RCRA FACILITY INVESTIGATION FINAL REPORT
BUILDING 209 INVESTIGATIVE SITE
XEROX CORPORATION
JOSEPH C. WILSON CENTER FOR TECHNOLOGY
WEBSTER, NEW YORK
VOLUME II OF II

by

H&A of New York
Rochester, New York

for

Xerox Corporation
Webster, New York

File No. 70096-45
October 1993

APPENDIX A

- Former Solvent Clean-Wash Installations

APPENDIX B

SWMU Descriptions

Investigative Site - W209

SWMU	Description
55	Building 209-AP67A Recirculation Tanks
57	Building 209-AP67A Storage Tanks

XEROX CORPORATION	SOLID WASTE MANAGEMENT UNIT DATA SHEET	55

I.D. NO. AND DESCRIPTION: #55 Building 209 AP67A Recirculation Tanks
LOCATION: Adjacent to Building 209, north part of east wall - see plan

UNIT PHYSICAL CONDITIONS

DESIGN CAPACITY: N/A

DIMENSIONS:

MATERIAL OF CONSTRUCTION: Carbon steel with phenolic resin lining

SECONDARY CONTAINMENT: Concrete dike

SITE ACCESS: Good

AGE: Tanks moved from Xerox Henrietta site and installed in 1978

PRESENT PHYSICAL CONDITION: SWMU includes secondary containment area; Tanks are empty and unused, but in place

WASTE DESCRIPTION: Hazardous Waste Solvents

PERIOD OF OPERATION: 1978 to

PREVIOUSLY INVESTIGATED? : Yes

CONSULTANT: Woodward-Clyde

REPORT TITLE, DATE: Interim Report, Phase I and Phase II Hydrogeologic Investigation, June, 1987

PURPOSE: To determine the nature and extent of soil and groundwater contamination near Building 209

SCOPE: Advance 9 exploratory borings, install 30 monitoring wells, collect surface water and groundwater samples. Surface water and sediment samples analysed for 601/602 analytes, arsenic, and mineral spirits.

RESULTS: Volatile organics and metals detected in soil adjacent to the tanks. Volatile organics were also detected in wells in water table and bedrock.

OTHER INVESTIGATIVE STUDIES: See Table 1

ENVIRONMENTAL SAMPLING:

TYPE OF SAMPLES:	DATES:	CONSULTANT:
Soil	4/86 through 12/86	Woodward-Clyde
Shallow groundwater	4/86 through 12/86	Woodward-Clyde
Deep groundwater	4/86 through 12/86	Woodward-Clyde

SPILL OR RELEASE - CLEAN UP: None

ON-GOING MONITORING: None

HYDROGEOLOGIC CONDITIONS

SOILS TYPE: Fill above Glacial Till

DEPTH TO BEDROCK: 10.5 ft. below ground surface

DEPTH TO GROUNDWATER: 3.5 ft. below ground surface (see attached groundwater contour map)

ENVIRONMENTAL QUALITY DATA: See attached Tables 2 and 3

PREVIOUS RELEASES? YES

SOURCES OF INFORMATION DOCUMENTING RELEASE: Xerox discovered soil and groundwater contamination in the solvent storage tank and processing areas of Bldg 209. Contamination discovered during closure activities for waste solvent storage tank and virgin solvent storage tank replacement

DATE(S) OF RELEASE: Unknown

TYPE OF WASTE/ MATERIAL RELEASED: See Tables 2 and 3

QUANTITY OF WASTE/ MATERIAL RELEASED: Unknown

NATURE OF RELEASE: Unknown

RCRA STATUS:

REMARKS

TABLE 1 (#55)

OTHER INVESTIGATIVE STUDIES

REPORT TITLE:

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1. "Aquifer Testing and Conceptual Groundwater Recovery System at Building 209" (Woodward-Clyde Consultants, 1988)

TABLE 2 (#55)

SOIL (B-4)

Constituent	Concentration (ppm) 4/25/86
Arsenic	511,000
Methylene Chloride	ND
1,1-Dichloroethene	6,000
1,1-Dichloroethane	ND
1,1,1-Trichloroethane	624,000
Chloroform	5,800
Trichloroethene	560,000
Tetrachloroethene	1,980,000
Toluene	132,000

TABLE 3 (#55)

GROUNDWATER MW-2

Constituent	Concentration (ppb) 12/17/86 MW-25*	 MW-2**
Arsenic	8,700	<50
Methylene Chloride	72,000	<1
1,1-Dichloroethene	5,400	35
1,1-Dichloroethane	<1,000	210
1,1,1-Trichloroethane	270,000	250
Chloroform	ND	28
Trichloroethene	133,000	14,700
Tetrachloroethene	33,000	15,100
Toluene	<1000	<1

ND = Not Detected

* Well installed in overburden

** Well installed in bedrock

XEROX CORPORATION	SOLID WASTE MANAGEMENT UNIT DATA SHEET	57

I.D. NO. AND DESCRIPTION: # 57 Building 209 AP67A Storage Tank
LOCATION: 100 ft. east of Bldg.209, north portion of east wall-see plan

UNIT PHYSICAL CONDITIONS

DESIGN CAPACITY:	8,000 gallons
DIMENSIONS:	10 ft. diameter x 13 ft. 8 in. high
MATERIAL OF CONSTRUCTION:	Carbon steel with phenolic resin lining
SECONDARY CONTAINMENT:	Fiber glass lined secondary containment dike
SITE ACCESS:	Good
AGE:	4 years
PRESENT PHYSICAL CONDITION:	The tanks are empty and unused, but in place
WASTE DESCRIPTION:	AP67A solvents
PERIOD OF OPERATION:	1985 - present (12/85)

PREVIOUSLY INVESTIGATED? : Yes

CONSULTANT: Woodward-Clyde

REPORT TITLE, DATE: Interim Report , Phase I and Phase II Hydrogeologic Investigation, Building 209, Webster, New York, June, 1987

PURPOSE: To determine the nature and extend of soil and groundwater contamination near Building 209

SCOPE: Advance 9 exploration borings, install 30 monitoring wells, collect surface water and groundwater samples. Surface water and surface sediment samples were analysed for 601/602 analytes and arsenic. Groundwater samples were analysed for 601/602 analytes, arsenic, and mineral spirits.

RESULTS: Arsenic and organic compounds detected in soil and groundwater samples.

XEROX CORPORATION

SOLID WASTE MANAGEMENT UNIT
DATA SHEET

57

PREVIOUS INVESTIGATIVE STUDIES: See Table 1

ENVIRONMENTAL SAMPLING:

TYPE OF SAMPLES:	DATES:	CONSULTANT:
Soil	4/86 through 12/86	Woodward-Clyde
Shallow groundwater	4/86 through 12/86	Woodward-Clyde
Deep groundwater	4/86 through 12/86	Woodward-Clyde

ON-GOING MONITORING: None

HYDROGEOLOGIC CONDITIONS

SOILS TYPE: Fill above Glacial Till

DEPTH TO BEDROCK: 12 ft. below ground surface

DEPTH TO GROUNDWATER: 2.5 ft. (see attached groundwater contour map)

ENVIRONMENTAL QUALITY DATA: See attached Tables 2 and 3

PREVIOUS RELEASES? NO

SOURCES OF INFORMATION DOCUMENTING RELEASE: N/A

DATE(S) OF RELEASE: N/A

TYPE OF WASTE/ MATERIAL RELEASED: See Tables 2 and 3

QUANTITY OF WASTE/ MATERIAL RELEASED: Unknown

NATURE OF RELEASE: Unknown

RCRA STATUS:

REMARKS

TABLE 1 (#57)

OTHER INVESTIGATIVE STUDIES

REPORT TITLE:

1. "Aquifer Testing and Conceptual Groundwater Recovery System at Building 209" (Woodward-Clyde Consultants, March, 1988)

TABLE 2 (#57)

SOIL ANALYSIS
MW-4

Constituent	Concentration (ppm) 5/2/86
Arsenic	30
Methylene Chloride	ND
1,1-Dichloroethene	66
1,1-Dichloroethane	300
1,1,1-Trichloroethane	190
1,2-Dichloroethene	ND
Trichloroethene	140
Tetrachloroethene	57
Toluene	22
Xylene	116

TABLE 3 (#57)

GROUNDWATER RESULTS
MW-4

Constituent	Concentration (ppb) 6/30/86
Arsenic	0.0178
Methylene Chloride	<100
1,1-Dichloroethene	ND
1,1-Dichloroethane	600
1,1,1-Trichloroethane	3,700
1,2-Dichloroethene	ND
Trichloroethene	2,400
Tetraaachloroethene	690
Toluene	<100
Xylene	ND

ND = Not Detected

APPENDIX C

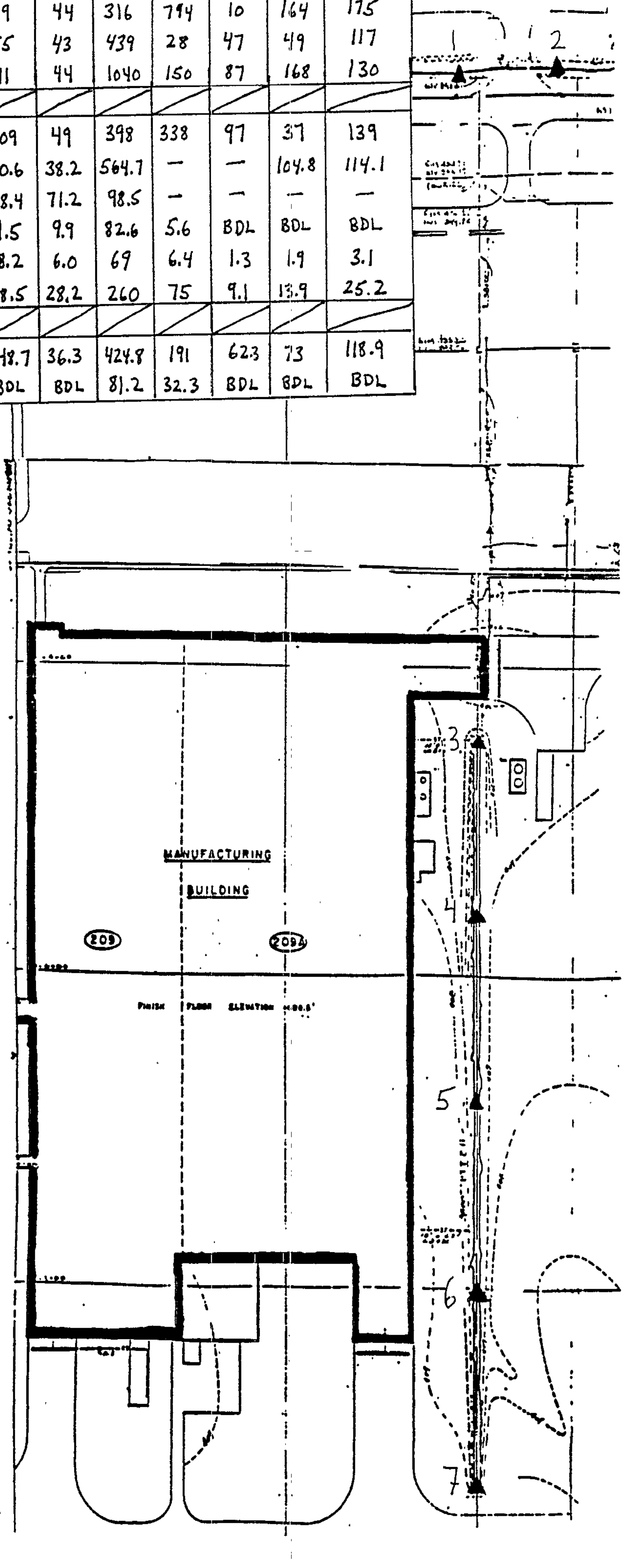
Xerox Storm Sewer Sampling Maps with Total VOCs Results - 1986 to 1989

Building 209 SURFACE WATER

These sample locations #1 - #7 CAN BE APPLIED BETWEEN July 1986 through JUNE 1988 ONLY.

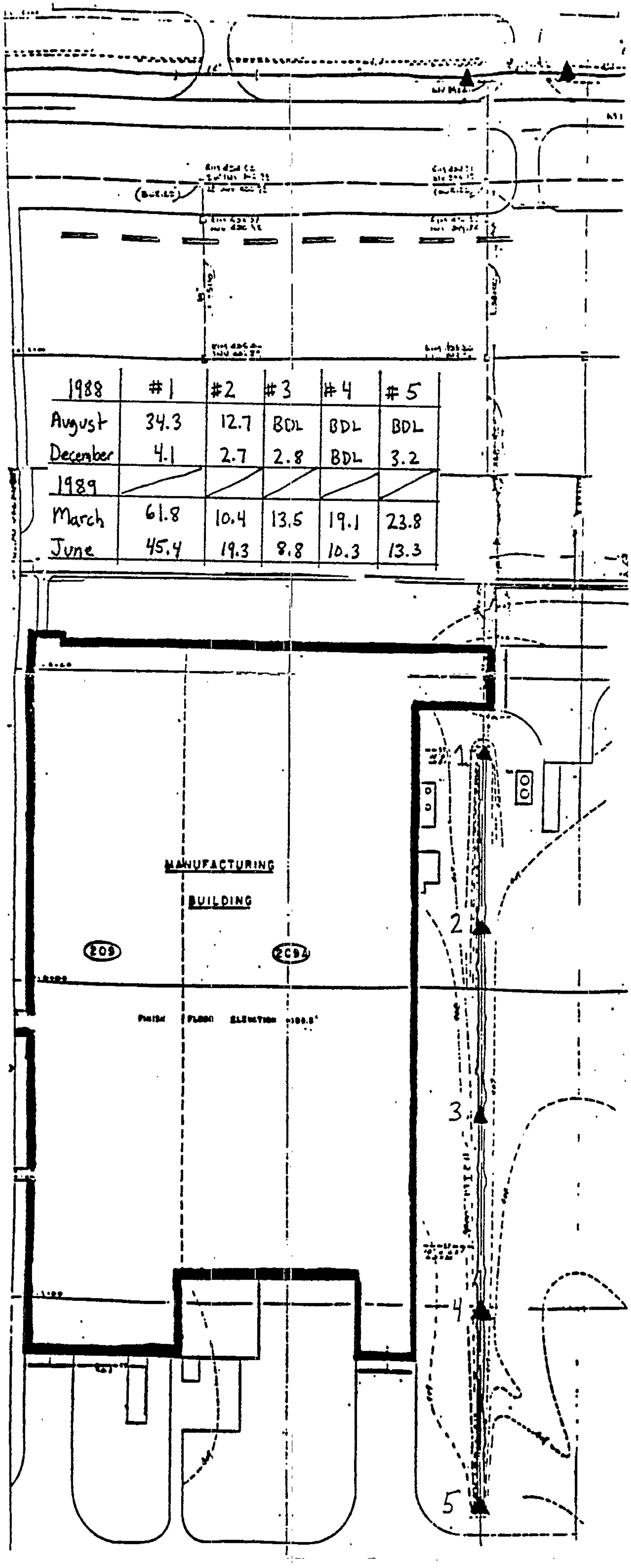
*Total Volatiles in PPB

1986	#1	#2	#3	#4	#5	#6	#7
July	10.1	14.6	214.6	16.2	33.3	16.0	9.0
August	50.4	42.8	2.7	3.7	—	9.9	8.1
September	26.9	23.9	111.2	10.9	4.5	3.8	15.1
October	39	44	316	794	10	164	175
November	55	43	439	28	47	49	117
December	41	44	1040	150	87	168	130
1987							
January	209	49	398	338	97	37	139
February	50.6	38.2	564.7	—	—	104.8	114.1
March	48.4	71.2	98.5	—	—	—	—
June	1.5	9.9	82.6	5.6	BDL	BDL	BDL
August	8.2	6.0	69	6.4	1.3	1.9	3.1
December	28.5	28.2	260	75	9.1	13.9	25.2
1988							
March	48.7	36.3	424.8	191	62.3	73	118.9
JUNE	BDL	BDL	81.2	32.3	BDL	BDL	BDL



Building 209 SURFACE WATER
* Total Volatiles in PPB

These sample locations
#1-5 are to be applied
from August 1988 to pres.

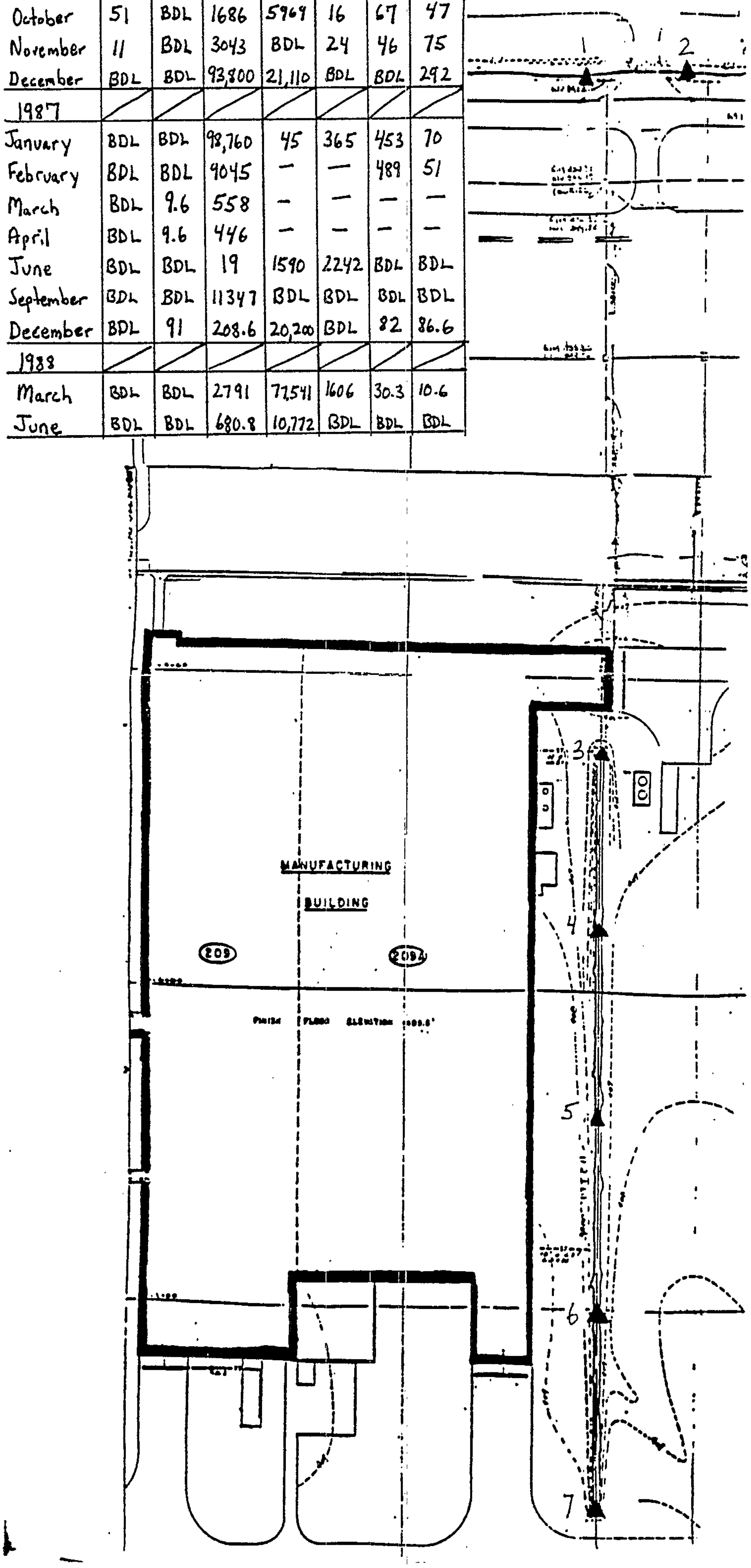


1988	#1	#2	#3	#4	#5
August	34.3	12.7	BDL	BDL	BDL
December	4.1	2.7	2.8	BDL	3.2
1989					
March	61.8	10.4	13.5	19.1	23.8
June	45.4	19.3	8.8	10.3	13.3

BUILDING [illegible] SOIL

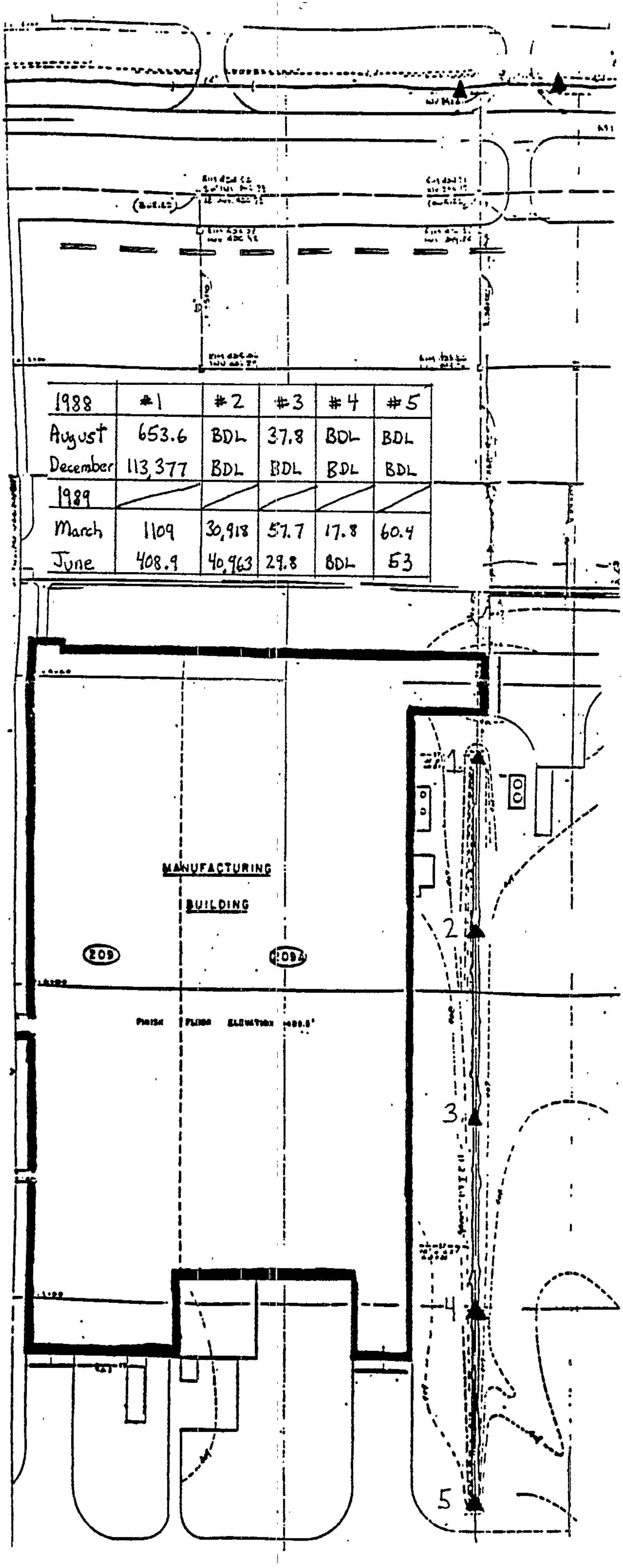
Total Volatiles in PPB

1986	#1	#2	#3	#4	#5	#6	#7
July	BDL	2.8	131	41	4.2	110.6	251
August	69.3	136.6	43.5	19.9	46	104.6	70.9
September	74.2	2.3	155.6	117	29	38	553.8
October	51	BDL	1686	5969	16	67	47
November	11	BDL	3043	BDL	24	46	75
December	BDL	BDL	93,800	21,110	BDL	BDL	292
1987							
January	BDL	BDL	98,760	45	365	453	70
February	BDL	BDL	9045	—	—	489	51
March	BDL	9.6	558	—	—	—	—
April	BDL	9.6	446	—	—	—	—
June	BDL	BDL	19	1590	2242	BDL	BDL
September	BDL	BDL	11347	BDL	BDL	BDL	BDL
December	BDL	91	208.6	20,200	BDL	82	86.6
1988							
March	BDL	BDL	2791	77,541	1606	30.3	10.6
June	BDL	BDL	680.8	10,772	BDL	BDL	BDL



Building 209 - Soil

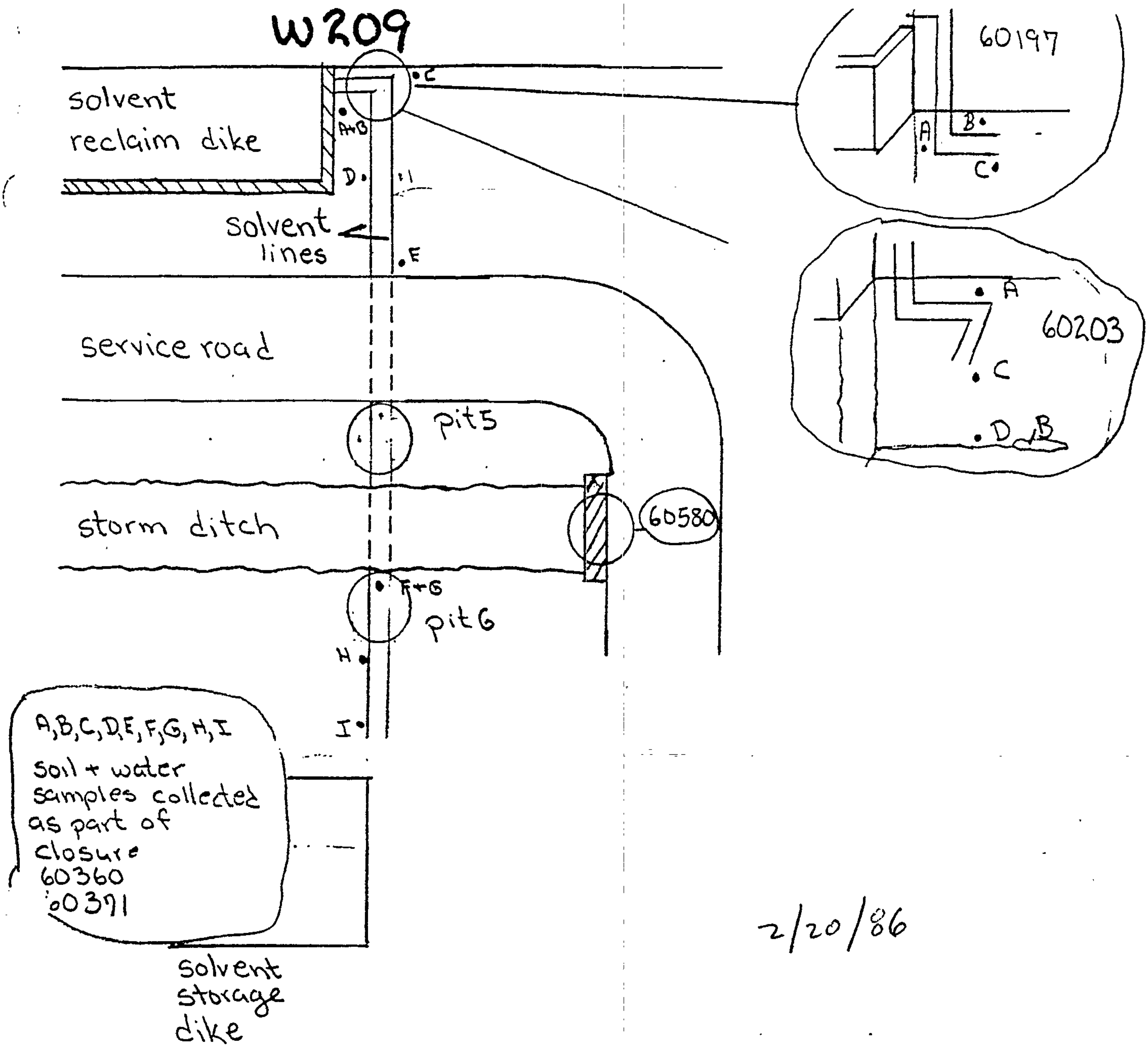
* Total Volatiles in PPB



1988	#1	#2	#3	#4	#5
August	653.6	BDL	37.8	BDL	BDL
December	113,377	BDL	BDL	BDL	BDL
1989					
March	1109	30,918	57.7	17.8	60.4
June	408.9	40,963	29.8	BDL	53

APPENDIX D

Sketch Maps of Samples Collected in Pipe Trench Excavations 2/20 and 2/21/86

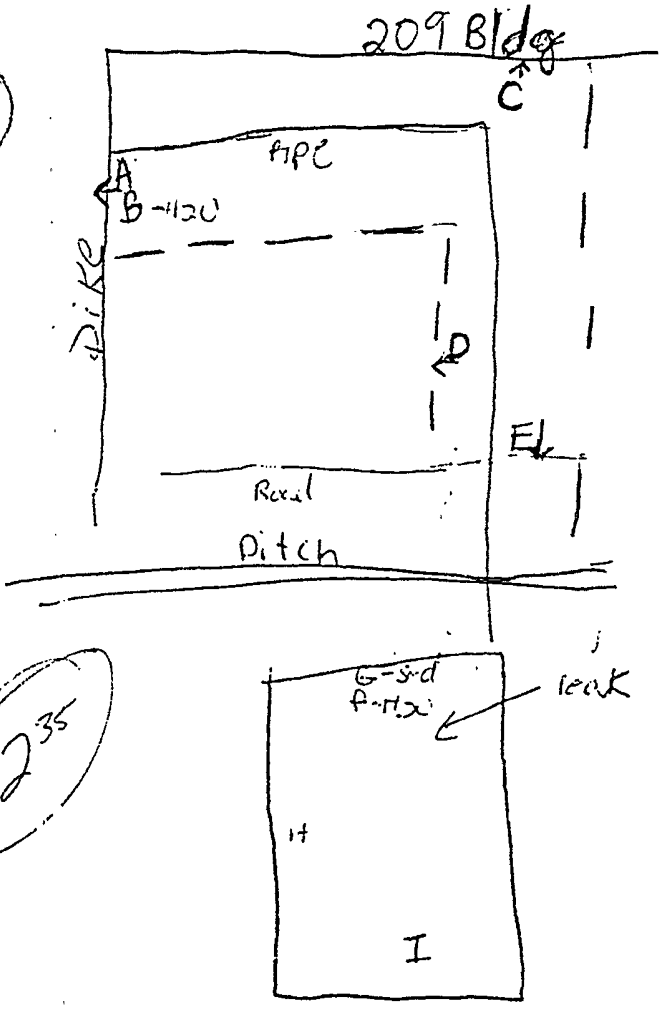

W209
solvent reclaim dike
A+B
C
D
E
solvent lines
service road
pit5
storm ditch
60580
F+G
pit6
H
I
60197
A
B
C
60203
A
C
D
B
A,B,C,D,E,F,G,H,I
soil + water samples collected as part of closure
60360
60371
solvent storage dike

2/20/86

2/20/86 Eliott

209 - Trench 601/602

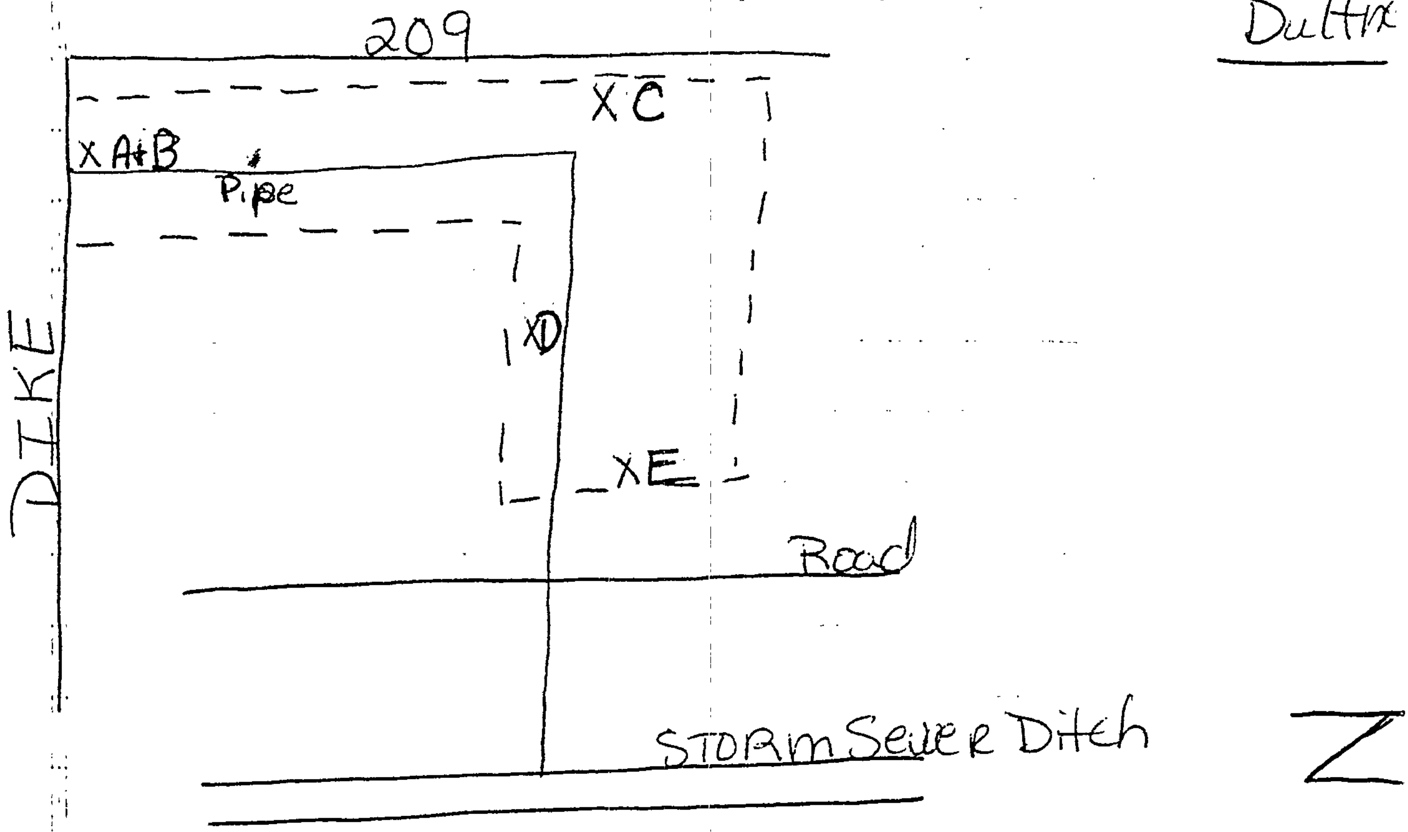
1:15

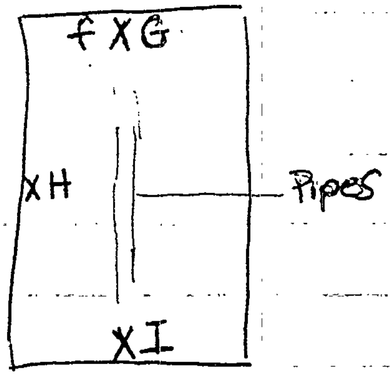


9' deep
5" above
pipeline

2:35

Eliott
Duffix





2/20/86 209 TRENCH PIPE

2 vials collected at each location

Analyze: 601 | 602, Dilimeniene

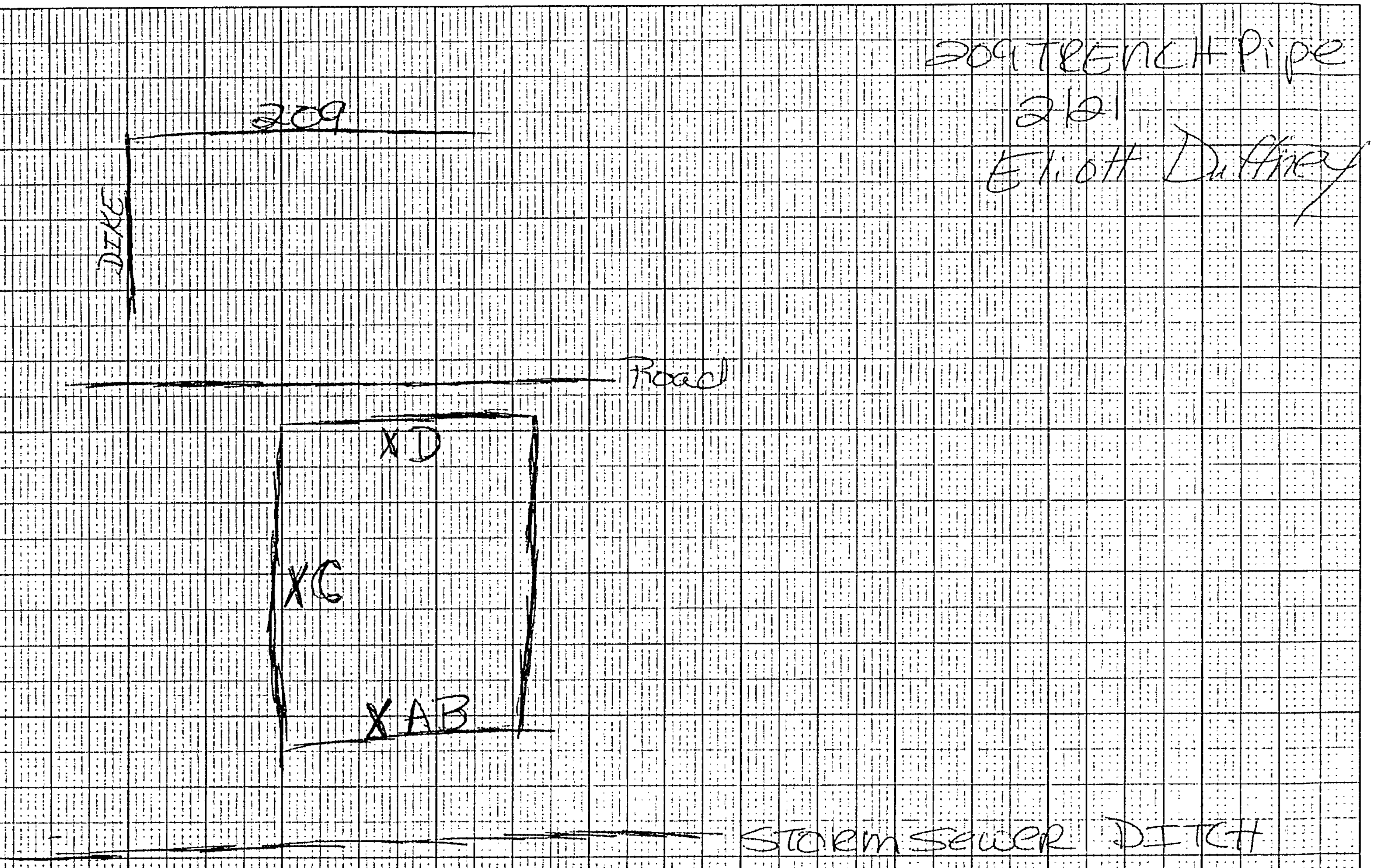
* Samples B and f are groundwater

All others are soil samples

— — - ➡ walls of Ditch

THANK YOU

Jayne Toomey
General Testing

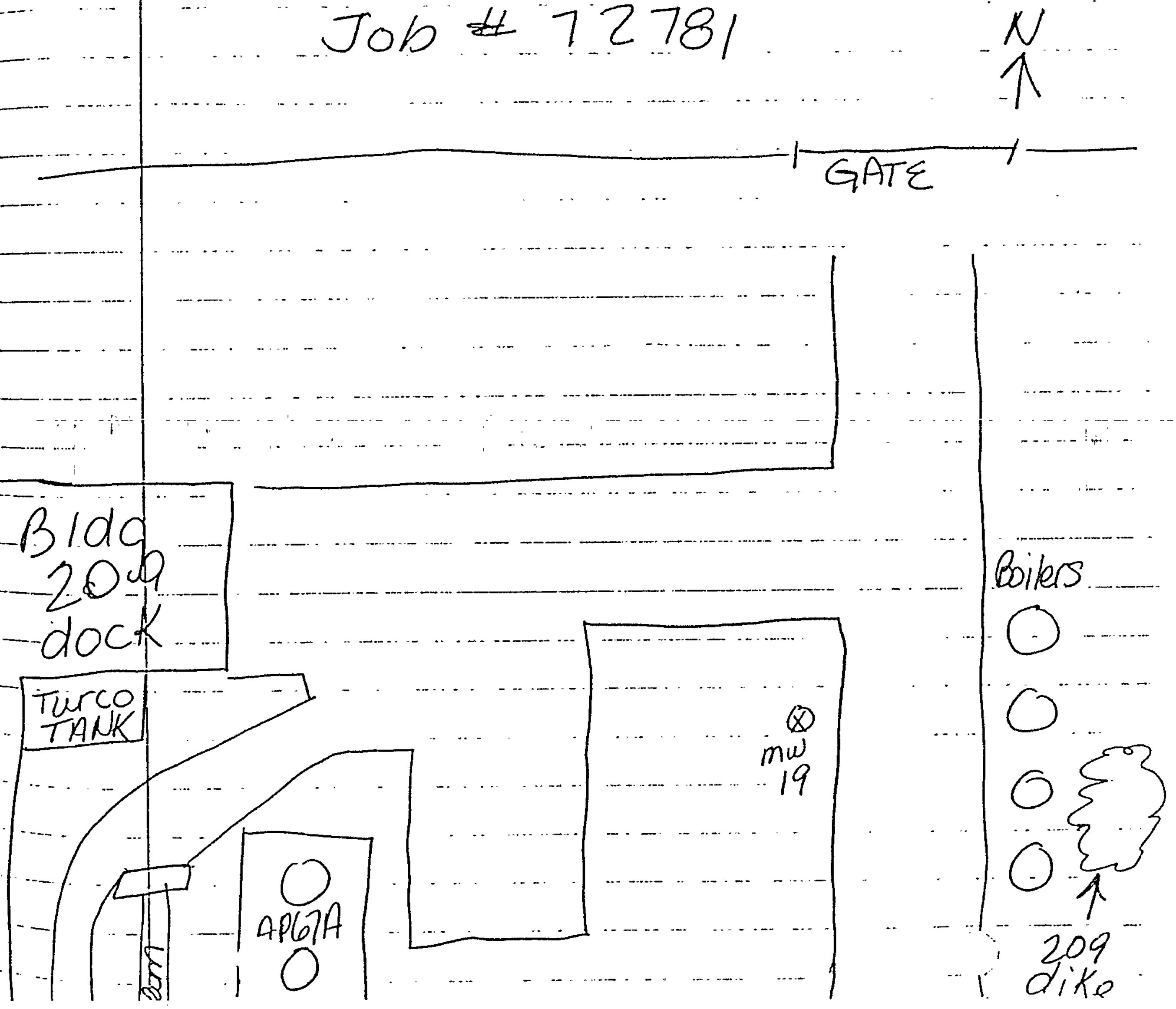


209 TRENCH Pipe
2/21
Eliott Duffney

10/14/87 Xerox

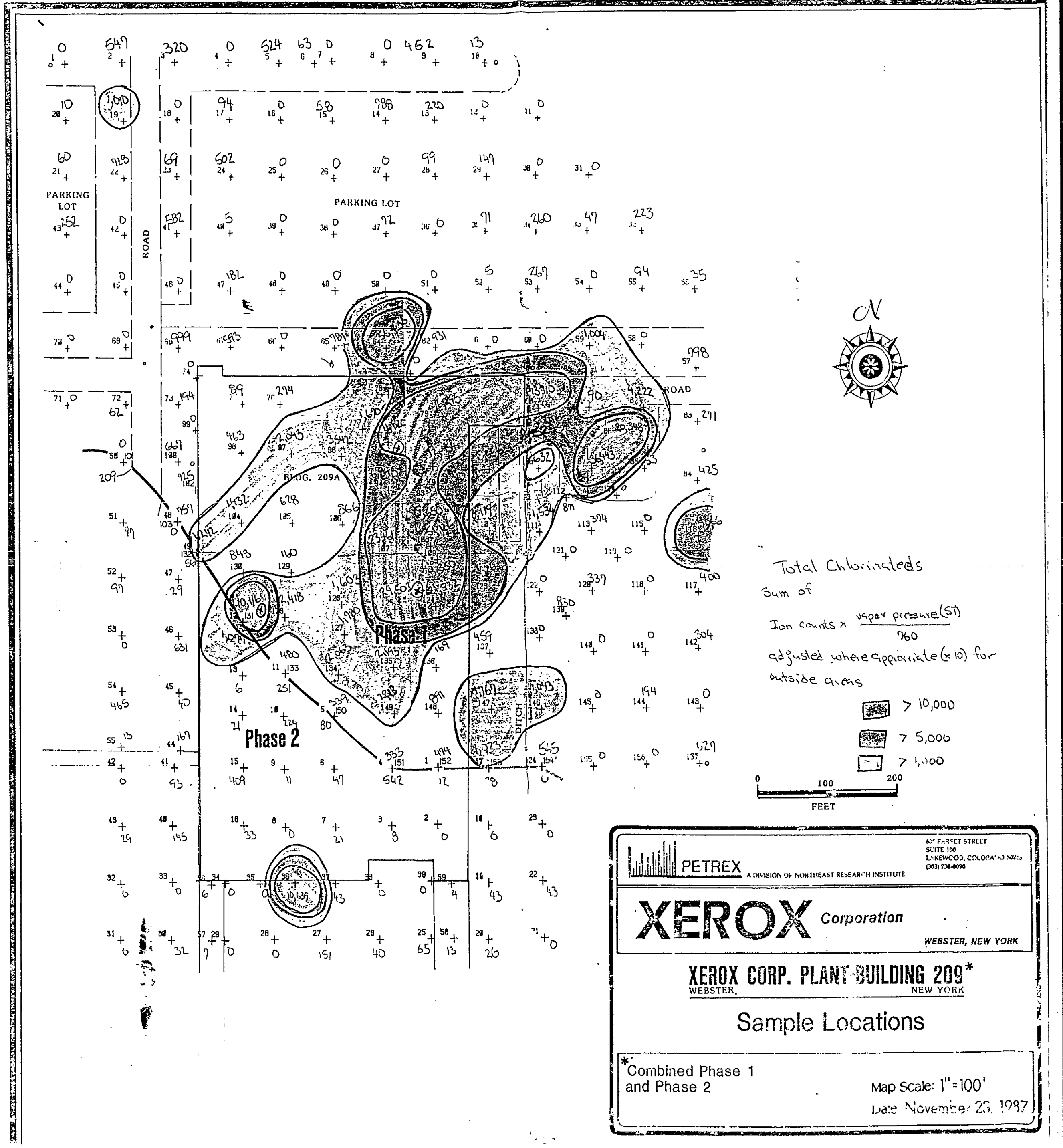
12^{05} 209 dike soils composite sample.

Job # 72781



APPENDIX E

Petrex Soil Gas Maps



Total Chlorinateds

Sum of

Ion counts x $\frac{\text{vapor pressure (ST)}}{760}$

adjusted where appropriate (x 10) for outside areas

▩ > 10,000

▨ > 5,000

☐ > 1,000

PETREX A DIVISION OF NORTHEAST RESEARCH INSTITUTE

6? FARSET STREET
SUITE 190
LAKEWOOD, COLORADO 80215
(303) 238-0090

XEROX Corporation

WEBSTER, NEW YORK

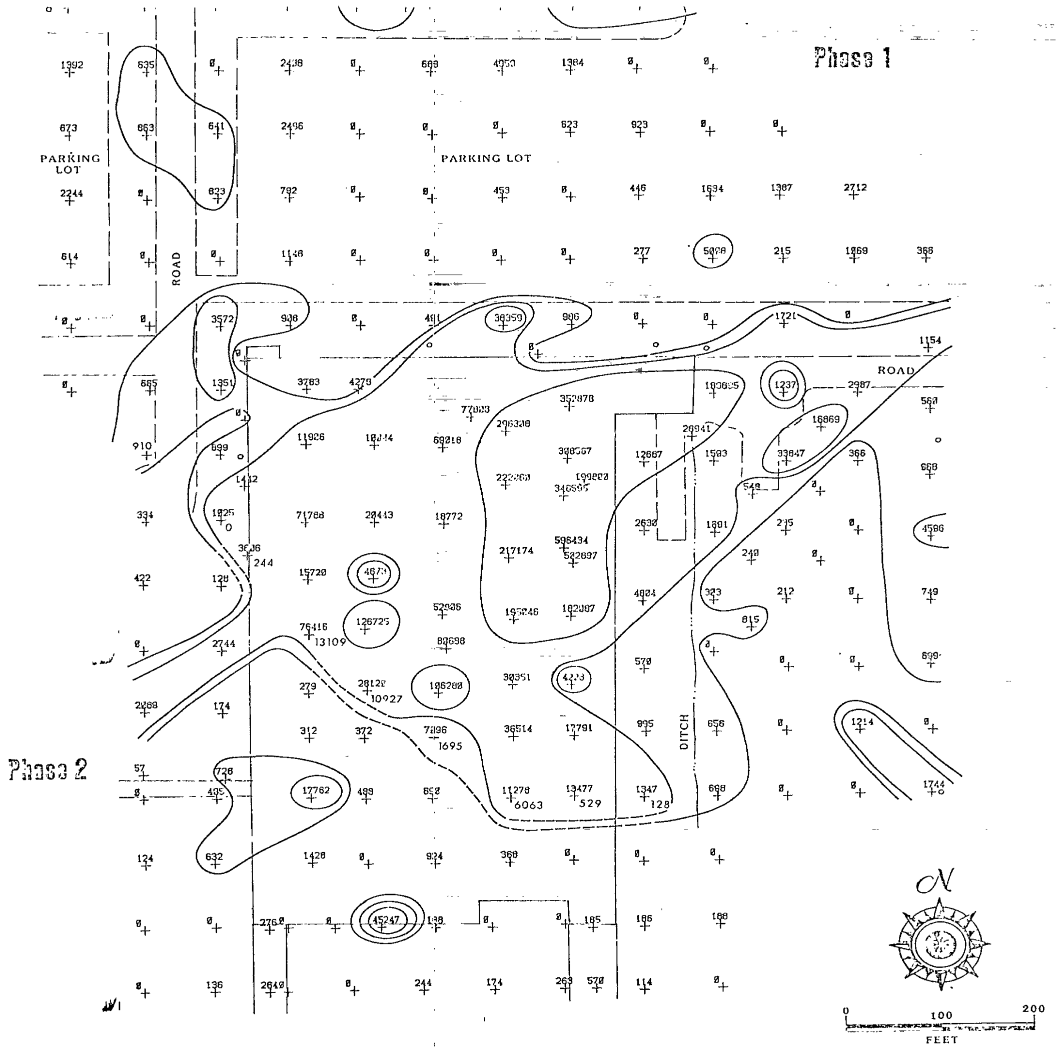
XEROX CORP. PLANT-BUILDING 209*
WEBSTER, NEW YORK

Sample Locations

*Combined Phase 1
and Phase 2

Map Scale: 1" = 100'

Date November 23, 1987



Legend:

Ion Current

☐ >100,000

☐ 10,000–99,999

☐ 5,000–9,999

0=Non-Detect (<5,000)

----- Dashed lines indicate more than one interpretation

** Unprotected samples adjusted for infiltration influences for phase one only.

PETREX A DIVISION OF NORTHEAST RESEARCH INSTITUTE

605 PARFET STREET
SUITE 100
LAKEWOOD, COLORADO 80215
(303) 238-0090

Xerox Corp. *Webster, New York*

XEROX CORP. PLANT-BUILDING 209 *

WEBSTER, NEW YORK

Summation of PCE, TCA, TCE, and DCE **

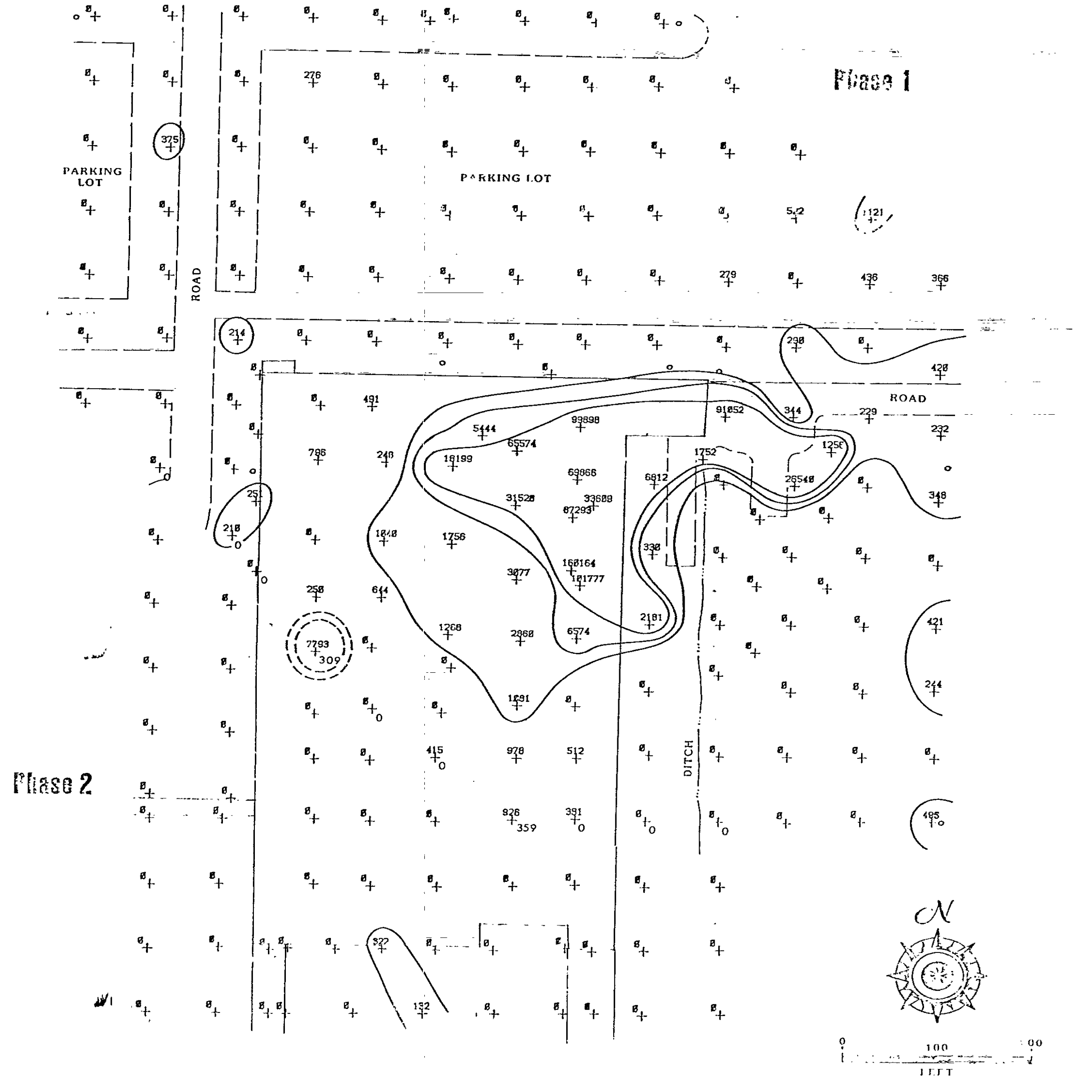
*Combined Phase 1 and Phase 2

**Relative Flux

Map Scale: 1" = 100'

Date: June 8, 1988

Plate 1



Legend:

Ion Current

☐ >10,000

☐ 5,000-9,999

☐ 1,000-4,999

0=Non-Detect (<1,000)

------ Dashed lines indicate more than one interpretation

** Unprotected samples adjusted for infiltration influences for phase one only.

PETREX A DIVISION OF NORTHEAST RESEARCH INSTITUTE

605 PARFET STREET
SUITE 100
LAKEWOOD, COLORADO [illegible]
[illegible]

Xerox Corp. Webster, New York

XEROX CORP. PLANT-BUILDING 209 *

WEBSTER, NEW YORK

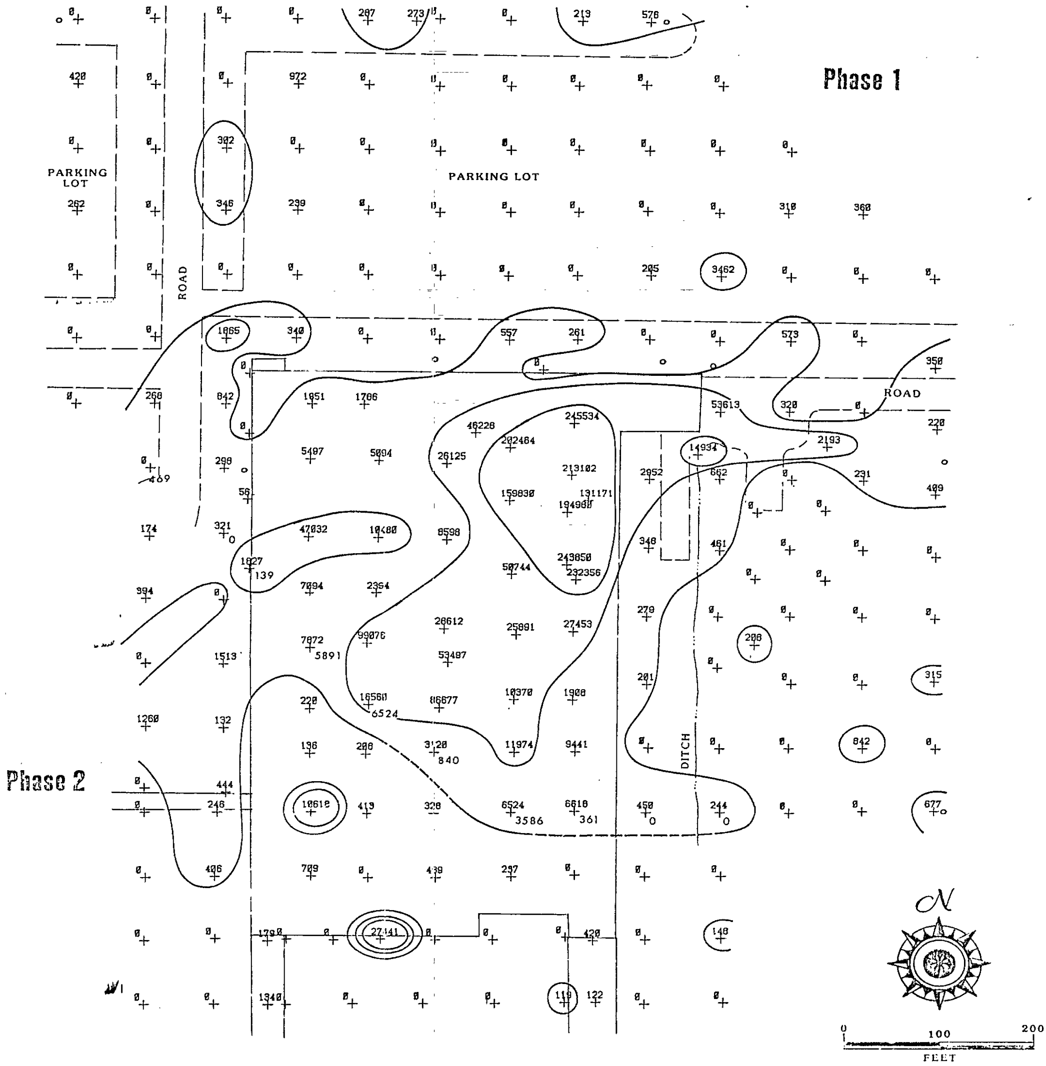
Relative Flux

Trichloroethylene **

*Combined Phase 1
and Phase 2

Map Scale: 1" = 100'

Date: June 8, 1988



Legend:

Ion Current

☐ >100,000

☐ 10,000–99,999

☐ 1,000–9,999

0=Non-Detect (<1,000)

---- Dashed lines indicate more than one interpretation

** Unprotected samples adjusted for infiltration influences for phase one only.

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606 PARFET STREET
SUITE 100
LAKEWOOD, COLORADO 80215
(303) 238-0090

Xerox Corp. *Webster, New York*

XEROX CORP. PLANT-BUILDING 209 *

WEBSTER, NEW YORK

Relative Flux

Tetrachloroethylene**

*Combined Phase 1
and Phase 2

Map Scale: 1" = 100'
Date: June 8, 1988

APPENDIX F

Organic Vapor Readings of Soil Samples from 1986 Test Boring Explorations

TABLE 2

SUMMARY OF HEADSPACE ANALYSIS
Building 209 Study
Xerox Corporation, Webster, New York

Boring ID	Sample Depth (ft)	OVM Reading (ppm)	Total$^{(1)}$ Volatile Organics (ppb)
B-1	0-2	0.4	
	2-4	14.5	
	4-6	4.1*	7
	6-8	0.5	
	8-10	1.7	
B-2	0-2	17.4	
	2-4	3.8	
	4-6	140	
	6-8	364	
	8-10	663*	320
	10-12	360	
B-3	0-2	1406*	829,000
	2-4	1020	
	4-6	821	
	6-8	910	
	8-10	520	
B-4	0-2	9.8	
	2-4	14.7	
	4-6	13.9	
	6-8	15.3	
	8-10	13.5	
	10-12	1885*	3,307,800
	12-14	1715	
	14-14.5	1799	
B-5	0-2	31.2	
	2-4	98.8	
	4-6	339*	519
	6-8	146	
	8-10	112	
B-6	0-2	0.9*	53
	2-4	0.3	
	4-6	0.3	519
	6-8	ND	
B-7	0-2	0.9	
	2-4	1.4*	ND$^{(2)}$
	4-6	1.3	
B-8	0-2	62.0	
	2-4	78.5	
	4-6	671	
	6-8	969*	631
	8-10	572	
B-9	0-2	36.2	
	2-4	86.1	
	4-6	109	
	6-8	864* →	No Data, Lab error
	8-10	270	
MW-1	0-2	0.9	
	2-4	19.8*	15
	4-6	2.3	
	6-8	1.6	
	8-10	1.3	
	10-12	0.8	
	12-14	2.8	
MW-2	0-2	896	
	2-4	1198*	682
	4-6	1062	
	6-8	1093	
	8-10	706	
	10-12	706	

TABLE 2 (Continued)

Boring ID	Sample Depth (ft)	OVM Reading (ppm)	Total (1) Volatile Organics (ppb)
MW-3	0-2	13.3	
	2-4	46.4	
	4-6	42.6	
	6-8	48.4*	165
	8-10	23.2	
MW-4	0-2	2.2	
	2-4	4.4	
	4-6	70.5	
	6-8	32.8	
	8-10	102.6*	962
MW-5	0-2	0.5	
	2-4	1.3*	3
	4-6	0.7	
	6-8	0.6	
	8-10	0.3	
MW-6	0-2	0.4	
	2-4	0.5	
	4-6	0.7	
	6-8	93	
	8-10	1.3 (?)	
	10-12	112	No sample analyzed
	12-14	20.5	
MW-7	0-2	4.2*	6
	2-4	1.2	
	4-6	1.1	
	6-8	0.2	
MW-10	0-2	0.2	
	2-4	0.3	
	4-6	0.4	
	6-8	1.0*	5
MW-11	0-2	45.0	
	2-4	57.0	
	4-6	85.5	
	6-8	5.8	
	8-10	393.5*	147
MW-12	0-2	ND	
	2-2.6	ND	
	2.6-3.2	0.2*	ND
	4-4.8	ND	
MW-13	0-2	ND	
	2-4	ND	
	4-6	1.0*	ND
	6-8	ND	
	8-10	0.1	
	10-12	0.6	
	12-12.2	ND	
MW-14	0-2	ND	
	2-4	ND	
	4-6	ND*	ND
	6-6.1	ND	
MW-15	0-2	ND	
	2-4	ND	
	4-6	ND*	ND
	6-7.4	ND	
	7.4-7.8	ND	
MW-16	0-2	1.4	
	2-4	1.1	
	4-5.5	1.5	
	5.5-7.5	1.4	
	7.5-8.8	1.7*	ND
MW-17	0-2	1.0	
	2-4	0.9	
	4-6	11.6*	ND
	6-8	1.1	
	8-8.5	5.4*	ND
	8.8-10.2	0.7	
MW-18	0-2	0.9	
	2-4	1.0	
	4-6	1.0	
	6-6.6	1.0	
	6.6-7.1	1.1*	ND
MW-19	0-2	7.3*	ND
	2-3.5	1.4	
	3.5-3.8	0.1	
	4-5.5	0.6	

* Selected for lab analysis
(1) 601/602 scan
(2) ND = None detected

TABLE E-1

SUMMARY OF HEADSPACE ANALYSIS
BUILDING 209 AQUIFER ANALYSIS
XEROX CORPORATION
WEBSTER, NEW YORK

Boring ID	Sample Depth (feet)	OVA Reading (ppm)	Total Volatile Organics (ppb)
MW-23	0 - 2	1	- -
	2 - 4	760	ND
	4 - 6	160	ND
	6 - 8A	12	
	6 - 8B	1.4	
	8 - 10A	1.0	
	8 - 10B	5	
MW-24	0 - 2	0.2	
	2.3 - 3.1	0.2	
	3.1 - 3.5	ND	ND
	4 - 6	ND	
	6 - 8	ND	
TW-1	0 - 2	0.6	
	2 - 4	210	ND
	4 - 5.5	26	
	5.5 - 6B	110	ND
	6 - 8	6	
	8 - 10	8	
TW-3	0 - 2	ND	
	2 - 4	1	
	4 - 6	6	
	6 - 8	10	379
	8 - 9.5A	3	
	9.5 - 9.9B	1	

APPENDIX G

Test Boring Exploration Logs

1986 Woodward-Clyde Soil Test Boring Logs

B-1 through B-9

LOG of BORING No. B-1

DATE: 4/23/86 **SURFACE ELEVATION:** 409 ± **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)1	OTHER TESTS	OTHER TESTS
0								
1		13			SC/GC	1		
2								
3		28	medium-dense becoming dense brown clayey silty fine SAND, trace coarse to fine gravel (POSSIBLE FILL)		SC/GC	ND (2)		
4								
5		140			SC/GC	ND		
6				403.0				
		100/5	very dense red-brown silty fine SAND with shale fragments (GLACIAL TILL)	402.1	SM/GM	ND		
7								
8			SHALE, red-brown, thin bedded, moderately to completely weathered and friable to silt					
9		160				ND		
10		*		399.0				
11								
12								
13								
14								
15								

* Auger refusal at 10
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

Completion Depth: 10 ft. Water Depth: 6.9 ft. Date: 4/23/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-1

LOG of BORING No. B-2

DATE: 4/24/86 SURFACE ELEVATION: 408 ± LOCATION: See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)¹	OTHER TESTS	OTHER TESTS
0	■							
1	■	14			SC	.5		
2	■							
3	■	30			SC/GC	.3		
4	■							
5	■	33	medium-dense becoming very dense red-brown clayey silty fine SAND, with gravel		SC	ND (2)		
6	■							
7	■	45	- trace gray shale fragments (GLACIAL TILL)		SC/GC	.2		
8	■							
9	■	44			SC/GC	ND		
10	■	100/3 *		397.5	SC/GC	ND		
11								
12								
13								
14								
15								

* Auger refusal at 10.5'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

Completion Depth: 10.5 ft. Water Depth: - ft. Date: 4/24/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-2

LOG of BORING No. B-3

DATE: 4/24/86 SURFACE ELEVATION: 408 ± LOCATION: See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0								
1		15			SM	50		
2								
3		42			SM/SP	50		
4			medium dense to dense brown silty fine SAND, trace gravel sized siltstone fragments					
5		27			SM/SP	5		
6								
7		47			SM/GM	5		
8								
9		75	- becoming very dense w/ green siltstone fragments at 10' (GLACIAL TILL)		SM/GM	5		
10		*		398.0				
11								
12								
13								
14								
15								

* Auger refusal at 10'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

Completion Depth: 10 ft. Water Depth: - ft. Date: 4/24/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-3

LOG of BORING No. B-4

DATE: 4/25/86 SURFACE ELEVATION: 408 ± LOCATION: See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)¹	OTHER TESTS	OTHER TESTS
0								
1		8			SC	ND (2)		
2			loose red-brown clayey fine SAND, trace silt, with some siltstone fragments (POSSIBLE FILL)					
3		2			SC	2.5		
4			- becoming very loose and moist to saturated					
5		2			SC	ND		
6								
7		64	- becoming very dense with yellow-green bands		SC	0.3		
8					GC	-		
9		100/3	- some gray shale fragments					
10								
11		22	- encountered black angular gravel seam w/ petroleum-type phase (diesel odor)		GC	450		
12			(GLACIOFLUVIAL)	396.0				
			very dense green-gray becoming red-brown clayey SILT, trace fine sand with angular gravel sized siltstone fragments - diesel odor (GLACIAL TILL)					
13		100/5			GC	-		
14		50/4		393.8	GC	140		
		*	* Auger refusal at 14.2' (1) Measured off split-spoon sampler (2) ND = None detected by OVM					
15								

Completion Depth: 14.2 ft. Water Depth: 5 ft. Date: 4/25/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-4

LOG of BORING No. B-5

DATE: 4/25/86 SURFACE ELEVATION: 406 ± LOCATION: See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)¹	OTHER TESTS	OTHER TESTS
0	■							
1	■	4			SC/GC	1.1		
2	■							
3	■	20	loose becoming medium-dense brown to red-brown clayey silty fine SAND, trace gravel sized rock fragments, moist		SM/GM	.5		
4	■							
5	■	20	- becoming saturated		SM/GM	ND (2)		
	■		(POSSIBLE FILL)	400.0				
6	■	70/3			SM/GM	ND		
7	■							
8	■	50/2	very dense gray silty fine SAND, trace clay with gray calcareous rock fragments (GLACIAL TILL)		SC/GC	3.2		
9	■			396.5				
		*						
10								
11								
12								
13								
14			* Auger refusal at 9.5' (1) Measured off split-spoon sampler (2) ND = None detected by OVM					
15								

Completion Depth: 9.5 ft. Water Depth: 5 ft. Date: 4/25/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-5

LOG of BORING No. B-6

DATE: 4/24/86 SURFACE ELEVATION: 407 ± LOCATION: See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0								
			TOPSOIL		ML			
1		11			SC	.3		
2								
3		5	loose to medium-dense red-brown silty fine SAND, trace clay		SM	.4		
4								
5		28	- trace gravel		SM/SP	ND (2)		
6								
7		40	- becoming dense		SM/SP	ND		
			(POSSIBLE FILL)	399.5				
			SILTSTONE, gray-green, severely to completely weathered, friable to silt	399.0				
8		*						
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 8'
(1) Measured off split-spoon sampler
(2) ND - None detected by OVM

Completion Depth: 8 ft. Water Depth: - ft. Date: 4/24/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-6

LOG of BORING No. B-7

DATE: 5/9/86 SURFACE ELEVATION: 406 ± LOCATION: See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0								
			TOPSOIL		ML			
1				405.0	SM/GM	ND (2)		
		27						
2								
3					SM/GM	ND		
		34						
4			medium-dense to dense red-brown gravelly silty coarse to fine SAND (FLUVIOGLACIAL)					
5					SM/GM	ND		
		33						
6								
		100/4			NR (3)	-		
7								
8				397.7				
		*						
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 8.3

(1) Measured off split-spoon sampler

(2) ND = None detected by OVM

(3) NR = No sample recovered

Completion Depth: 8.3 ft. Water Depth: - ft. Date: 5/9/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-7

LOG of BORING No. B-8

DATE: 5/12/86 **SURFACE ELEVATION:** 409.5 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)¹	OTHER TESTS	OTHER TESTS
0			CONCRETE FLOOR W/ GRAVEL SUBGRADE	408.5				
1		55			SM/GM	ND (2)		
3		125	very dense brown silty coarse to fine SAND, some gravel (POSSIBLE FILL)	405.1	SM/GM	ND		
5		65	very dense red-brown silty coarse to fine SAND, some gravel		SM/GM	158		
7		100/5	- trace gravel		SM/GM	150		
9		110	- with calcareous gravel sized rock fragments (GLACIAL TILL)	399.5	SM/GM	140		
10		*						
11								
12								
13								
14								
15								

* Auger refusal at 10'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

Completion Depth: 10 ft. Water Depth: - ft. Date: 5/12/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-8

LOG of BORING No. B-9

DATE: 5/12/86 SURFACE ELEVATION: 409.5 LOCATION: See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			CONCRETE FLOOR W/ GRAVEL SUBGRADE					
1		55		408.5				
					SM/GM	ND (2)		
2								
3		125	very dense brown coarse to fine SAND, some gravel (POSSIBLE FILL)		SM/GM	ND		
4								
5		65		404.5	SM/GM	2		
6								
7		160/11	very dense red-brown coarse to fine SAND, some gravel		SM/GM	3		
8								
9		110			SM/GM	2		
		*						
10			- with gray calcareous rock fragments (GLACIAL TILL)	399.5				
11								
12								
13								
14								
15								

* Auger refusal at 9.5'

(1) Measured off split-spoon sampler

(2) ND = None detected by OVM

Completion Depth: 10 ft. Water Depth: - ft. Date: 5/12/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-9

1986 Woodward-Clyde Test Boring Reports

MW-1 through MW-24
TW-1 through TW-4

LOG of BORING No. MW-1

DATE: 4/28/86 SURFACE ELEVATION: 407.8 LOCATION: See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			TOPSOIL	407.3	ML			
1		27			SM/GM	ND (2)		
2								
3		35			SM/GM	ND		
4			dense becoming very dense yellow-brown to red-brown silty medium to fine SAND with gray gravel sized rock fragments					
5		39	(GLACIOLACUSTRINE & GLACIOFLUVIAL)		SM/GM	ND		
6								
7		59			SM/GM	ND		
8								
9		54			SM/GM	ND		
10								
11		82		396.7	GM/SM	ND		
12			very dense gray fine sandy SILT, with friable calcareous rock fragments (GLACIAL TILL)					
13		64			GM/SM	ND		
14		*		393.8				
15			* Auger refusal at 14' (1) Measured off split-spoon sampler (2) ND = None detected by OVM CONTINUED ON NEXT PAGE					

Completion Depth: 22 ft. Water Depth: - ft. Date: 4/28/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-10A

LOG of BORING No. MW-1

DATE: 4/28/86 **SURFACE ELEVATION:** 407.8 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
13			SOIL DESCRIPTION ON PREVIOUS PAGE	393.8				
14		NX	CALCARENITE, gray, medium to fine grained, highly fractured, severely weathered	393.4			B	B
15		R1	CONGLOMERATE, red to gray, coarse grained, subrounded clasts (till?) fossiliferous, sparry and hematitic cement (KODAK SANDSTONE)	392.5			B	B
16		14-19'	SILTSTONE, red with some green mottled zones, fine grained, massive		93 (56)	62 (43)	1	
17							3	
18			- severely weathered at fractures 18 to 18.4'				3	
19			- moderately weathered 19 to 19.8'				1	
20		R2 19-22'			100 (36)	83 (30)	1	
21			(GRIMSBY FORMATION)				1	
22				385.8				
23								
24								
25								
26								
27								
28								

(B) Broken/Fragmented Rock Pieces < 2 - 4 inches

Completion Depth: 22 ft. Water Depth: - ft. Date: 4/28/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-10B

LOG of BORING No. MW-2

DATE: 5/6/86 **SURFACE ELEVATION:** 408.1 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)¹	OTHER TESTS	OTHER TESTS
0								
1		24			SM	2		
2			dense dark gray to brown silty coarse to fine SAND - trace black (shiney) carbon matrix at 2'					
3		44	- possible product? observed at 3' (POSSIBLE FILL)	404.8	SM	72		
4			dense to very dense red-brown silty medium to fine SAND with black inclusions to 6'					
5		33			SM	8		
6			- becoming saturated					
7		51	- with gravelly seams and both cross and laminar bedding (GLACIOFLUVIAL)		SM/GM	37		
8								
9		24			SM/GM	12		
10								
		65/3			SM/GM	5		
11								
		*		396.6				
12								
13								
14								
15								

* Auger refusal at 11.5'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 18.5 ft. Water Depth: 5 ft. Date: 5/6/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-11A

LOG of BORING No. MW-2

DATE: 5/6/86 SURFACE ELEVATION: 408.1 LOCATION: See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
10			SOIL DESCRIPTION ON PREVIOUS PAGE					
11				396.6				
12	■		CALCARENITE, gray, calcareous, fine grained, highly fractured, very severely weathered	396.0			B	B
13	■	NX R1 11.5 - 18.5'	CONGLOMERATE, red, hematitic cement, siltstone clasts, moderately weathered, severely fractured w/ clayey angular fragments in voids (till?) (KODAK SANDSTONE)	393.7	88 (74)	54 (46)	B	B
14	■						1	
15	■						0	
16	■		SILTSTONE, red with green mottling, fine grained, massive, moderately weathered, generally intact (GRIMSBY FORMATION)				0	
17	■						1	
18	■			389.6			0	
19								
20								
21								
22								
23								
24								
25								

(B) Broken/Fragmented Rock Pieces < 2 - 4 inches

Completion Depth: 18.5 ft. Water Depth: - ft. Date: 5/6/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-11B

LOG of BORING No. MW-3

DATE: 5/7/86 **SURFACE ELEVATION:** 407.5 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)¹	OTHER TESTS	OTHER TESTS
0								
1		62/3	Gravel at ground surface becoming very dense brown silty medium to fine SAND, trace gravel (FILL)		SM/GM	ND (2)		
2				405.1				
3		66			SM/GM	ND		
4			very dense red-brown gravelly silty coarse to fine SAND					
5		48			SM/GM	ND		
6								
7		88	- becoming saturated		SM/GM	ND		
8				399.3				
9		65/3	very dense gray gravelly coarse to fine SAND with red-brown sandy SILT seams and clasts (GLACIAL TILL)		SM/GM	ND		
10		*		397.5				
11								
12								
13								
14								
15								

* Auger refusal at 10'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 17 ft. Water Depth: 7 ft. Date: 5/7/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-12A

LOG of BORING No. MW-3

DATE: 5/7/86 SURFACE ELEVATION: 407.5 LOCATION: See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
9			SOIL DESCRIPTION ON PREVIOUS PAGE					
10			CALCARENITE, green-gray, medium to fine grained, severely weathered, highly fractured to 14.5' w/ a clayey zone of angular rock fragment (till?)	397.5			B	B
11		NX			93	34	B	B
12		R1 10-17'	- severely weathered to 12.6'		(78)	(29)	5	
13			- weathering moderately severe to 13.6'				4	
14			CONGLOMERATE, red to gray, coarse to fine grained, w/ clayey rock fragment seams (till?) (KODAK SANDSTONE)	393.5 393.2			2	
15			SILTSTONE, red with green mottling, massive, fine grained, intact w/ a high angle fracture at 14.2' (GRIMSBY FORMATION)				0	
16							0	
17				390.5				
18								
19								
20								
21								
22								
23								
24								

(B) Broken/Fragmented Rock
Pieces < 2 - 4 inches

Completion Depth: 17 ft. Water Depth: - ft. Date: 5/7/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-12B

LOG of BORING No. MW-3I

DATE: 10/1/86 **SURFACE ELEVATION:** 406.9 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
11			SOIL DESCRIPTION ON FIGURE A-12B RAN TRICONE TO 12'					
12			CALCARENITE, gray, fine grained, highly fractured, fossiliferous, w/ clayey zone of rock fragments (till?)	394.9			B	B
13		NX R1	CONGLOMERATE, gray, coarse grained, very thinly bedded w/ black phosphate pebbles, sparry cement (KODAK SANDSTONE)	393.9	94 (90)	61 (59)	B	B
14		12-20'	SILTSTONE, red with green mottling, fine grained, thin to thick bedded, weathered along horizontal fractures w/ calcareous zone 13.4 to 14.8'	393.6			2	
15							1	
16			- very soft (completely weathered to clayey silt) 16.8 to 17.1'				1	
17							1	
18			- weathered fractures, partially friable				2	
19			- fractures moderately to severely weathered 19.1 to 19.5'				3	
20							4	
21		R2 20-24'	- very soft zone (completely weathered to a clayey silt); 21.8 to 22.5'		79 (38)	50 (24)	1	
22							0	
23							3	
24			- core barrel jam at 24' (lost core?) ream to 25'				?	
25		R3 25-30'	- becoming intact (Continued on next page)		95 (57)	89 (54)	0	
26								

Completion Depth: 30 ft. Water Depth: - ft. Date: 10/2/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-13B

LOG of BORING No. MW-3I

DATE: 10/1/86 SURFACE ELEVATION: 406.9 LOCATION: See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
26			(Continued from previous page)				0	
27							0	
28			- weathered zone 28.1-28.6' (GRIMSBY FORMATION)				3	
29							0	
30				376.9				
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								

(B) Broken/Fragmented Rock
Pieces < 2 - 4 inches

Completion Depth: 30 ft. Water Depth: - ft. Date: 10/2/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-13B

LOG of BORING No. MW-3D

DATE: 10/2/86 **SURFACE ELEVATION:** 406.9 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
10			SOIL DESCRIPTION ON FIGURE A-12B RAN TRICONE TO 11'	395.9				
11		NX R1 11-19'	CALCARENITE, gray, fine grained, highly fractured, fossiliferous, w/ clayey zone of rock fragments (till?)		91 (87)	65 (62)	B	B
12			CONGLOMERATE, gray, coarse grained, very thinly bedded w/ black phosphate pebbles, sparry cement (KODAK SANDSTONE)	394.6			4	
13			SILTSTONE, red with green mottling, fine grained, thin to thick bedded, weathered along horizontal fractures w/ calcareous zones to ~24.5'	394.2			1	
14							1	
15			- very soft (completely weathered to clayey silt) ~15.7 to 15.8'				3	
16							0	
17			- swirly bedding observed				1	
18			- very soft (completely weathered to clayey silt) 18 to 18.2'				3	
19		R2 19-29'			98 (118)	67 (80)	B	B
20							0	
21			- very soft w/ very severe to completely weathered zone (~21.3 to 23')				2	
22							0	
23							1	
24			- becoming very hard and intact to ~29'				0	
25								

(Continued on next page)

Completion Depth: 40 ft. Water Depth: - ft. Date: 10/3/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-14B

LOG of BORING No. MW-3D

DATE: 10/2/86 SURFACE ELEVATION: 406.9 LOCATION: See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
25			(Continued from previous page)				0	
26			- hard, intact, thin to thick bedded w/ very thin argillaceous seams				0	
27							0	
28							0	
29		R3 29-35'	- very severe to completely weathered zone (29.6 to 30')		99 (71)	58 (42)	2	
30							1	
31			- moderate to moderately severe weathering along fractures 30.9 to 31.9 ', cross and swirly bedding from ~31 to 31.5'				6	
32			- becoming very hard and intact - w/ green, fine grained, sparry, seams 32.1 to 32.2' and 33.2 to 33.4'				0	
33							0	
34			- swirly bedding from 34.2 to 34.6'				0	
35		R4 35-40'			100 (60)	97 (58)	0	
36							0	
37			(GRIMSBY FORMATION)				1	
38							0	
39			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches				1	
40				366.9				

Completion Depth: 40 ft. Water Depth: - ft. Date: 10/3/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-14B

LOG of BORING No. MW-4

DATE: 5/2/86 **SURFACE ELEVATION:** 406.2 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			TOPSOIL		ML			
1		13		405.2	SM	ND (2)		
2								
3		37			SM/GM	ND		
4								
5		50	dense to very dense brown becoming red-brown silty coarse to fine SAND with gravel sized rock fragments		SM/GM	ND		
6								
		100/5			SM/GM	ND		
7								
8								
9		117	very dense gray to brown calcareous silty coarse to fine SAND and friable rock fragments (GLACIAL TILL)	397.3	GM/SM	ND		
10		*		396.4				
11								
12								
13								
14								
15								

* Auger refusal at 9.9'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 16.9 ft. Water Depth: - ft. Date: 5/2/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-15A

LOG of BORING No. MW-4

DATE: 5/2/86 **SURFACE ELEVATION:** 406.2 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
9			SOIL DESCRIPTION ON PREVIOUS PAGE	396.3				
10		NX	CALCARENITE, blue-gray, fine grained, highly fractured, severely weathered, w/ gray clayey zones of angular rock fragments (till?), fossiliferous				B	B
11		R1 9.9 - 16.9'			100 (84)	66 (55)	B	B
12			- severely weathered	393.7			2	
13			CONGLOMERATE, green, coarse grained subrounded to rounded clasts, fossiliferous, sparry matrix (KODAK SANDSTONE)	393.1			0	
14							0	
15			SILTSTONE, Green passing to red, with green mottling, massive, fine grained, intact (GRIMSBY FORMATION)				0	
16				389.3			0	
17								
18								
19								
20								
21								
22								
23								
24								

(B) Broken/Fragmented Rock
Pieces < 2 - 4 inches

Completion Depth: 16.9 ft. Water Depth: - ft. Date: 5/2/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-15B

LOG of BORING No. MW-5

DATE: 5/1/86 **SURFACE ELEVATION:** 406.6 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0								
			TOPSOIL		ML			
1		46		405.6	SM	ND (2)		
2								
3		35	very dense brown to red-brown silty medium to fine SAND, trace gravel		SM/GM	ND		
4			- becoming saturated					
5		33	-increasing gravel sized fragments		SM/GM	ND		
6								
7		92			SM/GM	ND		
8								
		50/3	- with silty SAND seams (GLACIOFLUVIAL)		SM/GM	ND		
9		*		397.3				
10								
11								
12								
13								
14								
15								

* Auger refusal at 9.3'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 16.8 ft. Water Depth: 4 ft. Date: 5/1/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-16A

LOG of BORING No. MW-5

DATE: 5/1/86 **SURFACE ELEVATION:** 406.6 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			SOIL DESCRIPTION ON PREVIOUS PAGE					
9				397.3				
10		NX	CALCARENITE, green-gray, medium to fine grained, interbedded by thin dark gray argillaceous seams, highly fractured, w/ clayey angular fragments in fractures (till?), fossiliferous				B	B
11		R1 9.3- 13.7'			73 (38)	0 (0)	B	B
12			CONGLOMERATE, gray, coarse grained, severely fractured, w/ fine subrounded siltstone clasts and clayey angular fragments 12.7-13.7' (till?) (KODAK SANDSTONE)	394.8			B	B
13							B	B
14			SILTSTONE, red, w/ occasional green mottling, fine grained, massive, w/ high angle fracture at 14', becoming intact (GRIMSBY FORMATION)	392.8			2	
15		R2 13.7- 16.8'			100 (38)	95 (36)	0	
16							0	
17				389.8				
18								
19								
20								
21								
22								
23								

(B) Broken/Fragmented Rock
Pieces < 2 - 4 inches

Completion Depth: 16.8 ft. Water Depth: - ft. Date: 5/1/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-6

DATE: 5/5/86 **SURFACE ELEVATION:** 406.0 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)1	OTHER TESTS	OTHER TESTS
0			TOPSOIL	405.3	ML			
1		10			SM	ND (2)		
3		7			SM	ND		
5		27	medium-dense becoming very dense brown to red-brown silty fine SAND /fine sandy SILT, some gravel sized rock fragments		SM/GM	ND		
7		120/10			SM/GM	.5		
8		50/2			SM/GM	.5		
11		137	very dense gray calcareous silty fine SAND, trace clay, trace gravel sized rock fragments (GLACIAL TILL)	395.2	SM/GM	ND		
12		50/1		394.0	GM/SM	.5		

* Auger refusal at 12'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

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Completion Depth: 19 ft. Water Depth: - ft. Date: 5/5/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-17A

LOG of BORING No. MW-6

DATE: 5/5/86 **SURFACE ELEVATION:** 406.0 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
11			SOIL DESCRIPTION ON PREVIOUS PAGE	394.0				
12			CALCARENITE, gray, medium to fine grained, highly fractured, trace fossils	393.5			B	B
13		NX R1	CONGLOMERATE, red to gray, coarse, rounded red and green clasts (till?) sparry cement (KODAK SANDSTONE)	392.8	79 (79)	61 (61)	1	
14		12-19'	SILTSTONE, red w/ green mottling, fine grained, thin to thick bedded, occasional argillaceous seams				0	
15							0	
16			- becoming severely to completely weathered, friable to silt (16 - 18')				2	
17								
18			- core jammed in barrel, mechanically broken when extruded (GRIMSBY FORMATION)	387.0			B	B
19								
20								
21								
22								
23								
24								
25								
26								

(B) Broken/Fragmented Rock
Pieces < 2 - 4 inches

Completion Depth: 19 ft. Water Depth: - ft. Date: 5/5/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-17B

LOG of BORING No. MW-7

DATE: 4/30/86 **SURFACE ELEVATION:** 406.9 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			TOPSOIL	406.4	ML			
1		21			SM/GM	ND (2)		
2								
3		14	medium-dense becoming dense brwon to red-brown silty medium to fine SAND, trace gravel		SM/GM	ND		
4			- becoming saturated					
5		38	(GLACIOFLUVIAL)		SM	ND		
6								
7		64	very dense gray calcareous sandy SILT with rock fragments (GLACIAL TILL)	400.1	SM/GM	ND		
8		*		398.8				
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 8'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 15 ft. Water Depth: 4.5 ft. Date: 4/30/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-18A

LOG of BORING No. MW-7

DATE: 4/30/86 **SURFACE ELEVATION:** 406.9 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
7			SOIL DESCRIPTION ON PREVIOUS PAGE	398.9				
8 9 10 11		NX R1 8 - 12.5'	CALCARENITE, blue to green-gray, highly fractured w/ clayey zones of angular rock fragments filling fractures (till?), medium to fine grained, thinly bedded and interbedded by dark gray argillaceous seams	395.1	74 (40)	0 (0)	B B B B	B B B B
12			CONGLOMERATE, gray, coarse to fine clastic material (till?), sparry matrix (KODAK SANDSTONE)	394.4			0	
13 14		R2 12.5- 15'	SILTSTONE, red w/ occasional green motteling, massive, intact, w/ trace shaley seams (GRIMSBY FORMATION)	391.9	100 (30)	92 (28)	0 0	
15 16 17 18 19 20 21 22			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					

Completion Depth: 15 ft. Water Depth: - ft. Date: 4/30/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-18B

LOG of BORING No. MW-10

DATE: 5/8/86 **SURFACE ELEVATION:** 409.2 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			TOPSOIL	408.4	ML			
1		42			SM/GM	ND (2)		
2								
3		36			SM/GM	ND		
4			very dense red-brown gravelly silty coarse to fine SAND					
5		37			SM/GM	ND		
6			- trace gravel (GLACIOFLUVIAL & GLACIOLACUSTRINE)					
7		50			SM	ND		
8		*		401.1				
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 8.1'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

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Completion Depth: 15.1 ft. Water Depth: 8 ft. Date: 5/8/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-10

DATE: 5/8/86 **SURFACE ELEVATION:** 409.2 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
7			SOIL DESCRIPTION ON PREVIOUS PAGE					
8				401.1				
9		NX R1 8.1- 15.1'	CALCARENITE, gray, medium to fine grained, interbedded by argillaceous seams, highly fossiliferous, fractured along bedding planes, severely weathered at joints, trace small vugs - severely weathered to 13' - moderately weathered to 15' (KODAK SANDSTONE)		89 (75)	49 (41)	B B 2 2 4 2 1	B B
15				394.1				
16								
17								
18								
19								
20								
21								
22			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					

Completion Depth: 15.1 ft. Water Depth: - ft. Date: 5/8/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-19B

