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534054

GROUNDWATER TECHNOLOGY ®

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SITE SUMMARY REPORT
DIESEL FUEL RECOVERY ACTIVITIES
CONSOLIDATED RAIL CORPORATION
BOTSFORD YARD
KALAMAZOO, MICHIGAN

3-29-95

Project Number: 04002-0015

March 29, 1995

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OCT 26 1995
ERD - Plainwell

Prepared for:

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1.0 INTRODUCTION

This report presents a summary of investigative and remedial activities conducted at the Consolidated Rail Corporation (Conrail) Botsford Yard in Kalamazoo, Michigan since the Corrective Response Summary and Site Characterization Report dated June 28, 1993. These activities were performed in response to the periodic historical appearance of separate phase hydrocarbons on the surface of the Kalamazoo River, located at the southern boundary of the site (Figure 1, Site Location Map and Figure 2, Site Map).

Specific investigative and remedial activities that are summarized in this report include:

- Oversight of the removal of an old storm drain from beneath Mills Street;
- Installation of a diesel fuel recovery trench (September and October 1993) located between Mills Street and the western wall of the former railyard roundhouse;
- The recovery of over 12,000 gallons of diesel fuel since installation of the trench;
- Initiating diesel fuel recovery from sump S-05 (near the Kalamazoo River);
- Diesel fuel bailing from MW-20; and
- Ongoing maintenance of the sorbent boom system deployed in the Kalamazoo River.

A summary of current conditions regarding diesel fuel thickness in the monitoring wells is also presented.

2.0 SEWER LINE CLOSURE AND REPLACEMENT

During the spring and summer of 1993, the City of Kalamazoo replaced the storm sewer line located beneath Mills Street, repaved the road, and replaced the Mills Street Bridge (spanning the Kalamazoo River). Mills Street forms the western boundary of the Botsford Yard (see Figure 2) and the bridge crosses the Kalamazoo River at the southwestern corner of the site. The road reconstruction plan also called for the closure of an old sanitary sewer bypass line, shown on Figure 2 as the line connecting manhole S8 (near the Kalamazoo River). That line, no longer needed by the City of Kalamazoo, was acting as a potential collection point for underground seepage, including diesel fuel. During low water stages, the line periodically flushed into the river, carrying diesel fuel onto the surface of the waterway. To prevent migration of the petroleum sheen, sorbent booms were placed and maintained by Conrail at the outfall of the sewer line.

Groundwater Technology personnel were present during the sewer line closure activities to observe whether the actual mechanism of diesel fuel seepage into the line could be determined. The possibilities included migration directly into the line via an unknown sewer line from the area of the former roundhouse on the Conrail property, preferential migration westward towards the impacted sewer line in association with old utility trenches, or general migration westward on the surface of the groundwater. Groundwater Technology personnel were also present to observe the distribution of diesel fuel in the soil beneath Mills Street.

The sewer line connected to manhole S8 was removed from the subsurface between the intersection of O'Neil and Mills Streets and the southernmost manhole in the centerline of Mills Street (see Figure 2) The short portion of the line that angles from the centerline of Mills Street southwestward to manhole S8 was closed with a flowable concrete Manhole S8 was removed from the subsurface and the exposed end of the line was plugged with concrete.

During these activities, the following observations were made by Groundwater Technology personnel

- Diesel fuel odors were noted in the sewer line excavation for the sewer line from the intersection of O'Neil and Mills Streets southward towards the Kalamazoo River The impacted soil was removed

to the Conrail property and stockpiled on plastic sheeting.

- An excavation to groundwater (approximately 8 to 10 feet below grade) located in the center of Mills Street and approximately 50 feet north of the river revealed a slight petroleum sheen on the groundwater exiting the northern wall of the excavation. The groundwater exiting the eastern, southern, and western walls into the excavation was free of sheen.

- Highly weathered (dark and viscous) product was noted at the depth of the groundwater within the center of Mills Street directly across from MW-3 (see Figure 2).

- No sewer lines or other utilities were observed connecting from the area of the roundhouse on the Conrail property directly to or within the area of the impacted sewer line.

Based upon these observations it may be concluded that the most likely transport mechanism of diesel fuel towards the impacted sewer line is on the surface of the groundwater. As such, some form of diesel fuel interception system was necessary to prevent further migration from the Botsford Yard in the vicinity of Mills Street The next section of the report describes the construction of a product interceptor trench installed immediately to the west of the former roundhouse area of the Botsford Yard.

3.0 MILLS STREET RECOVERY TRENCH INSTALLATION

The objective of this phase of the project was to create an interceptor trench between the Conrail property and the subsurface utilities beneath Mills Street to capture and subsequently recover separate phase hydrocarbons. Construction of the trench was initiated on September 22, 1993; the trench was completed on October 2, 1993. Diesel fuel recovery began on October 5, 1993. Johnston Contracting of Midland, Michigan was subcontracted by Groundwater Technology to complete the trench installation.

Installation of the trench was initiated in the area of monitoring well MW-3. This was done to determine whether there were any sewer lines exiting the former roundhouse and connecting to the sewer line previously identified as connected to manhole S8. As no lines exiting the former roundhouse were present, the trench was expanded both north and south until the areal extent of the occurrence of diesel fuel on the groundwater was delineated (see Drawing Y1).

In the trench, diesel fuel saturated soil was encountered at 11 to 12 feet below grade in the area directly adjacent to MW-3. To permit excavation beneath the water table, dewatering of the trench was performed in the first 24-inch recovery well (RW-2) set at a depth of 16 feet below grade. The water was stored in eight 20,000 gallon storage tanks located on the Conrail property. Dewatering proceeded at approximately 75 gallons per minute (gpm). Following completion of the trench, a permit was obtained from the City of Kalamazoo Sanitary Authority and the water was discharged to the sanitary sewer.

Five recovery wells were installed to an approximate depth of 16 feet below grade with a horizontal separation distance of 50 feet. The trench was excavated to between 15 and 16 feet below grade. The recovery wells were placed within the trench and peastone-sized gravel was utilized to backfill to approximately seven feet below grade. A filter fabric was then placed over the peastone and the trench finished to grade with clean sand The filter fabric was used to prevent infiltration of fines into the peastone, thereby reducing the effectiveness of the trench. The wells were completed with the installation of concrete vaults and locking covers. Drawing Y1 contains additional construction details

Each of the newly installed recovery wells were gauged on October 5, 1994 for diesel fuel thickness From north to south, the wells were labeled RW-1, RW-2, RW-3, RW-4 and RW-5 (see Figure Y1), and contained

0.03', 0.00', 0.09', 0.15', and 0.11' of diesel fuel, respectively.

Diesel fuel recovery pumps (Large Diameter Filter Scavengers™) have been placed in recovery wells RW-2, RW-3, RW-4, and RW-5. Each pump has been set up to discharge directly into a separate polyethylene tank for each recovery well. When the polyethylene tanks are full, the diesel fuel is transferred by vacuum truck (K&D Transportation) to a 10,000 gallon, idle rail car. When the rail car is full, the fuel is removed from the site by a licensed disposal contractor (Crystal Flash). Diesel fuel recovery was initiated on October 5, 1993 and continues through the present time.

4.0 SYSTEM OPERATION AND MAINTENANCE

4.1 Mills Street Recovery Trench

Groundwater Technology has conducted weekly site inspections since April 26, 1994 to monitor the diesel fuel removal progress at each of the recovery wells containing a large diameter filter scavenger. At present, filter scavengers are deployed in RW-2, RW-3, RW-4, and RW-5.

During each site visit, Groundwater Technology technicians gauge the depth to groundwater and diesel fuel in each recovery well, as well as MW-20, S-04, and S-05 Also noted is the volume of diesel fuel recovered from each well. The filter scavengers are also inspected, and if necessary, cleaned on a monthly basis On a quarterly basis, the depth to water and diesel fuel are measured in each of the site monitoring and recovery wells.

4.2 Additional Diesel Fuel Recovery Measures

An additional large diameter filter scavenger (5 total on site) was placed in sump S-05 during September 1994. As with the Mills Street Recovery Trench, the diesel fuel is pumped into an above-ground polyethylene tank placed directly adjacent to the sump. Periodically, the tank contents are transferred into the same tank car utilized for the Mills Street Recovery Trench system.

Weekly hand bailing of the diesel fuel noted in MW-20 was initiated in December 1994. That diesel fuel is placed in the poly tank dedicated to sump S-05.

Sorbent booms and pads are also maintained in the Kalamazoo River immediately adjacent to sump S-05 (Figure 2) and the outfall for the newly-installed storm sewer beneath the Mills Street bridge Maintenance of the sorbent boom system in the Kalamazoo River is being maintained on a bimonthly basis by Conrail subcontractors

4.3 Diesel Fuel Recovery Volumes

Since the initiation of diesel fuel recovery from the Mills Street trench on October 5, 1993, 12,312 gallons of diesel fuel have been recovered from the subsurface. The breakdown is as follows:

■ Mills Street Recovery Trench (RWs 1-5)	12,165 gallons
■ Sump S-05	130 gallons
■ MW-20 (hand bailing)	17 gallons
Total Recovery:	12,312 gallons

Appendix A contains the diesel fuel recovery statistics for the site. Also in Appendix A is a graph depicting the cumulative diesel fuel recovery for the Mills Street trench, as well as a calculated estimate of the volume of diesel present in the trench during each of the gauging events. As the graph shows, the rate of diesel fuel recovery from the trench has remained stable at approximately 600 gallons per month since July 1994.

The volume of diesel fuel present in the trench peaked in May 1994 (3,602 gallons) and has fallen to a fairly steady volume since that time (typically less than 500 gallons). This data is included to show that the volume of diesel fuel recovered (12,165 gallons) is roughly three times more than the highest volume calculated to be present within the trench.

4.4 Site Gauging Data

Appendix B contains hydrographs of the recovery wells, as well as monitoring wells MW-03, MW-07, MW-09, MW-10, MW-11, MW-12, MW-18, and MW-20 A brief discussion of each hydrograph (or group of hydrographs) is provided below.

Recovery Wells — These are all shown on one page, the purpose of which is to show that the diesel fuel thickness has remained relatively low (<0 1 feet) since the inception of diesel fuel recovery.

MW-3 and MW-18: These two monitoring wells are located immediately adjacent to the Mills Street Recovery Trench (Figure 2). Although both wells have historically exhibited a measurable thickness of diesel fuel, the diesel fuel thickness in each well has shown a decrease since the inception of diesel fuel recovery from the Mills Street Recovery Trench (between 1/31/93 and 6/15/94 as shown on the X-axis of each hydrograph).

Prior to initiating recovery from the Mills Street Recovery Trench, the apparent diesel fuel thickness in MW-3 averaged 1.13 feet; since then, the average thickness has been 0.39 feet (0.29 feet on January 31, 1995). The pre-trench thickness in MW-18 averaged 1.76 feet; since startup, the average thickness has been 0.66 feet (0.55 feet on January 31, 1995).

MW-7 and MW-11: These two monitoring wells are located immediately to the south (MW-7) and north (MW-11) of the former roundhouse (Figure 2). Prior to initiating recovery from the Mills Street Recovery Trench, the apparent diesel fuel thickness in MW-7 averaged 1.58 feet; since then, the average thickness has been 1.1 feet. The pre-trench thickness in MW-11 averaged 2.16 feet; since startup, the average thickness has been 2.47 feet.

MWs-9, 10, and 12: These three monitoring wells are located within the central area of the site (Figure 2). Each has historically exhibited a measurable thickness of diesel fuel and that thickness appears to be unaffected by the startup of diesel fuel recovery from the Mills Street Recovery Trench.

MW-20: The apparent thickness of diesel fuel in this monitoring well has averaged 1.15 feet since November 13, 1992. As this well is near the Kalamazoo River, a hand bailing program was initiated in December 1994. As of March 10, 1995, no measurable diesel fuel was noted in this well.

A table showing all of the gauging data collected from the site since December of 1989 is presented as Appendix C.

5.0 CONCLUSIONS

The remedial measures taken to increase the recovery of diesel fuel from the subsurface at the Botsford Yard have been successful. The Mills Street Recovery Trench has recovered 12,165 gallons of diesel fuel since its' installation and startup in October 1993. At present, fuel is recovered from the trench at an approximate rate of 600 gallons per month.

The removal of diesel fuel from the Mills Street Recovery Trench has affected the thickness of diesel fuel in monitoring wells MW-3 and MW-18. Both of these wells have shown a decrease in the apparent thickness of diesel fuel, demonstrating the effectiveness of the trench at recovering fuel from areas outside of the trench itself. This conclusion is further supported by the data on the cumulative recovery graph (Appendix A). That graph also shows that while the maximum volume of fuel within the trench was 3,602 gallons (5/26/94), the total recovery of diesel fuel has been three times that volume (12,165 gallons). Therefore, this demonstrates that the trench is an effective collection point for diesel fuel.

Since the inception of diesel fuel recovery from Sump S-05 in October 1994 and hand bailing from MW-20 in December 1994, the volume of diesel fuel removed from each well has been 130 gallons and 17 gallons, respectively. The diesel fuel thickness in Sump S-05 was 0.06 feet on March 10, 1995; the thickness in MW-20 on that same date was 0.00 feet.

FIGURES

Figure 1 Site Location Map

Figure 2 Site Map

Figure Y1 Layout Drawing of Mills Street Recovery Trench

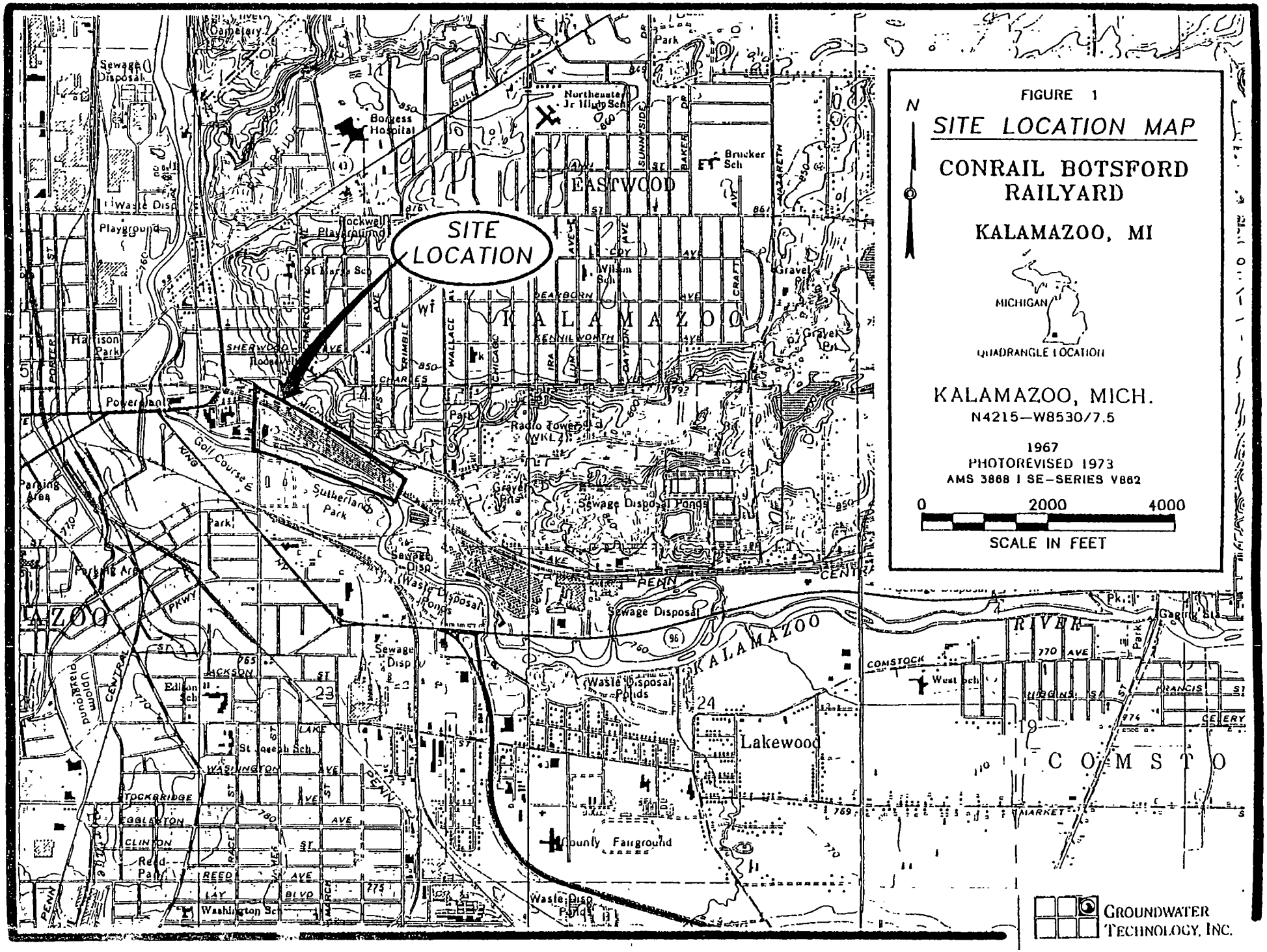
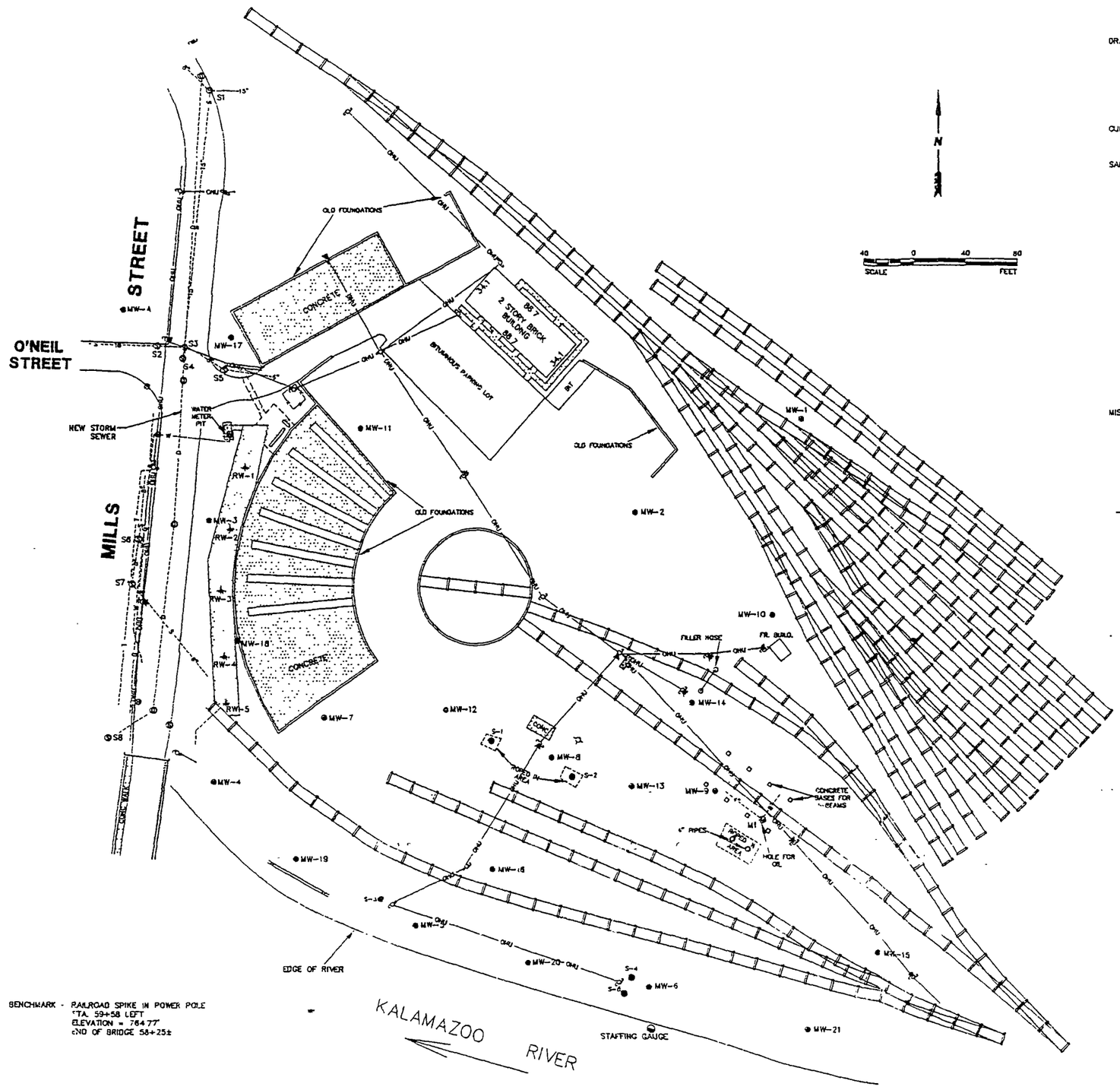


