GW - 21

MONITORING REPORTS

DATE: 1994

INDIAN BASIN GAS PLANT TREATMENT PROJECT QUARTERLY REPORT

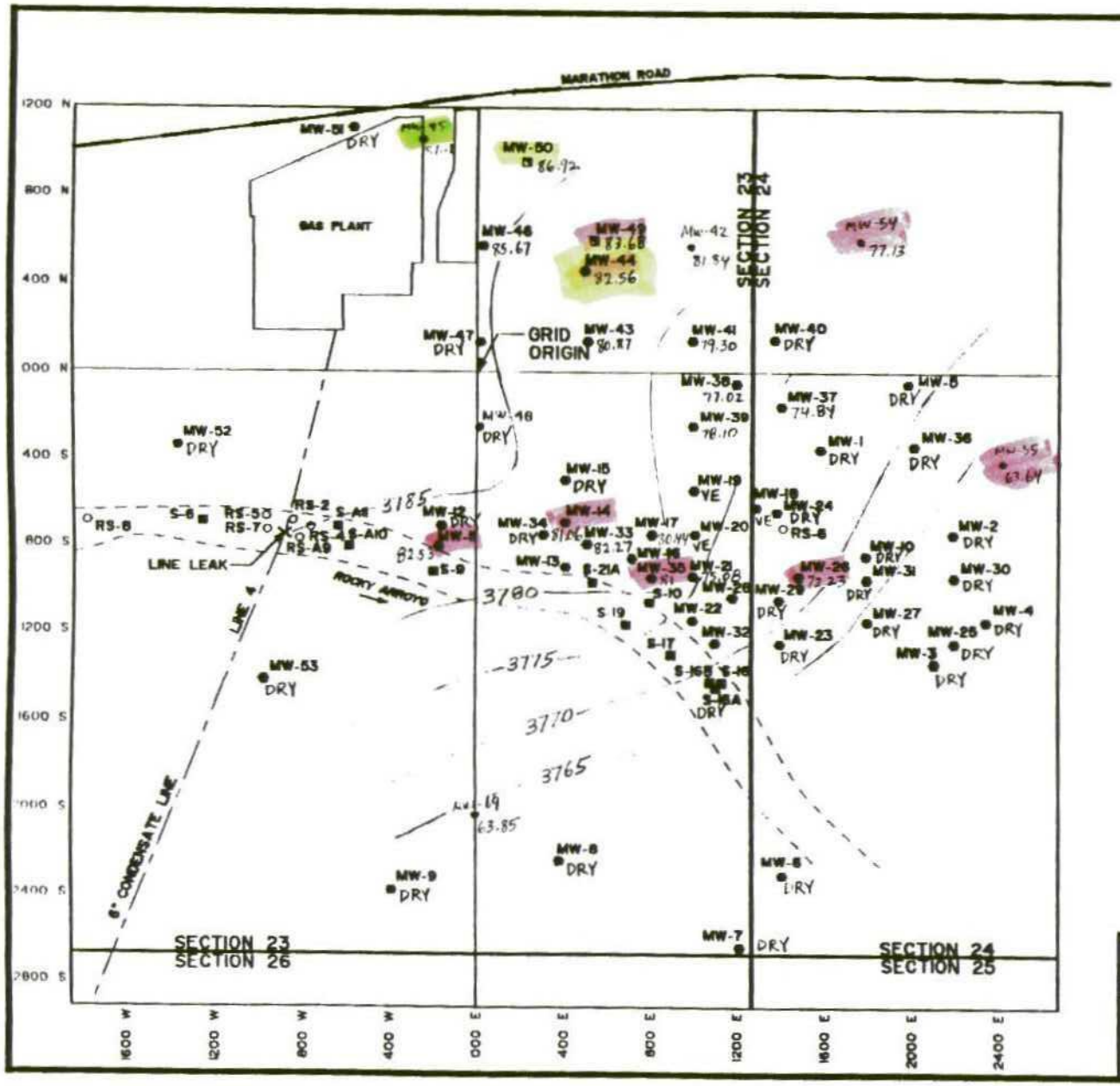
RECEIVED
MAY 16 1994
OIL CONSERVATION DIV.
SANTA FE

FIRST QUARTER 1994
JANUARY, FEBRUARY, AND MARCH

Submitted by
Marathon Oil Company
on behalf of the
Indian Basin Gas Plant Owners

May 13, 1994

NL-697



INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO

SCALE

0 1000' 2000'

FEET

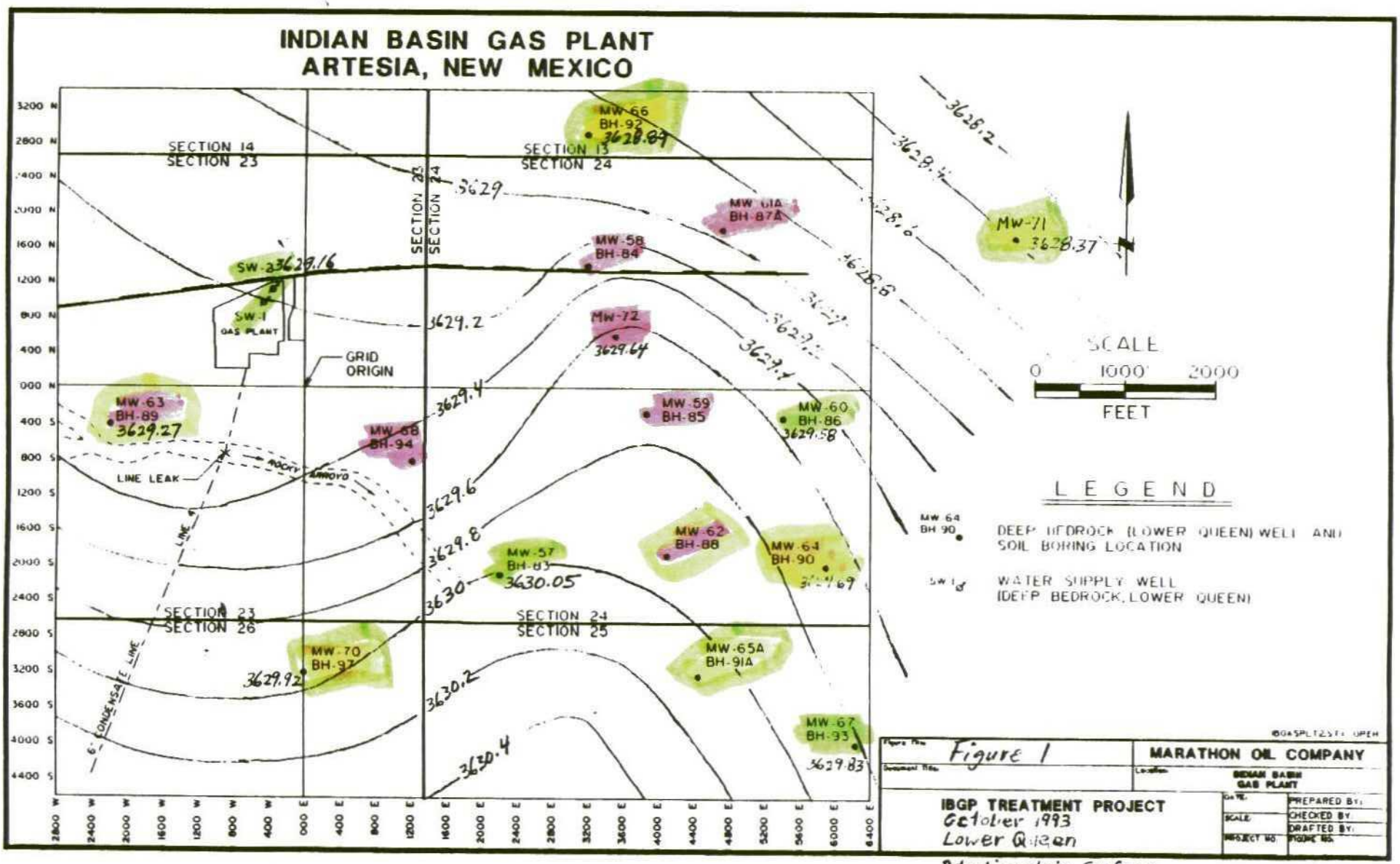
LEGEND

- MW-9 ● SHALLOW ALLUVIAL GROUNDWATER MONITORING WELL
- RS-4 ○ 4 INCH PVC RECOVERY SUMP
- S-18 ■ 24 INCH GALVANIZED RECOVERY SUMP

CONTOUR INTERVAL = 5 FEET

Figure Title: Figure 3	MARARTHON OIL COMPANY
Drawing Title: October 1993 Shallow zone Potentiometric Surface	Location: INDIAN BASIN GAS PLANT
DATE:	PREPARED BY:
SCALE:	CHECKED BY:
PROJECT NO.	DRAFTED BY:
	FIGURE NO.

BIGASPLT.STY OPEN


INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO
SECTION 14
SECTION 23
SECTION 13
SECTION 24
SECTION 23
SECTION 26
SECTION 24
SECTION 25
SW-3 3629.16
SW-1 GAS PLANT
GRID ORIGIN
MW-63 BH-89 3629.27
MW-66 BH-92 3628.89
MW-61A BH-87A
MW-58 BH-84
MW-72 3629.64
MW-71 3628.37
MW-68 BH-94
MW-59 BH-85
MW-60 BH-86 3629.58
LINE LEAK
MW-62 BH-88
MW-64 BH-90
MW-57 BH-83 3630.05
MW-70 BH-92
MW-65A BH-91A
MW-67 BH-93 3629.83
3629
3629.2
3629.4
3629.6
3629.8
3630
3630.2
3630.4
3628.2
3628.4
3628.6
3628.8
SCALE
0 1000' 2000
FEET
LEGEND
MW 64 BH 90 DEEP BEDROCK (LOWER QUEEN) WELL AND SOIL BORING LOCATION
SW 1 WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)
Figure 1
MARATHON OIL COMPANY
INDIAN BASIN GAS PLANT
IBGP TREATMENT PROJECT
October 1993
Lower Queen
Potentiometric Surface

EXECUTIVE SUMMARY

The pump-and-treat groundwater remediation system is fully operational and functioning as set forth in the Treatment Project Plan document (March 1992). Light nonaqueous phase liquids (condensate) remain in six (6) Lower Queen wells. Fluid recovery from the Lower Queen aquifer averaged 10,489 barrels per week with volatile hydrocarbon compounds being removed by air stripping. Lower Queen dissolved benzene concentrations range from 0.5 to 3000 micrograms per liter or parts per billion. The benzene concentrations in all five (5) downgradient wells were below the State maximum allowable concentration of 10 micrograms per liter indicating continued hydrocarbon plume containment. Chloride concentrations in all Lower Queen wells are below the State maximum allowable concentration of 250 milligrams per liter.

Light nonaqueous phase liquids (condensate) remain in seven (7) of twenty-five (25) Shallow zone wells. Shallow zone pumping continues from one (1) well. Nine (9) of ten (10) Shallow zone wells sampled in January indicate chloride concentrations above the State maximum allowable concentration of 250 milligrams per liter. Fluid recovery from the Shallow zone aquifer averaged 6 barrels per week. During the First Quarter, the vapor extraction system withdrew fuel hydrocarbon concentrations ranging from 94 to 1,500 micrograms per liter from three (3) Shallow zone wells.

Concentrations of benzene, toluene, ethylbenzene, total xylene, and chloride in groundwater collected from Shallow zone rancher wells and the Upper Indian Hills Spring West (Rocky Arroyo spring) have not exceeded State or Federal drinking water standards.

Light nonaqueous phase liquids (condensate) recovery from the Lower Queen and Shallow zone for the First Quarter was 39.8 barrels, an 11% increase compared to the Fourth Quarter. Cumulative recovery excluding the volume volatilized by the air stripper and vapor extraction system is 3,432.6 barrels or 9.8% of the total spill volume.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

INTRODUCTION 1

GROUNDWATER ELEVATION 1
- Lower Queen Aquifer 1
- Shallow Zone 1
- Groundwater Recharge (Rainfall) 1

QUARTERLY SAMPLING LABORATORY RESULTS 2

RANCHER WELLS, SPRING, AND PLANT WELL LABORATORY RESULTS .. 2

GROUNDWATER PUMPING 3
- Lower Queen 3
- Shallow Zone 4

GROUNDWATER TREATMENT AND PRODUCT RECOVERY 4

VAPOR EXTRACTION SYSTEM 4

OTHER ACTIVITIES 5

REFERENCES CITED 6

TABLES

TABLE 1	LOWER QUEEN DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
TABLE 2	SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
TABLE 3	HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN LOWER QUEEN GROUNDWATER
TABLE 4	HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN SHALLOW ZONE GROUNDWATER
TABLE 5	RANCHER WELL GROUNDWATER AND NATURAL SPRING WATER SAMPLE RESULTS

FIGURES

FIGURE 1	JANUARY 1994 LOWER QUEEN POTENTIOMETRIC SURFACE
FIGURE 2	LOWER QUEEN GROUNDWATER ELEVATION VS. TIME
FIGURE 3	JANUARY 1994 SHALLOW ZONE POTENTIOMETRIC SURFACE
FIGURE 4	SHALLOW ZONE GROUNDWATER ELEVATION VS. TIME
FIGURE 5	WEEKLY LOWER QUEEN FLUID RECOVERY
FIGURE 6	WEEKLY SHALLOW ZONE FLUID RECOVERY
FIGURE 7	WEEKLY TOTAL FLUID RECOVERY
FIGURE 8	VAPOR EXTRACTION WELL INDEX MAP

APPENDICES

APPENDIX A	JANUARY 1994 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY
APPENDIX B	JANUARY 1994 LABORATORY RESULTS - PROJECT WELLS, RANCHER WELLS, PLANT WELL, AND NATURAL SPRING
APPENDIX C	BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS
APPENDIX D	RANCHER WELL, PLANT WELL, AND NATURAL SPRING MONTHLY LABORATORY RESULTS - FEBRUARY
APPENDIX E	RANCHER WELL, PLANT WELL, AND NATURAL SPRING MONTHLY LABORATORY RESULTS - MARCH
APPENDIX F	STATE ENGINEER'S FLUID RECOVERY REPORTS
APPENDIX G	LABORATORY RESULTS - AIR (VAPOR EXTRACTION WELLS)

INTRODUCTION

This report summarizes groundwater and unsaturated zone treatment activities conducted during the First Quarter of 1994 in accordance with the Indian Basin Environmental Treatment Project Plan submitted on March 5, 1992 by Marathon Oil Company on behalf of the Indian Basin Gas Plant owners. Preparation of this report is also in accordance with the April 2, 1992 New Mexico Oil Conservation Division (OCD) directive for quarterly reporting of remediation project activities. Remediation activities are continuing to reduce the impact of a liquid gas condensate and brine spill from a production pipeline discovered in April 1991 near the Indian Basin Gas Plant.

GROUNDWATER ELEVATION

Lower Queen Aquifer

Depth-to-water measurements were acquired from nonpumping, Lower Queen monitoring wells in January, February, and March 1994. Table 1 presents groundwater elevations calculated from casing elevation data, depth-to-water measurements, and light nonaqueous phase liquid (LNAPL) thicknesses. Figure 1 is a potentiometric map of the Lower Queen aquifer based on depth-to-groundwater gauging conducted in January. First Quarter monitoring data indicate decreasing groundwater elevations (Figure 2).

Shallow Zone

A potentiometric map was constructed using depth-to-water measurements collected from Shallow zone monitoring wells in January 1994 (Figure 3). Table 2 shows depth-to-water measurements, calculated groundwater elevations, and LNAPL thickness for Shallow zone wells. These Shallow zone data indicate both decreasing and increasing groundwater elevations in monitoring wells during the quarter. Increased groundwater elevations are the result of recharge from rainfall.

Groundwater Recharge (Rainfall)

Daily rainfall is gauged at the gas plant. Monthly rainfall for January, February, and March was 0.00, 0.16, and 0.54 inches, respectively (Tables 1 and 2). Cumulative rainfall for the First Quarter was 0.70 inches.

QUARTERLY SAMPLING LABORATORY RESULTS

Gauging, purging, and sampling of 28 monitoring wells were attempted on January 10 through 14, 1994. Sixteen Lower Queen wells including the plant water supply well (SW-1) were sampled. The backup well (SW-2) was gauged, but not sampled. Eight of these Lower Queen wells have downhole pumps installed and were sampled through the pump. Six samples collected from these eight Lower Queen pumping wells contained LNAPL. Only two of these samples were submitted for laboratory analysis to confirm the presence of LNAPL (MW-62 and MW-68).

Ten of the fifty-nine Shallow zone wells were sampled in January. Four of the original twenty-five Shallow zone monitoring wells (including two sumps) designated for quarterly sampling in the Treatment Project Plan (see ***bolded and italicized*** well designations in Table 4) were sampled. The remaining 21 wells were either dry or bailed dry during sampling (18), contain LNAPL (MW-11 and MW-69), or are inaccessible (MW-13; pump in well). Six Shallow zone wells other than those designated in the Treatment Project Plan were sampled (MW-39, MW-41, MW-43, MW-45, MW-49, and MW-61). Samples were collected by Southwestern Laboratories, Inc. (SWL) using Environmental Protection Agency (EPA) sampling protocol. Analytical Technologies, Inc. in Albuquerque, New Mexico performed the BTEX and chloride analyses using EPA-approved methods. Appendix A is a table prepared by SWL of field observations (depth-to-water measurement, purge volume, temperature, pH, conductivity, and presence of LNAPL or free-phase product) from notes recorded during gauging, purging, and sampling activities.

Tables 3 and 4 are historical summaries of quarterly benzene concentration data since September 1991 for the Lower Queen and Shallow zone wells, respectively. Benzene concentration (in ug/l) versus time graphs for each routinely sampled monitoring well are provided in Appendix C.

RANCHER WELLS, SPRING, AND PLANT WELL LABORATORY RESULTS

Monthly groundwater samples from the closest downgradient rancher well to the Shallow zone plume (Lyman) and from the Upper Indian Hills Spring West (Hendrickson and Jones, 1952) were collected on January 12 and 13, February 9, and March 16, 1994. In addition, another rancher well which is sampled quarterly (Biebelle), was sampled on January 13. The plant water supply well (SW-1), completed in the Lower Queen aquifer, is also sampled and analyzed monthly. Concentrations of BTEX and chloride in groundwater collected from the Lyman and Biebelle wells and the Upper Indian Hills Spring West (Rocky Arroyo spring) did not exceed State or Federal drinking water standards during the quarter (Table 5).

The rancher well and natural spring samples were obtained using EPA sampling and handling procedures. Analytical Technologies, Inc. performed the BTEX and chloride analyses using EPA approved methods. Laboratory results of groundwater from the rancher wells and the natural spring are transmitted to the local ranchers each month with letters of explanation. Copies of these letters are also provided to the OCD and the Bureau of Land Management (BLM) in Santa Fe and Roswell, New Mexico, respectively. Laboratory reports for the rancher wells, Rocky Arroyo spring, and SW-1 are included in Appendices B (January), D (February), and E (March).

GROUNDWATER PUMPING

Lower Queen

Fluid recovery from the Lower Queen aquifer and Shallow zone is metered and reported to the State Engineer's Office (SEO) on a monthly basis, per SEO directive. The reports filed with the SEO for the First Quarter of 1994 are attached in Appendix F. Figures 5, 6, and 7 are stacked bar graphs depicting weekly Lower Queen fluid recovery, weekly Shallow zone fluid recovery, and combined weekly fluid recovery from both zones, respectively.

Seven Lower Queen wells (MW-58, MW-59, MW-61A, MW-62, MW-65A, MW-68, and MW-72) were pumped for plume control during the quarter. Monthly fluid recovery for each well and the plant supply well SW-1 is listed in the following table.

LOWER QUEEN FLUID RECOVERY

Well Number	January (Bbls)	February (Bbls)	March (Bbls)	Quarter Total (Bbls)	Average Pumping Rate (gpm)
MW-58	4,735.1	5,484.7	8,210.5	18,430.3	6.0
MW-59	3,581.9	3,501.9	2,946.6	10,030.4	3.2
MW-61A	4,309.1	4,884.0	6,678.0	15,871.1	5.1
MW-62	4,744.2	4,974.0	5,701.1	15,419.3	5.0
MW-65A	5,993.9	4,706.3	6,493.2	17,193.4	5.6
MW-68	2,206.8	2,049.0	3,658.8	7,914.6	2.6
MW-72	8,505.5	18,061.2	24,928.0	51,494.7	16.7
Plant Supply SW-1	5,501.3	11,033.0	5,437.7	21,972.0	7.1
TOTAL	**39,578**	**54,694**	**64,054**	**158,326**	**51.3**

Shallow Zone

Shallow zone fluid recovery during the First Quarter was from intermittent pumping well MW-69. Monthly Shallow zone fluid recovery is listed in the following table. Free product (condensate) recovery from MW-69 during the First Quarter totaled 29.9 barrels.

SHALLOW ZONE FLUID RECOVERY

Well Number	JANUARY (Bbls) Cond./Water	FEBRUARY (Bbls) Cond./Water	MARCH (Bbls) Cond./Water	Quarter Total (Bbls) Cond./Water
MW-69	5.4/2.3	6.7/3.3	17.8/21.3	29.9/26.9

GROUNDWATER TREATMENT AND PRODUCT RECOVERY

Commingled fluids pumped from seven Lower Queen recovery wells were pumped through piping to a treatment compound that includes an oil/water separator, air stripper, and two aboveground tanks. The oil/water separator is used to remove free product from the produced groundwater. The free product is transferred to a condensate holding tank which is gauged on a daily basis. The measured volume of free condensate recovered from the commingled groundwater during the First Quarter was 9.9 barrels. Cumulative condensate separated from the recovered groundwater since product separation began in April 1992 through March 1994 is 74.5 barrels.

Groundwater from the separator is pumped through the air stripper to remove dissolved-phase, volatile organic compounds. Stripped hydrocarbon compounds are vented to the atmosphere through a stack. Treated groundwater is used as make-up water for the gas plant.

Total free product recovery from the Lower Queen and Shallow zone for the First Quarter was 39.8 barrels, an 11% increase compared to the Fourth Quarter. Cumulative free product recovered to date excluding the volume volatilized by the air stripper and vapor extraction system is 3,432.6 barrels or 9.8% of the total spill volume.

VAPOR EXTRACTION SYSTEM

Phase I of the unsaturated zone remediation using vapor extraction (VE) was completed in March 1993. The Phase I program vented Shallow zone wells MW-16, MW-17, and MW-21. Shallow venting continued from MW-56 between April 8 and July 20, 1993. On October 7,

1993 the VE system commenced operation at MW-18, MW-19, and MW-20. Since that time, the system has extracted vapors from these three wells continuously. Figure 8 shows the locations of these vent wells.

A sampling system was designed to acquire an air sample directly from the vacuum at the wellhead. One-liter samples of the extracted vapor collected in Tedlar bags from each well are acquired quarterly to monitor system performance. Samples are shipped to Analytical Technologies, Inc. in Albuquerque, New Mexico for BTEX (EPA Method 8020) and fuel hydrocarbon (EPA Method 8015 Modified) analyses. Fuel hydrocarbon concentrations are quantified using the Indian Basin Gas Condensate Standard on file at the laboratory.

Samples from MW-18, MW-19, and MW-20 were collected on October 25, 1993 and March 21, 1994. Appendix F contains the laboratory results for the First Quarter 1994 samples. The following table shows the air sample results for Fourth Quarter 1993 and First Quarter 1994.

EXTRACTED VAPOR LABORATORY RESULTS

Extraction Well	Fuel Hydrocarbons (ug/l) October 25, 1993	Fuel Hydrocarbons (ug/l) March 21, 1994
MW-18	4,800	250
MW-19	41,000	1,500*
MW-20	500	94

*Result may not represent the extracted vapor concentration since the sample bag was received by the laboratory partially deflated.

OTHER ACTIVITIES

A free product recovery pump was installed in Shallow zone well MW-69 on March 16, 1994. Due to start-up mechanical problems the system has not operated consistently; however, production averages 4.1 barrels of condensate per day when the system is operational. Cumulative production through the First Quarter after the free product recovery pump was installed was 28.6 barrels of condensate.

REFERENCES CITED

Hendrickson, G. E., and Jones, R. S., 1952, Geology and Ground-water Resources of Eddy County, New Mexico: New Mexico Bureau of Mines & Mineral Resources Ground-water Report 3, 169 p., 4 pls.

TABLES

TABLE 1
LOWER QUEEN DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
FIRST QUARTER 1994

LOWER QUEEN WELL	Top of Casing (TOC) Elev. (ft AMSL)	Total Depth from TOC (ft)	Jan-10-94				Feb-9-94		Mar-16-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-57 (BH-83)	3787.70	177.20	157.91	3629.79	NG		158.78	3628.92	158.92	3628.78
MW-58 (BH-84)p	3824.31	218.03				present				
MW-59 (BH-85)p	3819.59	211.29				present				
MW-60 (BH-86)	3815.28	223.00	185.93	3629.35	NG		186.79	3628.49	184.91	3630.37
MW-61A (BH-87A)p	3815.97	215.67				present				
MW-62 (BH-88)p	3819.90	224.69								
MW-63 (BH-89)	3826.16	220.49	197.33	3628.83	NG		198.42	3627.74	198.37	3627.79
MW-64 (BH-90)	3798.57	201.89	169.12	3629.45	NG		169.92	3628.65	170.05	3628.52
MW-65A (BH-91A)p	3763.26	168.56								
MW-66 (BH-92)	3828.98	235.18	200.33	3628.65	NG		201.39	3627.59	201.44	3627.54
MW-67 (BH-93)	3765.87	165.77	136.25	3629.62	NG		137.16	3628.71	137.22	3628.65
MW-68 (BH-94)p	3797.83	203.43				present				
MW-70 (BH-97)	3822.57	225.07	192.99	3629.58	NG		194.02	3628.55	194.00	3628.57
MW-71 (BH-98)	3778.05	233.49	149.92	3628.13	NG		150.94	3627.11	150.90	3627.15
MW-72 (BH-99)p	3819.32					present				
SW-1 (SUPPLY)p	3808.19				NG					
SW-2 (BACKUP)	3808.79		180.41	3628.38	NG		181.55	3627.24	180.10	3628.69
Monthly Rainfall (in)			0.00				0.16		0.54	

p = pump present in well; unable to measure
VE = Vapor Extraction Well
NG = Not Gauged

AMSL = Above Mean Sea Level
FP = Free Product (condensate) being recovered
NS = Not Surveyed

TABLE 2
SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
FIRST QUARTER 1994

SHALLOW ZONE WELL	TOC Elev. (ft AMSL)	Total Depth from TOC (ft)	Jan-10-94				Feb-9-94		Mar-16-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-1 (BH-14)a	3792.50	16.10	DRY				NG		NG	
MW-2 (BH-23)	3788.82	15.52	DRY				NG		NG	
MW-3 (BH-24)	3787.50	16.90	DRY				NG		NG	
MW-4 (BH-26)	3785.88	18.68	DRY				NG		NG	
MW-5 (BH-28)a	3801.69	12.77	DRY				NG		NG	
MW-6 (BH-29)a	3785.17	13.66	DRY				NG		NG	
MW-7 (BH-30)a	3784.46	17.01	DRY				NG		NG	
MW-8 (BH-31)a	3795.04	16.97	DRY				NG		NG	
MW-9 (BH-32)a	3807.85	13.65	DRY				NG		NG	
MW-10 (BH-33)	3790.78	19.08	18.21	3772.57		strong odor	NG		NG	
MW-11 (BH-34)	3806.96	24.85	24.30	3782.66	24.27	0.36	NG		NG	
MW-12 (BH-35)	3809.86	25.21	DRY				NG		NG	
MW-13 (BH-36)p	3801.58	22.07	p				NG		NG	
MW-14 (BH-37)	3803.61	24.30	22.78	3780.83	22.34	5.28	NG		NG	
MW-15 (BH-38)vec	3803.59	19.47	DRY				NG		NG	
MW-16 (BH-39)pve	3801.04	22.66	22.67			odor	NG		NG	
MW-17 (BH-40)pve	3799.55	19.75	19.27	3780.28			NG		NG	
MW-18 (BH-41)VE	3795.82	17.42	VE				VE		VE	
MW-19 (BH-42)VE	3797.21	19.11	VE				VE		VE	
MW-20 (BH-43)VE	3797.59	16.89	VE				VE		VE	
MW-21 (BH-44)pve	3798.21	23.31	DRY			odor	NG		NG	
MW-22 (BH-45)	3799.20	17.30	DRY				NG		NG	
MW-23 (BH-46)a	3794.48	12.08	DRY				NG		NG	
MW-24 (BH-47)	3794.09	14.09	DRY				NG		NG	
MW-25 (BH-48)a	3786.97	10.27	DRY				NG		NG	
MW-26 (BH-49)	3793.01	21.11	20.77	3772.24	20.72	0.60	NG		NG	
MW-27 (BH-50)	3790.93	18.23	DRY				NG		NG	
MW-28 (BH-52)ve	3797.03	18.59	DRY				NG		NG	
MW-29 (BH-53)a	3794.06	14.76	DRY				NG		NG	
Monthly Rainfall (in)			0.00				0.16		0.54	

a = proposed abandonment candidate
p = pump present in well; unable to measure
vec = vapor extraction well candidate
pve = previous vapor extraction well

VE = Vapor Extraction Well
AMSL = Above Mean Sea Level
TOC = Top of Casing datum
NG = Not Gauged

TABLE 2 (CONTINUED)
SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA

SHALLOW ZONE WELL	TOC Elev. (ft AMSL)	Total Depth from TOC (ft)	Jan-10-94				Feb-9-94		Mar-16-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-30 (BH-54)a	3788.30	14.82	DRY				NG		NG	
MW-31 (BH-55)	3791.15	19.93	19.59				NG		NG	
MW-32 (BH-56)	3797.47	16.77	DRY				NG		NG	
MW-33 (BH-57)	3802.48	20.23	DRY			odor	NG		NG	
MW-34 (BH-58)	3806.00	19.97	DRY				NG		NG	
MW-35 (BH-59)	3800.81	20.71	20.09	3780.72	19.97	1.44	NG		NG	
MW-36 (BH-21)a	3792.94	8.77	NG				NG		NG	
MW-37 (BH-60)	3795.03	20.83	20.21	3774.82	NG	present	NG		NG	
MW-38 (BH-61)	3797.32	20.57	DRY			odor	NG		NG	
MW-39 (BH-62)	3796.20	20.54	18.72	3777.48		dissolved	NG		NG	
MW-40 (BH-63)	3803.12	14.07	DRY				NG		NG	
MW-41 (BH-64)	3799.04	24.04	19.82	3779.22	NG	present	NG		NG	
MW-42 (BH-65)	3804.73	23.59	23.13	3781.60			NG		NG	
MW-43 (BH-66)	3802.05	24.55	21.27	3780.78			NG		NG	
MW-44 (BH-67)	3804.14	25.24	21.68	3782.46		dissolved	NG		NG	
MW-45 (BH-68)	3808.68	26.62	21.54	3787.14			NG		NG	
MW-46 (BH-69)	3805.54	20.24	19.42	3786.12		odor	NG		NG	
MW-47 (BH-70)	3805.09	21.79	DRY			odor	NG		NG	
MW-48 (BH-71)	3806.18	19.98	DRY			odor	NG		NG	
MW-49 (BH-72)	3805.61	25.91	22.27	3783.34		dissolved	NG		NG	
MW-50 (BH-73)	3813.35	37.15	26.83	3786.52			NG		NG	
MW-51 (BH-74)	3810.86	20.06	DRY				NG		NG	
MW-52 (BH-75)	3817.49	21.44	DRY				NG		NG	
MW-53 (BH-77)a	3809.92	15.32	DRY				NG		NG	
MW-54 (BH-80)	3823.86	78.15	46.34	3777.52		dissolved	NG		NG	
MW-55 (BH-81)	3794.40	66.32	31.15	3763.25		dissolved	NG		NG	
MW-56 (BH-82)	3782.45	43.76	DRY				NG		NG	
MW-61 (BH-87)	3816.20	57.97	35.49	3780.71		dissolved	NG		NG	
MW-65 (BH-91)	3763.31	57.69	56.67	3706.64			NG		NG	
MW-69 (BH-95)p	3805.11	51.27	~43.5	3761.61	NG	97 (July 93)	NG		NG	
Sump A10		NG	DRY				NG		NG	
Sump 16A	3785.14	NG	DRY			odor	NG		NG	
Stock well (SE1/4 Sec. 13)	3779.76	NG	19.61	3760.15			NG		NG	
Monthly Rainfall (in)					0.00			0.16		0.54

a = proposed abandonment candidate
p = pump present in well; unable to measure
ve = potential vapor extraction well

AMSL = Above Mean Sea Level
TOC = Top of Casing datum
NG = Not Gauged

TABLE 3
HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN LOWER QUEEN GROUNDWATER
FIRST QUARTER 1994

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise									
WELL	Sep-91	Dec-91	Apr-92	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Oct-93	Jan-94
MW-57	1600	350	150	948**	15.1*	21*	8*	6*	<0.5	<0.5
MW-58	40	90	202**	178**	190*	192*	55*	25*	50*	FP
MW-59	540	420	40.4**	268**	98.8*	26*	10*	FP	10*	FP
MW-60	33	<1	3.5**	19**	31.7*	138*	17*	<1	<0.5	<0.5
MW-61A	190	10	5.0**	359**	470.1*	585*	2821*	FP	FP	FP
MW-62	2200	1400	257.5**	357**	212.3*	78*	33*	98*	10*	4.1
MW-63	<1	<1	4.1**	12**	4.3*	12*	7*	4*	14*	<0.5
MW-64	150	130	233**	115**	14	15*	5*	2	18*	1.7
MW-65A	680	150	25.3**	413**	10.6*	3*	4*	<1*	7*	<0.5
MW-66	<1	<1	3.3**	8**	12.1*	3*	<3*	8*	13*	<0.5
MW-67	280	320	4.3*	103**	2.6*	8*	7*	7*	<0.5	<0.5
MW-68	240	1900	1865**	160**	2208.2**	376*	1890*	150	374*	3000
MW-70	<1	<1	1.7**	<1	10.7*	<3*	9*	<1*	25*	<0.5
MW-71	NI	NI	NI	NI	NI	NI	NI	NI	8*	<0.5
MW-72	NI	NI	NI	NI	NI	NI	NI	NI	FP	FP
SW-1	<1	<1	5*	17.5*	15.7*	6*	<1	<1	<0.5	<0.5
SW-2	<1	<1	7.9*	7*	69.4*	47*	4	NS	NS	NS
Max. Conc.	2200	1900	1865	948	2208	585	2821	2821	2821	3000

* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.

FP = Free Product (Condensate)
NS = Not Sampled
NI = Not Installed

1QTABLE3.XLS

TABLE 4
HISTORICAL SUMMARY OF BENZENE IN SHALLOW ZONE GROUNDWATER
FIRST QUARTER 1994

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise									
WELL	SEP 1991	DEC 1991	APR 1992	JUL 1992	OCT 1992	JAN 1993	APR 1993	JUL 1993	OCT 1993	JAN 1994
MW-1 (BH-14)	250	200	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-2 (BH-23)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-3 (BH-24)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-4 (BH-26)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-5 (BH-28)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-6 (BH-29)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-7 (BH-30)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-8 (BH-31)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-9 (BH-32)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-10 (BH-33)	2300	2300	1780**	1842**	2100	NS	NS	DRY	DRY	BD
MW-11 (BH-34)	3000	3800	3087**	2199**	2942*	2746*	FP	FP	FP	FP
MW-12 (BH35)	3800	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-13 (BH-36)	3100	3000	3492**	2708**	NS	NS	PUMP	PUMP	PUMP	PUMP
MW-14 (BH-37)	5100**	NS	NS	NS	NS	NS	PUMP	PUMP	FP	FP
MW-15 (BH-38)	5100	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-16 (BH-39)	1700	NS	NS	NS	NS	NS	514*	DRY	DRY	DRY
MW-17 (BH-40)	2000	NS	NS	NS	NS	NS	1500	DRY	BD	NS
MW-18 (BH-41)	4300	NS	2639**	2700	3300	NS	NS	DRY	VE	VE
MW-19 (BH-42)	4700	NS	3195**	3000	3032*	NS	3926*	DRY	VE	VE
MW-20 (BH-43)	110	NS	NS	NS	NS	NS	NS	DRY	VE	VE
MW-21 (BH-44)	1000	1100	NS	NS	NS	NS	114*	FP	NS	DRY
MW-22 (BH-45)	4	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-23 (BH-46)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-24 (BH-47)	3400	NS	NS	4353**	NS	NS	NS	DRY	DRY	DRY
MW-25 (BH-48)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-26 (BH-49)	3100	3000	NS	2000	1992*	1708*	861*	FP	FP	FP
MW-27 (BH-50)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-28 (BH-52)	2200	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-29 (BH-53)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-30 (BH-54)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-31 (BH-55)	<1	NS	NS	332**	9*	NS	NS	DRY	DRY	NS
MW-32 (BH-56)	200	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-33 (BH-57)	6300	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-34 (BH-58)	2500	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-35 (BH-59)	5700	NS	NS	NS	NS	NS	NS	FP	FP	FP
MW-36 (BH-21)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-37 (BH-60)	150	NS	NS	NS	NS	NS	NS	27*	BD	NS
MW-38 (BH-61)	15	15	51**	37*	166**	NS	NS	DRY	BD	NS
MW-39 (BH-62)	880	NS	NS	NS	NS	14	29*	24*	BD	<2.5
MW-40 (BH-63)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-41 (BH-64)	200	170	NS	NS	NS	NS	NS	22*	BD	5.3
MW-42 (BH-65)	<1	<1	NS	NS	NS	NS	NS	NS	BD	NS
MW-43 (BH-66)	320	NS	NS	NS	NS	NS	NS	25*	BD	<0.5
MW-44 (BH-67)	59	NS	10**	97**	12	14	7*	6*	3*	12
MW-45 (BH-68)	<1	<1	NS	NS	NS	NS	NS	<3*	<3*	<0.5
MW-46 (BH-69)	140	25	NS	NS	NS	NS	NS	NS	BD	NS
MW-47 (BH-70)	2600	2200	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-48 (BH-71)	<1	<1	NS	47**	NS	NS	NS	DRY	DRY	DRY
MW-49 (BH-72)	35	NS	NS	NS	NS	NS	NS	210*	68*	13
MW-50 (BH-73)	<1	<1	4**	4**	8*	8*	<1	<3*	9*	<0.5
MW-51 (BH-74)	800	<1	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-52 (BH-75)	<1	NS	NS	5**	NS	NS	NS	DRY	DRY	DRY
MW-53 (BH-77)	<1	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY
MW-54 (BH-80)	<1	<1	9**	8**	62*	14*	10*	<3*	17*	8.6
MW-55 (BH-81)	940	400	296**	483**	215*	390	412*	625*	581*	290
MW-56 (BH-82)	2200	1000	NS	1114**	1026*	1128*	VE	DRY	DRY	DRY
MW-61 (BH-87)	<1	NS	NS	NS	NS	NS	NS	NS	NS	1.4
MW-65 (BH-91)	<1	NS	NS	NS	NS	NS	NS	<3*	BD	DRY
MW-69 (BH-95)	2400	2100	NS	568*	1598*	1284*	FP	FP	FP/PUMP	FP/PUMP
SUMP A-10	FP	FP	FP	FP	FP	FP	FP	DRY	DRY	DRY
SUMP A-11	1400	2900	3033**	1258**	2815*	NS	NS	DRY	DRY	DRY
SUMP A-16	240	2000	1233**	1495**	632*	741**	707*	DRY	DRY	DRY
Lyman well										<0.5
U. Indian Hills Spring W.	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5

Bolded Italicized well numbers = Designated wells for quarterly sampling in Marathon Treatment Plan (March 1992)

DRY = Dry well
BD = Bailed Dry - No Recovery
* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.

FP = Free Product (condensate)
NS = Not Sampled.
VE = Vapor Extraction well

1QTABLE4.XLS

TABLE 5

RANCHER WELL GROUNDWATER AND NATURAL SPRING WATER SAMPLE RESULTS

FIRST QUARTER 1994

	1994														
	Jan-12					Feb-9					Mar-16				
WELL/ SPRING	Benzene	Toluene	Ethylbenzene	Xylene	Chloride	Benzene	Toluene	Ethylbenzene	Xylene	Chloride	Benzene	Toluene	Ethylbenzene	Xylene	Chloride
Lyman (#1)	ND	ND	ND	ND	13	ND	ND	ND	ND	12.6	ND	ND	ND	ND	13
Upper Indian Hills Spring West (#2)	ND	ND	ND	ND	11	ND	ND	ND	ND	11.6	ND	ND	ND	ND	13
Biebelle (#3)	ND	ND	ND	ND	11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Benzene, Toluene, Ethylbenzene, and total Xylene concentration in ug/L.

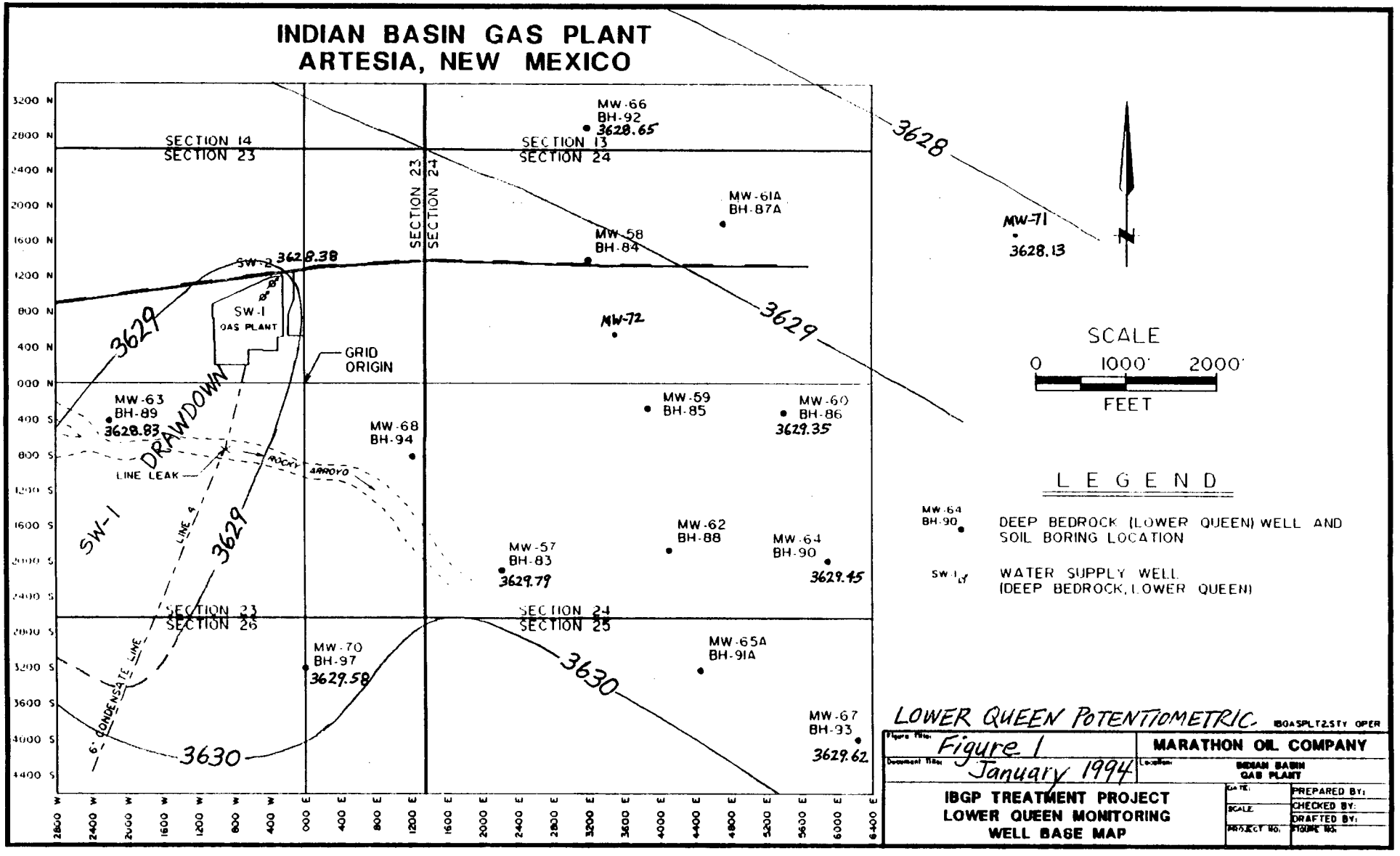
Chloride concentration in mg/L.

ND = Not Detected at method detection limit of 0.5 ug/L.

NS = Not Sampled.

FIGURES

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO



LEGEND

MW-64 BH-90 — DEEP BEDROCK (LOWER QUEEN) WELL AND SOIL BORING LOCATION

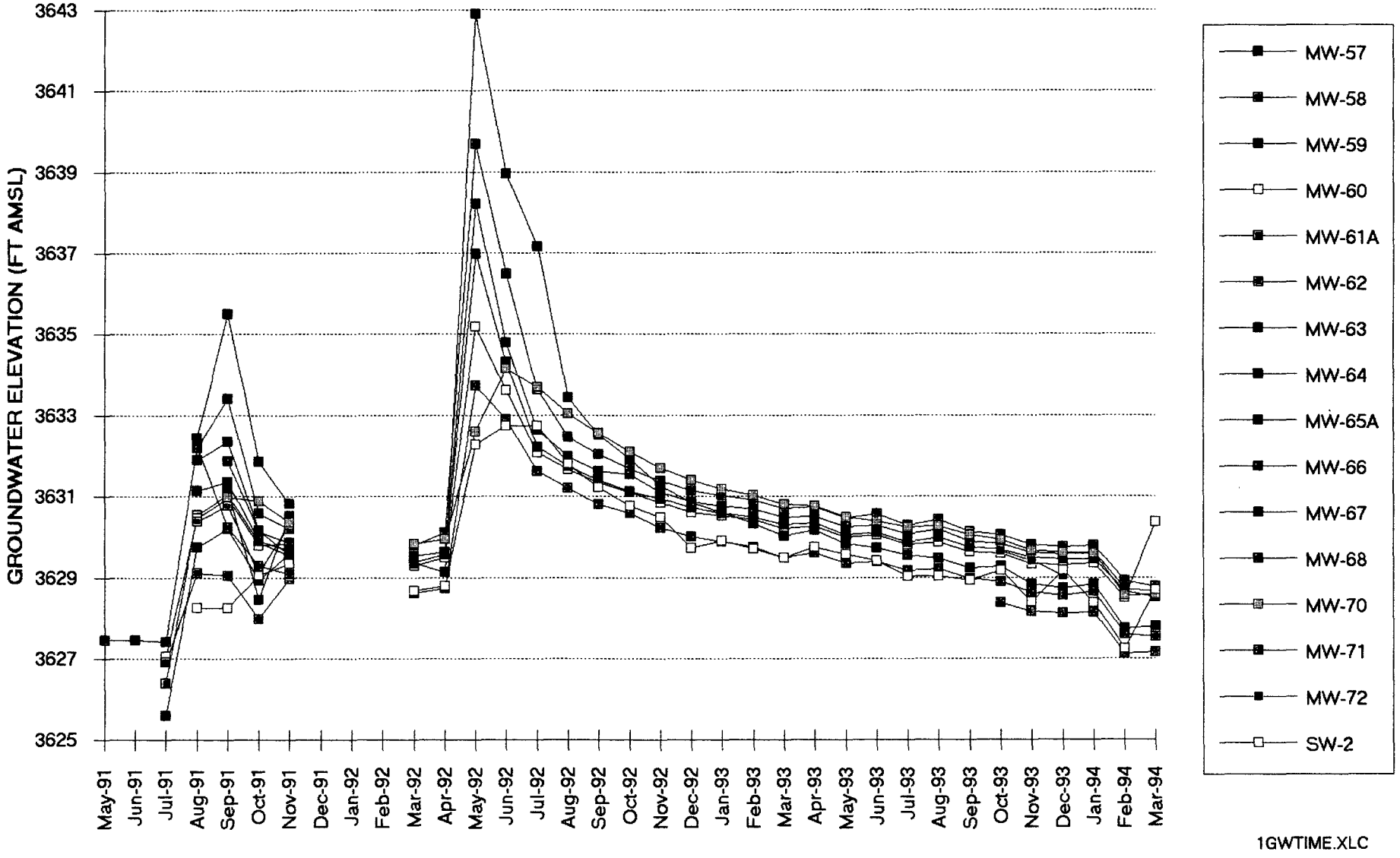
SW-1 — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

LOWER QUEEN POTENTIOMETRIC

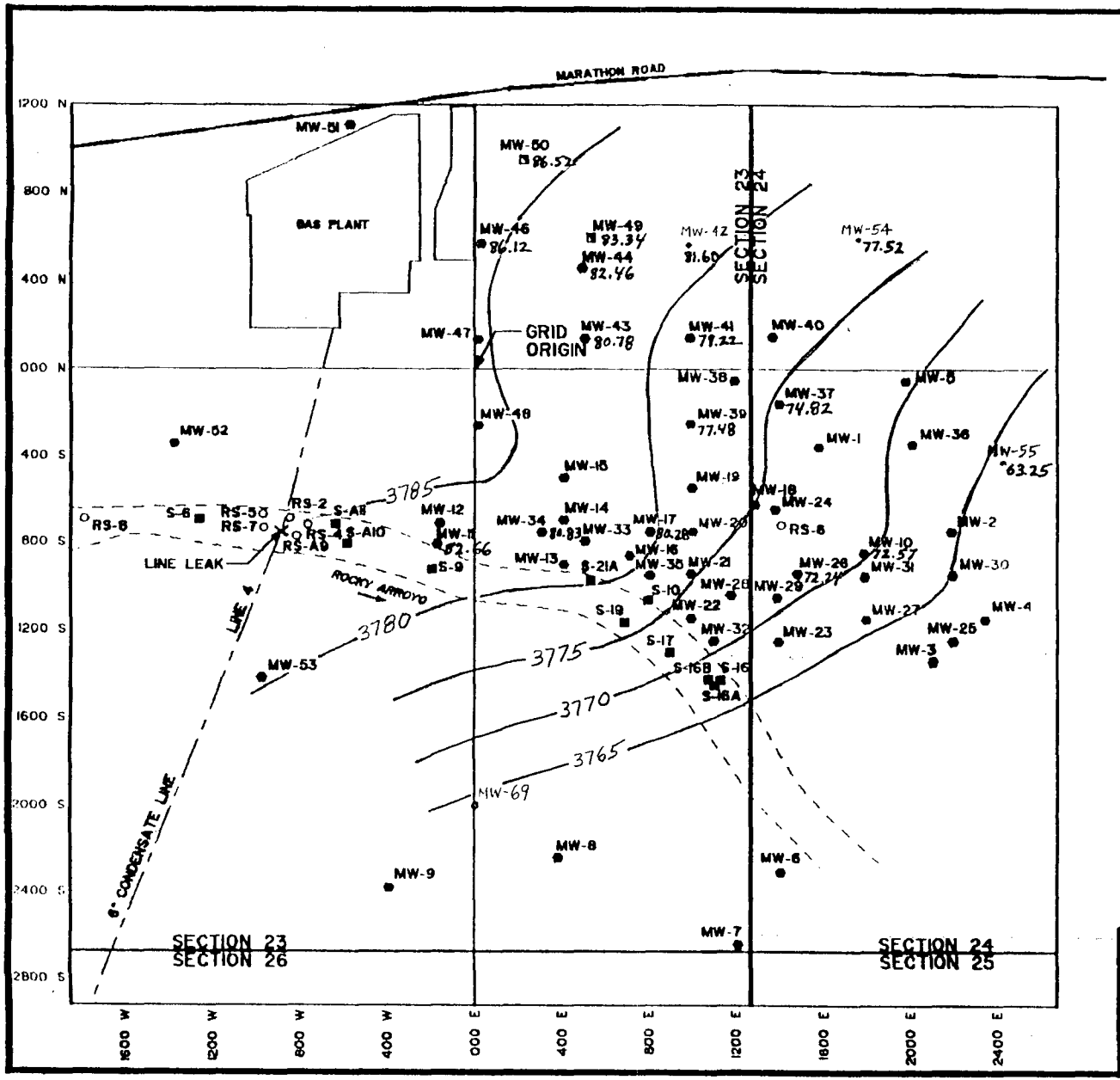
IBGASPLTZ.STY OPER

Figure Title: Figure 1	MARATHON OIL COMPANY
Document Title: January 1994	Location: INDIAN BASIN GAS PLANT
IBGP TREATMENT PROJECT LOWER QUEEN MONITORING WELL BASE MAP	DATE: PREPARED BY: SCALE: CHECKED BY: PROJECT NO. DRAFTED BY: FIGURE NO.

FIGURE 2. LOWER QUEEN GROUNDWATER ELEVATION VS. TIME



1GWTIME.XLC



INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO

SCALE

0 1000' 2000'

FEET

LEGEND

MW-9 ● SHALLOW ALLUVIAL GROUNDWATER MONITORING WELL

RS-4 ○ 4 INCH PVC RECOVERY SUMP

S-19 ■ 24 INCH GALVANIZED RECOVERY SUMP

Figure Title: Figure 3	MARARTHON OIL COMPANY
Document Title:	Location: INDIAN BASIN GAS PLANT
January 1994 Shallow zone Potentiometric Surface	DATE: PREPARED BY:
	SCALE: CHECKED BY:
	DRAFTED BY:
	PROJECT NO: FIGURE NO:

IBGASPLT.STY OPER

FIGURE 4. SHALLOW ZONE GROUNDWATER ELEVATION VS. TIME

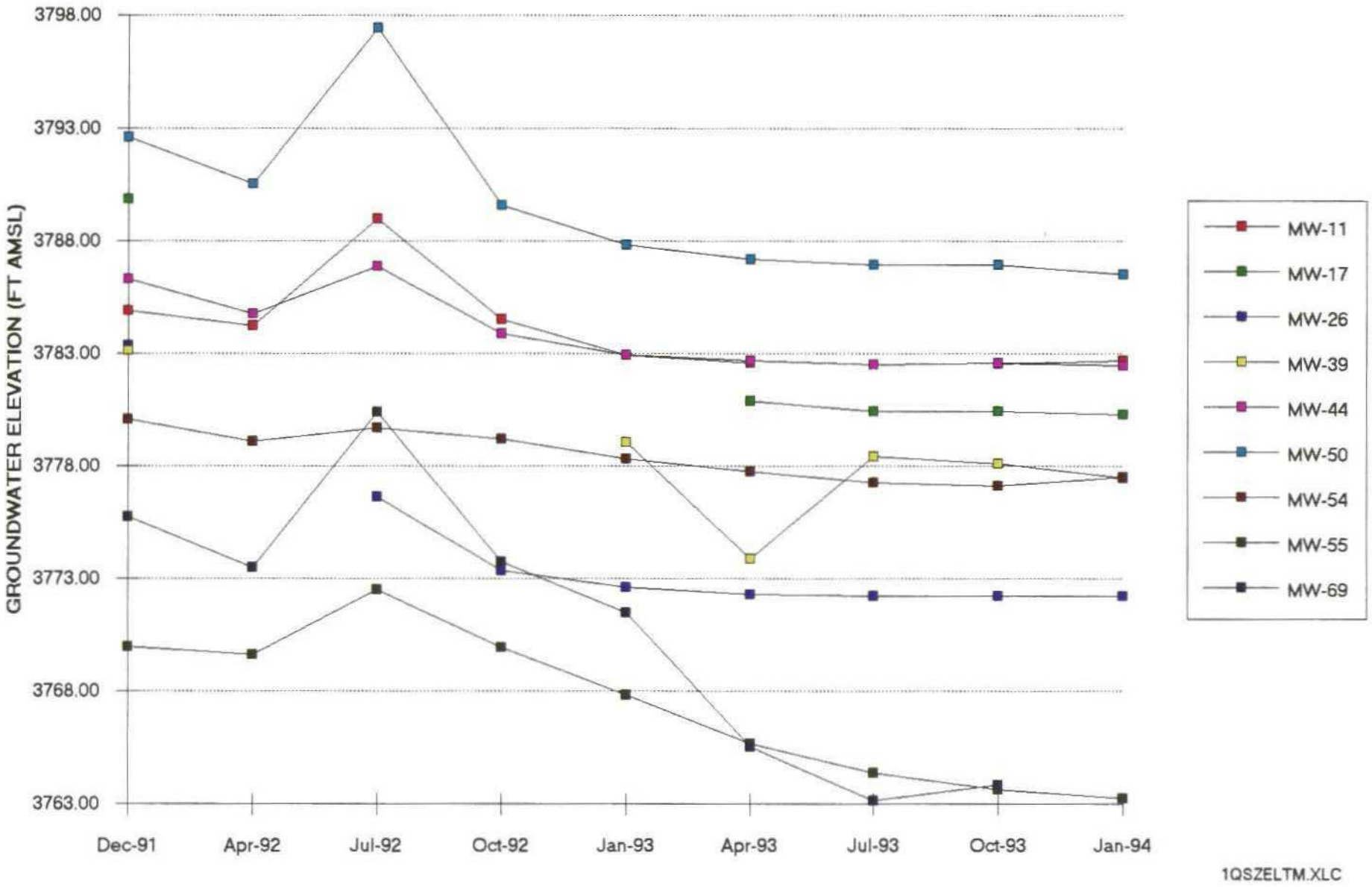


FIGURE 5
WEEKLY LOWER QUEEN FLUID RECOVERY
FIRST QUARTER 1994

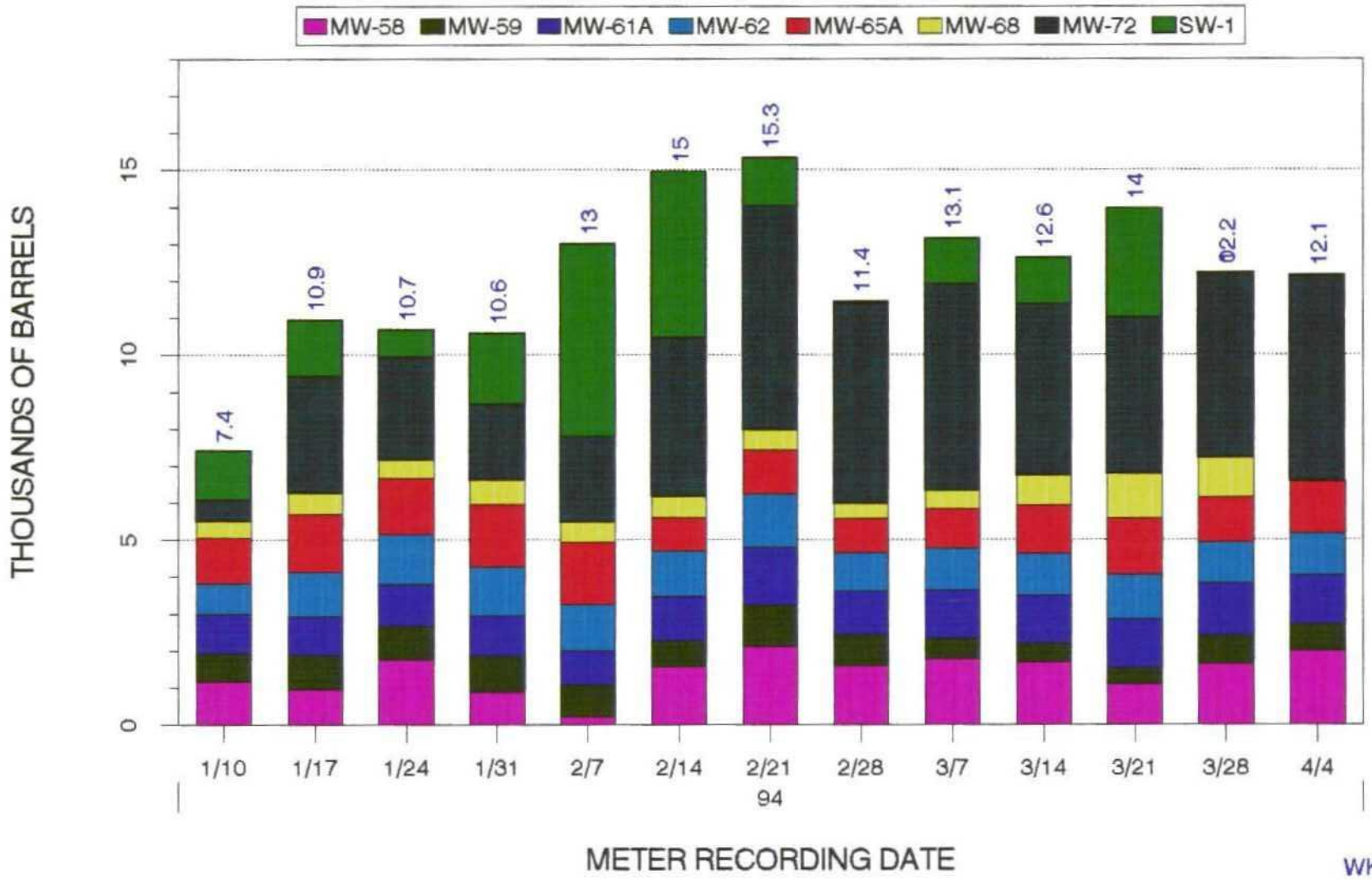
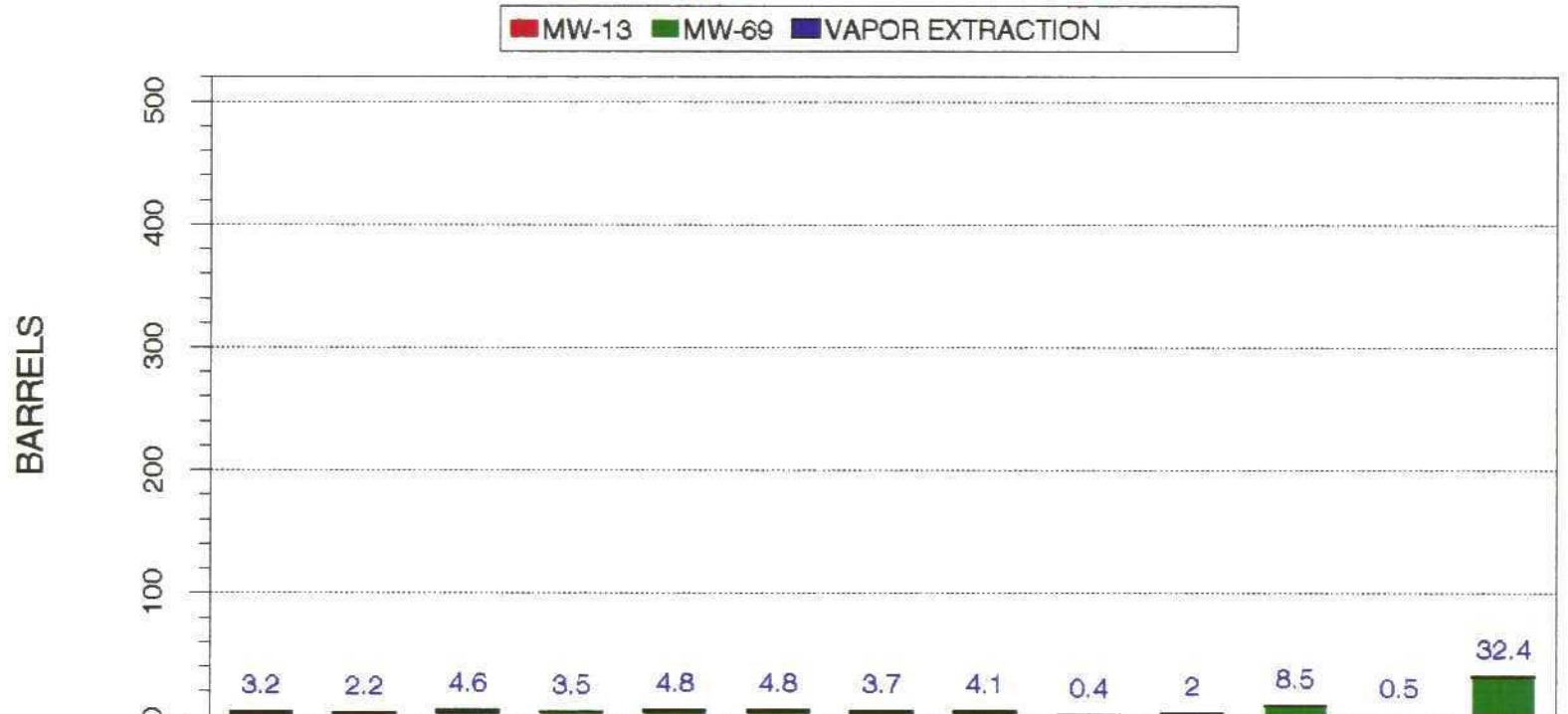


FIGURE 6
WEEKLY SHALLOW FLUID RECOVERY
FIRST QUARTER 1994

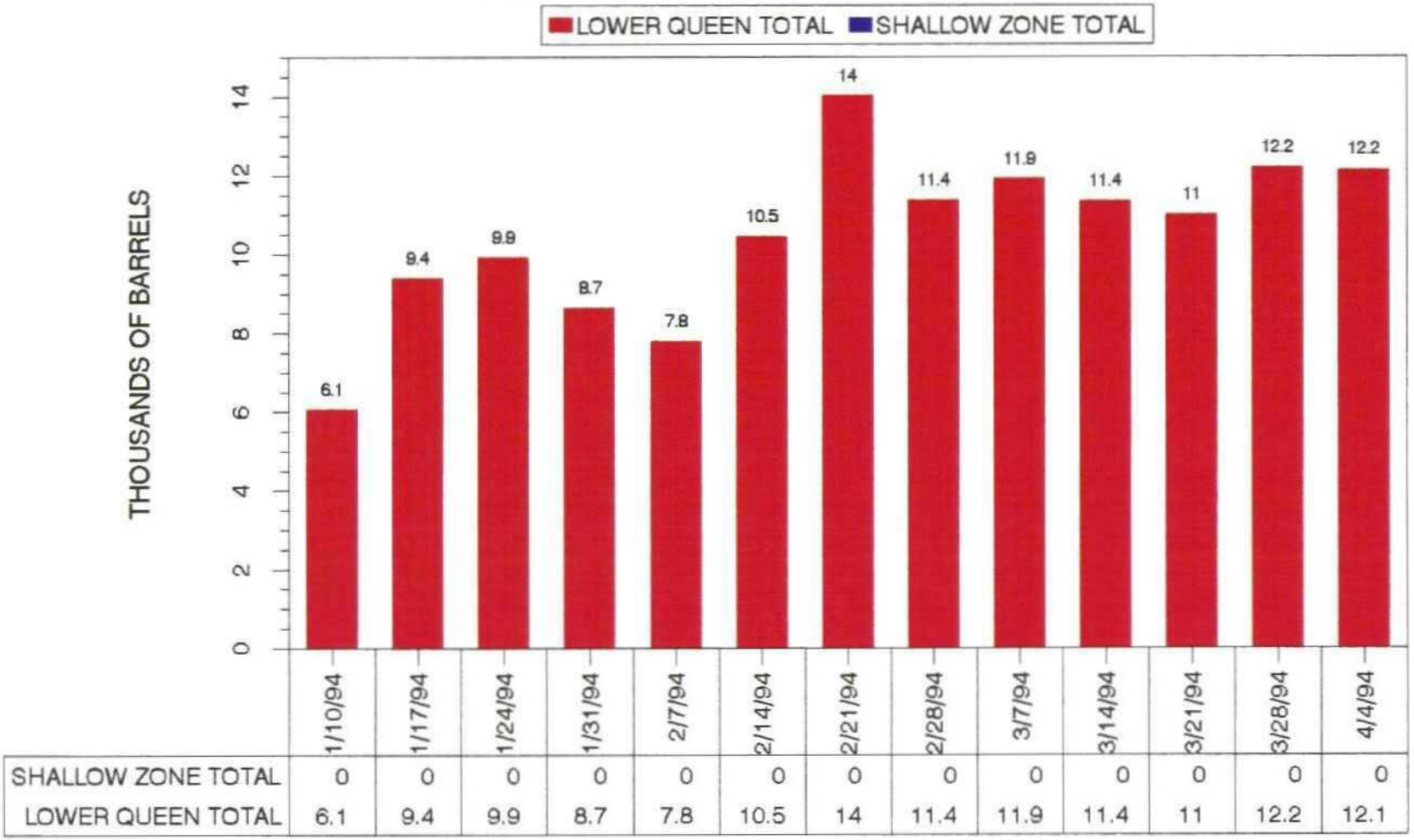


	1/10/94	1/17/94	1/24/94	1/31/94	2/7/94	2/14/94	2/21/94	2/28/94	3/7/94	3/14/94	3/21/94	3/28/94	4/4/94
VAPOR EXTRACTION	1.5	1.2	2.1	0.8	1.6	2.1	1.7	1.7	0.4	2	0.5	0.5	1.3
MW-69	1.7	1	2.5	2.7	3.2	2.7	2	2.4	0	0	8	0	31.1
MW-13	0	0	0	0	0	0	0	0	0	0	0	0	0

METER RECORDING DATE

WKSHREC1Q

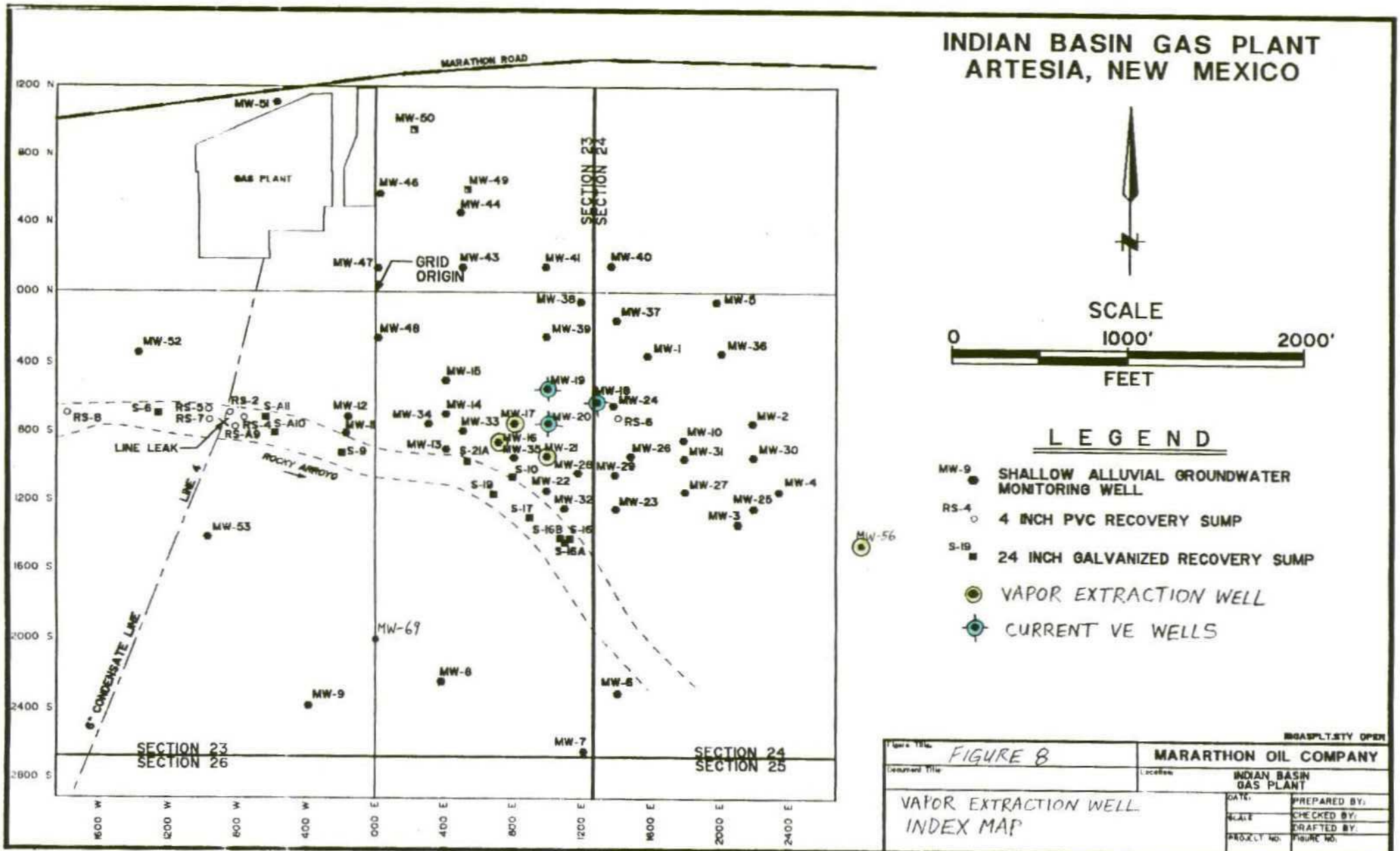
FIGURE 7
WEEKLY TOTAL FLUID RECOVERY
FIRST QUARTER 1994



	1/10/94	1/17/94	1/24/94	1/31/94	2/7/94	2/14/94	2/21/94	2/28/94	3/7/94	3/14/94	3/21/94	3/28/94	4/4/94
SHALLOW ZONE TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0
LOWER QUEEN TOTAL	6.1	9.4	9.9	8.7	7.8	10.5	14	11.4	11.9	11.4	11	12.2	12.1

METER RECORDING DATE

WKREC1Q


INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO
MARATHON ROAD
GAS PLANT
GRID ORIGIN
SECTION 23
SECTION 24
SECTION 26
SECTION 25
LINE LEAK
ROCKY ARROYO
6" CONDENSATE LINE
SCALE
0
1000'
2000'
FEET
LEGEND
MW-9 SHALLOW ALLUVIAL GROUNDWATER MONITORING WELL
RS-4 4 INCH PVC RECOVERY SUMP
S-19 24 INCH GALVANIZED RECOVERY SUMP
VAPOR EXTRACTION WELL
CURRENT VE WELLS
FIGURE 8
VAPOR EXTRACTION WELL INDEX MAP
MARARTHON OIL COMPANY
INDIAN BASIN GAS PLANT

APPENDIX A

JANUARY 1994 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY

SWL SOUTHWESTERN LABORATORIES

1703 West Industrial Avenue * P.O. Box 2150, Midland, Texas 79702 * 915/683-3349

Client Marathon Oil Company
P.O. Box 552
Midland, Texas 79702

Attn: Bob Menzie

Client No. 26546001
Report No. M4-01-175
Report Date 01/25/94 12:19

Project Indian Basin Gas Plant

Date Sampled 01/13/94

Sampled By SWL Field Services

Sample Type Sampling

Transported by Bus

P.O. # _____

Date Received 01/13/94

Lab No.	Sample Identification
M4-01-175-01	Indian Basin Gas Plant

SOUTHWESTERN LABORATORIES

RBB
Reviewed By

ALLAN B. JOHNSTON

2 6 1994

SOUTHWESTERN LABORATORIES, INC.

LOWER QUEENS WELLS
Indian Basin Gas Plant
Artesia, N.M.

Well I.D.	Well Depth TOC (ft)	Water Level TOC (ft)	Water Column (ft)	Purge Volume (gal.)	Free Product (Y/N)	Temperature °C	pH	Conductivity µmhos/cm @ 25° C	Date Sampled	Time Sampled	Remarks
MW-57	177.20	157.91	19.29	37.78	N	20.0	7.10	813	01/12/94	13:40	
MW-58	218.03			Pump Present	Y						(a)
MW-59	211.29			Pump Present	Y						(a)
MW-60	223.00	185.93	37.07	72.61	N	20.6	7.16	1033	01/12/94	10:21	
MW-61A	215.67			Pump Present	Y						(a)
MW-62	224.69			Pump Present	Y		6.83	1324	01/11/94	09:17	(a)
MW-63	220.49	197.33	23.16	45.36	N	19.0	7.33	582	01/11/94	15:00	
MW-64	201.89	169.12	32.77	64.18	N	18.9	7.12	953	01/12/94	08:23	
MW-65A	168.56			Pump Present	N	20.0	7.07	906	01/11/94	09:36	(a)
MW-66	235.18	200.33	34.85	68.26	N	19.7	7.18	1070	01/11/94	16:40	
MW-67	165.77	136.25	29.52	57.82	N	20.0	7.27	671	01/12/94	12"01	
MW-68	203.43			Pump Present	Y		7.26	717	01/11/94	09:55	(a)
MW-70	225.07	192.99	32.08	62.83	N	20.3	7.35	588	01/11/94	12:50	
MW-71	227.17	149.92	77.25	151.30	N	20.3	7.09	1327	01/11/94	11:00	Pumped Dry
MW-72				Pump Present	Y						(a)
SW-1	255.00										
SW-2	292.00										

NOTE: All calculations were based on water levels provided by Marathon Oil Company.

(a) Sampled by R.M. Gray

Equipment Blank and Decon Water Information

I.D.	Date Sampled	Time Sampled
Equipment Blank No. 1	01/11/94	17:22
Equipment Blank No. 2	01/12/94	18:00
Equipment Blank No. 3	01/13/94	09:20
Day 1 Decon	01/11/94	09:00
Day 2 Decon	01/12/94	07:34
Day 3 Decon	01/13/94	07:45

SOUTHWESTERN LABORATORIES, INC.

SHALLOW WELLS
Indian Basin Gas Plant
Artesia, N.M.

Well I.D.	Well Depth TOC (ft)	Water Level TOC (ft)	Water Column (ft)	Purge Volume (gal.)	Free Product (Y/N)	Temperature °C	pH	Conductivity µmhos/cm @ 25° C	Date Sampled	Time Sampled	Remarks
MW-3	16.90										
MW-5	12.77										
MW-6	13.66										
MW-7	17.01										
MW-8	16.97										
MW-9	13.65										
MW-10	19.08	18.21	0.87	1.70							(b)
MW-11	24.85										
MW-13	22.07										(c)
MW-14	24.30										
MW-15	19.47										
MW-16	22.66										
MW-17	19.75										
MW-19	19.11										
MW-21	23.31										
MW-24	14.09										
MW-26	21.11										
MW-29	14.76										
MW-32	16.77										
MW-33	20.29										
MW-35	20.71										
MW-37	20.83										
MW-38	20.57										
MW-39	20.54	18.72	1.82	3.56	N	-----	-----	-----	01/13/94	13:30	Bailed dry after 2.5 gal.
MW-41	24.04	19.82	4.22	8.27	N	16.6	7.12	2690	01/13/94	13:37	Bailed dry after 5 gal.

(a) Sampled by R.M. Gray
(b) Bailed dry, no recovery in 2 hours.
(c) Pump installed, system down.

SOUTHWESTERN LABORATORIES, INC.

SHALLOW WELLS
Indian Basin Gas Plant
Artesia, N.M.