LOG of BORING No. MW-11

DATE: 5/9/86 **SURFACE ELEVATION:** 409.5 **LOCATION:** See Figure 2

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0	■		CONCRETE FLOOR W/ GRAVEL SUBGRADE	408.5	ML			
1	■	75			SM/GM	ND (2)		
2	■	130/10	very dense brown to red-brown gravelly silty coarse to fine SAND					
3	■				SM/GM	ND		
4	■							
5	■	110	- with calcareous rock fragments		SM/GM	1		
6	■							
7	■	140	- trace gravel		SM	1		
8	■	100/2 *	(GLACIAL TILL)	400.8	SM	7		
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 8.7'

(1) Measured off split-spoon sampler

(2) ND = None detected by OVM

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Completion Depth: 15.7 ft. Water Depth: - ft. Date: 5/9/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-20A

LOG of BORING No. MW-11

DATE: 5/9/86 SURFACE ELEVATION: 409.5 LOCATION: See Figure 2

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8								
			SOIL DESCRIPTION ON PREVIOUS PAGE	400.8				
9		NX	CALCARENITE, gray, medium to fine grained, highly fractured w/ fractures retaining clayey zones of angular rock fragments (till?), weathered, fossiliferous				B	B
10		R1 8.7-					B	B
11		11.7'		398.0	92	43	B	B
12		R2	CONGLOMERATE, red to gray, coarse, hematitic cement, clayey subrounded to rounded clasts filling fractures (till?) (KODAK SANDSTONE)		(77)	(36)	B	B
				396.7				
13		11.7- 15.7'	SILTSTONE, red w/ green mottling, fine grained, thin to thick bedded occasionally interbedded by argillaceous seams, intact (GRIMSBY FORMATION)				0	
14							0	
15							0	
				393.8				
16								
17								
18								
19								
20								
21								
22								
23								

(B) Broken/Fragmented Rock Pieces < 2 - 4 inches

Completion Depth: 15.7 ft. Water Depth: - ft. Date: 5/9/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-20B

LOG of BORING No. MW-12

DATE: 9/12/86 **SURFACE ELEVATION:** 407.7 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)^1	OTHER TESTS	OTHER TESTS
0								
	■	100/6	Asphalt (2'') and gravel subgrade	407.0	GW			
1			very dense red-brown silty fine SAND		SM	ND (2)		
2	■			405.1				
3	■	52			SC/GC	ND		
4	■	100/4			GC/SC	ND		
5			very dense gray calcareous gravelly sandy SILT, trace clay (GLACIAL TILL)					
6		*		401.5				
7								
8								
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 6.2'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

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Completion Depth: 13.2 ft. Water Depth: - ft. Date: 9/15/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-21A

LOG of BORING No. MW-12

DATE: 9/12/86 **SURFACE ELEVATION:** 407.7 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
5			SOIL DESCRIPTION ON PREVIOUS PAGE					
6				401.5				
7		NX R1 6.2 - 13.2'	SANDSTONE, green, fine grained, severely fractured, hematitic staining along fractures, sparry, becoming a				6	
8							2	
9				398.6			0	
10			SILTSTONE, red, fine grained, moderate to complete (weathered to silt/clayey silt) weathering along fractures, severely fractured (GRIMSBY FORMATION)		72 (60)	45 (38)	B	B
11							6	
12							B	B
13				394.5			B	B
14								
15								
16								
17								
18								
19								
20								

(B) Broken/Fragmented Rock Pieces < 2 - 4 inches

Completion Depth: 13.2 ft. Water Depth: - ft. Date: 9/15/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-21B

LOG of BORING No. MW-13

DATE: 9/8/86 **SURFACE ELEVATION:** 407.9 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			TOPSOIL	407.5	ML			
1		77			SM/GM	ND (2)		
2								
3		38			SM/GM	ND		
4			very dense red-brown silty coarse to fine SAND, trace calcareous gravel fragments (GLACIAL TILL)					
5		33			SM/GM	ND		
6				401.9				
7		4			SC	ND		
8			soft red-brown clayey SILT, trace coarse to fine sand, moist (GLACIOLACUSTRINE & GLACIOFLUVIAL)					
9		9			SC	ND		
10				397.9				
11		13	medium-dense silty medium to fine SAND, trace gravel sized rock fragments (GLACIOFLUVIAL)		SM/GM	ND		
12		80/2 *		395.5	GM	ND		
13								
14								
15			* Auger refusal at 12.4' (1) Measured off split-spoon sampler (2) ND = None detected by OVM CONTINUED ON NEXT PAGE					

Completion Depth: 19.4 ft. Water Depth: - ft. Date: 9/8/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-22A

LOG of BORING No. MW-13

DATE: 9/8/86 **SURFACE ELEVATION:** 407.9 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
11			SOIL DESCRIPTION ON PREVIOUS PAGE					
12				395.5				
13		NX	SILTSTONE, red w/ green mottled zones, moderately fractured, severely to completely (weathered to a silt) weathered along fractures, thin to thick bedded				3	
14		R1 12.4 - 19.4'	- thinly bedded, severely fractured, slightly calcareous 13.9 to 15.3'				4	
15					99 (83)	58 (49)	9	
16			gray-green sparry zone, shaley inclusions/16.4-16.5'				3	
17			- thinly bedded, fractured, slightly calcareous 17.2 to 19.4'				0	
18			gray-green sparry zone, shaley inclusions/17.9-18.2' (GRIMSBY FORMATION)				3	
19				388.5			5	
20								
21								
22								
23								
24								
25								
26			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					

Completion Depth: 19.4 ft. Water Depth: - ft. Date: 9/8/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-22B

LOG of BORING No. MW-14

DATE: 9/4/86 SURFACE ELEVATION: 405.3 LOCATION: See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			TOPSOIL	404.9	ML			
1		21	dense red-brown silty coarse to fine SAND, trace clay, trace gravel sized sandstone fragments (GLACIAL TILL)		SM/GM	ND (2)		
2								
3		38			SM/GM	ND		
4								
5		26			SM/GM	ND		
6		100/1 *		399.2				
7								
8								
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 6.1'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

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Completion Depth: 13.1 ft. Water Depth: - ft. Date: 9/5/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-23A

LOG of BORING No. MW-14

DATE: 9/4/86 **SURFACE ELEVATION:** 405.3 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
5								
			SOIL DESCRIPTION ON PREVIOUS PAGE					
6				399.2				
			CONGLOMERATE, gray to red, coarse to fine grained, severely fractured, weathered (KODAK SANDSTONE)				B	B
7		NX		398.7				
		R1	SANDSTONE, green, medium to fine grained, sparry, becoming a	398.2			4	
8		6.1-						
		13.1'	SILTSTONE, red w/ green mottled zones, fractured, moderately weathered at fractures				1	
9					90	79		
					(76)	(66)	4	
10								
							2	
11			- becoming intact 10.9' to end of core run (GRIMSBY FORMATION)					
							0	
12								
							0	
13				392.2				
14								
15								
16								
17								
18								
19								
20								

(B) Broken/Fragmented Rock Pieces < 2 - 4 inches

Completion Depth: 13.1 ft. Water Depth: - ft. Date: 9/5/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-15

DATE: 9/3/86 **SURFACE ELEVATION:** 403.5 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			TOPSOIL	403.0	ML			
1		8			SM	ND (2)		
2								
3		12	medium-dense becoming very dense red-brown silty coarse to fine SAND, trace gravel		SM	ND		
4			(GLACIAL TILL)					
5		34			SM/GM	ND		
6								
7		123/10		396.5	SM/GM	ND		
8		100/5	very dense gray calcareous sandy GRAVEL (DECOMPOSED BEDROCK)		GM	ND		
9		*		394.7				
10								
11								
12								
13								
14								
15								

* Auger refusal at 8.8'

(1) Measured off split-spoon sampler

(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 14.8 ft. Water Depth: - ft. Date: 9/4/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-24A

LOG of BORING No. MW-15

DATE: 9/3/86 **SURFACE ELEVATION:** 403.5 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			SOIL DESCRIPTION ON PREVIOUS PAGE	394.7				
9		NX	CALCARENITE/CONGLOMERATE, gray, broken with clayey angular fragments filling fractures (till?) (KODAK SANDSTONE)	393.4			B	B
10		R1 8.8- 11.8'	SILTSTONE, red, fractured, moderate to complete (fractures filled w/ clayey silt & friable fragments) weathering along fractures		81 (29)	75 (27)	1	
11							1	
12		R2 11.8- 14.8'	- severely weathered, fractured, and calcareous zone (12.6-13.8')				3	
13			(GRIMSBY FORMATION)		61 (22)	50 (18)	B	B
14				388.7			2	
15								
16								
17								
18								
19								
20								
21								
22			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					
23								

Completion Depth: 14.8 ft. Water Depth: - ft. Date: 9/4/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-24B

LOG of BORING No. MW-16

DATE: 9/16/86 **SURFACE ELEVATION:** 407.7 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)[1]	OTHER TESTS	OTHER TESTS
0			TOPSOIL	407.0	ML			
1		20			SM	ND 2		
2								
3		49	dense silty coarse to fine SAND, trace gravel sized rock fragments		SM/GM	ND		
4								
5				402.7				
		143	very dense gray silty coarse to fine SAND and gravel sized calcareous rock fragments (GLACIAL TILL)		GM/SM	ND		
6								
		109			GM/SM	ND		
7								
8				399.4				
		144/10	completely fractured, very severely weathered calcareous SANDSTONE fragments (DECOMPOSED BEDROCK)		GM	ND		
		*		398.9				
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 8.8'

(1) Measured off split-spoon sampler

(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 15.3 ft. Water Depth: - ft. Date: 9/16/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-16

DATE: 9/16/86 **SURFACE ELEVATION:** 407.7 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			SOIL DESCRIPTION ON PREVIOUS PAGE	398.9				
9		NX					B	B
10		R1 8.8- 15.3'*	CALCARENITE, gray to white, medium to fine grained, highly fractured, complete weathering (clayey silt seams) along fractures, thinly bedded w/ dark gray argillaceous seams** (KODAK SANDSTONE)				B	B
11					45 (35)	0 (0)	B	B
12							B	B
13							B	B
14							B	B
15				392.4				
16								
17								
18								
19								
20			* terminated run @ 6.5' due to core bit wear/replaced for next run					
21			** lost core water @ 3', 4-5'					
22			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					
23								

Completion Depth: 15.3 ft. Water Depth: - ft. Date: 9/16/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-25B

LOG of BORING No. MW-17

DATE: 9/16/86 **SURFACE ELEVATION:** 409.3 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)¹	OTHER TESTS	OTHER TESTS
0			TOPSOIL	409.0	ML			
1		20			SM	ND 2		
2								
3		29	medium-dense to dense red-brown silty coarse to medium SAND, trace gravel		SM	ND		
4								
5		15	- becoming gray, trace clay (POSSIBLE FILL)		SC	ND		
6				403.3				
7		104			GM	ND		
8		100/6	very dense gray calcareous silty fine SAND, some calcareous gravel sized rock fragments (GLACIAL TILL)		GM	ND		
9		126/10			GM	ND		
10		*		399.1				
11								
12								
13								
14								
15								

* Auger refusal at 10.2'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 17.2 ft. Water Depth: - ft. Date: 9/17/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-26A

LOG of BORING No. MW-17

DATE: 9/16/86 **SURFACE ELEVATION:** 409.3 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
9			SOIL DESCRIPTION ON PREVIOUS PAGE					
10				399.1			B	B
11		NX R1	CALCARENITE, gray, medium to fine grained, clayey zone of angular rock fragments filling fractures (till?) interbedded by argillaceous seams				B	B
12		10.2- 17.2'	CONGLOMERATE, gray to red, fractured w/ sparry and hematitic cement	397.3			2	
			(KODAK SANDSTONE)	396.7				
13			SANDSTONE, green, medium to fine grained, sparry becoming a	396.3	85 (71)	61 (51)	0	
14			SILTSTONE, red, massive, intact to 16', fine grained				0	
15							0	
16			- severely weathered along fractures (GRIMSBY FORMATION)				3	
17				392.1				
18								
19								
20								
21								
22								
23			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					
24								

Completion Depth: 17.2 ft. Water Depth: - ft. Date: 9/17/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-26B

LOG of BORING No. MW-17I

DATE: 9/19/86 SURFACE ELEVATION: 408.1 LOCATION: See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
7			SOIL DESCRIPTION ON FIGURE A-26A RAN TRICONE TO 8.1'					
8				400.0				
							B	B
9		NX R1			48 (35)	22 (16)	B	B
10		8.1- 14.1'	CALCARENITE, gray, medium to fine grained, clayey zone of angular rock fragments filling fractures (till?) interbedded by argillaceous seams, fossiliferous				B	B
11							B	B
12				396.0				
			CONGLOMERATE, gray to red, fractured w/ sparry and hematitic cement (KODAK SANDSTONE)				5	
13				395.4				
			SANDSTONE, green, medium to fine grained, sparry becoming a				0	
14				394.0				
			SILTSTONE, red with green mottling/ layering, thick bedded to 15' becoming thin to thick bedded		94 (102)	52 (56)	1	
15		R2 14.1- 23.1'	- severely to moderately weathered along fractures from 15 to 24'				1	
16							6	
17							4	
18							2	
19							2	
20							2	
21			(Continued on next page)				2	
22								

Completion Depth: 30.1 ft. Water Depth: - ft. Date: 9/25/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-27B

LOG of BORING No. MW-17I

DATE: 9/19/86 SURFACE ELEVATION: 408.1 LOCATION: See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
22			(Continued from previous page)				5	
23			- becoming calcareous and fractures exhibiting very severe weathering (friable along fractures), vertical fracture at 23.4', swirly bedding at ~22.3' and 23.4 to 23.6'		75 (18)	19 (5)	3	
24		R3 23.1- 25.1'					2	
25			- becoming intact		93 (56)	83 (50)	0	
26		R4 25.1- 30.1'					0	
27							1	
28			- w/ weathered zone ~27.9 to 28.1' and swirly bedding from ~28.1 to 29.3'				1	
29			(GRIMSBY FORMATION)				0	
30				378.0				
31								
32								
33								
34								
35								
36			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					
37								

Completion Depth: 30.1 ft. Water Depth: - ft. Date: 9/25/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-27B

LOG of BORING No. MW-17D

DATE: 9/23/86 **SURFACE ELEVATION:** 408.1 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			SOIL DESCRIPTION ON FIGURE A-26A RAN TRICONE TO 9'					
9				399.1				
		NX			46 (22)	0 (0)	B	B
10		R1 9-13'						
			CALCARENITE, gray, medium to fine grained, clayey zone of angular rock fragments filling fractures (till?) interbedded by argillaceous seams, fossiliferous				B	B
11								
							B	B
12								
							B	B
13				395.1				
		R2 13-18'	SILTSTONE, red with green mottling/ layering, fine grained, thin to thick bedded		97 (58)	87 (52)	0	
14								
							0	
15								
							0	
16								
							2	
17			- severely to moderately weathered along fractures from ~16.8 to 17.2'					
							2	
18								
		R3 18-28'			95 (114)	45 (54)	3	
19								
							4	
20								
							2	
21								
			- very severely weathered/fractured zone 21 to 22' (partially friable) and very thinly bedded w/ argillaceous seams				8	
22								
							2	
23			(Continued on next page)					

Completion Depth: 40 ft. Water Depth: - ft. Date: 9/25/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-17D

DATE: 9/23/86 **SURFACE ELEVATION:** 408.1 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
23			(Continued from previous page)				3	
24			- thinly bedded w/ argillaceous seams to ~25'				4	
25							1	
26							0	
27							0	
28		R4 28-35'			95 (80)	71 (60)	2	
29							3	
30			- very thinly bedded to 31' (fractures appear to be mechanical)				0	
31			- swirly and cross-bedding from 31.5 to 35'				0	
32							0	
33							0	
34			- calcareous, broken, and completely weathered (to clayey silt) along fractures (~34 to 35')				B	B
35		R5 35-40'			98 (59)	76 (46)	1	
36							1	
37			- weathered at fractures w/ fractures being partially friable (~36.8 to 37'; ~37.3 to 37.5') (Continued on next page)				2	
38								

Completion Depth: 40 ft. Water Depth: - ft. Date: 9/25/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-17D

DATE: 9/23/86 **SURFACE ELEVATION:** 408.1 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
38	■		(Continued from previous page) - fractures weathered and friable to a clayey silt/silty clay (~38.4 to 39')				3	
39	■		(GRIMSBY FORMATION)				0	
40				368.1				
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53								

(B) Broken/Fragmented Rock Pieces < 2 - 4 inches

Completion Depth: 40 ft. Water Depth: - ft. Date: 9/25/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-28B

LOG of BORING No. MW-18

DATE: 9/17/86 **SURFACE ELEVATION:** 407.4 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
6			SOIL DESCRIPTION ON PREVIOUS PAGE					
7				400.1				
8		NX R1	CALCARENITE, gray, medium to fine grained, thinly bedded, highly fractured, clayey zones of angular fragments (till?) filling fractures to 8.3'				B	B
9		7.3- 14.3'	CONGLOMERATE, gray to red with zones of clayey subrounded clasts (till?) filling fractures (KODAK SANDSTONE)	398.4			1	
10			SILTSTONE, green, medium to fine grained, sparry w/ hematitic stains, becoming a	397.9	54	36	1	
11			SILTSTONE, red, fine grained, weathered along fractures, calcareous	396.9	(45)	(30)	3	
12			- becoming highly fractured and weathered to 14.3'				B	B
13			(GRIMSBY FORMATION)				B	B
14				393.1			?	?
15								
16			* No drill water returning from 13.3 to 14.3'					
17								
18								
19								
20			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					
21								

Completion Depth: 14.3 ft. Water Depth: - ft. Date: 9/17/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-29B

LOG of BORING No. MW-18

DATE: 9/17/86 **SURFACE ELEVATION:** 407.4 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)¹	OTHER TESTS	OTHER TESTS
0			TOPSOIL	406.9	ML			
1		36			SM/GM	ND (2)		
2			dense brown to dark gray gravelly silty fine SAND (POSSIBLE FILL)					
3		41			SM/GM	ND		
4				402.9				
5		76	very dense red-brown gravelly silty coarse to fine SAND		SM/GM	ND		
6		174/7		400.9				
7		*	very dense gray calcareous silty coarse to fine SAND, trace clay (GLACIAL TILL)	400.1	SM/GC	ND		
8								
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 7.3'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 14.3 ft. Water Depth: - ft. Date: 9/17/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-18I

DATE: 9/30/86 **SURFACE ELEVATION:** 407.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
10			SOIL DESCRIPTION ON FIGURE A-26A GROUND TRICONE TO 11.2					
11				396.6				
			CONGLOMERATE, gray to red with zones of clayey subrounded clasts (till?) filling fractures (KODAK SANDSTONE)					
12		NX		395.8	91 (88)	41 (39)	B	B
		R1	SANDSTONE, green, medium to fine grained, sparry w/ hematitic stains, becoming a					
13		11.2- -19.2'					B	B
			SILTSTONE, red, fine grained, weathered along fractures, calcareous	394.1				
14							2	
15							1	
16							1	
17			- 17.2 to 17.8' is moderately to severely weathered zone (partially friable)				2	
18							0	
19			- reamed through 19.2 to 19.6'				0	
20							2	
		R2	- 20.5 to 20.8 is moderately weathered along fractures					
21		19.6- 25'			96 (58)	30 (18)	2	
22							3	
			- very severely weathered zone (22.5 to 22.6) partially friable					
23							5	
24							4	
25			(Continued on next page)				0	

Completion Depth: 30 ft. Water Depth: - ft. Date: 10/3/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-30B

LOG of BORING No. MW-18I

DATE: 9/30/86 **SURFACE ELEVATION:** 407.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
25			(Continued from previous page)					
26		R3 25-30'	- 25 to 26.1' is hard, green, fine grained, sandstone layer		77 (46)	57 (34)	0	
27							2	
28							0	
29			- moderately to severely weathered along fractures 28.5 to 29' - unable to recover 29.2 to 30'				4	
30			(GRIMSBY FORMATION)	377.8			?	
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

(B) Broken/Fragmented Rock Pieces < 2 - 4 inches

Completion Depth: 30 ft. Water Depth: - ft. Date: 10/3/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-30B

LOG of BORING No. MW-18D

DATE: 9/25/86 **SURFACE ELEVATION:** 407.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			SOIL DESCRIPTION ON FIGURE A-26A GROUND TRICONE TO 9'					
9				398.8				
10		NX R1	CALCARENITE, gray, fine grained, highly fractured/completely weathered?, very poor recovery/washout to 12'?		50 (30)	28 (17)	? ?	? ?
			- losing core water 10 to 12'				?	?
11		9-14'	- coring very soft/seamy to 12' (core water white to ~10' becoming red turning gray @ ~10.5 to ~12.5')				?	?
12			CONGLOMERATE, gray, coarse to fine grained w/ black phosphate pebbles	396.0				
			SANDSTONE, green, medium to fine grained, sparry cement becoming a	395.6			1	
13			SILTSTONE, red, fine grained, very severely weathered along fractures 16 to 17' (partially friable to silt), thin to thick bedded w/ softer shaley seams, interbedded by green seams/inclusions	395.0			1	
14		R2			100	63	0	
15		14-23'			(108)	(68)		
16							1	
17							3	
18							1	
19							1	
20			- severely weathered fractures from 20 to 22' (partially to completely friable), calcareous to 22'				2	
21							2	
22							4	
23			(Continued on next page)				1	

Completion Depth: 40 ft. Water Depth: - ft. Date: 10/3/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-31B

LOG of BORING No. MW-18D

DATE: 9/25/86 **SURFACE ELEVATION:** 407.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
23			(Continued from previous page)					
		R3 23- 28.2'	- very thinly bedded 23 to 24.5' (fractures appear to be mechanical along softer shaley seams) calcareous to ~24'		92 (57)	66 (41)	8	
24								
							1	
25								
			- swirly bedding from ~25.6 to 26.6'				0	
26								
							0	
27								
							1	
28			- ~28 to 28.2' lost core water, (stopped core run to examine bit)					
		R4 28.2- 35'			93 (76)	56 (46)	2	
29								
							2	
30								
							1	
31			- very thinly bedded zone w/ soft shaley seams, severely weathered along fractures (partially friable), calcareous to 32'					
							7	
32			- green, shaley seam 32 to 32.3' w/ some cross and swirly bedding					
							0	
33								
							0	
34								
							0	
35								
		R5 35-40'	- green seam ~35.6 to 35.8'		92 (55)	83 (50)	1	
36								
							0	
37								
			(Continued on next page)				2	
38								

Completion Depth: 40 ft. Water Depth: - ft. Date: 10/3/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-18D

DATE: 9/25/86 **SURFACE ELEVATION:** 407.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
38	■		(Continued from previous page)				0	
39	■		- calcareous ~39 to 40' (GRIMSBY FORMATION)				0	
40				367.8				
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53								

(B) Broken/Fragmented Rock Pieces < 2 - 4 inches

Completion Depth: 40 ft. Water Depth: - ft. Date: 10/3/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-19

DATE: 9/18/86 **SURFACE ELEVATION:** 406.3 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)^1	OTHER TESTS	OTHER TESTS
0			TOPSOIL	406.0	ML			
1		14			SM	ND (2)		
2								
3		53	dense becoming very dense laminated red-brown and yellow-brown silty coarse to fine SAND (GLACIOFLUVIAL)		SM	ND		
4								
5		74			SM	ND		
6		*		400.3				
7								
8								
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 13'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 13 ft. Water Depth: - ft. Date: 9/18/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-32A

LOG of BORING No. MW-19

DATE: 9/18/86 **SURFACE ELEVATION:** 406.3 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
5			SOIL DESCRIPTION ON PREVIOUS PAGE	400.3				
6							B	B
7		NX R1 6-13'					B	B
8			CALCARENITE, gray, highly fractured, interbedded by dark gray argillaceous seams, clayey zone w/ rock fragments 3.7 to 3.9' (till?), fossiliferous, very thinly bedded		59 (50)	5 (4)	B	B
9							5	
10							B	B
11				394.3			B	B
12			CONGLOMERATE, gray and red, broken, sparry and hematitic with rounded black phosphate pebbles (KODAK SANDSTONE)	393.3			B	B
13								
14								
15								
16								
17								
18								
19								
20								

(B) Broken/Fragmented Rock
Pieces < 2 - 4 inches

Completion Depth: 13 ft. Water Depth: - ft. Date: 9/18/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-32B

LOG of BORING No. MW-20

DATE: 9/11/86 **SURFACE ELEVATION:** 407.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)^1	OTHER TESTS	OTHER TESTS
0			TOPSOIL	407.4	ML			
1		41			SM	ND (2)		
2								
3		73	dense laminated red-brown and yellow-brown silty fine SAND, trace clay					
4								
5		30						
6								
7		30	- trace coarse sand					
8								
9		53	- trace gravel (GLACIOFLUVIAL)	398.3				
10		100/6 *	very dense gray to brown calcareous silty coarse to fine SAND, trace friable rock fragments (GLACIAL TILL)	397.3				
11								
12								
13								
14								
15								

* Auger refusal at 10.5
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 17.1 ft. Water Depth: - ft. Date: 9/11/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-20

DATE: 9/11/86 **SURFACE ELEVATION:** 407.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
10			SOIL DESCRIPTION ON PREVIOUS PAGE	397.3				
11		NX R1					B	B
12		10.5- 17.1'*					B	B
13			CALCARENITE, gray, highly fractured, interbedded by dark gray argillac- seams, thinly bedded, fossiliferous, weathered along fractures		67 (53)	0 0	B	B
14			(KODAK SANDSTONE)				B	B
15							B	B
16							B	B
17				390.7				
18								
19								
20								
21								
22								
23			* terminated run at 17.1' to inspect core bit. Replaced core bit for next boring.					
24								
25			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					

Completion Depth: 17.1 ft. Water Depth: - ft. Date: 9/11/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-33B

LOG of BORING No. MW-21

DATE: 9/9/86 **SURFACE ELEVATION:** 407.9 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)1	OTHER TESTS	OTHER TESTS
0			TOPSOIL	407.4	ML			
1		6			SC	ND (2)		
2								
3		13	medium-dense becoming dense laminated yellow-brown and red-brown silty fine SAND, trace clay, trace gravel (GLACIOFLUVIAL)		SC	ND		
4								
5		37			SC	ND		
6								
7		35			SC	ND		
8				399.9				
		100/5	very dense gray calcareous sandy GRAVEL, friable (DECOMPOSED BEDROCK)		GM	ND		
9		100/1 *		398.2				
10								
11								
12								
13								
14								
15								

* Auger refusal at 9.7'
(1) Measured off split-spoon sampler
(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

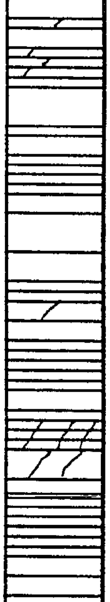
Completion Depth: 16.7 ft. Water Depth: - ft. Date: 9/9/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

LOG of BORING No. MW-21

DATE: 9/9/86 SURFACE ELEVATION: 407.9 LOCATION: See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			SOIL DESCRIPTION ON PREVIOUS PAGE					
9				398.6				
10		NX R1 9.7- 16.7'	CALCARENITE, gray, highly fractured becoming severely fractured, medium to fine grained, interbedded by thin argillaceous seams, moderate to severe weathering along fractures (clayey seams along fracture planes) fossiliferous				B	B
11							7	
12					84 (75)	9 (8)	7	
13							5	
14							7	
15			- high angle fractures 14.6 to 15.6' (KODAK SANDSTONE)				7	
16							9	
17				391.2				
18								
19								
20								
21								
22								
23			(B) Broken/Fragmented Rock Pieces < 2 - 4 inches					



Completion Depth: 16.7 ft. Water Depth: - ft. Date: 9/9/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-34B

LOG of BORING No. MW-22

DATE: 9/9/86 **SURFACE ELEVATION:** 405.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVM READING (ppm)^{1}	OTHER TESTS	OTHER TESTS
0			TOPSOIL	405.3	ML			
1		14			SC	ND (2)		
2			medium-dense laminated yellow brown and red-brown silty coarse to fine SAND					
3		14	-trace calcareous gravel fragments (GLACIOFLUVIAL)		SC/GC	ND		
4				401.8				
		50/1	very dense gray calcareous silty fine SAND & friable rock fragments (GLACIAL TILL)	400.9	GC	ND		
5		*						
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

* Auger refusal at 4.9'

(1) Measured off split-spoon sampler

(2) ND = None detected by OVM

CONTINUED ON NEXT PAGE

Completion Depth: 11.9 ft. Water Depth: - ft. Date: 9/10/86

Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-35A

LOG of BORING No. MW-22

DATE: 9/9/86 **SURFACE ELEVATION:** 405.8 **LOCATION:** See Figure 3

DEPTH ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (IN)	RQD % (IN)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
4			SOIL DESCRIPTION ON PREVIOUS PAGE	400.9				
5		NX					B	B
6		R1 4.9-	CALCARENITE, gray, severely to highly fractured, medium to fine grained interbedded by very thin dark gray argillaceous seams, severe to complete weathering along fractures, fossiliferous				0	
7		11.9'			93	40	2	
8					(78)	(34)	1	
9			- becoming very thinly bedded				4	
10							9	
11			- becoming coarse to fine grained (KODAK SANDSTONE)	393.9			5	
12								
13								
14								
15								
16								
17								
18								
19								

(B) Broken/Fragmented Rock
Pieces < 2 - 4 inches

Completion Depth: 11.9 ft. Water Depth: - ft. Date: 9/10/86
Project Name: XEROX CORP. - BUILDING 209 STUDY Project Number: 86C2046

Woodward-Clyde Consultants Figure A-35B

LOG of BORING No. MW-23

DATE 11/4 - 5/87 SURFACE ELEVATION 409.3 LOCATION See Figure 1

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
0								
			Topsoil					
1		9	Medium-dense red-brown medium to fine SAND, little silt, trace gravel		SM	1		
2								
				407.3				
3		29			SM/GM	760		
4			(Possible Fill)	407.3				
			Medium-dense to very dense red-brown and yellow brown medium to fine SAND, some silt, trace fine gravel with silty seams, becoming very moist at 5.5'.					
5		53			SM/GM	160		
6					GM/SM	12 1,4		
		100/4						
7			(Glaciofluvial)	402.1				
8			Very dense gray clayey SAND, some coarse to fine sand and calcareous rock fragments					
			(TILL)	400.3	GC/SC	1.0 5		
9		60						
			gray calcareous rock fragments (Boulder or top of completely fractured bedrock)	399.3	GM			
10								
			Auger refusal @ 9', advanced with tricone to 10.5'					

Completion Depth ______ Feet Water Depth ______ Feet Date ______

Project Name Building 209 Aquifer Study Project Number 86C2046-2

Woodward-Clyde Consultants

LOG of BORING No. MW-23

DATE 11/4 - 5/87 SURFACE ELEVATION 409.3 LOCATION See Plate 1

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVA HEADSPACE MEASUREMENT (ppm)	OTHER TESTS	OTHER TESTS
9			Soil Description on previous page	400.3				
			Calcarenite, gray, medium to fine grained, interbedded with gray argillareous seams					
10		10.5- 17.5'			87 (51)	0		
11			-fractures filled w/gray clayey silt and angular fragments (till) to 14'				B	
12			-high angular fractures 12.5-14'				B	
13							B	
14							B	
15				394.3			B	
			CONGLOMERATE, coarse to fine grained, weathered along fractures (KODAK)	393.6				
16			SILTSTONE, Red and green mottled, thin to thick bedded, slightly weathered along fractures				1	
17							2	
			(GRIMSBY)	391.8				
			Advanced tricone to 10.5' - refusal (B) Broken Pieces 2-4 inches					

Completion Depth 17.5 Feet Water Depth ______ Feet Date ______

Project Name Building 209 Aquifer Study Project Number 86C2046-2

Woodward-Clyde Consultants

LOG of BORING No. MW-24

DATE 11/9/87 SURFACE ELEVATION 409.0 LOCATION See Figure 1

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVA HEADSPACE MEASUREMENT (ppm)	OTHER TESTS	OTHER TESTS
0			TOPSOIL					
1		28	Medium-dense red-brown and brown medium to fine sand and gravel		SM/GM	.2		
2			becoming a dark brown SILT, little sand, trace clay		SC			
3		38	(FILL)	405.9		.2 ND		
			dense becoming very dense red-brown medium to fine SAND, some silt, some coarse to fine gravel		SM/GM			
4								
5		82	laminated by very thin (1") clay seams		SM/SC	ND		
6			(GLACIOFLUVIAL)	403.0				
		126/6			SM/GM			
			Very dense red and gray varigated fine SAND and clayey silt, some coarse to fine gravel			ND		
7								
8					GM/SM	ND		
			(TILL)	400.4				
9			Auger refusal at 7' ND = Non detected by OVA					

Completion Depth 17 Feet Water Depth - Feet Date -

Project Name BUILDING 209 AQUIFER STUDY Project Number 86C20462

Woodward-Clyde Consultants

LOG of BORING No. MW-24

DATE 11/9/87 SURFACE ELEVATION 409 LOCATION See Figure 1

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			SOIL DESCRIPTION ON PREVIOUS PAGE	404.4	74 (61)	28 (23)		
9		9-17'	CALCARENITE,grey, completely fractured, fractured, inter-bedded with gray argillaceous seams and fractures filled with gray clayey silt and angular fragments (till?)				B	
10							B	
11							B	
12			high angle fractures (clay filled)				B	
13			CONGLOMERATE, gray to red, homatietic with sparry seams, severly weathered at fractures	395.5			B	
14			(KODAK)	394.6			4	
15			SILTSTONE, green, very hard, slightly weathered				0	
16			(GRIMSBY)	393				
			(B) Broken/Fragmented Rock pieces <2-4 inches					
17								

Completion Depth 16 Feet Water Depth - Feet Date -

Project Name Building 209 AQUIFER STUDY Project Number 86C20462

Woodward-Clyde Consultants

LOG of BORING No. TW-1

DATE 11/5 - 6/87 SURFACE ELEVATION 409.4 LOCATION See Figure 1

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVA HEADSPACE MEASUREMENT (ppm)	OTHER TESTS	OTHER TESTS
0			Topsoil					
1		14	Medium-dense to dense red-brown to brown coarse to medium SAND, some silt, trace gravel		SM		.6	
2								
3		35			SM		210	
4			(FILL)	405.4				
5		75	Very dense red-brown coarse to fine SAND, some fine gravel, little silt		SM/GM	26 110		
6								
7		78			GM/SM	6		
8		70/1	-becoming gray calcarenite fragments and clayey silt (TILL)	400.6	GM	8		
9			*Auger refusal @ 8' ND = None detected by OVA					

Completion Depth 16.6 Feet Water Depth - Feet Date

Project Name Building 209 Aquifer Study Project Number 86C2046-2

Woodward-Clyde Consultants

LOG of BORING No. TW-1

DATE 11/5 - 6/87 SURFACE ELEVATION 409.4 LOCATION See Figure 1

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			Soil Description on previous page	400.6				
9		NX 8.8-15.8'	CALCARENITE, gray, medium to fine grained, weathered, severely to completely fractured, interbedded by argillaceous seams, fractures filled with gray clay zones of angular rock (till)		74 (61)	0		
10							B	
11							B	
12			-becoming predominantly thinnly bedded gray shale interbedded with 1-inch calcareous seams				B	
13							B	
14							B	
15				394.4			3	
			CONGLOMERATE, gray to red, broken with sparry & henatitic cement (KODAK)	396.2				
			SILTSTONE, green, sparry, medium to fine	396.6				
16			(B) Broken/fragmented rock pieces 2-4 inches * Reamed borehole to 16.6'					

Completion Depth 16.6* Feet Water Depth ____ Feet Date ____

Project Name Building 209 Aquifer Study Project Number 86C2046-2

LOG of BORING No. OB-TW2

DATE ______ SURFACE ELEVATION 407.6 LOCATION See Figure 1

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
			Augered to bedrock with out soil sampling	399.7				
8		7.9	CALCARENITE, hard, gray inter-bedded with argillaceous seams		92 (77)	53 (45)		
		14.9'					1	
			CONGLOMERATE, coarse to fine-grained sparry (KODAK)	399.2 398.7				
9			SILTSTONE, green medium to fine becoming a,	398.3			0	
10			SILTSTONE, red, thin to thick bedded, moderately weathered					
							4	
11			very severely to completely seathered (~11.4 - 125)				2	
12							B	
			fragmented					
13							B	
14			completely weathered seam				3	
15			(B) Broken/Fragmented Rock Pieces <2-4 inches					

Completion Depth ______ Feet Water Depth ______ Feet Date ______

Project Name Building 209 AQUIFER STUDY Project Number 86C20462

Woodward-Clyde Consultants

LOG of BORING No. TW-3

DATE 11/10/87 **SURFACE ELEVATION** 406.3 **LOCATION** See Figure 1

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVA HEADSPACE MEASUREMENT (ppm)	OTHER TESTS	OTHER TESTS
0			TOPSOIL	405.6				
			Memium dense to dense layered red-brown fine SAND and silty clay, little coarse to medium sand and gravel			ND		
1		11			SM/GM			
2								
						1		
3		35			SM/GM			
4								
			becoming very moist					
5		59						
			(GLACIOFLUVIAL)	401.1	5.5			
6								
			very dense red-brown coarse to fine SAND and clayey silt, little coarse to fine gravel		SM/GM	10		
7		66						
8					GM			
9		97				3 1		
			(TILL)	396.8	9.5			
			Auger refusal at 9.9' ND = none detected by OVA					
10								

Completion Depth ________ Feet Water Depth ________ Feet Date ________

Project Name Building 209 AQUIFER STUDY Project Number 86C20462

Woodward-Clyde Consultants

LOG of BORING No. TW-3

DATE 11/10/87 **SURFACE ELEVATION** 406.3 **LOCATION** See Figure 1

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
9			SOIL DESCRIPTION AON PREVIOUS PAGE	396.8				
10		10-17'	SILTSTONE, red, very thin seam becoming CALCARENITE, gray, fragmented medium to fine grained, with clayey silt (till?) filling fractures.		81 (68)	55 (46)	B	
11				394.4			B	
12			CONGLOMERTE, red and gray, coarse to fine grained, severely fractured (KODAK)	393.4			B	
13			SILTSTONE, red with green mottling, thin to thick bedded, slightly weathered at fractures				0	
14							3	
15							0	
16								
17				389.3				

(B) Broken/Fragmented Rock Pieces <2.4 inches

Completion Depth 17 Feet Water Depth ______ Feet Date ______

Project Name Building 209 AQUIFER STUDY Project Number 86C20462

Woodward-Clyde Consultants

LOG of BORING No. TW-4

DATE 11/12/87 **SURFACE ELEVATION** 409.0 **LOCATION** See Figure 1

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVA HEADSPACE MEASUREMENT (ppm)	OTHER TESTS	OTHER TESTS
0			Gray coarse to fine GRAVEL			1000+		
		14			SM			
2						1000+		
		6	medium-dense to loose medium to fine SAND, little silt, little gravel		SM			
4						1000+		
		4	becoming very moist to wet		SM			
6					SM	1000+		
		4				200		
8			(FILL)	400.4				
		62			SM	1000+		
10			very dense red-brown medium to fine SAND, some coarse to fine gravel, inter-bedded with yellow and red-brown silt seams					
		73			SM/GM	1000+ 1000+		
12					GM/SM			
		100/5	(GLACIOFLUVIAL)	396		1000+		
			Auger refusal at 13'					
14								

Completion Depth 20 Feet Water Depth _____ Feet Date _____

Project Name Building 209 AQUIFER STUDY Project Number 86C20462

Woodward-Clyde Consultants

LOG of BORING No. TW-4

DATE 11/12/87 **SURFACE ELEVATION** 409.0 **LOCATION** See Figure 1

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
12			SOIL DESCRIPTION ON PREVIOUS PAGE					
				396				
13			CALCARENITE, gray, hard, inter-bedded with gray argtllaceous seams and fractures filled with clayey silt and angular fragment (fill?)		87 (73)	46 (39)	B	
14								
				394.4			4	
			CONGLOMERATE, gray, coarse to fine, severly weathered					
15			(KODAK)	393.6			4	
			SILTSTONE, red with green nottling, weathered at fractures					
16								
							1	
17								
							0	
			sparry cement around mottles					
18								
							1	
19								
			moderately to very severe weathering, friable along fractures				3	
			(GRIMSBY)	389.0				
20			(B) Broken/Fragmented pieces <2-4 inches					

Completion Depth 20 Feet Water Depth - Feet Date -

Project Name Building 209 AQUIFER STUDY Project Number 86C20462

Woodward-Clyde Consultants

1989 H&A of New York Bedrock Core Boring Reports

R209-1 through R209-4

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. R209-1

PROJECT: XEROX - BUILDING 209 INVESTIGATION
CLIENT: XEROX CORPORATION, WEBSTER, NEW YORK
CONTRACTOR: ROCHESTER DRILLING CO., INC.

FILE NO. 70096-40
SHEET NO. 1 OF 2
LOCATION: N1338.1
E4257.6
ELEVATION: 404.0
DATUM: MSL
START: 27 Oct. 1989
FINISH: 31 Oct. 1989
DRILLER: T. Smith
H&A REP: C. Cubbison

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	PVC	---	NX
INSIDE DIAMETER (IN)	10	---	2-1/8
HAMMER WEIGHT (LB)	---	---	---
HAMMER FALL (IN)	---	---	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME 75, Truck-Mounted
BIT TYPE: 7-7/8 in. Roller Bit
DRILL MUD: Clear Water
OTHER: Augered to 5.8 ft. and used Nx core bit to 30.8 ft.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
						No soil samples taken in this borehole. Augered to 5.8 ft.
5						Top of Rock at 5.8 ft.
						Notes: 1. See Core Boring Report. 2. See Bedrock Observation Well Report.
10						
15						
20						
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER
	(See Observation Well Report)				

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
R	Rock Core Run

SUMMARY

OVERBURDEN (LIN FT):	5.8
ROCK CORED (LIN FT):	25.0
SAMPLES:	3R
BORING NO.	R209-1

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	CORE BORING REPORT	BORING NO. R209-1 FILE NO. 70096-40 SHEET NO. 2 OF 2

DEPTH (FT)	DRILLING RATE MIN./FT.	CORE NO. / DEPTH(FT)	RECOVERY IN.	RQD %	WEATH-ERING	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
5							Began Coring at 5.8 ft.
		5.8				6.0	Reddish-brown coarse to very coarse sandy Conglomerate.
	1						-THOROLD SANDSTONE-
	3						Dark reddish-brown, thin to medium-bedded, fine to medium-grained Sandstone. Light gray to greenish-gray mottling. Occasional cross-bedding and swirly bedding. Closely to widely spaced argillaceous partings.
	3						
	5						
10	3	R1	95/70	79/58	MOD		-GRIMSBY SANDSTONE-
	4						Moderately weathered, rough, irregular horizontal joints at 6.5, 6.6, 8.4, 8.6, 9.2, 10.4, 12.1, 13.0, 16.0, 16.2, 16.3, 24.7, 25.1, 25.2, 25.3, 25.4, 25.8, 26.3, 29.4 and 30.3 ft.
	3						
	3						Moderately weathered, rough, irregular vertical joint from 12.5 to 13.0 ft.
	5						
15		15.8					
	3	15.8					Moderately weathered, rough, irregular high angle joints from 8.2 to 9.0 ft. and at 12.2 and 17.5 ft.
	4						
	4				SEV		Severely weathered clayey shale partings at 10.8, 11.0, 24.2, 25.1, and 29.8 ft.
	2	R2	60/49	100/82			Severely fractured zone from 17.8 to 18.1 ft.
	3						
20		20.8					
	2	20.8					
	4				SL		
	3						
	3						
25	3						
	3						
	3	R3	118/90	98/75			
	4						
	3				MOD		-GRIMSBY SANDSTONE-
	3						
30		30.8					
	4						Bottom of Exploration at 30.8 ft.
35							

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. R209-2

PROJECT: XEROX - BUILDING 209 INVESTIGATION
CLIENT: XEROX CORPORATION, WEBSTER, NEW YORK
CONTRACTOR: ROCHESTER DRILLING CO., INC.

FILE NO. 70096-40
SHEET NO. 1 OF 2
LOCATION: N 872.3
E 4202.6
ELEVATION: 406.9
DATUM: MSL
START: 31 Oct. 1989
FINISH: 3 Nov. 1989
DRILLER: T. Smith
H&A REP: C. Cubbison

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	PVC	---	NX
INSIDE DIAMETER (IN)	10	---	2-1/8
HAMMER WEIGHT (LB)	---	---	---
HAMMER FALL (IN)	---	---	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME 75, Truck-Mounted
BIT TYPE: 6-3/4 in. HS Auger
DRILL MUD: Clear Water
OTHER: Augered to 4.9 ft. and used Nx core bit to 30.2 ft.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
						No overburden samples taken in this borehole. Augered to 4.9 ft.
						Top of Rock at 4.9 ft.
5						
						Notes: 1. See Core Boring Report. 2. See Bedrock Observation Well Report.
10						
15						
20						
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER
		(See Observation Well Report)			

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
R Rock Core Run

SUMMARY	
OVERBURDEN (LIN FT):	4.9
ROCK CORED (LIN FT):	25.3
SAMPLES:	3R
BORING NO.	R209-2

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	CORE BORING REPORT	BORING NO. R209-2 FILE NO. 70096-40 SHEET NO. 2 OF 2

DEPTH (FT)	DRILLING RATE MIN./FT.	CORE NO. / DEPTH(FT)	RECOVERY IN.	RQD %	WEATHERING	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
							Began Coring at 4.9 ft.
5	3	4.9					Light gray, medium to fine-grained, medium-bedded Sandstone, frequent argillaceous partings. Occasional cross-bedding and iron-staining. -THOROLD SANDSTONE- Very closely to closely spaced, moderately to severely weathered, rough, irregular, horizontal joints from 4.9 to 11.0 ft. Moderately weathered, rough, irregular horizontal joints at 11.8, 13.0, 13.3 and 13.5 ft. Moderately weathered, rough, irregular vertical joints from 7.2 to 7.4 ft., and at 7.8 ft. Severely weathered clayey shale partings at 5.4, 5.7, from 6.1 to 6.4, 8.9 to 9.0, 11.4 to 11.5, 12.0 to 12.1, 12.6 to 13.0, at 13.3 ft., and at 14.3 ft.
	3				SEV		
	3	R1	118/49	98/41			
	4				MOD-SEV		
	4						
10	4						
	4						
	4						
	4				MOD		
	4	14.9					
15	5	14.9				14.9	Dark reddish-brown, fine to medium-grained, medium-bedded Sandstone, light gray to greenish-gray mottling. Occasional argillaceous partings. -GRIMSBY SANDSTONE- Moderately weathered, rough, irregular horizontal joints at 15.8, 17.4, 17.9, 18.3, 25.5, 29.7, 30.0, and 30.1 ft. Severely-weathered, clayey shale partings at 18.5, 20.3 to 20.4 ft., 21.1 to 21.5 ft., 21.9, 22.5 to 22.7 ft., 23.6 to 24.1 ft., 24.4, and from 25.1 to 25.4 ft. Very closely spaced joints from 19.9 to 25.3 ft. *RQD based on core recovered.
	4						
	5	R2	61/58	101/95*			
	4						
	4	19.9					
20	4	19.9					
	7						
	6						
	7	R3	118/60	95/49			
	7						
25	6				SL		
	7						
	6						-GRIMSBY SANDSTONE-
	7						
	6	30.2					
30							Bottom of Exploration at 30.2 ft.
35							

Notes:

1. Good water return throughout coring. Loss of less than 10 gallons of drilling water during drilling of open Nx core interval.
2. See Test Boring Report.
3. See Bedrock Observation Well Report.

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. R209-3

PROJECT: XEROX - BUILDING 209 INVESTIGATION
CLIENT: XEROX CORPORATION, WEBSTER, NEW YORK
CONTRACTOR: ROCHESTER DRILLING CO., INC.

FILE NO. 70096-40
SHEET NO. 1 OF 2
LOCATION: N 1599.3 E 2958.8
ELEVATION: 399.5
DATUM: MSL
START: 8 Nov. 1989
FINISH: 10 Nov. 1989
DRILLER: T. Smith
H&A REP: C. Cubbison

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	PVC	---	Nx
INSIDE DIAMETER (IN)	10	---	2-1/8
HAMMER WEIGHT (LB)	---	---	---
HAMMER FALL (IN)	---	---	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME 75, Truck-Mounted
BIT TYPE: 6-3/4 in. H.S. Auger
DRILL MUD: Clear Water
OTHER: Augered to 5.3 ft. and used Nx core bit to 30.3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
						No soil samples taken in this borehole. Augered to 5.2 ft.
						Top of Rock at 5.2 ft.
5						Notes: 1. See Core Boring Report. 2. See Bedrock Observation Well Report.
10						
15						
20						
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER
	(See Observation Well Report)				

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
R	Rock Core Run

SUMMARY

OVERBURDEN (LIN FT):	5.3
ROCK CORED (LIN FT):	25.0
SAMPLES:	3R
BORING NO.	R209-3

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	CORE BORING REPORT	BORING NO. R209-3 FILE NO. 70096-40 SHEET NO. 2 OF 2

DEPTH (FT)	DRILLING RATE MIN./FT.	CORE NO. / DEPTH(FT)	RECOVERY IN.	RQD %	WEATH-ERING	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
							Began Coring at 5.3 ft.
5	4	5.3			MOD-SEV		Dark reddish-brown, fine to medium-grained, medium-bedded Sandstone. Light gray to greenish-gray mottling. Occasional argillaceous partings. -GRIMSBY SANDSTONE- Severely fractured from 5.2 to 5.5 ft. Severely weathered, clayey, moderately dipping joint at 9.7 ft. Vugs at 10.4 ft. Moderately weathered, rough, irregular horizontal joints at 5.7, 5.8, 5.9, 6.2, 6.5, 7.1, 7.2, 7.8, 7.9, 8.0, 9.2, 9.8, 10.0, 10.2, 10.7, 10.9, 11.5, 11.7, 11.9, 12.2, 13.4, 13.6, 14.0, 18.0, 18.4, 18.5, 22.1, 22.7, 24.3 and 27.4 ft. Severely weathered clayey shale partings at 22.7, 23.9, 24.5, and from 28.9 to 29.1 ft.
	4						
	4						
	4						
	4						
10	4				MOD		
	4	R1	118/70	98/58			
	4						
	4						
	4	15.3					
15	4	15.3					
	3						
	3	R2	56/54	93/90	SL		
	3						
	6	20.3					
20	6	20.3					-GRIMSBY SANDSTONE-
	4				MOD-SEV		
	4				MOD		
	5				SEV		
	6	R3	118/67	98/56	MOD-SEV		
25	5						
	6						
	6				SL		
	5						
	6	30.3					
30							Bottom of Boring at 30.3 ft.
35							

Bottom of Boring at 30.3 ft.

Notes:

1. Loss of approximately 10 gallons of water during R3.
2. See Test Boring Report.
3. See Bedrock Observation Well Report.

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. R209-4

PROJECT:	XEROX - BUILDING 209 INVESTIGATION	FILE NO.	70096-40
CLIENT:	XEROX CORPORATION, WEBSTER, NEW YORK	SHEET NO.	1 OF 2
CONTRACTOR:	ROCHESTER DRILLING CO., INC.	LOCATION:	N 985.8 E 2985.7

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	PVC	---	NX
INSIDE DIAMETER (IN)	10	---	2-1/8
HAMMER WEIGHT (LB)	---	---	---
HAMMER FALL (IN)	---	---	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE:	CME-75, Truck-Mounted
BIT TYPE:	6-3/4 in. H.S. Auger
DRILL MUD:	Clear Water
OTHER:	Augered to 5.3 ft. and used Nx core bit to 30.4 ft.

ELEVATION:	408.3
DATUM:	MSL
START:	6 Nov. 1989
FINISH:	8 Nov. 1989
DRILLER:	T. Smith
H&A REP:	C. Cubbison

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
						No soil samples taken in this borehole. Augered to 5.3 ft. Top of Rock at 5.3 ft.
5						Notes: 1. See Core Boring Report. 2. See Bedrock Observation Well Report.
10						
15						
20						
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
	(See Observation Well Report)				

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
R	Rock Core Run

SUMMARY

OVERBURDEN (LIN FT):	5.3
ROCK CORED (LIN FT):	30.1
SAMPLES:	3R
BORING NO.	R209-4

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	CORE BORING REPORT	BORING NO. R209-4 FILE NO. 70096-40 SHEET NO. 2 OF 2

DEPTH (FT)	DRILLING RATE MIN./FT.	CORE NO. DEPTH(FT)	RECOVERY IN.	RQD %	WEATHERING	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
							Began Coring at 5.3 ft.
5	3	5.3					Severely weathered, light gray, medium to fine-grained, medium-bedded Sandstone. Frequent argillaceous partings. Occasional cross-bedding and iron-staining. -THOROLD SANDSTONE-
	3						
	3						
	4	R1	38/0	47/0	SEV		
	6						
10	6						
	7	12.1					
	5	12.1			MOD	12.0	Dark reddish-brown fine to medium-grained, medium-bedded Sandstone. Light gray to greenish-gray mottling. Occasional shaley partings. -GRIMSBY SANDSTONE- Severely fractured from 14.5 to 14.9 ft. Moderately weathered, rough, irregular, vertical joints from 12.1 to 12.6 ft., and from 13.1 to 13.7 ft. Moderately weathered, rough, irregular horizontal joints at 12.4, 12.6, 13.1, 13.4, 13.8, 21.3, 22.1, 22.2, 22.3, 22.7, 23.0, 23.5, 24.9, 25.8, 26.0, 26.1, 27.7, 28.7, and 29.5 ft. Severely weathered clayey shale partings from 15.6 to 15.8, at 16.7, 16.8, 17.0, 17.3, 17.4, 17.8, 18.0, 18.4, 18.7, from 18.9 to 19.0, from 21.0 to 21.3, at 21.7, from 22.4 to 22.6, at 26.3, 26.5, and at 28.8 ft.
	5						
	4				SEV		
15	4						
	5	R2	95/44	97/45			
	5						
	5				MOD		
	6	20.3					
20	4	20.3					
	5						
	5						
	5						
	5						
25	5						
	4	R3	114/82	94/68			
	4						
	4				SL		
	5	30.4					
30							

Bottom of Boring at 30.4 ft.

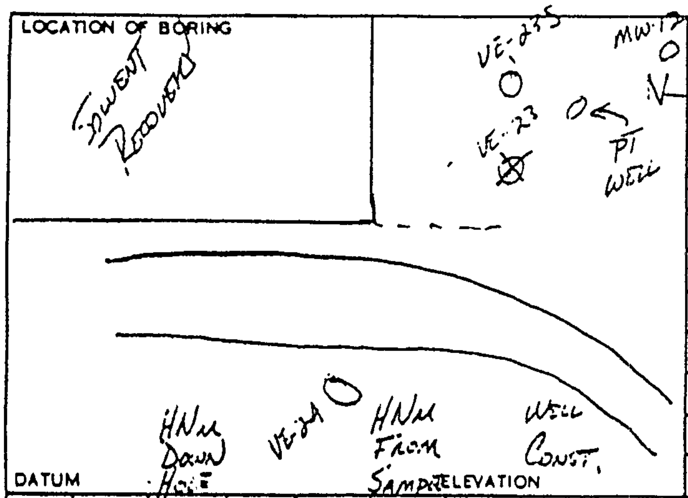
1. See Test Boring Report.
2. See Bedrock Observation Well Report.
3. Loss of 50 to 75 gallons of water during drilling of R1.
4. Loss of less than 10 gallons during drilling of R3.

1990 Dames & Moore Well Installation Reports

VE-23
VE-23S
VE-24S

Dames & Moore

LOCATION OF BORING



DATUM

ELEVATION

JOB NO.

CLIENT: Xerox

LOCATION: 209

BORING NO: 209 - VE23

SHEET: 1 OF 3

DRILLING METHOD: R-61

SAMPLING METHOD: 2" S. S.

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING	
START	FINISH
TIME	TIME
10:30	12.30
DATE	DATE
3.26	3.2

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	~~DEPTH OF CASING~~	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	~~NUMBER OF RINGS~~	DEPTH IN FEET	~~SOIL GRAPH~~
				3 4		0	
	24 / 6	—		6 4	0	1	
				3 1		2	
	24 / 0	—		2 3		3	
				3 1		4	
	24 / 8	—	#1 / 4'-6'	3 4	50	5	
				6 7		6	
2" Split Spoon	24 / 24	--		12 18	0	7	
				10 26		8	
	24 / 20	3	#2 / 9'-10'	50 54	3	9	
				7 8		0	
	24 / 18	—		100 SR		1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	

SURFACE CONDITIONS:

1"-2" GRAVEL

4"

0'-2' = SILTY SAND, SOME GRAVEL, BROWN - RED BROWN, MOIST, NO ODOR, PROBABLE FILL

2'-4' = NO RECOVERY

4'-6' = AS 0'-2' WITH SLIGHT ODOR

~~SAND~~ 6'-8' = SILTY SAND TRACE GRAVEL, BROWN RED BROWN, MOIST - SATURATED ~ 7', NO ODOR

8'-10' = AS ABOVE, SATURATED

10'-11'6" = AS ABOVE 2" GRAVEL LAYER AT ~ 11'
SPOON REFUSAL = 11'6"

AUGER REFUSAL = 13'5" = TOR

CORE FROM 13'5" TO 17'11"
4'6" CORE: TOP 1'6" = HIGHLY WEATHERED, FRACTURED ROCK. BOTTOM 3' = COMPETENT

REAM FROM 13'5" TO 19'
19' = BOH

APPROXIMATELY 550 GALLONS OF WATER WAS LOST TO THE FORMATION DURING CORING AND REAMING

DRILLING CONTR.

No.147075

BY

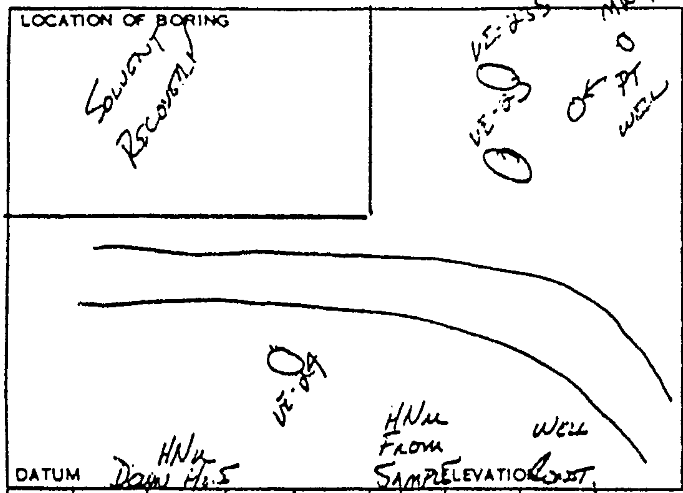
DATE

CHK'D BY

REV 11-80

Dames & Moore

LOCATION OF BORING



JOB NO.

CLIENT: XEROX

LOCATION: 209

BORING NO.: 209-VE23S

SHEET: 2 OF 3

DRILLING METHOD: R-61

SAMPLING METHOD: 2" S.S.

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING	
START	FINISH
TIME	TIME
1:00	2:00
DATE	DATE
3/27	3/27

DATUM: HNu DOWN HOLE

HNu FROM SAMPLE

ELEVATION: WELL CONST.

SURFACE CONDITIONS:

1"-2" GRAVEL

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	~~DEPTH OF CASING~~	SAMPLE NO / SAMPLE DEPTH	BLOWS/FT SAMPLER	~~NUMBER OF RINGS~~	DEPTH IN FEET	~~SOIL GRAPH~~	
						0		0'-2' = FINE SAND, TRACE GRAVEL, MOIST, BROWN
		–			0,75	1		ODOR
						2		
		–	3 / 2'-4'		.5	3		2'-4' = AS ABOVE (SAMPLE TAKEN)
						4		
						5		
						6		
						7		
						8		8'-10' = AS ABOVE
		20	4 / 8'-10'		200	9		BOH = 10'7" : 7'6" SCREENED INT. - FROM
						0		(SAMPLE TAKEN)
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		

DRILLING CONTR.

No14796

BY

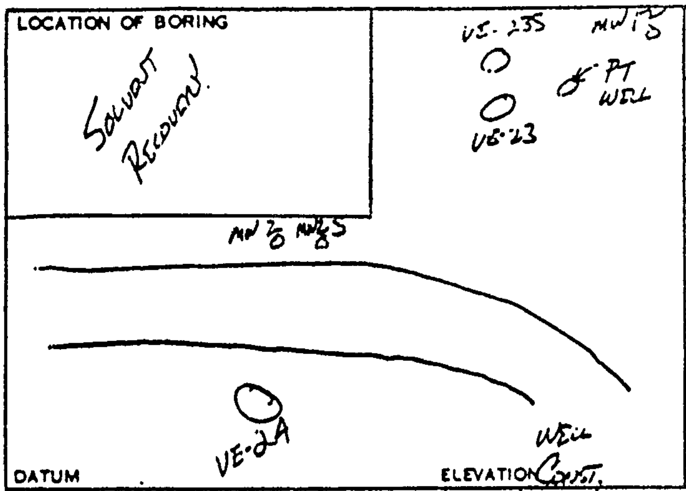
DATE

CHK'D BY

REV 11-80

Dames & Moore

LOCATION OF BORING



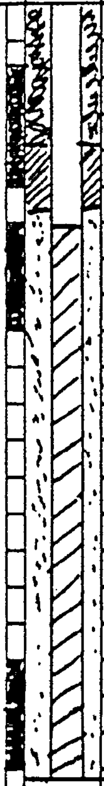
DATUM
ELEVATION

JOB NO.
CLIENT: Xerox
LOCATION: 209
BORING NO: 209 - VE 245
SHEET: 3 OF 3
DRILLING METHOD: B-61
SAMPLING METHOD: 2" S.S.

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING START	DRILLING FINISH
TIME 2:30	TIME 3:45
DATE 3/27	DATE 3/27

SURFACE CONDITIONS: Grass

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
						0	
						1	
						2	
			5 / 2'-4'			3	
						4	
						5	
						6	
						7	
						8	
			6 / 8'-10'			9	
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	

0'-2' = Fine-Medium Sand with Organic matter, Moist, Brown, No Odor

2'-4' = Fine-Medium Sand, Moist, Brown, No Odor (Sample Taken)

8'-10' = As above, 3" Gravel layer at ~9'

BOH = 10' 2"

DATE ______ CHK'D BY ______

REV 11-80

1992 H&A of New York VE-23 Replacement

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. VE23 Replacement

PROJECT: BUILDING 209 REMEDIATION
CLIENT: XEROX CORPORATION
CONTRACTOR: SJB SERVICES, INC.

FILE NO. 70096-43
SHEET NO. 1 OF 2
LOCATION: N796.3
E3742.5

ELEVATION: 408.3
DATUM: NGVD
START: 7 July 1992
FINISH: 8 July 1992
DRILLER: J. Lamm
H&A REP: W. Lanik

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Auger	SS	NQ
INSIDE DIAMETER (IN)	4-1/4	1-3/8	2-1/8
HAMMER WEIGHT (LB)	---	140	---
HAMMER FALL (IN)	---	30	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: Acker-soil max truck rig
BIT TYPE: Tri-cone roller bit
DRILL MUD: ---
OTHER: Advanced augers to 13.0 ft.
Set temporary 8 in. casing to 13.0 ft.
Cored and reamed to 23.0 ft.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
						Brown medium to fine SAND, plywood at 0.5 ft. -FILL-
		2 4 3 2	S1 6"/24"	1.0 3.0		Loose brown gravely coarse to medium SAND.
		1 4 4 1	S2 12"/24"	3.0 5.0		Same, except wet. -FILL-
5		3 6 14 12	S3 11"/24"	5.0 7.0	6.0	Same, except medium dense. Brown medium to fine SAND, little to trace gravel, wet. -LACUSTRINE-
		27 15 14 21	S4 24"/24"	7.0 9.0		Medium dense brown medium to fine SAND, trace gravel, trace coarse sand, wet.
10		14 12 16 16	S5 13"/24"	9.0 11.0		Same, except fine SAND. -LACUSTRINE- Same.
		4 8 4 50/0.4	S6 16"/23"	11.0 12.9	11.5 13.0	Medium dense red-brown gravelly SILT, trace clay (slightly plastic), wet. -GLACIAL TILL-
						Top of Rock at 13.0 ft.
15						
20						
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
See Groundwater Level Monitoring Report					

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
R	Rock Core Sample

SUMMARY

OVERBURDEN (LIN FT):	13.0
ROCK CORED (LIN FT):	10.0
SAMPLES:	6S, 2R
BORING NO.	VE23

H & A OF NEW YORK, ROCHESTER, NEW YORK
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

CORE BORING REPORT

BORING NO. VE23 Repl.
FILE NO. 70096-43
SHEET NO. 2 OF 2

DEPTH (FT)	DRILLING RATE (MIN./FT.)	CORE NO. / DEPTH(FT)	RECOVERY/RQD IN.	RECOVERY/RQD %	WEATH-ERING	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
							Began Coring at 13.0 ft.
	3	13.0			SL		Hard, slightly weathered, reddish brown, fine to medium-grained, thin to thick-bedded SANDSTONE. Greenish gray color mottling. Very closely to moderately closely spaced argillaceous partings. -GRIMSBY SANDSTONE- Highly fractured, coarse-grained, conglomentic rock from 12.0 to 13.9 ft. Joint, low angle, smooth, planar, slightly weathered, tight at 14.7 ft. Severely weathered, clayey seam at 15.0 ft. and from 17.6 to 17.8 ft. Highly fractured rock from 19.2 to 19.6 ft. and from 22.5 to 22.8 ft. (Note: core black at 21.0 ft.)
	2						
15	2				SEV		
	2	R1	78/51	81/53	SL		
	2						
	2				MOD-SEV		
	2				SL		
20	3	21.0					
	2	21.0					
	2	R2 23.0	22/14	92/58			
							Bottom of Boring at 23.0 ft. Notes: 1. Installed recovery well in completed boring. See Groundwater Recovery Well Report.
25							
30							
35							
40							
45							

1987 H&A of New York Test Boring Reports

R-80
R-92
R-94

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. R80

PROJECT: BEDROCK OBSERVATION WELL INSTALLATION, NE CORNER, BUILDING 210
CLIENT: XEROX CORPORATION, WEBSTER, NEW YORK
CONTRACTOR: HYDRO GROUP, INC.

FILE NO. 758021
SHEET NO. 1 OF 2
LOCATION: See Plan

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	AUGERS	SS	NX
INSIDE DIAMETER (IN)		1-3/8	
HAMMER WEIGHT (LB)	---	140	---
HAMMER FALL (IN)	---	30	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: Acker Soil Sentry
BIT TYPE:
DRILL MUD:
OTHER:

ELEVATION:
DATUM:
START: 18 November 1987
FINISH: 18 November 1987
DRILLER: W. Sanford
H&A REP: L. DiSalvo

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		2 10 8	S1 12"/18"	0.0 1.5		Medium dense light reddish-brown clayey coarse to fine SAND, trace silt and pebbles, moist.
		12 12 11	S2 12"/18"	1.5 3.0		Same, with trace coarse to fine subangular to subround gravel, moist.
		4 5 6	S3 12"/18"	3.0 4.5		Same, with trace fine gravel, some pebble-sized cinders, moist.
5		3 4 4	S4 10"/18"	4.5 6.0		Medium dense light to dark brown clayey coarse to fine SAND, trace wood fragments, trace cinders, trace silt, moist.
		5 5 6	S5 13"/18"	6.0 7.5		Same. -FILL-
		25 5 9	S6 14"/18"	7.5 9.0	8.0	Medium dense light brown clayey fine SAND, little silt. -LACUSTRINE-
10		8 7 50	S7 0"/10"	9.0 9.8		No recovery. Spoon refusal at 9.8 ft.
						Top of Rock at 9.8 ft.
						Note:
						1. See Bedrock Observation Well Report.
15						
20						
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
R	Rock Core Run

SUMMARY

OVERBURDEN (LIN FT):	9.8
ROCK CORED (LIN FT):	25.2
SAMPLES:	6S,3R
BORING NO.	R80

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	CORE BORING REPORT	BORING NO. R80 FILE NO. 758021 SHEET NO. 2 OF 2

DEPTH (FT)	DRILLING RATE MIN./FT.	CORE NO. / DEPTH(FT)	RECOVERY IN.	RQD %	WEATHERING	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
							Began Boring at 9.8 ft.
10 15	3 3 3 3 3 3 3 3	9.8 R1 18.5	79/32	75/30	SEV MOD-SEV SEV		Dark reddish-brown fine to medium grained, thin to medium bedded Sandstone, with little gray mottling and layering. -GRIMSBY SANDSTONE- Abundant severely weathered, smooth planar to rough, irregular low angle joints from 9.8 to 14.6 ft. and from 16.3 to 17.0 ft. Moderate to severely weathered, rough, irregular vertical fracture from 14.6 to 15.6 ft. Moderate to severely weathered, rough, irregular low angle joints at 15.7 and 15.8 ft.
20	3 3 3 3 3 3 3	18.5 R2 24.8	66/12	88/16	SEV		Abundant severely weathered, rough, planar to irregular low angle clayey joints from 18.5 to 24.8 ft.
25 30	3 3 3 3 3 3 3 3 3 3	24.8 R3 34.8	104/8	87/7	SEV		Abundant severely weathered, smooth to rough, planar to irregular, low angle, clayey joints from 24.8 to 34.8 ft. -GRIMSBY SANDSTONE-
35							Bottom of Boring at 34.8 ft.

Note:

1. See Bedrock Observation Well Report.

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

BORING NO. R92

PROJECT XEROX BUILDING 214 FIELD INVESTIGATION, WEBSTER, NEW YORK
CLIENT XEROX CORPORATION
CONTRACTOR NORTH STAR DRILLING CO.

FILE NO. 758022
SHEET NO. 1 OF 2
LOCATION N1504.1
E3917.3
ELEVATION 401.1
DATUM MSL
START 19 Apr. 1988
FINISH 20 Apr. 1988
DRILLER H. Lyon
H&A REP J. Talpey/J. Fitch

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Flush joint	SS	NX
INSIDE DIAMETER (IN)	6.0	1-3/8	2-1/8
HAMMER WEIGHT (LB)	-	140	-
HAMMER FALL (IN)	-	30	-

DRILLING EQUIPMENT & PROCEDURES
RIG TYPE CME-55 Truck mount
BIT TYPE NX, 5-7/8 in. tricone roller
DRILL MUD -
OTHER Advanced 6.0-in. I.D. flush joint casing to 2.0 ft.; roller bit to 2.5 ft.; NX barrel to 27.5 ft.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		1		0.0		Medium dense dark reddish brown coarse to fine sandy SILT, little gravel, trace root fibers, damp.
		10	S1A,B			
		12		1.5	1.5	Medium dense tan to dark gray coarse to fine SAND, trace silt, dry. -FILL-
		50/0.3	14"/21"	1.5-1.8		Spoon Refusal and Top of Rock at 1.8 ft.
5						Flush joint casing advanced to 2.0 ft. See Core Boring Report.
10						
15						
20						
25						
30						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER
See Observation Well Report					

SAMPLE IDENTIFICATION

O	OPEN END ROD
T	THIN WALL TUBE
U	UNDISTURBED SAMPLE
S	SPLIT SPOON
R	ROCK CORE RUN

SUMMARY
OVERBURDEN (LIN FT) 2.0
ROCK CORED (LIN FT) 25.0
SAMPLES 1S, 3R

BORING NO. R92

H&A. FORM 4 REV. 3/84

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

CORE BORING REPORT

BORING NO. R92
FILE NO. 758022
SHEET NO. 2 OF 2

DEPTH (FT.)	DRILLING RATE MIN./FT.	CORE NO. / DEPTH (FT.)	RECOVERY IN.	RQD %	WEATHERING	STRATA CHANGE (FT.)
	3	2.5				
	3					
	3					
5	3				MOD	
	3					
	3	R1	119/36	100/35		
	3					
	3				MOD-SEV	
10	3					
	2				MOD	
	3	12.5			SEV	
	3					
	3	R2	60/57	100/95		
15	3				SL	
	3					
	3	17.5				
	3				SL-MOD	
	3				SEV	
20	2				SL-MOD	
	2					
	3	R3	113/82	94/68		
	3					
	2				SL	
25	2					
	1					
		27.5				
30						

VISUAL CLASSIFICATION AND REMARKS

Began Coring at 2.5 ft.

Red-brown, fine to medium-grained, thin to medium-bedded, moderately hard sandstone, trace pockets of green-gray sandstone.

-GRIMSBY SANDSTONE-

Very closely to closely spaced, slightly to severely weathered horizontal joints.
Rough, moderately weathered, iron-stained horizontal joints at 2.8, 4.2, 5.5 and 7.2 ft.

Moderately dipping to high angle, rough, moderately weathered, iron-stained joints from 3.0 to 3.2, 4.1 to 4.2, 4.7 to 5.0, 6.7 to 7.2, 10.7 to 10.8 and 12.2 to 12.5 ft.

Fine-grained, moderate to severely weathered, medium soft shaley sandstone from 7.9 to 11.8 ft.

Very closely to moderately closely spaced, slightly to moderately weathered norizontal joints; little pockets of green-gray sandstone.

-GRIMSBY SANDSTONE-

Soft, severely weathered bedding plane joint at 13.1 ft.

Swirly-bedded texture from 15.0 to 17.5 ft.

Very closely to closely spaced, slightly to moderately weathered horizontal joints.

Trace pockets of light gray fine to medium-grained sandstone.

Clayey zone at 18.7 ft.

Shaley parting at 21.0 ft.

Bioturbation throughout R3.

Interbeds of red-brown and light gray sandstone frequently throughout R3.

-GRIMSBY SANDSTONE-

Bottom of Boring at 27.5 ft.

Notes:

1. Good water return throughout.
2. Drilling water surfaced in nearby drainage ditch.
3. See Bedrock Observation Well Reports.

BORING NO. R92

H&A FORM 4B REV. 4/84

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

BORING NO. R94

PROJECT	XEROX BUILDING 214 FIELD INVESTIGATION, WEBSTER, NEW YORK
CLIENT	XEROX CORPORATION
CONTRACTOR	HYDRO GROUP, INC.

FILE NO.	758022
SHEET NO.	1 OF 2
LOCATION	N1915.2 E3371.2
ELEVATION	400.1
DATUM	MSL
START	18 Apr. 1988
FINISH	20 Apr. 1988
DRILLER	W. Sanford
H&A REP	L. DiSalvo

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	--	S	NX
INSIDE DIAMETER (IN)	--	2-1/4	2-1/8
HAMMER WEIGHT (LB)	--	140	--
HAMMER FALL (IN)	--	30	--

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE	Acker Soil Sentry
BIT TYPE	Pneumatic Hammer
DRILL MUD	
OTHER	Borehole advanced to 18.3 ft. with 6.0-in. diameter pneumatic hammer.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		2	S1	0.0	0.2	Very loose dark brown medium to fine sandy SILT with trace organic fibers, damp.
		7	12"/18"			
		7		1.5		-TOPSOIL-
		9	S2	1.5		Medium dense dark reddish-brown fine sandy SILT with trace medium sand, trace fine gravel and clay, damp.
		7	15"/15"	2.8	2.8	-SEVERELY WEATHERED BEDROCK-
		50/0.4				Very dense dark reddish-brown coarse to fine sandy SILT, trace fine gravel, dry.
5						Spoon refusal and Top of Rock at 2.8 ft.
						Notes: 1. See Core Boring Report. 2. See Bedrock Observation Well Report.
10						
15						
20						
25						
30						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER
4/19/88	1300	--	--	18.3	Dry

SAMPLE IDENTIFICATION

O	OPEN END ROD
T	THIN WALL TUBE
U	UNDISTURBED SAMPLE
S	SPLIT SPOON
R	ROCK CORE RUN

SUMMARY

OVERBURDEN (LIN FT)	2.8
ROCK CORED (LIN FT)	25.5
SAMPLES	2S, 4R

BORING NO. R94

H&A FORM 4 REV. 3/84

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

CORE BORING REPORT

BORING NO. R94
FILE NO. 758022
SHEET NO. 2 OF 2

DEPTH (FT.)	DRILLING RATE MIN./FT.	CORE NO. DEPTH (FT.)	RECOVERY IN.	RQD %	WEATHERING	STRATA CHANGE (FT.)	VISUAL CLASSIFICATION AND REMARKS
	5						Began Coring at 2.8 ft.
	5	2.8			SEV		Light to dark brown fine-grained thin to very thinly-bedded SANDSTONE with occasional light greenish-gray mottling. -GRIMSBY SANDSTONE-
	5						
5	10	R1	52/0	87/0	MOD-SEV		Abundant, severely weathered, rough, irregular, high high angle to low angle joints from 2.8 to 7.8 ft.
	5				SEV		
	5	7.8					
	5				MOD		Occasional swirly bedding throughout core.
	5						
10	5				SL		
	5	R2	101/74	103/73	SEV		Severely weathered close rough irregular low to high angle joints from 11.0 to 12.2 ft.
	5						Moderately weathered rough low angle joints at 9.4, 12.8, 13.3, 14.0, 14.4, 15.2 and 15.6 ft.
	5				SL		
	5						
15	5	16.0			MOD		
	5						Severely weathered irregular clayey joint at 16.5 ft.
	5	R3	28/28	100/100	SL		
	10	18.3					
	10						Very fine-grained laminated interbeds from 19.3 to 22.0 and 25.4 to 28.3 ft.
20	5				MOD		Shale fragment inclusions from 23.3 to 25.3 ft.
	4						Occasional swirly bedding and cross bedding throughout core. -GRIMSBY SANDSTONE-
	3						
	5	R4	112/102	93/85	SEV MOD		Moderately weathered clayey shale partings at 18.7, 19.1, 19.7, 20.6, 20.9, 21.6, 22.0, 23.3, 24.2, 24.7 and 25.1 ft.
	2				SEV		
25	5				MOD-SEV SEV		Severely weathered, rough, irregular clayey shale low angle joints at 22.7, 23.5, 23.9 and 25.4 ft.
	5				MOD-SEV		
	5				MOD		
	5	28.3					Bottom of Boring at 28.3 ft.
30							Notes:

Notes:

1. See Test Boring Report.
2. See Bedrock Observation Well Report.
3. Half of wash water return lost at 25.0 ft. and not recovered throughout coring process.

BORING NO. R94

H&A FORM 4B REV. 4/84

1985 RECRA Research Inc. Test Boring Logs

R-21
R-35
R-36
R-37

DATE
STARTED 8/26/85
FINISHED 8/30/85
SHEET 1 OF 1

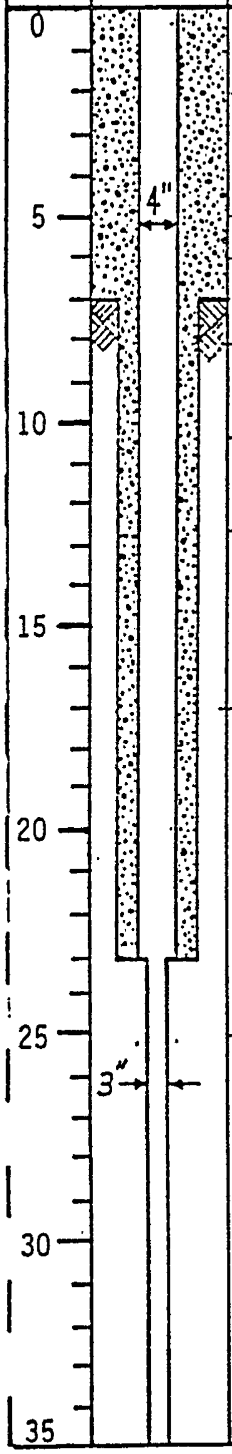
RECRA RESEARCH, INC.

SUBSURFACE LOG

HOLE NO. R-21
SURFACE ELEV. 401.1'
G.W. DEPTH 394.13'

PROJECT Xerox - Salt Road Complex
Project Number 5C100236

LOCATION North 16 + 96.0
East 47 + 02.7



SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12
SS	1	7	14
		20	18
SS	2	17	50/.4'
NX	Run I		
NX	Run II		
NX	Run III		
NX	Run IV		
NX	Run V		
NX	Run VI		
NX	Run VII		

(BLOWS ON SAMPLER second row: 12/18, 18/24)

DESCRIPTION

TOPSOIL, red brown, moist 0.5'

FILL, gray, powdery, some gravel 0.9'

Silty CLAY, red brown, dry to moist, slightly plastic, some rounded gravel 5.0'

Gravel becomes angular red-brown siltstone 7.17'

Red brown SILTSTONE to (F) SANDSTONE, some green gray, well indurated, massive, some SHALE at 7.4 to 11.6', 17.7 to 18.1', 18.65 to 18.9' and 19.8 to 20.1'. Fractures common in shaley layers.

NOTES

Boring advanced with 6¼" HSA, truck mounted CME-75 drilling rig. Split spoon sampling with 2" O.D. split spoons driven by a 140# hammer falling 30"

SS-1: 2.0' Drive
2.0' Recovery

SS-2: 0.9' Drive
0.5' Recovery

Auger refusal on bedrock at 7.17'.

NX Core:
Run I: 7.17-9.3'
Recovery = 1.5'/2.13'=70%
Run II: 9.3-11.6'
Recovery = 1.4'/2.3'=61%
Run III: 11.6-17.17'
Recovery = 4.35'/5.57'=78%
Run IV: 17.17-22.17
Recovery = 4.55'/5.0'=91%
Run V: 22.17-25.17'
Recovery = 3.0'/3.0'=100%
Run VI: 25.17-30.17
Recovery = 4.25'/5.0'=85%
Run VII: 30.17-35.17'
Recovery = 3.0'/5.0'=60%

Boring terminated at 35.17'

CLASSIFICATION Visual by KC, ASTM D2488
METHOD OF INVESTIGATION ASTM D1452, D1586 and D2113

DATE
STARTED 9/26/85
FINISHED 9/30/85
SHEET 1 OF 1

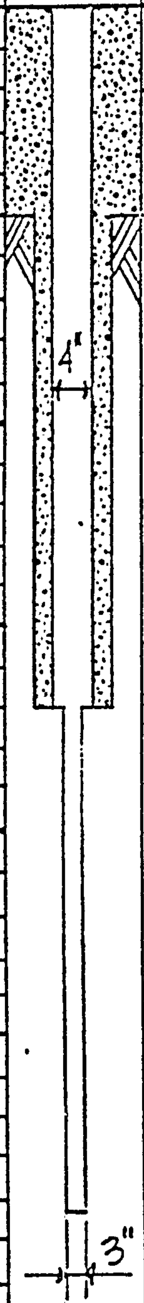
RECRA RESEARCH, INC.

SUBSURFACE LOG

HOLE NO. R-35
SURFACE ELEV. 400.9'
G.W. DEPTH 395.02'

PROJECT Xerox - Salt Road Complex
Project Number 5C100236

LOCATION North 17 + 10.3
East 50 + 23.3



DEPTH-FT	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	DESCRIPTION	NOTES
0	SS	1	2	2	4	5	TOPSOIL, dark brown, silty, roots, moist 0.5' Clayey SILT, red brown, some angular gravel, moist becomes dry at 2.5' 5.0'	Boring initially advanced with 6¼" HSA, CME-750 ATV mounted drill rig then a CME-55 truck mounted drill rig. spoon sampling using 2" O.D. split spoons driven by a 140# hammer falling 30". SS-1: 2.0' Drive 0.5' Recovery Auger refusal on bedrock at 5.0'
5	NX	Run I					SHALE to SILTSTONE, red brown, very fractured to 14.42' becomes massive, well indurated SILTSTONE to fine SANDSTONE. Fractured at 19.2, 20.1, 22.0, 22.8, 24.0, 26.5 and 28.5'	NX Core: Run I: 5.42-13.42' Recovery = 3.0'/8.0=38
	NX	Run II						Run II:13.42-14.42' Recovery = 0.15'/1.0=15%
15	NX	Run III						Run III:14.42-17.33' Recovery = 3.1'/2.91=106
20	NX	Run IV						Run IV:17.33-25.08' Recovery = 7.45/7.75=96%
25	NX	V						Run V:25.08-26.00' Recovery = 0.75'/0.92=81
	NX	VI						Run VI:26.00-27.00' Recovery = 0.9'/1.0=90
	NX	VII						Run VII:27.00-29.20' Recovery = 2.05'/2.20= 93%
30								Boring terminated at 29.20'
35								

CLASSIFICATION Visual by KC ASTM D2488

METHOD OF INVESTIGATION ASTM D1452, D1586 and D2113

DATE
STARTED 10-1-85
FINISHED 10-3-85
SHEET 1 OF 1

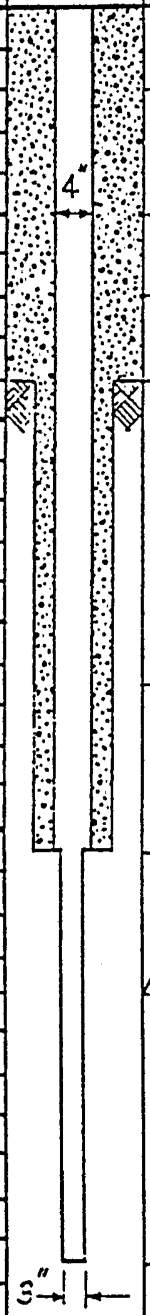
RECRA RESEARCH, INC.

SUBSURFACE LOG

HOLE NO. R-36
SURFACE ELEV. 402.2'
G.W. DEPTH 395.67'

PROJECT Xerox - Salt Road
Project Number 5C100236

LOCATION North 13 + 03.4
East 46 + 54.0



DEPTH-FT	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24
0	SS	1	1	1	3	3
5	SS	2	16	16	10	15
	NX	Run I				
	NX	Run II				
	NX	Run III				
	NX	Run IV				

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35

DESCRIPTION

TOPSOIL - Dark brown, moist, abundant organic matter 0.6'

Clayey sandy SILT - Moist, red brown, slightly plastic

Sandy SILT - Red brown, moist to wet, non-plastic, angular rock fragments

8.9'

SHALE to SILTSTONE - Red, massive, occasional gray mottling of SANDSTONE - Fine grained, well indurated. Fractured at 9.5-9.9'; 10.9-11.15'; 12.8'; 13.1-13.5'; 14.0'; 14.2'; 14.55' and 14.9'.

SILTSTONE to SANDSTONE, massive, well indurated, red with occasional gray mottling.
Thin shale layer at 17.6'
Pitting at 16.95 and 17.95'
Fractures at: 20.87-21.47'; 21.77'; 22.07'; 22.2'; 22.47'; 23.17'; 23.37'
Pitting at 22.37 to 22.47'

Boring Terminated at 30.8'

NOTES

Boring advanced with 6¼" HSA, ATV-mounted CME-750 drilling rig. Split Spoon sampling with 2" O.D. split spoon driven by a 140# hammer falling 30".

SS-1: 2.0' Drive
1.0' Recovery

SS-2: 2.0' Drive
0.8' Recovery

Auger refusal on bedrock at 8.9'

NX Core:

Run I: 8.9-16.75'
Recovery: 6.9'/7.85'
= 88%

Run II: 16.75-20.75'
Recovery: 3.8'/4.0'
= 95%

Run III: 20.87-24.3'
Recovery: 2.9'/3.5'
= 83%

Run IV: 24.3-30.8'
Recovery: 6.4'/6.5'
= 98%

CLASSIFICATION Visual by PMP, ASTM D2488
METHOD OF INVESTIGATION ASTM D1452, D2113 and D1586

DATE
STARTED 10-1-85
FINISHED 10-4-85
SHEET 1 OF 1

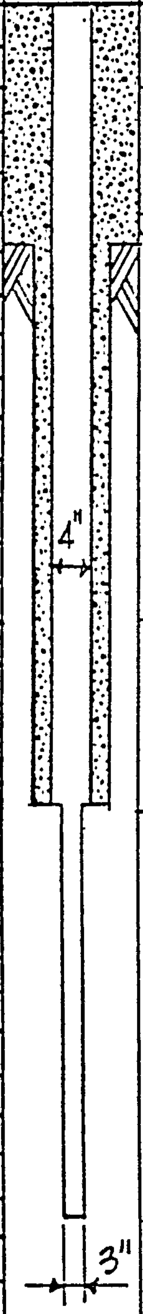
RECRA RESEARCH, INC.

SUBSURFACE LOG

HOLE NO. R-37
SURFACE ELEV. 403.0'
G.W. DEPTH 398.82'

PROJECT Xerox - Salt Road Complex
Project Number 5C100236

LOCATION North 13 + 08.2
East 49 + 97.4

DEPTH-FT	LOG	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER 0/6 12/18	6/12 18/24	DESCRIPTION	NOTES
0		SS	1	1 4	3 3	TOPSOIL, dark brown, silty, roots, moist 0.5' Clayey SILT, red brown with some angular gravel, wet	CME-75 truck mounted drill rig, 4¼" HSA. Split spoon sampling using a 2' long 2" O.D. split spoon driven by a 140# hammer falling 30".
5		SS	2	50/.35'		Increase in angular gravel 5.45'	
		NX	Run I			SILTSTONE to fine SANDSTONE, green gray, massive, well indurated, solutioning along bedding. Some shale at 6.0'. At 7.8' changes abruptly to CONGLOMERATE with gray green and gray pebbles in red brown matrix, some fossils. At 9.6' changes to gray green SILTSTONE to fine SANDSTONE, massive, well indurated, changes to red brown SILTSTONE to fine SANDSTONE at 10.0', fractured with some clay in fractures.	SS-1: 2.0' Drive 1.15 Recovery SS-2: 0.35' Drive 0.2' Recovery
10							Auger refusal on bedrock at 5.45'
15		NX	Run II				NX Core: Run I: 5.45-15.45' Recovery = 3.8'/10.0' = 38% Run II: 15.45-19.88' Recovery = 3.8'/ 4.43' = 86%
20		NX	Run III				Run III: 19.88-29.8' Recovery = 9.75/9.92' = 98% Boring terminated at 29.8'
25							
30							
35							

CLASSIFICATION Visual by KC ASTM D2488

METHOD OF INVESTIGATION ASTM D1452, D1586 and D2113

Building 208 Investigations

1990 Woodward-Clyde Boring Log RW-1
1987 Engineering Science Drilling Record MW-4

LOG of BORING No. RW-1

DATE 8/7/90 SURFACE ELEVATION 407.23 LOCATION 2604.84 E 822.11 N

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVA HEADSPACE MEASUREMENT (ppm)	OTHER TESTS	OTHER TESTS
0		5	Topsoil/Fill: Moist brown very fine sand, some silt			1		
	■	5						
1	■	8	Dry light brown very fine to coarse sand, trace fine gravel					
	■	48						
2	■	100/ 1"						
			Augered TOR 3.0'	404.2				
3								

Completion Depth 13' Feet Water Depth ______ Feet Date 8/7/90

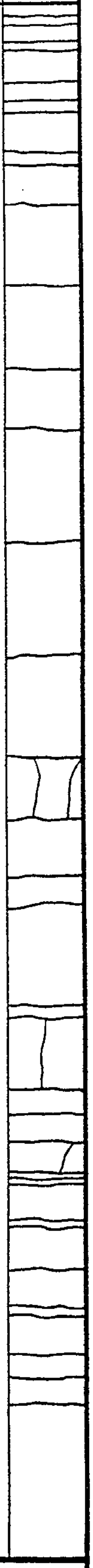
Project Name Xerox Corp./Bldg. 208, Recovery Well Program Project Number 90C2089

Woodward-Clyde Consultants

LOG of BORING No. RW-1

Page 1 of 2

DATE 8/7/90 SURFACE ELEVATION 407.23 LOCATION

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
3.0		NX RUN 1 3.0 to 8.0	Reynales Lms → Wallington Member medium grey, medium grained Dolostone with large brachiopods from 3.0 - 4.0'. Major water loss and weathered fracture at 3.4 and 3.8'. Interbedded argilleceous seams at 5.3 - 5.7', 6.4 - 6.6', 7.2 - 8.4', 9.5 - 10.8'. Vertical fractures at 7.5 - 8.0' and 9.0 - 9.5'.		56"/ 60" = 93%	24"/ 60" = 40%	9	
4.0							2	
5.0							2	
6.0							2	
7.0							3	
8.0		RUN 2 8.0 to 13.0			60"/ 60" = 100%	28"/ 60" = 47%	3	
9.0							6	
10.0							8	
11.0				396.2				
			Densmore Creekbed - Red to dk gray conglomerate w/calcareous cement	395.7			3	
12.0			Cambria Formation - Fine grained massive green sandstone. Becomes brown-red at 12.7' No sedimentary structures or fossils observed.					