FIGURE 1
SITE LOCATION MAP
CONRAIL BOTSFORD RAILYARD
KALAMAZOO, MI
MICHIGAN
QUADRANGLE LOCATION
KALAMAZOO, MICH.
N4215—W8530/7.5
1967
PHOTOREVISED 1973
AMS 3868 I SE—SERIES V862
0
2000
4000
SCALE IN FEET
N
SITE LOCATION
EASTWOOD
KALAMAZOO
Lakewood
COMSTO
Sewage Disposal
Waste Disposal Ponds
Sutherland Park
Golf Course
County Fairground
Northeaster Jr High Sch
Borgess Hospital
Brucker Sch
Radio Tower
Gravel Pit
Sewage Disposal Ponds
Waste Disposal Ponds
Waste Disp Ponds
Upjohn Playground
Harrison Park
Powerplant
Parking Area
Edison Sch
St Joseph Sch
Washington Sch
West Sch
Gaging Sta
Cemetery
Sewage Disposal
Waste Disp
Playground
Rockwell Playground
St Marys Sch
Wilson Sch
Park
Pk
Reed Park
Gravel Pit
GROUNDWATER TECHNOLOGY, INC.



BENCHMARK - RAILROAD SPIKE IN POWER POLE
STA. 59+58 LEFT
ELEVATION = 764.77'
END OF BRIDGE 58+25±

STRUCTURE INVENTORY

	#	RIM ELEVATION	SIZE	DIRECTION	INVERT ELEVATION
DRAINAGE	D1	752.46	36"	SOUTH	756.36
			36"	SOUTH	756.39
			15"	NORTHWEST	756.39
	D2	763.36	15"	NORTH	754.31
			15"	SOUTH	754.31
	D3	763.72	36"	NORTH	755.75
			36"	SOUTH	755.75
CURB INLETS	C1	762.43	12"	EAST	757.75
	C2	762.72	12"	WEST	757.42
SANITARY	S1	762.51	15"	SOUTH	755.61
			15"	EAST	755.61
			8"	NORTHWEST	755.61
	S2	752.70	18"	EAST	753.90
			18"	WEST	753.90
	S3	763.06	12"	SOUTH	757.71
			15"	SOUTH	755.06
			8"	EAST	756.96
			18"	WEST	754.26
			15"	NORTH	754.81
	S4	753.20	12"	NORTH	757.90
	S5	764.42	8"	WEST	758.57
			6"	EAST	758.74
	S6	763.77	8"	NORTH	755.95
			8"	SOUTH	755.95
	S7	764.12	8"	NORTH	758.12
			6"	SOUTHEAST	757.97
	S8	765.04	TOP OF OILY WATER TO BOTTOM NO PIPES VISIBLE		755.04 / 754.04
MISC.	M1	769.14	4"	NORTHWEST	765.89
			8"	NORTHEAST	765.39

WELL ELEVATIONS

WELL #	ELEVATION TOP OF GROUND	ELEVATION TOP OF RIM	ELEVATION TOP OF PVC	COORDINATES NORTH	COORDINATES EAST
1	766.2	768.28	767.93	1943.1	2411.9
3	765.2	767.57	767.27	1864.9	1955.1
4	762.1	764.34	764.16	1667.0	1960.0
5	761.7	764.41	764.06	1558.7	2115.7
6	762.4	764.85	764.59	1511.6	2296.8
7	766.5	769.45	769.13	1715.4	2044.8
8	766.9	769.34	769.07	1685.6	2221.5
9	767.1	769.41	769.28	1661.0	2346.7
10	764.1	766.55	766.11	1794.1	2390.3
11	768.1	770.15	769.98	1935.6	2071.2
12	766.9	769.03	768.85	1721.6	2138.3
13	767.2	769.14	768.83	1664.2	2283.6
14	766.0	765.97	765.79	1727.3	2329.1
15	765.1	767.32	767.06	1537.5	2471.8
16	764.9	766.98	766.76	1601.5	2175.6
17	764.3	766.48	766.31	2003.6	1972.2
18	765.6	768.04	767.85	1773.3	1972.4
19	762.0	764.08	763.80	1608.9	2023.5
20	761.4	763.73	763.44	1530.2	2203.5
21	762.5	764.62	764.34	1479.7	2417.8
A	761.7	765.03	——	2024.6	1889.5

PASSIVE RECOVERY SUMPS

#	RIM ELEVATION
S-1	766.71
S-2	767.75
S-3	764.01
S-4	762.99
S-5	762.55

LEGEND

- RAILROAD TRACKS
- BURIED GAS LINES AS MARKED BY COMPANY
- BURIED WATER LINES AS MARKED BY COMPANY
- BURIED TELEPHONE LINES AS MARKED BY UTILITY COMPANY
- BURIED DRAINAGE LINES
- BURIED SANITARY LINES
- OVERHEAD UTILITY LINES
- MONITOR WELL
- CURB INLET
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MANHOLE
- WATER VALVE
- HYDRANT
- UTILITY POLE
- UTILITY POLE WITH LIGHT
- FENCE LINE
- BILLBOARD
- CONCRETE AREA
- SPOT ELEVATION
- TELEPHONE PEDESTAL
- ELECTRIC MANHOLE
- WATER METER PIT

Hatfield Engineering, Inc.
Surveyors & Engineers
530 Michigan Avenue
BATTLE CREEK, MI 49017
616-962-5...

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NO.	DATE	BY	REVISION
1	3-28-95	PRF	Update Trench Layout

SIGNATURE	DATE
REVIEW ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

GROUNDWATER TECHNOLOGY
23933 RESEARCH DRIVE
FARMINGTON HILLS, MI 48335 (313) 475-0922

CONRAIL BOTSFORD YARD

75 MILL STREET
KALAMAZOO, MICHIGAN 49007

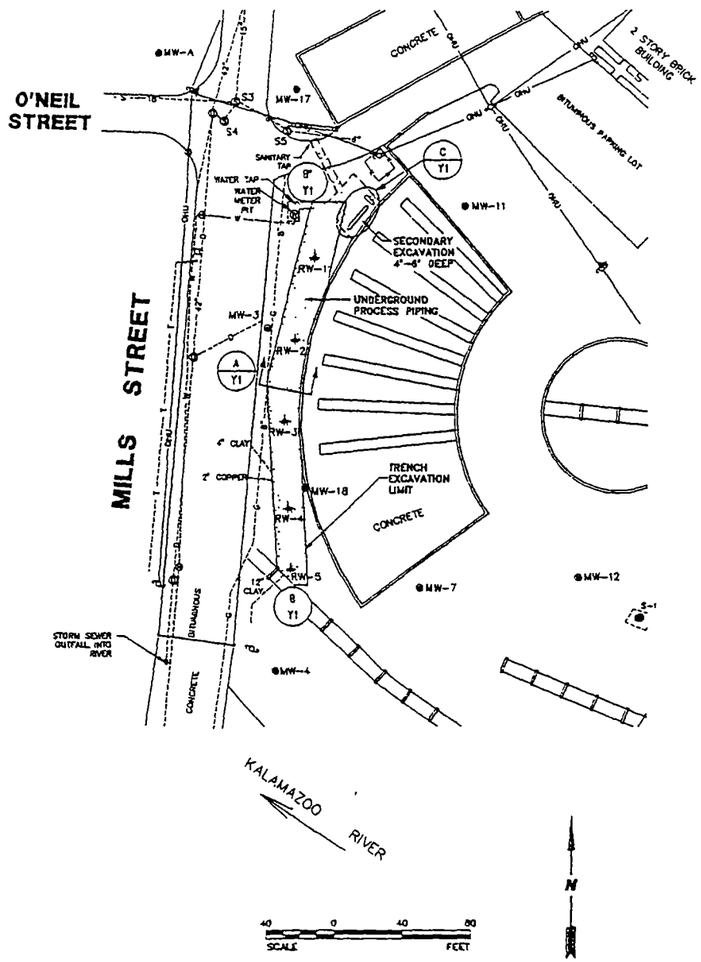
SITE MAP

DESIGNED BY:	DETAILED BY:	CHECKED BY:
BB	NLW	

DRAWING DATE:	ACAD FILE:
6-23-93	6001-Y1
PROJECT NO.: 04301 0122	CONTRACT:

DRAWING: REVISION:

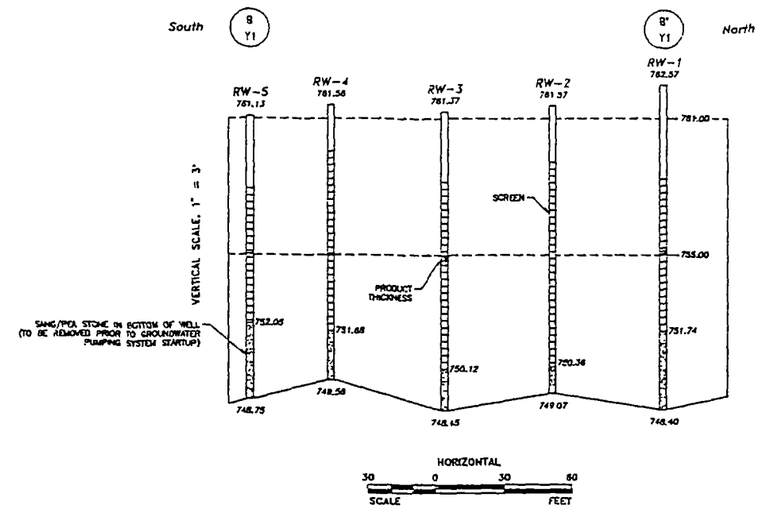
FIGURE 2



LEGEND

- RAILROAD TRACKS
- BURIED GAS LINES AS MARKED BY UTILITY COMPANY
- BURIED WATER LINES AS MARKED BY UTILITY COMPANY
- BURIED TELEPHONE LINES AS MARKED BY UTILITY COMPANY
- BURIED DRAINAGE LINES
- BURIED SANITARY LINES
- OVERHEAD UTILITY LINES
- MONITORING WELL
- SUMP INLET
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MANHOLE
- WATER VALVE
- HYDRANT
- UTILITY POLE
- UTILITY POLE WITH LIGHT
- FENCE LINE
- GUARD
- TELEPHONE PEDESTAL
- ELECTRIC MANHOLE
- WATER METER PIT

CROSS SECTION B - B'



PRODUCT RECOVERY STARTUP DATE OCTOBER 6, 1993

WELL ID	DEPTH TO PRODUCT	DEPTH TO WATER	PRODUCT THICKNESS
RW-1	7.39"	7.44"	0.03"
RW-2	6.40"	6.44"	0.04"
RW-3	6.24"	6.42"	0.18"
RW-4	6.42"	6.55"	0.13"
RW-5	6.14"	6.18"	0.04"

ELEVATIONS MEASURED ON 10-13-93 AT 4:30 PM
600 GALLONS RECOVERED

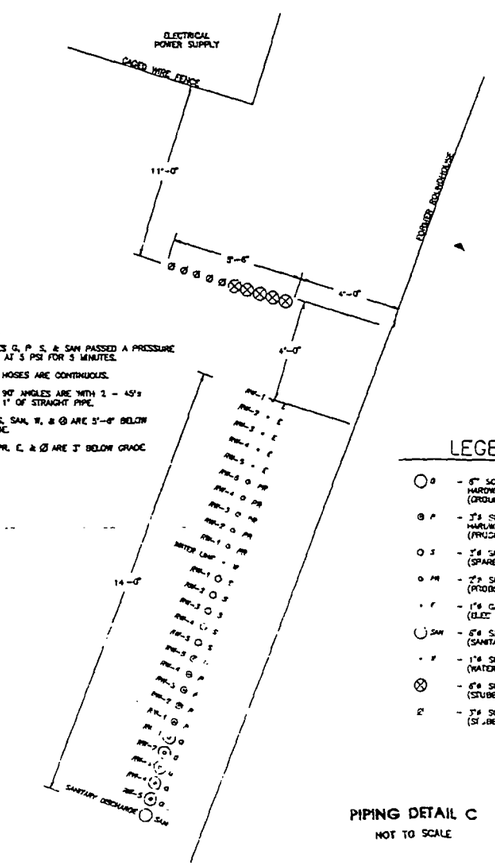
WELL ID	DEPTH TO BOTTOM INSIDE WELL (SAND)	AMOUNT CUT OFF TOP OF WELL
RW-1	10.63"	5.83"
RW-2	11.21"	7.50"
RW-3	11.25"	7.08"
RW-4	9.88"	8.00"
RW-5	9.20"	6.73"

NOTES:

RW-1, RW-2, RW-3, AND RW-4 WERE ORIGINALLY 20.00 FEET LONG.

RW-5 WAS CUT TO BE 18.25 LONG.

RECOVERY WELLS WERE CONSTRUCTED WITH 24"ø GALVANIZED CULVERT.



NOTES:

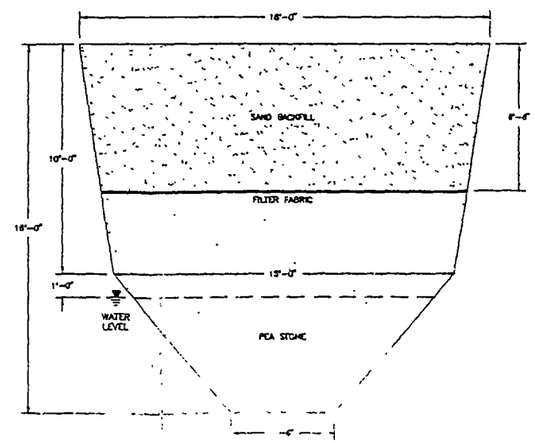
1. PIPES G, P, S, & SAN PASSED A PRESSURE TEST AT 5 PSI FOR 5 MINUTES.
2. ALL HOSES ARE CONTINUOUS.
3. ALL 90° ANGLES ARE WITH 2 - 45°s AND 1' OF STRAIGHT PIPE.
4. G, S, SAN, W, & Ø ARE 5'-6" BELOW GRADE.
5. P, PR, C, & Ø ARE 3' BELOW GRADE.