Well I.D.	Well Depth TOC (ft)	Water Level TOC (ft)	Water Column (ft)	Purge Volume (gal.)	Free Product (Y/N)	Temperature °C	pH	Conductivity µmhos/cm @ 25° C	Date Sampled	Time Sampled	Remarks
MW-42	23.59										
MW-43	24.55	21.27	3.28	6.42	N	16.1	6.87	2800	01/13/94	13:44	Bailed dry after 3 gal.
MW-44	25.24	21.68	3.56	6.97	N	17.0	6.88	3170	01/13/94	11:00	
MW-45	26.62	21.54	5.08	2.49					01/13/94	09:07	(a)
MW-46	20.24										
MW-47	21.79										
MW-48	19.98										
MW-49	25.91	22.27	3.64	1.78					01/13/94	09:30	(a)
MW-50	37.15	26.83	10.32	5.05					01/13/94	10:55	(a)
MW-52	21.44										
MW-53	15.32										
MW-54	78.15	46.34	31.81	62.30	N	18.8	7.01	3920	01/12/94	17:10	Pumped Dry
MW-55	66.32	31.15	35.17	68.88	N	19.2	7.02	2710	01/12/94	15:45	
MW-56	43.76										
MW-61	57.97	35.49	22.48	44.03	N	16.7	6.87	3860	01/13/94	08:17	Pumped Dry
MW-65	57.69										
MW-69	51.27										

(a) Sampled by R.M. Gray

APPENDIX B

JANUARY 1994 LABORATORY RESULTS - GROUNDWATER

AND

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

Analytical **Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **401334**

February 2, 1994

Marathon Oil Company
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: INDIAN BASIN REMEDIATION PROJECT 44999

Attention: Robert Menzie

On **01/14/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Low matrix spike recoveries for EPA Method 8020 - sample 40133420 were confirmed by re-analysis.

EPA Method 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street,Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jd

Enclosure

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY DATE RECEIVED: 01/14/94
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT REPORT DATE : 02/02/94

ATI I.D.: 401334

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	INITIAL DECON	AQUEOUS	01/11/94
02	MW-71	AQUEOUS	01/11/94
03	MW-70	AQUEOUS	01/11/94
04	MW-63	AQUEOUS	01/11/94
05	MW-66	AQUEOUS	01/11/94
06	EQUIPMENT BLANK NO. 1	AQUEOUS	01/11/94
07	MW-62	AQUEOUS	01/11/94
08	MW-65A	AQUEOUS	01/11/94
09	MW-68	AQUEOUS	01/11/94
10	AIR STRIPPER-OUT	AQUEOUS	01/12/94
11	AIR STRIPPER-IN	AQUEOUS	01/12/94
12	#1 LYMAN	AQUEOUS	01/12/94
13	SW-1	AQUEOUS	01/12/94
14	#3 BIEBLE	AQUEOUS	01/13/94
15	#2 ARROYO	AQUEOUS	01/13/94
16	2ND DAY DECON	AQUEOUS	01/12/94
17	MW-64	AQUEOUS	01/12/94
18	MW-60	AQUEOUS	01/12/94
19	MW-67	AQUEOUS	01/12/94
20	MW-57	AQUEOUS	01/12/94
21	MW-55	AQUEOUS	01/12/94
22	MW-54	AQUEOUS	01/12/94
23	EQUIPMENT BLANK NO. 2	AQUEOUS	01/12/94
24	3RD DAY DECON	AQUEOUS	01/13/94
25	MW-61	AQUEOUS	01/13/94
26	EQUIPMENT BLANK NO. 3	AQUEOUS	01/13/94
27	MW-45	AQUEOUS	01/13/94
28	MW-49	AQUEOUS	01/13/94
29	MW-44	AQUEOUS	01/13/94
30	MW-50	AQUEOUS	01/13/94
31	MW-41	AQUEOUS	01/13/94
32	MW-39	AQUEOUS	01/13/94
33	MW-43	AQUEOUS	01/13/94
34	TRIP BLANK	AQUEOUS	01/07/94

----TOTALS----

MATRIX	# SAMPLES
AQUEOUS	34

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 401334

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMEDIATION PROJECT

DATE RECEIVED : 01/14/94
REPORT DATE : 02/02/94

PARAMETER	UNITS	02	03	04	05	07
CHLORIDE (EPA 325.2)	MG/L	18	10	5.7	9.0	160

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 401334

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMEDIATION PROJECT

DATE RECEIVED : 01/14/94
REPORT DATE : 02/02/94

PARAMETER	UNITS	08	09	12	13	14
CHLORIDE (EPA 325.2)	MG/L	18	31	13	22	11

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 401334

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMEDIATION PROJECT

DATE RECEIVED : 01/14/94
REPORT DATE : 02/02/94

PARAMETER	UNITS	15	17	18	19	20
CHLORIDE (EPA 325.2)	MG/L	11	10	9.5	8.6	64

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 401334

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMEDIATION PROJECT

DATE RECEIVED : 01/14/94
REPORT DATE : 02/02/94

PARAMETER	UNITS	21	22	25	27	28
CHLORIDE (EPA 325.2)	MG/L	320	140	420	440	400

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 401334

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMEDIATION PROJECT

DATE RECEIVED : 01/14/94
REPORT DATE : 02/02/94

PARAMETER	UNITS	29	30	31	32	33
CHLORIDE (EPA 325.2)	MG/L	490	320	370	260	260

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMEDIATION PROJECT ATI I.D. : 401334

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	40133403	10	10	0	20	10	100
CHLORIDE	MG/L	40133415	11	11	0	22	10	110
CHLORIDE	MG/L	40133429	490	490	0	990	500	100

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	INITIAL DECON	AQUEOUS	01/11/94	NA	01/17/94	1
02	MW-71	AQUEOUS	01/11/94	NA	01/17/94	1
03	MW-70	AQUEOUS	01/11/94	NA	01/17/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	1.3	0.6
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	0.5	<0.5
BROMOFLUOROBENZENE (%)		101	102	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	MW-63	AQUEOUS	01/11/94	NA	01/17/94	1
05	MW-66	AQUEOUS	01/11/94	NA	01/17/94	1
06	EQUIPMENT BLANK NO. 1	AQUEOUS	01/11/94	NA	01/17/94	1

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	0.7	<0.5	0.7
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	0.7	0.6	<0.5
BROMOFLUOROBENZENE (%)		104	103	102

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
07	MW-62	AQUEOUS	01/11/94	NA	01/18/94	5
08	MW-65A	AQUEOUS	01/11/94	NA	01/17/94	1
09	MW-68	AQUEOUS	01/11/94	NA	01/18/94	250

PARAMETER	UNITS	07	08	09
BENZENE	UG/L	4.1	<0.5	3000
TOLUENE	UG/L	<2.5	<0.5	820
ETHYLBENZENE	UG/L	13	<0.5	1000
TOTAL XYLENES	UG/L	44	<0.5	7700
BROMOFLUOROBENZENE (%)		80	100	95

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
10	AIR STRIPPER-OUT	AQUEOUS	01/12/94	NA	01/19/94	5
11	AIR STRIPPER-IN	AQUEOUS	01/12/94	NA	01/18/94	20
12	#1 LYMAN	AQUEOUS	01/12/94	NA	01/17/94	1

PARAMETER	UNITS	10	11	12
BENZENE	UG/L	<2.5	14	<0.5
TOLUENE	UG/L	<0.5	<10	<0.5
ETHYLBENZENE	UG/L	12	20	<0.5
TOTAL XYLENES	UG/L	<2.5	260	<0.5
BROMOFLUOROBENZENE (%)		89	93	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
13	SW-1	AQUEOUS	01/12/94	NA	01/17/94	1
14	#3 BIEBLE	AQUEOUS	01/13/94	NA	01/17/94	1
15	#2 ARROYO	AQUEOUS	01/13/94	NA	01/18/94	1

PARAMETER	UNITS	13	14	15
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
BROMOFLUOROBENZENE (%)		100	101	103

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
16	2ND DAY DECON	AQUEOUS	01/12/94	NA	01/18/94	1
17	MW-64	AQUEOUS	01/12/94	NA	01/18/94	1
18	MW-60	AQUEOUS	01/12/94	NA	01/18/94	1

PARAMETER	UNITS	16	17	18
BENZENE	UG/L	<0.5	1.7	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	0.9	<0.5
BROMOFLUOROBENZENE (%)		100	104	102

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
19	MW-67	AQUEOUS	01/12/94	NA	01/18/94	1
20	MW-57	AQUEOUS	01/12/94	NA	01/18/94	1
21	MW-55	AQUEOUS	01/12/94	NA	01/18/94	5

PARAMETER	UNITS	19	20	21
BENZENE	UG/L	<0.5	<0.5	290
TOLUENE	UG/L	<0.5	<0.5	<2.5
ETHYLBENZENE	UG/L	<0.5	<0.5	89
TOTAL XYLENES	UG/L	<0.5	<0.5	<2.5
BROMOFLUOROBENZENE (%)		107	75	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
22	MW-54	AQUEOUS	01/12/94	NA	01/18/94	1
23	EQUIPMENT BLANK NO. 2	AQUEOUS	01/12/94	NA	01/18/94	1
24	3RD DAY DECON	AQUEOUS	01/13/94	NA	01/18/94	1

PARAMETER	UNITS	22	23	24
BENZENE	UG/L	8.6	0.8	<0.5
TOLUENE	UG/L	<0.5	0.6	<0.5
ETHYLBENZENE	UG/L	7.4	1.9	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
BROMOFLUOROBENZENE (%)		109	108	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
25	MW-61	AQUEOUS	01/13/94	NA	01/20/94	1
26	EQUIPMENT BLANK NO. 3	AQUEOUS	01/13/94	NA	01/18/94	1
27	MW-45	AQUEOUS	01/13/94	NA	01/18/94	1

PARAMETER	UNITS	25	26	27
BENZENE	UG/L	1.4	<0.5	<0.5
TOLUENE	UG/L	1.0	<0.5	<0.5
ETHYLBENZENE	UG/L	1.7	<0.5	<0.5
TOTAL XYLENES	UG/L	1.1	<0.5	<0.5
BROMOFLUOROBENZENE (%)		108	104	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
28	MW-49	AQUEOUS	01/13/94	NA	01/18/94	10
29	MW-44	AQUEOUS	01/13/94	NA	01/18/94	10
30	MW-50	AQUEOUS	01/13/94	NA	01/18/94	1

PARAMETER	UNITS	28	29	30
BENZENE	UG/L	13	12	<0.5
TOLUENE	UG/L	<5.0	<5.0	<0.5
ETHYLBENZENE	UG/L	15	7.2	<0.5
TOTAL XYLENES	UG/L	110	14	<0.5
BROMOFLUOROBENZENE (%)		98	90	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
31	MW-41	AQUEOUS	01/13/94	NA	01/18/94	10
32	MW-39	AQUEOUS	01/13/94	NA	01/19/94	5
33	MW-43	AQUEOUS	01/13/94	NA	01/18/94	1

PARAMETER	UNITS	31	32	33
BENZENE	UG/L	5.3	<2.5	<0.5
TOLUENE	UG/L	<5.0	<2.5	<0.5
ETHYLBENZENE	UG/L	27	8.4	<0.5
TOTAL XYLENES	UG/L	140	70	<0.5
BROMOFLUOROBENZENE (%)		104	101	116

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 401334
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REMEDIATION PROJECT

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
34	TRIP BLANK	AQUEOUS	01/07/94	NA	01/19/94	1

PARAMETER	UNITS	34
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 401334
BLANK I.D.	: 011794	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 01/17/94
PROJECT #	: 44999	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN REMEDIATION PROJECT		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 401334
BLANK I.D.	: 011894	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 01/18/94
PROJECT #	: 44999	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN REMEDIATION PROJECT		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		102

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 401334
BLANK I.D.	: 011894	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 01/18/94
PROJECT #	: 44999	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN REMEDIATION PROJECT		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		106

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 401334
BLANK I.D.	: 011994	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 01/19/94
PROJECT #	: 44999	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN REMEDIATION PROJECT		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		101

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)	ATI I.D.	: 401334
MSMSD #	: 40135403	DATE EXTRACTED:	NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED :	01/17/94
PROJECT #	: 44999	SAMPLE MATRIX :	AQUEOUS
PROJECT NAME:	INDIAN BASIN REMEDIATION PROJECT	REF. I.D. :	40135403
		UNITS :	UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.2	92	10	100	8
TOLUENE	0.6	10	8.9	83	10	94	12
ETHYL BENZENE	<0.5	10	8.4	84	10	100	17
TOTAL XYLENES	<0.5	30	26	87	31	103	18

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical **Technologies**, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)	ATI I.D.	: 401334
MSMSD #	: 40133430	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 01/19/94
PROJECT #	: 44999	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: INDIAN BASIN REMEDIATION PROJECT	REF. I.D.	: 40133430
		UNITS	: UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	10	100	11	110	10
TOLUENE	<0.5	10	9.4	94	9.8	98	4
ETHYL BENZENE	<0.5	10	9.4	94	9.7	97	3
TOTAL XYLENES	<0.5	30	29	97	30	100	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)	ATI I.D.	: 401334
MSMSD #	: 40133420	DATE EXTRACTED:	NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 01/18/94
PROJECT #	: 44999	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME:	INDIAN BASIN REMEDIATION PROJECT	REF. I.D.	: 40133420
		UNITS	: UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	7.6	76	7.6	76	0
TOLUENE	<0.5	10	6.1	61*	6.3	63*	3
ETHYL BENZENE	<0.5	10	6.7	67*	6.8	68*	1
TOTAL XYLENES	<0.5	30	20	67*	20	67*	0

*OUTSIDE ATI CONTROL LIMITS DUE TO MATRIX INTERFERENCE

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 1/11/94 PAGE 1 OF 2

ATI LAB I.D. 401334

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Earl Measles

COMPANY: Marathon Oil Co.
ADDRESS: P.O. Box 552
Midland TX 79702
PHONE: (915) 682-1626
FAX: (915) 687-8337

BILL TO: SAME
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	Chloride	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
Initial Down	1/10/94	0800	H_2O	01				X																	2
MW-71	1/10/94	1100	H_2O	02				X	X																2
MW-70	1/10/94	1230	H_2O	03				X	X																2
MW-63	1/10/94	1500	H_2O	04				X	X																2
MW-66	1/10/94	1610	H_2O	05				X	X																2
Equipment Blank No. 1	1/10/94	17:22	H_2O	06				X																	1

PROJECT INFORMATION

PROJ. NO.: 44999
PROJ. NAME: INDIAN BASIN
P.O. NO.: Remediation project
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	16
CUSTODY SEALS	(Y) / N / NA
RECEIVED INTACT	Y
RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 20:19	Signature: Time: 14:00	Signature: Time:
Printed Name: Allan Johnston Date: 1/11/94	Printed Name: Richard Brantley Date: 1/13/94	Printed Name: Date:
Company: SWL Phone:	Company: SWL (915) 683-3348	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time: 20:19	Signature: Time:	Signature: Time:
Printed Name: Richard Brantley Date: 1/11/94	Printed Name: Date:	Printed Name: Date: 1/14/94
Company: SWL	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 1-11-94 PAGE 2 OF X5

ATI LAB I.D. 401334

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER:

COMPANY: Marathon Oil Co.
ADDRESS: PO Box 552
Midland, TX 79702
PHONE: (915) 682-1626
FAX: (915) 687-8337

BILL TO: Bob Menzie Jr.
COMPANY: Marathon Oil Co.
ADDRESS: PO Box 552
Midland, Tx 79702

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Cl-	NUMBER OF CONTAINERS
MW-62	1-11-94	09:17	Water	07	✓	✓	3
MW-65A	1-11-94	09:36	water	08	✓	✓	3
MW-68	1-11-94	09:55	Water	09	✓	✓	3
Air Stripper - Out	1-12-94	16:15	water	10	✓		2
Air Stripper - In	1-12-94	16:20	Water	11	✓		2
#1 Lyman	1-12-94	17:00	Water	12	✓	✓	3
SW-1	1-12-94	16:30	Water	13	✓	✓	3
#3 Bieble	1-13-94	07:45	Water	14	✓	✓	3
#2 Arroyo	1-13-94	08:00	Water	15	✓	✓	3

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Volatile Organics GC/MS (624/8240)
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:	44999	NO. CONTAINERS	25
PROJ. NAME:	INDIAN BASIN	CUSTODY SEALS	(Y) / N / (NA)
P.O. NO.:	REMEDIATION Project	RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments: (X) No Custody Seals on all samples taken on 1-12 & 1-13 RM Gray

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: RM Gray Time: 08:24	Signature: Richard Brantley Time: 14:00	Signature: Time:
Printed Name: RM Gray Date: 1-13-94	Printed Name: Richard Brantley Date: 1/13/94	Printed Name: Date:
Company: MOC Phone: (915) 687-8314	Company: SWL (915) 6833348	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Richard Brantley Time: 08:29	Signature: Time:	Signature: Time: 1215
Printed Name: Richard Brantley Date: 1/13/94	Printed Name: Date:	Printed Name: Terri Pettee Date: 1/14/94
Company: SWL	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 1/12/94 PAGE 1 OF 1

ATI LAB I.D. 401334

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: BOB MENZIE

COMPANY: MARATHON OIL CO.
ADDRESS: P.O. BOX 552
MIDLAND TEXAS 79702
PHONE: (915) 682-1626
FAX: (915) 687-8337

BILL TO: SAME
COMPANY:
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/~~MTBE~~ (8020)	CHLORIDE	NUMBER OF CONTAINERS
2ND DAY DECON	1/12/94	7:34	H2O	16	X		2
MW-64	1/12/94	8:23	H2O	17	X	X	3
MW-60	1/12/94	10:21	H2O	18	X	X	3
MW-67	1/12/94	12:01	H2O	19	X	X	3
MW-57	1/12/94	13:40	H2O	20	X	X	3
MW-55	1/12/94	15:45	H2O	21	X	X	3
MW-54	1/12/94	17:10	H2O	22	X	X	3
EQUIPMENT BLK NO. 2	1/12/94	18:00	H2O	23	X		2

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Volatile Organics GC/MS (624/8240)
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)

PROJECT INFORMATION

PROJ. NO.: 44999
PROJ. NAME: INDIAN BASIN
P.O. NO.: REMEDIATION Project
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	22
CUSTODY SEALS	(Y) N / NA
RECEIVED INTACT	Y
RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Richard Bramley Time: 14:00	Signature: Time:	Signature: Time:
Printed Name: Richard Bramley Date: 1/13/94	Printed Name: Date:	Printed Name: Date:
Company: BWL Phone: (915) 683-3348	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1215
Printed Name: Date:	Printed Name: Date:	Printed Name: Terri Date: 1/14/94
Company:	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 1/13/94 PAGE 4 OF 25

ATI LAB I.D. 401334

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: BOB MENZIE

COMPANY: MARATHON OIL CO.
ADDRESS: P.O. BOX 552
MIDLAND TX 79702
PHONE: (915) 682-1626
FAX: (915) 687-8337

BILL TO: SAME
COMPANY:
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/~~MTBE~~ (8020)	Chlorides	NUMBER OF CONTAINERS
3RD DAY DECON	1/13/94	07:45	H_2O	24	X		2
MW-61	1/13/94	08:17	H_2O	25	X	X	3
EQUIPMENT BLANK NO.3	1/13/94	09:20	H_2O	26	X		2
MW-45	1/13/94	09:07	H_2O	27	X	X	3
MW-49	1/13/94	09:30	H_2O	28	X	X	3
MW-44	1/13/94	11:00	H_2O	29	X	X	3
MW-50	1/13/94	10:55	H_2O	30	X	X	3
MW-41	1/13/94	13:37	H_2O	31	X	X	3
MW-39	1/13/94	13:30	H_2O	32	X	X	3

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Volatile Organics GC/MS (624/8240)
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)

PROJECT INFORMATION

PROJ. NO.: 41999
PROJ. NAME: INDIAN BASIN
P.O. NO.: REMEDIATION DIGS
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS: 25
CUSTODY SEALS: Y / N / (NA)
RECEIVED INTACT: Y
RECEIVED COLD: Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:
All samples had C.O.C. seals except Lab ID. 27, 28, 30.

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Richard Beaty Time: 14:00	Signature: Time:	Signature: Time:
Printed Name: Richard Beaty Date: 1/13/94	Printed Name: Date:	Printed Name: Date:
Company: SWL Phone: (915) 683-3348	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1215
Printed Name: Date:	Printed Name: Date:	Printed Name: Terri Dotts Date: 1/14/94
Company:	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 1/13/94 PAGE 2 OF 2

ATI LAB I.D. 401334

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Co.
ADDRESS: P.O. Box 552
Midland Tx 79702
PHONE: (915) 682-1626
FAX: (915) 687-8337

BILL TO: Same
COMPANY:
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
MW-43	1/13/94	13:44	H2O	33
Trip Blank	1/7/94		H2O	34

ANALYSIS REQUEST

	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/~~MTBE (8020)~~	Oxygens	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.		Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)		SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal		The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
MW-43				X	X																			3
Trip Blank				X																				1

PROJECT INFORMATION

PROJ. NO.: 4466C1
PROJ. NAME: Laguna Plata
P.O. NO.: Remediation project
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	4
CUSTODY SEALS	Y / N / NA
RECEIVED INTACT	Y
RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Richard Beaudry Time: 14:00	Signature: Time:	Signature: Time:
Printed Name: Richard Beaudry Date: 1/13/94	Printed Name: Date:	Printed Name: Date:
Company: SWL Phone: (915) 683-3348	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY:(LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1215
Printed Name: Date:	Printed Name: Date:	Printed Name: Lorri Bettis Date: 1/14/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 1/14/94 PAGE 1 OF 3

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310		8240 /TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
401334-2	1/11/94	1100	AQ	2						X																					1
-3		1250		3						X																					1
-4		1500		4						X																					1
-5		1640		5						X																					1
-7		0917		7						X																					1
-8		0836		8						X																					1
-9		0855		9						X																					1
-12	1/12/94	1700		12						X																					1
-13	"	1630		13						X																					1

15

PROJECT INFORMATION	
PROJECT NUMBER:	401334
PROJECT NAME:	MCC
QC LEVEL:	STD. IV
QC REQUIRED:	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	401334

DUE DATE: 1/28/94
RUSH SURCHARGE:
CLIENT DISCOUNT: %

W.O.# 2K498

SAMPLES SENT TO:

- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX X
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: Terri Dettie Time: 1/14/94
Printed Name: Terri Dettie Date 1430
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Linda Eshelman Time: 1158A
Printed Name: Linda Eshelman Date: 1/15/94
Company: ATI

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 1/14/94 PAGE 2 OF 3

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310			8240 (TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
401334-14	1/13/94	0715	AQ	14						X																						1
-15	"	0800		15						X																						1
-17	1/12/94	0823		17						X																						1
-18		1021		18						X																						1
-19		1201		19						X																						1
-20		1340		20						X																						1
-21		1545		21						X																						1
-22		1710		22						X																						1
-25	1/13/94	0817		25						X																						1

PROJECT INFORMATION	
PROJECT NUMBER:	401334
PROJECT NAME:	MDC
QC LEVEL:	STD. IV
QC REQUIRED:	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	401334

DUE DATE: 1/28/94
RUSH SURCHARGE:
CLIENT DISCOUNT: %

W.O.# LK495

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX X
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: Terri Dottre Time: 1730
Printed Name: Terri Dottre Date: 1/14/94
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Linda Eshelman Time: 1158A
Printed Name: Linda Eshelman Date: 1/15/94
Company: ATI

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 1/14/94 PAGE 3 OF 3

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310			8240 (TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
401334-27	1/13/94	0907	AQ	27						X																						1
-28		0930		28						X																						1
-29		1100		29						X																						1
-30		1055		30						X																						1
-31		1337		31						X																						1
-32		1330		32						X																						1
-33		1344		33						X																						1

PROJECT INFORMATION	
PROJECT NUMBER:	401334
PROJECT NAME:	MDC
QC LEVEL:	STD. IV
QC REQUIRED:	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	7
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	401334

DUE DATE: 1/28/94

RUSH SURCHARGE:

CLIENT DISCOUNT: %

W.O. # LX498

SAMPLES SENT TO:

- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX X
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.

Signature: Terri Dotter Time: 1730

Printed Name: Terri Dotter Date: 1/14/94

Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.

Signature: Time:

Printed Name: Date:

Company:

RELINQUISHED BY: 2.

Signature: Time:

Printed Name: Date

Company:

RECEIVED BY: (LAB) 2.

Signature: Linda Eshelman Time: 1158A

Printed Name: Linda Eshelman Date: 1/15/94

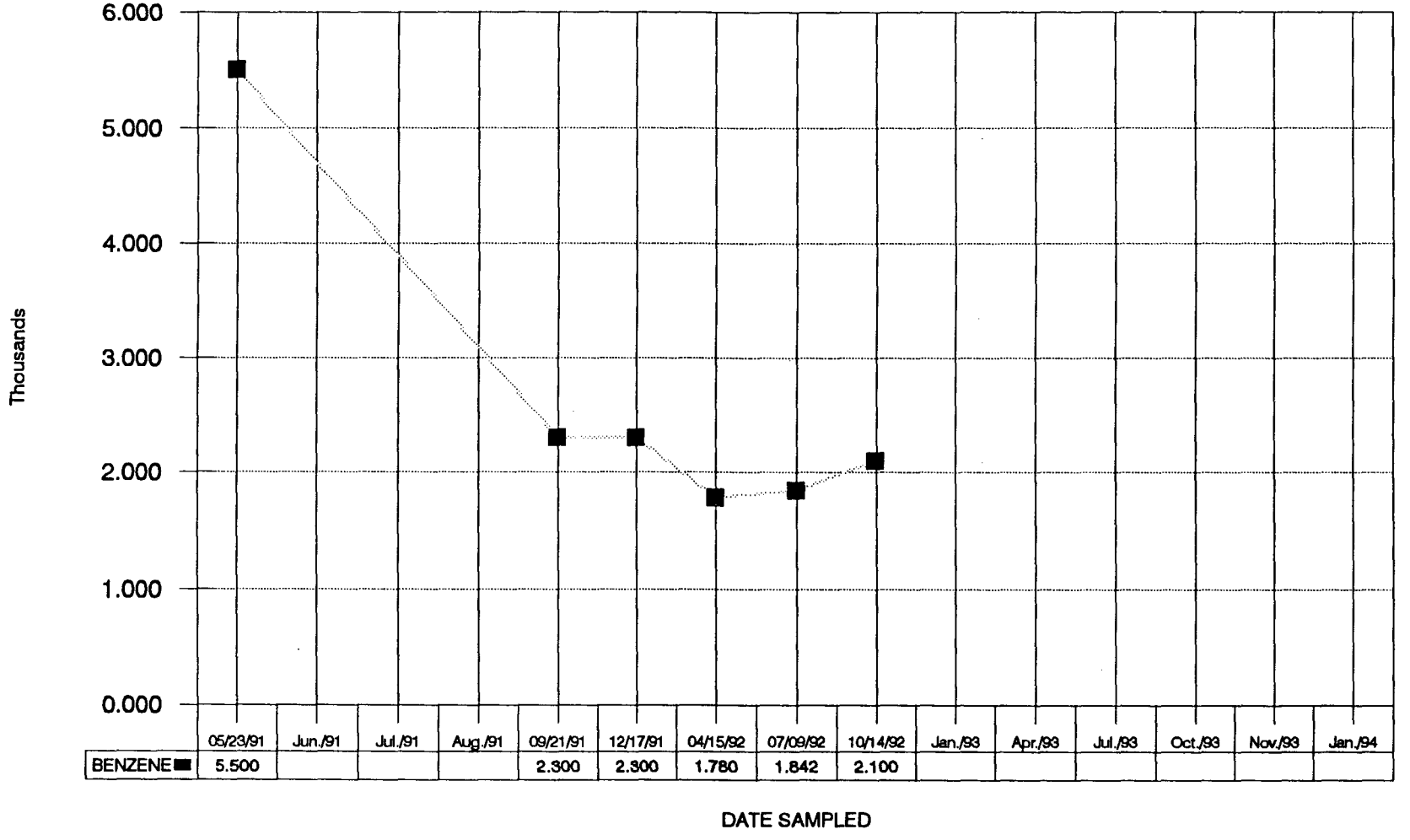
Company: ATI

APPENDIX C

BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS

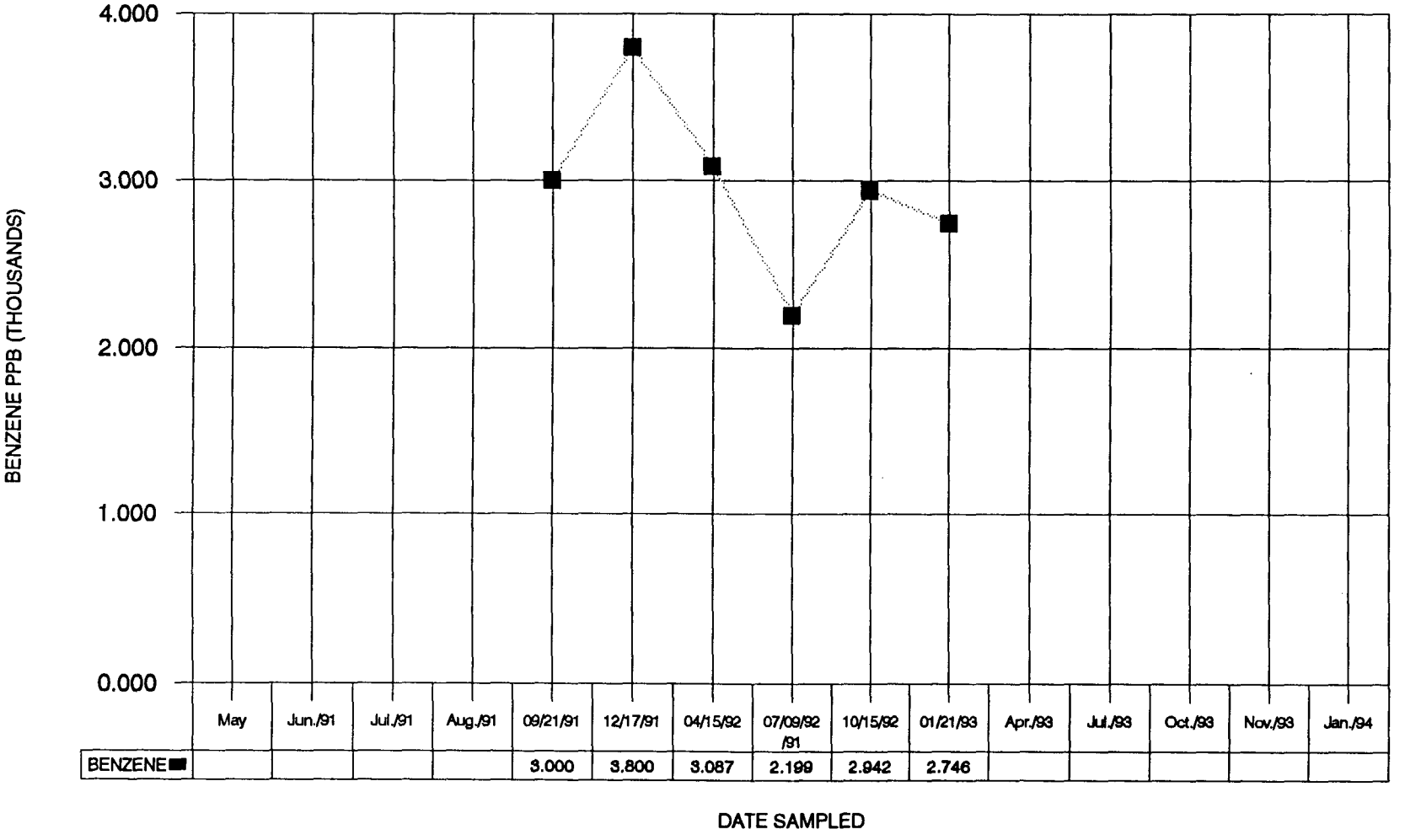
GROUNDWATER ANALYSIS DATA

MW#10 BH-33



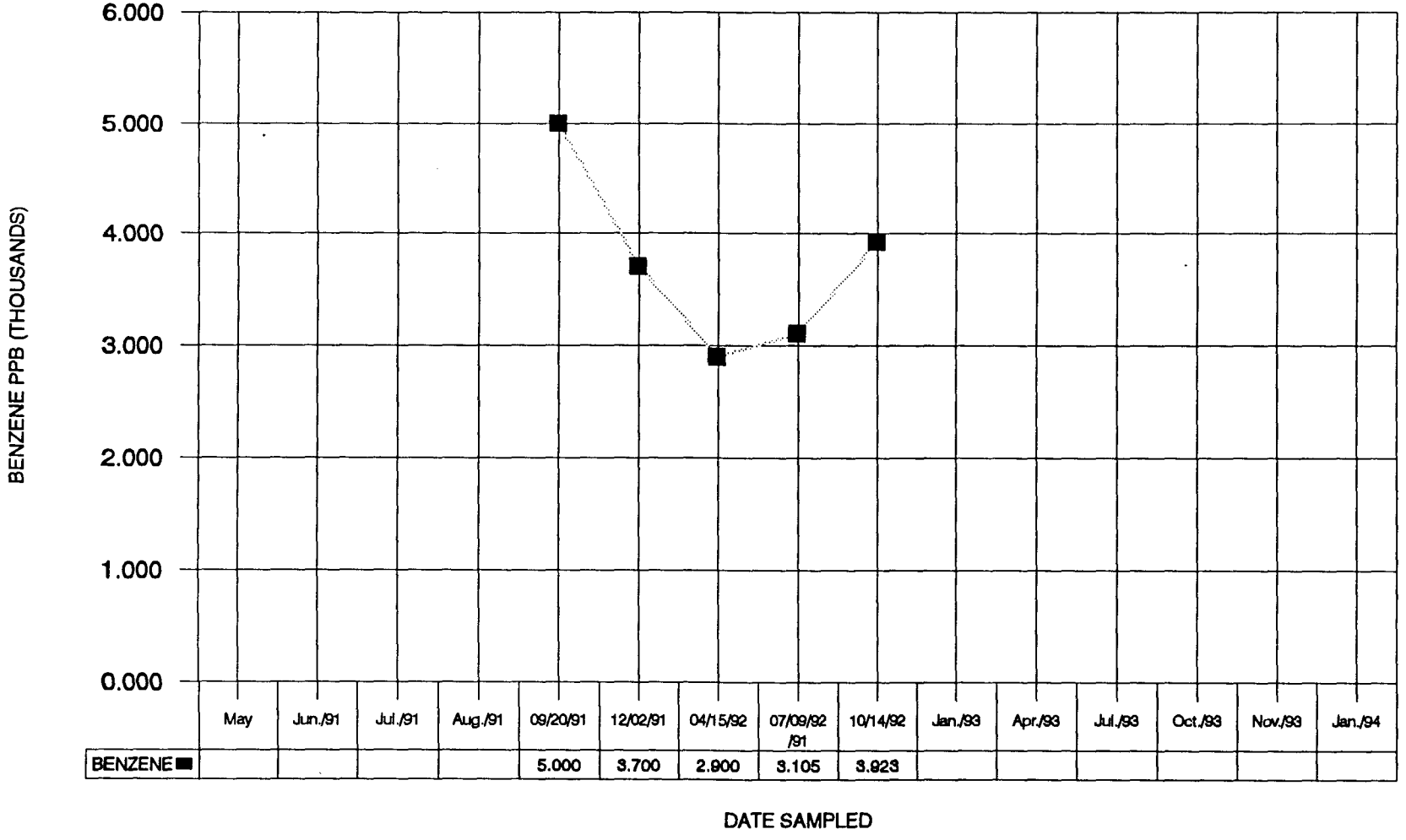
GROUNDWATER ANALYSIS DATA

MW#11 BH-34



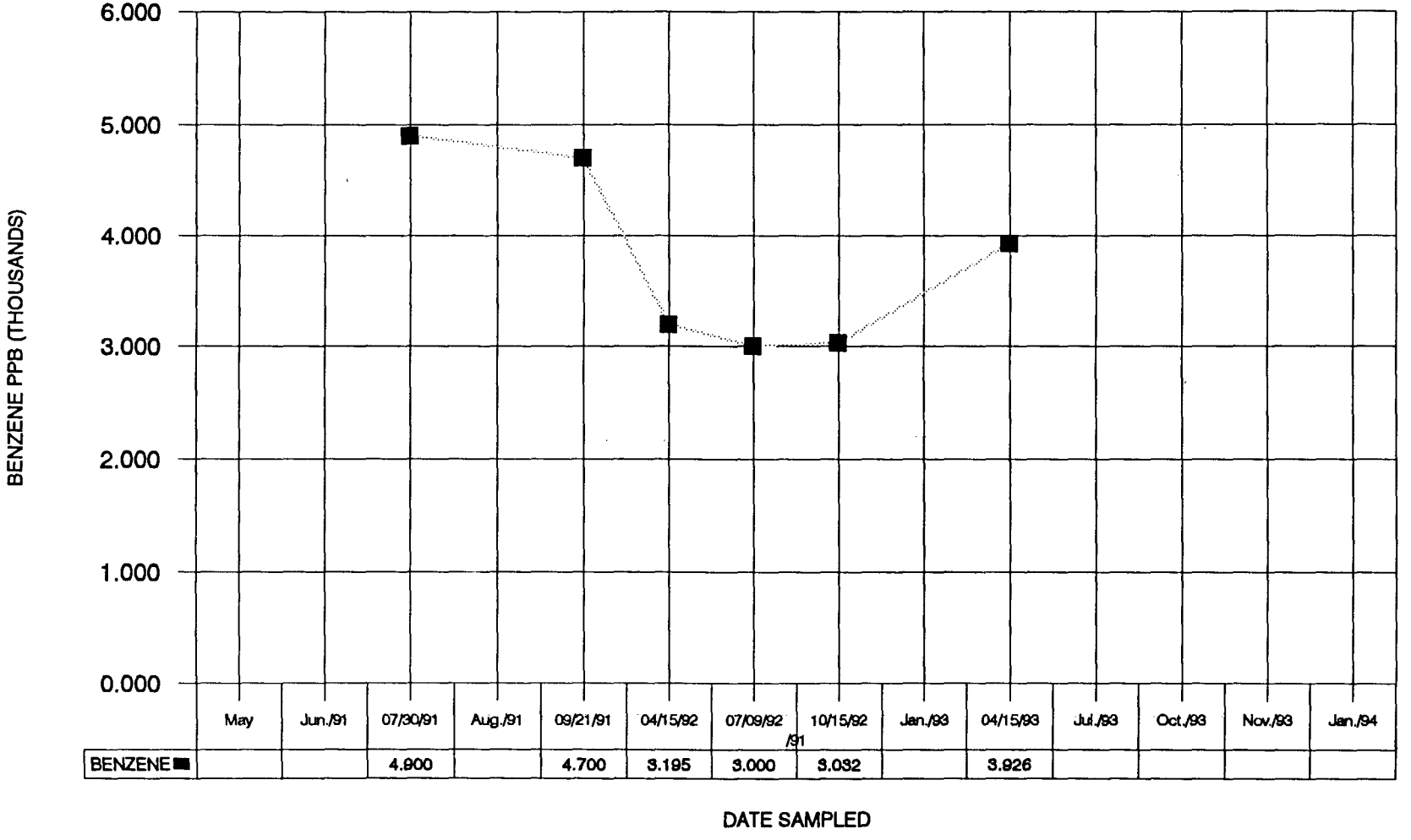
GROUNDWATER ANALYSIS DATA

MW#18 BH-41



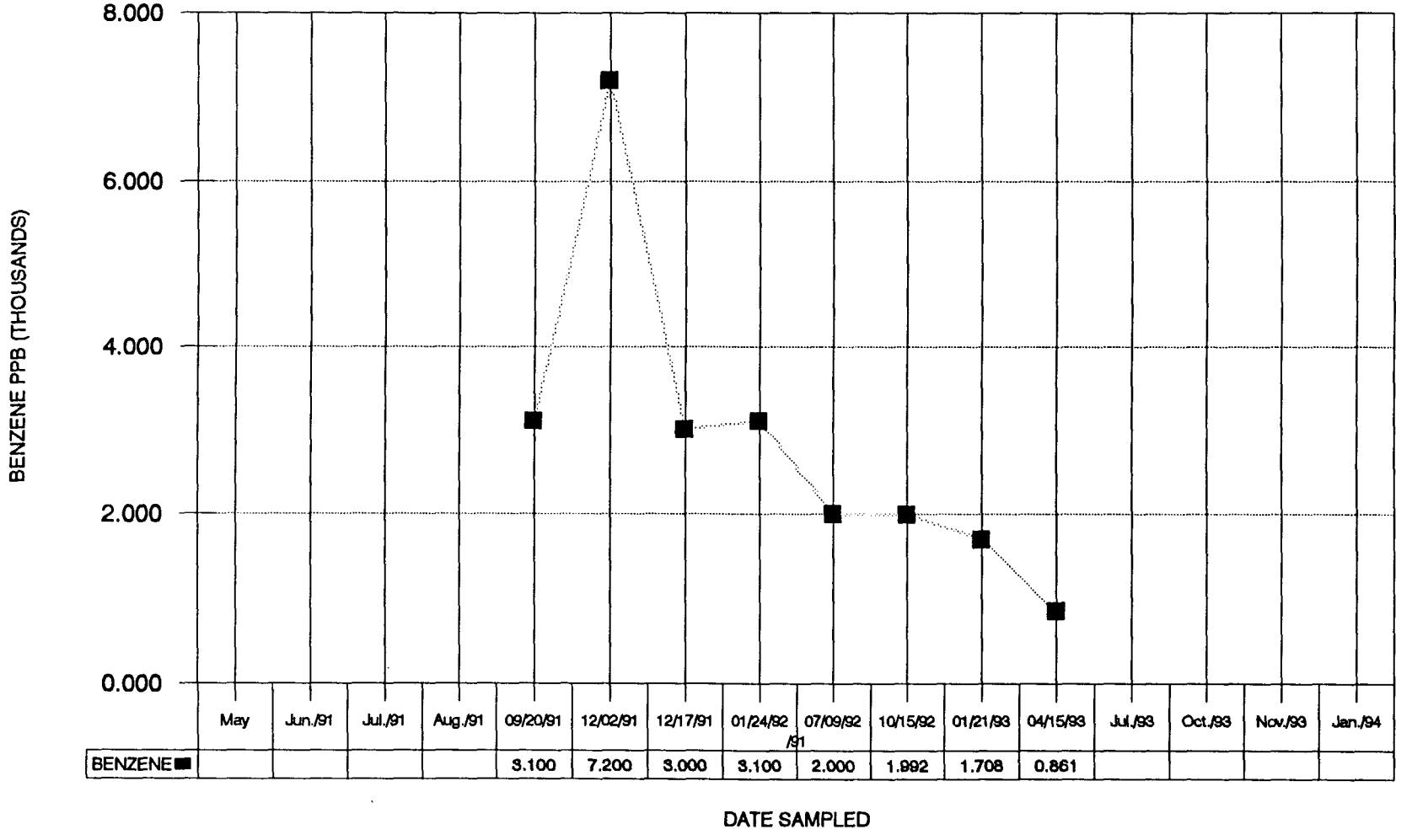
GROUNDWATER ANALYSIS DATA

MW#19 BH-42



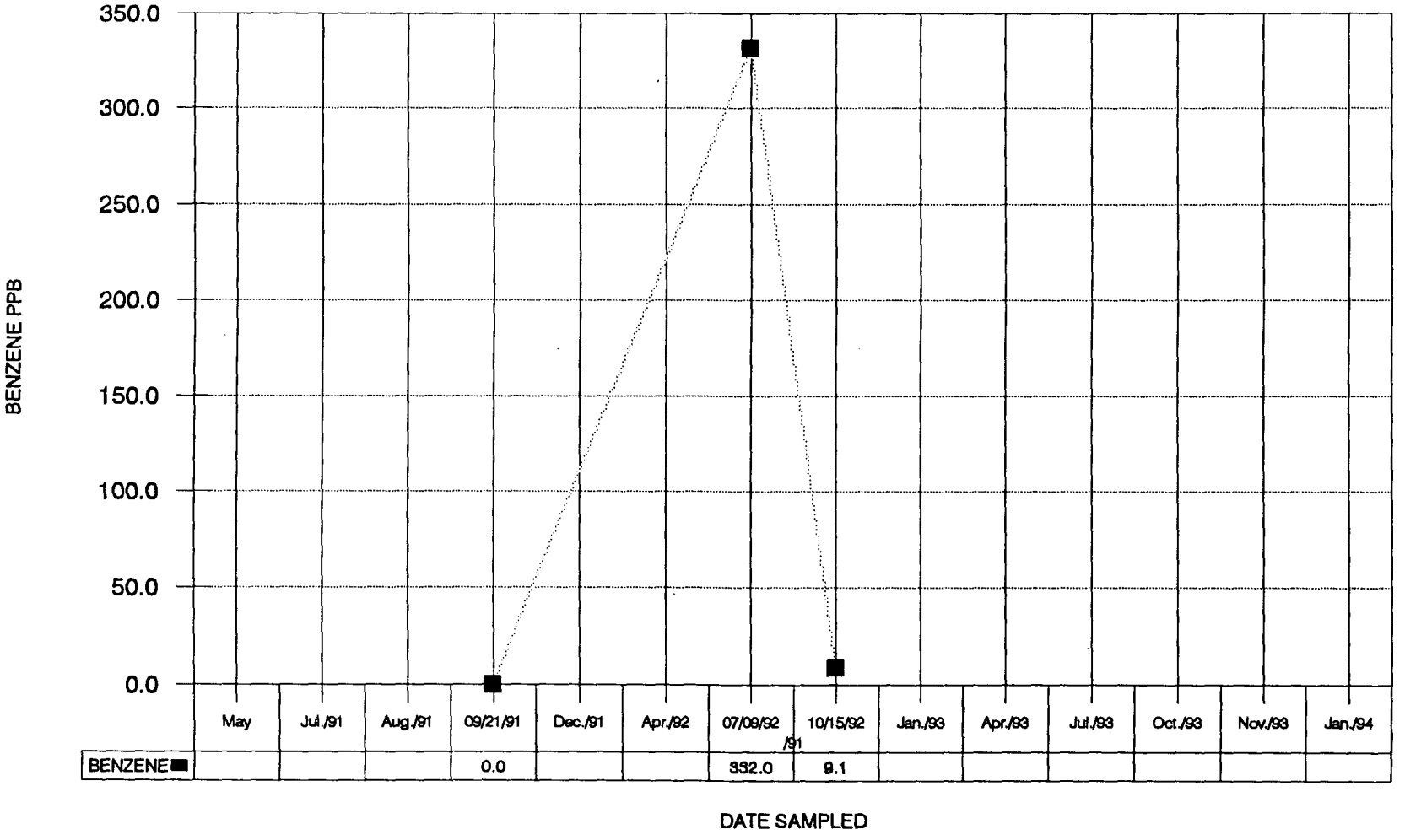
GROUNDWATER ANALYSIS DATA

MW#26 BH-49



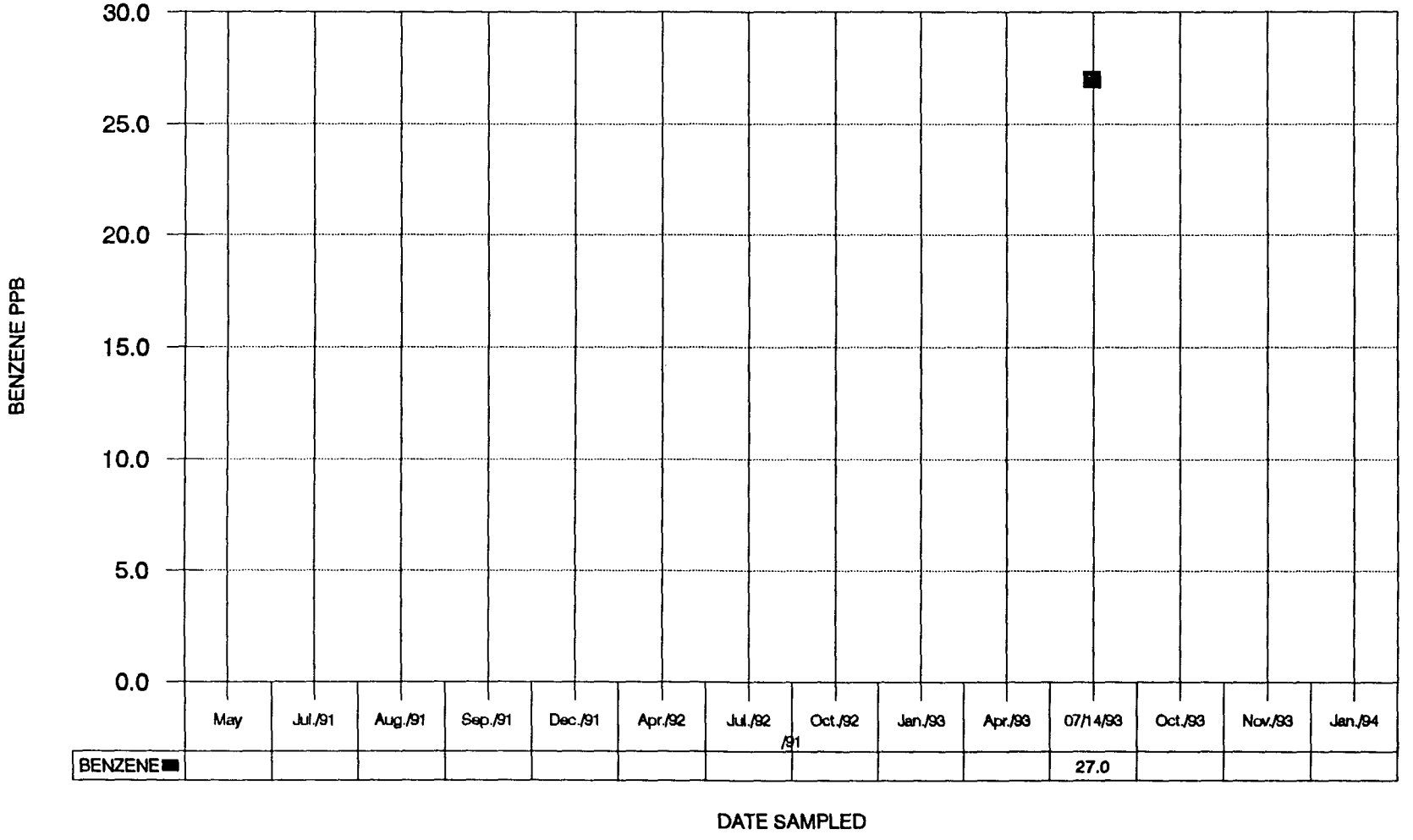
GROUNDWATER ANALYSIS DATA

MW#31 BH-55



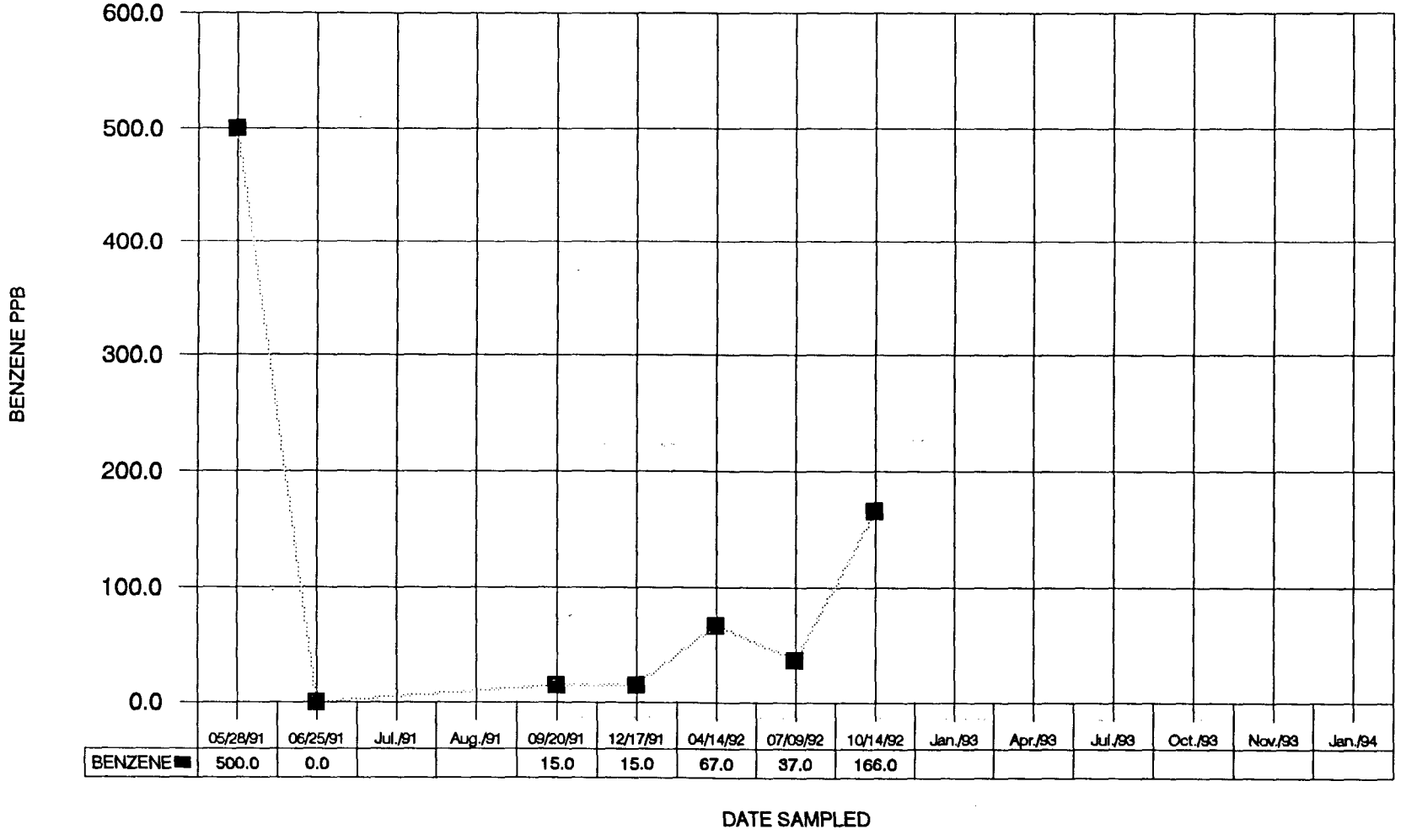
GROUNDWATER ANALYSIS DATA

MW#37 BH-60



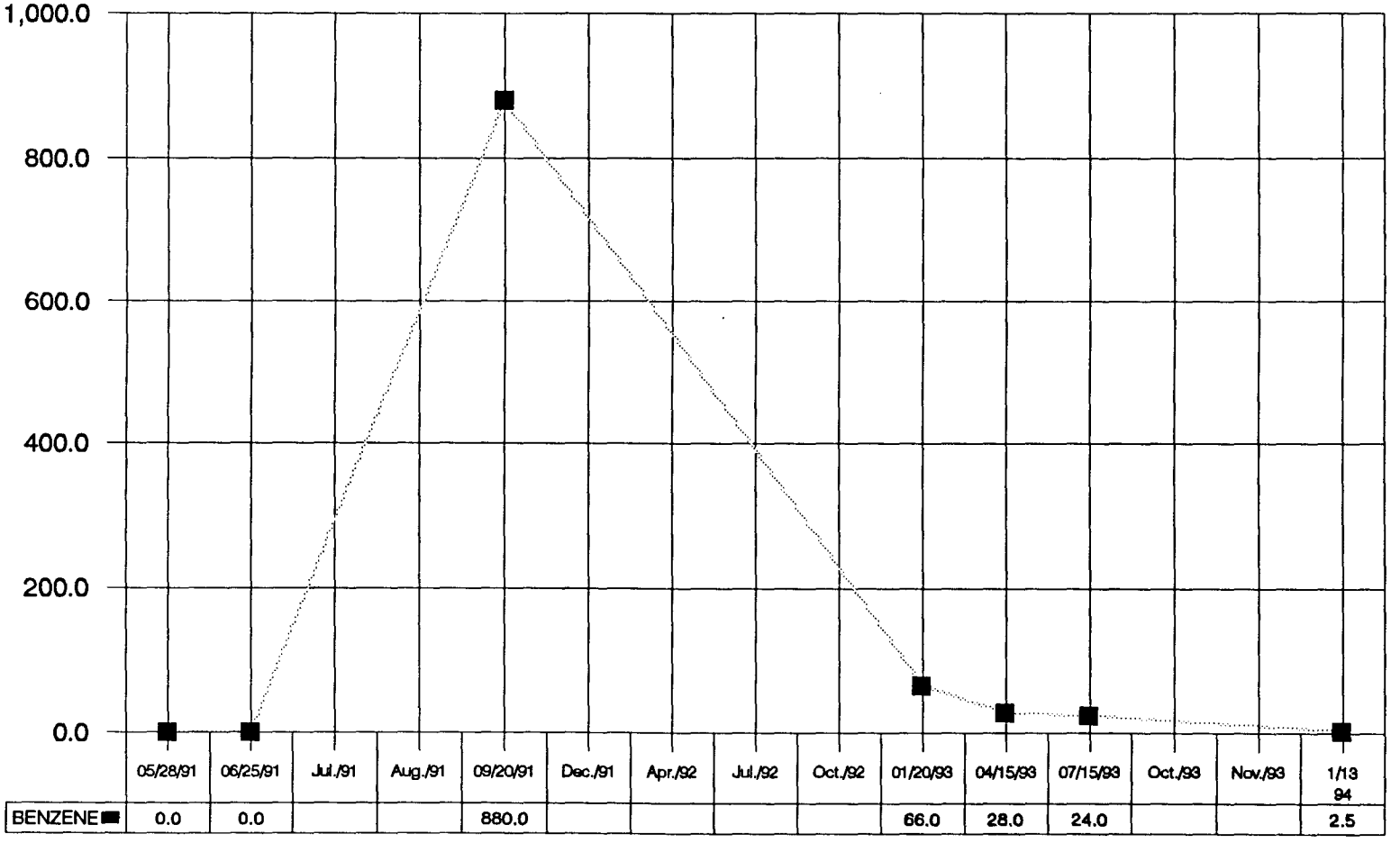
GROUNDWATER ANALYSIS DATA

MW#38 BH-61



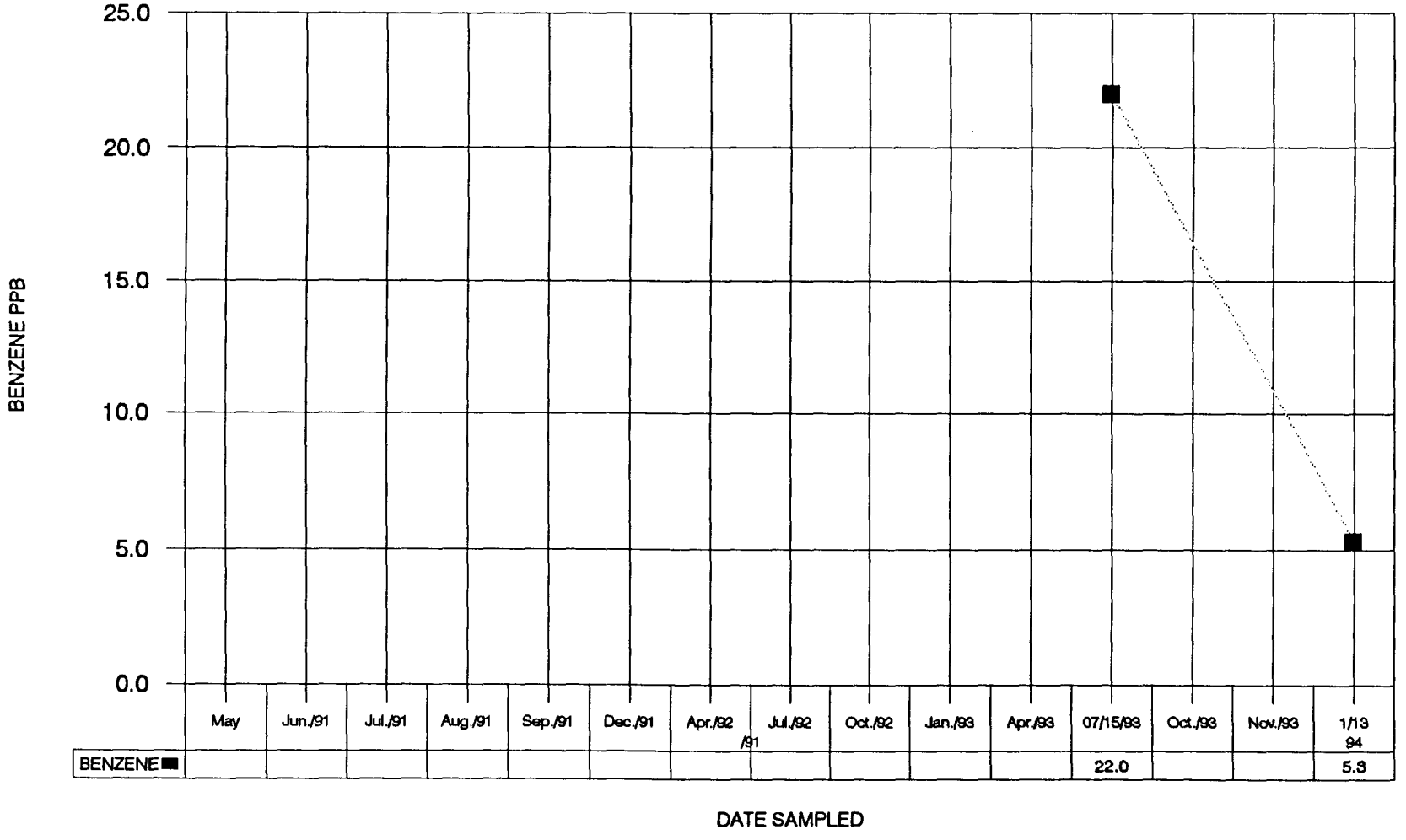
GROUNDWATER ANALYSIS DATA

MW#39 BH-62



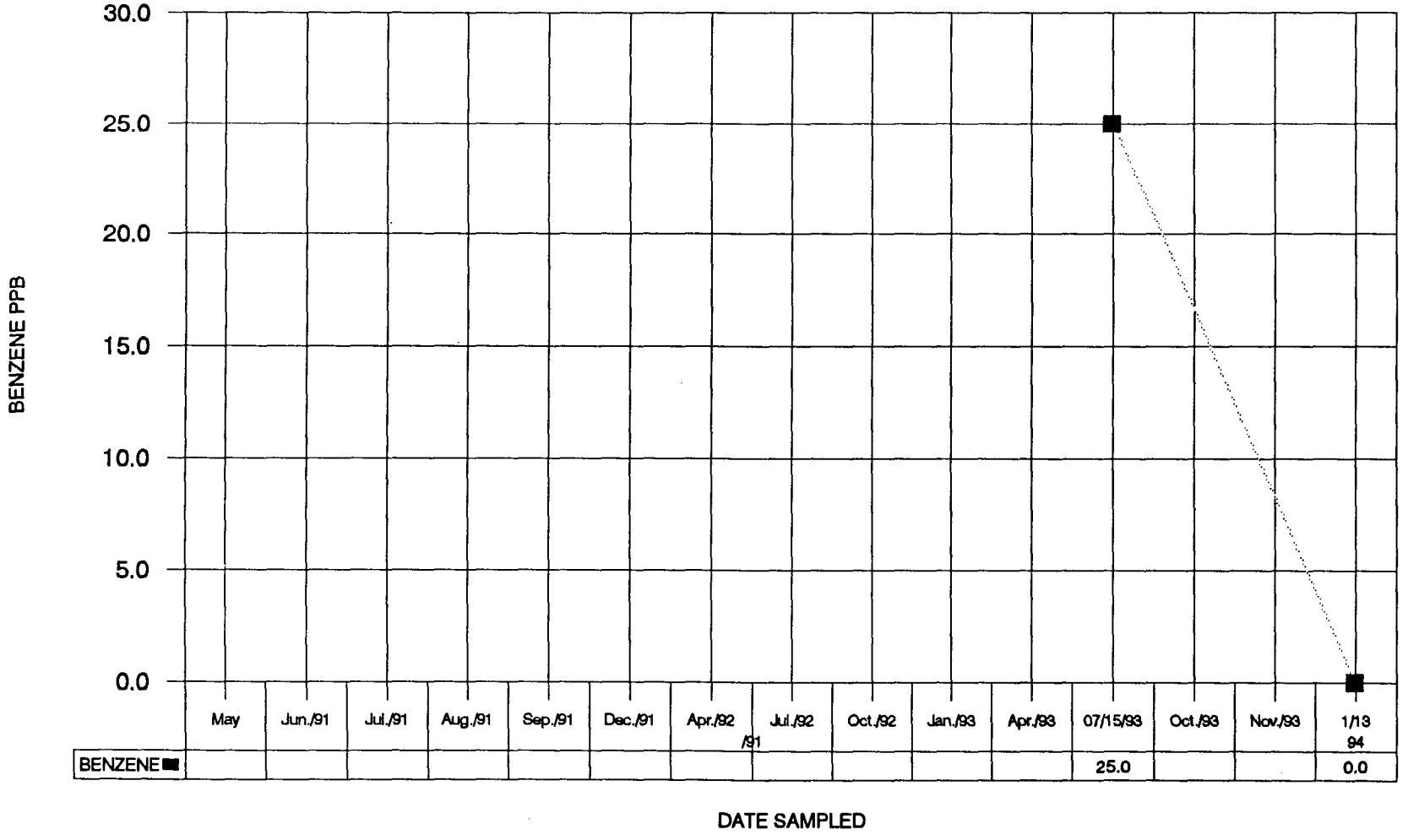
GROUNDWATER ANALYSIS DATA

MW#41 BH-64



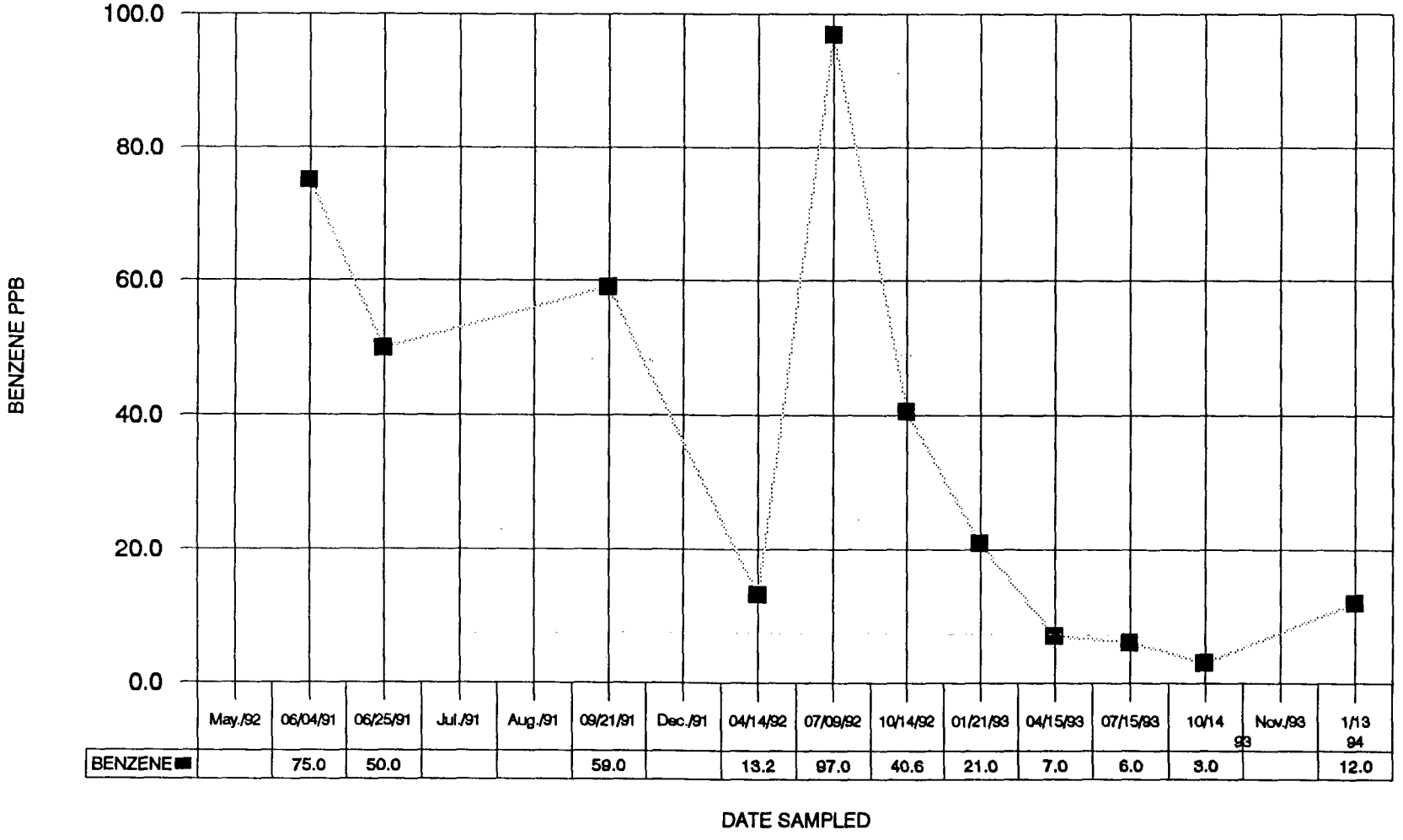
GROUNDWATER ANALYSIS DATA

MW#43 BH-66



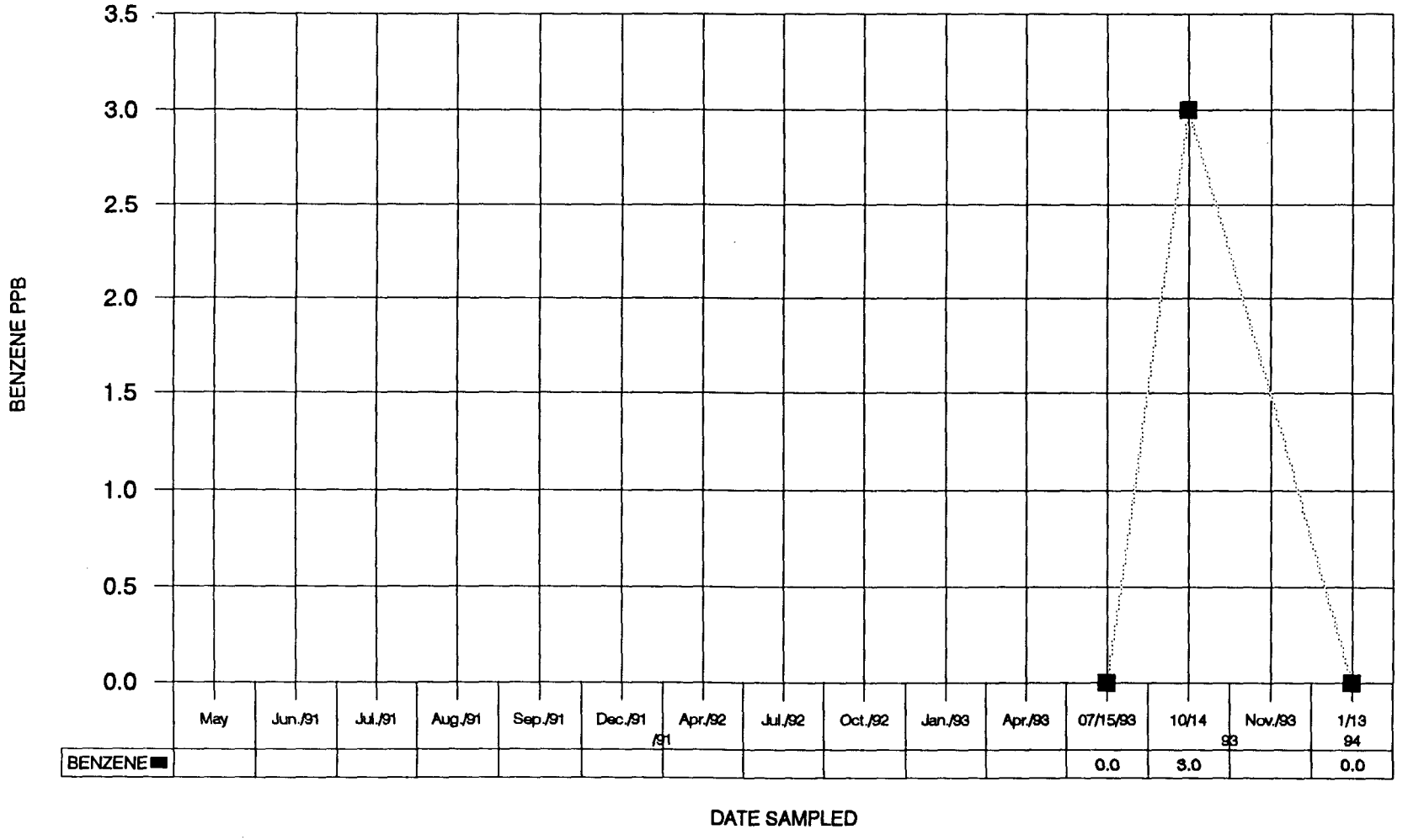
BOREHOLE WATER ANALYSIS DATA

MW#44 BH-67



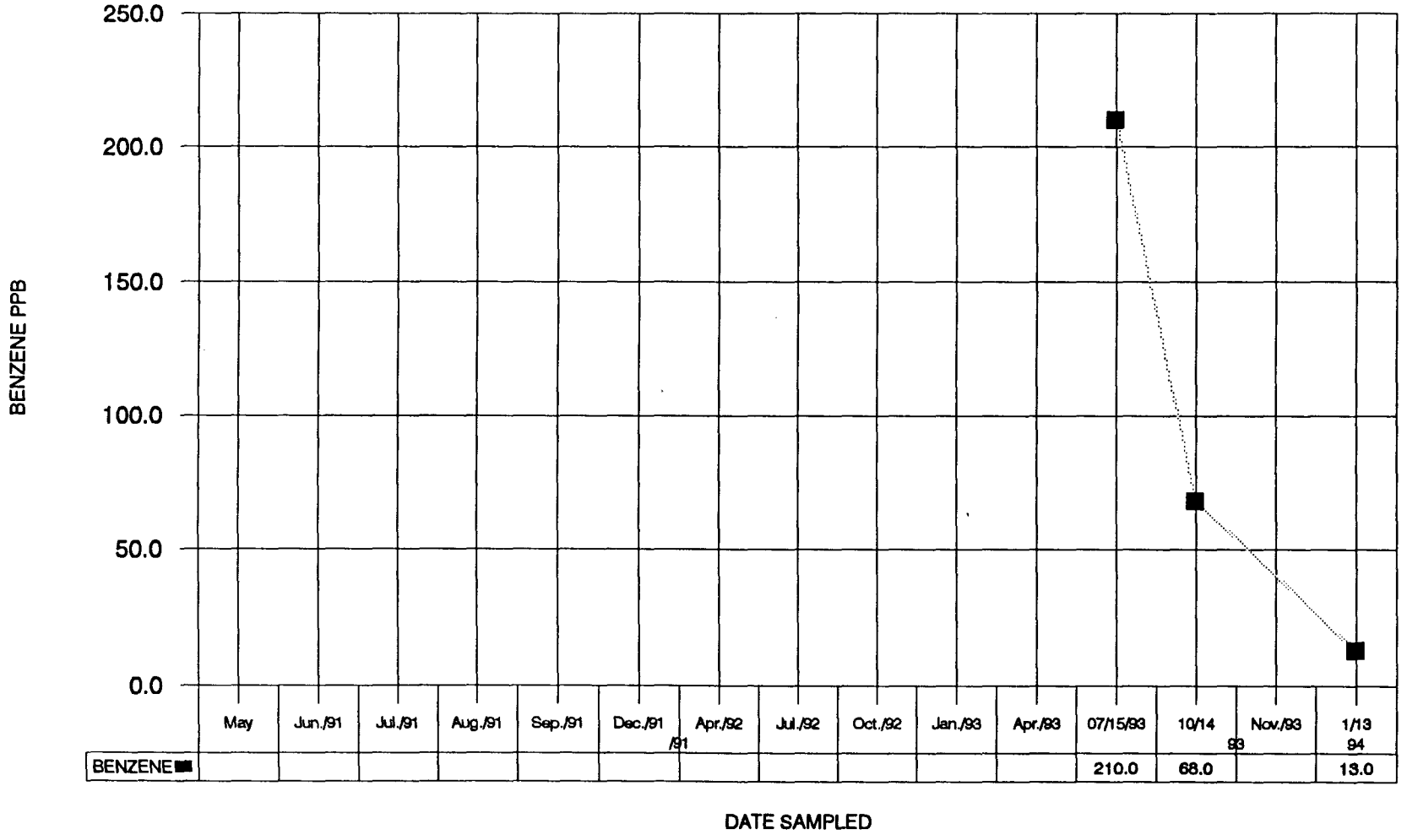
BOREHOLE WATER ANALYSIS DATA

MW#45 BH-68



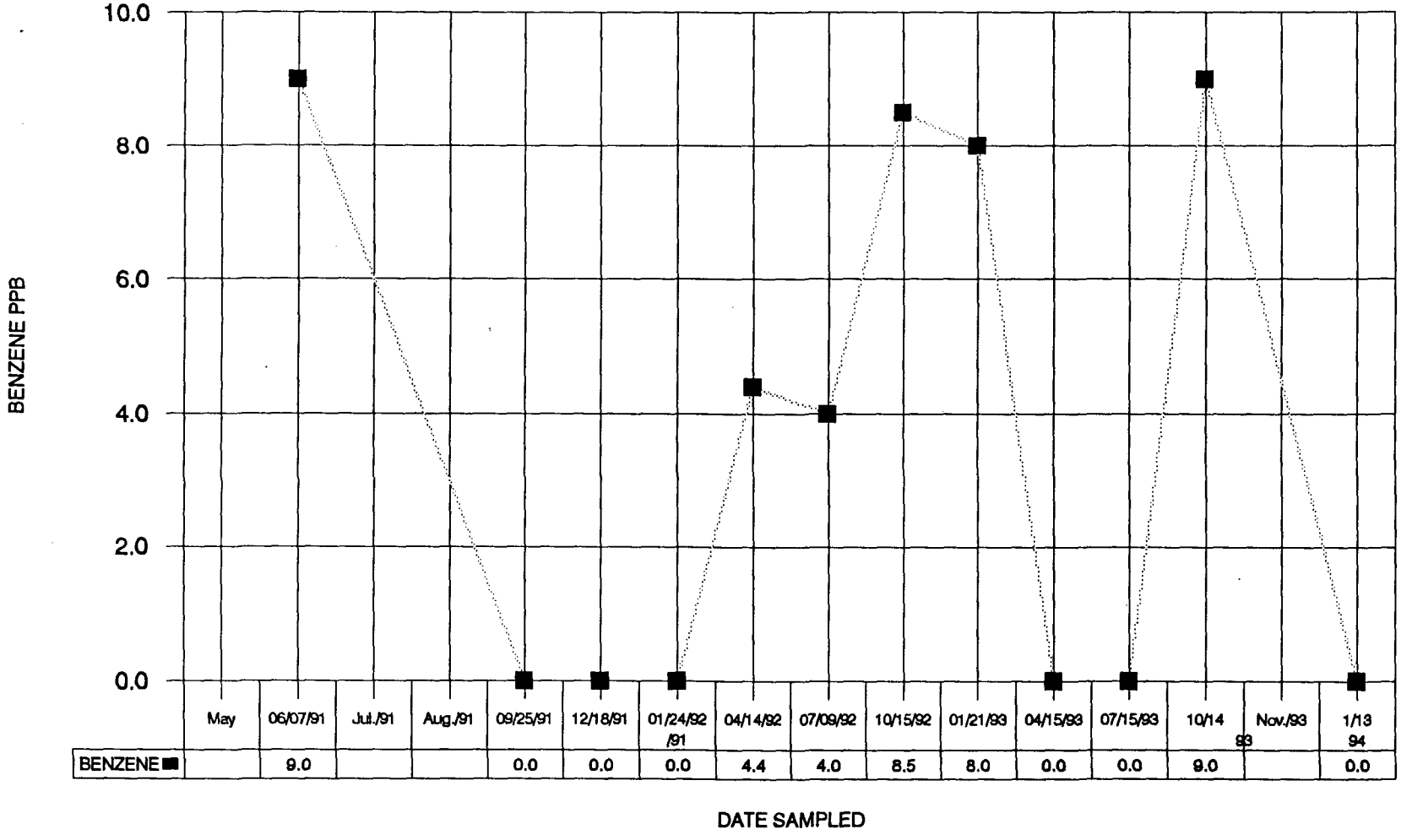
BOREHOLE WATER ANALYSIS DATA

MW#49 BH-72



GROUNDWATER ANALYSIS DATA

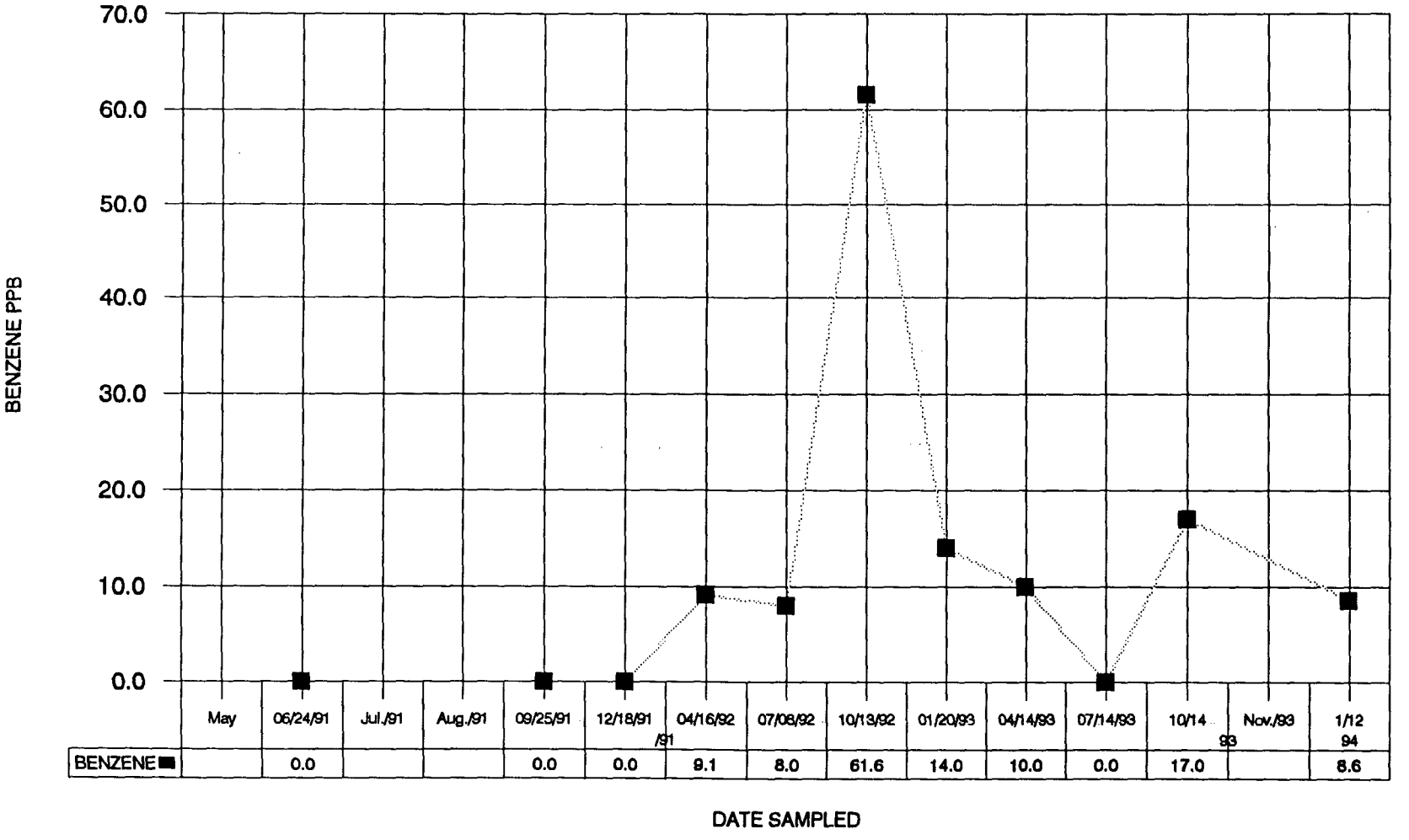
MW#50 BH-73



	May	06/07/91	Jul./91	Aug./91	09/25/91	12/18/91	01/24/92 /91	04/14/92	07/09/92	10/15/92	01/21/93	04/15/93	07/15/93	10/14 93	Nov./93	1/13 94
BENZENE ■		9.0			0.0	0.0	0.0	4.4	4.0	8.5	8.0	0.0	0.0	9.0		0.0