Completion Depth 13.0' Feet Water Depth - Feet Date

Project Name Xerox Corp./Bldg. 208 Project Number 90C2089

Woodward-Clyde Consultants

LOG of BORING No. RW-1 Page 2 of

DATE 8/7/90 SURFACE ELEVATION 407.23 LOCATION

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
12.0							0	
			End of Run	394.23				
13.0								

Completion Depth 13.0' Feet Water Depth Feet Date 8/9/90

Project Name Xerox Corp./ Bldg. 208 Project Number 90C2089

WCC-RP1

Woodward·Clyde Consultants

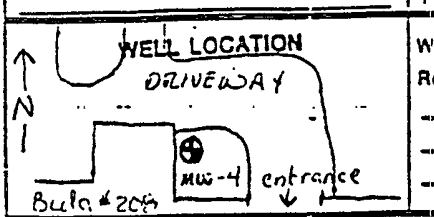
ENGINEERING-SCIENCE
DRILLING RECORD

DRILLING CONTRACTOR:
Driller: Jim Lamm
Inspector: Mark Chauvin

PROJECT NAME Xerox - Webster #208
PROJECT NO. SYC11.00

BORING NO. MW-4
Sheet 1 of 1
Location North of building #208 in grassy area to the northwest of the entrance to the building.

WELL LOCATION



Weather Sunny, Humid 85°
Remarks

Surface Elev. 406.66
Date Start 5/3/87
Date Finish 8/3/87

DEPTH BELOW SURFACE	SAMPLE DEPTHS	TYPE OF SAMPLE	STANDARD PENETRATION TEST 0–6	6–12	12–18	photovac ~~STRATA CHANGE~~ reading
	0 -2.0	SS-1	8	38-44	32	0.4/12.7
	2.0-4.0	SS-2	11	10-10	11	0.4/6.8
	4.0-6.0	SS-3	3	3-4	5	0.8/12.5
	6.0-8.0	SS-4	4	7-10	11	0.9/10.9
	8.0-10.0	SS-5	5	10-6	14	0.9/3.4
	10.0-11.2	SS-6	8	5-5%2		0.3/1.9
Run #1	Average coring time = 5 Min/ft					

REMARKS
FIELD IDENTIFICATION OF MATERIAL
(Incl. Color, Loss of Wash Water, Seams in Rock, etc.)

Topsoil 4"

Brown silt, some c-f sand and gravel, moist.

Becomes very moist at 4.0'. 6.0'

Brown c-f SAND, some c-f gravel and silt. wet.
grades to grey. 10.5'

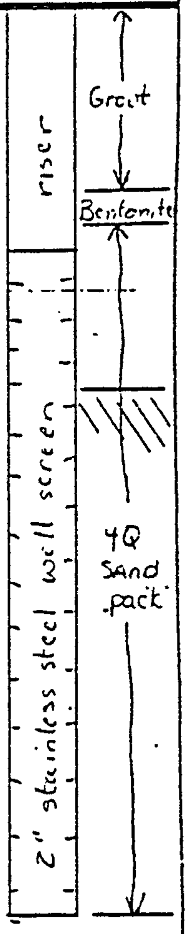
Weathered Siltstone. c-f gravel. wet. 11.2'

Conglomerate: Red and grey, coarse grain with rounded & subrounded clasts. Hematite layered within carbonaceous matrix. Bedded, medium-hard. Erosional unconformity w/ ss unit below. 12.2'

Grimsby Sandstone: Unit begins with a greenish-grey siltstone, bedded, medium-hard, fine grained with lenses of grey-green shale. At 13.2' it becomes predominately a red medium to fine grained sandstone. Thick bedded, medium-soft with nodules and blotches of the siltstone mixed in.

Boring Terminated at 16.2'

WELL CONSTRUCTION DETAILS



NOT TO SCALE

D = DRY W = WASHED C = CORED P = PIT A = AUGER CUTTINGS
U = UNDISTURBED [✓ SS] = SPLIT SPOON

PAY QUANTITIES	
FOOTAGE IN EARTH	11.2'
FOOTAGE IN ROCK	5.0'
NO. OF SAMPLES	6
CORE BARREL	x

1988 Woodward-Clyde Bldg. 119 Boring Logs

M-1D
MW-15
MW-20

LOG of BORING No. M-1D 1 of 3

DATE 1/22-26/88 **SURFACE ELEVATION** 412.1 **LOCATION** See Figure 2.

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			Soil description on previous page					
9		NX R-1 9- 19'	Shale, gray, severely to very severely weathered highly fractured	403.1	75 (90)	13 (15)	B	B
10							B	B
11							B	B
12			(Maplewood Shale)	399.4			B	B
13			Calcarenite, grey coarse to fine grained argillaceous with partings on argillaceous seams				1	
							6	
14							3	
15							5	
16							B	B
							2	
17			Continued on next page					

Completion Depth 30.5 Feet Water Depth — Feet Date —

Project Name Xerox; Nursery/Pilot Plant Project Number 87C2696

Woodward-Clyde Consultants

LOG of BORING No. M-1D

DATE 1/22-26/88 **SURFACE ELEVATION** 412.1 **LOCATION** See Figure 2

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
17								
							5	
18			-becomes fossiliferous					
							5	
			Calcarenite, gray, coarse to fine grained, argillaceous, fossiliferous					
19		R-2 19- 25 ft.			92 (66)	81 (58)	1	
20								
							3	
21								
							2	
22								
							B	B
							1	
23								
							3	
24								
							1	
25		R-3 25.3- 30.5ft.	-no fossils					
					88 (62)	46 (29)	0	
26								

Continued on next page

Completion Depth 30.5 Feet Water Depth — Feet Date —

Project Name Xerox; Nursery/Pilot Plant Project Number 87C2696

LOG of BORING No. M-1D

3 of 3

DATE 1/22-26/88 SURFACE ELEVATION 412.1 LOCATION See Figure 2

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
26			Calcerenite, gray argillaceous				2	
27							4	
28							6	
29				383.1				
			Comglomerate, red, hematitic, generally intact (Kodak Sandstone)	382.2			0	
30			Siltstone, green-gray -becomes red (Grimsby Formation)	381.6			0	
31			B = Broken/Fragmented Rock Pieces < 2 to 4 inches					

Completion Depth 30.5 Feet Water Depth — Feet Date —

Project Name Xerox; Nursery/Pilot Plant Project Number 87C2696

Woodward-Clyde Consultants

LOG of BORING No. MW-15

DATE 2/10-11/88 **SURFACE ELEVATION** 410.3 **LOCATION** See Figure 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVA HEADSPACE MEASUREMENT (ppm)	OTHER TESTS	OTHER TESTS
0			Dark brown gravelly fine sand and silt					
			(Topsoil)	409.8	SM/GM			
			Brown fine sand and gravel, trace silt and cobbles		GP/SP			
1		13+				2.4		
2								
					GP/SP			
3		44+				0.8		
4			(Fill)	406.3				
			Orange-brown gravelly fine sand, trace silt		SP			
5		29+				3		
6			-with rock fragments		SP			
7		66				4.8*		
8		60/1"	(Glaciofluvial)	402.3				
			Fractured calcarenite (Kodak Sandstone)	402.2				

Completion Depth 19.2 Feet Water Depth - Feet Date

Project Name Xerox; Pilot Plant, Phase II Project Number 87C26962

Woodward-Clyde Consultants

1 of 2

LOG of BORING No. MW-15

DATE 2/10-11/88 **SURFACE ELEVATION** 410.3 **LOCATION** See Figure 2

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
8			Soil description on previous page	402.0				
		NX R-1 8.3- 18.3ft.	Calcarenite, gray, medium to fine grained, argillaceous with clayey and argillaceous partings		80 (96)	28 (33)	B	B
9								
							B	B
10								
			-with clay in fractures from ∿ 10.25 to 14.65 ft.				B	B
11								
							B	B
12								
							B	B
13								
							1	
14			-fossiliferous with solution cavities from ∿ 14 to 18.25 ft.					
							5	
15								
							B	
16								
							B	
17								

Continued on next page

Completion Depth 19.2 Feet Water Depth - Feet Date

Project Name Xerox; Pilot Plant, Phase II Project Number 87C26962

Woodward-Clyde Consultants

LOG of BORING No. MW-15

2 of 2

DATE ____ SURFACE ELEVATION 410.3 LOCATION See Figure 2

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
17								
							3	
18								
							2	
19								
			(Kodak Sandstone)	391.1				
			B = Broken/Fragmented Rock Pieces ∿ 2 inches					

Completion Depth 19.2 Feet Water Depth ____ Feet Date ____

Project Name Xerox; Pilot Plant, Phase II Project Number 87C26962

Woodward-Clyde Consultants

LOG of BORING No. MW-20

DATE 2/17-18/88 **SURFACE ELEVATION** 409.1 **LOCATION** See Figure 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION SOIL BORING REPORT	ELEVATION	USCS SYMBOL	OVA HEADSPACE MEASUREMENT (ppm)	OTHER TESTS	OTHER TESTS
0			Medium to dark brown organic silty medium to fine sand with a trace of gravel (Topsoil)	408.4	SM			
1		9+	Brown gravelly clayey silty fine sand		SC/GM	ND		
2			-becomes light brown with cobbles					
3		35+				1.8		
4			(Possible Fill)	405.1				
			Red-brown clayey silty fine sand with rock fragments	404.6	SC/GM			
			Very firm to hard red-brown to light green silty clay	404.1	CL			
5		55+	Red-brown clayey silty fine sand		SC	1.0		
			-with rock fragments	403.4	SC/GM			
6			Very firm light green silty clay	403.1	CL			
			Light brown clayey fine sand (Glacial Till)	402.6	SC			
		100/5"	Gray calcarenite			9.5*		
7		100/5"				-		
8		100/0"**	(Kodak Sandstone)	401.1				
			** Split-spoon refusal at 8.0 ft. ?					
9								

Completion Depth 19 Feet Water Depth - Feet Date -

Project Name Xerox; Pilot Plant, Phase II Project Number 87C26962

Woodward-Clyde Consultants

LOG of BORING No. MW-20

1 of 2

DATE 2/17-18/88 SURFACE ELEVATION 409.1 LOCATION See Figure 2

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
			Soil Description on Previous Page	399.1				
10		NX R-1 10.0 to 15.0	CALCARENITE, gray, fine grained, severly weathered, wavy bedding structures, argillaceous, fossiliferous and localized solution cavities		90	51	5	
11							4	
12			fossiliferous zone				5	
13							2	
14							1	
15		R-2 15.0 to 20.0	clay seam, argillaceous at 15.7'		97 (58)	75 (45)	6	
16							1	
17							4	
18								

Completion Depth 20.0 Feet Water Depth — Feet Date —

Project Name Xerox/Webster, New York Project Number 87C26962

LOG of BORING No. MW-20 2 of 2

DATE 2/17-18/88 **SURFACE ELEVATION** ________ **LOCATION** See Figure 2

DEPTH, ft.	SAMPLES	CORE TYPE & RUN INTERVAL	DESCRIPTION ROCK CORING REPORT	ELEVATION	RECOVERY % (in.)	RQD % (in.)	FRACTURE DENSITY (nos./ft.)	FRACTURE DIP
18			(continued from previous page)					
							4	
			-Argillaceous partings at 18.6'					
19								
							2	
			-clay seams at 19.5'					
20				389.1				
			Note: The boring was seamed to 19 feet with a 6-inch diameter roller bit after coring to 20 feet with an NX core barrel					

Completion Depth 20 Feet Water Depth — Feet Date —

Project Name Xerox/Webster, New York Project Number 87C26962

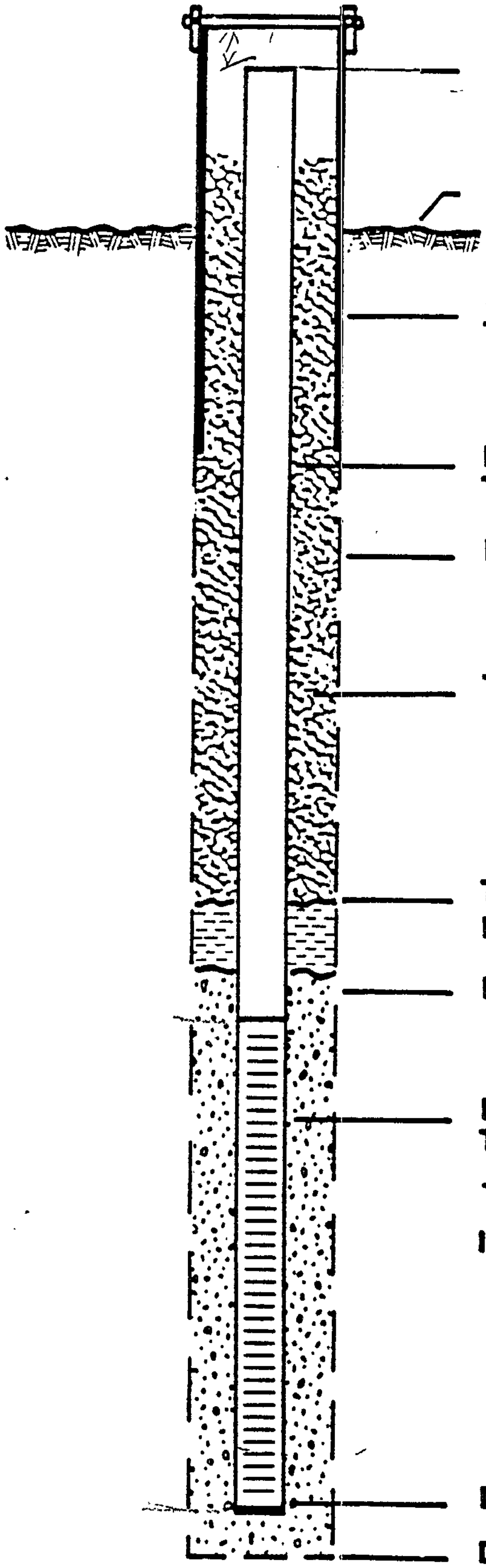
Woodward-Clyde Consultants

APPENDIX H

Well Construction Reports

1986 Woodward-Clyde Monitoring Well Reports

- MW-1S
- MW-1
- MW-2S
- MW-2
- MW-3
- MW-3I
- MW-3D
- MW-4
- MW-5S
- MW-5
- MW-6
- MW-7
- MW-10
- MW-11
- MW-12S
- MW-12
- MW-13
- MW-14
- MW-15
- MW-16
- MW-17
- MW-17I
- MW-17D
- MW-18
- MW-18I
- MW-18D
- MW-19
- MW-20
- MW-21
- MW-22



Elevation of top of riser pipe 409.64'

Ground Elevation 407.6'

I.D. of surface casing 6"
Type of surface casing steel

I.D. of riser pipe 2"
Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets
Depth to top of seal 0.7'

Depth to top of sand pack 1.7'

Depth to top of screen 2.2'
Type of screened section .010 slot stainless steel

I.D. of screened section 2"

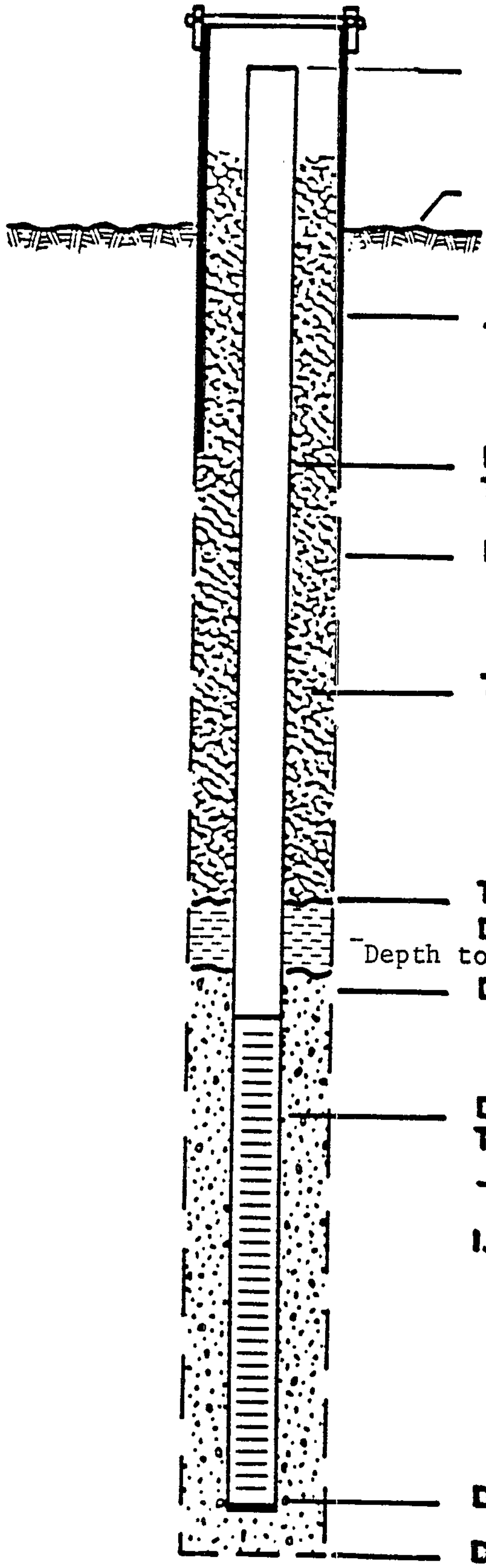
Depth to bottom of well 400.4 7.2'
Depth of borehole 8'

REPORT OF MONITORING WELL

MW-1S

DRAWN BY: TDG **CHECKED BY:** PFB **PROJECT NO:** 86C2046 **DATE:** 5/15/86 **FIGURE NO:** B-1

Woodward-Clyde Consultants



Elevation of top of riser pipe 409.42'

Ground Elevation 407.8'

I.D. of surface casing 6"
Type of surface casing steel

I.D. of riser pipe 2"
Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal Bentonite pellets
Depth to top of seal 13.5'
Depth to Bedrock 14'
Depth to top of sand pack 14.5'

Depth to top of screen 15'
Type of screened section .010 slot stainless steel

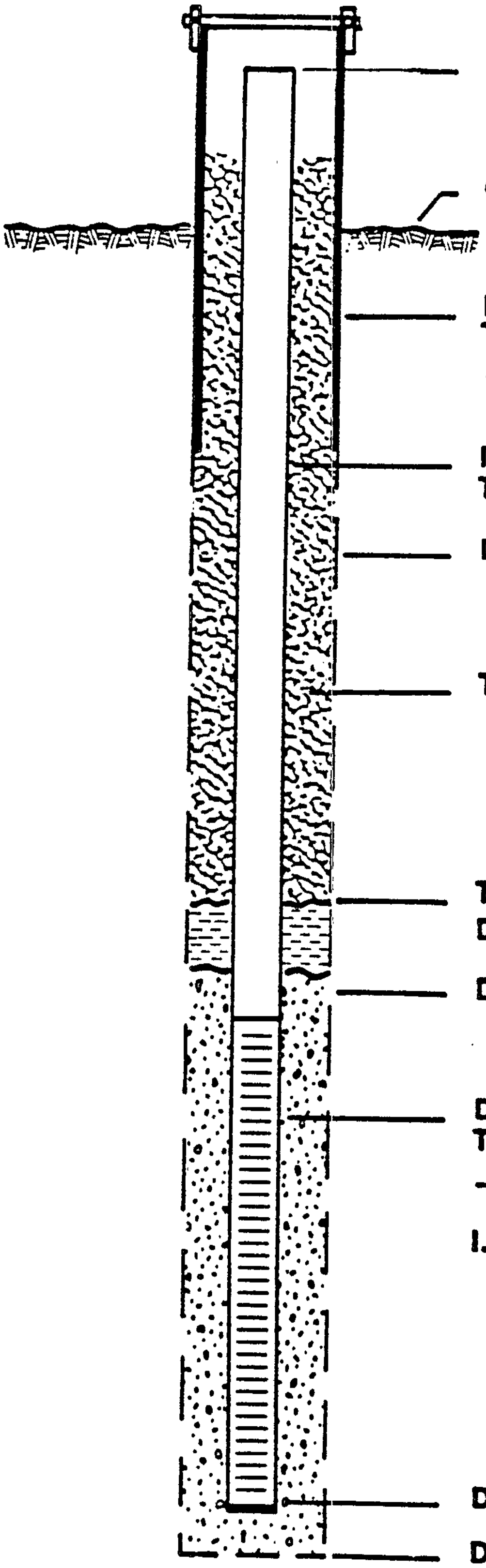
I.D. of screened section 2"

Depth to bottom of well 20'
Depth of borehole 22'

REPORT OF MONITORING WELL MW-1

DRAWN BY: TDG | **CHECKED BY:** PFB | **PROJECT NO:** 86C2046 | **DATE:** 4/29/86 | **FIGURE NO:** B-2

Woodward-Clyde Consultants



Elevation of top of riser pipe 409.95'

Ground Elevation 408.0'

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 2.8 '

Depth to top of sand pack 3.8 '

Depth to top of screen 4.3'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 9.3 '

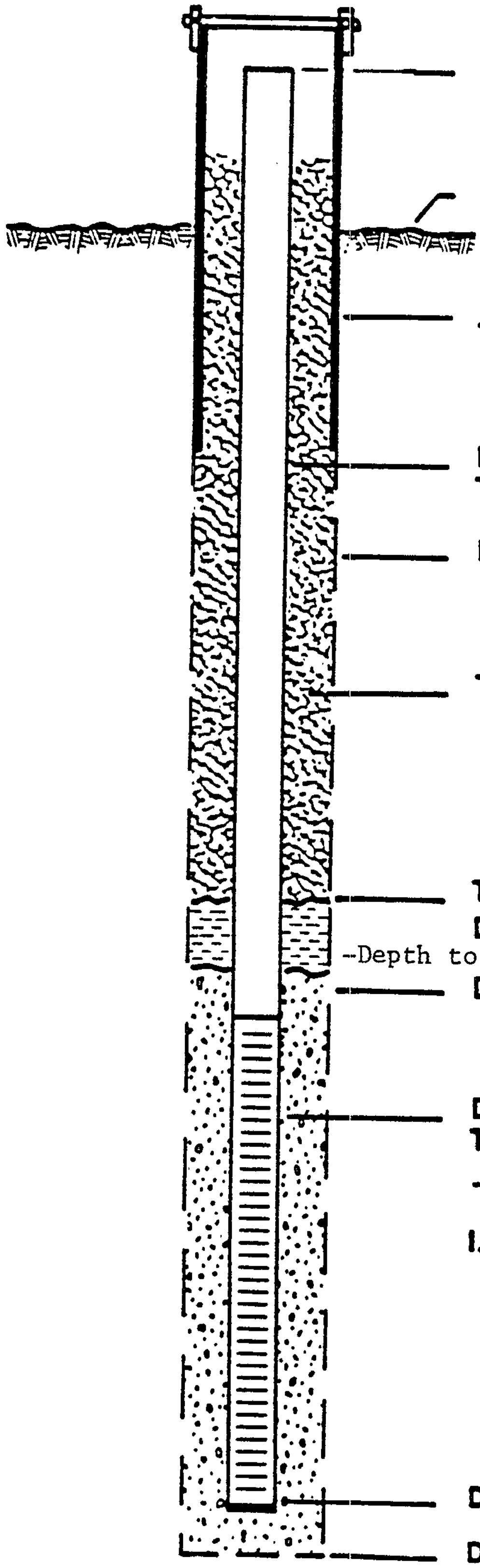
Depth of borehole 10.2

REPORT OF MONITORING WELL

MW-2 S

DRAWN BY: TDG
CHECKED BY: PFB
PROJECT NO: 86C2046
DATE: 5/15/86
FIGURE NO: B-3

Woodward-Clyde Consultants



Elevation of top of riser pipe 409.98'

Ground Elevation 408.1'

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 11'

-Depth to bedrock 11.5'

Depth to top of sand pack 12'

Depth to top of screen 12.5'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

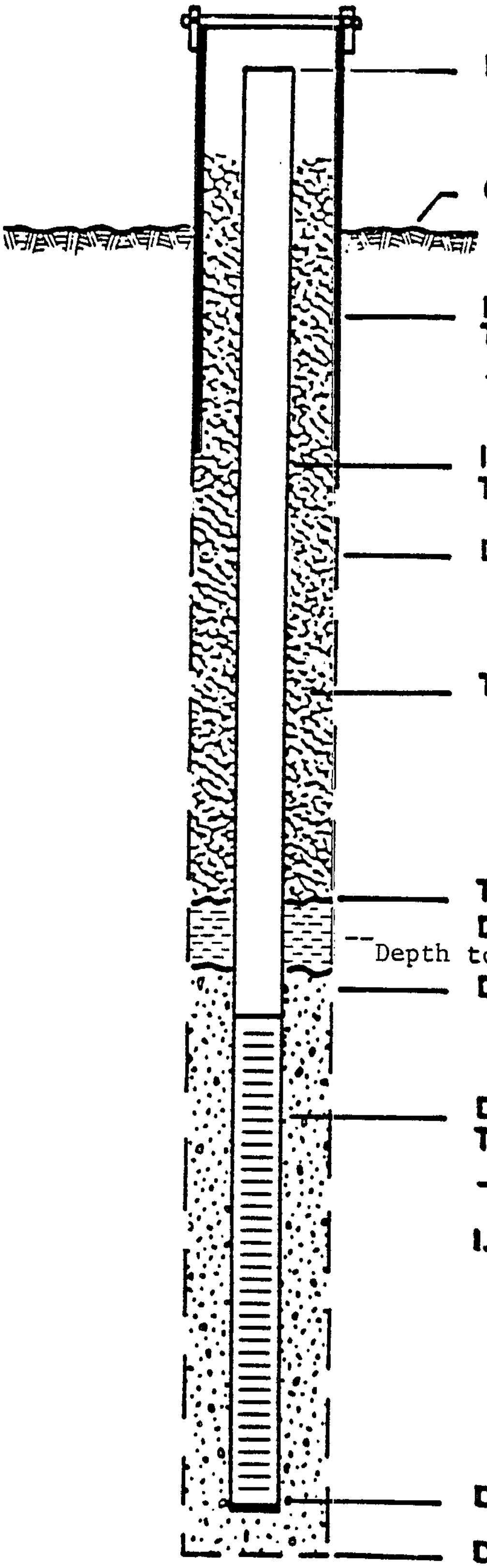
Depth to bottom of well 17.5'

Depth of borehole 18.5'

REPORT OF MONITORING WELL MW-2

DRAWN BY: TDG	CHECKED BY: PFB	PROJECT NO: 86C2046	DATE: 5/6/86	FIGURE NO: B-4

Woodward-Clyde Consultants



Elevation of top of riser pipe 40 9.64'

Ground Elevation 407.5 '

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 9'

Depth to bedrock 10'

Depth to top of sand pack 10.5'

Depth to top of screen 11'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 16'

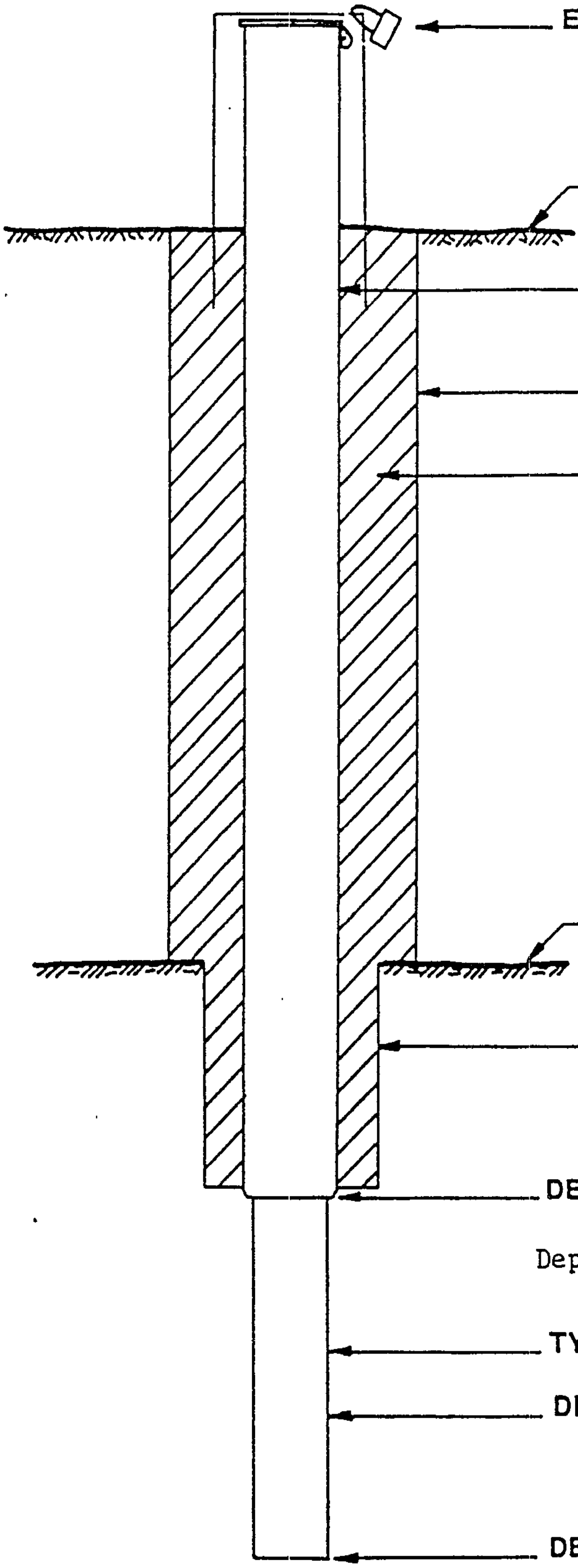
Depth of borehole 17'

REPORT OF MONITORING WELL

MW-3

DRAWN BY: TDG	CHECKED BY: PFB	PROJECT NO: 86C2046	DATE: 5/7/86	FIGURE NO: B-5

Woodward-Clyde Consultants



ELEVATION OF TOP OF RISER 409.26'

GROUND ELEVATION 406.88'

I.D. OF WELL CASING 4"

TYPE OF WELL CASING carbon steel

DIAMETER OF BOREHOLE 6"

TYPE OF BACKFILL cement/bentonite slurry

DEPTH TO BEDROCK SURFACE 11.5'

DIAMETER OF BOREHOLE 6"

DEPTH TO BOTTOM OF WELL CASING 25.0'

Depth (s) to Fracture 28.1 - 28.8'

TYPE OF SCREENED SECTION Open Hole

DIAMETER OF BOREHOLE 2.9"

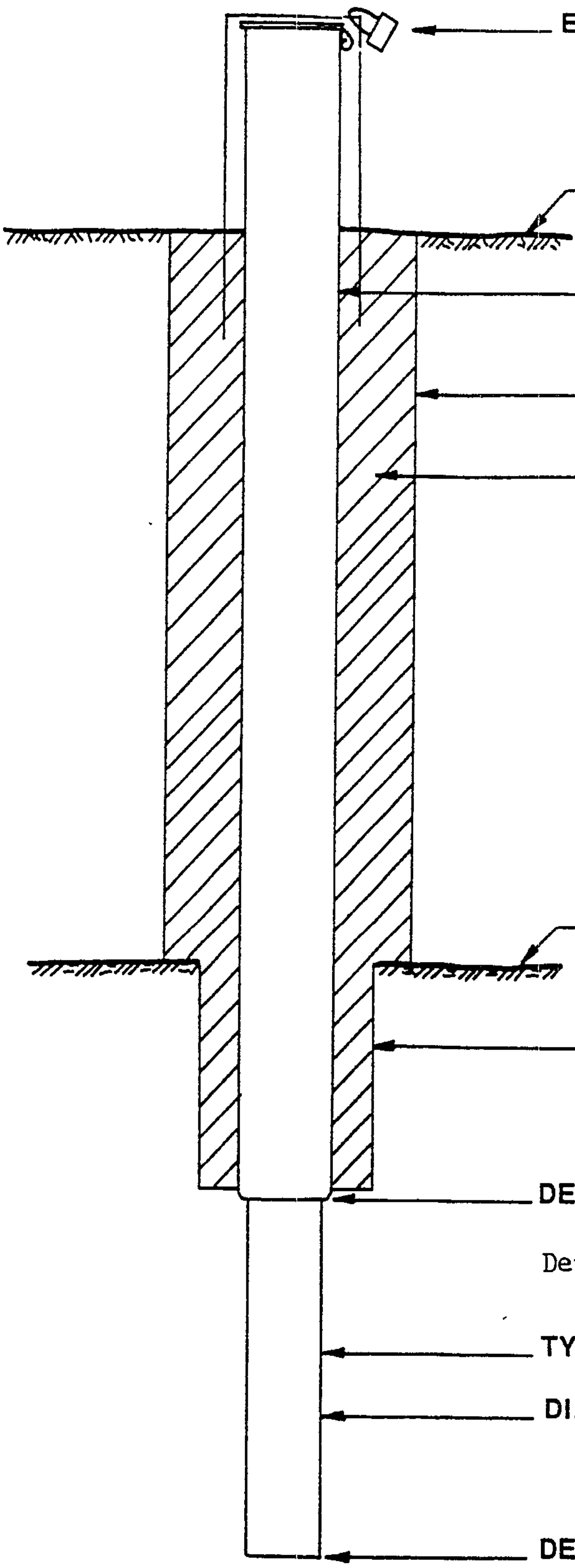
DEPTH TO BOTTOM OF WELL 30.0'

DEPTH TO BOTTOM OF BOREHOLE 30.0'

REPORT OF MONITORING WELL

MW-3I

Drawn by: SLT	Checked by: PFB	Project No.: 86C2046	Date: 10/2/86	Figure No.: B-6



ELEVATION OF TOP OF RISER 409.09'

GROUND ELEVATION 406.9'

I.D. OF WELL CASING 4"

TYPE OF WELL CASING carbon steel

DIAMETER OF BOREHOLE 6"

TYPE OF BACKFILL cement/bentonite slurry

DEPTH TO BEDROCK SURFACE 10.5'

DEPTH TO BOTTOM OF OUTER CASING 10.5' (1)

DIAMETER OF BOREHOLE 6"

DEPTH TO BOTTOM OF WELL CASING 35.0'

Depth(s) to Fracture 37.4', 39.5'

TYPE OF SCREENED SECTION Open Hole

DIAMETER OF BOREHOLE 2.9"

DEPTH TO BOTTOM OF WELL 40.0'

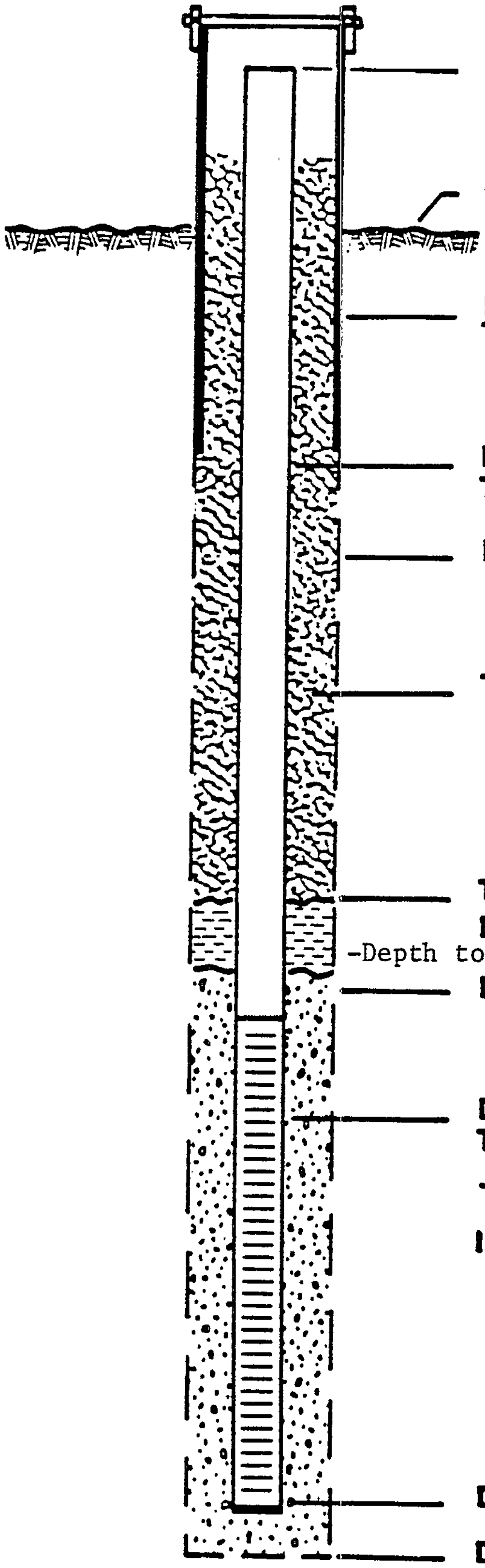
DEPTH TO BOTTOM OF BOREHOLE 40.0'

(1) Not able to pull outer (6") casing

REPORT OF MONITORING WELL

MW-3D

Drawn by: SLT	*Checked by:* PFB	*Project No.:* 86C2046	*Date:* 10/3/86	*Figure No.:* B-7



Elevation of top of riser pipe 408.30'

Ground Elevation 406.2'

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 9.3'

-Depth to bedrock 9.8'

Depth to top of sand pack 10.3'

Depth to top of screen 10.8'

Type of screened section .010 slot stainless steel

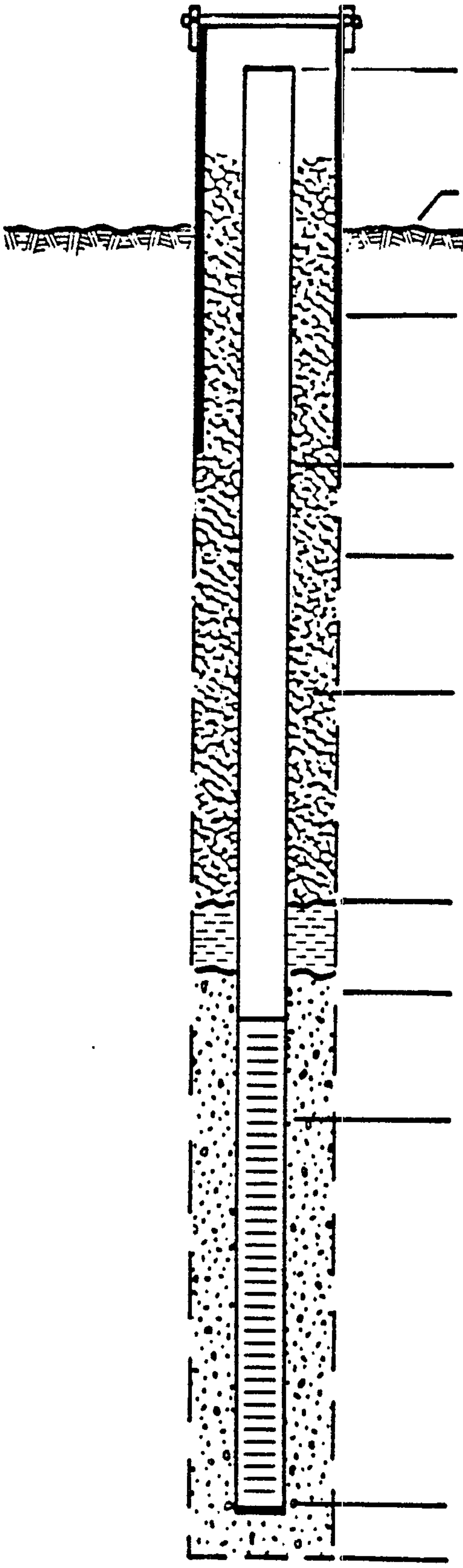
I.D. of screened section 2"

Depth to bottom of well 15.8'

Depth of borehole 16.9'

REPORT OF MONITORING WELL MW-4

DRAWN BY: TDG	**CHECKED BY:** PFB	**PROJECT NO:** 86C2046	**DATE:** 5/4/86	**FIGURE NO:** B-8



Elevation of top of riser pipe 409.20'

Ground Elevation 406.5'

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 0.7'

Depth to top of sand pack 1.7'

Depth to top of screen 2.2'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 7.2'

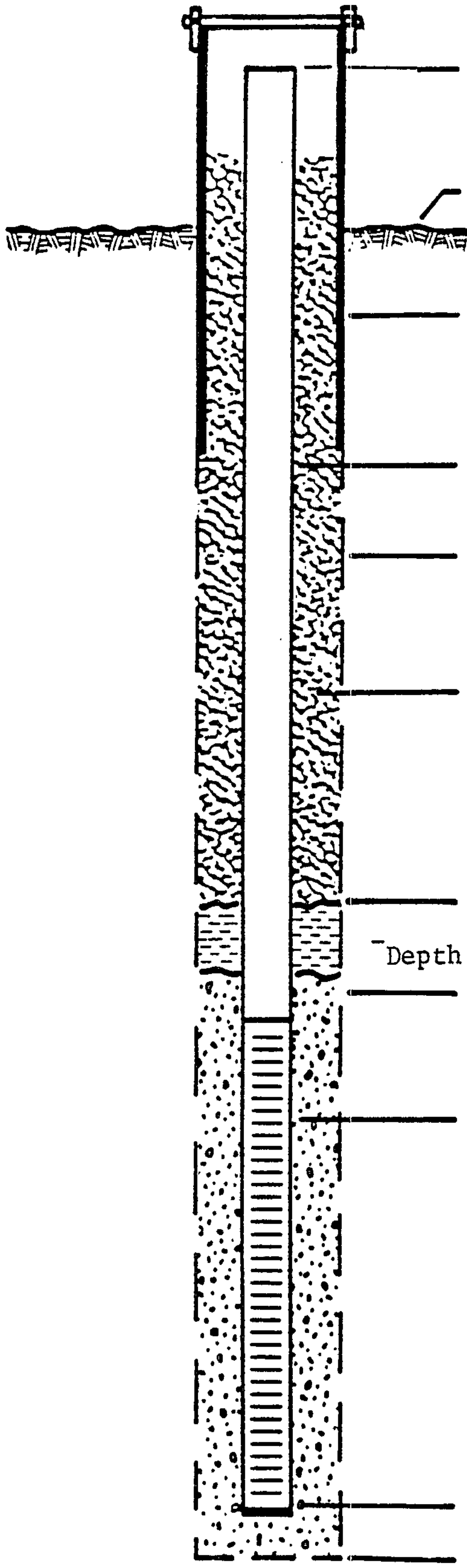
Depth of borehole 8'

REPORT OF MONITORING WELL

MW-5S

DRAWN BY: TDG
CHECKED BY: PFB
PROJECT NO: 86C2046
DATE: 5/14/86
FIGURE NO B-9

Woodward-Clyde Consultants



Elevation of top of riser pipe 408.89'

Ground Elevation 406.6'

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 8.8 '

Depth to bedrock 9.3 '

Depth to top of sand pack 9.8 '

Depth to top of screen 10.3 '

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 15.3 '

Depth of borehole 16.8'

REPORT OF MONITORING WELL

MW-5

DRAWN BY: TDG

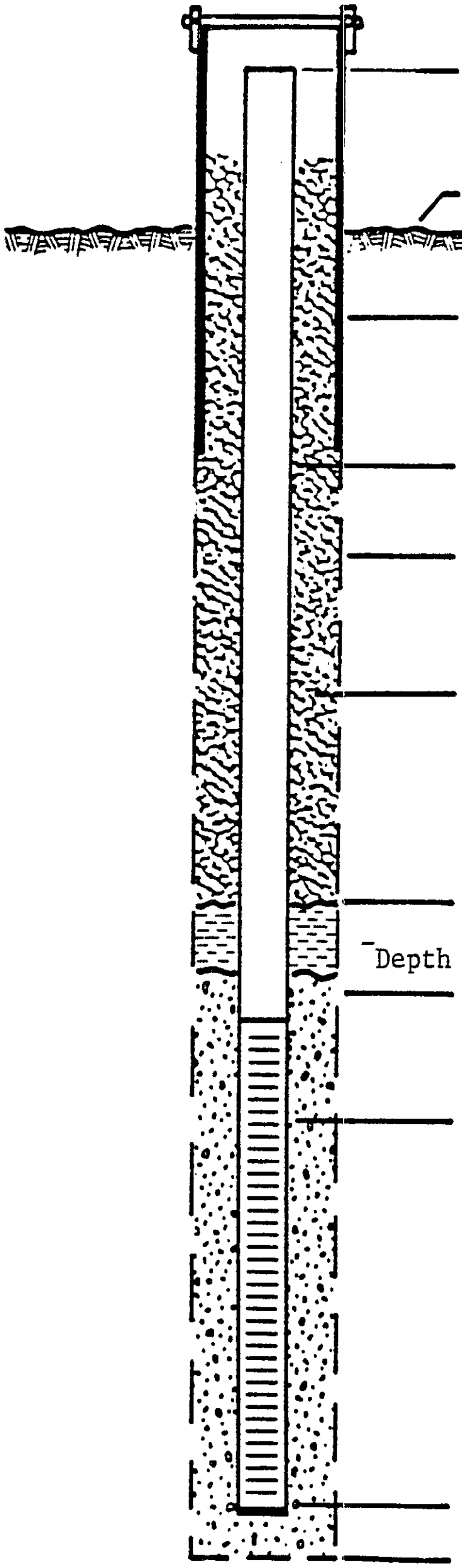
CHECKED BY: PFB

PROJECT NO: 86C2046

DATE: 5/1/86

FIGURE NO B-10

Woodward-Clyde Consultants



Elevation of top of riser pipe 408.10'

Ground Elevation 406.0 '

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 11.5'

Depth to bedrock 12'

Depth to top of sand pack 12.5'

Depth to top of screen 13'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 18'

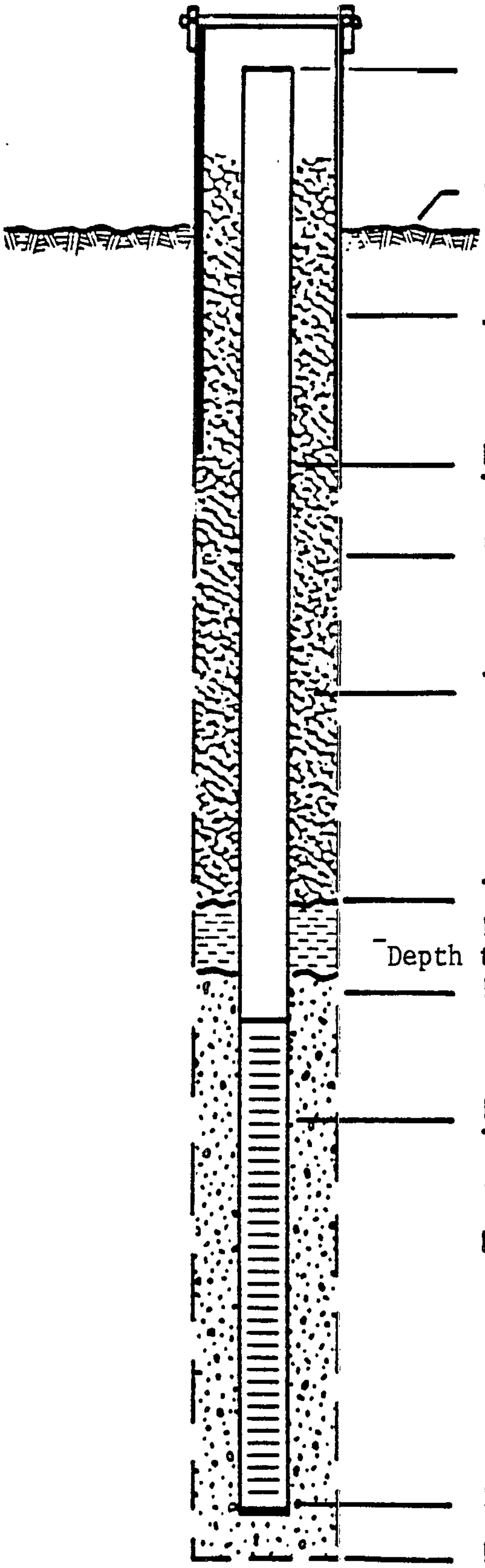
Depth of borehole 19'

REPORT OF MONITORING WELL

MW-6

DRAWN BY: TDG **CHECKED BY:** FFB **PROJECT NO:** 86C2046 **DATE:** 5/5/86 **FIGURE NO** B-11

Woodward-Clyde Consultants



Elevation of top of riser pipe 408.77'

Ground Elevation 406.9'

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal Bentonite pellets

Depth to top of seal 7.5'

Depth to bedrock 8.1'

Depth to top of sand pack 8.5'

Depth to top of screen 9'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 14'

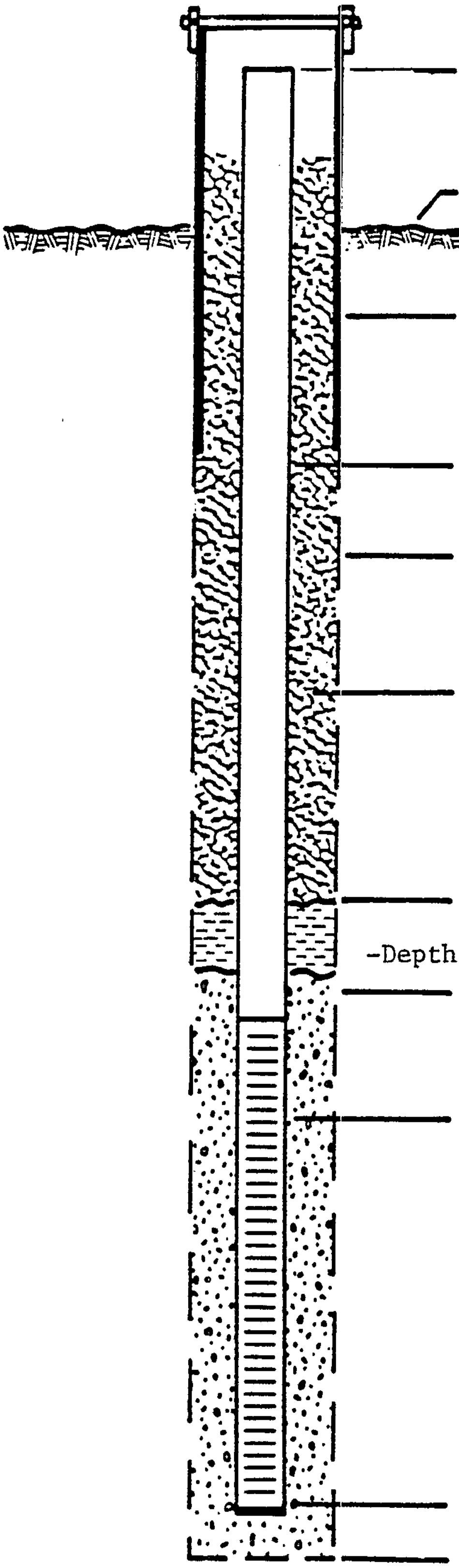
Depth of borehole 15'

REPORT OF MONITORING WELL

MW-7

DRAWN BY: TDG	**CHECKED BY:** PFB	**PROJECT NO:** 86C2046	**DATE:** 1/30/86	**FIGURE NO** B-12

Woodward-Clyde Consultants



Elevation of top of riser pipe 411.03'

Ground Elevation 409.2'

I.D. of surface casing 6"
Type of surface casing steel

I.D. of riser pipe 2"
Type of riser pipe stainless steel
Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets
Depth to top of seal 7'
-Depth to bedrock 8.1'
Depth to top of sand pack 8.5'

Depth to top of screen 9'
Type of screened section
.010 slot stainless steel

I.D. of screened section 2"

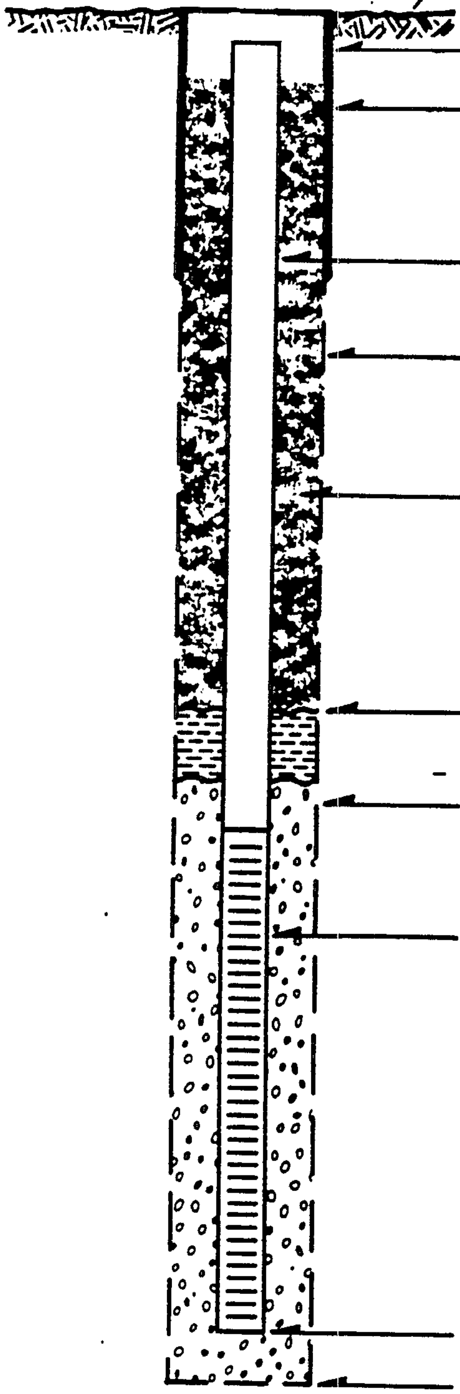
Depth to bottom of well 14'
Depth of borehole 15.1'

REPORT OF MONITORING WELL

MW-10

DRAWN BY: TDG	**CHECKED BY:** PFB	**PROJECT NO:** 86C2046	**DATE:** 5/8/86	**FIGURE NO:** B-13

Woodward-Clyde Consultants



Ground Elevation 409.12'

Elevation of top of riser pipe 408.5'

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 8.2'

- Depth to bedrock 8.7'

Depth to top of sand pack 9.2'

Depth to top of screen 9.7'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

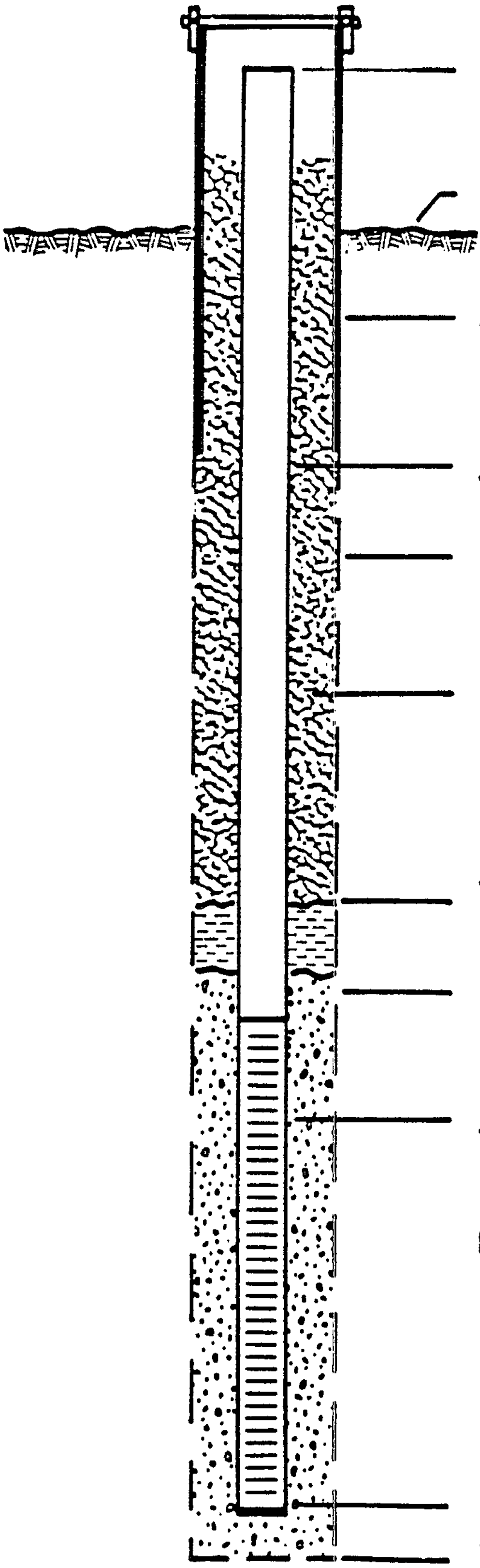
Depth to bottom of well 14.7'

Depth of borehole 15.7'

REPORT OF MONITORING WELL NO. MW-11

DRAWN BY: D.B.	CHECKED BY: PFB	PROJECT NO: 86C2046	DATE: 5/9/86	FIGURE NO: B-14

Woodward-Clyde Consultants



Elevation of top of riser pipe 409.89'

Ground Elevation 408.1'

I.D. of surface casing 6"

Type of surface casing steel

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 6.1'

Depth to top of sand pack 7.1'

Depth to top of screen 7.6'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 12.6'

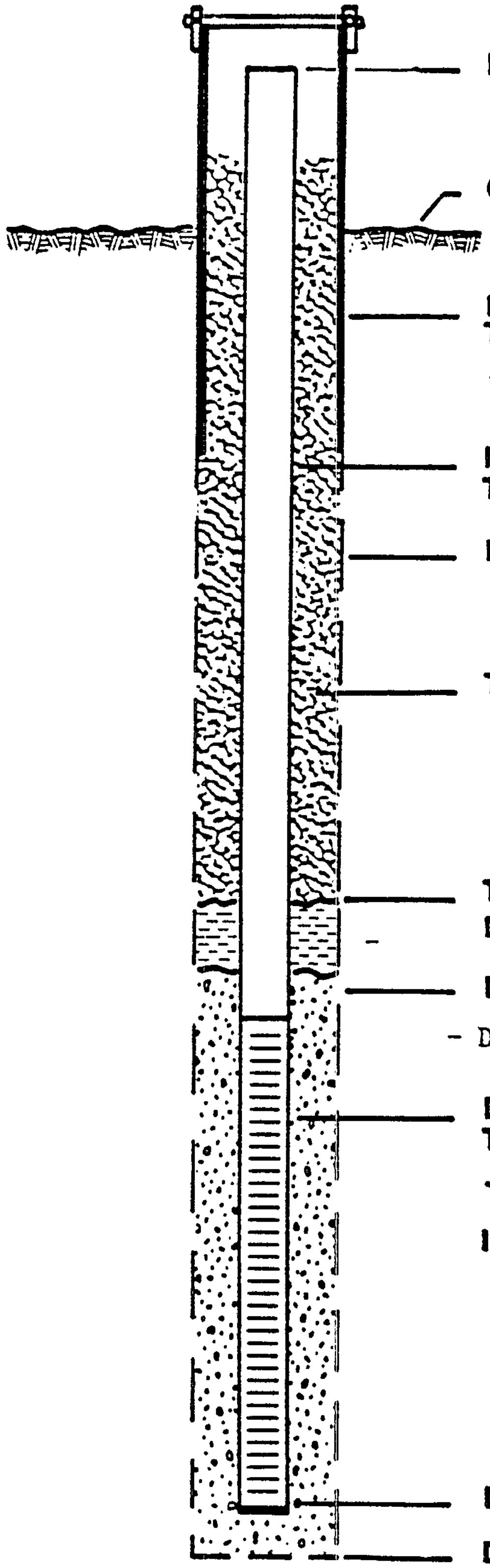
Depth of borehole 13'

REPORT OF MONITORING WELL

MW-12.S

DRAWN BY: TDG	**CHECKED BY:** PFB	**PROJECT NO:** 86C2046	**DATE:** 5/16/86	**FIGURE NO:** B-15

Woodward-Clyde Consultants



Elevation of top of riser pipe 409.57'

Ground Elevation 407. 7'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 6"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 4.9'

Depth to top of sand pack 5.9'

- Depth to bedrock 6.2'

Depth to top of screen 6.4'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 11.7'

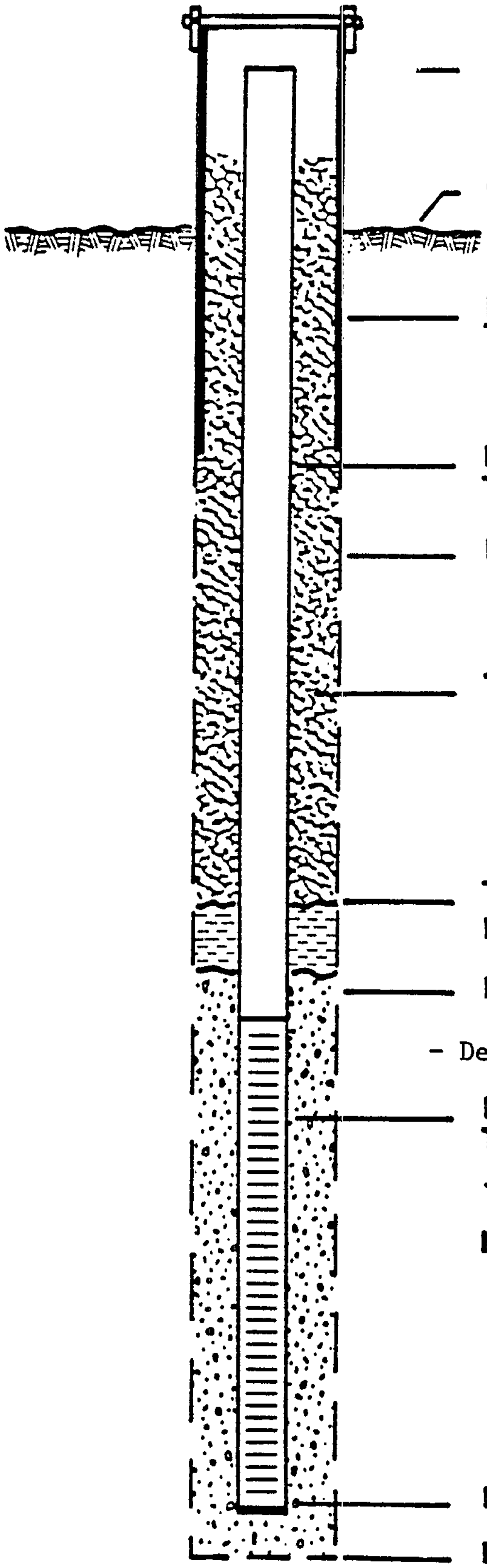
Depth of borehole 13.2'

REPORT OF MONITORING WELL

MW-12

DRAWN BY: SLT	CHECKED BY: PFB	PROJECT NO: 86C2046	DATE: 9/15/86	FIGURE NO: B-16

Woodward-Clyde Consultants



Elevation of top of riser pipe 410.21'

Ground Elevation 407.9'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 10.4'

Depth to top of sand pack 11.8'

- Depth to bedrock 12.4'

Depth to top of screen 13.1'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

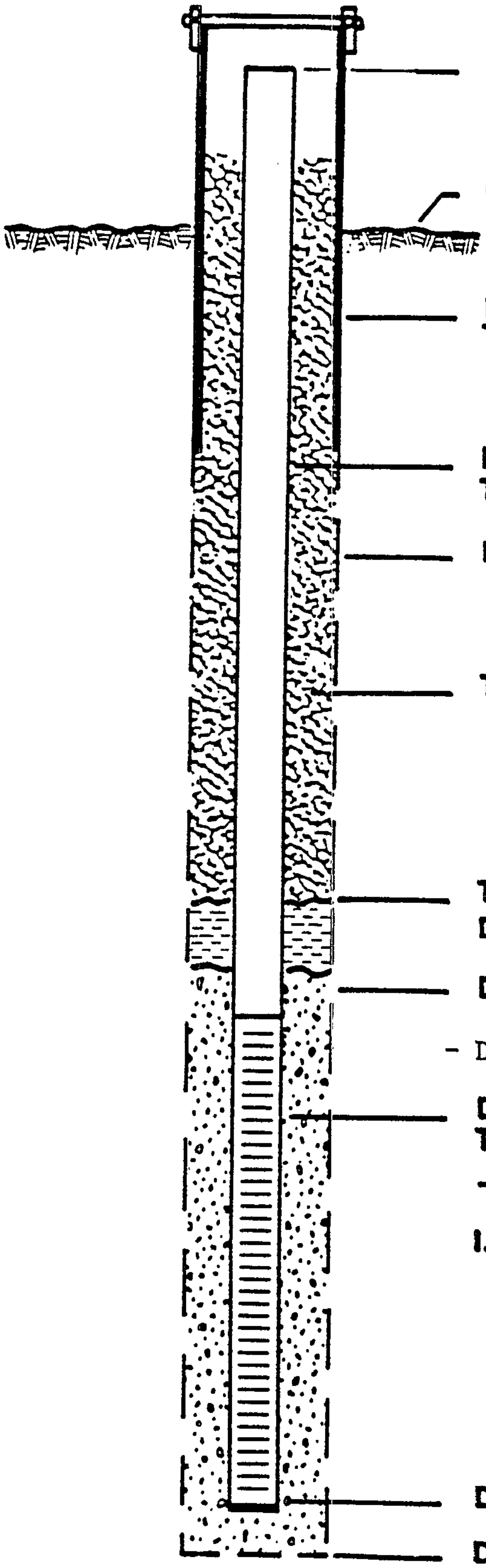
Depth to bottom of well 18.4'

Depth of borehole 19.4

REPORT OF MONITORING WELL MW-13

DRAWN BY: SLT	CHECKED BY: PFB	PROJECT NO: 86C2046	DATE: 9/8/86	FIGURE NO: B-17

Woodward-Clyde Consultants



Elevation of top of riser pipe 407.18'

Ground Elevation 405. 3'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 5'

Depth to top of sand pack 6'

- Depth to bedrock 6.1'

Depth to top of screen 6.6'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 11.9'

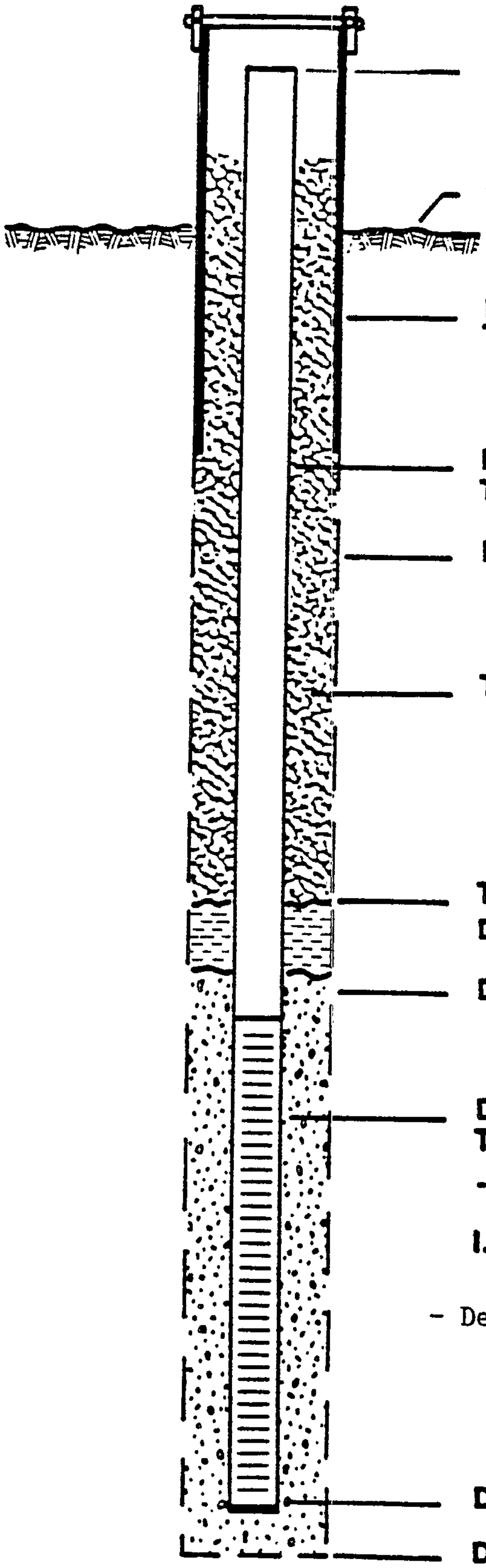
Depth of borehole 13.1'

REPORT OF MONITORING WELL

MW-14

DRAWN BY: SLT
CHECKED BY: PFB
PROJECT NO: 86C2046
DATE: 9/5/86
FIGURE NO B-18

Woodward-Clyde Consultants



Elevation of top of riser pipe 404.86'

Ground Elevation 403.5'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 6.5'

Depth to top of sand pack 7.5'

Depth to top of screen 8.5'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

- Depth to bedrock 8.8'

Depth to bottom of well 13.8'

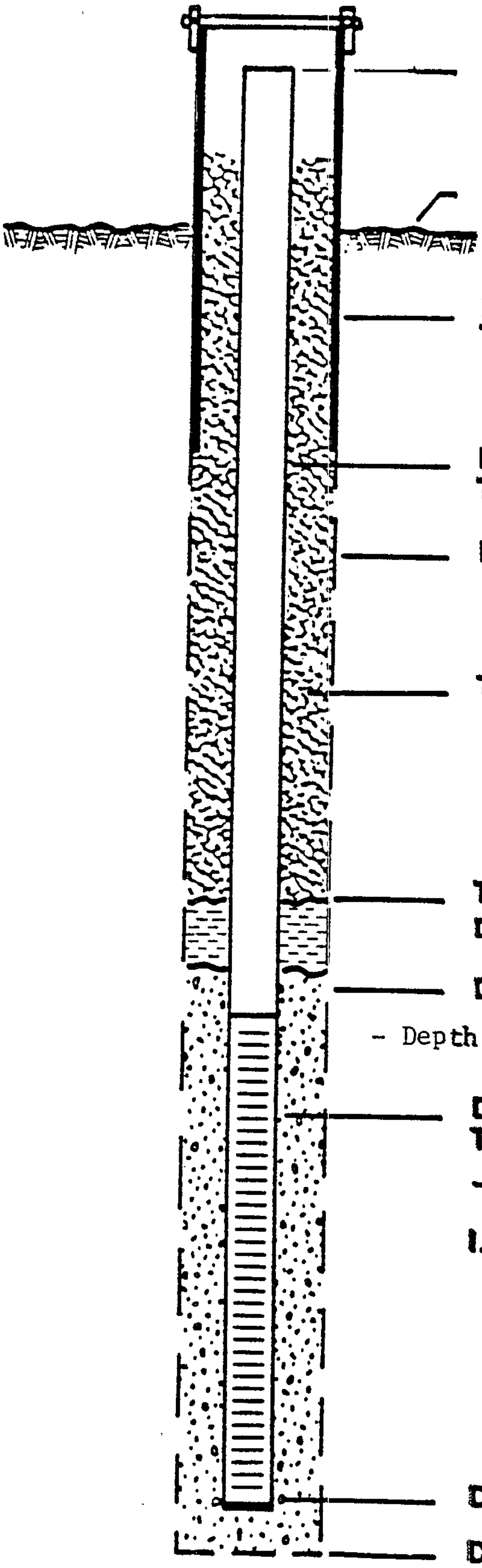
Depth of borehole 14.8'

REPORT OF MONITORING WELL

MW-15

DRAWN BY: SLT	**CHECKED BY** PFB	**PROJECT NO:** 86C2046	**DATE:** 9/4/86	**FIGURE NO:** B-19

Woodward-Clyde Consultants



Elevation of top of riser pipe 409.52'

Ground Elevation 407. 6'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 6"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 7.0'

Depth to top of sand pack 8.0'

- Depth to bedrock 8.8'

Depth to top of screen 8.8'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

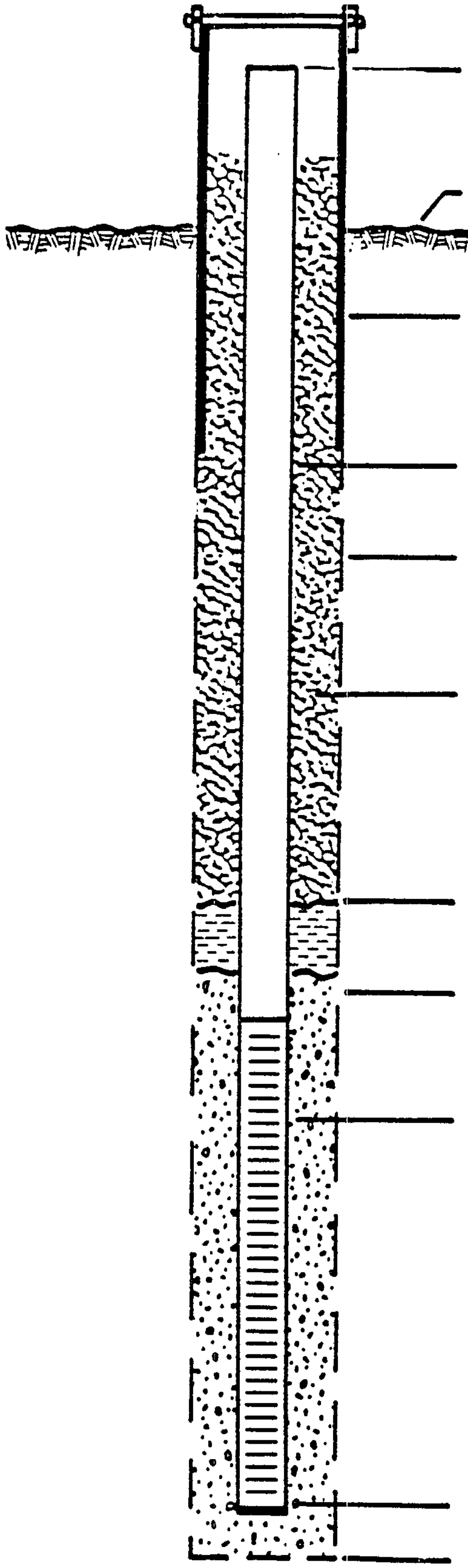
Depth to bottom of well 14.0'

Depth of borehole 15.3'

REPORT OF MONITORING WELL MW-16

DRAWN BY: SLT	CHECKED BY: PFB	PROJECT NO: 86C2046	DATE: 9/16/86	FIGURE NO: B-20

Woodward-Clyde Consultants



Elevation of top of riser pipe 411.16'

Ground Elevation 409.3'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 6"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 8.5'

Depth to top of sand pack 9.5'

Depth to top of screen 10.0'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bedrock 10.1'

Depth to bottom of well 15.3'

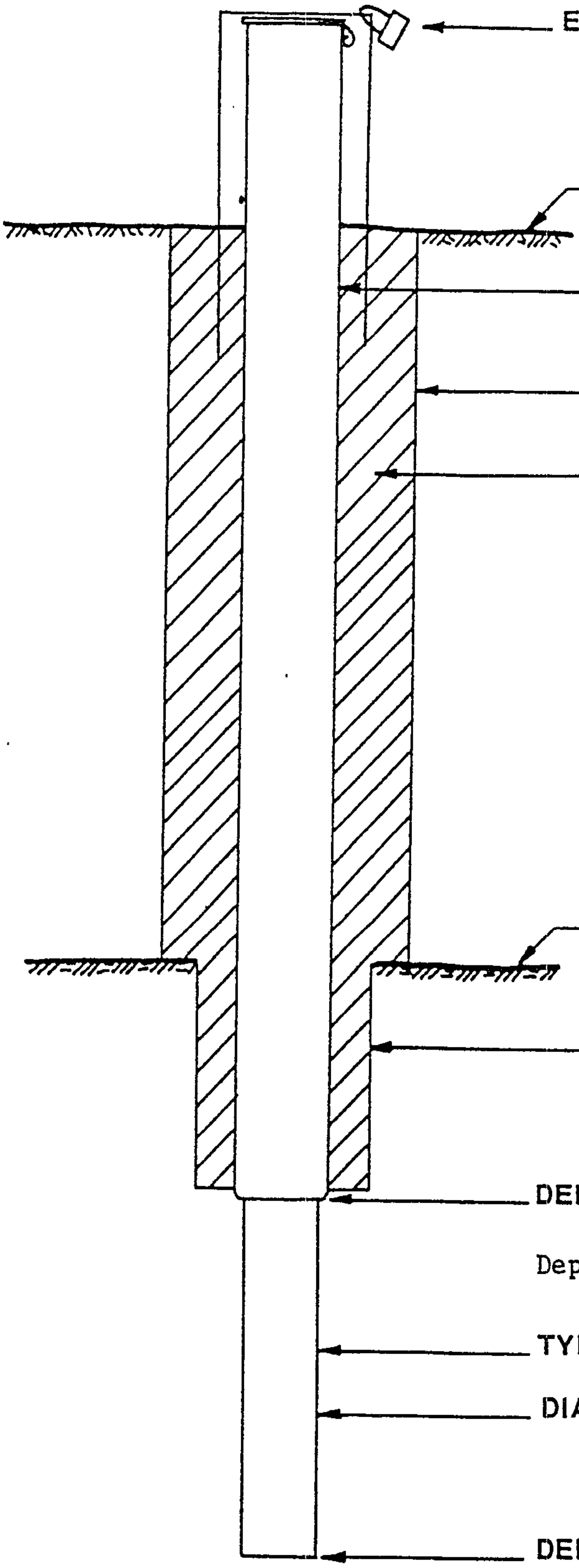
Depth of borehole 17.2'

REPORT OF MONITORING WELL

MW-17

DRAWN BY: SLT	**CHECKED BY:** PFB	**PROJECT NO:** 86C2046	**DATE:** 9/17/86	**FIGURE NO:** B-21

Woodward-Clyde Consultants



ELEVATION OF TOP OF RISER 410.09'

GROUND ELEVATION 408.1'

I.D. OF WELL CASING 4"

TYPE OF WELL CASING carbon steel

DIAMETER OF BOREHOLE 6"

TYPE OF BACKFILL cement/bentonite slurry

DEPTH TO BEDROCK SURFACE 8.1'

DIAMETER OF BOREHOLE 6"

DEPTH TO BOTTOM OF WELL CASING 25.1'

Depth (s) to Fracture 28 - 28.2'

TYPE OF SCREENED SECTION Open Hole

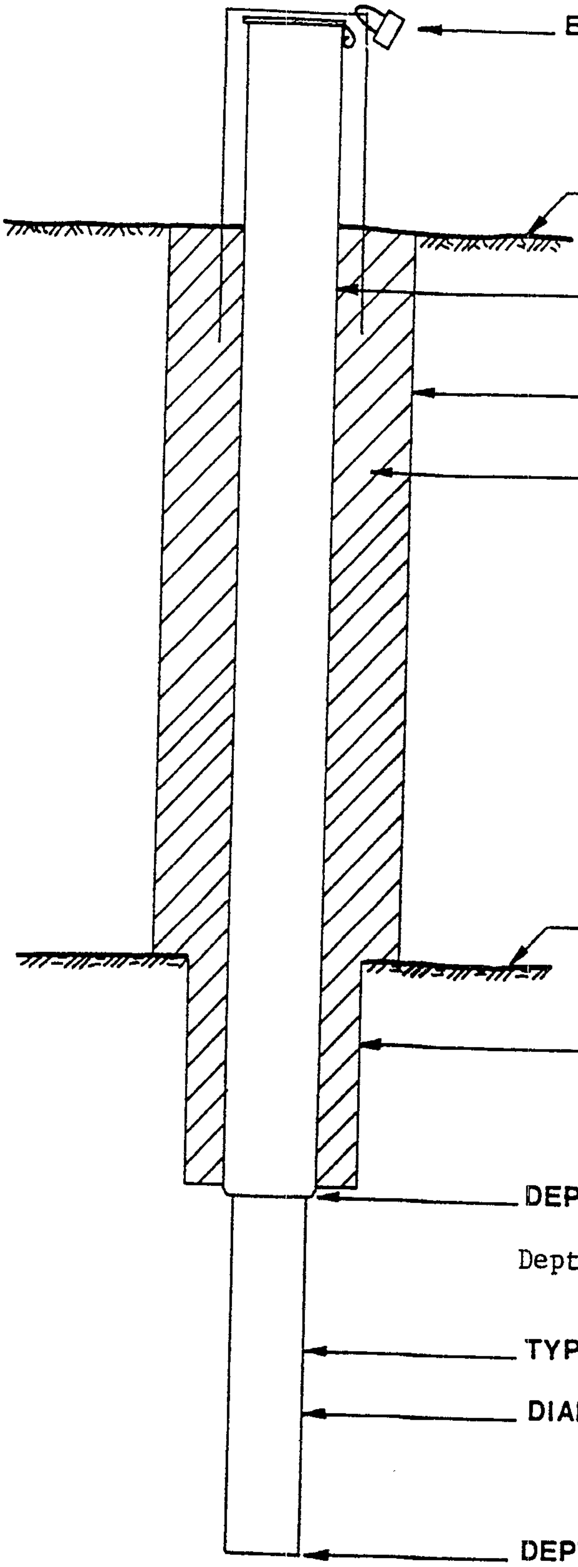
DIAMETER OF BOREHOLE 2.9"

DEPTH TO BOTTOM OF WELL 30.1'

DEPTH TO BOTTOM OF BOREHOLE 30.1'

REPORT OF MONITORING WELL MW-17I

Drawn by: SLT	Checked by: PFB	Project No.: 86C2046	Date: 9/25/86	Figure No.: B-22



ELEVATION OF TOP OF RISER 410.23'

GROUND ELEVATION 408.14'

I.D. OF WELL CASING 4"

TYPE OF WELL CASING carbon steel

DIAMETER OF BOREHOLE 6"

TYPE OF BACKFILL cement/bentonite slurry

DEPTH TO BEDROCK SURFACE 10.0'

DIAMETER OF BOREHOLE 6"

DEPTH TO BOTTOM OF WELL CASING 35.0'

Depth (s) to Fracture 36.8-36.9'; 37.3-37.4'; 38.4-38.5'

TYPE OF SCREENED SECTION Open Hole

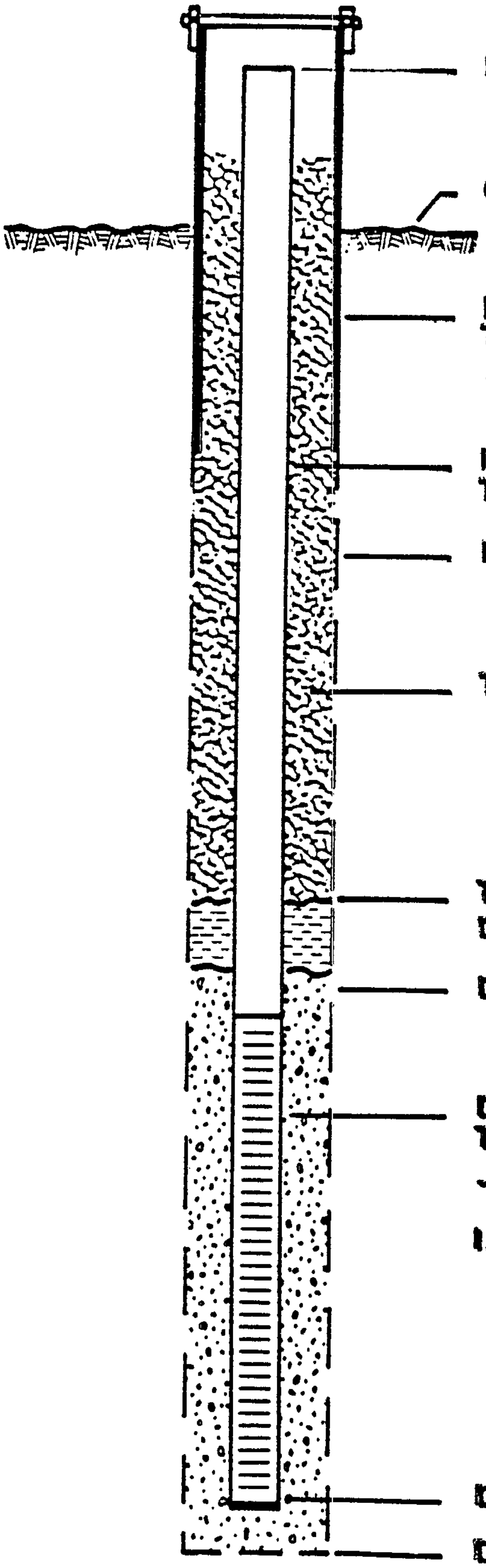
DIAMETER OF BOREHOLE 2.9"

DEPTH TO BOTTOM OF WELL 40.0'

DEPTH TO BOTTOM OF BOREHOLE 40.0'

REPORT OF MONITORING WELL MW-17D

Drawn by: SLT	*Checked by:* PFB	*Project No.:* 86C2046	*Date:* 9/25/86	*Figure No.:* B-23



Elevation of top of riser pipe 409.44'

Ground Elevation 407.4'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 6"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 5.8'

Depth to top of sand pack 6.8'

Depth to bedrock 7.3'

Depth to top of screen 7.3'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 12.6'

Depth of borehole 14.3'

REPORT OF MONITORING WELL MW-18

DRAWN BY: SLT	**CHECKED BY:** PFB	**PROJECT NO:** 86C2046	**DATE:**	**FIGURE NO** B-24

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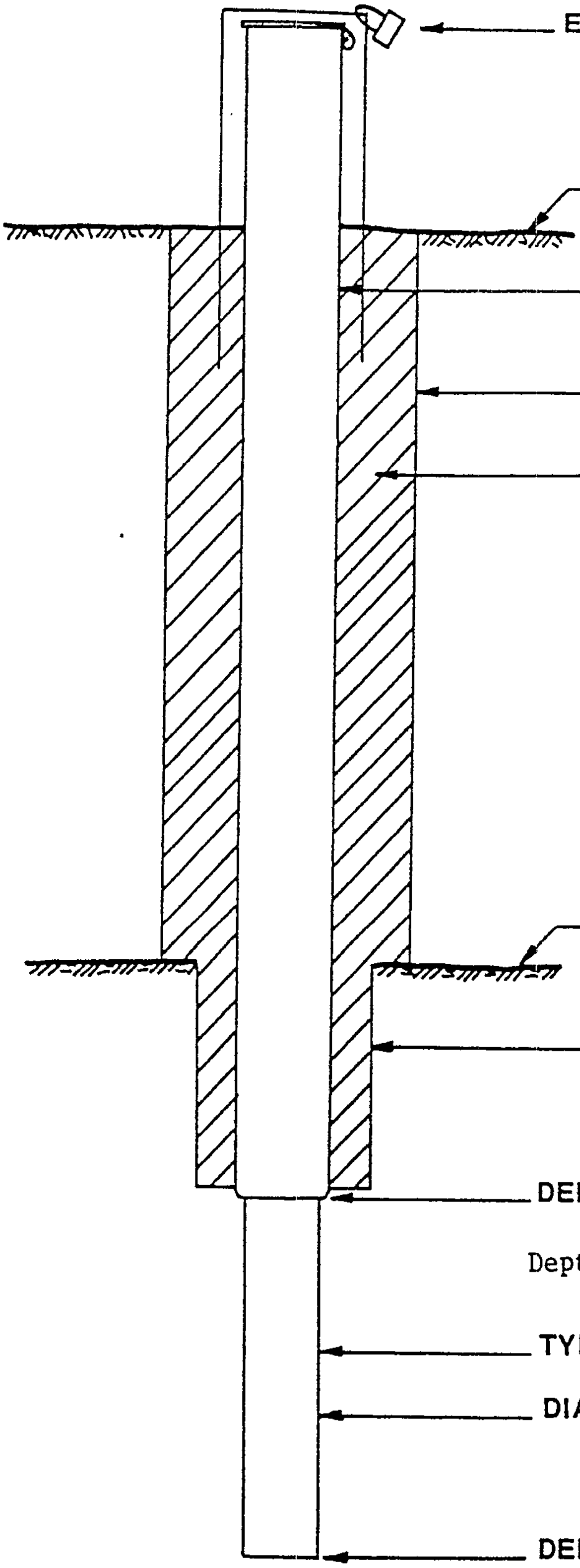


ELEVATION OF TOP OF RISER 410.05'

GROUND ELEVATION 407.9'

I.D. OF WELL CASING 4"

TYPE OF WELL CASING carbon steel

DIAMETER OF BOREHOLE 6"

TYPE OF BACKFILL cement/bentonite slurry

DEPTH TO BEDROCK SURFACE 10.1'

DIAMETER OF BOREHOLE 6"

DEPTH TO BOTTOM OF WELL CASING 25.0'

Depth (s) to Fracture 26.6' - 27.1';
28.5' - 28.9'

TYPE OF SCREENED SECTION Open Hole

DIAMETER OF BOREHOLE 2.9"

DEPTH TO BOTTOM OF WELL 29.5' (1)

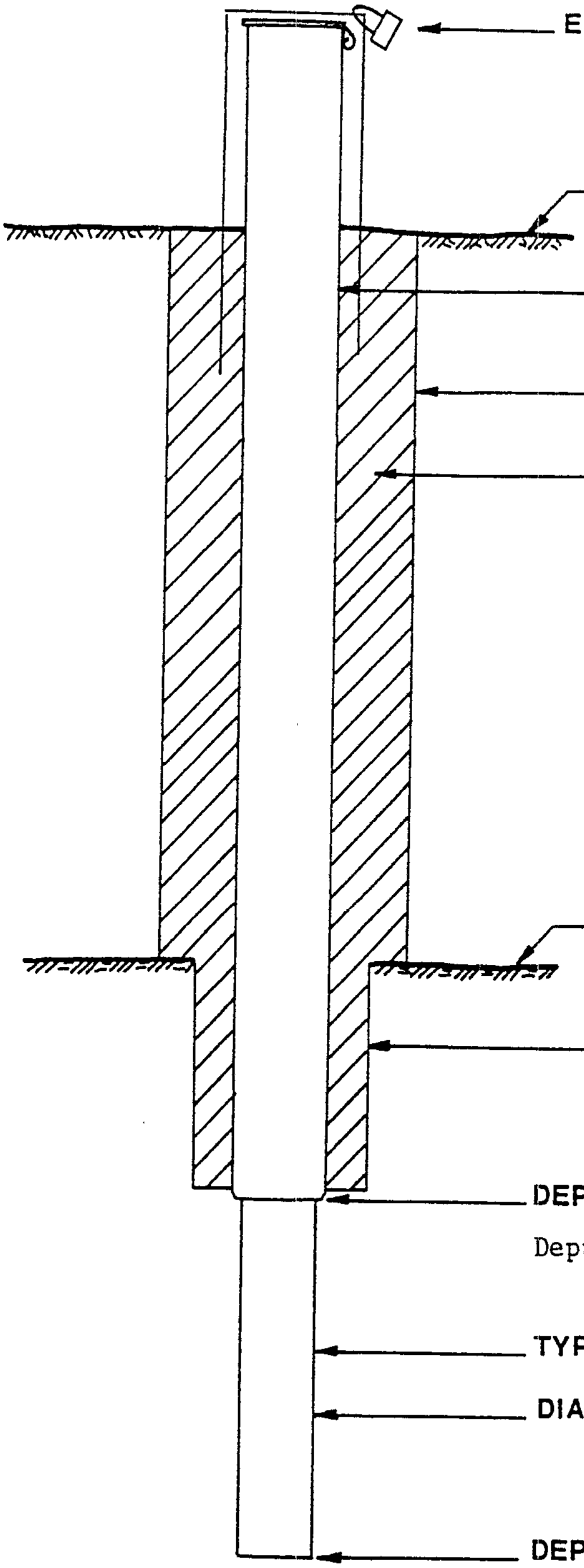
DEPTH TO BOTTOM OF BOREHOLE 30.0'

