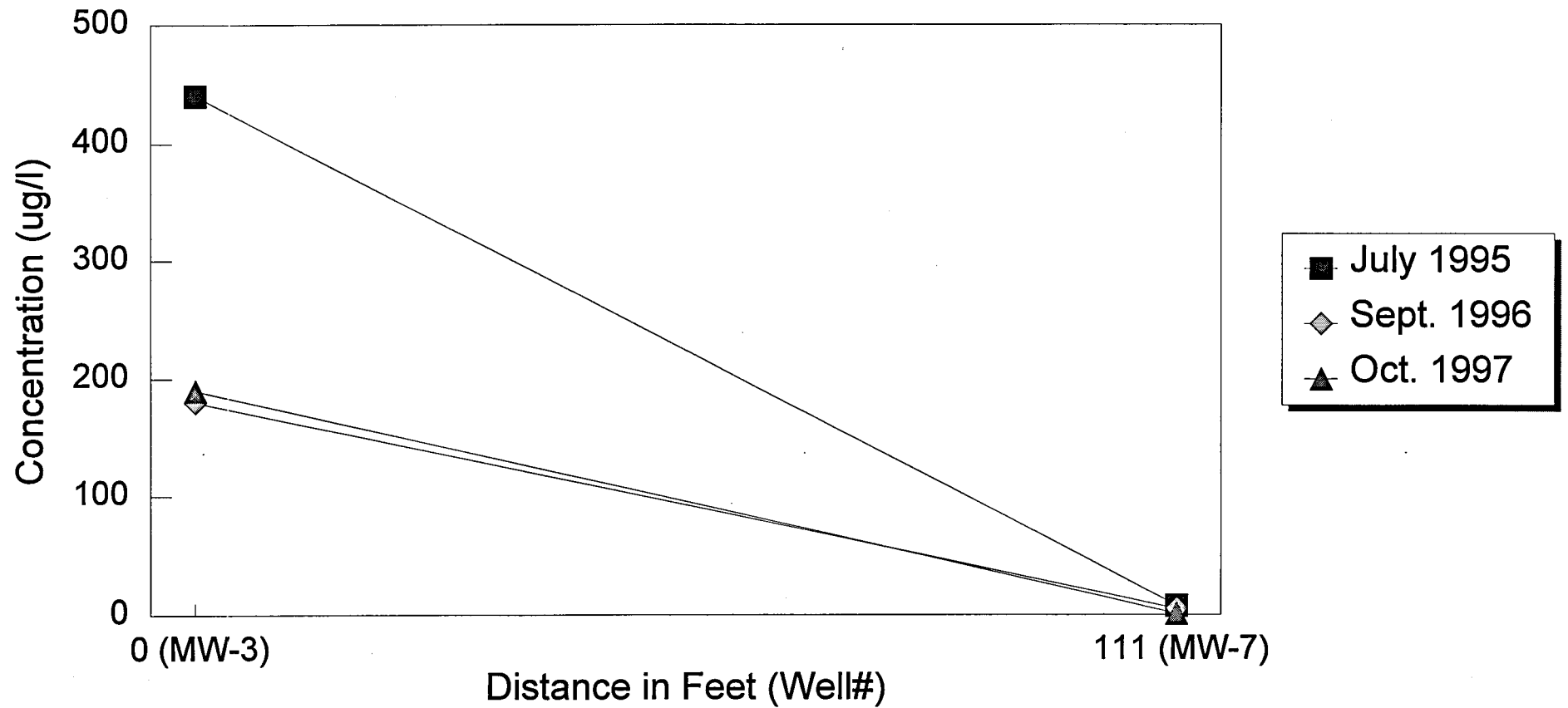


■ Total VOCs

**CONCENTRATION  
VS  
DISTANCE  
CURVES**

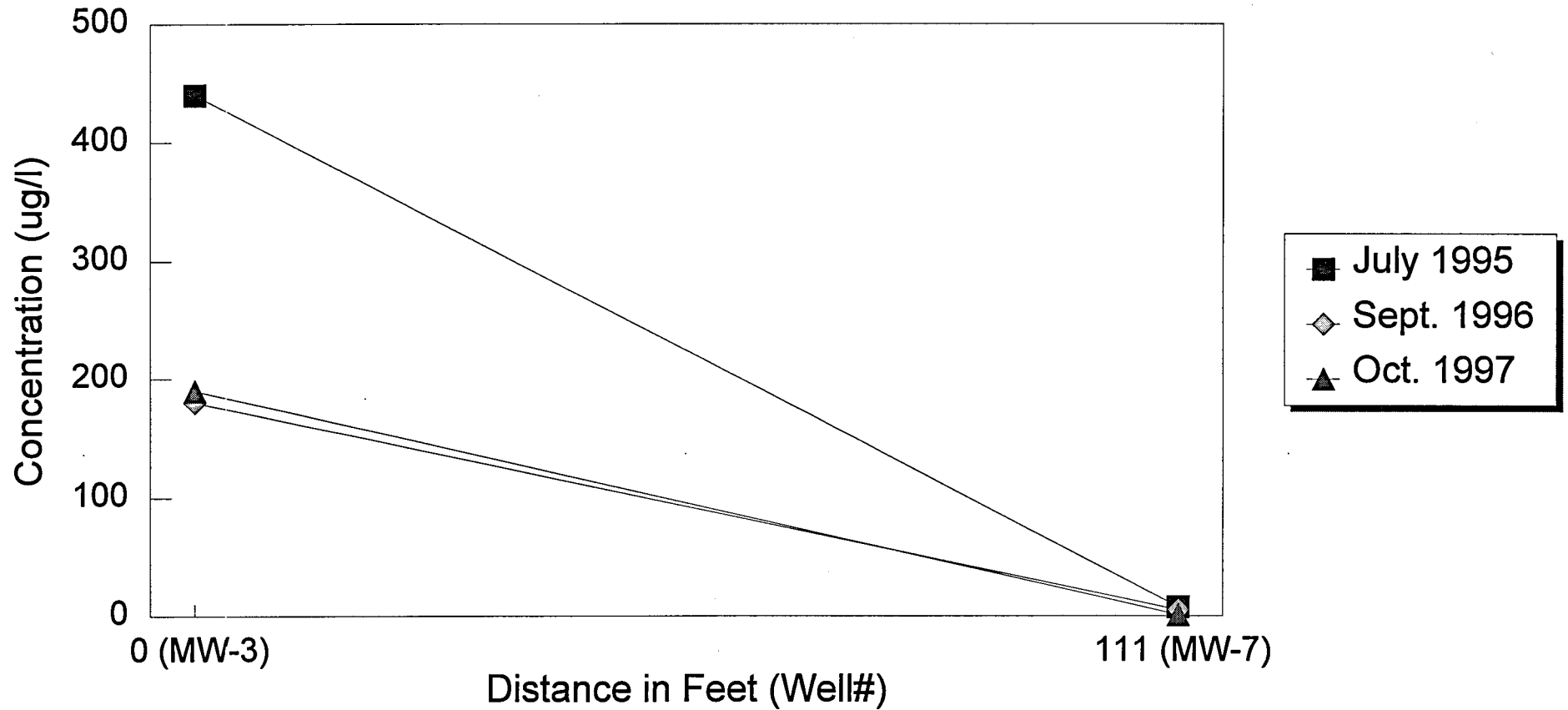
# Concentration Vs. Distance Curve

cis-1,2-DCE



# Concentration Vs. Distance Curve

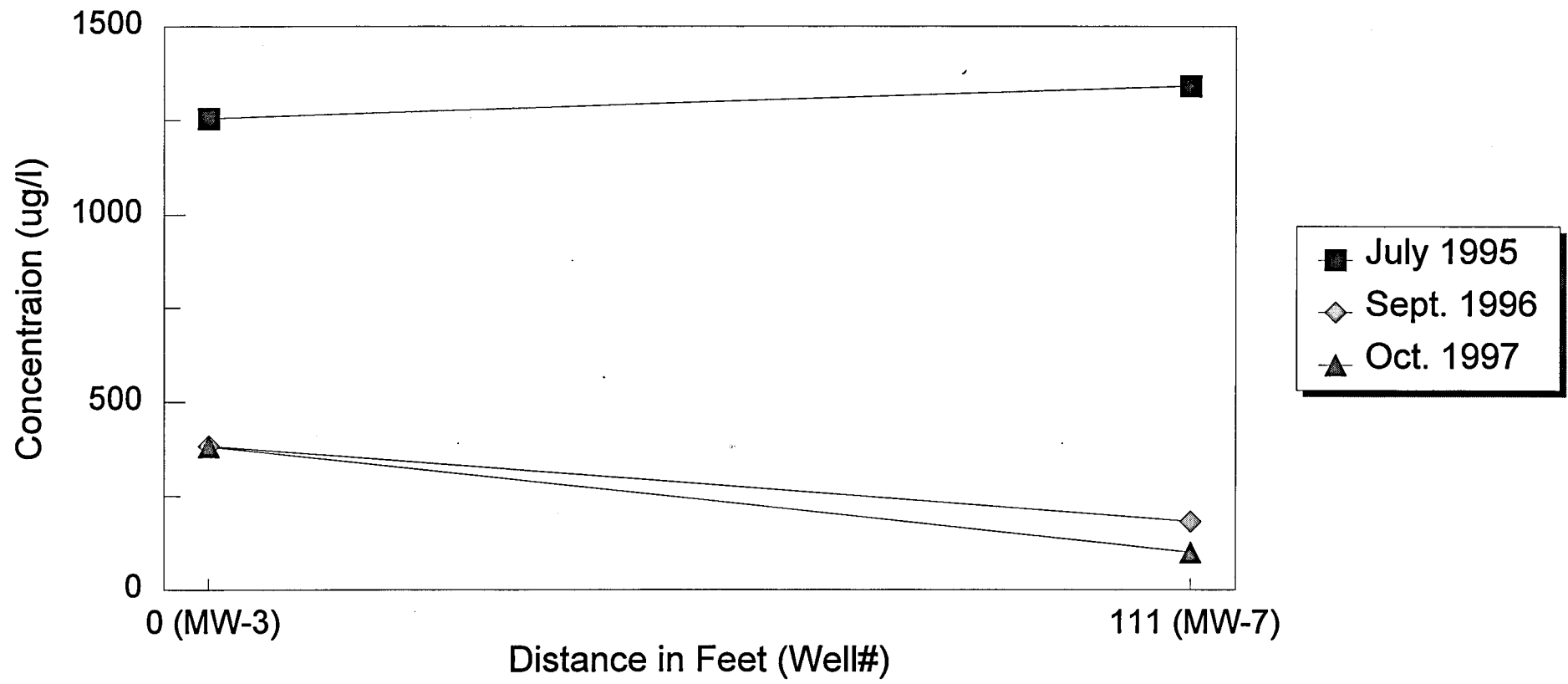
cis-1,2-DCE





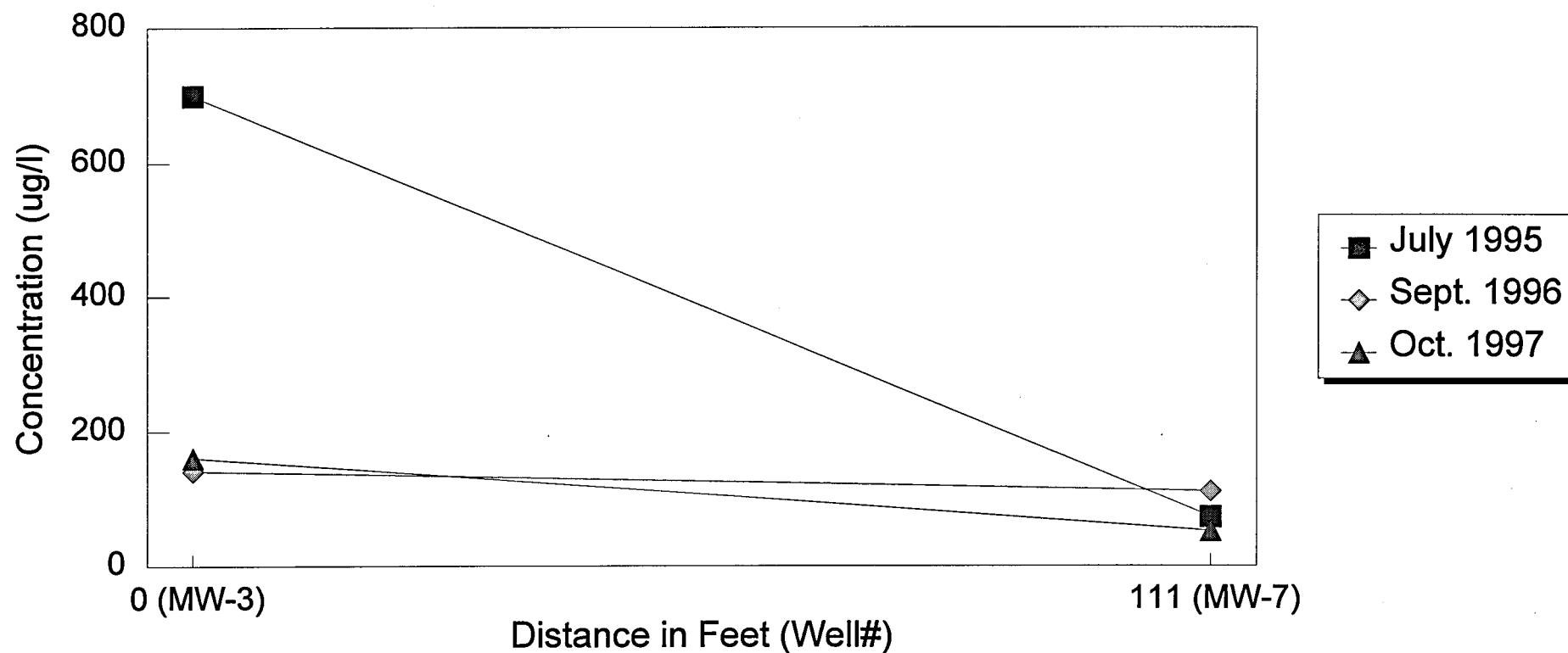
# Concentration Vs. Distance Curve

Total VOCs



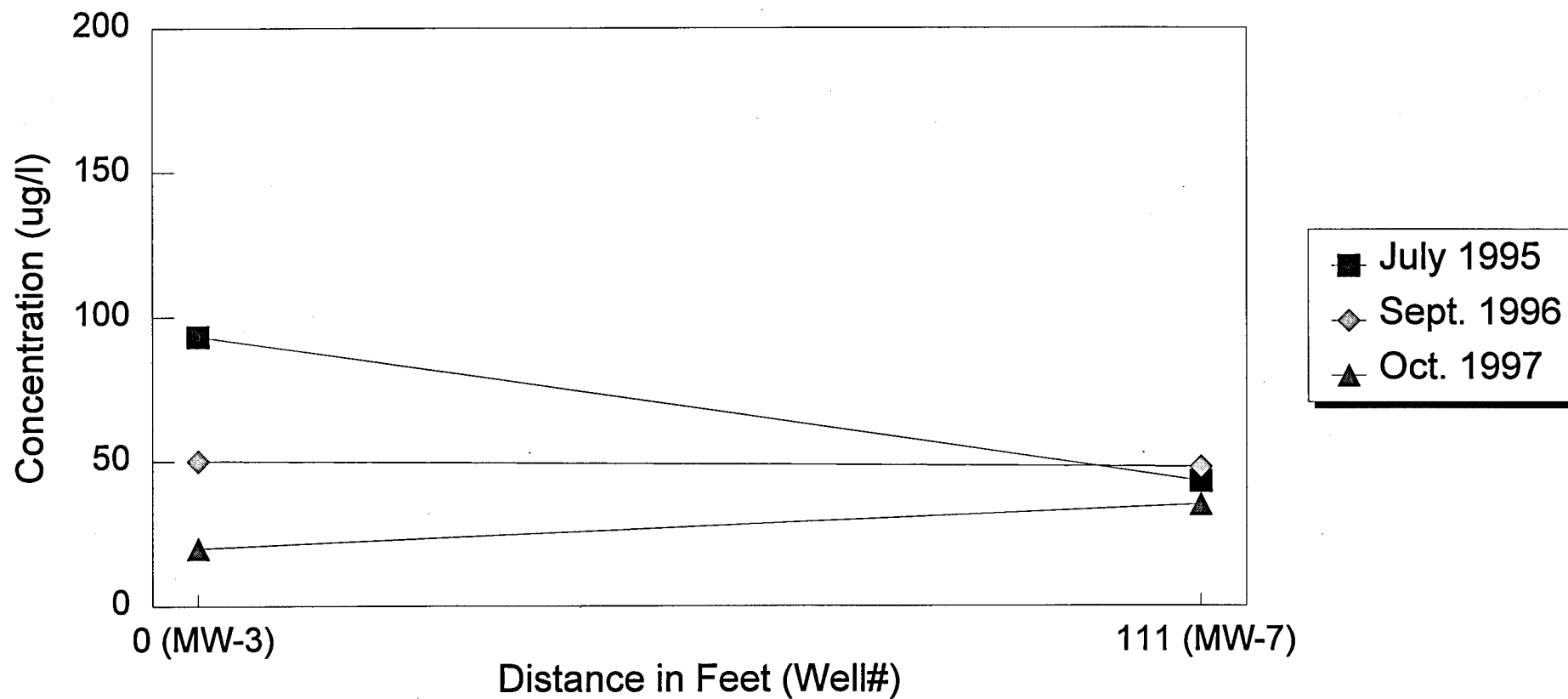
# Concentration Vs. Distance Curve

Vinyl Chloride



# Concentration Vs. Distance Curve

Benzene



## PRODUCT BAILING RECORD

MILWAUKEE PLATING COMPANY  
 PRODUCT BAILING RECORD  
 FOR WELL MW- 4-1