LEGEND

- 6" SCH 40 PVC WITH 1-1/2"ø HARDWALL RUBBER HOSE (GROUNDWATER RECOVERY)
- 3"ø SCH 40 PVC WITH 3/4"ø HARDWALL PRODUCT HOSE (PRODUCT RECOVERY)
- 3"ø SCH 40 PVC (SPARE)
- 3"ø SCH 40 PVC (PROBE CONDUIT)
- 1"ø GALV PVC (ELECTRICAL CONDUIT)
- 6"ø SCH 40 PVC (SANITARY DISCHARGE)
- 1"ø SOFT COPPER (WATER LINE)
- 6"ø SCH 40 PVC (STUBBED UNDERGROUND)
- 3"ø SCH 40 PVC (STUBBED UNDERGROUND)

PIPING DETAIL C

NOT TO SCALE



SCALE 1" = 3'

ALL DIMENSIONS ARE ±1'-0" TOLERANCE

CROSS SECTION A

(WITHOUT PROCESS PIPING NEATH FILTER FABRIC)

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NO.	DATE	BY

SIGNATURE

REVIEW ENGR:

PROJECT ENGR:

PROJECT MGR:

CLIENT:

GROUN TECHN

255 28TH STREET S.E.
GRAND RAPIDS, M. 49548

CONRA BOTSFORD

78 MILLS STRE
KALAMAZOO, MI.

MILLS STRE RECOVERY TRENCH AS BUILT & PIPING

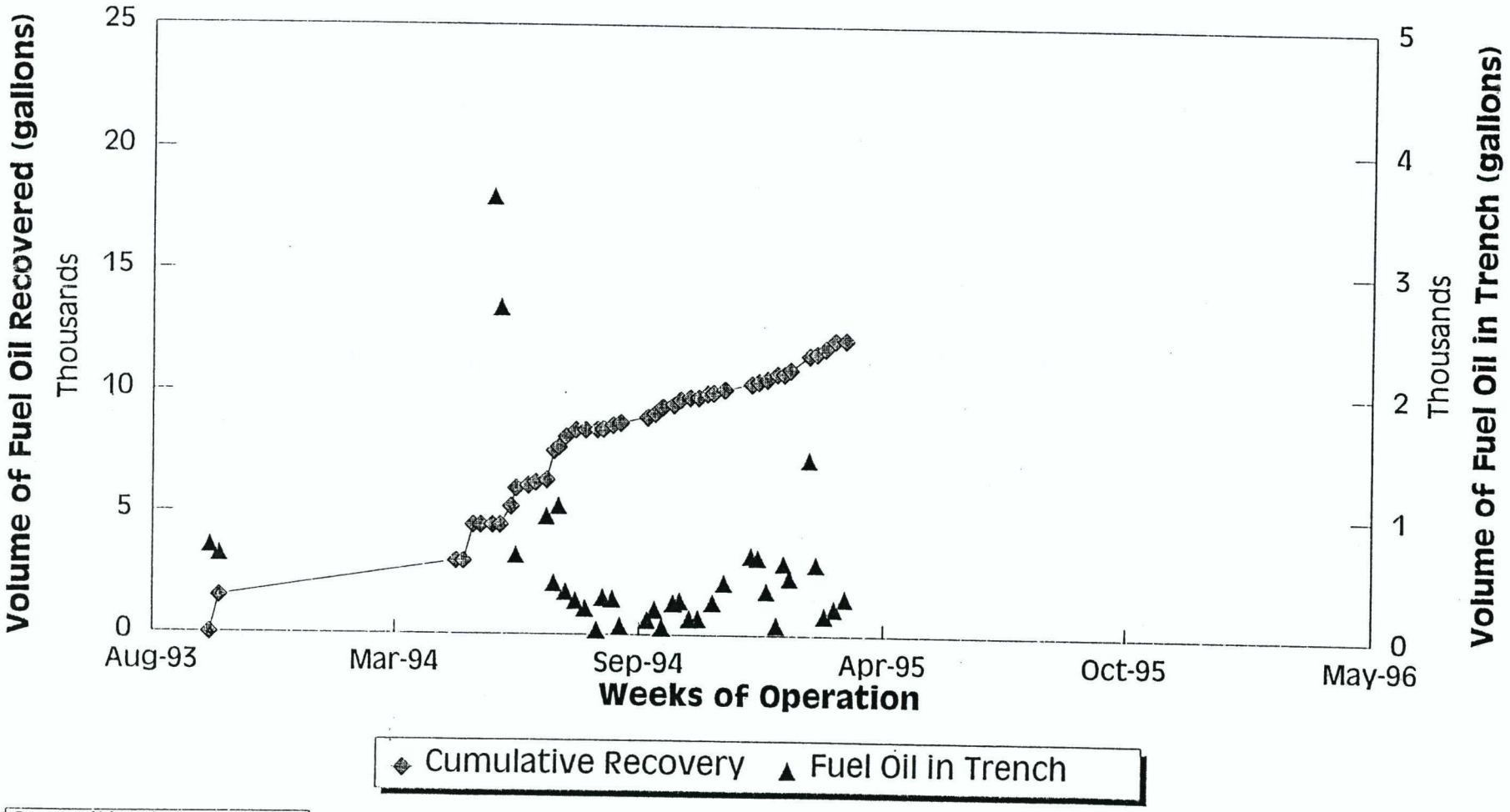
DESIGNED BY: DMP	DETAILED BY: NLW
DRAWING DATE: 10-22-93	ACAD
PROJECT NO.: 04301 0122	CONTRA
DRAWING: Y1	REVISIO

APPENDIX A

DIESEL FUEL RECOVERY STATISTICS

Mills Street Recovery Trench

Diesel Fuel Recovery



Conrail/Botsford Yard

GROUNDWATER TECHNOLOGY

Conrail
Botsford Yard
Kalamazoo, Michigan
Diesel Fuel Recovery Statistics

03/29/95

Date of Site Visit:	10/05/93	10/13/93	04/26/94	05/02/94	05/10/94	05/16/94	05/26/94	06/01/94	06/10/94	06/14/94	06/24/94
Days between site visits		8	195	6	8	6	10	6	9	4	10
Cumulative days of operation		8	203	209	217	223	233	239	248	252	262
Cumulative weeks of operation		1	29	30	31	32	33	34	35	36	37

Diesel Fuel Recovery Data

Periodic Recovery: Mills St. Recovery Trench:	0	1500	1500	0	1500	0	0	0	750	750	120
Cumulative Recovery: Trench:	0	1500	3000	3000	4500	4500	4500	4500	5250	6000	6120
Periodic Recovery: Sump S-05:											
Cumulative Recovery: Sump S-05:											
Periodic Recovery: Bailing MW-20:											
Cumulative Recovery: MW-20:											
Periodic Recovery: Total Site:	0	1500	1500	0	1500	0	0	0	750	750	120
Cumulative Recovery: Total Site:	0	1500	3000	3000	4500	4500	4500	4500	5250	6000	6120

Notes
All amounts reported in gallons.

				Tank Full		Tank Full	F.S. Sunk	F.S. Susp.			

Recovery Trench Data

Fuel Oil Thickness (feet)											
RW-1	0.07	0.05					0.2	0.13		0.17	
RW-2	0	0.04					0.23	0.19		0.08	
RW-3	0.12	0.18					0.83	0.59		0.08	
RW-4	0.18	0.13					0.87	1.1		0.07	
RW-5	0.18	0.04		0.32	0.03		0.91	0.23		0.06	
Average DTP (ft):	6.13	6.52					7.30	7.75		7.35	
Average Liquid Width (ft):	15.1	15.0					13.5	12.7		13.4	
Weighted Average Fuel Oil Thickness (ft):	0.098	0.089					0.547	0.434		0.100	
Estimated Volume of Fuel Oil in Trench (gals):	721	652					3602	2688		652	

Conrail
Botsford Yard
Kalamazoo, Michigan
Diesel Fuel Recovery Statistics

03/29/95

Date of Site Visit:	06/30/94	07/09/94	07/15/94	07/19/94	07/25/94	08/02/94	08/10/94	08/19/94	08/24/94	09/01/94	09/07/94
Days between site visits	6	9	6	4	6	8	8	9	5	8	6
Cumulative days of operation	268	277	283	287	293	301	309	318	323	331	337
Cumulative weeks of operation	38	40	40	41	42	43	44	45	46	47	48

Diesel Fuel Recovery Data

Periodic Recovery: Mills St. Recovery Trench:	120	110	1200	150	465	280	0	20	15	165	100
Cumulative Recovery: Trench:	6240	6350	7550	7700	8165	8445	8445	8465	8480	8645	8745
Periodic Recovery: Sump S-05:											
Cumulative Recovery: Sump S-05:											
Periodic Recovery: Bailing MW-20:											
Cumulative Recovery: MW-20:											
Periodic Recovery: Total Site:	120	110	1200	150	465	280	0	20	15	165	100
Cumulative Recovery: Total Site:	6240	6350	7550	7700	8165	8445	8445	8465	8480	8645	8745

Notes
All amounts reported in gallons.

Recovery Trench Data

Fuel Oil Thickness (feet)										
RW-1	0.1	0.03	0.06	0.03	0.06	0.02	0	0	0.05	0.01
RW-2	0.1	0.04	0.06	0.03	0.02	0.03	0.005	0.04	0.04	0.01
RW-3	0.07	0.1	0.35	0.1	0.04	0.05	0.01	0.05	0.03	0.03
RW-4	0.3	0.06	0.15	0.04	0.03	0.05	0.01	0.07	0.07	0
RW-5	0.1	0.07	0.16	0.04	0.03	0.01	0	0.07	0.01	0
Average DTP (ft):	5.61	6.41	6.78	6.41	6.45	7.38	4.43	5.77	7.01	7.32
Average Liquid Width (ft):	15.3	15.0	14.5	15.0	15.0	13.4	15.6	15.2	14.1	13.5
Weighted Average Fuel Oil Thickness (ft):	0.131	0.057	0.150	0.048	0.038	0.033	0.005	0.041	0.043	0.011
Estimated Volume of Fuel Oil in Trench (gals):	973	420	1060	351	276	216	39	301	292	74

Conrail
Botsford Yard
Kalamazoo, Michigan
Diesel Fuel Recovery Statistics

03/29/95

Date of Site Visit:	09/29/94	10/05/94	10/11/94	10/20/94	10/25/94	11/02/94	11/09/94	11/16/94	11/21/94	11/30/94	12/22/94
Days between site visits	22	6	6	9	5	8	7	7	5	9	22
Cumulative days of operation	359	365	371	380	385	393	400	407	412	421	443
Cumulative weeks of operation	51	52	53	54	55	56	57	58	59	60	63

Diesel Fuel Recovery Data

Periodic Recovery: Mills St. Recovery Trench:	230	160	270	95	200	85	15	155	30	140	230
Cumulative Recovery: Trench:	8975	9135	9405	9500	9700	9785	9800	9955	9985	10125	10355
Periodic Recovery: Sump S-05:			40		35	10	5				30
Cumulative Recovery: Sump S-05:			40	40	75	85	90	90	90	90	120
Periodic Recovery: Bailing MW-20:											
Cumulative Recovery: MW-20:											
Periodic Recovery: Total Site:	230	160	310	95	235	95	20	155	30	140	260
Cumulative Recovery: Total Site:	8975	9135	9445	9540	9775	9870	9890	10045	10075	10215	10475

Notes
All amounts reported in gallons.

Recovery Trench Data

Fuel Oil Thickness (feet)											
RW-1	0.03	0.02	0	0.04	0.03	0.02	0.02		0.01	0.03	
RW-2	0	0.03	0.01	0.05	0.05	0.03	0.02		0.06	0.07	0.22
RW-3	0.04	0.03	0.02	0.06	0.05	0.01	0.02		0.04	0.11	0.08
RW-4	0.02	0.06	0.01	0.02	0.06	0.02	0.01		0.06	0.05	0.11
RW-5	0	0.01	0.01	0.03	0.02	0.01	0.02		0.01	0.02	0.02
Average DTP (ft):	7.83	7.17	7.10	7.70	7.44	6.77	4.93		6.55	6.23	6.12
Average Liquid Width (ft):	12.6	13.8	13.9	12.8	13.3	14.5	15.5		14.9	15.1	15.1
Weighted Average Fuel Oil Thickness (ft):	0.020	0.031	0.010	0.042	0.043	0.019	0.018		0.037	0.059	0.089
Estimated Volume of Fuel Oil in Trench (gals):	124	206	64	260	280	134	137		268	431	656

Conrail
Botsford Yard
Kalamazoo, Michigan
Diesel Fuel Recovery Statistics

03/29/95

Date of Site Visit:	12/28/94	01/04/95	01/12/95	01/18/95	01/23/95	02/08/95	02/14/95	02/21/95	03/01/95	03/10/95
Days between site visits	6	7	8	6	5	16	6	7	8	9
Cumulative days of operation	449	456	464	470	475	491	497	504	512	521
Cumulative weeks of operation	64	65	66	67	68	70	71	72	73	74

Diesel Fuel Recovery Data

Periodic Recovery: Mills St. Recovery Trench:	105	90	220	0	160	595	90	205	320	25
Cumulative Recovery: Trench:	10460	10550	10770	10770	10930	11525	11615	11820	12140	12165
Periodic Recovery: Sump S-05:						10				
Cumulative Recovery: Sump S-05:	120	120	120	120	120	130	130	130	130	130
Periodic Recovery: Bailing MW-20:	5		3	4			3	2		
Cumulative Recovery: MW-20:	5	5	8	12	12	12	15	17	17	17
Periodic Recovery: Total Site:	110	90	223	4	160	605	93	207	320	25
Cumulative Recovery: Total Site:	10585	10675	10898	10902	11062	11667	11760	11967	12287	12312

Notes
All amounts reported in gallons.

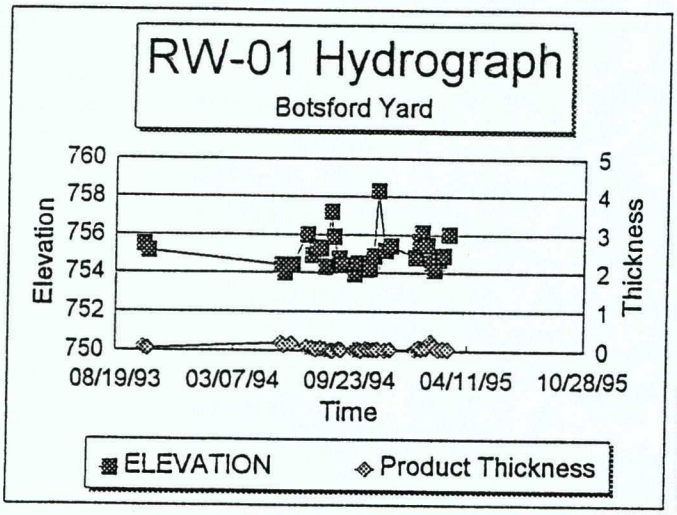
Recovery Trench Data

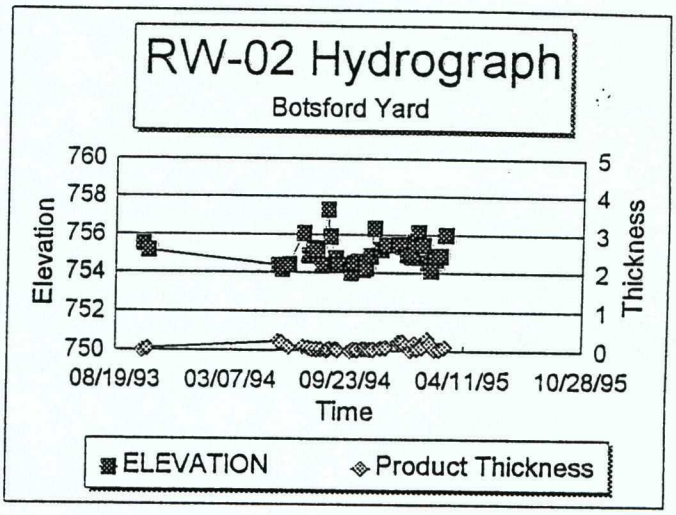
Fuel Oil Thickness (feet)										
RW-1			0.02	0.08	0.05	0.22	0.12	0.03	0.04	0.03
RW-2	0.22	0.13	0.01	0.18	0.04	0.31	0.18	0.03	0.03	0.09
RW-3	0.09	0.03	0.01	0.03	0.05	0.11	0.04	0.03	0.03	0.02
RW-4	0.08	0.05	0.01	0.04	0.05	0.06	0.03	0.01	0.03	0.03
RW-5	0.03	0.05	0.01	0.05	0.19	0.54	0.06	0.01	0.02	0.03
Average DTP (ft):	6.17	6.62	6.87	6.00	5.56	7.40	7.61	6.97	6.78	5.64
Average Liquid Width (ft):	15.1	14.8	14.3	15.2	15.3	13.4	13.0	14.1	14.5	15.3
Weighted Average Fuel Oil Thickness (ft):	0.087	0.050	0.013	0.081	0.064	0.223	0.093	0.024	0.031	0.041
Estimated Volume of Fuel Oil in Trench (gals):	638	363	88	596	473	1448	585	165	222	307