(1) Lost ∿ .5' from core run

REPORT OF MONITORING WELL

MW-18I

Drawn by: SLT	*Checked by:* PFB	*Project No.:* 86C2046	*Date:* 10/3/86	*Figure No.:* B-25



ELEVATION OF TOP OF RISER 409.89'

GROUND ELEVATION 407.8'

I.D. OF WELL CASING 4"

TYPE OF WELL CASING carbon steel

DIAMETER OF BOREHOLE 6"

TYPE OF BACKFILL cement/bentonite slurry

DEPTH TO BEDROCK SURFACE 8.5'

DIAMETER OF BOREHOLE 6"

DEPTH TO BOTTOM OF WELL CASING 35.0'

Depth (s) to Fracture 35.1'; 35.7'; 37.2'; 37.4'

TYPE OF SCREENED SECTION Open Hole

DIAMETER OF BOREHOLE 2.9"

DEPTH TO BOTTOM OF WELL 40.0'

DEPTH TO BOTTOM OF BOREHOLE 40.0'

REPORT OF MONITORING WELL

MW-18D

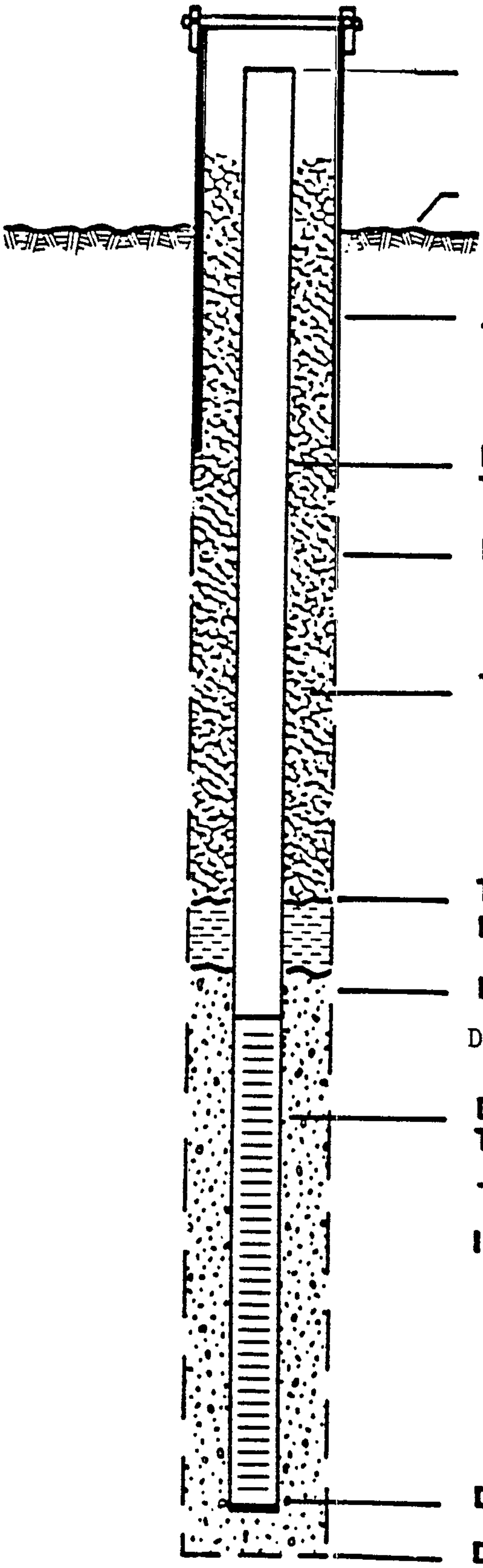
Drawn by: SLT

Checked by: PFB

Project No.: 86C2046

Date: 10/3/86

Figure No.: B-26



Elevation of top of riser pipe 408.55

Ground Elevation 406.3'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 6"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 4.7'

Depth to top of sand pack 5.7'

Depth to bedrock 6.0'

Depth to top of screen 6.2'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 11.5'

Depth of borehole 13.0'

REPORT OF MONITORING WELL

MW-19

DRAWN BY: SLT	**CHECKED BY:** PFB	**PROJECT NO:** 86C2046	**DATE:** 9/18/86	**FIGURE NO:** B-27

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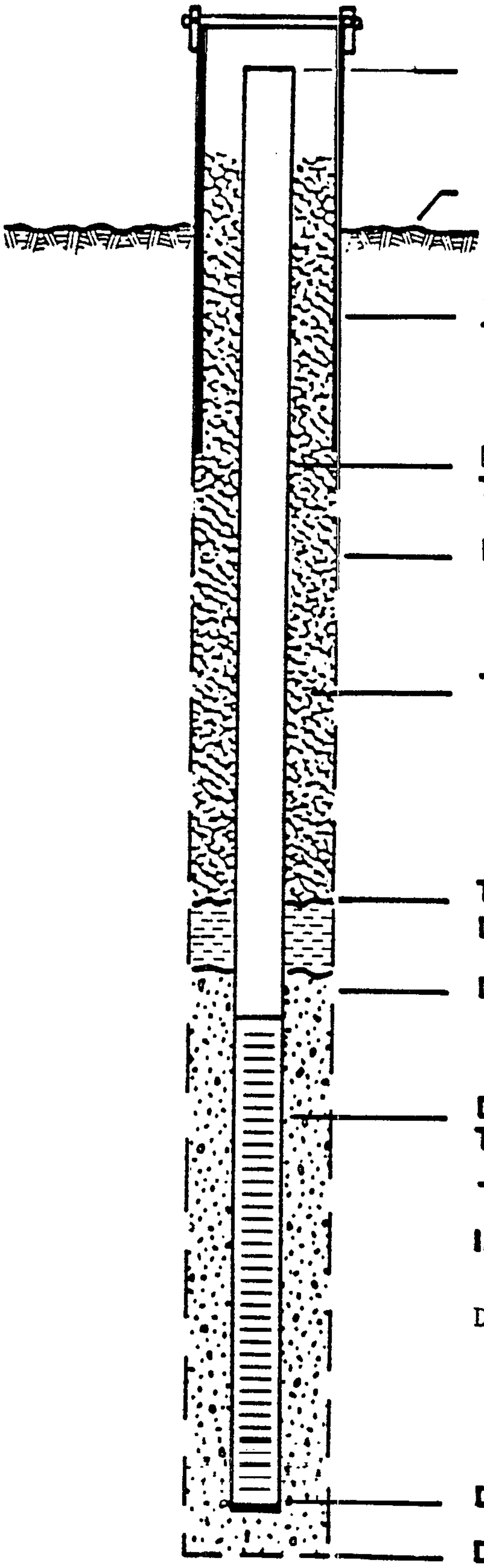

Elevation of top of riser pipe 410.40'

Ground Elevation 407.8'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 8.5'

Depth to top of sand pack 9.5'

Depth to top of screen 10.2'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bedrock 10.5'

Depth to bottom of well 15.5'

Depth of borehole 17.1'

REPORT OF MONITORING WELL

MW-20

DRAWN BY: SLT
CHECKED BY: PFB
PROJECT NO: 86C2046
DATE: 9/11/86
FIGURE NO: B-28

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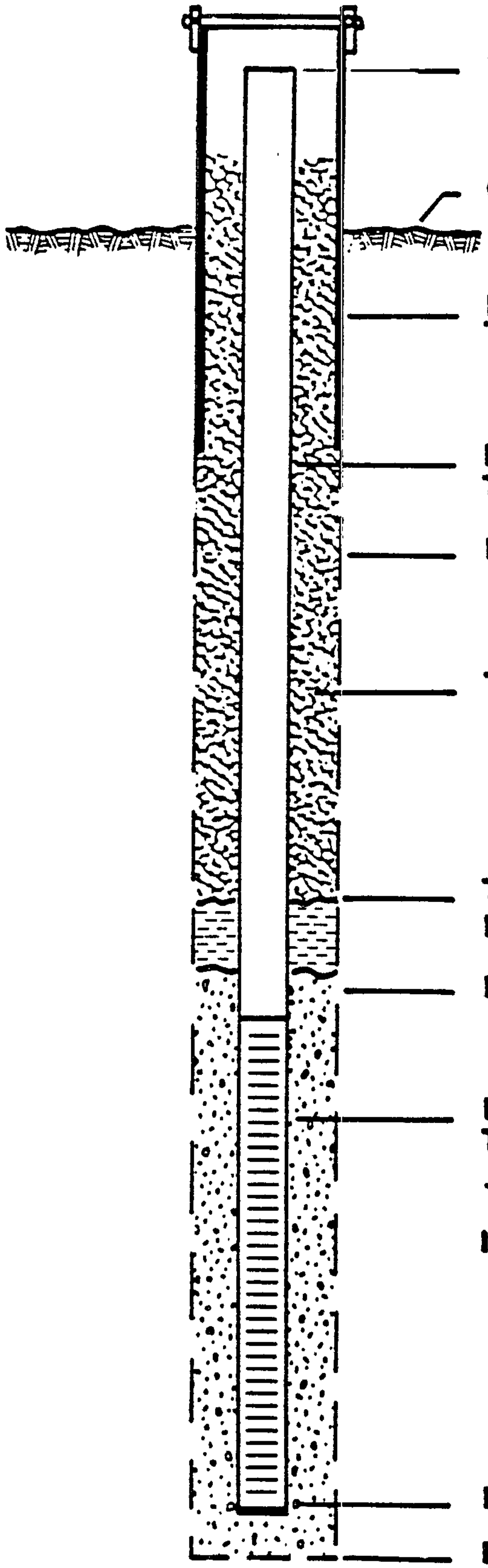


Elevation of top of riser pipe 410.43'

Ground Elevation 407.9'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 7.9'

Depth to top of sand pack 9.1'

Depth to bedrock 9.3'

Depth to top of screen 9.8'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 15.1'

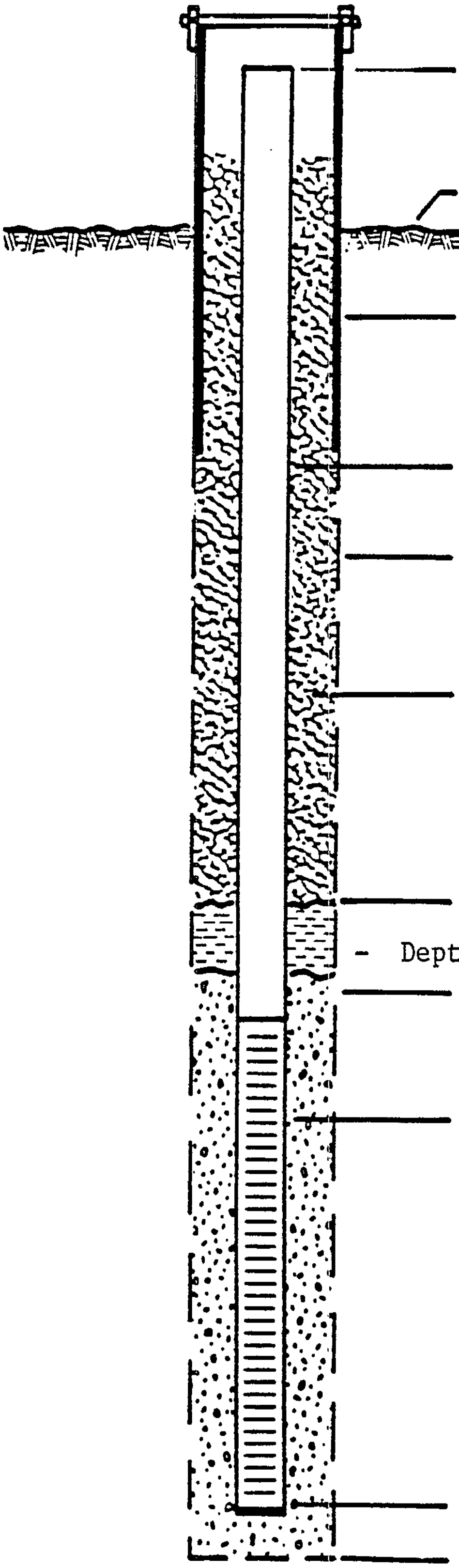
Depth of borehole 16.7'

REPORT OF MONITORING WELL

MW-21

DRAWN BY: SLT	CHECKED BY: PFB	PROJECT NO: 86C2046	DATE: 9/9/86	FIGURE NO B-29

Woodward-Clyde Consultants



Elevation of top of riser pipe 407.63'

Ground Elevation 405.8'

I.D. of surface casing 4"

Type of surface casing steel with locking cap

I.D. of riser pipe 2"

Type of riser pipe stainless steel

Diameter of borehole 13"

Type of backfill cement/bentonite slurry

Type of seal bentonite pellets

Depth to top of seal 3.6'

- Depth to bedrock 4.9'

Depth to top of sand pack 5.3'

Depth to top of screen 5.9'

Type of screened section .010 slot stainless steel

I.D. of screened section 2"

Depth to bottom of well 11.2'

Depth of borehole 11.9'

REPORT OF MONITORING WELL MW-22

DRAWN BY: SLT **CHECKED BY:** PFB **PROJECT NO:** 86C2046 **DATE:** 9/10/86 **FIGURE NO** B-30

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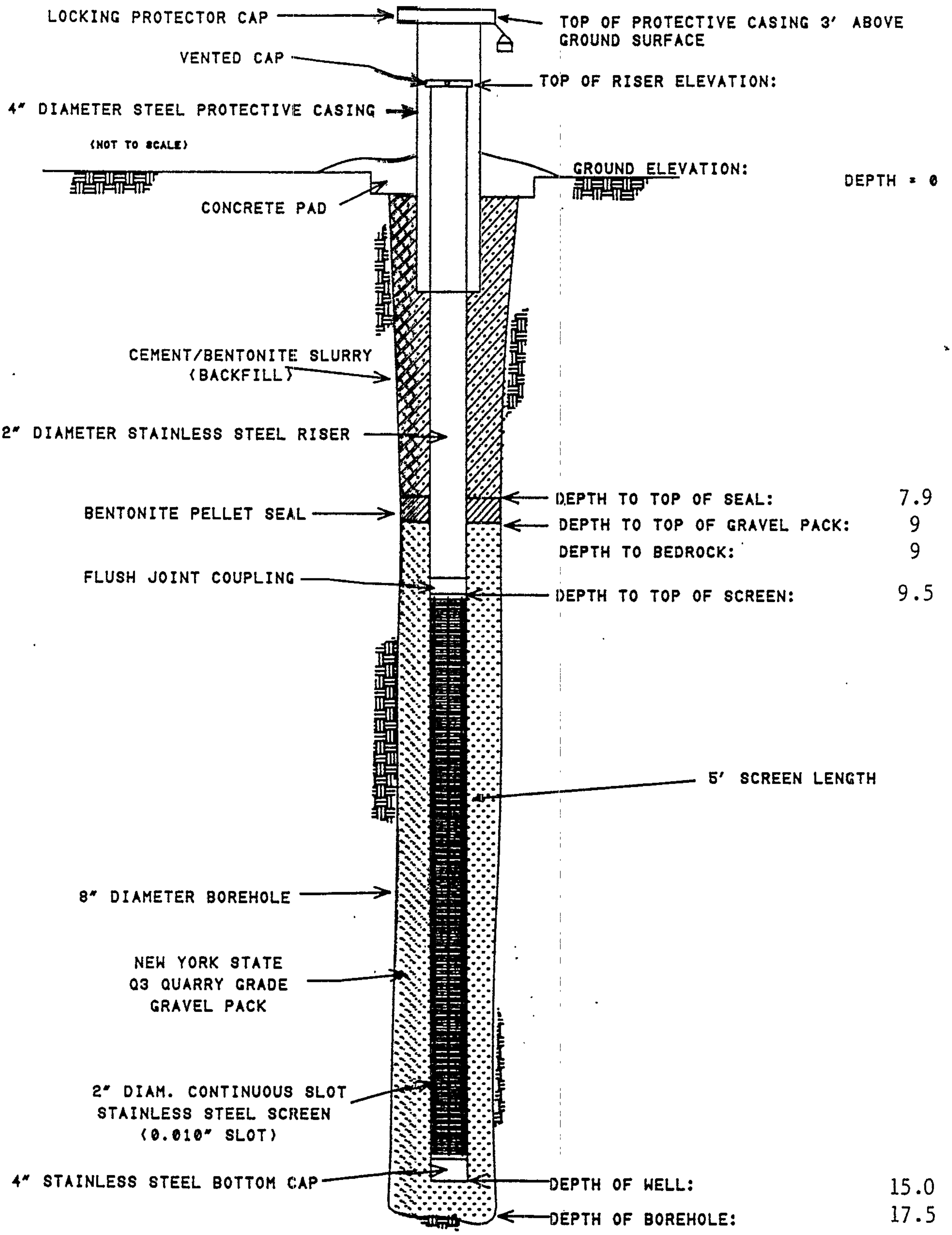
2-inch Well Reports:	MW-23 MW-24 OB-TW2
4-inch Well Reports:	TW-1 TW-2 TW-3 TW-4

REPORT OF 2-INCH WELL MW-23
XEROX CORPORATION - BUILDING 209 STUDY



DEPTH TO TOP OF SEAL: 7.9
DEPTH TO TOP OF GRAVEL PACK: 9
DEPTH TO BEDROCK: 9
DEPTH TO TOP OF SCREEN: 9.5
DEPTH OF WELL: 15.0
DEPTH OF BOREHOLE: 17.5

DATE WELL INSTALLED: CHECKED BY: SLT DATE: 3/1/88 PROJECT NO.: 86C20462

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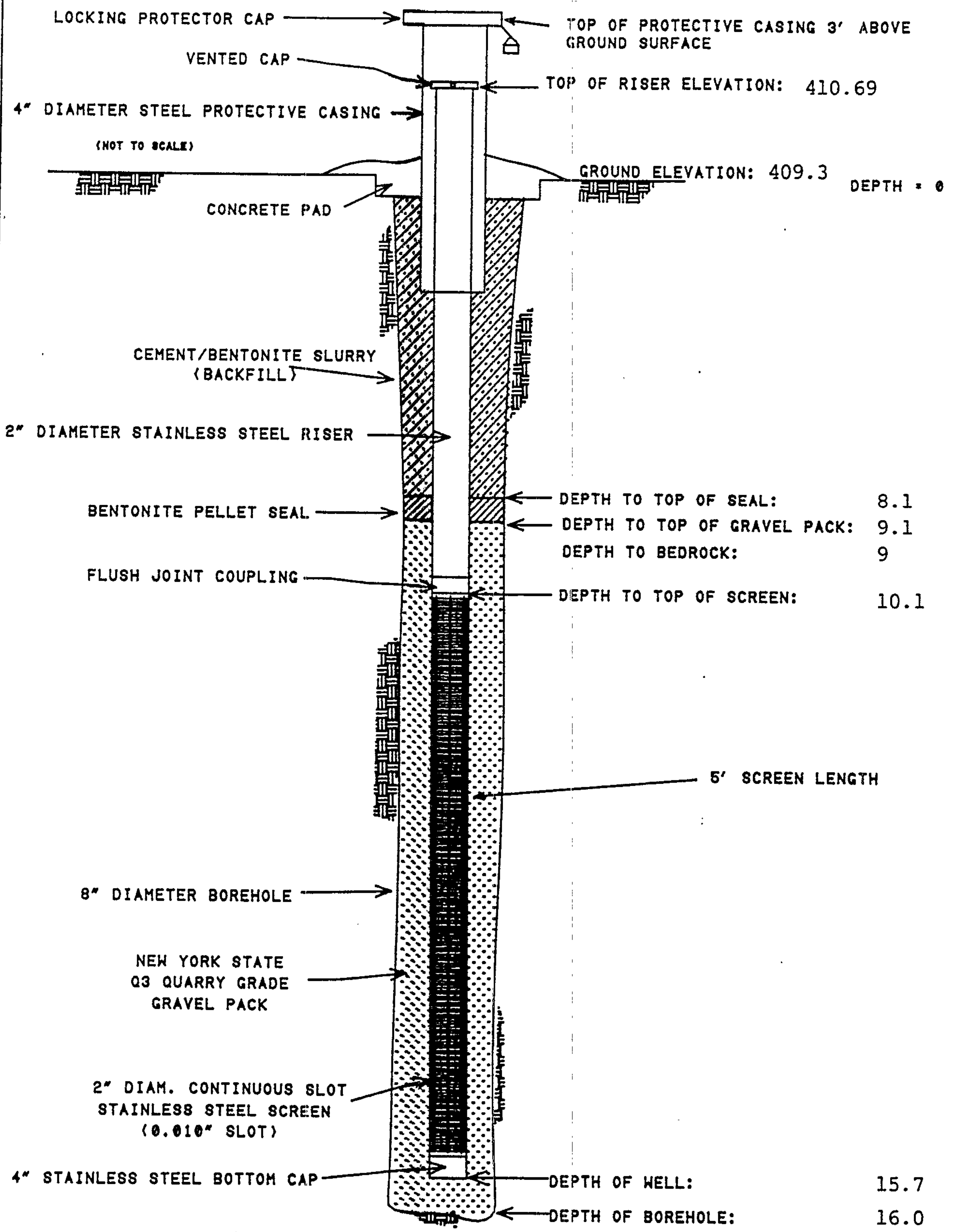
Figure B-5

REPORT OF 2-INCH WELL MW-24
XEROX CORPORATION - BUILDING 209 STUDY

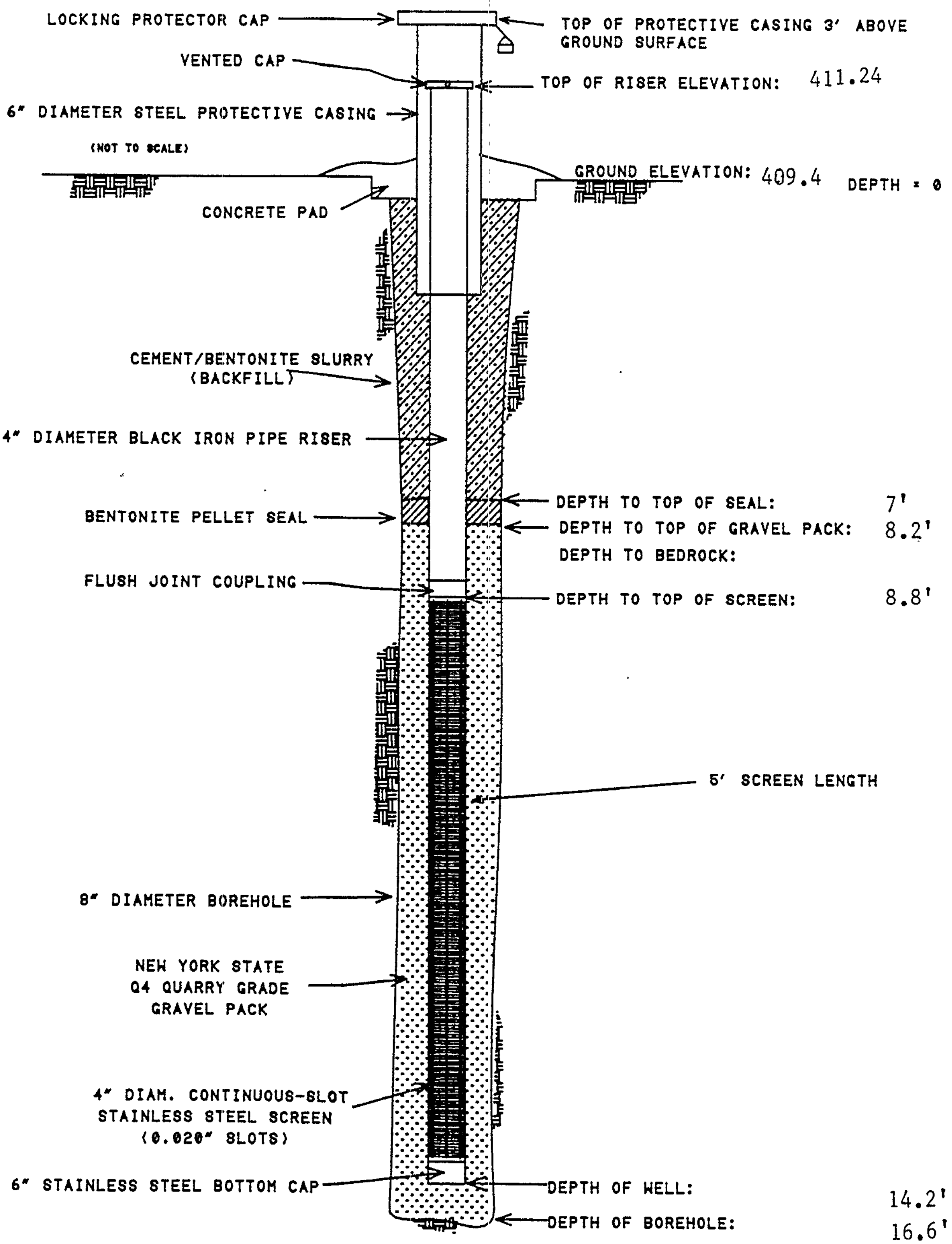


DATE WELL INSTALLED: 11/9/87 CHECKED BY: SLT DATE: 3/1/88 PROJECT NO.: 86C20462

Woodward-Clyde Consultants

FIGURE B-6

REPORT OF 4-INCH WELL TW-1
XEROX CORPORATION - BUILDING 209 STUDY



TOP OF PROTECTIVE CASING 3' ABOVE GROUND SURFACE

TOP OF RISER ELEVATION: 411.24

GROUND ELEVATION: 409.4 DEPTH = 0

DEPTH TO TOP OF SEAL: 7'

DEPTH TO TOP OF GRAVEL PACK: 8.2'

DEPTH TO BEDROCK:

DEPTH TO TOP OF SCREEN: 8.8'

DEPTH OF WELL: 14.2'

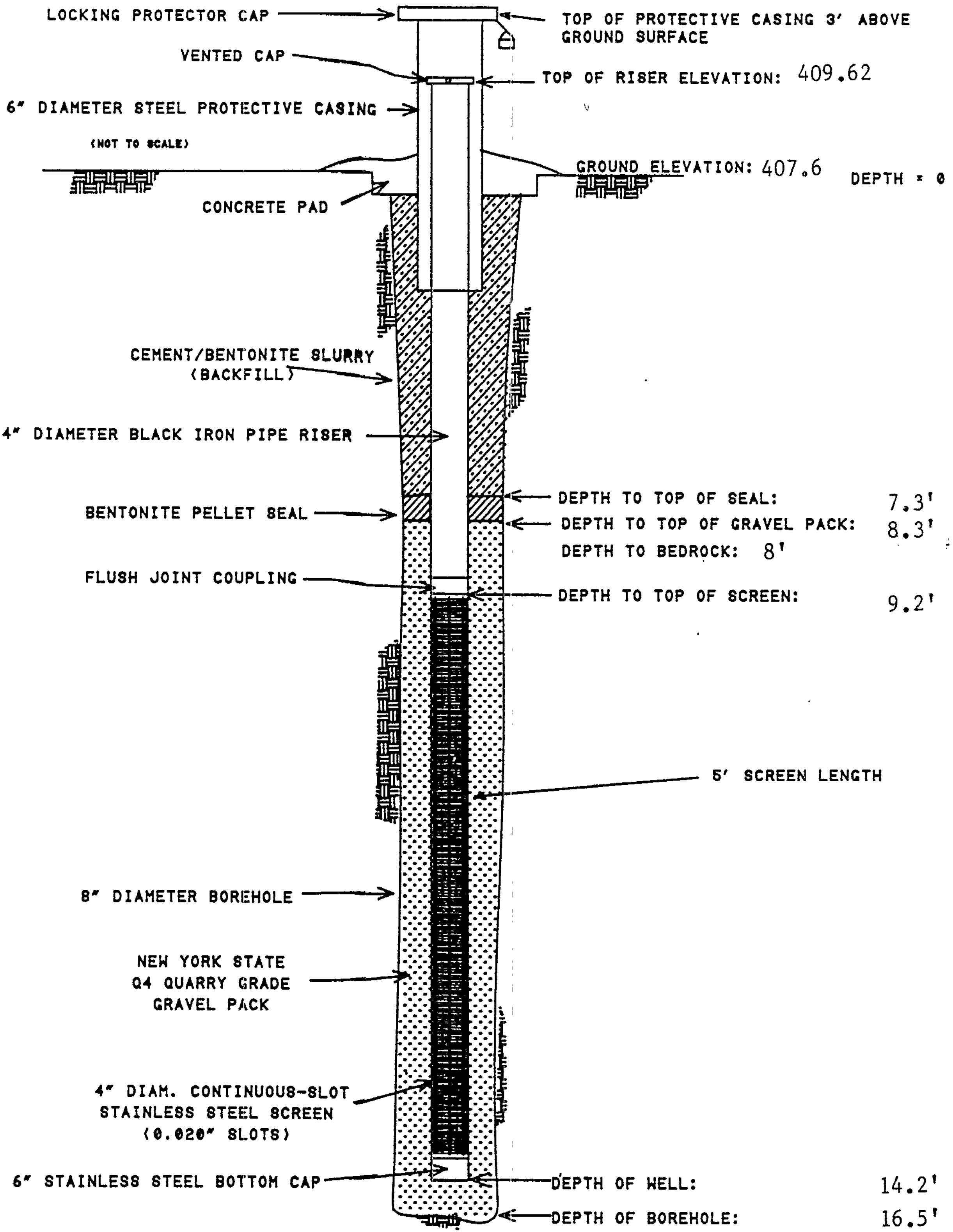
DEPTH OF BOREHOLE: 16.6'

DATE WELL INSTALLED: CHECKED BY: SLT DATE: 3/1/88 PROJECT NO.: 86C20462

Woodward-Clyde Consultants

FIGURE B-1

REPORT OF 4-INCH WELL TW-2
XEROX CORPORATION - BUILDING 209 STUDY

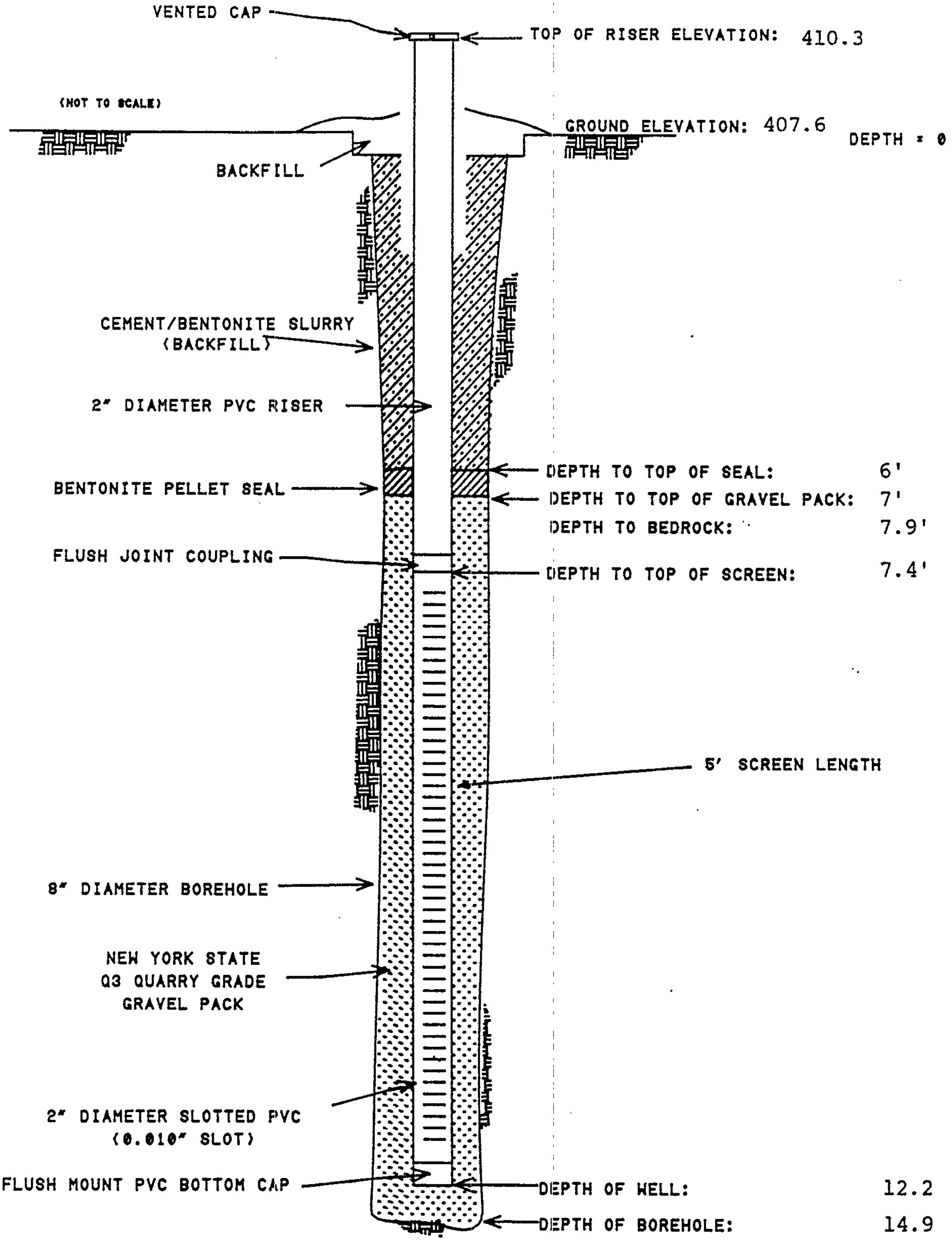


DATE WELL INSTALLED: 11/11/87 CHECKED BY: SLT DATE: 3/1/88 PROJECT NO.: 86C20462

Woodward-Clyde Consultants

FIGURE B-2

REPORT OF 2-INCH PVC WELL OB-TW2
XEROX CORPORATION - BUILDING 209 STUDY



DATE WELL INSTALLED: 11/11/87 CHECKED BY: SLT DATE: 3/1/88 PROJECT NO.: 86C20462

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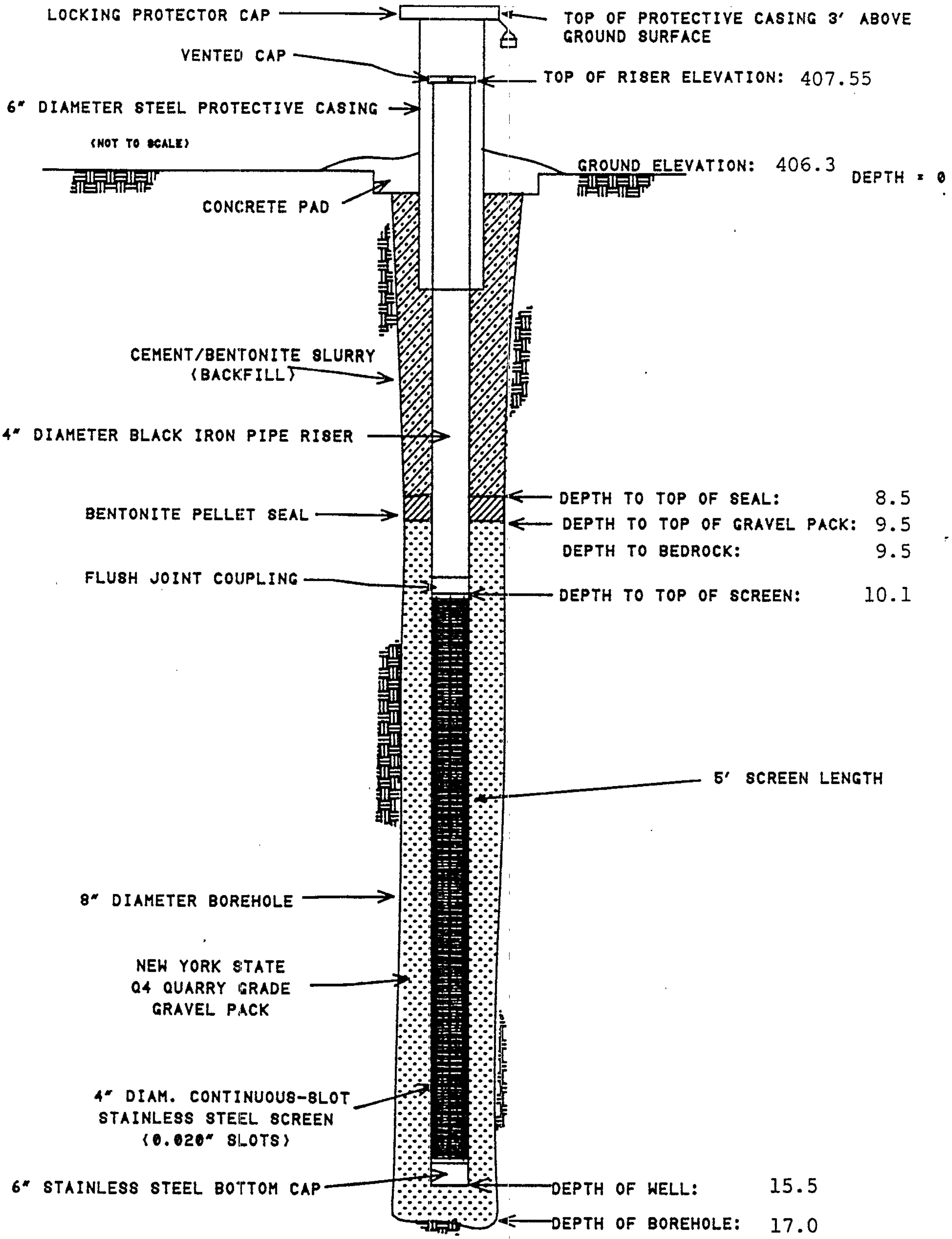
FIGURE B-7

REPORT OF 4-INCH WELL TW-3
XEROX CORPORATION - BUILDING 209 STUDY

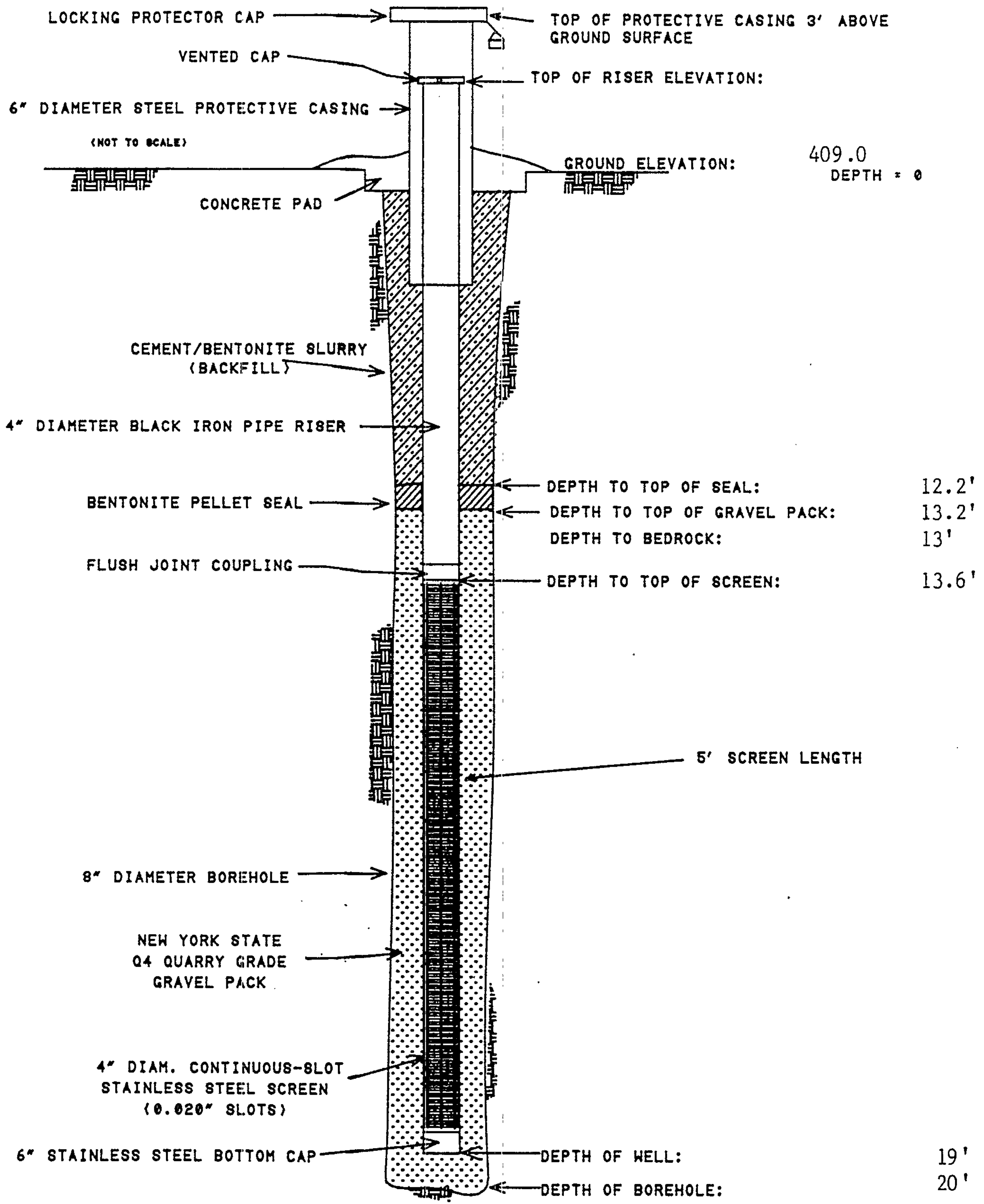


DATE WELL INSTALLED: 11/10/87 CHECKED BY: SLT DATE: 3/1/88 PROJECT NO.: 86C20462

FIGURE B-3

Woodward-Clyde Consultants

REPORT OF 4-INCH WELL TW-4
XEROX CORPORATION - BUILDING 209 STUDY



DATE WELL INSTALLED: 11/13/87 CHECKED BY: SLT DATE: 3/1/88 PROJECT NO.: 86C20462

H&A of New York
Bedrock Observation Well Reports

R209-1
R209-2
R209-3
R209-4

H & A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

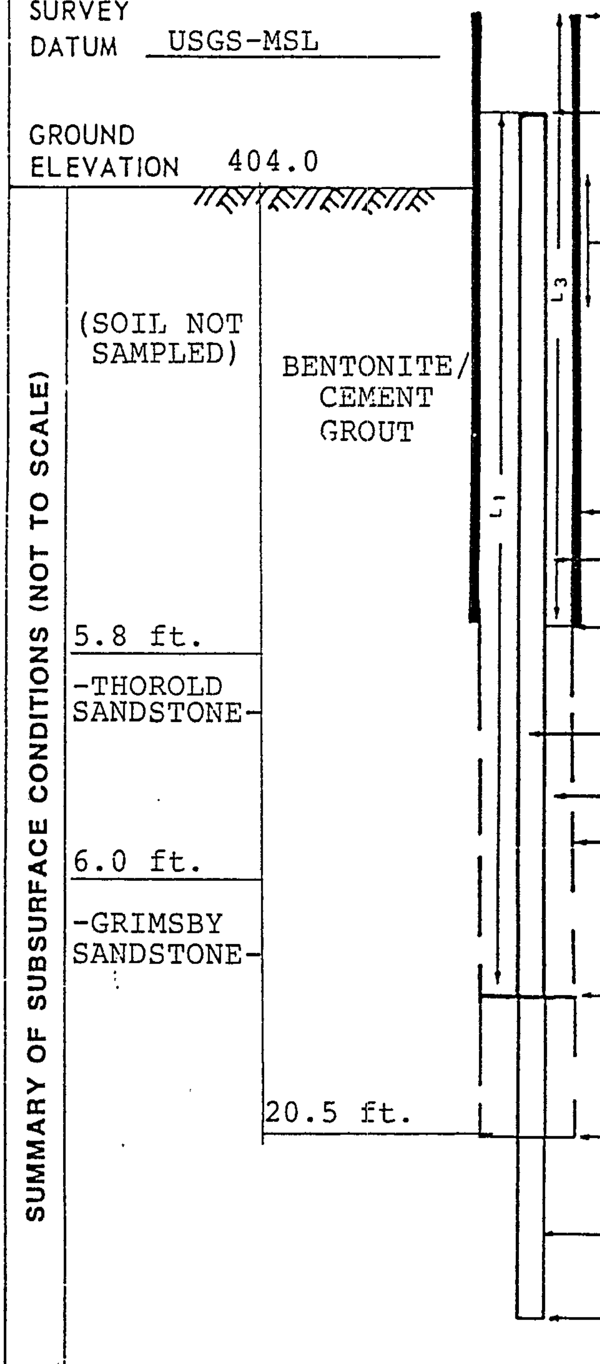
BEDROCK OBSERVATION WELL REPORT

PROJECT: XEROX - BLDG. 209 INVESTIGATION
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: ROCHESTER DRILLING COMPANY, INC.
DRILLER: T. SMITH H&A REPRESENTATIVE: C. CUBBISON
INSTALLATION DATE 31 OCTOBER 1989

FILE NO. 70096-40
WELL NO. R209-1
BORING NO. R209-1
LOCATION N1338.1
E4257.6
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 404.0



XXXXXXXXXX STICKUP ABOVE/XXXXX GROUND SURFACE OF CASING OR XXXXXX XXXXX BOX	2.3 ft.
XXXXXXXXXX STICKUP ABOVE/XXXXX GROUND SURFACE OF CASING	2.0 ft.
THICKNESS OF SURFACE SEAL	20.5 ft.
TYPE OF SURFACE SEAL	Bentonite/ Cement Grout
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]	
TYPE OF PROTECTIVE CASING	Steel
INSIDE DIAMETER OF PROTECTIVE CASING	6.0 in.
XXXXXXXXX/DEPTH OF BOTTOM OF PROTECTIVE CASING	2.7 ft.
INSIDE DIAMETER OF CASING	4.0 in.
TYPE OF BACKFILL AROUND CASING	Bentonite/ Cement Grout
DIAMETER OF BOREHOLE	8.0 in.
XXXXXXXXX/DEPTH OF TOP OF BEDROCK	5.8 ft.
XXXXXXXXX/DEPTH OF BOTTOM OF CASING	20.5 ft.
DIAMETER OF ROCK HOLE	3.0 in.
XXXXXXXXX/DEPTH OF BOTTOM OF ROCK HOLE	30.8 ft.

[FIGURES REFER TO: EL. ____ DEPTH X]

WELL SUMMARY: 23.0 ft. (CASING LENGTH) + 9.8 ft. (LENGTH OF ROCK HOLE) = 32.8 ft. (TOTAL LENGTH)

H&A

H & A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

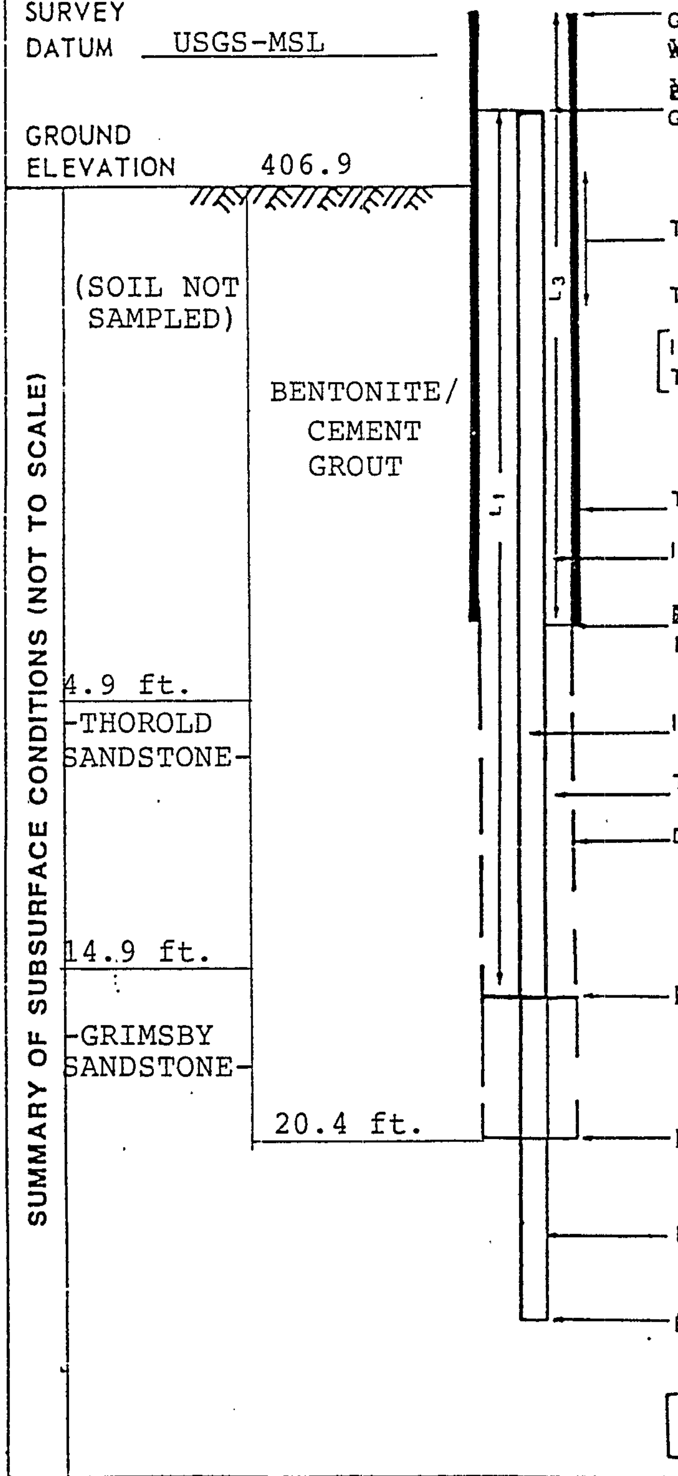
BEDROCK OBSERVATION WELL REPORT

PROJECT: XEROX - BLDG. 209 INVESTIGATION
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: ROCHESTER DRILLING COMPANY, INC.
DRILLER: T. SMITH H&A REPRESENTATIVE: C. CUBBISON
INSTALLATION DATE 3 NOVEMBER 1989

FILE NO. 70096-40
WELL NO. R209-2
BORING NO. R209-2
LOCATION N872.3
E4202.6
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 406.9



~~ELEVATION OR~~ STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING ~~OR ROAD-WAY BOX~~	2.6 ft.
~~ELEVATION OR~~ STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING	2.3 ft.
THICKNESS OF SURFACE SEAL	20.4 ft.
TYPE OF SURFACE SEAL	Bentonite/ Cement Grout
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]	
TYPE OF PROTECTIVE CASING	Steel
INSIDE DIAMETER OF PROTECTIVE CASING	6.0 in.
~~ELEVATION~~/DEPTH OF BOTTOM OF PROTECTIVE CASING	2.4 ft.
INSIDE DIAMETER OF CASING	4.0 in.
TYPE OF BACKFILL AROUND CASING	Bentonite/ Cement Grout
DIAMETER OF BOREHOLE	8.0 in.
~~ELEVATION~~/DEPTH OF TOP OF BEDROCK	4.9 ft.
~~ELEVATION~~/DEPTH OF BOTTOM OF CASING	20.4 ft.
DIAMETER OF ROCK HOLE	3.0 in.
~~ELEVATION~~/DEPTH OF BOTTOM OF ROCK HOLE	30.2 ft.

[FIGURES REFER TO: EL. ____ DEPTH X]

WELL SUMMARY:	CASING LENGTH	+	LENGTH OF ROCK HOLE	=	TOTAL LENGTH
	22.7 ft.	+	9.8 ft.	=	32.5 ft.

H & A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

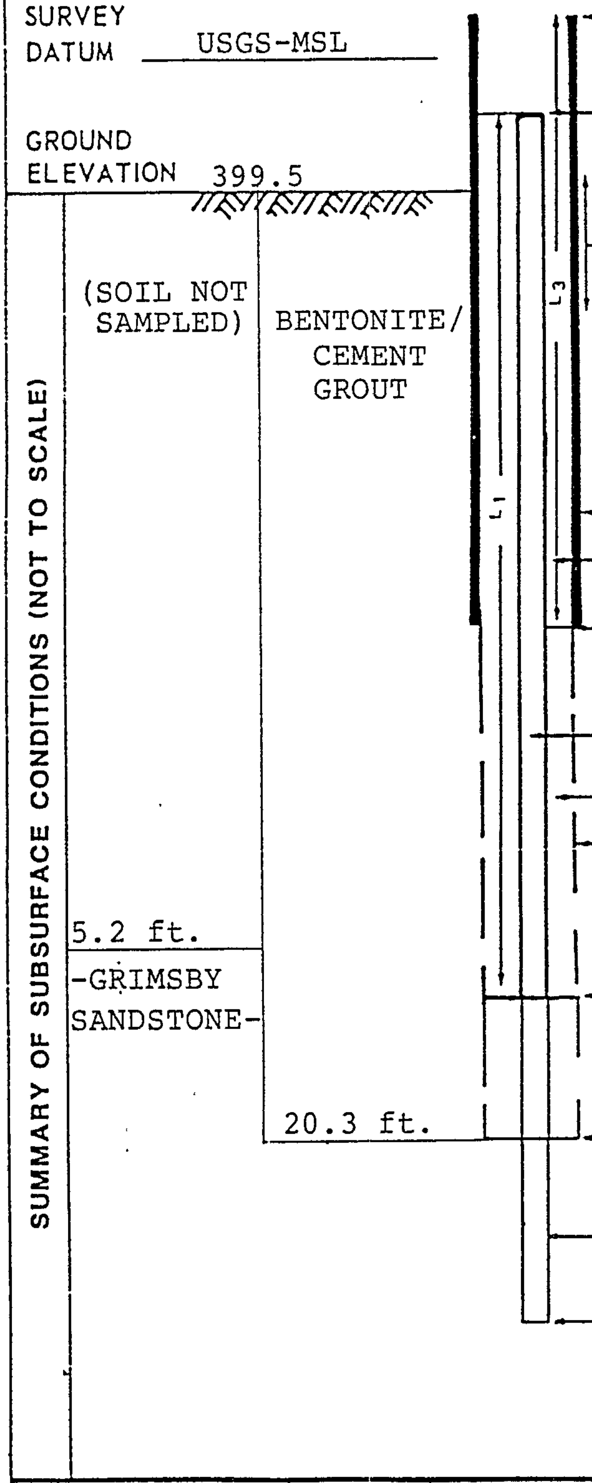
BEDROCK OBSERVATION WELL REPORT

PROJECT: XEROX - BLDG. 209 INVESTIGATION
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: ROCHESTER DRILLING COMPANY, INC.
DRILLER: T. SMITH H&A REPRESENTATIVE: C. CUBBISON
INSTALLATION DATE 10 NOVEMBER 1989

FILE NO. 70096-40
WELL NO. R209-3
BORING NO. R209-3
LOCATION N1599.3
E2958.8
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 399.5



~~ELEVATION~~ STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING OR ~~RISER PIPE~~ 2.5 ft.
~~ELEVATION~~ STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING 2.4 ft.
THICKNESS OF SURFACE SEAL 20.3 ft.
TYPE OF SURFACE SEAL Bentonite/ Cement Grout
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]
TYPE OF PROTECTIVE CASING Steel
INSIDE DIAMETER OF PROTECTIVE CASING 6.0 in.
~~ELEVATION~~/DEPTH OF BOTTOM OF PROTECTIVE CASING 2.5 ft.
INSIDE DIAMETER OF CASING 4.0 in.
TYPE OF BACKFILL AROUND CASING Bentonite/ Cement Grout
DIAMETER OF BOREHOLE 8.0 in.
~~ELEVATION~~/DEPTH OF TOP OF BEDROCK 5.2 ft.
~~ELEVATION~~/DEPTH OF BOTTOM OF CASING 20.3 ft.
DIAMETER OF ROCK HOLE 3.0 in.
~~ELEVATION~~/DEPTH OF BOTTOM OF ROCK HOLE 30.3 ft.

[FIGURES REFER TO: EL. ____ DEPTH X]

WELL SUMMARY: 22.7 ft. + 10.0 ft. = 32.7 ft.
CASING LENGTH LENGTH OF ROCK HOLE TOTAL LENGTH

H & A

BEDROCK OBSERVATION WELL REPORT

PROJECT: XEROX - BLDG. 209 INVESTIGATION
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: ROCHESTER DRILLING COMPANY, INC.
DRILLER: T. SMITH H&A REPRESENTATIVE: C. CUBBISON
INSTALLATION DATE 8 NOVEMBER 1989

FILE NO. 70096-40
WELL NO. R209-4
BORING NO. R209-4
LOCATION N985.8
E2985.7
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 408.3

SUMMARY OF SUBSURFACE CONDITIONS (NOT TO SCALE)

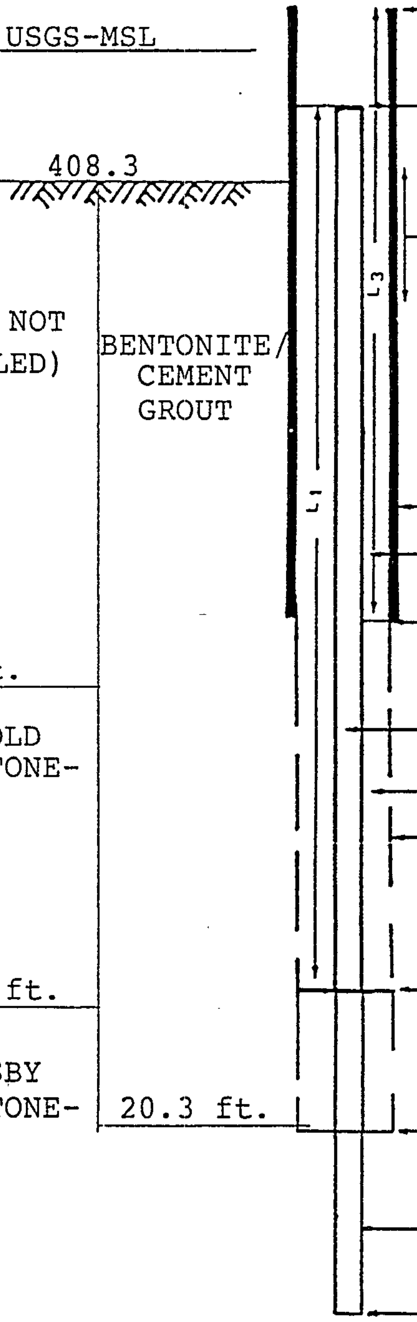
(SOIL NOT SAMPLED)

5.3 ft.

-THOROLD SANDSTONE-

12.0 ft.

-GRIMSBY SANDSTONE-



~~ELEVATION OR~~ STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING ~~OR RISER~~ ~~PIPE~~	2.3 ft.
~~ELEVATION OR~~ STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING	2.0 ft.
THICKNESS OF SURFACE SEAL	20.3 ft.
TYPE OF SURFACE SEAL	Bentonite/ Cement Grout
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]	
TYPE OF PROTECTIVE CASING	Steel
INSIDE DIAMETER OF PROTECTIVE CASING	6.0 in.
~~ELEVATION~~/DEPTH OF BOTTOM OF PROTECTIVE CASING	2.7 ft.
INSIDE DIAMETER OF CASING	4.0 in.
TYPE OF BACKFILL AROUND CASING	Bentonite/ Cement Grout
DIAMETER OF BOREHOLE	8.0 in.
~~ELEVATION~~/DEPTH OF TOP OF BEDROCK	5.3 ft.
~~ELEVATION~~/DEPTH OF BOTTOM OF CASING	20.3 ft.
DIAMETER OF ROCK HOLE	3.0 in.
~~ELEVATION~~/DEPTH OF BOTTOM OF ROCK HOLE	30.4 ft.

[FIGURES REFER TO: EL. ____ DEPTH X]

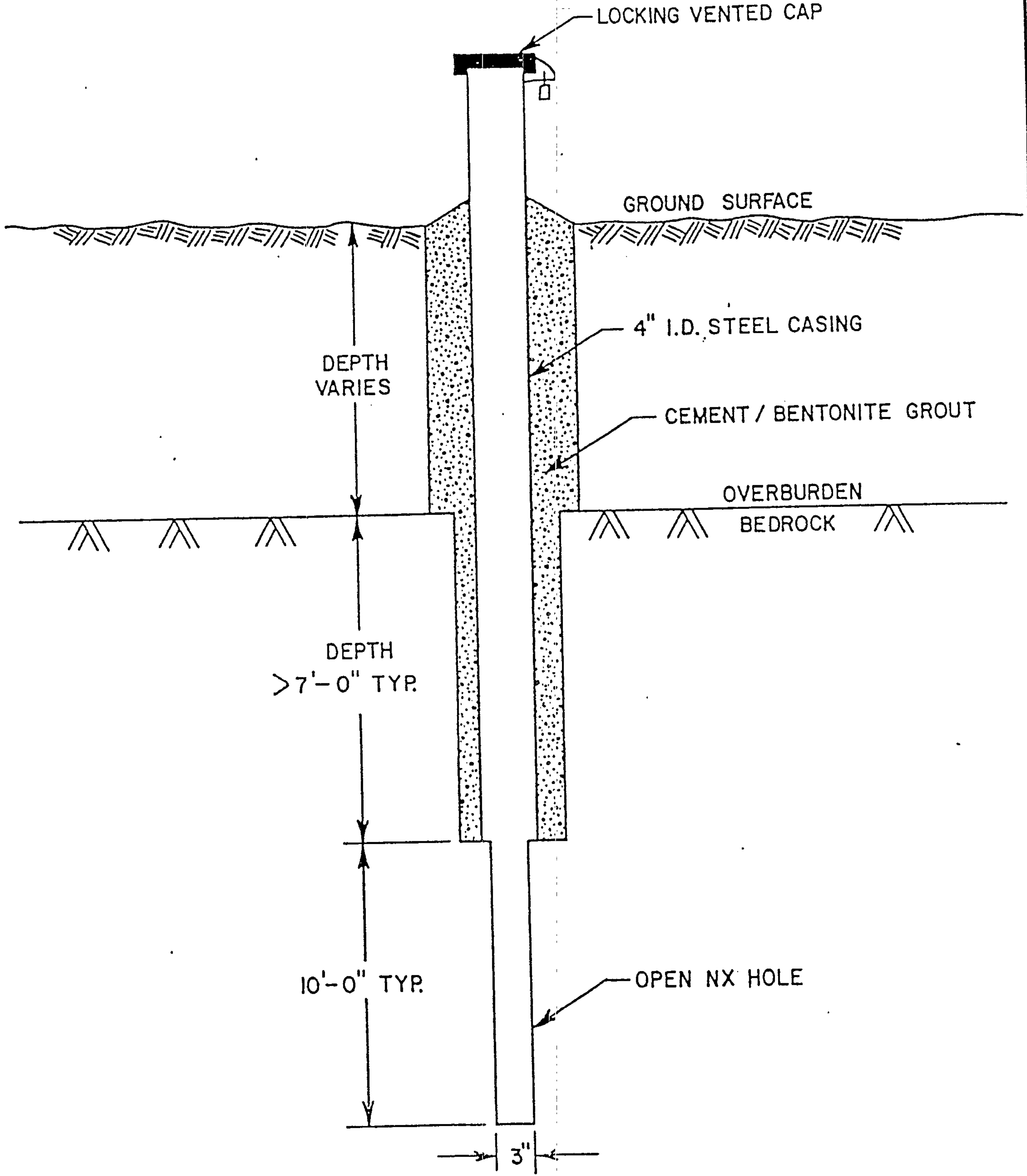
WELL SUMMARY:	CASING LENGTH		LENGTH OF ROCK HOLE		TOTAL LENGTH
	22.3 ft.	+	10.1 ft.	=	32.4 ft.

H&A

1986 RECRA Research, Inc.

Bedrock Monitoring Well Construction Diagram

"R" AND "OR" WELLS



61160-1

BRUNING

RECRA RESEARCH INC.
BUFFALO, NEW YORK

Scale: NTS		
	By	Date
Dwn.	DLS	11/85
Ckd.	KC	12/85
Ap'vd.	RLC	3/86
Rev.		

XEROX CORP.
SALT ROAD COMPLEX
WEBSTER, NEW YORK

MONITORING WELL
CONSTRUCTION
DEEP BEDROCK ZONE

Project No. 5C100236

A

1987-1988 H&A of New York
Bedrock Observation Well Reports

R-80
SR-91
R-92
SR-93
R-94
R-103

H & A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

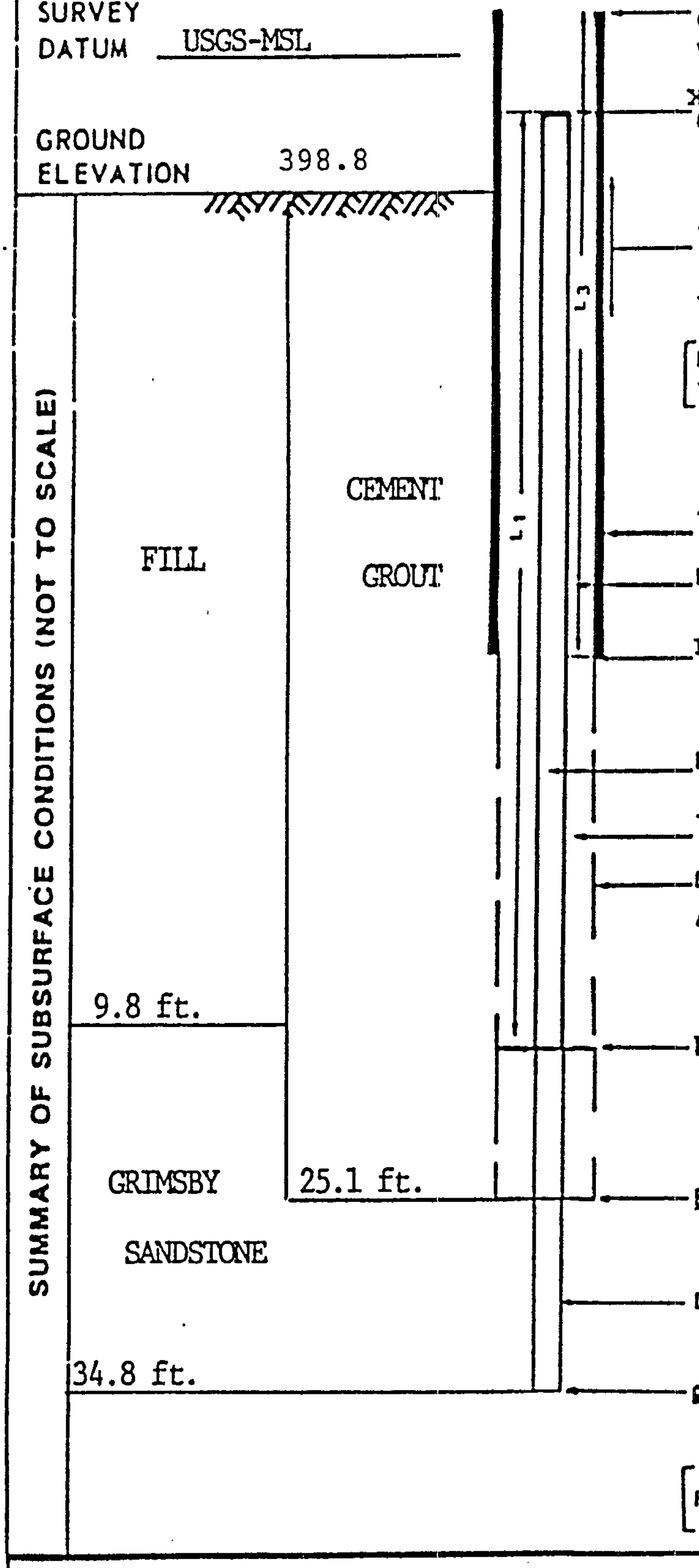
BEDROCK OBSERVATION WELL REPORT

PROJECT: BEDROCK OBSERVATION WELL INSTALLATION
LOCATION: XEROX NW CORNER, BUILDING 214, WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: HYDRO GROUP, INC.
DRILLER: W. SANFORD H&A REPRESENTATIVE: L. DISALVO
INSTALLATION DATE 18 NOVEMBER - 19 NOVEMBER 1987

FILE NO. 758021
WELL NO. R-80
BORING NO. R-80
LOCATION N2730.2
E3328.5
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 398.8



~~ELEVATION OR~~ STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING OR ROADWAY BOX 2.0 ft.

~~ELEVATION OR~~ STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING 1.5 ft.

THICKNESS OF SURFACE SEAL 25.1 ft.

TYPE OF SURFACE SEAL Cement Grout

[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]

TYPE OF PROTECTIVE CASING Square Steel casing

INSIDE DIAMETER OF PROTECTIVE CASING 6.0 in.

~~ELEVATION~~/DEPTH OF BOTTOM OF PROTECTIVE CASING 3.0 ft.

INSIDE DIAMETER OF CASING 4.0 in.

TYPE OF BACKFILL AROUND CASING Cement Grout

DIAMETER OF BOREHOLE 6.0 in.

4.0 in. I.D. Steel casing installed.

~~ELEVATION~~/DEPTH OF TOP OF BEDROCK 9.8 ft. ±

~~ELEVATION~~/DEPTH OF BOTTOM OF CASING 25.1 ft.

DIAMETER OF ROCK HOLE 3.0 in.

~~ELEVATION~~/DEPTH OF BOTTOM OF ROCK HOLE 34.8 ft.

[FIGURES REFER TO: EL. ____ DEPTH X]

WELL SUMMARY: 26.6 ft. + 10.0 ft. = 36.6 ft.
CASING LENGTH LENGTH OF ROCK HOLE TOTAL LENGTH

H & A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

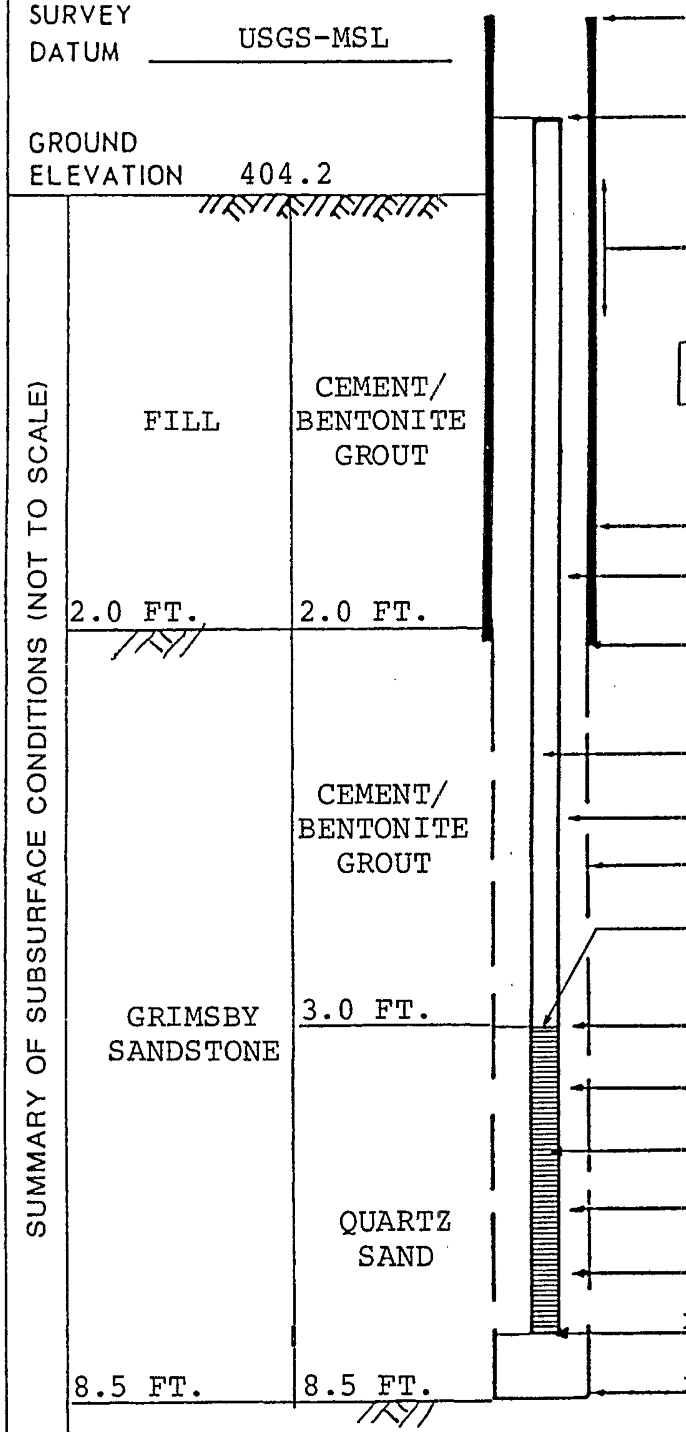
BEDROCK OBSERVATION WELL REPORT

PROJECT: XEROX - SALT ROAD COMPLEX
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: NORTH STAR DRILLING CO.
DRILLER: H. Lyon H&A REPRESENTATIVE: J. FITCH
INSTALLATION DATE 19 APRIL 1988

FILE NO. 758022
WELL NO. SR91
BORING NO. SR91
LOCATION N1504.1
E3908.9
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 404.2



~~ELEVATION/~~ STICKUP ABOVE~~/BELOW~~ GROUND SURFACE OF CASING OR ROADWAY BOX	2.8 FT.
~~ELEVATION/~~ STICKUP ABOVE~~/BELOW~~ GROUND SURFACE OF RISER PIPE.	1.8 FT.
THICKNESS OF SURFACE SEAL	2.0 FT.
TYPE OF SURFACE SEAL	Cement/Bentonite Grout
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]	
TYPE OF CASING	Steel Pipe
INSIDE DIAMETER OF CASING	4.0 IN.
~~ELEVATION/~~DEPTH OF BOTTOM OF CASING	2.1 FT.
INSIDE DIAMETER OF RISER PIPE	2.0 IN.
TYPE OF BACKFILL AROUND RISER	Cement/Bentonite Grout
DIAMETER OF BOREHOLE	6.0 IN.
TYPE OF COUPLING (THREADED, SOLVENT WELDED, WELDED, ETC.)	Threaded
~~ELEVATION/~~DEPTH OF BOTTOM OF RISER	3.0 FT.
TYPE OF WELLSCREEN/RISER	T304 Stainless
SCREEN SLOT SIZE	.010 IN.
DIAMETER OF WELLSCREEN	2.0 IN.
TYPE OF BACKFILL AROUND WELLSCREEN	Quartz Sand
~~ELEVATION/~~DEPTH OF BOTTOM OF WELLSCREEN	8.5 FT.
~~ELEVATION/~~DEPTH OF BOTTOM OF BOREHOLE	8.5 FT.

[FIGURES REFER TO: EL. ____ DEPTH X]

WELL SUMMARY: 4.8 FT. LENGTH OF RISER PIPE + 5.6 FT. LENGTH OF WELLSCREEN = 10.4 FT. TOTAL LENGTH

H&A FORM 59 SEP 72

H&A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

BEDROCK OBSERVATION WELL REPORT

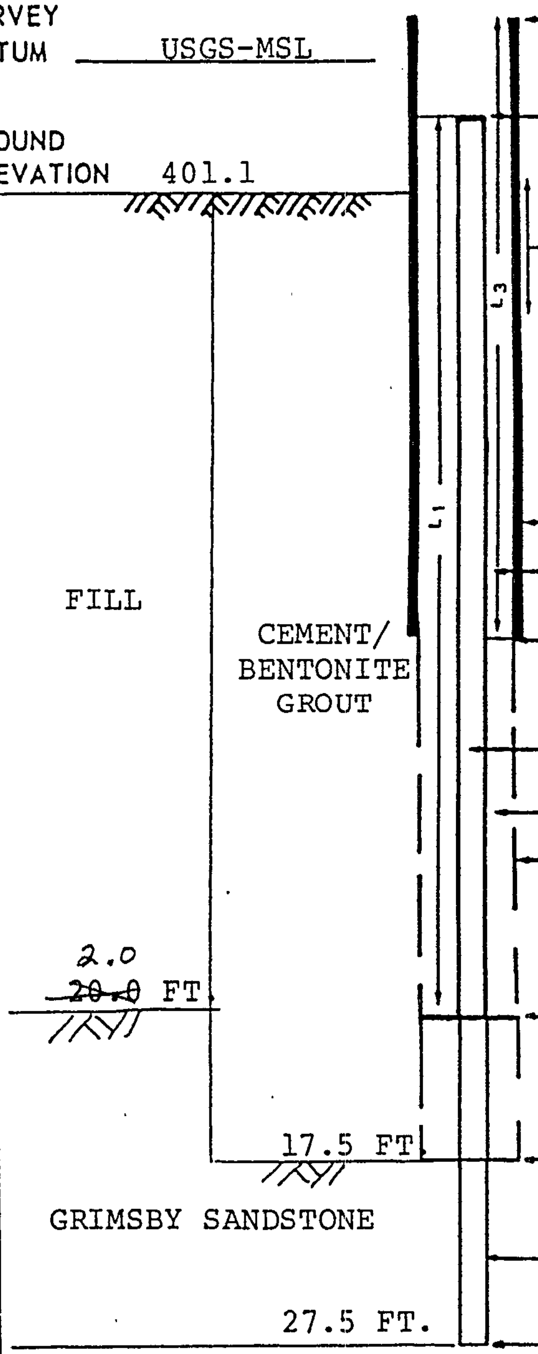
PROJECT: XEROX - SALT·ROAD COMPLEX
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: NORTH STAR DRILLING CO.
DRILLER: H. LYON H&A REPRESENTATIVE: J. FITCH
INSTALLATION DATE 20 APRIL 1988

FILE NO. 758022
WELL NO. R92
BORING NO. R92
LOCATION N1504.1
E3917.3
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 401.1

SUMMARY OF SUBSURFACE CONDITIONS (NOT TO SCALE)



STICKUP ABOVE/ GROUND SURFACE OF CASING 3.0 FT.
STICKUP ABOVE/ GROUND SURFACE OF CASING 1.9 FT.
THICKNESS OF SURFACE SEAL 17.5 FT.
TYPE OF SURFACE SEAL Cement/Bentonite Grout
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]
TYPE OF PROTECTIVE CASING Steel Pipe
INSIDE DIAMETER OF PROTECTIVE CASING 6.0 IN.
/DEPTH OF BOTTOM OF PROTECTIVE CASING 1.9 FT.
INSIDE DIAMETER OF CASING 4.0 IN.
TYPE OF BACKFILL AROUND CASING Cement/Bentonite Grout
DIAMETER OF BOREHOLE 6.0 IN.
/DEPTH OF TOP OF BEDROCK 2.0 FT.
/DEPTH OF BOTTOM OF CASING 17.5 FT.
DIAMETER OF ROCK HOLE 3.0 IN.
DEPTH OF BOTTOM OF ROCK HOLE 27.5 FT.

[FIGURES REFER TO: EL. ____ DEPTH X]

WELL SUMMARY: 19.4 FT. CASING LENGTH + 10.0 FT. LENGTH OF ROCK HOLE = 29.4 FT. TOTAL LENGTH

H & A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

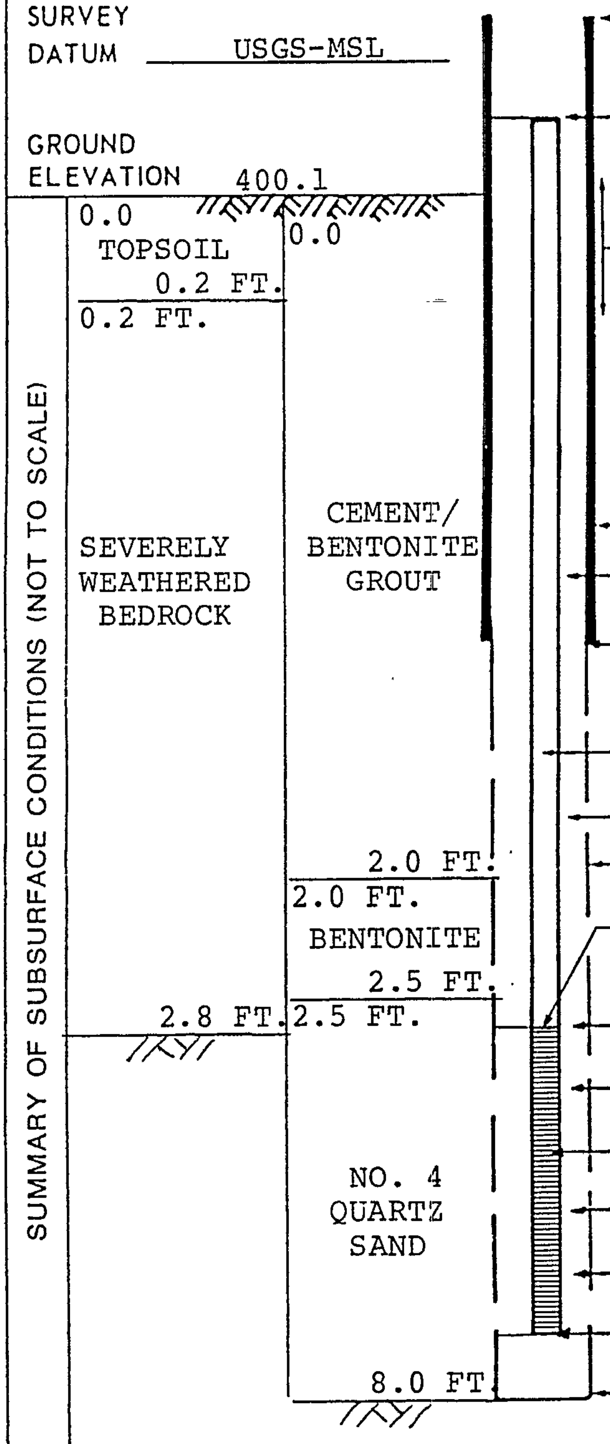
BEDROCK OBSERVATION WELL REPORT

PROJECT: XEROX BUILDING 214 FIELD INVESTIGATION
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: HYDRO GROUP, INC.
DRILLER: W. SANFORD H&A REPRESENTATIVE: L. DISALVO
INSTALLATION DATE 20 APRIL 1988

FILE NO. 758022
WELL NO. SR93
BORING NO. R94
LOCATION N1914.9
E3365.4
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 400.1



~~ELEVATION/~~STICKUP ABOVE~~/BELOW~~ GROUND SURFACE OF CASING OR ROAD-WAY BOX	2.8 FT.
~~ELEVATION/~~STICKUP ABOVE~~/BELOW~~ GROUND SURFACE OF RISER PIPE.	2.1 FT.
THICKNESS OF SURFACE SEAL	2.5 FT.
TYPE OF SURFACE SEAL	Cement/Bentonite Grout
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]	
TYPE OF CASING	Round steel Pipe
INSIDE DIAMETER OF CASING	4.0 IN.
~~ELEVATION/~~DEPTH OF BOTTOM OF CASING	1.6 FT.
INSIDE DIAMETER OF RISER PIPE	2.0 IN.
TYPE OF BACKFILL AROUND RISER	Cement/Bentonite Grout
DIAMETER OF BOREHOLE	6.0 IN.±
TYPE OF COUPLING (THREADED, SOLVENT WELDED, WELDED, ETC.)	Threaded
~~ELEVATION/~~DEPTH OF BOTTOM OF RISER	3.0 FT.
TYPE OF WELLSCREEN/RISER	Stainless Steel/ Steel Pipe
SCREEN SLOT SIZE	.01 IN.
DIAMETER OF WELLSCREEN	2.0 IN.
TYPE OF BACKFILL AROUND WELLSCREEN	No. 4 Quartz Sand
~~ELEVATION/~~DEPTH OF BOTTOM OF WELLSCREEN	8.0 FT.
~~ELEVATION/~~DEPTH OF BOTTOM OF BOREHOLE	8.0 FT.

[FIGURES REFER TO: EL. ____ DEPTH X]

WELL SUMMARY: 5.1 FT. (LENGTH OF RISER PIPE) + 5.0 FT. (LENGTH OF WELLSCREEN) = 10.1 FT. (TOTAL LENGTH)

H & A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

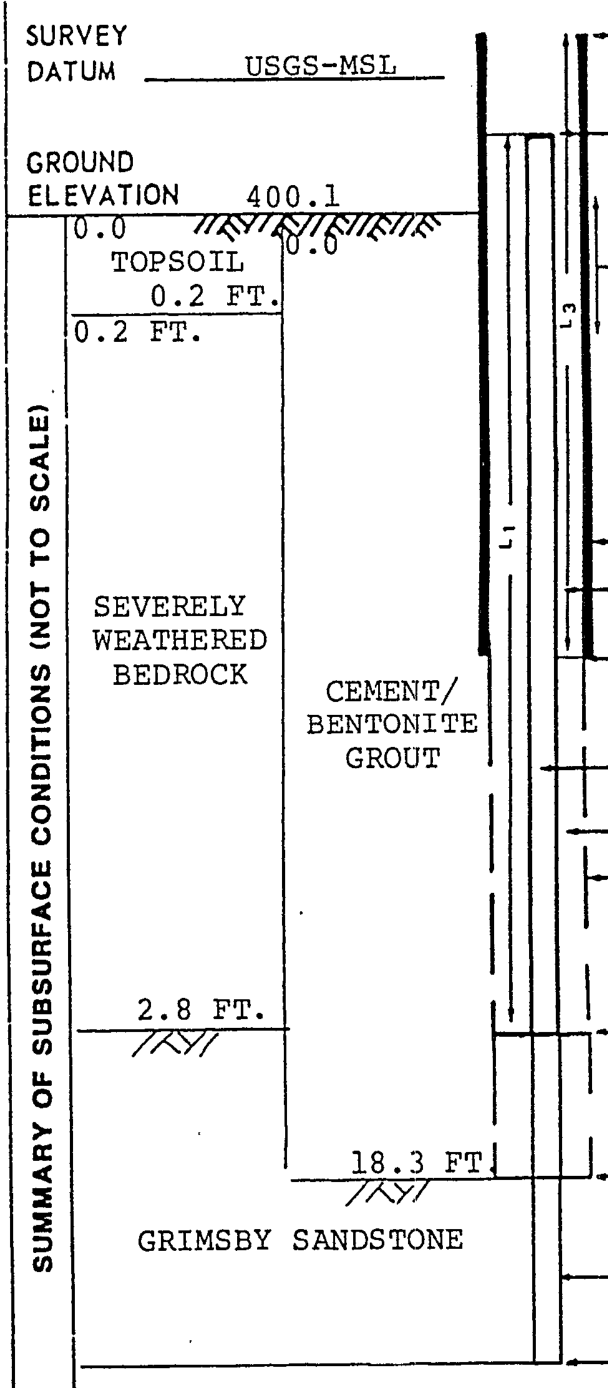
BEDROCK OBSERVATION WELL REPORT

PROJECT: XEROX BUILDING 214 FIELD INVESTIGATION
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: HYDRO GROUP, INC.
DRILLER: W. SANFORD H&A REPRESENTATIVE: L. DISALVO
INSTALLATION DATE 18 APRIL 1988 - 20 APRIL 1988

FILE NO. 758022
WELL NO. R94
BORING NO. R94
LOCATION N1915.2
E3371.2
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 400.1



STICKUP ABOVE GROUND SURFACE OF CASING 3.2 FT.
STICKUP ABOVE GROUND SURFACE OF CASING 2.1 FT.
THICKNESS OF SURFACE SEAL 18.3 FT.
TYPE OF SURFACE SEAL Cement/Bentonite Grout
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]
TYPE OF PROTECTIVE CASING Round Steel Pipe
INSIDE DIAMETER OF PROTECTIVE CASING 6.0 IN.
/DEPTH OF BOTTOM OF PROTECTIVE CASING 1.8 FT.
INSIDE DIAMETER OF CASING 4.0 IN.
TYPE OF BACKFILL AROUND CASING Cement/Bentonite Grout
DIAMETER OF BOREHOLE 6.0 IN.±
/DEPTH OF TOP OF BEDROCK 2.8 FT.
/DEPTH OF BOTTOM OF CASING 18.3 FT.
DIAMETER OF ROCK HOLE 3.0 IN.
/DEPTH OF BOTTOM OF ROCK HOLE 28.3 FT.