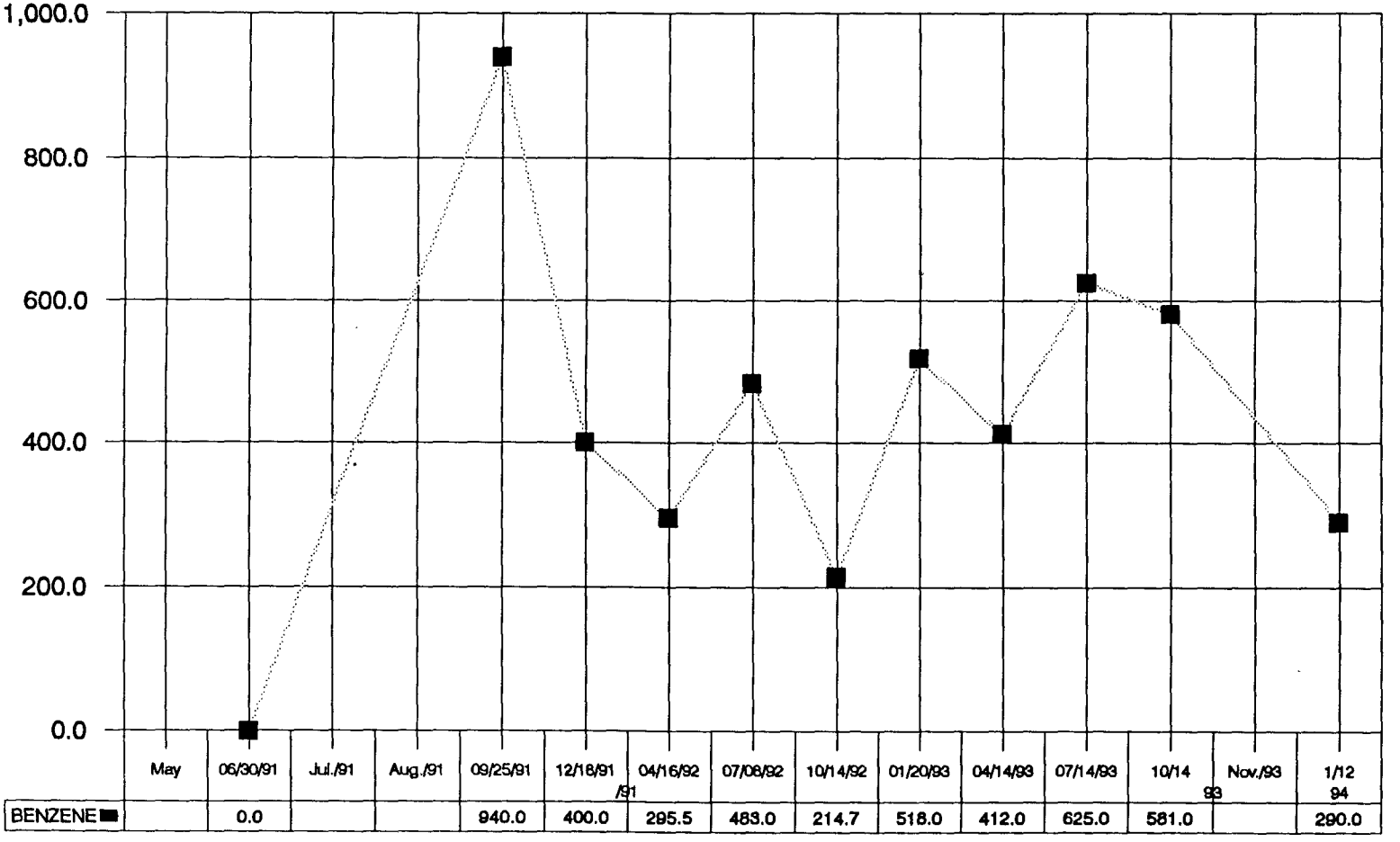
GROUNDWATER ANALYSIS DATA

MW#54 BH-80



GROUNDWATER ANALYSIS DATA

MW#55 BH-81

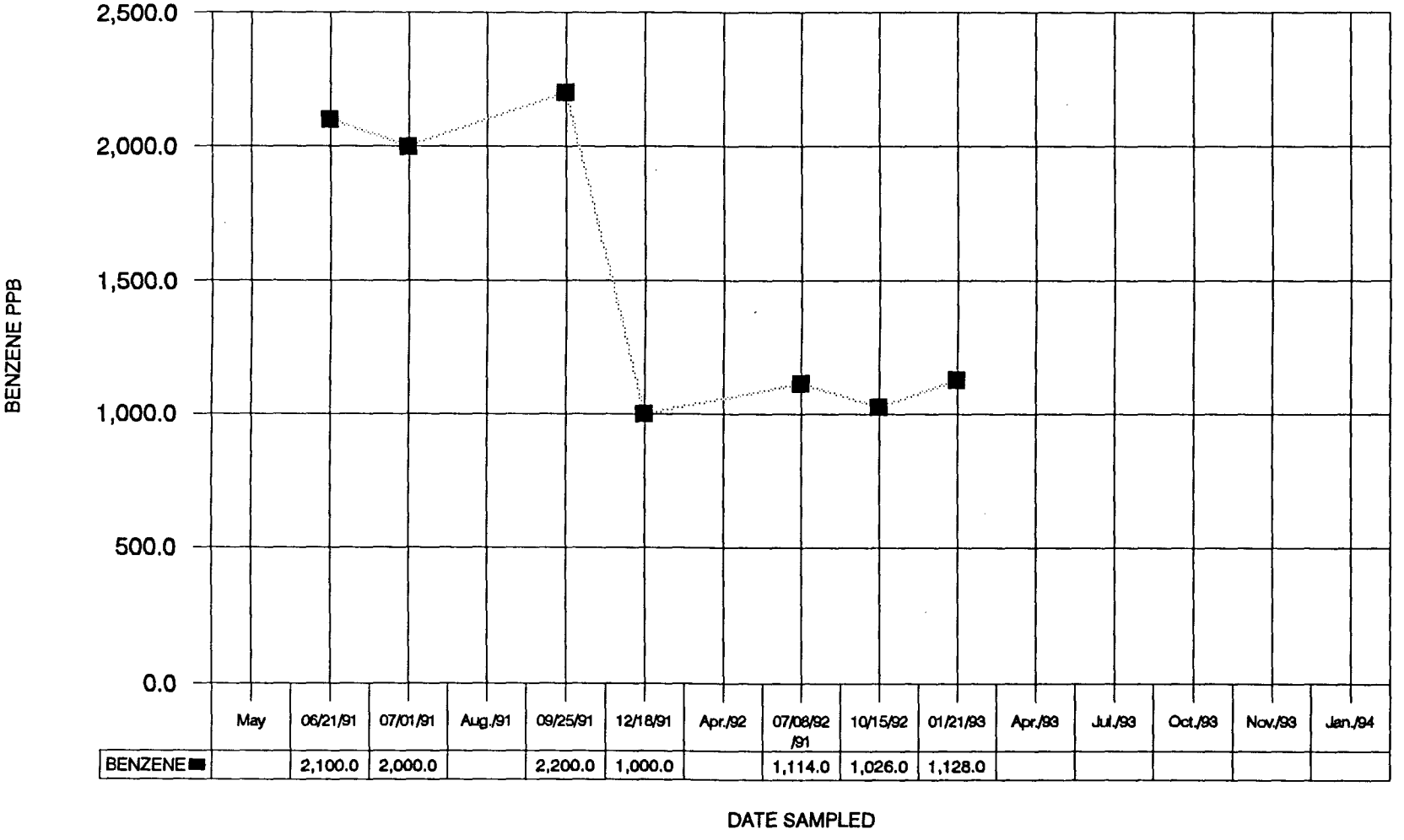


	May	06/30/91	Jul./91	Aug./91	09/25/91	12/16/91	04/16/92	07/08/92	10/14/92	01/20/93	04/14/93	07/14/93	10/14/93	Nov./93	1/12/94
BENZENE		0.0			940.0	400.0	295.5	483.0	214.7	518.0	412.0	625.0	581.0		290.0

DATE SAMPLED

GROUNDWATER ANALYSIS DATA

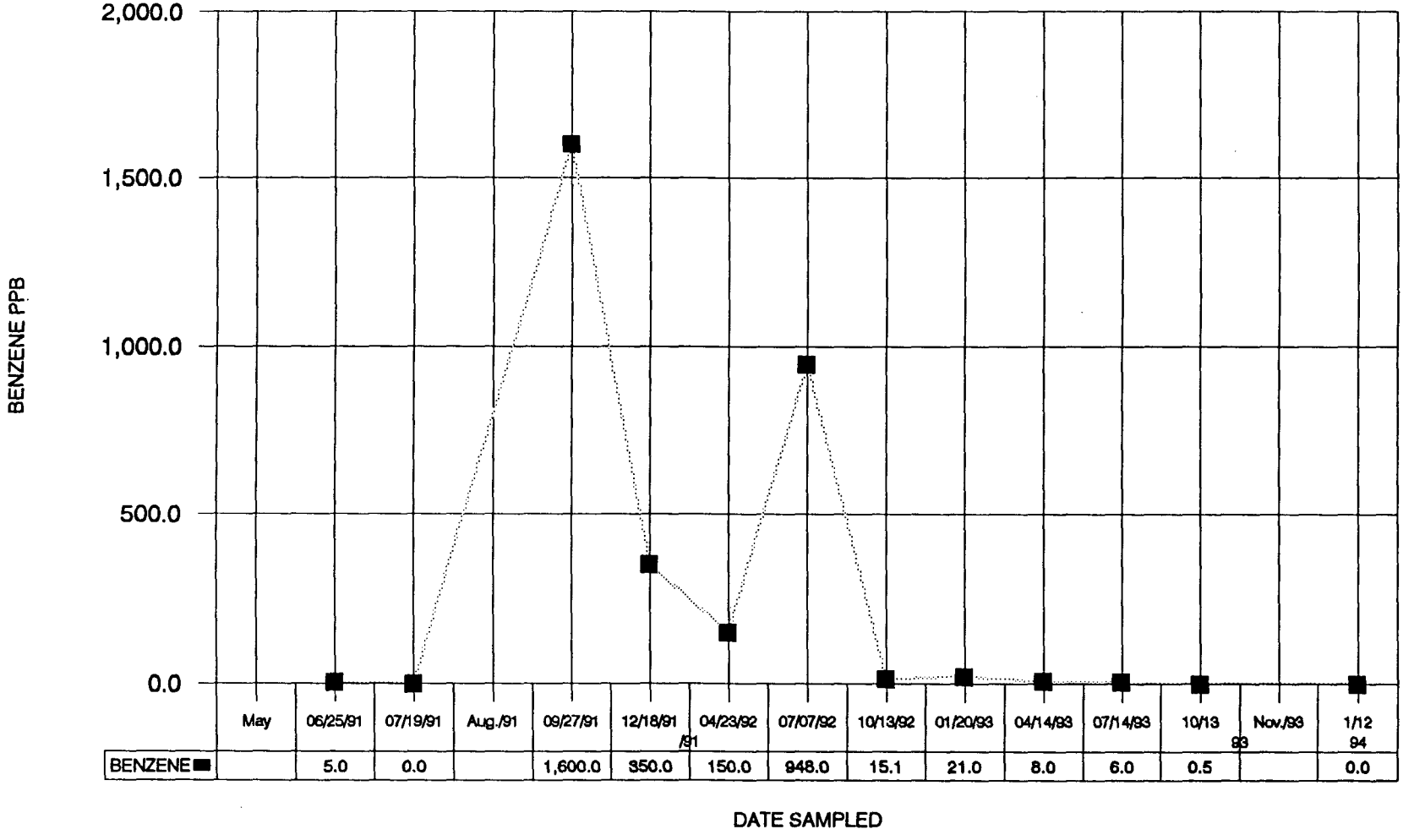
MW#56 BH-82



	May	06/21/91	07/01/91	Aug./91	09/25/91	12/18/91	Apr./92	07/08/92 /91	10/15/92	01/21/93	Apr./93	Jul./93	Oct./93	Nov./93	Jan./94
BENZENE		2,100.0	2,000.0		2,200.0	1,000.0		1,114.0	1,026.0	1,128.0					

GROUNDWATER ANALYSIS DATA

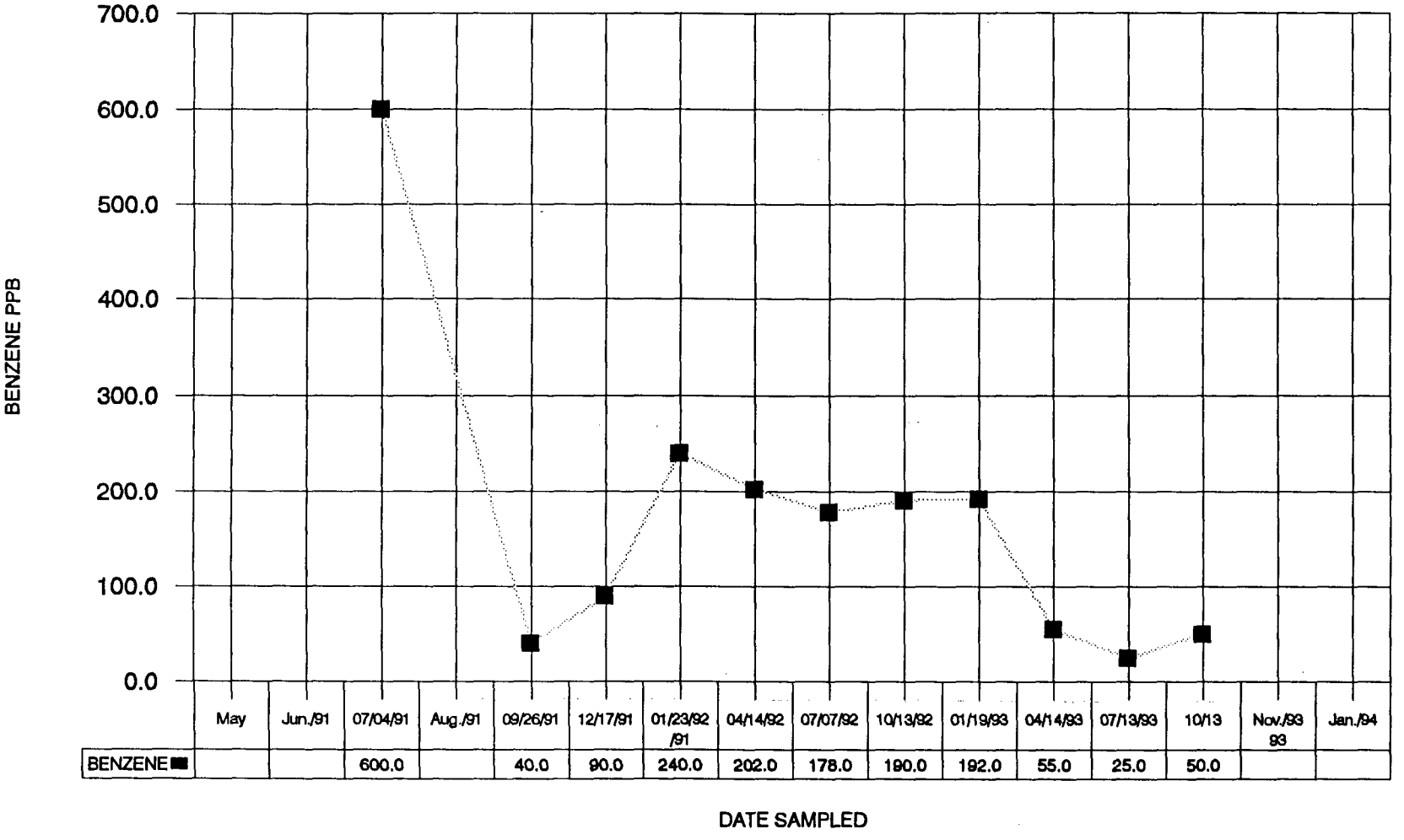
MW#57 BH-83



	May	06/25/91	07/19/91	Aug./91	09/27/91	12/18/91	04/23/92 /91	07/07/92	10/13/92	01/20/93	04/14/93	07/14/93	10/13 93	Nov./93	1/12 94
BENZENE		5.0	0.0		1,600.0	350.0	150.0	948.0	15.1	21.0	8.0	6.0	0.5		0.0

GROUNDWATER ANALYSIS DATA

MW#58 BH-84

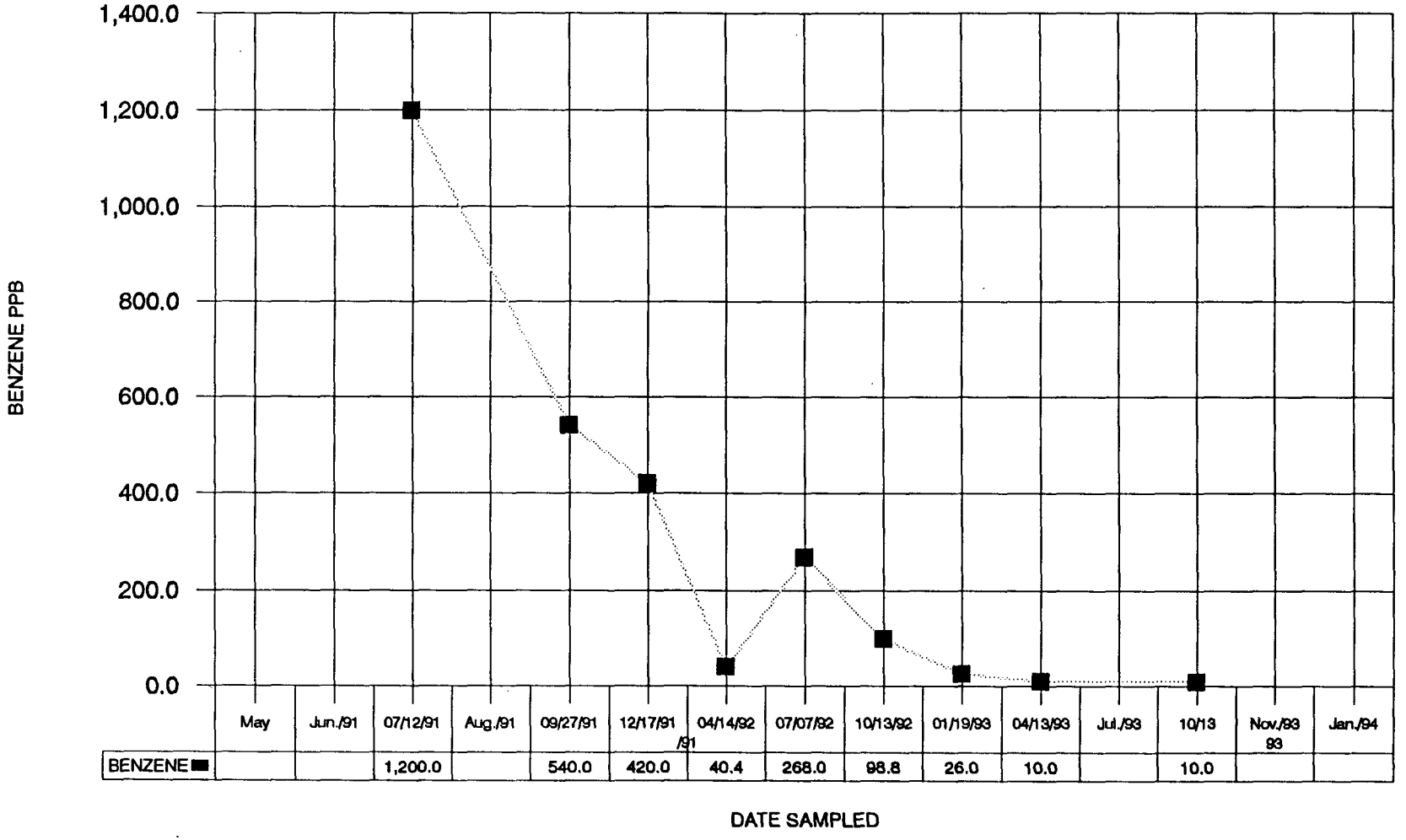


	May	Jun./91	07/04/91	Aug./91	09/26/91	12/17/91	01/23/92 /91	04/14/92	07/07/92	10/13/92	01/19/93	04/14/93	07/13/93	10/13	Nov./93 93	Jan./94
BENZENE ■			600.0		40.0	90.0	240.0	202.0	178.0	190.0	192.0	55.0	25.0	50.0		

DATE SAMPLED

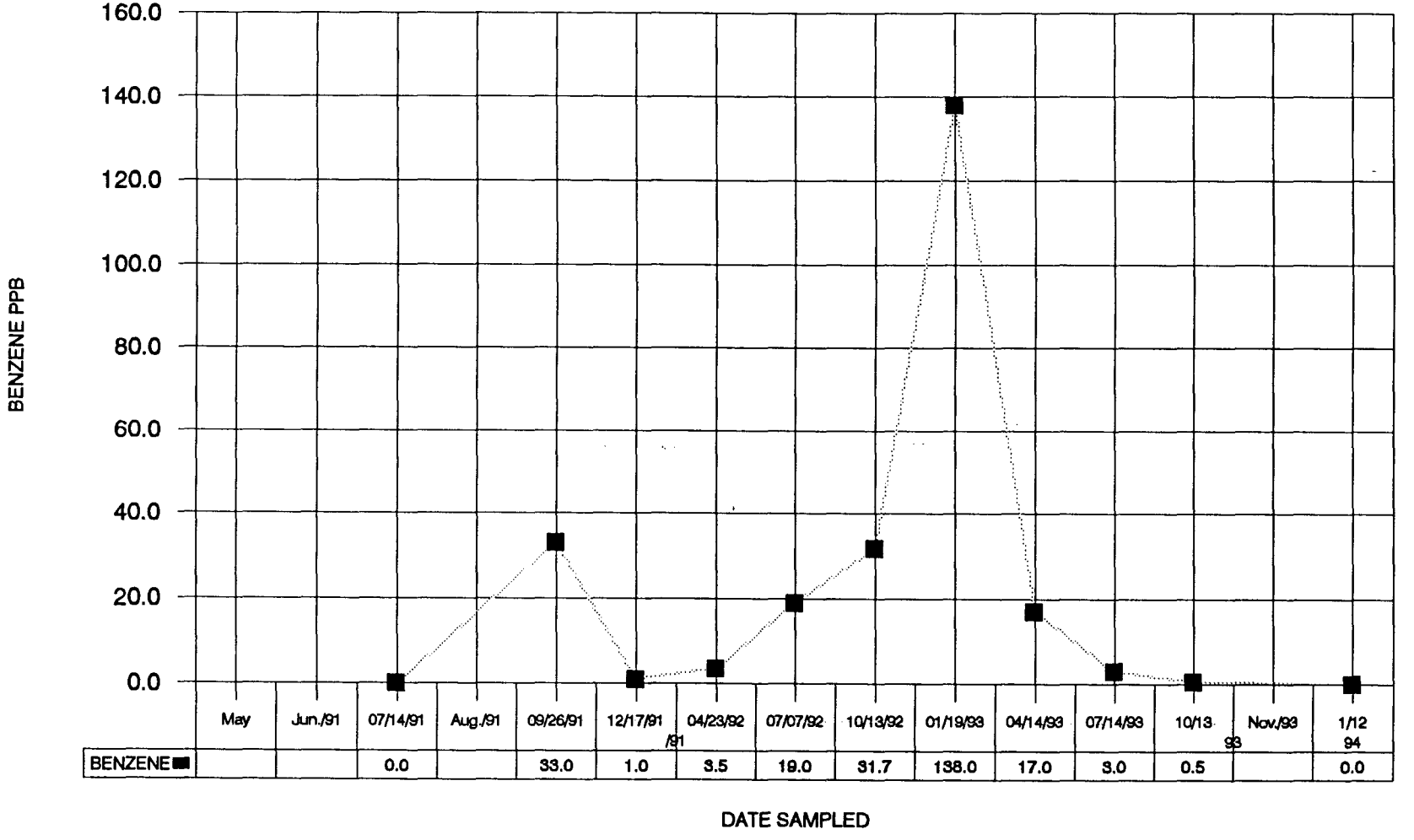
GROUNDWATER ANALYSIS DATA

MW#59 BH-85



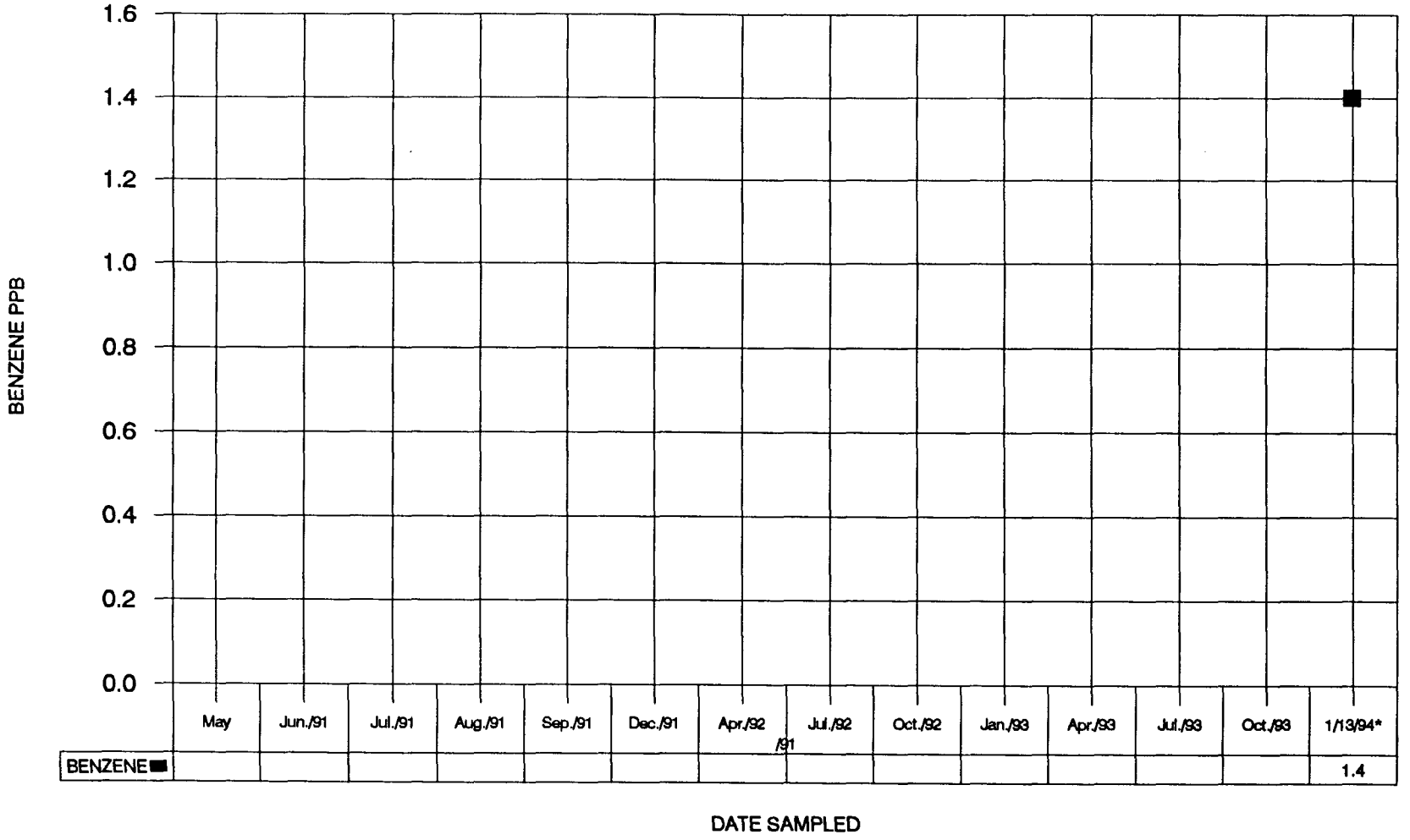
GROUNDWATER ANALYSIS DATA

MW#60 BH-86



BOREHOLE WATER ANALYSIS DATA

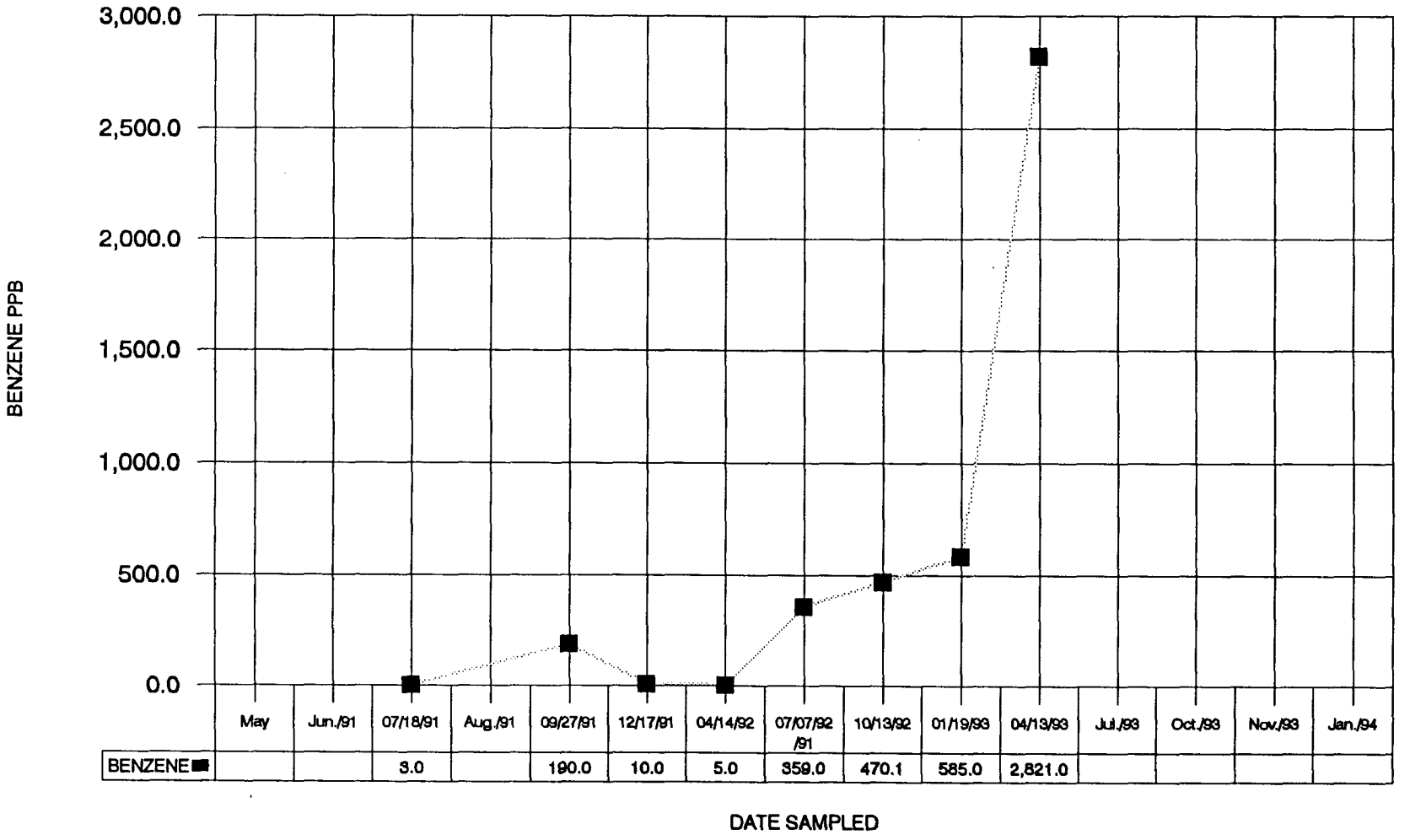
MW#61 BH-87



*- Jan. 1994 is the first time to sample this well.

GROUNDWATER ANALYSIS DATA

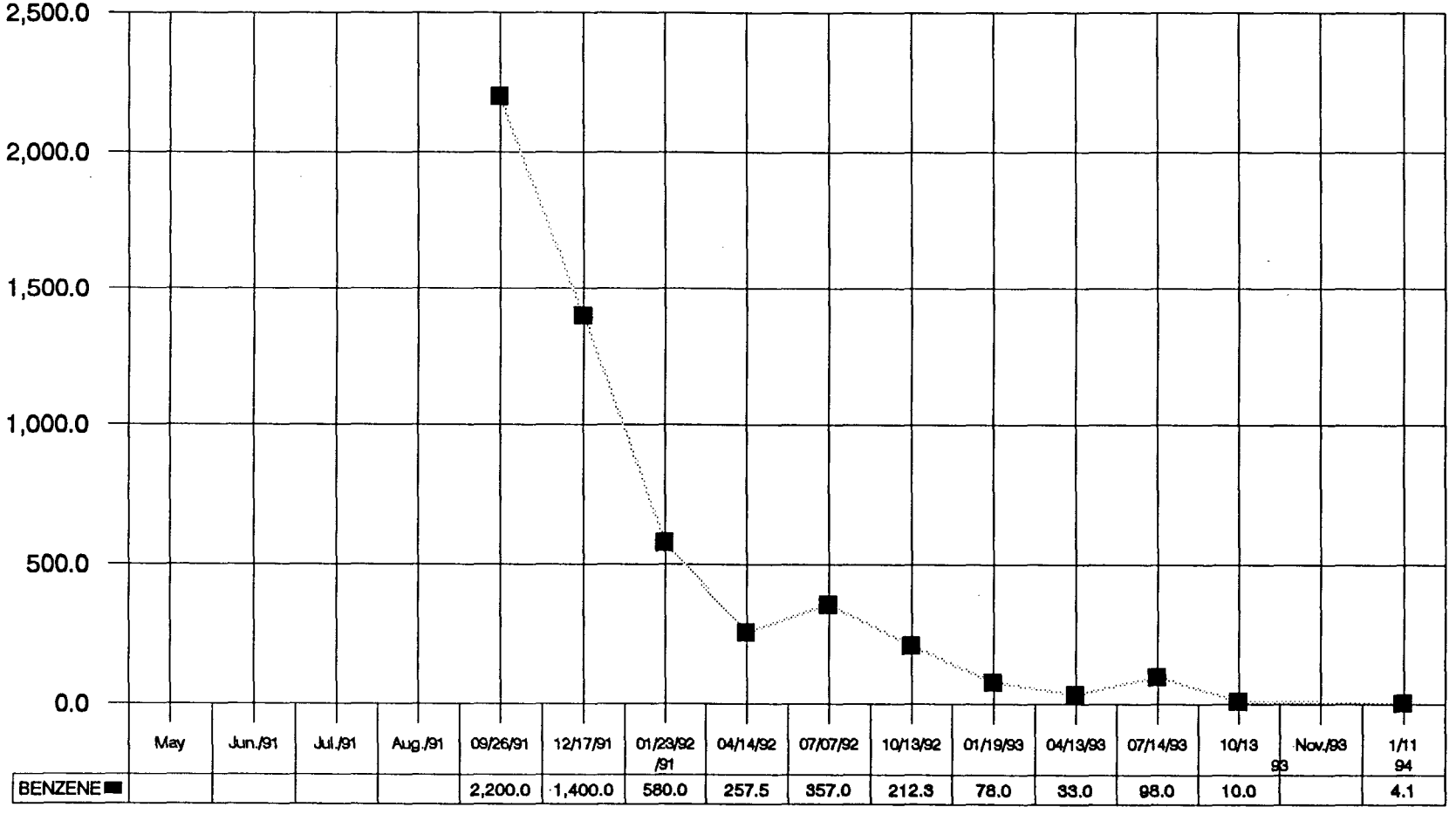
MW#61A BH-87A



	May	Jun./91	07/18/91	Aug./91	09/27/91	12/17/91	04/14/92	07/07/92 /91	10/13/92	01/19/93	04/13/93	Jul./93	Oct./93	Nov./93	Jan./94
BENZENE			3.0		190.0	10.0	5.0	359.0	470.1	585.0	2,821.0				

GROUNDWATER ANALYSIS DATA

MW#62 BH-88

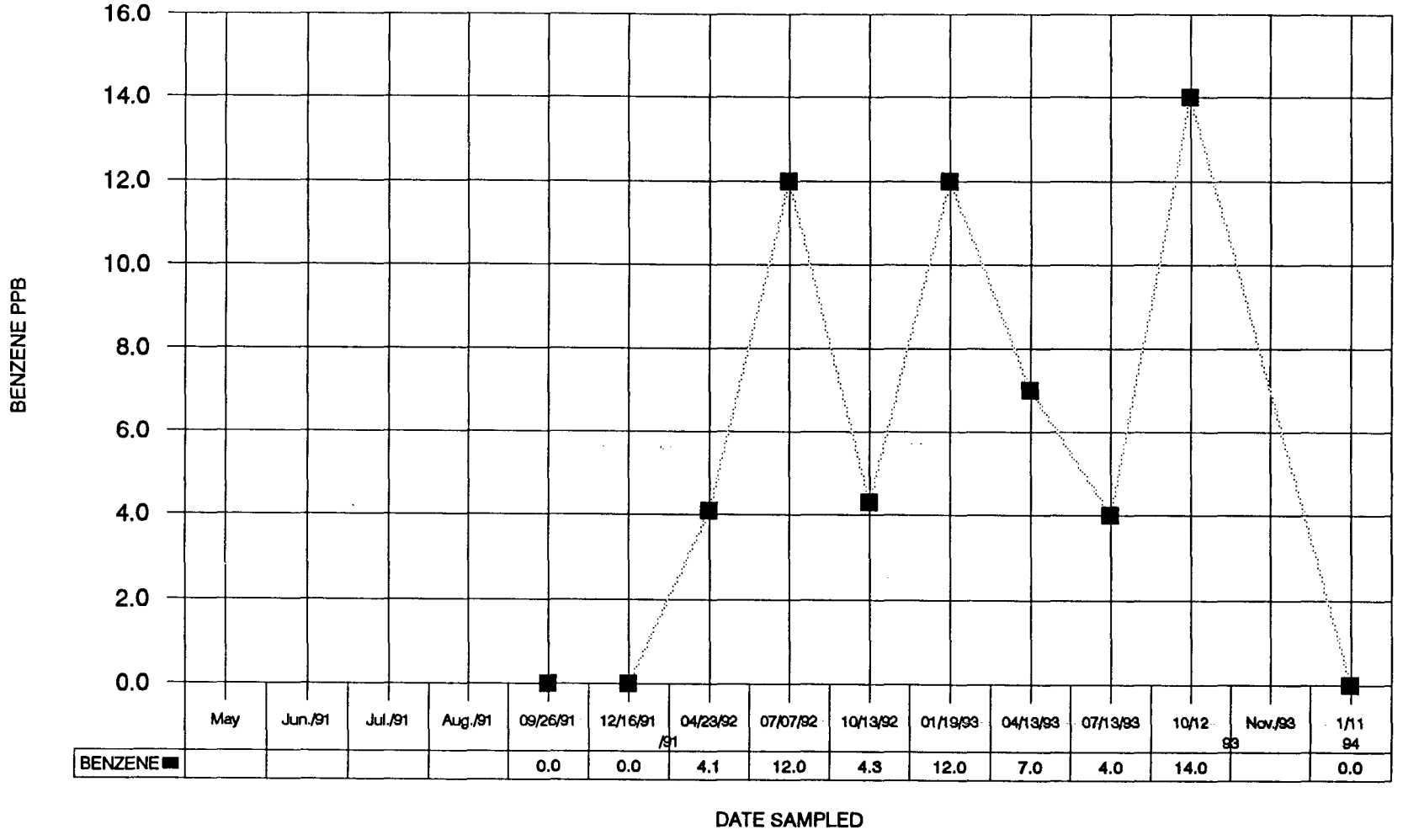


	May	Jun./91	Jul./91	Aug./91	09/26/91	12/17/91	01/23/92 /91	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93	07/14/93	10/13 93	Nov./93	1/11 94
BENZENE ■					2,200.0	1,400.0	580.0	257.5	357.0	212.3	78.0	33.0	98.0	10.0		4.1

DATE SAMPLED

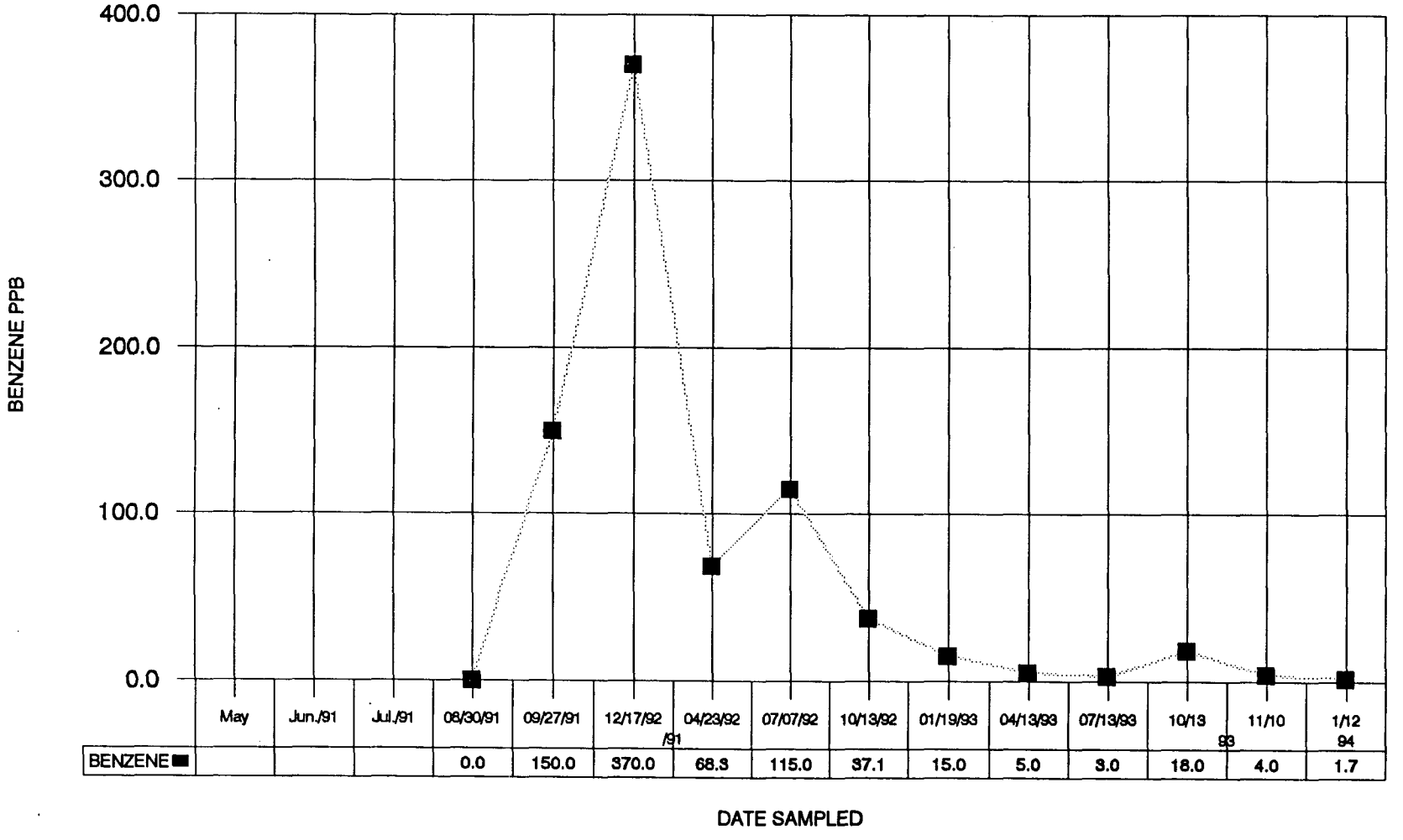
GROUNDWATER ANALYSIS DATA

MW#63 BH-89



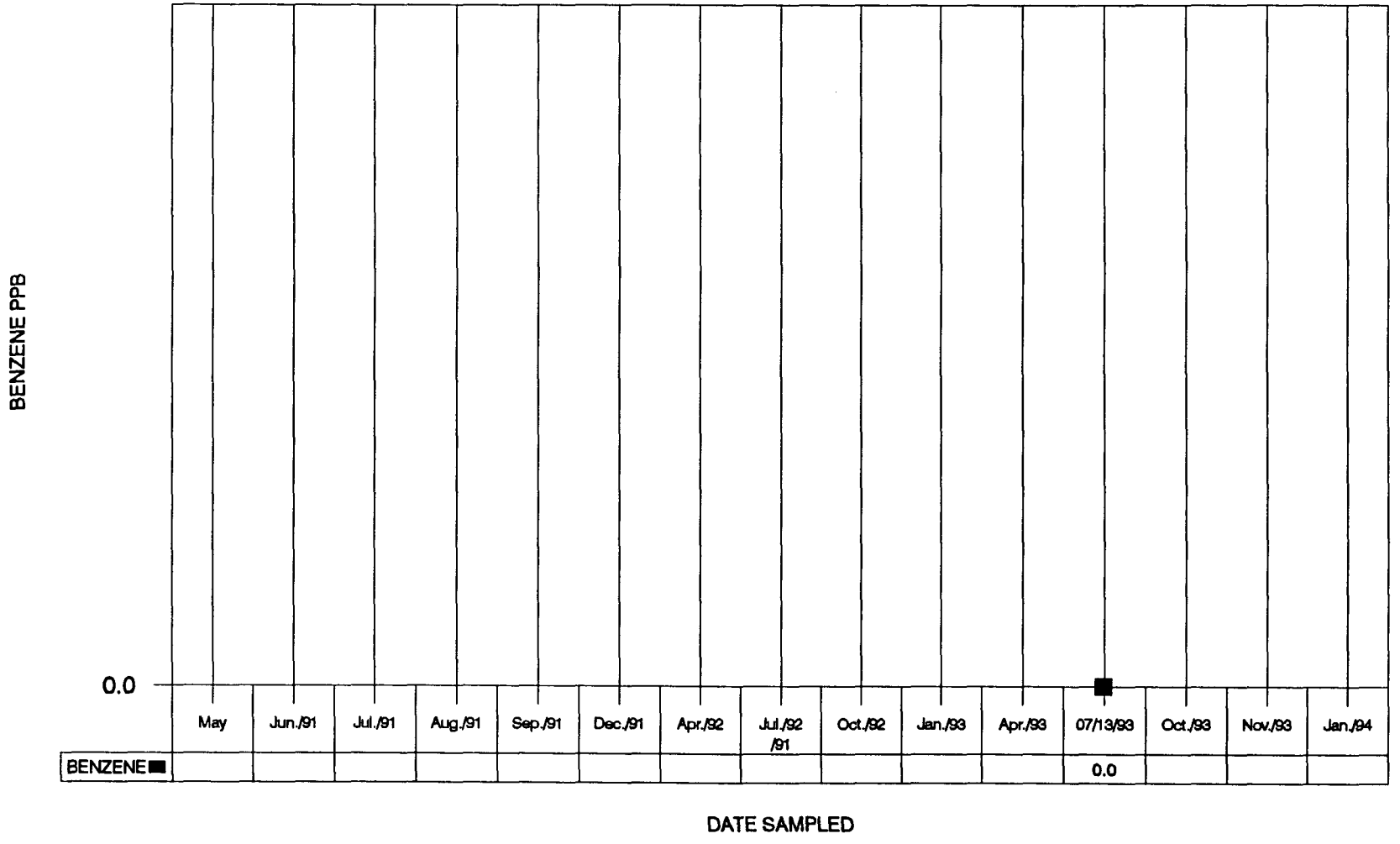
BOREHOLE WATER ANALYSIS DATA

MW#64 BH-90



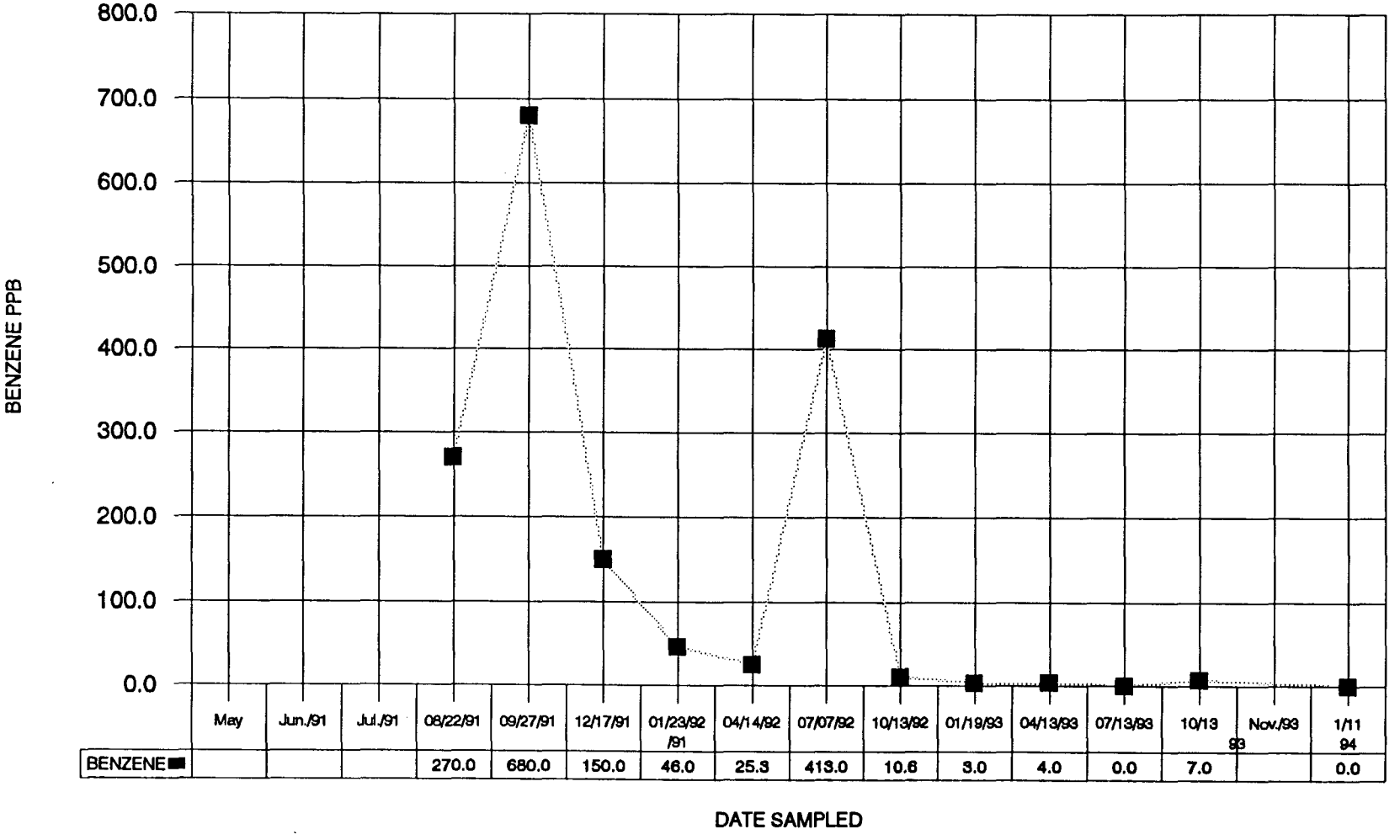
BOREHOLE WATER ANALYSIS DATA

MW#65 BH-91



BOREHOLE WATER ANALYSIS DATA

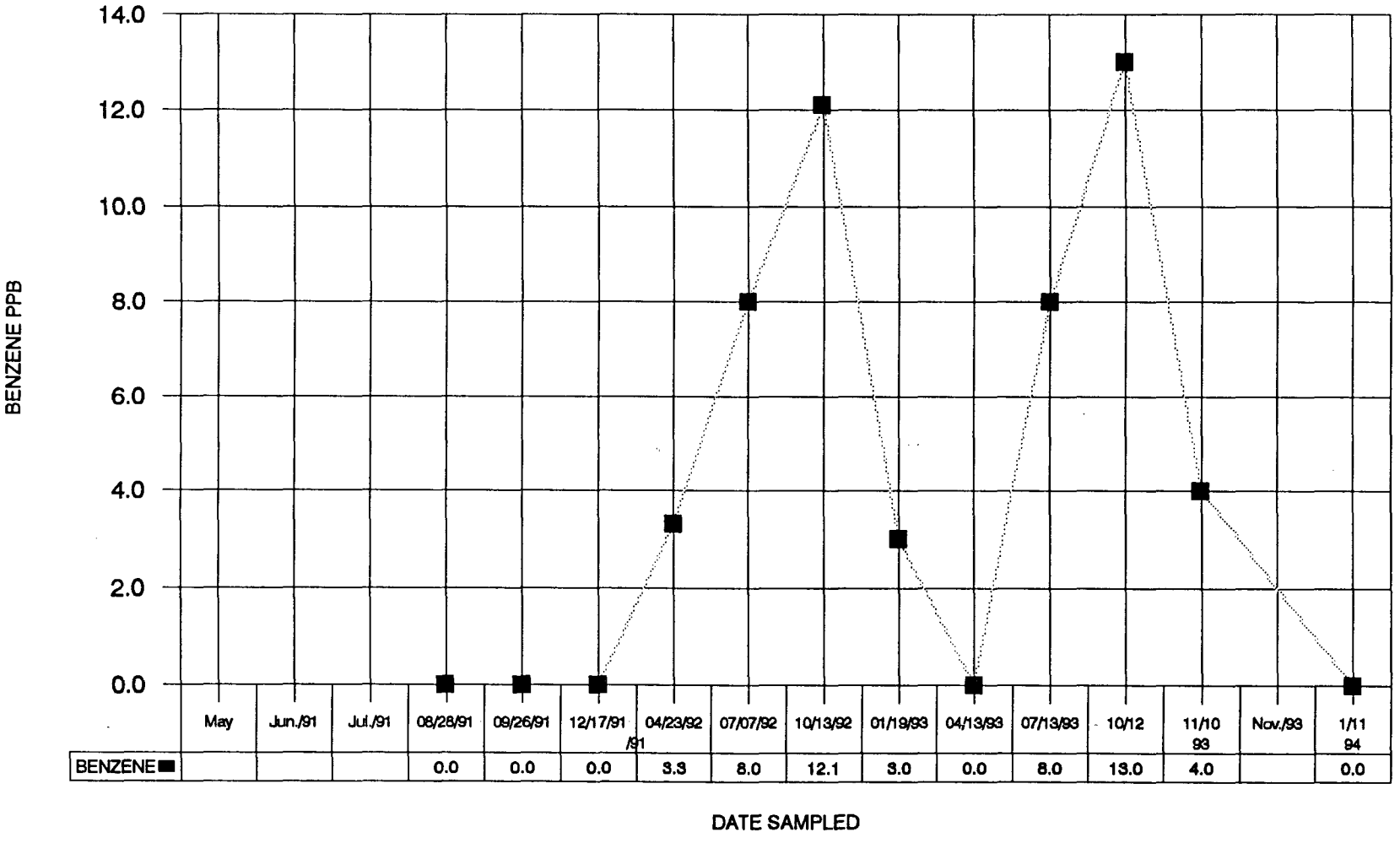
MW#65A BH-91A



	May	Jun./91	Jul./91	08/22/91	09/27/91	12/17/91	01/23/92 /91	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93	07/13/93	10/13 93	Nov./93	1/11 94
BENZENE				270.0	680.0	150.0	46.0	25.3	413.0	10.6	3.0	4.0	0.0	7.0		0.0

GROUNDWATER ANALYSIS DATA

MW#66 BH-92

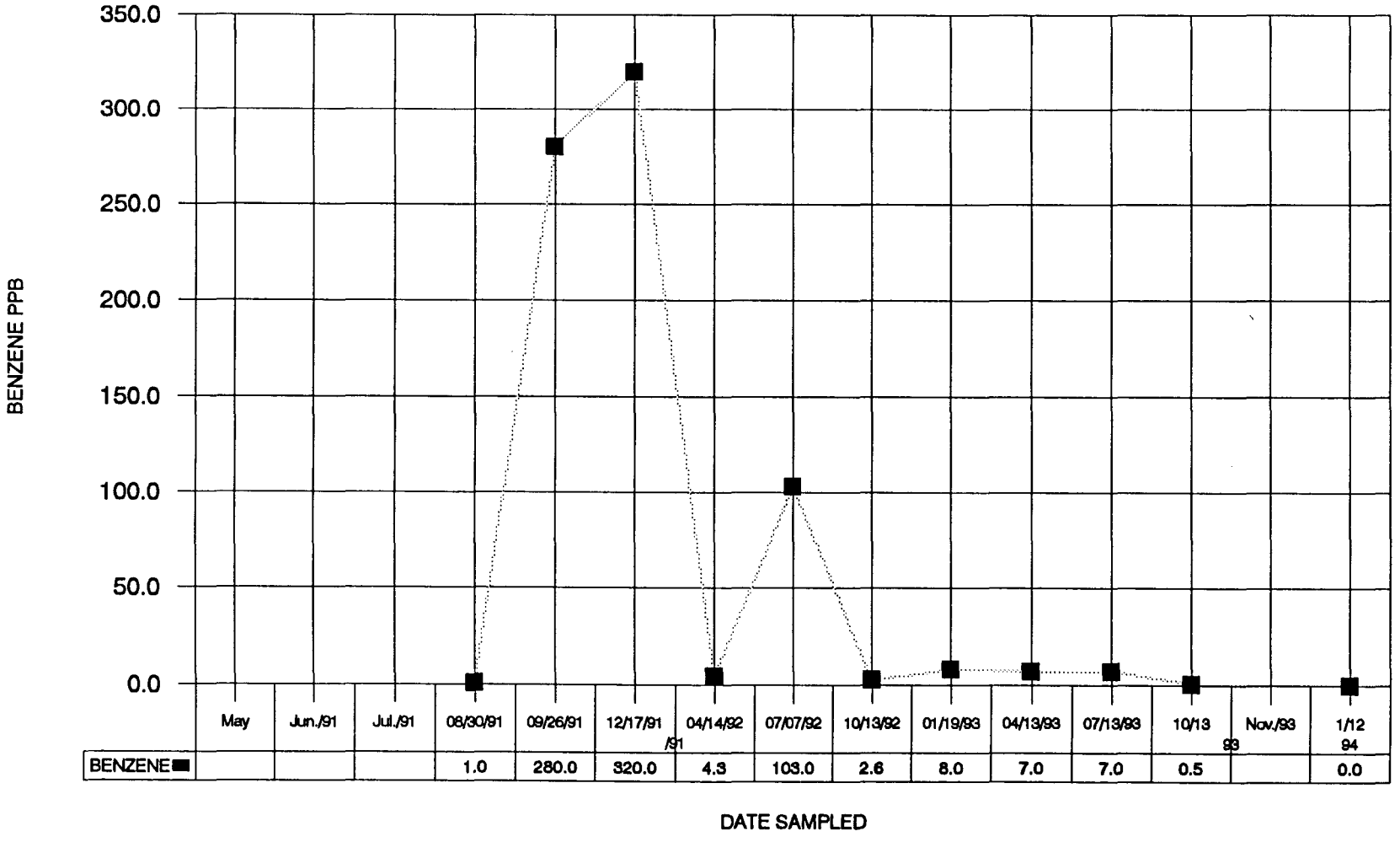


	May	Jun./91	Jul./91	08/28/91	09/26/91	12/17/91	04/23/92 /91	07/07/92	10/13/92	01/19/93	04/13/93	07/13/93	10/12	11/10 93	Nov./93	1/11 94
BENZENE ■				0.0	0.0	0.0	3.3	8.0	12.1	3.0	0.0	8.0	13.0	4.0		0.0

DATE SAMPLED

GROUNDWATER ANALYSIS DATA

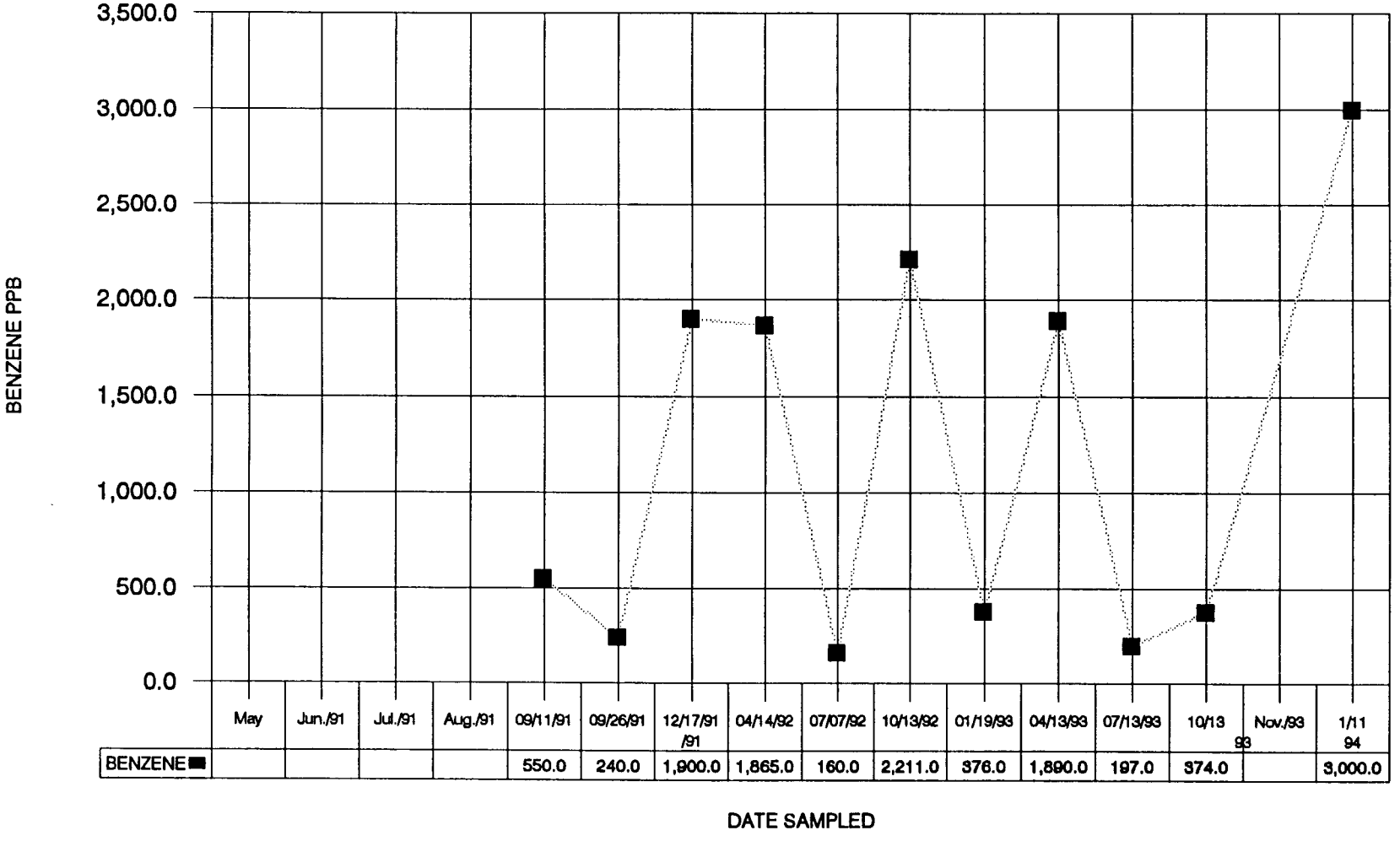
MW#67 BH-93



	May	Jun./91	Jul./91	08/30/91	09/26/91	12/17/91	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93	07/13/93	10/13/93	Nov./93	1/12/94
BENZENE				1.0	280.0	320.0	4.3	103.0	2.6	8.0	7.0	7.0	0.5		0.0

GROUNDWATER ANALYSIS DATA

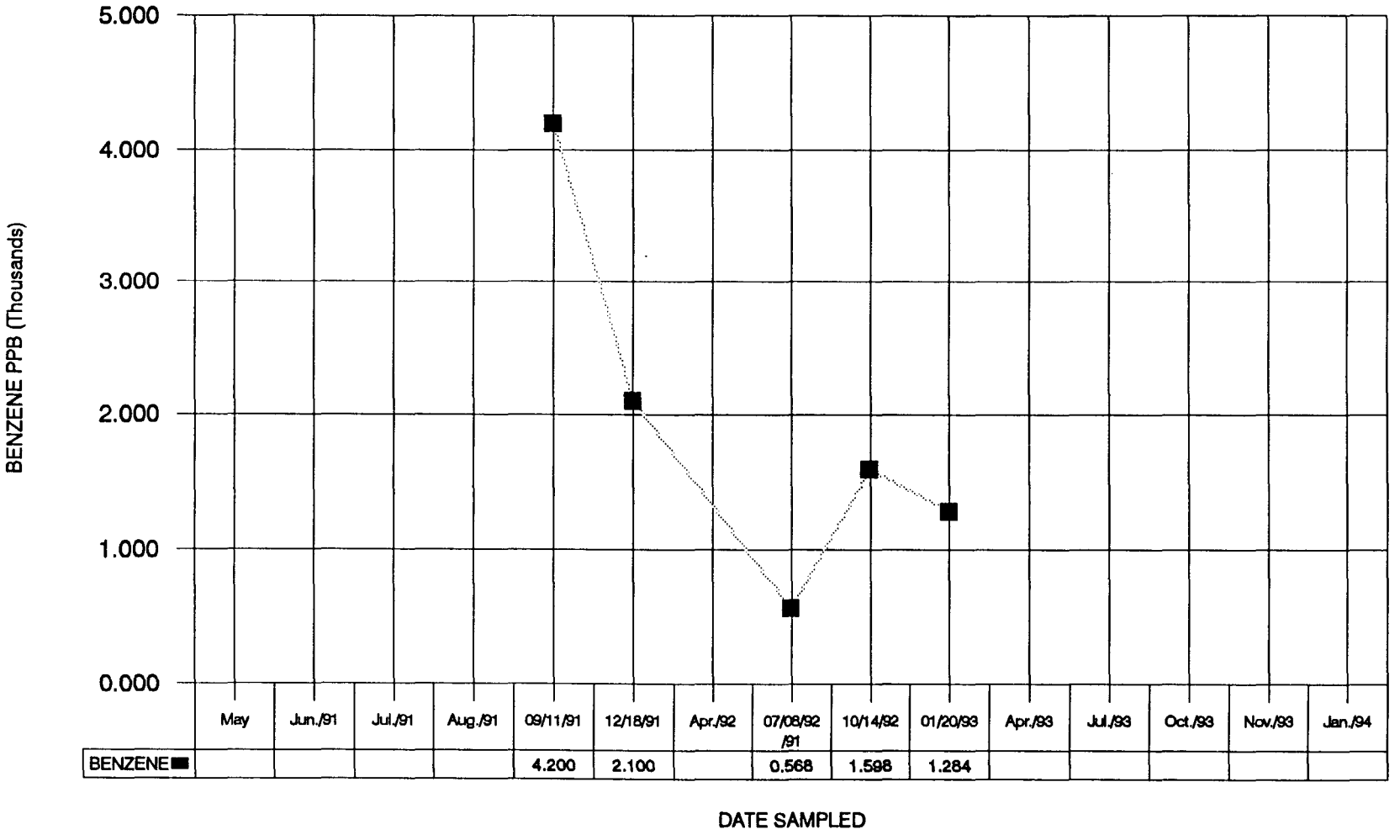
MW#68 BH-94



	May	Jun./91	Jul./91	Aug./91	09/11/91	09/26/91	12/17/91 /91	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93	07/13/93	10/13 93	Nov./93	1/11 94
BENZENE					550.0	240.0	1,900.0	1,865.0	160.0	2,211.0	376.0	1,890.0	197.0	374.0		3,000.0

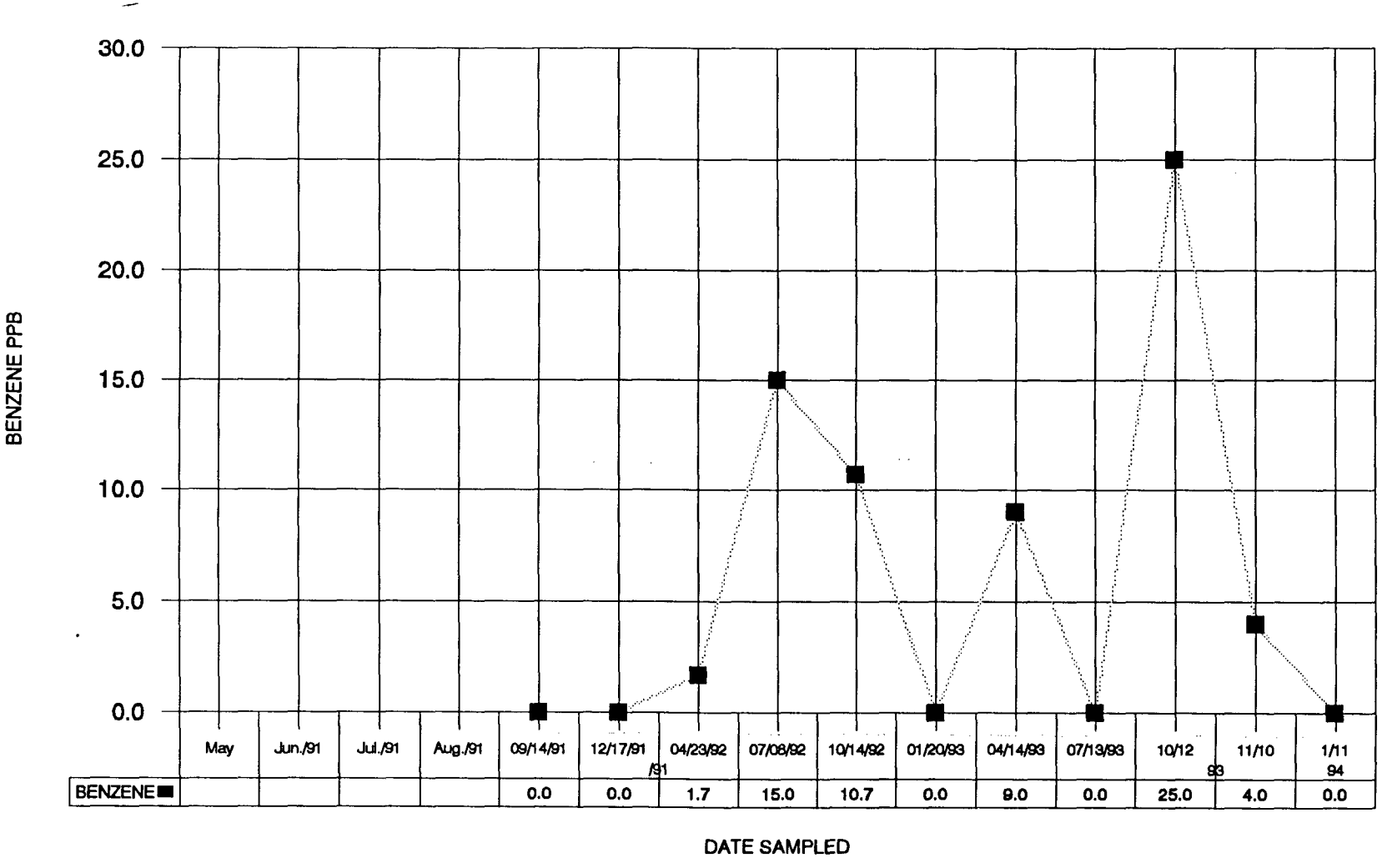
GROUNDWATER ANALYSIS DATA

MW#69 BH-95



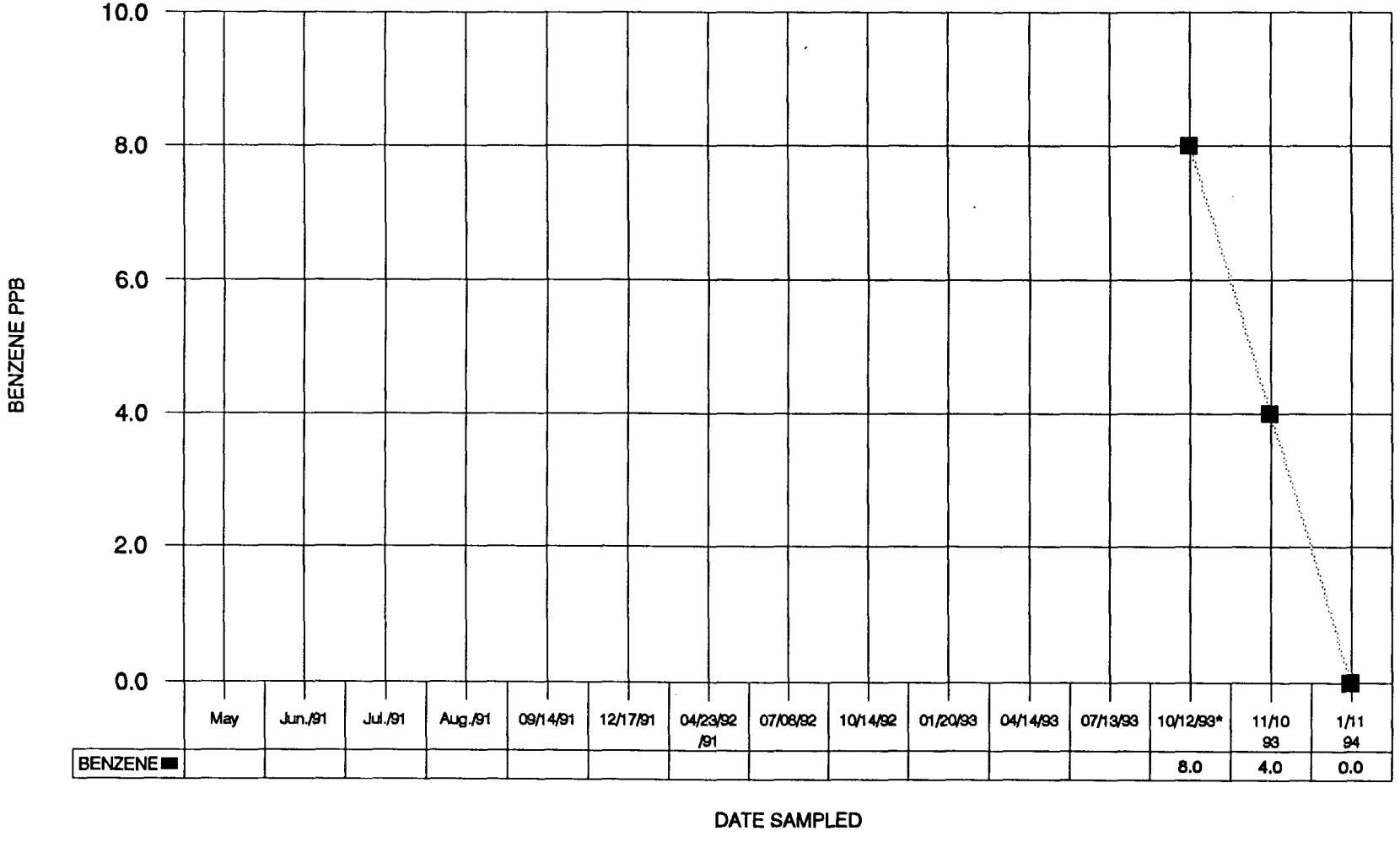
GROUNDWATER ANALYSIS DATA

MW#70 BH-97



GROUNDWATER ANALYSIS DATA

MW#71 BH-98



* 10/12/93 is the first time to sample this well.