DATE	TIME	PRODUCT THICKNESS BEFORE BAILING (inches)	BAILED PRODUCT VOLUME (ml)	QUANTITY OF LIQUID BAILED (gallons)	INITIALS OF SAMPLER	COMMENTS
11/2/96	09:00	3"	—	2 gal	DN	Water level C 14'-0"
11/9/96	10:30	3 1/4"		2 gal	DN	Water level C 13'-9"
11/27/96	15:45	3 3/4"		2 gal	DN	Water level C 14'-2 1/2"
12/8/96	20:05	3 1/2"		2 gal	DN	Water level C 14'-1 1/4"
12/22/96	21:05	3 1/4"		2 gal	DN	Water level C 14'-1/2"
1/6/97	20:15	4"		2 gal	DN	Water level C 14'-1"
1/14/97	19:00	3 3/4"		2 gal	DN	Water level C 14'-1 1/4"
2/15/97	10:00	3 3/4"		2 gal	DN	Water level C 13'-10"
2/28/97	15:00	1 1/4"		2 gal	DN	Water level C 12'-1 1/4"
3/8/97	11:15	2"		2 gal	DN	Water level C 12'-0"
3/15/97	16:00	2 1/4"		2 gal	DN	Water level C 12'6"
3/29/97	16:15	3 3/4"		2 gal	DN	Water level C 13'-1"
4/14/97	20:15	3 1/2"		2 gal	DN	Water level C 13'-5"

MILWAUKEE PLATING COMPANY  
 PRODUCT BAILING RECORD  
 FOR WELL MW- #1

DATE	TIME	PRODUCT THICKNESS BEFORE BAILING (inches)	BAILED PRODUCT VOLUME (ml)	QUANTITY OF LIQUID BAILED (gallons)	INITIALS OF SAMPLER	COMMENTS
4/27/97	06:00	3 1/4"	—	2 gal	TN	Water level @ 13'4"
5/10/97	18:00	3 1/2"	—	2 gal	TN	Water level @ 13'2"
5/24/97	8:30	4 1/4"	—	2 gal	TN	Water level @ 12'8 1/2"
5/31/97	10:30	4"	—	2 gal	TN	Water level @ 13'0"
6/22/97	20:00	4"	—	2 gal	TN	Water level @ 12'8"
