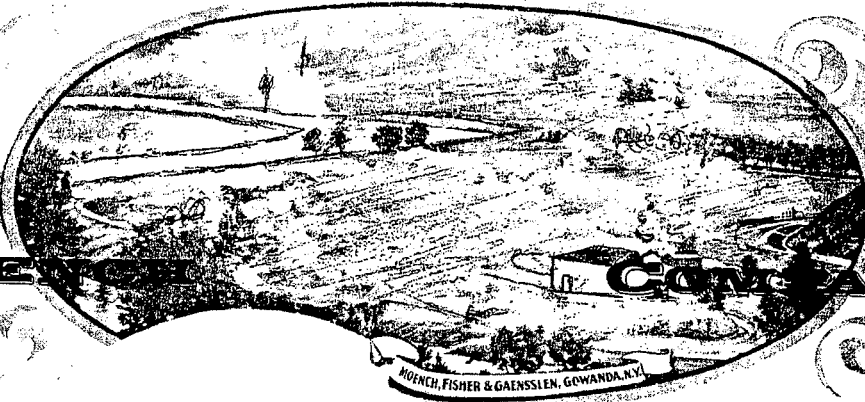


C. Moench and Sons
Co.

MOENCH



Established
1865

COMPANY

465 PALMER STREET
GOWANDA, NEW YORK 14070

TEL. 716-532-2201

FAX 716-532-5518

✓ Mr. Stan Radon
NYS Department of Environmental Conservation
270 Michigan Ave.
Buffalo, New York 14203-2999

December 16, 2003

DEC 22 2003

Re: Palmer Street Landfill; Annual 2003 Groundwater Quality Report.

NYSDEC - REG. 9
FOIL
REL UNREL

Dear Mr. Radon:

Enclosed is the 2003 Annual Summary report for the Palmer Street Landfill. The weather was more rainy this year, than typical. Continual Beaver activity, along the creek, seemed to raise the water level in a couple wells adjacent to the creek.

The landfill was sampled twice, in 2003. A Cover System Evaluation, sample, was also performed. That report will be out in a few months.

Again, this year, there were no "metals of concern" detected in the landfill, above the class "GA" standard. Some "guidance value" VOCs were detected.

These results continue to confirm the minimal impact of the landfill, on the environment, and justification for delisting of the landfill.

Moench will continue to conduct two sample events in 2004.

Please call me if you have any questions.

Sincerely,

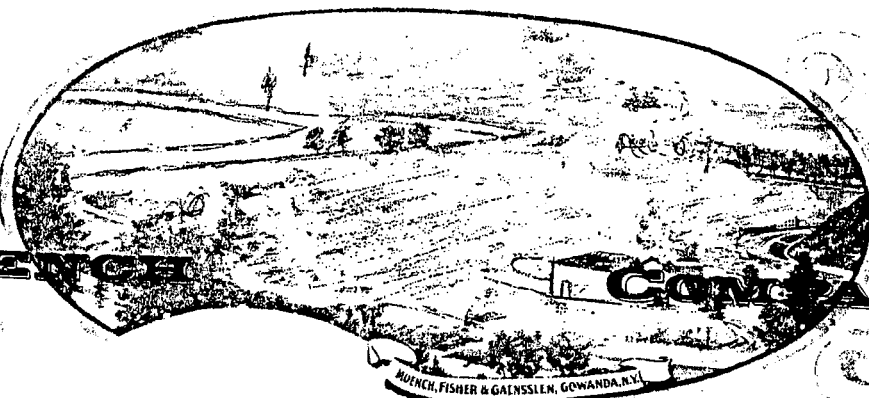
Jeffrey Smith

Jeffrey Smith
Site Manager

Cc: Ed Miles-NYSDEC, Albany, NY
Virgil Simpson-Brown Shoe Co., St. Louis, MO
Rick Frappa-Geomatrix, Williamsville, NY

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PALMER STREET LANDFILL.

ANNUAL GROUNDWATER MONITORING REPORT.

2003 CALENDAR YEAR

MOENCH COMPANY
GOWANDA, NEW YORK 14070

JEFFREY SMITH
SITE MANAGER
DECEMBER 2003

MOENCH COMPANY
PALMER STREET LANDFILL
 2003 ANNUAL GROUNDWATER MONITORING REPORT.....

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<u>ATTACHMENT</u>	<u>DESCRIPTION</u>
A	INFILTROMETER DESIGN
B	GROUNDWATER ELEVATION DATA & GRAPHS.
B1	FIELD MEASUREMENT TRENDS; "PH", CONDUCTIVITY, ETC.
C	GRAPH: METALS CONCENTRATION vs TIME; GROUPED BY MONITORING POINT; WHERE DETECTED.
D	GRAPH: VOLATILES vs TIME; GROUPED BY MONITORING POINT; WHERE DETECTED.
E	FIELD MEASUREMENT DATA SHEETS; SUBMITTED IN PREVIOUS SEMI-ANNUAL REPORTS OF: 4/03 & 8/03.
F	ANALYTICAL DATA FROM "PHILLIPS ANALYTICAL SERVICES", 2003 MONITORING EVENT; SUBMITTED IN PREVIOUS SEMI-ANNUAL REPORTS OF: 4/03 & 8/03.

1.0 INTRODUCTION

1.1 BACKGROUND

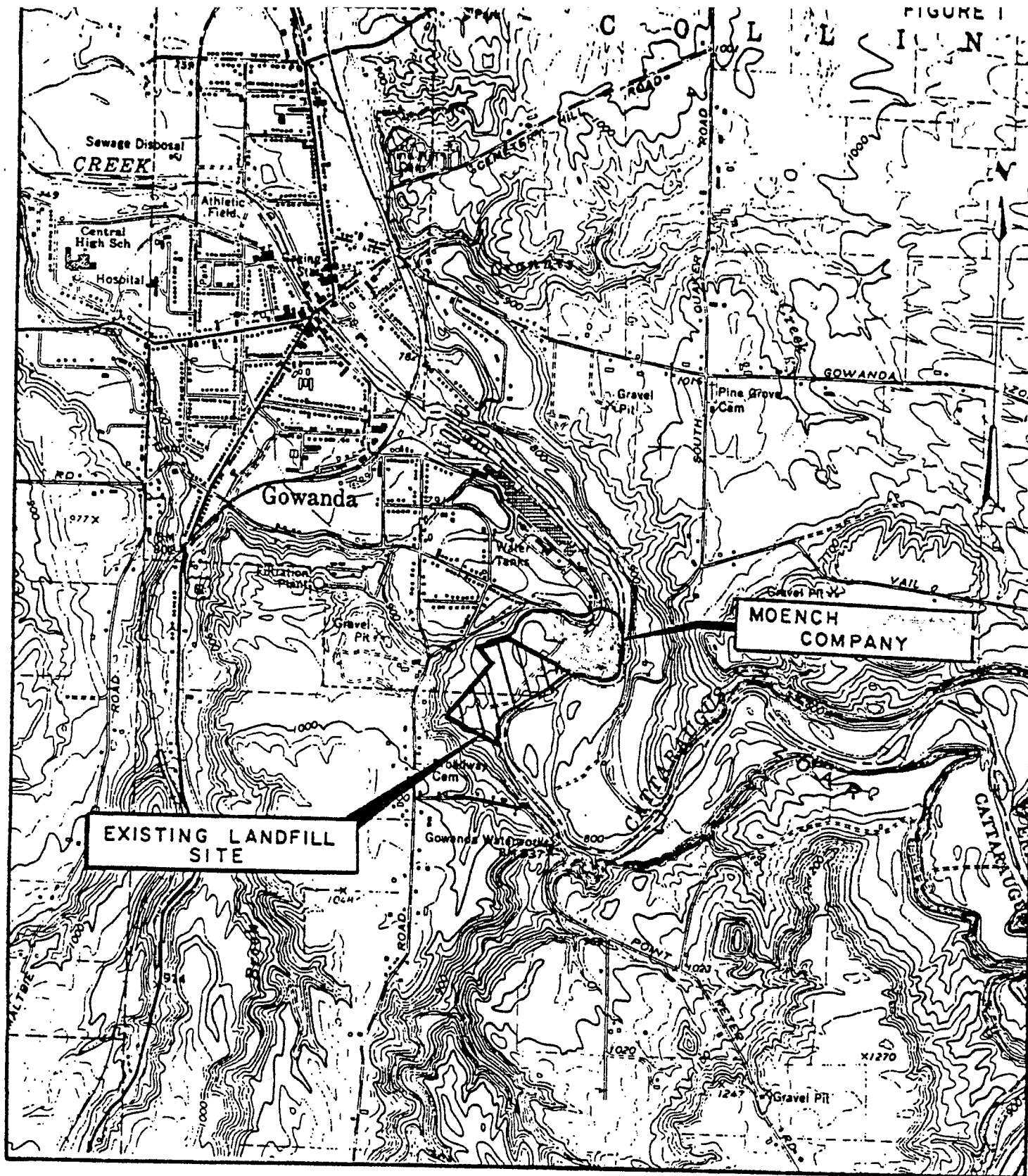
THE MOENCH COMPANY, A DIVISION OF BROWN SHOE COMPANY, INC. IS LOCATED NEAR THE SOUTHEAST CORNER OF THE VILLAGE OF GOWANDA, CATTARAUGUS COUNTY, NEW YORK.

(FIGURE 1). THE PALMER STREET LANDFILL WHICH WAS OPERATED BY MOENCH TANNING FROM 1900 THROUGH JULY 1983, LIES IMMEDIATELY SOUTHWEST OF THE FORMER SITE COMPLEX ON AN APPROXIMATELY 25-ACRE PARCEL OF LAND. A VARIETY OF WASTE GENERATED BY MOENCH TANNING WERE DISPOSED OF AT THE PALMER STREET LANDFILL SITE. THESE WASTES INCLUDED SOLE LEATHER EXTRACT, RENDERING WASTE, SPRAY BOOTH CLEAN UP WASTE, WASTE FINISH, WASTE HAIR/LEATHER SCRAPS, WASTEWATER TREATMENT PLANT SLUDGE, AND OCCASIONAL CONSTRUCTION DEBRIS.

MOENCH TANNING HAS CLOSED THE PALMER STREET LANDFILL. ACCORDINGLY, THE CLOSURE/POST-CLOSURE PLAN (REFERENCE 1), IS BEING PERFORMED. THE LONG-TERM POST CLOSURE MONITORING PROGRAM HAS BEEN APPROVED & IMPLEMENTED.
(JULY 1993, REVISED MARCH 1994.

1.2 PUPOSE AND SCOPE

SAMPLES ASSOCIATED WITH TWO ROUNDS OF WATER QUALITY MONITORING, FOR THE 2003 CALENDAR YEAR, WERE COLLECTED IN APRIL & AUGUST OF 2003, FOR THE LANDFILL. THE PURPOSE OF THIS REPORT IS TO PROVIDE A SUMMARY OF THE DATA GENERATED FOR THE PALMER STREET LANDFILL DURING 2003....



{FIGURE 1}

NOTE:
TOPOGRAPHY TAKEN FROM 1963 GOWANDA, N.Y.
U.S.G.S. QUADRANGLE 7.5 MIN. SERIES
SCALE: 1" = 2000'

SITE LOCATION MAP
PALMER STREET LANDFILL
GOWANDA, N.Y. 6-94

MOENCH CO.

6-94



QUADRANGLE LOCATION

2.0 MONITORING SYSTEM

SEVEN (7) GROUNDWATER MONITORING WELLS AT THE PALMER STREET LANDFILL ARE MONITORED IN ACCORDANCE WITH THE LONG TERM POST CLOSURE MONITORING PLAN APPROVED FOR THE SITE.

THESE WELLS ARE DESIGNATED AS FOLLOWS:

UPGRADIANT UPPER BEDROCK	DOWN GRADIANT UPPER BEDROCK	UPPER BEDROCK PIEZOMETER P-6D
MW-1D	MW-3DR	LOWER OVERBURDEN
MW-7D	MW-4D	PIEZOMETER P-6B
MW-8D (ANNUAL)	MW-6D	

IN ADDITION TO THE WELLS, NYSDEC ALSO REQUIRES THE MONITORING OF TWO (2) BANK SEEPS DESIGNATED AS BS-1 AND BS-3, RESPECTIVELY. THE ABILITY TO OBTAIN SAMPLES FROM THESE BANKSEEPS VARIES DUE WET/DRY WEATHER CONDITIONS. CREEK SAMPLES ARE USUALLY OBTAINED IN THEIR PLACE.

A BANK SEEP SAMPLE WAS AVAILABLE FOR THE APRIL SAMPLE, BUT NOT FOR THE AUGUST SAMPLE.

TO AID IN THE EVALUATION OF COVER PERFORMANCE, LEVELS FROM FIVE (5) INFILTRMETERS, ARE ALSO MEASURED. LOCATIONS OF MONITORING POINTS ARE SHOWN ON FIGURE 2.

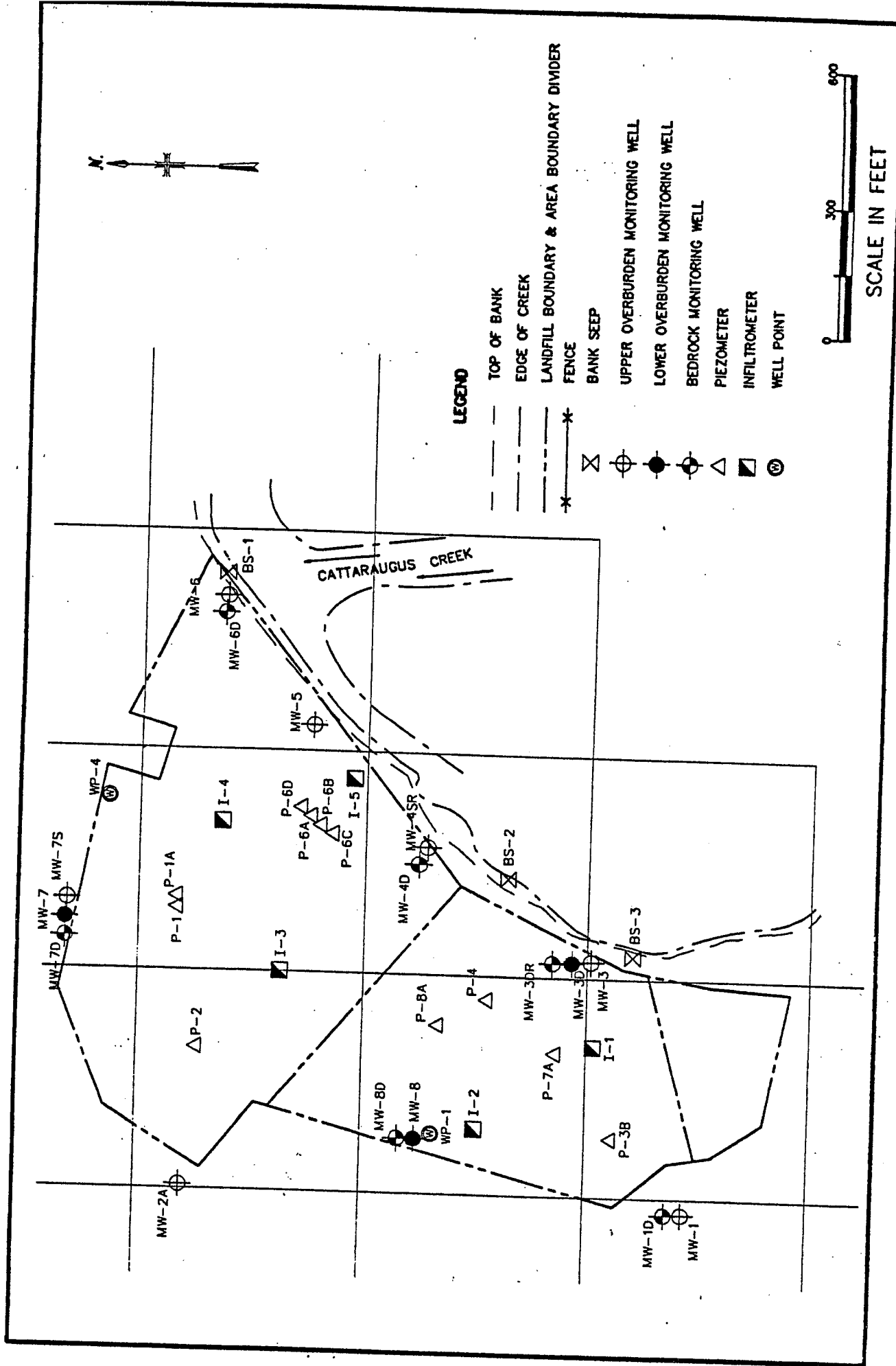


FIGURE #2

3.0 MONITORING METHODS

3.1 GROUNDWATER MONITORING-LANDFILL

SAMPLES COLLECTED DURING THE TWO MONITORING EVENTS, FOR THE LANDFILL, WERE COLLECTED BY MOENCH COMPANY PERSONNEL, IN 2003. THE ANALYTICAL WORK WAS PERFORMED BY PHILIPS ANALYTICAL SERVICES.(HAMILTON, ONTARIO). THE ANALYSIS WAS PERFORMED IN ACCORDANCE WITH THE SAMPLING PLAN/QUALITY ASSURANCE PLAN FOR THE PALMER ST. LANDFILL.(REFERENCE 3).

LABORATORY ANALYSES WERE PERFORMED IN ACCORDANCE WITH THE USEPA SW-846, 3RD EDITION (REFERENCE 4). THE MONITORING PARAMETERS ARE LISTED IN TABLE 1. SAMPLES WERE COLLECTED FROM EACH OF THE TEN(10) MONITORING LOCATIONS IDENTIFIED IN SECTION 2.0.

PRIOR TO SAMPLING, STATIC WATER LEVEL ELEVATIONS WERE MEASURED IN THE MONITORING WELLS AND THE WELLS WERE PURGED (SEE TABLE 4). GROUNDWATER ELEVATIONS WERE ALSO MEASURED IN THE PIEZOMETERS, INFILTRMETERS, AND WELLS ON-SITE.

FIELD SAMPLES WERE COLLECTED AND MEASURED FOR THE FIELD PARAMETERS IDENTIFIED IN TABLE 1. THE FIELD MEASUREMENTS ARE SUMMARIZED IN TABLE 7.

3.2 INFILTRMETER MONITORING

FIVE INFILTRMETERS HAVE BEEN INSTALLED BENEATH THE LAND-FILL CAP TO AID IN THE ASSESSMENT OF PERFORMANCE OF THE CAP. DURING EACH SEMIANNUAL EVENT, WATER LEVELS IN THE INFILTRMETER ARE MEASURED AND THE AMOUNT OF WATER INFILTRATING IS CALCULATED.