[FIGURES REFER TO: EL. ____ DEPTH X]

WELL SUMMARY:	20.4 FT.	+	10.0 FT.	=	30.4 FT.
	CASING LENGTH		LENGTH OF ROCK HOLE		TOTAL LENGTH

H&A

H & A of New York
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

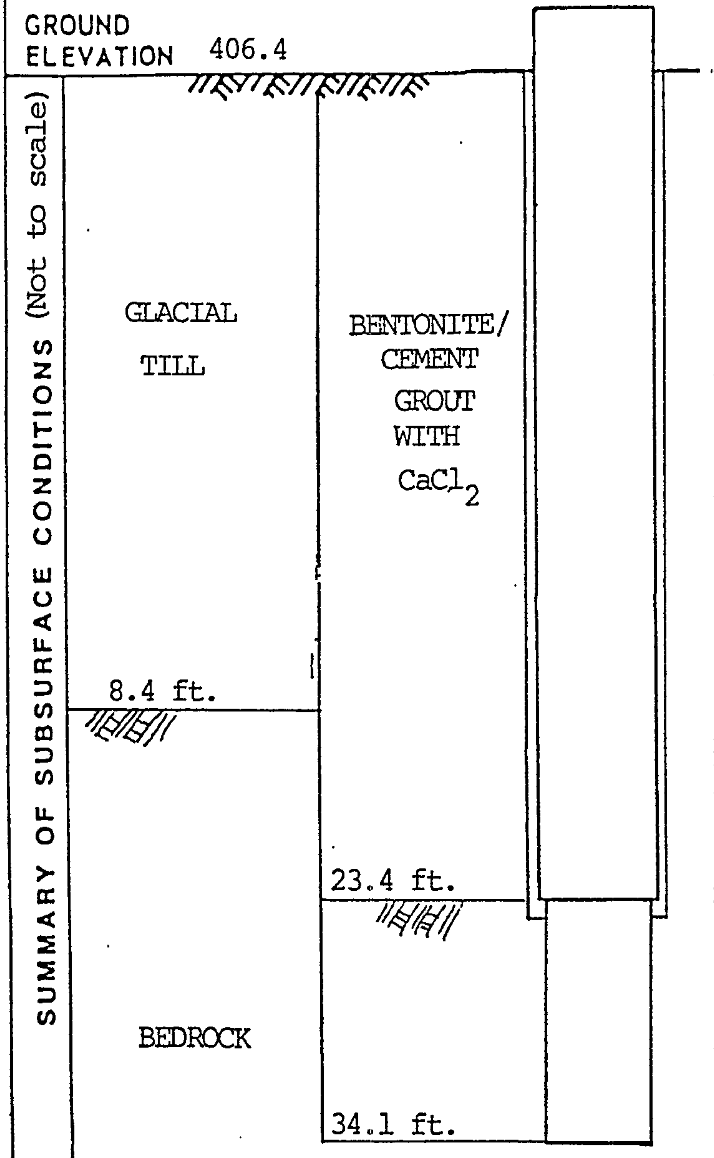
BEDROCK WELL COMPLETION REPORT

PROJECT: XEROX — SALT ROAD COMPLEX
LOCATION: WEBSTER, NEW YORK
CLIENT: XEROX CORPORATION
CONTRACTOR: FREY WELL DRILLING
DRILLER: D. FREY INSPECTOR: L. DISALVO
INSTALLATION DATE 16 DECEMBER 1988

FILE NO. 7580-24
WELL NO. R-103
BORING NO. ---
LOCATION N 1336.4
E 3351.2
SHEET 1 OF 2

SURVEY DATUM USGS-MSL

GROUND ELEVATION 406.4



XXXXXXXXXX STICKUP ABOVE/XXXXX GROUND SURFACE OF WELL CASING	1.5 ft.
ELEVATION OR STICKUP ABOVE/BELOW GROUND SURFACE OF SURFACE CASING, IF PRESENT	NA
ELEVATION/DEPTH OF SURFACE CASING	NA
DIAMETER OF BOREHOLE	10.0 in.
INSIDE DIAMETER OF WELL CASING	8.0 in.
WALL THICKNESS OF WELL CASING	---
TYPE OF SEAL INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE	Bentonite/Cement Grout
TOTAL VOLUME OF SEAL PLACED	4.6 cu. ft.
METHOD OF SEAL PLACEMENT	Pressure Grout
XXXXXXXX/DEPTH TOP OF BEDROCK	8.4 ft.
XXXXXXXX/DEPTH BOTTOM OF CASING	23.4 ft.
DIAMETER OF ROCK HOLE	8.0 in.
XXXXXXXX/DEPTH OF ROCK HOLE	34.1 ft.

[FIGURES REFER TO: EL. ____ DEPTH X]

LENGTH OF CASING PLACED 24.9 ft. LENGTH OF ROCK HOLE DRILLED 10.7 ft.

1992 H&A of New York VE-23 Replacement

H&A OF NEW YORK
CONSULTING GEOTECHNICAL ENGINEERS
GEOLOGISTS AND HYDROGEOLOGISTS

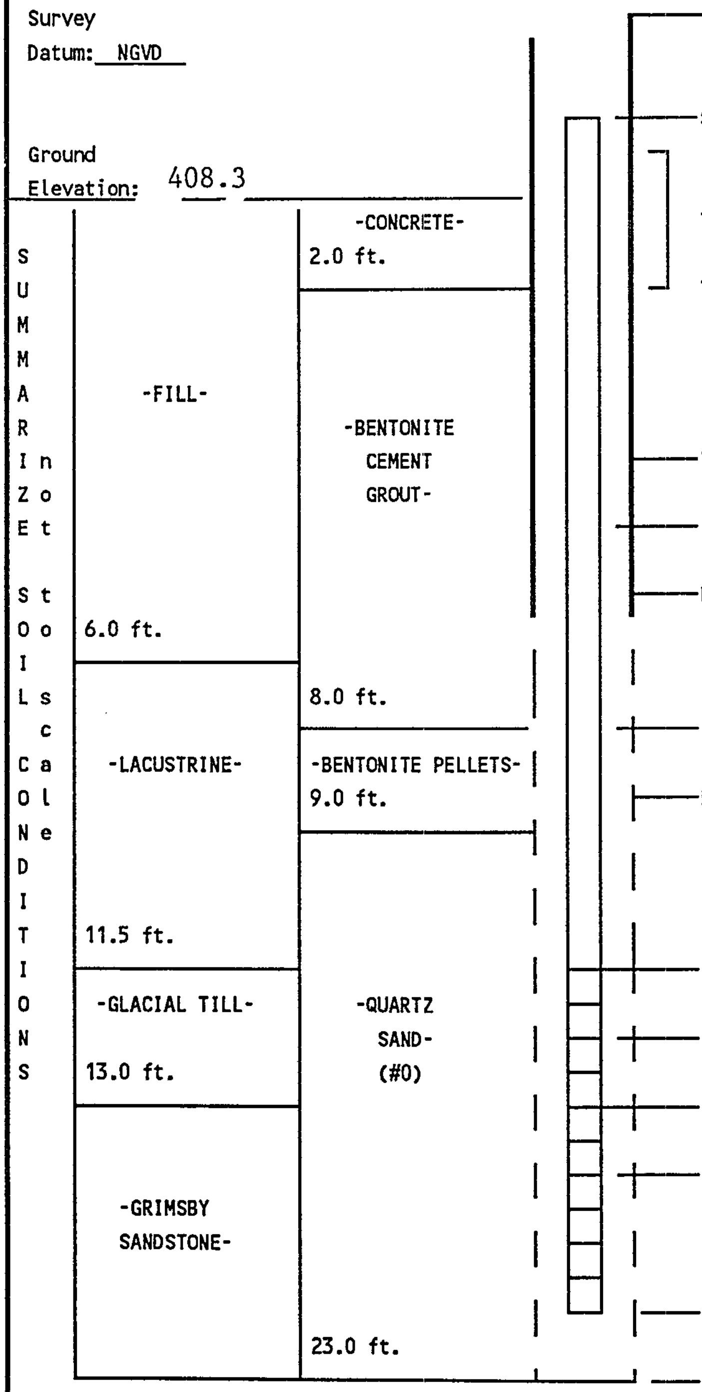
GROUNDWATER RECOVERY WELL REPORT

PROJECT:	BUILDING 209 REMEDIATION
LOCATION:	WEBSTER, NEW YORK
CLIENT:	XEROX CORPORATION
CONTRACTOR:	SJB SERVICES, INC.
DRILLER:	J. Lamm RIG TYPE: Acker Soil Max.
INSTALLATION DATE:	8 July 1992

FILE NO.:	70096-43
WELL NO.:	VE23 Replacement
LOCATION:	N796.3 E3742.5
SHEET:	1 OF 2
INSPECTOR:	W. Lanik

Survey Datum: NGVD

Ground Elevation: 408.3



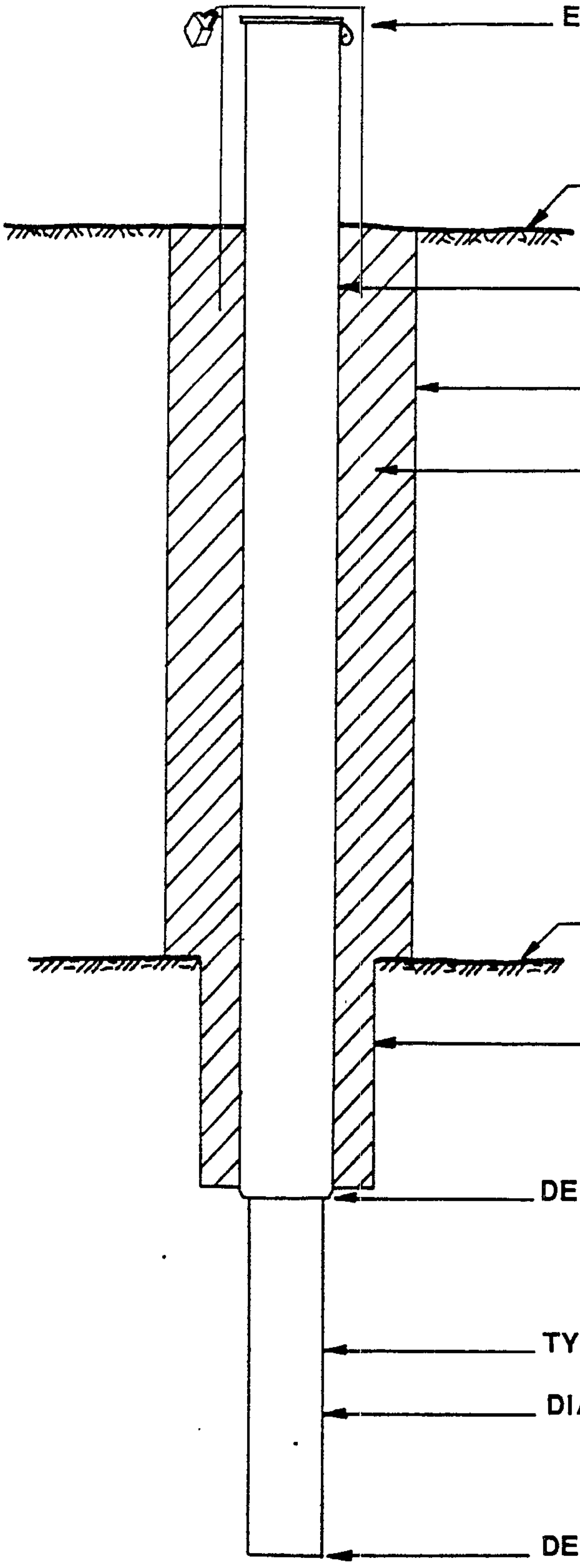
Stickup above ground surface of protective casing.	2.2 ft.
Stickup above ground surface of riser pipe.	1.9 ft.
Thickness of Surface Seal	2.0 ft.
Type of Surface Seal [indicated all seals showing depth, thickness and type]	Concrete
Type of Protective Casing	Zinc-coated Steel
Inside Diameter of Protective Casing	6 x 6 in. sq.
Depth of Bottom of Protective Casing	2.8 ft.
Inside Diameter of Riser Pipe	4.0 in.
Type of Backfill Around Riser	Bentonite Cement Grout
Diameter of Borehole	8 in. +/-
Type of coupling (threaded, welded, etc.)	Threaded
Depth of Bottom of Riser	10.8 ft.
Type of Wellscreen	304 stainless
Screen Slot Size	0.010 in.
Diameter of Wellscreen	4.0 in.
Type of Backfill Around Wellscreen	Quartz Sand
Depth of Bottom of Wellscreen	20.8 ft.
Depth of Bottom of Borehole	23.0 ft.

Remarks: Installed as replacement for damaged well VE23.

Well No. VE23

Bldg. 119 Monitoring Well Reports

M-1D
MW-15
MW-20



ELEVATION OF TOP OF CASING 414.39'

GROUND ELEVATION 412.09'

I.D. OF WELL CASING 4.0"

TYPE OF WELL CASING Stainless Steel

DIAMETER OF BOREHOLE 7"

TYPE OF BACKFILL Cement/Bentonite Grout

DEPTH TO BEDROCK SURFACE 4.0'

DIAMETER OF BOREHOLE 6.13"

DEPTH TO BOTTOM OF WELL CASING 24.3'

TYPE OF SCREENED SECTION Open Hole

DIAMETER OF BOREHOLE 2.9"

DEPTH TO BOTTOM OF WELL 30.5'

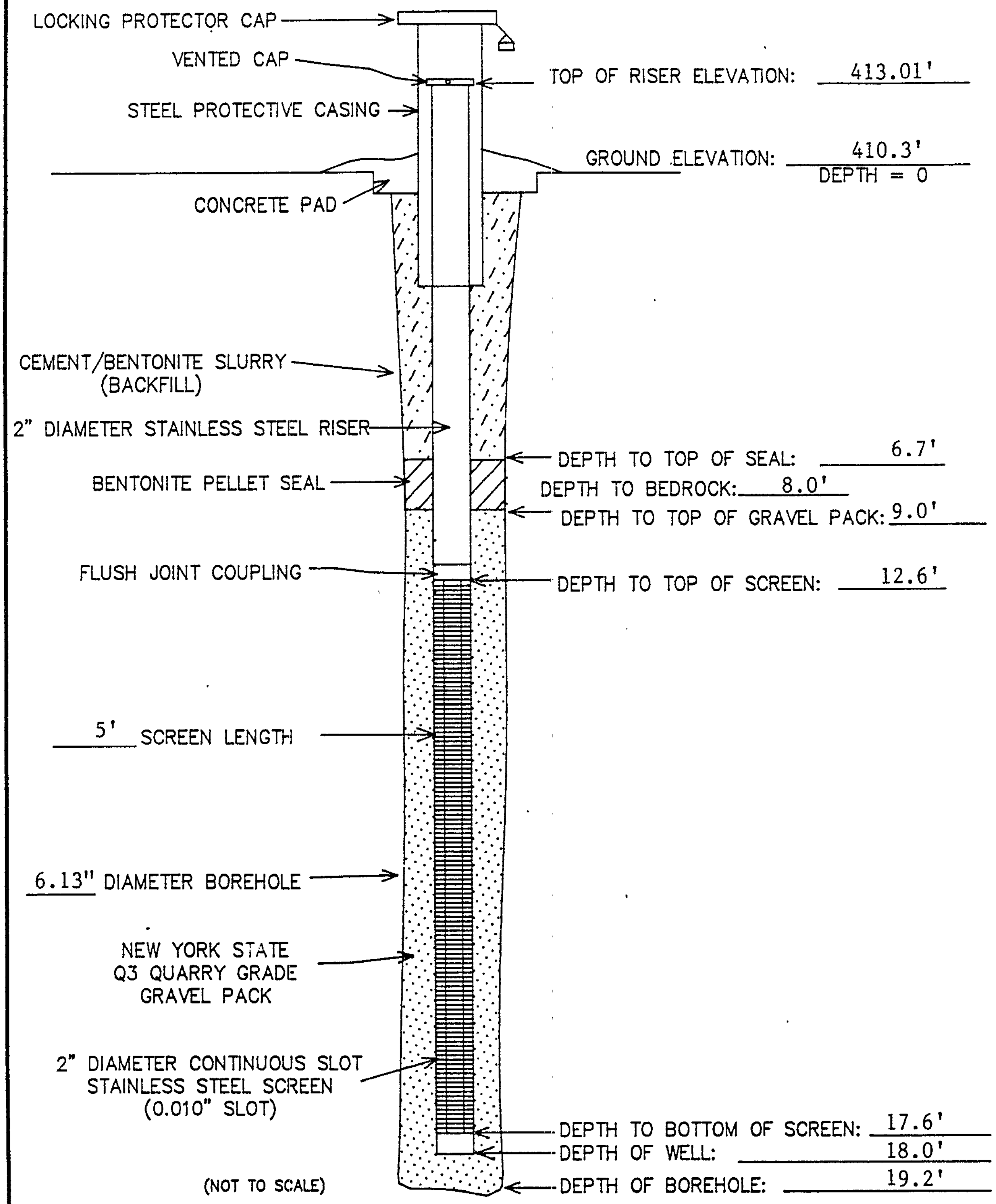
DEPTH TO BOTTOM OF BOREHOLE 30.5'

REPORT OF MONITORING WELL M-1D

Drawn by:	*Checked by:* JPB	*Project No.:* 87C2696	*Date:* 1/26/88	*Figure No.:*

REPORT OF MONITORING WELL: MW-15

XEROX CORPORATION – NURSERY / PILOT PLANT STUDY



TOP OF RISER ELEVATION: 413.01'

GROUND ELEVATION: 410.3'
DEPTH = 0

DEPTH TO TOP OF SEAL: 6.7'

DEPTH TO BEDROCK: 8.0'

DEPTH TO TOP OF GRAVEL PACK: 9.0'

DEPTH TO TOP OF SCREEN: 12.6'

5' SCREEN LENGTH

6.13" DIAMETER BOREHOLE

DEPTH TO BOTTOM OF SCREEN: 17.6'

DEPTH OF WELL: 18.0'

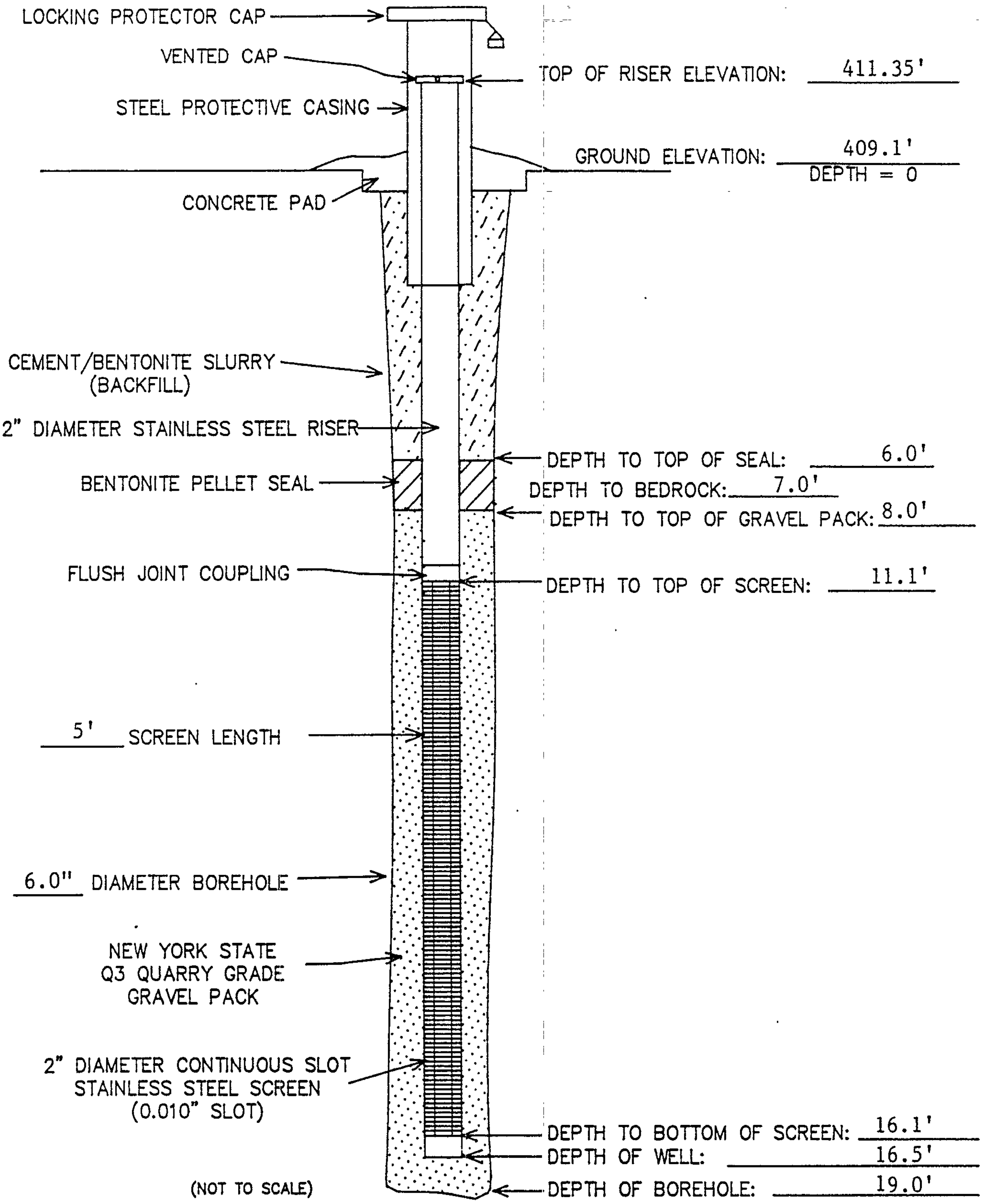
DEPTH OF BOREHOLE: 19.2'

DATE WELL INSTALLED: 2/11/88 CHECKED BY: JPB DATE: 2/29/88 PROJECT NO.: 87C26962

Woodward–Clyde Consultants

REPORT OF MONITORING WELL: MW-20

XEROX CORPORATION – NURSERY / PILOT PLANT STUDY



TOP OF RISER ELEVATION: 411.35'

GROUND ELEVATION: 409.1'
DEPTH = 0

DEPTH TO TOP OF SEAL: 6.0'

DEPTH TO BEDROCK: 7.0'

DEPTH TO TOP OF GRAVEL PACK: 8.0'

DEPTH TO TOP OF SCREEN: 11.1'

5' SCREEN LENGTH

6.0" DIAMETER BOREHOLE

DEPTH TO BOTTOM OF SCREEN: 16.1'

DEPTH OF WELL: 16.5'

DEPTH OF BOREHOLE: 19.0'

(NOT TO SCALE)

DATE WELL INSTALLED: 2/18/88 CHECKED BY: JPB DATE: 2/29/88 PROJECT NO.: 87C26962

Woodward–Clyde Consultants

APPENDIX I

2-Phase Extraction Case Study

CASE STUDY - XEROX BUILDING 209
2-PHASE VACUUM EXTRACTION SYSTEM
WEBSTER, NEW YORK

2-PHASE
EXTRACTION
SYSTEM

Prepared for

Eliott N. Duffney -
Project Manager

Xerox Corporation
Webster, New York

by

Paul M. Tornatore, P.E.
Manager, Remedial Design

H&A of New York
Rochester, New York

File No. 70285-40
April 1993

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ABSTRACT

Conventional environmental remedies have typically relied on pump and treat and other passive in-situ techniques to recover contaminants from soils and groundwater. These approaches result in extended remedial durations and limit effectiveness to areas where contaminants are easily accessed. Recent evaluations of remedial performance have shown that passive approaches often fall short of expectations and site requirements, even when dealing with health based risk closure criteria. This shortcoming can lead to longer remedial durations, higher remediation costs and increased residual risk in many instances.

Low permeability soils and many bedrock applications make passive remedies impractical and ineffective. Where contaminant levels have warranted remediation, ex-situ techniques have generally been required at significant cost and/or disruption of business operations.

Many companies and agencies now embrace active in-situ remedies that recover contaminants rapidly, provide improved migration control and reduce residual contaminant levels. These remedies may provide an opportunity to significantly reduce remediation duration and total project cost.

The Building 209 Case Study presents an evaluation of 2-Phase Extraction Technology as an active in-situ remedy to soils and groundwater contamination. The site is challenging, as contaminants have been identified in soils, overburden groundwater and within fractured bedrock beneath and downgradient of the source areas. Permeabilities in the water bearing zones are highly variable, with relatively low permeabilities in overburden soils and higher permeabilities in the upper zone of underlying bedrock. The site conditions are not unlike many industrial locations, with shallow overburden and underlying rock formations.

This paper presents the promising initial results of 2-Phase Extraction performed as part of an Interim Remedial Measure at Building 209. Through approximately 6 months of extraction operations, over 3,300 pounds of contaminant mass has been removed from the site. Groundwater average concentrations detected in 19 regularly sampled monitoring wells in the vicinity of the extraction process have been reduced by over 75% from average levels before remediation. Soils concentrations in the extraction area have been reduced by 3 orders of magnitude from initial average levels of 5,000 ppm to current levels of less than 5 ppm in approximately 6 months.

While remedial activities are expected to continue for some time, the initial results show significant benefits from the use of the 2-Phase Extraction process. Based on these initial results, significant reduction in the remediation time required for the site is expected.

I. INTRODUCTION

The 2-Phase Extraction process is an innovative remedial technique developed for in-situ remediation of volatile organic compounds in soils and groundwater. The process uses high vacuum (>25 inches Hg at the source) to enhance the recovery of groundwater and soil vapors. The process can greatly simplify remedial installations by eliminating the need for groundwater recovery pumps within individual wells and simultaneously reduces groundwater treatment requirements by in process stripping.

Xerox and H&A of New York have performed extensive evaluations of system performance and subsurface response associated with the use of the 2-Phase Extraction process as an interim remedy in the Building 209 area of the Xerox Webster complex. This report summarizes the background and results achieved in extended pilot testing at the site. The testing utilized the 2-Phase Extraction process for groundwater and soil vapor recovery using one to four extraction wells. The test results also include an evaluation of the performance of a prototype equipment package designed to improve extraction performance, reliability, flexibility and treatment efficiency.

The work described herein is ongoing at the site. This report reflects actual remedial performance from August 1992 through March 1993.

II. HOW THE 2-PHASE EXTRACTION PROCESS WORKS

2-Phase Extraction simultaneously recovers groundwater and soil vapor under vacuum from a modified conventional recovery well. Figure 1 shows how 2-Phase Extraction impacts subsurface conditions maximizing groundwater and soil vapor recovery in the contaminated zone.

Groundwater and soil vapors that enter the well under vacuum are removed from the well casing. Vapor velocities and vapor/liquid ratios cause conveyance of the groundwater to the surface with minimal pressure drop which results in increased applied vacuums within the well casing. This in turn results in increased vapor and groundwater flow by enhancing formation pressure gradients. Figure 2 shows a typical wellhead used for 2-Phase Extraction.

Volatiles present in groundwater recovered by the 2-Phase process are stripped during extraction. The contaminant mass originally contained within the groundwater is transferred to the vapor phase for treatment. Small residual contaminant loadings in the groundwater typically require only polishing prior to discharge.

The 2-Phase Extraction process accelerates groundwater extraction rates, the removal of volatile contaminants present as free products (non-aqueous phase liquids), soil vapors and materials sorbed to soils in saturated zones by enhancing partitioning. The contaminant mass recovered can be greater than would be achieved with conventional technologies as all contaminant phases can be simultaneously influenced during 2-Phase Extraction.

The majority of the contaminants recovered are removed from the ground in the vapor phase and/or transferred to the vapor phase for treatment. A large variety of cost effective processes exist for vapor phase treatment.

Testing performed in this study has confirmed that 2-Phase Extraction under high vacuum results in higher mass removal rates than conventional pump and treat or vacuum enhanced pump and treat processes. Short duration pilot testing at the site has also shown significantly greater mass removal rates under high vacuum compared to low vacuum extraction methods typically used in some soil venting applications.

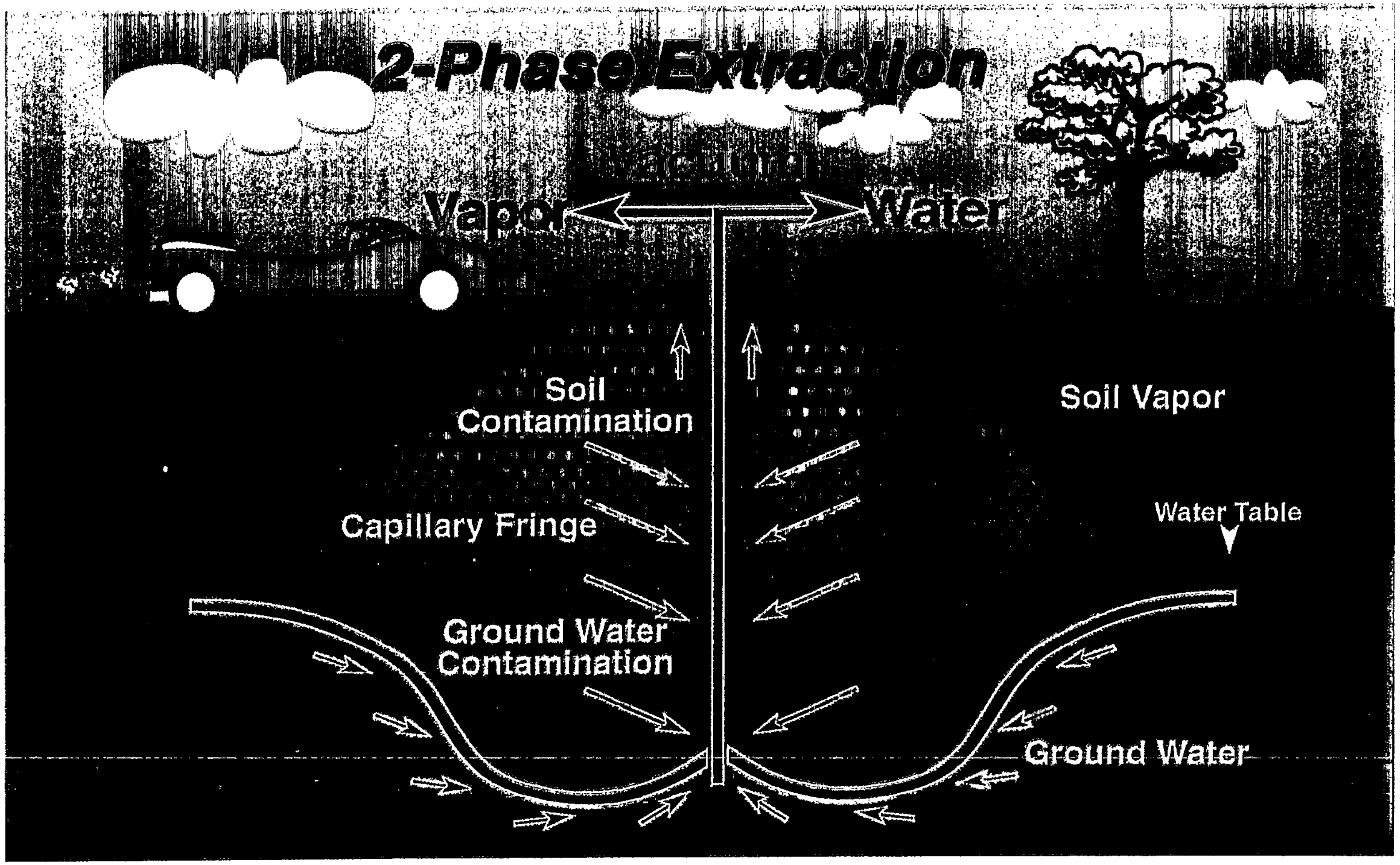
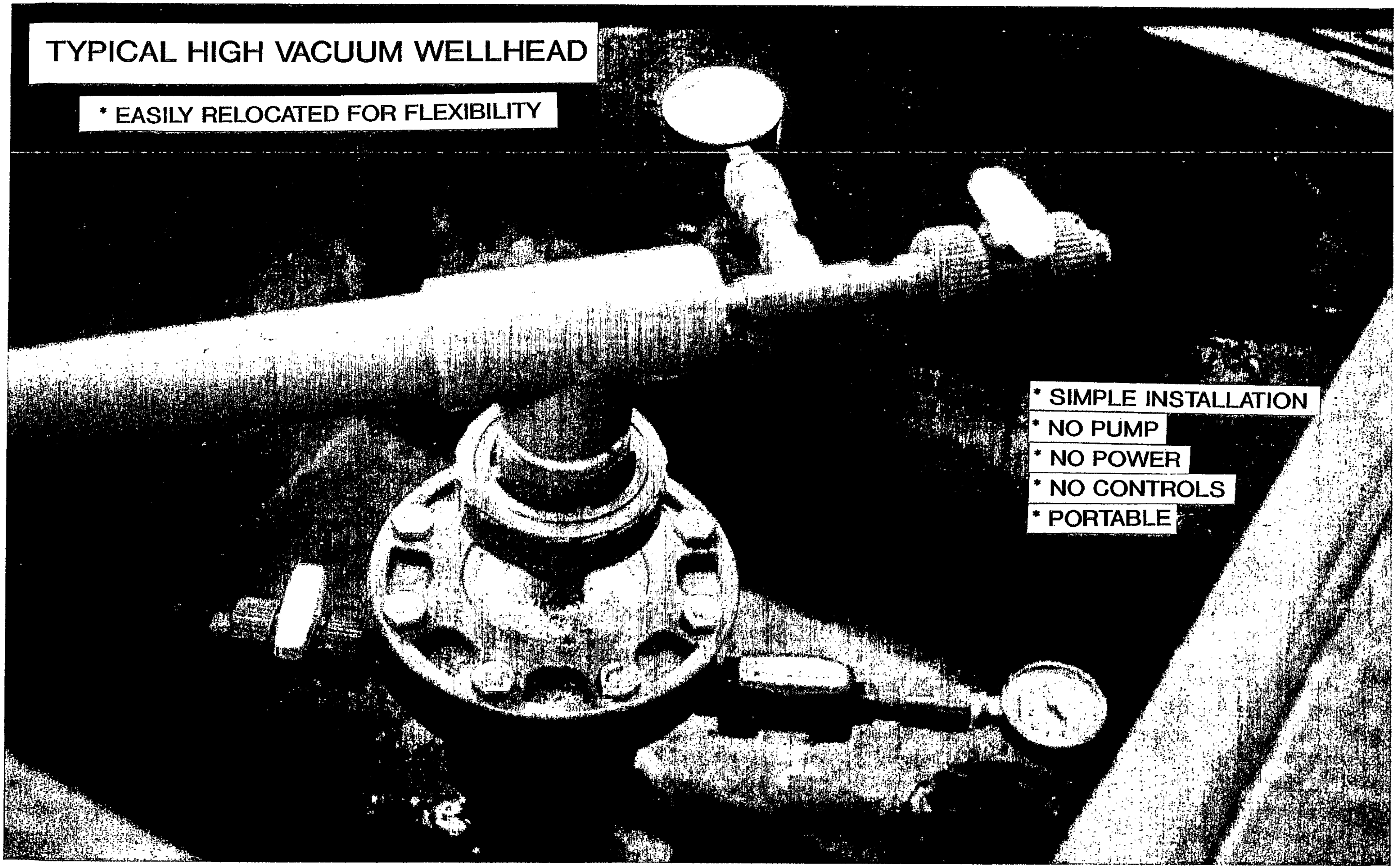

2-Phase Extraction
Vacuum
Vapor
Water
Soil Contamination
Soil Vapor
Capillary Fringe
Water Table
Ground Water Contamination
Ground Water

FIGURE 1



TYPICAL HIGH VACUUM WELLHEAD

* EASILY RELOCATED FOR FLEXIBILITY

* SIMPLE INSTALLATION
* NO PUMP
* NO POWER
* NO CONTROLS
* PORTABLE

FIGURE 2

III. SITE SPECIFIC CONDITIONS - BUILDING 209

The 2-Phase Extraction system installed at Xerox Building 209 (Figure 3) is part of an interim remedial program intended to remediate source soils and groundwater contaminated with organic solvents. This testing will also serve as a basis for including 2-Phase Extraction Technology as a site wide remedial alternative when full-scale remediation is initiated.

3-01. SITE BACKGROUND

Building 209 is a center for refurbishing, disassembling and cleaning copiers. In the past, chlorinated solvents were used at this location for cleaning/degreasing operations in the copier refurbishing process.

In early 1986, Xerox encountered volatile organic contamination in the soil and shallow groundwater in the vicinity of solvent handling areas adjacent to Building 209. The contamination was discovered during excavation for construction of overhead pipe rack support footings. Initial soil and groundwater samples indicated the presence of elevated levels of 1,1,1-trichloroethane, trichloroethene, tetrachloroethene and mineral spirits. Subsequent investigative activities identified significant areas of soil and groundwater contamination in areas where solvents were stored and handled. The contamination is present in areas adjacent to and beneath the building.

3-02. SITE HYDROGEOLOGY

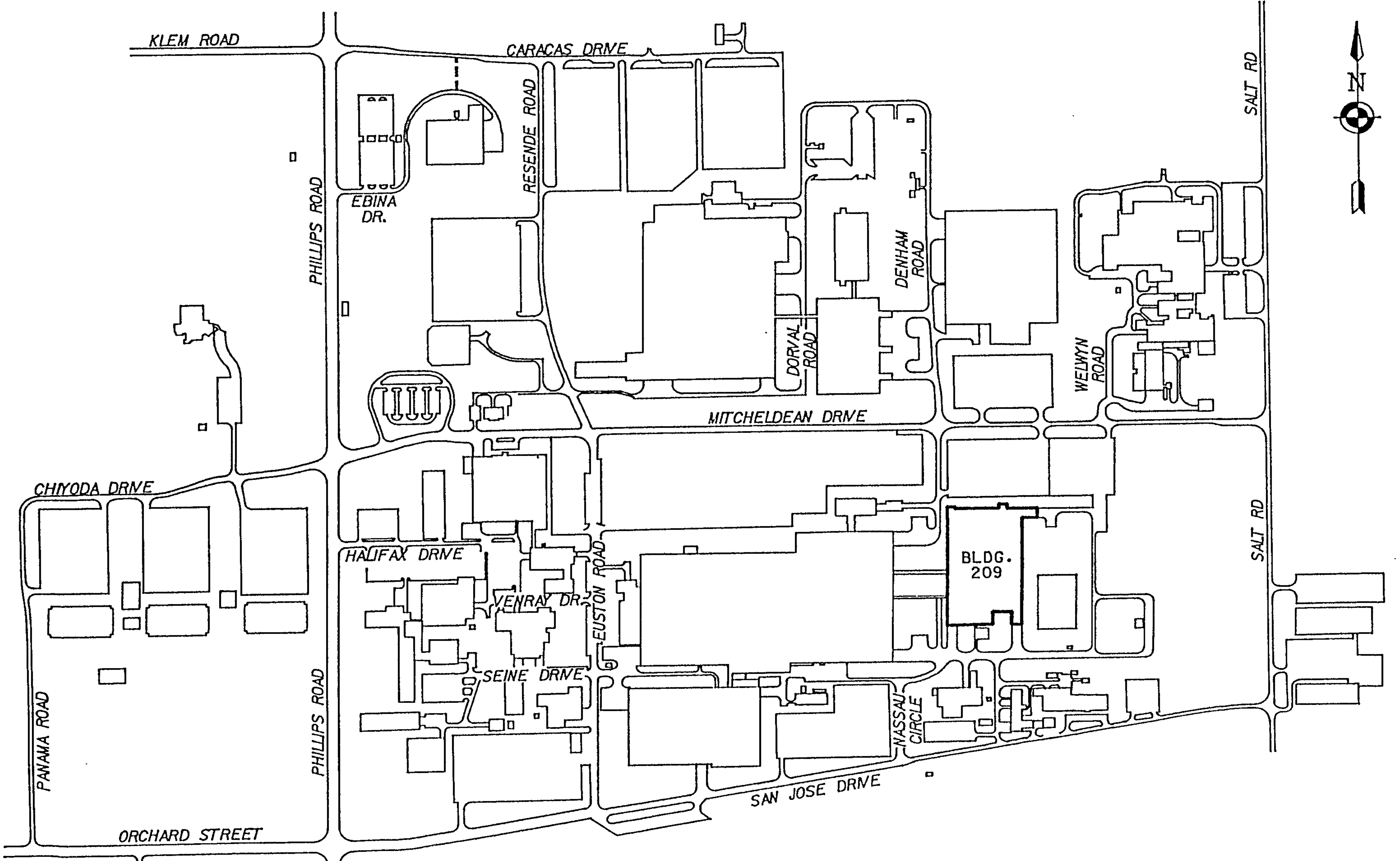
The topography of the Building 209 site is characterized by very low relief (less than 10 feet) with a gentle northward slope. A single unlined drainage ditch flows south to north carrying surface water off-site.

The Xerox facility lies within the low-lying Ontario Plain section of the Erie-Ontario lowland physiographic province. The area is underlain by quaternary glacial and post glacial overburden materials which have been deposited on approximately 2000 feet of Paleozoic sedimentary rocks.

The overburden materials at this site range in thickness from 5 to 15 feet and consist of glacial till, overlain by glacial - lacustrine and fluvial deposits and fill material. The glacial till generally consists of medium dense to dense silty medium-to-fine-grained sand with moderate amounts of coarse to medium sand. These deposits typically exhibit hydraulic conductivity ranging from 10^{-5} to 10^{-7} cm/sec.

The bedrock stratigraphy of the region is summarized in a general stratigraphic profile presented in Figure 4. The bedrock units which subcrop in the Building 209 area include the Kodak and Cambria formations. The Kodak is a medium-to-fine grained, thick-to-medium bedded sandstone. The Cambria is a fine-grained, medium-to-thin bedded shaley siltstone.

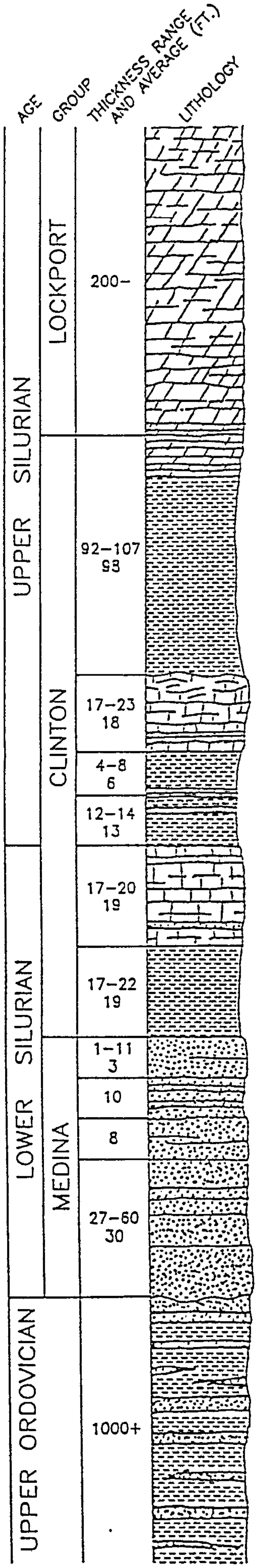
The overburden-bedrock contact is somewhat transitional as a result of glacial erosion which has fractured the top-of-rock surface. Large-scale structural features are not evident within the bedrock explored at the site, however, bedding plane partings and high angle joints are prevalent.



XEROX SITE PLAN

FIGURE 3

GENERAL STRATIGRAPHIC PROFILE



FORMATION DESCRIPTION:

LOCKPORT DOLOMITE – Light to medium gray, fine to medium-grained, thin to medium-bedded, siliceous DOLOMITE with stylolites, very close to moderately close argillaceous partings, and vugs and cavities often lined with secondary dolomite, calcite, aragonite and quartz.

Includes three members: Oak Orchard Dolomite (over 100 ft. thick in western New York), Penfield Dolomite (about 75 ft. thick), and Decew Dolomite (approximately 22 ft. thick).

Oak Orchard is uppermost unit. Underlying Penfield contains wavy and uneven partings in lower 20 ft. Partings may slope at high angles, may appear as 1/8 – to 1/4-in. thick silty bands, and are frequently slickensided. Some cross-bedding observed. Basal Decew Member contains very thin clay partings in the basal few ft. Secondary gypsum seams in closely spaced partings occur throughout the Decew.

Contact with underlying Rochester Shale is gradational. Usually marked only by increasing dolomitic mudstone between increasingly thinner dolomite beds in the Decew.

ROCHESTER SHALE – Light to dark gray, fine-grained, fossiliferous, dolomitic MUDSTONE with interbeds of dolomite and limestone, and secondary gypsum seams in closely to very closely spaced partings.

Upper 8 to 12 ft. called the Gates Dolomite Member and consists of thin to very thin dolomite beds. Very thin limestone beds occur from 15 to 25 ft. below top of Rochester and increase in thicknessand frequency downward. They grade into the adjacent mudstone and contain fine quartz silt. Infrequently, weathered clay partings and clay beds observed. Pits and vugs occur in trace amounts in the upper Rochester and their frequency decreases downwards. Gypsum nodules present in trace amounts throughout the formation.

Upper contact with Lockport Dolomite is gradational. Marked by upwardly increasing frequency and thickness of dolomite beds in the Rochester.

IRONDEQUOIT LIMESTONE – Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous LIMESTONE with thin interbeds of dark gray, dolomitic shale, trace pits and vugs, gypsum nodules, and secondary gypsum seams at partings. Limestone bedding wavy. Shale beds thickest in lowest quarter of formation.

WILLIAMSON SHALE – Dark greenish gray SHALE with trace fossils, a few thin limestone beds and dark gray, very thin shale beds containing graptolite fossils at the base.

LOWER SODUS SHALE – Dark greenish gray to grayish brown SHALE with trace fossils. Upper part contains several light gray, thin, close to moderately close limestone beds containing abundant brachiopod fossils. Sometimes weathered zone is present at the upper contact.

REYNALES LIMESTONE – Light to mediun gray, fine to mediun-grained, thin-bedded, fossiliferous, crystalline LIMESTONE with dark gray, very thin dolomitic shale interbeds. Thin siliceous zones (chert or chalcedony and fine-grained quartz siltstone) observed. Trace stylolites, secondary gypsum seams at partings, and a persistent, red, oolitic, fossiliferous, hematitic limestone bed ((Seneca Park Hematite Member) present.

MAPLEWOOD SHALE – Light greenish gray argillaceous SHALE.

KODAK SANDSTONE – Light gray to greenish gray, fine to medium-grained, medium to thick-bedded SANDSTONE. Bioturbated[3] Historically referred to as the Thorold Sandstone, which is now recognized to be older (see below).

CAMBRIA FORMATION – Reddish brown, fine-grained, medium to thin-bedded shaley SILTSTONE with gray mottling and bioturbation[3] This formation has historically been considered the top portion of the Grimsby Sandstone (see below).

THOROLD SANDSTONE – Reddish brown and light gray mottled, fine-grained, medium-bedded SANDSTONE, with bioturbation[3] Once thought to be equivalent to, or synonymous with, the Kodak Sandstone (see above).

GRIMSBY SANDSTONE – Reddish brown, fine to medium-grained, thin to thick-bedded SANDSTONE. Gray and greenish gray color mottling in upper half.. Closely to widely spaced, argillaceous partings with occasional gypsum seams. Bioturbated[3] in the upper half. Lower half is massive, has shallow cross-bedding, and has largest grain size in formation. Basal contact is sharp and undulating; an uncomformity in Rochester area, frequently marked by weathered shaly or clay parting.

QUEENSTON FORMATION – Reddish brown, fine-grained, thin to thick-bedded SANDSTONE, with some greenish gray to light gray mottling and very thin color banding. Close to moderately close argillaceous partings, some of which have secondary gypsum seams. Lithology grading laterally and vertically, including sandstone, siltstone, mudstone and very thin limestone beds.

NOTES:

1. Rock descriptions and thicknesses obtained from available test borings drilled for Monroe County Department of Engineering sewer tunnel project, modified with new formation names, descriptions and relationships proposed by geology staff at University of Rochester and accepted by New York state geologist.
2. Profile not to scale.
3. Swirly bedding caused by activity of marine worms.

GENERAL
STRATIGRAPHIC PROFILE
ROCHESTER, NEW YORK
H&A OF NEW YORK Rev. MAY 1991

FIGURE 4

In general, the upper portion of the bedrock is more intensely fractured than at depth.

Groundwater flow in the bedrock generally occurs through secondary porosity features such as joints and partings. As discussed above, the upper bedrock is generally more fractured than the lower rock. As a result, the shallow/fractured - rock zone transmits the greatest volume of groundwater. Groundwater flows in the shallow/fractured-rock zone to the north-northwest across the Building 209 site, with an average permeability of about 10^{-3} cm/sec.

Water-bearing zones have been encountered at lower levels within the bedrock below Building 209. These flow zones produce significantly lower hydraulic conductivities (averaging 10^{-6} cm/sec) and appear to be hydraulically isolated from the surface, except where vertical fractures provide connection. Figure 5 shows the subsurface geology and water bearing units in a cross section through the Building 209 area. The shallow low permeability overburden and multiple bedrock units present multiple heterogeneities limiting the effectiveness of passive remedial approaches.

3-03. NATURE AND EXTENT OF CONTAMINATION

Both the soil and shallow groundwater of the study area of Building 209 have been contaminated by organic solvents. The primary constituents detected include: dichloroethene/dichloroethane, methylene chloride, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, toluene and mineral spirits.

Volatile organic compounds were detected in borings in the former solvent reclamation area, with an extent of approximately 110,000 square feet. Areal and vertical extent of the soils contamination are shown in figures 6 and 7 respectively.

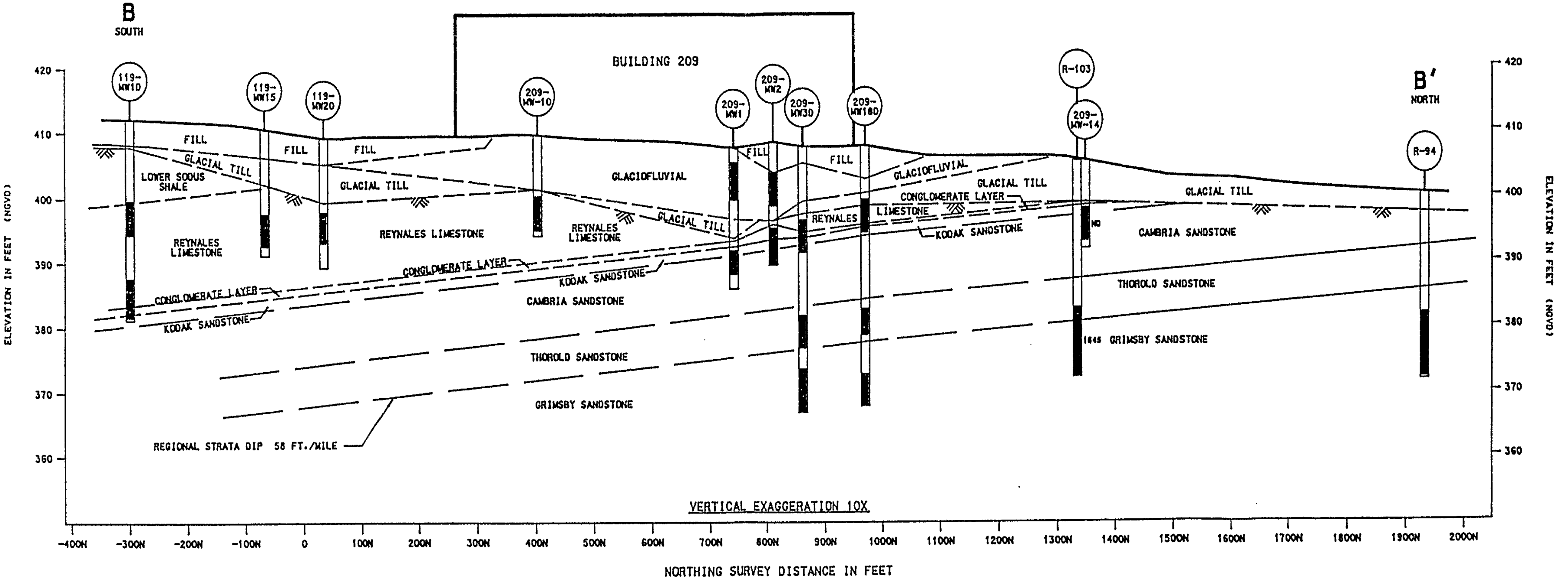
The highest concentrations of organics in groundwater have been encountered in the saturated overburden zone in the solvent reclamation area and beneath the building at the solvent spray booth locations. The downward vertical gradients in the overburden toward the shallow rock zone have resulted in limited lateral migration of contaminants in the overburden. As presented on Figure 8, the shallow/fractured-rock plume has primarily migrated northward, affecting an area of approximately 295,000 square feet.

The hydraulic separation between the shallow rock and lower rock water-bearing zones has resulted in only limited contamination in lower rock.

3-04. PILOT TESTING PROGRAM

As part of the interim remediation program at Building 209, Xerox has used an integrated 2-Phase Extraction system. The system has been used to evaluate contaminant recovery rates and methods and to assess sitewide feasibility of 2-Phase Extraction as a remedial alternative.

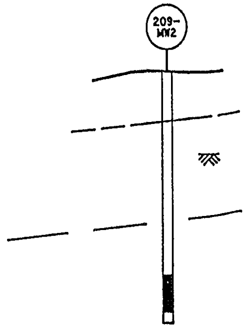
Initial pilot-testing has focused on achieving maximum contaminant mass removal from the apparent source area and stopping contaminant migration to an adjacent surface water outfall. The pilot-testing program has included extraction from an overburden well (VE-23S), shallow rock wells (MW-11, MW-4), and an overburden/bedrock interface well (VE-23) individually and collectively. The locations of these wells are shown on Figure 9.



NOTES:

1. REFER TO FIGURE 2, SITE PLAN, FOR WELL LOCATIONS.
2. MULTIPLE SCREENED INTERVALS SHOWN IN DEEP WELLS REPRESENT SCREENED INTERVALS OF SHALLOW AND INTERMEDIATE BEDROCK WELLS AT SAME WELL CLUSTER.
3. SEE REPORT TEXT FOR GEOLOGIC FORMATION DESCRIPTIONS.

LEGEND:



WELL NUMBER AND LOCATION

GROUND SURFACE

FORMATION CONTACT (DASHED WHERE CONTACT INFERRED BETWEEN BOREHOLES)

TOP OF BEDROCK SYMBOL

FORMATION CONTACT (STRATA THICKNESSES TAKEN FROM XEROX REFERENCE ROCK CORE, BOREHOLES 209-MW17I AND 209-MW18D)

GROUNDWATER LEVEL MEASURED IN WELL

SCREENED INTERVALS

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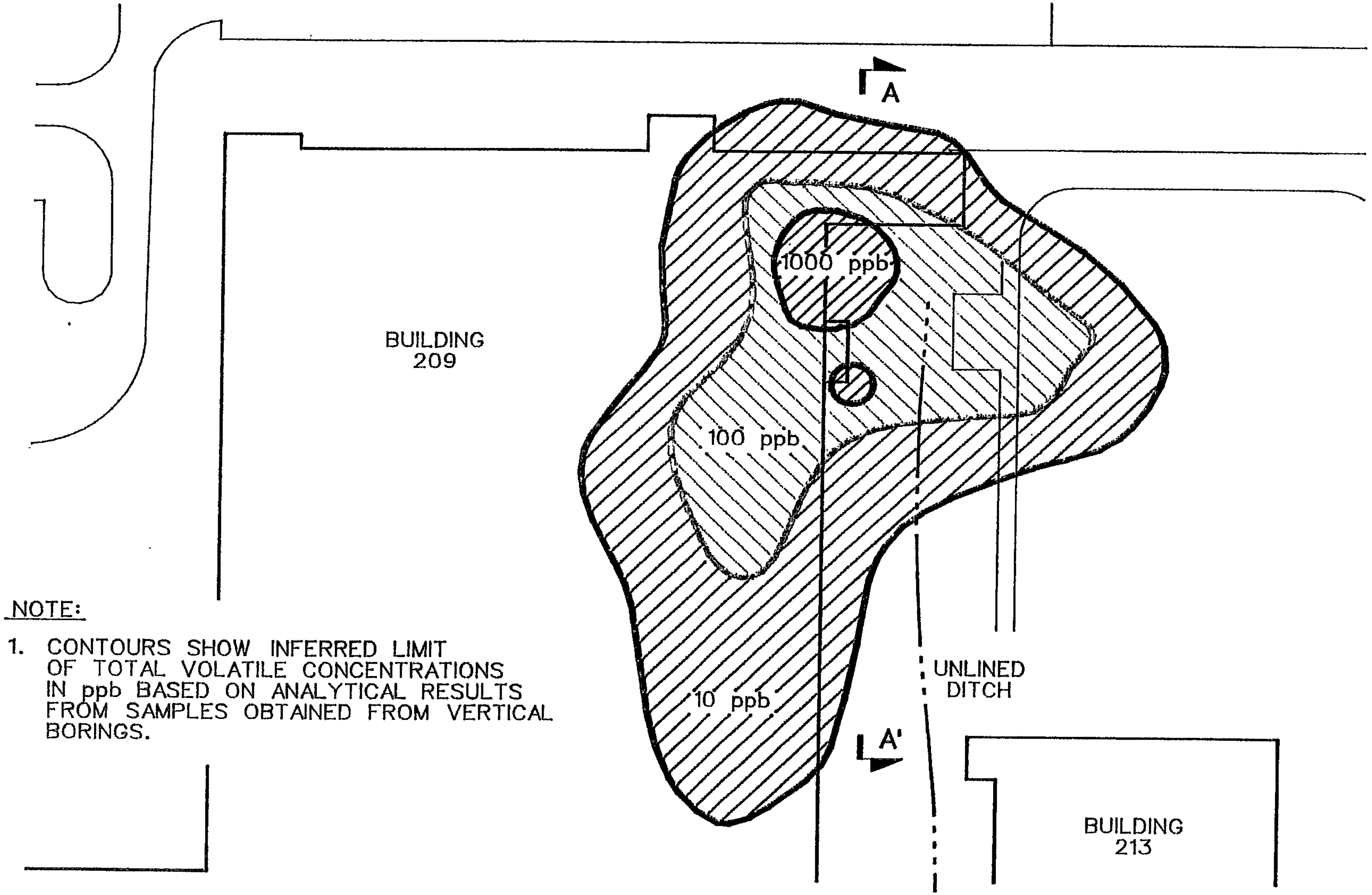
Geotechnical Engineers & Environmental Consultants

XEROX CORPORATION
WEBSTER, NEW YORK
BUILDING 209

GEOLOGIC CROSS SECTION
NORTH - SOUTH

FIGURE 5

E No. 70096-45

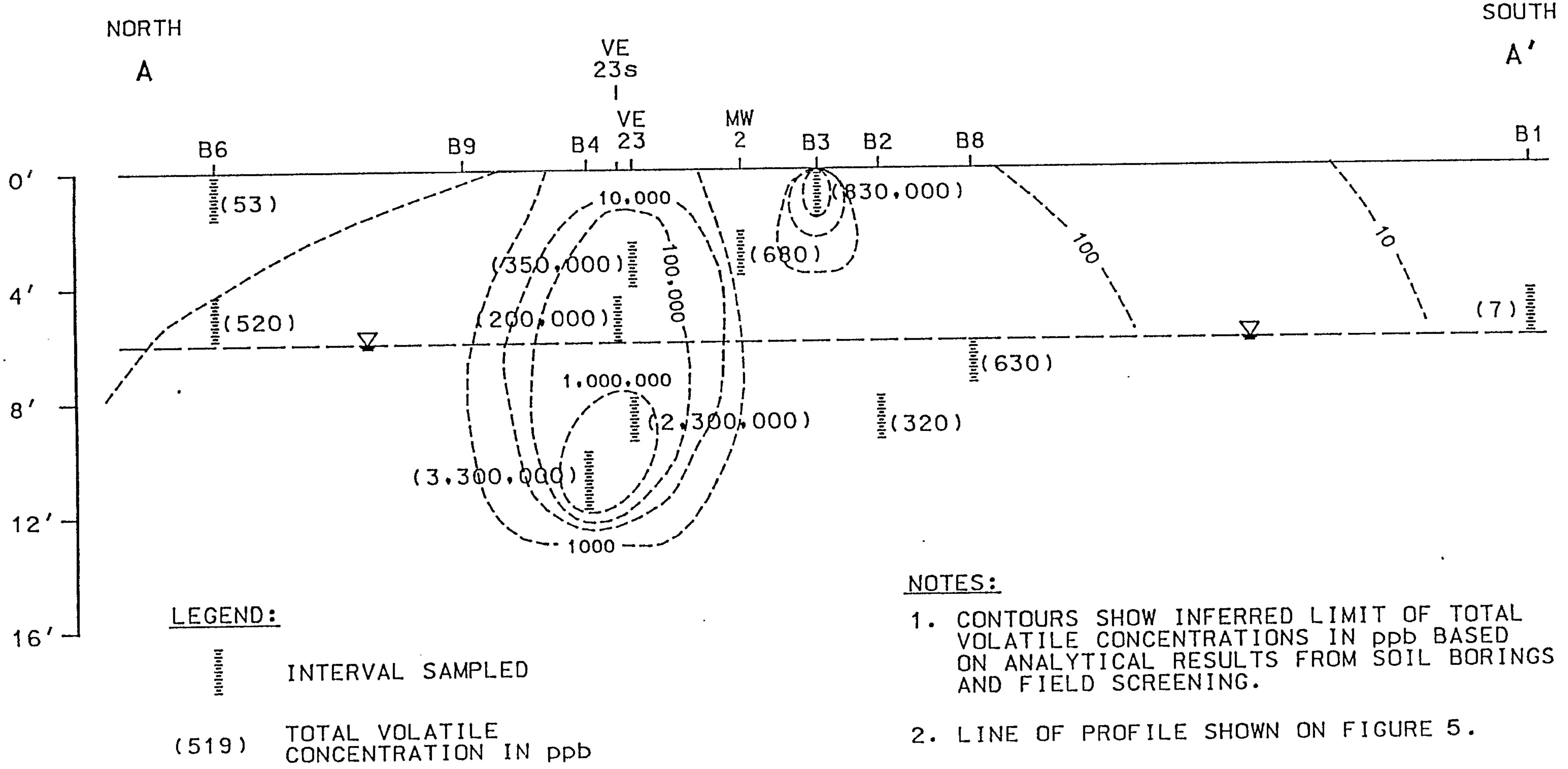


NOTE:

1. CONTOURS SHOW INFERRED LIMIT OF TOTAL VOLATILE CONCENTRATIONS IN ppb BASED ON ANALYTICAL RESULTS FROM SAMPLES OBTAINED FROM VERTICAL BORINGS.

TOTAL VOLATILE CONCENTRATIONS
IN SOIL

FIGURE 6

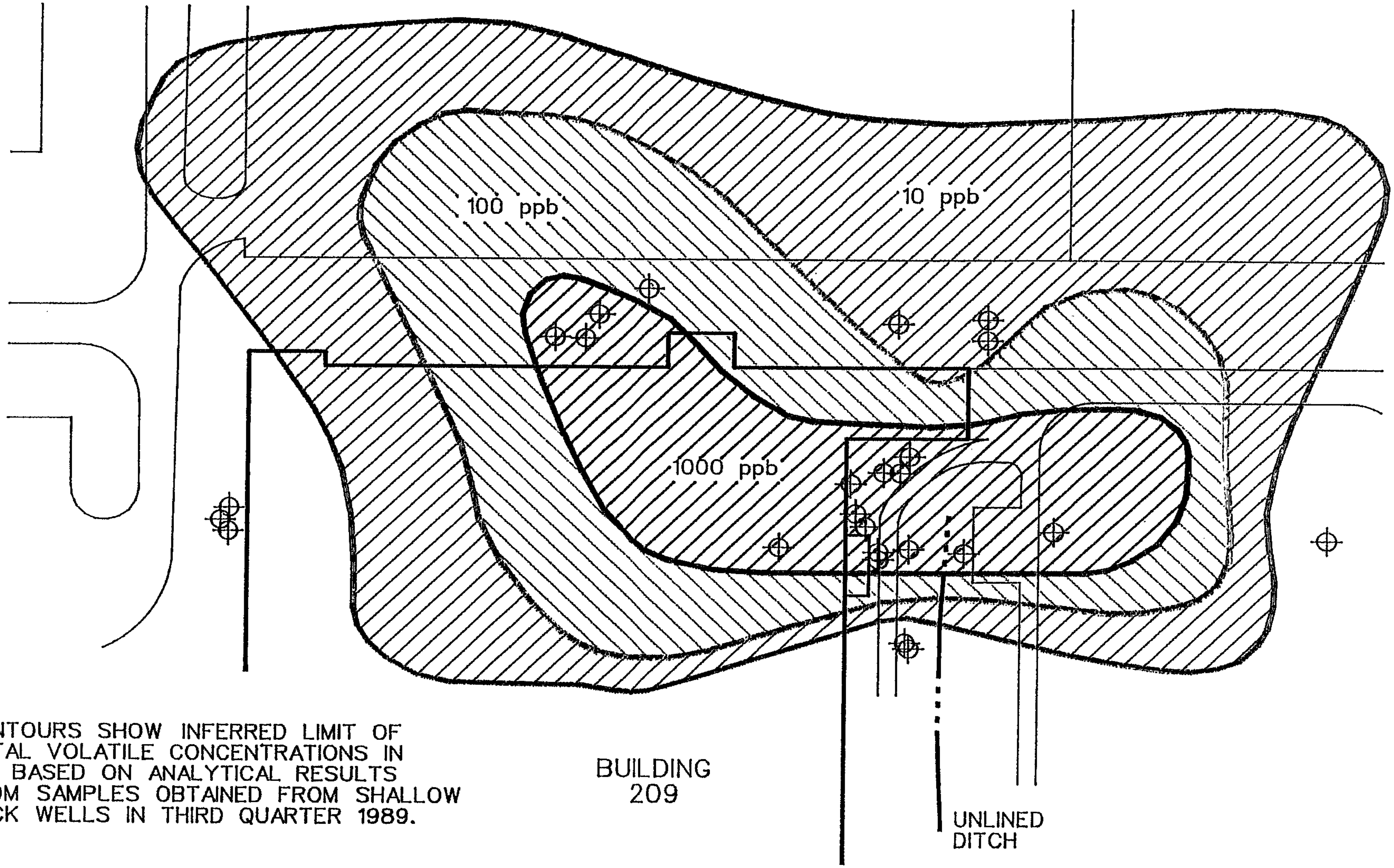


NOTES:

1. CONTOURS SHOW INFERRED LIMIT OF TOTAL VOLATILE CONCENTRATIONS IN ppb BASED ON ANALYTICAL RESULTS FROM SOIL BORINGS AND FIELD SCREENING.
2. LINE OF PROFILE SHOWN ON FIGURE 5.

INFERRED EXTENT OF SOIL
CONTAMINATION
VERTICAL PROFILE

FIGURE 7



NOTE:

1. CONTOURS SHOW INFERRED LIMIT OF TOTAL VOLATILE CONCENTRATIONS IN ppb BASED ON ANALYTICAL RESULTS FROM SAMPLES OBTAINED FROM SHALLOW ROCK WELLS IN THIRD QUARTER 1989.

TOTAL VOLATILE CONCENTRATIONS IN GROUNDWATER

FIGURE 8

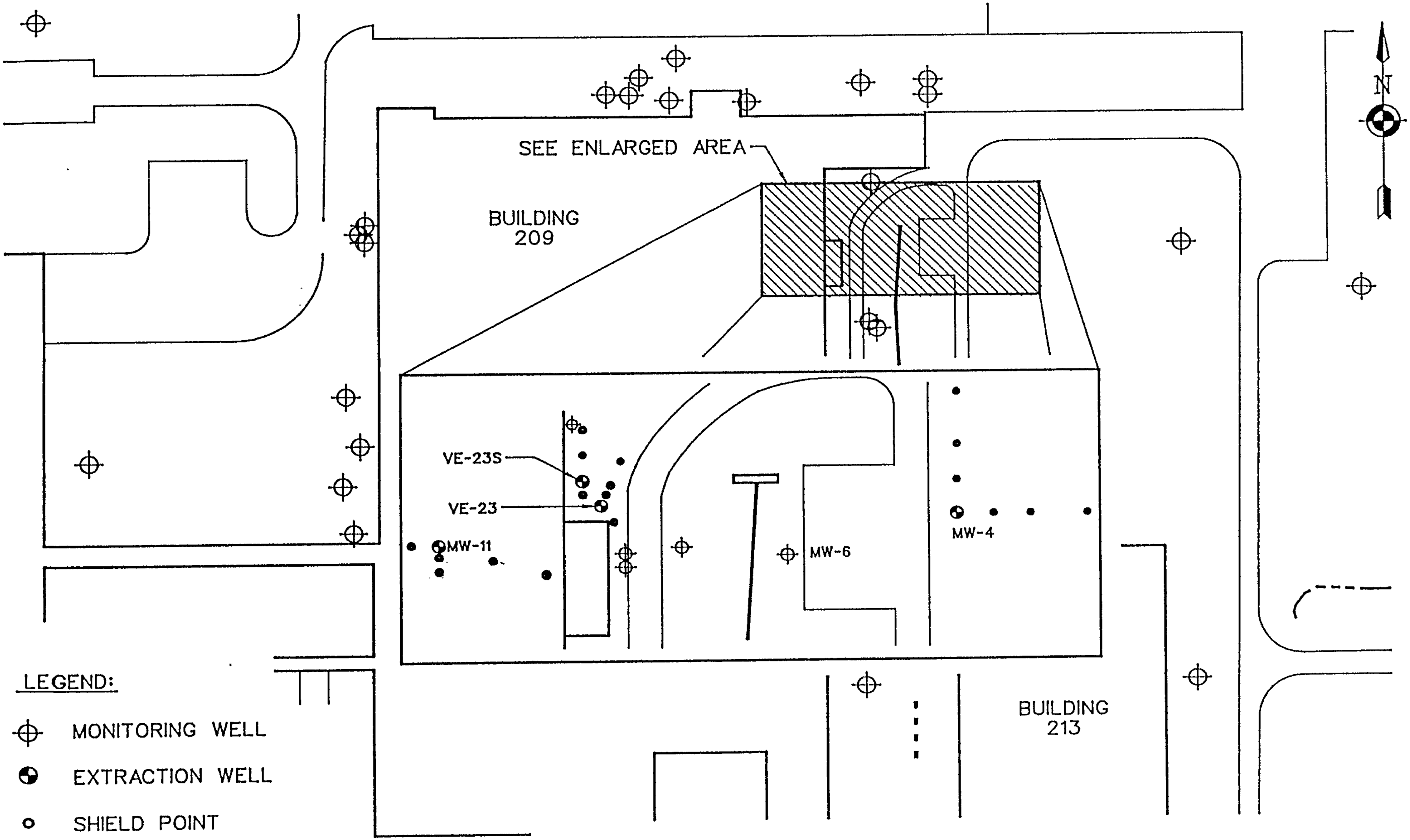
Different extraction strategies are implemented by incorporating a variety of well designs. The high levels of contaminants in the shallow source area soils were accessed directly with overburden wells. Extraction from shallow bedrock wells served a dual purpose of controlling groundwater migration and removing contaminant mass trapped in the rock fractures.

By extracting from shallow rock wells which are hydraulically connected with the overburden, the water table has effectively depressed to alter groundwater flow paths. Extraction from a rock well which is not hydraulically connected to the overburden, resulted in the development of a more intense vacuum field around the well. The more intense vacuum field may enhance contaminant recovery from the rock fractures.

Overburden/bedrock interface wells provided the greatest degree of extraction versatility. The selected design allows the unique strategy of simultaneously desaturating the overburden and shallow rock and extracting vapor from both of these zones. The amount of drawdown and, hence, the area exposed to vapor extraction can be modified by adjusting the vertical position of the well intervals.

The performance of the 2-Phase system during pilot testing was gaged by several factors including: subsurface response, contaminant mass removal and contaminant reduction. The ability of any system to effectively remediate a site is a function of its ability to mobilize the contaminants through induced groundwater and soil vapor gradients.

Groundwater gradients are monitored by a network of approximately thirty monitoring wells which have been installed across the site (Figure 9). Vacuum gradients in the vapor phase are monitored by 17 pairs (shallow and deep) of shield points clustered around each extraction well (Figure 9).



BUILDING 209
SITE PLAN

FIGURE 9

IV. MECHANICAL/PROCESS EQUIPMENT PACKAGE

The Xerox Building 209 process equipment package represents a unique equipment configuration designed to maximize available vacuum at the well head in a compact arrangement. The goal of the package development was to provide higher reliability, improved flexibility and lower system operating and maintenance costs than currently applied vacuum systems. The system is also specifically designed to provide vapor-phase conditioning as a means of optimizing treatment efficiency.

4-01. BASIC SYSTEM DESCRIPTION

Figure 10 shows the simplified flow and main equipment subsystems contained in the process equipment package. The main equipment subsystems consist of the following:

- o Groundwater/soil vapor extraction stripping and groundwater/vapor separator.
- o Two-stage vacuum pump with high efficiency discharge separator and self contained sealing equipment.
- o Vapor phase pretreatment module, designed to optimize approach conditions of recovered contaminant vapors for carbon adsorption or other treatment processes.

Instrumentation for process evaluation includes pressure, vacuum and temperature indicators, a recovered groundwater totalizer, a vortex shedding flow meter for vapor flow determination, and sample ports for acquisition of vapors and recovered liquids for analysis.

The integrated vacuum system, including vapor phase pretreatment module and controls is packaged on a 7'x7' skid, pre-wired and capable of operation within 1-3 days of delivery.

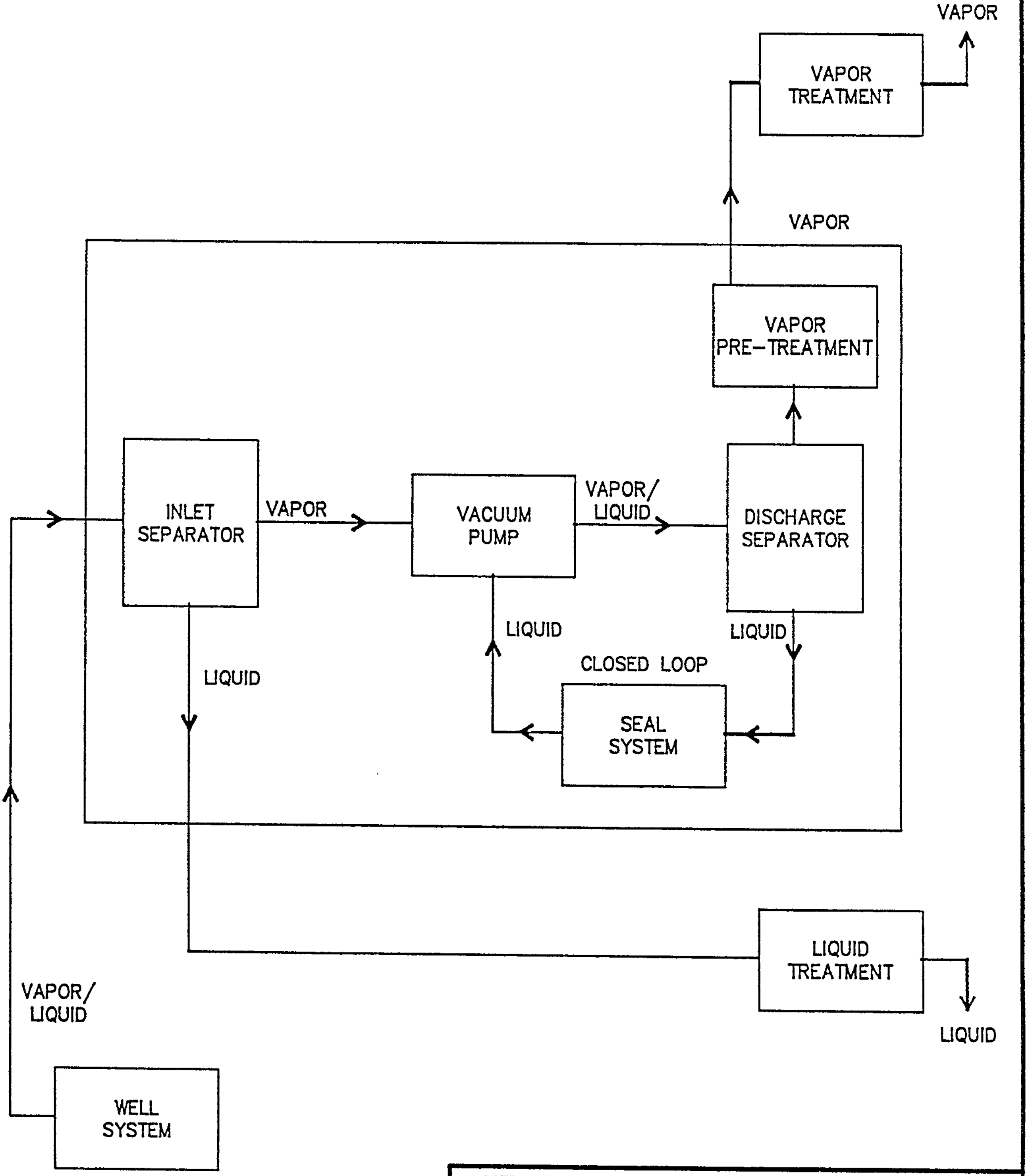
4-02. DETAILED SYSTEM DESCRIPTION

A summary of components used within the vacuum system is as follows:

Inlet Separator/Recovered Liquids Extraction

The inlet separator is a vacuum rated vapor/liquid disengagement vessel. The vessel is designed for an operating range of 10 inches Hg to full vacuum. The nominal design conditions for the vessel have been established to prevent entrainment of free liquids into the vacuum pump suction under conditions of slug or mist flow. The vessel is internally epoxy coated for corrosion protection.

A motor driven extraction pump is provided for removal of recovered liquids. The pump is designed for low net positive suction head (NPSH) operation. Pump on/off controls



H & A OF NEW YORK
Geotechnical Engineers & Environmental Consultants

XEROX CORPORATION
BUILDING 209

SCHEMATIC OF
INTEGRATED 2-PHASE
EXTRACTION SYSTEM

NOT TO SCALE

FEBRUARY 1993

FILE NO. 70285-40

FIGURE 10

are mounted on the inlet separator.

The pump suction line draws liquids from above the vessel bottom. The pump discharge is routed through a filter to remove entrained fine grain materials prior to treatment.

Since the recovered groundwater has been stripped of over 90% of the contaminant mass by the 2-Phase. Process granular activated carbon is used to remove low levels of residual contaminants prior to discharge to sanitary sewer. The 2-Phase process has eliminated the need for more costly treatment alternatives for recovered groundwater.

Vacuum Pump/Seal System

Deep vacuum capability and high volumetric efficiency are provided by the vacuum pump and seal system. Operating conditions are controlled to prevent accumulation of volatile compounds in the seal system.

The vacuum pump is a two-stage liquid ring type, capable of continuous operation at vacuums in excess of 26 inches Hg. Vacuums typically exceed 20 inches Hg in the well bore. The vacuum pump receives a continuous supply of seal fluid which is discharged with recovered contaminant vapors to a high efficiency separator. The separator assures that contaminant vapors only are discharged to treatment.

The discharge separator also serves as a seal fluid reservoir. Hot seal fluid is removed from the reservoir and circulated through the system using a seal circulating pump. The fluid is passed through a heat exchanger to remove the heat of compression developed during vacuum pump operation.

Vapor Phase Pretreatment Equipment

Recovered vapors exiting the vacuum pump discharge separator are routed through a vapor phase pretreatment module. The vapor phase pretreatment module reduces the saturation temperature of the process stream, recovers condensate and free product in some cases, and reduces the relative humidity prior to treatment.

During operation cooled process vapors, condensate, and in some instances free product pass through a separator for condensate and product recovery. The condensate and product can be recovered concurrently or separately as required by the site treatment processes. In all instances, free product recovery reduces loading to the treatment processes with resulting reduction in treatment cost.

After removal of condensate and free product the vapor stream temperature is adjusted to control relative humidity. This step is necessary at Building 209 since vapor phase treatment is accomplished using carbon. The system is capable of delivering recovered vapors over a wide range of conditions.

The Building 209 extraction apparatus pretreatment module is versatile and compatible with a wide variety of treatment technologies.

4-03. TREATMENT SYSTEM

There are several opportunities for treatment to reduce contaminant loading as the liquid/vapor stream flows through the system. Many of these processes are applied individually in remedial designs, and are well proven technologies. The 2-Phase system at Building 209 applies a combination of air stripping, condensation, and carbon adsorption treatment technologies to the delivered contaminated vapor and water streams.

Significant stripping of contaminants from the removed groundwater is accomplished in the lines delivering the vapor/water flow to the system. The turbulent flow achieves an effective transfer of water borne contaminants to the vapor stream. Further transfer occurs in the inlet separator, where the movement to the vapor phase is more passive as the vapor passes over the settled liquid phase.

At Building 209, final treatment of both the vapor and water stream is accomplished with mobile activated carbon units. The vapor side of the system uses two 2,000 lb. units in series which are capable of handling the typical flows through the system. The water is passed through two 200 lb. carbon units also arranged in series. Original design allows for the capability to redirect flow of vapors in a reverse direction which allows flexibility in the carbon management plan. All carbon units are regenerated off-site, and the reactivated units are returned to the site for further usage.

The piping layout surrounding the carbon units provides several sampling ports to obtain both water and vapor samples. Carbon replacement decisions and optimization efforts utilize the analytical results of these samples. Compliance monitoring is achieved by weekly sampling and analyses of the effluent vapor and water.

4-04. SYSTEMS INTEGRATION

The vacuum extraction system is designed and manufactured as a modular equipment package. The package includes the integration of the preceeding components into a fabricated unit that is delivered to the remediation site ready for operation. Figure 11 shows the actual extraction unit in service at this site.

The unit is designed for handling with a forklift to allow positioning in the proximity of extraction wells and allows relocation to other areas or other projects as necessary. This feature and the simple installation at the extraction well head maximizes flexibility of the system.

The unit is designed for minimal utility interconnections and rapid set up. Typical installations can be operational within 1-3 days of unit delivery after field connection to power supply, extraction well(s) and treatment processes.

W209 2 PHASE EXTRACTION SYSTEM

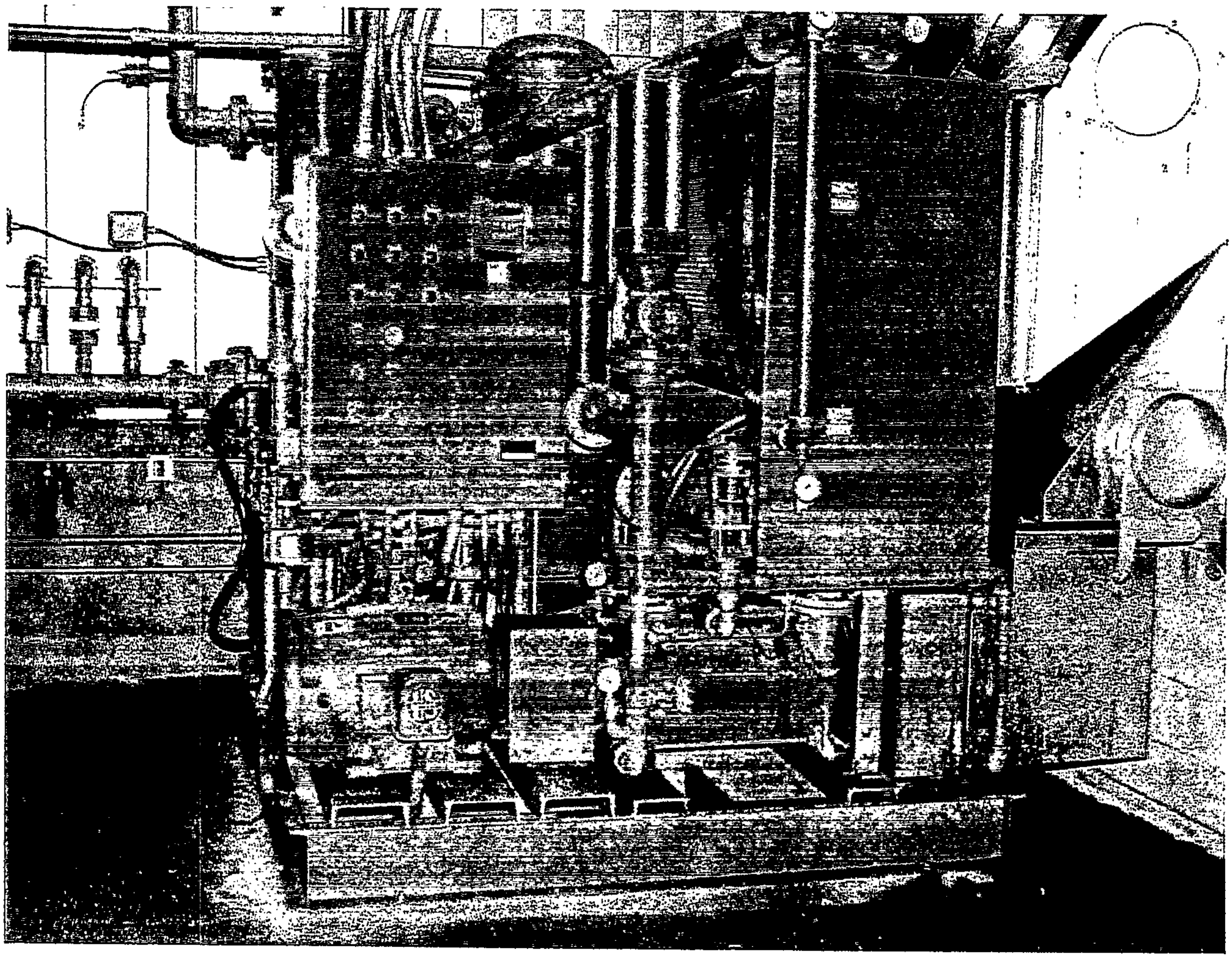


FIGURE 11

V. IMPLEMENTATION OF 2-PHASE EXTRACTION TECHNOLOGY - BUILDING 209

This section of the case study reviews the results achieved to date in a series of tests and evaluations of the extraction process. The system is currently operated to maximize contaminant mass recovery from the source areas of the plume and to provide a level of hydraulic containment to the extended plume in bedrock.

5-01. PRELIMINARY EXTRACTION TESTING RESULTS

A short-term extraction test was performed at the Building 209 site in August 1992. The primary objective of the test was to monitor the subsurface response associated with bringing VE-23 (an overburden/bedrock interface extraction well) online.

The shield-point monitoring network was not installed at the time of the August 1992 extraction test. Vacuum response was monitored in 2-inch piezometers installed in the shallow overburden, adjacent to VE-23. After one day of extraction, an unsaturated radius of vacuum influence of 40 feet developed around the extraction well. After six days of extraction, the areal distribution of the vacuum field became more irregular. This was likely caused by vacuum propagation upward to and, ultimately, venting through the more permeable materials at the surface.

Extraction from VE-23 affected groundwater levels up to 100 feet away. At least one foot of drawdown was observed in all overburden wells west of the unlined ditch. The entire area west of the unlined ditch appeared to be within the area of influence of VE-23. Extensive groundwater capture was also achieved in the shallow/fractured rock zone as drawdown of approximately 0.5 feet was observed within the monitoring network.

Extraction from VE-23 also effectively reversed the discharge of groundwater to the unlined ditch. This is supported both by the drop in groundwater levels adjacent to the stream (indicating a reversed gradient) and by subsequent analytical results obtained from the stream. Since the initiation of extraction from VE-23, concentration of volatile organics, monitored in the ditch discharge for Xerox SPDES permit compliance, have dropped below detection limits.

5-02. EXTRACTION EFFICIENCY

The 2-Phase Extraction system has removed 3330 pounds of volatile organic compounds (VOC) from the formation during the period August 1992 - March 1993. The total mass removal includes 3310 pounds treated in the vapor phase and 20 pounds treated in the liquid phase. During the approximately 6 months of operation 12,800,000 standard cubic feet of vapor and 670,000 gallons of groundwater have been recovered from the formation by the system under vacuum ranging from 26-29 inches Hg.

Figure 12 shows the average groundwater recovery rate for each month of operation. Events impacting groundwater recovery include addition of well MW-4 in November resulting in a net increase of 1200+- gallons per day. Reduced recoveries in February were a result of severe weather.

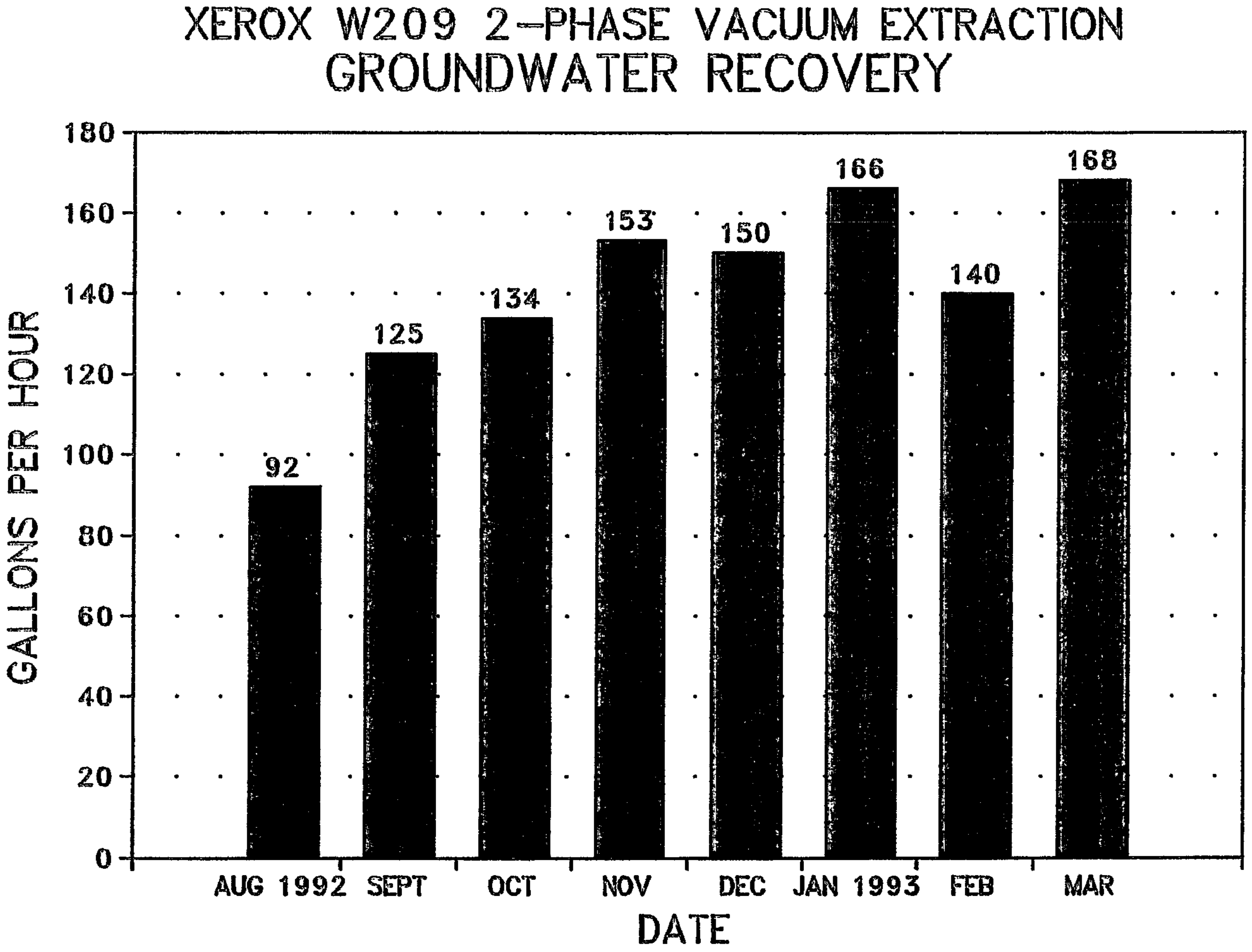

XEROX W209 2-PHASE VACUUM EXTRACTION
GROUNDWATER RECOVERY
GALLONS PER HOUR
180
160
140
120
100
80
60
40
20
0
92
125
134
153
150
166
140
168
AUG 1992
SEPT
OCT
NOV
DEC
JAN 1993
FEB
MAR
DATE

FIGURE 12

Figure 13 shows the cumulative pounds of VOC's treated in the vapor phase. The mass has been calculated using the influent to carbon concentration and average flow for the period between sampling events. The calculation procedure interpolates results between sampling events to improve accuracy of the reported data. Figure 14 shows the average extraction rate of the system in pounds per hour over the period of operation. Extraction rates reached a maximum of approximately 1.3 pounds per hour during the month of November and averaged .95 pounds per hour from August-December 1992. Current extraction rates are approximately .25 pounds per hour indicating the impact of the process in reducing source area contaminant levels.

The monitoring wells on the 209 site are sampled and analyzed quarterly for several contaminants of concern. The effectiveness of the 2-Phase system for transferring water borne contaminants to the vapor stream by stripping is estimated by comparing the groundwater analyses to recovered groundwater analyzed prior to carbon treatment. Analysis of the samples shows that stripping efficiencies in excess of 90% have been achieved since system start up. Average stripping efficiency for the period of August - December 1992 is 94%.