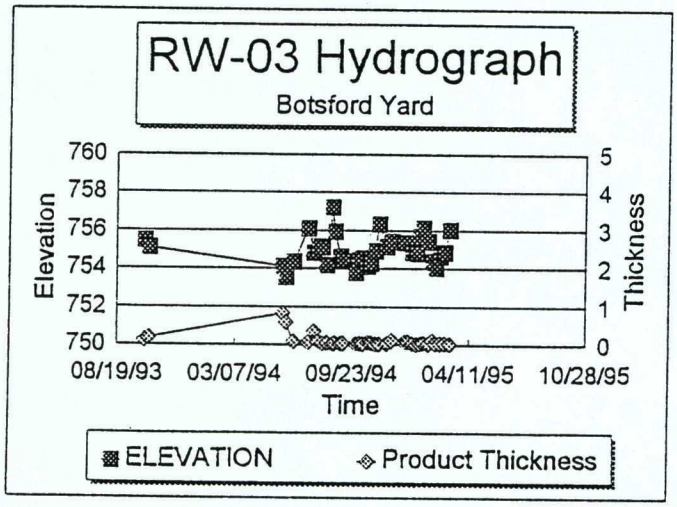
APPENDIX B

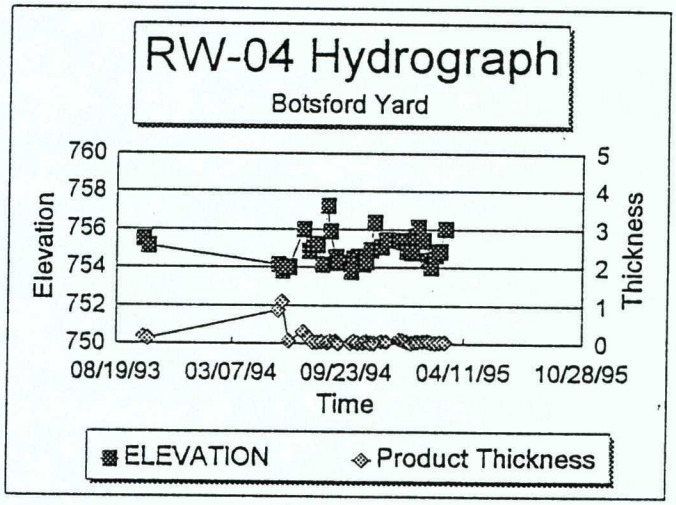
HYDROGRAPHS

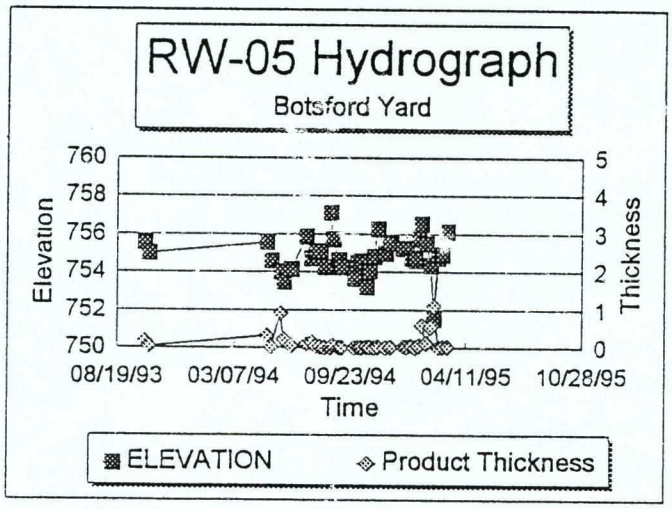
CONRAIL/BOTSFORD YARD
Recovery Wells



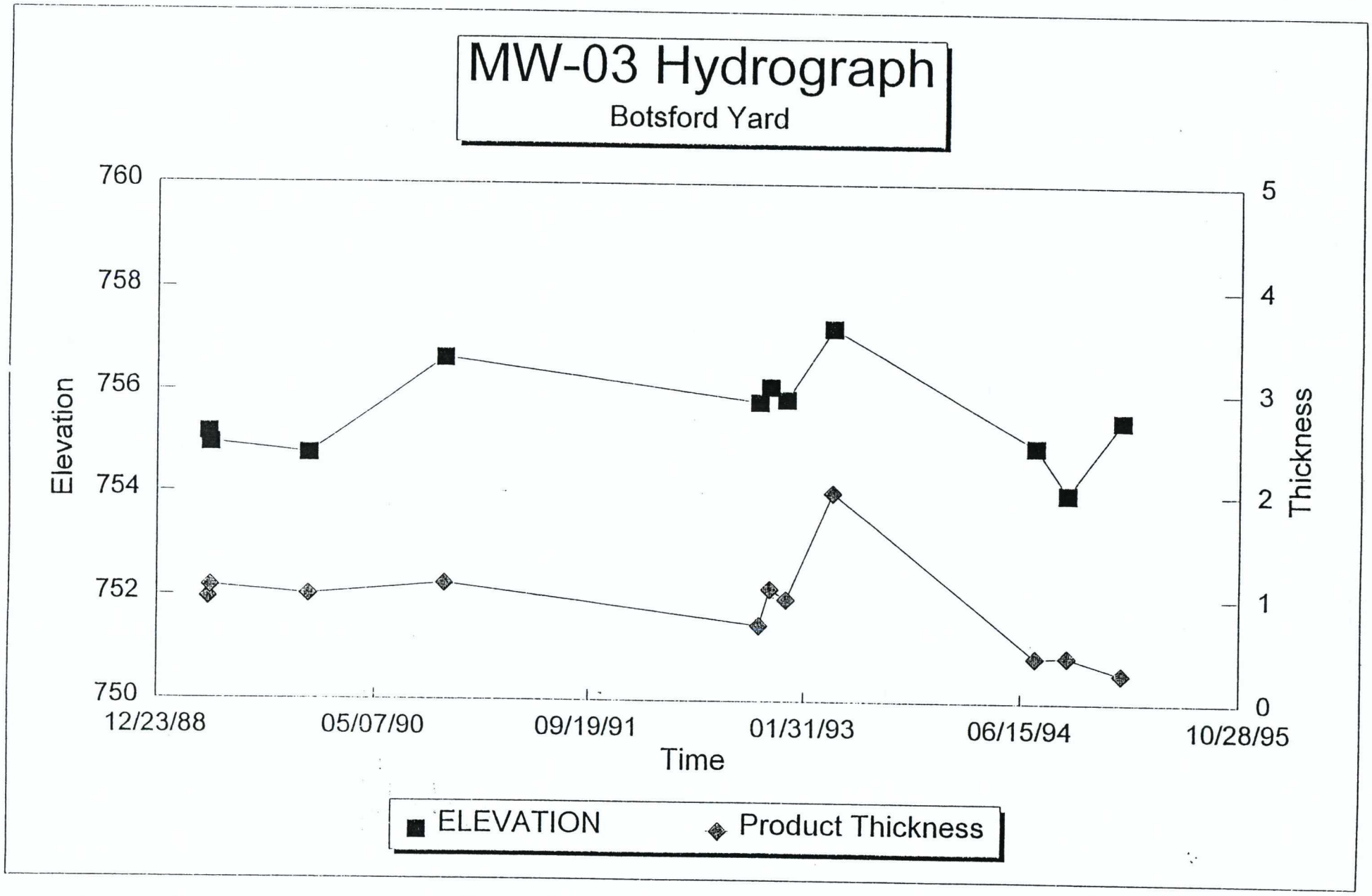


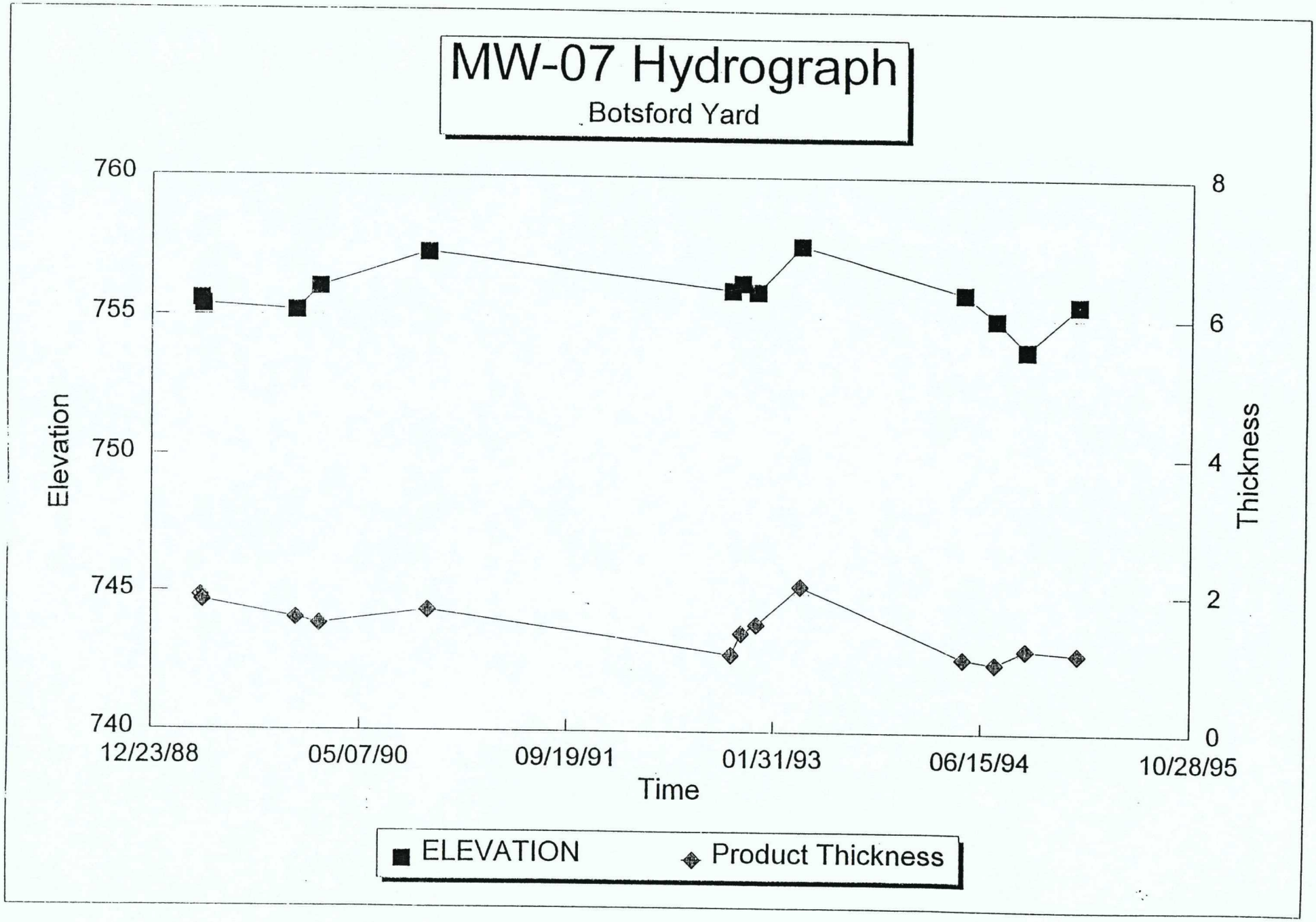




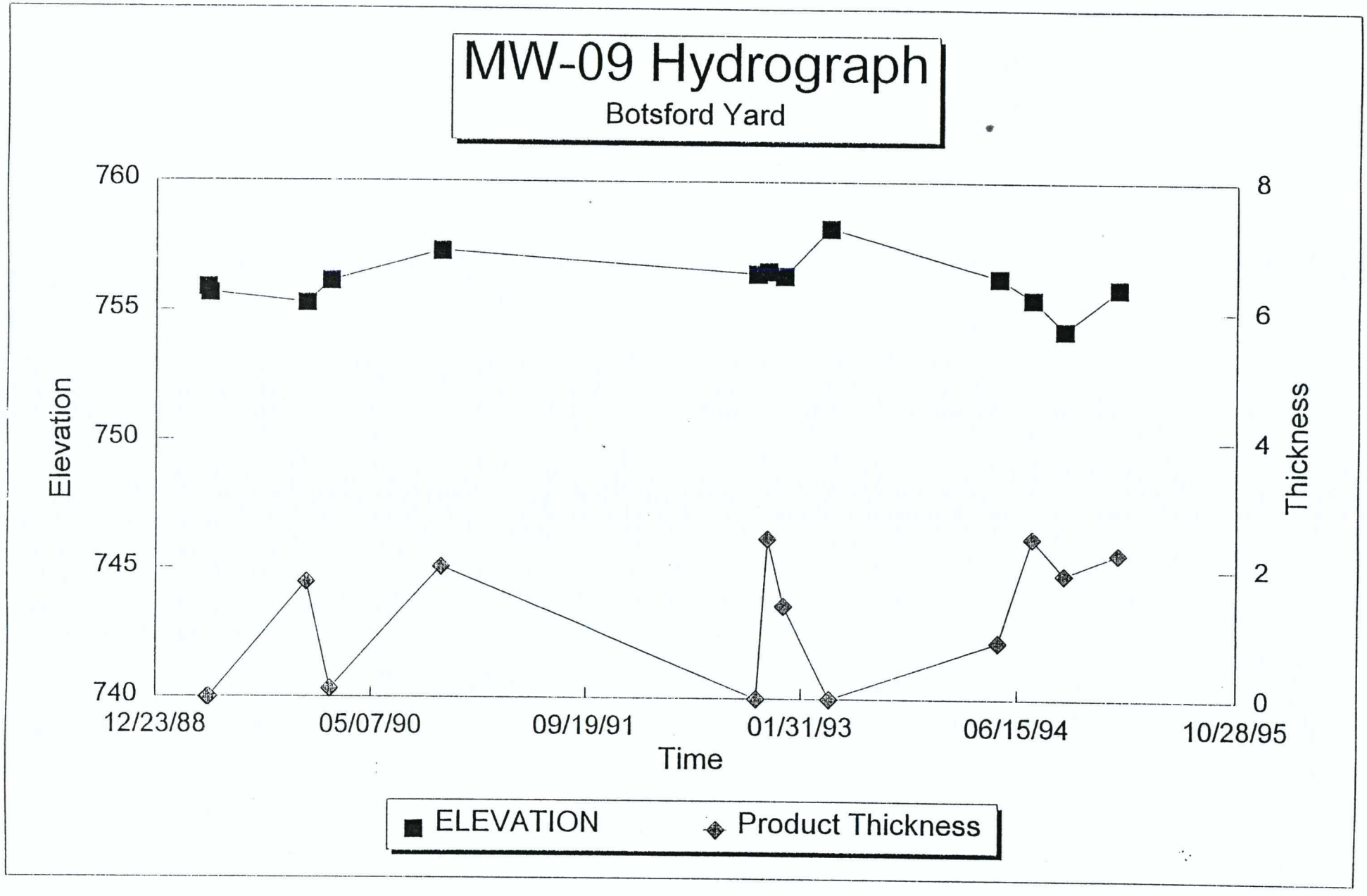


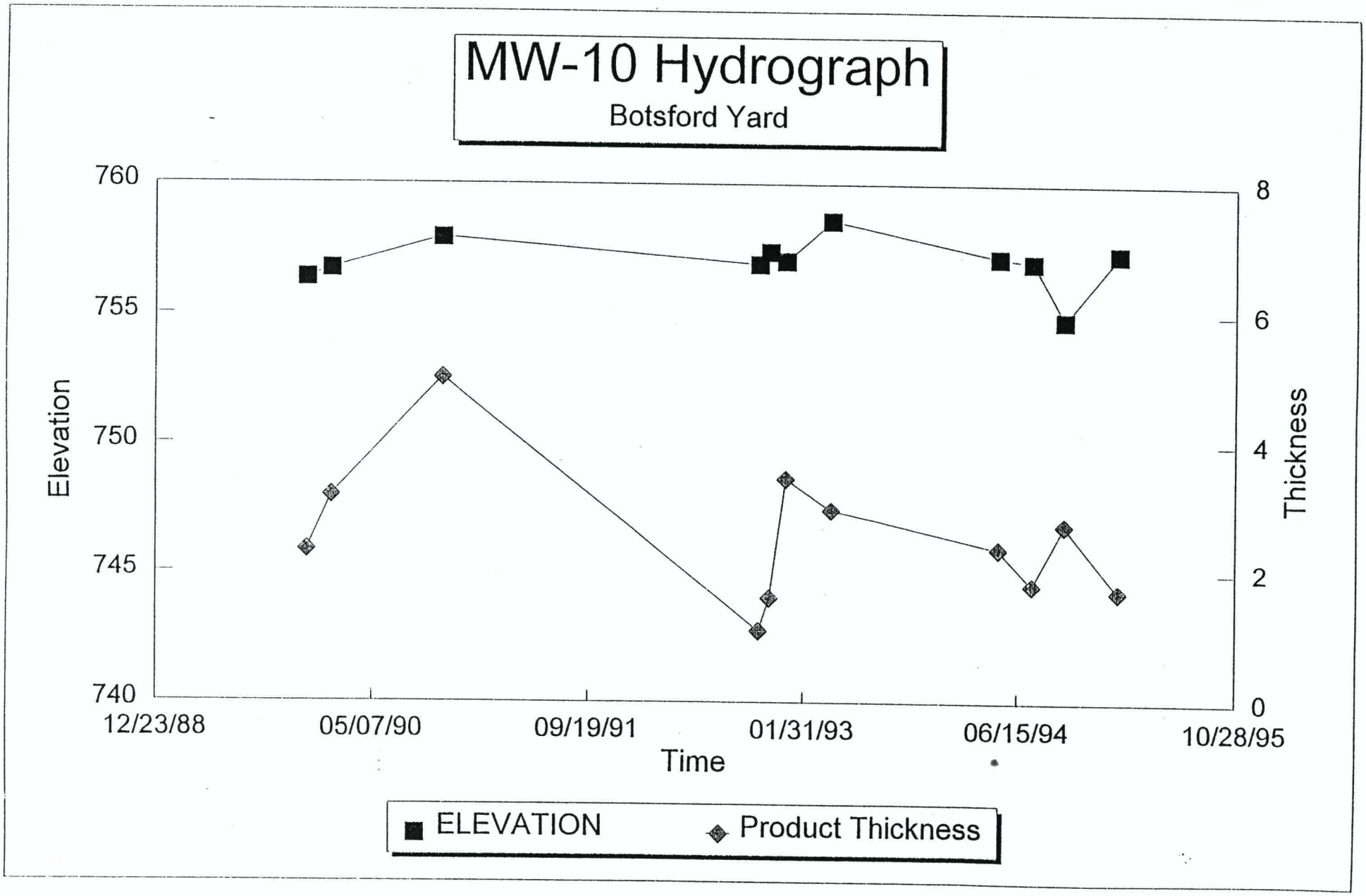
Thickness and Elevation in feet

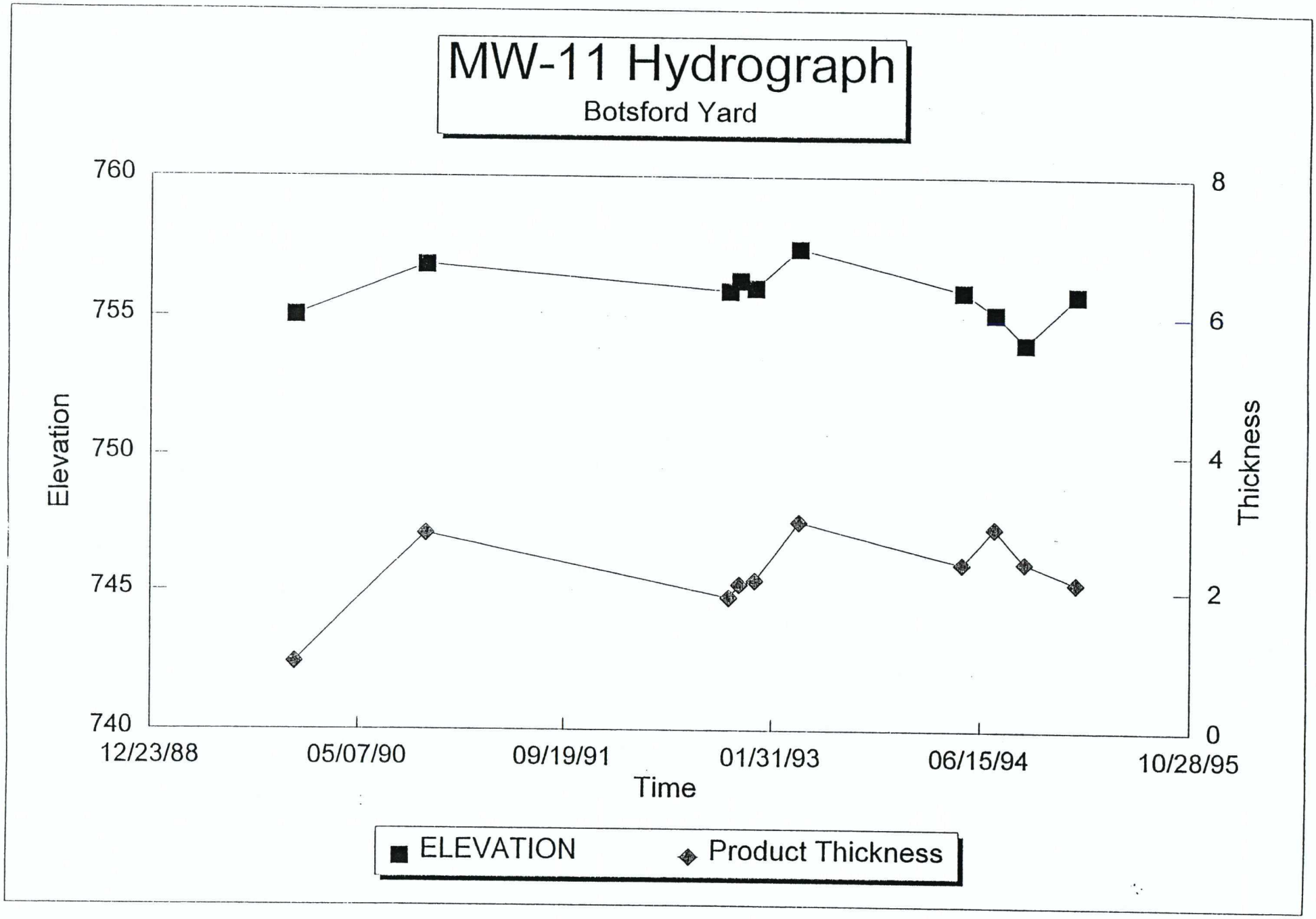

MW-03 Hydrograph
Botsford Yard
760
758
756
754
752
750
Elevation
5
4
3
2
1
0
Thickness
12/23/88
05/07/90
09/19/91
01/31/93
06/15/94
10/28/95
Time
ELEVATION
Product Thickness


MW-07 Hydrograph
Botsford Yard
760
755
750
745
740
Elevation
8
6
4
2
0
Thickness
12/23/88
05/07/90