THE CALCULATED INFILTRATION RATES ARE PRESENTED ON TABLE 2 & 3. CALCULATED INFILTRATION RATES ARE USUALLY WITHIN THE DESIGNED INFILTRATION RATE OF 1×10^{-7} CM/SEC, EXCEPT ARE NOTED ON THE TABLE. A SCHEMATIC SHOWING THE DESIGN AND DIMENSIONS OF THE INFILTRMETERS IS PRESENTED IN ATTACHMENT A.

TABLE 1

**MOENCH COMPANY
PALMER STREET LANDFILL**

ROUTINE GROUNDWATER QUALITY MONITORING PARAMETERS

Soluble Arsenic
Soluble Chromium
Soluble Lead

Volatile Organics⁽²⁾⁽³⁾

pH⁽¹⁾

Conductivity⁽¹⁾

Turbidity⁽¹⁾ - visual only

Groundwater Elevation⁽¹⁾

Temperature⁽¹⁾

All samples collected for analysis of soluble metals will be pressure-filtered in the field immediately upon sample collection.

NOTES:

1. All field parameters (i.e., pH, specific conductance, temperature and turbidity) will be measured in the field. No analysis of these parameters will be required by the laboratory.
2. Volatile organic compounds will be those compounds determined by SW-846, Method 8260.

2003

TABLE 4

PALMER STREET LANDFILL
SUMMARY OF GROUNDWATER ELEVATIONS⁽¹⁾

Location	Dates of Measurement	
	3-28-03	8-18-03
MW-1	820.89	826.95
MW-1D	816.57	818.12
MW-2A	806.85	806.12
MW-3	793.50	795.50
MW-3D	800.03	800.96
MW-3DR	802.42	802.67
MW-4SR	797.28	798.95
MW-4D	795.73	795.23
MW-5	DRY	DRY
MW-6	786.10	787.93
MW-6D	783.91	782.28
MW-7S	793.33	794.27
MW-7	794.00	794.62
MW-7D	796.29	795.84
MW-8D	808.49	809.19
P-1	793.65	794.75
P-1A	DRY	797.31
P-2	800.94	802.17
P-3B	817.97	817.97
P-4	796.88	798.73
P-6A	793.22	793.20
P-6B	792.95	791.20
P-6C	792.83	792.80
P-6D	793.16	792.40
P-7A	796.17	798.73
P-8A	DRY	DRY
WP-1	RUSTED SHUT	RUSTED SHUT
WP-4	" "	" "

Notes:

- (1) Measured in feet; distance above sea level.
 * Well locked; unable to open.
 ** Wells added to program prior to November 1993 event.
 MW = Monitoring Well P = Piezometer WP = Well Point

TABLE 2

MOENCH COMPANY
PALMER STREET LANDFILL
3-28-03 MONITORING EVENT

INFILTROMETER MEASUREMENTS

Infiltrometer	Static Water Level (ft) 3-28-03	Static Water Level (ft) 8-16-02	Δ Depth (ft)	# Days Between Readings (#)	Infiltration Rate		Approx. Total Rainfall This Period (ft)	Infiltration (%)
					gal/day.ft ²	(cm/sec)		
① I-1	3.96	4.98	1.02	224	.0041	1.9×10^{-7}	2.81	17%
I-2	7.64	7.62	NEGATIVE	"	NEG.	NEG.	NEG.	NEG.
I-3	6.76	6.84	.08	"	.0004	2.0×10^{-8}	2.81	< 1%
I-4	7.65	7.72	.07	"	.0004	2.0×10^{-8}	"	< 1%
I-5	6.64	7.05	.41	"	.0021	1.4×10^{-7}	"	1%

Note:

** Negative ΔD precludes calculation of meaningful data.

① I-1; FREQUENTLY FLOODED DUE TO HIGH WATER TABLE.

TABLE 3

MOENCH COMPANY
PALMER STREET LANDFILL
8-18-03 MONITORING EVENT

INFILTROMETER MEASUREMENTS

Infiltrometer	Static Water Level (ft)	Static Water Level (ft)	Δ Depth (ft)	# Days Between Readings (#)	Infiltration Rate		Approx. Total Rainfall This Period (ft)	Infiltration (%)
					gal/day-ft ²	(cm/sec)		
I-1	8-18-03	3-28-03	**NEGATIVE	141	—	—	—	—
I-2	5.55	3.96	.06	"	.0002	$.15 \times 10^{-8}$	1.59'	< 1%
I-3	7.58	7.64	**NEGATIVE	"	—	—	—	—
I-4	7.14	6.76	.05	"	.0002	$.15 \times 10^{-8}$	1.59'	< 1%
I-5	7.60	7.65	**NEGATIVE	"	—	—	—	—
I-5	7.16	6.64	**NEGATIVE	"	—	—	—	—

Note:

** Negative ΔD precludes calculation of meaningful data. — LIKELY DUE TO EVAPORATION / SUMMER.

4.0 GROUNDWATER QUALITY MONITORING RESULTS

4.1 EVALUATION OF GROUNDWATER ELEVATION DATA:

GROUNDWATER ELEVATION MEASUREMENTS WERE TAKEN AT EACH OF THE ACCESSIBLE ONSITE MONITORING WELLS, PIEZOMETERS AND WELL POINTS DURING THE ANNUAL 2003, MONITORING EVENTS. THE DATA IS SUMMARIZED ON TABLE #4.

PLOTS OF THE GROUNDWATER ELEVATIONS MEASURED IN THE MONITORING WELLS WITH RESPECT TO TIME, ARE PRESENTED IN FIGURE 3, 4, & 5, FOR THE "SHALLOW OVERBURDEN, DEEP OVERBURDEN AND BEDROCK WELLS, RESPECTIVELY. AS SHOWN IN FIGURES 3, AND 4, OVERBURDEN GROUNDWATER ELEVATIONS WERE GENERALLY CONSISTENT THROUGHOUT THE MONITORING PERIOD. WATER LEVELS HAVE STABILIZED, AFTER THREE YEARS OF INCREASE ('92-'94). THIS OCCURRED DUE TO CESSATION OF VILLAGE AND TANNERY PUMPING OF THE DEEP AQUIFERS. SOME SLIGHT SEASONAL FLUCTUATION STILL OCCURS.

4.2 THE GROUNDWATER AND SURFACE WATER QUALITY RESULTS FOR THE TWO MONITORINGS EVENTS AT THE PALMER STREET LANDFILL, ARE PRESENTED IN TABLES #5 THROUGH #7.

IT SHOULD BE NOTED THAT THESE TABLES INCLUDES ONLY THOSE PARAMETERS WHICH WERE DETECTED ABOVE ANALYTICAL DETECTION LIMITS AT A MINIMUM OF ONE LOCATION. COMPARISON OF THE MONITORING DATA TO THE NYSDEC CLASS "GA" GROUNDWATER QUALITY STANDARDS/GUIDANCE VALUES IS ALSO PRESENTED IN THE TABLES.

BOTH THE SOIL AND WASTE AT THE PALMER STREET LANDFILL CONTAIN METALS-OF-INTEREST AS A COMPONENT OF THE SOIL OR WASTE PARTICLES (REFERENCE 5). THEREFORE, THE SEDIMENT (OR TURBIDITY) CONTENT OF ANY GROUNDWATER OR SURFACE WATER QUALITY SAMPLES WILL DIRECTLY IMPACT THE TOTAL METAL CONCENTRATION OF THE SAMPLES. THE TURBIDITY CONTENT OF THE GROUNDWATER SAMPLES COLLECTED AT THE SITE IS EXTREMELY VARIABLE AND RELATIVELY HIGH BECAUSE THE SOIL AND WASTE FILL BOTH CONTAIN HIGH PERCENTAGES OF FINE-GRAINED PARTICLES. AS NYSDEC HAS PREVIOUSLY AGREED, IN ORDER TO AVOID MIS-INTERPRETATION OF WATER QUALITY DATA, "TOTAL" METALS WILL NO LONGER ANALYZED FOR GROUNDWATER QUALITY STANDARDS OR EVALUATION OF GROUNDWATER QUALITY. IMPACTS WILL BE BASED ON SOLUBLE METALS CONCENTRATION.

ALSO TOTAL NOR SOLUABLE BARIUM WILL NO LONGER BE SAMPLED FOR IN THE AGREEMENT WITH NYSDEC, AS THE ELEMENT IS NATURALLY HIGH IN CONCENTRATION IN NATIVE SOIL. 2002 ANNUAL SUMMARIES AS FOLLOWS:

- THERE WERE NO DETECTIONS OF METALS (As, Cr, Pb), ABOVE THE CLASS "GA" STANDARD, IN EITHER OF THE SAMPLING EVENTS.
- ACETONE WAS DETECTED AT MONITORING POINTS MW-3DR AND MW1D (UPGRADIENT). THIS IS A GUIDANCE VALUE PARAMETER. MW-1D IS UPGRADIENT OF THE LANDFILL. THIS OCCURRED IN BOTH SAMPLES. THIS WILL CONTINUE TO BE OBSERVED. THIS COULD BE A RESULT OF OLDER BENTONITE PELLETS.
- IN THE APRIL SAMPLE, MONITORING POINT MW-4D, CHLOROMETHANE WAS DETECTED AT SLIGHTLY ABOVE CLASS "GA" STANDARD (.005MG/L). THIS IS A RARE OCCURANCE.
- THERE WERE SEVERAL OTHER SLIGHT DETECTIONS OF VOCs IN THE AUGUST SAMPLE, BUT AT BELOW STANDARD, OR GUIDANCE VALUE.

TABLE 7

MOENCH COMPANY
PALMER STREET LANDFILL
3/31/03-4/2/03 MONITORING EVENT

SUMMARY OF FIELD MEASUREMENTS

Location	Sampling Date	Sampling Time	Temp. (°C)	pH (units)	Conductance ⁽¹⁾ (umhos/cm)	Turbidity (NTU)	Sample Appearance	Sample Odor
(2) MW-1D*	4-1-03	1600	10.3	7.71	800	NA	CLEAR	NO
MW-3DR***	4-1-03	1450	11.5	7.97	520	"	SLIGHT TURB.	NO
MW-4D	4/1/03	1400	12.4	7.81	560	"	SLIGHT TUR.	NO
(3) MW-6D	3/31/03	850	12.1	7.97	850	"	CLEAR	NO
MW-7D***	4-2-03	920	12.1	7.85	680	"	CLEAR	NO
MW-8D***	ANNUAL							
P-6B	3/31/03	1100	11.1	7.76	500	"	CLEAR	NO
P-6D	3/31/03	1010	12.1	7.91	620	"	SLIGHT TURB.	NO
BS-1	3/31/03	945	10.1	7.16	900	"	REDISH	NO
BS-3	4-1-03	1520	10.8	8.03	440	"	CLEAR	NO
				6.5-8.5				

NOTES:

- (1) Conductivity readings corrected to 25°C.
 (2) MW-1 is hydraulically upgradient shallow overburden well.
 (3) MW-7D is apparent hydraulically upgradient bedrock well.

* Shallow Overburden Well
 *** Bedrock Well

** Deep Overburden Well
 BS Bank Seep

{ CLASS "GA" }
 STD

TABLE 7

MOENCH COMPANY
PALMER STREET LANDFILL
8/18-8/20/03 MONITORING EVENT

SUMMARY OF FIELD MEASUREMENTS

Location	Sampling Date	Sampling Time	Temp. (°C)	pH (units)	Conductance ⁽¹⁾ (umhos/cm)	Turbidity (NTU)	Sample Appearance	Sample Odor
(2) MW-1D*	8-19-03	920	16.5	7.70	740	NA	CLEAR	NO
MW-3DR**	8-19-03	820	15.5	7.96	540	"	CLEAR	NO
MW-4D	8-18-03	1130	15.3	7.51	620	"	VERY TURB.	NO
(3) MW-6D	8-18-03	851	15.6	7.58	1000	"	SLIGHT TUR.	NO
MW-7D***	8-20-03	820	13.3	8.11	760	"	CLEAR	NO
MW-8D**	8-19-03 ANNUAL	1020	21.9	7.67	360	"	CLEAR	NO
P-6B	8-18-03	1035	25.1	7.68	560	"	SLIGHT TUR.	NO
P-6D	8-18-03	955	14.3	7.61	540	"	CLEAR	NO
BS-1	8-18-03	927	23.1	7.62	540	"	SLIGHT TUR.	NO
BS-3	8-18-03	1355	26.3	7.80	240	"	VERY TURB.	NO
				6.5-8.5 { CLASS "GA" } STD				

NOTES:

- (1) Conductivity readings corrected to 25°C.
 (2) MW-1 is hydraulically upgradient shallow overburden well.
 (3) MW-7D is apparent hydraulically upgradient bedrock well.

* Shallow Overburden Well ** Deep Overburden Well
 *** Bedrock Well BS Bank Seep

MOENCH COMPANY
PALMER STREET LANDFILL
3/31/03-4/2/03 MONITORING EVENT⁽⁰⁾

SUMMARY OF ANALYTICAL RESULTS										P-6B
Metals (mg/l):	Quantitation Limit	MW-1	MW-3DR	MW 4D	MW 6D	P-6B	P-6D	BLIND DUPLICAT.	Class "GA" Std. (2)	
Arsenic - Soluble	0.005	<.002	<.002	<.002	<.002	.008	<.002	.008	0.025 -	
Chromium - Soluble	0.005	<.004	<.004	<.004	<.004	<.004	.005	<.004	0.05	
Lead - Soluble	0.005	<.02	<.02	<.02	<.02	<.02	<.02	<.02	0.025	
Volatiles (mg/l):										
ACETONE		.160	.270			ND	ND	ND		
m,p XYLENE					.002	"	"	"	.005	
CHLOROMETHANE				.006						
		</								

TABLE 5 (Cont. 3d)

MOENCH COMPANY
PALMER STREET LANDFILL
3/31/03 - 4/2/03 MONITORING EVENT⁽¹⁾

SUMMARY OF ANALYTICAL RESULTS

Parameter	Quantitation Limit	MW-7D	ANNUAL MW-8D	BS-1	BS-3	Trip Blank ⁽³⁾	Class "GA" Std. ⁽²⁾
Metals (mg/l):							
Arsenic - Soluble	0.005	<.002	NA	.003	<.002	ND	0.025
Chromium - Soluble	0.005	<.004	"	.008	.006		0.05
Lead - Soluble	0.005	<.02	"	<.02	<.02		0.025
Volatiles (mg/l):		ND		ND	ND	ND	

NOTES:

- (1) Only those parameters found at a concentration above laboratory detection limits at a minimum of one location are shown.
 (2) NYSDC Class "GA" Ground Water Quality Standards, 6NYCRR Part 703, Revised October 1993.
 (3) Trip blanks were analyzed for only volatile organic compounds.
 (4) MW-8D sampled only once annually (Reference 6).
 (5) Monitor wells 3D and 7 are monitored quarterly, sampled annually.
 J Estimated value due to limitations identified in the quality control review.

(B) LIKELY LAB CONTAMINATION.

9

MOENCH COMPANY

SUMMARY OF ANALYTICAL RESULTS

SUMMARY OF ANALYTICAL RESULTS										MW-4D
	Quantitation Limit	MW-1D	MW-3DR	MW 4D	MW 6D	P-6B	P-6D	BLIND DUPLICAT.	Class "GA" Std.(2)	
Metals (mg/l):										
Arsenic - Soluble	.02 .005	<.02	<.02	<.02	<.02	<.02	<.02	<.02	0.025 -	
Chromium - Soluble	.004 .005	<.004	<.004	<.004	<.004	<.004	<.004	<.004	0.05 -	
Lead - Soluble	.02 .005	<.02	<.02	<.02	<.02	<.02	<.02	<.02	0.025	
Volatiles (mg/l):										
ACETONE		.120	.370	-	-	-	<.005	-		
MEK		-	-	-	-	.006(J)	-	-	.005	
CHLOROMETH.		-	-	.004(J)	-	-	-	.004(J)		
m,p XYLENE		-	-	-	.001(J)	-	-	-		

TABLE (Continued)

6

MOENCH COMPANY

PALMER STREET LANDFILL

8/18 - 8/29/03 MONITORING EVENT⁽¹⁾

SUMMARY OF ANALYTICAL RESULTS

Parameter	Quantitation Limit	MW-7D	ANNUAL MW-8D	BS-1	BS-3	Trip Blank ⁽³⁾	Class "GA" Std. ⁽²⁾
Metals (mg/l):							
Arsenic - Soluble	.02 0.005	<.02	<.02	<.02	<.02	<.02	0.025 —
Chromium - Soluble	.004 0.005	<.004	<.004	<.004	<.004	<.004	— 0.05
Lead - Soluble	.02 0.005	<.02	<.02	<.02	<.02	<.02	0.025
Volatiles (mg/l):							
		<.005	<.005	<.005	<.005	<.005	

NOTES:

- (1) Only those parameters found at a concentration above laboratory detection limits at a minimum of one location are shown.
 (2) NYSDEC Class "GA" Ground Water Quality Standards, 6NYCRR Part 703, Revised October 1993.
 (3) Trip blanks were analyzed for only volatile organic compounds.
 (4) MW-8D sampled only once annually (Reference 6).
 (5) Monitor wells 3D and 7 are monitored quarterly, sampled annually.
 (6) Estimated value due to limitations identified in the quality control review.