Additional recovery of free phase organics has occurred in the system condensate receiver since start up. The amount of material recovered has not been included in mass removals reported. An analysis of the material indicated composition of the following constituents. mineral spirits 98.3%, trichloroethane 0.8%, tetrachloroethylene 0.8%, and trichloroethene at 0.1%. Total material recovery to date is approximately 25 gallons. Recovery of this material is incidental to unit operations and provides a means of reducing carbon loading.

5-03. CONTINUING EXTRACTION PERFORMANCE

Continuing extraction has maintained the groundwater influence developed during initial testing and resulted in reversal of flow directions in bedrock in a portion of the site. Figure 15 shows the average concentration of contaminants detected in 19 monitoring wells has been reduced by over 75% during the first 6 months of operation. Mass removal rates measured by the system have declined over this period. Groundwater concentrations in the vicinity of the extraction points have been reduced by over 1 order of magnitude.

A number of source area monitoring wells at the edges of the extraction network have observed an initial reduction in contaminant concentrations followed by an increase in the subsequent quarter. We believe removal of free phase products followed by mobilization of contaminant mass outside the immediate extraction area to be the cause of variations in concentration observed.

A preliminary evaluation of mass removal by media performed in December 1992 and shown on Figure 16 estimated 93+% of the recovered mass to be from sources other than groundwater. Soils sampling is being performed in the area of active extraction to assess the initial impact on soils concentrations and free phase product. The soils sampling results indicate a 3 order of magnitude reduction in contaminant concentrations from pre-extraction levels during the 6 months of operation. Initial soils concentrations averaging 5,000 ppm have been reduced to less than 5 ppm during this period. Soils results are being used to correlate vacuum influence to contaminant reduction.

W209 2-PHASE VACUUM EXTRACTION
AVERAGE EXTRACTION RATE / HOUR

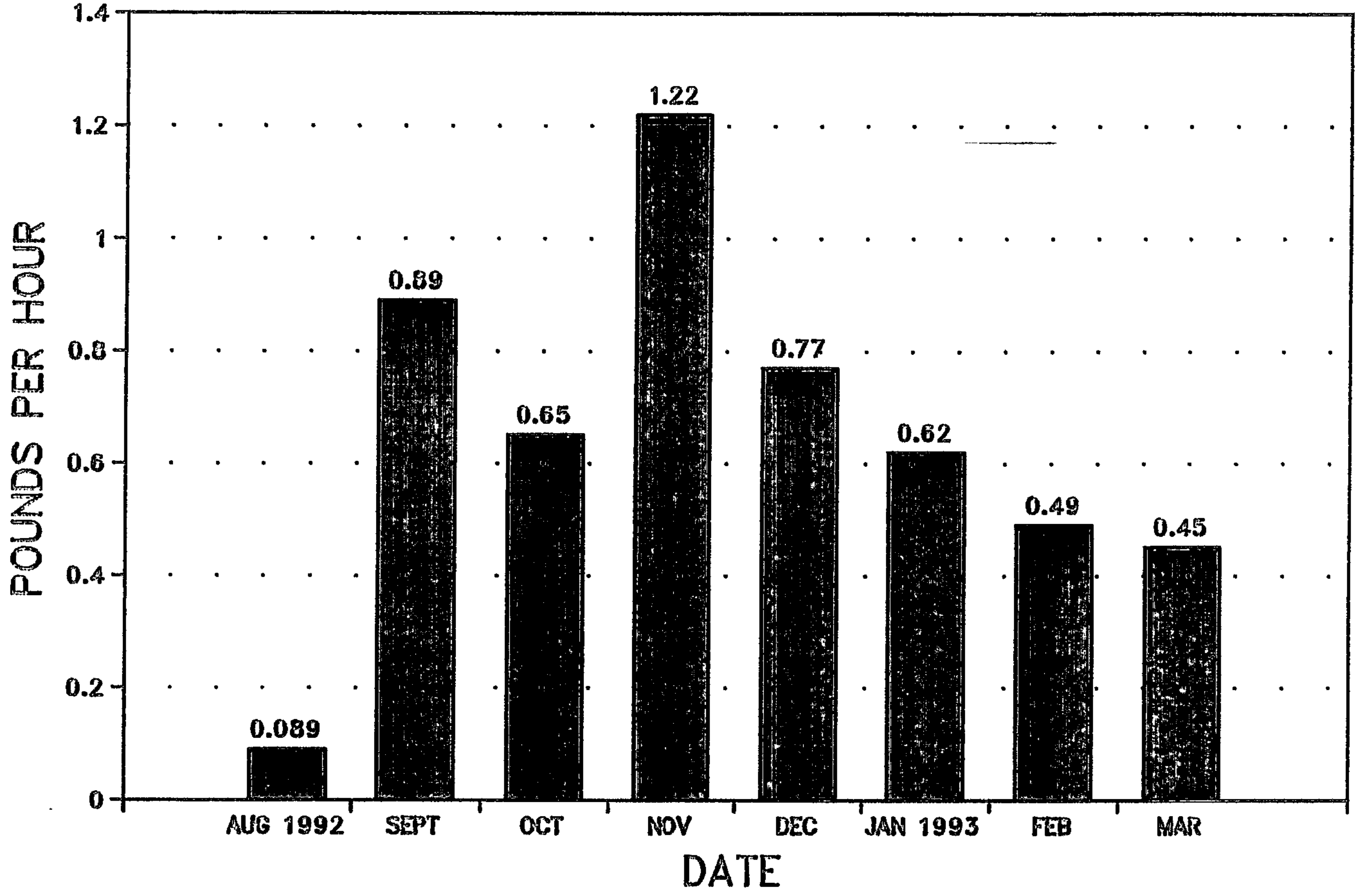


FIGURE 14

XEROX W209 2–PHASE VACUUM EXTRACTION IMPACT ON GROUNDWATER CONCENTRATIONS

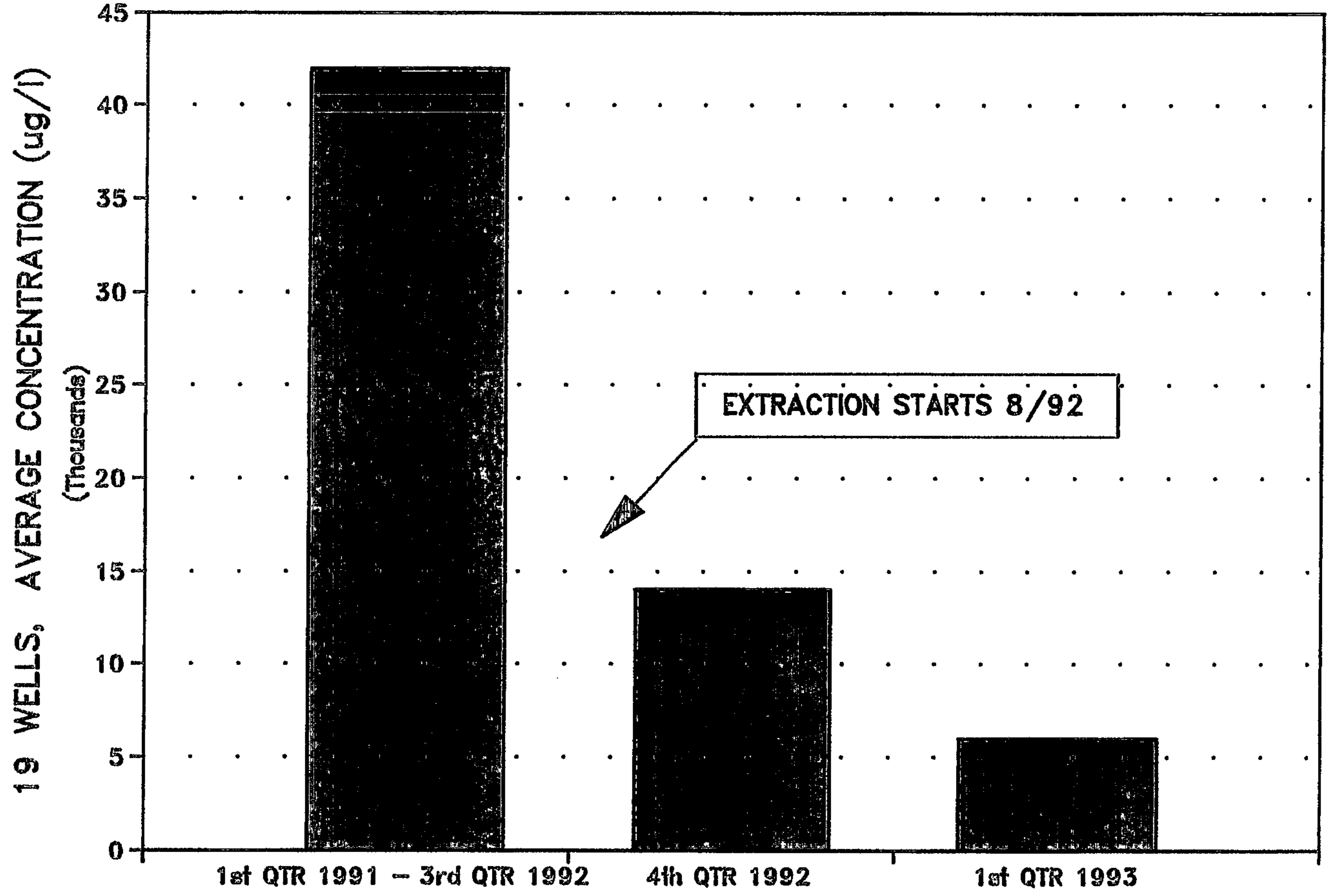
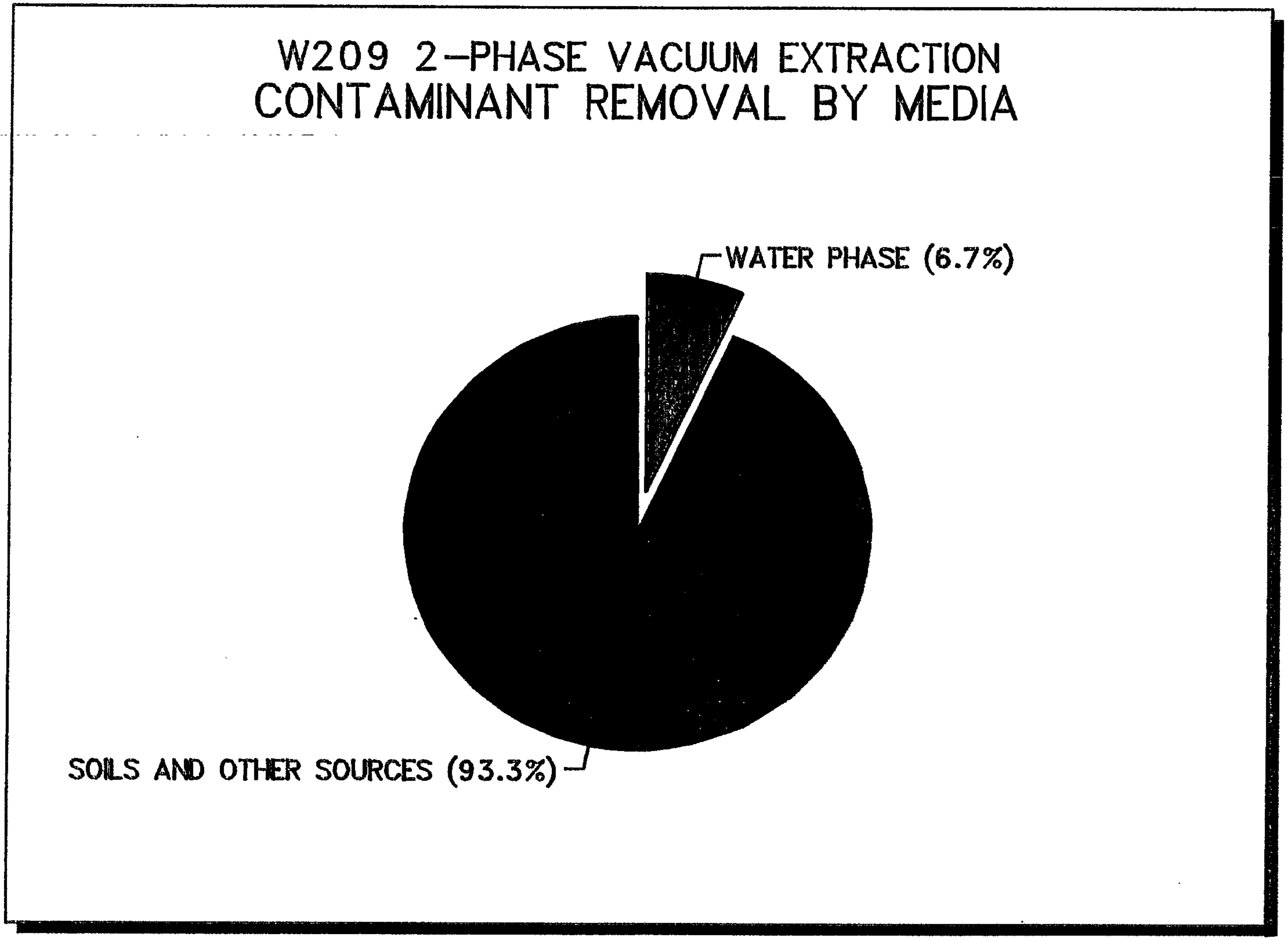


FIGURE 15



W209 2-PHASE VACUUM EXTRACTION
CONTAMINANT REMOVAL BY MEDIA

FIGURE 16

5-04. IMPACT OF VACUUM ON CONTAMINANT RECOVERY AND EXTRACTION PERFORMANCE

A series of short duration extraction tests have been performed to assess the impact of vacuum on extraction performance and contaminant recovery. These tests have been coupled with a surface seal installation over a portion of the site to reduce venting and expand the vacuum area of influence as a means of maximizing remedial effectiveness.

The tests included an initial vacuum reduction from 28" to 18" at the extraction unit for a 3 day duration during September 1992. The mass removal rates observed over that period where impacted significantly, with an 80% reduction noted. Restoration of system vacuum resulted in an increase in mass removal to original levels. Figure 17 shows the impact of vacuum reduction on mass removal during this time.

A membrane installation over part of the site was performed in January 1993. The membrane resulted in increased subsurface vacuums at all monitoring points, significant expansion of the vacuum area of influence, and increase in contaminant recovery. Figure 18 shows the pre and post membrane subsurface vacuum levels.

A further result of the membrane installation was the mobilization of additional mineral spirits from the subsurface to extraction and increased free product recovery. Since the mineral spirits generally reside in soils or an LNAPL layer, the increased recovery noted is favorable to expanding the zone of remediation. Soils testing is currently being done to establish the extent of influence.

A vacuum step test was performed in February 1993 to determine the vacuum impacts on groundwater containment and mass removal. The results of the step test on groundwater elevations in overburden, upper and lower bedrock support the premise that maximum vacuum provides beneficial impact. Groundwater gradients were maximized, with resulting maximum area of capture under high vacuum. Figure 19 shows the results of the step test on water levels in the Building 209 area.

Mass removals noted during the step test are shown in Figure 20 and did not respond as dramatically as the initial extraction results noted in September 1992. While there is still a relationship between vacuum and mass removal, it is likely that the results noted in September were not replicated due to an absence of free phase contaminants in the extraction area.

The Building 209 formation was observed to respond slowly to vacuum application with maximum mass removal rates achieved typically 5-7 days after initiation of extraction. Cessation of extraction for even short periods (1 day or less) resulted in a significant loss of remedial effectiveness on restart. Typical restarts of the system required the full 5-7 days to restore extraction performance to maximum levels. We believe these observations to be a function of surface tensions in the capillary fringe which are beneficially impacted over time by extraction. The formation rapidly returns to equilibrium when vacuum application is stopped. These observations support the premise that system reliability is paramount to remedial effectiveness.

XEROX – BUILDING 209
LBS. RECOVERED PER DAY

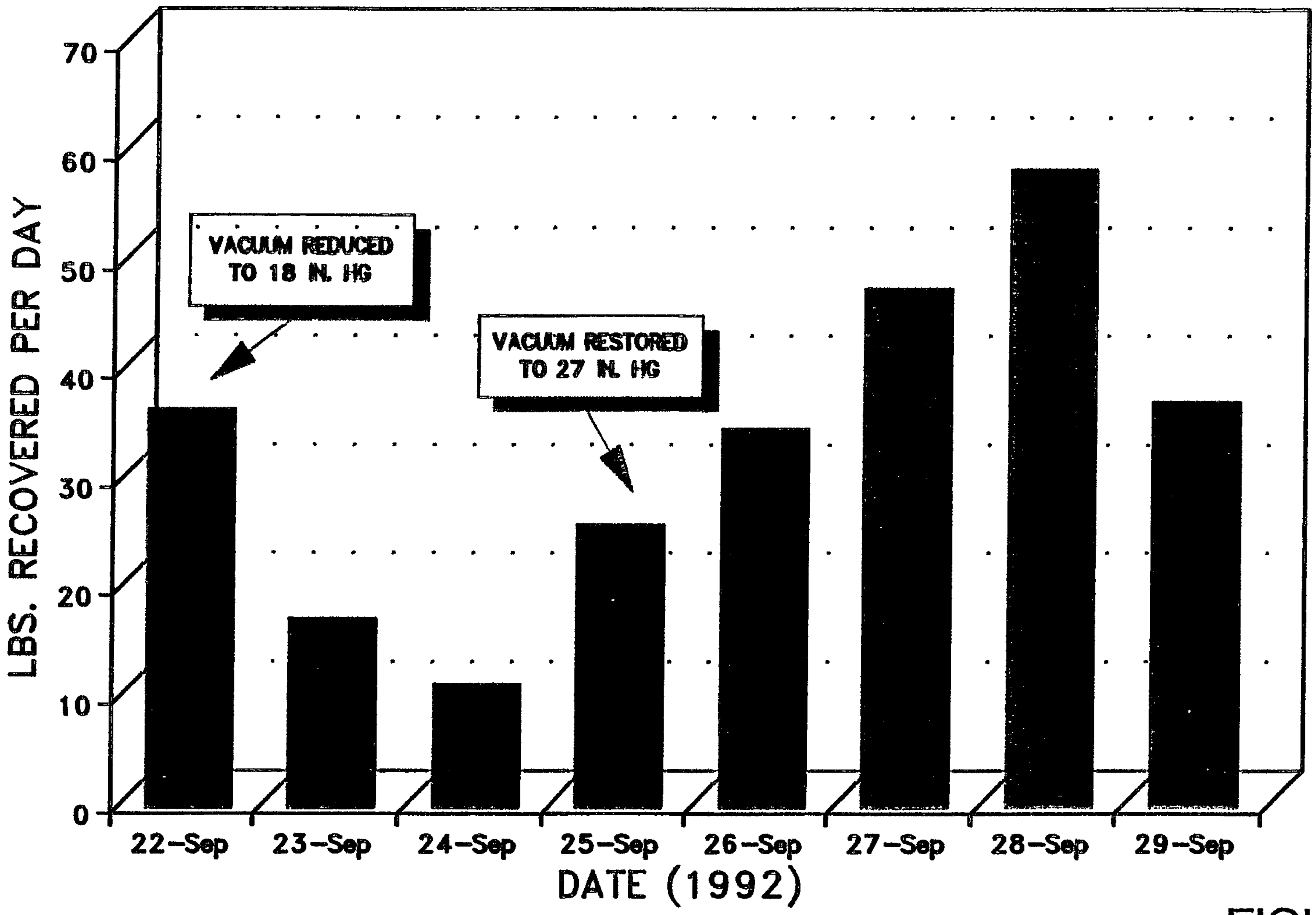
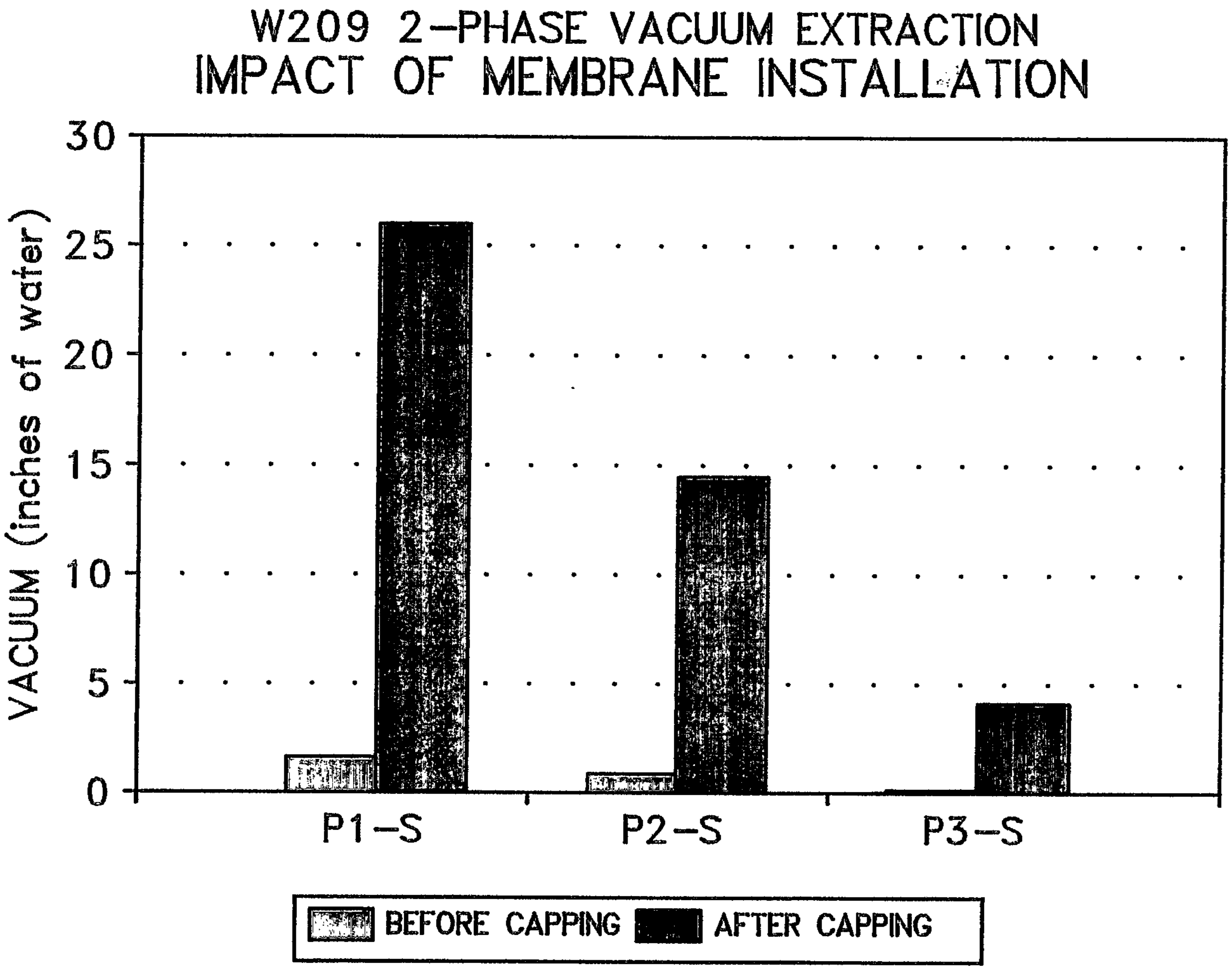


FIGURE 17



W209 2-PHASE VACUUM EXTRACTION
IMPACT OF MEMBRANE INSTALLATION

FIGURE 18

W209 2–PHASE VACUUM EXTRACTION
STEP TEST WATER LEVEL DATA

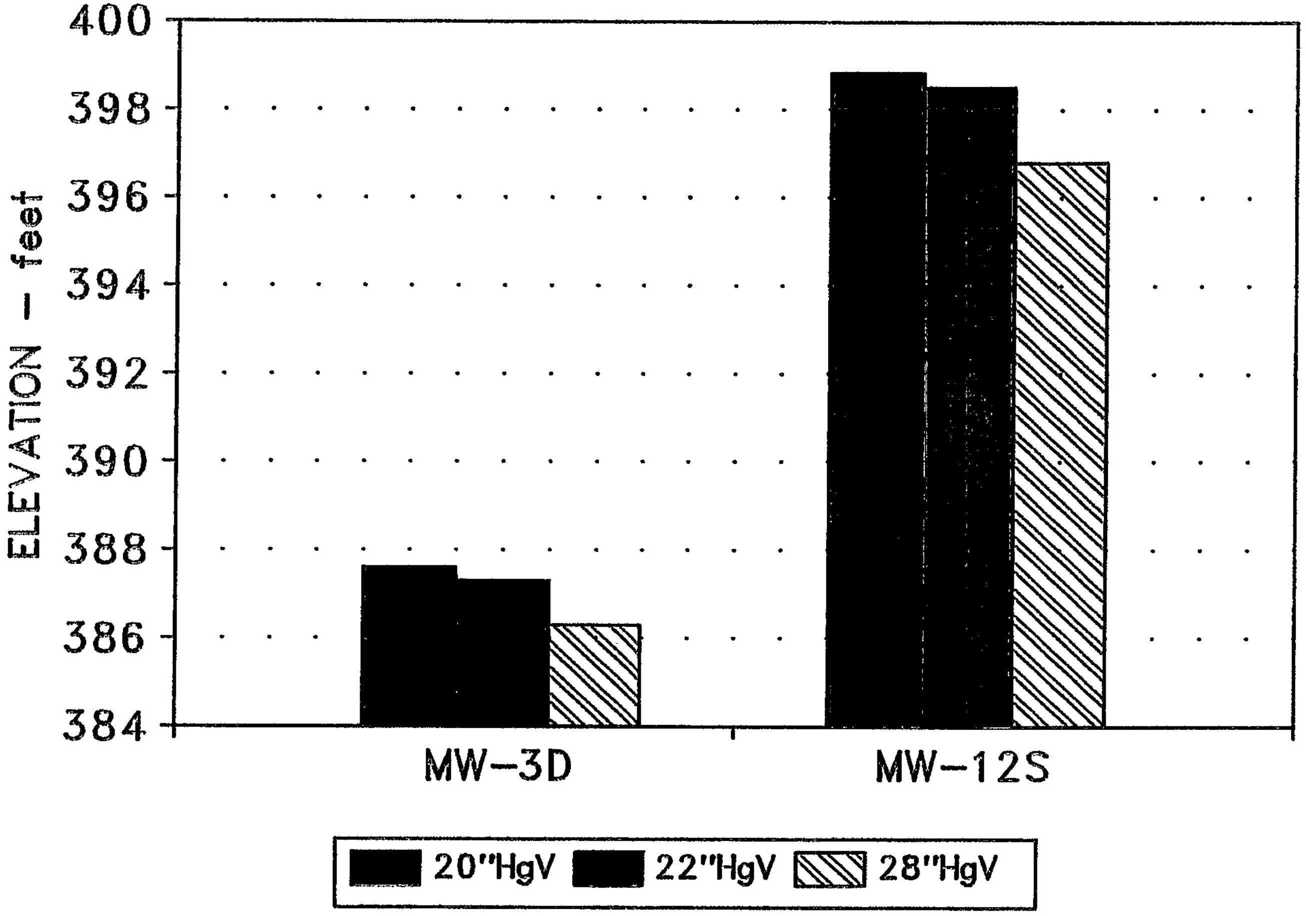


FIGURE 19

W209 2-PHASE VACUUM EXTRACTION
AVERAGE MASS REMOVAL RATES VS. VACUUM

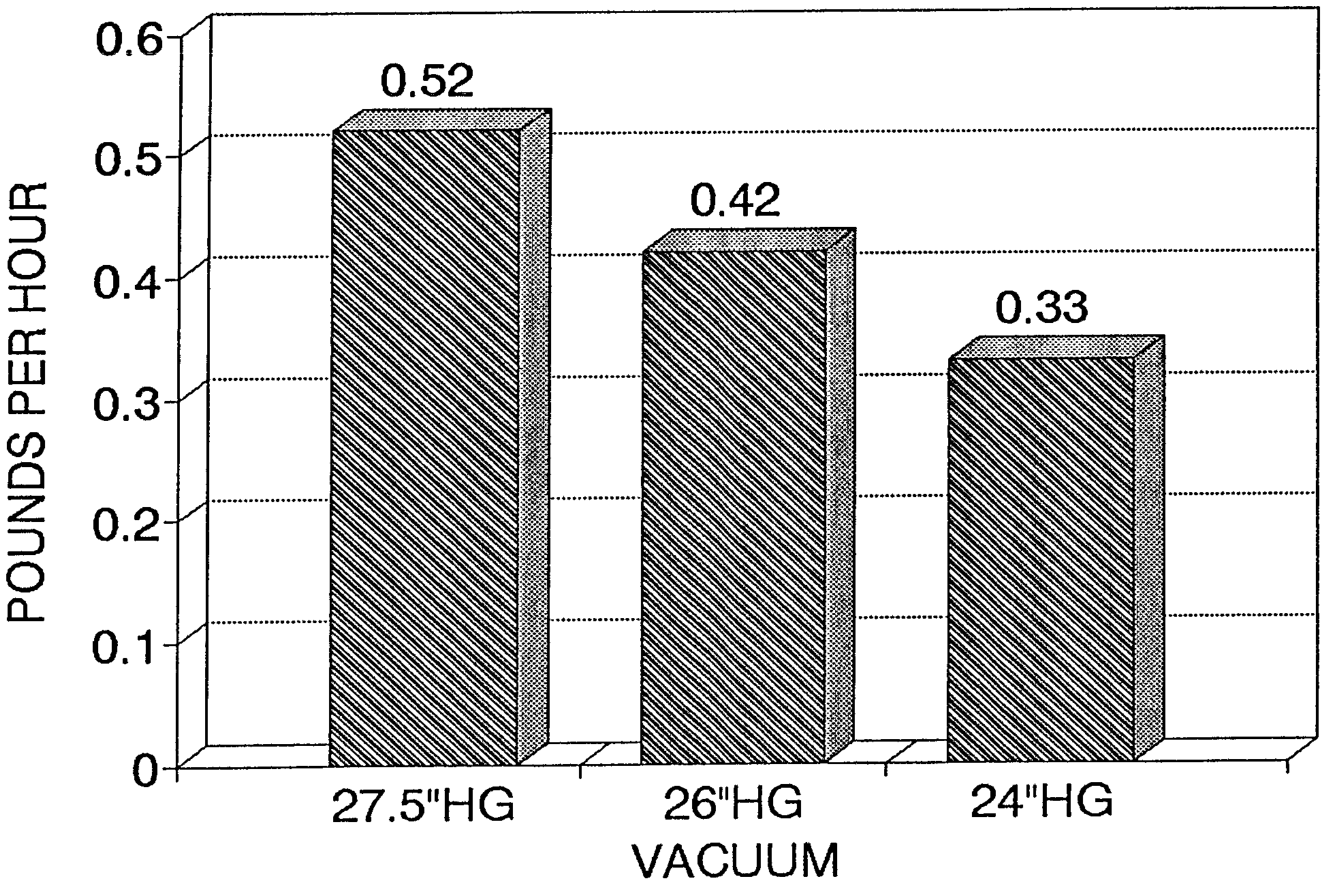


FIGURE 20

5-05. TREATMENT EFFICIENCY

The variety of contaminants encountered in the vapor and groundwater at Building 209 present a difficult mix for carbon adsorption. Lower molecular weight compounds such as methylene chloride and 1,1 dichloroethane will start to pass through or desorb from the carbon unit as it continues to have capacity for 1,1,1 trichloroethane and other higher molecular weight compounds. In the Building 209 treatment system, methylene chloride has adsorbed to a maximum of approximately 65 lbs on a 2,000 lb carbon contained in the unit. Trichloroethane (one of the major site contaminants) has adsorbed to a maximum of approximately 600 lbs. on a 2,000 lb. unit.

Carbon units for vapor treatment are monitored once per week at a pre, mid, and post carbon location. Decisions to remove and replace carbon units are based on comparison of post carbon analytical results with air permit requirements. The primary carbon is allowed to desorb lighter compounds in order to optimize its efficiency for heavier contaminant mix. The secondary carbon unit is not allowed to desorb any contaminant above the hourly limits set in the air permit.

All breakthrough and carbon capacity determinations for the Building 209 system are based on the loading (in pounds) on the unit when the first significant level of compound is detected in the effluent. This breakthrough definition yields a carbon capacity calculated by dividing the mass of VOC's captured by the total mass of the carbon contained in the unit.

The carbon supplier estimated carbon capacity achievable given the mixture of compounds expected in the vapor stream. The manufacturer uses a computer model to generate a capacity prediction which accounts for concentration, contaminant mix, delivery temperature and humidity effects. The capacity predicted by the manufacturer is 0.2 pounds VOC captured/pound carbon. To date, the Building 209 installation has performed at a capacity of 0.3 pounds VOC captured/pound carbon.

Proper conditioning of the vapor stream, to the extent practical, has allowed optimization of carbon capacity for vapor contaminant adsorption. Delivery temperature, relative humidity, and concentration are all parameters that have a major effect on the adsorptive capacity of a carbon unit. The Building 209 system conditions the vapor to <30% relative humidity with a reheater that provides a delivery temperature of <100°F.

Efficient vapor pretreatment and design optimization has provided a 50% increase in manufacturer's predicted capacity for the carbon. Better than expected adsorption capacities for the carbon units, confirms the conclusion that the vacuum pump has no major impact on the effectiveness of the vapor phase carbon units.

The water side carbons receive relatively low levels of contaminant at flows that typically average less than 5 gallons per minute. Change out decisions on the water side were initially based on effluent concentrations and the buildup of backpressure on the unit. Solids that passed through the prefiltration system were caught in the liquid carbon drums. Awareness of this situation has focused increased attention on development of improved filtration of the groundwater. The pore size of installed filters has recently been reduced with a corresponding 75% reduction in carbon consumption.

5-06. MECHANICAL RELIABILITY

System Uptime Performance

The Building 209 Extraction system has operated over 90% of the available operating hours since the initial start-up activities in August 1992 with minimal oversight. No serious equipment problems have been identified which detrimentally impact system reliability. Nearly all equipment related shutdowns have resulted from extraction pump failure due to wear, which is predictable and can be avoided with proactive replacement. A single level probe failure resulted in a one week outage due to replacement availability. The system has operated for over 4,500 hours since start up in August 1992 with no significant downtime or maintenance requirements.

Operation and Maintenance

Operation and Maintenance (O&M) activities for the 2-Phase Extraction system at Building 209 have been minimal. Typical daily inspections require less than one hour and include sample collection, process checks, and filter changes. Additional O&M procedures that occur on a less frequent basis include performing carbon change-outs once breakthrough is detected or checking strainers for potential sediment accumulation. The system is currently being monitored approximately 3-5 hours per week, with no monitoring on weekends or holidays.

In most cases routine maintenance activities can be accomplished while the system is operating. This has proven to be beneficial as it optimizes system uptime performance without affecting specific process parameters. Economics associated with the low O&M activities have resulted in considerable savings in terms of downtime interruptions, labor, equipment replacement costs and impact to extraction performance.

5-07. OPERATING COSTS

An effort to quantify the capital and operating costs for the 2-Phase Extraction, Building 209 installation has been made in Table I. All capital costs represent actual expenditures. For purposes of analysis an equipment life of 10 years at 10% interest rate has been used to arrive at an annualized cost for capital purchases. Maintenance costs, which to date have been very low, are estimated at 10% of the annualized capital costs.

Operating costs, including labor, energy and compliance monitoring are based on actual Building 209 costs projected to a full year. The energy costs have a factor applied to account for 95% uptime during a year. Compliance monitoring costs are based on the minimum number of samples analyzed for vapor and water to assess compliance with air and water permits.

Operational costs have been presented per pound of VOC removed per year. The costs use annualized equipment and operating costs divided by the projected annual mass removal. Projected annual mass removal is based on the total pounds removed from the subsurface over a three month period multiplied by four to predict the amount removed for a year of operation. No effort has been made in this analysis to predict the drop in recovery rates which would be expected in any remedial effort. At present date, further wells are planned to be brought onto the system. The related increase in removal rates also has not been accounted for in the analysis of Table I.

TABLE I

ANNUALIZED COST PERFORMANCE
BUILDING 209 2-PHASE EXTRACTION SYSTEM

CAPITAL COSTS	Total Cost	Annualized * Cost
Mechanical/Electical	$46,800	$7,620
Instrumentation	$2,000	$325
Carbon (4 vapor, 4 water)	$32,900	$5,365
Installation	$5,000	$815
		$14,125
MAINTENANCE COSTS		
10 % of Capital Costs		$1,415
OPERATING COSTS		
Labor		$10,400
Energy		$24,822
Compliance Monitoring		$10,400
CONSUMABLES		
Carbon		$40,685
Filters		$350

TOTAL ANNUALIZED COST
$102,197

COST PER LB VOC PER YEAR
$15.26

* Annualized Costs based on 10 years at 10% interest.

VI. CONCLUSIONS

The results of the work performed to date indicate that 2-Phase Extraction is an excellent technology for the Building 209 site conditions. Further, the impact of increased well bore vacuum on groundwater migration control/recovery, and mass removal rates appears to be significant and favorable.

Vapor phase carbon adsorption capacity has been enhanced and is exceeding carbon suppliers predicted performance due to the vapor phase pretreatment module included in the extraction apparatus.

System mechanical performance, reliability and maintenance history are all significantly better than previously applied liquid ring vacuum pump extraction apparatus.

Additional activities underway to utilize membranes for control of surface venting, and correlating vacuum application to area of influence and remedial effectiveness are yielding positive results.

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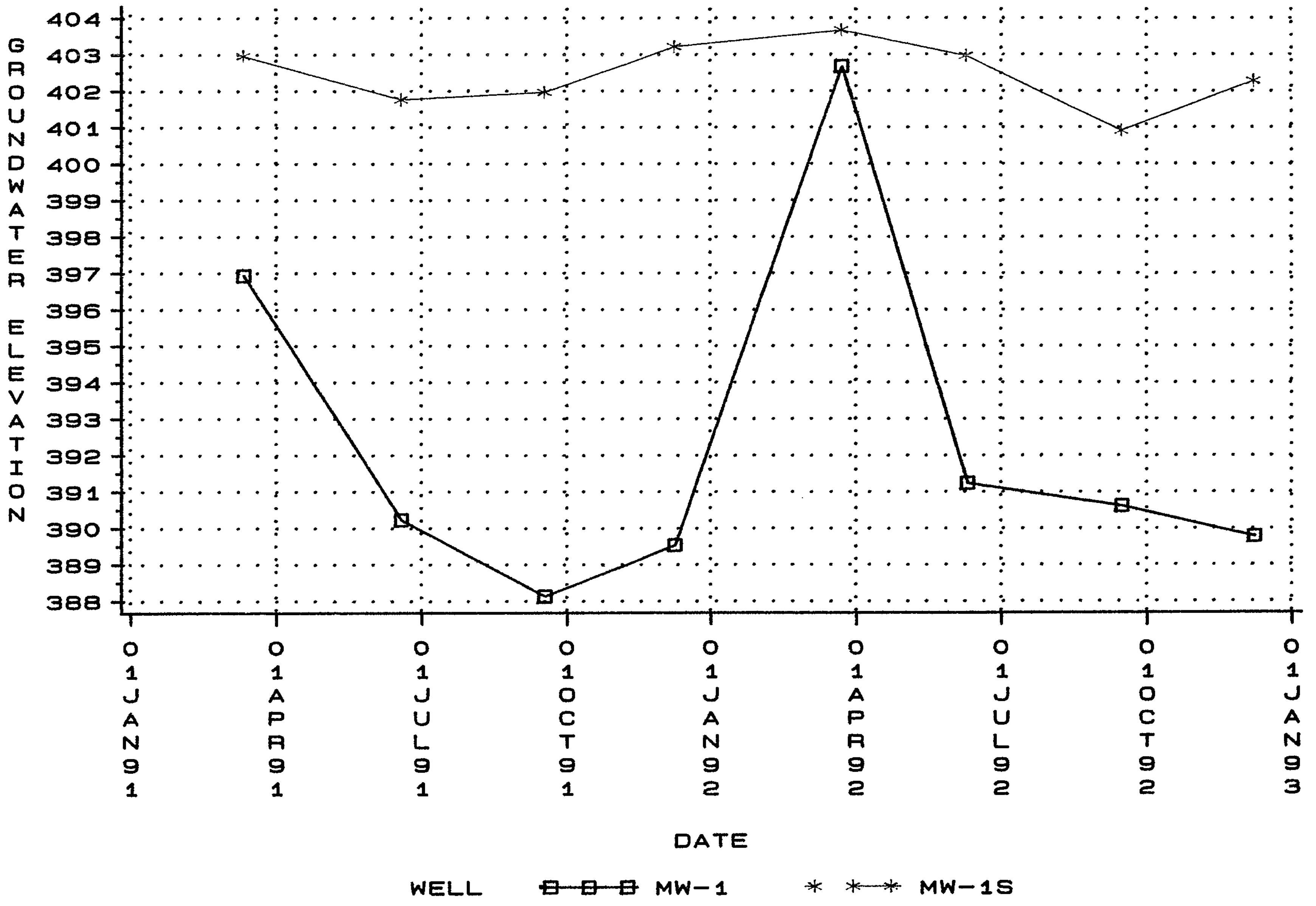
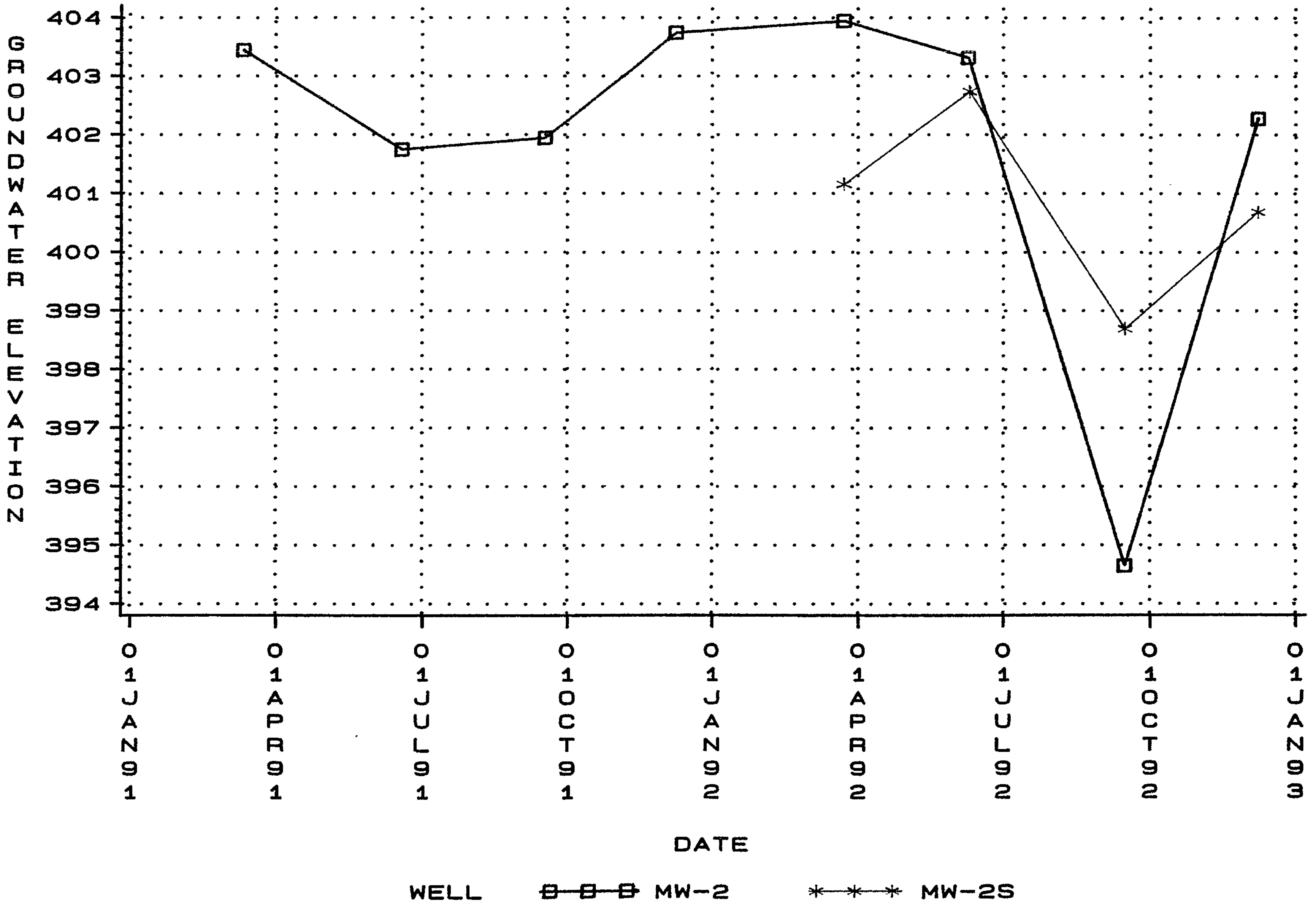
APPENDIX J

Well Hydrographs 1991-1992
Overburden/Shallow Bedrock Well Couplets
Shallow/Intermediate/Deep Bedrock Well Clusters

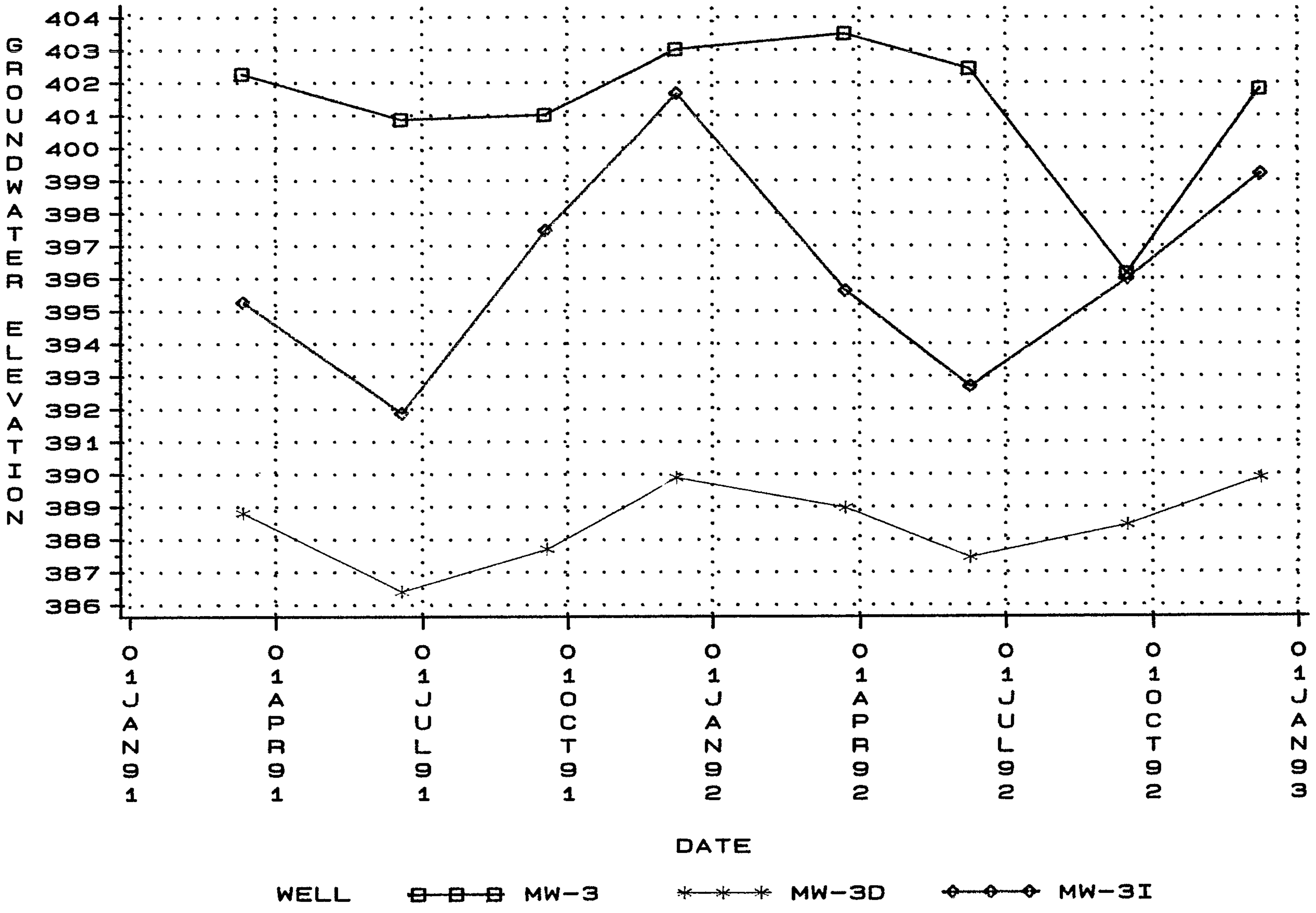
WELL HYDROGRAPHS
MW−1 CLUSTER



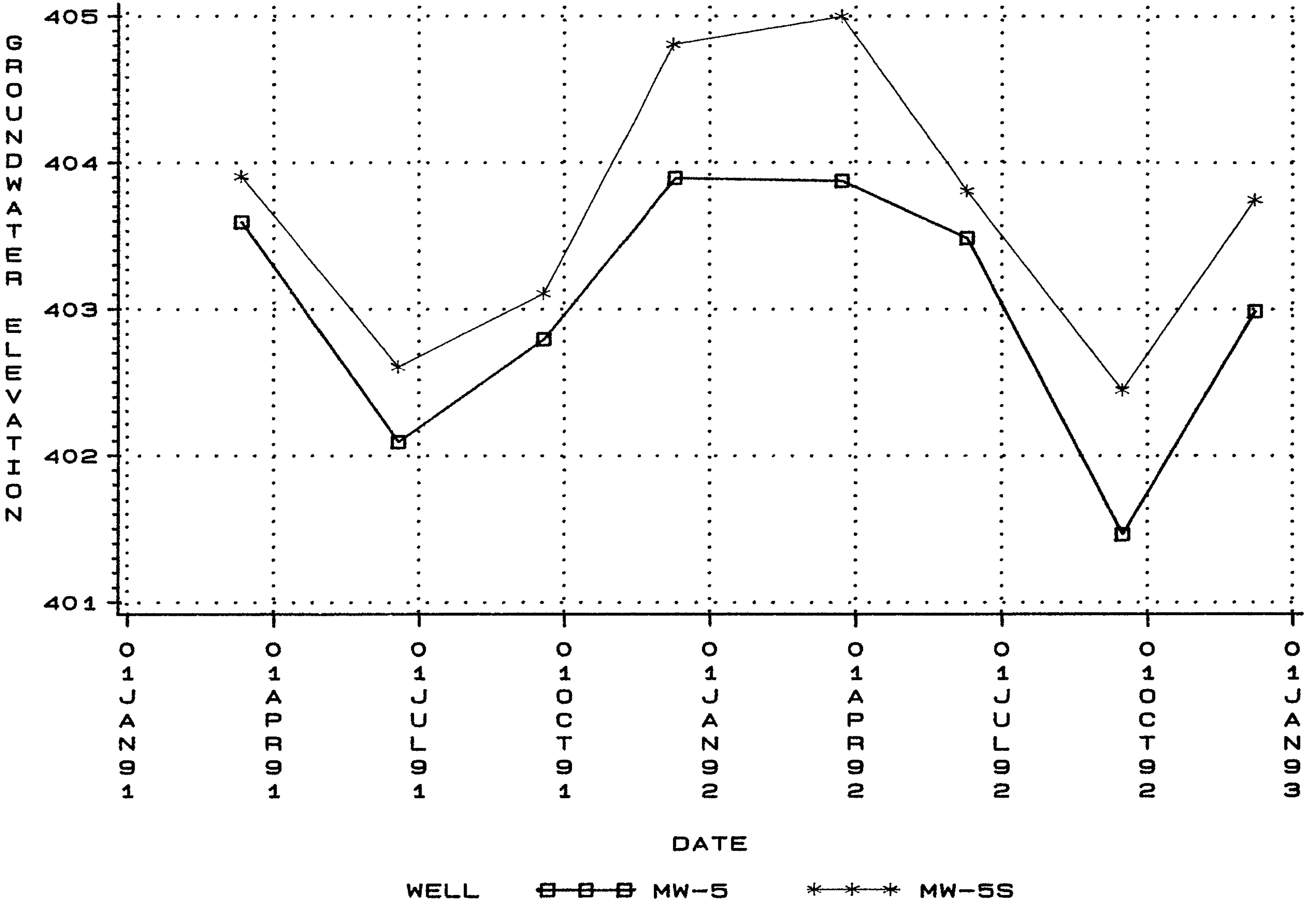
WELL HYDROGRAPHS
MW-2 CLUSTER



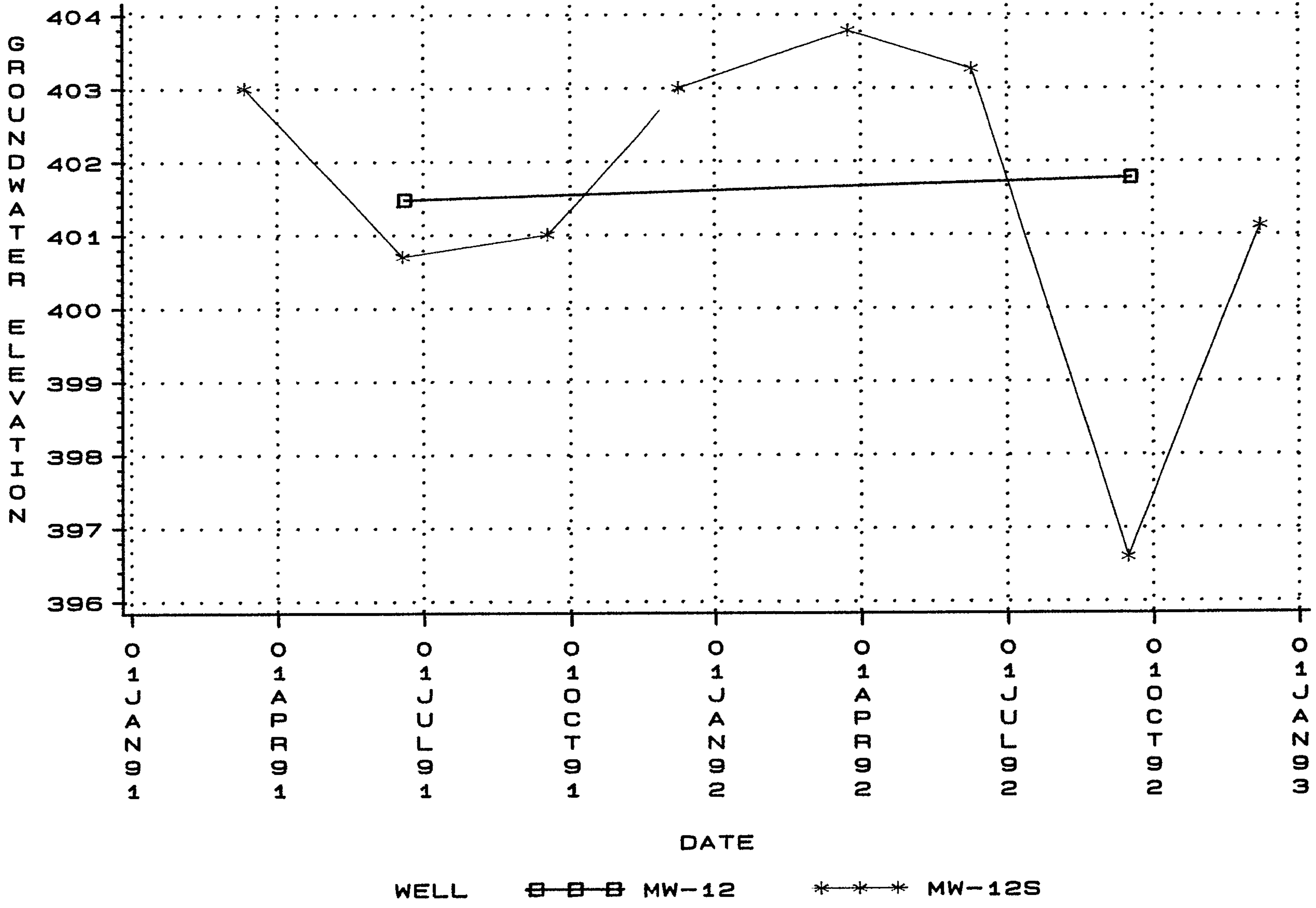
WELL HYDROGRAPHS
MW–3 CLUSTER



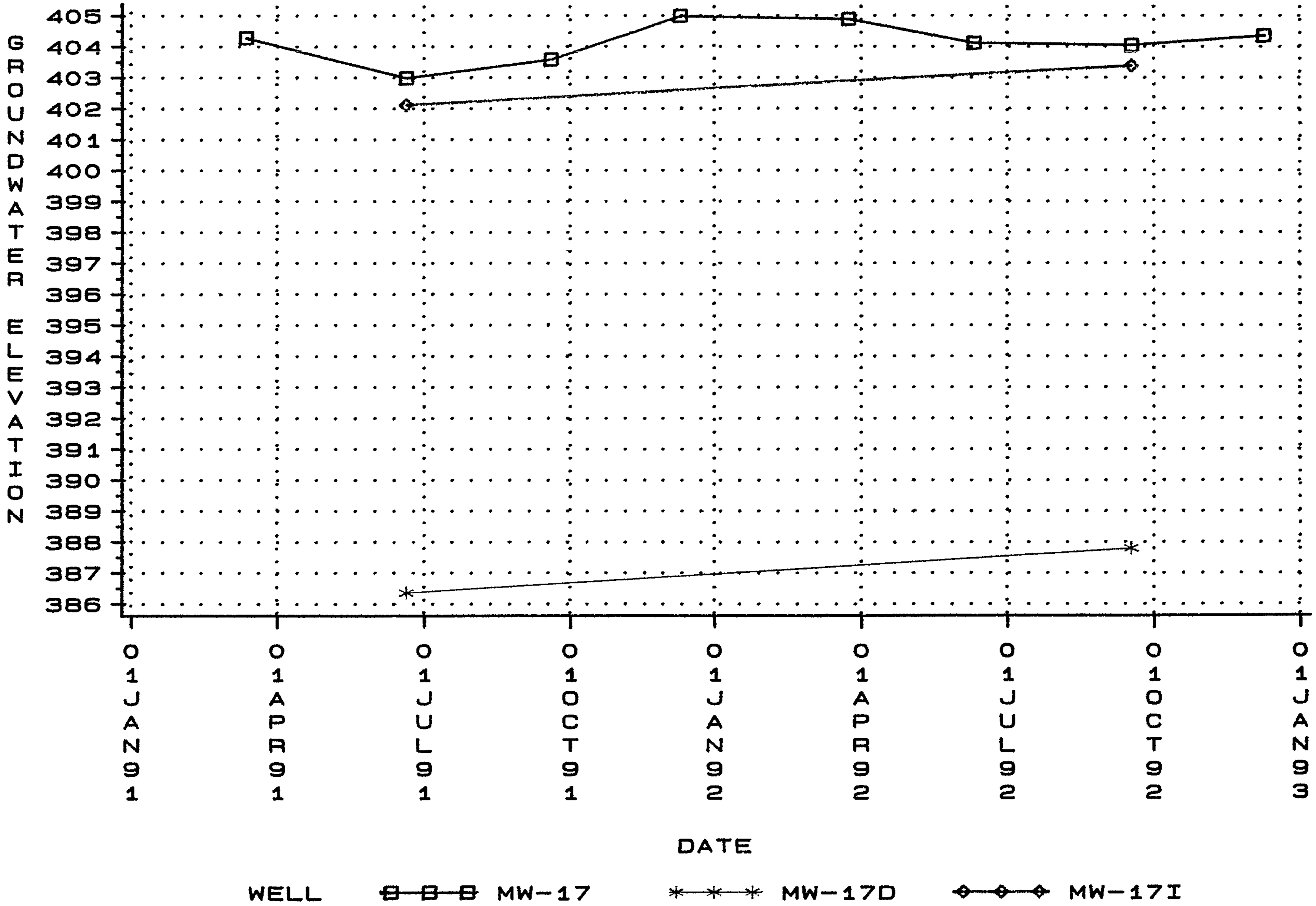
WELL HYDROGRAPHS
MW–5 CLUSTER



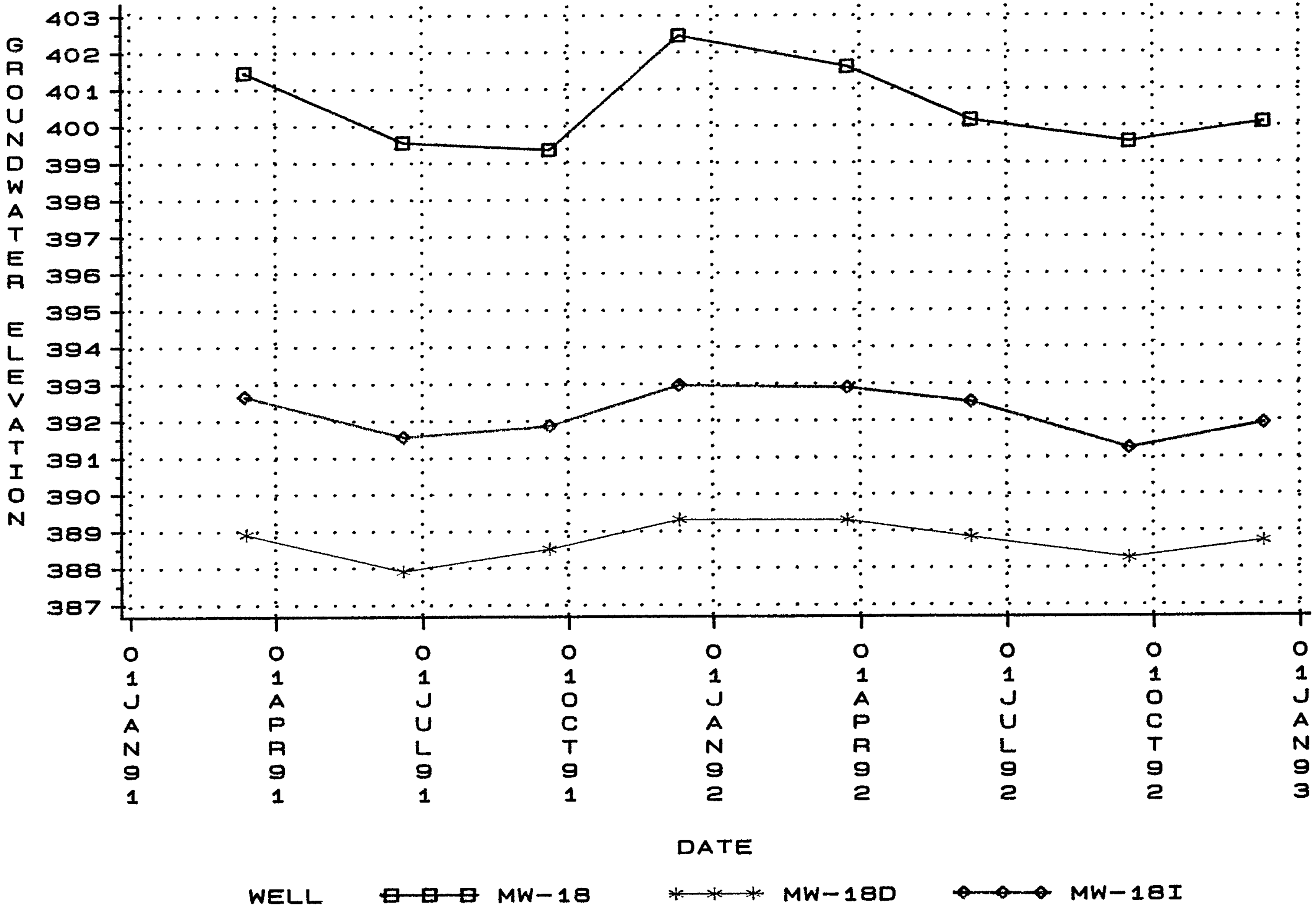
WELL HYDROGRAPHS
MW–12 CLUSTER



WELL HYDROGRAPHS
MW-17 CLUSTER



WELL HYDROGRAPHS
MW–18 CLUSTER



APPENDIX K

Water Level Monitoring Data

WELL	DATE	DTW	GWE
MW-1S	12MAR91	6.70	402.94
MW-1S	18JUN91	7.90	401.74
MW-1S	17SEP91	7.70	401.94
MW-1S	09DEC91	6.45	403.19
MW-1S	23MAR92	6.00	403.64
MW-1S	09JUN92	6.70	402.94
MW-1S	15SEP92	8.76	400.88
MW-1S	08DEC92	7.39	402.25
MW-1	12MAR91	12.50	396.92
MW-1	18JUN91	19.20	390.22
MW-1	17SEP91	21.30	388.12
MW-1	09DEC91	19.90	389.52
MW-1	23MAR92	6.76	402.66
MW-1	10JUN92	18.20	391.22
MW-1	15SEP92	18.82	390.60
MW-1	08DEC92	19.65	389.77
MW-2S	23MAR92	8.81	401.14
MW-2S	10JUN92	7.23	402.72
MW-2S	15SEP92	11.27	398.68
MW-2S	08DEC92	9.28	400.67
MW-2	12MAR91	7.00	402.98
MW-2	18JUN91	8.70	401.28
MW-2	17SEP91	8.50	401.48
MW-2	09DEC91	6.70	403.28
MW-2	23MAR92	6.50	403.48
MW-2	09JUN92	7.13	402.85
MW-2	15SEP92	15.80	394.18
MW-2	08DEC92	8.17	401.81
MW-3	12MAR91	7.35	402.29
MW-3	18JUN91	8.75	400.89
MW-3	17SEP91	8.60	401.04
MW-3	09DEC91	6.60	403.04
MW-3	23MAR92	6.12	403.52
MW-3	09JUN92	7.19	402.45
MW-3	15SEP92	13.47	396.17
MW-3	08DEC92	7.81	401.83
MW-3I	12MAR91	14.00	395.26
MW-3I	18JUN91	17.40	391.86
MW-3I	17SEP91	11.80	397.46
MW-3I	09DEC91	7.60	401.66
MW-3I	23MAR92	13.65	395.61
MW-3I	09JUN92	16.58	392.68
MW-3I	15SEP92	13.28	395.98
MW-3I	08DEC92	10.06	399.20
MW-3D	12MAR91	20.30	388.79
MW-3D	18JUN91	22.70	386.39
MW-3D	18SEP91	21.40	387.69
MW-3D	09DEC91	19.21	389.88
MW-3D	23MAR92	20.14	388.95
MW-3D	09JUN92	21.65	387.44
MW-3D	15SEP92	20.66	388.43
MW-3D	08DEC92	19.22	389.87
MW-4	12MAR91	4.35	403.95
MW-4	18JUN91	6.60	401.70

WELL	DATE	DTW	GWE
MW-4	18SEP91	6.60	401.70
MW-4	09DEC91	3.80	404.50
MW-4	23MAR92	3.89	404.41
MW-4	09JUN92	4.33	403.97
MW-4	15SEP92	6.48	401.82
MW-5S	12MAR91	5.30	403.90
MW-5S	18JUN91	6.60	402.60
MW-5S	18SEP91	6.10	403.10
MW-5S	09DEC91	4.40	404.80
MW-5S	23MAR92	4.21	404.99
MW-5S	09JUN92	5.40	403.80
MW-5S	15SEP92	6.76	402.44
MW-5S	08DEC92	5.46	403.74
MW-5	12MAR91	5.30	403.59
MW-5	18JUN91	6.80	402.09
MW-5	18SEP91	6.10	402.79
MW-5	10DEC91	5.00	403.89
MW-5	23MAR92	5.02	403.87
MW-5	09JUN92	5.41	403.48
MW-5	15SEP92	7.43	401.46
MW-5	08DEC92	5.91	402.98
MW-6	12MAR91	3.80	404.30
MW-6	18JUN91	6.40	401.70
MW-6	18SEP91	6.50	401.60
MW-6	09DEC91	4.20	403.90
MW-6	23MAR92	7.69	400.41
MW-6	09JUN92	4.82	403.28
MW-6	15SEP92	8.25	399.85
MW-6	08DEC92	5.26	402.84
MW-7	14MAR91	5.50	403.27
MW-7	19JUN91	6.70	402.07
MW-7	19SEP91	7.20	401.57
MW-7	11DEC91	5.20	403.57
MW-7	24MAR92	5.00	403.77
MW-7	09JUN92	5.61	403.16
MW-7	16SEP92	7.58	401.19
MW-7	09DEC92	6.47	402.30
MW-10	12MAR91	6.25	404.78
MW-10	18JUN91	8.35	402.68
MW-10	15SEP92	7.29	403.74
MW-11	13MAR91	5.75	403.37
MW-11	20JUN91	7.00	402.12
MW-11	19SEP91	7.50	401.62
MW-11	11DEC91	6.40	402.72
MW-11	24MAR92	5.63	403.49
MW-11	10JUN92	6.02	403.10
MW-12S	12MAR91	6.90	402.99
MW-12S	18JUN91	9.20	400.69
MW-12S	17SEP91	8.90	400.99
MW-12S	09DEC91	6.90	402.99
MW-12S	24MAR92	6.12	403.77
MW-12S	09JUN92	6.64	403.25
MW-12S	15SEP92	13.30	396.59
MW-12S	08DEC92	8.78	401.11

WELL	DATE	DTW	GWE
MW-12	19JUN91	8.10	401.47
MW-12	17SEP92	7.80	401.77
MW-13	13MAR91	13.05	397.16
MW-13	19JUN91	13.20	397.01
MW-13	19SEP91	13.70	396.51
MW-13	10DEC91	13.10	397.11
MW-13	24MAR92	12.92	397.29
MW-13	10JUN92	13.05	397.16
MW-13	17SEP92	13.06	397.15
MW-13	09DEC92	13.02	397.19
MW-14	13MAR91	5.50	401.68
MW-14	19JUN91	7.30	399.88
MW-14	18SEP91	7.40	399.78
MW-14	10DEC91	6.60	400.58
MW-14	24MAR92	6.62	400.56
MW-14	09JUN92	6.74	400.44
MW-14	16SEP92	7.36	399.82
MW-14	09DEC92	7.24	399.94
MW-15	14MAR91	3.50	401.36
MW-15	19JUN91	5.20	399.66
MW-15	18SEP91	6.30	398.56
MW-15	10DEC91	3.70	401.16
MW-15	24MAR92	2.92	401.94
MW-15	09JUN92	4.14	400.72
MW-15	16SEP92	4.60	400.26
MW-15	09DEC92	3.21	401.65
MW-16	20JUN91	8.10	401.42
MW-16	17SEP92	6.67	402.85
MW-17	13MAR91	6.90	404.26
MW-17	20JUN91	8.20	402.96
MW-17	19SEP91	7.60	403.56
MW-17	10DEC91	6.20	404.96
MW-17	24MAR92	6.30	404.86
MW-17	10JUN92	7.07	404.09
MW-17	17SEP92	7.14	404.02
MW-17	09DEC92	6.83	404.33
MW-17I	20JUN91	8.00	402.09
MW-17I	17SEP92	6.73	403.36
MW-17D	20JUN91	23.90	386.33
MW-17D	17SEP92	22.47	387.76
MW-18	13MAR91	8.00	401.44
MW-18	19JUN91	9.90	399.54
MW-18	19SEP91	10.10	399.34
MW-18	11DEC91	7.00	402.44
MW-18	24MAR92	7.85	401.59
MW-18	09JUN92	9.30	400.14
MW-18	16SEP92	9.89	399.55
MW-18	09DEC92	9.36	400.08
MW-18I	13MAR91	17.40	392.65
MW-18I	19JUN91	18.50	391.55
MW-18I	19SEP91	18.20	391.85
MW-18I	11DEC91	17.10	392.95
MW-18I	24MAR92	17.17	392.88
MW-18I	09JUN92	17.55	392.50

WELL	DATE	DTW	GWE
MW-18I	16SEP92	18.81	391.24
MW-18I	09DEC92	18.14	391.91
MW-18D	14MAR91	21.00	388.89
MW-18D	19JUN91	22.00	387.89
MW-18D	19SEP91	21.40	388.49
MW-18D	11DEC91	20.60	389.29
MW-18D	24MAR92	20.62	389.27
MW-18D	09JUN92	21.08	388.81
MW-18D	16SEP92	21.65	388.24
MW-18D	09DEC92	21.20	388.69
MW-19	14MAR91	3.45	405.10
MW-19	18JUN91	6.10	402.45
MW-19	18SEP91	5.90	402.65
MW-19	09DEC91	2.90	405.65
MW-19	23MAR92	3.11	405.44
MW-20	14MAR91	1.90	408.50
MW-20	19JUN91	3.60	406.80
MW-20	17SEP92	3.54	406.86
MW-20	08DEC92	2.32	408.08
MW-21	12MAR91	5.00	405.43
MW-21	18JUN91	6.20	404.23
MW-21	18SEP91	6.30	404.13
MW-21	10DEC91	4.90	405.53
MW-21	23MAR92	5.78	404.65
MW-21	09JUN92	5.15	405.28
MW-21	16SEP92	5.28	405.15
MW-21	08DEC92	4.67	405.76
MW-22	12MAR91	3.15	404.48
MW-22	18JUN91	5.80	401.83
MW-22	18SEP91	6.40	401.23
MW-22	10DEC91	3.00	404.63
MW-22	23MAR92	2.75	404.88
MW-22	09JUN92	3.67	403.96
MW-22	16SEP92	4.82	402.81
MW-22	08DEC92	3.32	404.31
MW-23	20JUN91	9.70	402.03
MW-23	17SEP92	7.85	403.88
MW-24	20JUN91	8.90	401.79
MW-24	17SEP92	7.59	403.10
R209-1	14MAR91	12.00	394.00
R209-2	12MAR91	5.70	403.50
R209-2	19JUN91	8.30	400.90
R209-2	18SEP91	8.90	400.30
R209-2	10DEC91	5.00	404.20
R209-2	23MAR92	5.32	403.88
R209-2	09JUN92	6.30	402.90
R209-2	16SEP92	7.68	401.52
R209-2	08DEC92	5.86	403.34
R209-3	13MAR91	17.00	384.90
R209-3	19JUN91	18.00	383.90
R209-3	18SEP91	17.80	384.10
R209-3	10DEC91	16.60	385.30
R209-3	24MAR92	16.37	385.53
R209-3	10JUN92	16.98	384.92

WELL	DATE	DTW	GWE
R209-3	17SEP92	17.21	384.69
R209-3	09DEC92	16.81	385.09
R209-4	13MAR91	8.40	401.90
R209-4	20JUN91	9.80	400.50
R209-4	19SEP91	10.80	399.50
R209-4	10DEC91	10.00	400.30
R209-4	24MAR92	8.00	402.30
R209-4	10JUN92	8.32	401.98
R209-4	17SEP92	8.41	401.89
R209-4	09DEC92	8.72	401.58
R-21	08JAN92	NA	393.52
R-21	05OCT92	NA	393.06
R-35	08JAN92	NA	393.68
R-35	05OCT92	NA	393.34
R-36	08JAN92	NA	394.34
R-36	05OCT92	NA	393.64
R-37	08JAN92	NA	397.77
R-37	05OCT92	NA	397.21
SR-91	05OCT92	NA	395.61
R-92	13MAR91	14.00	389.00
R-92	19JUN91	18.20	384.80
R-92	10DEC91	18.90	384.10
R-92	17SEP92	18.20	384.80
R-92	09DEC92	17.29	385.71
SR-93	08JAN92	NA	394.32
SR-93	05OCT92	NA	394.32
R-94	24MAR92	15.87	386.33
R-94	10JUN92	16.05	386.15
R-94	17SEP92	16.60	385.60
R-94	09DEC92	17.09	385.11
R-103	13MAR91	21.25	386.65
R-103	19JUN91	23.00	384.90
R-103	18SEP91	21.90	386.00
R-103	10DEC91	20.60	387.30
R-103	24MAR92	20.90	387.00
R-103	10JUN92	21.22	386.68
R-103	17SEP92	21.63	386.27
R-103	09DEC92	21.05	386.85

TABLE 1

TWENTYSECOND QUARTERLY SAMPLING ROUND
GROUNDWATER ELEVATIONS

WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION
REC10	377.00	SR11	395.04	OR114	403.28
REC11	380.00	SR12	394.27	OR116	399.18
REC12	384.00	SR14	396.76	OR118	384.00
REC13	384.00	SR15	391.87	OR38	379.59
REC15	381.00	SR16	392.15	OR61	377.70
REC1A	385.92	SR17	393.92	OR62	382.16
REC2	390.00	SR2	398.09	OR63	375.70
REC3	390.00	SR20	393.52	OR68	374.83
REC4	390.00	SR22	394.35	OR69	375.10
REC5	390.00	SR3	397.37	OR70	376.59
REC6	382.00	SR4	395.08	OR71	383.95
REC7	382.00	SR5	396.54	R103	387.00
REC8	382.00	SR56	394.79	R18	385.67
OS105	393.55	SR65	395.14	R21	393.06
OS107	399.48	SR67	392.58	R25	375.00
OS109	392.67	SR7	396.20	R26	378.00
OS113	400.70	SR73	394.64	R23	379.90
OS115	406.36	SR75	393.76	R35	393.34
OS27	392.44	SR77	394.10	R36	393.64
OS28	390.82	SR79	390.95	R37	397.21
OS29	389.02	SR8	394.66	R55	386.51
OS30	389.16	SR81	387.79	R57	383.08
OS31	392.93	SR83	391.15	R59	384.76
OS32	385.00	SR85	390.14	R6	392.25
OS33	393.28	SR87	381.86	R60	392.60
OS34	392.29	SR89	379.70	R64	387.74
OS41	384.40	SR9	395.73	R66	393.50
OS42	385.45	SR91	395.61	R72	376.98
OS43	380.19	SR93	394.32	R76	388.66
OS44	394.54	SR95	370.92	R78	391.96
OS45	391.79	209-1	395.13	R80	382.72
OS46	386.50	210-1	380.82	R82	396.10
OS47	384.29	210-2	372.95	R84	380.36
OS48	389.82	210-3	377.21	R86	379.34
OS49	393.48	OR104	382.76	R88	377.56
OS50	396.45	OR106	391.11	R90	376.37
OS53	382.00	OR108	383.15	R92	378.89
OS54	392.55	OR110	378.57	R94	386.28
OS58	382.80	OR112	394.79	R96	366.74
SR10	392.39				

5-15 Oct 1992

FILE NO. 7580-68

TABLE 1

TWENTY-FIRST QUARTERLY SAMPLING ROUND GROUNDWATER ELEVATIONS

WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION
DR101	370.67	REC14	.
209-1	394.02	REC15	.
210-1	380.98	REC1A	393.25
210-2	377.02	REC2	.
210-3	377.19	REC3	.
OR104	381.92	REC4	.
OR106	390.98	REC5	.
OR110	380.92	REC6	.
OR111	381.65	REC7	.
OR112	393.38	REC8	.
OR114	401.48	225A	.
OR118	358.92	OB97	372.54
OR61	377.95	OS105	392.30
OR63	374.65	OS107	397.99
OR68	373.35	OS117	404.24
OR69	374.75	OS29	388.70
OR71	382.63	OS34	392.47
R103	387.77	OS41	383.83
R18	385.50	OS42	383.75
R19	393.68	OS43	382.01
R21	397.95	OS44	394.87
R26	.	OS45	391.69
R35	392.90	OS46	386.40
R36	393.53	OS47	383.49
R37	396.75	OS50	395.27
R57	382.60	OS53	380.25
R64	386.91	OS58	381.92
R74	381.58	SR12	397.61
R86	380.14	SR16	391.59
R88	378.09	SR17	393.92
R90	376.10	SR65	395.01
R92	385.34	SR7	398.27
R94	386.04	SR75	394.95
R96	366.28	SR81	387.69
REC10	.	SR87	382.66
REC11	.	SR89	379.30
REC12	.	SR93	394.04
REC13	.	SR95	371.16

jg/xerox/wks/21qtr/table1

22 July - 10 Aug 1992

FILE NO. 7580-63

TABLE 1

TWENTIETH QUARTERLY SAMPLING ROUND GROUNDWATER ELEVATIONS

WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION
DR101	371.30	REC15	370.00
209-1	394.57	REC1A	387.38
210-1	382.29	REC2	380.00
210-2	374.28	REC3	380.00
210-3	378.55	REC4	390.00
OR104	382.13	REC5	390.00
OR106	391.98	REC6	377.00
OR110	378.17	REC7	372.00
OR111	374.43	REC8	380.00
OR112	394.87	225A	.
OR114	402.76	OB97	372.70
OR118	358.98	OS105	393.87
OR61	378.57	OS107	399.45
OR63	375.03	OS117	405.64
OR68	373.80	OS29	389.93
OR69	374.35	OS34	394.18
OR71	383.38	OS41	384.20
R103	386.85	OS42	385.61
R18	386.91	OS43	380.09
R19	386.45	OS44	395.10
R21	395.10	OS45	391.48
R25	.	OS46	386.07
R26	.	OS47	383.82
R35	395.20	OS50	396.86
R36	395.17	OS53	381.13
R37	398.39	OS58	383.45
R57	383.52	SR12	395.93
R64	385.51	SR16	394.00
R74	384.00	SR17	395.74
R86	380.40	SR4	395.37
R88	377.70	SR5	398.77
R90	375.61	SR65	395.39
R92	377.42	SR7	398.69
R94	386.46	SR75	394.71
R96	367.76	SR81	388.06
REC10	368.00	SR85	390.85
REC11	366.00	SR87	385.18
REC12	383.00	SR89	380.56
REC13	382.00	SR93	394.57
REC14	380.00	SR95	371.42

jg/xerox/wks/20qtr/table1.wks

22 April - 6 May 1992

TABLE 1
NINTEENTH QUARTERLY SAMPLING ROUND
GROUNDWATER ELEVATIONS

WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION
210-3	380.02	REC6	380.00
210-2	377.94	REC10	372.00
210-1	380.79	REC11	368.00
209-1	394.39	REC13	375.00
OR61	378.40	REC14	379.00
OR63	376.48	SR3	399.07
OR68	376.58	SR4	394.12
OR69	375.80	SR5	396.63
OR71	383.60	SR7	397.28
OR104	383.53	SR12	394.50
OR106	391.44	SR16	392.58
OR110	377.90	SR17	394.30
OR111	374.25	OS29	393.38
OR112	395.11	OS34	392.75
OR114	402.78	OS41	384.04
OR118	358.38	OS42	383.92
R6	392.80	OS43	379.52
R18	386.96	OS44	394.82
R19	386.98	OS45	391.70
R21	393.52	OS46	387.01
R35	393.68	OS47	388.28
R36	394.34	OS50	396.12
R37	397.77	OS53	381.39
R57	384.48	OS58	383.30
R64	381.44	SR65	395.73
R74	384.14	SR75	393.98
R86	379.66	SR81	387.82
R88	377.32	SR85	390.20
R90	375.10	SR87	383.82
R92	383.41	SR89	380.56
R94	386.25	SR93	394.32
R96	366.58	SR95	370.93
R103	386.93	OB97	371.78
REC1A	387.48	OS105	393.79
REC2	379.00	OS107	399.62
REC3	380.00	OS117	404.94
REC4	380.00		

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TABLE 1
EIGHTEENTH QUARTERLY SAMPLING ROUND
GROUNDWATER ELEVATIONS

WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION
DR100	360.70	R60	385.20	OS34	390.32
DR101	369.02	R64	385.13	OS41	377.05
DR102	370.42	R66	377.80	OS43	373.16
209-1	393.43	R72	374.60	OS44	393.37
210-1	376.20	R74	380.01	OS45	390.03
210-2	369.90	R76	377.50	OS46	381.36
210-3	374.00	R78	376.10	OS47	380.12
OB97	371.20	R80	378.20	OS48	382.48
OR104	381.03	R82	375.10	OS49	386.97
OR106	389.99	R84	373.60	OS50	390.30
OR108	381.55	R86	365.20	OS53	375.35
OR110	372.05	R88	364.40	SR10	390.22
OR111	370.41	R90	371.07	SR11	395.10
OR112	389.65	R92	386.81	SR12	393.95
OR114	399.31	R94	381.90	SR14	395.70
OR116	397.56	R96	361.30	SR15	390.42
OR118	359.03	REC10	370.84	SR16	390.87
OR38	382.83	REC11	368.00	SR17	394.02
OR52	370.38	REC12	375.63	SR2	395.32
OR61	376.84	REC13	371.80	SR20	392.78
OR62	381.17	REC14		SR22	393.86
OR63	373.67	REC1A	384.04	SR3	395.34
OR68	369.80	REC2	373.16	SR4	393.77
OR69	372.98	REC3	373.88	SR5	395.92
OR70	374.41	REC4	376.86	SR7	393.88
OR71	377.68	REC5	384.33	SR73	393.78
R103	386.00	REC6	378.88	SR75	392.83
R18	383.69	REC7		SR77	390.06
R19	384.81	REC8	378.91	SR79	388.60
R21	379.40	REC9	389.52	SR8	395.34
R23	380.45	SR56	393.62	SR81	384.50
R25		SR65	386.87	SR83	387.08
R26		SR67	390.38	SR85	386.33
R35	393.00	OS105	390.41	SR87	380.65
R36	394.01	OS107	395.48	SR89	375.07
R37	396.13	OS109	390.65	SR9	394.43
R39	380.50	OS113	395.48	SR91	395.52
R55	384.62	OS115	400.84	SR93	393.62
R57	381.70	OS117	402.12	SR95	368.60
R59	382.21	OS29	386.37	SR99	395.59
R6	383.40	OS31	389.48		

10-25 oct 1991

FILE NO. 7580-63

TABLE 1
SEVENTEENTH QUARTERLY SAMPLING ROUND
GROUNDWATER ELEVATIONS

WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION	WELL	GROUNDWATER ELEVATION
DR101	370.59	R57	380.75	OS117	400.83
209-1	392.44	R6	388.52	OS34	388.30
210-1	380.18	R64	386.85	OS41	379.35
210-2	373.54	R74	381.05	OS42	376.45
210-3	380.61	R86	377.27	OS43	377.89
OR104	379.93	R88	378.14	OS44	391.02
OR106	386.13	R90	372.55	OS45	386.96
OR106	386.34	R92	377.71	OS46	382.47
OR110	377.79	R94	385.20	OS47	380.08
OR111	373.63	R96	361.84	OS50	391.11
OR112	389.72	REC10	370.84	OS53	379.98
OR114	398.55	REC11	368.00	SR12	388.12
OR118	358.98	REC12	375.63	SR16	387.06
OR61	379.15	REC13	369.80	SR3	395.04
OR63	377.08	REC14	382.50	SR4	393.06
OR68	374.20	REC1A	382.93	SR5	395.00
OR69	378.62	REC2	373.16	SR65	389.93
OR71	381.34	REC3	373.88	SR7	392.72
R103	385.70	REC4	376.86	SR75	393.43
R18	381.28	REC5	377.33	SR81	387.17
R19	384.72	REC6	378.88	SR85	387.25
R21	387.05	REC8	378.91	SR87	380.78
R35	386.85	OB97	369.08	SR89	376.99
R36	388.07	OS105	389.25	SR93	393.50
R37	391.37	OS107	394.88	SR95	367.68

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11-24 July 1991

FILE NO. 7580-53

TABLE 1

STATIC WATER LEVELS AND GROUNDWATER ELEVATIONS

WELL	DEPTH TO WATER	WATER ELEVATION	WELL	DEPTH TO WATER	WATER ELEVATION	WELL	DEPTH TO WATER	WATER ELEVATION
DR-101	31.08	372.22	R-37	10.50	396.20	OS-29	8.80	390.40
209-1	11.90	394.40	R-57	14.32	387.18	OS-32	11.01	388.39
210-1	15.78	380.42	R-64	16.62	384.78	OS-34	7.60	393.60
210-2	15.91	373.79	R-74	11.96	391.14	OS-41	4.67	385.53
210-3	12.82	381.48	R-86	14.32	380.48	OS-42	4.96	386.14
225A	-	-	R-88	10.02	378.08	OS-43	8.00	384.00
OB-97	17.29	372.71	R-90	10.99	375.71	OS-44	4.22	394.88
OR-104	12.18	388.82	R-92	24.08	380.02	OS-45	4.50	391.60
OR-106	13.13	392.17	R-94	17.23	386.07	OS-46	5.15	389.35
OR-108	6.80	394.30	R-96	24.10	367.10	OS-47	5.25	389.85
OR-110	10.40	378.60	REC-10	-	-	OS-50	4.91	397.09
OR-111	11.40	378.60	REC-11	-	-	OS-53	4.94	387.46
OR-112	10.88	395.52	REC-12	-	-	OS-58	7.62	383.18
OR-114	8.74	402.66	REC-13	-	-	OS-61	5.65	382.17
OR-118	28.83	358.67	REC-14	7.30	-	SR-12	10.87	393.63
OR-63	7.11	388.59	REC-1A	11.93	389.87	SR-16	9.67	393.03
OR-68	13.84	374.96	REC-2	-	-	SR-17	10.36	393.04
OR-69	4.02	387.78	REC-3	-	-	SR-65	5.34	395.56
OR-70	19.42	377.78	REC-4	-	-	SR-7	7.11	397.39
OR-71	12.11	384.19	REC-5	-	-	SR-75	9.35	394.35
R-103	21.11	386.79	REC-6	-	-	SR-81	13.04	387.96
R-18	14.32	388.88	REC-7	-	-	SR-85	5.05	390.65
R-19	14.69	388.71	REC-8	-	-	SR-87	10.87	384.23
R-21	10.03	394.67	OS-105	7.76	393.74	SR-89	6.74	379.86
R-35	12.47	392.43	OS-107	6.15	399.15	SR-93	8.97	394.03
R-36	10.38	394.52	OS-117	4.78	404.32	SR-95	19.22	371.58

3 to 15 April 1991

Notes:

1. All water levels measured from top of outer casing, except for REC wells, where water level is elevation above pump intake.
2. Water levels measured between 3 and 15 April, 1991.

Xerox Webster, 1992 First Quarter
Well Elevation Information
Area 119 by Flow Zone (ft.)