09/19/91
01/31/93
06/15/94
10/28/95
Time
ELEVATION
Product Thickness

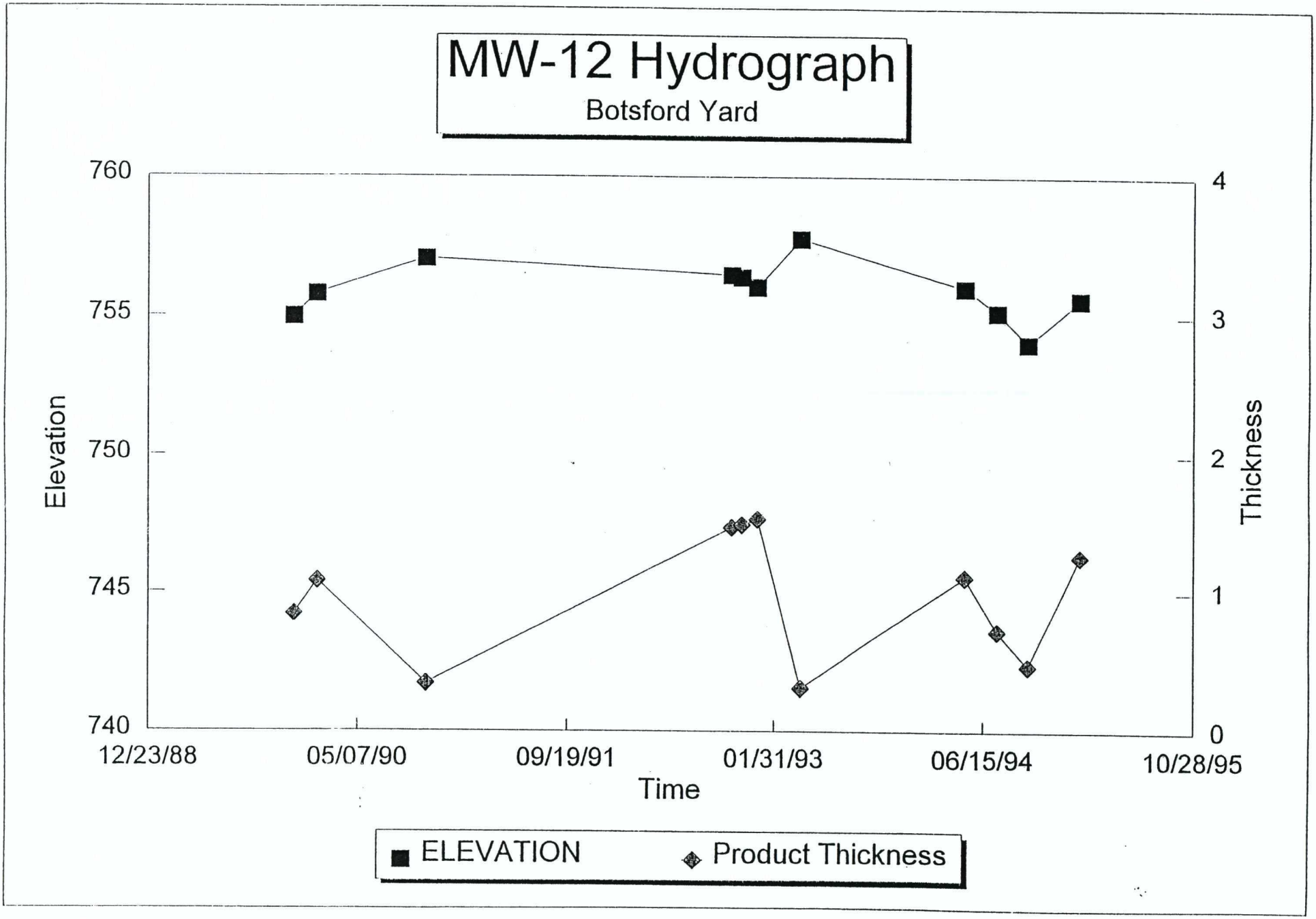
03/27/95


MW-09 Hydrograph
Botsford Yard
760
755
750
745
740
Elevation
8
6
4
2
0
Thickness
12/23/88
05/07/90
09/19/91
01/31/93
06/15/94
10/28/95
Time
ELEVATION
Product Thickness

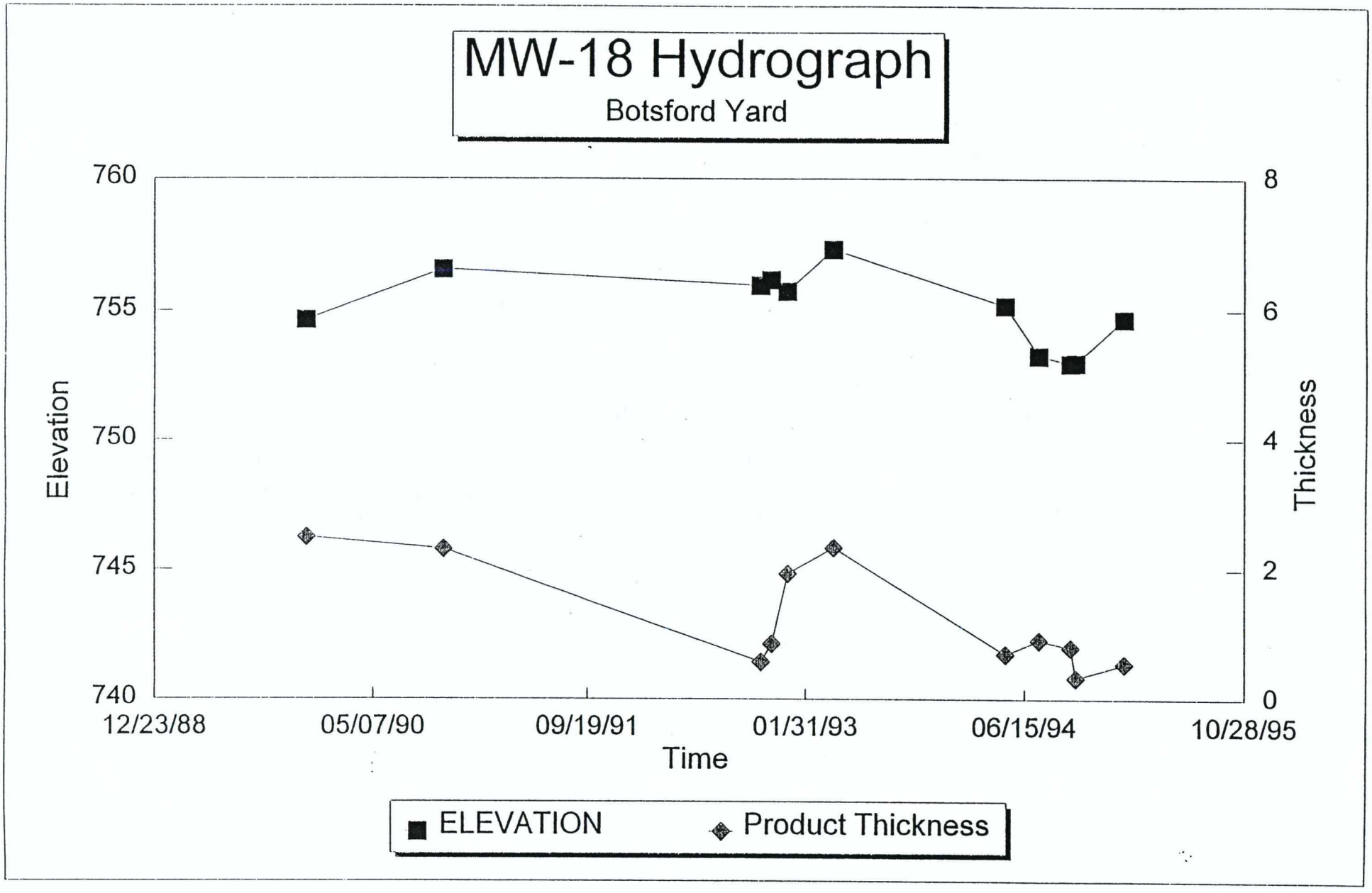

MW-10 Hydrograph
Botsford Yard
760
755
750
745
740
Elevation
8
6
4
2
0
Thickness
12/23/88
05/07/90
09/19/91
01/31/93
06/15/94
10/28/95
Time
ELEVATION
Product Thickness

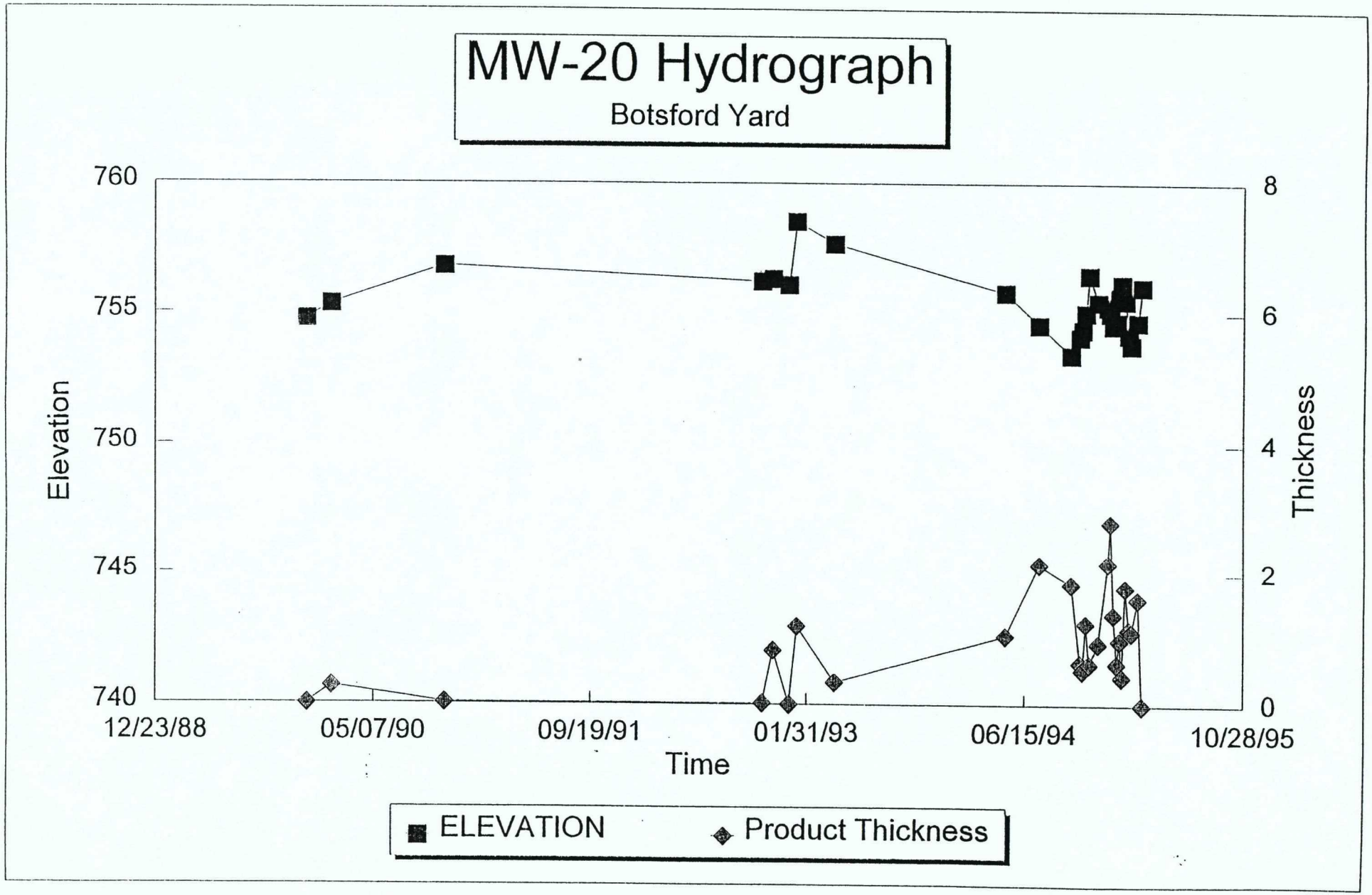

MW-11 Hydrograph
Botsford Yard
760
755
750
745
740
Elevation
8
6
4
2
0
Thickness
12/23/88
05/07/90
09/19/91
01/31/93
06/15/94
10/28/95
Time
ELEVATION
Product Thickness