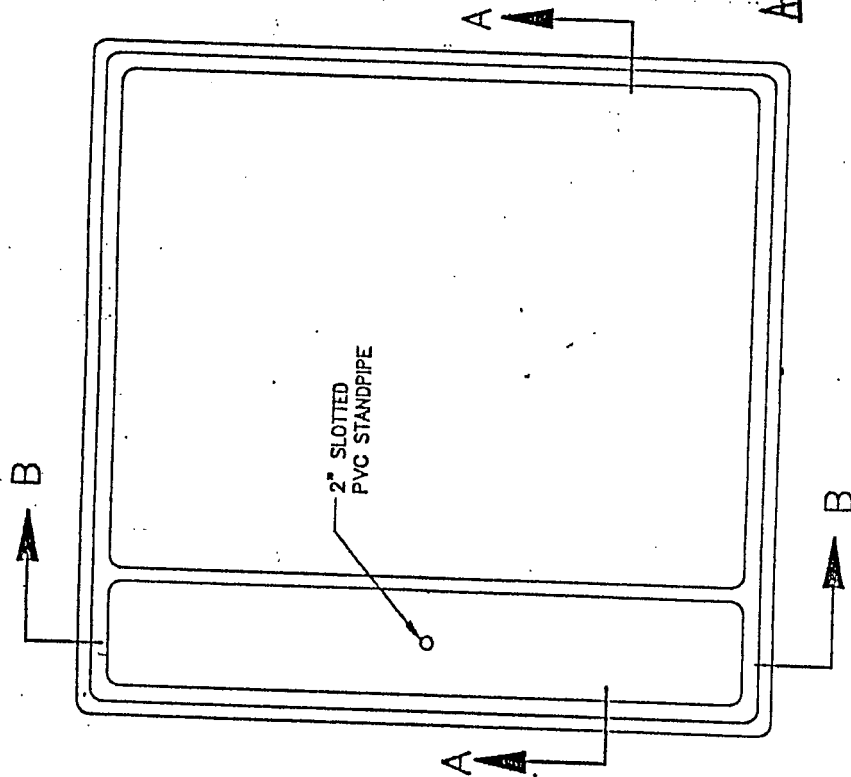
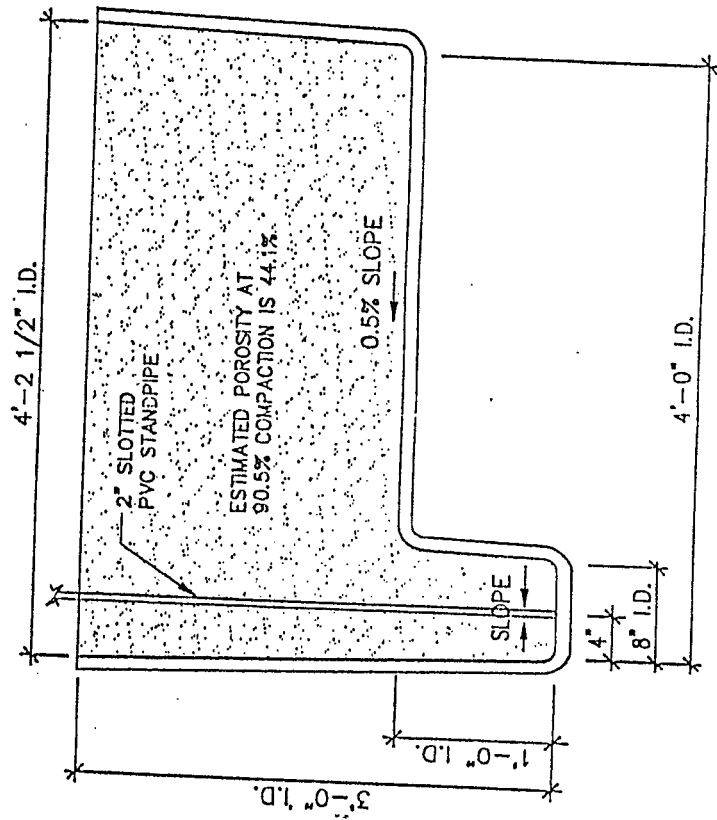
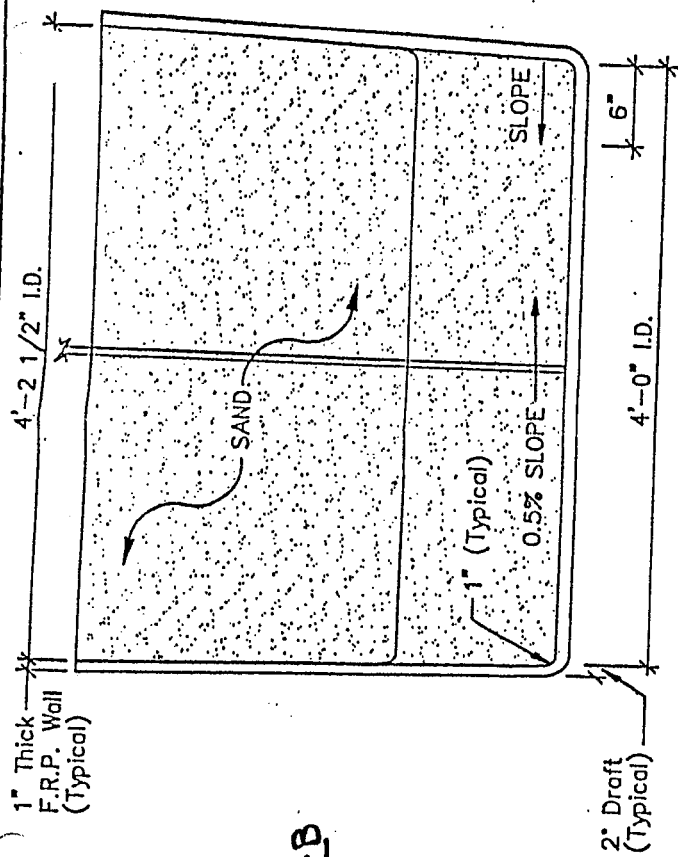
(B) LIKELY LAB CONTAMINATION.

ATTACHMENT A

INFILTROMETER DESIGN

PALMER STREET LANDFILL
GROUNDWATER MONITORING REPORT...

4/03 & 8/03 SAMPLING EVENT..



TYPICAL INFILTRATOR BY HEY'S ENTERPRISES
AS INSTALLED AT PALMER STREET LANDFILL

INFIL TROUGH

ATTACHMENT B

GROUNDWATER ELEVATION
DATA & GRAPHS

MONITORING EVENTS 4/03 & 8/03

Pirgweiv

FIGURE #3	PALMER STREET LANDFILL																							
	MOENCH COMPANY																							
	GROUNDWATER ELEVATION vs TIME SHALLOW OVERBURDEN MONITOR WELLS (FEET ABOVE SEA LEVEL)																							
MW-1	Jan-90 818	Apr-90 819	Jul-90 817	Oct-90 817	Jan-91 819	May-91 817	Jul-91 818	Oct-91 818	Jan-92 819	May-92 820	Jul-92 818	Oct-92 820	Feb-93 820	May-93 821	Jul-93 819	Oct-93 820	Mar-94 821	Jun-94 821	Sep-94 822	Dec-94 822	Mar-95 823	Jun-95 822		
MW-3	796	796	794	793	794	793	792	792	793	794	793	793	794	794	794	793	794	794	794	794	794	793		
MW-5	785	785	784	784	786	784	782	782	783	784	784	783	783	784	784	782	783	786	783	784	784	784		
MW-6	784	784	783	784	785	784	784	784	784	784	784	783	784	784	784	784	784	784	783	784	784	783		
MW-7S	795	795	793	795	795	794	792	792	793	793	792	792	793	793	792	793	786	792	791	792	794	791		
MW-4SR																767	792	791	789	791	791	790		

Figure #3

Pirgweiv

Sep-95 821	Dec-95 821	Apr-96 821	Aug-96 821	Nov-96 822	Apr-97 822	Aug-97 821	Nov-97 821	Apr-98 821	Aug-98 821	Nov-98 821	Apr-99 821	Aug-99 819	Nov-99 820	Apr-00 822	Sep-00 821	Mar-01 822	Aug-01 820	Mar-02 820	Aug-02 821	Mar-03 821	Aug-03 821
793	794	796	799	798	794	794	794	800	794	794	794	794	793	794	794	796	794	795	796	794	796
784	782	DRY	DRY	DRY	787	787	787	787	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
783	784	784	783	787	785	785	784	784	784	783	784	783	783	785	784	783	783	785	784	786	788
791	793	794	792	794	793	792	793	793	792	792	793	793	791	794	792	794	794	794	794	793	794
790	790	790	796	791	792	791	793	793	791	790	791	790	790	794	794	792	794	793	795	797	799

MW-1
"-3

"-5

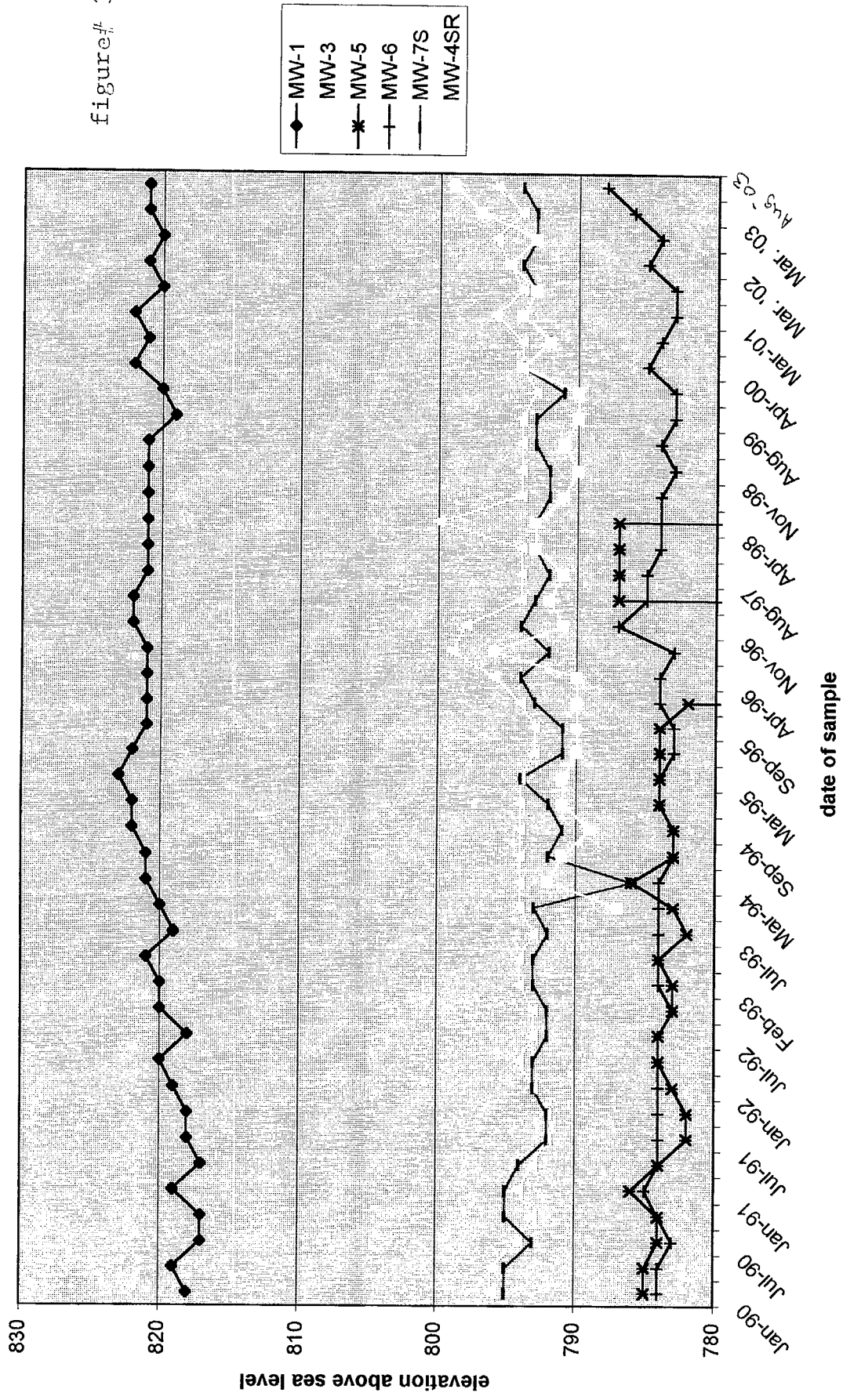
"-6

"-7S

"-4SR

beaver dams

Palmer St. L/fill: shallow GW elevation



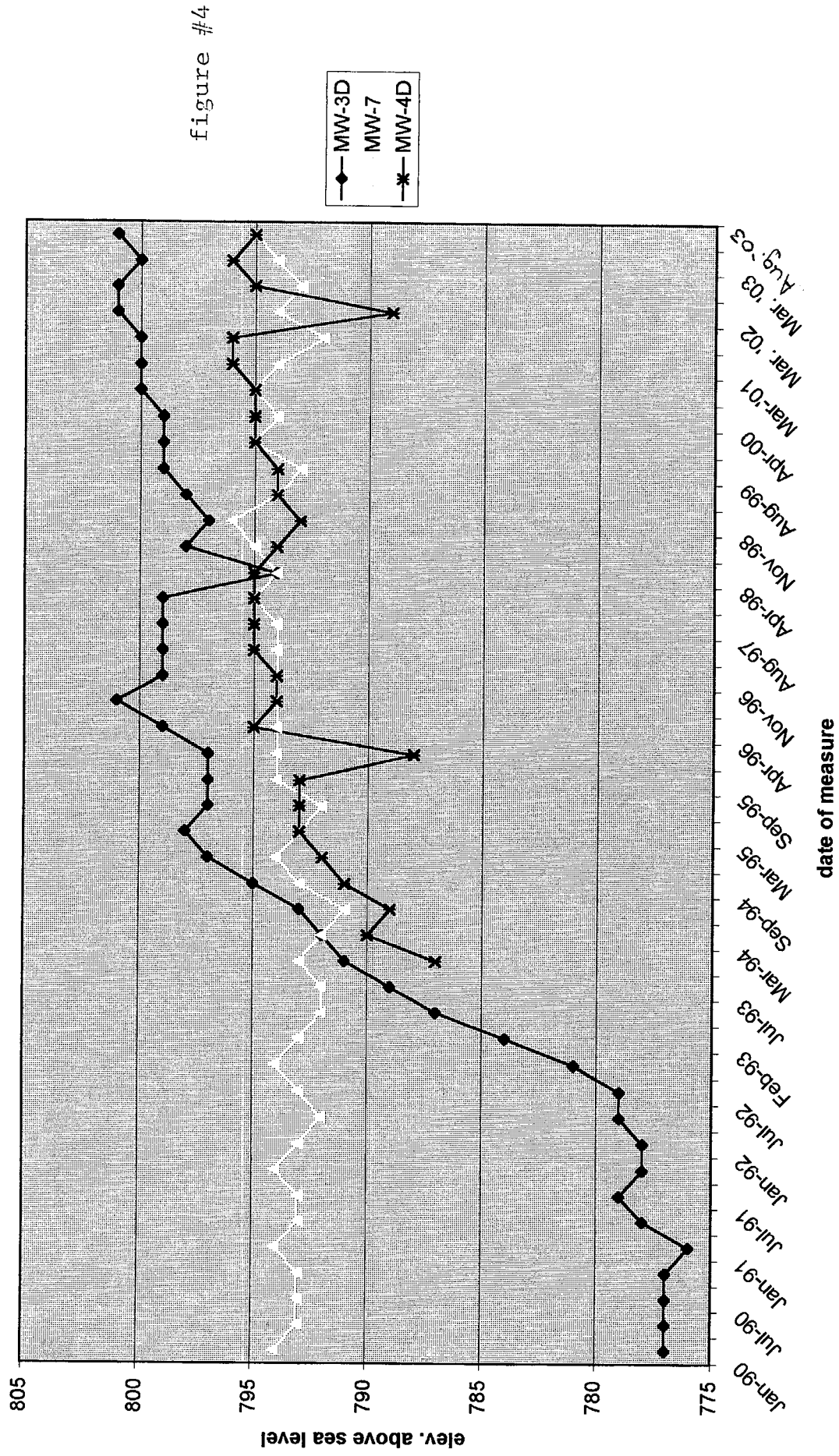
figure# 3

Figure #4		PALMER STREET LANDFILL																							
		MOENCH COMPANY																							
		GROUNDWATER ELEVATION vs TIME (FEET ABOVE SEA LEVEL)																							
		DEEP OVERBURDEN MONITOR WELLS																							
		Jul-90	Aug-90	Jul-90	Oct-90	Jan-91	May-91	Jul-91	Oct-91	Jan-92	May-92	Jul-92	Oct-92	Feb-93	May-93	Jul-93	Oct-93	Mar-94	Jun-94	Sep-94	Dec-94	Mar-95	Jun-95	Sep-95	
MW-3D	777	777	777				776	778	779	778	778	779	779	784	787	789	791	792	793	795	795	797	798	797	797
MW-7	794	793	793				794	793	793	794	793	792	793	793	792	792	793	792	791	793	793	794	793	792	794
MW-4D																	787	790	789	791	791	792	793	793	793

P/mrgw2

[illegible]

Palmer St. L/fill: deep overburden GW elev.