Well ID	Sample Date	Top of Riser Elevation As Installed	Bottom of Well Elevation As Installed	Depth to Bottom of Well As Installed	Bottom of Well Elevation As Measured	Depth to Bottom of Well As Measured	Static Water Elevation As Measured	Depth to Water As Measured
Flow Zone: SHALLOW								
MW-1	2/21/92	414.23	394.38	19.85	396.63	17.60	408.23	6.00
MW-10	2/20/92	414.91	392.81	22.10	394.91	20.00	408.91	6.00
MW-11	2/20/92	411.91	392.93	18.98	393.41	18.50	407.71	4.20
MW-12	2/20/92	415.18	394.91	20.27	397.18	18.00	408.68	6.50
MW-13	2/20/92	414.76	393.55	21.21	396.26	18.50	405.86	8.90
MW-14	2/21/92	414.21	393.32	20.89	395.71	18.50	403.91	10.30
MW-15	2/21/92	413.01	392.05	20.96	395.01	18.00	400.71	12.30
MW-16	2/21/92	412.60	391.62	20.98	394.60	18.00	402.80	9.80
MW-17	2/21/92	413.03	391.12	21.91	393.93	19.10	403.53	9.50
MW-18	2/21/92	411.13	389.76	21.37	392.03	19.10	404.03	7.10
MW-19	2/21/92	411.61	388.30	23.31	391.01	20.60	405.11	6.50
MW-2	2/21/92	414.11	394.51	19.60	396.41	17.70	407.91	6.20
MW-20	2/21/92	411.35	392.33	19.02	394.85	16.50	399.55	11.80
MW-21	2/20/92	413.86	388.33	25.53	390.96	22.90	402.56	11.30
MW-22	2/20/92	415.36	394.14	21.22	396.76	18.60	409.36	6.00
MW-23	2/20/92	413.90	390.44	23.46	392.20	21.70	405.00	8.90
MW-24		416.86	398.36	18.50				
MW-25		416.98	397.98	19.00				
MW-26		411.55	387.45	24.10				
MW-27		411.93	395.43	16.50				
MW-28		412.62	389.12	23.50				
MW-3	2/20/92	416.72	396.08	20.64	398.72	18.00	410.52	6.20
MW-4	2/20/92	413.21	394.25	18.96	397.21	16.00	409.21	4.00
MW-5	2/20/92	414.88	396.00	18.88	397.98	16.90	409.98	4.90
MW-6	2/20/92	416.21	395.10	21.11	397.51	18.70	410.01	6.20
MW-7	2/20/92	415.17	394.20	20.97	397.37	17.80	409.17	6.00
MW-8	2/20/92	413.76	397.82	15.94	399.76	14.00	408.76	5.00
MW-9	2/20/92	414.55	395.26	19.29	397.55	17.00	408.85	5.70
Flow Zone: INTERMEDIATE								
MW-1D	2/21/92	414.39	384.01	30.38	383.89	30.50	402.79	11.60
MW-3D	2/20/92	416.55	384.43	32.12	386.25	30.30	404.35	12.20
MW-7D	2/20/92	415.16	382.90	32.26	385.66	29.50	401.26	13.90

Notes: Blank spaces occur under the "AS MEASURED" columns, when no depth to water or well depth information was recorded for this sampling period.

2/24/93

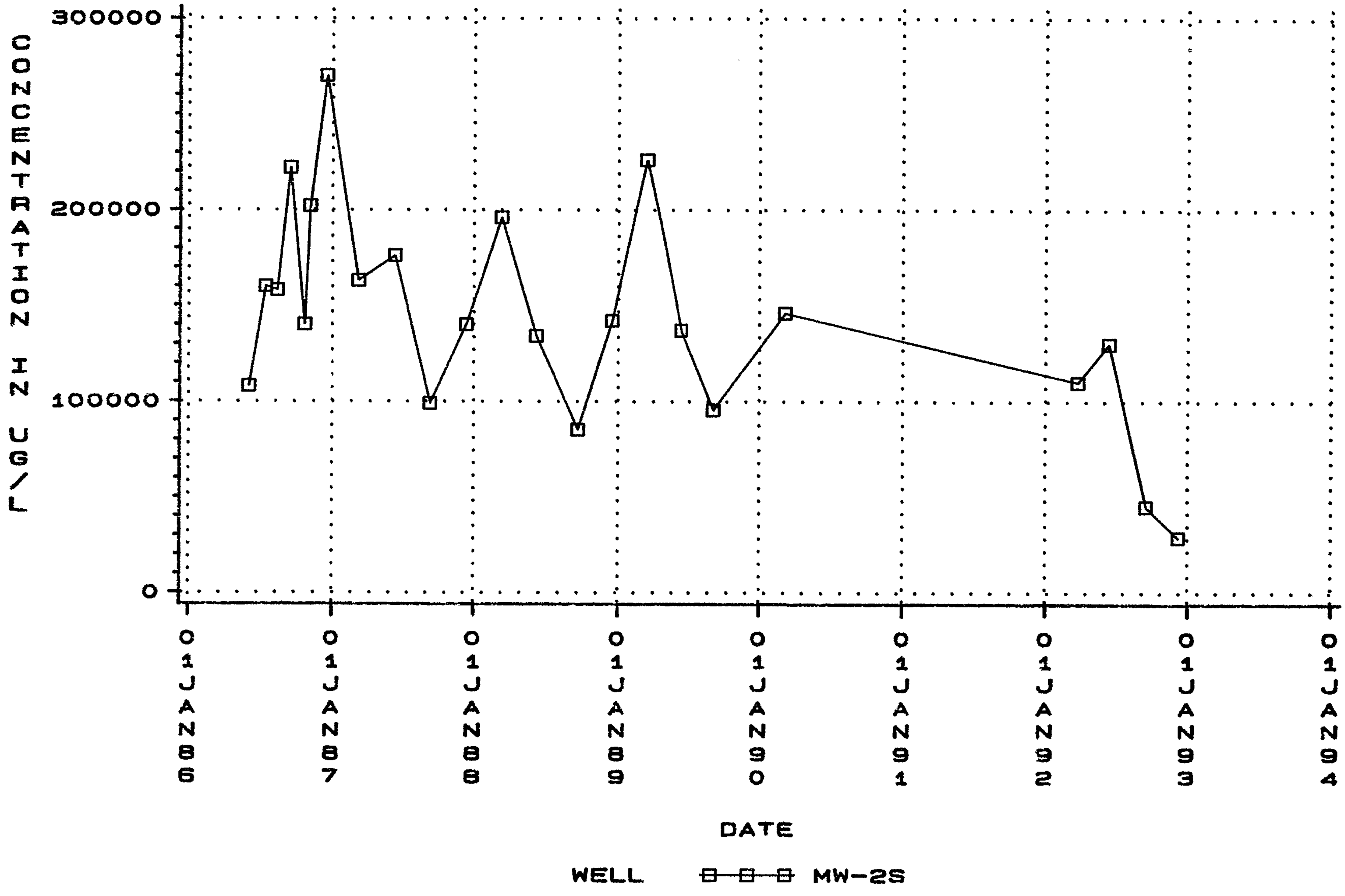
Contouring Disposition By Flow Zone By Area, 1992 Q3
(Xerox Webster)

WELL ID	Depth To Water	Inner Casing Elev	GW Elev	Contouring Disposition	Notes
Flow Zone: SHALLOW					
Area: 119					
MW-1	6.78	414.23	407.45		
MW-10	7.51	414.91	407.40		
MW-11	4.63	411.91	407.28		
MW-12	7.50	415.18	407.68		
MW-13	9.79	414.76	404.97		
MW-14	11.29	414.21	402.92		
MW-15	12.68	413.01	400.33		
MW-16	10.67	412.60	401.93		
MW-17	10.64	413.03	402.39		
MW-18	8.01	411.13	403.12		
MW-19	7.50	411.61	404.11		
MW-2	6.80	414.11	407.31		
MW-20	11.93	411.35	399.42		
MW-21	11.07	413.86	402.79		
MW-22	6.70	415.36	408.66		
MW-23	9.69	413.90	404.21		
MW-3	7.22	416.72	409.50		
MW-4	4.95	413.21	408.26		
MW-5	5.72	414.88	409.16		
MW-6	7.41	416.21	408.80		
MW-7	6.90	415.17	408.27		
MW-8	5.90	413.76	407.86		
MW-9	6.35	414.55	408.20		
Area: 200					
B19-SR	11.38	381.79	370.41		
B26-A	3.91	381.14	377.23	Not Used	GW elevation is not consistent with the GW surface within the investigative site
B26-IR	2.50	386.44	383.94	Not Used	GW elevation is not consistent with the GW surface within the investigative site
B26-SR	5.35	380.83	375.48		

APPENDIX L

VOC Time-Series Plots for Monitoring Well Clusters MW-2, MW-10, MW-18

1,1,1—TCA
MW—2S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200000
100000
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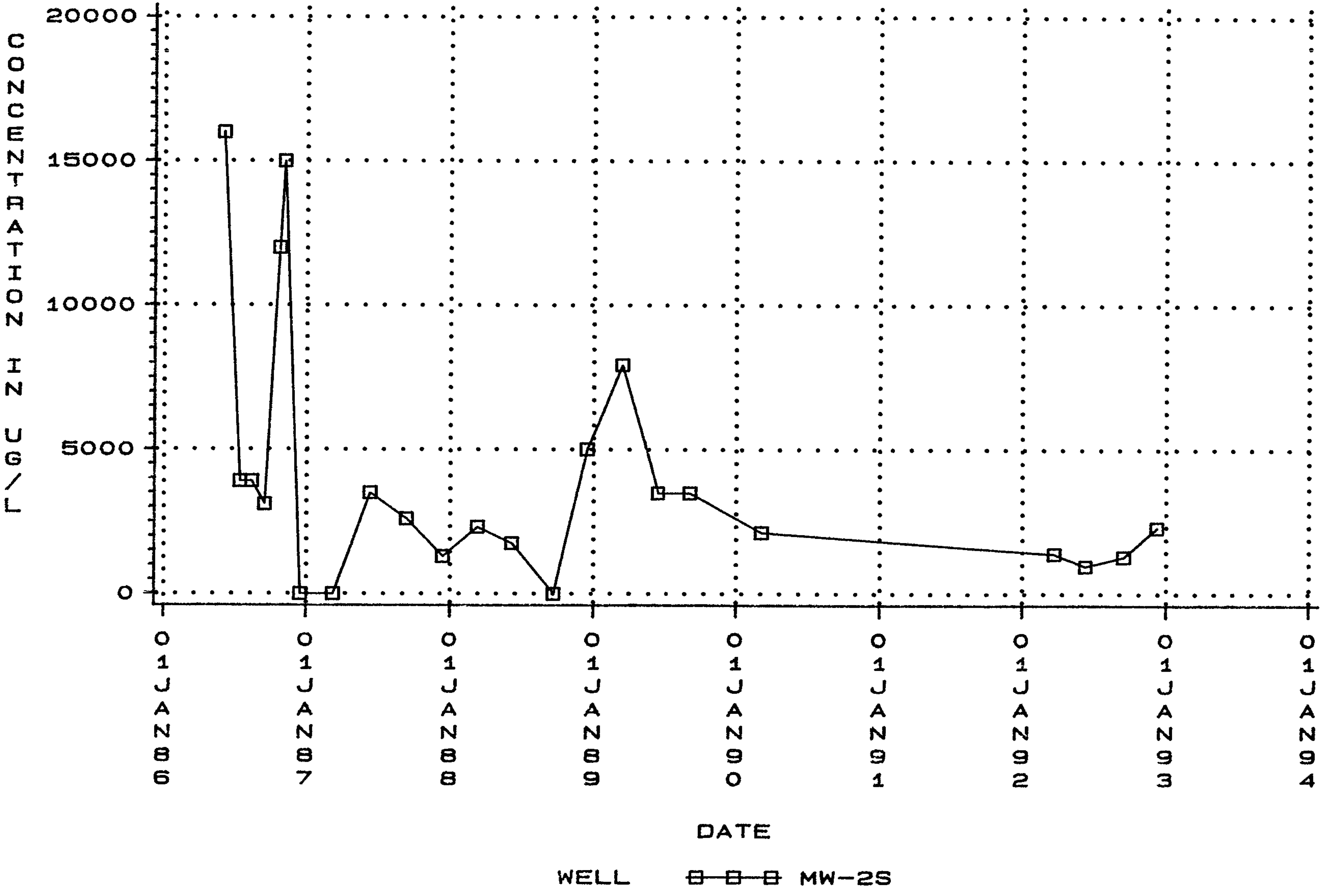
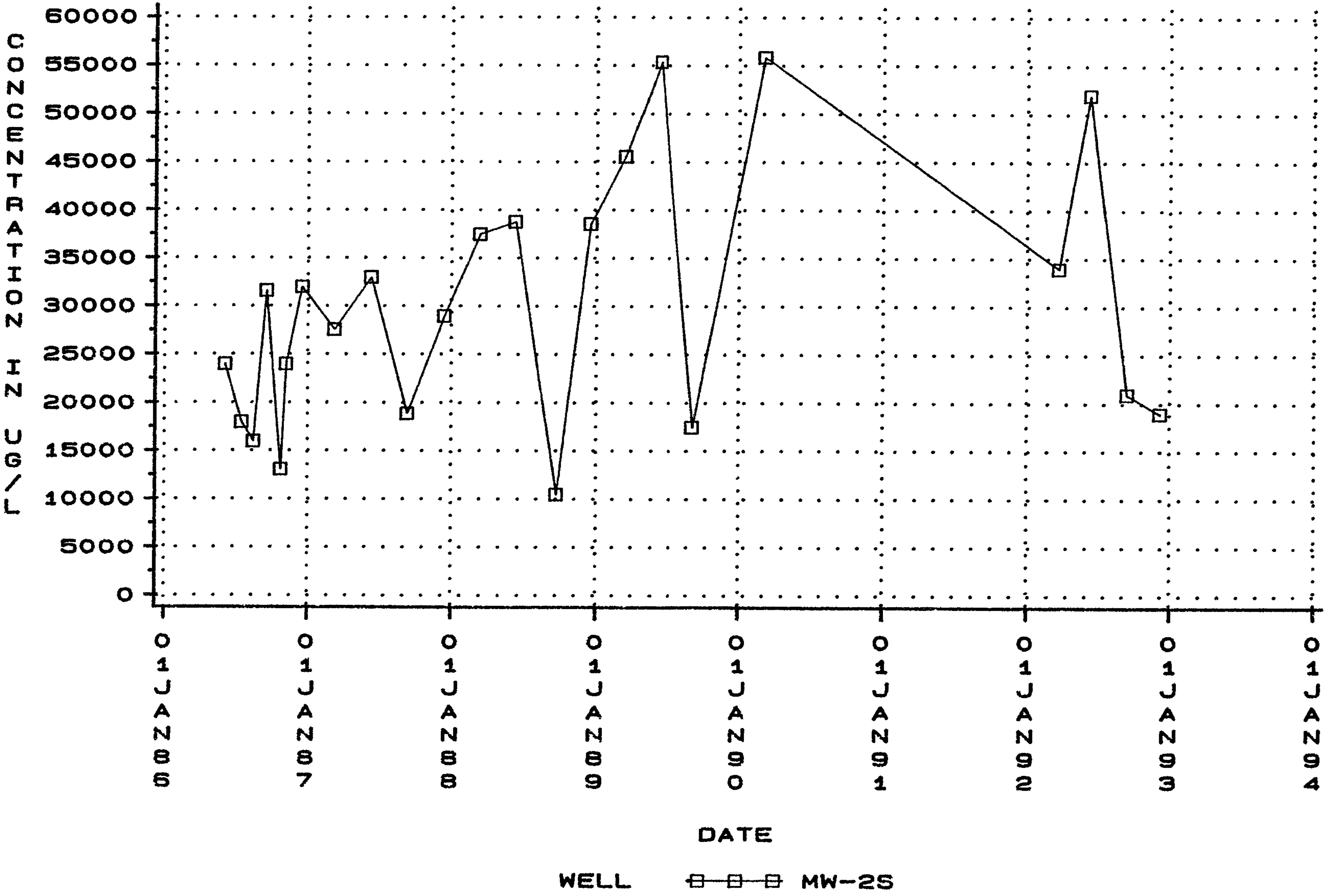
01JAN87
01JAN88
01JAN89
01JAN90
01JAN91
01JAN92
01JAN93
01JAN94
DATE
WELL
MW-2S

1,1—DICHLOROETHANE
MW—2S



TETRACHLOROETHENE
MW-2S



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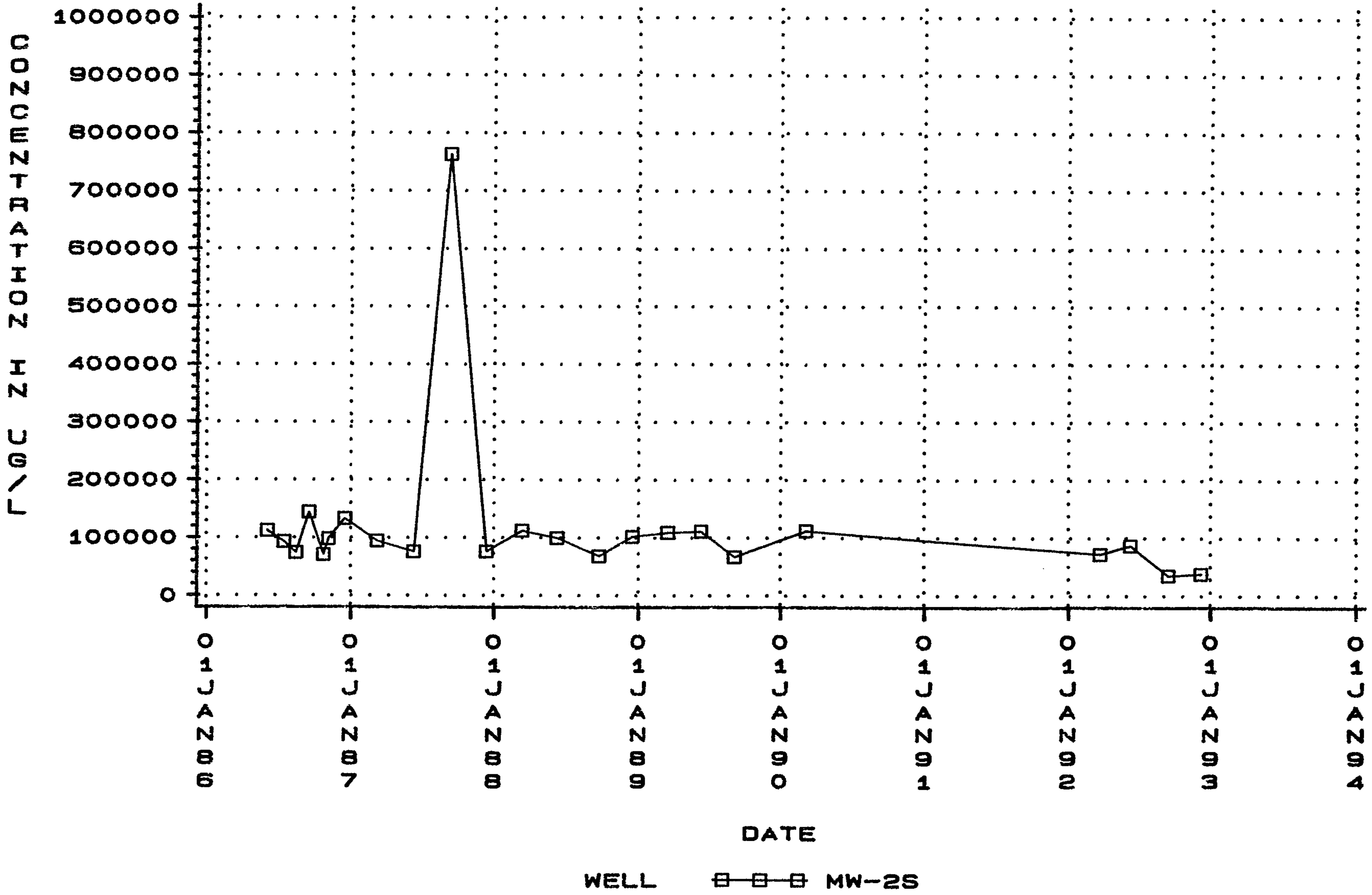
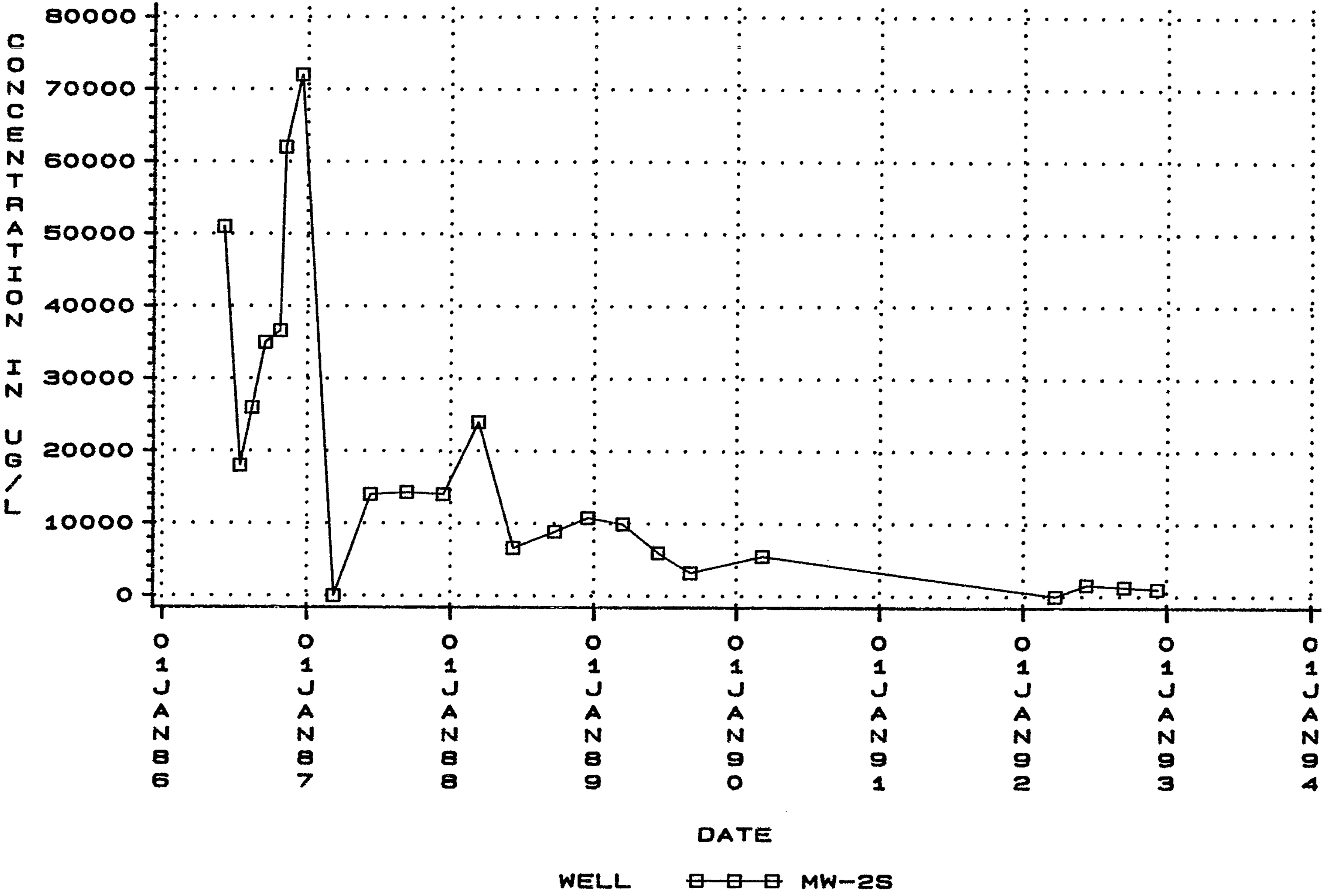
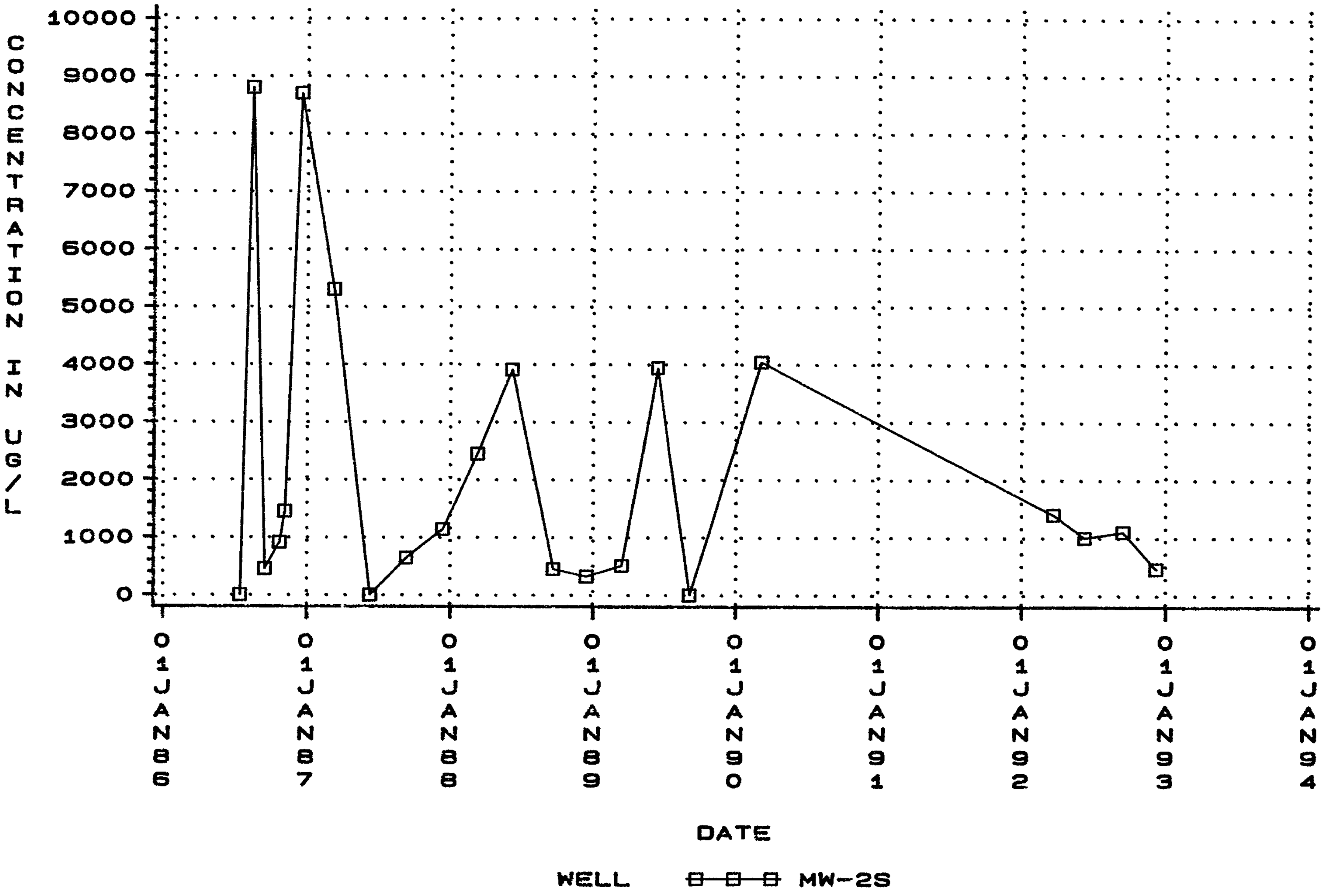
MW-2S



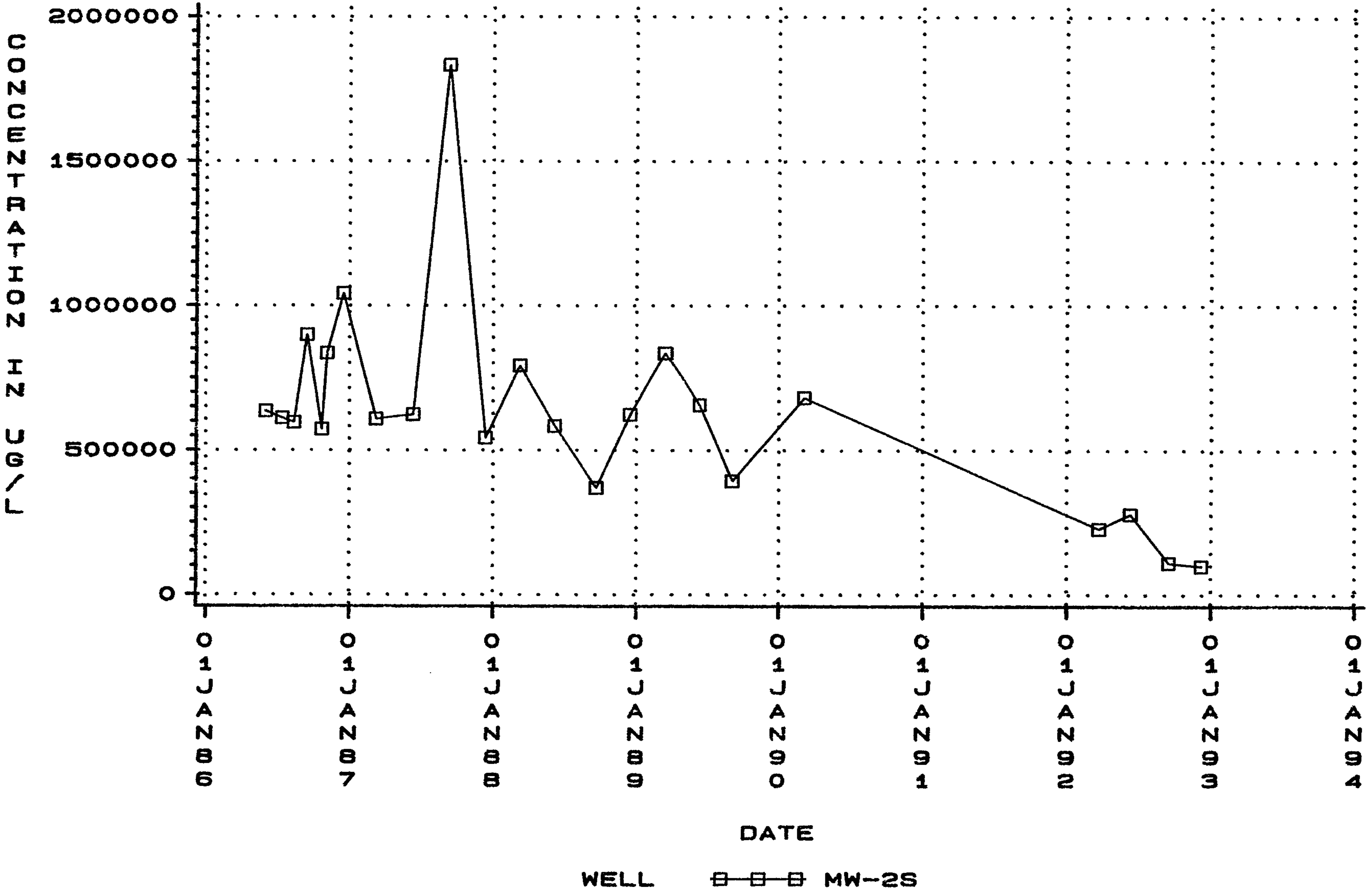
METHYLENE CHLORIDE
MW—2S



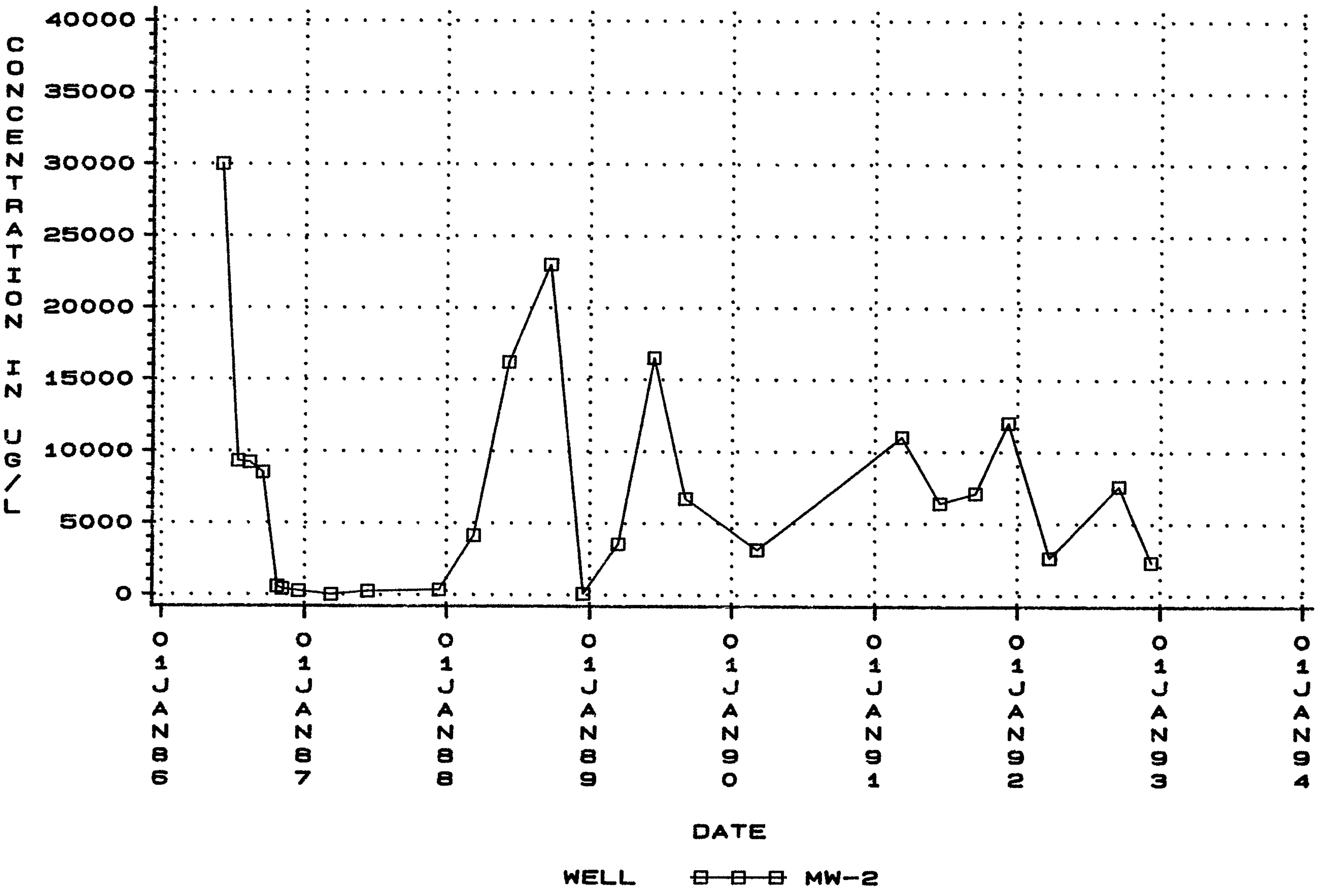
MINERAL SPIRITS
MW—2S



TOTAL VOLATILES + MINERAL SPIRITS
MW–2S



1,1,1-TCA
MW-2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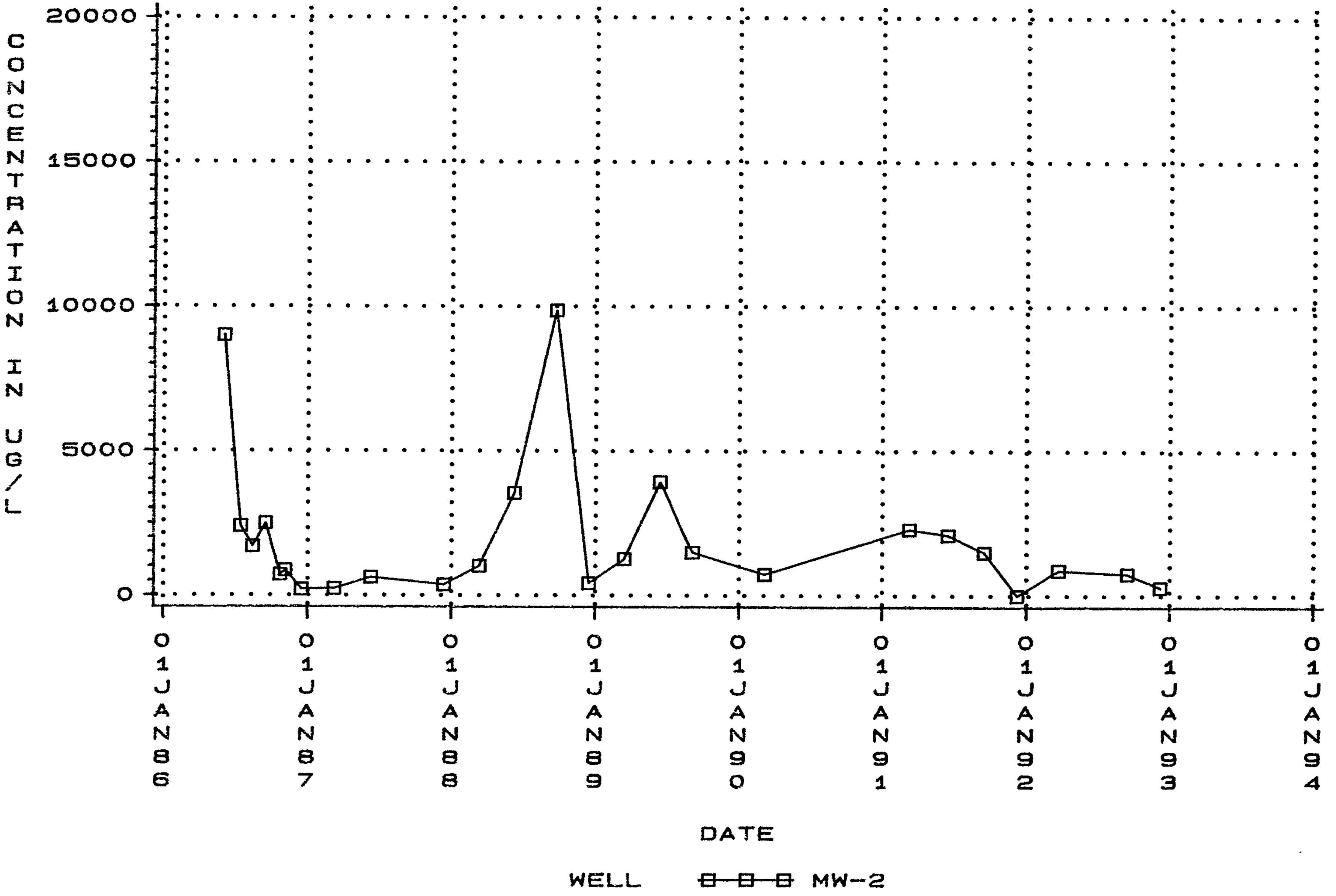
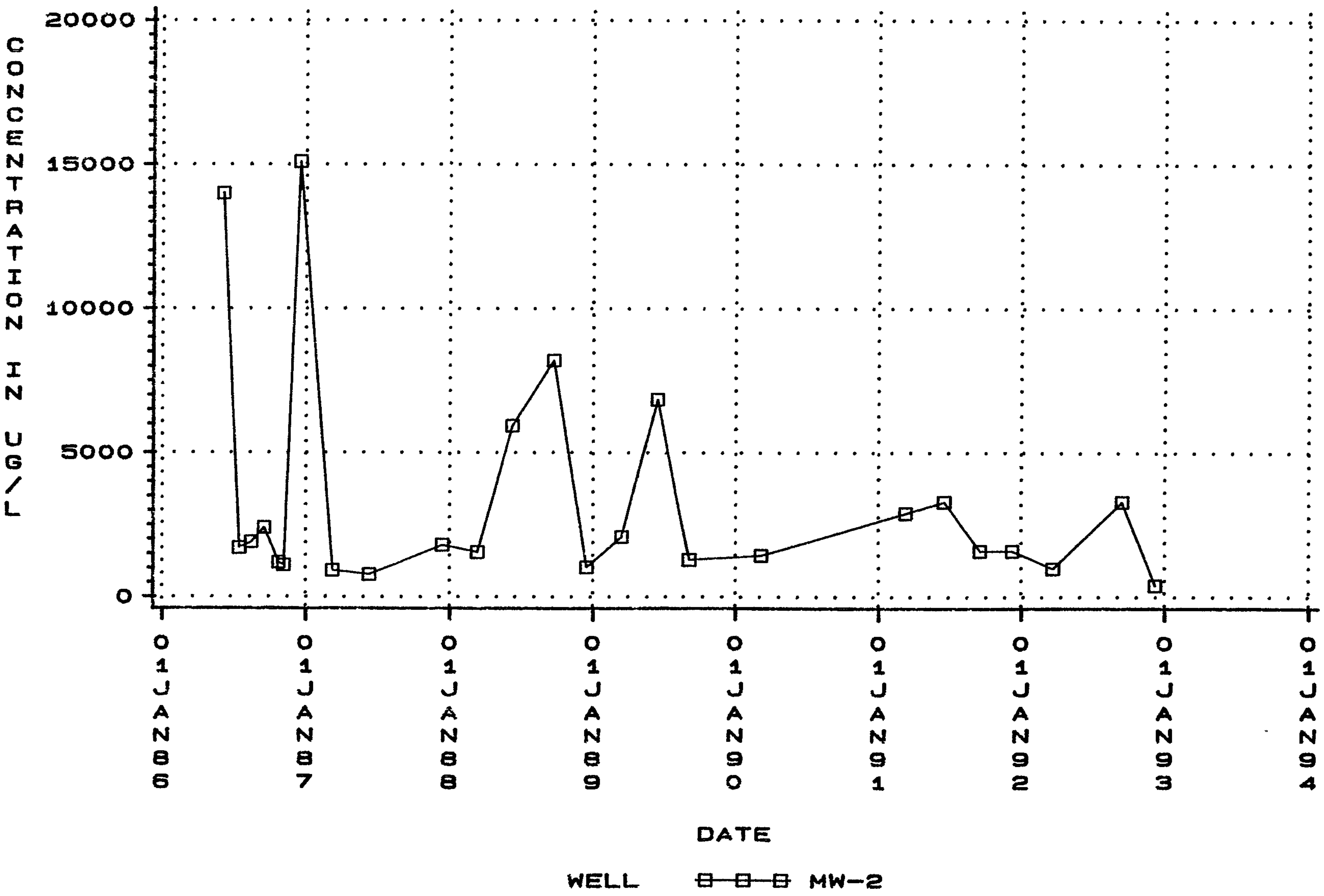
01JAN87
01JAN88
01JAN89
01JAN90
01JAN91
01JAN92
01JAN93
01JAN94
DATE
WELL
MW-2

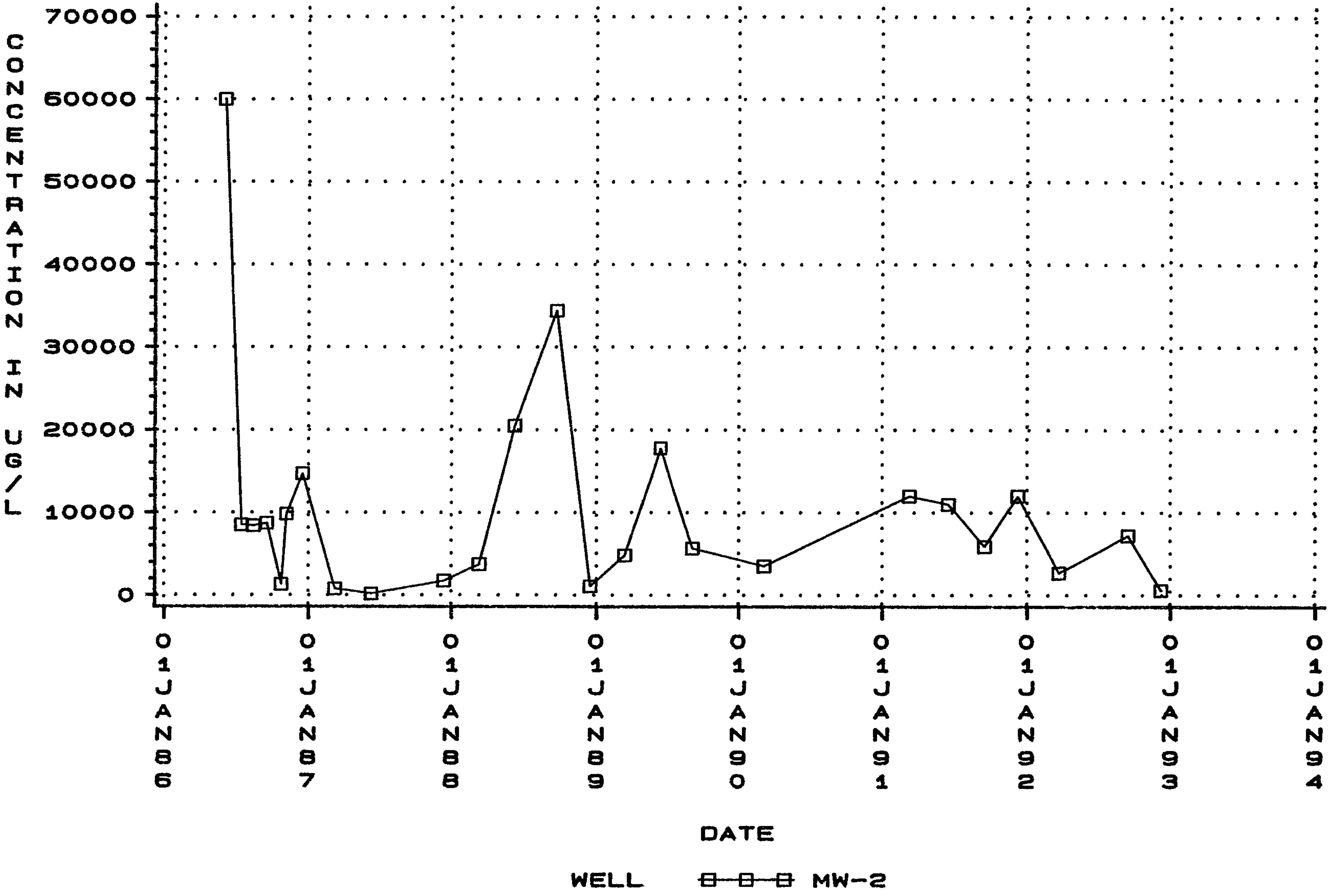
1,1-DICHLOROETHANE
MW-2



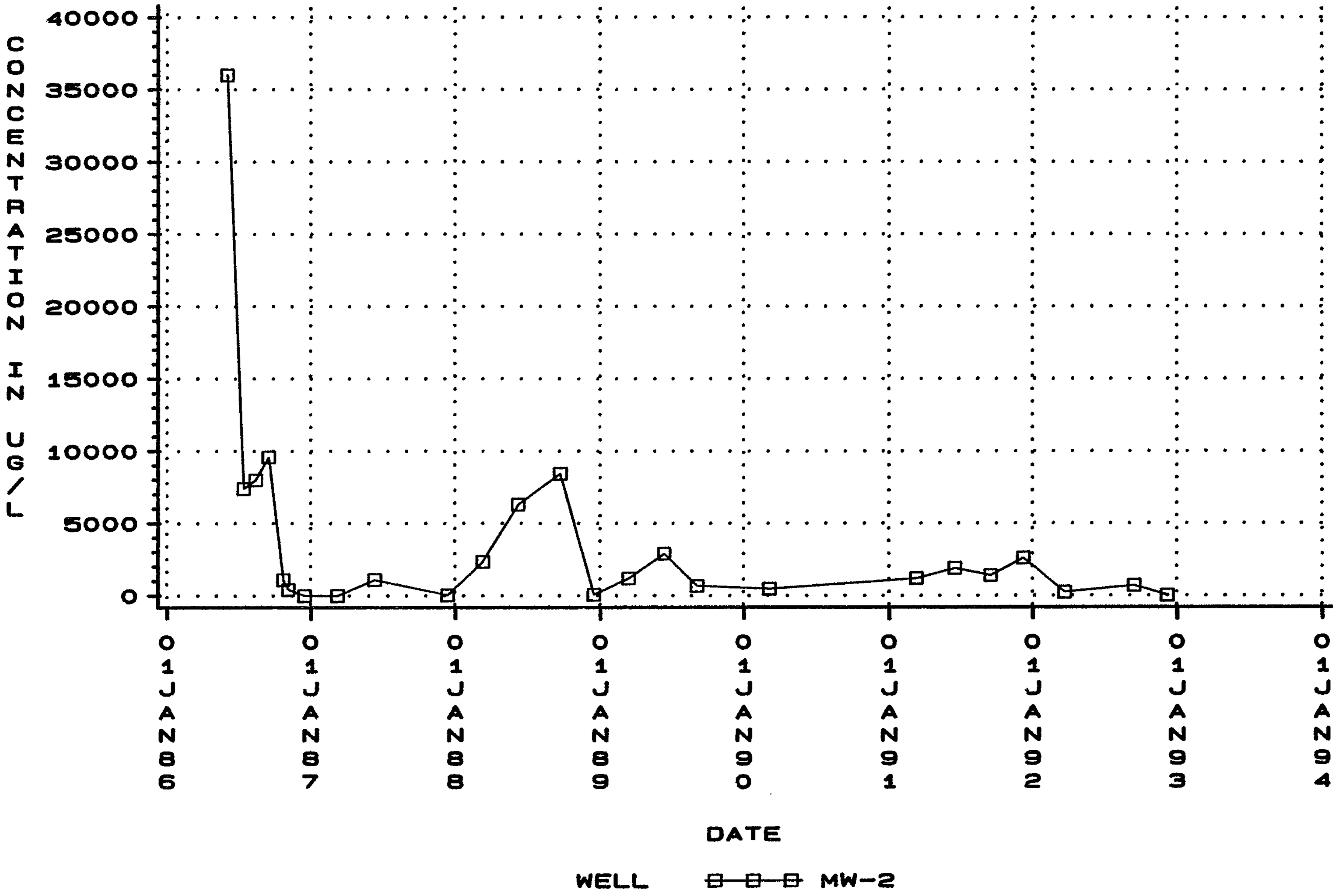
TETRACHLOROETHENE
MW–2



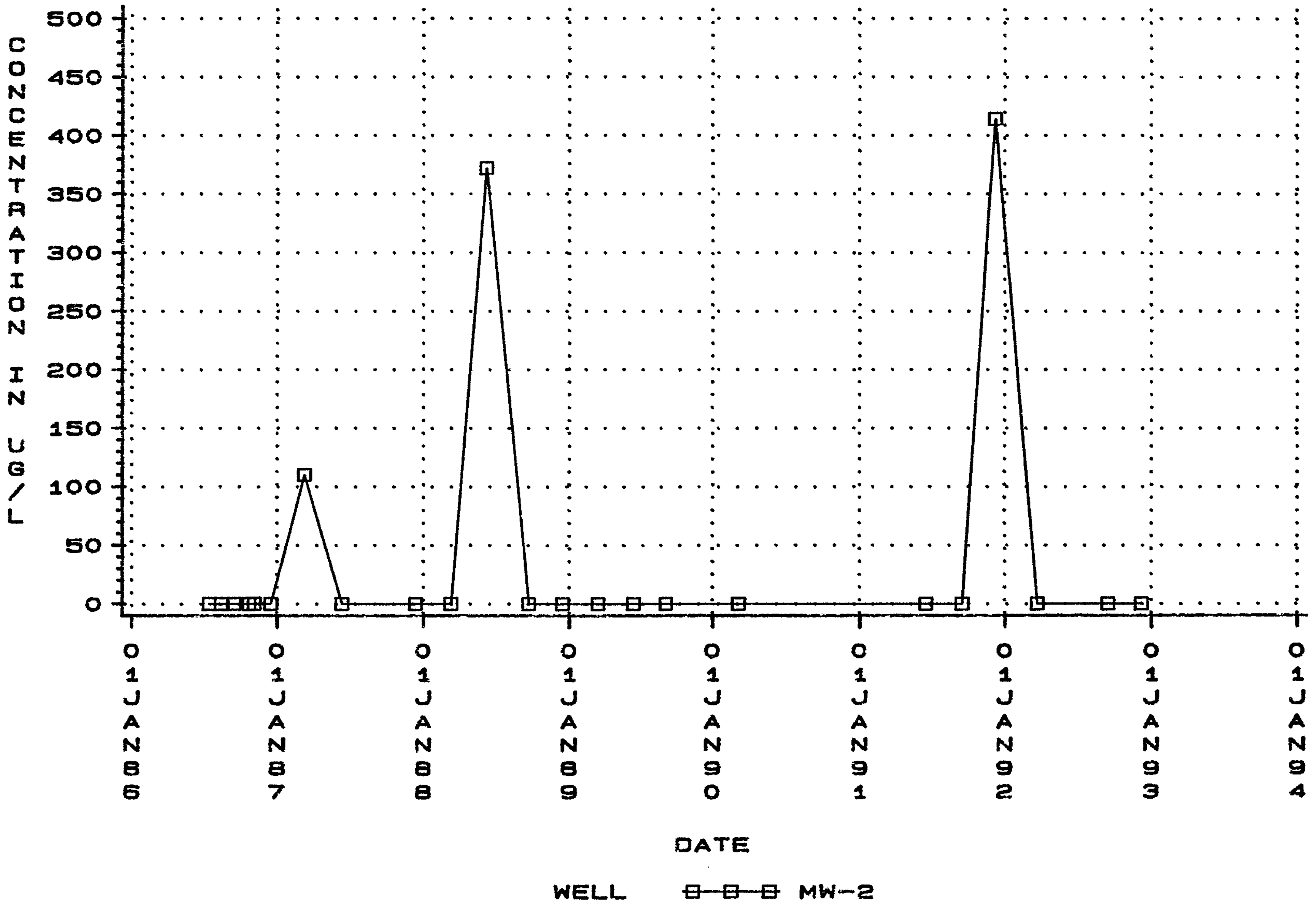
TRICHLOROETHENE
MW—2



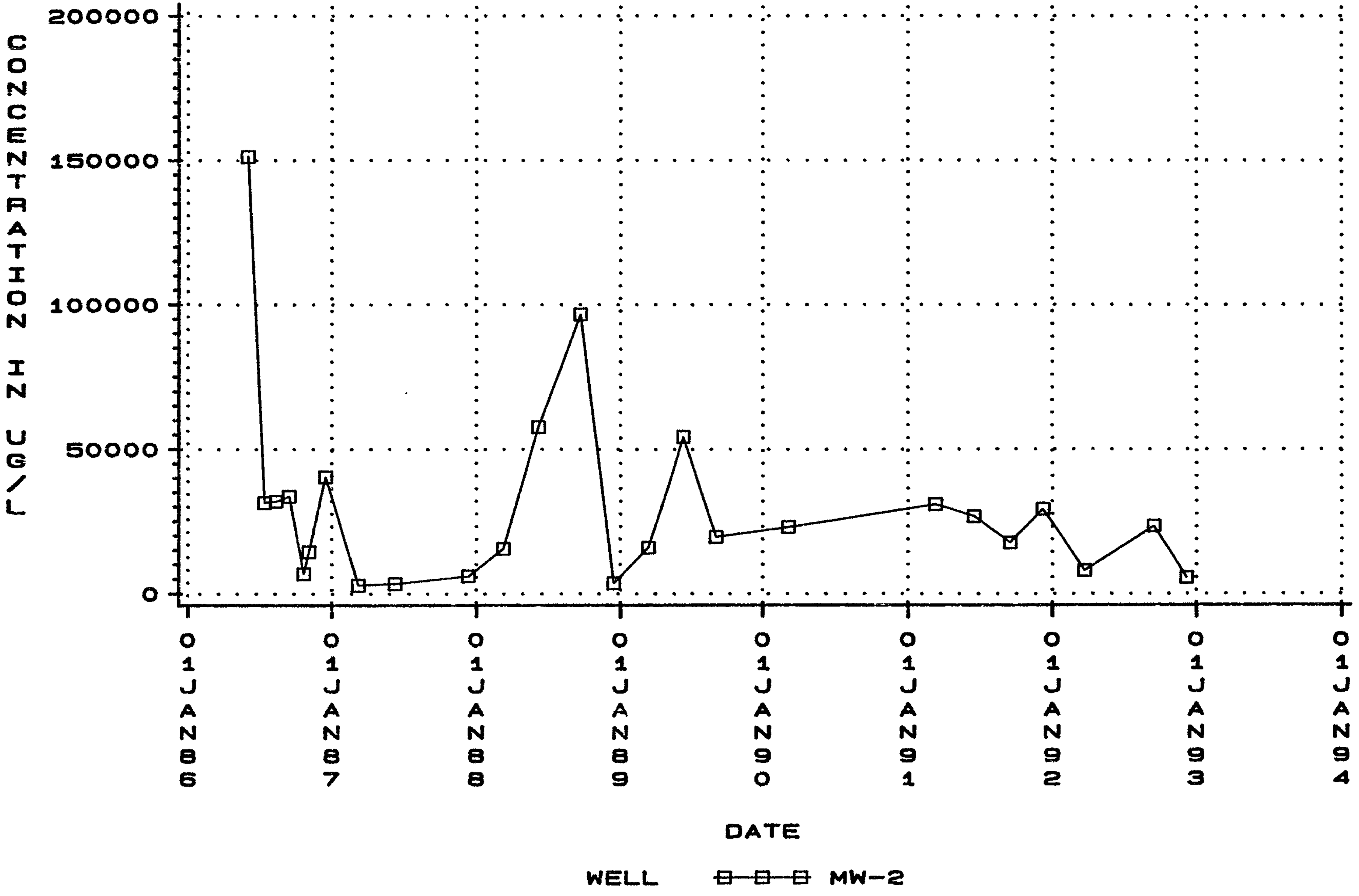
METHYLENE CHLORIDE
MW-2



MINERAL SPIRITS
MW–2



TOTAL VOLATILES + MINERAL SPIRITS
MW–2



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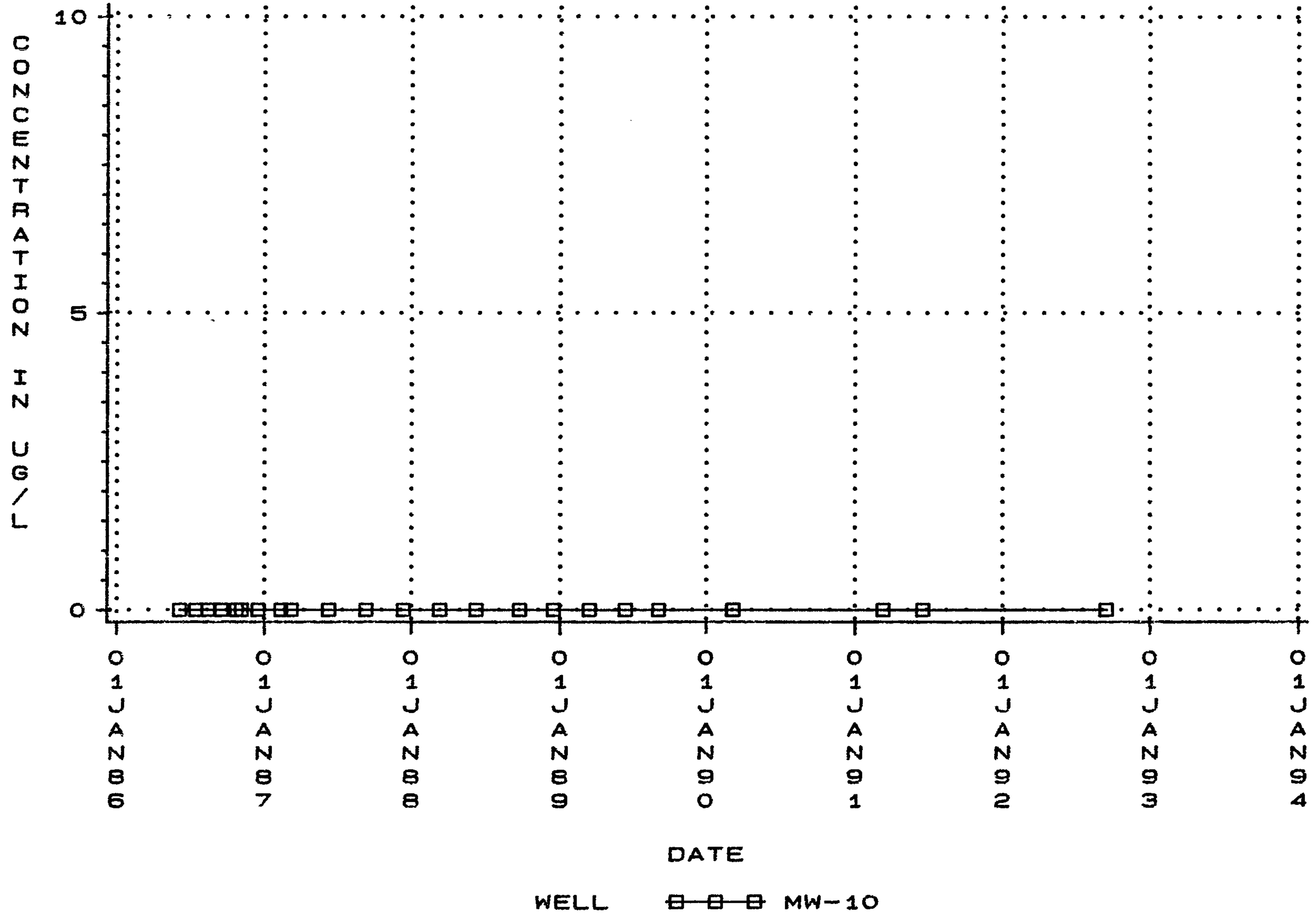
MW–10



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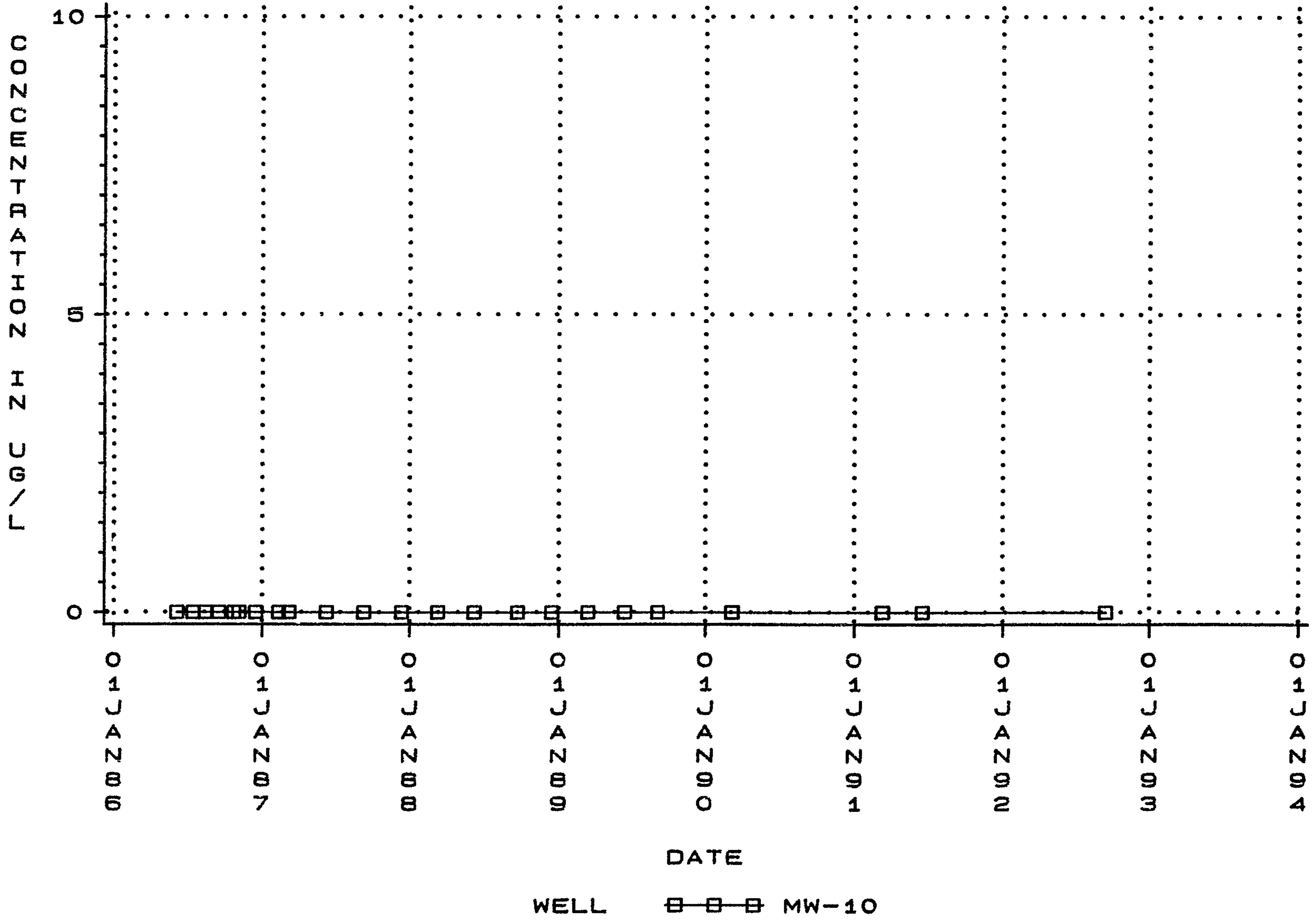
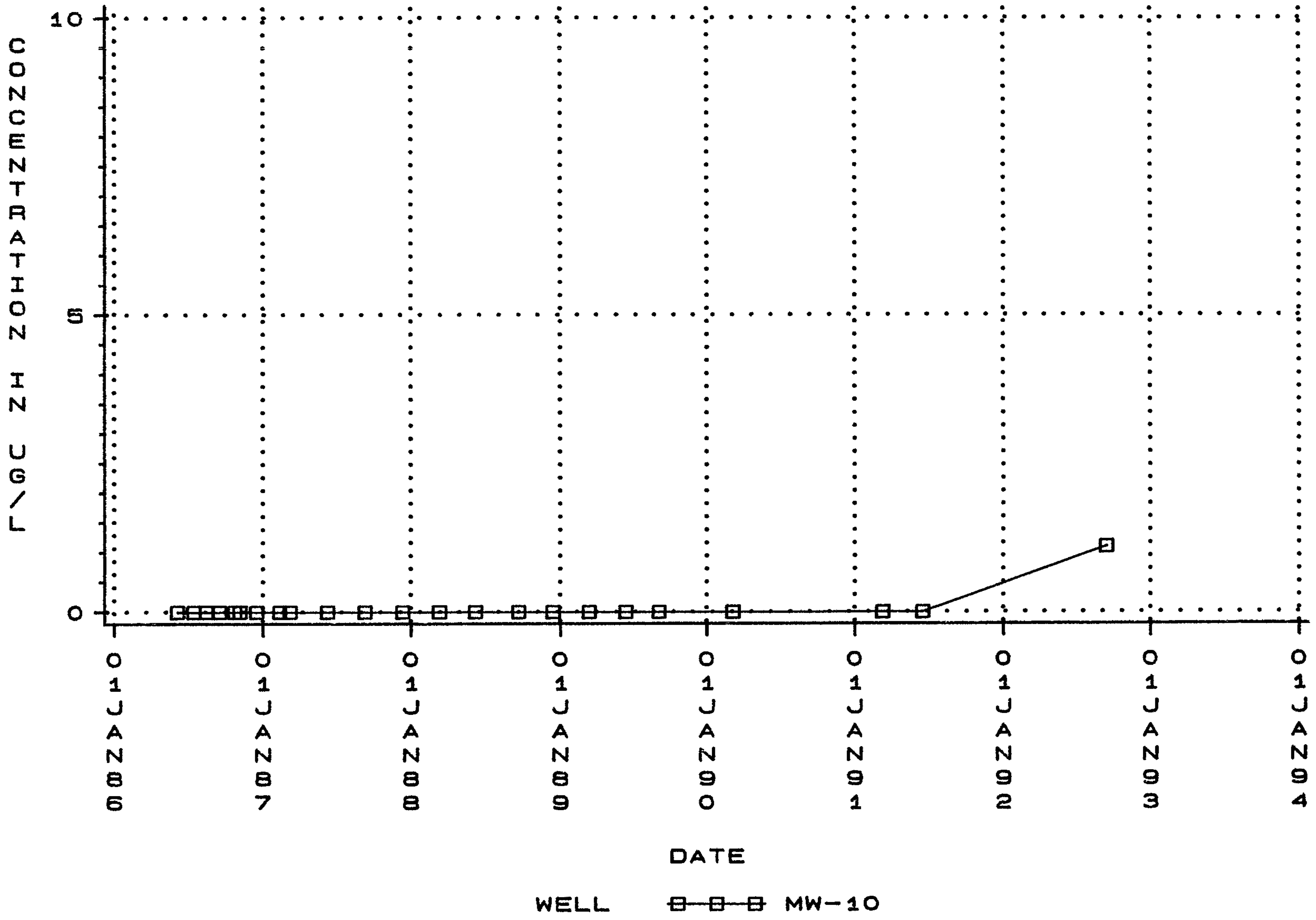
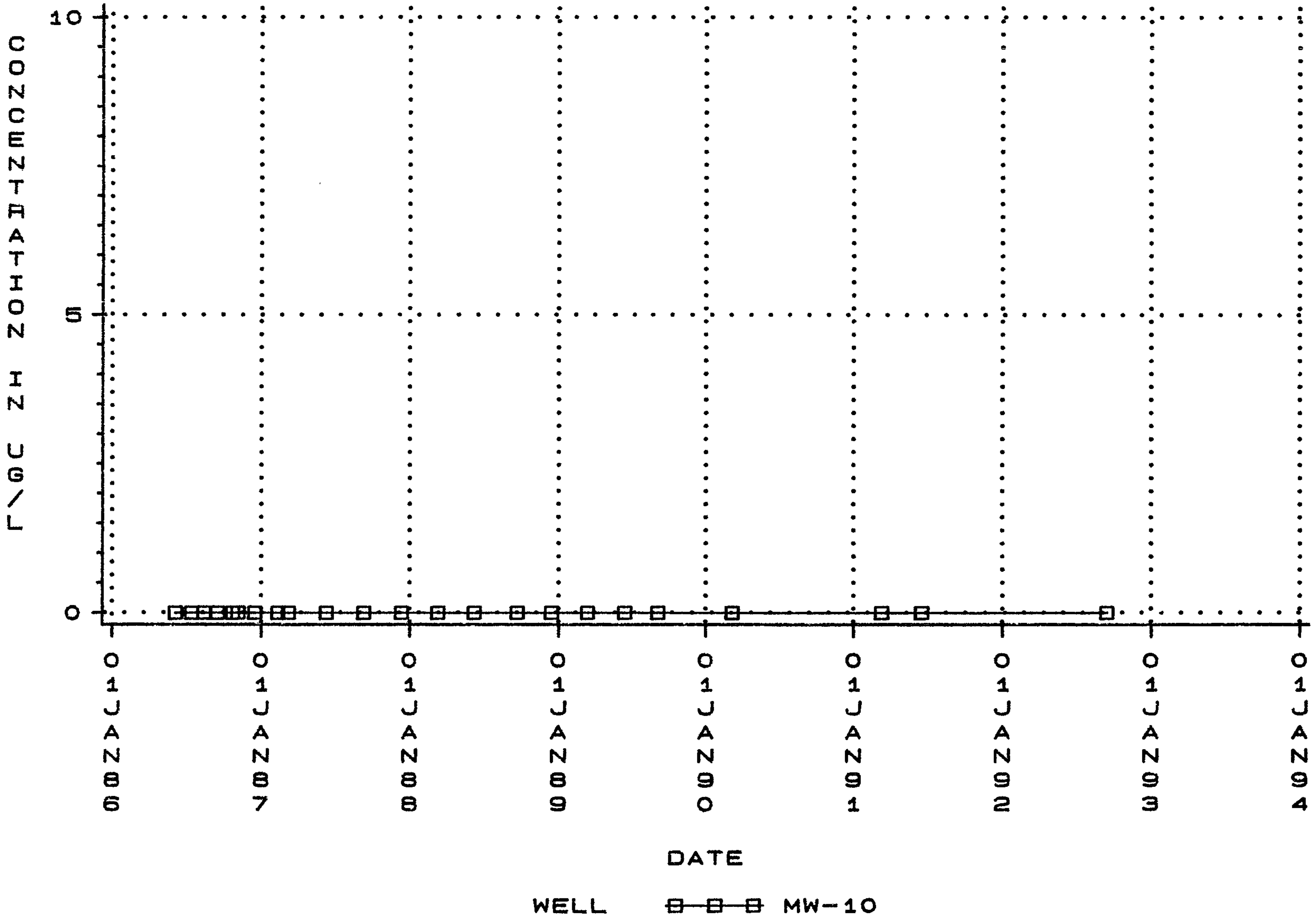
MW–10



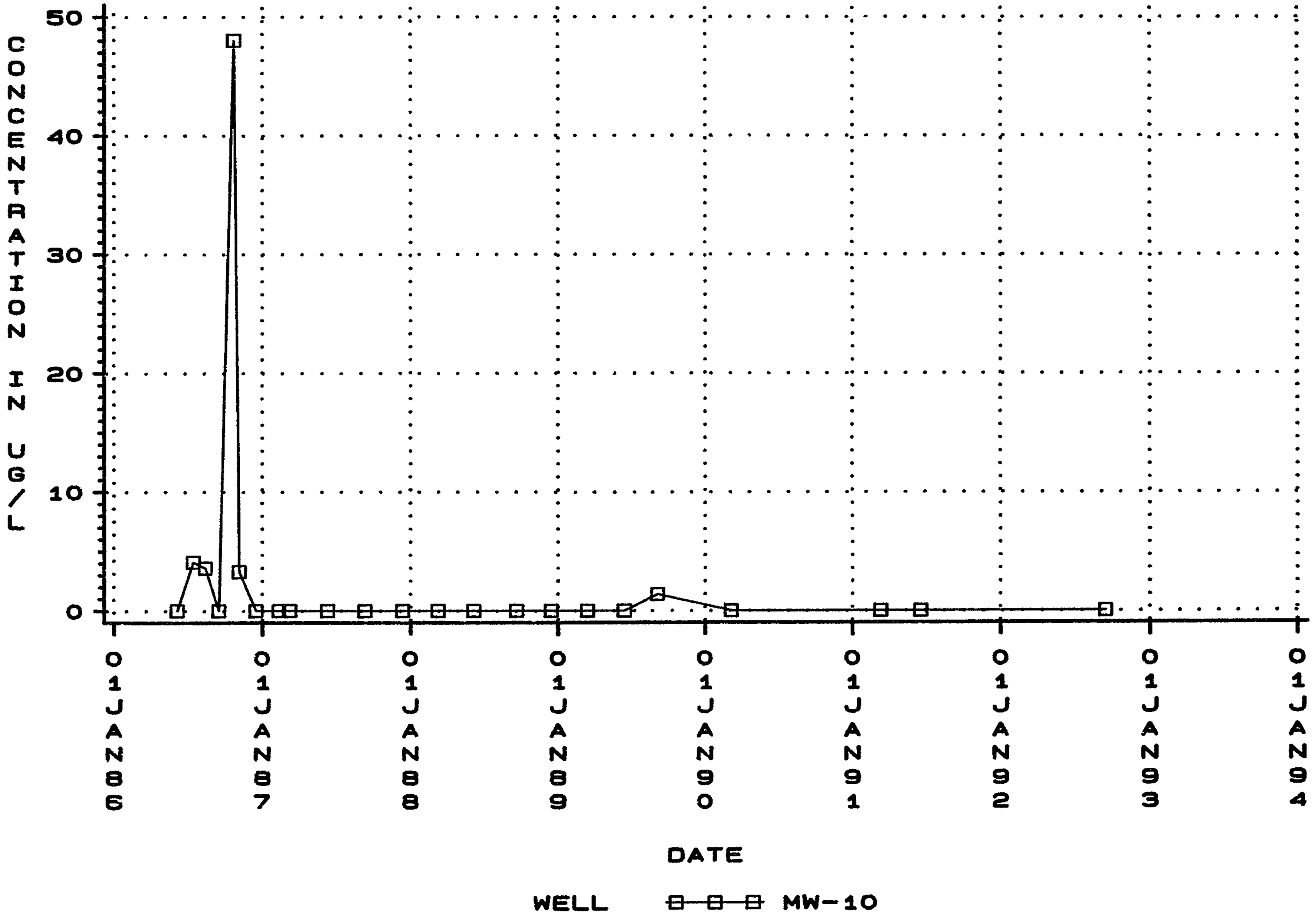
TETRACHLOROETHENE
MW—10



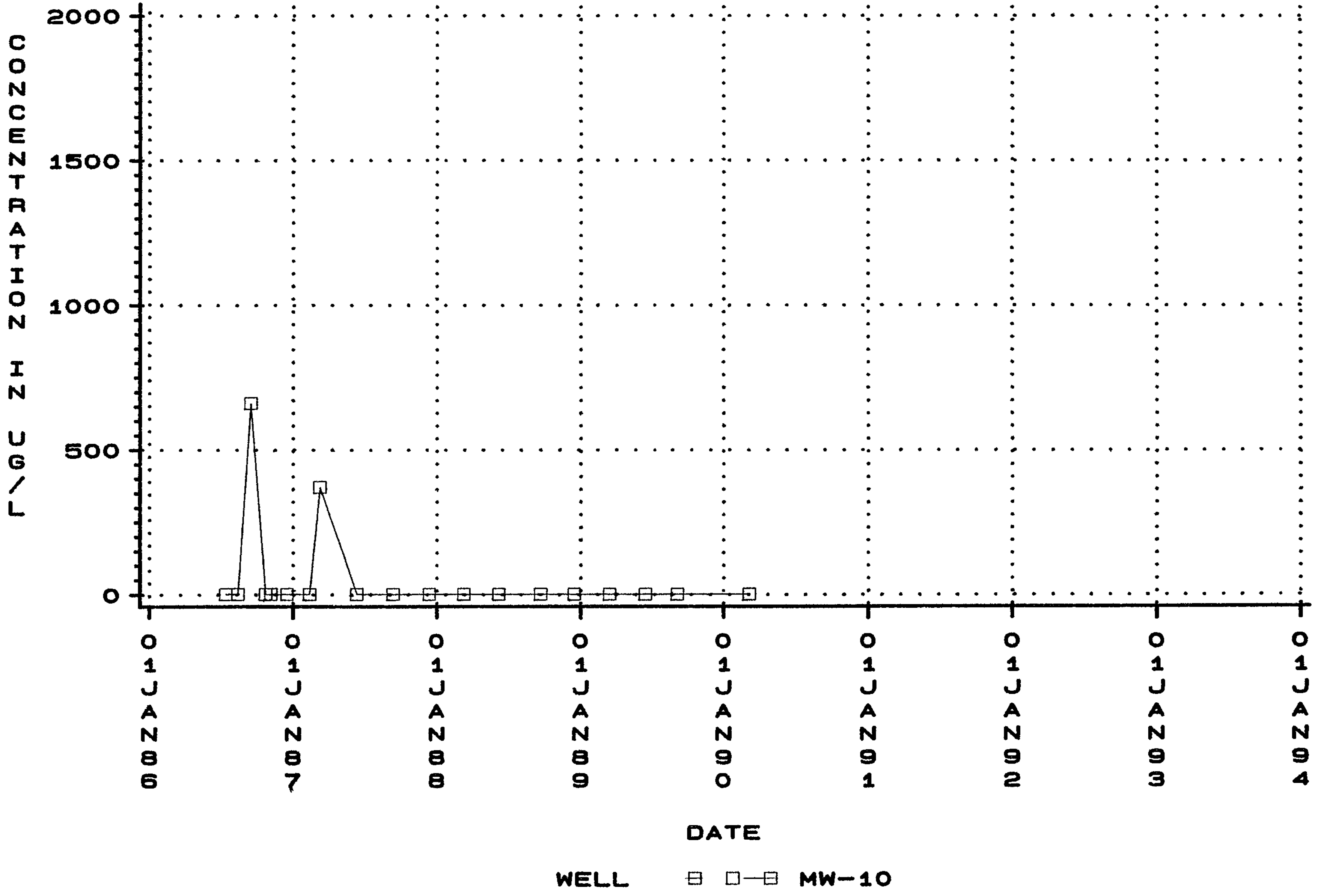
TRICHLOROETHENE
MW-10



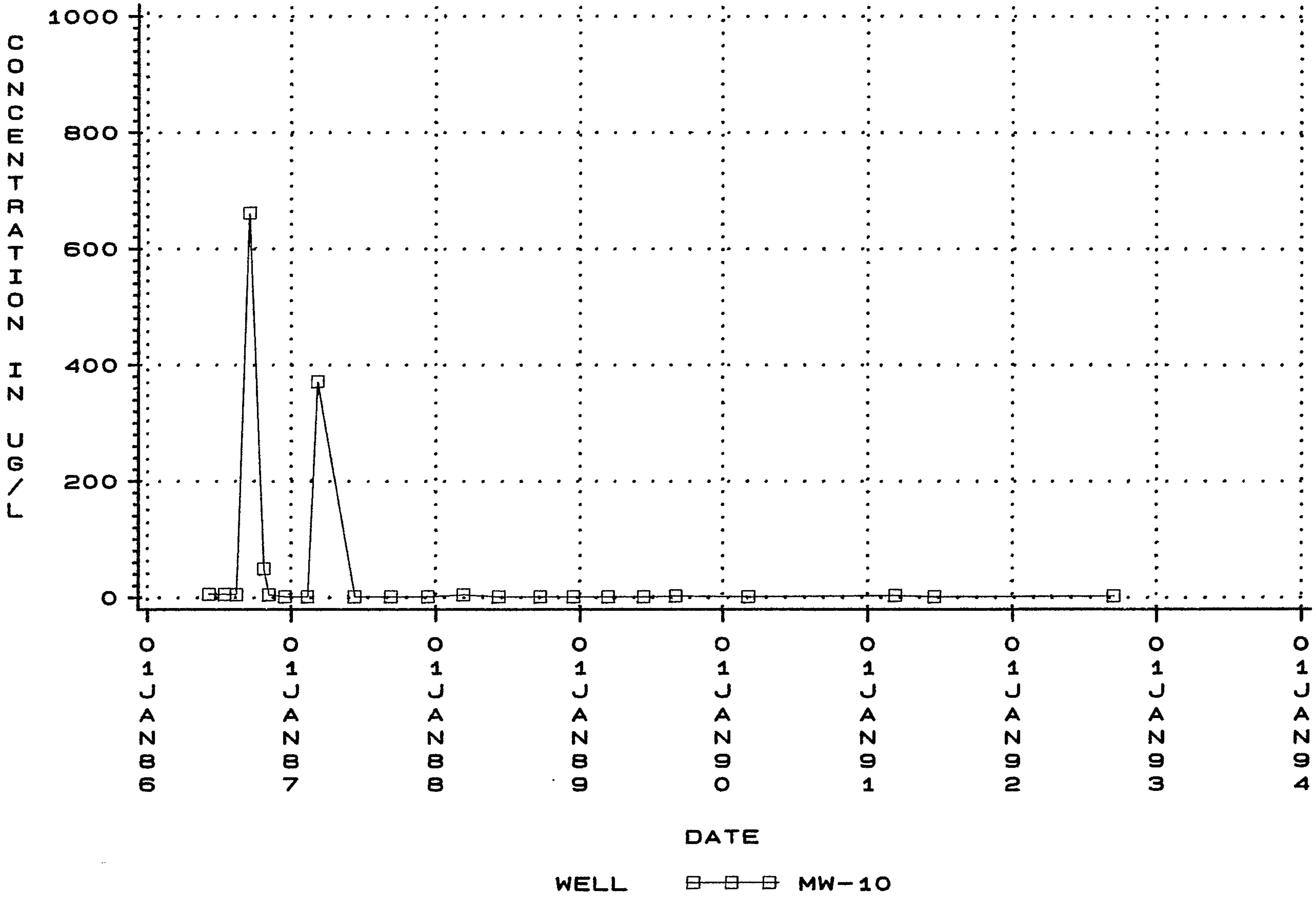
METHYLENE CHLORIDE
MW-10



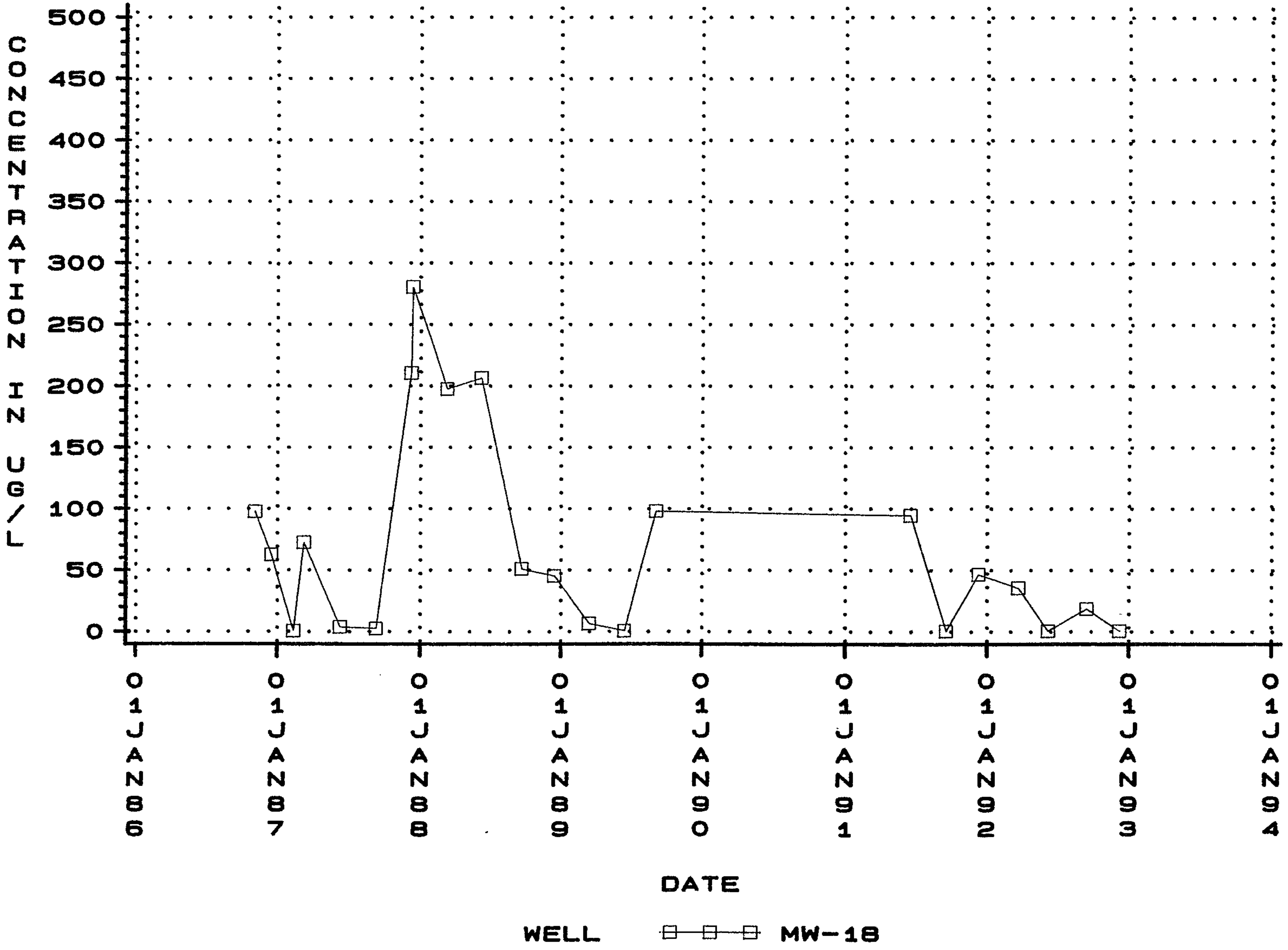
MINERAL SPIRITS
MW—10



TOTAL VOLATILES + MINERAL SPIRITS
MW—10



1,1,1—TCA
MW—18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400
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300
250
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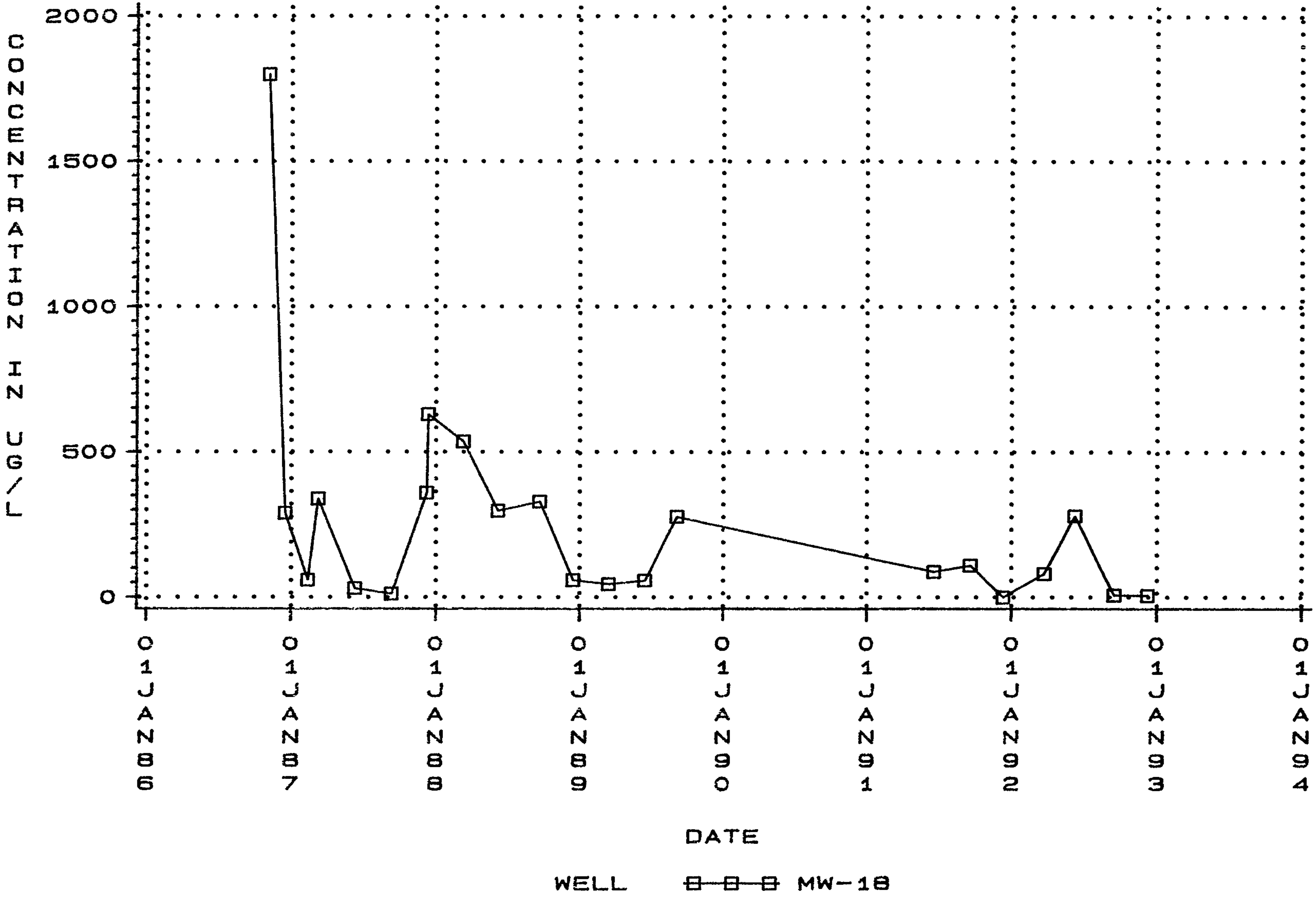
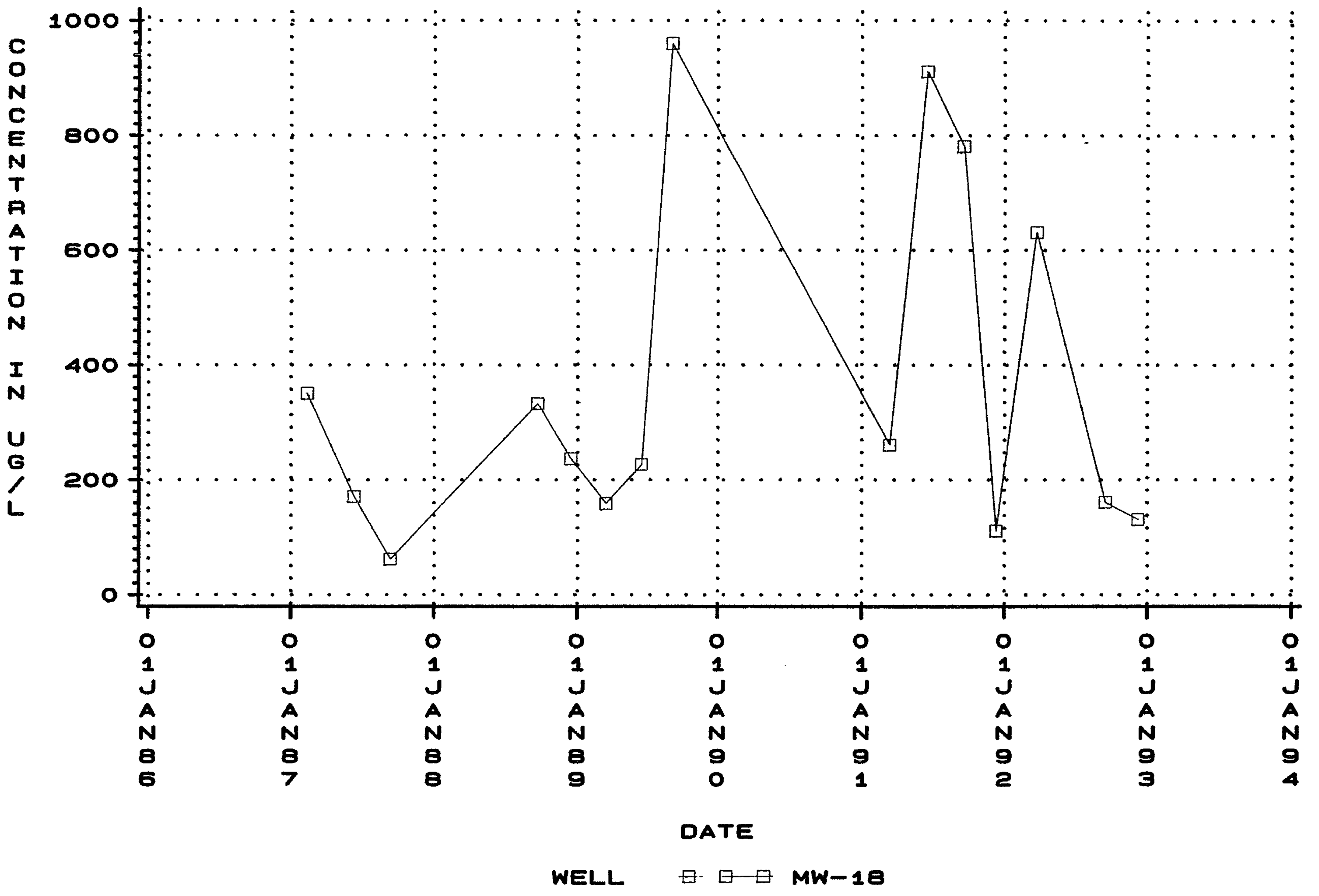
150
100
50
0
01JAN86
01JAN87
01JAN88
01JAN89
01JAN90
01JAN91
01JAN92
01JAN93
01JAN94
DATE
WELL
MW—18