APPENDIX D

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

MONTHLY LABORATORY RESULTS

(FEBRUARY)

Analytical **Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **402343**

March 7, 1994

Marathon Oil Company
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: INDIAN BASIN GAS PLANT & OTHER

Attention: Robert Menzie

On **02/15/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** and **non-aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

EPA Method 418.1 and 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jd

Enclosure

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME: INDIAN BASIN GAS PLANT & OTHER

DATE RECEIVED: 02/15/94
REPORT DATE : 03/07/94

ATI I.D.: 402343

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	#2 ARROYO	AQUEOUS	02/09/94
02	#1 LYMAN	AQUEOUS	02/09/94
03	AIR STRIP. OUTLET	AQUEOUS	02/09/94
04	AIR STRIP. INLET	AQUEOUS	02/09/94
05	SW-1	AQUEOUS	02/09/94
06	TRIP BLANK	AQUEOUS	01/17/94
07	NM 204 GRAB	NON-AQ	02/09/94
08	NM 204 COMP.	NON-AQ	02/09/94

----TOTALS----

MATRIX	# SAMPLES
AQUEOUS	6
NON-AQ	2

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 402343

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN GAS PLANT & OTHER

DATE RECEIVED : 02/15/94
REPORT DATE : 03/07/94

PARAMETER	UNITS	01	02	05
CHLORIDE (EPA 325.2)	MG/L	11.6	12.6	21

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 402343

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN GAS PLANT & OTHER

DATE RECEIVED : 02/15/94
REPORT DATE : 03/07/94

PARAMETER	UNITS	07	08
CHLORIDE	MG/KG	7800	4800

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN GAS PLANT & OTHER ATI I.D. : 402343

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	40295401	50	50	0	99	50	98
CHLORIDE	MG/KG	40234307	7800	7800	0	15200	7500	99

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT	: MARATHON OIL COMPANY	ATI I.D.	: 402343
PROJECT #	: (NONE)	DATE RECEIVED:	02/15/94
PROJECT NAME:	INDIAN BASIN GAS PLANT & OTHER	DATE ANALYZED:	02/16/94

PARAMETER	UNITS	07	08
PETROLEUM HYDROCARBONS, IR	MG/KG	43000	39000

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE) ATI I.D.: 402343
PROJECT NAME: INDIAN BASIN GAS PLANT & OTHER

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC.	% REC
PETROLEUM HYDROCARBONS	MG/KG	40234901	24	24	0	190	150	111

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 402343
PROJECT # : (NONE)
PROJECT NAME: INDIAN BASIN GAS PLANT & OTHER

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	#2 ARROYO	AQUEOUS	02/09/94	NA	02/15/94	1
02	#1 LYMAN	AQUEOUS	02/09/94	NA	02/15/94	1
03	AIR STRIP. OUTLET	AQUEOUS	02/09/94	NA	02/16/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	0.9
TOTAL XYLENES	UG/L	<0.5	<0.5	7.9
BROMOFLUOROBENZENE (%)		94	95	83

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 402343
PROJECT # : (NONE)
PROJECT NAME: INDIAN BASIN GAS PLANT & OTHER

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	AIR STRIP. INLET	AQUEOUS	02/09/94	NA	02/16/94	5
05	SW-1	AQUEOUS	02/09/94	NA	02/15/94	1
06	TRIP BLANK	AQUEOUS	01/17/94	NA	02/15/94	1

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	100	<0.5	<0.5
TOLUENE	UG/L	34	<0.5	<0.5
ETHYLBENZENE	UG/L	11	<0.5	<0.5
TOTAL XYLENES	UG/L	330	<0.5	<0.5
BROMOFLUOROBENZENE (%)		88	95	95

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 402343
BLANK I.D.	: 021594	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 02/15/94
PROJECT #	: (NONE)	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN GAS PLANT & OTHER		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		92

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 402343
BLANK I.D.	: 021694	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 02/16/94
PROJECT #	: (NONE)	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN GAS PLANT & OTHER		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		92

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)	ATI I.D.	: 402343
MSMSD #	: 40234302	DATE EXTRACTED:	NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED :	02/15/94
PROJECT #	: (NONE)	SAMPLE MATRIX :	AQUEOUS
PROJECT NAME:	INDIAN BASIN GAS PLANT & OTHER	REF. I.D. :	40234302
		UNITS :	UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	11	110	11	110	0
TOLUENE	<0.5	10	10	100	10	100	0
ETHYL BENZENE	<0.5	10	9.6	96	9.7	97	1
TOTAL XYLENES	<0.5	30	30	100	30	100	0

$$\%\ \text{Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical**Technologies,**Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 2/9/94 PAGE 1 OF 1

ATI LAB I.D. 402343

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER:

COMPANY: Marathon Oil Company
ADDRESS: PO Box 552
Midland, TX 79702
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Same
COMPANY:
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/~~MTBE~~ (8020) *	Cl-	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
#2 Arroyo	2/9/94	10:27	water	01				✓	✓																	3
#1 Lyman	2/9/94	11:00	water	02				✓	✓																	3
Air Strip. Outlet	2/9/94	11:23	water	03				✓																		2
Air Strip. Inlet	2/9/94	11:27	water	04				✓																		2
SW-1	2/9/94	11:40	water	05				✓	✓																	3
Trip Blank	11/7/94		water	06				✓																		1
NM 204 Grab	2/9/94	15:39	soil	07	✓				✓																	1
NM 204 Comp.	2/9/94	15:40	soil	08	✓				✓																	1

ANALYSIS REQUEST

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:		NO. CONTAINERS	16
PROJ. NAME:	Indian Basin Gas Plant + Cotton	CUSTODY SEALS	(Y) N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:	Airborne	RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

* Do not report MTBE.

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: RM Gray Time:	Signature: RM Gray Time: 14:39	Signature: Time:
Printed Name: RM Gray Date:	Printed Name: RM Gray Date: 2/14/94	Printed Name: Date:
Company: MOC Phone: (915) 687-8314	Company: MOC	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY:(LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1245
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 2/15/94
Company:	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 2/15/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Cl	632/632 MOD	619/619 MOD	610/8310	8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
402343-1	2/9/94	1027	AQ	1						X																1
-2	"	1100	"	2						X																1
-5	"	1140	"	5						X																1
-7	"	1537	non-aq	7						X																1
-8	"	1540	"	8						X																1

PROJECT INFORMATION

PROJECT NUMBER: 402343
PROJECT NAME: MDC
QC LEVEL: (STD) IV
QC REQUIRED: MS MSD BLANK
TAT: (STANDARD) RUSHI

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	5
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	402343

DUE DATE: 3/1/94
RUSH SURCHARGE:
CLIENT DISCOUNT: 10 % on soils
per quote on waters att.

W.O.# LX535

SAMPLES SENT TO:

SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: Time: 1730
Printed Name: Terri Dottie Date: 2/15/94
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 9:42
Printed Name: Richard A. Bare Date: 2/16/94
Company:

APPENDIX E

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

MONTHLY LABORATORY RESULTS

(MARCH)

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **403380**

April 1, 1994

Marathon Oil Company
P.O. Box 552
Midland, TX 79702

Project Name/Number: INDIAN BASIN

Attention: Bob Menzie

On **03/17/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

EPA Method 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

Chloride analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jd

Enclosure

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME: INDIAN BASIN

DATE RECEIVED: 03/17/94
REPORT DATE : 04/01/94

ATI I.D.: 403380

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	AIR STRIPPER (INLET)	AQUEOUS	03/16/94
02	AIR STRIPPER (OUTLET)	AQUEOUS	03/16/94
03	SW-1	AQUEOUS	03/16/94
04	LYMAN	AQUEOUS	03/16/94
05	ARROYO	AQUEOUS	03/16/94
06	TRIP BLANK	AQUEOUS	01/17/94

----TOTALS----

MATRIX	# SAMPLES
AQUEOUS	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 403380

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN

DATE RECEIVED : 03/17/94
REPORT DATE : 04/01/94

PARAMETER	UNITS	03	04	05
CHLORIDE (EPA 325.2)	MG/L	22	13	13

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN ATI I.D. : 403380

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	40393706	210	210	0	420	200	105

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 403380
PROJECT # : (NONE)
PROJECT NAME: INDIAN BASIN

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	AIR STRIPPER (INLET)	AQUEOUS	03/16/94	NA	03/21/94	20
02	AIR STRIPPER (OUTLET)	AQUEOUS	03/16/94	NA	03/22/94	1
03	SW-1	AQUEOUS	03/16/94	NA	03/21/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	21	<0.5	<0.5
TOLUENE	UG/L	12	<0.5	<0.5
ETHYLBENZENE	UG/L	<10	<0.5	<0.5
TOTAL XYLENES	UG/L	250	2.8	<0.5
BROMOFLUOROBENZENE (%)		104	117	96

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 403380
PROJECT # : (NONE)
PROJECT NAME: INDIAN BASIN

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	LYMAN	AQUEOUS	03/16/94	NA	03/21/94	1
05	ARROYO	AQUEOUS	03/16/94	NA	03/21/94	1
06	TRIP BLANK	AQUEOUS	01/17/94	NA	03/21/94	1

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
BROMOFLUOROBENZENE (%)		95	95	94

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 403380
BLANK I.D.	: 032194	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 03/21/94
PROJECT #	: (NONE)	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		90

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)	ATI I.D.	: 403380
MSMSD #	: 40338004	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 03/22/94
PROJECT #	: (NONE)	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: INDIAN BASIN	REF. I.D.	: 40338004
		UNITS	: UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.6	96	9.6	96	0
TOLUENE	<0.5	10	9.9	99	9.8	98	1
ETHYL BENZENE	<0.5	10	10	100	10	100	0
TOTAL XYLENES	<0.5	30	30	100	29	97	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 3-16-94 PAGE 1 OF 1

ATI LAB I.D. 403380

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Monzip

COMPANY: Marathon Oil Company
ADDRESS: PO Box 552
Midland, TX 79702
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Same
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE (~~MTBE 8020~~)	CL	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
Air Stripper (Inlet)	3-16-94	10:37	water	01			✓																		2
Air Stripper (Outlet)	3-16-94	10:40	water	02			✓																		2
SW - [illegible]	3-16-94	11:00	water	03			✓	✓																	2
Lyman	3-16-94	11:23	water	04			✓	✓																	3
Arroyo	3-16-94	11:45	water	05			✓	✓																	3
Trip Blank	1-17-94		water	06			✓																		1

PROJECT INFORMATION

PROJ. NO.: INDIAN BASIN
PROJ. NAME:
P.O. NO.:
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	14
CUSTODY SEALS	(Y) N / NA
RECEIVED INTACT	Y
RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.

Signature: R M Gray Time: 13:55
Printed Name: R M Gray Date: 3-16-94
Company: MOC Phone: (915) 687-8314

RELINQUISHED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.

Signature: Time: 450
Printed Name: Date: 3/17/94
Analytical Technologies, Inc. 3/17/94

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 3/18/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310		8240 /TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
403380-3	3/16/94	1100	AQ	3						X																	1
-4	"	1123	"	4						X																	1
-5	"	1145	"	5						X																	1

PROJECT INFORMATION	
PROJECT NUMBER:	403380
PROJECT NAME:	NOC
QC LEVEL:	(STD.) IV
QC REQUIRED:	MS MSD BLANK
TAT	(STANDARD) RUSHI

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	403380

DUE DATE: 3/31/94 W.O.#LL601

RUSH SURCHARGE:

CLIENT DISCOUNT: %

SAMPLES SENT TO:	
SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERQUANT	

RELINQUISHED BY: 1.

Signature: Terri Dettre Time: 1730

Printed Name: Terri Dettre Date: 3/18/94

Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.

Signature: Time:

Printed Name: Date:

Company:

RELINQUISHED BY: 2.

Signature: Time:

Printed Name: Date

Company:

RECEIVED BY: (LAB) 2.

Signature: Linda Eshelman Time: 935A

Printed Name: Linda Eshelman Date: 3/19/94

Company: ATI

APPENDIX F

STATE ENGINEER'S FLUID RECOVERY REPORTS

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

February 4, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, January 31, 1994. Cumulative Lower Queen fluid removal through that date is 28,990,683 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	1/31/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	4778825	4,778,825 26,922[1]	4,805,747
MW-59 (BH-85)	10259114	0	94230.5*	3,957,681 83,454[1]	4,041,135
MW-61A (BH-87A)	10239116	0	4575988	4,575,988 130,850[1]	4,706,838
MW-62 (BH-88)	10239115	0	3510328	3,510,328 256,553[1]	3,766,881
MW-65A (BH-91A)	10239117	0	6987808	6,987,808 39,774[1]	7,027,582
MW-68 (BH-94)	02209213	122618	1913006	1,790,388 2,484,076[1]	4,274,464
MW-72 (BH-99)	02881532	470	368506	368,036	368,036
LOWER QUEEN TOTAL 28,990,683 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, January 31, 1994. The cumulative shallow fluid removal through that date is 749,876 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	1/31/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	225577.3	127,341.[1] 115,911[1]	243,252
MW-14	02209214	0	398204.3	398,204[1] 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	323.4[2] 2704.8[1]	3,028.2
SHALLOW TOTAL				749,876 Gallons	

[1] Previously metered recovered volumes.
[2] Well is pumped off once or twice daily and gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM10394/nrt

xc: R. A. Biernbaum - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

March 4, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, February 28, 1994. Cumulative Lower Queen fluid removal through that date is 30,825,708 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	2/28/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	5009168	5,009,168 26,922[1]	5,036,090
MW-59 (BH-85)	10259114	0	97732.4*	4,104,761 83,454[1]	4,188,215
MW-61A (BH-87A)	10239116	0	4781118	4,781,118 130,850[1]	4,911,968
MW-62 (BH-88)	10239115	0	3719242	3,719,242 256,553[1]	3,975,795
MW-65A (BH-91A)	10239117	0	7185474	7,185,474 39,774[1]	7,225,248
MW-68 (BH-94)	02209213	122618	2000324	1,877,706 2,484,076[1]	4,361,782
MW-72 (BH-99)	02881532	470	1127080	1,126,610	1,126,610
LOWER QUEEN TOTAL 30,825,708 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, February 28, 1994. The cumulative shallow fluid removal through that date is 750,296 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	2/28/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	225577.3	127,341.[1] 115,911[1]	243,252
MW-14	02209214	0	398204.3	398,204[1] 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	420[2] 3028.2[1]	3,448
SHALLOW TOTAL				750,296 Gallons	

[1] Previously metered recovered volumes.
[2] Well is pumped off once or twice daily and gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM30394/nrt

xc: R. A. Biernbaum - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, Texas 79702
Telephone 915/682-1626

April 5, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, April 4, 1994. Cumulative Lower Queen fluid removal through that date is 33,283,307 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	4/04/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	5351734	5,351,734 26,922[1]	5,378,656
MW-59 (BH-85)	10259114	0	100679.0*	4,228,518 83,454[1]	4,311,972
MW-61A (BH-87A)	10239116	0	5061586	5,061,586 130,850[1]	5,192,436
MW-62 (BH-88)	10239115	0	3958696	3,958,696 256,553[1]	4,215,249
MW-65A (BH-91A)	10239117	0	7456182	7,456,182 39,774[1]	7,495,956
MW-68 (BH-94)	02209213	122618	2153994	2,031,376 2,484,076[1]	4,515,452
MW-72 (BH-99)	02881532	470	2174056	2,173,586	2,173,586
LOWER QUEEN TOTAL 31,283,307 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, April 4, 1994. The cumulative shallow fluid removal through that date is 751,938 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	4/04/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	225577.3	127,341.[1] 115,911[1]	243,252
MW-14	02209214	0	398204.3	398,204[1] 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	1642[2] 3448[1]	5,090
SHALLOW TOTAL				751,938 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM40594/nrt

xc: R. A. Biernbaum - Midland
C. M. Schweser - IBGP, Lakewood

APPENDIX G

LABORATORY RESULTS - AIR (VAPOR EXTRACTION WELLS)

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **403393**

March 29, 1994

Marathon Oil Company
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: None given

Attention: Bob Menzie

On **03/22/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **air** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Sample MW-19 was received at ATI, Albuquerque partially deflated.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jd

Enclosure

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME: (NONE)

DATE RECEIVED: 03/22/94
REPORT DATE : 03/29/94

ATI I.D.: 403393

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-19	AIR	03/21/94
02	MW-18	AIR	03/21/94
03	MW-20	AIR	03/21/94

----TOTALS----

MATRIX	# SAMPLES
AIR	3

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from th date of this report. If an extended storage period is required, please contac our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 403393
PROJECT # : (NONE)
PROJECT NAME: (NONE)

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MW-19	AIR	03/21/94	NA	03/23/94	20
02	MW-18	AIR	03/21/94	NA	03/23/94	2.5
03	MW-20	AIR	03/21/94	NA	03/23/94	1

PARAMETER	UNITS	01	02	03
FUEL HYDROCARBONS	MG/M^3	1500	250	94
HYDROCARBON RANGE		C6-C14	C6-C14	C6-C14
HYDROCARBONS QUANTITATED USING		GAS CONDENSATE	GAS CONDENSATE	GAS CONDENSATE
BROMOFLUOROBENZENE (%)		84	73	81

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: EPA 8015 MODIFIED (C6-C16)	ATI I.D.	: 403393
BLANK I.D.	: 032394	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 03/23/94
PROJECT #	: (NONE)	DILUTION FACTOR:	1
PROJECT NAME:	(NONE)		

PARAMETER	UNITS	
FUEL HYDROCARBONS	MG/M^3	<5
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		89

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 403393
PROJECT # : (NONE)
PROJECT NAME: (NONE)

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MW-19	AIR	03/21/94	NA	03/23/94	20
02	MW-18	AIR	03/21/94	NA	03/23/94	2.5
03	MW-20	AIR	03/21/94	NA	03/23/94	1

PARAMETER	UNITS	01	02	03
BENZENE	MG/M^3	<1.0	<0.12	<0.05
TOLUENE	MG/M^3	<1.0	<0.12	<0.05
ETHYLBENZENE	MG/M^3	<1.0	0.50	<0.05
TOTAL XYLENES	MG/M^3	1.9	<0.12	0.23
BROMOFLUOROBENZENE (%)		84	73	81

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 403393
BLANK I.D.	: 032394	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 03/23/94
PROJECT #	: (NONE)	DILUTION FACTOR:	1
PROJECT NAME:	(NONE)		

PARAMETER	UNITS	
BENZENE	MG/M^3	<0.05
TOLUENE	MG/M^3	<0.05
ETHYLBENZENE	MG/M^3	<0.05
TOTAL XYLENES	MG/M^3	<0.05
BROMOFLUOROBENZENE (%)		89

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX (EPA 8020)/8015, MOD (C6-C16)

MSMSD # : 40333503
CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME: (NONE)

ATI I.D. : 403393
DATE EXTRACTED: NA
DATE ANALYZED : 03/22/94
SAMPLE MATRIX : AIR
REF. I.D. : 40333503
UNITS : MG/M^3

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	0.4	1.0	1.4	100	1.3	90	7
TOLUENE	<0.05	1.0	1.0	100	1.0	100	0
ETHYL BENZENE	<0.05	1.0	1.1	110	1.1	110	0
TOTAL XYLENES	<0.05	3.0	3.1	103	3.2	107	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 3-21-94 PAGE 1 OF 1

ATI LAB I.D. 403393

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil
ADDRESS: PO Box 552
Midland, TX 79702
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: same
COMPANY:
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	NUMBER OF CONTAINERS
MW-19	3-21-94	10:00	air	01	1
MW-18	3-21-94	10:05	air	02	1
MW-20	3-21-94	10:10	air	03	1

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	BTXE (8020) / Fuel Hydrocarbons	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)
				✓															
				✓															
				✓															

PROJECT INFORMATION

PROJ. NO.:
PROJ. NAME:
P.O. NO.:
SHIPPED VIA: Greyhound Bus

SAMPLE RECEIPT

NO. CONTAINERS	3
CUSTODY SEALS	Y / N (NA)
RECEIVED INTACT	Y
RECEIVED COLD	WA

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:

please do not report MTBE.

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: RM Gray Time: 12:14p	Signature: Time:	Signature: Time:
Printed Name: RM Gray Date: 3-21-94	Printed Name: Date:	Printed Name: Date:
Company: MOC Phone: (915) 687-8344	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1610
Printed Name: Date:	Printed Name: Date:	Printed Name: Patti Dettre Date: 3/22/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

INDIAN BASIN GAS PLANT TREATMENT PROJECT QUARTERLY REPORT

RECEIVED

AUG 1 2 1994

OIL CONSERVATION DIV.
SANTA FE

SECOND QUARTER 1994
APRIL, MAY, AND JUNE

Submitted by
Marathon Oil Company
on behalf of the
Indian Basin Gas Plant Owners

August 10, 1994

EXECUTIVE SUMMARY

The pump-and-treat groundwater remediation system is fully operational and functioning as set forth in the Treatment Project Plan document (March 1992). Light nonaqueous phase liquid (condensate) was observed in one (1) Lower Queen well. Fluid recovery from the Lower Queen aquifer averaged 10,183 barrels per week with volatile hydrocarbon compounds being removed by air stripping. Lower Queen dissolved benzene concentrations range from 0.5 to 120 micrograms per liter or parts per billion. The benzene concentrations in all five (5) downgradient wells were below the State maximum allowable concentration of 10 micrograms per liter indicating continued hydrocarbon plume containment. Chloride concentrations in all Lower Queen wells are below the State maximum allowable concentration of 250 milligrams per liter.

Light nonaqueous phase liquid (condensate) was observed in two (2) Shallow zone wells. Shallow zone pumping continues from one (1) well. Eight (8) Shallow zone wells sampled in April indicate chloride concentrations above the State maximum allowable concentration of 250 milligrams per liter. Fluid recovery from the Shallow zone aquifer averaged 20 barrels per week. The vapor extraction system operated only during the first 30 days of the Second Quarter withdrawing volatile organic compounds from three (3) Shallow zone wells.

Concentrations of benzene, toluene, ethylbenzene, total xylene, and chloride in groundwater collected from Shallow zone rancher wells and the Upper Indian Hills Spring West (Rocky Arroyo spring) have not exceeded State or Federal drinking water standards.

Light nonaqueous phase liquid (condensate) recovery from the Lower Queen and Shallow zone for the Second Quarter was 73.7 barrels, a 85% increase compared to the First Quarter. Cumulative condensate recovery, excluding the volume volatilized by the air stripper and vapor extraction system, is 3,506.3 barrels or 10.0% of the total spill volume.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

INTRODUCTION 1

GROUNDWATER ELEVATION 1
- Lower Queen Aquifer 1
- Shallow Zone 1
- Groundwater Recharge (Rainfall) 1

QUARTERLY SAMPLING LABORATORY RESULTS 2

RANCHER WELLS, SPRING, AND PLANT WELL LABORATORY RESULTS .. 2

GROUNDWATER PUMPING 3
- Lower Queen 3
- Shallow Zone 4

GROUNDWATER TREATMENT AND PRODUCT RECOVERY 4

VAPOR EXTRACTION SYSTEM 4

OTHER ACTIVITIES 5

REFERENCES CITED 6

TABLES

TABLE 1	LOWER QUEEN DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
TABLE 2	SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
TABLE 3	HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN LOWER QUEEN GROUNDWATER
TABLE 4	HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN SHALLOW ZONE GROUNDWATER
TABLE 5	RANCHER WELL GROUNDWATER AND NATURAL SPRING WATER SAMPLE RESULTS

FIGURES

FIGURE 1	APRIL 1994 LOWER QUEEN POTENTIOMETRIC SURFACE
FIGURE 2	LOWER QUEEN GROUNDWATER ELEVATION VS. TIME
FIGURE 3	APRIL 1994 SHALLOW ZONE POTENTIOMETRIC SURFACE
FIGURE 4	SHALLOW ZONE GROUNDWATER ELEVATION VS. TIME
FIGURE 5	WEEKLY LOWER QUEEN FLUID RECOVERY
FIGURE 6	WEEKLY SHALLOW ZONE FLUID RECOVERY
FIGURE 7	WEEKLY TOTAL FLUID RECOVERY
FIGURE 8	VAPOR EXTRACTION WELL INDEX MAP

APPENDICES

APPENDIX A	APRIL 1994 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY
APPENDIX B	APRIL 1994 LABORATORY RESULTS - PROJECT WELLS, RANCHER WELLS, PLANT WELL, AND NATURAL SPRING
APPENDIX C	BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS
APPENDIX D	RANCHER WELL, PLANT WELL, AND NATURAL SPRING MONTHLY LABORATORY RESULTS - MAY
APPENDIX E	RANCHER WELL, PLANT WELL, AND NATURAL SPRING MONTHLY LABORATORY RESULTS - JUNE
APPENDIX F	STATE ENGINEER'S FLUID RECOVERY REPORTS

INTRODUCTION

This report summarizes groundwater and unsaturated zone treatment activities conducted during the Second Quarter of 1994 in accordance with the Indian Basin Environmental Treatment Project Plan submitted on March 5, 1992 by Marathon Oil Company on behalf of the Indian Basin Gas Plant owners. Preparation of this report is also in accordance with the April 2, 1992 New Mexico Oil Conservation Division (OCD) directive for quarterly reporting of remediation project activities. Remediation activities are continuing to reduce the impact of a liquid gas condensate and brine spill from a production pipeline discovered in April 1991 near the Indian Basin Gas Plant.

GROUNDWATER ELEVATION

Lower Queen Aquifer

Depth-to-water measurements were acquired from nonpumping, Lower Queen monitoring wells in April, May, and June 1994. Table 1 presents groundwater elevations calculated from casing elevation data, depth-to-water measurements, and light nonaqueous phase liquid (LNAPL) thicknesses. Figure 1 is a potentiometric map of the Lower Queen aquifer based on depth-to-groundwater gauging conducted in April. Second Quarter monitoring data indicate both decreasing and increasing groundwater elevations (Figure 2).

Shallow Zone

A potentiometric map was constructed using depth-to-water measurements collected from Shallow zone monitoring wells in April 1994 (Figure 3). Table 2 shows depth-to-water measurements, calculated groundwater elevations, and LNAPL thickness for Shallow zone wells. These Shallow zone data indicate decreasing groundwater elevations in monitoring wells during the quarter (Figure 4).

Groundwater Recharge (Rainfall)

Daily rainfall is gauged at the gas plant. Monthly rainfall for April, May, and June was 0.9, 2.36, and 0.4 inches, respectively (Tables 1 and 2). Cumulative rainfall for the Second Quarter was 3.66 inches.

QUARTERLY SAMPLING LABORATORY RESULTS

Thirty-one Shallow zone and nine Lower Queen monitoring wells were gauged on April 4, 1994. Sixteen Lower Queen wells including the plant water supply well (SW-1) were sampled. The backup plant supply well (SW-2) was gauged, but not sampled. Eight Lower Queen wells have downhole pumps installed and were sampled through the pump. One of the Lower Queen wells sampled through the downhole pump contained LNAPL (MW-68).

Nine of the fifty-nine Shallow zone wells were sampled in April. Four of the original twenty-five Shallow zone monitoring wells (including two sumps) designated for quarterly sampling in the Treatment Project Plan (see ***bolded and italicized*** well designations in Table 4) were sampled. The remaining 21 Shallow zone compliance wells were either dry or bailed dry during sampling (18), contain LNAPL (MW-11 and MW-69), or are inaccessible (MW-13; pump in well). Six Shallow zone wells other than those designated in the Treatment Project Plan were sampled (MW-39, MW-41, MW-43, MW-45, MW-49, and MW-61). Samples were collected by Carter and Burgess, Inc. using Environmental Protection Agency (EPA) sampling protocol. Analytical Technologies, Inc. performed the BTEX (EPA Method 8020) and chloride (EPA Method 325.2) analyses in Albuquerque, New Mexico and Phoenix, Arizona, respectively. Appendix A contains two tables prepared by Carter and Burgess, Inc. of field observations (well depth, depth-to-water measurement, gauge date and time, presence of LNAPL or free-phase product, measured hydrocarbon and hydrogen sulfide vapor concentrations at the wellhead, purge method and volume, temperature, specific conductance, pH, and dissolved oxygen) from notes recorded during field activities.

Tables 3 and 4 are historical summaries of quarterly benzene concentration data since September 1991 for the Lower Queen and Shallow zone wells, respectively. Benzene concentration (in ug/l) versus time graphs for each routinely sampled monitoring well are provided in Appendix C.

RANCHER WELLS, SPRING, AND PLANT WELL LABORATORY RESULTS

Monthly groundwater samples from the closest downgradient rancher well to the Shallow zone plume (Lyman) and from the Upper Indian Hills Spring West (Hendrickson and Jones, 1952) were collected on April 5, May 19, and June 23, 1994. In addition, another rancher well which is sampled quarterly (Biebelle), was sampled on April 5. The plant water supply well (SW-1), completed in the Lower Queen aquifer, is also sampled and analyzed monthly. Concentrations of BTEX and chloride in groundwater collected from the Lyman and Biebelle wells and the Upper Indian Hills Spring West (Rocky Arroyo spring) did not exceed State or Federal drinking water standards during the quarter (Table 5).

The rancher well and natural spring samples were obtained using EPA sampling and handling procedures. Analytical Technologies, Inc. performed the BTEX and chloride analyses using EPA approved methods. Laboratory results of groundwater from the rancher wells and the natural spring are transmitted to the local ranchers each month with letters of explanation. Copies of these letters are also provided to the OCD and the Bureau of Land Management (BLM) in Santa Fe and Roswell, New Mexico, respectively. Laboratory reports for the rancher wells, Rocky Arroyo spring, and SW-1 are included in Appendices B (April), D (May), and E (June).

GROUNDWATER PUMPING

Lower Queen

Fluid recovery from the Lower Queen aquifer and Shallow zone is metered and reported to the State Engineer's Office (SEO) on a monthly basis per SEO directive. The reports filed with the SEO for the Second Quarter of 1994 are attached in Appendix F. Figures 5, 6, and 7 are stacked bar graphs depicting weekly Lower Queen fluid recovery, weekly Shallow zone fluid recovery, and combined weekly fluid recovery from both zones, respectively.

Seven Lower Queen wells (MW-58, MW-59, MW-61A, MW-62, MW-65A, MW-68, and MW-72) were pumped for plume control during the quarter. Monthly fluid recovery for each well and the plant supply well SW-1 is listed in the following table.

LOWER QUEEN FLUID RECOVERY

Well Number	April (Bbls)	May (Bbls)	June (Bbls)	Quarter Total (Bbls)	Average Pumping Rate (gpm)
MW-58	7,629.5	3,758.9	33.0	11,421.4	3.7
MW-59	2,017.5	1,441.8	3,715.2	7,174.5	2.3
MW-61A	5,177.2	5,847.8	5,942.0	16,967.0	5.4
MW-62	4,291.1	4,513.7	4,067.8	12,872.6	4.1
MW-65A	5,076.6	6,368.7	4,805.7	16,251.0	5.2
MW-68	6,146.8	3,979.3	4,914.9	15,041.0	4.8
MW-72	18,966.2	18,900.4	14,822.1	52,688.7	16.9
Plant Supply SW-1	4,770.9	23,791.0	21,226.0	49,787.9	16.0
TOTAL	**54,076**	**68,602**	**64,054**	**158,326**	**58.4**

Shallow Zone

Shallow zone fluid recovery during the Second Quarter was from MW-13 and MW-69. Monthly Shallow zone fluid recovery is listed in the following table.

SHALLOW ZONE FLUID RECOVERY

Well Number	April (Bbls) Cond./Water	May (Bbls) Cond./Water	June (Bbls) Cond./Water	Quarter Total (Bbls) Cond./Water
MW-13	0/0	0/7.6	0/0	0/7.6
MW-69	10.8/21.5	33.2/92.4	21.8/72.9	65.8/186.8

GROUNDWATER TREATMENT AND PRODUCT RECOVERY

Commingled fluids pumped from one Shallow zone (MW-13) and seven Lower Queen recovery wells were pumped through piping to a treatment compound that includes an condensate/water separator, two aboveground tanks, and an air stripper,. The separator is used to remove free product from the produced groundwater. When operating properly, the free product is transferred to a condensate tank. When the separator is not effective, free product is transferred to an equalization tank in addition to the condensate tank. Both tanks are gauged on a daily basis. Condensate and equalization tank free condensate measurements indicated a minimum of 7.9 barrels were recovered from the commingled groundwater during the Second Quarter. Cumulative condensate separated from the recovered groundwater since product separation began in April 1992 through the Second Quarter is 76.9 barrels.

Groundwater from the equalization tank is pumped through the air stripper to remove dissolved-phase, volatile organic compounds. Stripped volatile organic compounds are vented to the atmosphere through a stack. Treated groundwater is used as make-up water for the gas plant.

Free product (condensate) recovery from MW-69 during the Second Quarter totaled 65.8 barrels. This represents 89% of the recovered condensate for the Second Quarter.

Total free product recovery from the Lower Queen and Shallow zone for the Second Quarter was 73.7 barrels, an 85% increase compared to the First Quarter. Cumulative free product recovered to date excluding the volume volatilized by the air stripper and vapor extraction system is 3,506.3 barrels or 10.0% of the total spill volume.

VAPOR EXTRACTION SYSTEM

A vapor extraction (VE) system consisting of a trailer-mounted blower rated at 100 standard cubic feet per minute (SCFM) with a vacuum of approximately 50 inches of water

commenced operation on March 10, 1992. This system is capable of extracting vapors from four wells simultaneously. Vented gases are not treated and are emitted to the atmosphere from an exhaust stack connected to the blower.

Phase I of the unsaturated zone remediation using VE was completed in March 1993. The Phase I program vented Shallow zone wells MW-16, MW-17, MW-35 and later MW-16, MW-17, and MW-21. Shallow venting continued from MW-56 between April 8 and July 20, 1993. On October 7, 1993 the VE system commenced operation at MW-18, MW-19, and MW-20. Figure 8 shows the locations of these vent wells.

The system has extracted vapors from MW-18, MW-19, and MW-20 continuously since October 7, 1993 until May 5, 1994 when it was determined that an air emissions permit was required for system operation. The system was shut in pending acquisition of a New Mexico Air Pollution Control Bureau air permit.

REFERENCES CITED

Hendrickson, G. E., and Jones, R. S., 1952, Geology and Ground-water Resources of Eddy County, New Mexico: New Mexico Bureau of Mines & Mineral Resources Ground-water Report 3, 169 p., 4 pls.

TABLES

TABLE 1
LOWER QUEEN DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
SECOND QUARTER 1994

LOWER QUEEN WELL	Top of Casing (TOC) Elev. (ft AMSL)	Total Depth from TOC (ft)	Apr-4-94				May-19-94		Jun-23-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-57 (BH-83)	3787.70	177.20	158.96	3628.74	NG		158.74	3628.96		3787.70
MW-58 (BH-84)p	3824.31	218.03								
MW-59 (BH-85)p	3819.59	211.29								
MW-60 (BH-86)	3815.28	223.00	186.91	3628.37	NG		186.71	3628.57		3815.28
MW-61A (BH-87A)p	3815.97	215.67								
MW-62 (BH-88)p	3819.90	224.69								
MW-63 (BH-89)	3826.16	220.49	197.47	3628.69	NG		198.28	3627.88		3826.16
MW-64 (BH-90)	3798.57	201.89	170.03	3628.54	NG		169.89	3628.68		3798.57
MW-65A (BH-91A)p	3763.26	168.56								
MW-66 (BH-92)	3828.98	235.18	201.36	3627.62	NG		201.26	3627.72		3828.98
MW-67 (BH-93)	3765.87	165.77	137.31	3628.56	NG		137.14	3628.73		3765.87
MW-68 (BH-94)p	3797.83	203.43								
MW-70 (BH-97)	3822.57	225.07	193.19	3629.38	NG		193.86	3628.71		3822.57
MW-71 (BH-98)	3778.05	233.49	149.98	3628.07	NG		150.64	3627.41		3778.05
MW-72 (BH-99)p	3819.32	236.55								
SW-1 (SUPPLY)p	3808.19	255.00			NG					
SW-2 (BACKUP)	3808.79	292.00	180.58	3628.21	NG		181.13	3627.66		3808.79
Monthly Rainfall (in)					0.09			2.36		0.40

p = pump present in well; unable to measure
NG = Not Gauged

AMSL = Above Mean Sea Level
FP = Free Product (condensate) being recovered

TABLE 2
SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
FIRST QUARTER 1994

SHALLOW ZONE WELL	TOC Elev. (ft AMSL)	Total Depth from TOC (ft)	Apr-4-94				May-19-94		Jun-23-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-1 (BH-14)a	3792.50	16.10	NG				NG		NG	
MW-2 (BH-23)	3788.82	15.52	NG				NG		NG	
MW-3 (BH-24)	3787.50	16.90	DRY				NG		NG	
MW-4 (BH-26)	3785.88	18.68	NG				NG		NG	
MW-5 (BH-28)a	3801.69	12.77	DRY				NG		NG	
MW-6 (BH-29)a	3785.17	13.66	DRY				NG		NG	
MW-7 (BH-30)a	3784.46	17.01	DRY				NG		NG	
MW-8 (BH-31)a	3795.04	16.97	DRY				NG		NG	
MW-9 (BH-32)a	3807.85	13.65	DRY				NG		NG	
MW-10 (BH-33)	3790.78	19.08	DRY			odor	NG		NG	
MW-11 (BH-34)	3806.96	24.85	24.38	3782.58	24.34	0.48	NG		NG	
MW-12 (BH-35)	3809.86	25.21	NG				NG		NG	
MW-13 (BH-36)p	3801.58	22.07	p				NG		NG	
MW-14 (BH-37)	3803.61	24.30	NG				NG		NG	
MW-15 (BH-38)vec	3803.59	19.47	NG				NG		NG	
MW-16 (BH-39)pve	3801.04	22.66	NG				NG		NG	
MW-17 (BH-40)pve	3799.55	19.75	NG				NG		NG	
MW-18 (BH-41)VE	3795.82	17.42	VE				VE		VE	
MW-19 (BH-42)VE	3797.21	19.11	VE				VE		VE	
MW-20 (BH-43)VE	3797.59	16.89	VE				VE		VE	
MW-21 (BH-44)pve	3798.21	23.31	NG				NG		NG	
MW-22 (BH-45)	3799.20	17.30	NG				NG		NG	
MW-23 (BH-46)a	3794.48	12.08	NG				NG		NG	
MW-24 (BH-47)	3794.09	14.09	DRY			odor	NG		NG	
MW-25 (BH-48)a	3786.97	10.27	NG				NG		NG	
MW-26 (BH-49)	3793.01	21.11	NG				NG		NG	
MW-27 (BH-50)	3790.93	18.23	NG				NG		NG	
Monthly Rainfall (in)					0.09		2.36		0.40	

a = abandonment candidate
p = pump present in well; unable to measure
vec = vapor extraction well candidate
NG = Not Gauged
pve = previous vapor extraction well

VE = Vapor Extraction Well
AMSl = Above Mean Sea Level
TOC = Top of Casing datum

TABLE 2 (CONTINUED)
SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA

SHALLOW ZONE WELL	TOC Elev. (ft AMSL)	Total Depth from TOC (ft)	Apr-4-94 Depth to water (ft)	Apr-4-94 Ground-water Elev. (ft)	Apr-4-94 Depth to product (ft)	Apr-4-94 Condensate thickness (in)	May-19-94 Depth to water (ft)	May-19-94 Ground-water Elev. (ft)	Jun-23-94 Depth to water (ft)	Jun-23-94 Ground-water Elev. (ft)
MW-28 (BH-52)ve	3797.03	18.59	NG				NG		NG	
MW-29 (BH-53)a	3794.06	14.76	DRY				NG		NG	
MW-30 (BH-54)a	3788.30	14.82	NG				NG		NG	
MW-31 (BH-55)	3791.15	19.93	NG				NG		NG	
MW-32 (BH-56)	3797.47	16.77	DRY				NG		NG	
MW-33 (BH-57)	3802.48	20.29	NG				NG		NG	
MW-34 (BH-58)	3806.00	19.97	NG				NG		NG	
MW-35 (BH-59)	3800.81	20.71	NG				NG		NG	
MW-36 (BH-21)a	3792.94	8.77	NG				NG		NG	
MW-37 (BH-60)	3795.03	20.83	NG				NG		NG	
MW-38 (BH-61)	3797.32	20.57	DRY				NG		NG	
MW-39 (BH-62)	3796.20	20.54	19.07	3777.13			NG		NG	
MW-40 (BH-63)	3803.12	14.07	NG				NG		NG	
MW-41 (BH-64)	3799.04	24.04	21.19	3777.85	NG	odor	NG		NG	
MW-42 (BH-65)	3804.73	23.59	NG				NG		NG	
MW-43 (BH-66)	3802.05	24.55	22.38	3779.67			NG		NG	
MW-44 (BH-67)	3804.14	25.24	22.02	3782.12			NG		NG	
MW-45 (BH-68)	3808.68	26.62	22.64	3786.04		odor	NG		NG	
MW-46 (BH-69)	3805.54	20.24	19.59	3785.95			NG		NG	
MW-47 (BH-70)	3805.09	21.79	DRY			odor	NG		NG	
MW-48 (BH-71)	3806.18	19.98	DRY				NG		NG	
MW-49 (BH-72)	3805.61	25.91	22.64	3782.97			NG		NG	
MW-50 (BH-73)	3813.35	37.15	27.04	3786.31			NG		NG	
MW-51 (BH-74)	3810.86	20.06	NG				NG		NG	
MW-52 (BH-75)	3817.49	21.44	DRY				NG		NG	
MW-53 (BH-77)a	3809.92	15.32	DRY				NG		NG	
MW-54 (BH-80)	3823.86	78.15	47.45	3776.41			NG		NG	
MW-55 (BH-81)	3794.40	66.32	32.30	3762.10			NG		NG	
MW-56 (BH-82)	3782.45	43.76	DRY			odor	NG		NG	
MW-61 (BH-87)	3816.20	57.97	37.04	3779.16			NG		NG	
MW-65 (BH-91)	3763.31	57.69	DRY				NG		NG	
MW-69 (BH-95)p	3805.11	51.27	NG		NG	odor	NG		NG	
Sump A10		NG	DRY				NG		NG	
Sump 16A	3785.14	NG	DRY				NG		NG	
Stock well (SE1/4 Sec. 13)	3779.76	NG	NG				NG		NG	
Monthly Rainfall (in)				0.09			2.36		0.40	

a = *proposed abandonment candidate*
p = pump present in well; unable to measure
ve = potential vapor extraction well

AMSL = Above Mean Sea Level
TOC = Top of Casing datum
NG = Not Gauged

TABLE 3
HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN LOWER QUEEN GROUNDWATER
SECOND QUARTER 1994

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise										
WELL	Sep-91	Dec-91	Apr-92	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Oct-93	Jan-94	Apr-94
MW-57	1600	350	150	948**	15.1*	21*	8*	6*	<0.5	<0.5	<0.5
MW-58	40	90	202**	178**	190*	192*	55*	25*	50*	FP	<2.5
MW-59	540	420	40.4**	268**	98.8*	26*	10*	FP	10*	FP	<2.5
MW-60	33	<1	3.5**	19**	31.7*	138*	17*	<1	<0.5	<0.5	<0.5
MW-61A	190	10	5.0**	359**	470.1*	585*	2821*	FP	FP	FP	<0.5
MW-62	2200	1400	257.5**	357**	212.3*	78*	33*	98*	10*	4.1	<2.5
MW-63	<1	<1	4.1**	12**	4.3*	12*	7*	4*	14*	<0.5	<0.5
MW-64	150	130	233**	115**	14	15*	5*	2	18*	1.7	<0.5
MW-65A	680	150	25.3**	413**	10.6*	3*	4*	<1*	7*	<0.5	<0.5
MW-66	<1	<1	3.3**	8**	12.1*	3*	<3*	8*	13*	<0.5	<0.5
MW-67	280	320	4.3*	103**	2.6*	8*	7*	7*	<0.5	<0.5	<0.5
MW-68	240	1900	1865**	160**	2208.2**	376*	1890*	150	374*	3000	120
MW-70	<1	<1	1.7**	<1	10.7*	<3*	9*	<1*	25*	<0.5	<0.5
MW-71	NI	NI	NI	NI	NI	NI	NI	NI	8*	<0.5	<0.5
MW-72	NI	NI	NI	NI	NI	NI	NI	NI	FP	FP	<2.5
SW-1	<1	<1	5*	17.5*	15.7*	6*	<1	<1	<0.5	<0.5	<0.5
SW-2	<1	<1	7.9*	7*	69.4*	47*	4	NS	NS	NS	NS
Max. Conc.	2200	1900	1865	948	2208	585	2821	2821	2821	3000	120

* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.

FP = Free Product (Condensate)
NS = Not Sampled
NI = Not Installed

TABLE 4
HISTORICAL SUMMARY OF BENZENE IN SHALLOW ZONE GROUNDWATER
SECOND QUARTER 1994

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise										
WELL	SEP 1991	DEC 1991	APR 1992	JUL 1992	OCT 1992	JAN 1993	APR 1993	JUL 1993	OCT 1993	JAN 1994	APR 1994
MW-1 (BH-14)	250	200	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-2 (BH-23)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-3 (BH-24)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-4 (BH-26)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-5 (BH-28)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-6 (BH-29)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-7 (BH-30)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-8 (BH-31)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-9 (BH-32)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-10 (BH-33)	2300	2300	1780**	1842**	2100	NS	NS	DRY	DRY	BD	DRY
MW-11 (BH-34)	3000	3800	3087**	2199**	2942*	2746*	FP	FP	FP	FP	FP
MW-12 (BH35)	3800	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-13 (BH-36)	3100	3000	3492**	2708**	NS	NS	PUMP	PUMP	PUMP	PUMP	PUMP
MW-14 (BH-37)	5100**	NS	NS	NS	NS	NS	PUMP	PUMP	FP	FP	NS
MW-15 (BH-38)	5100	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-16 (BH-39)	1700	NS	NS	NS	NS	NS	514*	DRY	DRY	DRY	NS
MW-17 (BH-40)	2000	NS	NS	NS	NS	NS	1500	DRY	BD	NS	NS
MW-18 (BH-41)	4300	NS	2639**	2700	3300	NS	NS	DRY	VE	VE	VE
MW-19 (BH-42)	4700	NS	3195**	3000	3032*	NS	3926*	DRY	VE	VE	VE
MW-20 (BH-43)	110	NS	NS	NS	NS	NS	NS	DRY	VE	VE	VE
MW-21 (BH-44)	1000	1100	NS	NS	NS	NS	114*	FP	NS	DRY	NS
MW-22 (BH-45)	4	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-23 (BH-46)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-24 (BH-47)	3400	NS	NS	4353**	NS	NS	NS	DRY	DRY	DRY	DRY
MW-25 (BH-48)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-26 (BH-49)	3100	3000	NS	2000	1992*	1708*	861*	FP	FP	FP	NS
MW-27 (BH-50)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-28 (BH-52)	2200	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-29 (BH-53)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-30 (BH-54)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-31 (BH-55)	<1	NS	NS	332**	9*	NS	NS	DRY	DRY	NS	NS
MW-32 (BH-56)	200	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-33 (BH-57)	6300	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-34 (BH-58)	2500	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-35 (BH-59)	5700	NS	NS	NS	NS	NS	NS	FP	FP	FP	NS
MW-36 (BH-21)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-37 (BH-60)	150	NS	NS	NS	NS	NS	NS	27*	BD	NS	NS
MW-38 (BH-61)	15	15	51**	37*	166**	NS	NS	DRY	BD	NS	DRY
MW-39 (BH-62)	880	NS	NS	NS	NS	14	29*	24*	BD	<2.5	<0.5
MW-40 (BH-63)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-41 (BH-64)	200	170	NS	NS	NS	NS	NS	22*	BD	5.3	0.6
MW-42 (BH-65)	<1	<1	NS	NS	NS	NS	NS	NS	BD	NS	NS
MW-43 (BH-66)	320	NS	NS	NS	NS	NS	NS	25*	BD	<0.5	<0.5
MW-44 (BH-67)	59	NS	10**	97**	12	14	7*	6*	3*	12	22
MW-45 (BH-68)	<1	<1	NS	NS	NS	NS	NS	<3*	<3*	<0.5	<0.5
MW-46 (BH-69)	140	25	NS	NS	NS	NS	NS	NS	BD	NS	NS
MW-47 (BH-70)	2600	2200	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-48 (BH-71)	<1	<1	NS	47**	NS	NS	NS	DRY	DRY	DRY	DRY
MW-49 (BH-72)	35	NS	NS	NS	NS	NS	NS	210*	68*	13	82
MW-50 (BH-73)	<1	<1	4**	4**	8*	8*	<1	<3*	9*	<0.5	<0.5
MW-51 (BH-74)	800	<1	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS
MW-52 (BH-75)	<1	NS	NS	5**	NS	NS	NS	DRY	DRY	DRY	DRY
MW-53 (BH-77)	<1	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY
MW-54 (BH-80)	<1	<1	9**	8**	62*	14*	10*	<3*	17*	8.6	<0.5
MW-55 (BH-81)	940	400	296**	483**	215*	390	412*	625*	581*	290	370
MW-56 (BH-82)	2200	1000	NS	1114**	1026*	1128*	VE	DRY	DRY	DRY	DRY
MW-61 (BH-87)	<1	NS	NS	NS	NS	NS	NS	NS	NS	1.4	<0.5
MW-65 (BH-91)	<1	NS	NS	NS	NS	NS	NS	<3*	BD	DRY	DRY
MW-69 (BH-95)	2400	2100	NS	568*	1598*	1284*	FP	FP	FP/PUMP	FP/PUMP	FP/PUMP
SUMP A-10	FP	FP	FP	FP	FP	FP	FP	DRY	DRY	DRY	DRY
SUMP A-11	1400	2900	3033**	1258**	2815*	NS	NS	DRY	DRY	DRY	NS
SUMP A-16	240	2000	1233**	1495**	632*	741**	707*	DRY	DRY	DRY	DRY
Lyman well										<0.5	<0.5
U. Indian Hills Spring W.	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5

Bolded Italicized well numbers = Designated wells for quarterly sampling in Marathon Treatment Plan (March 1992)

DRY = Dry well
BD = Bailed Dry - No Recovery
* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.

FP = Free Product (condensate)
NS = Not Sampled.
VE = Vapor Extraction well

2QTABLE4.XLS

TABLE 5
RANCHER WELL GROUNDWATER AND NATURAL SPRING WATER SAMPLE RESULTS
SECOND QUARTER 1994

		1994														
	Probable	Apr-5					May-19					Jun-23				
WELL/ SPRING	Aquifer	Benzene	Toluene	Ethylbenzene	Xylene	Chloride	Benzene	Toluene	Ethylbenzene	Xylene	Chloride	Benzene	Toluene	Ethylbenzene	Xylene	Chloride
Lyman	Shallow Alluvial	ND	ND	ND	ND	12.5	ND	ND	ND	ND	12.1	ND	ND	ND	ND	12
Upper Indian Hills Spring West	Shallow Alluvial	ND	ND	ND	ND	14	ND	ND	ND	ND	12.2	ND	ND	ND	ND	13
Biebelle	Seven Rivers	ND	ND	ND	ND	10.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Benzene, Toluene, Ethylbenzene, and total Xylene concentration in ug/L.

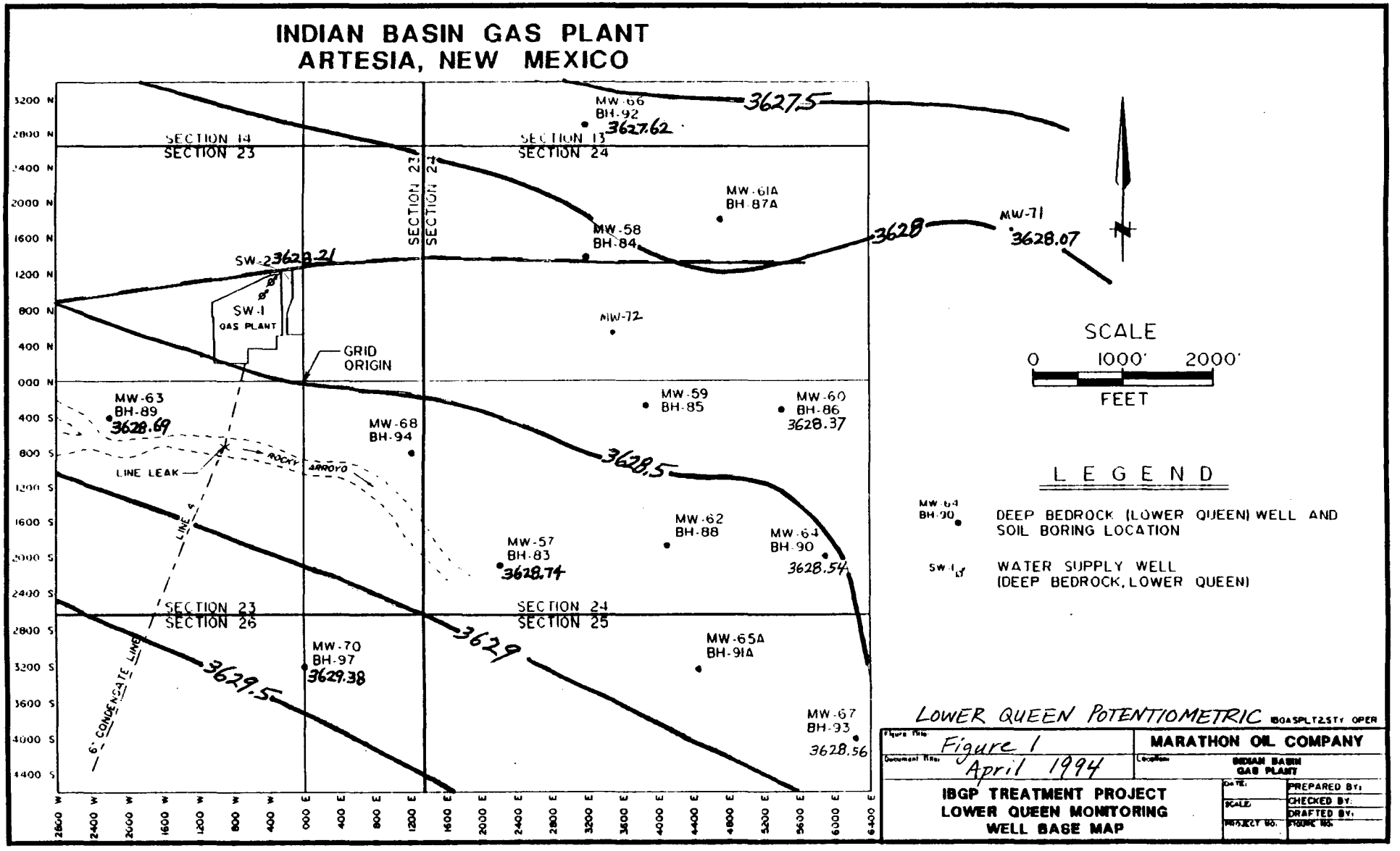
Chloride concentration in mg/L.

ND = Not Detected at method detection limit of 0.5 ug/L.

NS = Not Sampled.

FIGURES

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO



SCALE

0 1000' 2000'

FEET

LEGEND

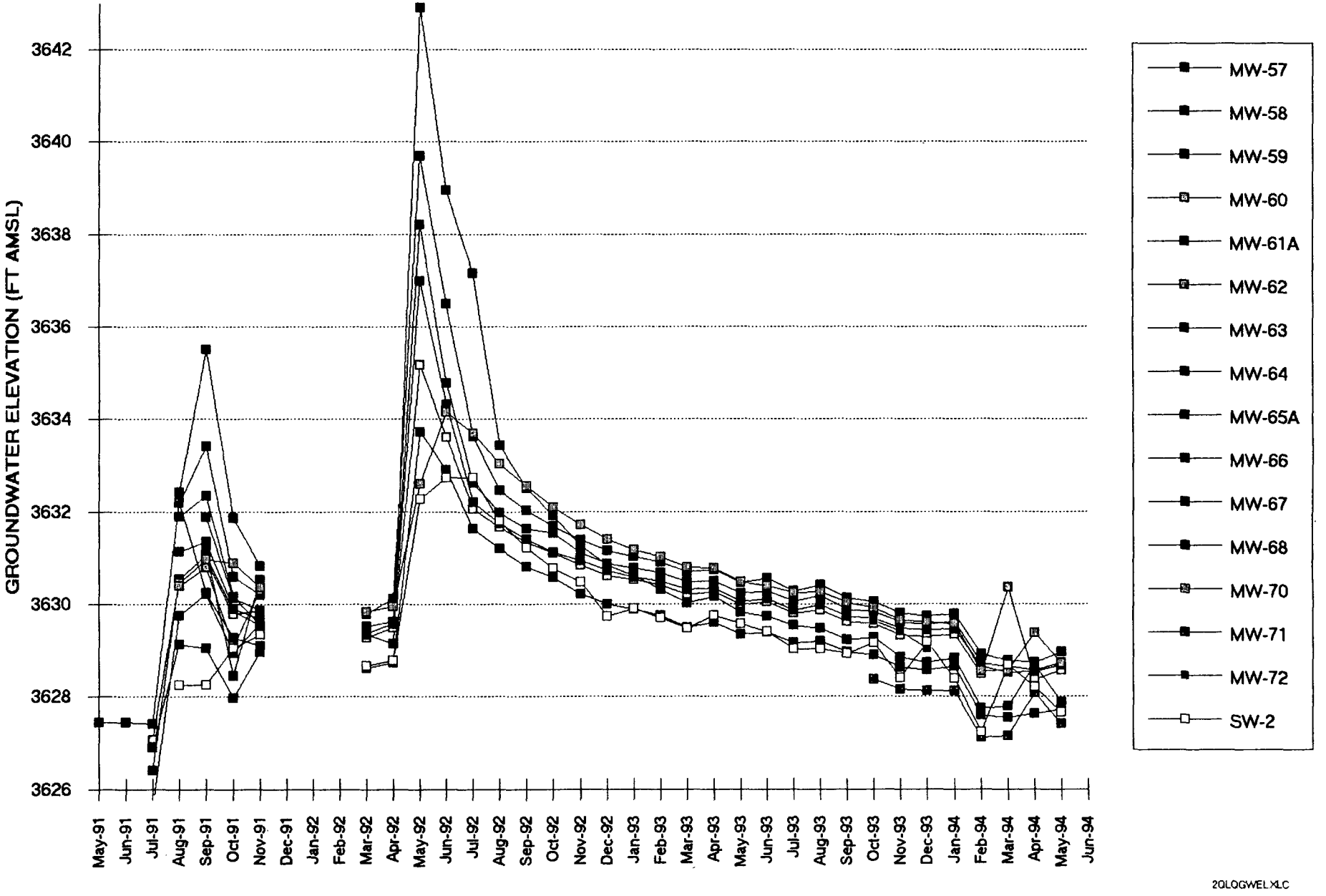
MW-64 BH-90 — DEEP BEDROCK (LOWER QUEEN) WELL AND SOIL BORING LOCATION

SW-1 (LQ) — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

LOWER QUEEN POTENTIOMETRIC (BOASPLT2ST1 OPER)

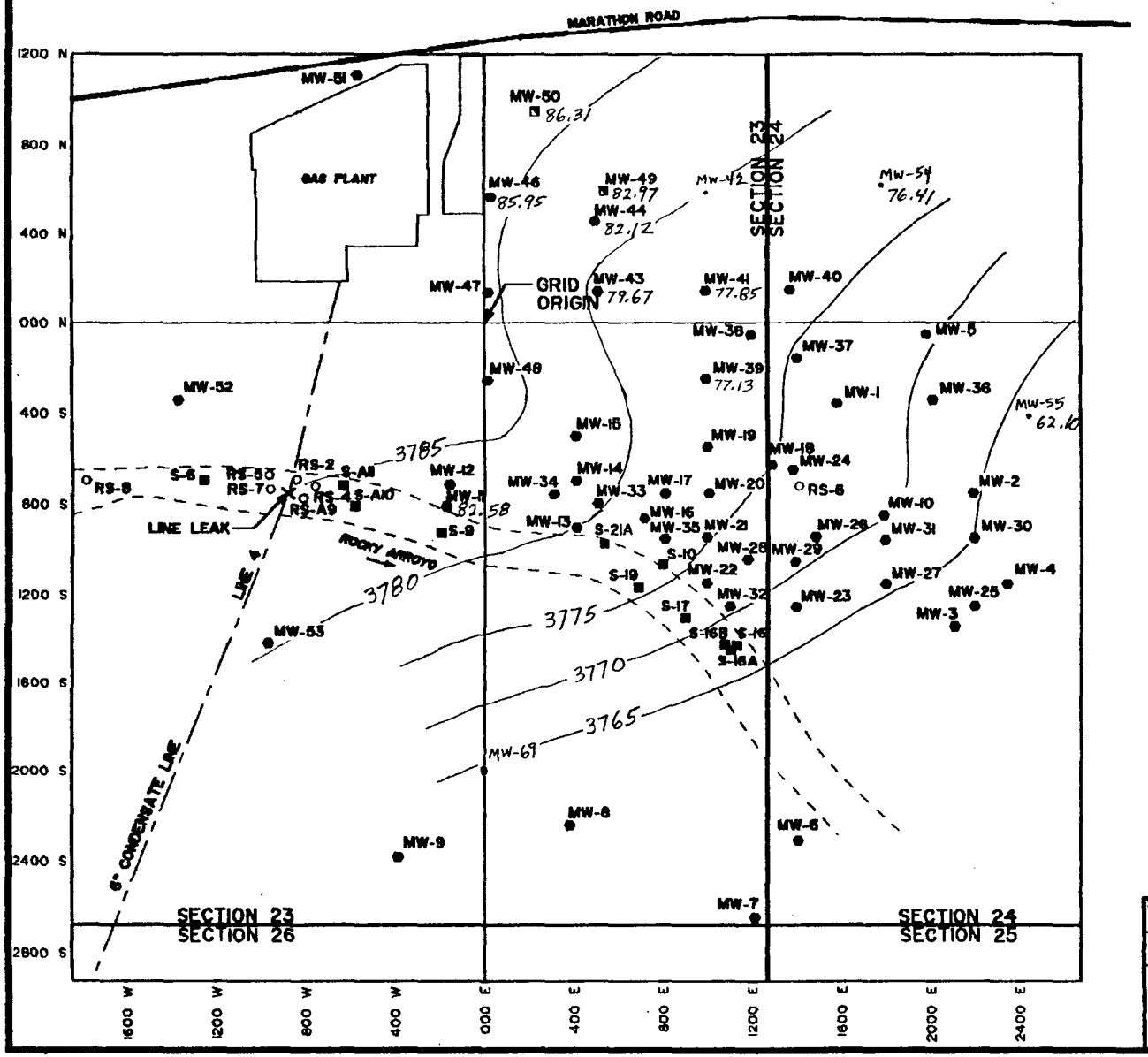
Figure Title: Figure 1	MARATHON OIL COMPANY
Document Title: April 1994	Location: INDIAN BASIN GAS PLANT
IBGP TREATMENT PROJECT LOWER QUEEN MONITORING WELL BASE MAP	Date: PREPARED BY: Scale: CHECKED BY: Project No.: DRAFTED BY: FIGURE NO.

FIGURE 2. LOWER QUEEN GROUNDWATER ELEVATION VS. TIME



2QLOGWEL.XLC

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO



SCALE

0 — 1000' — 2000'

FEET

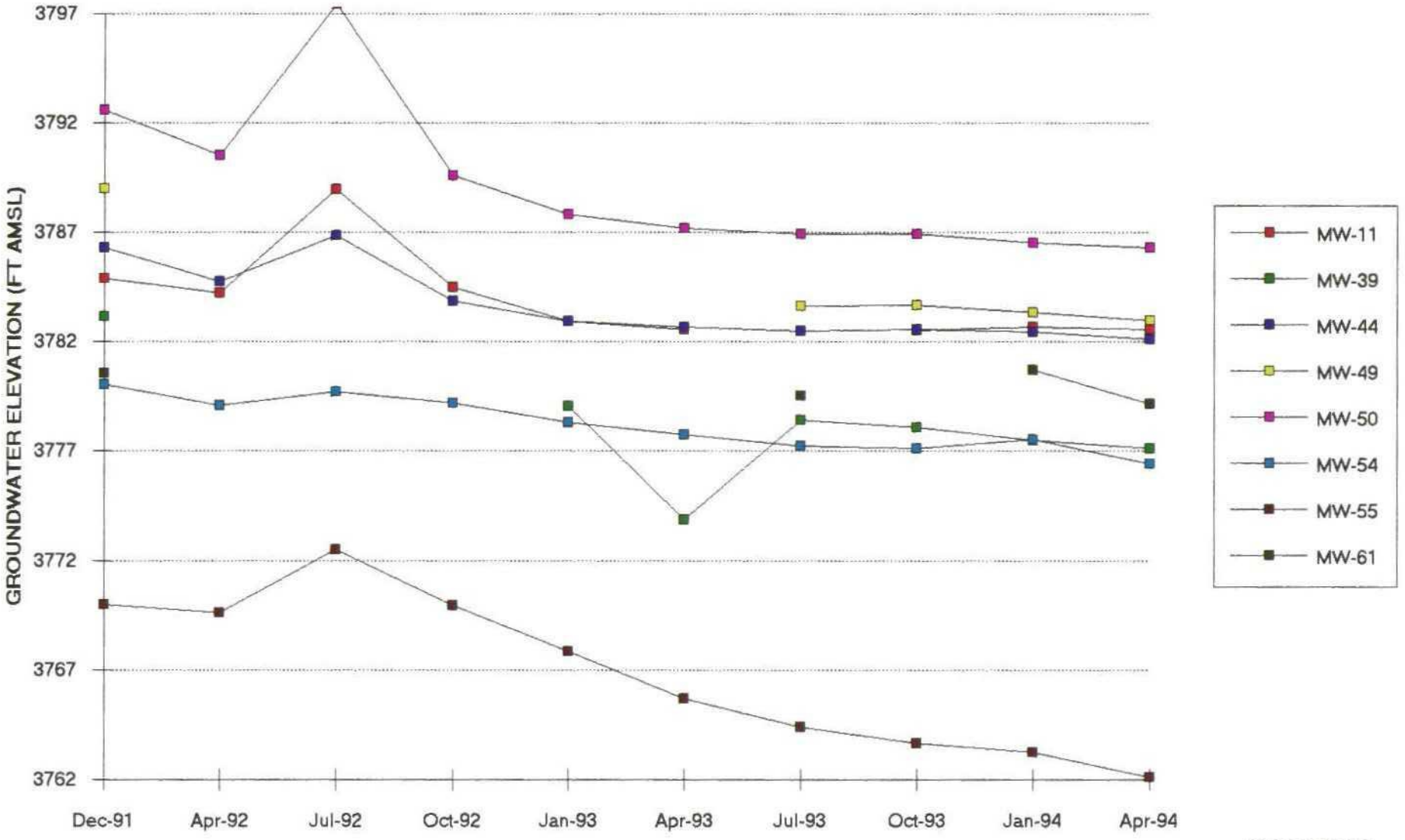
LEGEND

- MW-9 ● SHALLOW ALLUVIAL GROUNDWATER MONITORING WELL
- RS-4 ○ 4 INCH PVC RECOVERY SUMP
- S-19 ■ 24 INCH GALVANIZED RECOVERY SUMP

BGASPLT.STY OPER

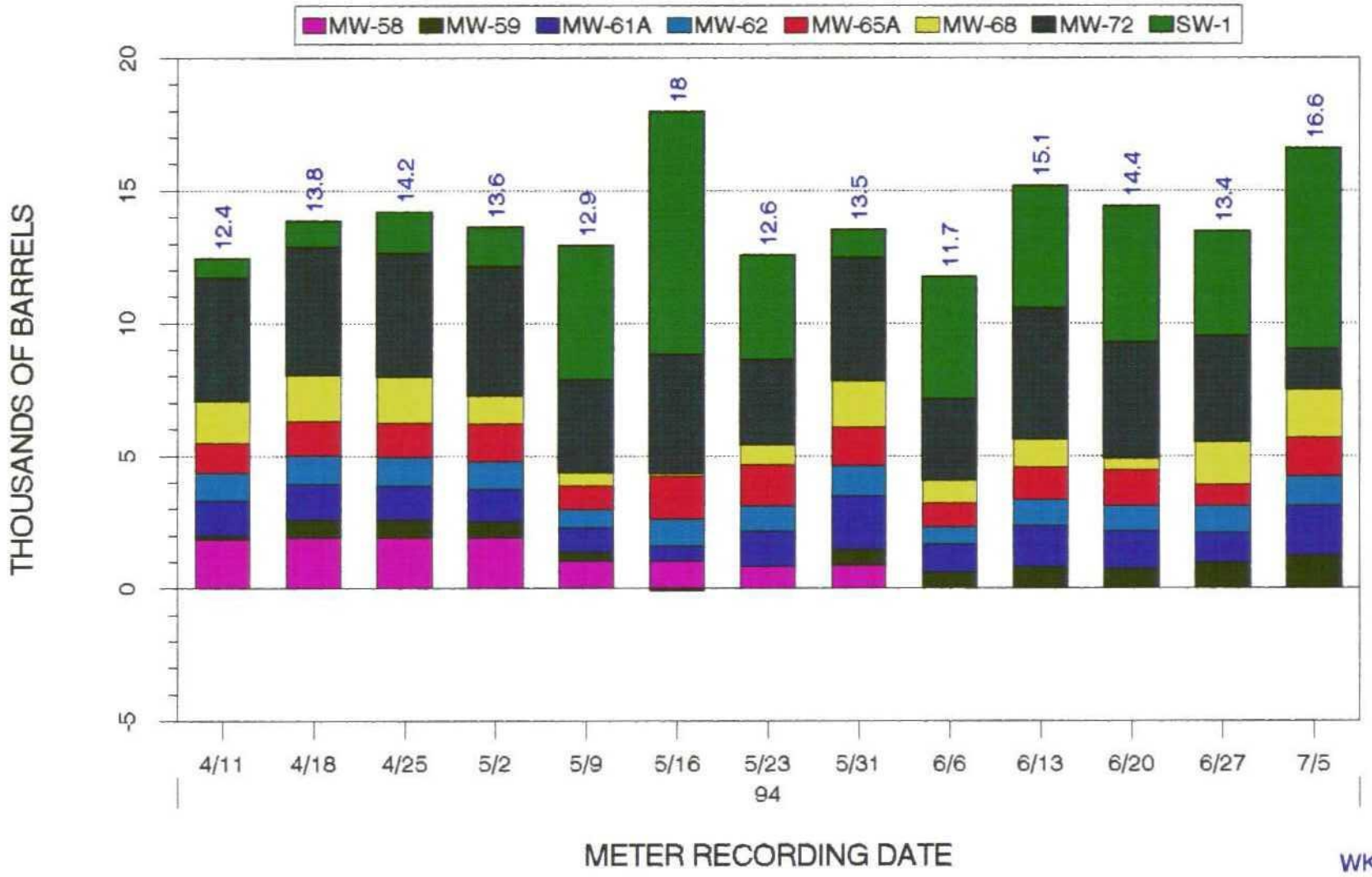
Figure Title: Figure 3	MARARTHON OIL COMPANY
Document Title: April 1994	Location: INDIAN BASIN GAS PLANT
Shallow zone Potentiometric Surface	DATE: / SCALE: / PROJECT NO: / PREPARED BY: / CHECKED BY: / DRAFTED BY: / FIGURE NO:

FIGURE 4. SHALLOW ZONE GROUNDWATER ELEVATION VS. TIME



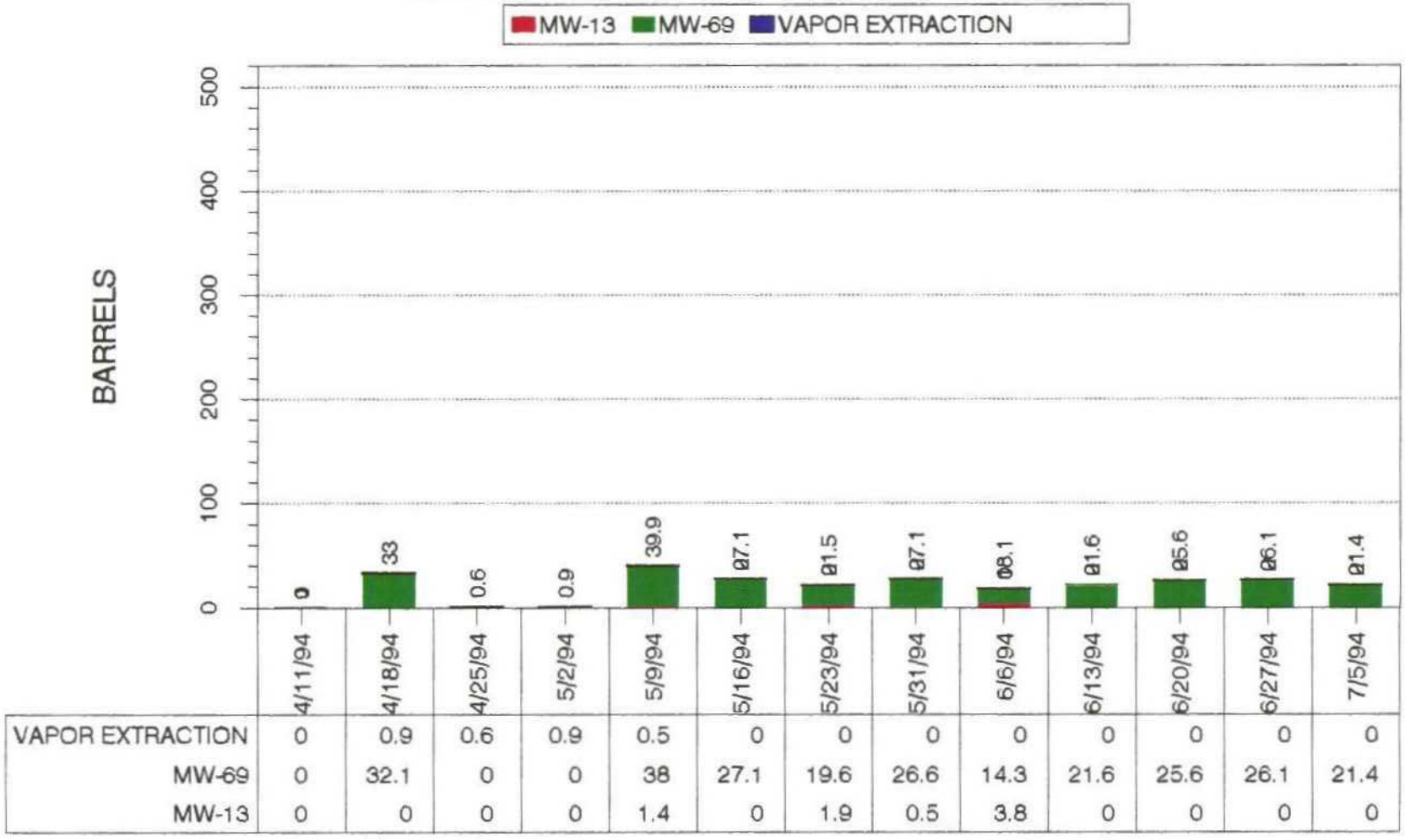
2QSZELTM.XLC

FIGURE 5
WEEKLY LOWER QUEEN FLUID RECOVERY
SECOND QUARTER 1994



WKLQREC2Q

FIGURE 6
WEEKLY SHALLOW FLUID RECOVERY
SECOND QUARTER 1994

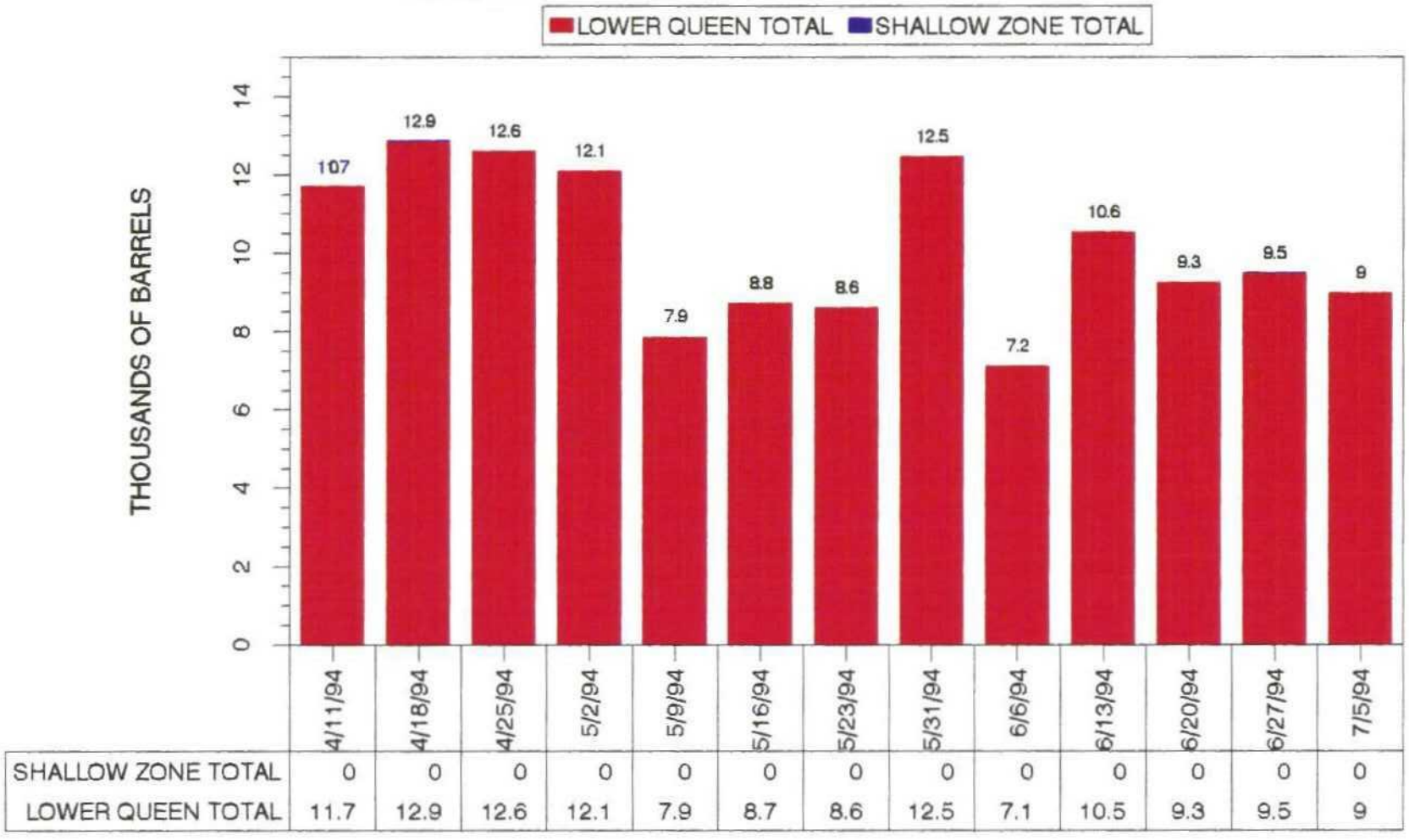


	4/11/94	4/18/94	4/25/94	5/2/94	5/9/94	5/16/94	5/23/94	5/31/94	6/6/94	6/13/94	6/20/94	6/27/94	7/5/94
VAPOR EXTRACTION	0	0.9	0.6	0.9	0.5	0	0	0	0	0	0	0	0
MW-69	0	32.1	0	0	38	27.1	19.6	26.6	14.3	21.6	25.6	26.1	21.4
MW-13	0	0	0	0	1.4	0	1.9	0.5	3.8	0	0	0	0