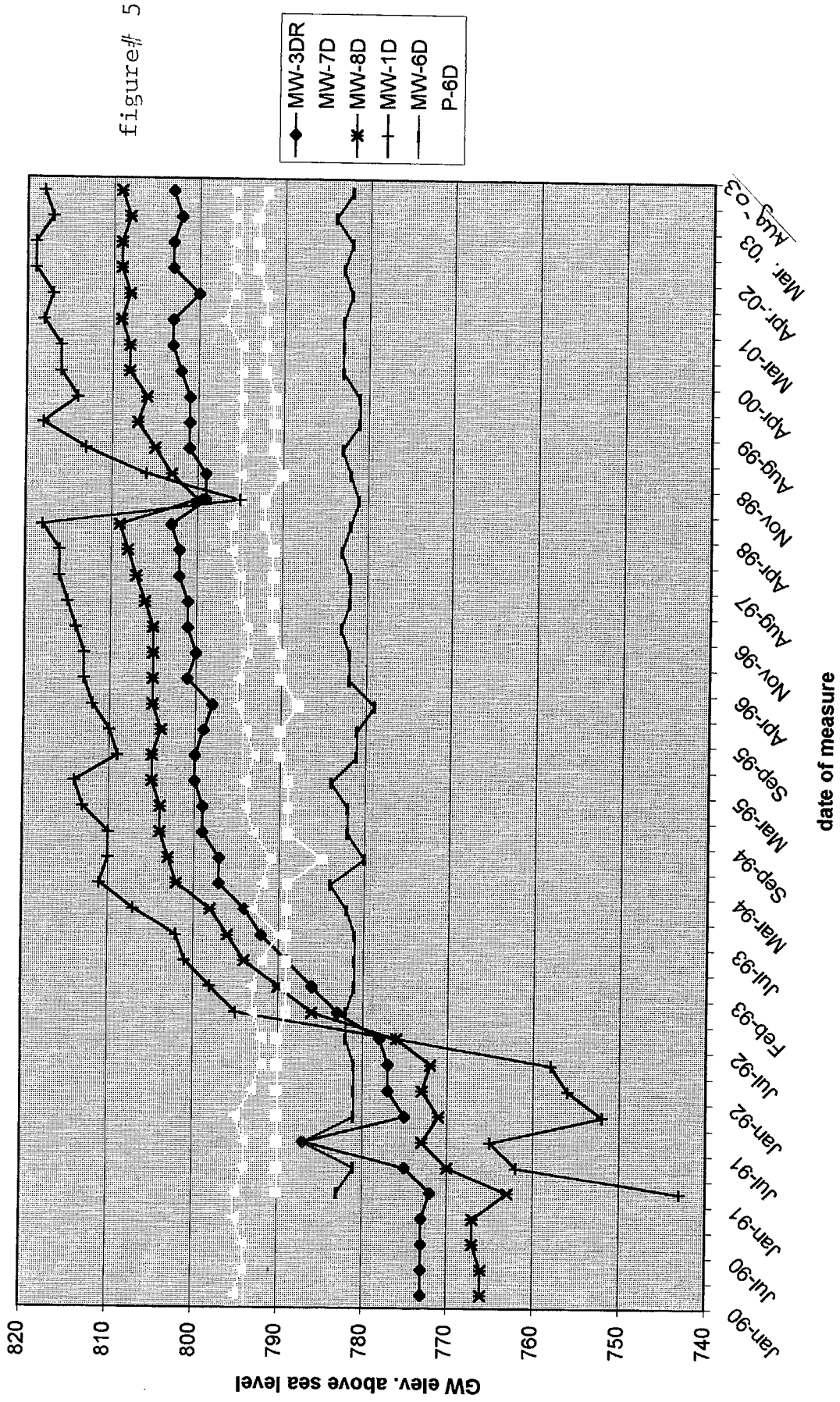


					PALMER STREET LANDFILL															
					MOENCH COMPANY															
					(FIG.#5)															
MW-3DR	Jan-90 773	Apr-90 773	Jul-90 773	Oct-90 773	Jan-91 772	May-91 775	Jul-91 787	Oct-91 775	Jan-92 777	May-92 777	Jul-92 778	Oct-92 783	Feb-93 786	May-93 789	Jul-93 792					
MW-7D	795	794	794	795	795	794	794	795	793	792	792	793	793	792	790					
MW-8D	766	766	767	767	763	770	773	771	773	772	776	786	790	794	796					
MW-1D					743	762	765	752	756	758	776	795	798	801	802					
MW-6D					783	781	787	781	781	781	782	782	781	781	781					
P-6D					790	790	790	790	790	790	790	789	789	789	789					

[illegible]

	Apr-98	Aug-98	Nov-98	Apr-99	Aug-99	Nov-99	Apr-00	Sep-00	Mar-01	Aug-01	Apr-02	Aug-02	Mar-03	Aug-03
MW-3DR	803	799	799	801	801	801	802	803	803	800	803	803	802	803
MW-7D	796	795	795	795	795	795	795	795	797	796	796	796	796	796
MW-8D	809	800	803	805	807	806	808	808	809	808	809	809	808	809
MW-1D	818	795	806	813	818	814	816	816	818	817	819	819	817	818
MW-6D	782	781	782	783	781	781	783	783	783	782	783	782	784	782
P-6D	792	792	790	791	791	791	792	792	792	792	793	793	793	792

Palmer I/fill; Bedrock GW levels



figure# 5

5.0 GROUNDWATER FLOW

A WATER TABLE ISOPOTENTIAL MAP, BEDROCK ISOPOTENTIAL MAP AND A BEDROCK WATER LEVEL HYDROGRAPH HAVE BEEN PREPARED FOR THE PALMER STREET LANDFILL AND ARE PRESENTED IN FIGURES 3,4 AND 5, RESPECTIVELY. GROUNDWATER ELEVATIONS MEASURED THROUGH 2003 WERE USED IN PREPARING THE WATER TABLE AND BEDROCK ISOPOTENTIAL MAP INDICATED THAT THE SHALLOW GROUNDWATER FLOW IS PRIMARILY TO THE EAST TOWARD CATTARAUGUS CREEK. THE BEDROCK ISOPOTENTIAL MAP AND THE BEDROCK WATER LEVEL HYDROGRAPH ILLUSTRATE A "LEVELING OFF" AFTER THREE YEARS ('92-'94) OF RISING LEVELS AT WELLS MW-1D, MW-3DR AND MW-8D. MW-1D AND MW-8D, WHICH WERE FORMERLY DOWNGRAIENT WELLS ARE NOW UPGRADIENT OF THE LANDFILL.

THE VILLAGE OF GOWANDA IS CONSIDERING INSTALLING WELLS IN THE DEEP AQUIFER, TO SUPPLY THE PRISONS WITH WATER. THIS COULD HAVE A FUTURE AFFECT ON THE HYDRAULIC GRADIANTS.

PALMER STREET LANDFILL

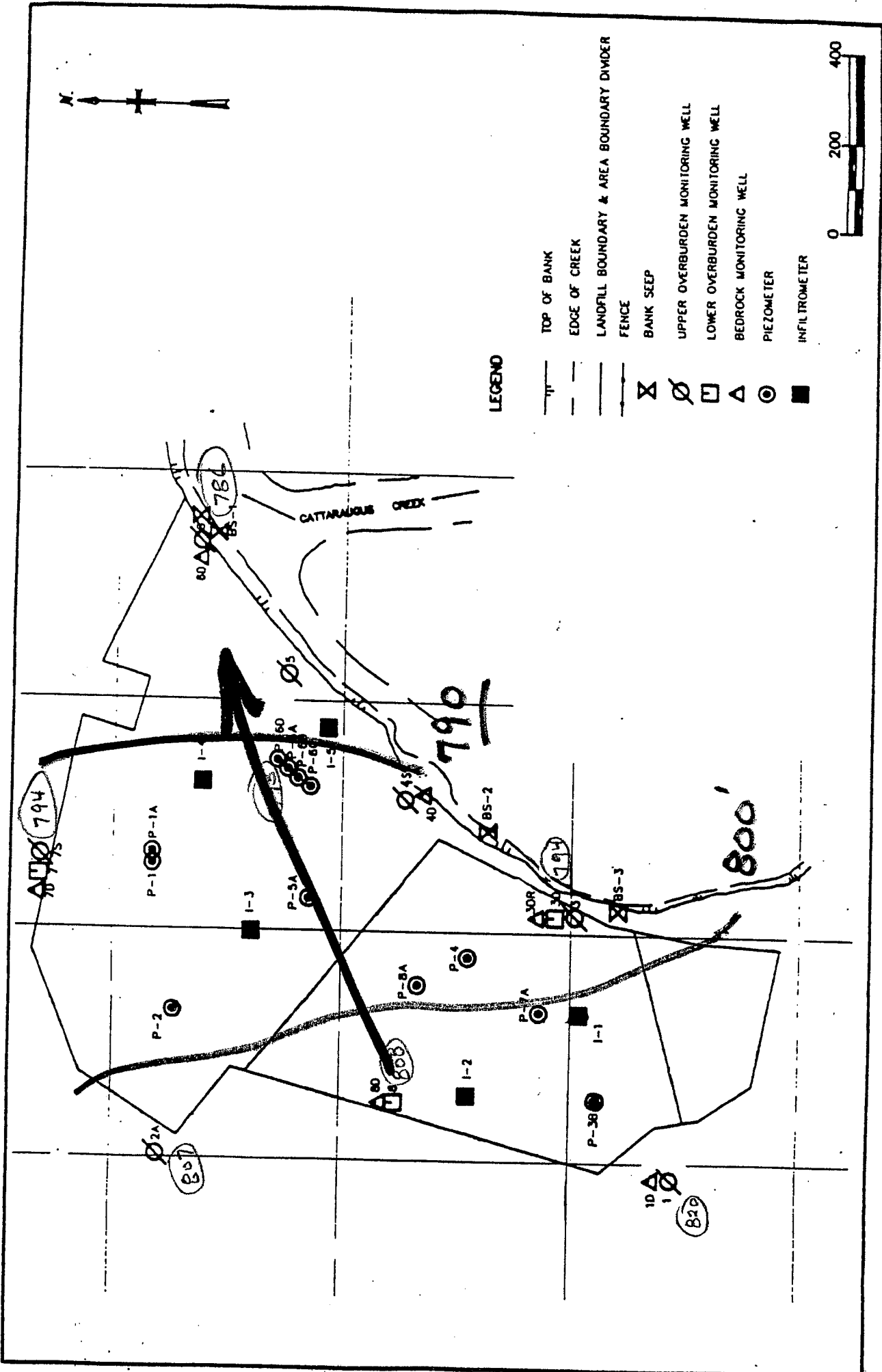
WATER TABLE ISOPOTENTIAL MAP

3-03

MONITORING EVENT

MOENCH & COMPANY JULY 1992

FIG. 8



FIGURE

PALMER STREET LANDFILL
 WATER TABLE ISOPOTENTIAL MAP
 8-18-03 MONITORING EVENT

MOENCH T. COMPANY JULY 1992

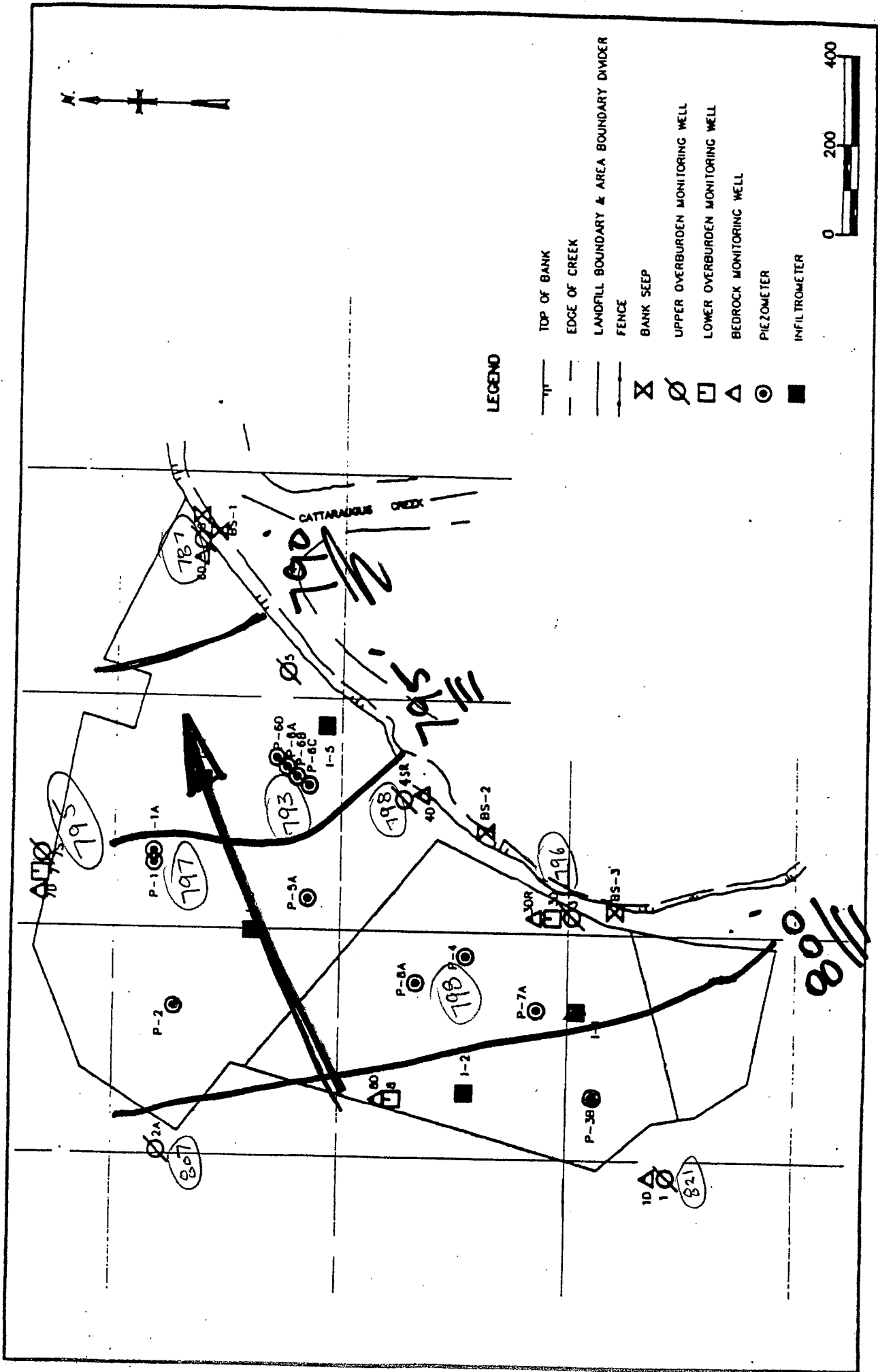


 FIG. 9

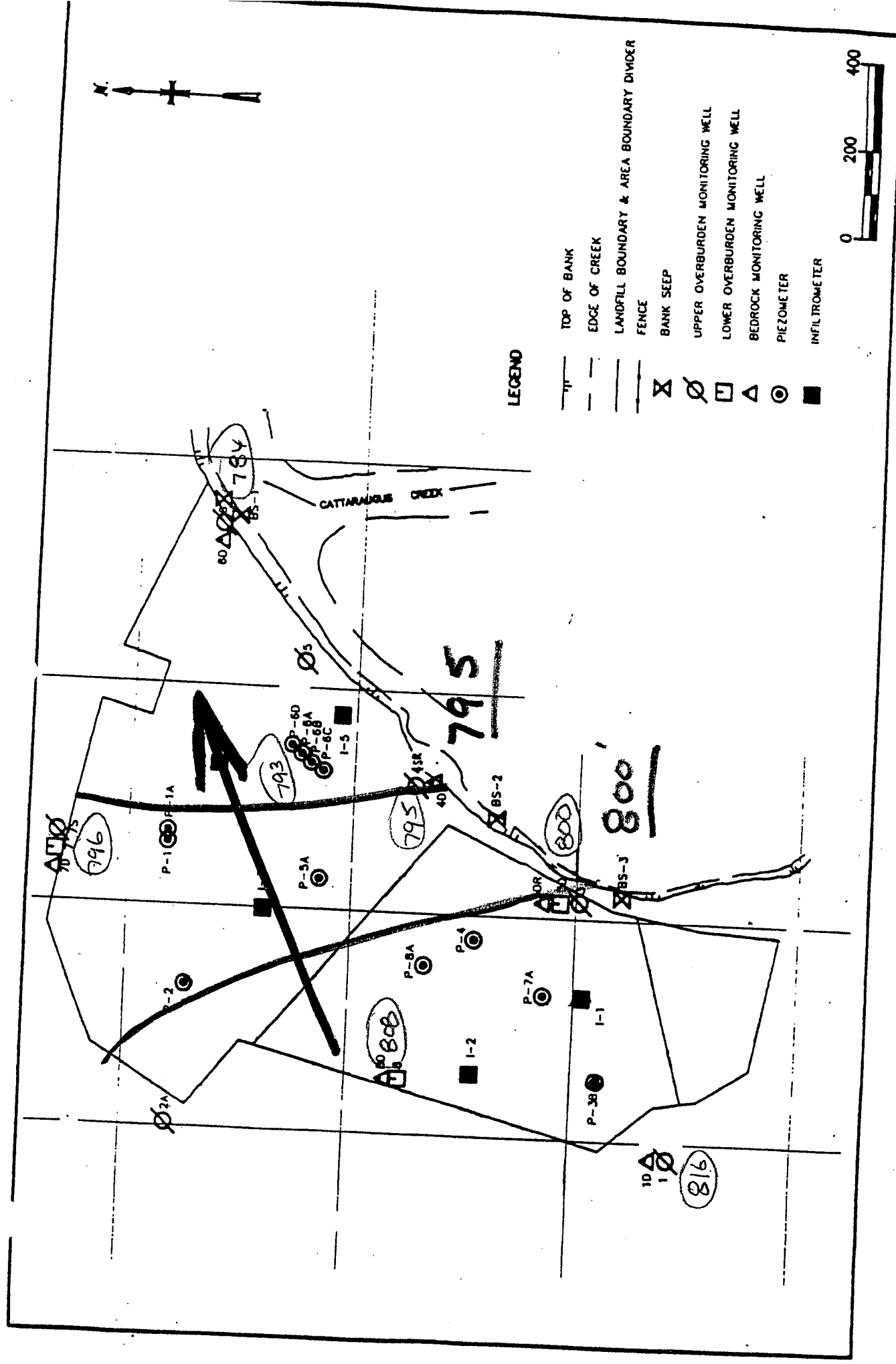
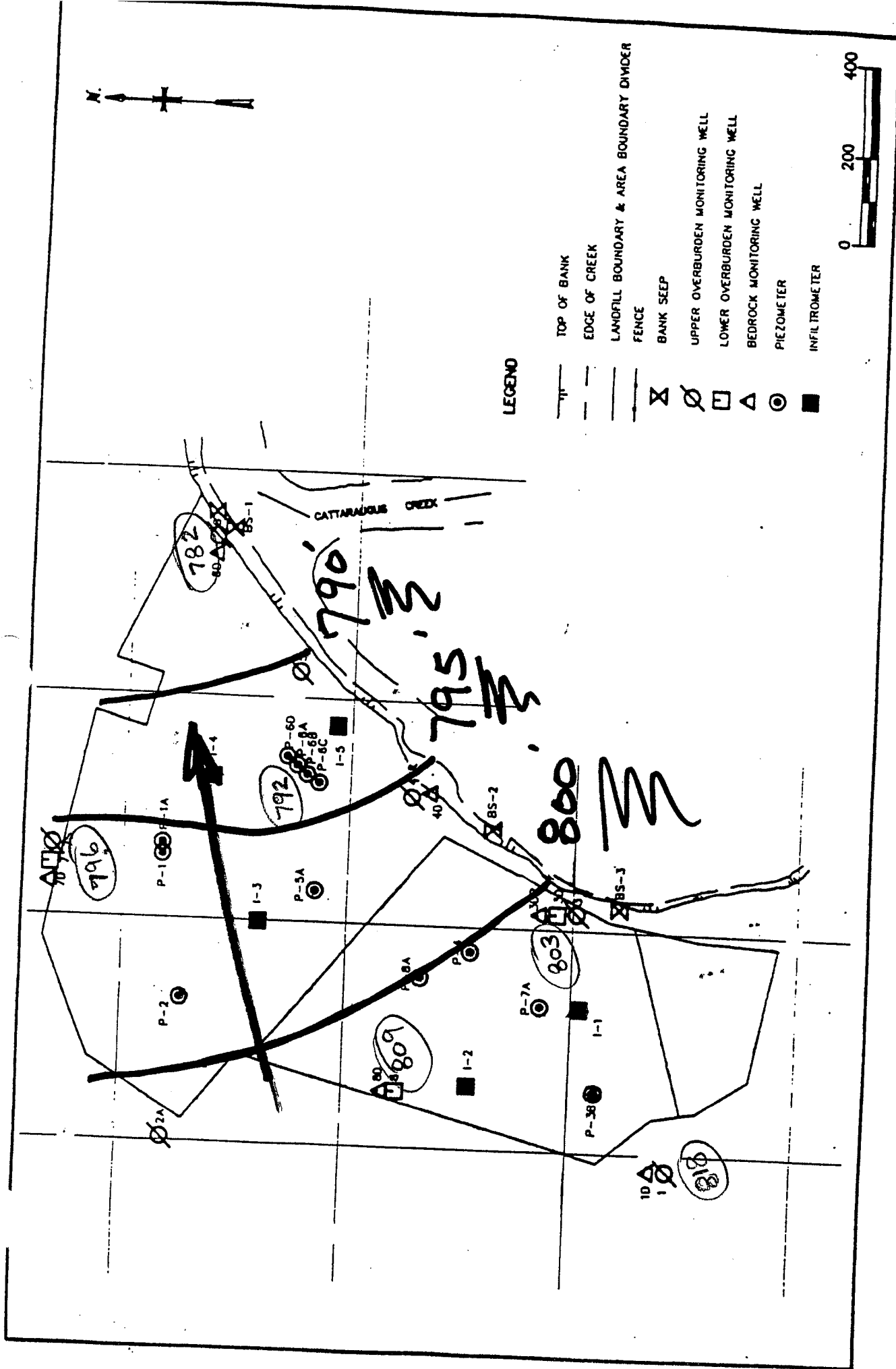