03/27/95


MW-12 Hydrograph
Botsford Yard
760
755
750
745
740
Elevation
4
3
2
1
0
Thickness
12/23/88
05/07/90
09/19/91
01/31/93
06/15/94
10/28/95
Time
ELEVATION
Product Thickness

03/27/95


MW-18 Hydrograph
Botsford Yard
760
755
750
745
740
Elevation
8
6
4
2
0
Thickness
12/23/88
05/07/90
09/19/91
01/31/93
06/15/94
10/28/95
Time
ELEVATION
Product Thickness


MW-20 Hydrograph
Botsford Yard
760
755
750
745
740
Elevation
8
6
4
2
0
Thickness
12/23/88
05/07/90
09/19/91
01/31/93
06/15/94
10/28/95
Time
ELEVATION
Product Thickness

APPENDIX C

GAUGING DATA TABLE

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M/D/Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-01	04/21/89	767.93	11.96		—	NA	NA	11.96	755.97
MW-01	04/26/89	767.93	12.19		—	NA	NA	12.19	755.74
MW-01	12/05/89	767.93	12.61		—	NA	NA	12.61	755.32
MW-01	01/31/90	767.93	12.15		—	NA	NA	12.15	755.78
MW-01	10/17/90	767.93	10.83		—	NA	NA	10.83	757.10
MW-01	10/20/92	767.93	11.73		—	NA	NA	11.73	756.20
MW-01	11/13/92	767.93	3.11		—	NA	NA	3.11	764.82
MW-01	12/21/92	767.93	3.04		—	NA	NA	3.04	764.89
MW-01	04/05/93	767.93	2.51	Casing cracked about 2.5 feet from the top					
MW-01	07/18/94	767.93	1.61		—	NA	NA	1.61	766.32
MW-01	09/29/94	767.93	1.33		—	NA	NA	1.33	766.60
MW-02	12/21/92	100.10	Well gauged in November; damaged (cause unknown) prior to survey in December 1992.						
MW-03	04/21/89	767.27	12.88	11.90	0.98	0.80	0.78	12.10	755.17
MW-03	04/26/89	767.27	13.18	12.09	1.09	0.80	0.87	12.31	754.96
MW-03	12/05/89	767.27	13.32	12.31	1.01	0.80	0.81	12.51	754.76
MW-03	10/17/90	767.27	11.52	10.40	1.12	0.80	0.90	10.62	756.65
MW-03	10/20/92	767.27	12.05	11.32	0.73	0.80	0.58	11.47	755.80
MW-03	11/13/92	767.27	12.03	10.95	1.08	0.80	0.86	11.17	756.10
MW-03	12/21/92	767.27	12.20	11.22	0.98	0.80	0.78	11.42	755.85
MW-03	04/05/93	767.27	11.63	9.62	2.01	0.80	1.61	10.02	757.25
MW-03	07/18/94	767.27	12.68	12.24	0.44	0.80	0.35	12.33	754.94
MW-03	09/29/94	767.27	13.60	13.15	0.45	0.80	0.36	13.24	754.03
MW-03	01/31/95	767.27	12.03	11.74	0.29	0.80	0.23	11.80	755.47
MW-04	04/21/89	764.16	9.41	9.35	0.06	0.80	0.05	9.36	754.80
MW-04	04/26/89	764.16	9.73	9.56	0.17	0.80	0.14	9.59	754.57
MW-04	12/05/89	764.16	9.52		—	NA	NA	9.52	754.64
MW-04	01/31/90	764.16	8.90		—	NA	NA	8.90	755.26
MW-04	10/17/90	764.16	7.29		—	NA	NA	7.29	756.87
MW-04	10/20/92	764.16	8.17	SHEEN	—	NA	NA	8.17	755.99
MW-04	11/13/92	764.16	7.81		—	NA	NA	7.81	756.35
MW-04	12/21/92	764.16	8.24		—	NA	NA	8.24	755.92
MW-04	01/07/93	764.16	5.45		—	NA	NA	5.45	758.71
MW-04	04/05/93	764.16	6.46		—	NA	NA	6.46	757.70
MW-04	05/02/94	764.16	8.37		—	NA	NA	8.37	755.79

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-04	07/18/94	764.16	9.20		—	NA	NA	9.20	754.96
MW-04	09/29/94	764.16	10.56		—	NA	NA	10.56	753.60
MW-04	01/31/95	764.16	8.50	8.49	0.01	0.80	0.01	8.49	755.67
MW-05	04/21/89	764.04	8.94		—	NA	NA	8.94	755.10
MW-05	04/26/89	764.04	9.08		—	NA	NA	9.08	754.96
MW-05	12/05/89	764.04	9.01		—	NA	NA	9.01	755.03
MW-05	01/31/90	764.04	8.41		—	NA	NA	8.41	755.63
MW-05	10/17/90	764.04	7.16		—	NA	NA	7.16	756.88
MW-05	10/20/92	764.04	8.02		—	NA	NA	8.02	756.02
MW-05	11/13/92	764.04	7.66		—	NA	NA	7.66	756.38
MW-05	12/21/92	764.04	8.07		—	NA	NA	8.07	755.97
MW-05	01/07/93	764.04	5.30		—	NA	NA	5.30	758.74
MW-05	04/05/93	764.04	6.35	SHEEN	—	NA	NA	6.35	757.69
MW-05	05/02/94	764.06	8.15		—	NA	NA	8.15	755.91
MW-05	07/18/94	764.06	9.55		—	NA	NA	9.55	754.51
MW-05	09/29/94	764.06	10.53		—	NA	NA	10.53	753.53
MW-05	10/11/94	764.06	9.54	9.53	0.01	0.80	0.01	9.53	754.53
MW-05	01/31/95	764.06	8.40		—	NA	NA	8.40	755.66
MW-06	04/21/89	764.59	9.14	9.12	0.02	0.80	0.02	9.12	755.47
MW-06	04/26/89	764.59	9.35	9.33	0.02	0.80	0.02	9.33	755.26
MW-06	12/05/89	764.59	9.55	9.54	0.01	0.80	0.01	9.54	755.05
MW-06	01/31/90	764.59	8.95		—	NA	NA	8.95	755.64
MW-06	10/17/90	764.59	7.65	7.63	0.02	0.80	0.02	7.63	756.96
MW-06	10/20/92	764.59	8.46		—	NA	NA	8.46	756.13
MW-06	11/13/92	764.59	8.04	SHEEN	—	NA	NA	8.04	756.55
MW-06	12/21/92	764.59	8.56		—	NA	NA	8.56	756.03
MW-06	01/07/93	764.59	5.93	5.82	0.11	0.80	0.09	5.84	758.75
MW-06	04/05/93	764.59	6.91	6.82	0.09	0.80	0.07	6.84	757.75
MW-06	05/02/94	764.59	8.62		—	NA	NA	8.62	755.97
MW-06	07/18/94	764.59	9.46	9.45	0.01	0.80	0.01	9.45	755.14
MW-06	09/29/94	764.59	10.65	10.63	0.02	0.80	0.02	10.63	753.96
MW-06	01/31/95	764.59	9.07	8.89	0.18	0.80	0.14	8.93	755.66
MW-07	04/21/89	769.13	15.09	13.15	1.94	0.80	1.55	13.54	755.59
MW-07	04/26/89	769.13	15.23	13.36	1.87	0.80	1.50	13.73	755.40

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-07	12/05/89	769.13	15.23	13.61	1.62	0.80	1.30	13.93	755.20
MW-07	01/30/90	769.13	14.32	12.78	1.54	0.80	1.23	13.09	756.04
MW-07	10/17/90	769.13	13.24	11.50	1.74	0.80	1.39	11.85	757.28
MW-07	10/20/92	769.13	14.06	12.95	1.11	0.80	0.89	13.17	755.96
MW-07	11/13/92	769.13	14.05	12.63	1.42	0.80	1.14	12.91	756.22
MW-07	12/21/92	769.13	14.46	12.91	1.55	0.80	1.24	13.22	755.91
MW-07	04/05/93	769.13	13.26	11.15	2.11	0.80	1.69	11.57	757.56
MW-07	05/02/94	769.13	14.12	13.05	1.07	0.80	0.86	13.26	755.87
MW-07	07/18/94	769.13	14.96	13.96	1.00	0.80	0.80	14.16	754.97
MW-07	09/29/94	769.13	16.20	15.00	1.20	0.80	0.96	15.24	753.89
MW-07	01/31/95	769.13	14.53	13.39	1.14	0.80	0.91	13.62	755.51
MW-08	04/21/89	769.07	13.92	13.21	0.71	0.80	0.57	13.35	755.72
MW-08	04/26/89	769.07	15.37	13.33	2.04	0.80	1.63	13.74	755.33
MW-08	12/05/89	769.07	14.80	13.54	1.26	0.80	1.01	13.79	755.28
MW-08	01/30/90	769.07	14.10	12.77	1.33	0.80	1.06	13.04	756.03
MW-08	10/17/90	769.07	11.46	11.41	0.05	0.80	0.04	11.42	757.65
MW-08	10/20/92	769.07	11.73	11.60	0.13	0.80	0.10	11.63	757.44
MW-08	11/13/92	769.07	11.23	11.01	0.22	0.80	0.18	11.05	758.02
MW-08	12/21/92	769.07	12.79	12.39	0.40	0.80	0.32	12.47	756.60
MW-08	04/05/93	769.07	10.71	10.59	0.12	0.80	0.10	10.61	758.46
MW-08	05/02/94	769.07	12.09	11.72	0.37	0.80	0.30	11.79	757.28
MW-08	07/18/94	769.07	12.01	11.98	0.03	0.80	0.02	11.99	757.08
MW-08	09/29/94	769.07	14.61	14.53	0.08	0.80	0.06	14.55	754.52
MW-08	01/31/95	769.07	11.64	11.58	0.06	0.80	0.05	11.59	757.48
MW-09	04/21/89	769.28	13.36		---	NA	NA	13.36	755.92
MW-09	04/26/89	769.28	13.58		---	NA	NA	13.58	755.70
MW-09	12/05/89	769.28	15.40	13.62	1.78	0.80	1.42	13.98	755.30
MW-09	01/30/90	769.28	13.22	13.09	0.13	0.80	0.10	13.12	756.16
MW-09	10/17/90	769.28	13.61	11.58	2.03	0.80	1.62	11.99	757.29
MW-09	10/20/92	769.28	12.81		---	NA	NA	12.81	756.47
MW-09	11/13/92	769.28	14.70	12.21	2.49	0.80	1.99	12.71	756.57
MW-09	12/21/92	769.28	14.03	12.60	1.43	0.80	1.14	12.89	756.39
MW-09	04/05/93	769.28	11.09	SHEEN	---	NA	NA	11.09	758.19
MW-09	05/02/94	769.28	13.65	12.77	0.88	0.80	0.70	12.95	756.33
MW-09	07/18/94	769.28	15.76	13.25	2.51	0.80	2.01	13.75	755.53

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-09	09/29/94	769.28	16.51	14.58	1.93	0.80	1.54	14.97	754.31
MW-09	01/31/95	769.28	15.14	12.88	2.26	0.80	1.81	13.33	755.95
MW-10	12/05/89	766.11	11.58	9.24	2.34	0.80	1.87	9.71	756.40
MW-10	01/31/90	766.11	11.92	8.73	3.19	0.80	2.55	9.37	756.74
MW-10	10/17/90	766.11	12.18	7.16	5.02	0.80	4.02	8.16	757.95
MW-10	10/20/92	766.11	10.04	8.95	1.09	0.80	0.87	9.17	756.94
MW-10	11/13/92	766.11	9.98	8.38	1.60	0.80	1.28	8.70	757.41
MW-10	12/21/92	766.11	11.80	8.34	3.46	0.80	2.77	9.03	757.08
MW-10	04/05/93	766.11	9.87	6.90	2.97	0.80	2.38	7.49	758.62
MW-10	05/02/94	766.11	10.80	8.43	2.37	0.80	1.90	8.90	757.21
MW-10	07/18/94	766.11	10.52	8.71	1.81	0.80	1.45	9.07	757.04
MW-10	09/29/94	766.11	13.49	10.75	2.74	0.80	2.19	11.30	754.81
MW-10	01/31/95	766.11	10.10	8.39	1.71	0.80	1.37	8.73	757.38
MW-11	12/05/89	769.98	15.72	14.74	0.98	0.80	0.78	14.94	755.04
MW-11	10/17/90	769.98	15.42	12.58	2.84	0.80	2.27	13.15	756.83
MW-11	10/20/92	769.98	15.59	13.69	1.90	0.80	1.52	14.07	755.91
MW-11	11/13/92	769.98	15.37	13.28	2.09	0.80	1.67	13.70	756.28
MW-11	12/21/92	769.98	15.68	13.53	2.15	0.80	1.72	13.96	756.02
MW-11	04/05/93	769.98	14.96	11.95	3.01	0.80	2.41	12.55	757.43
MW-11	05/02/94	769.98	16.00	13.60	2.40	0.80	1.92	14.08	755.90
MW-11	07/18/94	769.98	17.19	14.26	2.93	0.80	2.34	14.85	755.13
MW-11	09/29/94	769.98	17.87	15.45	2.42	0.80	1.94	15.93	754.05
MW-11	01/31/95	769.98	15.87	13.75	2.12	0.80	1.70	14.17	755.81
MW-12	12/05/89	768.85	14.53	13.69	0.84	0.80	0.67	13.86	754.9[illegible]
MW-12	01/30/90	768.85	13.92	12.84	1.08	0.80	0.86	13.06	755.79
MW-12	10/17/90	768.85	12.05	11.71	0.34	0.80	0.27	11.78	757.07
MW-12	10/20/92	768.85	13.54	12.07	1.47	0.80	1.18	12.36	756.4[illegible]
MW-12	11/13/92	768.85	13.64	12.15	1.49	0.80	1.19	12.45	756.40
MW-12	12/21/92	768.85	14.02	12.49	1.53	0.80	1.22	12.80	756.05
MW-12	04/05/93	768.85	11.30	10.99	0.31	0.80	0.25	11.05	757.80
MW-12	05/02/94	768.85	13.71	12.60	1.11	0.80	0.89	12.82	756.03
MW-12	07/18/94	768.85	14.25	13.53	0.72	0.80	0.58	13.67	755.18
MW-12	09/29/94	768.85	15.17	14.70	0.47	0.80	0.38	14.79	754.06
MW-12	01/31/95	768.85	14.23	12.97	1.26	0.80	1.01	13.22	755.63

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M/D/Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-13	12/05/89	768.83	14.02	13.41	0.61	0.80	0.49	13.53	755.30
MW-13	01/30/90	768.83	13.11	12.72	0.39	0.80	0.31	12.80	756.03
MW-13	10/17/90	768.83	12.72	11.35	1.37	0.80	1.10	11.62	757.21
MW-13	10/20/92	768.83	13.30	12.30	1.00	0.80	0.80	12.50	756.33
MW-13	11/13/92	768.83	13.56	11.97	1.59	0.80	1.27	12.29	756.54
MW-13	12/21/92	768.83	14.42	12.16	2.26	0.80	1.81	12.61	756.22
MW-13	04/05/93	768.83	10.91	10.73	0.18	0.80	0.14	10.77	758.06
MW-13	05/02/94	768.83	13.11	12.44	0.67	0.80	0.54	12.57	756.26
MW-13	07/18/94	768.83	14.65	13.08	1.57	0.80	1.26	13.39	755.44
MW-13	09/29/94	768.83	14.29		—	NA	NA	14.29	754.54
MW-13	01/31/95	768.83	14.93	12.55	2.38	0.80	1.90	13.03	755.80
MW-14		765.79	CASING BROKEN			—	—	—	
MW-14	12/05/89	765.79	15.86	11.82	4.04	0.80	3.23	12.63	753.16
MW-14	01/30/90	765.79	15.86	10.98	4.88	0.80	3.90	11.96	753.83
MW-14	10/17/90	765.79	13.62	9.73	3.89	0.80	3.11	10.51	755.28
MW-14	11/13/92	765.79	7.78	7.36	0.42	0.80	0.34	7.44	758.35
MW-14	12/21/92	765.79	8.25	7.93	0.32	0.80	0.26	7.99	757.80
MW-14	04/05/93	765.79	7.09	6.82	0.27	0.80	0.22	6.87	758.92
MW-14	05/02/94	765.79	8.46	7.51	0.95	0.80	0.76	7.70	758.09
MW-14	07/18/94	765.79	8.60	8.26	0.34	0.80	0.27	8.33	757.46
MW-14	09/29/94	765.79	10.91	9.95	0.96	0.80	0.77	10.14	755.65
MW-15	12/05/89	767.06	11.72		—	NA	NA	11.72	755.34
MW-15	01/30/90	767.06	11.12		—	NA	NA	11.12	755.94
MW-15	10/17/90	767.06	9.72		—	NA	NA	9.72	757.34
MW-15	10/20/92	767.06	10.69		—	NA	NA	10.69	756.37
MW-15	11/13/92	767.06	10.35		—	NA	NA	10.35	756.71
MW-15	12/21/92	767.06	10.64		—	NA	NA	10.64	756.42
MW-15	04/05/93	767.06	9.05		—	NA	NA	9.05	758.01
MW-15	05/02/94	767.06	13.73		—	NA	NA	13.73	753.33
MW-15	07/18/94	767.06	11.42		—	NA	NA	11.42	755.64
MW-15	09/29/94	767.06	12.66		—	NA	NA	12.66	754.40
MW-15	01/31/95	767.06	10.99		—	NA	NA	10.99	756.07
MW-16	12/05/89	766.76	11.87	11.84	0.03	0.80	0.02	11.85	754.91