METER RECORDING DATE

WKSHREC2Q

FIGURE 7
WEEKLY TOTAL FLUID RECOVERY
SECOND QUARTER 1994



WKREC2Q

APPENDIX A

APRIL 1994 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY

1994

FIELD GAUGE AND PURGE RECORD

INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY

CARLSBAD, NEW MEXICO

Well No.	Well Depth	Static Water Level Depth & Meas. Tech.	Sample Collection		HC Vapor Conc.	H2S Vapor Conc.	Field Observations/Comments
			Date	Time			
3	16.90'	17.0'	4/4/94	1619	0	0	Dry
5	*13.07'	Dry NA	4/4/94	1550	0	0	No Sample *12.77' listed depth
6	*14.28'	14.28'	4/4/94	1711	0	0	Water in bottom cap <0.01'. *13.66' listed depth
7	*17.45'	17.45'	4/4/94	1707			Water in bottom cap <0.01'. *17.01' listed depth
8	*17.40'	17.40'	4/4/94	1703	0	0	Water in bottom cap <0.01'. *16.97 listed depth
9	*13.83'	13.83'	4/4/94	1655	0	0	Water in bottom cap <0.01'. *13.65 listed depth
10	*18.31'	18.31'	4/4/94	1615	30ppm	0	Water in bottom cap <0.01'. *19.08' listed depth
11	24.85'	24.38'	4/4/94	1522	110 static ppm	0	24.34' LNAPL Depth. No Sample - product in well
29	14.76'	Dry NA	4/4/94	1600	0	0	No Sample
32	*15.82'	15.82'	4/4/94	1640	0	0	Water in bottom cap <0.01'. *16.77' listed depth
38	20.57'	Dry NA	4/4/94	1510	0	0	No Sample
47	21.79'	Dry NA	4/4/94	1430	60 ppm	0	No Sample
48	19.98'	19.88'	4/4/94	1436	0	0	No Sample. Approx. 1" water in bottom cap - not able to purge.
52	21.44'	Dry NA	4/4/94	1442	0	0	No Sample
53	*15.28'	15.28'	4/4/94	1720			Water in bottom cap < 0.01'. *15.32' listed depth

1994
FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY

CARLSBAD, NEW MEXICO

Well No.	Well Depth	Static Water Level Depth & Meas. Tech.	Sample Collection		HC Vapor Conc.	H2S Vapor Conc.	Field Observations/Comments
			Date	Time			
56	*43.72'	43.72'	4/4/94	1623	50 ppm	1	Water in bottom cap < 0.01'. *43.76' listed depth
65	57.69'	57.56'	4/6/94	0838	0	0	No sample collected due to limited volume of water in well bore
69	51.27'	N/A			125 ppm	0	Pump in well - sample not collected
Sump 16A			4/4/94	1645	5 ppm	0	Dry - not able to remove locking top plate
SW-2	292'	EIP 180.58'	4/4/94	1145	11 ppm	0	EIP - No Sample Collected
Sump A10	N/A				0	0	Locked - unable to gauge. Dropped rock in sump - no splash
13	22.07'						Not gauged - pump in well

1994
FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY

CARLSBAD, NEW MEXICO

Well No.	Well Depth	Static Water Level Depth & Meas. Tech.	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection		HC Vapor Conc.	H2S Vapor Conc.	Parameters					Field Observations/Comments
				Method	Rates	Volume			Date	Time			Time	Degree C / Degree F Temp.	Micro Mhos Spec. Cond.	pH	mg/l Diss. O2	
24	14.09'	13.29' 4/4/94 1540	NA	PVC Bailer		~ 0.1 gal			4/6/94	0930	18 ppm	0						No sample - approx 1" water in bottom cap
46	20.24'	19.59' 4/4/94 1426; Dry 4/6/94 1345		PVC Bailer 4/6/94		> 0.1 gal			None		0	0						No sample
39	20.54'	19.07' 4/4/94 1512 20.70' 4/6/94 1915		PVC Bailer		1 gal		Teflon bailer	4/6/94	1920	0	0						Sample after 7 hour recovery from purging during sampling period 7/10/94
41	24.04'	21.19' 4/6/94 0829		PVC Bailer		5 gal			4/6/94	1900	190 ppm	0						
43	24.55	22.38' 4/6/94 0825		PVC Bailer		2 gal		Teflon bailer	4/6/94	1530	0	0						Water gray color - HC odor. After recovery (~ 6 hrs) water level back to 22.23' 93.5% recovery
44	25.24'	22.02' 4/4/94 1456		PVC Bailer		6 gal		Teflon bailer	4/6/94	1610	0	0						Bail dry 1050 - 4/6/94, 1607 4/6/94 gauge DTW 21.23' 80.3% recovery

1994
FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY

CARLSBAD, NEW MEXICO

Well No.	Well Depth	Static Water Level Depth & Meas. Tech.	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection		HC Vapor Conc.	H2S Vapor Conc.	Parameters					Field Observations/Comments
				Method	Rates	Volume			Date	Time			Time	Degree C / Degree F Temp.	Micro Mhos Spec. Cond.	pH	mg/l Diss. O2	
45	26.62'	22.64' 4/4/94 1415	NA	PVC Bailer	NA	2.5 gal		Teflon bailer	4/6/94	2045	6 ppm	0						
49	25.91'	22.64' 4/4/94 1500 23.65' 4/6/94 1837	NA	PVC Bailer	NA	2 gal			4/6/94	1840	0	0						Bailed dry 1155 - 4/6/94, Sample at ~1840 with 69% recovery
50	37.15'	27.04' 4/4/94 1422 32.4' 4/6/94 2010	NA	PVC Bailer	NA	6.5 gal		Teflon bailer	4/6/94	2015	0	0						Sample groundwater approx. 7 hour after purging. 47% recovery
54	78.15'	47.45' 4/4/94 1332	NA	Redi-flow Pump	2 gpm for 6 min - 381 HZ/1 gpm for 22 min - 230 HZ	32 gal.	70 ' initially (pumped dry) 74' final	Teflon bailer	4/8/94	1102	0	0	0754					Water slightly murky. Very slow recharge - each time purge dry. After purge DTW 61.2' @ 1100 4-8-94
													0756	18/62.7	2620	6.92	2.2	
													0809	19/69.1	2490	6.9	1.3	
													Break Dry					
													0823					
													0825	19/66.7	2530	6.9	1.5	
													0830	20/68.7	2390	6.88	2.6	
													0835	- Dry				

1994
FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY

CARLSBAD, NEW MEXICO

Well No.	Well Depth	Static Water Level Depth & Meas. Tech.	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection		HC Vapor Conc.	H2S Vapor Conc.	Parameters					Field Observations/Comments
				Method	Rates	Volume			Date	Time			Time	Degree C / Degree F Temp.	Micro Mhos Spec. Cond.	pH	mg/l Diss. O2	
55	66.32'	32.30' DTW WLI 4/4/94 1320	NA	Redi-flow Pump	1 gpm / 99 HZ	44 gal	60'	Redi-flow pump	4/8/94	1025	0	0	0938					DO stabilized for sample collection. Water gray, cloudy, with oil odor
													0945	22/72.7	1810	6.86	1.25	
													0954	21.2/73.4	1860	6.83	1.5	
													1003	21/73.8	1880	6.88	1.3	
													1014	21/72.6	1870	6.84	1.25	
													1024	22/74.4	1890	6.85	1.3	
57	179.3'	158.96' 4/7/94 1300	NA	Redi-flow Pump	1 gpm	40 gal	175'	Redi-flow pump	4/7/94	1645	< 20 ppm meter pegged	0	1600					
													1605	23/75.4	523	7.17	1.5	
													1615	22/73.3	521	7.14	1.2	
													1625	22/71.4	553	7.0	1.0	
													1640	22.3/71.8	551	6.9	1.8	
60	226.08'	186.91' 4/4/94 1220	NA	Redi-flow Pump	1 gpm / 383 HZ	80 gal	200'	Redi-flow pump	4/7/94	1245	0	0	1155	22/74.3	649	7.06	2.5	
													1205	22/73.9	701	6.95	2.0	
													1215	23/77.4	719	7.02	1.8	
													1225	23/78.1	683	6.92	2.2	
													1235	23.2/78.6	665	6.94	2.1	
													1245	23.6/77.4	665	7.2	2.0	

1994
FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY

CARLSBAD, NEW MEXICO

Well No.	Well Depth	Static Water Level Depth & Meas. Tech.	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection		HC Vapor Conc.	H2S Vapor Conc.	Parameters					Field Observations/Comments
				Method	Rates	Volume			Date	Time			Time	Degree C / Degree F Temp.	Micro Mhos Spec. Cond.	pH	mg/l Diss. O2	
61	57.97'	37.04' 4/4/94 1325, 48.25' 4/7/94 1831	NA	Redi-flow Pump	1.33 GPM/ 243 HZ	31 gal	50'	Redi-flow pump	4/7/94	1845	0	0						After pumped well dry at 50' lower pump and sample. Purge water clear with H2S smell.
													1754					
													1800	22/71.9	3070	6.03	0.9	
													1815	21/70.1	3130	6.14	0.9	
													1825	21/70.6	3140	6.2	0.9	
													1831	Pump stops				
													Lower pump 4'					
63	221.68'	197.47' 4/4/94 1130 EIP	NA	Redi-flow Pump	2 gpm	45 gal	215'	Redi-flow pump	4/6/94	1415	0	0		20 Deg. C	416	7.39	4.2	
64	200.0'	170.03' 4/4/94 1235	NA	Redi-flow Pump	2 gpm	70 gal	190'	Redi-flow pump	4/7/94	0800	70 ppm	0						
													0723	20/65.3	680	6.99	1.3	
													0728	19/65.2	677	7.08	1.4	
													0733	19/64.9	676	6.95	1.4	
													0738	19/64.2	662	7.2	1.3	
													0743	18/63.3	660	7.09	2.3	
													0748	19/63.7	655	7.2	1.6	
													0753	19/64	652	7.3	1.6	
													0758	19/63.7	645	7.42	1.5	

1994

FIELD GAUGE AND PURGE RECORD

INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY

CARLSBAD, NEW MEXICO

Well No.	Well Depth	Static Water Level Depth & Meas. Tech.	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection		HC Vapor Conc.	H2S Vapor Conc.	Parameters					Field Observations/Comments
				Method	Rates	Volume			Date	Time			Time	Degree C / Degree F Temp.	Micro Mhos Spec. Cond.	pH	mg/l Diss. O2	
66	237.86'	201.36' 4/4/94 1208	NA	Redi-flow Pump	2.2 gpm	80 gal	215'	Redi-flow Pump	4/6/94	1040	0	0						
													0950	19/66.5	677	7.26	1.8	
													1000	20/69.7	683	7.16	1.8	
													1010	20/74.8	717	7.21	1.8	
													1020	21/74	687	7.15	1.8	
													1030	21/77.3	711	6.93	1.8	
67	168.54'	137.31' 4/4/94 1246		Redi-flow Pump	2 gpm / 383 HZ	60 gal	145'	Redi-flow pump	4/7/94	1450	64 ppm	0						
													1410					
													1420	22/75.6	428	7.2	1.2	
													1430	23/74	457	7.15	1.0	
													1440	22/72.8	469	7.23	1.0	
70	228.14'	193.19' 4/4/94 1115 EIP	NA	Redi-flow Pump	1 gpm	65 gal	215'	Redi-flow pump	4/6/94	1115	0	0		17 deg C	423	7.12	4.2	Slow purge rate
71	235.41'	149.98' 4/4/94 1158	NA	Redi-flow Pump	1.8 gpm	170 gal	215'	Redi-flow pump	4/6/94	1905	0	0						Silts & clays in bottom of well @ 233' - 225'
													1730	72.2	908	7.0	0.9	
													1845	66.9	901	7.19	2.3	
													1850	66.2	879	7.43	1.5	
													1855	68.0	904	7.27	1.3	
													1900	68.4	911	7.35	1.25	

APPENDIX B

APRIL 1994 LABORATORY RESULTS - GROUNDWATER

AND

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **404345**

May 2, 1994

Marathon Oil Company
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: INDIAN BASIN REMED. 44999

Attention: Robert Menzie

On **04/11/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

EPA Method 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jd

Enclosure

1994

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.
ATI I.D. : 404345

DATE RECEIVED : 04/11/94
REPORT DATE : 05/02/94

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	AIR STRIPPER OUTLET	AQUEOUS	04/05/94
02	AIR STRIPPER INLET	AQUEOUS	04/05/94
03	SW-1	AQUEOUS	04/05/94
04	LYMAN	AQUEOUS	04/05/94
05	BIEBBLE	AQUEOUS	04/05/94
06	ARROYO	AQUEOUS	04/05/94
07	MW-61A	AQUEOUS	04/05/94
08	MW-58	AQUEOUS	04/05/94
09	MW-72	AQUEOUS	04/05/94
10	MW-59	AQUEOUS	04/05/94
11	MW-62	AQUEOUS	04/05/94
12	MW-65A	AQUEOUS	04/05/94
13	MW-68	AQUEOUS	04/05/94
14	MW-70	AQUEOUS	04/06/94
15	MW-71	AQUEOUS	04/06/94
16	INITIAL	AQUEOUS	04/05/94
17	E.B. #1	AQUEOUS	04/06/94
18	E.B. #2	AQUEOUS	04/06/94
19	E.B. #3	AQUEOUS	04/06/94
20	E.B. #4	AQUEOUS	04/07/94
21	MW-66	AQUEOUS	04/07/94
22	E.B. #5	AQUEOUS	04/07/94
23	MW-60	AQUEOUS	04/07/94
24	E.B. #6	AQUEOUS	04/07/94
25	MW-67	AQUEOUS	04/07/94
26	E.B. #7	AQUEOUS	04/07/94
27	MW-57	AQUEOUS	04/07/94
28	E.B. #8	AQUEOUS	04/07/94
29	MW-61	AQUEOUS	04/07/94
30	E.B. #9	AQUEOUS	04/07/94
31	MW-39	AQUEOUS	04/06/94
32	MW-41	AQUEOUS	04/06/94
33	MW-43	AQUEOUS	04/06/94
34	MW-44	AQUEOUS	04/06/94
35	MW-45	AQUEOUS	04/06/94
36	MW-49	AQUEOUS	04/06/94
37	MW-50	AQUEOUS	04/06/94
38	MW-63	AQUEOUS	04/05/94

(CONTINUED NEXT PAGE)

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.
ATI I.D. : 404345

DATE RECEIVED : 04/11/94
REPORT DATE : 05/02/94

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
39	MW-64	AQUEOUS	04/06/94
40	MW-54	AQUEOUS	04/08/94
41	E.B. #10	AQUEOUS	04/08/94
42	MW-55	AQUEOUS	04/08/94
43	TRIP BLANK	AQUEOUS	03/29/94

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	43

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	AIR STRIPPER OUTLET	AQUEOUS	04/05/94	NA	04/14/94	1
02	AIR STRIPPER INLET	AQUEOUS	04/05/94	NA	04/14/94	5
03	SW-1	AQUEOUS	04/05/94	NA	04/14/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	13	<0.5
TOLUENE	UG/L	<0.5	4.9	<0.5
ETHYLBENZENE	UG/L	0.6	7.5	<0.5
TOTAL XYLENES	UG/L	3.1	140	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		116	99	96

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	LYMAN	AQUEOUS	04/05/94	NA	04/14/94	1
05	BIEBBLE	AQUEOUS	04/05/94	NA	04/14/94	1
06	ARROYO	AQUEOUS	04/05/94	NA	04/14/94	1

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		92	88	94

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
07	MW-61A	AQUEOUS	04/05/94	NA	04/14/94	1
08	MW-58	AQUEOUS	04/05/94	NA	04/14/94	5
09	MW-72	AQUEOUS	04/05/94	NA	04/14/94	5

PARAMETER	UNITS	07	08	09
BENZENE	UG/L	<0.5	<2.5	<2.5
TOLUENE	UG/L	<0.5	<2.5	<2.5
ETHYLBENZENE	UG/L	0.5	7.4	4.7
TOTAL XYLENES	UG/L	3.8	27	15
SURROGATE:				
BROMOFLUOROBENZENE (%)		86	79	87

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
10	MW-59	AQUEOUS	04/05/94	NA	04/14/94	5
11	MW-62	AQUEOUS	04/05/94	NA	04/14/94	5
12	MW-65A	AQUEOUS	04/05/94	NA	04/14/94	1

PARAMETER	UNITS	10	11	12
BENZENE	UG/L	<2.5	<2.5	<0.5
TOLUENE	UG/L	<2.5	<2.5	<0.5
ETHYLBENZENE	UG/L	3.3	4.4	<0.5
TOTAL XYLENES	UG/L	25	26	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		90	89	95

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
13	MW-68	AQUEOUS	04/05/94	NA	04/14/94	25
14	MW-70	AQUEOUS	04/06/94	NA	04/14/94	1
15	MW-71	AQUEOUS	04/06/94	NA	04/14/94	1

PARAMETER	UNITS	13	14	15
BENZENE	UG/L	120	<0.5	<0.5
TOLUENE	UG/L	61	<0.5	<0.5
ETHYLBENZENE	UG/L	170	<0.5	<0.5
TOTAL XYLENES	UG/L	1300	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		93	99	97

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
16	INITIAL	AQUEOUS	04/05/94	NA	04/14/94	1
21	MW-66	AQUEOUS	04/07/94	NA	04/14/94	1
23	MW-60	AQUEOUS	04/07/94	NA	04/14/94	1

PARAMETER	UNITS	16	21	23
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		92	92	94

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
25	MW-67	AQUEOUS	04/07/94	NA	04/15/94	1
27	MW-57	AQUEOUS	04/07/94	NA	04/15/94	1
28	E.B. #8	AQUEOUS	04/07/94	NA	04/15/94	1

PARAMETER	UNITS	25	27	28
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	1.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		90	67	99

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
29	MW-61	AQUEOUS	04/07/94	NA	04/15/94	1
31	MW-39	AQUEOUS	04/06/94	NA	04/15/94	1
32	MW-41	AQUEOUS	04/06/94	NA	04/16/94	1

PARAMETER	UNITS	29	31	32
BENZENE	UG/L	<0.5	<0.5	0.6
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	0.5	4	3.8
TOTAL XYLENES	UG/L	<0.5	38	7.4
SURROGATE:				
BROMOFLUOROBENZENE (%)		90	113	77

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
33	MW-43	AQUEOUS	04/06/94	NA	04/16/94	1
34	MW-44	AQUEOUS	04/06/94	NA	04/16/94	5
35	MW-45	AQUEOUS	04/06/94	NA	04/16/94	1

PARAMETER	UNITS	33	34	35
BENZENE	UG/L	<0.5	22	<0.5
TOLUENE	UG/L	<0.5	<2.5	<0.5
ETHYLBENZENE	UG/L	1.2	3.3	<0.5
TOTAL XYLENES	UG/L	14	11	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		113	75	99

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
36	MW-49	AQUEOUS	04/06/94	NA	04/16/94	1
37	MW-50	AQUEOUS	04/06/94	NA	04/16/94	1
38	MW-63	AQUEOUS	04/05/94	NA	04/16/94	1

PARAMETER	UNITS	36	37	38
BENZENE	UG/L	82	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	11	<0.5	<0.5
TOTAL XYLENES	UG/L	10	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		80	100	98

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
39	MW-64	AQUEOUS	04/06/94	NA	04/16/94	1
40	MW-54	AQUEOUS	04/08/94	NA	04/16/94	1
42	MW-55	AQUEOUS	04/08/94	NA	04/17/94	5

PARAMETER	UNITS	39	40	42
BENZENE	UG/L	<0.5	<0.5	370
TOLUENE	UG/L	<0.5	<0.5	<2.5
ETHYLBENZENE	UG/L	<0.5	<0.5	33
TOTAL XYLENES	UG/L	<0.5	<0.5	<2.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		99	99	79

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 404345

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
43	TRIP BLANK	AQUEOUS	03/29/94	NA	04/16/94	1

PARAMETER	UNITS	43
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5

SURROGATE:

BROMOFLUOROBENZENE (%) 97

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 404345
BLANK I.D.	: 041394	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/13/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		95

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 404345
BLANK I.D.	: 041494	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/14/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		96

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 404345
BLANK I.D.	: 041494	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/14/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		96

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 404345
BLANK I.D.	: 041594	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/15/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		97

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 404345
BLANK I.D.	: 041694	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/16/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		98

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 404345
BLANK I.D.	: 041794	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/17/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40436401	ATI I.D.	: 404345
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/14/94
PROJECT NAME	: INDIAN BASIN REMED.	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40436401	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	21	10	31	100	30	90	3
TOLUENE	11	10	21	100	20	90	5
ETHYLBENZENE	0.8	10	11	102	11	102	0
TOTAL XYLENES	13	30	41	93	41	93	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40434512	ATI I.D.	: 404345
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/14/94
PROJECT NAME	: INDIAN BASIN REMED.	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40434512	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	8.8	88	9.0	90	2
TOLUENE	<0.5	10	8.8	88	8.9	89	1
ETHYLBENZENE	<0.5	10	9.3	93	9.4	94	1
TOTAL XYLENES	<0.5	30	27	90	27	90	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40435906	ATI I.D.	: 404345
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 04/16/94
PROJECT NAME	: INDIAN BASIN REMED.	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40435906	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.2	92	8.9	89	3
TOLUENE	<0.5	10	9.4	94	9.2	92	2
ETHYLBENZENE	<0.5	10	9.6	96	9.3	93	3
TOTAL XYLENES	<0.5	30	29	97	27	90	7

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 404345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 04/11/94
REPORT DATE : 05/02/94

PARAMETER	UNITS	03	04	05	06	07
CHLORIDE (EPA 325.2)	MG/L	22	12.5	10.5	14	10.7

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 404345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 04/11/94
REPORT DATE : 05/02/94

PARAMETER	UNITS	08	09	10	11	12
CHLORIDE (EPA 325.2)	MG/L	48	32	30	139	15

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 404345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 04/11/94
REPORT DATE : 05/02/94

PARAMETER	UNITS	13	14	15	21	23
CHLORIDE (EPA 325.2)	MG/L	30	9.5	17	8.7	9.0

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 404345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 04/11/94
REPORT DATE : 05/02/94

PARAMETER	UNITS	25	27	29	31	32
CHLORIDE (EPA 325.2)	MG/L	7.6	58	450	220	290

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 404345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 04/11/94
REPORT DATE : 05/02/94

PARAMETER	UNITS	33	34	35	36	37
CHLORIDE (EPA 325.2)	MG/L	250	440	430	380	290

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 404345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 04/11/94
REPORT DATE : 05/02/94

PARAMETER	UNITS	38	39	40	42
CHLORIDE (EPA 325.2)	MG/L	5.5	10.0	102	310

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED. ATI I.D. : 404345

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	40434504	12.5	12.6	1	22.5	10.0	100
CHLORIDE	MG/L	40434514	9.5	9.6	1	20.0	10.0	105
CHLORIDE	MG/L	40434535	430	440	2	930	500	100

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 4-5-94 PAGE 1 OF 6

ATI LAB I.D. 40493-05

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: ROBERT J. MENZIE, JR

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie, Jr.
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	Chloride	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
AIR STRIPPER OUTLET	4-5-94	8:08a	Water	01				✓																	2
AIR STRIPPER INLET		8:10a		02				✓																	2
SW-1		8:36a		03				✓	✓																3
LYMAN		8:54a		04				✓	✓																3
BIEBBLE		9:15a		05				✓	✓																3
ARROYO		9:33a		06				✓	✓																3
MW-61A		9:53a		07			*	✓	✓																3
MW-58		10:04a		08			*	✓	✓																3
MW-72		10:14a		09			*	✓	✓																3

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	25
PROJ. NAME: INDIAN BASIN REMED.		CUSTODY SEALS	(Y) / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:
* Potential Free-Phase - Analyze Water-Phase only

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: RM Gray	Signature: Marty Cox	Signature: RM Gray
Time: 09:37	Time: 1120	Time: 1:31
Printed Name: RM Gray	Printed Name: MARTY COX	Printed Name: RM Gray
Date: 4-7-94	Date: 4-8-94	Date: 4-8-94
Company: MOC	Company: C+B	Company: MOC
Phone: (915) 687-8314		

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Marty Cox	Signature: RM Gray	Signature:
Time: 0938	Time: 11:35	Time: 1400
Printed Name: MARTY COX	Printed Name: RM Gray	Printed Name:
Date: 4-7-94	Date: 4-8-94	Date: 4/11/94
Company: CARTER + BURGESS, INC	Company: MOC	Analytical Technologies, Inc.

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 4-5-94 PAGE 2 OF 6

ATI LAB I.D. 404345

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie, Jr.

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie, Jr.
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	Chloride	NUMBER OF CONTAINERS
MW-59	4-5-94	11:57a	Water	10	*✓	✓	✓	3
MW-62		12:06p		11	*✓	✓		3
MW-65A		12:18p		12		✓	✓	3
MW-68		12:34p		13	*✓	✓		3

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:	44999	NO. CONTAINERS	12
PROJ. NAME:	INDIAN BASIN REMED.	CUSTODY SEALS	(Y) / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:
* Potential Free-Phase - Analyze Water Phase only

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: RM Gray Time: 09:37	Signature: Marty Cox Time: 1120	Signature: RM Gray Time: 1:31
Printed Name: RM Gray Date: 4-7-94	Printed Name: MARTY COX Date: 4-8-94	Printed Name: RM Gray Date: 4-8-94
Company: MOC Phone: (915) 687-8314	Company: C&B	Company: MOC

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Marty Cox Time: 0930	Signature: RM Gray Time: 11:35	Signature: Time: 1150
Printed Name: MARTY COX Date: 4-7-94	Printed Name: RM Gray Date: 4-8-94	Printed Name: Date: 4/11/94
Company: CARTER & BURGESS, INC	Company: MOC	Analytical Technologies, Inc.

AnalyticalTechnologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 4-6-94 PAGE 3 OF 6

ATI LAB I.D. 4043345

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: BOB MENZIE

COMPANY: MARATHON
ADDRESS: P.O. BOX 552
MIDLAND, TX 79702-0552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO: MR. BOB MENZIE
COMPANY: MARATHON
ADDRESS: P.O. BOX 552
MIDLAND, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTEX/MTBE (8020)	Chloride	Hold for P.M. approval	NUMBER OF CONTAINERS
MW-70	4-6-94	0945	WATER	14	✓	✓		3
MW-71	4-6-94	1806	WATER	15	✓	✓		3
INITIAL	4-5-94	1130	WATER	16	✓			2
E.B. #1	4-6-94	1135	WATER	17	✓		✓	2
E.B. #2	4-6-94	1521	WATER	18	✓		✓	2
E.B. #3	4-6-94	1846	WATER	19	✓		✓	2
E.B. #4	4-7-94	0900	WATER	20	✓		✓	2
MW-66	4-7-94	1034	WATER	21	✓	✓		3
E.B. #5	4-7-94	1115	WATER	22	✓		✓	2

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
Volatile Organics GC/MS (624/8240)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	21
PROJ. NAME: INDIAN BASIN		CUSTODY SEALS	Y / N / NA*
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

*all containers for these samples have C.o.c. seals except VOAs for E.B.#1 and E.B.#3.

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Marty Cox	Signature: RM Gray	Signature:
Time: 1120	Time: 1131	Time:
Printed Name: MARTY COX	Printed Name: RM Gray	Printed Name:
Date: 4-8-94	Date: 4-8-94	Date:
Company: CNB	Company: MOC	Company:
Phone: 817-735-6107		

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: RM Gray	Signature:	Signature:
Time: 11:35	Time:	Time: 1600
Printed Name: RM Gray	Printed Name:	Printed Name: Terri Stone
Date: 4-8-94	Date:	Date: 4/11/94
Company: MOC	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 4-7-94 PAGE 4 OF 6

ATI LAB I.D. 404345

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: ROBERT J. MENZIE, JR

COMPANY: MARATHON OIL COMPANY
ADDRESS: P.O. BOX 552
MIDLAND, TX 79702-9552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO: ROBERT J. MENZIE, JR
COMPANY: MARATHON OIL COMPANY
ADDRESS: P.O. BOX 552
MIDLAND, TX 79702-9552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Chlorides	Hold for P.M. approval	NUMBER OF CONTAINERS
MW-60	4-7-94	1245	WATER	23	✓	✓		3
E.B. # 6	4-7-94	1326	WATER	24	✓		✓	2
MW-67	4-7-94	1445	WATER	25	✓	✓		3
E.B # 7	4-7-94	1520	WATER	26	✓		✓	2
MW-57	4-7-94	1640	WATER	27	✓	✓		3
E.B. # 8	4-7-94	1720	WATER	28	✓		✓	2
MW-61	4-7-94	1835	WATER	29	✓	✓		3
E.B. # 9	4-7-94	1910	WATER	30	✓		✓	2

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:	44994	NO. CONTAINERS	20
PROJ. NAME:	INDIAN BASIN	CUSTODY SEALS	(Y) N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Marty Cox Time: 1120	Signature: RM Gray Time: 1231	Signature: Time:
Printed Name: MARTY COX Date: 4-8-94	Printed Name: RM Gray Date: 4-8-94	Printed Name: Date:
Company: C&B Phone: 817-735-6107	Company: MOC	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: RM Gray Time: 17:34	Signature: Time:	Signature: Time:
Printed Name: RM Gray Date: 4-8-94	Printed Name: Date:	Printed Name: Date: 4/11/94
Company: MOC	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 4-8-94 PAGE 5 OF 6

ATI LAB I.D. 409345

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: BOB MENZIE

COMPANY: MARATHON
ADDRESS: P.O. BOX 552
MIDLAND, TX 79702
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO: MR. BOB MENZIE
COMPANY: MARATHON
ADDRESS: P.O. BOX 552
MIDLAND, TX 79702

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Chloride	NUMBER OF CONTAINERS
MW-39	4-6-94	1930	WATER	31	✓	✓	3
MW-41	4-6-94	1900	WATER	32	✓	✓	3
MW-43	4-6-94	1540	WATER	33	✓	✓	3
MW-44	4-6-94	1620	WATER	34	✓	✓	3
MW-45	4-6-94	2045	WATER	35	✓	✓	3
MW-49	4-6-94	1955	WATER	36	✓	✓	3
MW-50	4-6-94	2025	WATER	37	✓	✓	3
MW-63	4-5-94	1425	WATER	38	✓	✓	3
MW-64	4-6-94	0800	WATER	39	✓	✓	3

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	27
PROJ. NAME: INDIAN BASIN		CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	
SHIPPED VIA:		RECEIVED COLD	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

C.O.C. seals on all containers for these samples except MW-43.

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Marty Cox	Signature: RM Gray	Signature:
Time: 1120	Time: 1:31	Time:
Printed Name: MARTY COX	Printed Name: RM Gray	Printed Name:
Date: 4-8-94	Date: 4-8-94	Date:
Company: C+B	Company: MOC	Company:
Phone: 817-735-6107		

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: RM Gray	Signature:	Signature:
Time: 11:35	Time:	Time: 1600
Printed Name: RM Gray	Printed Name:	Printed Name: [illegible]
Date: 4-8-94	Date:	Date: 4/11/94
Company: MOC	Company:	Analytical Technologies, Inc.

Analytical**Technologies,**Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 4-8-94 PAGE 6 OF 6

ATI LAB I.D. 404345

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: ROBERT J MENZIE, JR

COMPANY: MARATHON OIL COMPANY
ADDRESS: P.O. BOX 552
MIDLAND, TX 79702-0552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO: MR ROBERT J MENZIE, JR
COMPANY: MARATHON OIL COMPANY
ADDRESS: P O BOX 552
MIDLAND, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTEX/MTBE (8020)	Chloride	Hold for P.M. approval	NUMBER OF CONTAINERS
MW-54	4-8-94	1102	WATER	40	✓	✓		3
E.B # 10	4-8-94	0910	WATER	41	✓		✓	2
MW-55	4-8-94	1030	WATER	42	✓	✓		3
~~E.B # 11~~	~~4-8-94~~		~~WATER~~		~~✓~~		MW	~~2~~
Trip Blank	3/29/94		AQ	43				1

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311)

PROJECT INFORMATION

PROJ. NO.: 44999
PROJ. NAME: INDIAN BASIN
P.O. NO.:
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS: 9
CUSTODY SEALS: (Y) N / NA
RECEIVED INTACT: Y
RECEIVED COLD: Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.
Signature: Marty Cox Time: 1120
Printed Name: MARTY COX Date: 4-8-94
Company: C-B Phone: 817-735-6107

RELINQUISHED BY: 2.
Signature: RM Gray Time: 1:31
Printed Name: RM Gray Date: 4-8-94
Company: MOC

RELINQUISHED BY: 3.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.
Signature: RM Gray Time: 1135
Printed Name: RM Gray Date: 4-8-94
Company: MOC

RECEIVED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.
Signature: Time:
Printed Name: Date:
Analytical Technologies, Inc.

AnalyticalTechnologies, Inc. Albuquerque, NM

Chain of Custody

DATE 4/11/94 PAGE 1 OF 4

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310		8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
404345-3	4/5/94	0836	AQ	3						X																					1
-4		0854		4						X																					1
-5		0913		5						X																					1
-6		0933		6						X																					1
-7		0953		7						X																					1
-8		1004		8						X																					1
-9		1014		9						X																					1
-10		1157		10						X																					1
-11		1206		11						X																					1

PROJECT INFORMATION	
PROJECT NUMBER:	404345
PROJECT NAME:	INDC
QC LEVEL:	STD, IV
QC REQUIRED?	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	404345

DUE DATE: 4/25/94
RUSH SURCHARGE:
CLIENT DISCOUNT: 0 % per quote

W.O.C# KK655

SAMPLES SENT TO:	
SAN DIEGO	
FT. COLLINS	X
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: Lori Dettle Time: 1720
Printed Name: Lori Dettle Date: 4/11/94
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 859
Printed Name: Date:
Company: ATI 4/12/94

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 4/11/94 PAGE 3 OF 4

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310	8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O_2, CO_2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
404345-31	4/6/94	1930	AQ	31						X																1
-32		1900		32						X																1
-33		1540		33						X																1
-34		1620		34						X																1
-35		2045		35						X																1
-36		1455		36						X																1
-37		2025		37						X																1
-38	4/5/94	1425		38						X																1
-39	4/6/94	0800		39						X																1

PROJECT INFORMATION	
PROJECT NUMBER:	404345
PROJECT NAME:	MOC
~~QC LEVEL:~~ (STD.) IV	
QC REQUIRED: (MS) MSD BLANK	
TAT: (STANDARD) RUSH!	

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	4
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	404345

DUE DATE: 4/20/94
RUSH SURCHARGE:
CLIENT DISCOUNT: 0 % per quote

WO# 4655 LK

SAMPLES SENT TO:	
SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERQUANT	

RELINQUISHED BY: 1.	
Signature:	Time: 1730
Printed Name: Lori Dettre	Date 4/11/94
Analytical Technologies, Inc. Albuquerque	
RECEIVED BY: (LAB) 1.	
Signature:	Time:
Printed Name:	Date:
Company:	

RELINQUISHED BY: 2.	
Signature:	Time:
Printed Name:	Date
Company:	
RECEIVED BY: (LAB) 2.	
Signature:	Time: 957
Printed Name: Mancuso	Date: 4/12/94
Company: ATI	

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 4/11/94 PAGE 4 OF 4

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
404345-40	4/8/94	1102	AQ	40
-42	"	1030	"	42

ANALYSIS REQUEST

TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310		8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
				X	X																	1
				X	X																	1

PROJECT INFORMATION

PROJECT NUMBER: 404345

PROJECT NAME: MOC

QC LEVEL: ~~STD.~~ IV

QC REQUIRED: MS MSD BLANK

TAT: (STANDARD) RUSH!

DUE DATE: 4/25/94

RUSH SURCHARGE: _____

CLIENT DISCOUNT: 0 % per quote

WO# 12655

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	2
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	404345

SAMPLES SENT TO:

- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX X
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.

Signature: Lori Dottie Time: 1730

Printed Name: Lori Dottie Date: 4/4/94

Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.

Signature: Time:

Printed Name: Date:

Company:

RELINQUISHED BY: 2.

Signature: Time:

Printed Name: Date

Company:

RECEIVED BY: (LAB) 2.

Signature: Time: 859

Printed Name: MARGUERITE CHAVEZ Date:

Company: ATI 4/12/94

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 4/11/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310	8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
404345-12	4/5/94	1218	SOIL	12						X																1
-13	"	1234		13						X																1
-14	4/6/94	0945		14						X																1
-15	"	1800		15						X																1
-21	4/7/94	1034		21						X																1
-23		1245		23						X																1
-25		1445		25						X																1
-27		1640		27						X																1
-29		1835		29						X																1

PROJECT INFORMATION	
PROJECT NUMBER:	404345
PROJECT NAME:	INOC
QC LEVEL:	STD. IV
QC REQUIRED:	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	404345

DUE DATE: 4/25/94
RUSH SURCHARGE: _____
CLIENT DISCOUNT: 0 % per quote

W.O.#12655

SAMPLES SENT TO:

- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX X
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: Time: 1730
Printed Name: Date 4/4/94
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

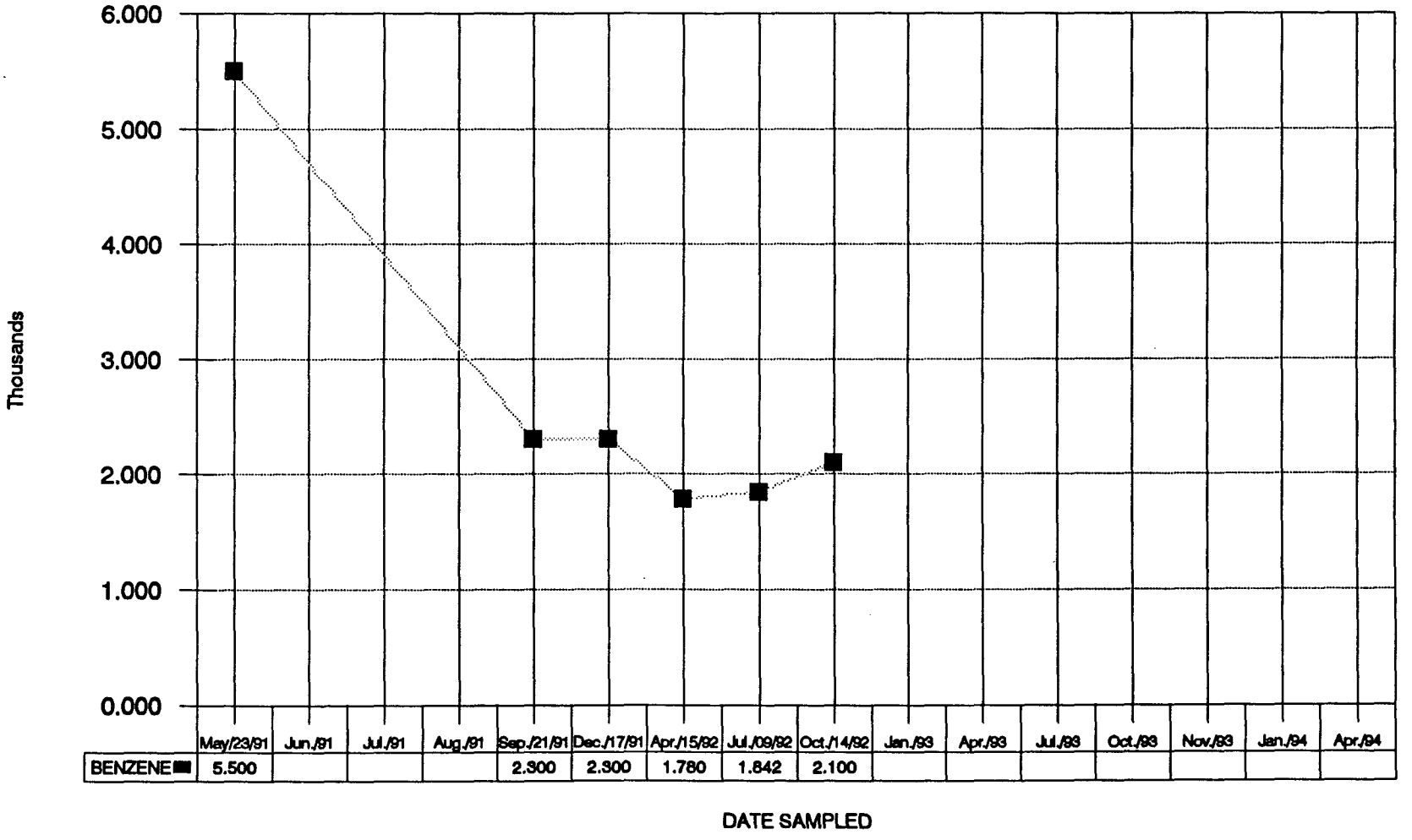
RECEIVED BY: (LAB) 2.
Signature: Time: 859
Printed Name: MARGUERITE RUSSELL Date:
Company: ATI 4/12/94

APPENDIX C

BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS

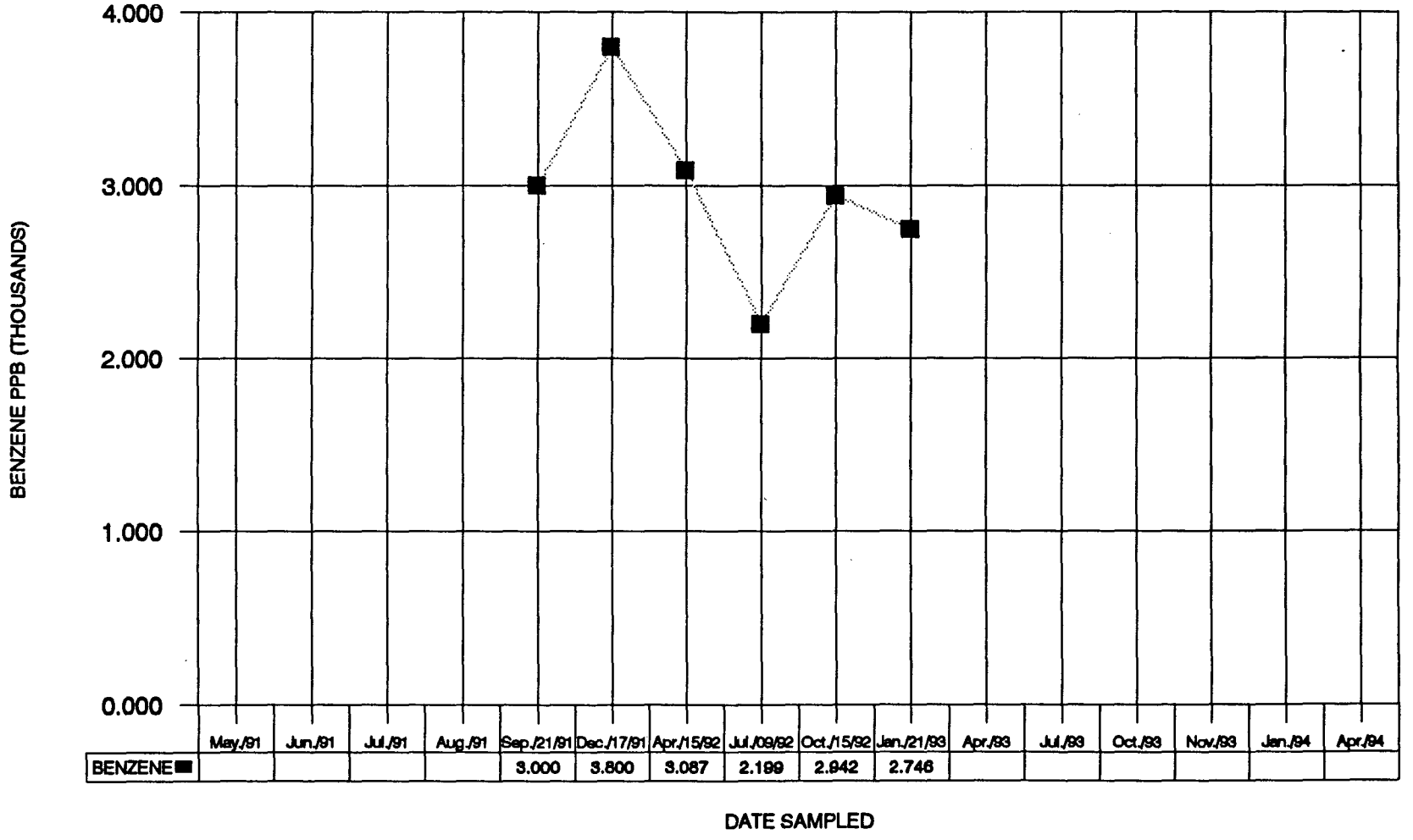
GROUNDWATER ANALYSIS DATA

MW#10 BH-33



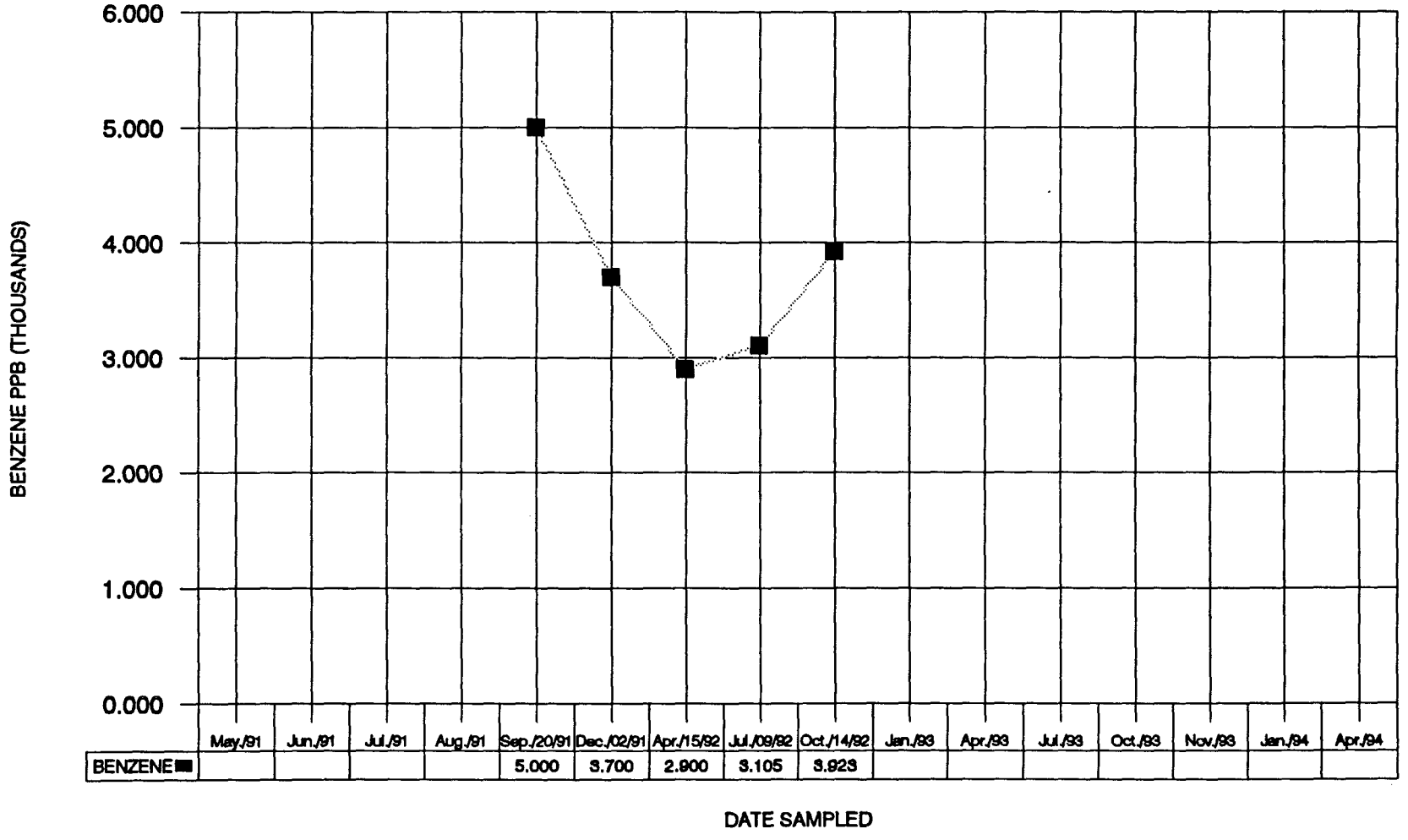
GROUNDWATER ANALYSIS DATA

MW#11 BH-34



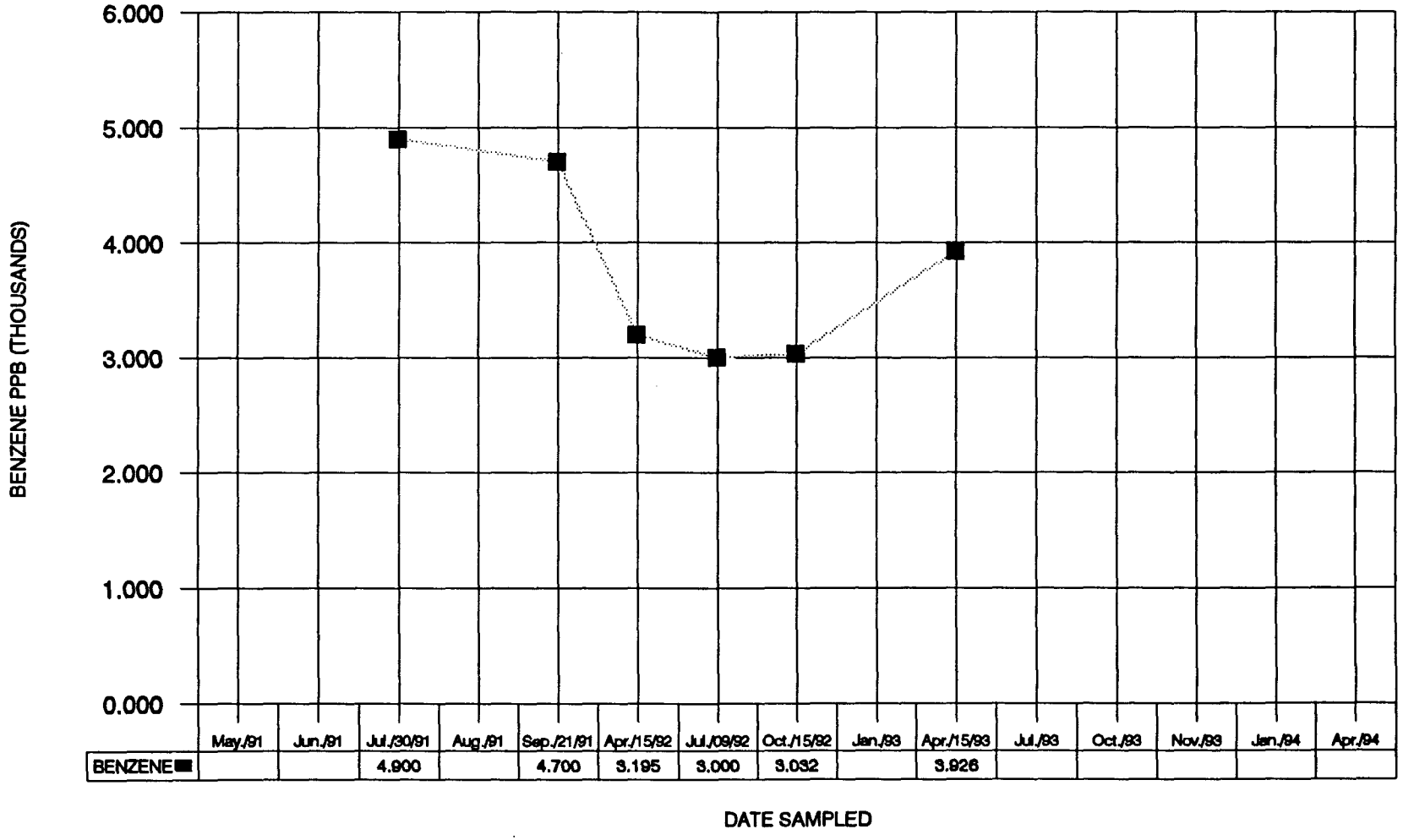
GROUNDWATER ANALYSIS DATA

MW#18 BH-41



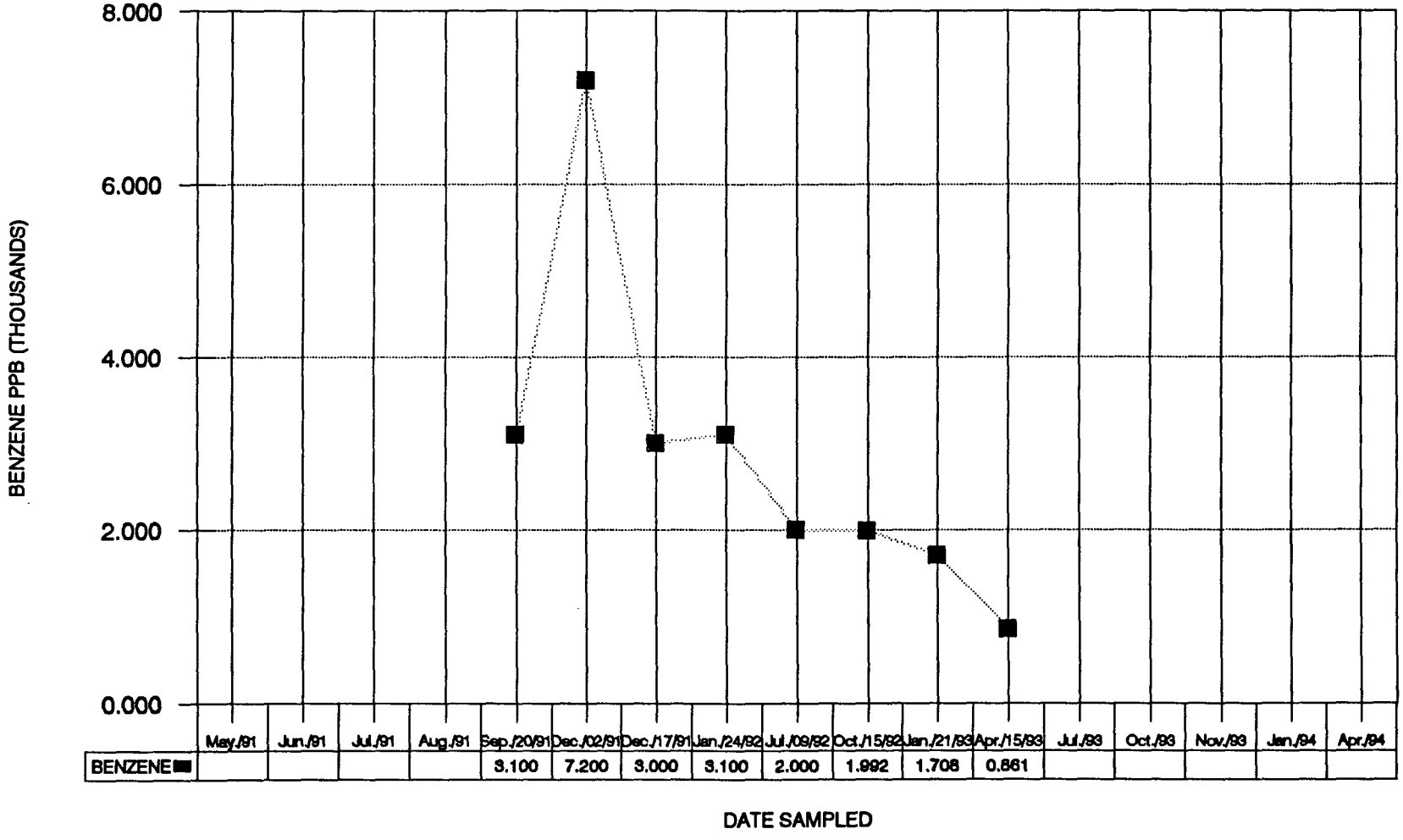
GROUNDWATER ANALYSIS DATA

MW#19 BH-42



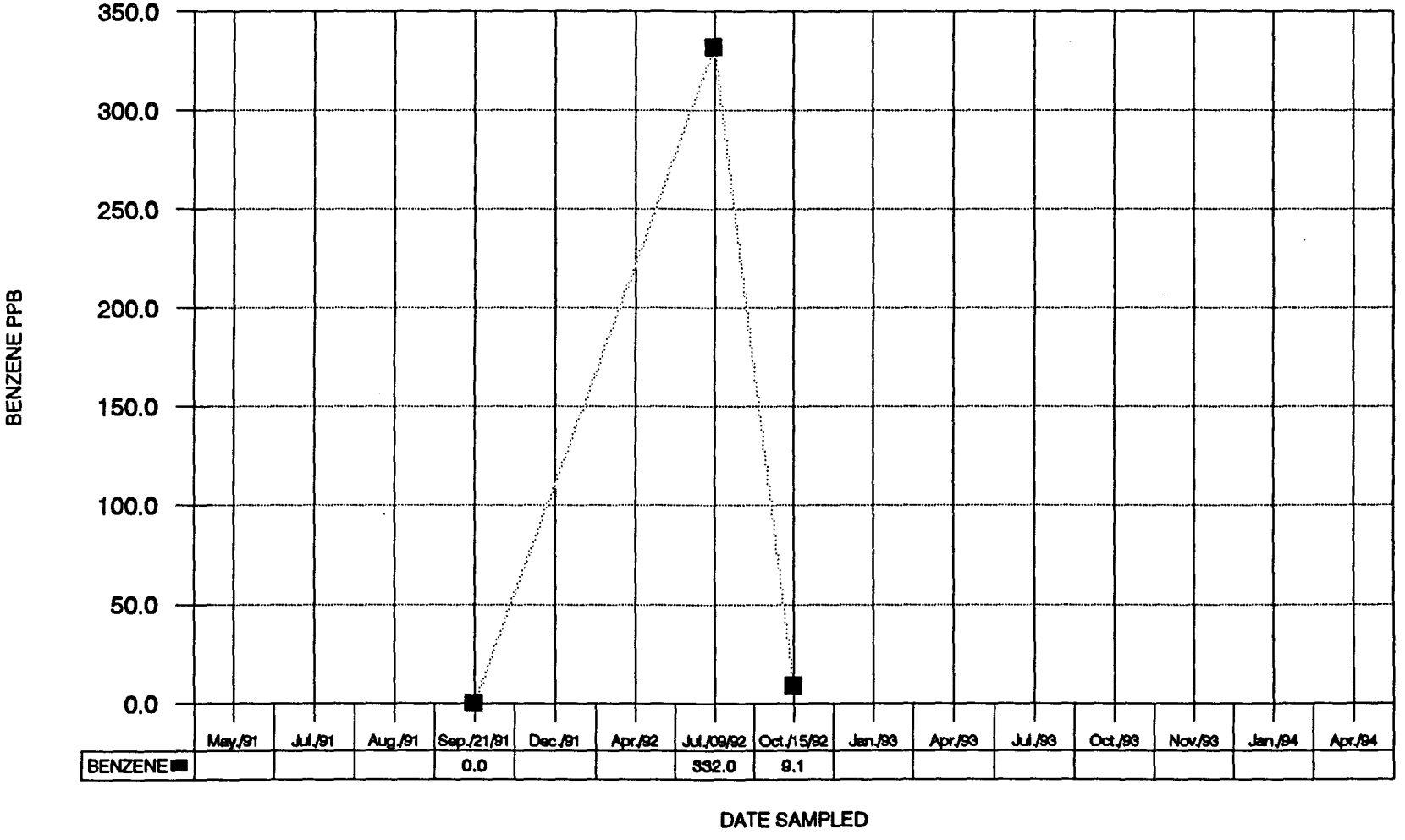
GROUNDWATER ANALYSIS DATA

MW#26 BH-49



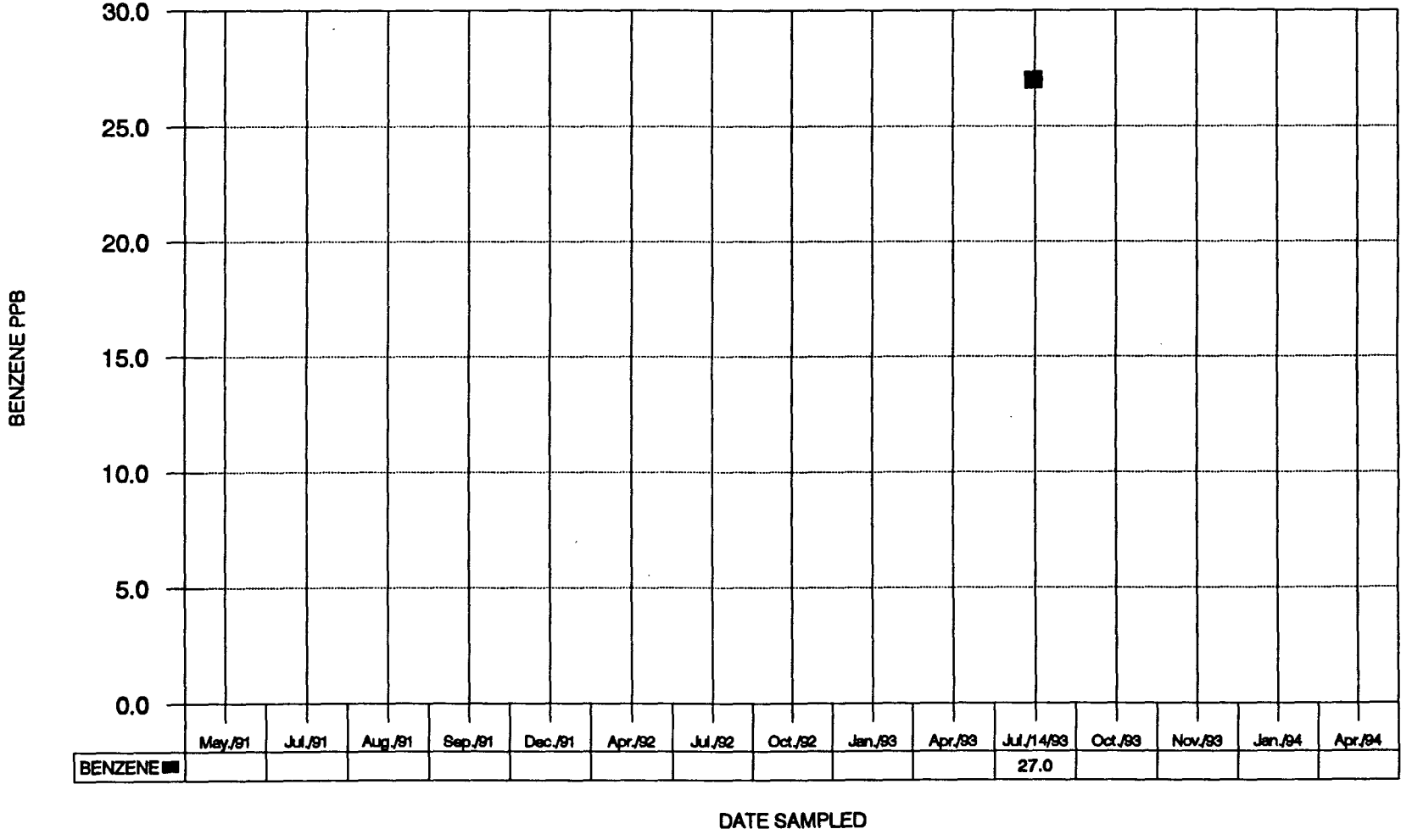
GROUNDWATER ANALYSIS DATA

MW#31 BH-55



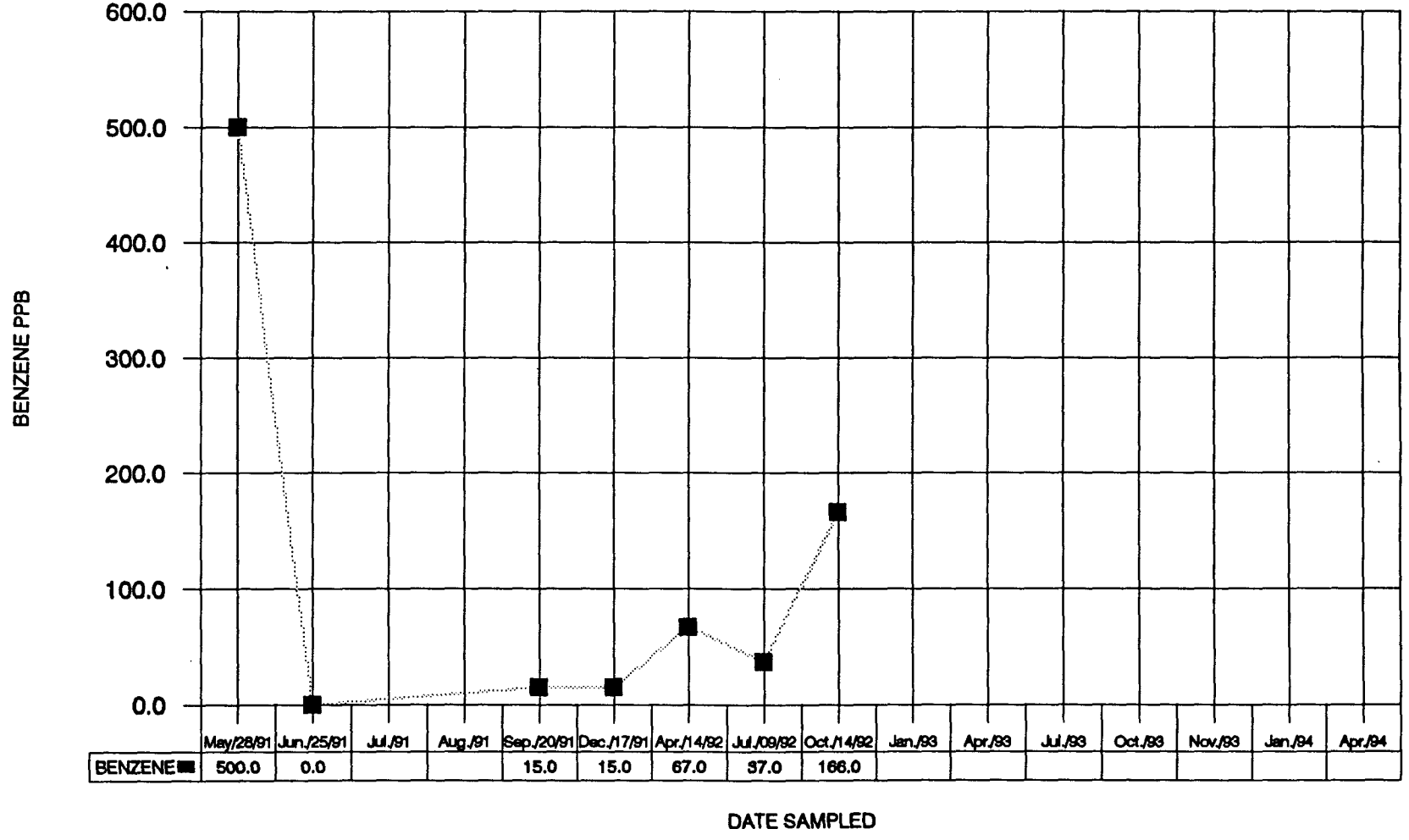
GROUNDWATER ANALYSIS DATA

MW#37 BH-60



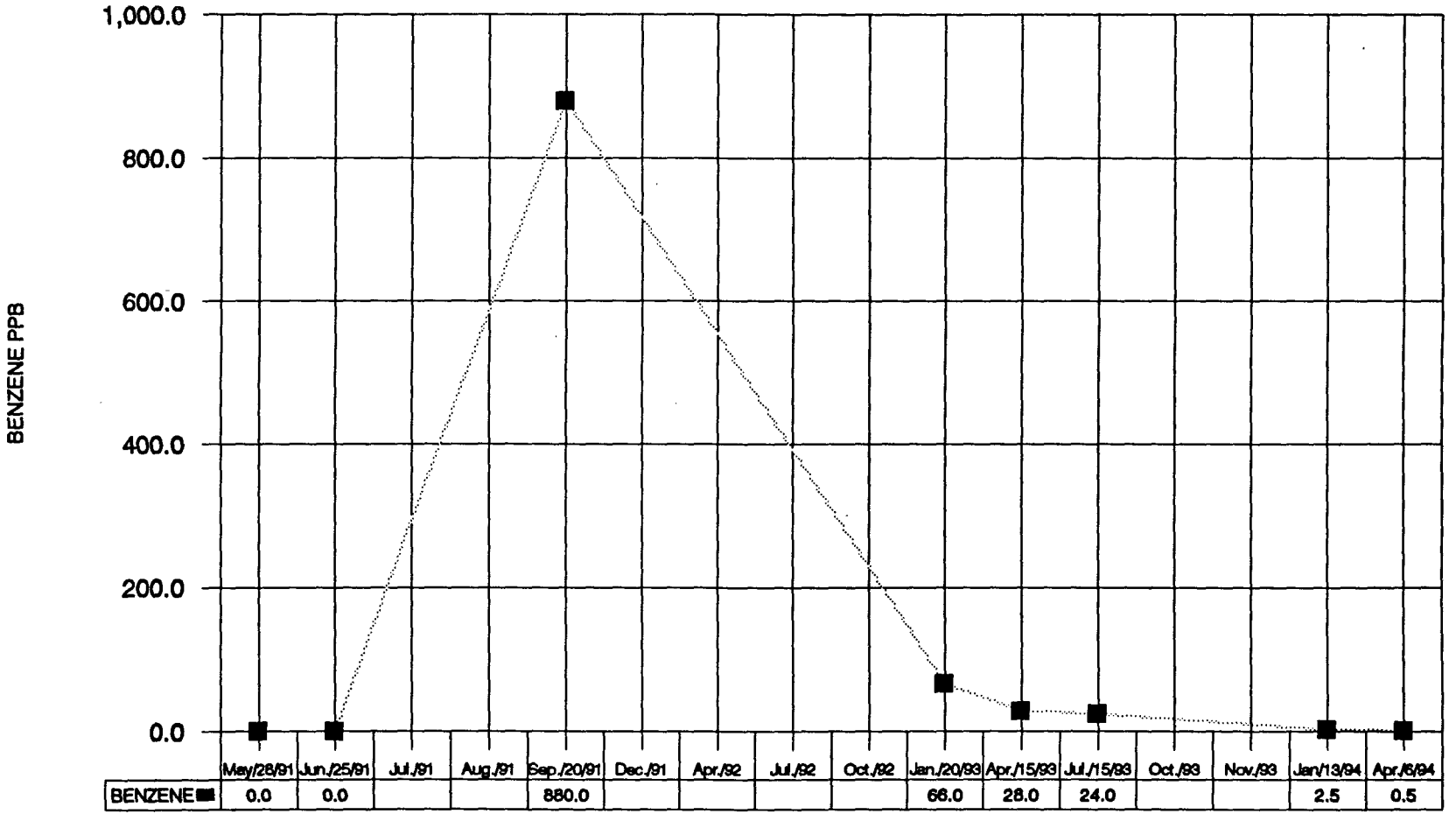
GROUNDWATER ANALYSIS DATA

MW#38 BH-61



GROUNDWATER ANALYSIS DATA

MW#39 BH-62

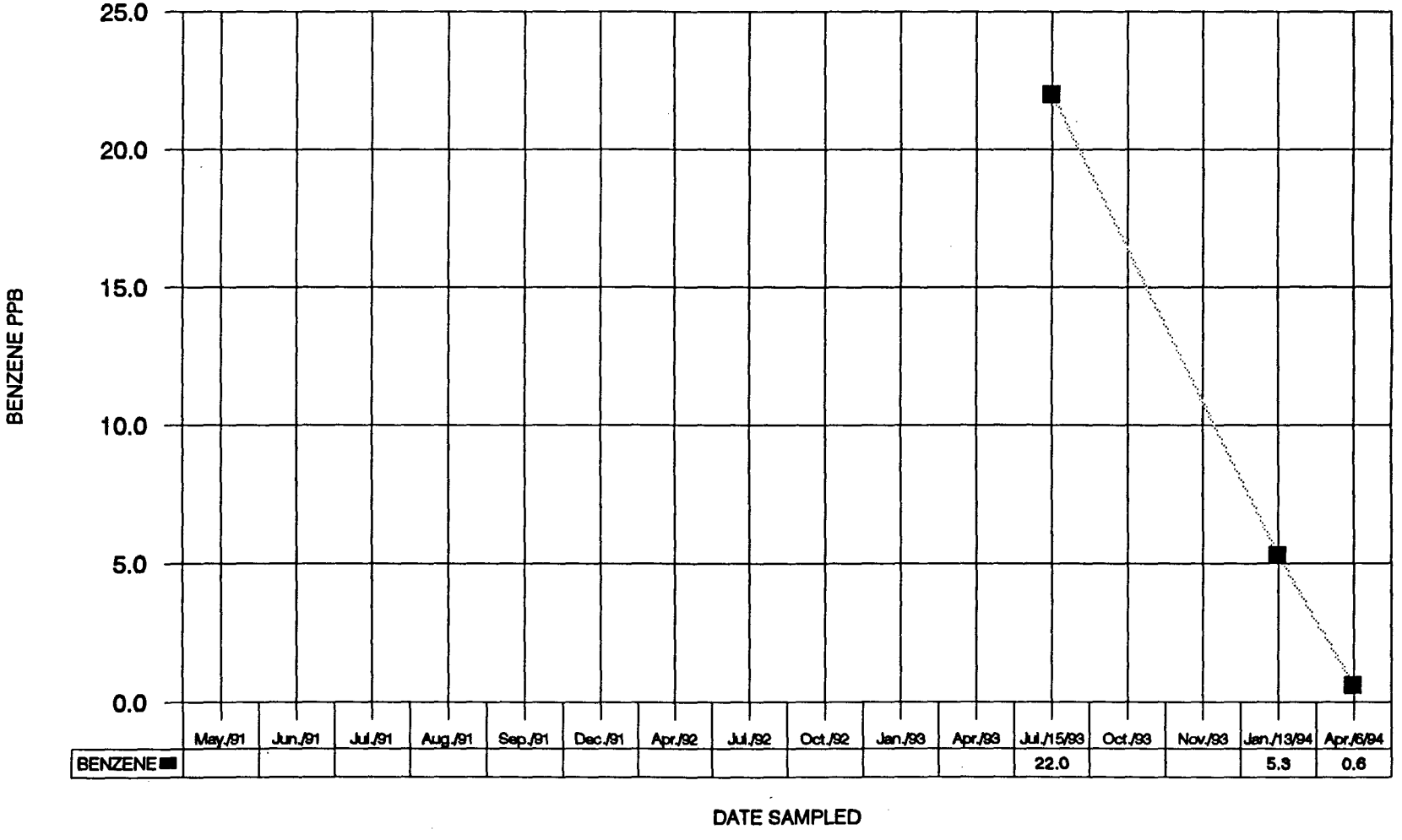


	May/28/91	Jun./25/91	Jul./91	Aug./91	Sep./20/91	Dec./91	Apr./92	Jul./92	Oct./92	Jan./20/93	Apr./15/93	Jul./15/93	Oct./93	Nov./93	Jan/13/94	Apr./6/94
BENZENE	0.0	0.0			880.0					66.0	28.0	24.0			2.5	0.5