FIGURE
PALMER STREET LANDFILL
BEDROCK ISOPOTENTIAL MAP
3-03 MONITORING EVENT
MOENCH TANNING COMPANY JULY 1992

FIG. 10



ATTACHMENT B1

PALMER ST. LANDFILL

FIELD MEASUREMENT TRENDS

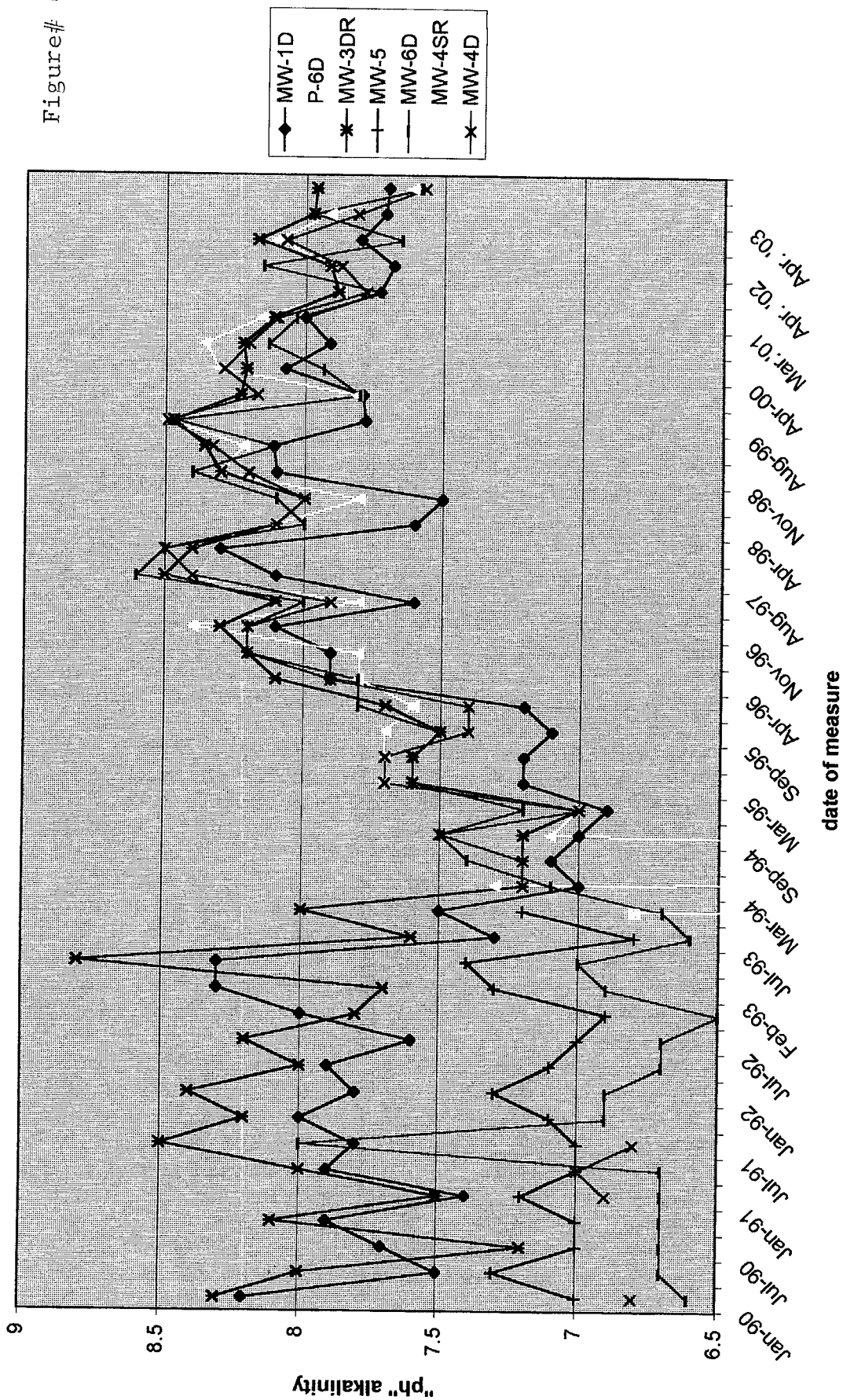
MONITORING EVENTS 4-03
8-03

[illegible]

Plmr gw4

[illegible]

Palmer St. I/fill; "ph" vs. time



Figure# 6

Plmr5ph

		PALMER ST L/F, MOENCH COMPANY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Plmr5ph

													</											

Palmer St. I/fill; "ph" vs. time

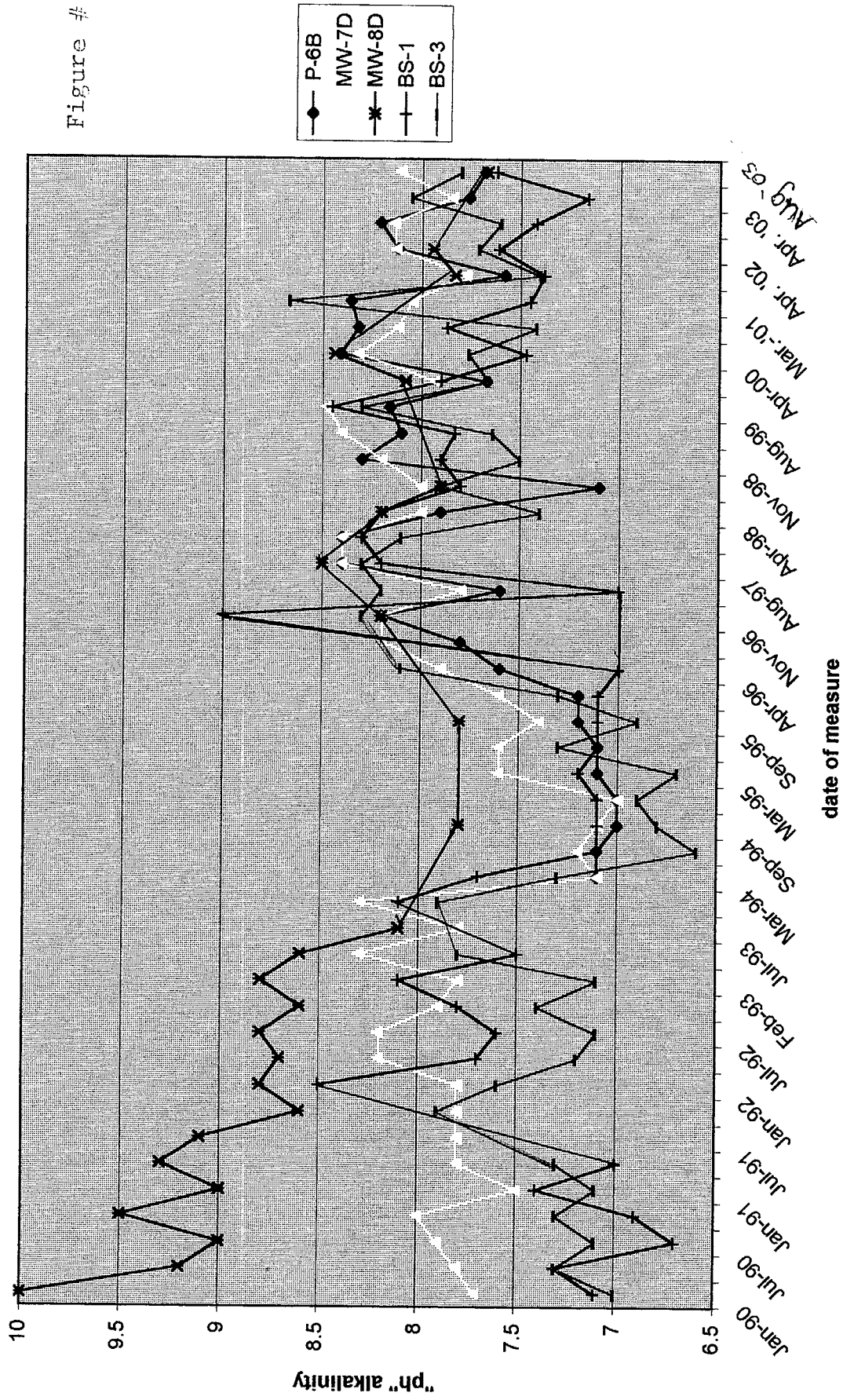


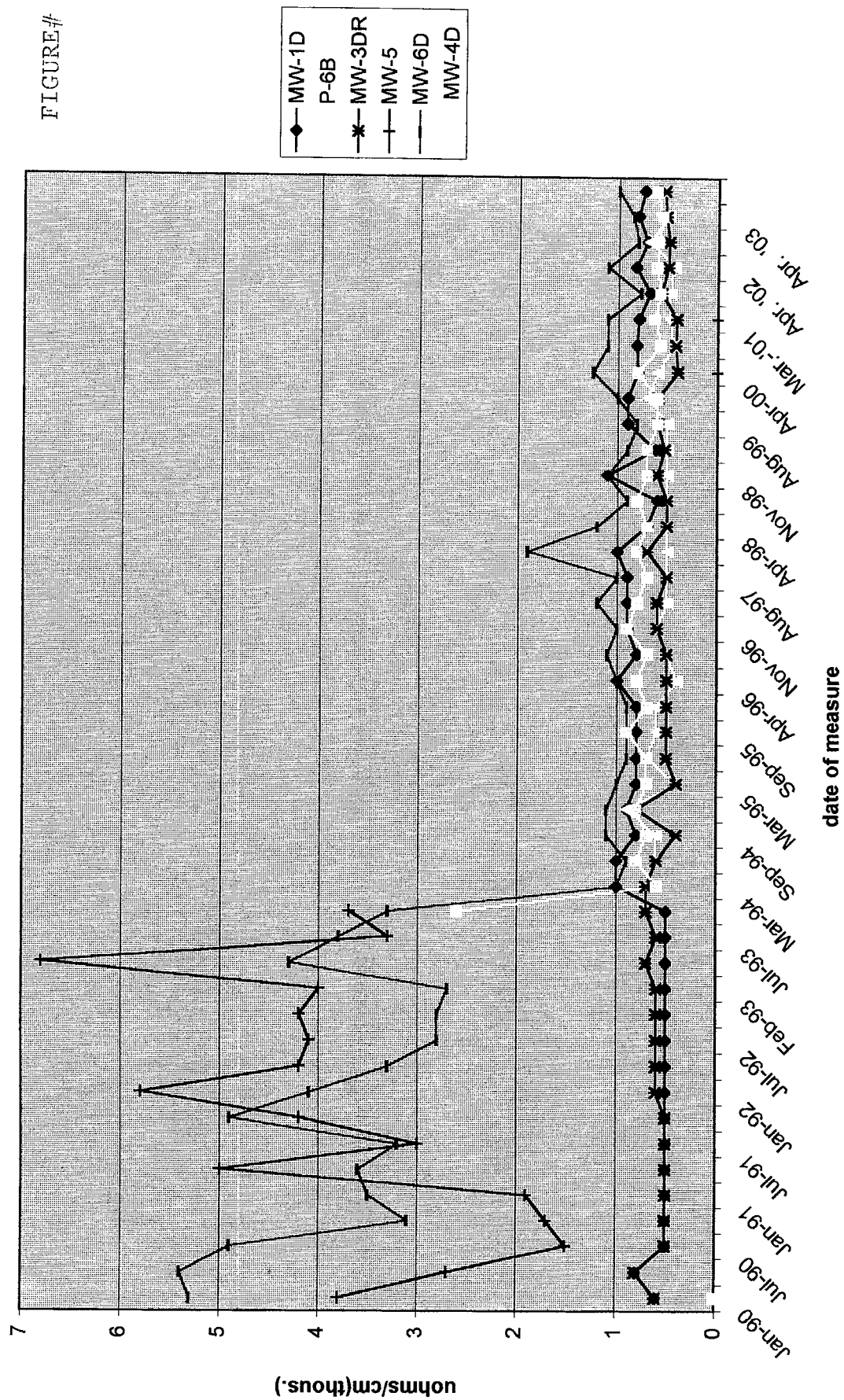
Figure # 7

		PALMER ST L/F; M JOENCH CO.														fig. #7	
		SPECIFIC CONDUCTIVITY vs TIME															
		MONITOR WELLS & BANK SEEPS															
		Jan-90	Apr-90	Jul-90	Oct-90	Jan-91	May-91	Jul-91	Oct-91	Jan-92	May-92	Jul-92	Oct-92	Feb-93	May-93	Jul-93	
MW-1D		0.6	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
P-6B	START94																
MW-3DR		0.6	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.6	
MW-5		3.8	2.7	1.5	1.7	1.9	5	3	4.2	5.8	4.2	4.1	4.2	4	6.8	3.3	
MW-6D		5.3	5.4	4.9	3.1	3.5	3.6	3.2	4.9	4.1	3.3	2.8	2.8	2.7	4.3	3.8	
MW-4D																	

		Nov-93	Mar-94	Jun-94	Sep-94	Dec-94	Mar-95	Jun-95	Sep-95	Dec-95	Apr-96	Aug-96	Nov-96	Apr-97	Aug-97	Nov-97
MW-1D		0.5	1	1	0.8	0.9	0.8	0.8	0.8	0.8	1	0.8	0.9	0.9	0.9	1
P-6B			0.7	0.6	0.6	0.9	0.4	0.7	0.6	0.6	0.4	0.5	0.6	0.5	0.5	0.5
MW-3DR		0.7	0.7	0.6	0.4	0.8	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.7
MW-5		3.7														
MW-6D		3.3	1	0.9	1.1	1.1	1	0.9	0.9	0.9	1	1.1	1	1.2	1	1.9
MW-4D		2.6	0.6	0.8	0.7	0.8	0.7	0.7	0.9	0.7	0.8	0.7	0.9	0.8	0.7	0.8

		Apr-98	Aug-98	Nov-98	Apr-99	Aug-99	Nov-99	Apr-00	Sep-00	Mar-01	Aug-01	Apr-02	Aug-02	Apr-03	Aug-03
MW-1D		0.7	0.6	1.1	0.62	0.9	0.9	0.8	0.81	0.79	0.68	0.82	0.71	0.8	0.74
P-6B		0.5	0.5	0.5	0.5	0.5	0.7	0.6	0.44	0.48	0.48	0.44	0.69	0.5	0.56
MW-3DR		0.5	0.5	0.6	0.53	0.6	0.6	0.4	0.42	0.41	0.57	0.5	0.49	0.52	0.54
MW-5															
MW-6D		1.2	0.9	1.1	0.9	0.8	1	1.25	1.1	1.1	0.77	1.1	0.8	0.85	1
MW-4D		0.7	0.8	0.7	0.7	0.6	0.6	0.8	0.57	0.63	0.58	0.61	0.6	0.56	0.62

Palmer St. I/fill; Specific Conduct. vs. time



FIGURE# 7

FIGURE # 7	PALMER ST. LANDFILL, MOENCH COMPANY											
	SPECIFIC CONDUCTIVITY vs TIME											
	MONITOR WELLS & BANK SEEPS											
											(umhos/CM)(THOUSANDS)	
P-6D	Jan-90	Apr-90	Jul-90	Oct-90	Jan-91	May-91	Jul-91	Oct-91	Jan-92	May-92	Jul-92	Oct-92
	STR-94											
MW-7D	1	1	0.7	0.8	0.5	0.7	0.8	0.7	0.5	0.8	0.6	0.6
MW-8D	0.5	0.6	0.3	0.3	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4
BS-1	2.7	2.9	3	2.9	1	1.6		1.3	1.3	1.3	0.6	0.6
BS-3	2.8	2.9	1.8	1.8	1	1.8		1.1	0.9	0.9	1.1	0.5
												0.7

	Nov-93	Mar-94	Jun-94	Sep-94	Dec-94	Mar-95	Jun-95	Sep-95	Dec-95	Apr-96	Aug-96	Nov-96	Apr-97	Aug-97	Nov-97
P-6D	0.6	0.6	0.7	0.9	0.9	0.5	0.6	0.6	0.4	0.6	0.6	0.7	0.6	0.6	0.6
MW-7D	0.7	0.7	0.7	0.7	1	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.6	0.7
MW-8D								0.3				0.3		0.3	
BS-1	0.8	0.7	0.6		0.8	1.1	0.7	1		1	0.7	0.3	1.5	0.5	0.5
BS-3	0.7	0.6	1	0.6	0.9	1.2	0.5	1.4	0.5	0.2	0.5	0.5	0.5	0.6	0.8

	Apr-98	Aug-98	Nov-98	Apr-99	Aug-99	Nov-99	Apr-00	Sep-00	Mar-'01	Aug-'01	Apr-'02	Aug-'02	Apr-'03	Aug-'03
P-6D	0.6	0.5	0.7	0.6	0.5	0.57	0.7	0.58	0.85	0.52	0.48	0.72	0.62	0.54
MW-7D	0.6	0.7	0.7	0.62	0.61	0.59	0.7	0.6	0.65	0.58	0.79	0.59	0.68	0.76
MW-8D		0.5				0.53	0.4			0.4	0.44			0.36
BS-1	0.5	0.6	0.7	0.9	0.62	0.6	1.05	0.52	1.05	0.39	1.1	0.42	0.9	0.54
BS-3	0.8	0.4	1.1	0.8	0.56	0.56	0.8	1.1	0.39	1.6	1.2	0.32	0.44	0.24