6/29/97	22:00	3 1/4"	—	2 gal	TN	Water level @ 12'10"
7/13/97	17:00	3"	—	2 gal	TN	Water level @ 12'5"
7/20/97	08:00	3 1/2"	—	2 gal	TN	Water level @ 12'7"
8/11/97	20:00	5 1/2"	—	2 gal	TN	Water level @ 12'4"
8/25/97	14:00	4 1/2"	—	2 gal	TN	Water level @ 12'10"
9/6/97	09:30	4"	—	2 gal	TN	Water level @ 13'0"
9/27/97	10:00	6"	—	2 gal	TN	Water level @ 12'10 1/2"
10/10/97	<del>08:00</del> 20:00	5 1/2"	—	2 gal	TN	

MILWAUKEE PLATING COMPANY  
 PRODUCT BAILING RECORD  
 FOR WELL MW- #1

DATE	TIME	PRODUCT THICKNESS BEFORE BAILING (inches)	BAILED PRODUCT VOLUME (ml)	QUANTITY OF LIQUID BAILED (gallons)	INITIALS OF SAMPLER	COMMENTS
10/18/97	09:30	5 1/2"	—	2gal	DN	Water level @ 13' 10"
10/20/97	10:00	5"		2gal	DN	Water level @ 13' 11 1/2"
11/16/97	07:30	5 1/4"		2gal	DN	Water level @ 13' 11"
11/20/97	<del>07:30</del> 19:00	5"		2gal	DN	Water level @ 13' 10"
12/14/97	22:00	5 1/4"		2gal	DN	Water level @ 13' 11 1/2"
1/17/98	10:00	5 1/4"		2gal	DN	Water level @ 13' 3"
1/30/98	18:00	5"		2gal	DN	Water level @ 13' 1"
2/13/98	19:00	5 1/2"		2gal	DW	water level @ 12' 6"
2/20/98	17:30	5 1/2"		2gal	DW	water level @ 12' 5"
3/2/98	19:00	5 1/2"		2gal	DW	water level @ 11' 9"
3/7/98	09:45	7"		2gal	DW	water level @ 12' 2"
3/16/98	14:45	4 3/4"		2gal	DW	water level @ 12' 1"
3/20/98	14:45	4 3/4"		2gal	DW	water level @ 11' 5"