DATE SAMPLED

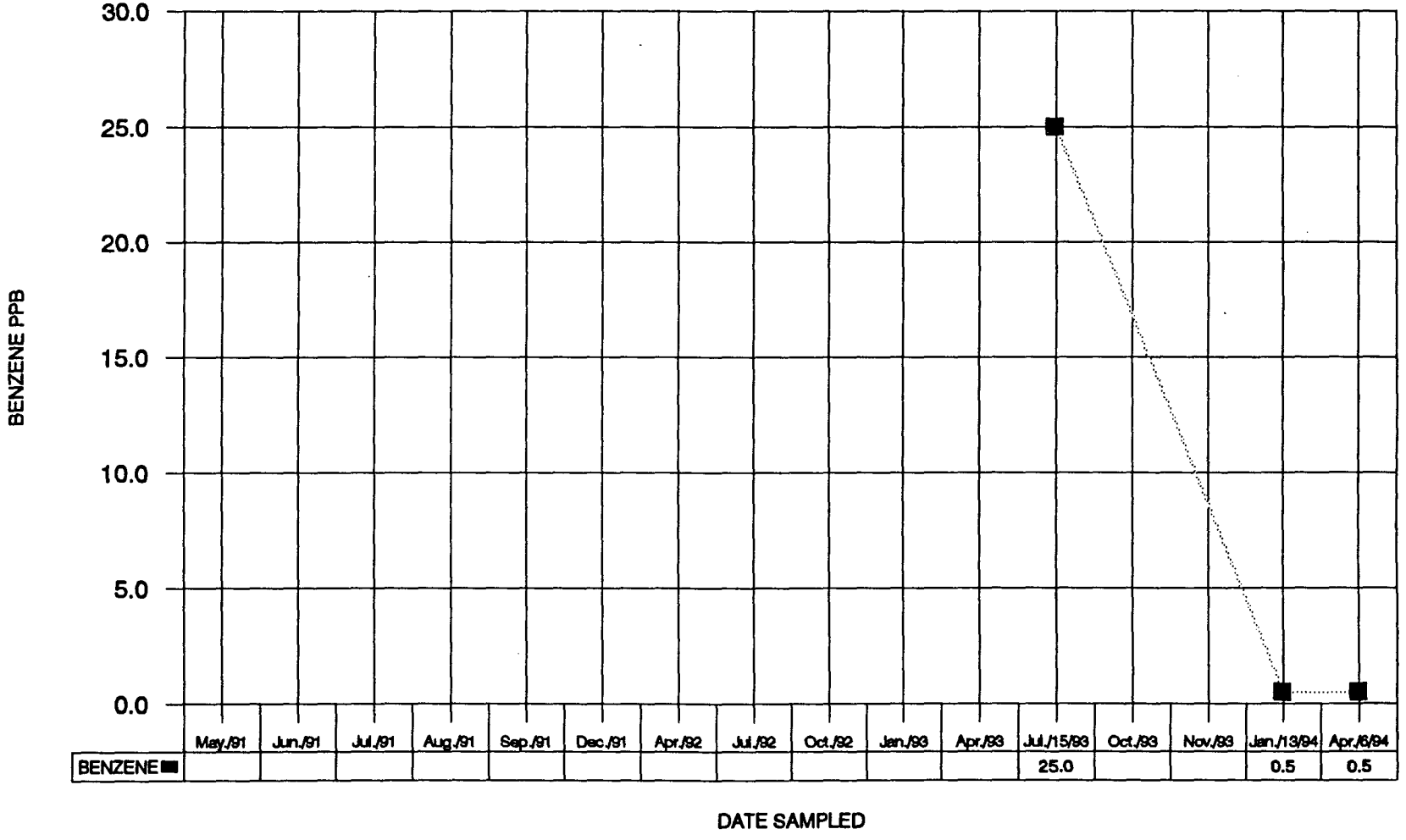
GROUNDWATER ANALYSIS DATA

MW#41 BH-64



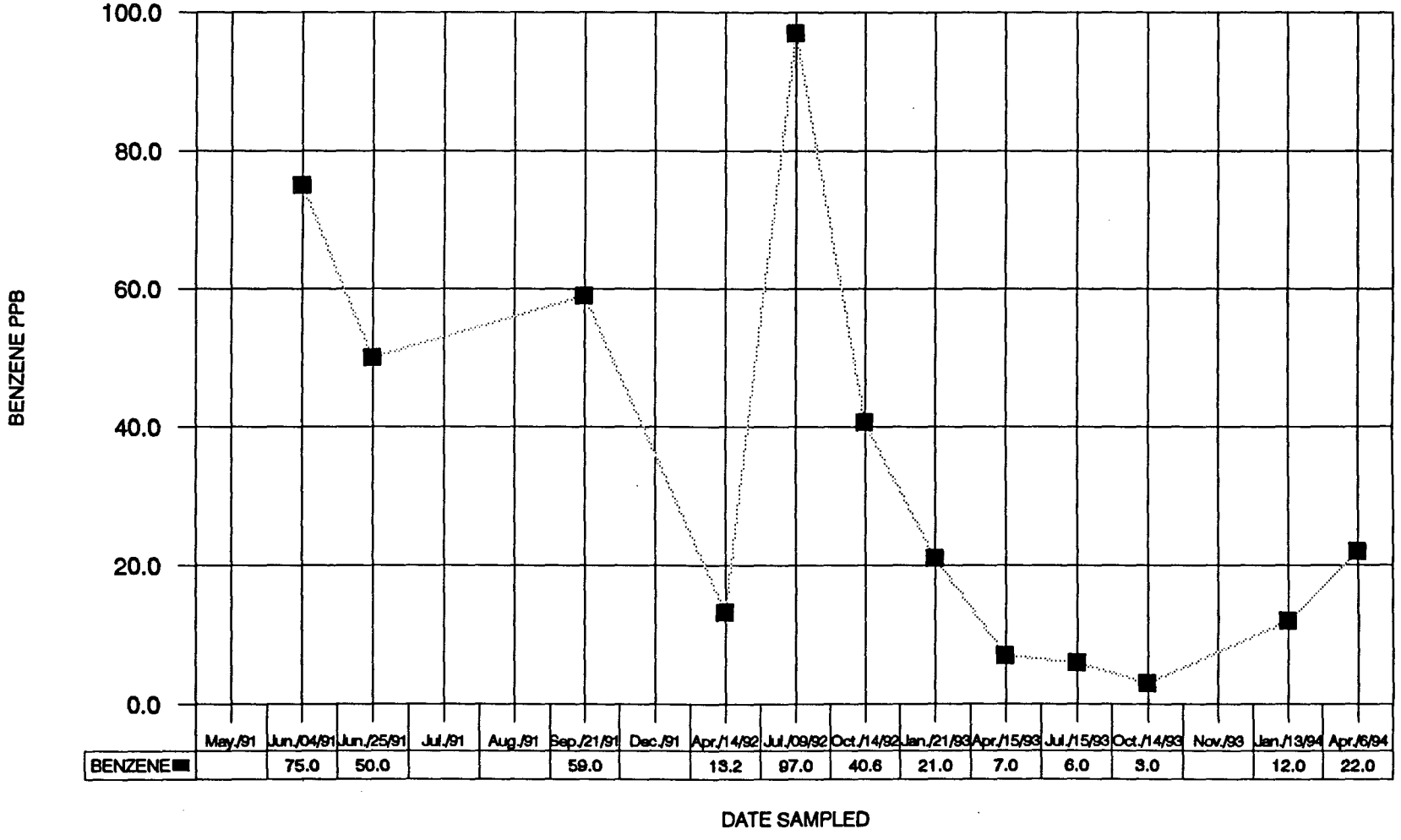
GROUNDWATER ANALYSIS DATA

MW#43 BH-66



BOREHOLE WATER ANALYSIS DATA

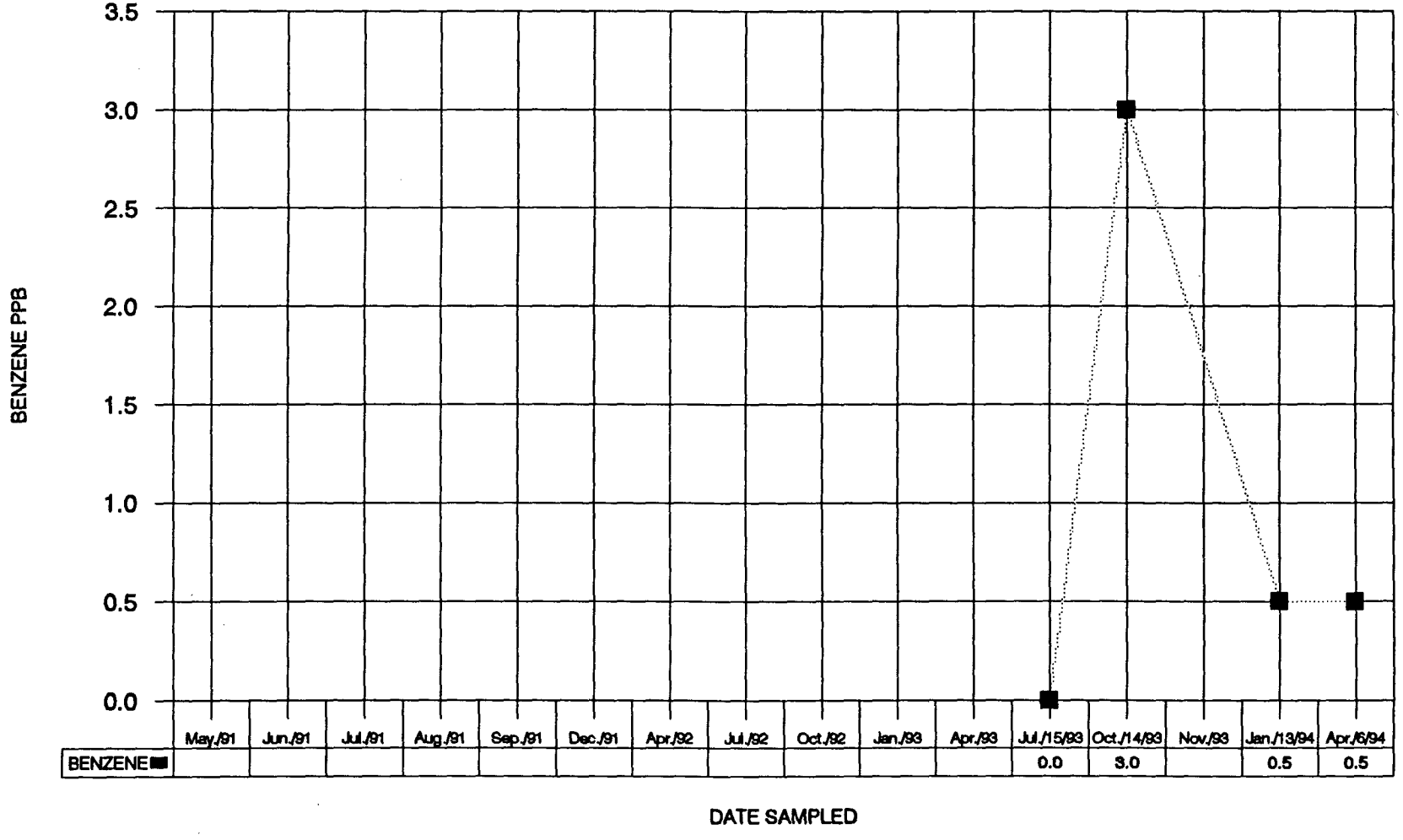
MW#44 BH-67



	May./91	Jun./04/91	Jun./25/91	Jul./91	Aug./91	Sep./21/91	Dec./91	Apr./14/92	Jul./09/92	Oct./14/92	Jan./21/93	Apr./15/93	Jul./15/93	Oct./14/93	Nov./93	Jan./13/94	Apr./6/94
BENZENE		75.0	50.0			59.0		13.2	97.0	40.6	21.0	7.0	6.0	3.0		12.0	22.0

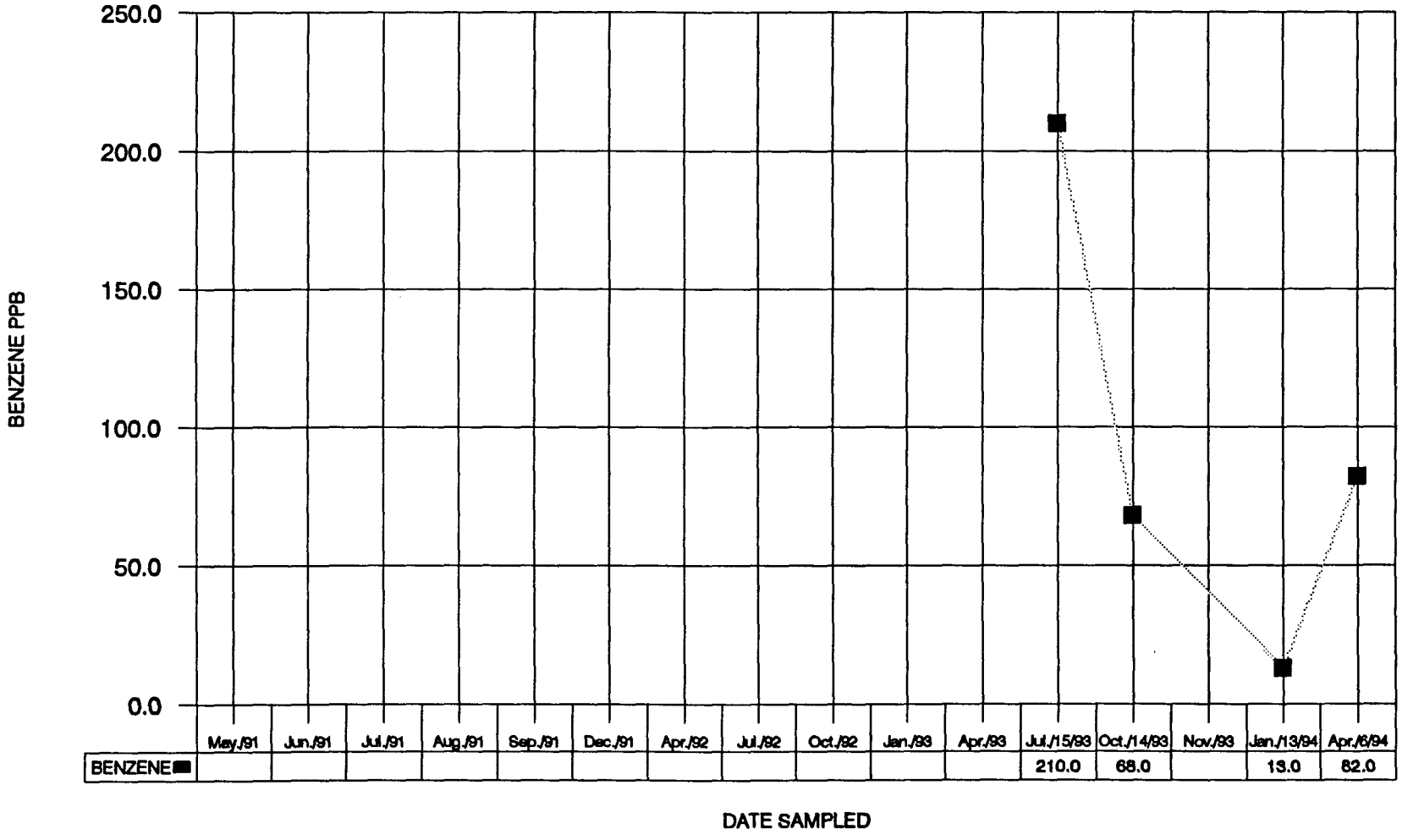
BOREHOLE WATER ANALYSIS DATA

MW#45 BH-68



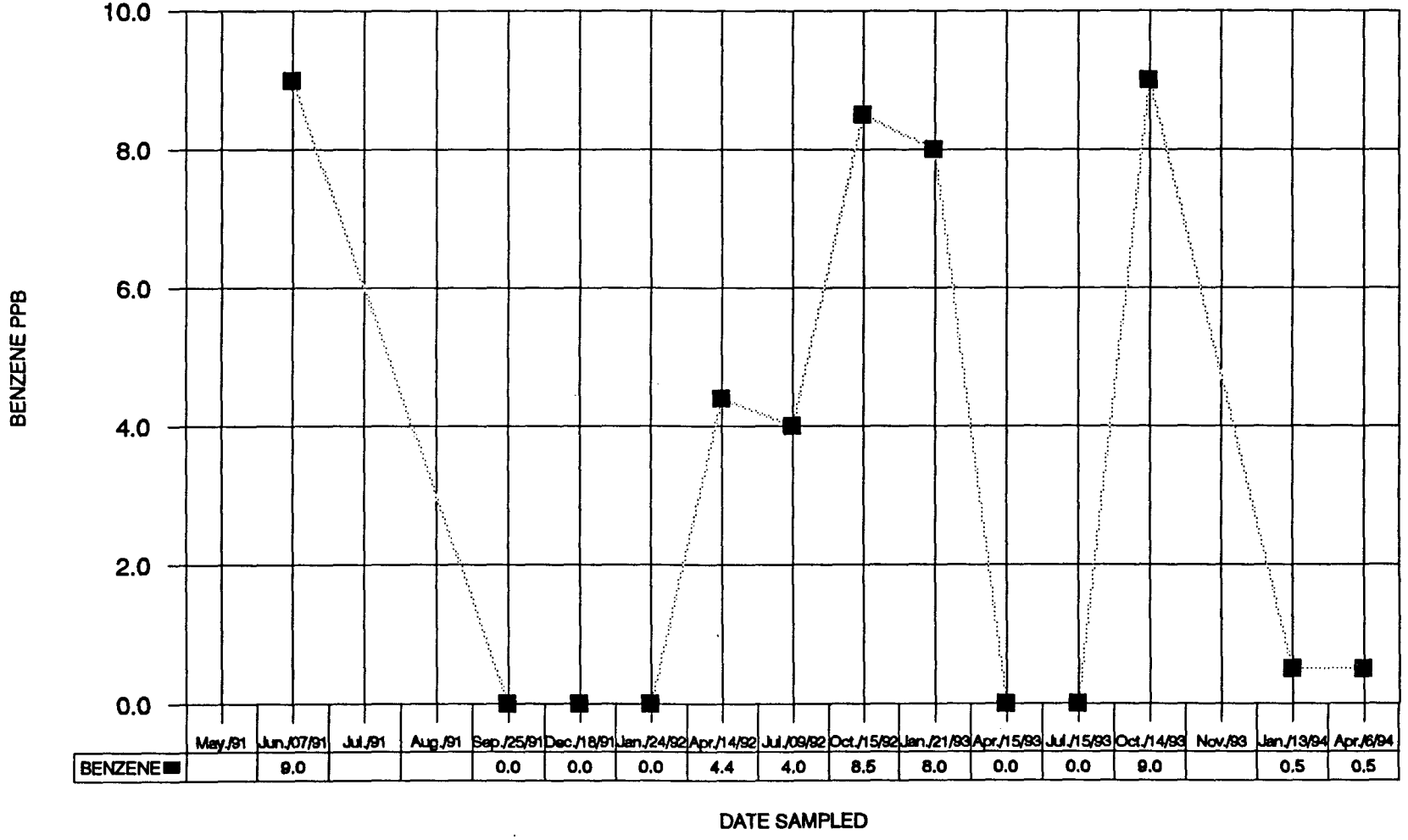
BOREHOLE WATER ANALYSIS DATA

MW#49 BH-72



GROUNDWATER ANALYSIS DATA

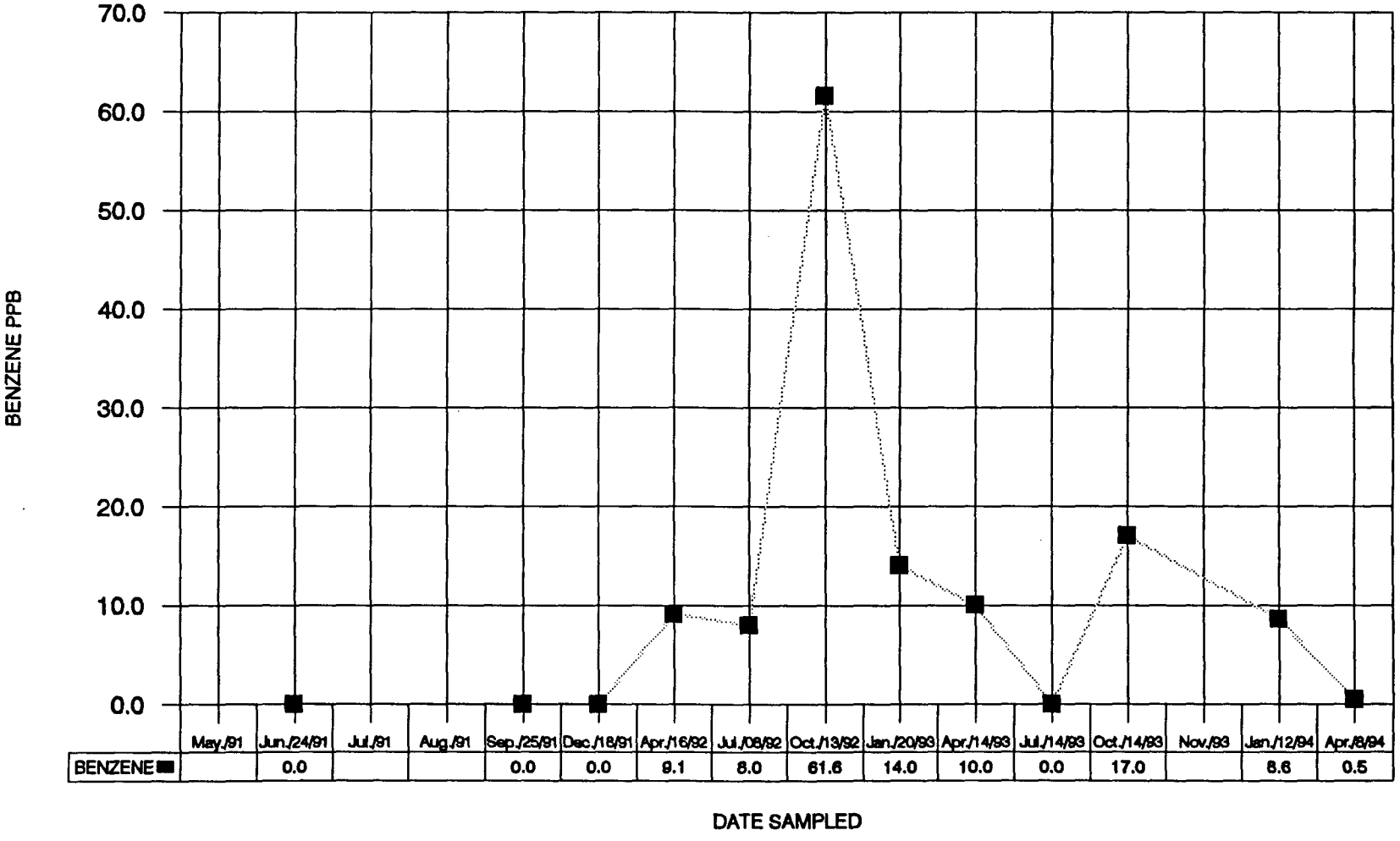
MW#50 BH-73



	May./91	Jun./07/91	Jul./91	Aug./91	Sep./25/91	Dec./18/91	Jan./24/92	Apr./14/92	Jul./09/92	Oct./15/92	Jan./21/93	Apr./15/93	Jul./15/93	Oct./14/93	Nov./93	Jan./13/94	Apr./6/94
BENZENE		9.0			0.0	0.0	0.0	4.4	4.0	8.5	8.0	0.0	0.0	9.0		0.5	0.5

GROUNDWATER ANALYSIS DATA

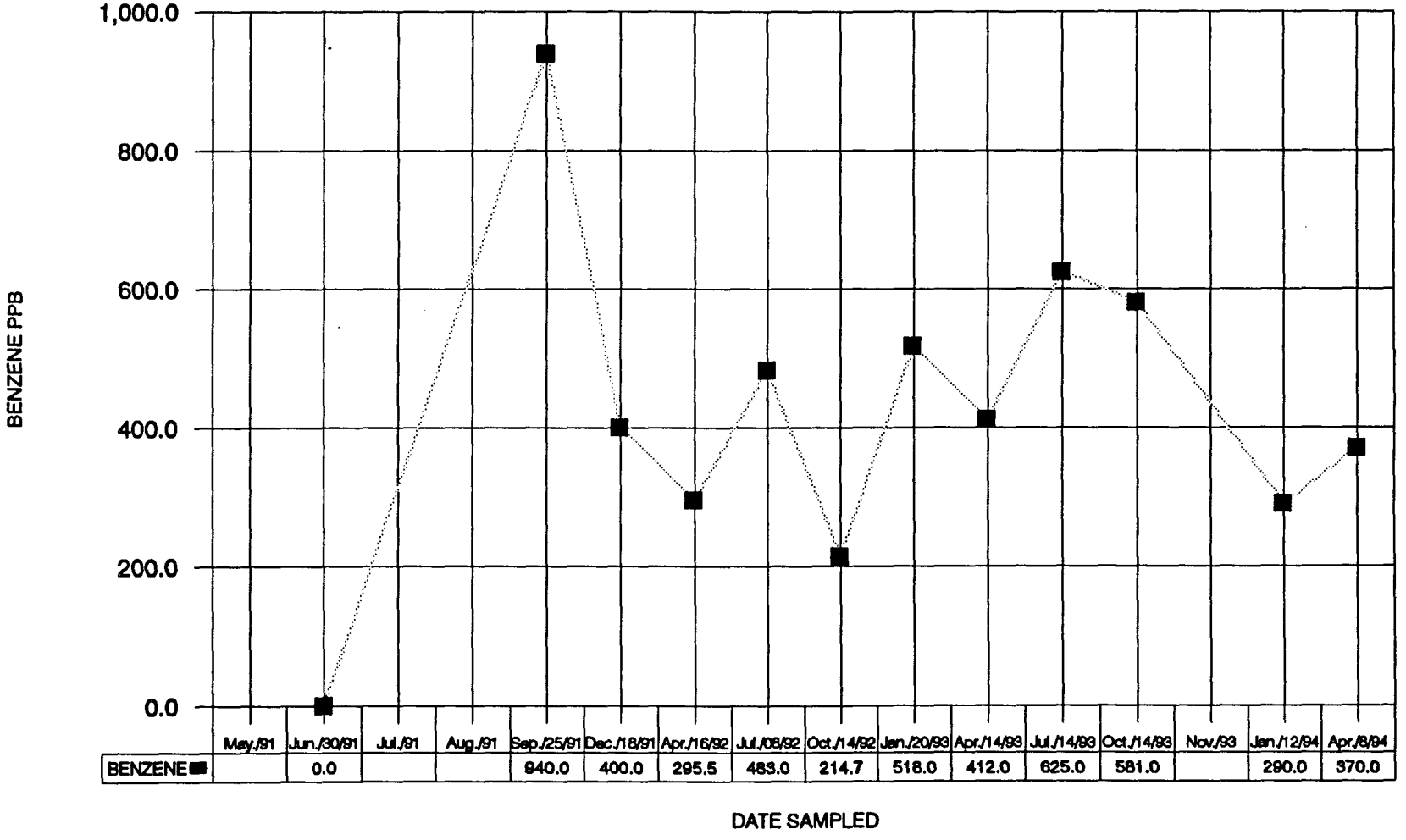
MW#54 BH-80



	May./91	Jun./24/91	Jul./91	Aug./91	Sep./25/91	Dec./18/91	Apr./16/92	Jul./08/92	Oct./13/92	Jan./20/93	Apr./14/93	Jul./14/93	Oct./14/93	Nov./93	Jan./12/94	Apr./8/94
BENZENE		0.0			0.0	0.0	9.1	8.0	61.6	14.0	10.0	0.0	17.0		8.6	0.5

GROUNDWATER ANALYSIS DATA

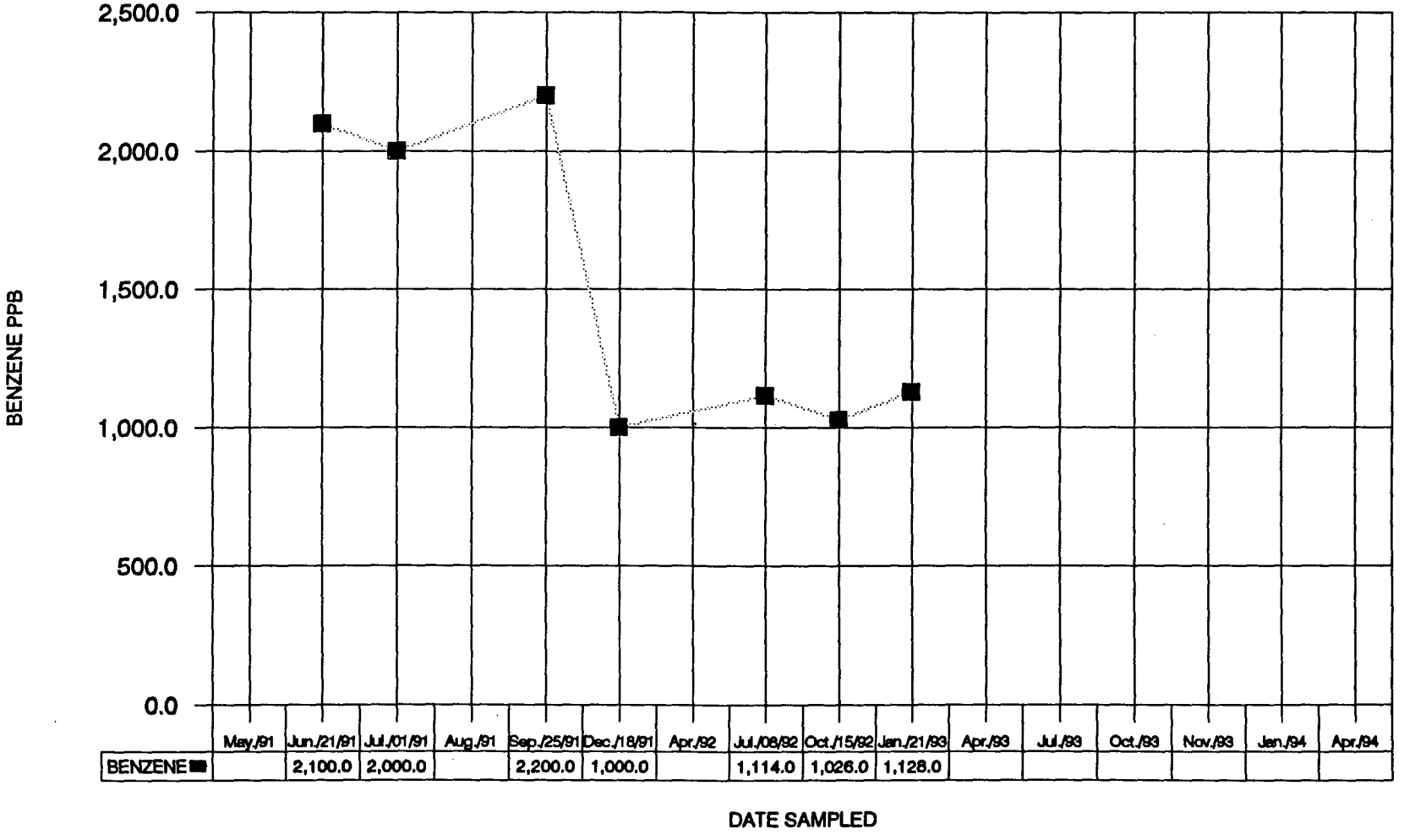
MW#55 BH-81



	May./91	Jun./30/91	Jul./91	Aug./91	Sep./25/91	Dec./18/91	Apr./16/92	Jul./08/92	Oct./14/92	Jan./20/93	Apr./14/93	Jul./14/93	Oct./14/93	Nov./93	Jan./12/94	Apr./8/94
BENZENE		0.0			940.0	400.0	295.5	483.0	214.7	518.0	412.0	625.0	581.0		290.0	370.0

GROUNDWATER ANALYSIS DATA

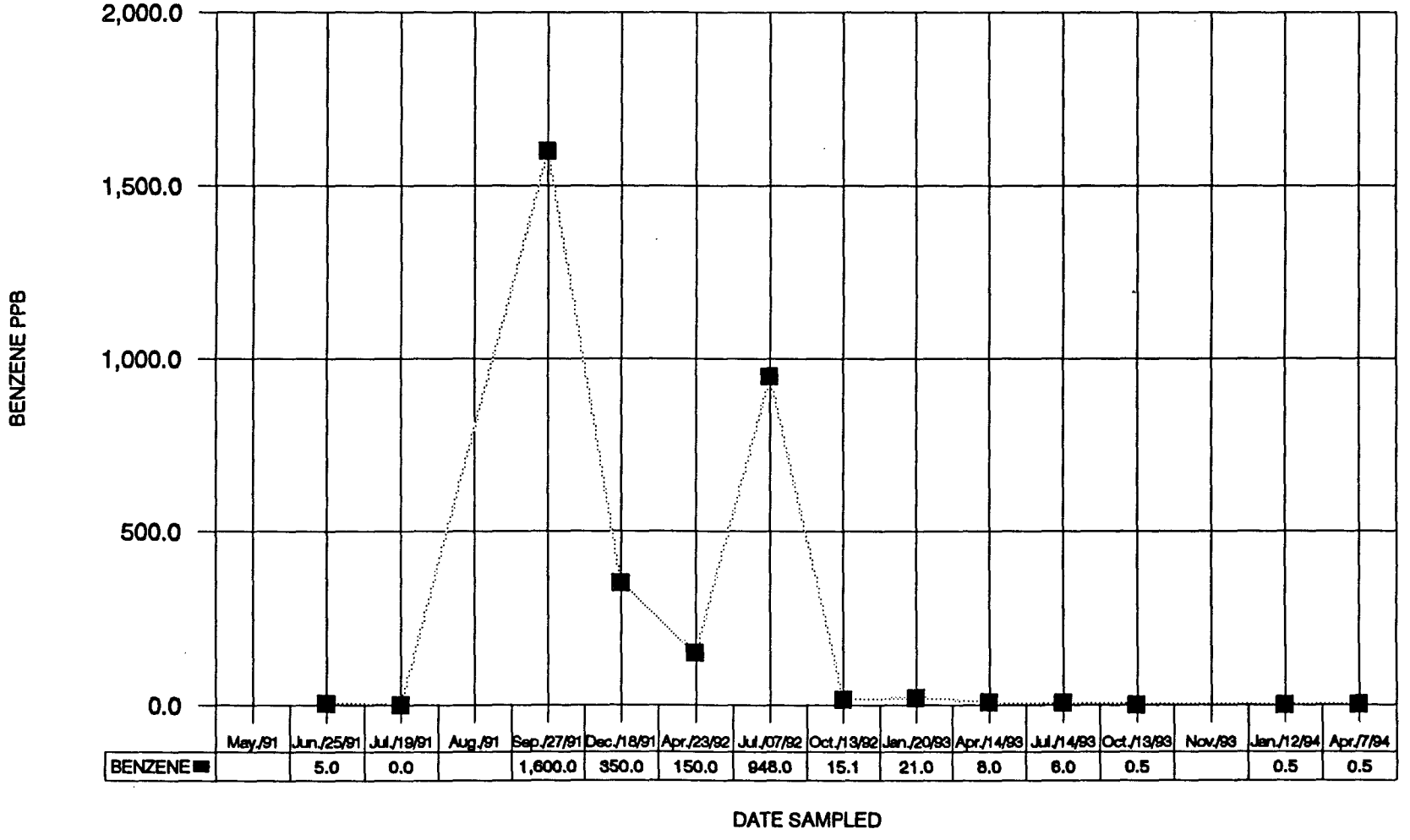
MW#56 BH-82



	May./91	Jun./21/91	Jul./01/91	Aug./91	Sep./25/91	Dec./18/91	Apr./92	Jul./08/92	Oct./15/92	Jan./21/93	Apr./93	Jul./93	Oct./93	Nov./93	Jan./94	Apr./94
BENZENE		2,100.0	2,000.0		2,200.0	1,000.0		1,114.0	1,026.0	1,128.0						

GROUNDWATER ANALYSIS DATA

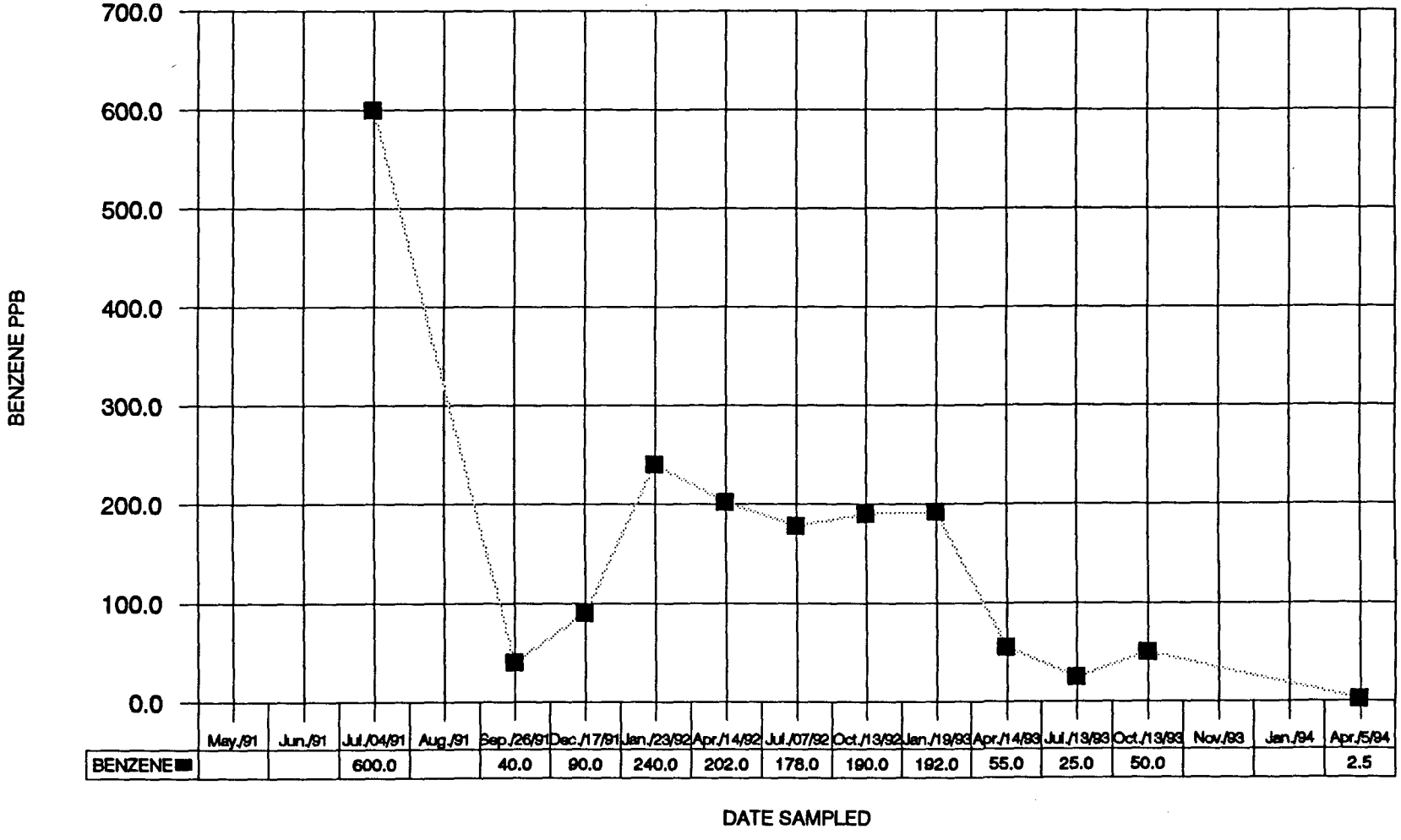
MW#57 BH-83



	May./91	Jun./25/91	Jul./19/91	Aug./91	Sep./27/91	Dec./18/91	Apr./23/92	Jul./07/92	Oct./13/92	Jan./20/93	Apr./14/93	Jul./14/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94
BENZENE		5.0	0.0		1,600.0	350.0	150.0	948.0	15.1	21.0	8.0	6.0	0.5		0.5	0.5

GROUNDWATER ANALYSIS DATA

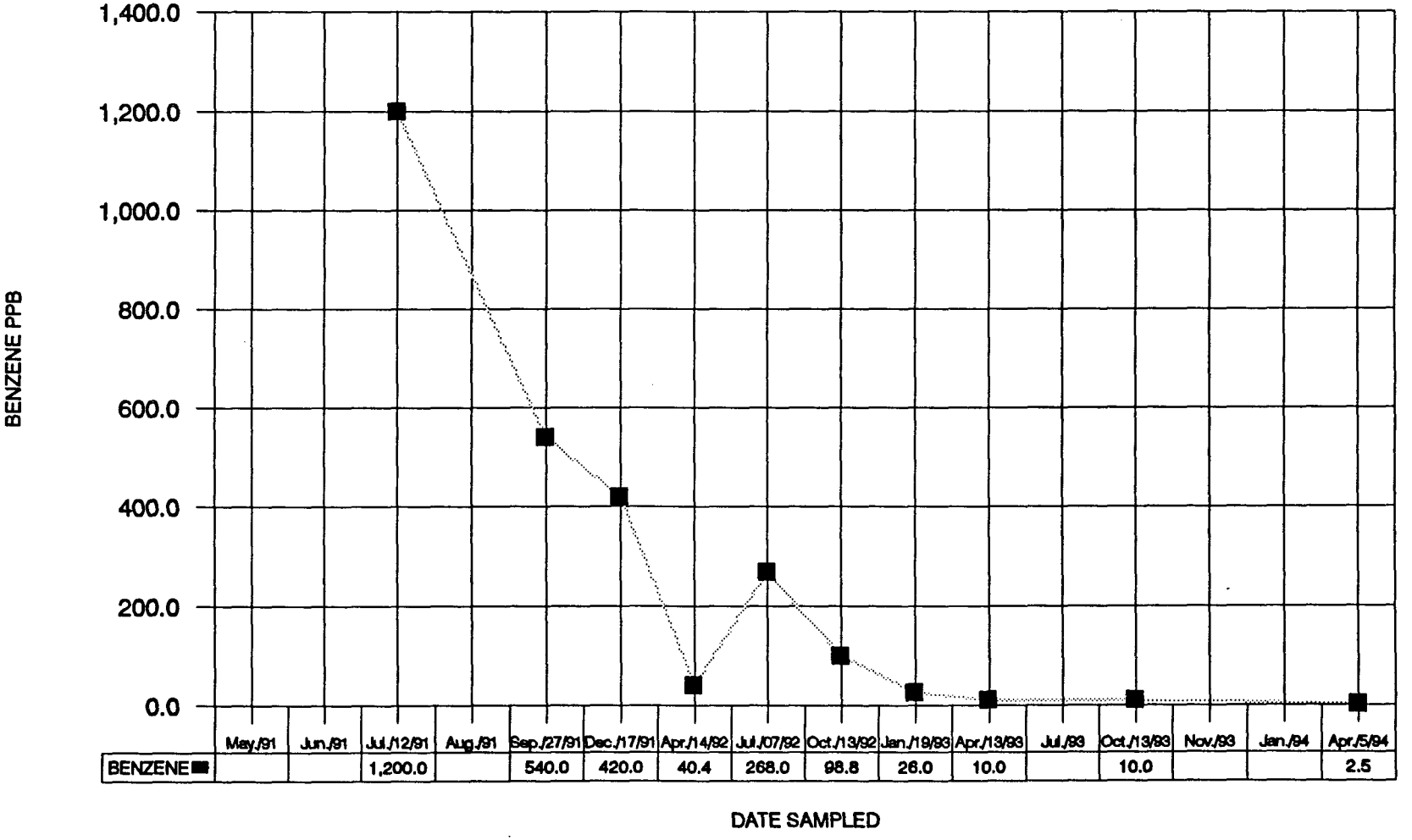
MW#58 BH-84



	May./91	Jun./91	Jul./04/91	Aug./91	Sep./26/91	Dec./17/91	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./14/93	Jul./13/93	Oct./13/93	Nov./93	Jan./94	Apr./5/94
BENZENE			600.0		40.0	90.0	240.0	202.0	178.0	190.0	192.0	55.0	25.0	50.0			2.5

GROUNDWATER ANALYSIS DATA

MW#59 BH-85

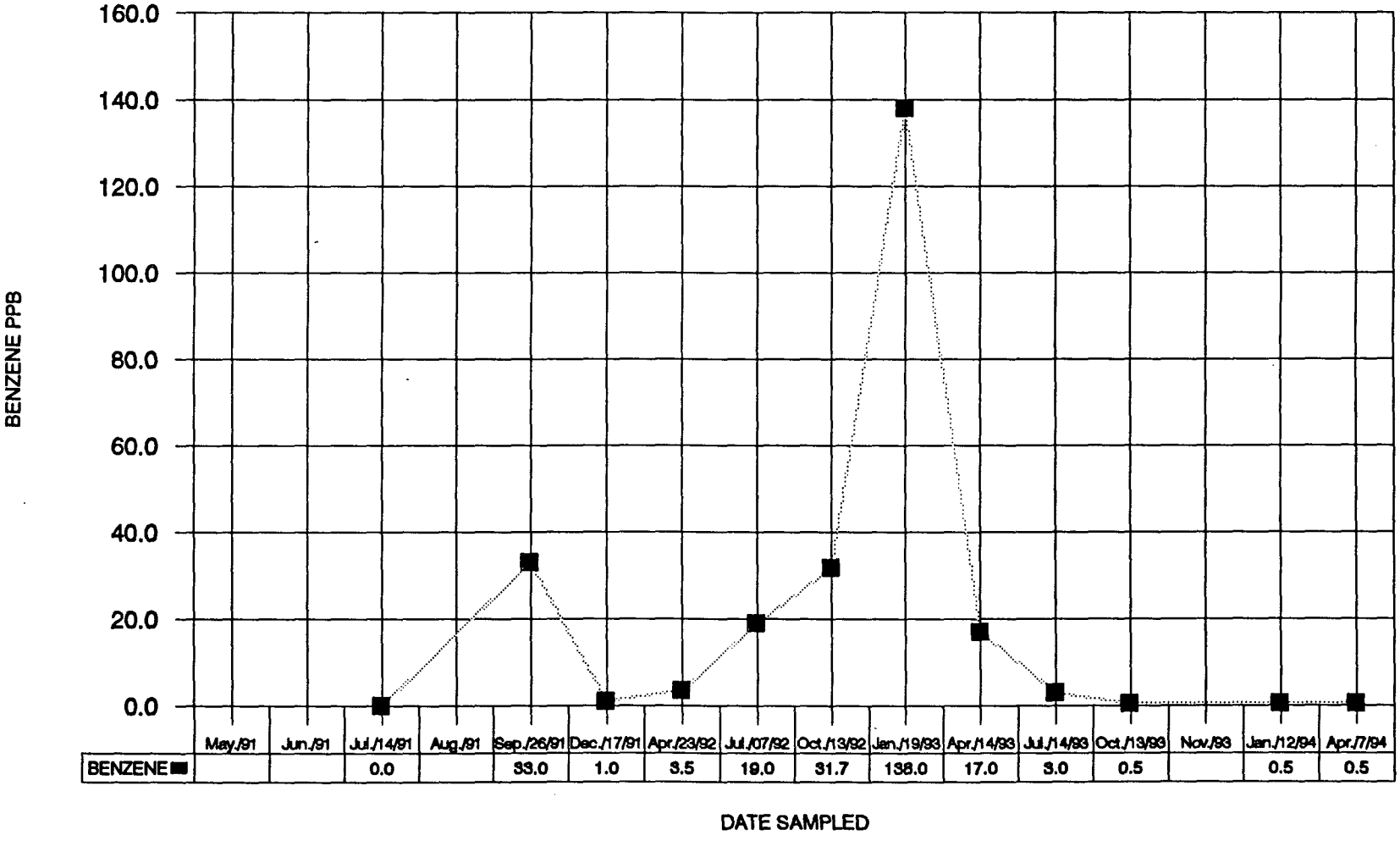


	May./91	Jun./91	Jul./12/91	Aug./91	Sep./27/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./93	Oct./13/93	Nov./93	Jan./94	Apr./5/94
BENZENE			1,200.0		540.0	420.0	40.4	268.0	98.8	26.0	10.0		10.0			2.5

DATE SAMPLED

GROUNDWATER ANALYSIS DATA

MW#60 BH-86

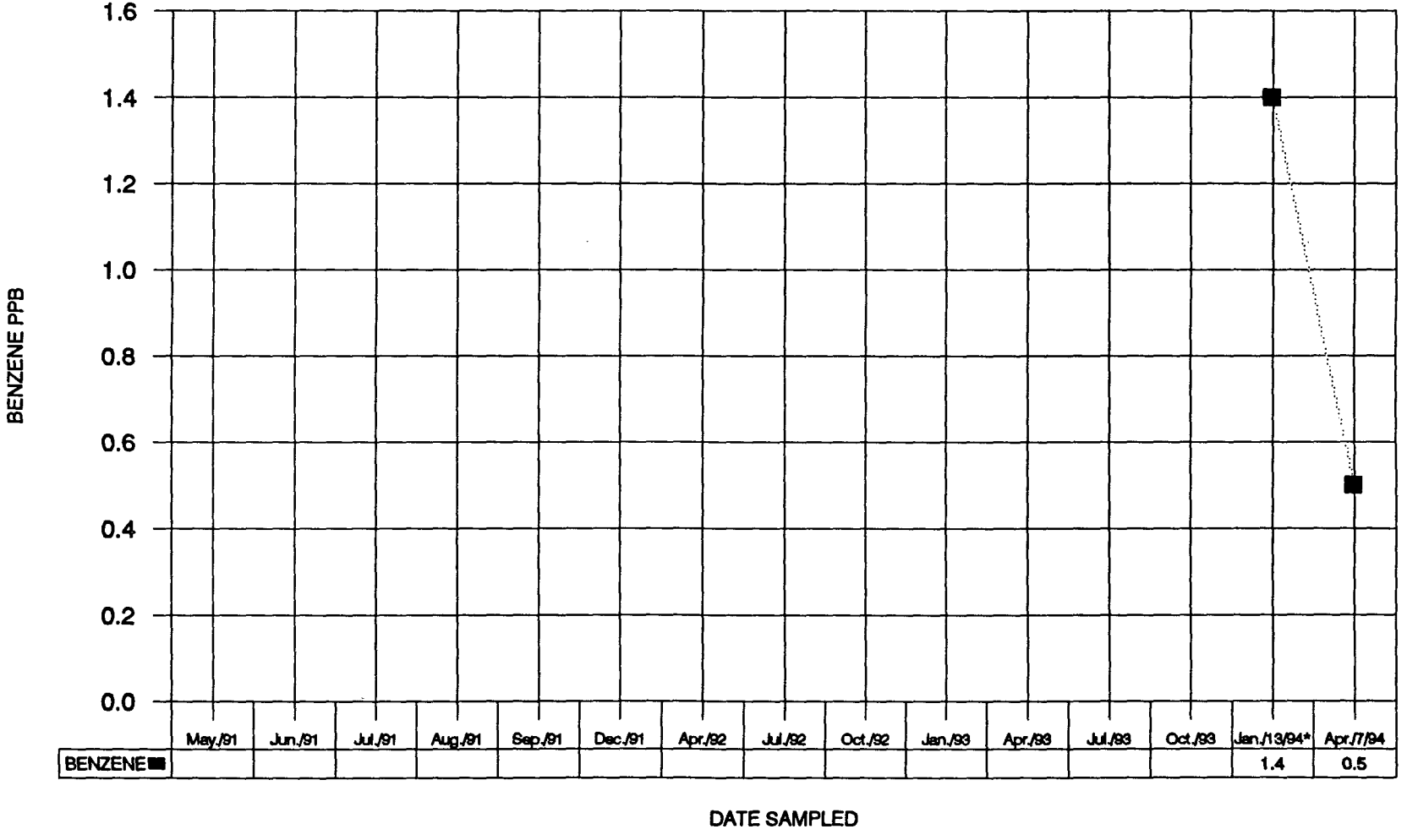


	May./91	Jun./91	Jul./14/91	Aug./91	Sep./26/91	Dec./17/91	Apr./23/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./14/93	Jul./14/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94
BENZENE ■			0.0		33.0	1.0	3.5	19.0	31.7	138.0	17.0	3.0	0.5		0.5	0.5

DATE SAMPLED

BOREHOLE WATER ANALYSIS DATA

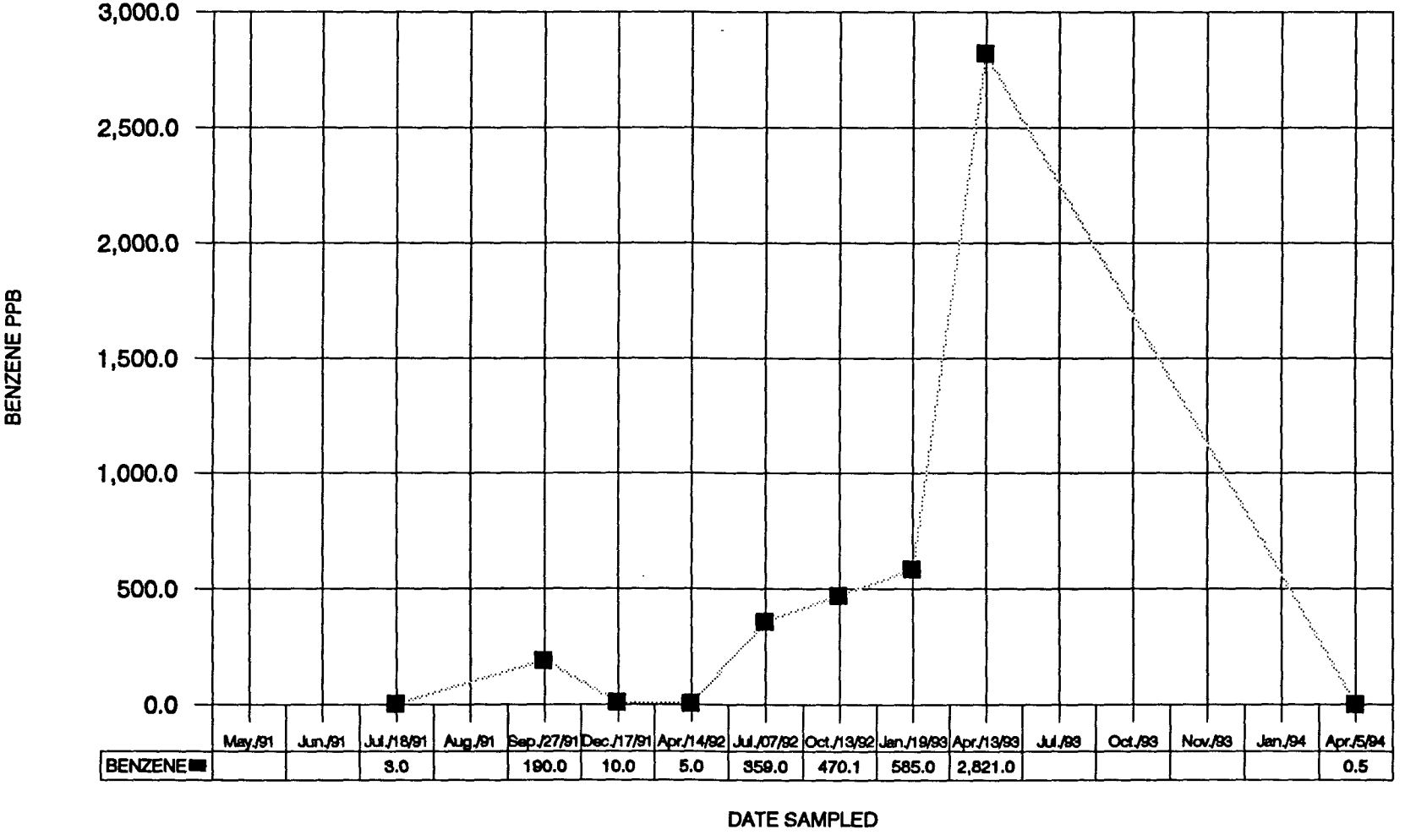
MW#61 BH-87



*- Jan. 1994 is the first time to sample this well.

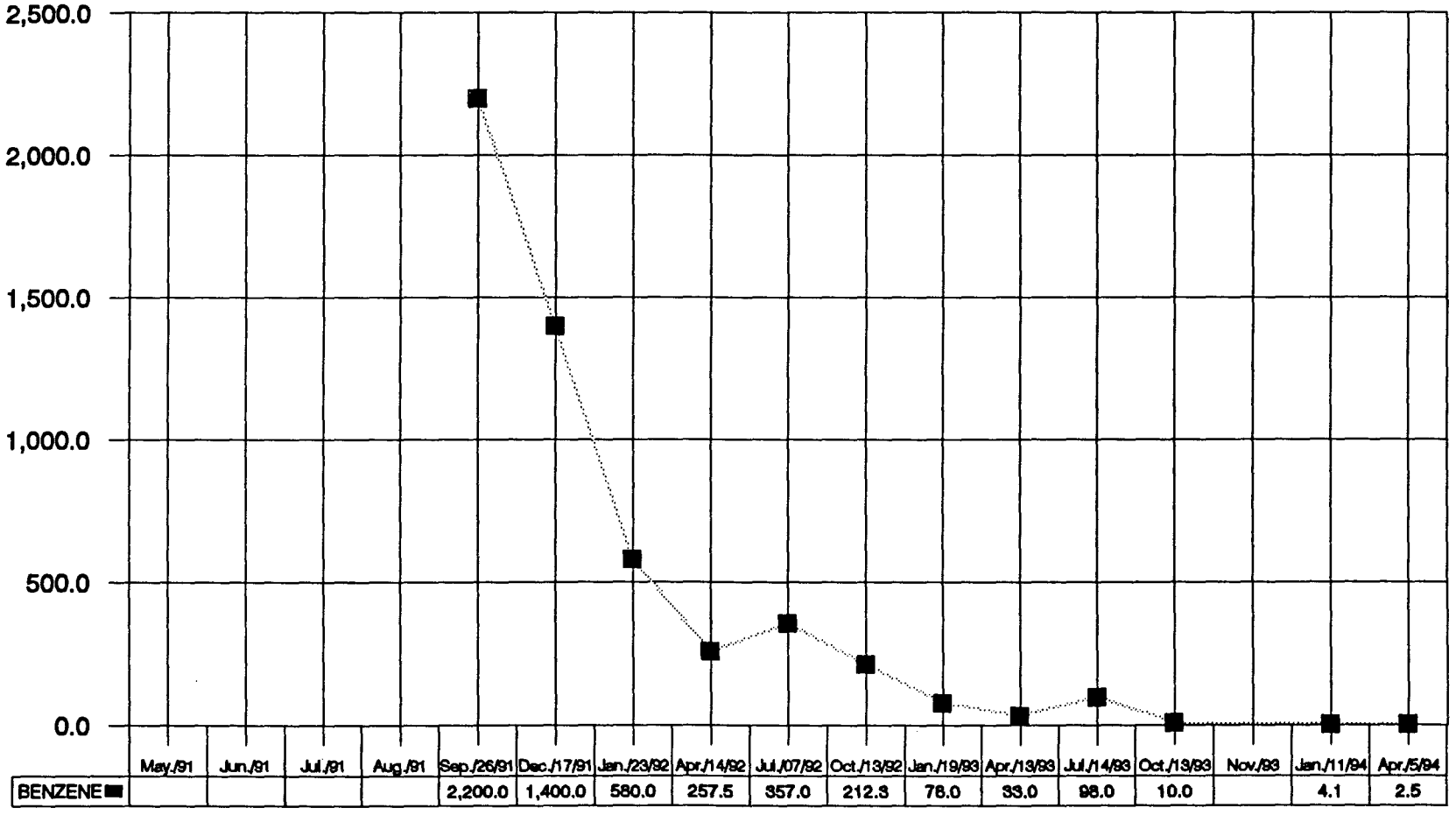
GROUNDWATER ANALYSIS DATA

MW#61A BH-87A



GROUNDWATER ANALYSIS DATA

MW#62 BH-88

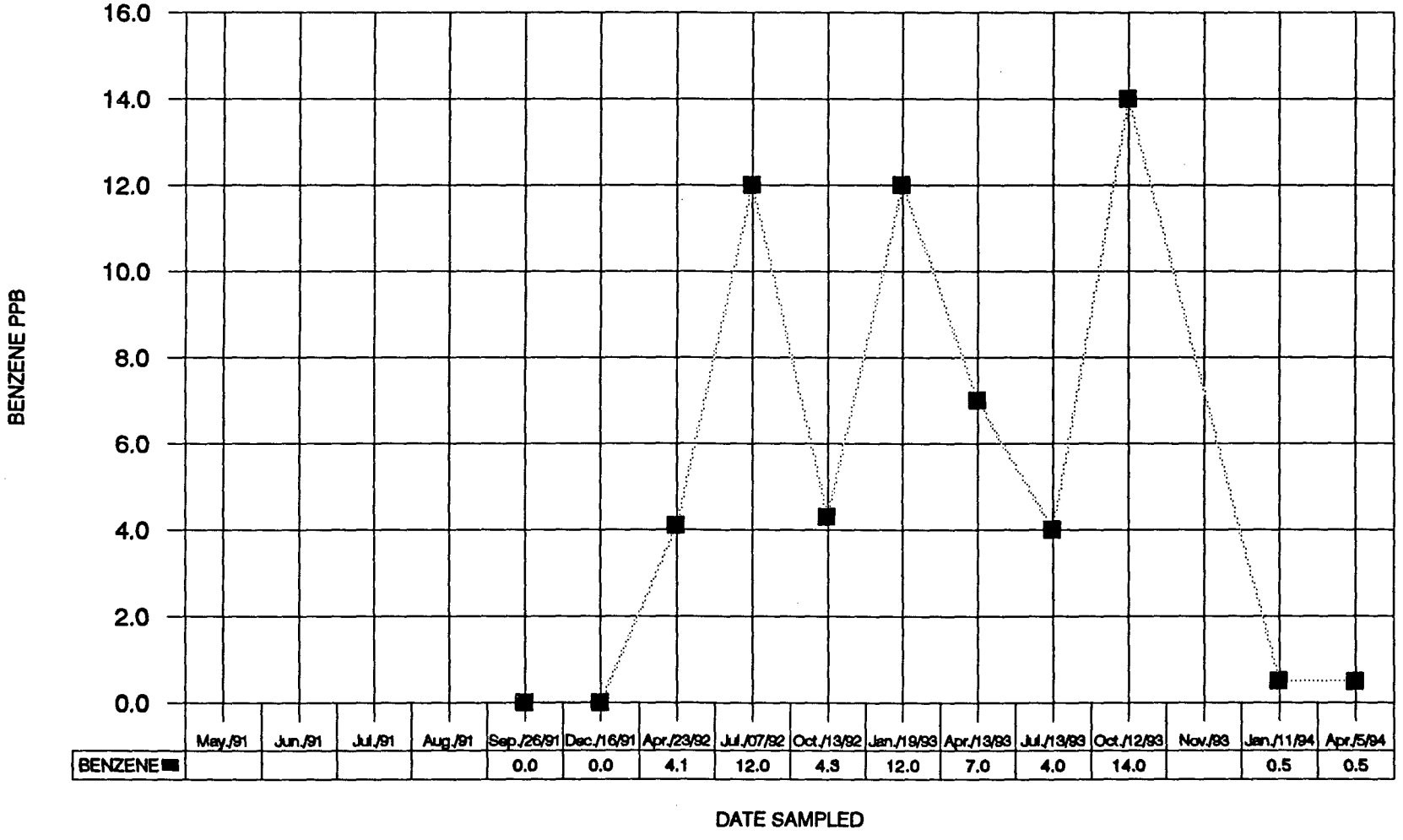


	May./91	Jun./91	Jul./91	Aug./91	Sep./26/91	Dec./17/91	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./14/93	Oct./13/93	Nov./93	Jan./11/94	Apr./5/94
BENZENE					2,200.0	1,400.0	580.0	257.5	357.0	212.3	78.0	33.0	98.0	10.0		4.1	2.5

DATE SAMPLED

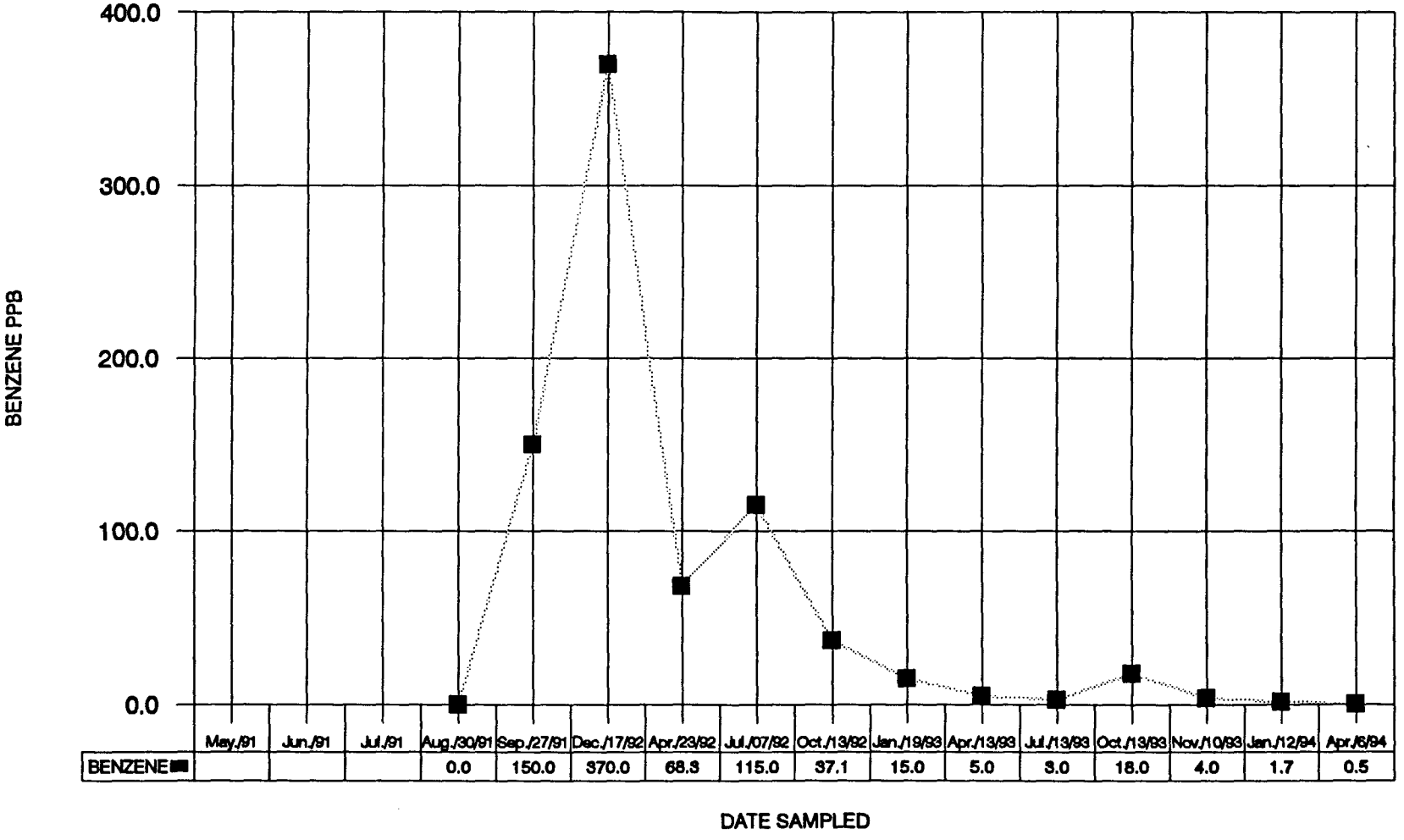
GROUNDWATER ANALYSIS DATA

MW#63 BH-89



BOREHOLE WATER ANALYSIS DATA

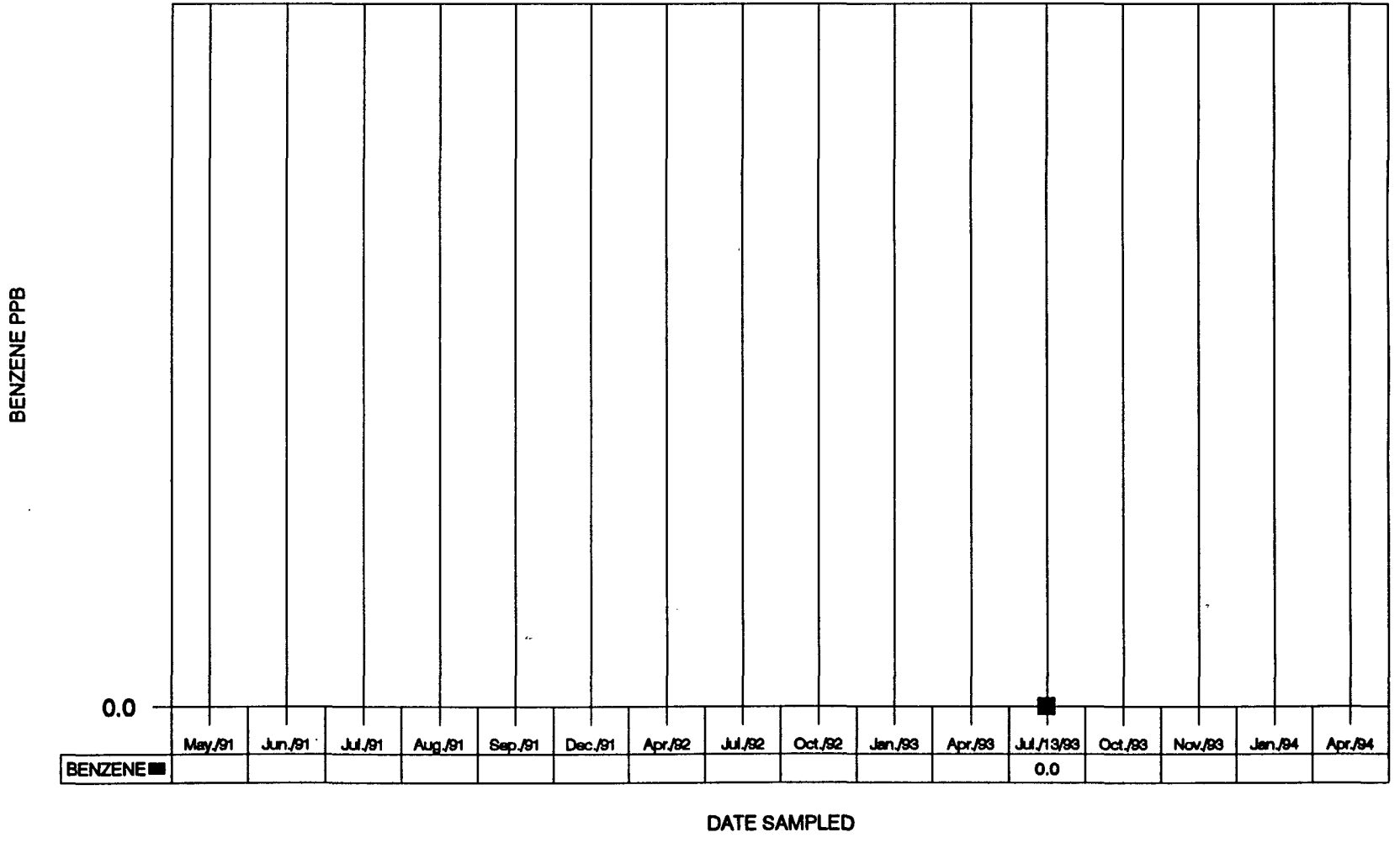
MW#64 BH-90



	May./91	Jun./91	Jul./91	Aug./30/91	Sep./27/91	Dec./17/92	Apr./23/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./10/93	Jan./12/94	Apr./6/94
BENZENE				0.0	150.0	370.0	68.3	115.0	37.1	15.0	5.0	3.0	18.0	4.0	1.7	0.5

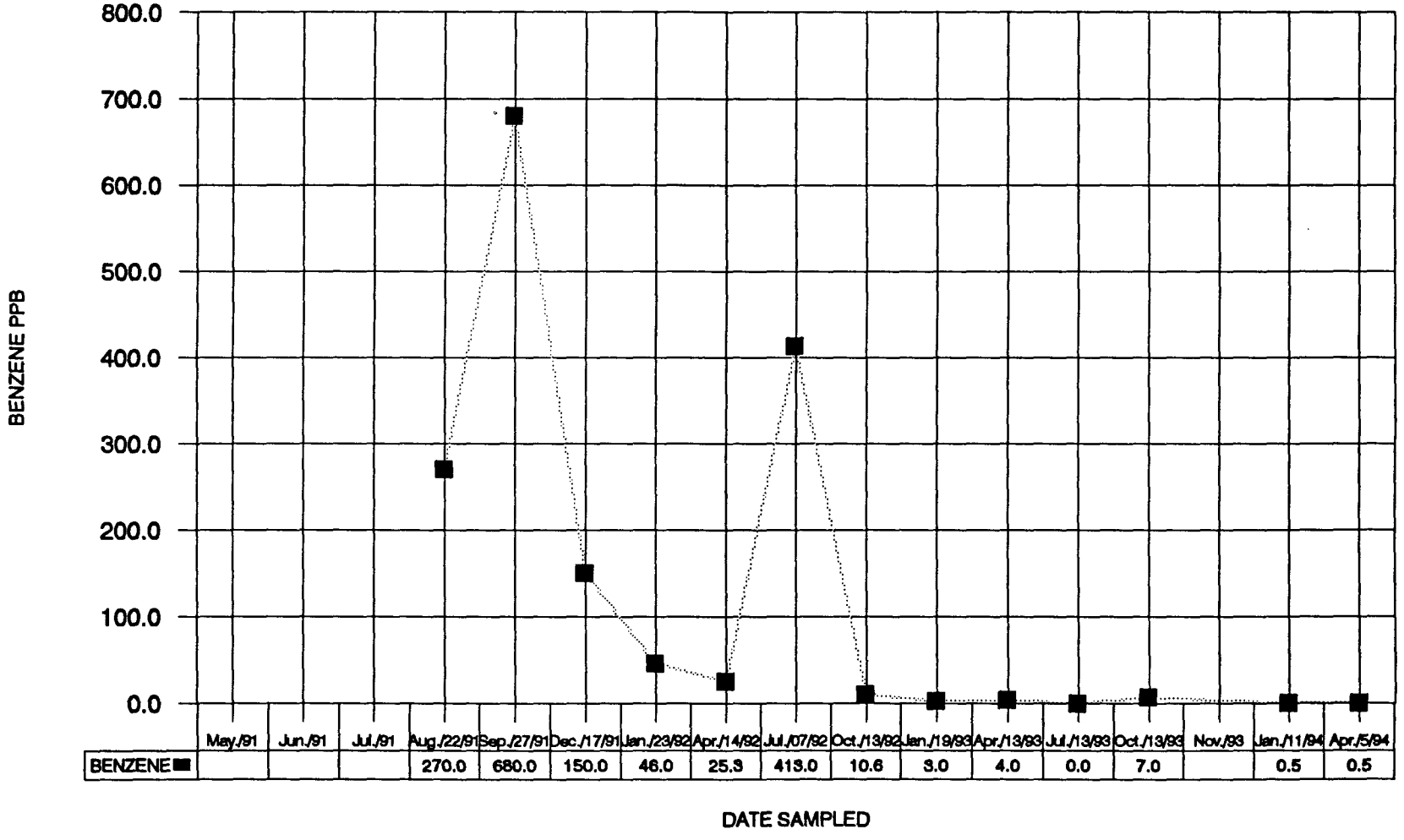
BOREHOLE WATER ANALYSIS DATA

MW#65 BH-91



BOREHOLE WATER ANALYSIS DATA

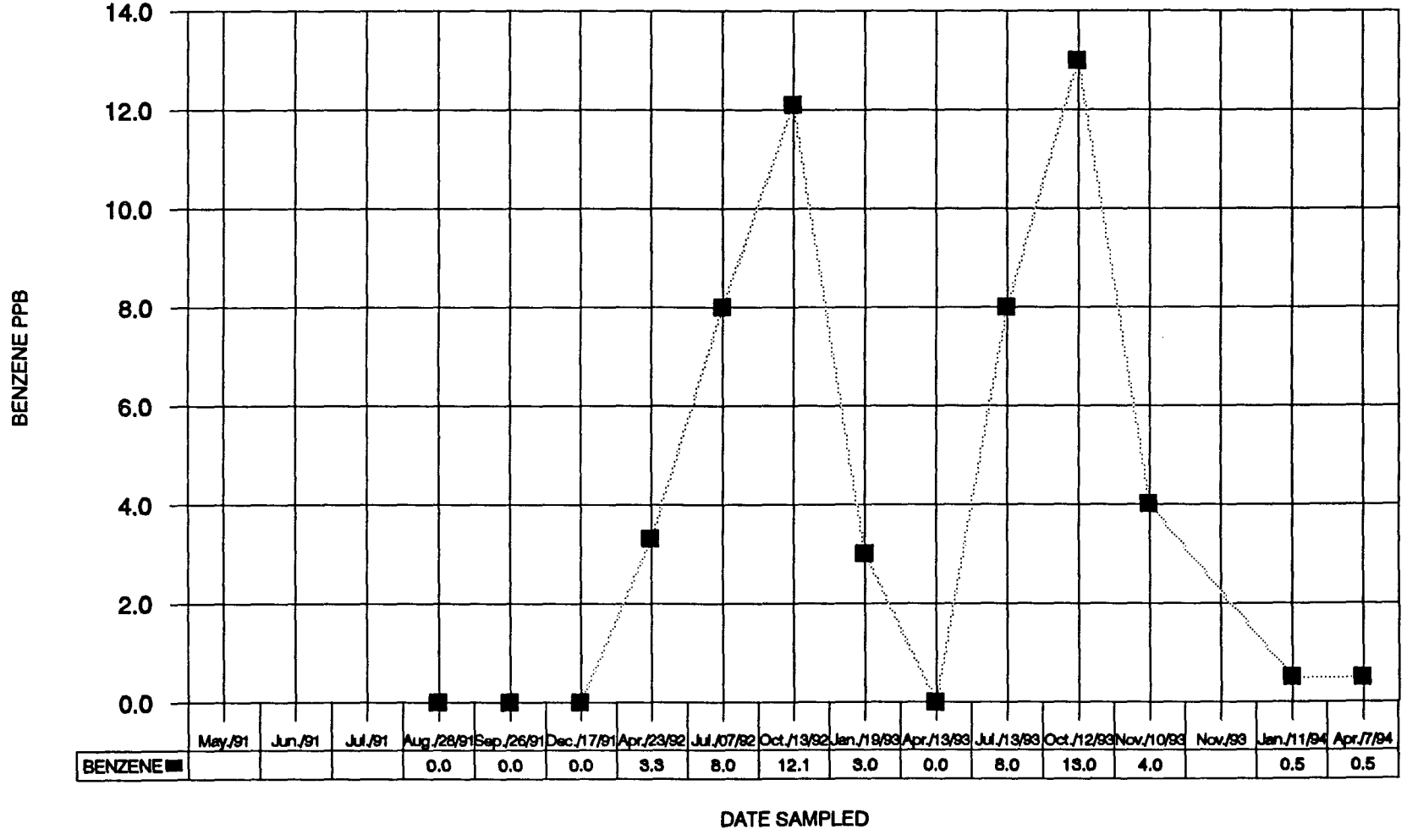
MW#65A BH-91A



	May./91	Jun./91	Jul./91	Aug./22/91	Sep./27/91	Dec./17/91	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./93	Jan./11/94	Apr./5/94
BENZENE				270.0	680.0	150.0	46.0	25.3	413.0	10.6	3.0	4.0	0.0	7.0		0.5	0.5