Palmer St. I/fill; specific conductiv. vs. time

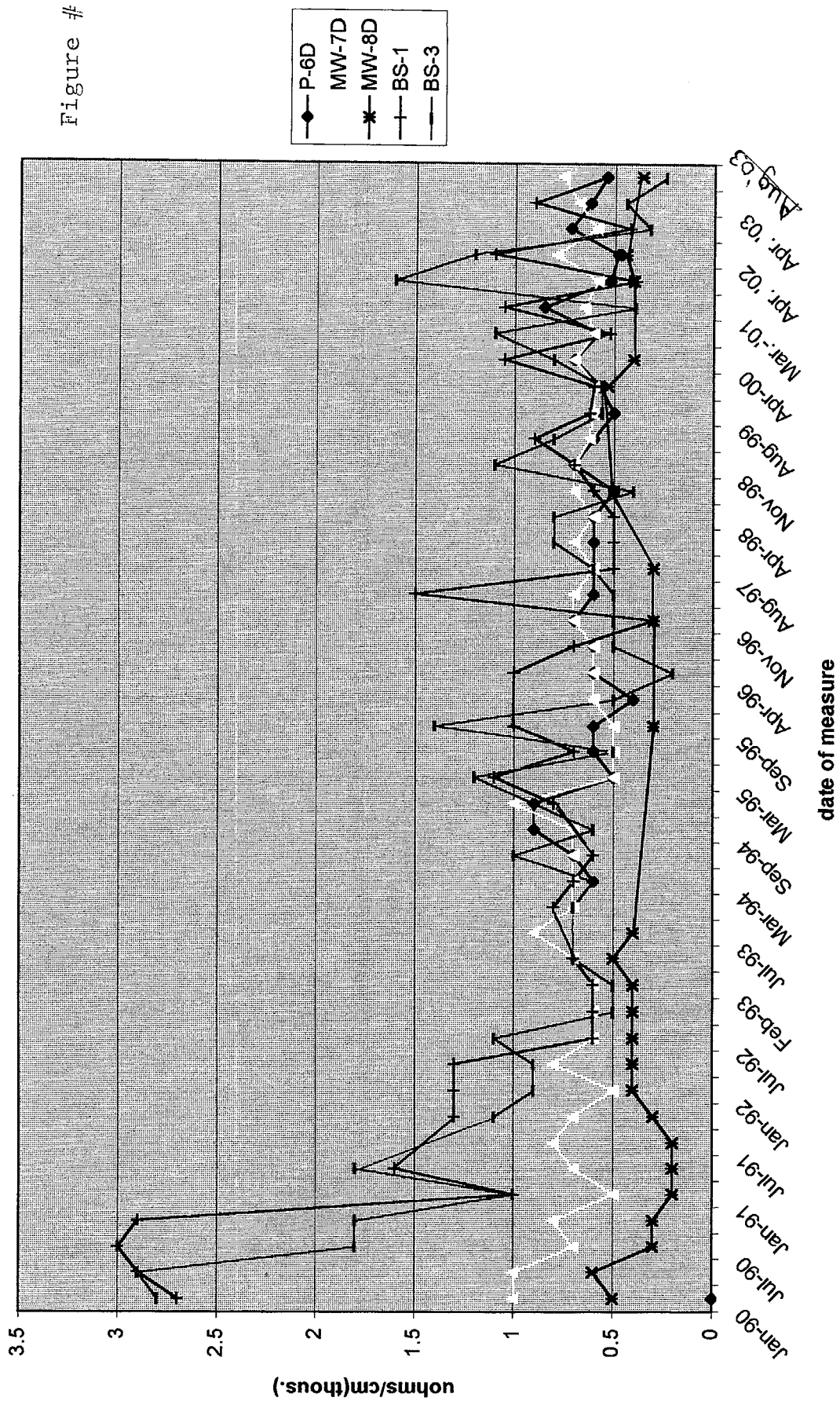


Figure # 7

4.3 RATE OF CONTAMINANT MIGRATION

Contaminant migration and potential environmental impacts for the Palmer Street Landfill are discussed in detail in the report entitled "Palmer Street Landfill - Evaluation of Alternative Cover Systems" prepared by Malcolm Pirnie, Inc., January 1989 (Reference 7). As described in the above-mentioned report, groundwater migrates from the landfill through the shallow water-bearing zone along both the eastern and northern boundaries of the waste/fill area. A reasonable assumption in determining the rate of contaminant migration across the site is the rate of contaminant migration is equivalent to the rate at which groundwater leaves the site. This latter calculation can be performed through the application of Darcy's Law which is expressed as:

$$V = \frac{ki}{\theta}$$

where: V = velocity of shallow groundwater flow (feet/day)
k = hydraulic conductivity of the shallow water bearing zone (feet/day)
i = hydraulic gradient (dimensionless)
 θ = average porosity of the shallow water bearing zone (dimensionless)

Values for k and θ were previously determined (see Reference 2) as 4.1 ft/day and 0.35, respectively. The hydraulic gradient (i) is measured perpendicular to the primary direction of groundwater flow (viz., to the east toward Cattaraugus Creek - see Section 5.0) using average water level elevations as measured in MW-1 and MW-3 and elevation as measured in MW-2A and MW-5 during the 1993 monitoring year. The hydraulic gradient for MW-1 and MW-3 is thus:

$$\frac{\Delta H}{\Delta X} = \frac{26.3}{600} = 0.044$$

where

ΔH = difference in average groundwater elevations between MW-1 and MW-3 (feet)
 ΔX = distance between MW-1 and MW-3 (feet)

Upon inserting this value into the Darcy's Law expression for velocity, the following result is obtained:

$$V = \frac{K_i}{\theta} \frac{(4.1)(0.044)}{0.35} = 0.52 \text{ ft/day}$$

Thus, the rate of contaminant migration across the site is approximately 0.52 feet/day between monitoring wells MW-1 and MW-3.

The hydraulic gradient for MW-2A and MW-5 is as follows:

$$\frac{\Delta H}{\Delta X} = \frac{24.5}{1085} = 0.022$$

ΔH = difference in average groundwater elevations between MW-2A and MW-5 (feet)

ΔX = distance between MW-2A and MW-5 (feet)

$$V = \frac{K_i}{\theta} \frac{(4.1)(0.022)}{0.35} = 0.26 \text{ ft/day}$$

The rate of contaminant migration across the site is approximately 0.26 ft/day between monitoring wells MW-2A and MW-5.

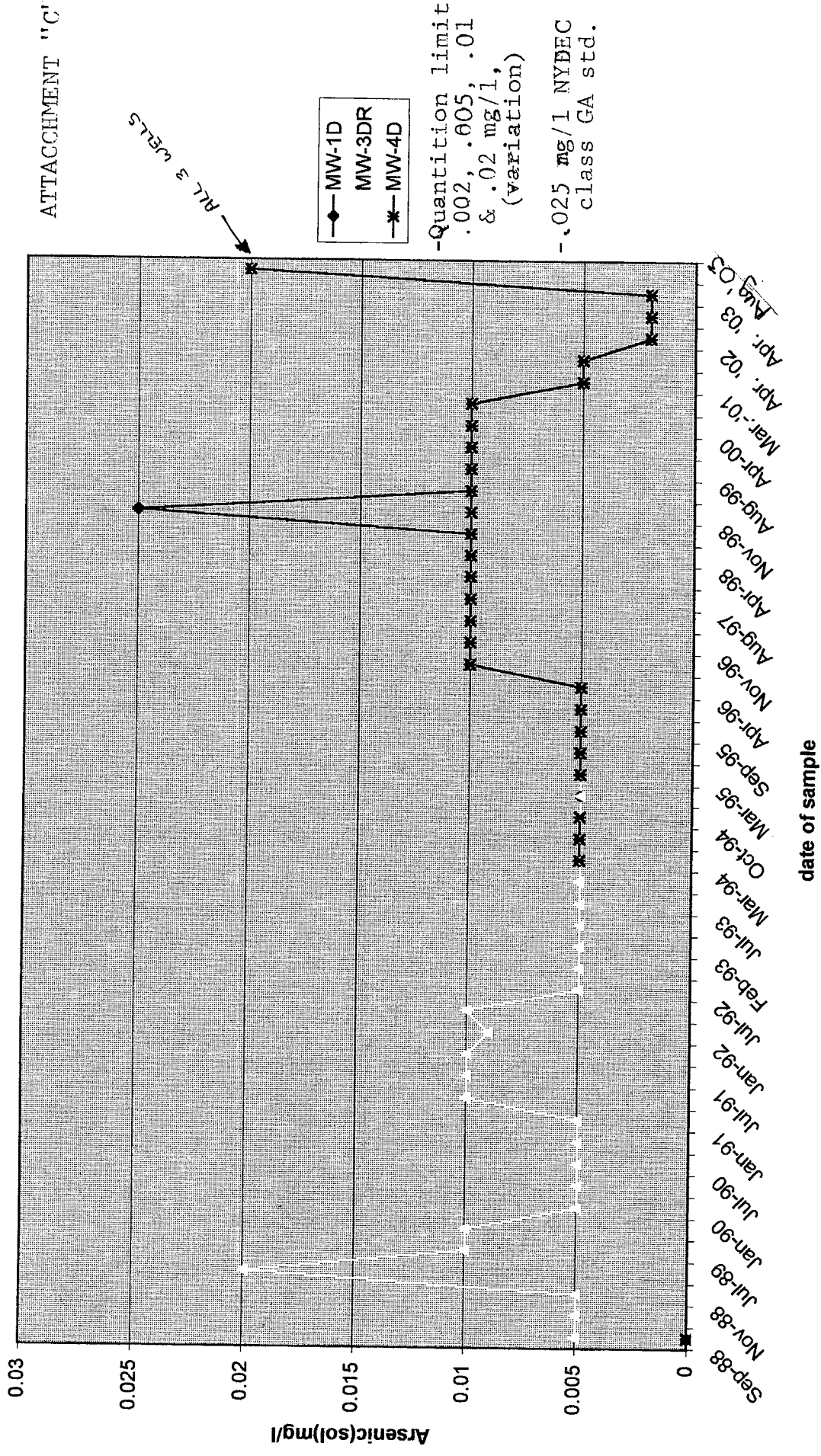
ATTACHMENT C

SOLUBLE METALS CONCENTRATION VS. TIME

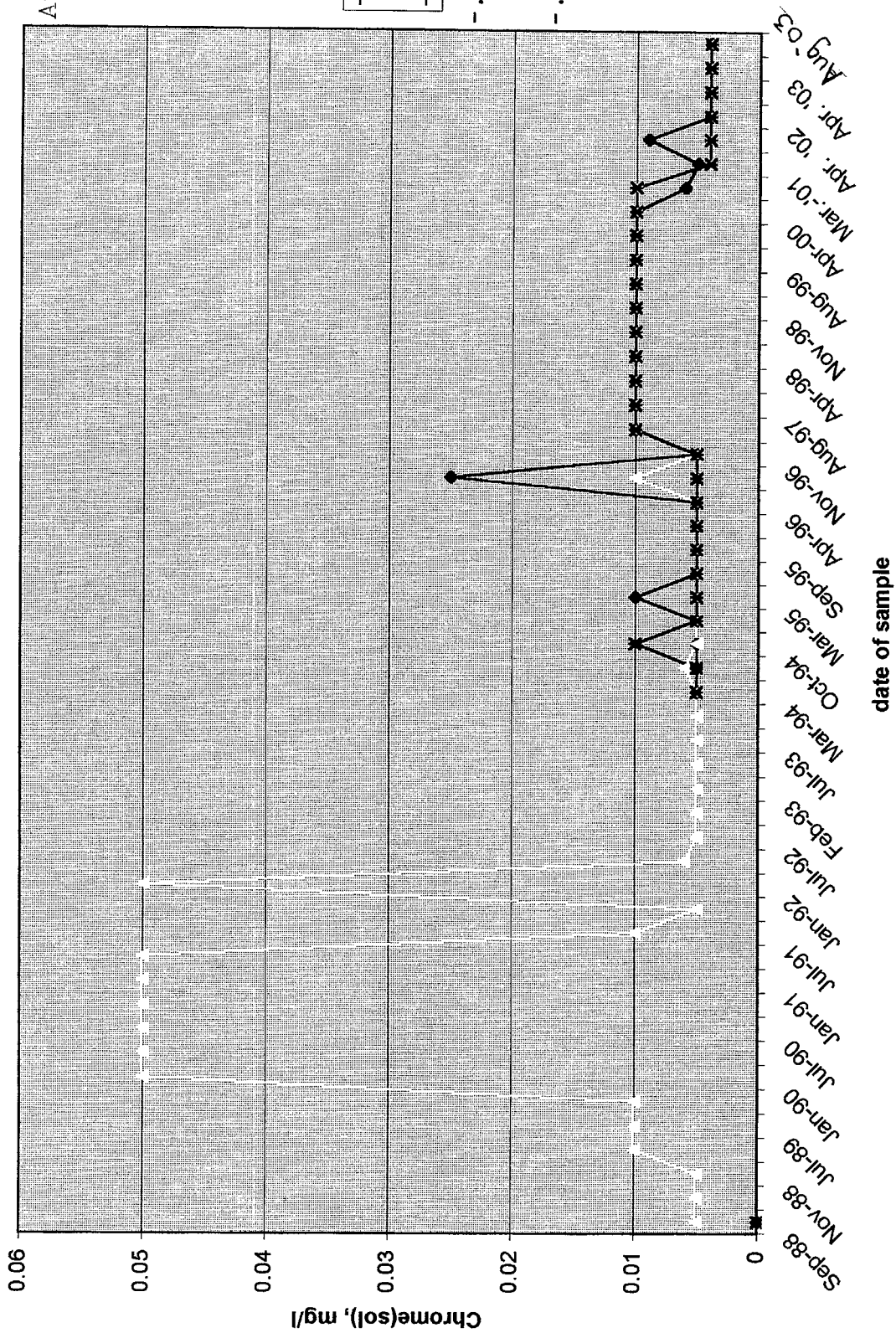
MONITORING EVENTS: April 2003

August 2003

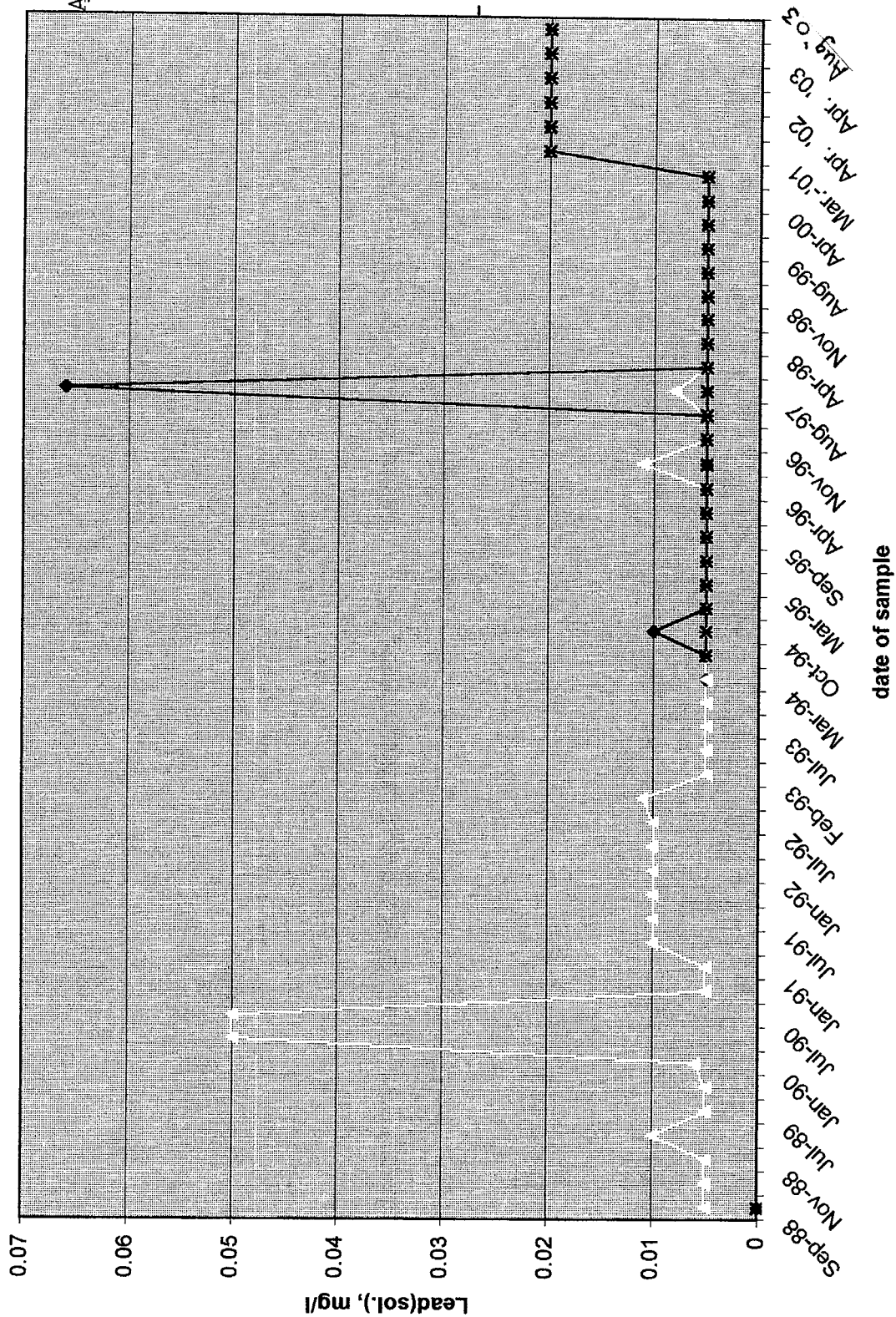
Palmer St. L/ill: Arsenic(soluble)