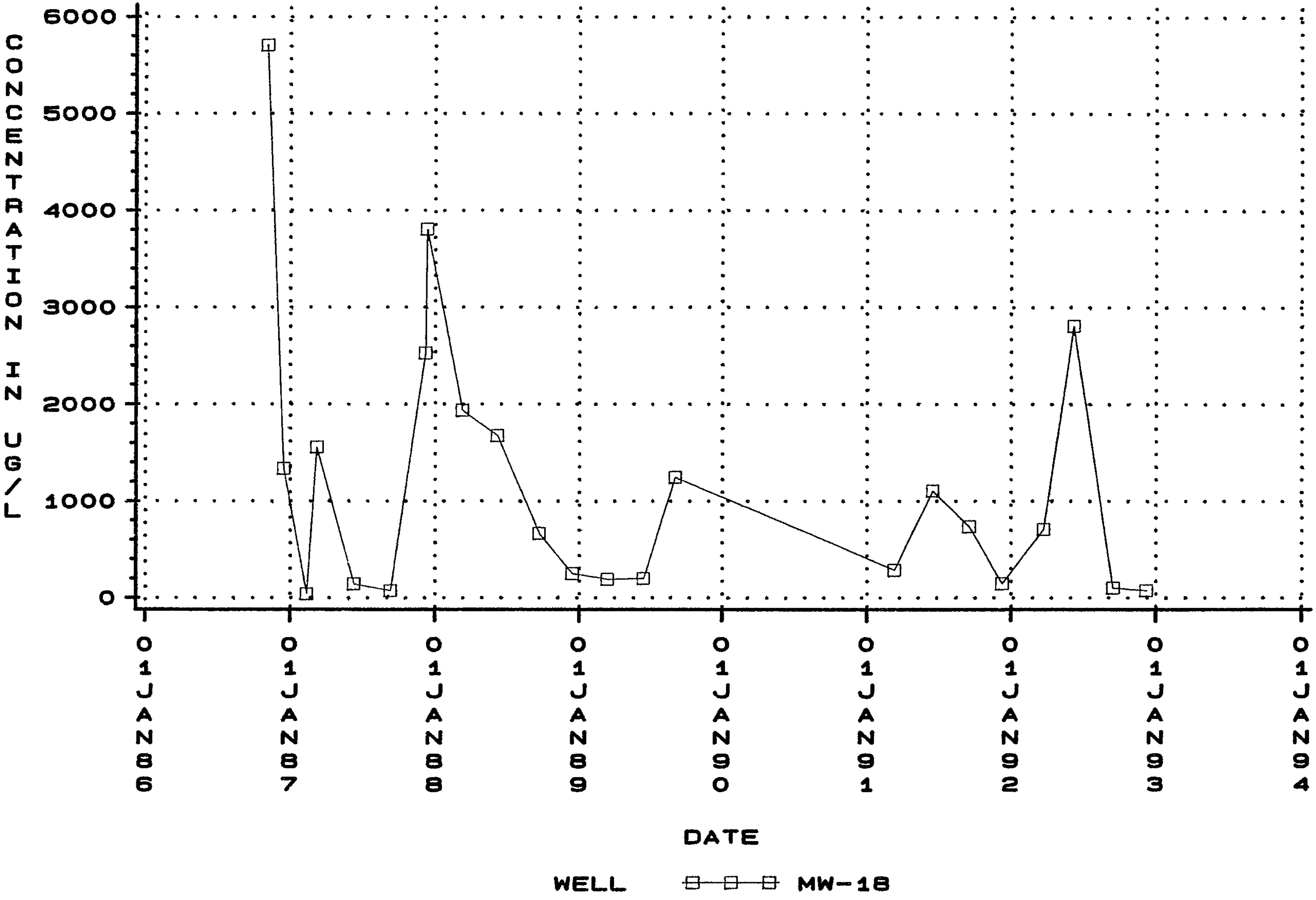
1,1—DICHLOROETHANE
MW—18



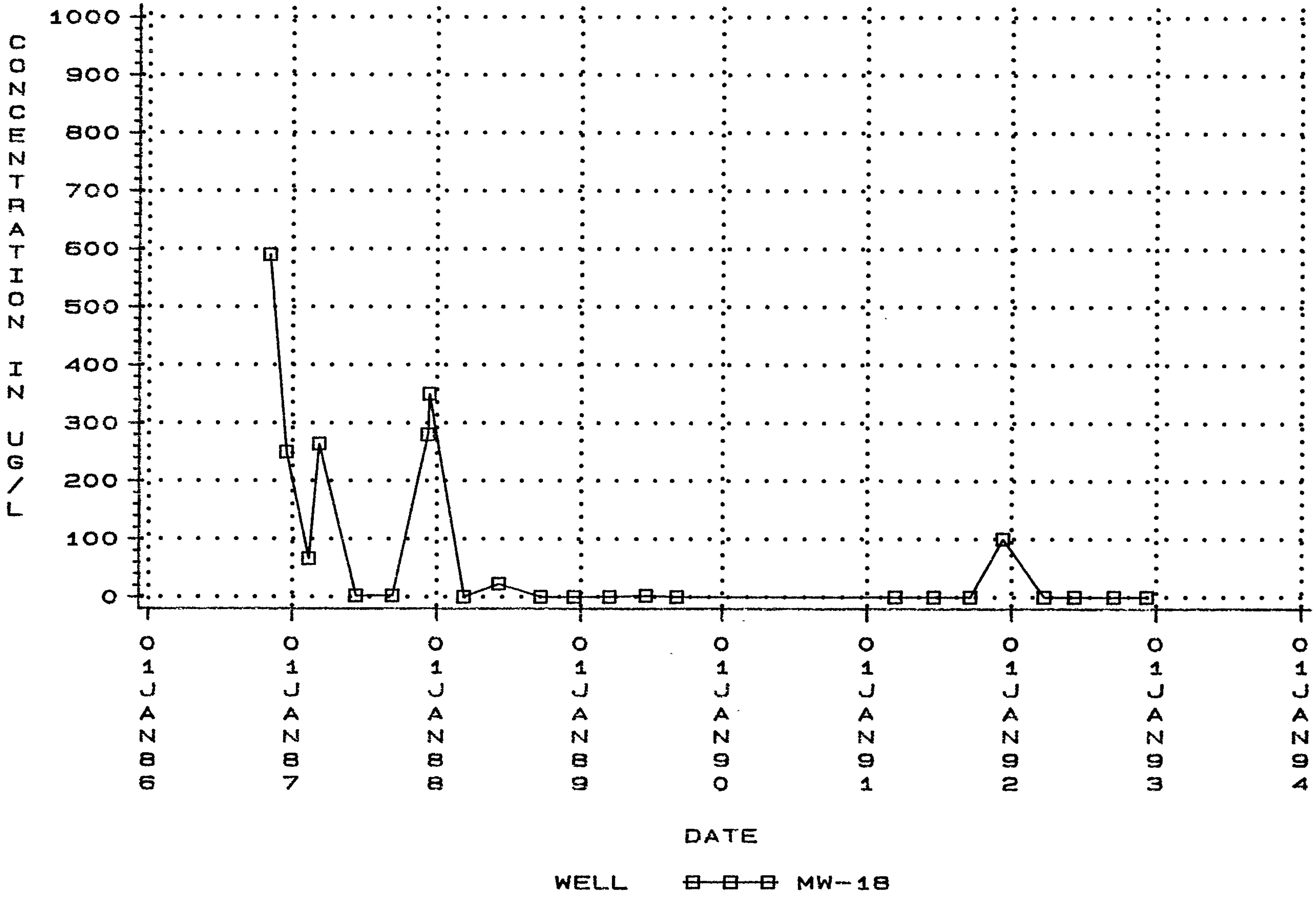
TETRACHLOROETHENE
MW—18



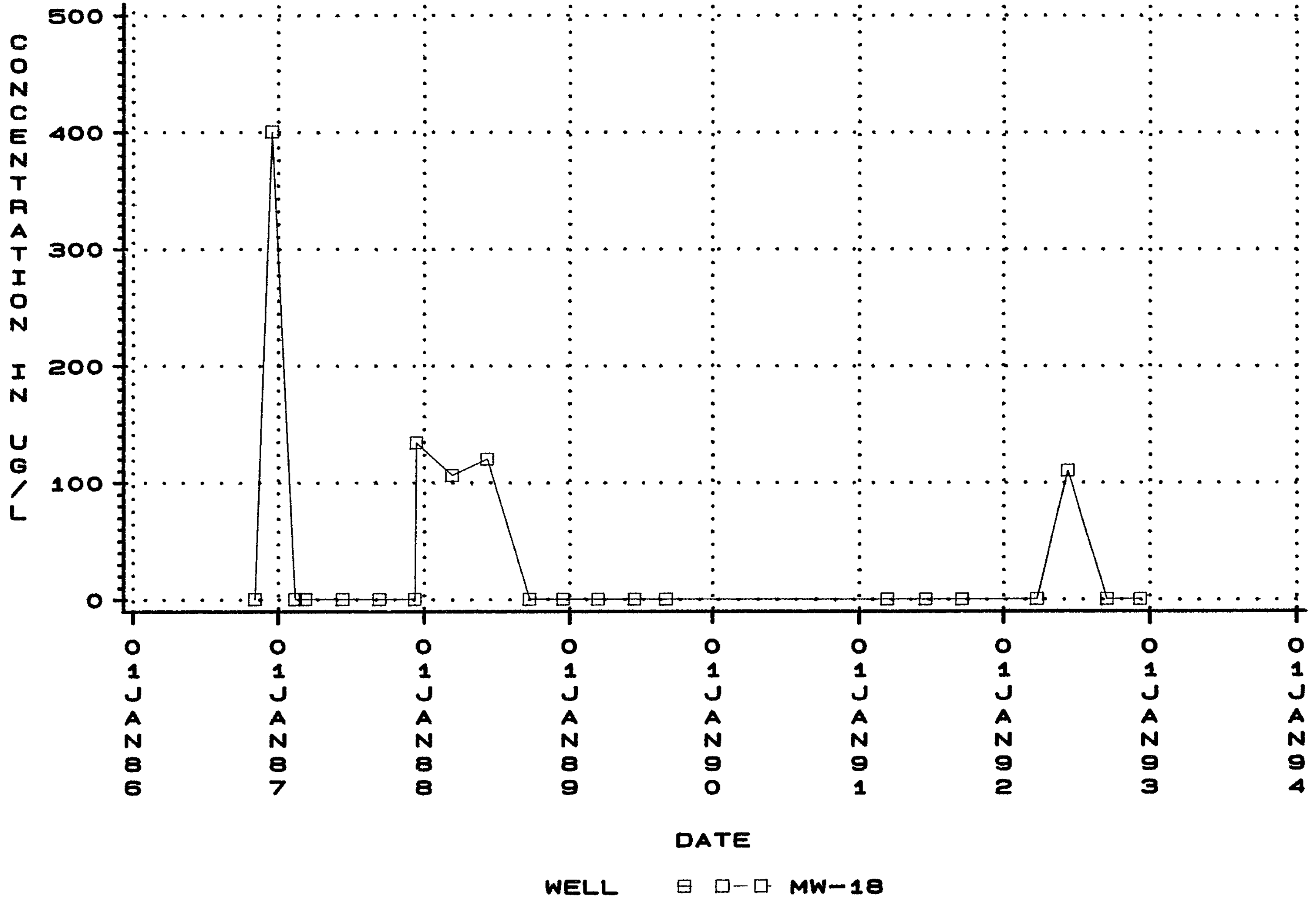
TRICHLOROETHENE
MW—18



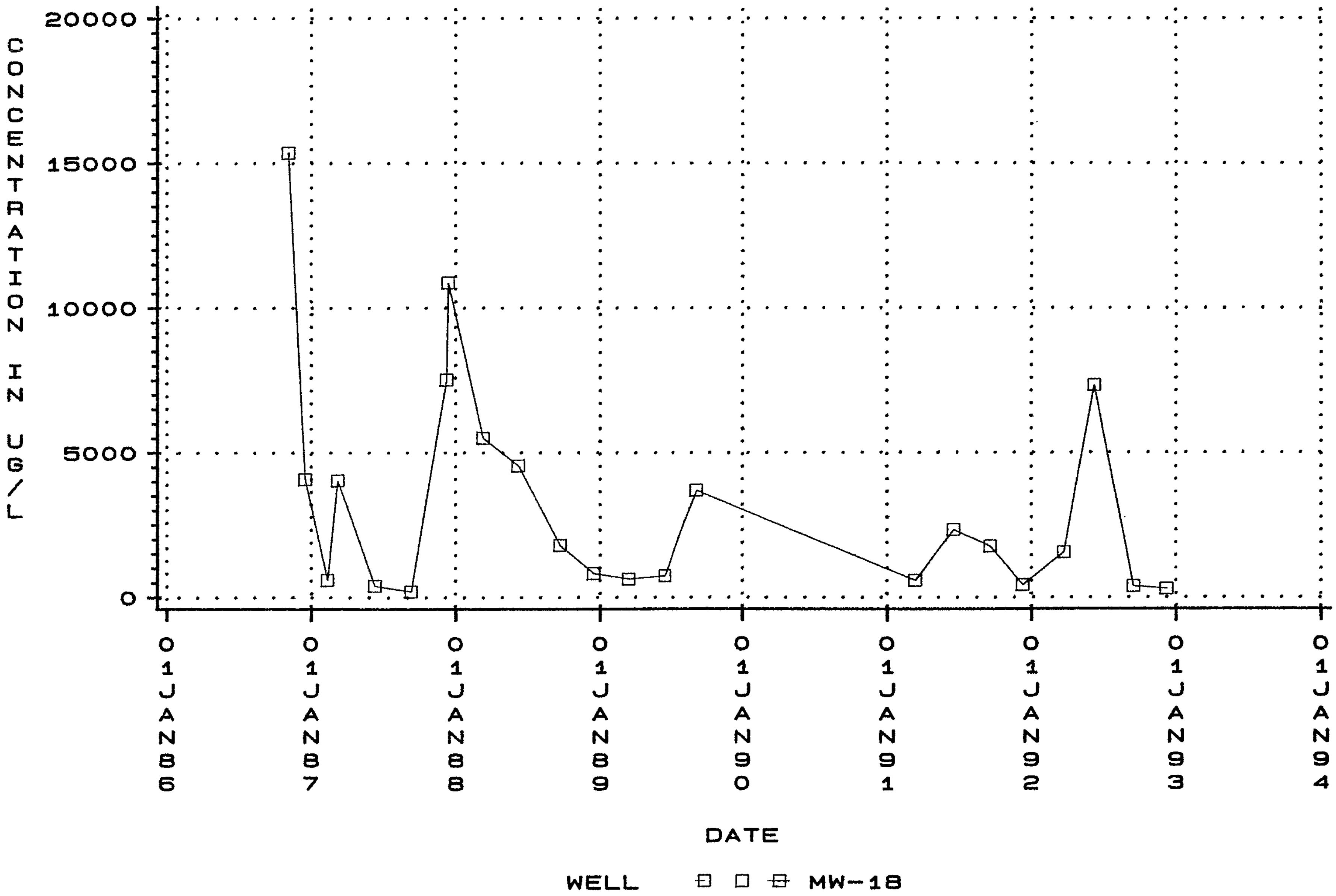
METHYLENE CHLORIDE
MW—18



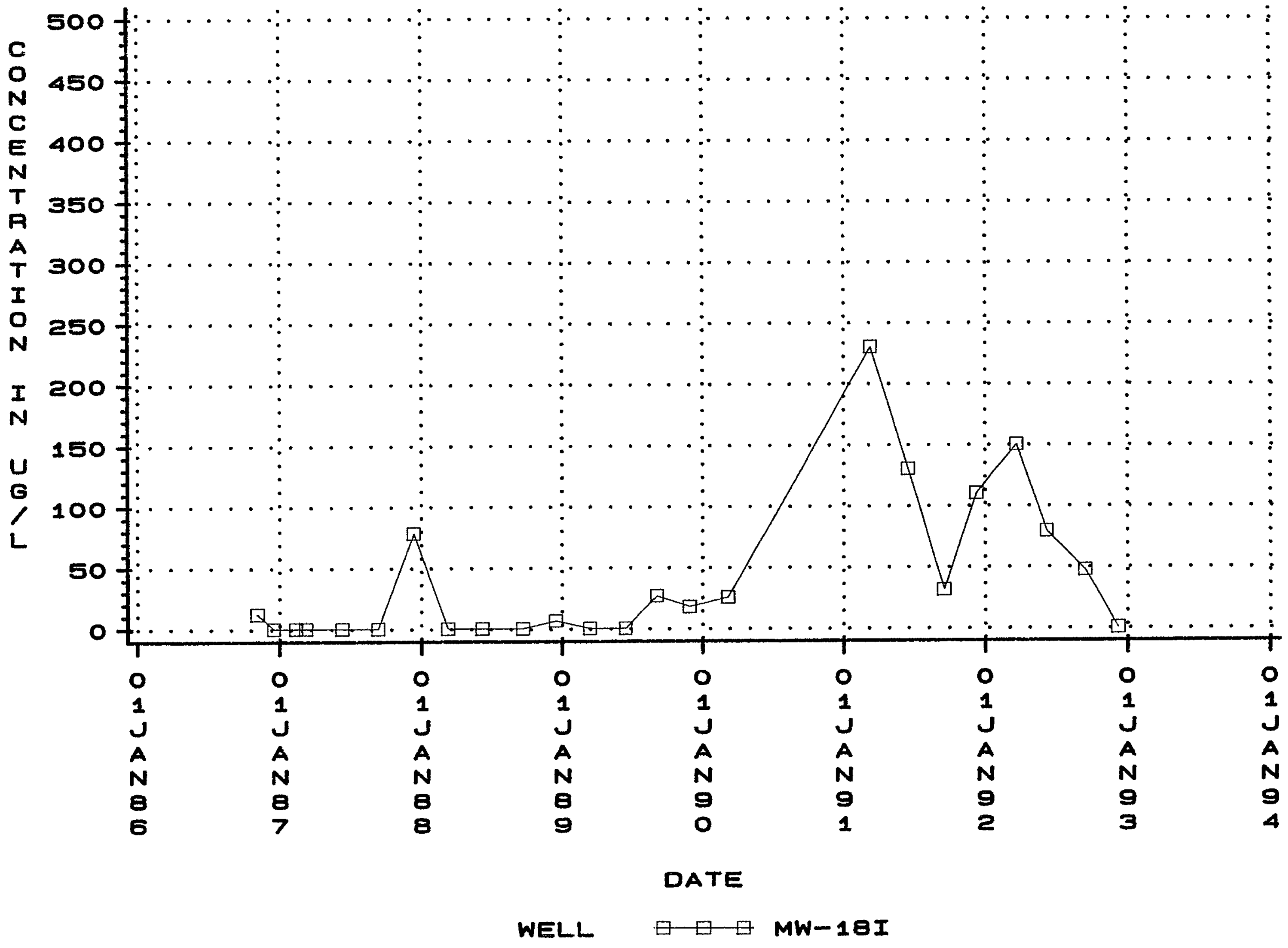
MINERAL SPIRITS
MW—18



TOTAL VOLATILES + MINERAL SPIRITS
MW–18



1,1,1–TCA
MW–18I



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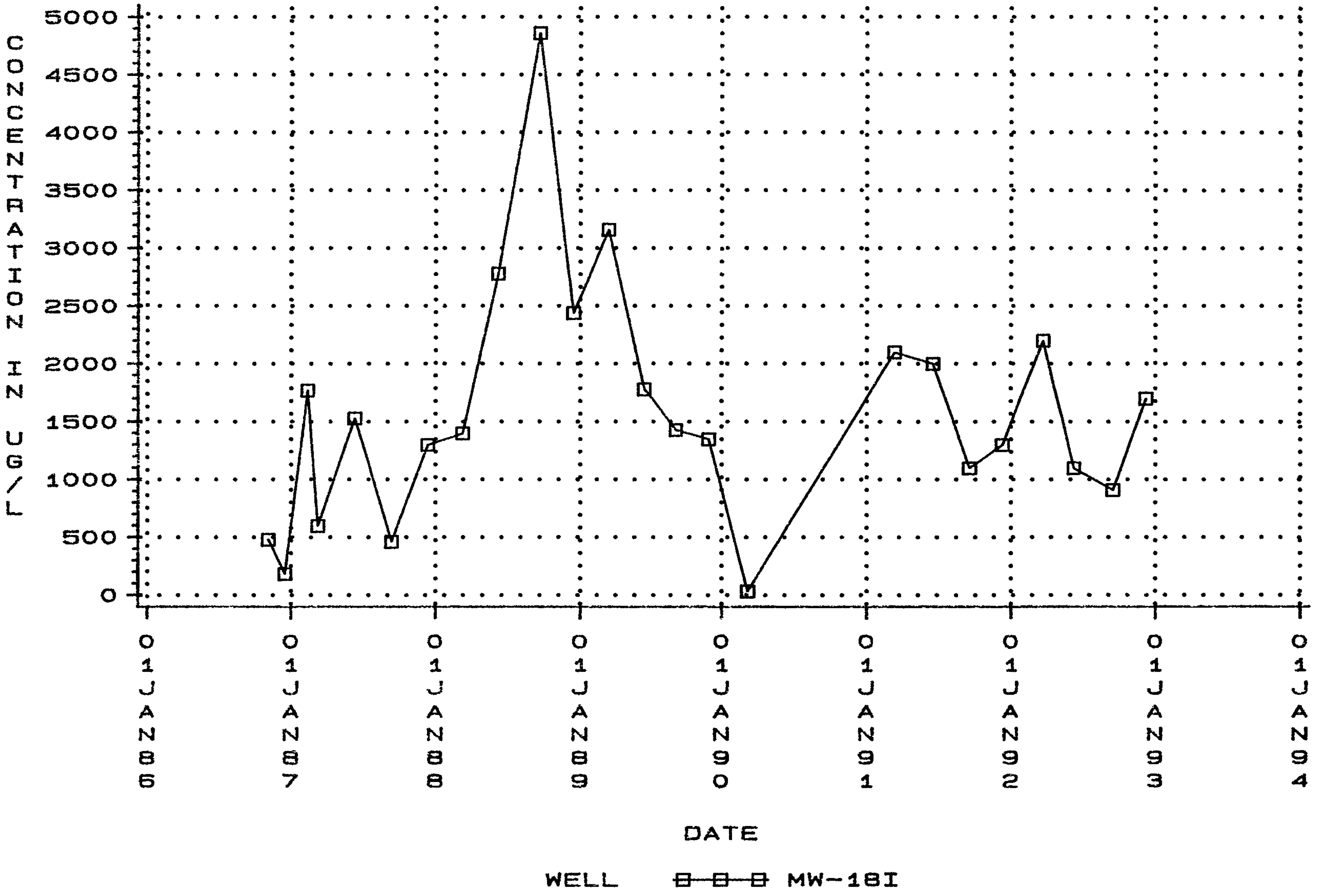
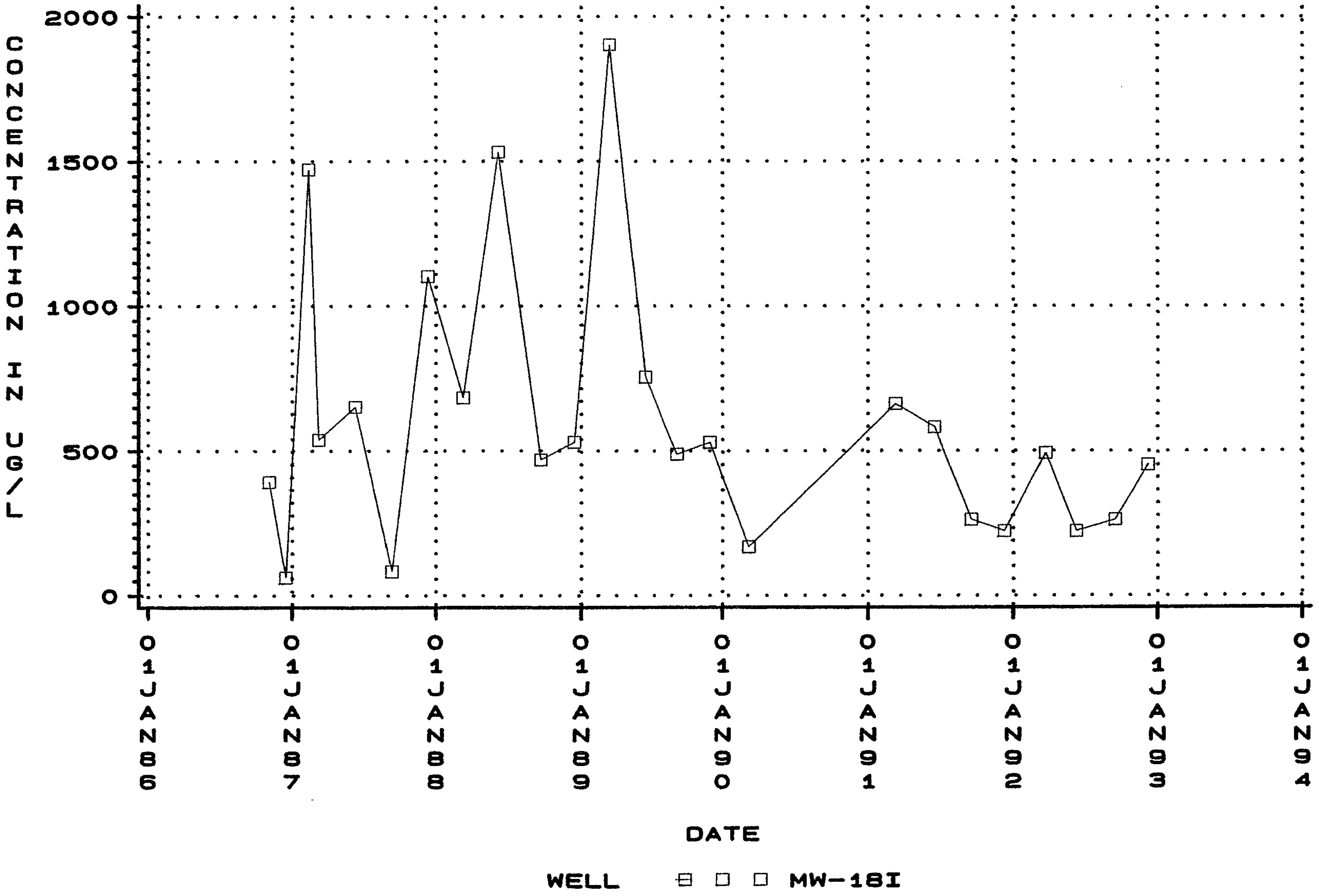
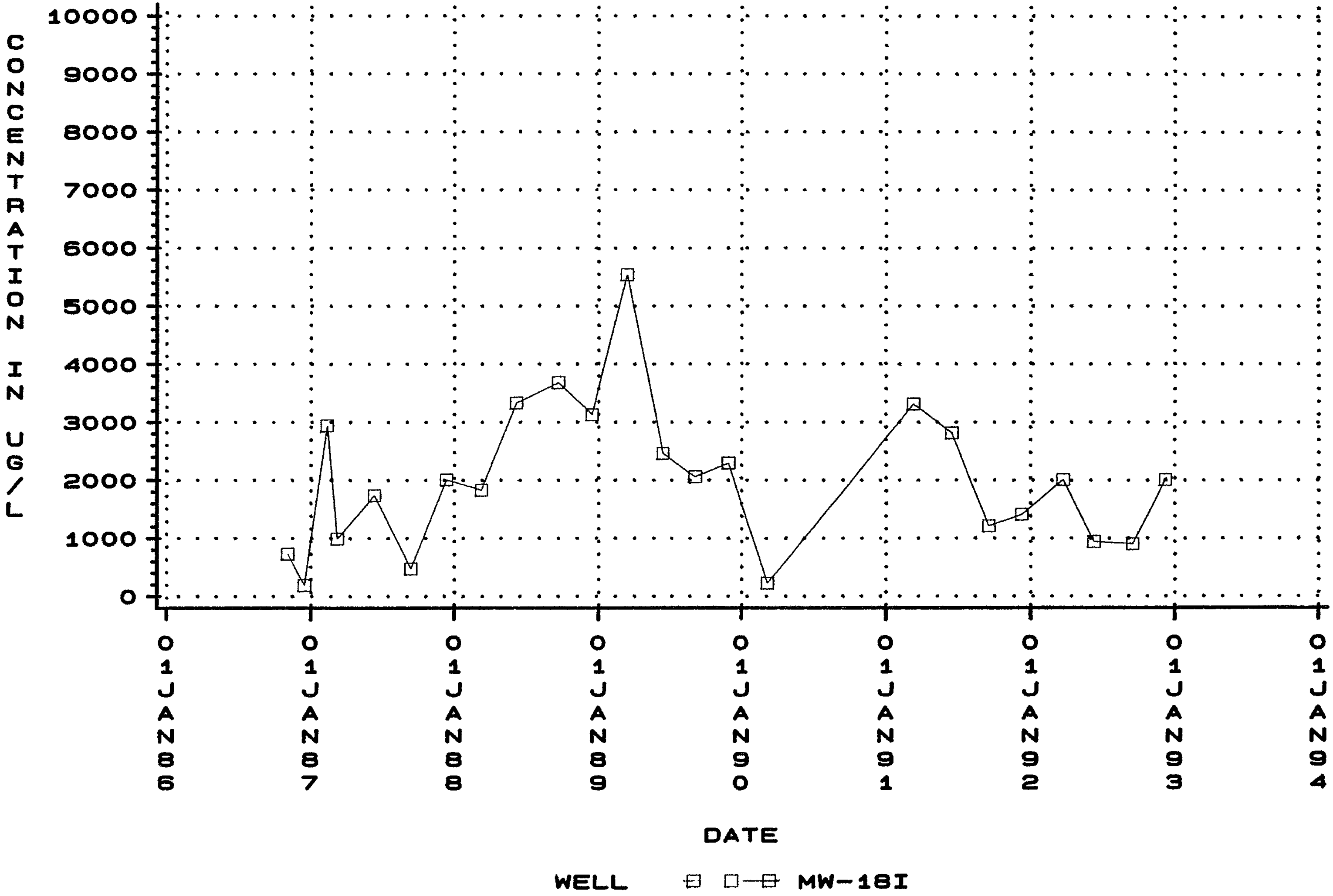
MW—18I



TETRACHLOROETHENE
MW-18I



TRICHLOROETHENE
MW-18I



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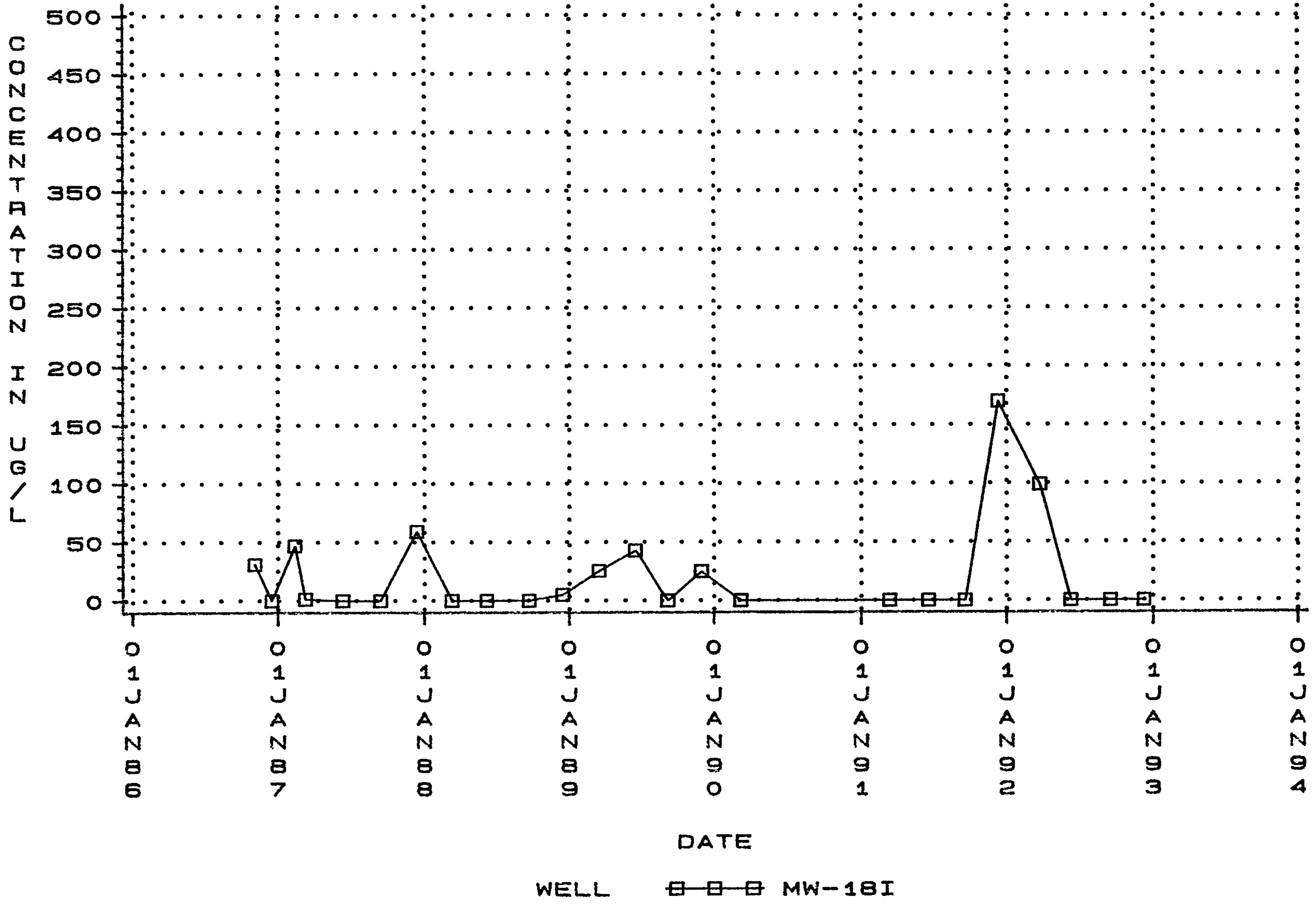
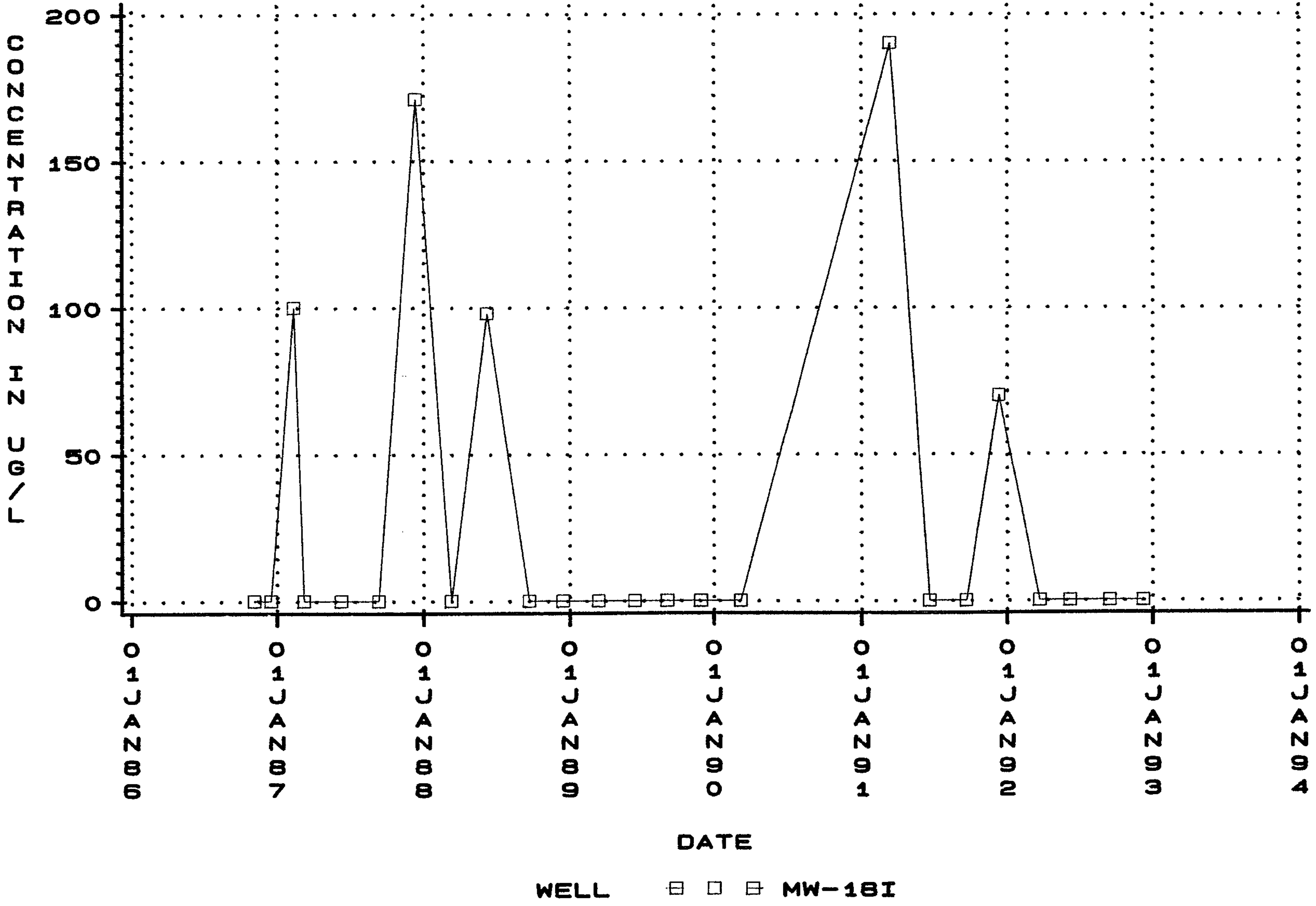
MW—18I

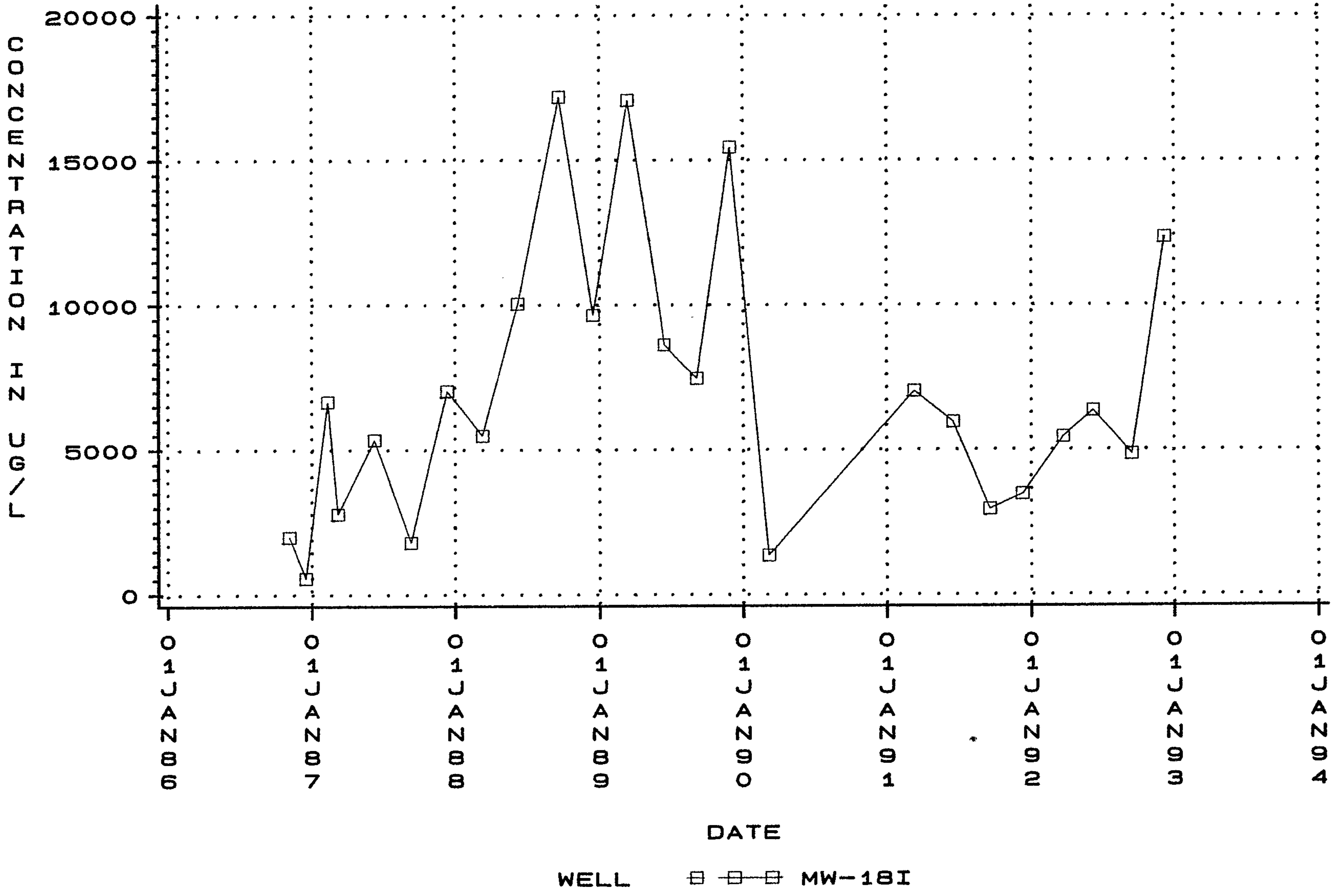


MINERAL SPIRITS
MW—18I



TOTAL VOLATILES + MINERAL SPIRITS

MW—18I



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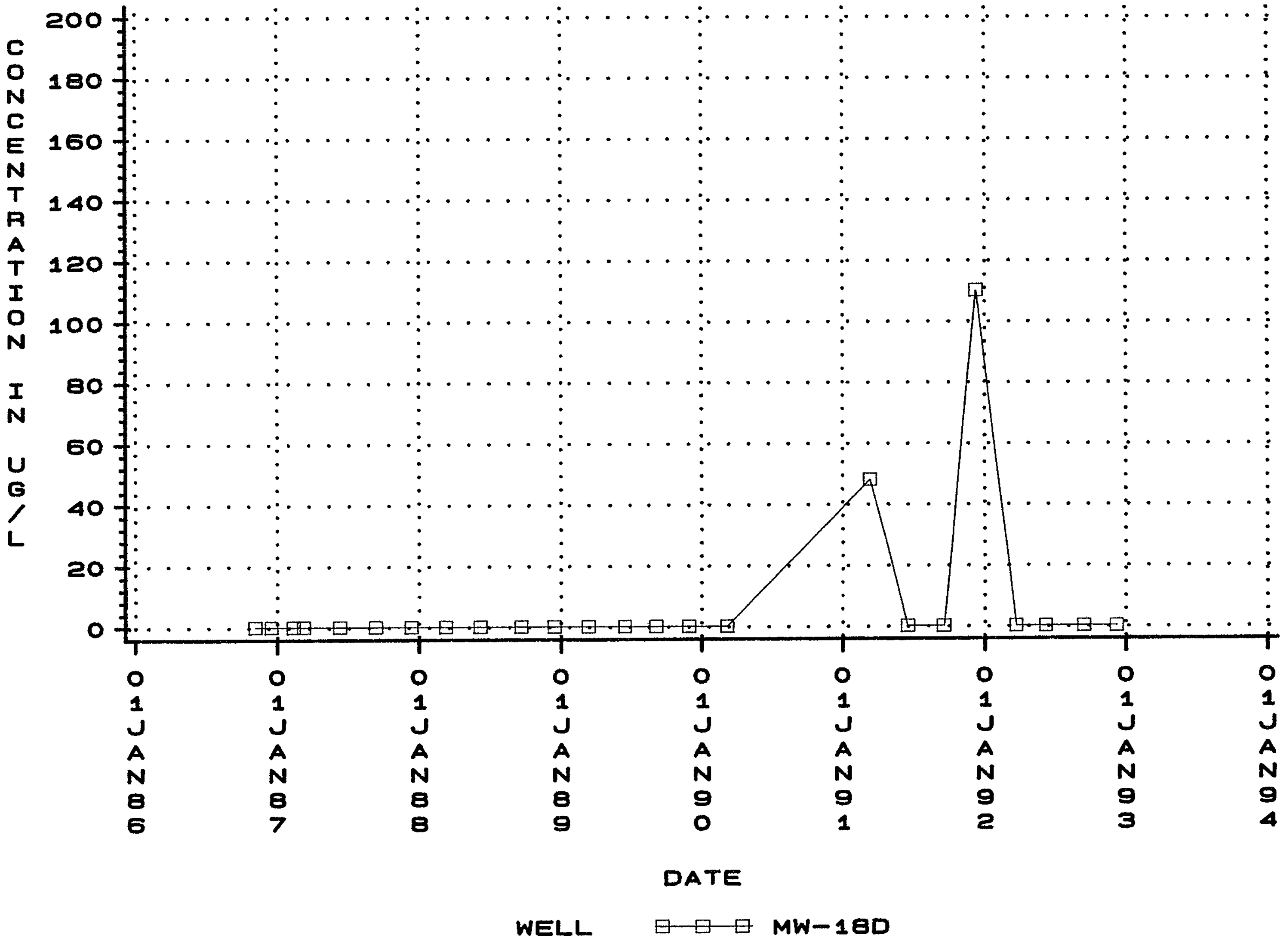
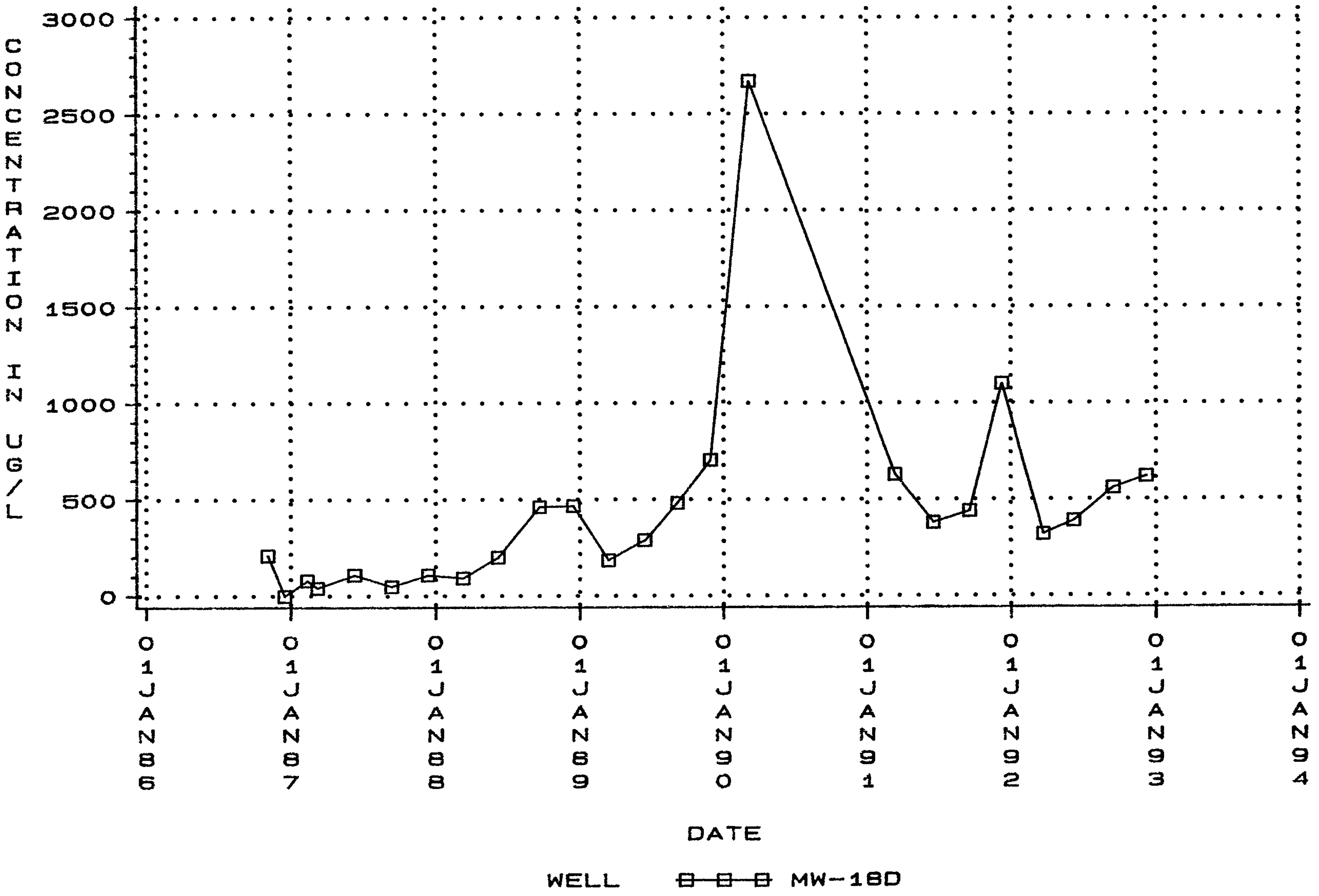
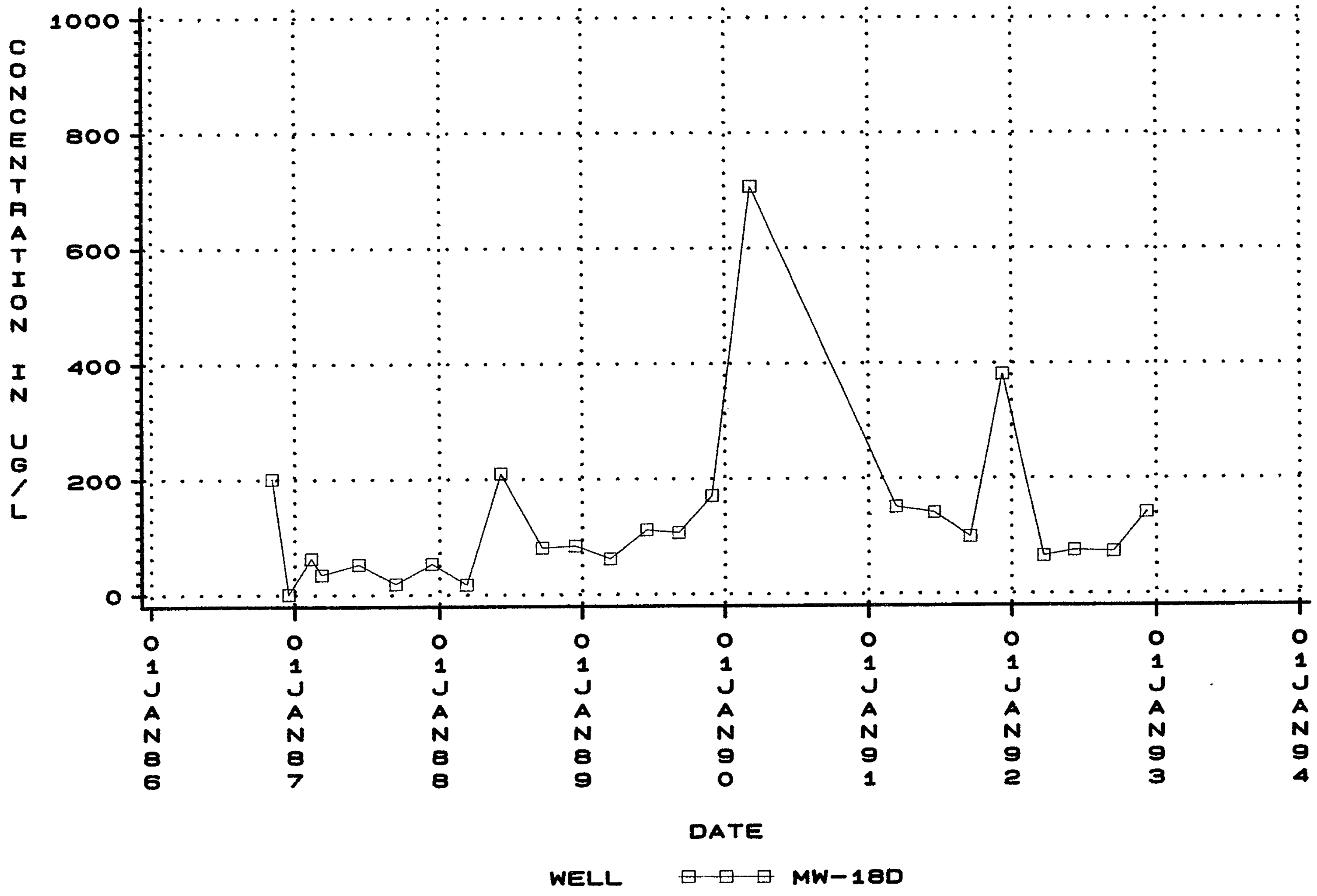


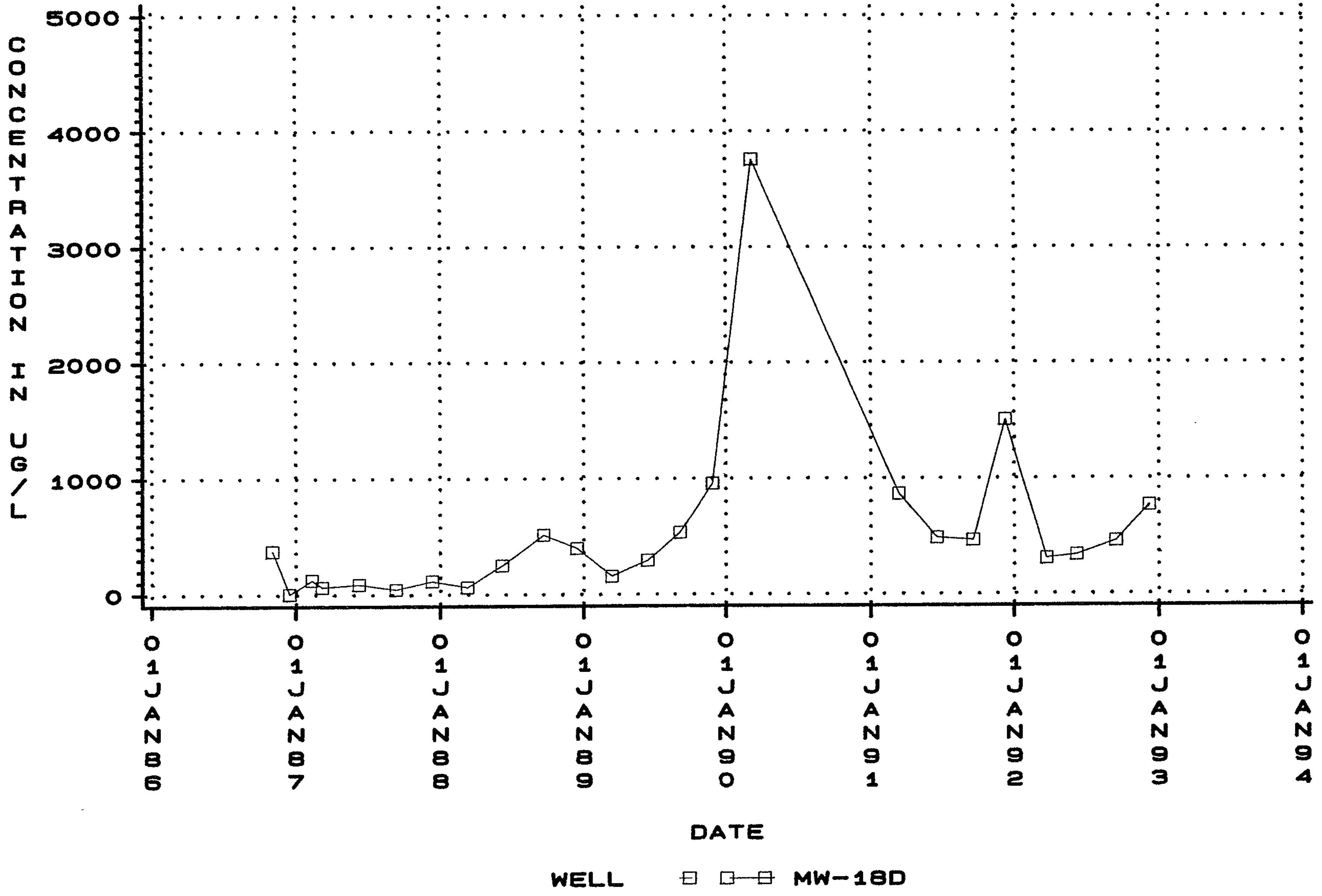
1,1—DICHLOROETHANE
MW—18D



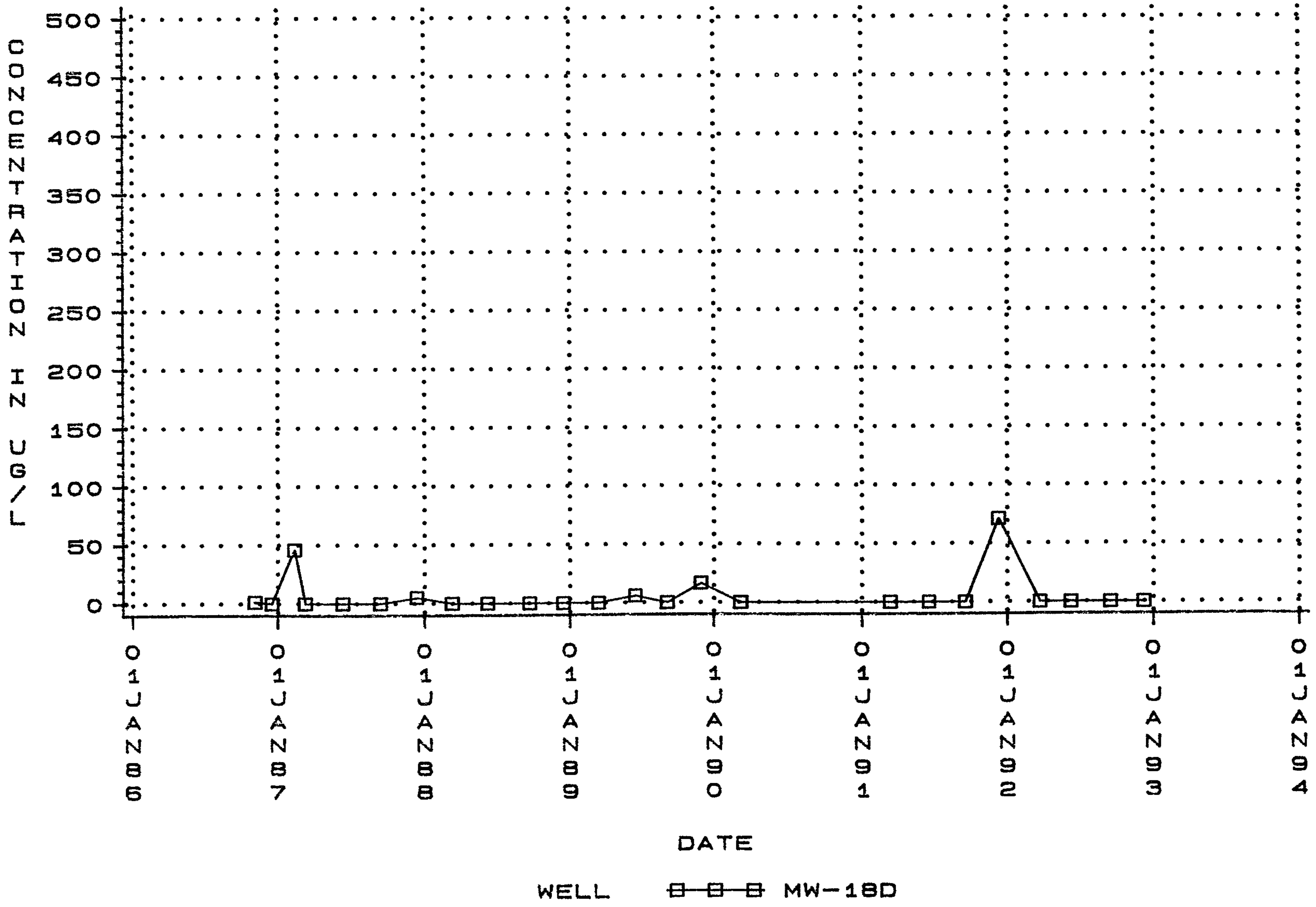
TETRACHLOROETHENE
MW—18D



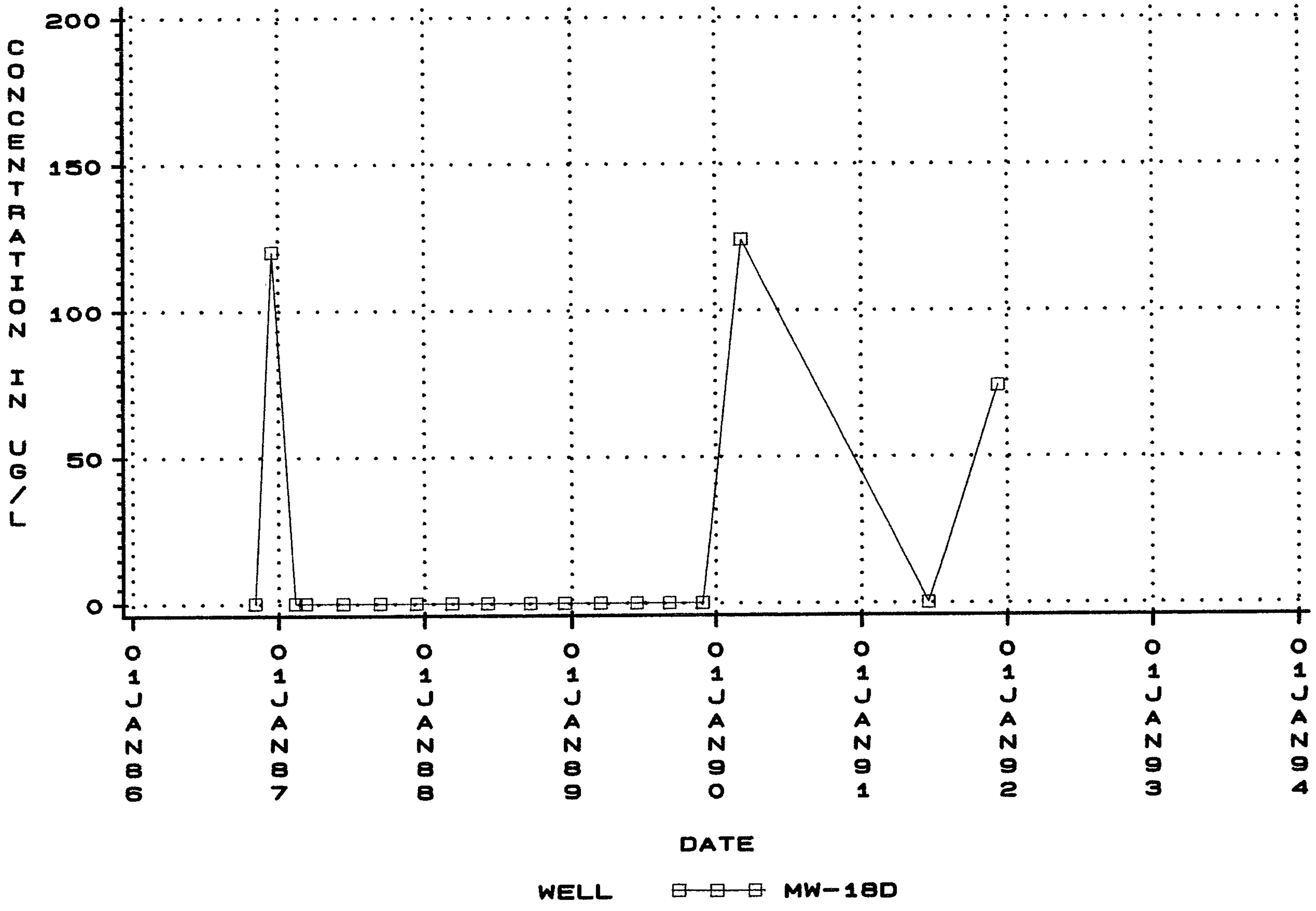
TRICHLOROETHENE
MW–18D



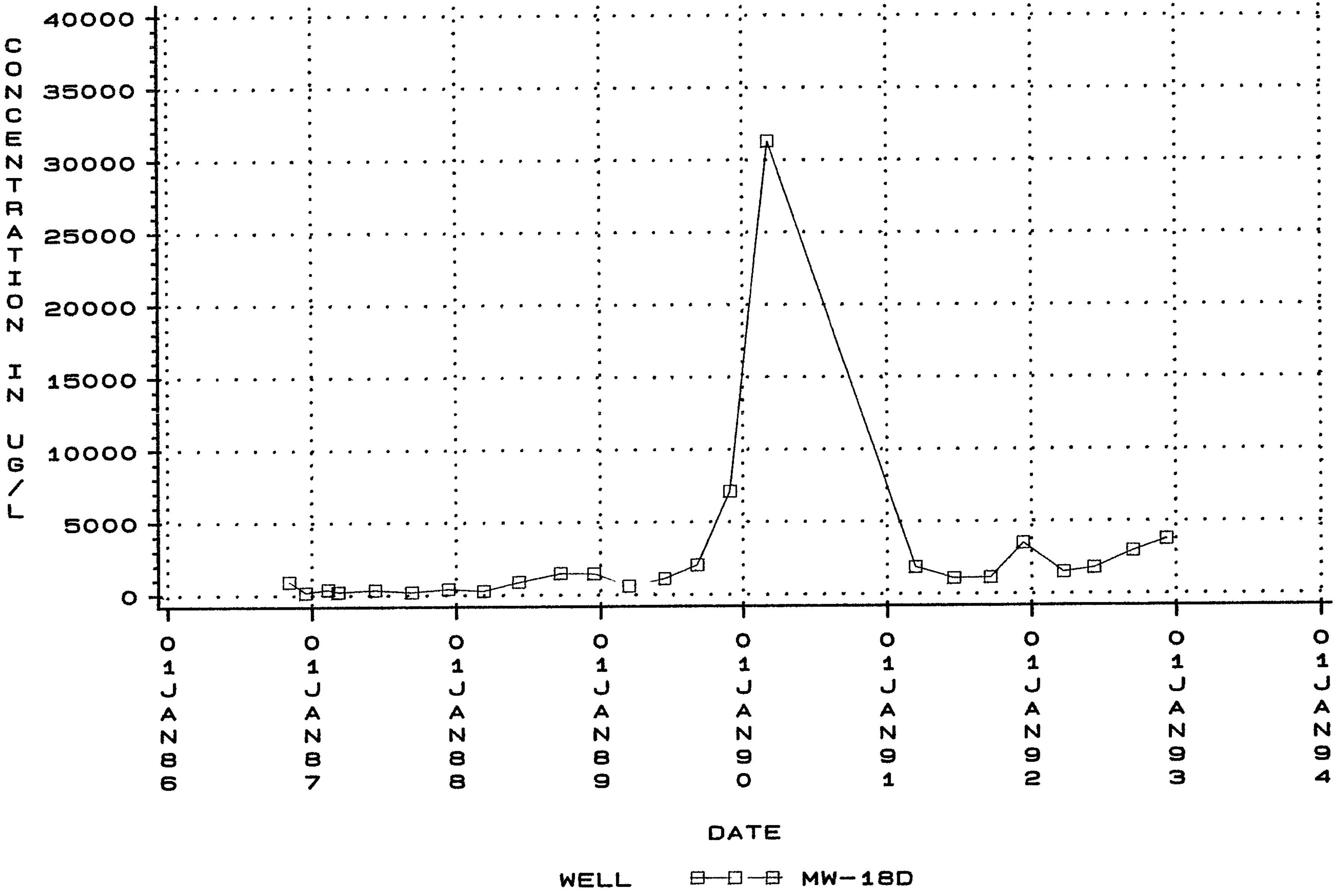
METHYLENE CHLORIDE
MW-18D

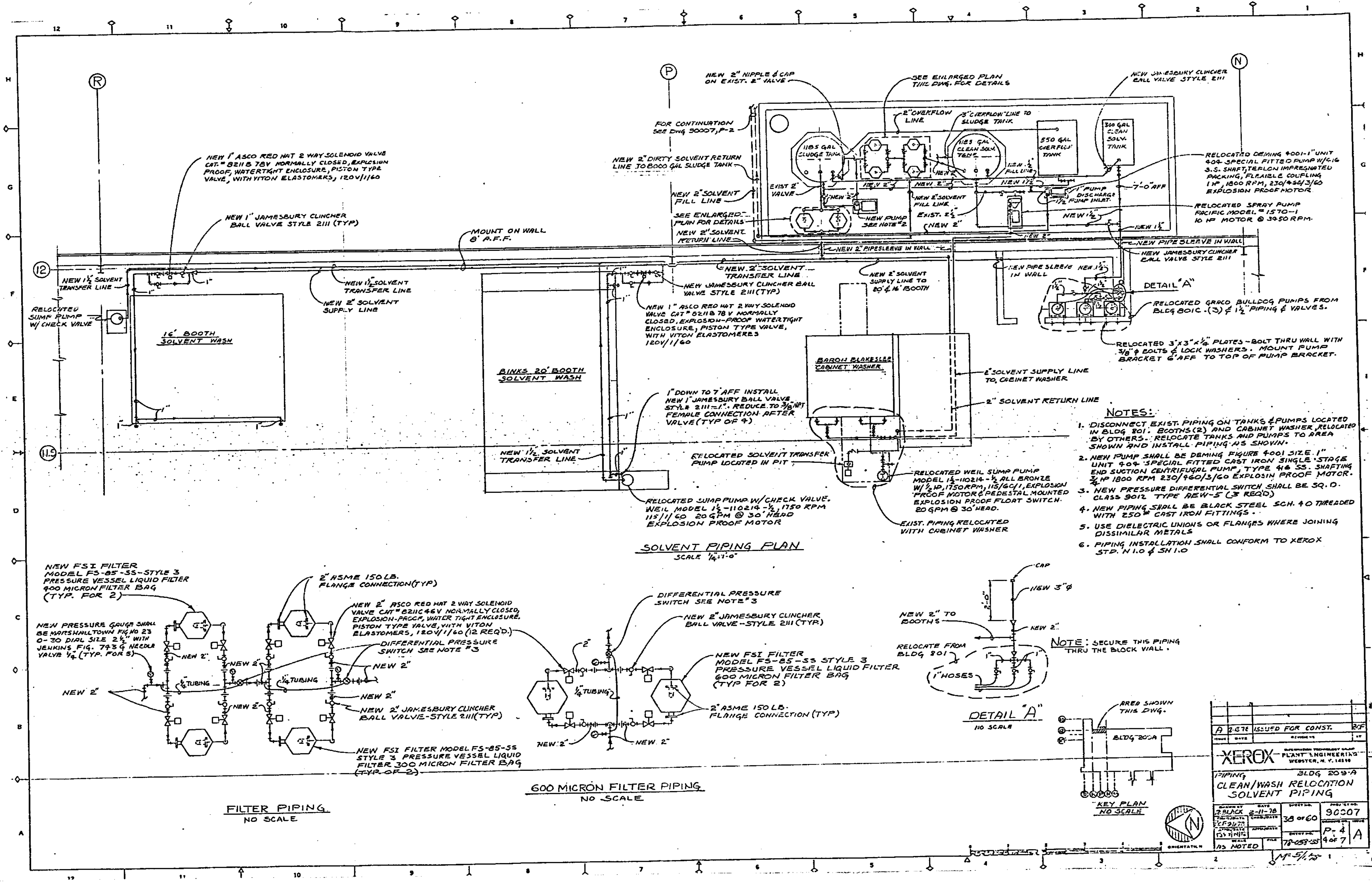


MINERAL SPIRITS
MW—18D



TOTAL VOLATILES + MINERAL SPIRITS
MW−18D





NOTE: SECURE THIS PIPING THRU THE BLOCK WALL.

NOTES:

1. DISCONNECT EXIST. PIPING ON TANKS & PUMPS LOCATED IN BLDG 801. BOOTHS (2) AND CABINET WASHER, RELOCATED BY OTHERS. RELOCATE TANKS AND PUMPS TO AREA SHOWN AND INSTALL PIPING AS SHOWN.
2. NEW PUMP SHALL BE DEMING FIGURE 4001 SIZE 1" UNIT 404 SPECIAL FITTED CAST IRON SINGLE STAGE END SUCTION CENTRIFUGAL PUMP, TYPE 416 SS. SHAFTING ¾ HP 1800 RPM 230/460/3/60 EXPLOSIN PROOF MOTOR.
3. NEW PRESSURE DIFFERENTIAL SWITCH SHALL BE SQ. D. CLASS 9012 TYPE AEW-5 (3 REQ'D)
4. NEW PIPING SHALL BE BLACK STEEL SCH. 40 THREADED WITH 250# CAST IRON FITTINGS.
5. USE DIELECTRIC UNIONS OR FLANGES WHERE JOINING DISSIMILAR METALS
6. PIPING INSTALLATION SHALL CONFORM TO XEROX STD. N 1.0 & SN 1.0

ISSUE	DATE	REVISIONS	BY
A	2-6-78	ISSUED FOR CONST.	RF

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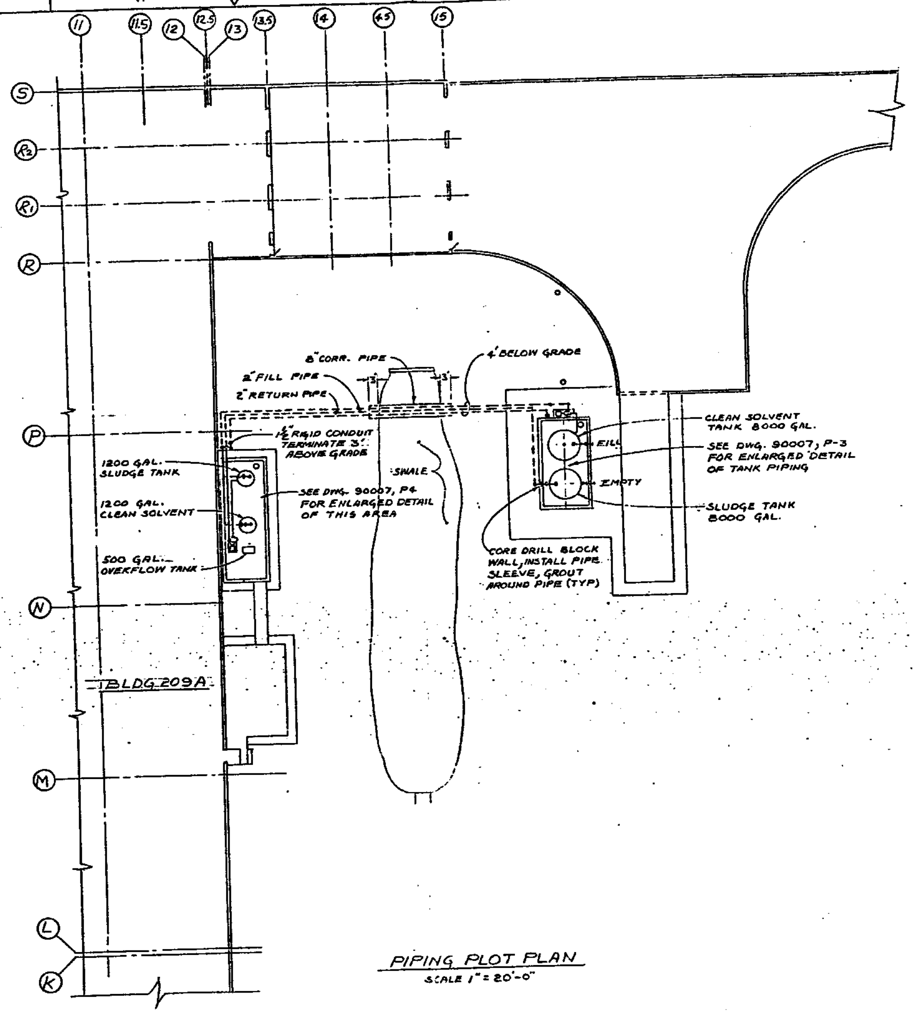
PIPING BLDG 209-A
CLEAN/WASH RELOCATION
SOLVENT PIPING

DRAWN BY	DATE	SHEET NO.	PROJECT NO.
R. BLACK	2-11-78	38 OF 60	90007
ENG'R/DATE CF 2/1/78	CHKR/DATE	ENTRY NO. 78-058-55	DRAWING NO. P-4 4 OF 7
APPR/DATE [illegible] 2/14/78	APPR/DATE		ISSUE A
SCALE AS NOTED	FILE		

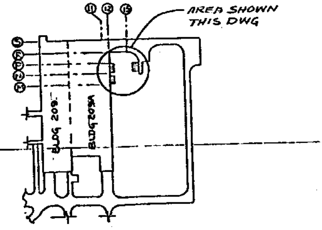
M-5/1/78

NOTES

1. REMOVE EXISTING 8000 GAL. TANKS(2), 1200 GAL. TANKS(2), 500 GAL. TANK(1), THREE EXISTING PUMPS OUTSIDE OF BLDG 801 AND RELOCATE TO OUTSIDE OF BLDG 209 AS SHOWN.
2. TWO 8000 GAL. TANKS AND TWO 1200 GAL. TANKS SHALL BE CLEANED ON THE INSIDE BY OPENING MAN HOLES ON SIDE OF TANKS.
3. NEW PIPING SHALL BE BLACK STEEL SCHEDULE 40 THREADED PIPE WITH 250 # CAST IRON FITTINGS.



PIPING PLOT PLAN
SCALE 1" = 20'-0"



KEY PLAN
NO SCALE

ISSUE	DATE	REVISIONS	BY
A	2-10-78	ISSUED FOR CONCTRUCTION	EU

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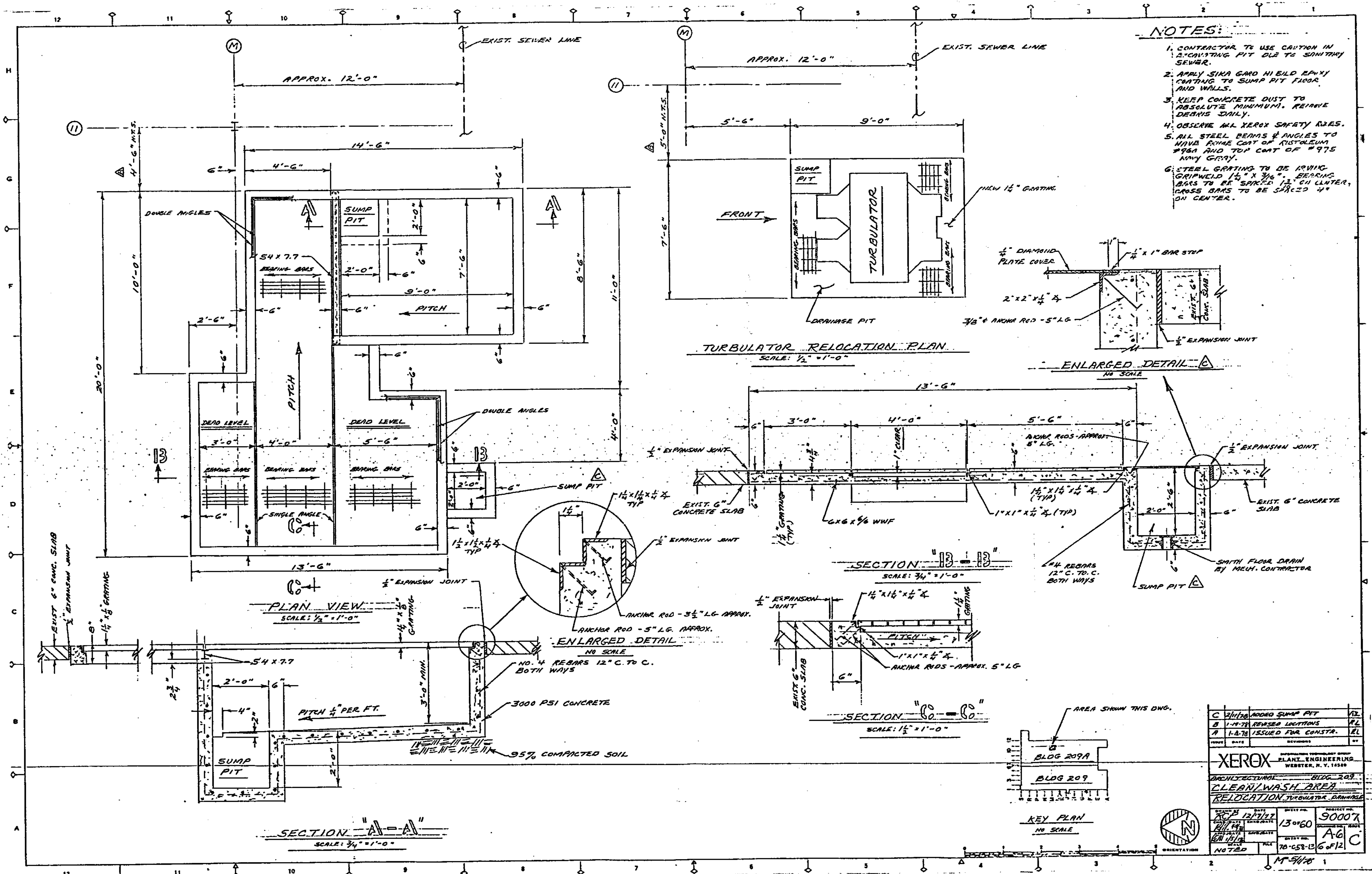
PIPING
BLDG 209A
CLEAN WASH AREA
SOLVENT TANK PIPING

DRAWN BY: R. BLACK DATE: 12/1/77
CHKD/DATE: BE 2-10-78
APPD/DATE: TJS 2/14/78
SCALE: AS NOTED
SHEET NO. 36 OF 60
ENTRY NO. 78-258-34
PROJECT NO. 90007.
DRAWING NO. P-2 2 OF 7
ISSUE A

ORIENTATION

M 5/1/78



PLAN VIEW
SCALE: ½" = 1'-0"

SECTION "A-A"
SCALE: ¾" = 1'-0"

ENLARGED DETAIL
NO SCALE

TURBULATOR RELOCATION PLAN
SCALE: ½" = 1'-0"

ENLARGED DETAIL C
NO SCALE

SECTION "B-B"
SCALE: ¾" = 1'-0"

SECTION "C-C"
SCALE: 1½" = 1'-0"

KEY PLAN
NO SCALE

NOTES:

1. CONTRACTOR TO USE CAUTION IN EXCAVATING PIT DUE TO SANITARY SEWER.
2. APPLY SIKA GARD HI BILD EPOXY COATING TO SUMP PIT FLOOR AND WALLS.
3. KEEP CONCRETE DUST TO ABSOLUTE MINIMUM. REMOVE DEBRIS DAILY.
4. OBSERVE ALL XEROX SAFETY RULES.
5. ALL STEEL BEAMS & ANGLES TO HAVE PRIME COAT OF RUSTOLEUM #960 AND TOP COAT OF #975 NAVY GRAY.
6. STEEL GRATING TO BE IRVING GRIPWELD 1¼" X 3/16". BEARING BARS TO BE SPACED 1 3/16" ON CENTER, CROSS BARS TO BE SPACED 4" ON CENTER.

ISSUE	DATE	REVISIONS	BY
C	2/11/78	ADDED SUMP PIT	RL
B	1-19-78	REVISED LOCATIONS	RL
A	1-4-78	ISSUED FOR CONSTR.	RL

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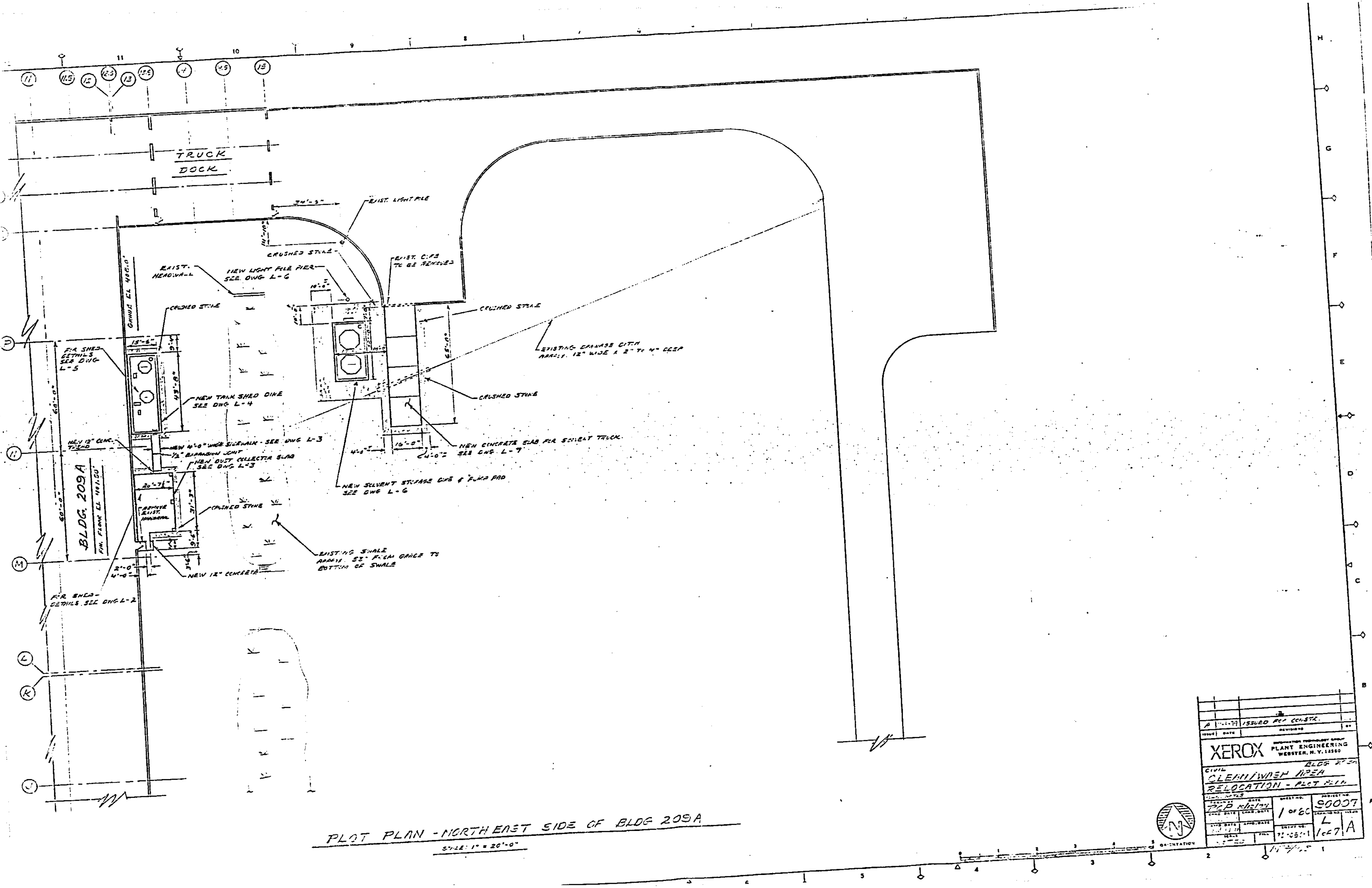
ARCHITECTURAL BLDG 209
CLEAN/WASH AREA
RELOCATION TURBULATOR DRAINAGE

DRAWN BY RCP	DATE 12/7/77	SHEET NO. 13 OF 60	PROJECT NO. 90007
CHKD/DATE RL 1/4/78	CHKD/DATE		DRAWING NO. A-6
APPD/DATE EM 1/5/78	APPD/DATE	ENTRY NO. 78-C58-13	6 OF 12
SCALE NOTED	FILE		ISSUE C

M 5/1/78



PLOT PLAN - NORTH EAST SIDE OF BLDG 209A

SCALE: 1" = 20'-0"

ISSUE	DATE	REVISIONS	BY
A	[illegible]	ISSUED FOR CONSTR.	

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CIVIL
BLDG 209A
CLEAN/WASH AREA
RELOCATION - PLOT PLAN

DRAWN BY PCP	DATE [illegible]	SHEET NO. 1 OF 20	PROJECT NO. 90037
CHKD. DATE	CHKD. DATE		DRAWING NO. L 1 of 7
APPD. DATE	APPD. DATE	ENTRY NO. [illegible]	ISSUE A
SCALE NOTED	FILE		