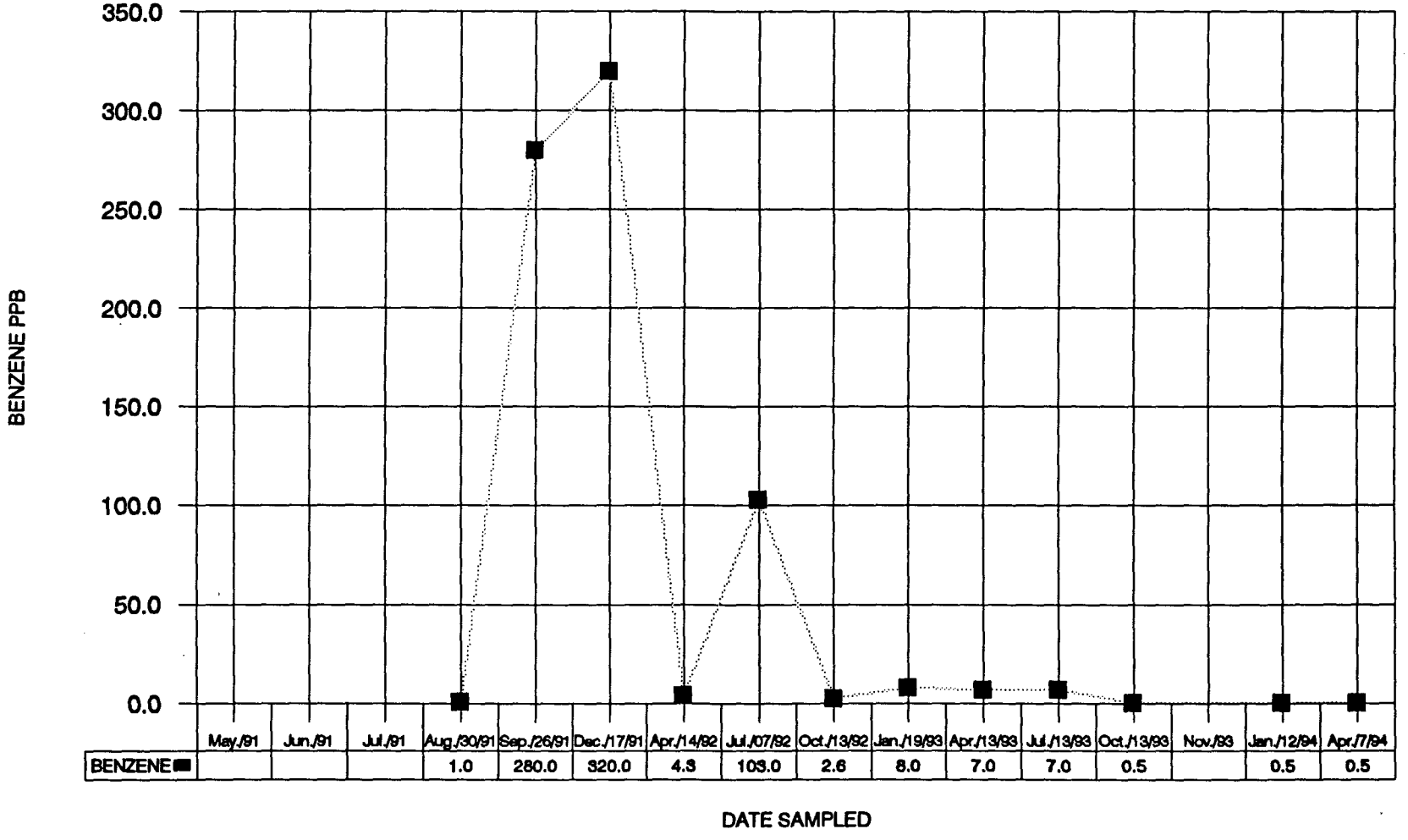
GROUNDWATER ANALYSIS DATA

MW#66 BH-92



GROUNDWATER ANALYSIS DATA

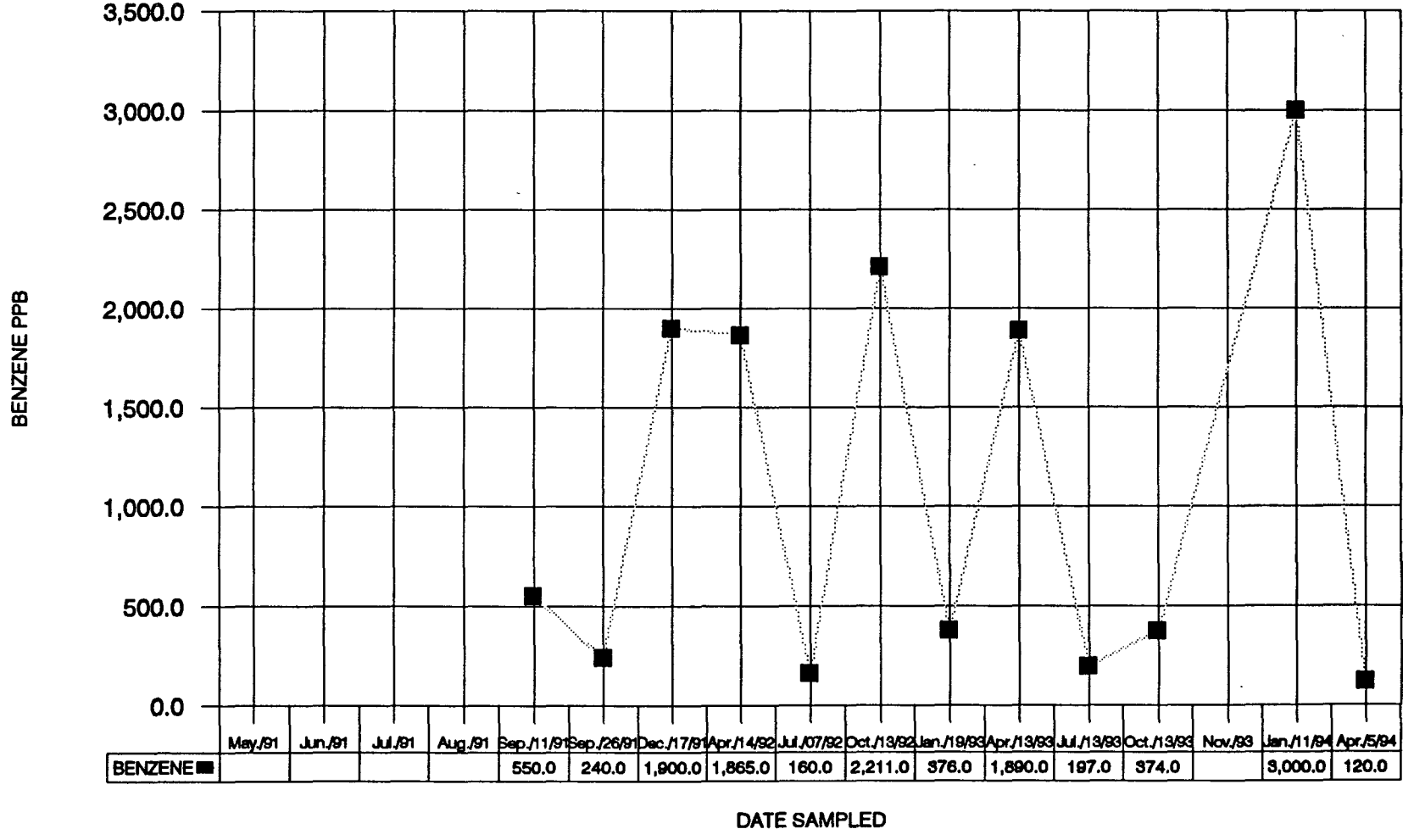
MW#67 BH-93



	May./91	Jun./91	Jul./91	Aug./30/91	Sep./26/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94
BENZENE				1.0	280.0	320.0	4.3	103.0	2.6	8.0	7.0	7.0	0.5		0.5	0.5

GROUNDWATER ANALYSIS DATA

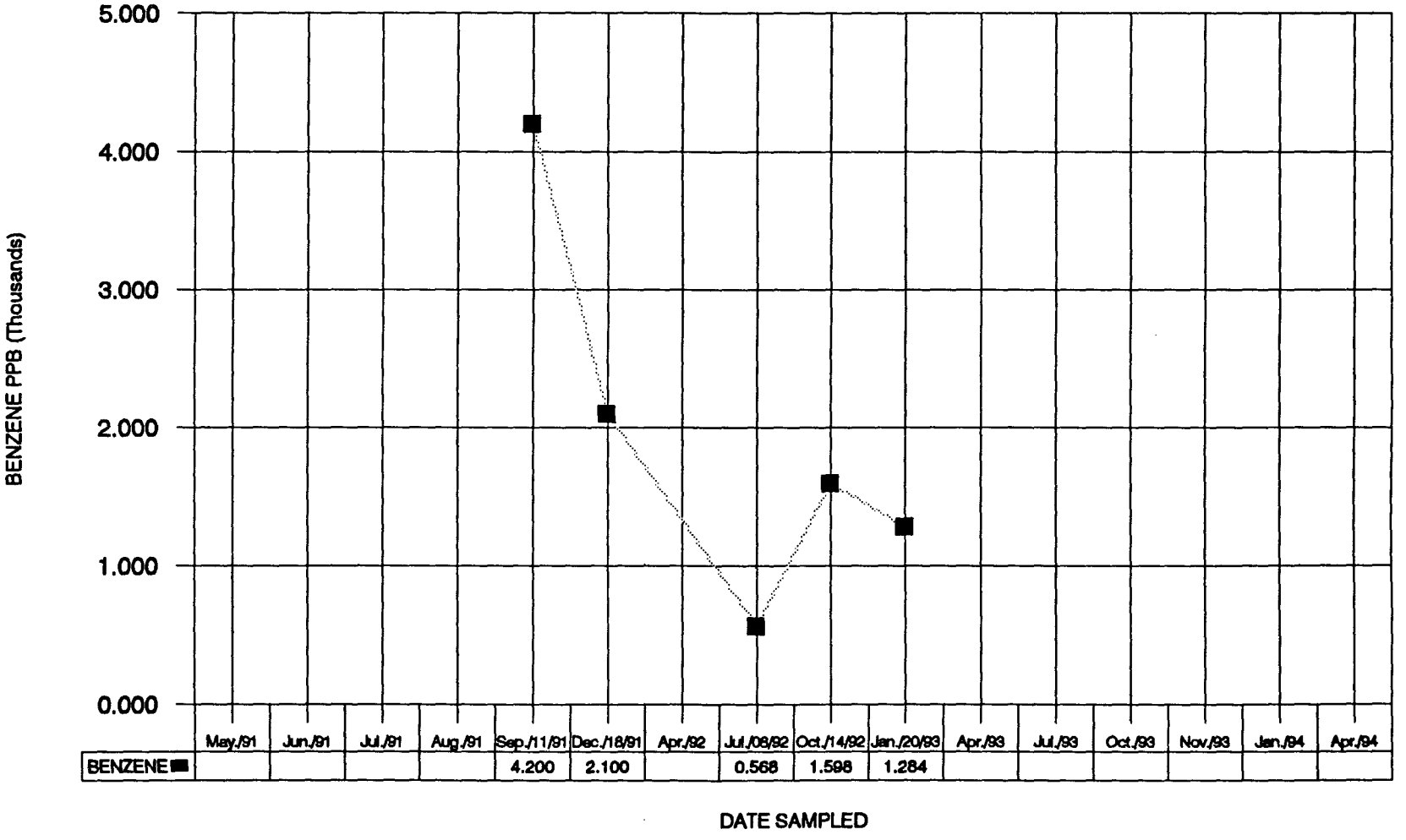
MW#68 BH-94



	May./91	Jun./91	Jul./91	Aug./91	Sep./11/91	Sep./26/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./93	Jan./11/94	Apr./5/94
BENZENE					550.0	240.0	1,900.0	1,865.0	160.0	2,211.0	376.0	1,890.0	197.0	374.0		3,000.0	120.0

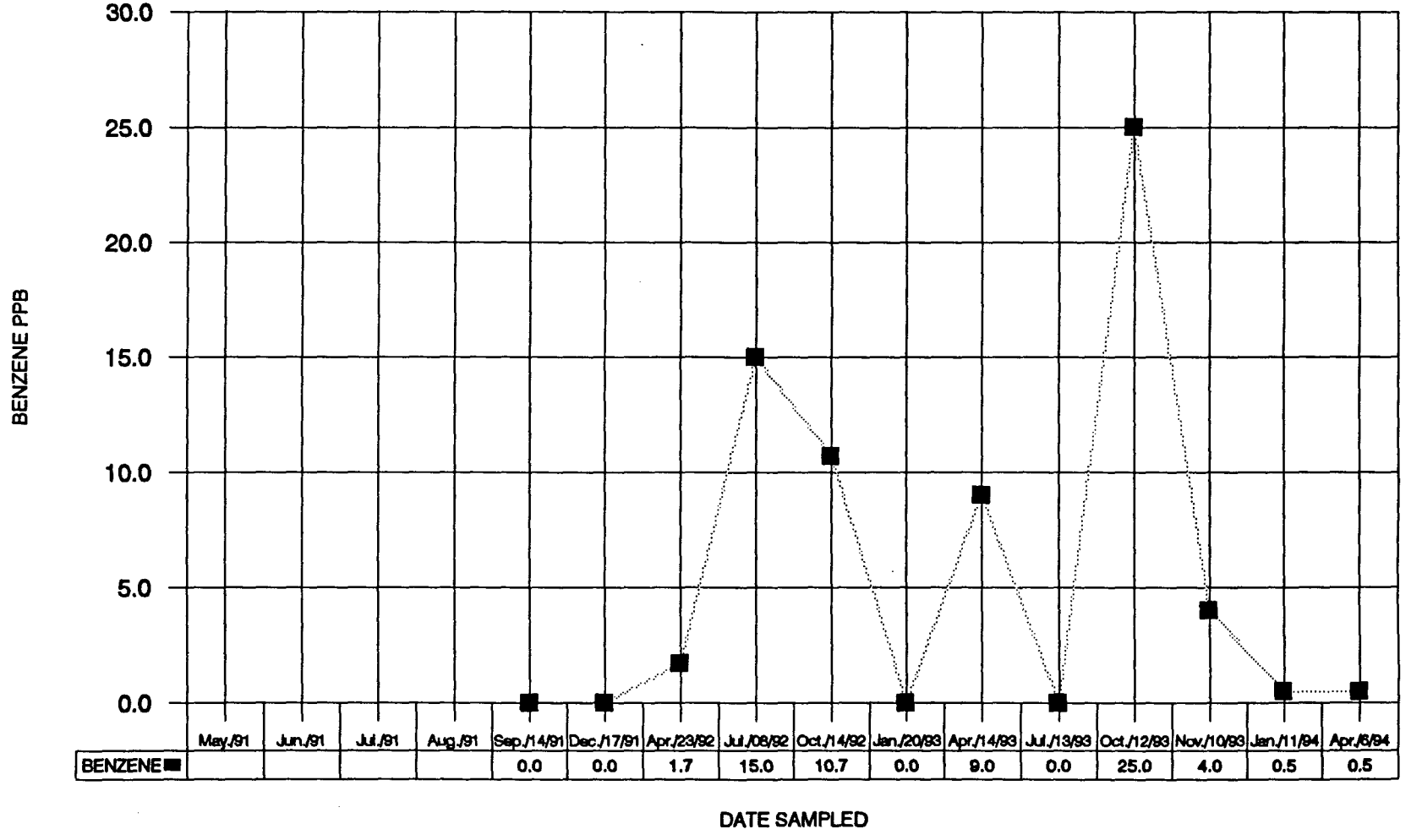
GROUNDWATER ANALYSIS DATA

MW#69 BH-95



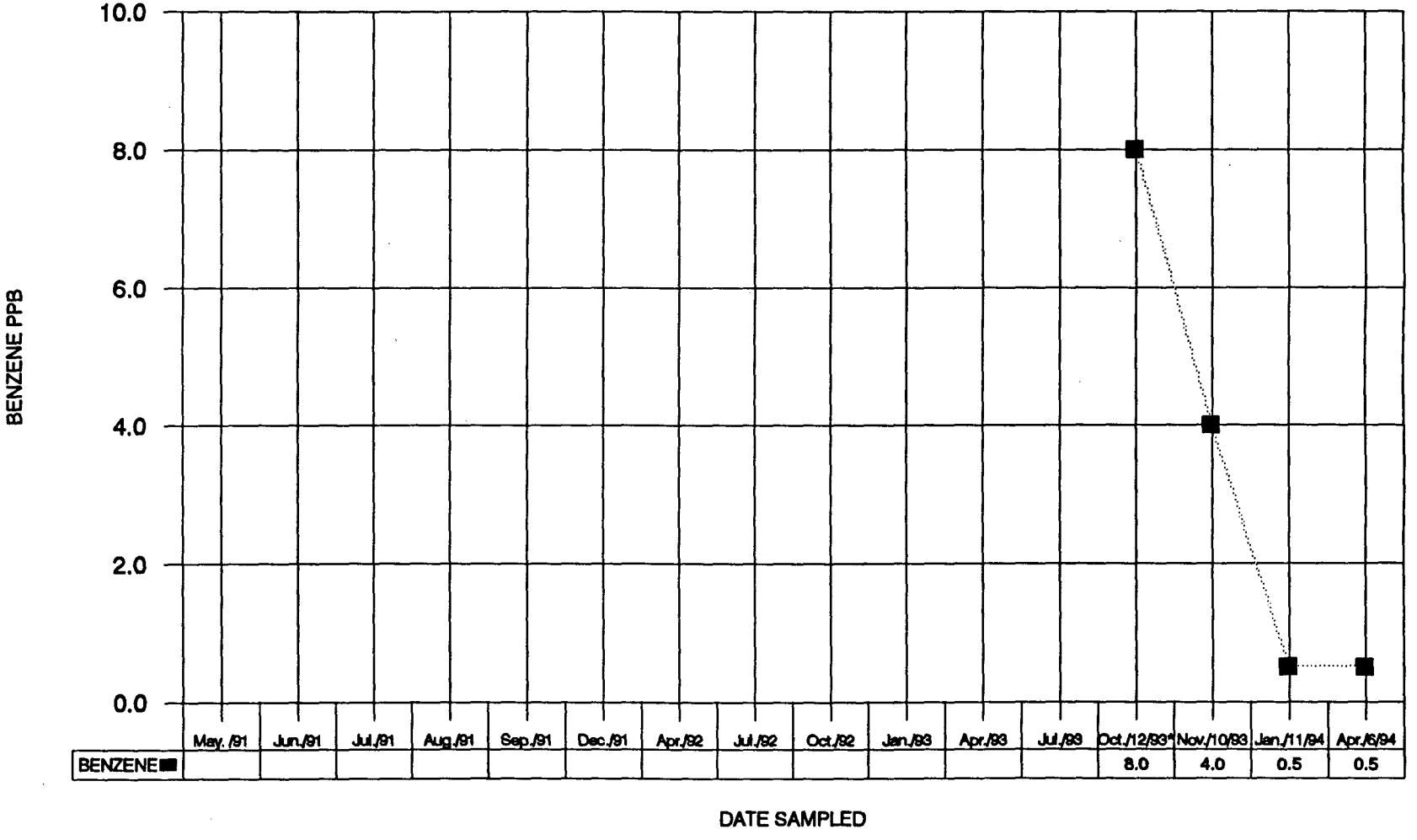
GROUNDWATER ANALYSIS DATA

MW#70 BH-97



GROUNDWATER ANALYSIS DATA

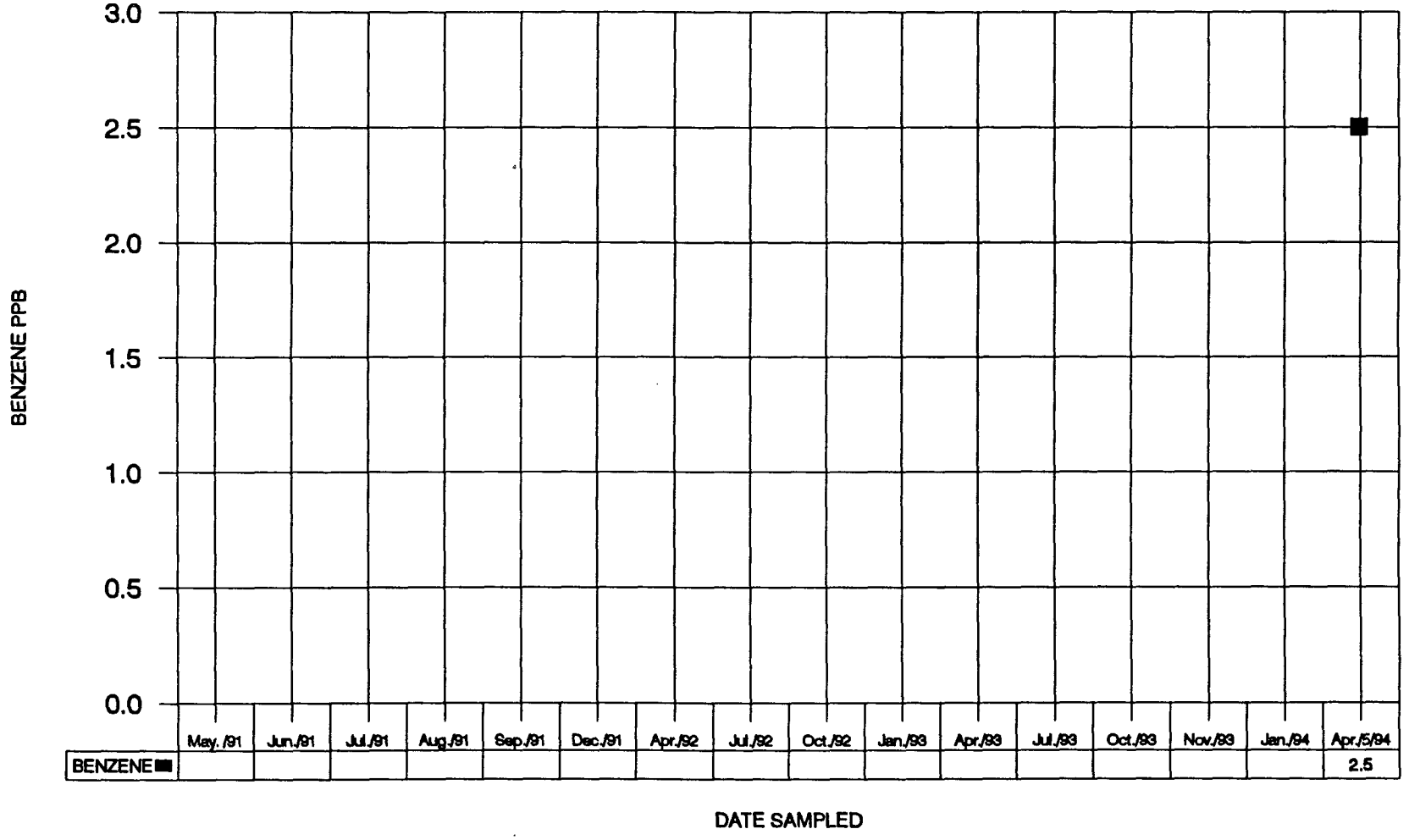
MW#71 BH-98



* 10/12/93 is the first time to sample this well.

GROUNDWATER ANALYSIS DATA

MW#72 BH-99



APPENDIX D

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

MONTHLY LABORATORY RESULTS

(MAY)

Analytical Technologies, Inc.

2709-D Pan American Freeway. NE Albuquerque. NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **405391**

June 6, 1994

Marathon Oil Company
PO Box 552
Albuquerque, NM 79702-0552

Project Name/Number: INDIAN BASIN REMEDIATION (NONE)

Attention: Robert Menzie

On **05/20/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Chloride analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

EPA Method 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jd

Enclosure

Analytical Technologies, Inc.

CLIENT	: MARATHON OIL COMPANY	DATE RECEIVED	: 05/20/94
PROJECT #	: (NONE)		
PROJECT NAME	: INDIAN BASIN REMEDIATION	REPORT DATE	: 06/06/94

ATI ID: 405391

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	ARROYO	AQUEOUS	05/19/94
02	LYMAN	AQUEOUS	05/19/94
03	STRIPPER OUTLET	AQUEOUS	05/19/94
04	STRIPPER INLET	AQUEOUS	05/19/94
05	SW-1	AQUEOUS	05/19/94
06	TRIP BLANK	AQUEOUS	05/13/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 405391

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN

DATE RECEIVED : 05/20/94
REPORT DATE : 05/31/94

PARAMETER	UNITS	01	02	05
CHLORIDE (EPA 325.2)	MG/L	12.2	12.1	21

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN ATI I.D. : 405391

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	40539306	97	97	0	195	100	98

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 1$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 405391

PROJECT # : (NONE)

PROJECT NAME : INDIAN BASIN REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	ARROYO	AQUEOUS	05/19/94	NA	05/23/94	1
02	LYMAN	AQUEOUS	05/19/94	NA	05/23/94	1
03	STRIPPER OUTLET	AQUEOUS	05/19/94	NA	05/23/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	<0.5	0.7
TOLUENE	UG/L	<0.5	<0.5	2.1
ETHYLBENZENE	UG/L	<0.5	<0.5	2.8
TOTAL XYLENES	UG/L	<0.5	<0.5	2.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		89	93	85

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 405391

PROJECT # : (NONE)

PROJECT NAME : INDIAN BASIN REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	STRIPPER INLET	AQUEOUS	05/19/94	NA	05/23/94	20
05	SW-1	AQUEOUS	05/19/94	NA	05/23/94	1
06	TRIP BLANK	AQUEOUS	05/13/94	NA	05/23/94	1

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	80	<0.5	<0.5
TOLUENE	UG/L	31	<0.5	<0.5
ETHYLBENZENE	UG/L	13	<0.5	<0.5
TOTAL XYLENES	UG/L	780	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		85	93	93

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 405391
BLANK I.D.	: 052394	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 05/23/94
PROJECT NAME	: INDIAN BASIN REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		92

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40539101	ATI I.D.	: 405391
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 05/23/94
PROJECT NAME	: INDIAN BASIN REMEDIATION	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40539101	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	10	100	10	100	0
TOLUENE	<0.5	10	11	110	10	100	10
ETHYLBENZENE	<0.5	10	11	110	11	110	0
TOTAL XYLENES	<0.5	30	34	113	33	110	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 5-19-94 PAGE 1 OF 1

ATI LAB I.D. 405391

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO: Bob Menzie
COMPANY: Marathon Oil Co.
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Chloride	NUMBER OF CONTAINERS
Arroyo	5-19-94	11:37a	Water	01	✓	✓	3
Lyman		11:55a		02	✓	✓	3
Stripper Outlet		12:05p		03	✓		2
Stripper Inlet		12:12p		04	✓		2
SW-1		12:25p		05	✓	✓	3
Trip Blank	5-13-94		Water	06	✓		1

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:		NO. CONTAINERS	14
PROJ. NAME:	INDIAN BASIN REMEDIATN.	CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:	GREYHOUND	RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: RM Gray Time: 1:10	Signature: Time:	Signature: Time:
Printed Name: RM Gray Date: 5-19-94	Printed Name: Date:	Printed Name: Date:
Company: MOC Phone: 915 687-8314	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY:(LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1400
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 5/20/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

AnalyticalTechnologies, Inc. Albuquerque, NM

Chain of Custody

DATE 5/20/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER: D Ladd

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310		8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
405391-1	5/19/94	1137	AQ	1						X																					1
-2	"	1155	"	2						X																					1
-5	"	1225	"	5						X																					1

PROJECT INFORMATION

PROJECT NUMBER: 405391
PROJECT NAME: MOC
QC LEVEL: (STD.) IV
QC REQUIRED: MS MSD BLANK
TAT: (STANDARD) RUSHI

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	X
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	405391

DUE DATE: 6/6/94
RUSH SURCHARGE:
CLIENT DISCOUNT: ~~0~~ %
quote prices - 16.00/sample

W.O.#HK769

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX X
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: Terri DeHre Time: 1730
Printed Name: Terri DeHre Date: 5/20/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 09:07
Printed Name: Date: 5-21-94
Company:

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

APPENDIX E

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

MONTHLY LABORATORY RESULTS

(JUNE)

Analytical Technologies, Inc.

2709-D Pan American Freeway. NE Albuquerque. NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **406409**

July 15, 1994

Marathon Oil Co.
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: INDIAN BASIN REMED.

Attention: Robert J. Menzie Jr.

On **06/25/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Chloride analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

EPA Method 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

MCR

JUL 18 1994

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

Environmental & Safety

Analytical Technologies, Inc.

CLIENT : MARATON OIL CO.
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 06/25/94
REPORT DATE : 07/15/94

ATI ID: 406409

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	ARROYO	AQUEOUS	06/23/94
02	LYMAN	AQUEOUS	06/23/94
03	SW-1	AQUEOUS	06/23/94
04	AIR STRIP INLET	AQUEOUS	06/23/94
05	AIR STRIP OUTLET	AQUEOUS	06/23/94
06	TRIP BLANK	AQUEOUS	06/16/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 406409

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 06/25/94
REPORT DATE : 07/15/94

PARAMETER	UNITS	01	02	03
CHLORIDE (EPA 325.2)	MG/L	13	12	21

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN REMED. ATI I.D. : 406409

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	40601301	71	70	1	174	100	103

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATON OIL CO. ATI I.D.: 406409

PROJECT # : (NONE)

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	ARROYO	AQUEOUS	06/23/94	NA	06/30/94	1
02	LYMAN	AQUEOUS	06/23/94	NA	06/29/94	1
03	SW-1	AQUEOUS	06/23/94	NA	06/29/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		100	101	99

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATON OIL CO. ATI I.D.: 406409

PROJECT # : (NONE)

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	AIR STRIP INLET	AQUEOUS	06/23/94	NA	06/30/94	5
05	AIR STRIP OUTLET	AQUEOUS	06/23/94	NA	06/30/94	1
06	TRIP BLANK	AQUEOUS	06/16/94	NA	06/30/94	1

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	10	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	15	1.6	<0.5
TOTAL XYLENES	UG/L	130	21	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		89	98	94

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 406409
BLANK I.D.	: 062994	MATRIX	: AQUEOUS
CLIENT	: MARATON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 06/29/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		95

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 406409
BLANK I.D.	: 063094	MATRIX	: AQUEOUS
CLIENT	: MARATON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 06/30/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		93

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40640406	ATI I.D.	: 406409
CLIENT	: MARATON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 06/29/94 06/30/94
PROJECT NAME	: INDIAN BASIN REMED.	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40640406	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	8.3	83	8.5	85	2
TOLUENE	<0.5	10	8.2	82	8.4	84	2
ETHYLBENZENE	<0.5	10	8.8	88	9.1	91	3
TOTAL XYLENES	<0.5	30	26	87	26	87	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical**Technologies,**Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 6-23-94 PAGE 1 OF 1

ATI LAB I.D. 406409

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie Jr.

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO: Same as above
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE (8020)	Chloride	NUMBER OF CONTAINERS
ARROYO	6-23-94	4:50 PM	water	-01	✓	✓	3
LYMAN		5:05 PM		-02	✓	✓	3
SW-1		5:30 PM		-03	✓	✓	3
AIR STRIP INLET		5:50 PM		-04	✓		2
AIR STRIP OUTLET		5:45 PM		-05	✓		2
TRIP BLANK	6-16-94			-06	✓		1

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:		NO. CONTAINERS	14
PROJ. NAME: INDIAN BASIN REMED.		CUSTODY SEALS	Y (N) NA
P.O. NO.:	AIRBORNE	RECEIVED INTACT	Y
SHIPPED VIA: ~~GREYHOUND~~		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☑ 2 WEEK

Comments:
CHAIN WAS RELINQUISHED & PACKAGED IN COOLER, BUT GREYHOUND WAS CLOSED. COOLER REOPENED AND RECEIVED AND THEN "RE"-RELINQUISHED TO AIRBORNE ON FRIDAY

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Jr. Time: 6:40 PM	Signature: Robert J. Menzie Jr. Time: 10:00 AM	Signature: Time:
Printed Name: Robert J. Menzie Jr. Date: 6-23-94	Printed Name: Robert J. Menzie Jr. Date: 6-24-94	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company: Marathon 915-687-8312	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Robert J. Menzie Jr. Time: 6:40 PM	Signature: Time:	Signature: Time: 11:10a
Printed Name: Robert J. Menzie Date: 6-23-94	Printed Name: Date:	Printed Name: Date: 6/25/94
Company: Marathon 915 687-8312	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 6/27/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310	8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
406409-1	6/23/94	1650	AQ	1						X																1
-2	"	1705	"	2						X																1
-3	"	1730	"	3						Y																1

PROJECT INFORMATION	
PROJECT NUMBER:	406409
PROJECT NAME:	ROC
QC LEVEL:	~~STD.~~ IV
QC REQUIRED:	~~MS~~ MSD BLANK
TAT:	~~STANDARD~~ RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	N
INTACT?	N
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	406409

DUE DATE: 7/12/94

RUSH SURCHARGE:

CLIENT DISCOUNT: ____%

$160.00/sample

W.O.# 14869

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: [signature] Time: 1730
Printed Name: Terri Lotto Date: 6/27/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: [signature] Time: 09:31
Printed Name: Date:
M. FOSTNER 6-28-94
Company:
ATI

APPENDIX F

STATE ENGINEER'S FLUID RECOVERY REPORTS

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, Texas 79702
Telephone 915/682-1626

May 10, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, May 2, 1994. Cumulative Lower Queen fluid removal through that date is 35,354,100 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	5/02/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	5672170	5,672,170 26,922[1]	5,699,092
MW-59 (BH-85)	10259114	0	102696.5*	4,313,253 83,454[1]	4,396,707
MW-61A (BH-87A)	10239116	0	5279022	5,279,022 130,850[1]	5,409,872
MW-62 (BH-88)	10239115	0	4138920	4,138,920 256,553[1]	4,395,473
MW-65A (BH-91A)	10239117	0	7669400	7,669,400 39,774[1]	7,709,174
MW-68 (BH-94)	02209213	122618	2412158	2,289,540 2,484,076[1]	4,773,616
MW-72 (BH-99)	02881532	470	2970636	2,970,166	2,970,166
LOWER QUEEN TOTAL 35,354,100 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, May 2, 1994. The cumulative shallow fluid removal through that date is 753,295 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	5/02/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	225577.3	127,341[1] 115,911[1]	243,252
MW-14	02209214	0	398204.3	398,204[1] 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	1357[2] 5090[1]	6,447
SHALLOW TOTAL				753,295 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM51094/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, Texas 79702
Telephone 915/682-1626

June 8, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, June 6, 1994. Cumulative Lower Queen fluid removal through that date is 37,239,147 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	6/06/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	5830031	5,830,031 26,922[1]	5,856,953
MW-59 (BH-85)	10259114	0	104138.3*	4,373,809 83,454[1]	4,457,263
MW-61A (BH-87A)	10239116	0	5524638	5,524,638 130,850[1]	5,655,488
MW-62 (BH-88)	10239115	0	4328506	4,328,506 256,553[1]	4,585,059
MW-65A (BH-91A)	10239117	0	7939880	7,939,880 39,774[1]	7,979,654
MW-68 (BH-94)	02209213	122618	2579292	2,456,674 2,484,076[1]	4,940,750
MW-72 (BH-99)	02881532	470	3764450	3,763,980	3,763,980
LOWER QUEEN TOTAL 37,239,147 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, June 6, 1994. The cumulative shallow fluid removal through that date is 757,960 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	6/06/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	226324	128,088 115,911[1]	243,999
MW-14	02209214	0	398204.3	398,204[1] 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	5275[2] 5090[1]	10,365
SHALLOW TOTAL				757,960 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM60894/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, Texas 79702
Telephone 915/682-1626

July 12, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Tuesday, July 5, 1994. Cumulative Lower Queen fluid removal through that date is 38,847,559 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	7/05/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	5831414	5,831,414 26,922[1]	5,858,336
MW-59 (BH-85)	10259114	0	107861.5*	4,530,183 83,454[1]	4,613,637
MW-61A (BH-87A)	10239116	0	5774197	5,774,197 130,850[1]	5,905,047
MW-62 (BH-88)	10239115	0	4498792	4,498,792 256,553[1]	4,755,345
MW-65A (BH-91A)	10239117	0	8141720	8,141,720 39,774[1]	8,181,494
MW-68 (BH-94)	02209213	122618	2785724	2,663,106 2,484,076[1]	5,147,182
MW-72 (BH-99)	02881532	470	4386988	4,386,518	4,386,518
LOWER QUEEN TOTAL 38,847,559 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Tuesday, July 5, 1994. The cumulative shallow fluid removal through that date is 761,937 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	7/05/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	226324	243,999[1]	243,999
MW-14	02209214	0	398204.3	398,391[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	3,977[2] 10,365[1]	14,342
SHALLOW TOTAL				761,937 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM71294/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood

INDIAN BASIN GAS PLANT
REMEDIATION PROJECT
QUARTERLY REPORT

THIRD QUARTER 1994
JULY, AUGUST, AND SEPTEMBER

RECEIVED
NOV 09 1994
OIL CONSERVATION DIV.
SANTA FE

Submitted by
Marathon Oil Company
on behalf of the
Indian Basin Gas Plant Owners

November 3, 1994

EXECUTIVE SUMMARY

The pump-and-treat groundwater remediation system is fully operational and functioning as set forth in the Treatment Project Plan document (March 1992). Light nonaqueous phase liquid (condensate) was observed in one (1) Lower Queen well. Fluid recovery from the Lower Queen aquifer averaged 6,499 barrels per week with volatile hydrocarbon compounds being removed by air stripping. Lower Queen dissolved benzene concentrations ranged from 0.5 to 260 micrograms per liter or parts per billion. The benzene concentration in all five (5) downgradient monitoring wells were below the State maximum allowable concentration of 10 micrograms per liter indicating continued hydrocarbon plume containment. Chloride concentrations in all Lower Queen wells were below the State maximum allowable concentration of 250 milligrams per liter.

Light nonaqueous phase liquid (condensate) was observed in two (2) Shallow zone wells. Shallow zone pumping continues from one (1) well. Eight (8) Shallow zone wells sampled in July indicated chloride concentrations above the State maximum allowable concentration of 250 milligrams per liter. Fluid recovery from the Shallow zone aquifer averaged 11.7 barrels per week. The vapor extraction system did not operate during the Second Quarter.

Concentrations of benzene, toluene, ethylbenzene, total xylene, and chloride in groundwater collected from Shallow zone rancher wells and the Upper Indian Hills Spring West (Rocky Arroyo spring) have not exceeded State or Federal drinking water standards.

Light nonaqueous phase liquid (condensate) recovery from the Lower Queen and Shallow zone for the Third Quarter was 19.5 barrels. Cumulative recovery excluding the volume volatilized by the air stripper and vapor extraction system is 3,525.8 barrels or 10.1% of the total spill volume.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

INTRODUCTION 1

GROUNDWATER ELEVATION 1
Lower Queen Aquifer 1
Shallow Zone 1
Groundwater Recharge (Rainfall) 1

QUARTERLY SAMPLING LABORATORY RESULTS 1

RANCHER WELLS, NATURAL SPRING, AND PLANT WELL LABORATORY RESULTS 2

GROUNDWATER PUMPING 3
Lower Queen 3
Shallow Zone 4

GROUNDWATER TREATMENT AND PRODUCT RECOVERY 4

VAPOR EXTRACTION SYSTEM 5

REFERENCES CITED 5

TABLES

TABLE 1 LOWER QUEEN DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA

TABLE 2 SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA

TABLE 3 HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN LOWER QUEEN GROUNDWATER

TABLE 4 HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN SHALLOW ZONE GROUNDWATER

TABLE 5 RANCHER WELL GROUNDWATER AND NATURAL SPRING WATER SAMPLE RESULTS

FIGURES

FIGURE 1 JULY 1994 LOWER QUEEN POTENTIOMETRIC SURFACE

FIGURE 2 LOWER QUEEN GROUNDWATER ELEVATION VS. TIME

FIGURE 3 JULY 1994 SHALLOW ZONE POTENTIOMETRIC SURFACE

FIGURE 4 SHALLOW ZONE GROUNDWATER ELEVATION VS. TIME

FIGURE 5 WEEKLY LOWER QUEEN FLUID RECOVERY

FIGURE 6 WEEKLY SHALLOW ZONE FLUID RECOVERY

FIGURE 7 WEEKLY TOTAL FLUID RECOVERY

FIGURE 8 VAPOR EXTRACTION WELL INDEX MAP

APPENDICES

APPENDIX A JULY 1994 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY

APPENDIX B JULY 1994 LABORATORY RESULTS - PROJECT WELLS, RANCHER WELLS, PLANT WELL, AND NATURAL SPRING

APPENDIX C BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS

APPENDIX D RANCHER WELL, PLANT WELL, AND NATURAL SPRING MONTHLY LABORATORY RESULTS - AUGUST

APPENDIX E RANCHER WELL, PLANT WELL, AND NATURAL SPRING MONTHLY LABORATORY RESULTS - SEPTEMBER

APPENDIX F STATE ENGINEER'S FLUID RECOVERY REPORTS

INTRODUCTION

This report summarizes groundwater and unsaturated zone treatment activities conducted during the Third Quarter of 1994 in accordance with the Indian Basin Environmental Treatment Project Plan submitted on March 5, 1992 by Marathon Oil Company on behalf of the Indian Basin Gas Plant owners. Preparation of this report is also in accordance with the April 2, 1992 New Mexico Oil Conservation Division (OCD) directive for quarterly reporting of remediation project activities. Remediation activities are continuing to reduce the impact of a liquid gas condensate and brine spill from a production pipeline discovered in April 1991 near the Indian Basin Gas Plant.

GROUNDWATER ELEVATION

Lower Queen Aquifer

Depth-to-water measurements were acquired from nonpumping, Lower Queen monitoring wells in July, August, and September 1994. Table 1 presents groundwater elevations calculated from casing elevation data, depth-to-water measurements, and light nonaqueous phase liquid (LNAPL) thicknesses. Figure 1 is a potentiometric map of the Lower Queen aquifer based on depth-to-groundwater gauging conducted in July. Third Quarter monitoring data indicate both increasing and decreasing groundwater elevations (Figure 2).

Shallow Zone

Figure 3 is a potentiometric map constructed using depth-to-water measurements collected from Shallow zone monitoring wells in July 1994. Table 2 shows depth-to-water measurements, calculated groundwater elevations, and LNAPL thickness for Shallow zone wells. These Shallow zone data indicate both increasing and decreasing groundwater elevations in monitoring wells during the quarter (Figure 4). Increasing groundwater elevations are the result of recharge from rainfall.

Groundwater Recharge (Rainfall)

Daily rainfall is gauged at the gas plant. Monthly rainfall for July, August, and September was 0.5, 4.3, and 0.1 inches, respectively (Tables 1 and 2). Cumulative rainfall for the Third Quarter was 4.9 inches.

QUARTERLY SAMPLING LABORATORY RESULTS

Twenty-nine Shallow zone and nine Lower Queen monitoring wells were gauged on July 18, 1994. Sixteen Lower Queen wells including the plant water supply well (SW-1) were sampled. The backup plant supply well (SW-2) was gauged, but not sampled. Eight Lower

Queen wells have downhole pumps installed and were sampled through the pump. One of the Lower Queen wells sampled through the downhole pump contained LNAPL (MW-68).

Ten of the fifty-nine Shallow zone wells were sampled in July. Four of the original twenty-five Shallow zone monitoring wells (including two sumps) designated for quarterly sampling in the Treatment Project Plan (see ***bolded and italicized*** well designations in Table 4) were sampled. The remaining 21 Shallow zone compliance wells were either dry or bailed dry during sampling (17), contain LNAPL (MW-11 and MW-69), or are inaccessible (MW-13, pump and tubing in well; MW-19, vapor extraction piping). Six Shallow zone wells other than those designated in the Treatment Project Plan were sampled (MW-39, MW-41, MW-43, MW-45, MW-49, and MW-61). Samples were collected by Carter and Burgess, Inc. using Environmental Protection Agency (EPA) sampling protocol. Analytical Technologies, Inc. performed the BTEX (EPA Method 8020) and chloride (EPA Method 325.2) analyses (Appendix B). Appendix A contains a table for each well of field observations (well depth, depth-to-water measurement, gauge date and time, presence of LNAPL or free-phase product, measured hydrocarbon and hydrogen sulfide vapor concentrations at the wellhead, purge method, rates, and volume, temperature, specific conductance, pH, and dissolved oxygen) from notes recorded during field activities.

Tables 3 and 4 are historical summaries of quarterly benzene concentration data since September 1991 for the Lower Queen and Shallow zone wells, respectively. Benzene concentration (in ug/l) versus time graphs for each routinely sampled monitoring well are provided in Appendix C.

RANCHER WELLS, NATURAL SPRING, AND PLANT WELL LABORATORY RESULTS

Monthly groundwater samples from the closest downgradient rancher well to the Shallow zone plume (Lyman) and from the Upper Indian Hills Spring West (Hendrickson and Jones, 1952) were collected on July 21, August 24, and September 20, 1994. In addition, another rancher well (Biebelle) was sampled on July 21. The plant water supply well (SW-1), completed in the Lower Queen aquifer, is also sampled and analyzed monthly. Concentrations of BTEX and chloride in groundwater collected from the Lyman and Biebelle wells and the Upper Indian Hills Spring West (Rocky Arroyo spring) did not exceed State or Federal drinking water standards during the quarter (Table 5).

The rancher wells and natural spring samples were obtained using EPA sampling and handling procedures. Analytical Technologies, Inc. performed the BTEX and chloride analyses using EPA approved methods. Laboratory results of groundwater from the rancher wells and the natural spring are transmitted to the local ranchers each month with letters of explanation.

Copies of these letters are also provided to the OCD and the Bureau of Land Management (BLM) in Santa Fe and Roswell, New Mexico, respectively. Laboratory reports for the rancher wells, Rocky Arroyo spring, and SW-1 are included in Appendices B (July), D (August), and E (September).

GROUNDWATER PUMPING

Lower Queen

Fluid recovery from the Lower Queen aquifer and Shallow zone is metered and reported to the State Engineer's Office (SEO) on a monthly basis per SEO directive. The reports filed with the SEO for the Third Quarter of 1994 are attached in Appendix F. Figures 5, 6, and 7 are stacked bar graphs depicting weekly Lower Queen fluid recovery, weekly Shallow zone fluid recovery, and combined weekly fluid recovery from both zones, respectively.

Seven Lower Queen wells (MW-58, MW-59, MW-61A, MW-62, MW-65A, MW-68, and MW-72) were pumped for plume control during the quarter. Monthly fluid recovery for each well and the plant supply well SW-1 is listed in the following table.

LOWER QUEEN FLUID RECOVERY

Well Number	July (Bbls)	August (Bbls)	September (Bbls)	Quarter Total (Bbls)	Average Pumping Rate (gpm)
MW-58	2782.7	1305.0	2868.8	6956.5	2.3
MW-59	3441.9	2268.9	3745.1	9455.9	3.1
MW-61A	6493.2	3747.4	1442.3	11682.9	3.8
MW-62	3430.2	2239.1	3648.8	9318.1	3.0
MW-65A	4160.1	1680.4	4056.2	9896.7	3.2
MW-68	4538.2	1404.2	4571.6	10514.0	3.4
MW-72	13378.8	7616.4	10374.0	31369.2	10.2
Plant Supply SW-1	16262.0	46918.0	14158.0	77338.0	25.1
TOTAL	**54,487**	**67,179**	**44,865**	**166,531**	**54.0**

Shallow Zone

Shallow zone fluid recovery during the Third Quarter was from MW-69 only. Monthly Shallow zone fluid recovery is listed in the following table. Electric generator malfunctions affected the pumping of MW-69 for part of the quarter and resulted in no recovery during August and part of July and September. After repairs were completed, pumping was resumed in September. Free product (condensate) recovery from MW-69 during the Third Quarter totaled 11.9 barrels.

SHALLOW ZONE FLUID RECOVERY

Well Number	July (Bbls) Cond./Water	August (Bbls) Cond./Water	September (Bbls) Cond./Water	Quarter Total (Bbls) Cond./Water
MW-69	5.8/22.1	0/0	6.1/118	11.9/140.1

GROUNDWATER TREATMENT AND PRODUCT RECOVERY

Commingled fluids from seven Lower Queen recovery wells were pumped through piping to a treatment compound that includes an oil/water separator, air stripper, and two aboveground tanks. The oil/water separator is used to remove free product from the produced groundwater. The free product is transferred to a condensate holding tank which is gauged on a daily basis. The measured volume of free condensate recovered from the commingled groundwater during the Third Quarter was 7.6 barrels. Cumulative condensate separated from the recovered groundwater since product separation began in April 1992 through the Third Quarter is 90.0 barrels.

Groundwater from the separator is pumped through the air stripper to remove dissolved-phase, volatile organic compounds. Stripped volatile organic compounds are vented to the atmosphere through a stack. Treated groundwater is used as make-up water for the gas plant.

Total free product recovery from the Lower Queen and Shallow zone for the Third Quarter was 19.5 barrels. Cumulative free product recovered to date excluding the volume volatilized by the air stripper and vapor extraction system is 3,525.8 barrels or 10.1% of the total spill volume.

VAPOR EXTRACTION SYSTEM

A vapor extraction system (VES) consisting of a trailer-mounted blower rated at 100 standard cubic feet per minute (SCFM) with a vacuum of approximately 50 inches of water commensed operation on March 10, 1992. Phase I of the unsaturated zone remediation using the VES was completed in March 1993. The Phase I program vented Shallow zone wells MW-16, MW-17, MW-35 and MW-16, MW-17, and MW-21. Shallow venting continued from MW-56 between April 8 and July 20, 1993. On October 7, 1993 the VES commenced operation at MW-18, MW-19, and MW-20. Figure 8 shows the locations of these vent wells. The system has extracted vapors from MW-18, MW-19, and MW-20 continuously from October 7, 1993 until May 5, 1994 when it was determined that an air permit was required for system operation. The system was shut in pending acquisition of a New Mexico Air Pollution Control Bureau 702 permit.

REFERENCES CITED

Hendrickson, G. E., and Jones, R. S., 1952, Geology and Ground-water Resources of Eddy County, New Mexico: New Mexico Bureau of Mines & Mineral Resources Ground-water Report 3, 169 p., 4 pls.

TABLES

TABLE 1
LOWER QUEEN DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
THIRD QUARTER 1994

LOWER QUEEN WELL	Top of Casing (TOC) Elev. (ft AMSL)	Total Depth from TOC (ft)	Jul-18-94				Aug-25-94		Sep-20-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-57 (BH-83)	3787.70	177.20	158.49	3629.21	none		158.16	3629.54	158.14	3629.56
MW-58 (BH-84)p	3824.31	218.03	NG		NG					
MW-59 (BH-85)p	3819.59	211.29	NG		NG					
MW-60 (BH-86)	3815.28	223.00	186.54	3628.74	none		185.34	3629.94	186.24	3629.04
MW-61A (BH-87A)p	3815.97	215.67	NG		NG					
MW-62 (BH-88)p	3819.90	224.69	NG		NG					
MW-63 (BH-89)	3826.16	220.49	197.98	3628.18	none		197.12	3629.04	197.33	3628.83
MW-64 (BH-90)	3798.57	201.89	169.65	3628.92	none		168.39	3630.18	169.32	3629.25
MW-65A (BH-91A)p	3763.26	168.56	NG		NG					
MW-66 (BH-92)	3828.98	235.18	200.91	3628.07	none		199.86	3629.12	200.66	3628.32
MW-67 (BH-93)	3765.87	165.77	136.82	3629.05	none		135.55	3630.32	136.58	3629.29
MW-68 (BH-94)p	3797.83	203.43	NG		NG	FP				
MW-70 (BH-97)	3822.57	225.07	193.59	3628.98	none		193.09	3629.48	193.17	3629.40
MW-71 (BH-98)	3778.05	233.49	150.37	3627.68	none		149.35	3628.70	150.19	3627.86
MW-72 (BH-99)p	3819.32	236.55	NG		NG					
SW-1 (SUPPLY)p	3808.19	255.00	NG		NG					
SW-2 (BACKUP)	3808.79	292.00	181.00	3627.79	none		180.61	3628.18	180.52	3628.27
Monthly Rainfall (in)			0.50				4.30		0.10	

p = pump present in well
NG = Not Gauged

AMSL = Above Mean Sea Level
FP = Free Product (condensate) being recovered

TABLE 2
SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
THIRD QUARTER 1994

SHALLOW ZONE WELL	TOC Elev. (ft AMSL)	Total Depth from TOC (ft)	Jul-18-94				Aug-25-94		Sep-20-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-1 (BH-14)	3792.50	16.10	NG				NG		NG	
MW-2 (BH-23)	3788.82	15.52	NG				NG		NG	
MW-3 (BH-24)	3787.50	16.90	DRY				NG		NG	
MW-4 (BH-26)	3785.88	18.68	NG				NG		NG	
MW-5 (BH-28)	3801.69	12.77	DRY				NG		NG	
MW-6 (BH-29)	3785.17	13.66	NG				NG		NG	
MW-7 (BH-30)	3784.46	17.01	DRY				NG		NG	
MW-8 (BH-31)	3795.04	16.97	DRY				NG		NG	
MW-9 (BH-32)	3807.85	13.65	DRY				NG		NG	
MW-10 (BH-33)	3790.78	19.08	DRY				NG		NG	
MW-11 (BH-34)	3806.96	24.85	24.34	3782.62	24.32	0.24	NG		NG	
MW-12 (BH-35)	3809.86	25.21	NG				NG		NG	
MW-13 (BH-36)p	3801.58	22.07	p				NG		NG	
MW-14 (BH-37)	3803.61	24.30	NG				NG		NG	
MW-15 (BH-38)	3803.59	19.47	NG				NG		NG	
MW-16 (BH-39)	3801.04	22.66	NG				NG		NG	
MW-17 (BH-40)	3799.55	19.75	NG				NG		NG	
MW-18 (BH-41)VE	3795.82	17.42	NG				NG		NG	
MW-19 (BH-42)VE	3797.21	19.11	NG				NG		NG	
MW-20 (BH-43)VE	3797.59	16.89	NG				NG		NG	
MW-21 (BH-44)	3798.21	23.31	NG				NG		NG	
MW-22 (BH-45)	3799.20	17.30	NG				NG		NG	
MW-23 (BH-46)	3794.48	12.08	NG				NG		NG	
MW-24 (BH-47)	3794.09	14.09	DRY				NG		NG	
MW-25 (BH-48)	3786.97	10.27	NG				NG		NG	
MW-26 (BH-49)	3793.01	21.11	NG				NG		NG	
MW-27 (BH-50)	3790.93	18.23	NG				NG		NG	
Monthly Rainfall (in)					0.50			4.30		0.10

p = pump present in well
NG = Not Gauged

VE = Vapor Extraction Well
AMSI = Above Mean Sea Level
TOC = Top of Casing datum

TABLE 2 (CONTINUED)
SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA

SHALLOW ZONE WELL	TOC Elev. (ft AMSL)	Total Depth from TOC (ft)	Jul-18-94				Aug-25-94		Sep-20-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-28 (BH-52)	3797.03	18.59	NG				NG		NG	
MW-29 (BH-53)	3794.06	14.76	DRY				NG		NG	
MW-30 (BH-54)	3788.30	14.82	NG				NG		NG	
MW-31 (BH-55)	3791.15	19.93	NG				NG		NG	
MW-32 (BH-56)	3797.47	16.77	DRY				NG		NG	
MW-33 (BH-57)	3802.48	20.29	NG				NG		NG	
MW-34 (BH-58)	3806.00	19.97	NG				NG		NG	
MW-35 (BH-59)	3800.81	20.71	NG				NG		NG	
MW-36 (BH-21)	3792.94	8.77	NG				NG		NG	
MW-37 (BH-60)	3795.03	20.83	NG				NG		NG	
MW-38 (BH-61)	3797.32	20.57	DRY				NG		NG	
MW-39 (BH-62)	3796.20	20.54	19.29	3776.91		odor	NG		NG	
MW-40 (BH-63)	3803.12	14.07	NG				NG		NG	
MW-41 (BH-64)	3799.04	24.04	20.52	3778.52	NG	odor	NG		NG	
MW-42 (BH-65)	3804.73	23.59	NG				NG		NG	
MW-43 (BH-66)	3802.05	24.55	21.41	3780.64			NG		NG	
MW-44 (BH-67)	3804.14	25.24	22.13	3782.01	22.12	0.12	NG		NG	
MW-45 (BH-68)	3808.68	26.62	21.85	3786.83			NG		NG	
MW-46 (BH-69)	3805.54	20.24	DRY			odor	NG		NG	
MW-47 (BH-70)	3805.09	21.79	DRY			odor	NG		NG	
MW-48 (BH-71)	3806.18	19.98	DRY				NG		NG	
MW-49 (BH-72)	3805.61	25.91	22.73	3782.88			NG		NG	
MW-50 (BH-73)	3813.35	37.15	27.16	3786.19			NG		NG	
MW-51 (BH-74)	3810.86	20.06	NG				NG		NG	
MW-52 (BH-75)	3817.49	21.44	DRY				NG		NG	
MW-53 (BH-77)	3809.92	15.32	DRY				NG		NG	
MW-54 (BH-80)	3823.86	78.15	47.12	3776.74			NG		NG	
MW-55 (BH-81)	3794.40	66.32	31.90	3762.50		odor	NG		NG	
MW-56 (BH-82)	3782.45	43.76	DRY			odor	NG		NG	
MW-61 (BH-87)	3816.20	57.97	37.43	3778.77			NG		NG	
MW-65 (BH-91)	3763.31	57.69	56.70	3706.61			NG		NG	
MW-69 (BH-95)p	3805.11	51.27	NG		NG	odor	NG		NG	
Sump A10		NG	NG				NG		NG	
Sump 16A	3785.14	NG	DRY				NG		NG	
Stock well (SE1/4 Sec. 13)	3779.76	NG	NG				NG		NG	
Monthly Rainfall (in)			0.50				4.30		0.10	

p = pump present in well

AMSL = Above Mean Sea Level
TOC = Top of Casing datum
NG = Not Gauged

TABLE 3
HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN LOWER QUEEN GROUNDWATER
THIRD QUARTER 1994

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise											
WELL	Sep-91	Dec-91	Apr-92	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Oct-93	Jan-94	Apr-94	Jul-94
MW-57	1600	350	150	948**	15.1*	21*	8*	6*	<0.5	<0.5	<0.5	0.7
MW-58	40	90	202**	178**	190*	192*	55*	25*	50*	FP	<2.5	2.0
MW-59	540	420	40.4**	268**	98.8*	26*	10*	FP	10*	FP	<2.5	13
MW-60	33	<1	3.5**	19**	31.7*	138*	17*	<1	<0.5	<0.5	<0.5	<0.5
MW-61A	190	10	5.0**	359**	470.1*	585*	2821*	FP	FP	FP	<0.5	<0.5
MW-62	2200	1400	257.5**	357**	212.3*	78*	33*	98*	10*	4.1	<2.5	4.3
MW-63	<1	<1	4.1**	12**	4.3*	12*	7*	4*	14*	<0.5	<0.5	1.0
MW-64	150	130	233**	115**	14	15*	5*	2	18*	1.7	<0.5	<0.5
MW-65A	680	150	25.3**	413**	10.6*	3*	4*	<1*	7*	<0.5	<0.5	<0.5
MW-66	<1	<1	3.3**	8**	12.1*	3*	<3*	8*	13*	<0.5	<0.5	<0.5
MW-67	280	320	4.3*	103**	2.6*	8*	7*	7*	<0.5	<0.5	<0.5	<0.5
MW-68	240	1900	1865**	160**	2208.2*	376*	1890*	150	374*	3000	120	260
MW-70	<1	<1	1.7**	<1	10.7*	<3*	9*	<1*	25*	<0.5	<0.5	<0.5
MW-71	NI	NI	NI	NI	NI	NI	NI	NI	8*	<0.5	<0.5	<0.5
MW-72	NI	NI	NI	NI	NI	NI	NI	NI	FP	FP	<2.5	18
SW-1	<1	<1	5*	17.5*	15.7*	6*	<1	<1	<0.5	<0.5	<0.5	<0.5
SW-2	<1	<1	7.9*	7*	69.4*	47*	4	NS	NS	NS	NS	NS
Max. Conc.	2200	1900	1865	948	2208	585	2821	2821	2821	3000	120	260

* High Performance Liquid Chromatography (HPLC)

** Average of more than one sample result using HPLC.

FP = Free Product (Condensate)

NS = Not Sampled

NI = Not Installed

TABLE 4
HISTORICAL SUMMARY OF BENZENE IN SHALLOW ZONE GROUNDWATER
THIRD QUARTER 1994

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise											
WELL	SEP 1991	DEC 1991	APR 1992	JUL 1992	OCT 1992	JAN 1993	APR 1993	JUL 1993	OCT 1993	JAN 1994	APR 1994	JUL 1994
MW-1 (BH-14)	250	200	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-2 (BH-23)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-3 (BH-24)	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-4 (BH-26)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-5 (BH-28)	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-6 (BH-29)	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***NS***
MW-7 (BH-30)	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-8 (BH-31)	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-9 (BH-32)	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-10 (BH-33)	***2300***	***2300***	***1780****	***1842****	***2100***	***NS***	***NS***	***DRY***	***DRY***	***BD***	***DRY***	***DRY***
MW-11 (BH-34)	***3000***	***3800***	***3087****	***2199****	***2942****	***2746****	***FP***	***FP***	***FP***	***FP***	***FP***	***FP***
MW-12 (BH35)	3800	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-13 (BH-36)	***3100***	***3000***	***3492****	***2708****	***NS***	***NS***	***PUMP***	***PUMP***	***PUMP***	***PUMP***	***PUMP***	***PUMP***
MW-14 (BH-37)	5100**	NS	NS	NS	NS	NS	PUMP	PUMP	FP	FP	NS	NS
MW-15 (BH-38)	5100	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-16 (BH-39)	1700	NS	NS	NS	NS	NS	514*	DRY	DRY	DRY	NS	NS
MW-17 (BH-40)	2000	NS	NS	NS	NS	NS	1500	DRY	BD	NS	NS	NS
MW-18 (BH-41)	4300	NS	2639**	2700	3300	NS	NS	DRY	VE	VE	VE	VE
MW-19 (BH-42)	***4700***	***NS***	***3195****	***3000***	***3032****	***NS***	***3926****	***DRY***	***VE***	***VE***	***VE***	***VE***
MW-20 (BH-43)	110	NS	NS	NS	NS	NS	NS	DRY	VE	VE	VE	VE
MW-21 (BH-44)	1000	1100	NS	NS	NS	NS	114*	FP	NS	DRY	NS	NS
MW-22 (BH-45)	4	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-23 (BH-46)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-24 (BH-47)	***3400***	***NS***	***NS***	***4353****	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-25 (BH-48)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-26 (BH-49)	3100	3000	NS	2000	1992*	1708*	861*	FP	FP	FP	NS	NS
MW-27 (BH-50)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-28 (BH-52)	2200	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-29 (BH-53)	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-30 (BH-54)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-31 (BH-55)	<1	NS	NS	332**	9*	NS	NS	DRY	DRY	DRY	NS	NS
MW-32 (BH-56)	***200***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-33 (BH-57)	6300	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-34 (BH-58)	2500	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-35 (BH-59)	5700	NS	NS	NS	NS	NS	NS	FP	FP	FP	NS	NS
MW-36 (BH-21)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-37 (BH-60)	150	NS	NS	NS	NS	NS	NS	27*	BD	NS	NS	NS
MW-38 (BH-61)	***15***	***15***	***51****	***37****	***166****	***NS***	***NS***	***DRY***	***BD***	***NS***	***DRY***	***DRY***
MW-39 (BH-62)	880	NS	NS	NS	NS	14	29*	24*	BD	<2.5	<0.5	<0.5
MW-40 (BH-63)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-41 (BH-64)	200	170	NS	NS	NS	NS	NS	22*	BD	5.3	0.6	1.4
MW-42 (BH-65)	<1	<1	NS	NS	NS	NS	NS	NS	BD	NS	NS	NS
MW-43 (BH-66)	320	NS	NS	NS	NS	NS	NS	25*	BD	<0.5	<0.5	<0.5
MW-44 (BH-67)	***59***	***NS***	***10****	***97****	***12***	***14***	***7****	***6****	***3****	***12***	***22***	***36***
MW-45 (BH-68)	<1	<1	NS	NS	NS	NS	NS	<3*	<3*	<0.5	<0.5	<0.5
MW-46 (BH-69)	140	25	NS	NS	NS	NS	NS	NS	BD	NS	NS	DRY
MW-47 (BH-70)	2600	2200	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY	DRY
MW-48 (BH-71)	***<1***	***<1***	***NS***	***47****	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-49 (BH-72)	35	NS	NS	NS	NS	NS	NS	210*	68*	13	82	150
MW-50 (BH-73)	***<1***	***<1***	***4****	***4****	***8****	***8****	***<1***	***<3****	***9****	***<0.5***	***<0.5***	***<0.5***
MW-51 (BH-74)	800	<1	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS
MW-52 (BH-75)	***<1***	***NS***	***NS***	***5****	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-53 (BH-77)	***<1***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-54 (BH-80)	***<1***	***<1***	***9****	***8****	***62****	***14****	***10****	***<3****	***17****	***8.6***	***<0.5***	***15***
MW-55 (BH-81)	***940***	***400***	***296****	***483****	***215****	***390***	***412****	***625****	***581****	***290***	***370***	***360***
MW-56 (BH-82)	***2200***	***1000***	***NS***	***1114****	***1026****	***1128****	***VE***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-61 (BH-87)	<1	NS	NS	NS	NS	NS	NS	NS	NS	1.4	<0.5	3.2
MW-65 (BH-91)	<1	NS	NS	NS	NS	NS	NS	<3*	BD	DRY	DRY	NS
MW-69 (BH-95)	***2400***	***2100***	***NS***	***568****	***1598****	***1284****	***FP***	***FP***	***FP/PUMP***	***FP/PUMP***	***FP/PUMP***	***FP/PUMP***
SUMP A-10	***FP***	***FP***	***FP***	***FP***	***FP***	***FP***	***FP***	***DRY***	***DRY***	***DRY***	***DRY***	***NS***
SUMP A-11	1400	2900	3033**	1258**	2815*	NS	NS	DRY	DRY	DRY	NS	NS
SUMP A-16	***240***	***2000***	***1233****	***1495****	***632****	***741****	***707****	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
Lyman well										<0.5	<0.5	<0.5
U. Indian Hills Spring West	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5

Bolded Italicized well numbers = Designated wells for quarterly sampling in Marathon Treatment Plan (March 1992)

DRY = Dry well
BD = Bailed Dry - No Recovery
* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.

FP = Free Product (condensate)
NS = Not Sampled.
VE = Vapor Extraction well

TABLE 5
RANCHER WELL GROUNDWATER AND NATURAL SPRING WATER SAMPLE RESULTS
THIRD QUARTER 1994

		1994														
	Probable	Jul-21					Aug-24					Sep-20				
WELL/ SPRING	Aquifer	Benzene	Toluene	Ethylbenzene	Xylene	Chloride	Benzene	Toluene	Ethylbenzene	Xylene	Chloride	Benzene	Toluene	Ethylbenzene	Xylene	Chloride
Lyman	Shallow Alluvial	ND	ND	ND	ND	12.0	ND	ND	ND	ND	11.5	ND	ND	ND	ND	11
Upper Indian Hills Spring West	Shallow Alluvial	ND	ND	ND	ND	8.0	ND	ND	ND	ND	12.7	ND	ND	ND	ND	11
Biebelle	Seven Rivers	ND	ND	ND	ND	15.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Benzene, Toluene, Ethylbenzene, and total Xylene concentration in ug/L.

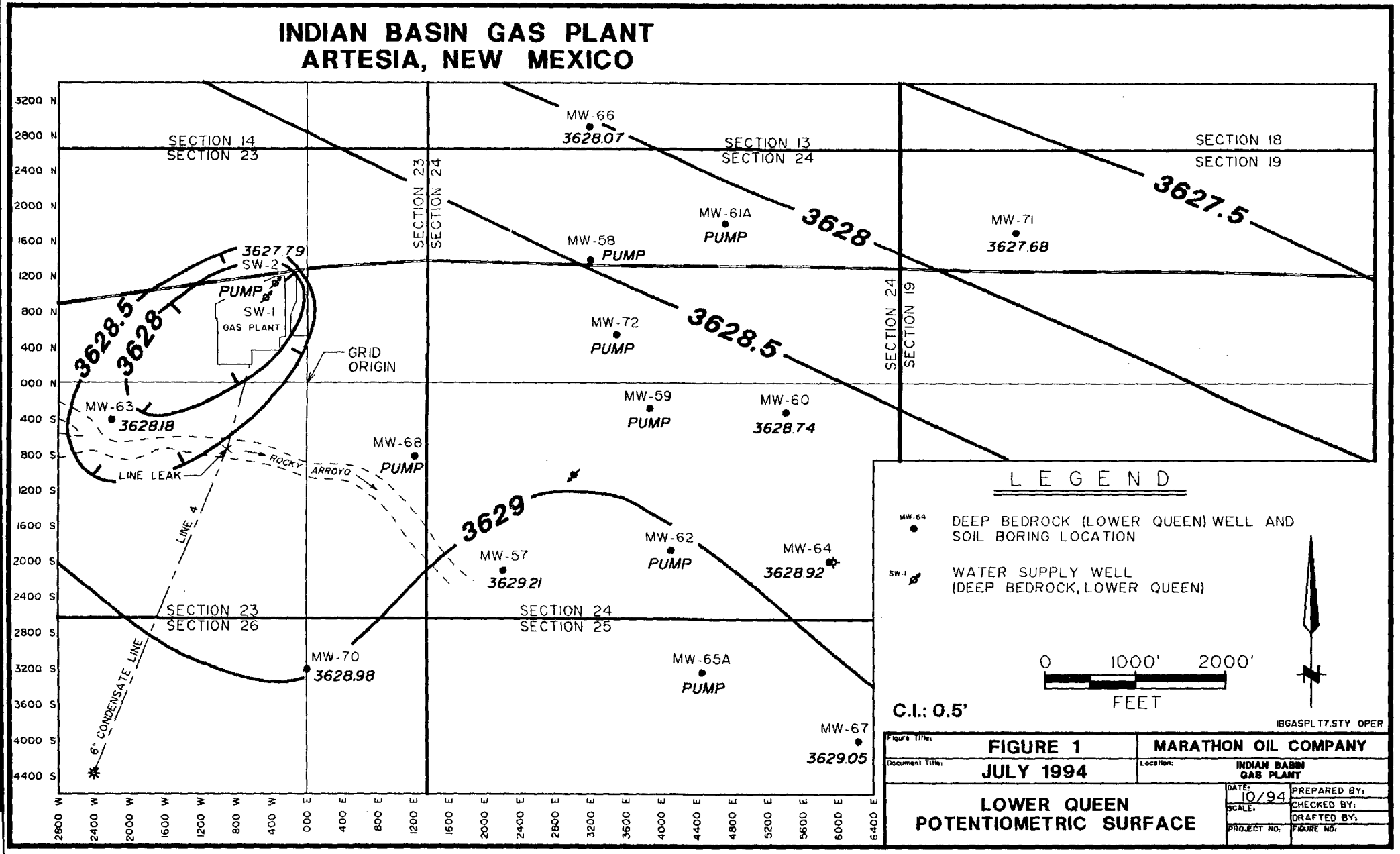
Chloride concentration in mg/L.

ND = Not Detected at method detection limit of 0.5 ug/L.

NS = Not Sampled.