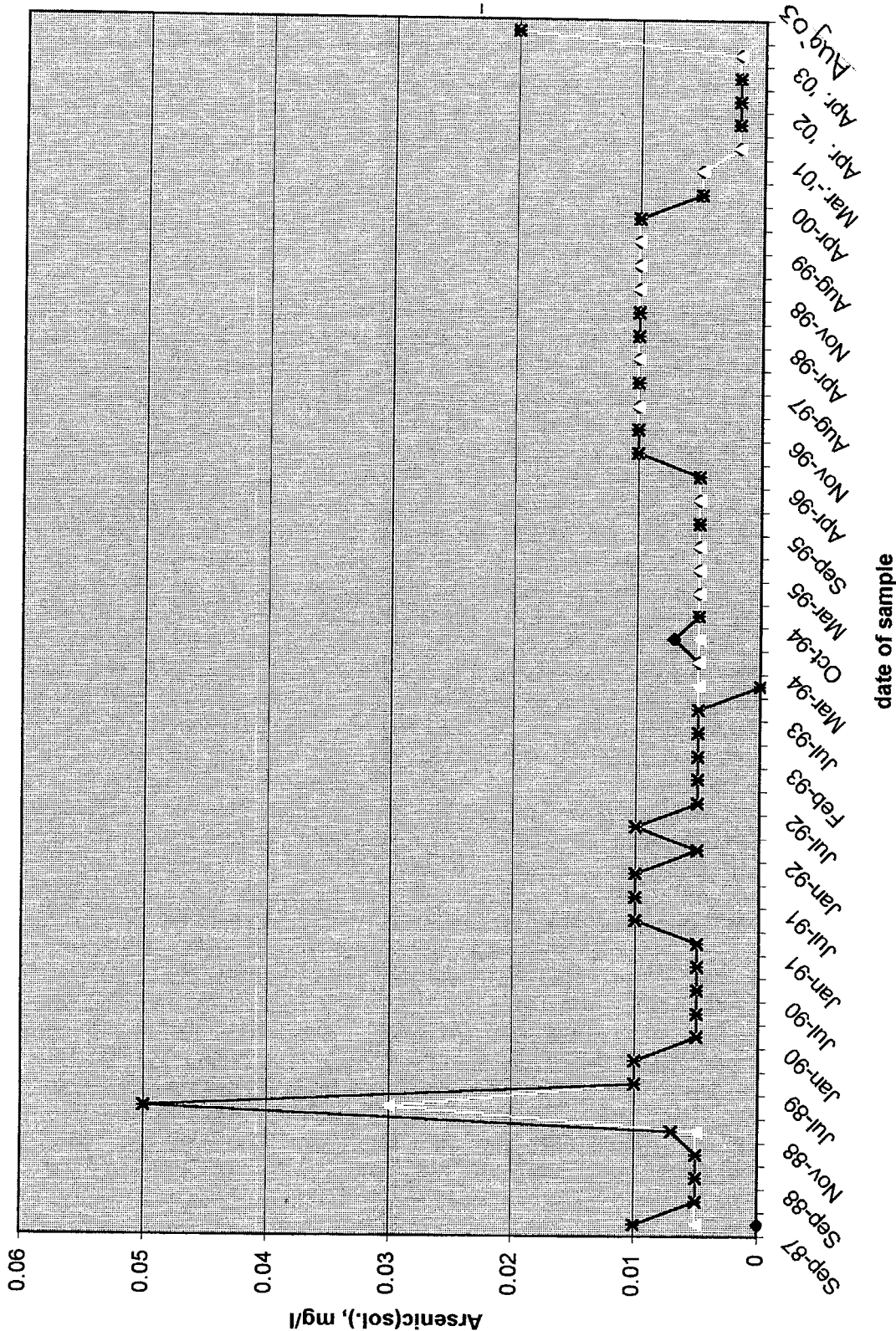
Palmer St. L/fill: Chrome(soluble) vs. time



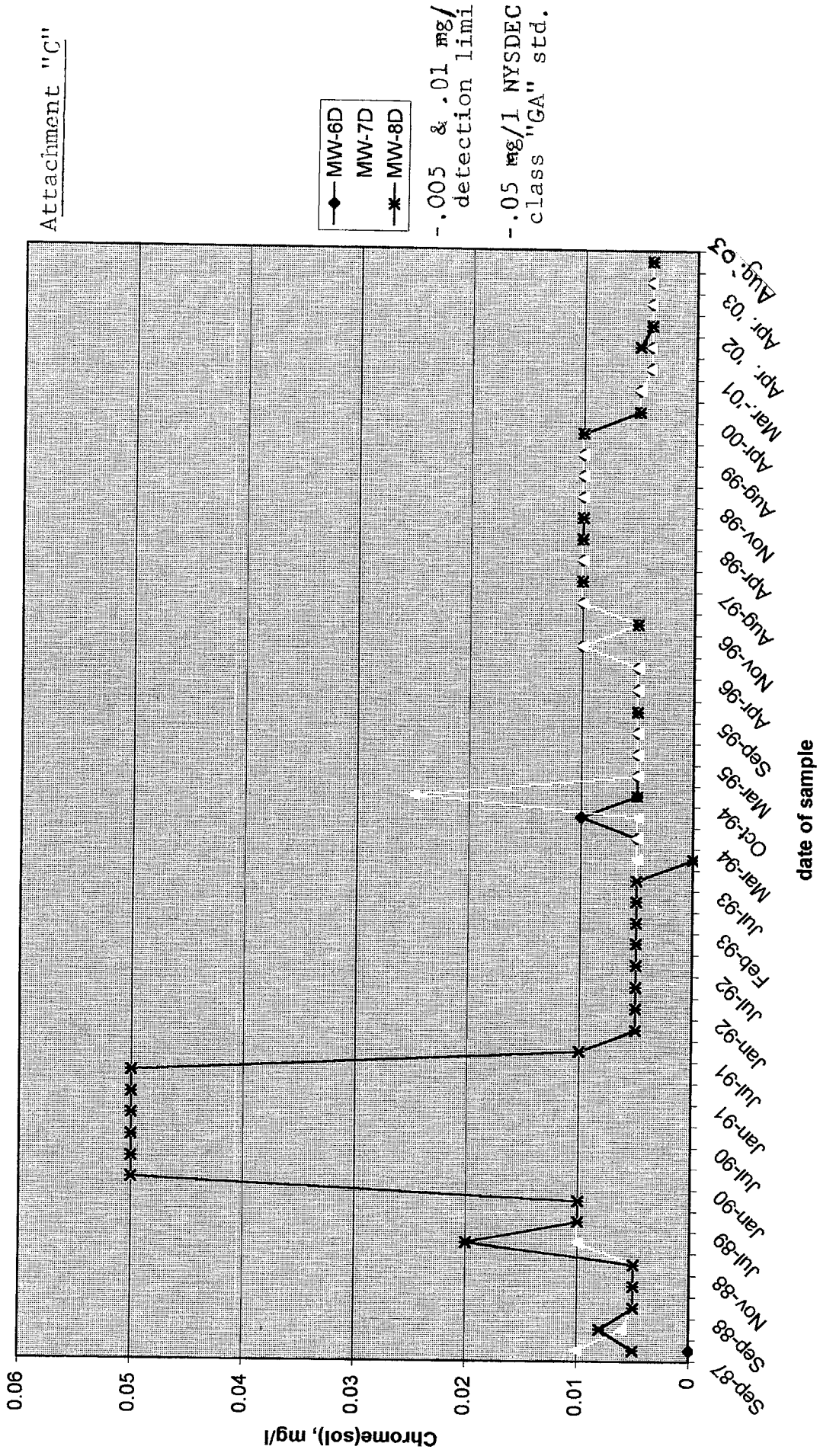
Palmer St. I/fill; Lead(soluble) vs. Time



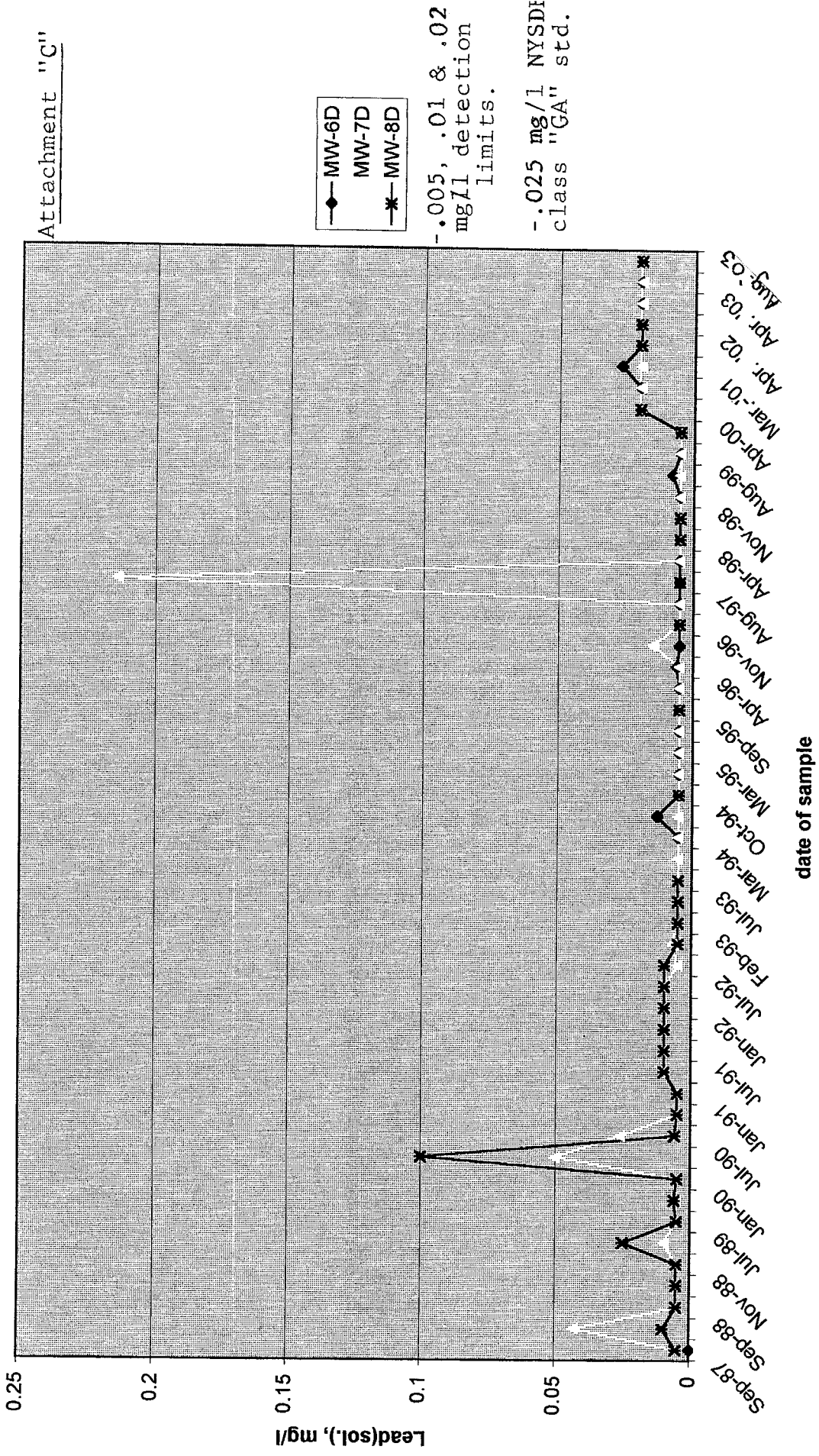
Palmer St. I/fill; Arsenic(soluble) vs. Time



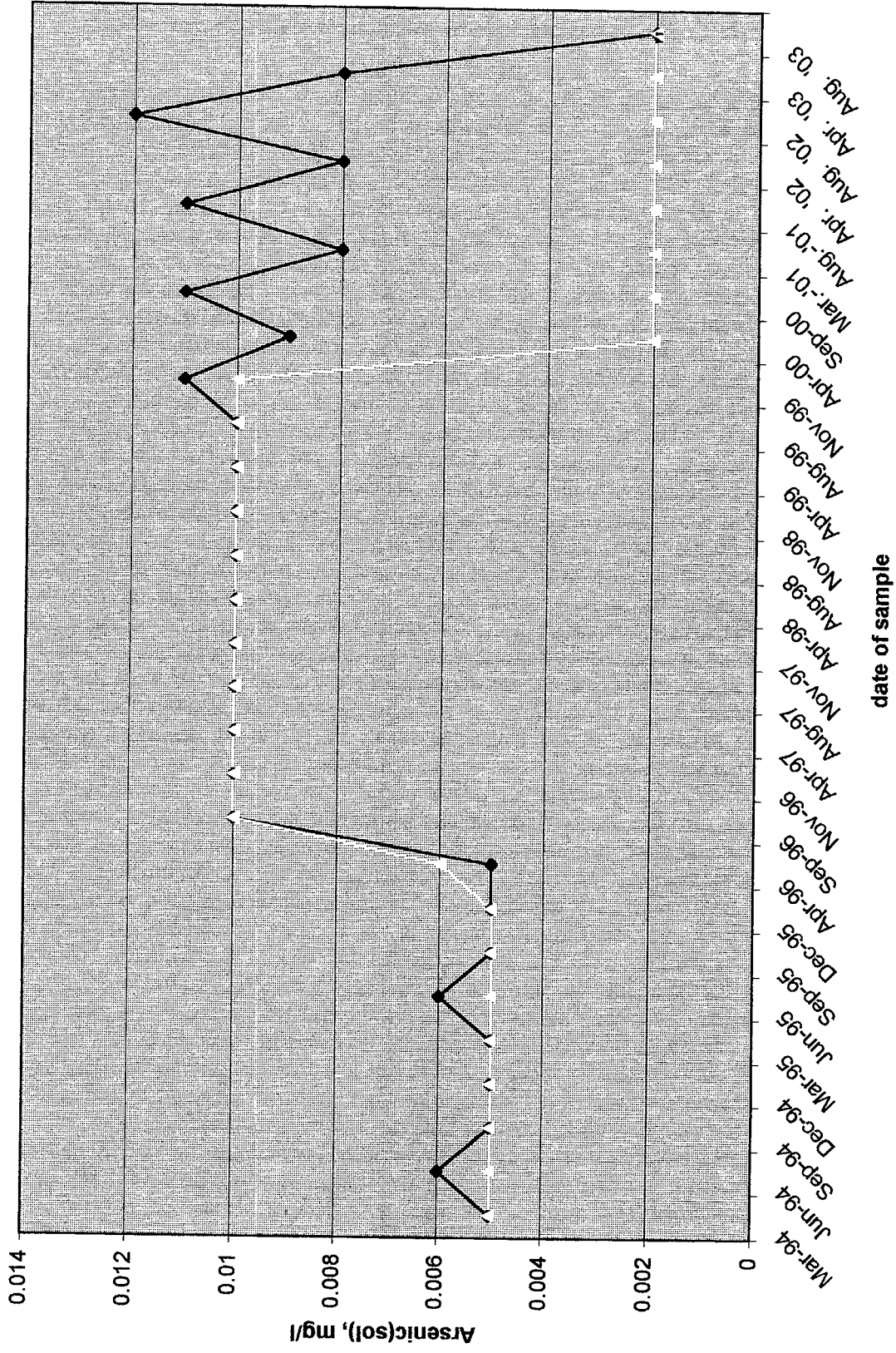
Palmer St. I/fill; Chrome(soluble) vs. time



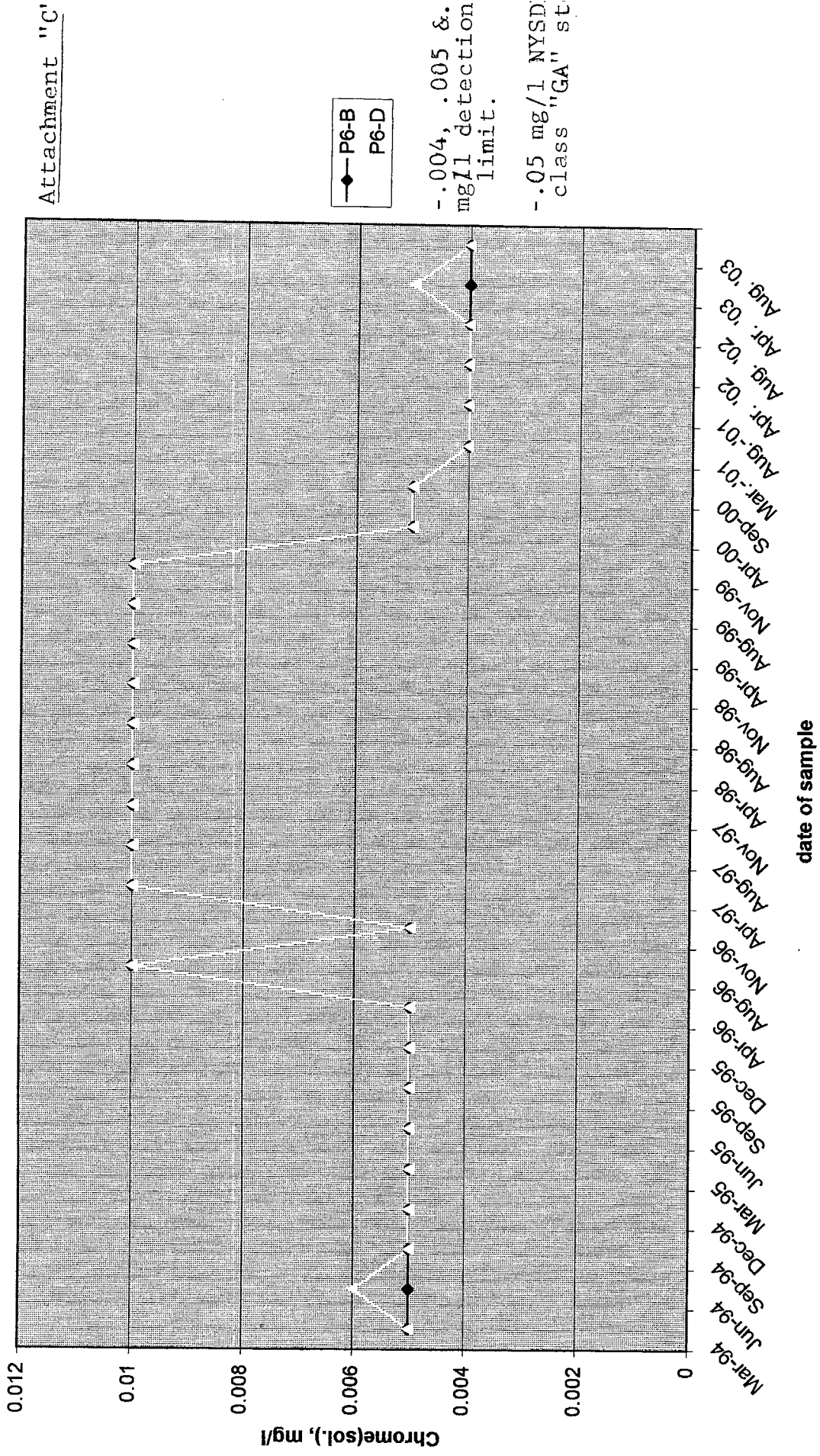
Palmer St. I/fill; Lead(soluble) vs. time