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-16	01/30/90	766.76	10.83		—	NA	NA	10.83	755.93
MW-16	10/17/90	766.76	9.34	9.18	0.16	0.80	0.13	9.21	757.55
MW-16	10/21/92	766.76	12.54	9.03	3.51	0.80	2.81	9.73	757.03
MW-16	11/13/92	766.76	11.36	9.68	1.68	0.80	1.34	10.02	756.74
MW-16	12/21/92	766.76	12.36	9.98	2.38	0.80	1.90	10.46	756.30
MW-16	04/05/93	766.76	8.70	8.57	0.13	0.80	0.10	8.60	758.16
MW-16	05/02/94	766.76	12.71	10.40	2.31	0.80	1.85	10.86	755.90
MW-16	07/18/94	766.76	12.71	11.23	1.48	0.80	1.18	11.53	755.23
MW-16	09/29/94	766.76	12.97	12.55	0.42	0.80	0.34	12.63	754.13
MW-16	01/31/95	766.76	10.44		—	NA	NA	10.44	756.32
MW-17	12/05/89	766.31	11.27		—	NA	NA	11.27	755.04
MW-17	01/31/90	766.31	10.69		—	NA	NA	10.69	755.62
MW-17	10/17/90	766.31	9.58		—	NA	NA	9.58	756.73
MW-17	10/20/92	766.31	10.40		—	NA	NA	10.40	755.91
MW-17	11/13/92	766.31	10.04		—	NA	NA	10.04	756.27
MW-17	12/21/92	766.31	10.26		—	NA	NA	10.26	756.05
MW-17	04/05/93	766.31	9.12		—	NA	NA	9.12	757.19
MW-17	05/02/94	766.31	10.39		—	NA	NA	10.39	755.92
MW-17	07/18/94	766.31	11.06		—	NA	NA	11.06	755.25
MW-17	09/29/94	766.31	12.13		—	NA	NA	12.13	754.18
MW-17	01/31/95	766.31	10.58		—	NA	NA	10.58	755.73
MW-18	12/05/89	767.85	15.19	12.69	2.50	0.80	2.00	13.19	754.66
MW-18	10/17/90	767.85	13.12	10.80	2.32	0.80	1.86	11.26	756.59
MW-18	10/20/92	767.85	12.34	11.76	0.58	0.80	0.46	11.88	755.97
MW-18	11/13/92	767.85	12.35	11.49	0.86	0.80	0.69	11.66	756.19
MW-18	12/21/92	767.85	13.65	11.71	1.94	0.80	1.55	12.10	755.75
MW-18	04/05/93	767.85	12.38	10.04	2.34	0.80	1.87	10.51	757.34
MW-18	05/02/94	767.85	13.20	12.50	0.70	0.80	0.56	12.64	755.21
MW-18	07/18/94	767.85	15.28	14.37	0.91	0.80	0.73	14.55	753.30
MW-18	09/29/94	767.85	15.50	14.70	0.80	0.80	0.64	14.86	752.99
MW-18	10/11/94	767.85	15.09	14.76	0.33	0.80	0.26	14.83	753.02
MW-18	01/31/95	767.85	13.60	13.05	0.55	0.80	0.44	13.16	754.69
MW-19	12/05/89	763.80	9.04		—	NA	NA	9.04	754.76
MW-19	01/31/90	763.80	8.42		—	NA	NA	8.42	755.38

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M/D/Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-19	10/17/90	763.80	6.91		—	NA	NA	6.91	756.89
MW-19	10/20/92	763.80	7.75	SHEEN	—	NA	NA	7.75	756.05
MW-19	11/13/92	763.80	7.50		—	NA	NA	7.50	756.30
MW-19	12/21/92	763.80	7.93		—	NA	NA	7.93	755.87
MW-19	01/07/93	763.80	5.10		—	NA	NA	5.10	758.70
MW-19	04/05/93	763.80	6.17		—	NA	NA	6.17	757.63
MW-19	05/02/94	763.80	8.15		—	NA	NA	8.15	755.65
MW-19	07/18/94	763.80	9.43		—	NA	NA	9.43	754.37
MW-19	09/29/94	763.80	10.36		—	NA	NA	10.36	753.44
MW-19	10/11/94	763.80	9.66		—	NA	NA	9.66	754.14
MW-19	01/31/95	763.80	8.54		—	NA	NA	8.54	755.26
MW-20	12/05/89	763.44	8.66		—	NA	NA	8.66	754.78
MW-20	01/31/90	763.44	8.30	8.04	0.26	0.80	0.21	8.09	755.35
MW-20	10/17/90	763.44	6.65	6.63	0.02	0.80	0.02	6.63	756.81
MW-20	10/20/92	763.44	7.23	7.21	0.02	0.80	0.02	7.21	756.23
MW-20	11/13/92	763.44	7.76	6.95	0.81	0.80	0.65	7.11	756.33
MW-20	12/21/92	763.44	7.34		—	NA	NA	7.34	756.10
MW-20	01/07/93	763.44	5.85	4.67	1.18	0.80	0.94	4.91	758.53
MW-20	04/05/93	763.44	6.03	5.70	0.33	0.80	0.26	5.77	757.67
MW-20	05/02/94	763.44	8.45	7.41	1.04	0.80	0.83	7.62	755.82
MW-20	07/18/94	763.44	10.57	8.42	2.15	0.80	1.72	8.85	754.59
MW-20	09/29/94	763.44	11.45	9.61	1.84	0.80	1.47	9.98	753.46
MW-20	10/20/94	763.44	9.80	9.17	0.63	0.80	0.50	9.30	754.14
MW-20	10/25/94	763.44	9.43	8.91	0.52	0.80	0.42	9.01	754.43
MW-20	11/02/94	763.44	9.36	8.13	1.23	0.80	0.98	8.38	755.06
MW-20	11/09/94	763.44	7.43	6.82	0.61	0.80	0.49	6.94	756.50
MW-20	11/30/94	763.44	8.69	7.77	0.92	0.80	0.74	7.95	755.49
MW-20	12/22/94	763.44	9.88	7.71	2.17	0.80	1.74	8.14	755.30
MW-20	12/28/94	763.44	10.63	7.82	2.81	0.80	2.25	8.38	755.06
MW-20	01/04/95	763.44	9.95	8.58	1.37	0.80	1.10	8.85	754.59
MW-20	01/12/95	763.44	9.22	8.60	0.62	0.80	0.50	8.72	754.72
MW-20	01/18/95	763.44	8.54	7.57	0.97	0.80	0.78	7.76	755.68
MW-20	01/23/95	763.44	7.60	7.18	0.42	0.80	0.34	7.26	756.18
MW-20	01/31/95	763.44	9.69	7.90	1.79	0.80	NA	7.90	755.54
MW-20	02/08/95	763.44	10.12	8.98	1.14	0.80	0.91	9.21	754.23
MW-20	02/14/95	763.44	10.48	9.38	1.10	0.80	0.88	9.60	753.84

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-20	03/01/95	763.44	10.01	8.40	1.61	0.80	NA	8.72	754.72
MW-20	03/10/95	763.44	7.38		---	NA	NA	7.38	756.06
MW-21	12/05/89	764.34	9.36		---	NA	NA	9.36	754.98
MW-21	01/31/90	764.34	8.81		---	NA	NA	8.81	755.53
MW-21	10/17/90	764.34	7.40		---	NA	NA	7.40	756.94
MW-21	10/20/92	764.34	8.03		---	NA	NA	8.03	756.31
MW-21	11/13/92	764.34	7.89		---	NA	NA	7.89	756.45
MW-21	12/21/92	764.34	8.31		---	NA	NA	8.31	756.03
MW-21	01/07/93	764.34	5.54		---	NA	NA	5.54	758.80
MW-21	04/05/93	764.34	6.56		---	NA	NA	6.56	757.78
MW-21	05/02/94	764.34	8.38		---	NA	NA	8.38	755.96
MW-21	07/18/94	764.34	9.27		---	NA	NA	9.27	755.07
MW-21	09/29/94	764.34	10.38		---	NA	NA	10.38	753.96
MW-21	01/31/95	764.34	8.82		---	NA	NA	8.82	755.52
RW-01	10/05/93	762.57	7.12	7.05	0.07	0.80	0.06	7.06	755.51
RW-01	10/13/93	762.57	7.44	7.39	0.05	0.80	0.04	7.40	755.17
RW-01	05/26/94	762.57	8.32	8.12	0.20	0.80	0.16	8.16	754.41
RW-01	06/01/94	762.57	8.64	8.51	0.13	0.80	0.10	8.54	754.03
RW-01	06/14/94	762.57	8.27	8.10	0.17	0.80	0.14	8.13	754.44
RW-01	07/09/94	762.57	6.65	6.55	0.10	0.80	0.08	6.57	756.00
RW-01	07/19/94	762.57	7.69	7.63	0.06	0.80	0.05	7.64	754.93
RW-01	07/25/94	762.57	7.28	7.25	0.03	0.80	0.02	7.26	755.31
RW-01	08/02/94	762.57	7.33	7.27	0.06	0.80	0.05	7.28	755.29
RW-01	08/10/94	762.57	8.27	8.25	0.02	0.80	0.02	8.25	754.32
RW-01	08/19/94	762.57	5.36		---	NA	NA	5.36	757.21
RW-01	08/24/94	762.57	6.66		---	NA	NA	6.66	755.91
RW-01	09/03/94	762.57	7.84	7.79	0.05	0.80	0.04	7.80	754.77
RW-01	09/07/94	762.57	8.16	8.15	0.01	0.80	0.01	8.15	754.42
RW-01	09/29/94	762.57	8.65	8.62	0.03	0.80	0.02	8.63	753.94
RW-01	10/05/94	762.57	8.07	8.05	0.02	0.80	0.02	8.05	754.52
RW-01	10/11/94	762.57	8.04		---	NA	NA	8.04	754.53
RW-01	10/20/94	762.57	8.42	8.38	0.04	0.80	0.03	8.39	754.18
RW-01	10/25/94	762.57	8.34	8.31	0.03	0.80	0.02	8.32	754.25
RW-01	11/02/94	762.57	7.69	7.67	0.02	0.80	0.02	7.67	754.90
RW-01	11/09/94	762.57	4.26	4.24	0.02	0.80	0.02	4.24	758.33

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M./D./Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
RW-01	11/21/94	762.57	7.40	7.39	0.01	0.80	0.01	7.39	755.18
RW-01	11/30/94	762.57	7.16	7.13	0.03	0.80	0.02	7.14	755.43
RW-01	01/12/95	762.57	7.75	7.73	0.02	0.80	0.02	7.73	754.84
RW-01	01/18/95	762.57	6.93	6.85	0.08	0.80	0.06	6.87	755.70
RW-01	01/23/95	762.57	6.48	6.43	0.05	0.80	0.04	6.44	756.13
RW-01	01/31/95	762.57	7.19	7.11	0.08	0.80	0.06	7.13	755.44
RW-01	02/08/95	762.57	8.19	7.97	0.22	0.80	0.18	8.01	754.56
RW-01	02/14/95	762.57	8.48	8.37	0.11	0.80	0.09	8.39	754.18
RW-01	02/21/95	762.57	7.88	7.85	0.03	0.80	0.02	7.86	754.71
RW-01	03/01/95	762.57	7.69	7.65	0.04	0.80	0.03	7.66	754.91
RW-01	03/10/95	762.57	6.57	6.54	0.03	0.80	0.02	6.55	756.02
RW-02	10/05/93	761.57	6.09		---	NA	NA	6.09	755.48
RW-02	10/13/93	761.57	6.44	6.40	0.04	0.80	0.03	6.41	755.16
RW-02	05/26/94	761.57	7.35	7.12	0.23	0.80	0.18	7.17	754.40
RW-02	06/01/94	761.57	7.54	7.35	0.19	0.80	0.15	7.39	754.18
RW-02	06/14/94	761.57	7.20	7.12	0.08	0.80	0.06	7.14	754.43
RW-02	07/09/94	761.57	5.60	5.50	0.10	0.80	0.08	5.52	756.05
RW-02	07/19/94	761.57	6.73	6.67	0.06	0.80	0.05	6.68	754.89
RW-02	07/25/94	761.57	6.30	6.27	0.03	0.80	0.02	6.28	755.29
RW-02	08/02/94	761.57	6.35	6.33	0.02	0.80	0.02	6.33	755.24
RW-02	08/10/94	761.57	7.20	7.17	0.03	0.80	0.02	7.18	754.39
RW-02	08/19/94	761.57	4.27		---	NA	NA	4.27	757.30
RW-02	08/24/94	761.57	5.69	5.65	0.04	0.80	0.03	5.66	755.91
RW-02	09/03/94	761.57	6.85	6.81	0.04	0 80	0.03	6.82	754.75
RW-02	09/07/94	761.57	7.16	7.15	0.01	0.80	0.01	7.15	754.42
RW-02	09/29/94	761.57	7.55		---	NA	NA	7.55	754.02
RW-02	10/05/94	761.57	7.08	7.05	0.03	0.80	0.02	7.06	754.51
RW-02	10/11/94	761.57	7.00	6.99	0.01	0.80	0.01	6.99	754.58
RW-02	10/20/94	761.57	7.42	7.37	0.05	0.80	0.04	7.38	754.19
RW-02	10/25/94	761.57	7.34	7.29	0.05	0.80	0.04	7.30	754.27
RW-02	11/02/94	761.57	6.71	6.68	0.03	0.80	0.02	6.69	754.88
RW-02	11/09/94	761.57	5.24	5.22	0.02	0.80	NA	5.23	756.34
RW-02	11/21/94	761.57	6.40	6.34	0.06	0.80	0.05	6.35	755.22
RW-02	11/30/94	761.57	6.17	6.10	0.07	0.80	0.06	6.11	755.46
RW-02	12/22/94	761.57	6.27	6.05	0.22	0.80	0.18	6.09	755.48
RW-02	12/28/94	761.57	6.37	6.15	0.22	0.80	0.18	6.19	755.38

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
RW-02	01/04/95	761.57	6.73	6.60	0.13	0.80	0.10	6.63	754.94
RW-02	01/12/95	761.57	6.71	6.70	0.01	0.80	0.01	6.70	754.87
RW-02	01/18/95	761.57	6.05	5.87	0.18	0.80	0.14	5.91	755.66
RW-02	01/23/95	761.57	5.47	5.43	0.04	0.80	0.03	5.44	756.13
RW-02	01/31/95	761.57	6.20	6.10	0.10	0.80	0.08	6.12	755.45
RW-02	02/08/95	761.57	7.25	6.94	0.31	0.80	0.25	7.00	754.57
RW-02	02/14/95	761.57	7.57	7.39	0.18	0.80	0.14	7.43	754.14
RW-02	02/21/95	761.57	6.88	6.85	0.03	0.80	0.02	6.86	754.71
RW-02	03/01/95	761.57	6.70	6.67	0.03	0.80	0.02	6.68	754.89
RW-02	03/10/95	761.57	5.64	5.55	0.09	0.80	0.07	5.57	756.00
RW-03	10/05/93	761.37	6.00	5.88	0.12	0.80	0.10	5.90	755.47
RW-03	10/13/93	761.37	6.42	6.24	0.18	0.80	0.14	6.28	755.09
RW-03	05/26/94	761.37	7.92	7.09	0.83	0.80	0.66	7.26	754.11
RW-03	06/01/94	761.37	8.30	7.71	0.59	0.80	0.47	7.83	753.54
RW-03	06/14/94	761.37	7.10	7.02	0.08	0.80	0.06	7.04	754.33
RW-03	07/09/94	761.37	5.32	5.25	0.07	0.80	0.06	5.26	756.11
RW-03	07/19/94	761.37	6.85	6.50	0.35	0.80	0.28	6.57	754.80
RW-03	07/25/94	761.37	6.29	6.19	0.10	0.80	0.08	6.21	755.16
RW-03	08/02/94	761.37	6.29	6.25	0.04	0.80	0.03	6.26	755.11
RW-03	08/10/94	761.37	7.22	7.17	0.05	0.80	0.04	7.18	754.19
RW-03	08/19/94	761.37	4.17	4.16	0.01	0.80	0.01	4.16	757.21
RW-03	08/24/94	761.37	5.50	5.45	0.05	0.80	0.04	5.46	755.91
RW-03	09/03/94	761.37	6.77	6.74	0.03	0.80	0.02	6.75	754.62
RW-03	09/07/94	761.37	7.03	7.00	0.03	0.80	0.02	7.01	754.36
RW-03	09/29/94	761.37	7.63	7.59	0.04	0.80	0.03	7.60	753.77
RW-03	10/05/94	761.37	6.94	6.91	0.03	0.80	0.02	6.92	754.45
RW-03	10/11/94	761.37	6.86	6.84	0.02	0.80	0.02	6.84	754.53
RW-03	10/20/94	761.37	7.30	7.24	0.06	0.80	0.05	7.25	754.12
RW-03	10/25/94	761.37	7.14	7.09	0.05	0.80	0.04	7.10	754.27
RW-03	11/02/94	761.37	6.47	6.46	0.01	0.80	0.01	6.46	754.91
RW-03	11/09/94	761.37	5.04	5.02	0.02	0.80	0.02	5.02	756.35
RW-03	11/21/94	761.37	6.27	6.23	0.04	0.80	0.03	6.24	755.13
RW-03	11/30/94	761.37	6.04	5.93	0.11	0.80	0.09	5.95	755.42
RW-03	12/22/94	761.37	6.08	6.00	0.08	0.80	0.06	6.02	755.35
RW-03	12/28/94	761.37	6.10	6.01	0.09	0.80	0.07	6.03	755.34
RW-03	01/04/95	761.37	6.53	6.50	0.03	0.80	0.02	6.51	754.86