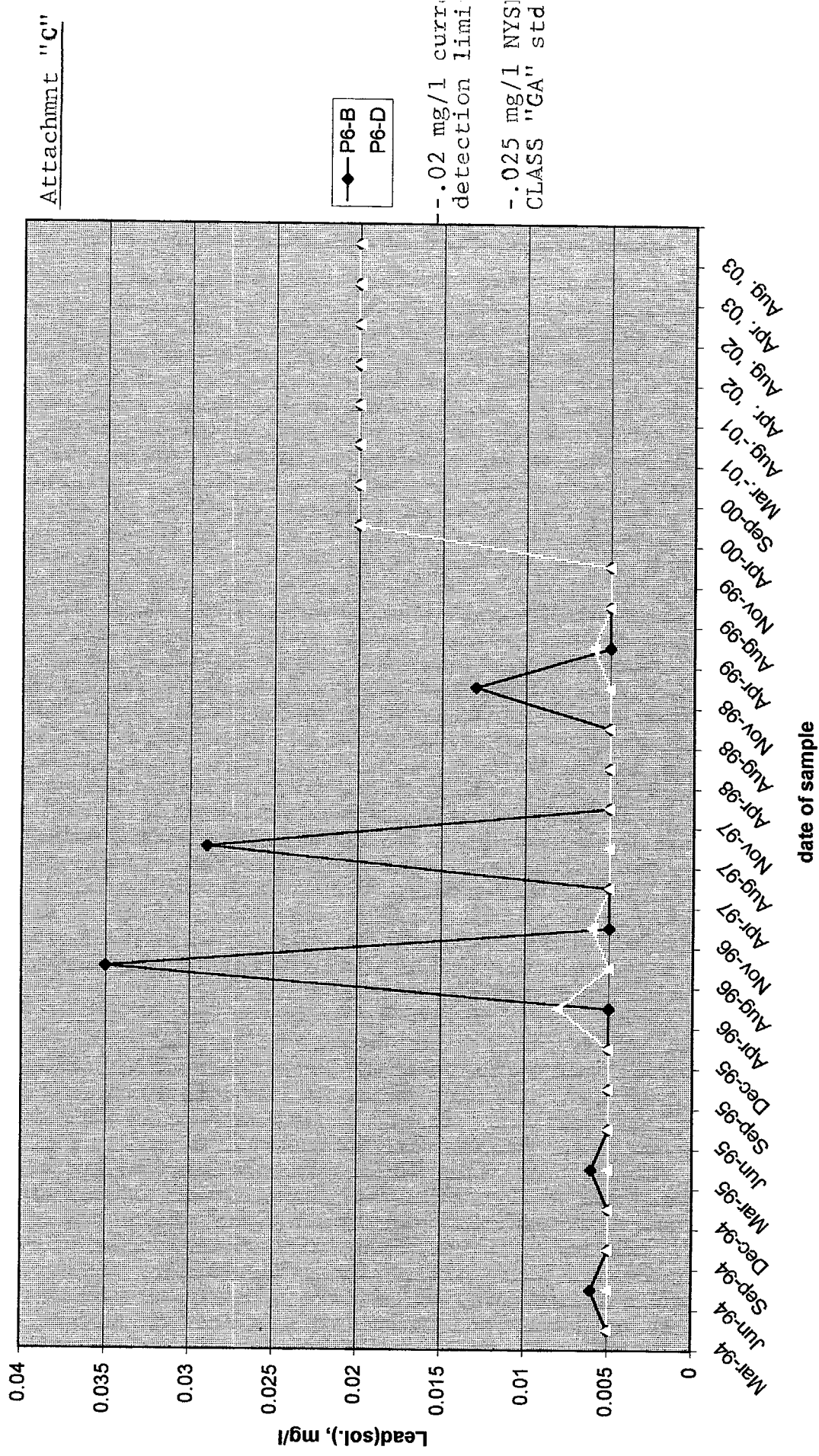
Palmer St. I/fill; Arsenic(soluble) vs. time



Palmer St. I/fill; Chrome(soluble) vs. time



Palmer St. landfill; Lead(soluble) vs. time



		PALMER ST L/F, MOENCH COMPANY														
		ARSENIC(SOL), CHROME(SOL), LEAD(SOL) vs TIME (MG/L)														
		BANK SEEPS														

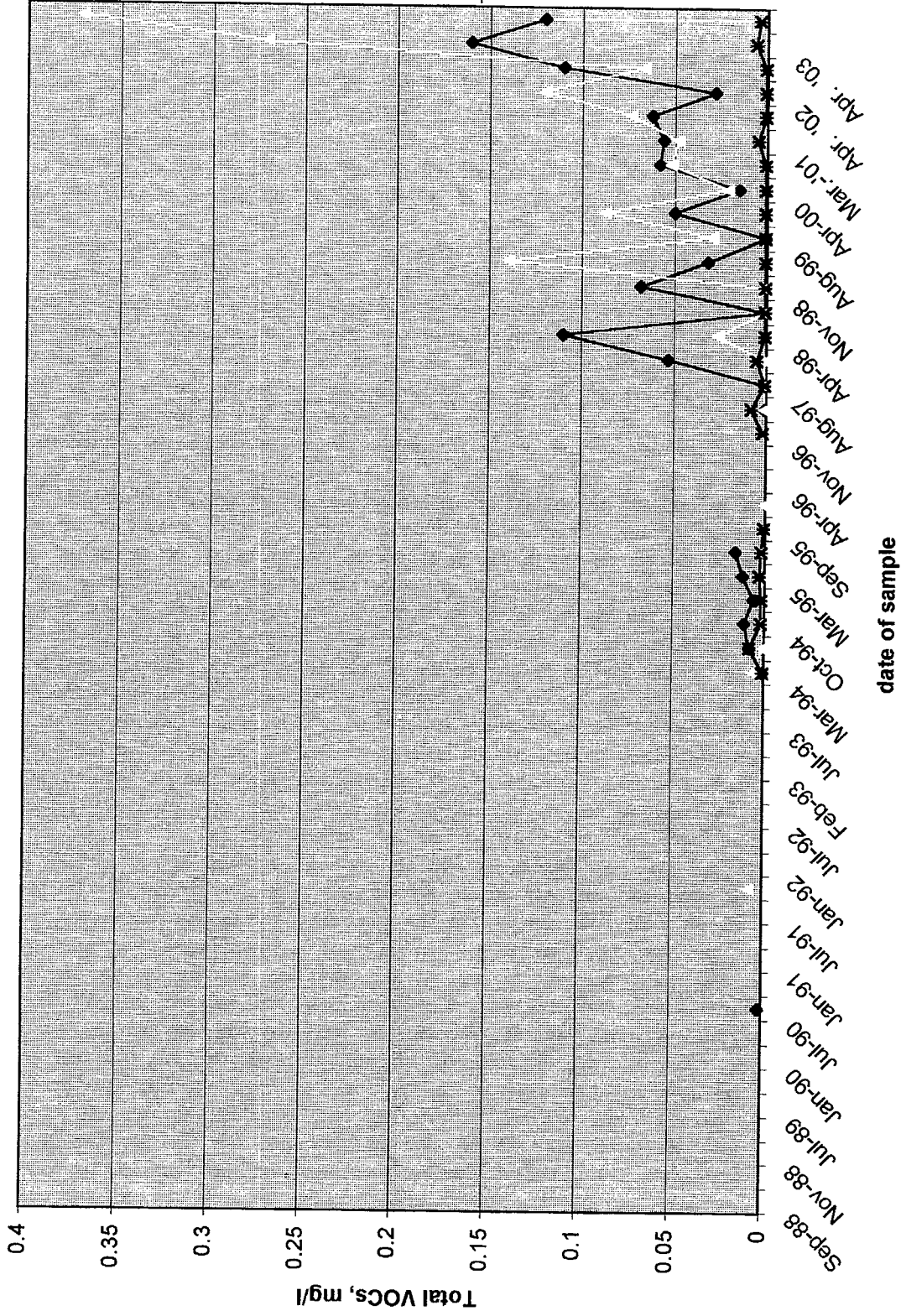
N.
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3
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ATTACHMENT "D"

TOTAL VOLATILES vs TIME
(grouped by monitoring point)

MONITORING EVENTS: April 2003
August 2003

Palmer St. I/fill: Total Volatile organics



-Attachment "D"

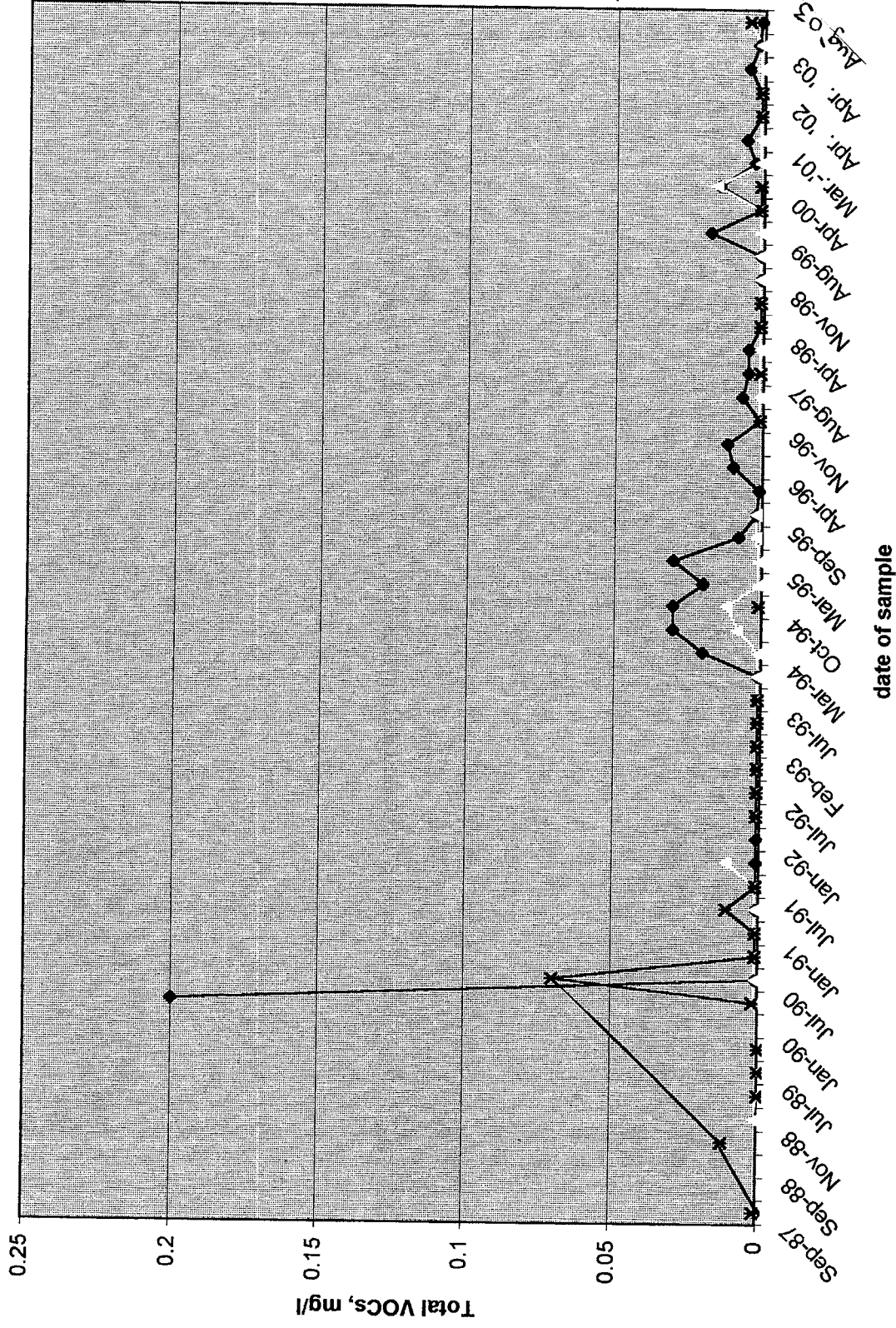
◆ MW-1D
 □ MW-3DR
 * MW-4D

"Guidance value" included since '99 in total (acetone, MEK, etc.)

"GA" std not relevant in total results.

-acetone/pellet contamination likely in MW1D & MW-3DR. MW-1D is upgradient.

Palmer St. I/fill: Total Volatiles Organics

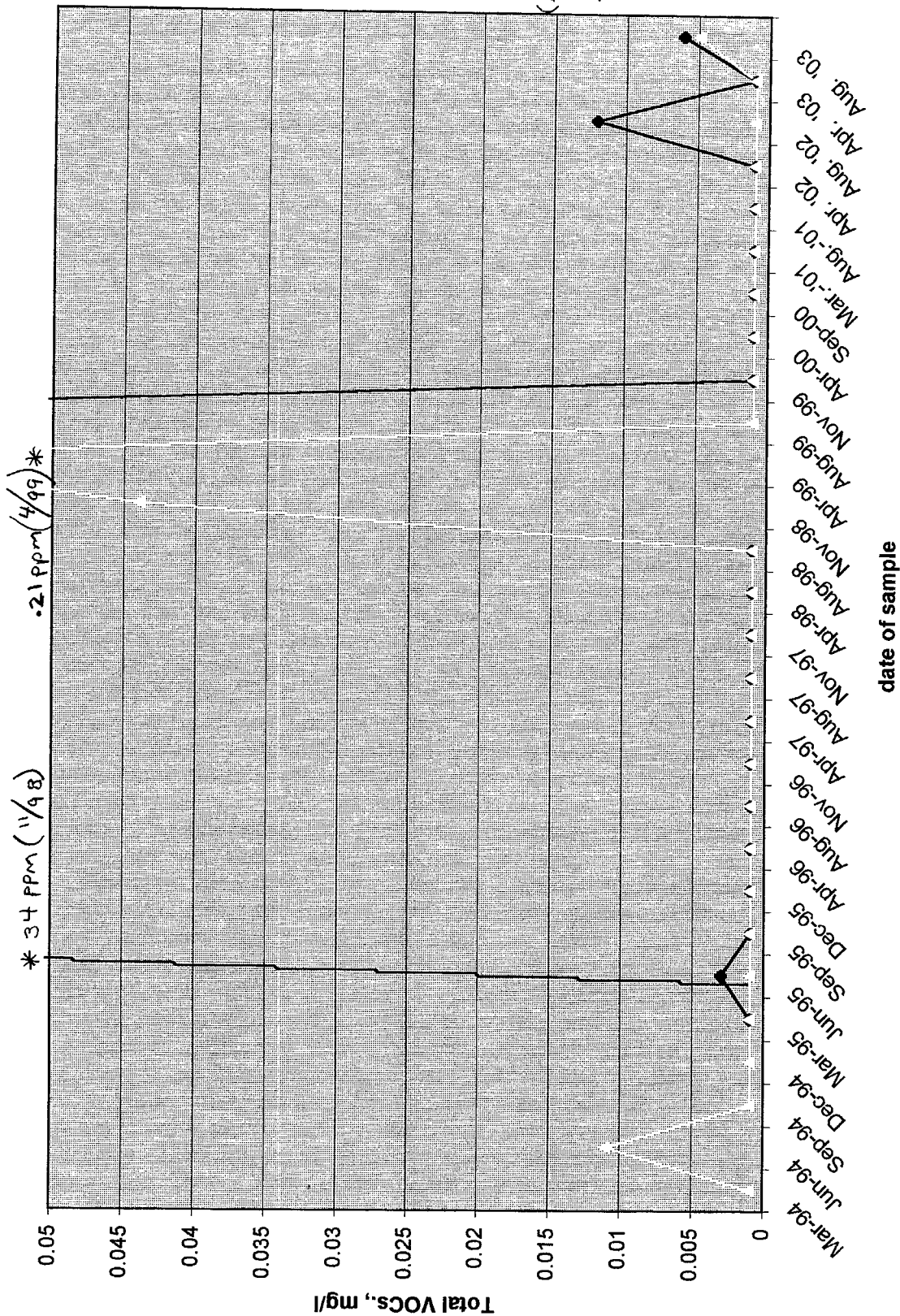


-detection limit
 .001 & .005 mg/l

-Totals include
 "guidance value"
 (acetone, MEK, Et)

- "GA" std not
 relevant, as is
 total value.

Palmer St. I/fill; Total Volatile Organics



--Attachment"D

-detection limit
.001 & .005 m

—●— P6-B
- - - P6-D

-Total includes
guidance value
(Acetone, MEK, "

-"GA" std irre:
vent with tota

[illegible][illegible]

Aug. '02	Apr. '03	Aug. '03	
0.012	0.001	0.006	
	l.t.	(J) est	
0.001	0.001	0.005	

			PALMER ST. L/F, MOENCH COMPANY											
			TOTAL VOLATILE ORGANICS vs TIME (MG/L)											
			BANK SEEPS											
												Attachement "D"		

BS-1	Aug-97	0.001	Nov-97	0.001	Apr-98	0.001	Aug-98	0.001	Nov-98	0.001	Apr-99	0.001	Aug-99	0.001	Nov-99	0.001	Apr-00	0.001	Sep-00	0.001	Mar-01	0.001	Aug-01	0.001	Apr-02
BS-3		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

BS-1	Aug. '02	0.001	Apr. '03	0.005	Aug. '03	0.005
		l.t.	l.t.	l.t.	l.t.	l.t.
BS-3		0.001	0.005	0.005	0.005	0.005
		l.t.	l.t.	l.t.	l.t.	l.t.

-No graphs generated, as no detection in 9 years.

-often in dry weather, there are no bank seeps.
If not, a creek sample is taken adjacent to the bank seep location.

ATTACHMENT "E"

* FIELD MEASUREMENT DATA SHEETS;

SAMPLE EVENTS: April & August, 2003

*Individual "field data sheets" were submitted with prior actual sample event reports. Contact Moench if you require them.

ATTACHMENT "F"

ANALYTICAL DATA; EVENTS: April & August, 2003

*Analytical data from Phillips Analytical Services, of Hamilton, Ontario, was submitted in the prior individual semiannual reports. Please contact Moench if you require them.

6.0 REFERENCES

1. PALMER STREET LANDFILL CLOSURE/POST CLOSURE PLAN (EPA ID. NYDOO2126910), PREPARED BY MALCOLM PIRNIE, INC. REVISED FEBRUARY 1989.
2. PALMER STREET LANDFILL, SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION, PREPARED BY MALCOLM PIRNIE, INC. JANUARY 1989.
3. SAMPLING PLAN/QUALITY ASSURANCE PLAN FOR GROUNDWATER MONITORING - PALMER STREET LANDFILL. PREPARED BY MALCOLM PIRNIE, INC., AUGUST 1989. REVISED-7/93, 8/94.
4. TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, THIRD EDITION, USEPA OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, NOVEMBER 1986.
5. PALMER STREET LANDFILL, EVALUATION OF ALTERNATIVE COVER SYSTEMS, PREPARED BY MALCOLM PIRNIE, INC., JANUARY 1989.
6. COVER SYSTEM PERFORMANCE EVALUATION, PALMER STREET LANDFILL; PREPARED BY MALCOLM PIRNIE, INC. OCTOBER 1995 & FEBRUARY 1999.
7. FORMER TANNERY PLANT SITE, WELL INSTALLATION REPORT; PREPARED BY BENCHMARK ENVIRONMENTAL ENGINEERING SCIENCE CO., AUGUST 2000.

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