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M/D/Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
RW-03	01/12/95	761.37	6.59	6.58	0.01	0.80	0.01	6.58	754.79
RW-03	01/18/95	761.37	5.70	5.67	0.03	0.80	0.02	5.68	755.69
RW-03	01/23/95	761.37	5.28	5.23	0.05	0.80	0.04	5.24	756.13
RW-03	01/31/95	761.37	5.97	5.95	0.02	0.80	0.02	5.95	755.42
RW-03	02/08/95	761.37	7.09	6.98	0.11	0.80	0.09	7.00	754.37
RW-03	02/14/95	761.37	7.37	7.33	0.04	0.80	0.03	7.34	754.03
RW-03	02/21/95	761.37	6.74	6.71	0.03	0.80	0.02	6.72	754.65
RW-03	03/01/95	761.37	6.56	6.53	0.03	0.80	0.02	6.54	754.83
RW-03	03/10/95	761.37	5.37	5.35	0.02	0.80	0.02	5.35	756.02
RW-04	10/05/93	761.56	6.23	6.05	0.18	0.80	0.14	6.09	755.47
RW-04	10/13/93	761.56	6.55	6.42	0.13	0.80	0.10	6.45	755.11
RW-04	05/26/94	761.56	8.11	7.24	0.87	0.80	0.70	7.41	754.15
RW-04	06/01/94	761.56	8.65	7.55	1.10	0.80	0.88	7.77	753.79
RW-04	06/14/94	761.56	7.60	7.53	0.07	0.80	0.06	7.54	754.02
RW-04	07/09/94	761.56	5.80	5.50	0.30	0.80	0.24	5.56	756.00
RW-04	07/19/94	761.56	6.84	6.69	0.15	0.80	0.12	6.72	754.84
RW-04	07/25/94	761.56	6.38	6.34	0.04	0.80	0.03	6.35	755.21
RW-04	08/02/94	761.56	6.39	6.36	0.03	0.80	0.02	6.37	755.19
RW-04	08/10/94	761.56	7.46	7.41	0.05	0.80	0.04	7.42	754.14
RW-04	08/19/94	761.56	4.33	4.32	0.01	0.80	0.01	4.32	757.24
RW-04	08/24/94	761.56	5.74	5.67	0.07	0.80	0.06	5.68	755.88
RW-04	09/03/94	761.56	7.09	7.02	0.07	0.80	0.06	7.03	754.53
RW-04	09/07/94	761.56	7.33	SHEEN	---	NA	NA	7.33	754.23
RW-04	09/29/94	761.56	7.81	7.79	0.02	0.80	0.02	7.79	753.77
RW-04	10/05/94	761.56	7.12	7.06	0.06	0.80	0.05	7.07	754.49
RW-04	10/11/94	761.56	7.01	17.00	0.01	0.80	0.01	7.00	754.56
RW-04	10/20/94	761.56	7.42	7.40	0.02	0.80	0.02	7.40	754.16
RW-04	10/25/94	761.56	7.30	7.24	0.06	0.80	0.05	7.25	754.31
RW-04	11/02/94	761.56	6.67	6.65	0.02	0.80	0.02	6.65	754.91
RW-04	11/09/94	761.56	5.21	5.20	0.01	0.80	0.01	5.20	756.36
RW-04	11/21/94	761.56	6.52	6.46	0.06	0.80	0.05	6.47	755.09
RW-04	11/30/94	761.56	6.15	6.10	0.05	0.80	0.04	6.11	755.45
RW-04	12/22/94	761.56	6.22	6.11	0.11	0.80	0.09	6.13	755.43
RW-04	12/28/94	761.56	6.27	6.19	0.08	0.80	0.06	6.21	755.35
RW-04	01/04/95	761.56	6.77	6.72	0.05	0.80	0.04	6.73	754.83
RW-04	01/12/95	761.56	6.80	6.79	0.01	0.80	0.01	6.79	754.77

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
RW-04	01/18/95	761.56	5.93	5.88	0.05	0.80	0.04	5.89	755.67
RW-04	01/23/95	761.56	5.48	5.43	0.05	0.80	0.04	5.44	756.12
RW-04	01/31/95	761.56	6.19	6.13	0.06	0.80	0.05	6.14	755.42
RW-04	02/08/95	761.56	7.25	7.19	0.06	0.80	0.05	7.20	754.36
RW-04	02/14/95	761.56	7.57	7.54	0.03	0.80	0.02	7.55	754.01
RW-04	02/21/95	761.56	6.94	6.93	0.01	0.80	0.01	6.93	754.63
RW-04	03/01/95	761.56	6.73	6.70	0.03	0.80	0.02	6.71	754.85
RW-04	03/10/95	761.56	5.57	5.54	0.03	0.80	0.02	5.55	756.01
RW-05	10/05/93	761.13	5.76	5.58	0.18	0.80	0.14	5.62	755.51
RW-05	10/13/93	761.13	6.18	6.14	0.04	0.80	0.03	6.15	754.98
RW-05	05/02/94	761.13	5.82	5.50	0.32	0.80	0.26	5.56	755.57
RW-05	05/10/94	761.13	6.58	6.55	0.03	0.80	0.02	6.56	754.57
RW-05	05/26/94	761.13	7.86	6.95	0.91	0.80	0.73	7.13	754.00
RW-05	06/01/94	761.13	7.85	7.62	0.23	0.80	0.18	7.67	753.46
RW-05	06/14/94	761.13	7.02	6.96	0.06	0.80	0.05	6.97	754.16
RW-05	07/09/94	761.13	5.35	5.25	0.10	0.80	0.08	5.27	755.86
RW-05	07/19/94	761.13	6.55	6.39	0.16	0.80	0.13	6.42	754.71
RW-05	07/25/94	761.13	6.06	6.02	0.04	0.80	0.03	6.03	755.10
RW-05	08/02/94	761.13	6.07	6.04	0.03	0.80	0.02	6.05	755.08
RW-05	08/10/94	761.13	6.89	6.88	0.01	0.80	0.01	6.88	754.25
RW-05	08/19/94	761.13	4.04		---	NA	NA	4.04	757.09
RW-05	08/24/94	761.13	5.47	5.40	0.07	0.80	0.06	5.41	755.72
RW-05	09/03/94	761.13	6.51	6.50	0.01	0.80	0.01	6.50	754.63
RW-05	09/07/94	761.13	6.90	SHEEN	---	NA	NA	6.90	754.23
RW-05	09/29/94	761.13	7.50		---	NA	NA	7.50	753.63
RW-05	10/05/94	761.13	6.65	6.64	0.01	0.80	0.01	6.64	754.49
RW-05	10/11/94	761.13	6.57	6.56	0.01	0.80	0.01	6.56	754.57
RW-05	10/20/94	761.13	7.95	7.92	0.03	0.80	0.02	7.93	753.20
RW-05	10/25/94	761.13	7.07	7.05	0.02	0.80	0.02	7.05	754.08
RW-05	11/02/94	761.13	6.32	6.31	0.01	0.80	0.01	6.31	754.82
RW-05	11/09/94	761.13	4.90	4.88	0.02	0.80	0.02	4.88	756.25
RW-05	11/21/94	761.13	6.15	6.14	0.01	0.80	0.01	6.14	754.99
RW-05	11/30/94	761.13	5.64	5.62	0.02	0.80	0.02	5.62	755.51
RW-05	12/22/94	761.13	5.90	5.88	0.02	0.80	0.02	5.88	755.25
RW-05	12/28/94	761.13	5.92	5.89	0.03	0.80	0.02	5.90	755.23
RW-05	01/04/95	761.13	6.45	6.40	0.05	0.80	0.04	6.41	754.72

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
RW-05	01/12/95	761.13	6.51	6.50	0.01	0.80	0.01	6.50	754.63
RW-05	01/18/95	761.13	5.41	5.36	0.05	0.80	0.04	5.37	755.76
RW-05	01/23/95	761.13	5.08	4.49	0.59	0.80	0.47	4.61	756.52
RW-05	01/31/95	761.13	5.75	5.62	0.13	0.80	0.10	5.65	755.48
RW-05	02/08/95	761.13	7.21	6.67	0.54	0.80	0.43	6.78	754.35
RW-05	02/14/95	761.13	10.48	9.38	1.10	0.80	0.88	9.60	751.53
RW-05	02/21/95	761.13	6.40	6.39	0.01	0.80	0.01	6.39	754.74
RW-05	03/01/95	761.13	6.23	6.21	0.02	0.80	0.02	6.21	754.92
RW-05	03/10/95	761.13	5.03	5.00	0.03	0.80	0.02	5.01	756.12
S-01	04/26/89	766.71	10.97	10.95	0.02	0.80	0.02	10.95	755.76
S-01	12/05/89	766.71	11.05		—	NA	NA	11.05	755.66
S-01	01/30/90	766.71	10.96		—	NA	NA	10.96	755.75
S-01	10/17/90	766.71	9.09	9.05	0.04	0.80	0.03	9.06	757.65
S-01	10/20/92	766.71	10.45		—	NA	NA	10.45	756.26
S-01	11/13/92	766.71	9.17		—	NA	NA	9.17	757.54
S-01	12/21/92	766.71	10.15		—	NA	NA	10.15	756.56
S-01	04/05/93	766.71	8.25		—	NA	NA	8.25	758.46
S-01	07/18/94	766.71	10.86		—	NA	NA	10.86	755.85
S-01	09/29/94	766.71	12.08		—	NA	NA	12.08	754.63
S-01	01/31/95	766.71	9.61		—	NA	NA	9.61	757.10
S-02	04/26/89	767.75	11.43	11.42	0.01	0.80	0.01	11.42	756.33
S-02	12/05/89	767.75	11.63	11.61	0.02	0.80	0.02	11.61	756.14
S-02	01/30/90	767.75	11.45	11.41	0.04	0.80	0.03	11.42	756.33
S-02	10/17/90	767.75	9.56	9.50	0.06	0.80	0.05	9.51	758.24
S-02	10/20/92	767.75	10.07	10.04	0.03	0.80	0.02	10.05	757.70
S-02	11/13/92	767.75	8.86	SHEEN	—	NA	NA	8.86	758.89
S-02	12/21/92	767.75	9.98	SHEEN	—	NA	NA	9.98	757.77
S-02	04/05/93	767.75	6.02		—	NA	NA	6.02	761.73
S-02	07/18/94	767.75	11.36		—	NA	NA	11.36	756.39
S-02	09/29/94	767.75	12.62		—	NA	NA	12.62	755.13
S-02	01/31/95	767.75	10.63		—	NA	NA	10.63	757.12
S-03	12/05/89	764.01	8.96		—	NA	NA	8.96	755.05
S-03	01/31/90	764.01	8.32		—	NA	NA	8.32	755.69
S-03	10/20/92	764.01	7.98	SHEEN	—	NA	NA	7.98	756.03

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
Location: Kalamazoo, Michigan
Job#: 04301-0122

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
S-03	11/13/92	764.01	7.64	7.62	0.02	0.80	0.02	7.62	756.39
S-03	12/21/92	764.01	8.01	8.00	0.01	0.80	0.01	8.00	756.01
S-03	04/05/93	764.01	6.30		—	NA	NA	6.30	757.71
S-03	07/18/94	764.01	8.82		—	NA	NA	8.82	755.19
S-03	09/29/94	764.01	10.02	10.00	0.02	0.80	0.02	10.00	754.01
S-03	01/31/95	764.01	8.32		—	NA	NA	8.32	755.69
S-04	01/31/90	762.99	7.39	7.35	0.04	0.80	0.03	7.36	755.63
S-04	10/17/90	762.99	6.12	6.10	0.02	0.80	0.02	6.10	756.89
S-04	10/20/92	762.99	5.53	5.45	0.08	0.80	0.06	5.47	757.52
S-04	11/13/92	762.99	5.79	5.59	0.20	0.80	0.16	5.63	757.36
S-04	12/21/92	762.99	6.14	6.00	0.14	0.80	0.11	6.03	756.96
S-04	04/05/93	762.99	4.98	4.85	0.13	0.80	0.10	4.88	758.11
S-04	07/18/94	762.99	6.94	6.90	0.04	0.80	0.03	6.91	756.08
S-04	09/29/94	762.99	7.54		—	NA	NA	7.54	755.45
S-04	10/05/94	762.99	7.78	7.75	0.03	0.80	0.02	7.76	755.23
S-04	10/20/94	762.99	8.06	7.98	0.08	0.80	0.06	8.00	754.99
S-04	10/25/94	762.99	8.04	8.02	0.02	0.80	0.02	8.02	754.97
S-04	11/02/94	762.99	7.34	7.33	0.01	0.80	0.01	7.33	755.66
S-04	11/09/94	762.99	5.85		—	NA	NA	5.85	757.14
S-04	11/30/94	762.99	7.87	7.85	0.02	0.80	0.02	7.85	755.14
S-04	12/22/94	762.99	6.81	6.77	0.04	0.80	0.03	6.78	756.21
S-04	12/28/94	762.99	6.77	6.72	0.05	0.80	0.04	6.73	756.26
S-04	01/04/95	762.99	7.25	7.22	0.03	0.80	0.02	7.23	755.76
S-04	01/12/95	762.99	6.63	6.60	0.03	0.80	0.02	6.61	756.38
S-04	01/18/95	762.99	6.89	6.71	0.18	0.80	0.14	6.75	756.24
S-04	01/23/95	762.99	6.52	6.28	0.24	0.80	0.19	6.33	756.66
S-04	01/31/95	762.99	6.85	6.68	0.17	0.80	NA	6.68	756.31
S-04	02/08/95	762.99	7.78	7.68	0.10	0.80	0.08	7.70	755.29
S-04	03/01/95	762.99	7.84	7.58	0.26	0.80	0.21	7.63	755.36
S-04	03/10/95	762.99	6.48	6.33	0.15	0.80	0.12	6.36	756.63
S-05	04/26/89	762.55	7.45	7.44	0.01	0.80	0.01	7.44	755.11
S-05	12/05/89	762.55	7.70	7.63	0.07	0.80	0.06	7.64	754.91
S-05	01/31/90	762.55	7.10	6.97	0.13	0.80	0.10	7.00	755.55
S-05	10/17/90	762.55	5.92	5.64	0.28	0.80	0.22	5.70	756.85
S-05	10/20/92	762.55	6.76	6.48	0.28	0.80	0.22	6.54	756.01

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail Botsford
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NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
S-05	11/13/92	762.55	6.33	6.09	0.24	0.80	0.19	6.14	756.41
S-05	12/21/92	762.55	6.72	6.53	0.19	0.80	0.15	6.57	755.98
S-05	01/07/93	762.55	4.05	3.75	0.30	0.80	0.24	3.81	758.74
S-05	04/05/93	762.55	4.96	4.83	0.13	0.80	0.10	4.86	757.69
S-05	07/18/94	762.55	7.72	7.60	0.12	0.80	0.10	7.62	754.93
S-05	09/29/94	762.55	8.45		—	NA	NA	8.45	754.10
S-05	10/20/94	762.55	8.48	8.36	0.12	0.80	0.10	8.38	754.17
S-05	10/25/94	762.55	8.43	8.28	0.15	0.80	0.12	8.31	754.24
S-05	11/02/94	762.55	7.73	7.48	0.25	0.80	0.20	7.53	755.02
S-05	11/09/94	762.55	6.13	6.00	0.13	0.80	0.10	6.03	756.52
S-05	11/30/94	762.55	7.25	7.01	0.24	0.80	0.19	7.06	755.49
S-05	12/22/94	762.55	7.22	7.01	0.21	0.80	0.17	7.05	755.50
S-05	12/28/94	762.55	7.22	7.05	0.17	0.80	0.14	7.08	755.47
S-05	01/04/95	762.55	7.65	7.54	0.11	0.80	0.09	7.56	754.99
S-05	01/12/95	762.55	7.85	7.67	0.18	0.80	0.14	7.71	754.84
S-05	01/18/95	762.55	6.60	6.53	0.07	0.80	0.06	6.54	756.01
S-05	01/23/95	762.55	6.23	6.15	0.08	0.80	0.06	6.17	756.38
S-05	01/31/95	762.55	7.15	6.98	0.17	0.80	0.14	7.01	755.54
S-05	02/08/95	762.55	8.12	7.98	0.14	0.80	0.11	8.01	754.54
S-05	02/14/95	762.55	6.38	6.25	0.13	0.80	0.10	6.28	756.27
S-05	03/01/95	762.55	7.48	7.34	0.14	0.80	0.11	7.37	755.18
S-05	03/10/95	762.55	6.38	6.32	0.06	0.80	0.05	6.33	756.22
SEWER	10/20/92	765.04	8.82	8.78	0.04	0.80	0.03	8.79	756.25
SEWER	11/13/92	765.04	9.09	8.78	0.31	0.80	0.25	8.84	756.20
SEWER	12/21/92	765.04	9.78	9.35	0.43	0.80	0.34	9.44	755.60

GROUNDWATER TECHNOLOGY