FIGURES

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO



LEGEND

MW-64 ● DEEP BEDROCK (LOWER QUEEN) WELL AND SOIL BORING LOCATION

SW-1 WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

0 1000' 2000'

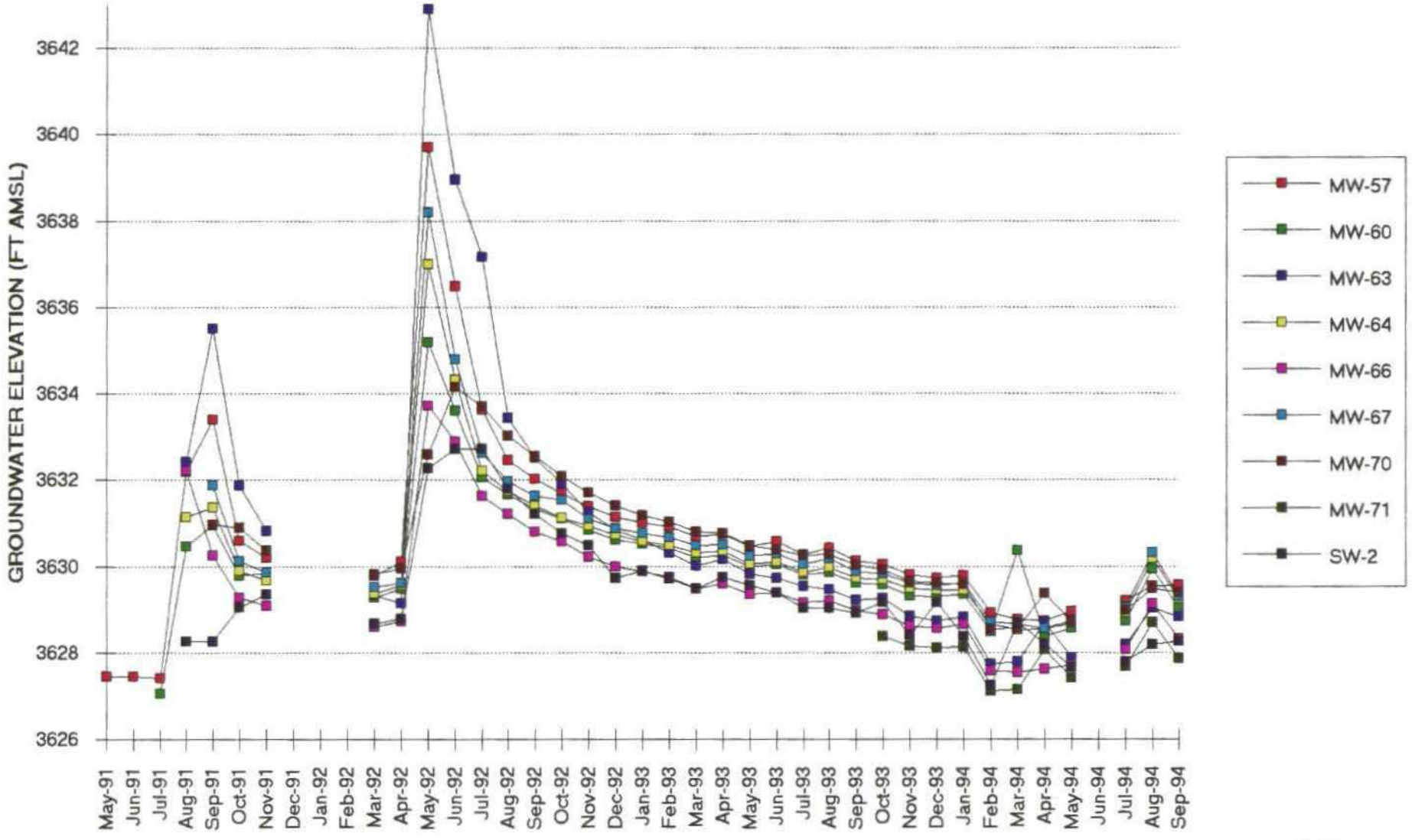
FEET

C.I.: 0.5'

IBGASPLT7.STY OPER

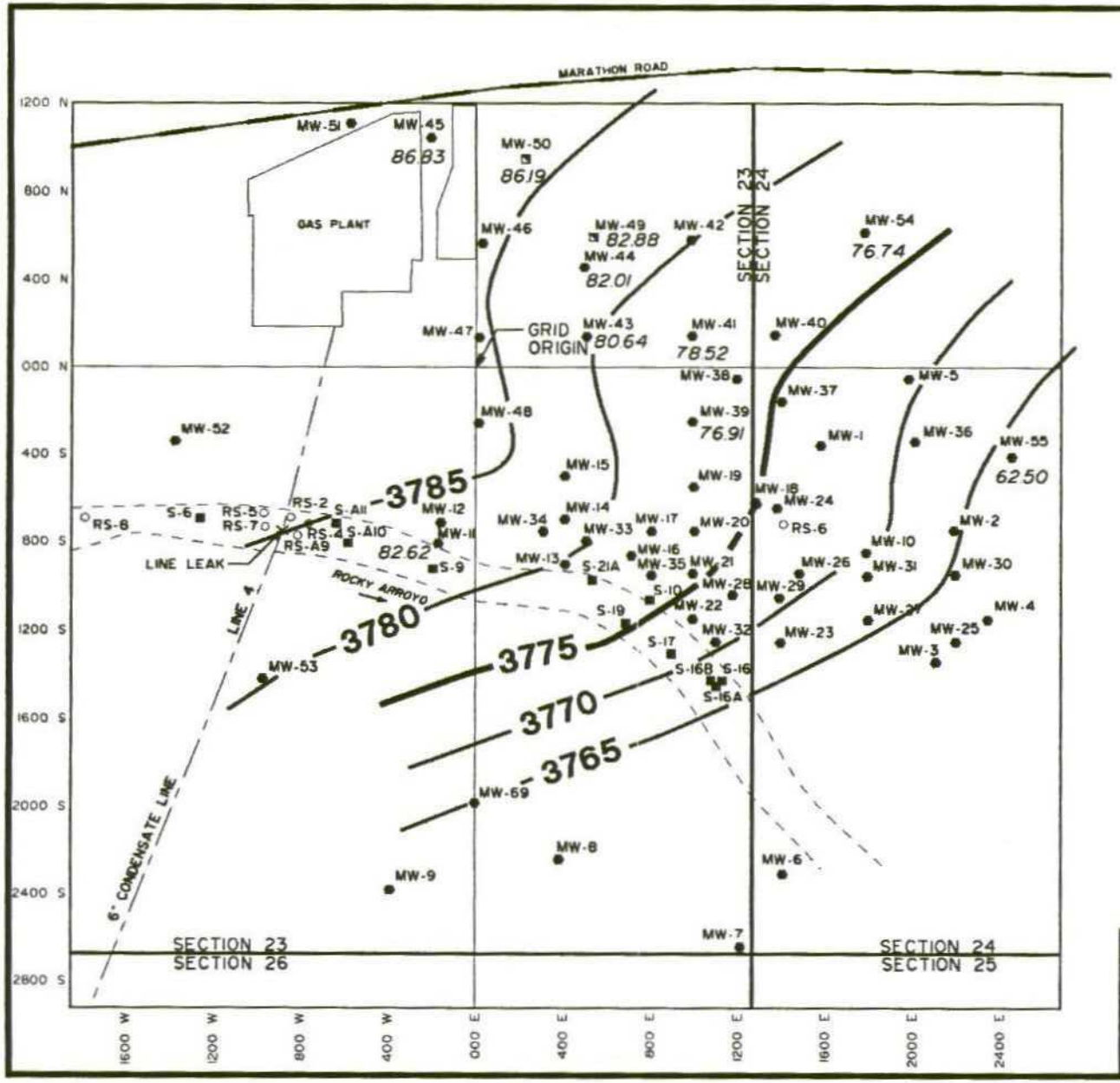
Figure Title:	FIGURE 1	MARATHON OIL COMPANY	
Document Title:	JULY 1994	Location:	INDIAN BASIN GAS PLANT
LOWER QUEEN POTENTIOMETRIC SURFACE		DATE: 10/94	PREPARED BY:
		SCALE:	CHECKED BY:
			DRAFTED BY:
		PROJECT NO:	FIGURE NO:

FIGURE 2. LOWER QUEEN GROUNDWATER ELEVATION VS. TIME



3QGWELTH.XLC

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO



SCALE

0 1000' 2000'

FEET

LEGEND

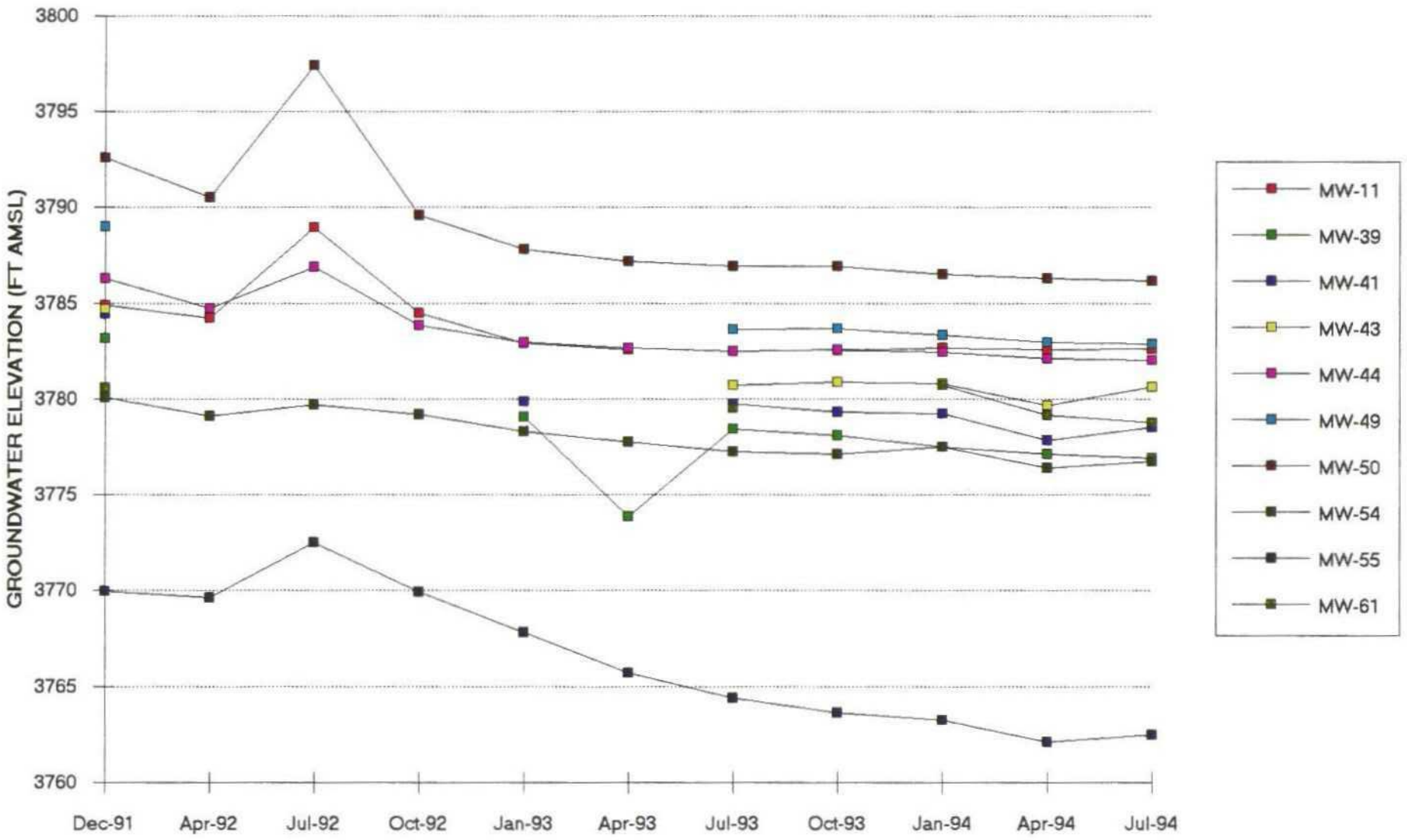
- MW-9 ● SHALLOW ALLUVIAL GROUNDWATER MONITORING WELL
- RS-4 ○ 4 INCH PVC RECOVERY SUMP
- S-19 ■ 24 INCH GALVANIZED RECOVERY SUMP

C.I.: 5'

IBGASPLT6 STY OPER

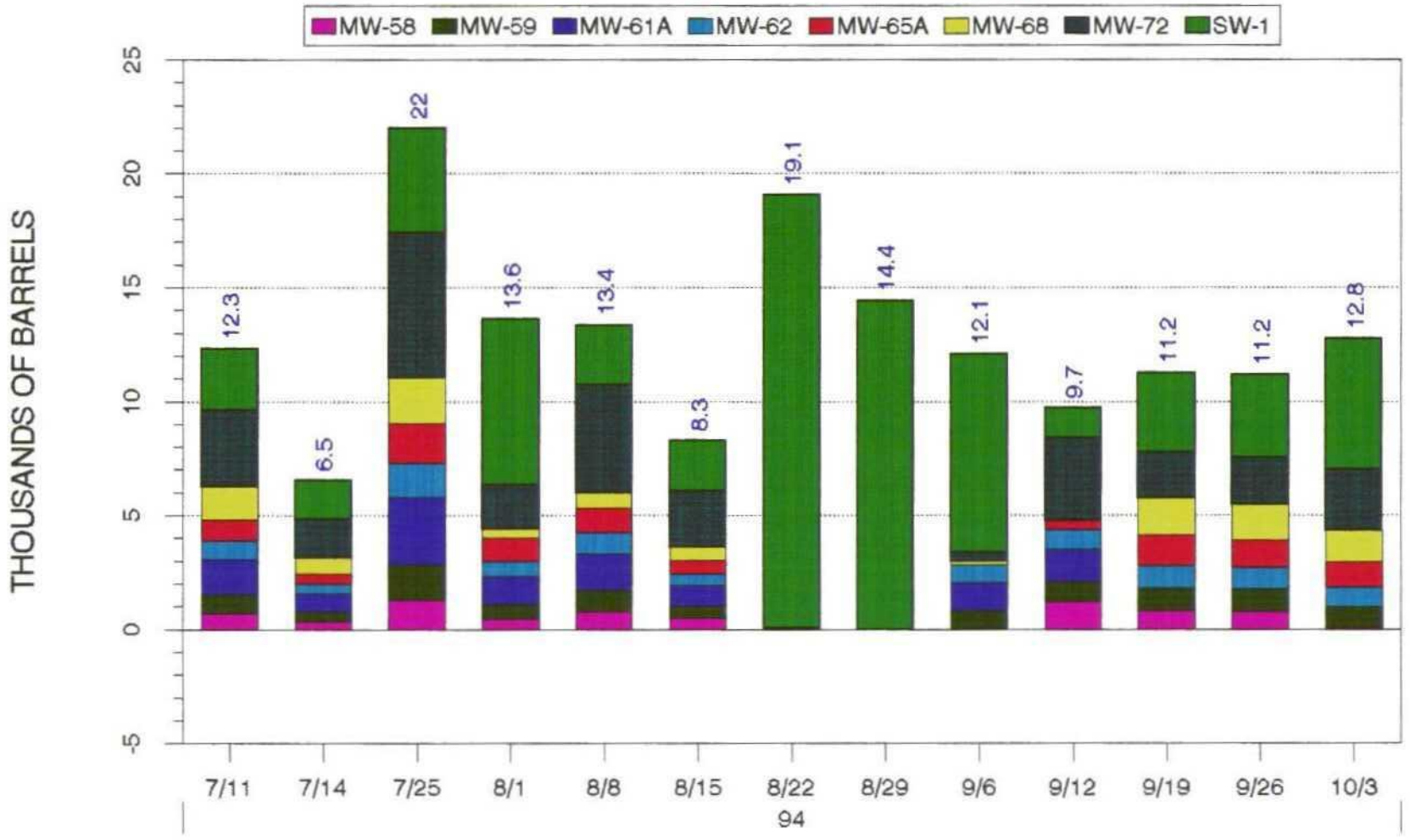
Figure Title:	FIGURE 3	MARATHON OIL COMPANY	
Document Title:	JULY 1994	Location: INDIAN BASIN GAS PLANT	
SHALLOW ZONE POTENTIOMETRIC SURFACE		DATE: 10/94	PREPARED BY:
		SCALE:	CHECKED BY:
		PROJECT NO:	DRAFTED BY:
			FIGURE NO:

FIGURE 4. SHALLOW ZONE GROUNDWATER ELEVATION VS. TIME



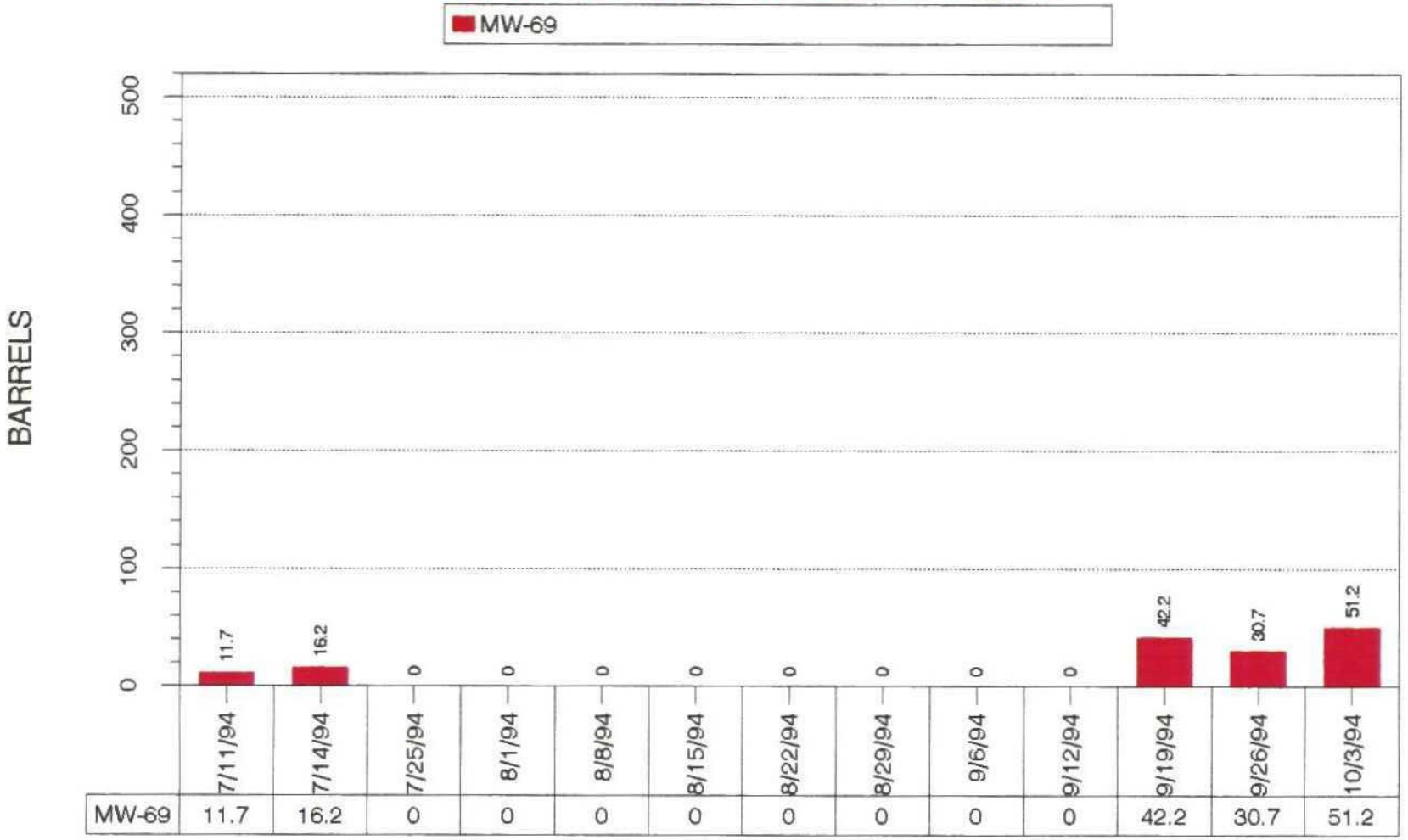
3QSZELTM.XLC

FIGURE 5
WEEKLY LOWER QUEEN FLUID RECOVERY
THIRD QUARTER 1994



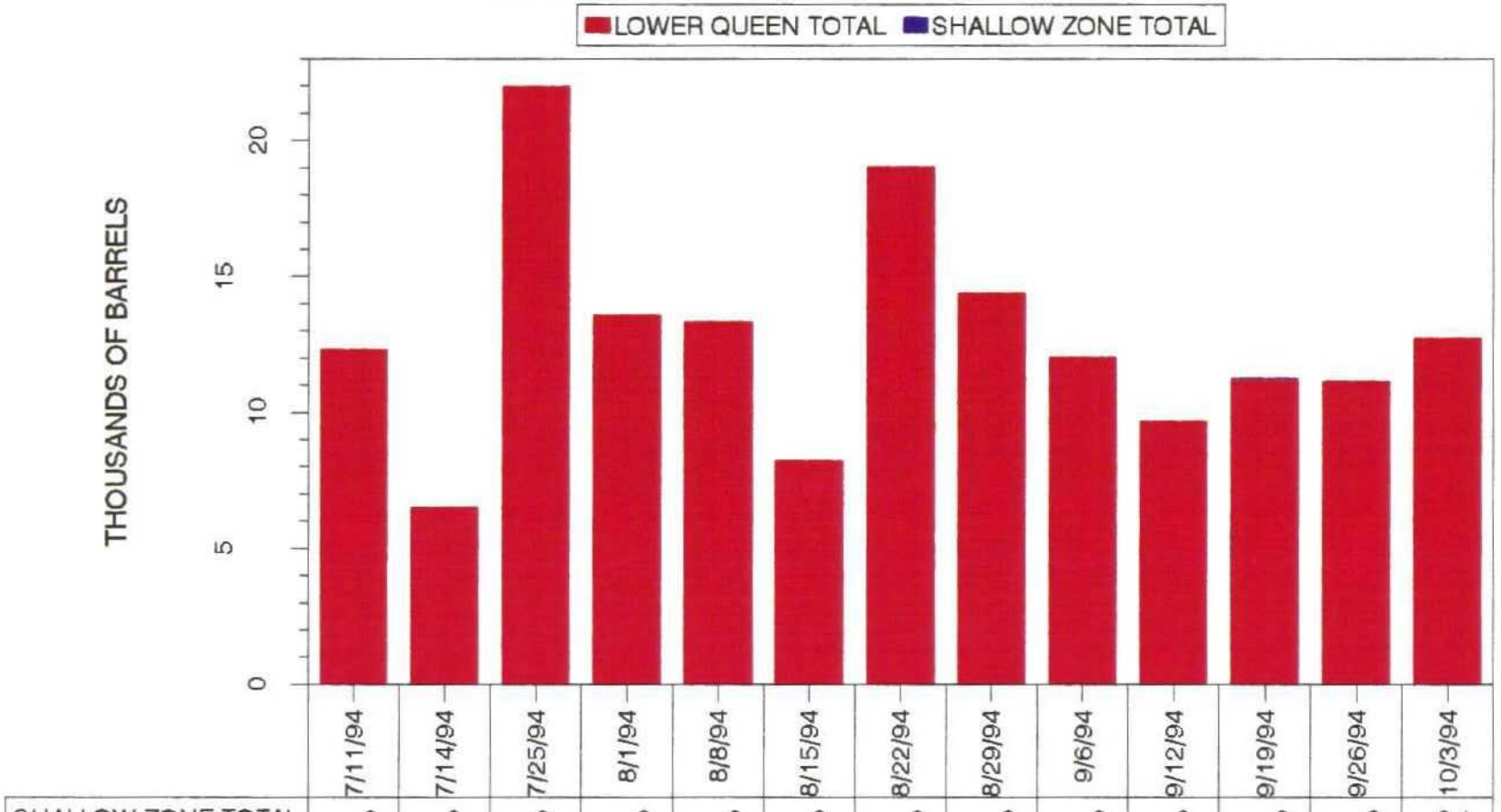
WKLQREC3Q

FIGURE 6
WEEKLY SHALLOW FLUID RECOVERY
THIRD QUARTER 1994



WKSHREC3Q

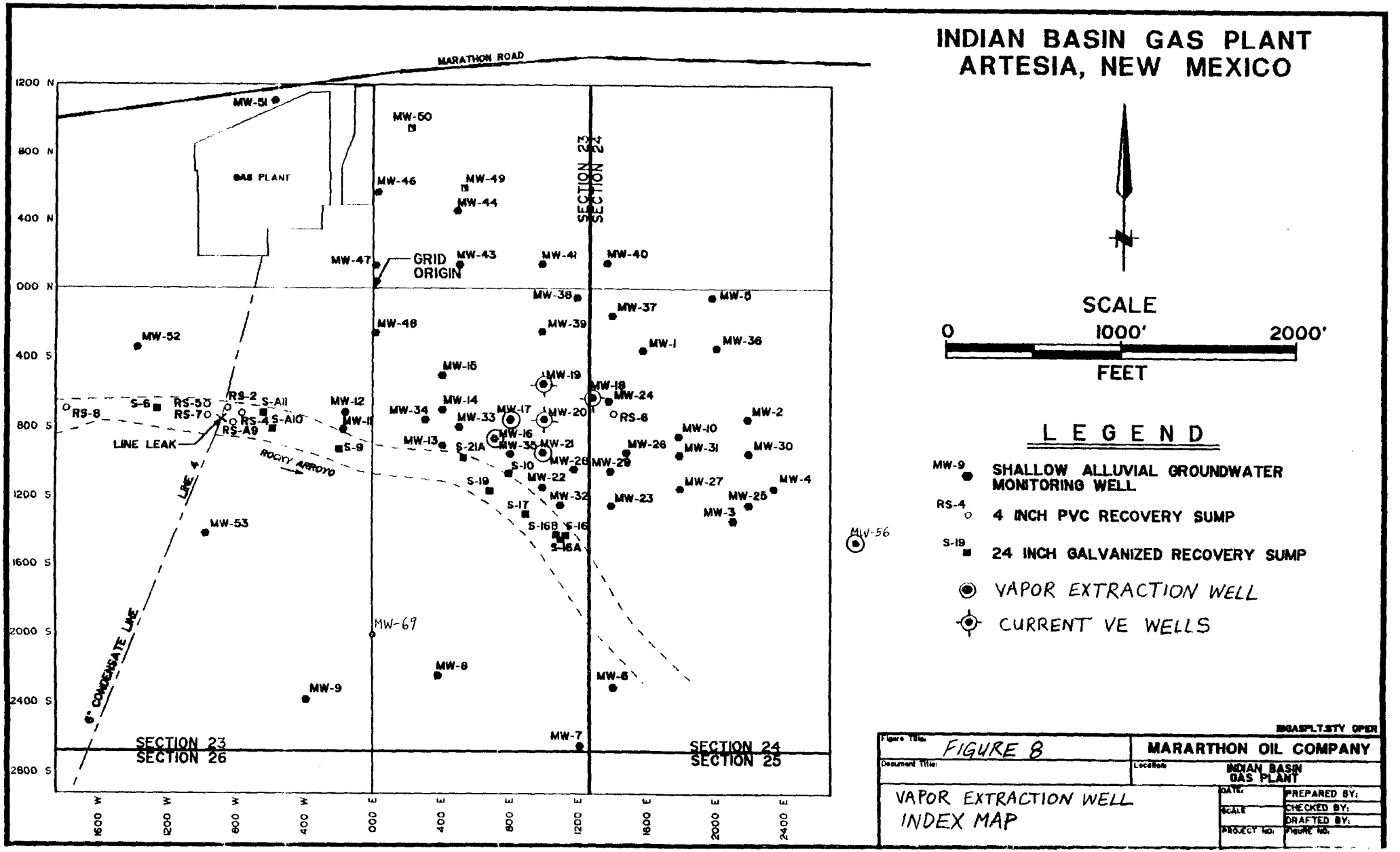
FIGURE 7
WEEKLY TOTAL FLUID RECOVERY
THIRD QUARTER 1994



	7/11/94	7/14/94	7/25/94	8/1/94	8/8/94	8/15/94	8/22/94	8/29/94	9/6/94	9/12/94	9/19/94	9/26/94	10/3/94
SHALLOW ZONE TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0.1
LOWER QUEEN TOTAL	12.3	6.5	22	13.6	13.4	8.3	19.1	14.4	12.1	9.7	11.2	11.2	12.8

METER RECORDING DATE

WKREC3Q


INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO
MARATHON ROAD
GAS PLANT
GRID ORIGIN
SECTION 23
SECTION 24
SECTION 23
SECTION 26
SECTION 24
SECTION 25
LINE LEAK
ROCKY ARROYO
6" CONDENSATE LINE
MW-51
MW-50
MW-46
MW-49
MW-44
MW-47
MW-43
MW-41
MW-40
MW-38
MW-37
MW-5
MW-48
MW-39
MW-52
MW-1
MW-36
MW-15
MW-19
MW-18
MW-24
MW-12
MW-14
MW-34
MW-33
MW-17
MW-20
RS-6
MW-2
MW-10
MW-11
MW-16
MW-35
MW-21
MW-26
MW-31
MW-30
MW-13
S-21A
MW-28
MW-29
S-10
MW-22
MW-27
MW-4
S-19
MW-32
MW-23
MW-25
S-17
MW-3
MW-53
S-16B
S-16
MW-56
S-16A
MW-69
MW-8
MW-9
MW-7
SCALE
0
1000'
2000'
FEET
LEGEND
MW-9 SHALLOW ALLUVIAL GROUNDWATER MONITORING WELL
RS-4 4 INCH PVC RECOVERY SUMP
S-19 24 INCH GALVANIZED RECOVERY SUMP
VAPOR EXTRACTION WELL
CURRENT VE WELLS
FIGURE 8
VAPOR EXTRACTION WELL INDEX MAP
MARARTHON OIL COMPANY
INDIAN BASIN GAS PLANT

APPENDIX A

JULY 1994 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-10

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 mg/L
18.32	18.20	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No Sample Collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-10	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-10

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-11

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
24.81	24.34	7/19/94	24.32	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-11	HCL in VOA	38	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-11

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-24

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
13.25	13.21	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-24	HCL in VOA	7	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-24

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-29

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
14.79	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-29	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-3

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
~16.97	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-3	HCL in VOA	6	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-3

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-32

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
15.80	15.76	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-32	HCL in VOA	5	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-32

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-38

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
20.47	20.46	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer		No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-38	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-38

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-39

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
20.45	19.29	7/19/94	N/A	Disposable Bailer		1.0, actual	N/A	Disposable Bailer	7/20/94	2:40 pm	Cox	2-40 mL VOA / 1-1 pint poly	MW-39	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-39

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-41

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
24.12	20.52	7/19/94	Unknown	Disposable Bailer		5.0, actual	N/A	Disposable Bailer	7/20/94	2:25 pm	Cox	2-40 mL VOA / 1-1 pint poly	MW-41	HCL in VOA	4	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-41

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-43

Well Depth	Static Water Level Depth & Meas. Tech.	Date Guaged	Depth LNAPL & Detection Method	Purge			Depth of Pump during *Purging* & Sampling	Sampling Equipment	*Sample* Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
24.49	21.41	7/19/94	N/A	Disposable Bailer		3.5, actual	N/A	Disposable Bailer	7/20/94	2:15 pm	Cox	2-40 mL VOA / 1-1 pint poly	MW-43	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-43

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-44

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
25.45	22.13	7/19/94	22.12	Disposable Bailer		6.0, actual	N/A	Disposable Bailer	7/20/94	5:22 pm	Cox	2-40 mL VOA / 1-1 pint poly	MW-44	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94903001\MW-44

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-45

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
26.62	21.85	7/18/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/20/94	2:05 pm	Cox	2-40 mL VOA / 1-1 pint poly	MW-45	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-45

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-46

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
19.87	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-46	HCL in VOA	20	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-46

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-47

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
21.83	21.82	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-47	HCL in VOA	60	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-47

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-48

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
19.81	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-48	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-48

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-49

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
26.66	22.73	7/19/94	N/A	Disposable Bailer		1.5, actual	N/A	Disposable Bailer	7/20/94	4:59 pm	Cox	2-40 mL VOA / 1-1 pint poly	MW-49	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-49

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-5

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
13.05	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer		No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-5	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-5

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-50

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
37.15	27.16	7/18/94	N/A	Disposable Bailer		5.0, actual	N/A	Disposable Bailer	7/20/94	4:41 pm	Cox	2-40 mL VOA / 1-1 pint poly	MW-50	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-50

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-52

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
21.31	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-52	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-52

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-53

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
15.26	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/20/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-53	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94\903001\MW-53

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-54

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
77.78	47.12	7/19/94	N/A	Redi - Flo 2	1 gal/min / shut down @ 32 gal	60 gal calc	70'	Red-Flo 2	7/20/94	12:59 pm	Boerner/Day	2-40 mL VOA	MW-54 EB #10 2:45 pm	HCL in VOA	0	0	:00	10:39	31.2	1400	6.39	5.93
																	:05	10:44	25.5	3400	6.26	3.44
																	:11	10:50	23.8	3550	6.26	2.96
																	:18	10:57	24.0	3560	6.25	2.75
																	:23	11:02	24.2	3700	6.22	2.84
																	:28	11:07	24.6	3710	6.22	2.52
																	2:12	12:51	33.0	3480	6.34	4.74
																	2:17	12:56	33.1	3600	6.26	2.78

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-55

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
66.49	31.90	7/19/94	N/A	Redi-Flo 2	1 gal/min	68 gal calculated	60	Redi-Flo 2	7/20/94	9:37 am	Boerner/Day	2-40 mL VOA / 1-1 pint poly	MW-55 EB #9 10:06 am	HCL in VOA	0	0	:00	8:16	23.6	2420	6.46	3.26
																	:05	8:21	22.4	2590	6.40	2.48
																	:11	8:27	22.0	2670	6.36	2.52
																	:17	8:33	21.8	2670	6.31	2.27
																	:22	8:38	21.9	2670	6.35	2.24
																	:28	8:44	21.7	2670	6.36	1.79
																	:36	8:52	21.8	2630	6.33	1.26
																	:42	8:58	21.8	2670	6.32	1.74
																	:48	9:04	21.9	2650	6.33	1.05
																	:57	9:13	21.7	2650	6.34	0.78
																	1:02	9.18	21.6	2640	6.30	1.24
																	1:08	9:24	21.9	2650	6.34	1.33
																	1:14	9:30	21.7	2670	6.33	1.40
																	1:19	9:35	22.0	2650	6.34	1.29

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-55

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-56

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmo/cm)	pH	Diss. O_2 (mg/L)
43.70	43.65	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-56	HCL in VOA	42	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-56

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-57

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
176.49	158.49	7/18/94	N/A	Redi-Flo 2	2 gal/min	36 gal calculated Estimate 40 ± gal	165'	Redi-Flo 2	7/19/94	2:52 pm	Boerner/Day	2-40 mL VOA / 1-1 pint poly 2-40 mL VOA - state	MW-57 EB #7 3:15 pm	HCL in VOA	30	0	0	2:32	29.0	757	6.70	3.82
																	:05	2:37	23.6	778	6.65	2.14
																	:10	2:42	23.1	790	6.72	1.33
																	:15	2:47	23.0	792	6.65	1.45
																	:20	2:52	22.2	794	6.63	1.07

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-57

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-6

Well Depth	Static Water Level Depth & Meas. Tech.	Dage Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
14.25	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-6	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-6

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-60

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
221.74	186.54	7/18/94	N/A	Redi-Flo 2	3 gal/min	70 gal calculated Estimate 85 ± gal total	210'	Redi-Flo 2	7/19/94	10:48 am	Boerner/Day	2-40 mL VOA / 1-1 pint poly 2-40 mL VOA - state	MW-60 EB #5 11:00 am	HCL in VOA	0	0	:00	10:18	27.4	1130	6.62	2.95
																	:05	10:23	22.8	1020	6.66	2.16
																	:10	10:28	22.6	1020	6.66	2.82
																	:15	10:33	23.6	1000	6.70	2.86
																	:20	10:38	22.1	1001	6.74	2.66
																	:24	10:42	22.2	1001	6.85	2.77

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-60

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-61

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauge	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
57.73	37.43	7/19/94	N/A	Redi-Flo 2	1.0 gal/min	40 gal calculated	50'	Redi-flo 2	7/20/94	3:46 pm	Boerner/Day	2-40 mL VOA / 1-1 pint poly	MW-61	HCL in VOA	0	0	:00	2:59	36.4	19	7.62	5.69
																	:05	3:04	31.3	2030	6.33	5.08
																	:10	3:09	28.1	3680	6.27	4.05
																	:17	3:16	25.6	3690	6.23	3.72
																	:23	3:22	25.2	3800	6.25	3.83
																	:29	3:28	24.8	3900	6.23	3.47
																	:36	3:35	24.6	3870	6.18	3.20
																	:47	3:46	24.8	3960	6.19	2.77

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-61

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-63

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauge	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
221.82	197.98	7/18/94	N/A	Redi-Flo 2	3 gal/min	47 gal calculated Estimate 84 ± gal total	191'	Redi-Flo 2	7/18/94	1:42 pm	Boerner/Day	2-40 mL VOA / 1-1 pint poly	MW-63	HCL in VOA	0	0	:00	1:07	38.2	760	8.35	8.04
																	:06	1:13	24.8	200	7.43	10.6
																	:12	1:19	23.4	557	7.43	10.46
																	:21	1:28	23.7	560	7.41	6.67
																	:24	1:31	23.2	570	7.46	6.01
																	:29	1:36	23.2	540	7.37	5.73

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-63

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-64

Well Depth	Static Water Level Depth & Meas. Tech.	Date Guaged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rates (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
201.59	169.65	7/18/94	N/A	Redi-Flo 2	4 gal/min	65 gal calculated Estimate 72 ± gal total	190'	Redi-Flo 2	7/19/94	12:00 pm	Boerner/Day	2-40 mL VOA / 1-1 pint poly 2-40 mL VOA - state	MW-64 EB #6 12:22 pm	HCL in VOA	0	0	:00	11:42	26.3	910	7.25	2.72
																	:06	11:48	23.3	930	6.86	1.48
																	:11	11:53	22.2	910	7.14	2.69
																	:16	11:58	22.0	920	6.69	1.34

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-64

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-65

Well Depth	Static Water Level Depth & Meas. Tech.	Date Guaged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
57.42	56.70	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-56	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-65

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-66

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
235.33	200.91	7/18/94	N/A	Redi-Flo 2	2 gal/min @ 375 Hz	70 gal calculated Estimate 85 ± gal total	215'	Redi-Flo 2	7/19/94	9:07 am	Boerner/Day	2-40 mL VOA / 1-1 pint poly 2-40 mL VOA - state	MW-66 EB #4 9:35 am	HCL in VOA	0	0	:00	8:27	23.2	950	6.87	4.03
																	:06	8:33	20.9	1030	6.83	2.69
																	:12	8:39	20.9	1100	6.80	2.62
																	:17	8:44	20.8	1040	6.78	2.44
																	:22	8:49	20.7	1100	6.84	2.31
																	:27	8:54	20.1	1080	6.82	2.60
																	:32	8:59	20.6	1040	6.75	2.45
																	:37	9:04	20.3	1040	6.70	2.60

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-66

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-67

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
165.44	136.82	7/18/94	N/A	Redi-Flo 2	3.5 gal/min	60 gal calculated Estimate 70 ± gal total	155'	Redi-Flo 2	7/19/94	1:22 pm	Boerner/Day	2-40 mL VOA / 1-1 pint poly	MW-67 EB #17 1:45 pm	HCL in VOA	50	0	:00	1:01	26.5	666	6.72	1.52
																	:05	1:06	22.7	700	6.82	1.77
																	:09	1:10	22.5	711	6.74	1.13
																	:14	1:15	22.5	709	6.70	1.05
																	:18	1:19	22.1	708	6.81	2.49

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-67

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-69

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gueged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 mg/L
		7/19/94								Recovery well, unable to sample	Cox		MW-69									

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-69

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-7

Well Depth	Static Water Level Depth & Meas. Tech.	Date Guaged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
17.42	17.35	7/19/94	N/A	Disposable Bailer		No sample collected	N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-7	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-7

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-70

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauge	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
222.66	193.59	7/18/94	N/A	Redi-Flo 2	370 Hz @ 2.4 gal/min		210'	Redi-Flo 2	7/18/94	11:04 am	Boerner/Day	2-40 mL / 1 pint poly	MW-70 EB #1	HCL - 40 mL BTEX / poly pint	0	0	:00	10:23	33.8	20	8.74	4.70
																	:13	10:36	24.5	470	7.50	6.20
																	:18	10:41	22.6	580	7.54	5.86
																	:23	10:46	22.1	580	7.51	5.77
																	:28	10:51	22.1	570	7.48	5.61
																	:33	10:56	22.4	570	7.36	5.18
																	:38	11:01	22.0	560	7.24	5.23

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MASTER

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-71

Well Depth	Static Water Level Depth & Meas. Tech.	Date Guaged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
221.00	150.37	7/18/94	N/A	Redi-Flo 2	2 gal/min	140 gal calculated Estimate 138 ± gal total	200'	Redi-Flo 2	7/18/94	4:10 pm	Cox	2-40 mL VOA / 1-1 pint poly 2-4 mL VOA - state	MW-71 EB #3	HCL in VOA	0	0	:00	2:58	35.4	127	8.04	4.89
																	:05	3:03	25.8	1333	7.31	4.28
																	:11	3:09	24.0	1333	7.44	2.10
																	:16	3:14	23.5	1290	7.23	2.20
																	:21	3:19	23.6	1290	7.12	1.14
																	:27	3:25	23.4	1240	7.07	1.32
																	:32	3:30	22.8	1120	7.00	1.23
																	:37	3:35	23.8	1250	6.97	1.50
																	:42	3:40	23.6	1340	6.89	0.92
																	:48	3:46	23.4	1350	6.95	0.49
																	:54	3:52	22.4	1380	6.98	0.56
																	:60	3:58	23.3	1370	6.87	0.82
																	:65	4:03	23.2	1370	6.88	1.05
																	:69	4:07	22.2	1370	6.78	1.03

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-71

July, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-8

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
17.38	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-8	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-8

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-9

Well Depth	Static Water Level Depth & Meas. Tech.	Date Guaged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
13.79	13.75	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	MW-9	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-9

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. Sump 16

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gueged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
18.10	dry	7/19/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/19/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	Sump 16	HCL in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\SUMP-16

July , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. SW-2

Well Depth	Static Water Level Depth & Meas. Tech.	Date Guaged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
Unknown	181.00	7/18/94	N/A	Disposable Bailer			N/A	Disposable Bailer	7/18/94	No sample collected	Cox	2-40 mL VOA / 1-1 pint poly	SW-2	HCL in VOA	30	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\SW-2

APPENDIX B

JULY 1994 LABORATORY RESULTS - GROUNDWATER

AND

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

Analytical **Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **407399**

July 28, 1994

Marathon Oil Co.
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: INDIAN BASIN REMED 44999

Attention: Robert J. Menzie, Jr.

On **07/22/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Chloride analyses were performed by Analytical Technologies, Inc., 5550 Morehouse Drive, San Diego, CA.

All other analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Analytical Technologies, Inc.

CLIENT : MARATHON OIL CO. DATE RECEIVED : 07/22/94
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED REPORT DATE : 07/28/94

ATI ID: 407399

ATI #	ATI SD	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	407399-01	AIR STRIPPER OUTLET	AQUEOUS	07/21/94
02	407399-02	AIR STRIPPER INLET	AQUEOUS	07/21/94
03	407399-03	SW-1	AQUEOUS	07/21/94
04	407399-04	LYMAN	AQUEOUS	07/21/94
05	407399-05	BIEBBLE	AQUEOUS	07/21/94
06	407399-06	ARROYO	AQUEOUS	07/21/94
07	407399-07	MW-61A	AQUEOUS	07/19/94
08	407399-08	MW-58	AQUEOUS	07/19/94
09	407399-09	MW-72	AQUEOUS	07/19/94
10	407399-10	MW-59	AQUEOUS	07/19/94
11	407399-11	MW-62	AQUEOUS	07/19/94
12	407399-12	MW-65A	AQUEOUS	07/21/94
13	407399-13	MW-68	AQUEOUS	07/21/94
14	407399-14	INITIAL	AQUEOUS	07/18/94
15	407399-15	MW-70	AQUEOUS	07/18/94
16	407399-16	E.B. #1	AQUEOUS	07/18/94
17	407399-17	MW-63	AQUEOUS	07/18/94
18	407399-18	E.B. #2	AQUEOUS	07/18/94
19	407399-19	MW-71	AQUEOUS	07/18/94
20	407399-20	E.B. #3	AQUEOUS	07/18/94
21	407399-21	MW-66	AQUEOUS	07/19/94
22	407399-22	E.B. #4	AQUEOUS	07/19/94
23	407399-23	MW-60	AQUEOUS	07/19/94
24	407399-24	E.B. #5	AQUEOUS	07/19/94
25	407399-25	MW-64	AQUEOUS	07/19/94
26	407399-26	E.B. #6	AQUEOUS	07/19/94
27	407399-27	MW-67	AQUEOUS	07/19/94
28	407399-28	E.B. #7	AQUEOUS	07/19/94
29	407399-29	MW-57	AQUEOUS	07/19/94
30	407399-30	E.B. #8	AQUEOUS	07/19/94

Analytical Technologies, Inc.

CLIENT : MARATHON OIL CO. DATE RECEIVED : 07/22/94
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED REPORT DATE : 07/28/94

ATI ID: 407399

ATI #	ATI SD	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
31	407399-31	MW-54	AQUEOUS	07/20/94
32	407399-32	E.B. #9	AQUEOUS	07/20/94
33	407399-33	MW-55	AQUEOUS	07/20/94
34	407399-34	E.B. #10	AQUEOUS	07/20/94
35	407399-35	MW-45	AQUEOUS	07/20/94
36	407399-36	MW-50	AQUEOUS	07/20/94
37	407399-37	MW-43	AQUEOUS	07/20/94
38	407399-38	MW-44	AQUEOUS	07/20/94
39	407399-39	MW-49	AQUEOUS	07/20/94
40	407399-40	MW-61	AQUEOUS	07/20/94
41	407399-41	MW-41	AQUEOUS	07/20/94
42	407399-42	MW-39	AQUEOUS	07/20/94
43	407399-43	TRIP BLANK	AQUEOUS	06/27/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	43

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

Client : ANALYTICAL TECHNOLOGIES, INC.
Project # : 407399 ATI I.D.: 4072[illegible]5
Project Name: MARATHON OIL COMPANY/INDIAN BASIN REMED.

Sample #	Client ID	Matrix	Date Sampled	Date Received
1	407399-03	WATER	21-JUL-94	23-JUL-[illegible]4
2	407399-04	WATER	21-JUL-94	23-JUL-[illegible]4
3	407399-05	WATER	21-JUL-94	23-JUL-94
4	407399-06	WATER	21-JUL-94	23-JUL-[illegible]4
5	407399-07	WATER	19-JUL-94	23-JUL-[illegible]4

Parameter	Units	1	2	3	4	5
CHLORIDE	MG/L	22.0	12.0	15.0	8.0	8.0

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

Client : ANALYTICAL TECHNOLOGIES, INC.
Project # : 407399
ATI I.D.: 40727

Project Name: MARATHON OIL COMPANY/INDIAN BASIN REMED.

Sample #	Client ID	Matrix	Date Sampled	Date Received
6	407399-08	WATER	19-JUL-94	23-JUL-9
7	407399-09	WATER	19-JUL-94	23-JUL-9
8	407399-10	WATER	19-JUL-94	23-JUL-9
9	407399-11	WATER	19-JUL-94	23-JUL-9
10	407399-12	WATER	21-JUL-94	23-JUL-9

Parameter	Units	6	7	8	9	10
CHLORIDE	MG/L	38.0	32.0	<5.0	129	10.0

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

Client : ANALYTICAL TECHNOLOGIES, INC.
Project # : 407399 ATI I.D.: 407275
Project Name: MARATHON OIL COMPANY/INDIAN BASIN REMED.

Sample #	Client ID	Matrix	Date Sampled	Date Received
11	407399-13	WATER	21-JUL-94	23-JUL-94
12	407399-15	WATER	18-JUL-94	23-JUL-94
13	407399-17	WATER	18-JUL-94	23-JUL-94
14	407399-19	WATER	18-JUL-94	23-JUL-94
15	407399-21	WATER	19-JUL-94	23-JUL-94

Parameter	Units	11	12	13	14	15
CHLORIDE	MG/L	29.0	8.0	<5.0	<5.0	<5.0

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

Client : ANALYTICAL TECHNOLOGIES, INC.
Project # : 407399 ATI I.D.: 40727
Project Name: MARATHON OIL COMPANY/INDIAN BASIN REMED.

Sample #	Client ID	Matrix	Date Sampled	Date Received
16	407399-23	WATER	19-JUL-94	23-JUL-9
17	407399-25	WATER	19-JUL-94	23-JUL-9
18	407399-27	WATER	19-JUL-94	23-JUL-9
19	407399-29	WATER	19-JUL-94	23-JUL-9
20	407399-31	WATER	20-JUL-94	23-JUL-9

Parameter	Units	16	17	18	19	20
CHLORIDE	MG/L	<5.0	<5.0	<5.0	48.0	135

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

Client : ANALYTICAL TECHNOLOGIES, INC.
Project # : 407399
ATI I.D.: 407
Project Name: MARATHON OIL COMPANY/INDIAN BASIN REMED.

Sample #	Client ID	Matrix	Date Sampled	Date Received
21	407399-33	WATER	20-JUL-94	23-JUL
22	407399-35	WATER	20-JUL-94	23-JUL
23	407399-36	WATER	20-JUL-94	23-JUL
24	407399-37	WATER	20-JUL-94	23-JUL
25	407399-38	WATER	20-JUL-94	23-JUL

Parameter	Units	21	22	23	24	25
CHLORIDE	MG/L	299	429	290	266	430

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

Client : ANALYTICAL TECHNOLOGIES, INC.
Project # : 407399 ATI I.D.: 40727
Project Name: MARATHON OIL COMPANY/INDIAN BASIN REMED.

Sample #	Client ID	Matrix	Date Sampled	Date Received
26	407399-39	WATER	20-JUL-94	23-JUL-9
27	407399-40	WATER	20-JUL-94	23-JUL-9
28	407399-41	WATER	20-JUL-94	23-JUL-9
29	407399-42	WATER	20-JUL-94	23-JUL-9

Parameter	Units	26	27	28	29
CHLORIDE	MG/L	368	387	259	198

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

DUP/MS

Client : ANALYTICAL TECHNOLOGIES, INC.
Project # : 407399 ATI I.D. : 407[illegible]
Project Name: MARATHON OIL COMPANY/INDIAN BASIN REMED.

Parameters	REF I.D.	Units	Sample Result	Dup Result	RPD	Spiked Sample	Spike Conc	% R[illegible]
CHLORIDE	407275-06	MG/L	38.0	36.0	5	77.0	40.0	98
CHLORIDE	407214-01	MG/L	28000	28200	1	28900	1000	9[illegible]
CHLORIDE	407275-23	MG/L	290	289	0	331	40.0	1[illegible]
CHLORIDE	407285-03	MG/L	90.0	88.0	2	127	40.0	93

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

BLANK SPIKE

Client : ANALYTICAL TECHNOLOGIES, INC.
Project # : 407399 ATI I.D. : 40727
Project Name: MARATHON OIL COMPANY/INDIAN BASIN REMED.

Parameters	Blank Spike ID#	Units	Blank Result	Spiked Sample	Spike Conc.	% Rec
CHLORIDE	48660	MG/L	<5.0	41.0	40.0	103
CHLORIDE	48685	MG/L	<5.0	40.0	40.0	100

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	AIR STRIPPER OUTLET	AQUEOUS	07/21/94	NA	07/26/94	1
02	AIR STRIPPER INLET	AQUEOUS	07/21/94	NA	07/23/94	10
03	SW-1	AQUEOUS	07/21/94	NA	07/23/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	11	<0.5
TOLUENE	UG/L	15	<5.0	<0.5
ETHYLBENZENE	UG/L	1.8	9.1	<0.5
TOTAL XYLENES	UG/L	17	70	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		93	-	-
TRIFLUOROTOLUENE (%)		-	93	96

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	LYMAN	AQUEOUS	07/21/94	NA	07/23/94	1
05	BIEBBLE	AQUEOUS	07/21/94	NA	07/23/94	1
06	ARROYO	AQUEOUS	07/21/94	NA	07/25/94	1

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		-	-	98
TRIFLUOROTOLUENE (%)		99	93	-

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
07	MW-61A	AQUEOUS	07/19/94	NA	07/23/94	1
08	MW-58	AQUEOUS	07/19/94	NA	07/26/94	1
09	MW-72	AQUEOUS	07/19/94	NA	07/23/94	1

PARAMETER	UNITS	07	08	09
BENZENE	UG/L	<0.5	2.0	18
TOLUENE	UG/L	<0.5	29	<0.5
ETHYLBENZENE	UG/L	<0.5	4.5	5.1
TOTAL XYLENES	UG/L	2.5	27	2.8
SURROGATE:				
BROMOFLUOROBENZENE (%)		-	101	-
TRIFLUOROTOLUENE (%)		91	-	101

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
10	MW-59	AQUEOUS	07/19/94	NA	07/26/94	1
11	MW-62	AQUEOUS	07/19/94	NA	07/26/94	1
12	MW-65A	AQUEOUS	07/21/94	NA	07/24/94	1

PARAMETER	UNITS	10	11	12
BENZENE	UG/L	13	4.3	<0.5
TOLUENE	UG/L	69	32	<0.5
ETHYLBENZENE	UG/L	0.5	7.5	<0.5
TOTAL XYLENES	UG/L	73	26	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		116	102	-
TRIFLUOROTOLUENE (%)		-	-	104

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
13	MW-68	AQUEOUS	07/21/94	NA	07/24/94	100
14	INITIAL	AQUEOUS	07/18/94	NA	07/24/94	1
15	MW-70	AQUEOUS	07/18/94	NA	07/24/94	1

PARAMETER	UNITS	13	14	15
BENZENE	UG/L	260	<0.5	<0.5
TOLUENE	UG/L	170	1.0	<0.5
ETHYLBENZENE	UG/L	220	<0.5	<0.5
TOTAL XYLENES	UG/L	2000	1.1	<0.5
SURROGATE:				
TRIFLUOROTOLUENE (%)		104	105	104

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
17	MW-63	AQUEOUS	07/18/94	NA	07/24/94	1
19	MW-71	AQUEOUS	07/18/94	NA	07/26/94	1
21	MW-66	AQUEOUS	07/19/94	NA	07/26/94	1

PARAMETER	UNITS	17	19	21
BENZENE	UG/L	1.0	<0.5	<0.5
TOLUENE	UG/L	9.6	3.0	0.6
ETHYLBENZENE	UG/L	1.4	0.7	<0.5
TOTAL XYLENES	UG/L	13	6.2	0.8
SURROGATE:				
BROMOFLUOROBENZENE (%)		-	96	94
TRIFLUOROTOLUENE (%)		106	-	-

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
23	MW-60	AQUEOUS	07/19/94	NA	07/25/94	1
25	MW-64	AQUEOUS	07/19/94	NA	07/25/94	1
27	MW-67	AQUEOUS	07/19/94	NA	07/25/94	1

PARAMETER	UNITS	23	25	27
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	1.3	0.5	0.6
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	3.5	3.6	3.0
SURROGATE:				
BROMOFLUOROBENZENE (%)		95	99	97

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
29	MW-57	AQUEOUS	07/19/94	NA	07/25/94	1
31	MW-54	AQUEOUS	07/20/94	NA	07/25/94	1
33	MW-55	AQUEOUS	07/20/94	NA	07/26/94	2

PARAMETER	UNITS	29	31	33
BENZENE	UG/L	0.7	15	360
TOLUENE	UG/L	<0.5	1.2	5.5
ETHYLBENZENE	UG/L	<0.5	8.5	16
TOTAL XYLENES	UG/L	1.8	8.7	120
SURROGATE:				
BROMOFLUOROBENZENE (%)		72	96	230*

*OUTSIDE ATI QUALITY CONTROL LIMITS DUE TO MATRIX INTERFERENCE

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
35	MW-45	AQUEOUS	07/20/94	NA	07/25/94	1
36	MW-50	AQUEOUS	07/20/94	NA	07/25/94	1
37	MW-43	AQUEOUS	07/20/94	NA	07/25/94	1

PARAMETER	UNITS	35	36	37
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	1.5
TOTAL XYLENES	UG/L	<0.5	<0.5	7.1
SURROGATE:				
BROMOFLUOROBENZENE (%)		98	95	92

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
38	MW-44	AQUEOUS	07/20/94	NA	07/25/94	10
39	MW-49	AQUEOUS	07/20/94	NA	07/25/94	10
40	MW-61	AQUEOUS	07/20/94	NA	07/26/94	1

PARAMETER	UNITS	38	39	40
BENZENE	UG/L	36	150	3.2
TOLUENE	UG/L	<5.0	<5.0	<0.5
ETHYLBENZENE	UG/L	12	32	<0.5
TOTAL XYLENES	UG/L	14	27	0.8
SURROGATE:				
BROMOFLUOROBENZENE (%)		88	99	93

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 407399

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
41	MW-41	AQUEOUS	07/20/94	NA	07/26/94	1
42	MW-39	AQUEOUS	07/20/94	NA	07/25/94	10
43	TRIP BLANK	AQUEOUS	06/27/94	NA	07/26/94	1

PARAMETER	UNITS	41	42	43
BENZENE	UG/L	1.4	<0.5	<0.5
TOLUENE	UG/L	31	<0.5	<0.5
ETHYLBENZENE	UG/L	4.9	5.9	<0.5
TOTAL XYLENES	UG/L	<0.5	78	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		110	113	104

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 407399
BLANK I.D.	: 072394	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/24/94
PROJECT NAME	: INDIAN BASIN REMED	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		109

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 407399
BLANK I.D.	: 072394	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/23/94
PROJECT NAME	: INDIAN BASIN REMED	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
TRIFLUOROTOLUENE (%)		92

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 407399
BLANK I.D.	: 072394	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/23/94
PROJECT NAME	: INDIAN BASIN REMED	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
TRIFLUOROTOLUENE (%)		105

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 407399
BLANK I.D.	: 072594	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/25/94
PROJECT NAME	: INDIAN BASIN REMED	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		98

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 407399
BLANK I.D.	: 072594	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/25/94
PROJECT NAME	: INDIAN BASIN REMED	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		94

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 407399
BLANK I.D.	: 072694	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/26/94
PROJECT NAME	: INDIAN BASIN REMED	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		89

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 407399
BLANK I.D.	: 072694	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/26/94
PROJECT NAME	: INDIAN BASIN REMED	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		98

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40739903	ATI I.D.	: 407399
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/23/94
PROJECT NAME	: INDIAN BASIN REMED	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40739903	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.6	96	9.2	92	4
TOLUENE	<0.5	10	9.7	97	9.3	93	4
ETHYLBENZENE	<0.5	10	9.6	96	9.2	92	4
TOTAL XYLENES	<0.5	30	30	100	29	97	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40739917	ATI I.D.	: 407399
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/24/94
PROJECT NAME	: INDIAN BASIN REMED	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40739917	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	1.0	10	11	100	11	100	0
TOLUENE	9.6	10	20	104	19	94	5
ETHYLBENZENE	1.4	10	11	96	11	96	0
TOTAL XYLENES	13	30	44	103	42	97	5

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40739906	ATI I.D.	: 407399
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/25/94
PROJECT NAME	: INDIAN BASIN REMED	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40739906	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	11	110	11	110	0
TOLUENE	<0.5	10	11	110	11	110	0
ETHYLBENZENE	<0.5	10	11	110	11	110	0
TOTAL XYLENES	<0.5	30	34	113	34	113	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40740402	ATI I.D.	: 407399
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/26/94
PROJECT NAME	: INDIAN BASIN REMED	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40740402	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	11	110	11	110	0
TOLUENE	<0.5	10	11	110	11	110	0
ETHYLBENZENE	<0.5	10	10	100	10	100	0
TOTAL XYLENES	<0.5	30	32	107	32	107	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD (EXTERNAL)

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40740402	ATI I.D.	: 407399
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 07/26/94
PROJECT NAME	: INDIAN BASIN REMED	SAMPLE MATRIX	: AQUEOUS
QC. I.D.	: 40740402	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.7	97	9.8	98	1
TOLUENE	<0.5	10	9.7	97	9.8	98	1
ETHYLBENZENE	<0.5	10	9.6	96	9.7	97	1
TOTAL XYLENES	<0.5	30	29	97	29	97	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical**Technologies,**Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 7-21-94 PAGE 1 OF 6

ATI LAB I.D. 407299

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie, Jr.

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie, Jr.
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTEX (8020)	Chlorides	NUMBER OF CONTAINERS
Air Stripper Outlet	7-21-94	12:26p	Water	01	✓		2
Air Stripper Inlet	7-21-94	12:33p		02	✓		2
SW-1	7-21-94	12:54p		03	✓	✓	3
Lyman	7-21-94	10:40a		04	✓	✓	3
Biebble	7-21-94	10:00a		05	✓	✓	3
Arroyo	7-21-94	10:20a		06	✓	✓	3
MW-61A	7-19-94	10:36a		07	✓	✓	3
MW-58	7-19-94	9:28a		08	✓	✓	3
MW-72	7-19-94	2:30p		09	✓	✓	3

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
BTXE (8020)
Chlorides
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Volatile Organics GC/MS (624/8240)
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)
NUMBER OF CONTAINERS

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	25
PROJ. NAME: Indian Basin Remed.		CUSTODY SEALS	(Y) N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

by BAS

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Jr. Time: 3:00PM	Signature: Time:	Signature: Time:
Printed Name: Robert J. Menzie Jr. Date: 7-21-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915 687-8312	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY:(LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time: 0830
Printed Name: Date:	Printed Name: Date:	Printed Name: Dianne Cutter Date: 7/22/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 7-21-94 PAGE 2 OF 6

ATI LAB I.D. 407399

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie, Jr.

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie, Jr
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
MW-59	7-19-94	11:02a	Water	10
MW-62	7-19-94	3:11p		11
MW-65A	7-21-94	11:50p		12
MW-68	7-21-94	12:05p		13

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	Chlorides	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
			✓	✓																3
			✓	✓																3
			✓	✓																3
			✓	✓																3

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	12
PROJ. NAME: Indian Basin Remed.		CUSTODY SEALS	(Y) N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

by bbs

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Time: 3:00PM	Signature: Time:	Signature: Time:
Printed Name: Robert J. Menzie Jr. Date: 7-21-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915 687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 12:30
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 7/22/94
Company:	Company:	Analytical Technologies, Inc.

AnalyticalTechnologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 7-18-94 PAGE 3 OF 6

ATI LAB I.D. 407397

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie, Jr

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie, Jr.
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Chloride Held for P.M. Approval	NUMBER OF CONTAINERS
Initial	7-18-94	10:00a	water	14	✓		2
MW-70		11:04a		15	✓	✓	3
E.B. #1		11:28a		16	✓	✓	2
M.W.-63		1:42p		17	✓	✓	3
E.B. #2		2:06p		18	✓	✓	2
MW-71		4:10p		19	✓	✓	3
E.B #3	↓	4:45p		20	✓	✓	2
MW-66	7-19-94	9:07a		21	✓	✓	3
E.B. #4	↓	9:35a	↓	22	✓	✓	2

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Volatile Organics GC/MS (624/8240)
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	22
PROJ. NAME: Indian Basin Remed.		CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

Note: Equipment Blanks are to be held until PM. releases for sampling or disposal.

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Jr. Time: 3:00 PM	Signature: Time:	Signature: Time:
Printed Name: Robert J. Menzie Jr. Date: 7-21-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915 687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 12:30
Printed Name: Date:	Printed Name: Date:	Printed Name: Diane Luther Date: 7/22/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

AnalyticalTechnologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 7-21-94 PAGE 4 OF 6

ATI LAB I.D. 407399

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie, Jr.

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie, Jr.
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Chloride	Hold For P.M. Approval	NUMBER OF CONTAINERS
MW-60	7-19-94	10:48a	Water	23	✓	✓		3
E.B. #5	7-19-94	11:10a		24	✓		✓	2
MW-64	7-19-94	12:00p		25	✓	✓		3
E.B. #6	7-19-94	12:32p		26	✓		✓	2
MW-67	7-19-94	1:22p		27	✓	✓		3
E.B. #7	7-19-94	1:45p		28	✓		✓	2
MW-57	7-19-94	2:50p		29	✓	✓		3
E.B. #8	7-19-94	3:15p		30	✓		✓	2
MW-54	7-20-94	12:59p	↓	31	✓	✓		3

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	23
PROJ. NAME: Indian Basin Remed		CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	↓
SHIPPED VIA:		RECEIVED COLD	↓

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:
Note: Equipment blanks are to be held until P.M. releases for sampling or disposal.

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Jr. Time: 3:00 PM	Signature: Time:	Signature: Time:
Printed Name: Robert J. Menzie Jr. Date: 7-21-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915 687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 12:30
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 7/22/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 7-21-94 PAGE 5 OF 6

ATI LAB I.D. 407399

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie, Jr.

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie, Jr.
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTEX/MTBE (8020)	Chlorides	Hold For P.M. Approval	NUMBER OF CONTAINERS
E.B. #9	7-20-94	10:06a	Water	32	✓		✓	2
MW-55		9:31a		33	✓	✓		3
E.B. #10		2:45p		34	✓		✓	2
MW-45		2:05p		35	✓	✓		3
MW-50		4:41p		36	✓	✓		3
MW-43		2:15p		37	✓	✓		3
MW-44		5:22p		38	✓	✓		3
MW-49		4:59p		39	✓	✓		3
MW-61	↓	3:46p	↓	40	✓	✓		3

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Pesticides/PCB (608/8080); Herbicides (615/8150); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); Base/Neutral/Acid Compounds GC/MS (625/8270); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	25
PROJ. NAME: Indian Basin Remed.		CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:
Note: Equipment Blanks are to be held until P.M. releases for sampling or disposal. by fax

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Jr. Time: 7:00 PM	Signature: Time:	Signature: Time:
Printed Name: Robert J. Menzie Jr. Date: 7-21-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915 687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 12:30
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 7/22/94
Company:	Company:	Analytical Technologies, Inc.

Analytical**Technologies,**Inc., Albuquerque, NM
San Diego ▪ Phoenix ▪ Seattle ▪ Pensacola ▪ Ft. Collins ▪ Portland ▪ Albuquerque

CHAIN OF CUSTODY

DATE: 7-21-94 PAGE 6 OF 6

ATI LAB I.D. 407899

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie, Jr.

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie, Jr.
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	(BTXE/MTBE 8020)	chlorides	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
MW-41	7-20-94	2:25P	Water	41				✓	✓																3
MW-39	↓	2:40P	↓	42				✓	✓																3
Trip Blank	6-27-94		↓	43				✓																	1

PROJECT INFORMATION

PROJ. NO.: 44999
PROJ. NAME: Indian Basin Remed.
P.O. NO.:
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	7
CUSTODY SEALS	(Y) / N / NA
RECEIVED INTACT	Y
RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Time: 3:00 P.M.	Signature: Time:	Signature: Time:
Printed Name: Robert J. Menzie, Jr. Date: 7-21-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1230
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 7/22
Company:	Company:	Analytical Technologies, Inc.

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 7/22 PAGE 1 OF 4

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310		6240 /TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
407399-03	7/21	1254a	Aq	01						X																						
-04		1040a		02						X																						
-05		1000a		03						X																						
-06		1020a		04						X																						
-07	7/19	10.26a		05						X																						
-08	7/19	928A		06						X																						
-09	7/19	230P		07						X																						
-10	7/19	1102A		08						X																						
-11	7/19	311P		09						X																						

PROJECT INFORMATION	
PROJECT NUMBER:	407399
PROJECT NAME:	MDC
QC LEVEL:	~~STD.~~ IV
QC REQUIRED:	~~MS~~ MSD BLANK
TAT:	~~STANDARD~~ RUSHI

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	4
INTACT?	4
RECEIVED GOOD COND./COLD	Y/Y
LAB NUMBER	407275

DUE DATE: 8/5
RUSH SURCHARGE: ~~0~~
CLIENT DISCOUNT: ~~0.10~~ % ~~0~~

Cooler #113: 2.0°c

SAMPLES SENT TO:
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PHOENIX
BARRINGER
FIBERQUANT

RELINQUISHED BY: 1.
Signature: Time: 1700
Printed Name: Date 7/22/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 10:15
Printed Name: Date: 7-23-94
Company: ATI - SD

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 7/20 PAGE 2 OF 4

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
407399-12	7/21	1150	AQ	10
-13	7/21	1205		11
-15	7/18	1104		12
-17	7/18	142		13
-19	7/18	410		14
-21	7/19	907		15
-23	7/19	1048		16
-25	7/19	1200		17
-27	7/19	122		18

ANALYSIS REQUEST

TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	CHLORIDE	632/632 MOD	619/619 MOD	610/8310		8240 /TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
					X																						1
					X																						1
					X																						1
					X																						1
					X																						1
					X																						1
					X																						1
					X																						1
					X																						1

PROJECT INFORMATION

PROJECT NUMBER: 407399
PROJECT NAME: Rodeo
QC LEVEL: STD. IV
QC REQUIRED: MS MSD BLANK
TAT: STANDARD RUSHI

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	4
INTACT?	4
RECEIVED GOOD COND./COLD	4/4
LAB NUMBER	407275

DUE DATE: 8/5
RUSH SURCHARGE: —
CLIENT DISCOUNT: — %

Cooler #1 3=2.6c

SAMPLES SENT TO:
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PHOENIX
BARRINGER
FIBERQUANT

RELINQUISHED BY: 1.
Signature: [signature] Time: 1700
Printed Name: LPARKER Date 7/20
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 10:15
Printed Name: Lisa J Tucker Date: 7.23.94
Company: ATI - SD

ATI Lab - San Diego (619) 458-9141 - Phoenix (602) 496-4400 - Seattle (206) 228-8335 - Pensacola (904) 474-1001 - Portland (503) 684-0447 - Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI Pink - ORIGINATOR

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 7/22 PAGE 3 OF 4

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	CHLORIDE	632/632 MOD	619/619 MOD	610/8310		8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
407399-29	7/19	252	AQ	19					X	X																			
-31	7/20	259		20					X	X																			
-33	7/20	937		21					X	X																			
-35	7/20	205		22					X	X																			
-36	7/20	441		23					X	X																			
-37	7/20	215		24					X	X																			
-38	7/20	522		25					X	X																			
-39	7/20	459		26					X	X																			
-40	7/20	346		27					X	X																			

PROJECT INFORMATION	
PROJECT NUMBER:	407399
PROJECT NAME:	DOC
QC LEVEL:	STD IV
QC REQUIRED:	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y/Y
LAB NUMBER	407275

DUE DATE: 8/5
RUSH SURCHARGE: —
CLIENT DISCOUNT: — %

cooler #113 = 2.0°C

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX
- BARRINGER
- FIBEROUANT

RELINQUISHED BY: 1.
Signature: Time: 1700
Printed Name: Date 7/22/94
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 10:15
Printed Name: Lisa J Tucker Date: 7-23-94
Company: ATT-SD

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 7/22 PAGE 1 OF 4

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
407359-41	7/20	225	Aq	28
-42	7/20	240	"	29

TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	CHLORIDE	632/632 MOD	619/619 MOD	610/8310		8240 (TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
					X																						2
					X																						2

PROJECT INFORMATION

PROJECT NUMBER: 407359
PROJECT NAME: INDC
QC LEVEL: STD. IV
QC REQUIRED: MS MSD BLANK
TAT: STANDARD RUSH!!

DUE DATE: 8/5
RUSH SURCHARGE: ——
CLIENT DISCOUNT: —— %

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	2
CHAIN OF CUSTODY SEALS	4
INTACT?	Y
RECEIVED GOOD COND./COLD	Y/Y
LAB NUMBER	407275

Cooler #113: 2.0°C

SAMPLES SENT TO:
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PHOENIX ✓
BARRINGER
FIBERQUANT

RELINQUISHED BY: 1.
Signature: [signature] Time: 1700
Printed Name: [signature] Date 7/20/94
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

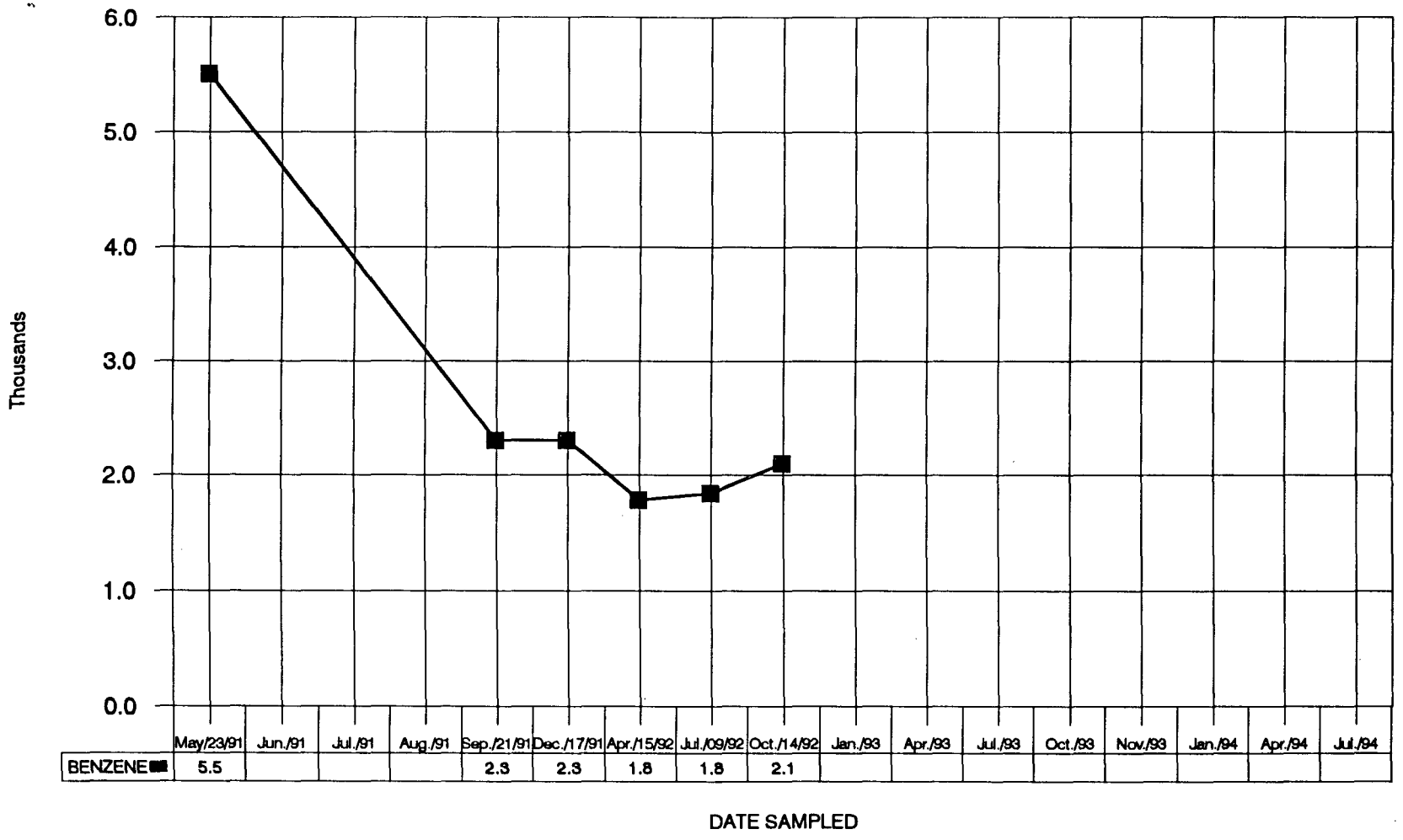
RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: [signature] Time: 10:15
Printed Name: Lisa J. Tucker Date: 7-23-94
Company: ATI-SD

APPENDIX C

BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS

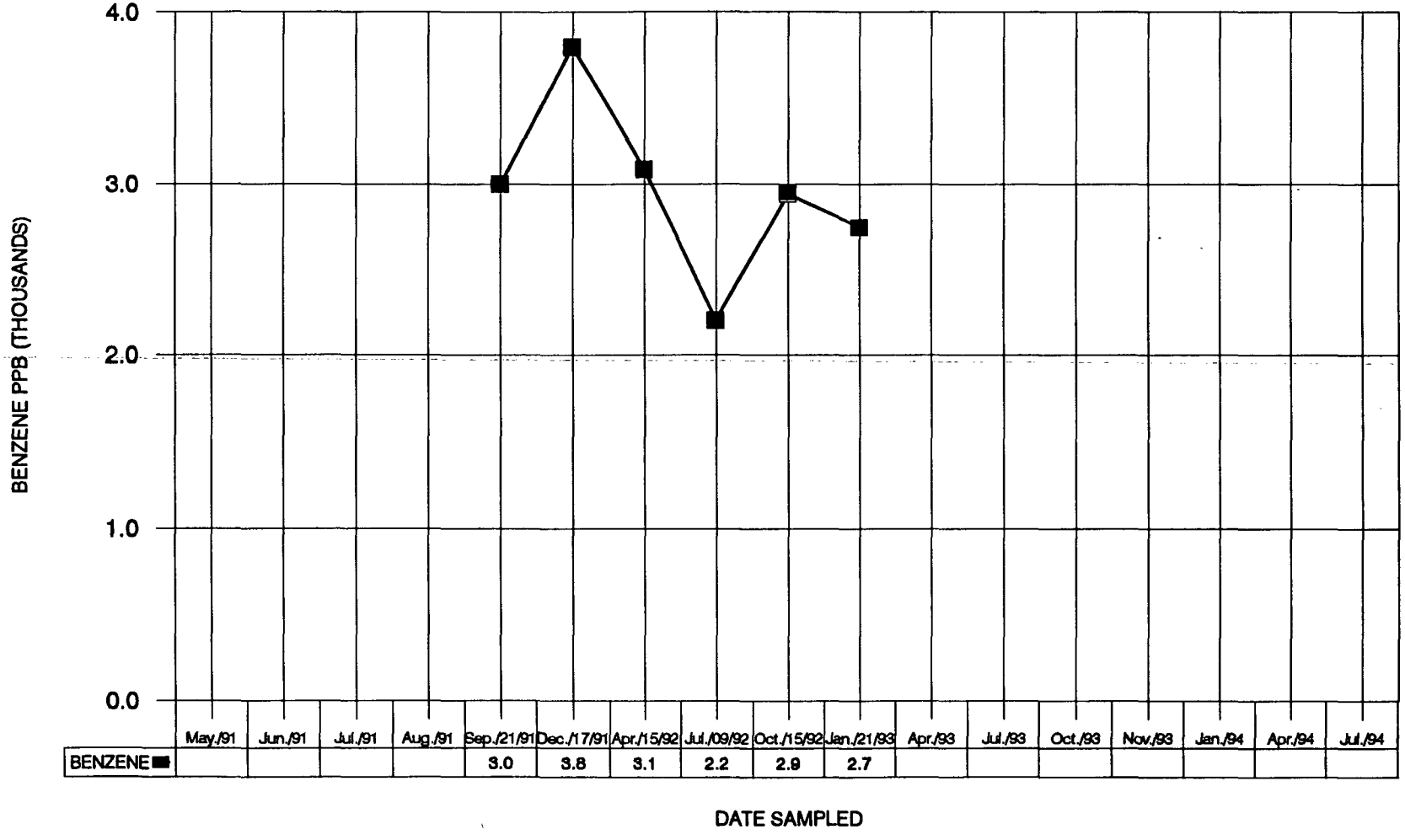
GROUNDWATER ANALYSIS DATA
MW#10 BH-33



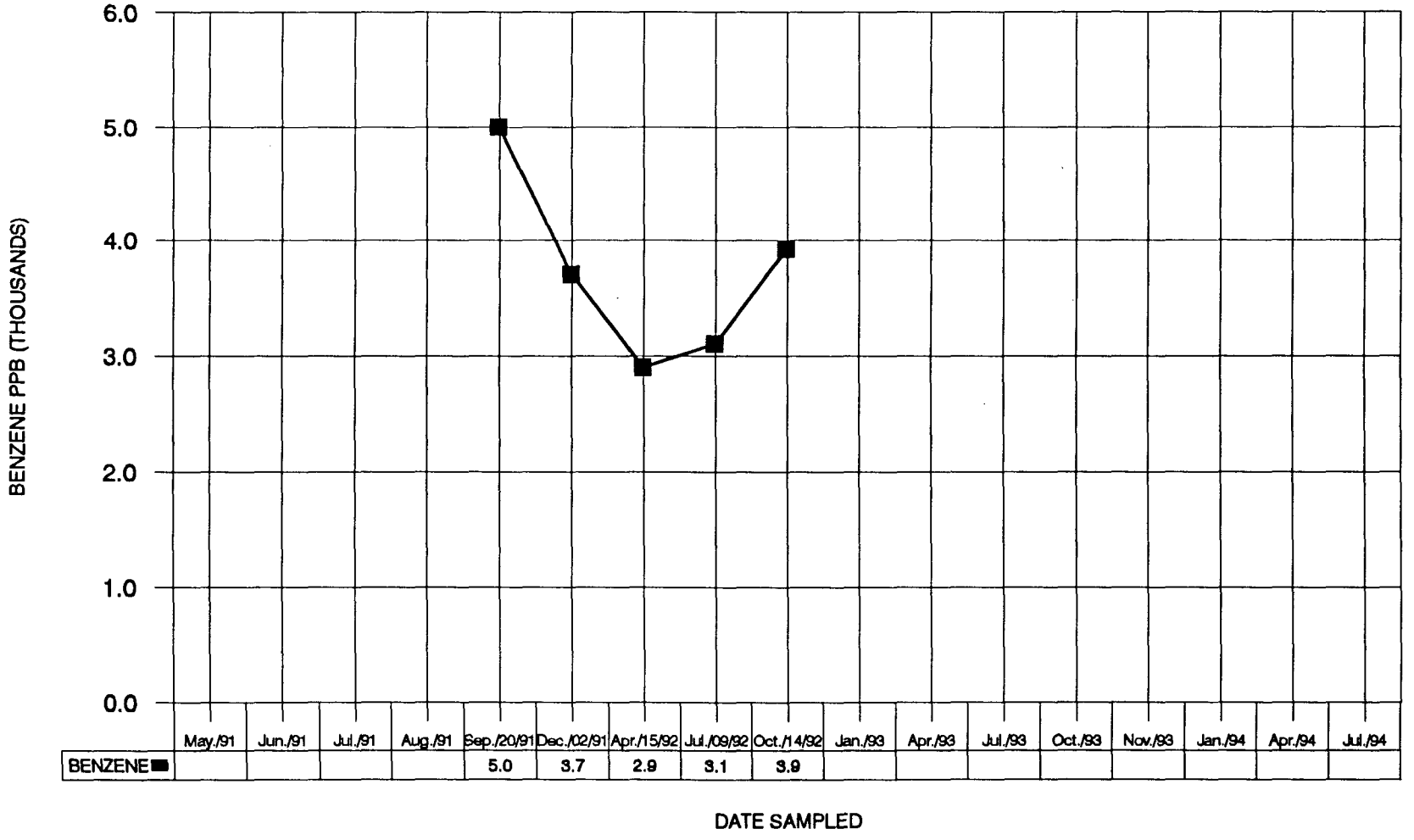
	May/23/91	Jun./91	Jul./91	Aug./91	Sep./21/91	Dec./17/91	Apr./15/92	Jul./09/92	Oct./14/92	Jan./93	Apr./93	Jul./93	Oct./93	Nov./93	Jan./94	Apr./94	Jul./94
BENZENE	5.5				2.3	2.3	1.8	1.8	2.1								

DATE SAMPLED

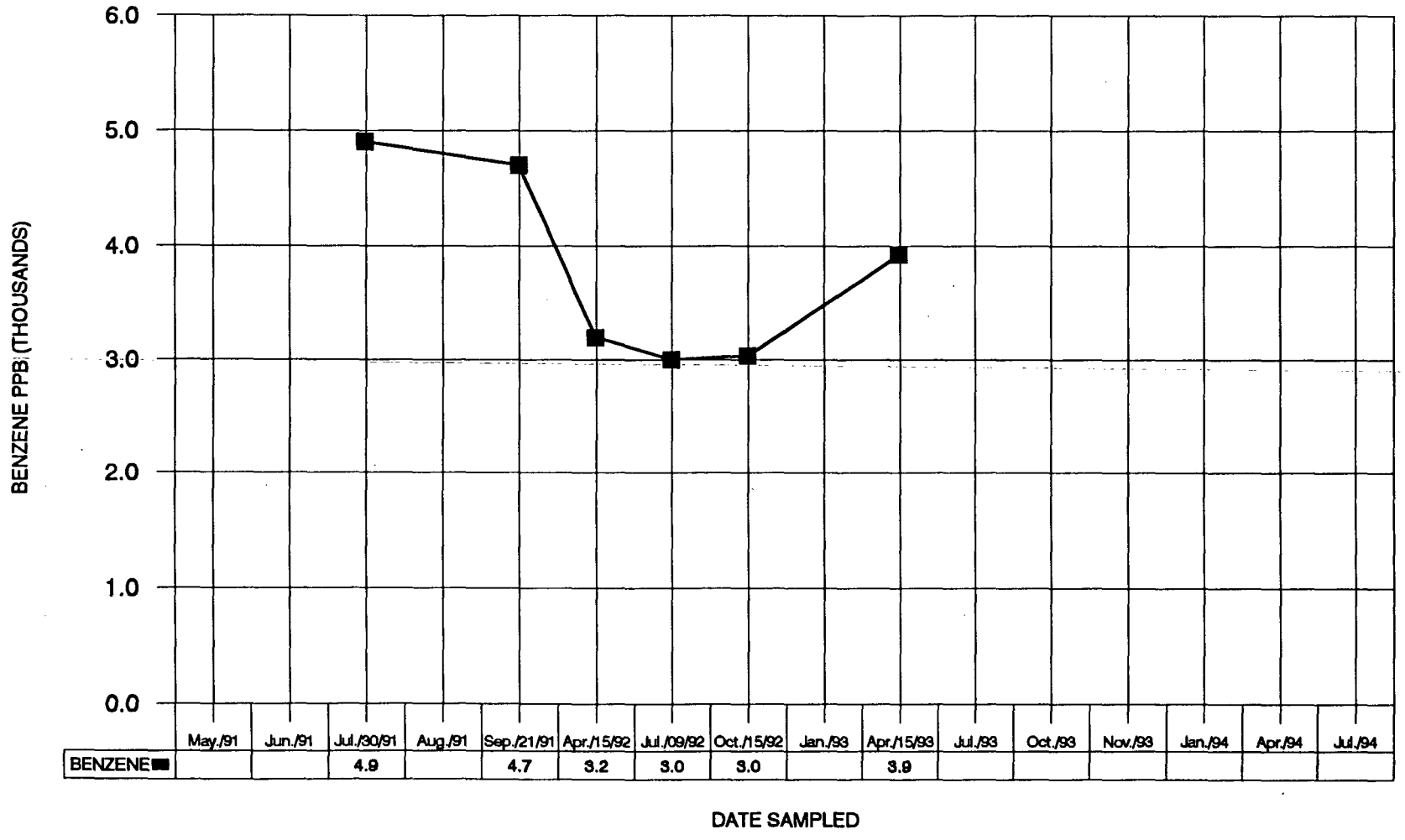
GROUNDWATER ANALYSIS DATA
MW#11 BH-34



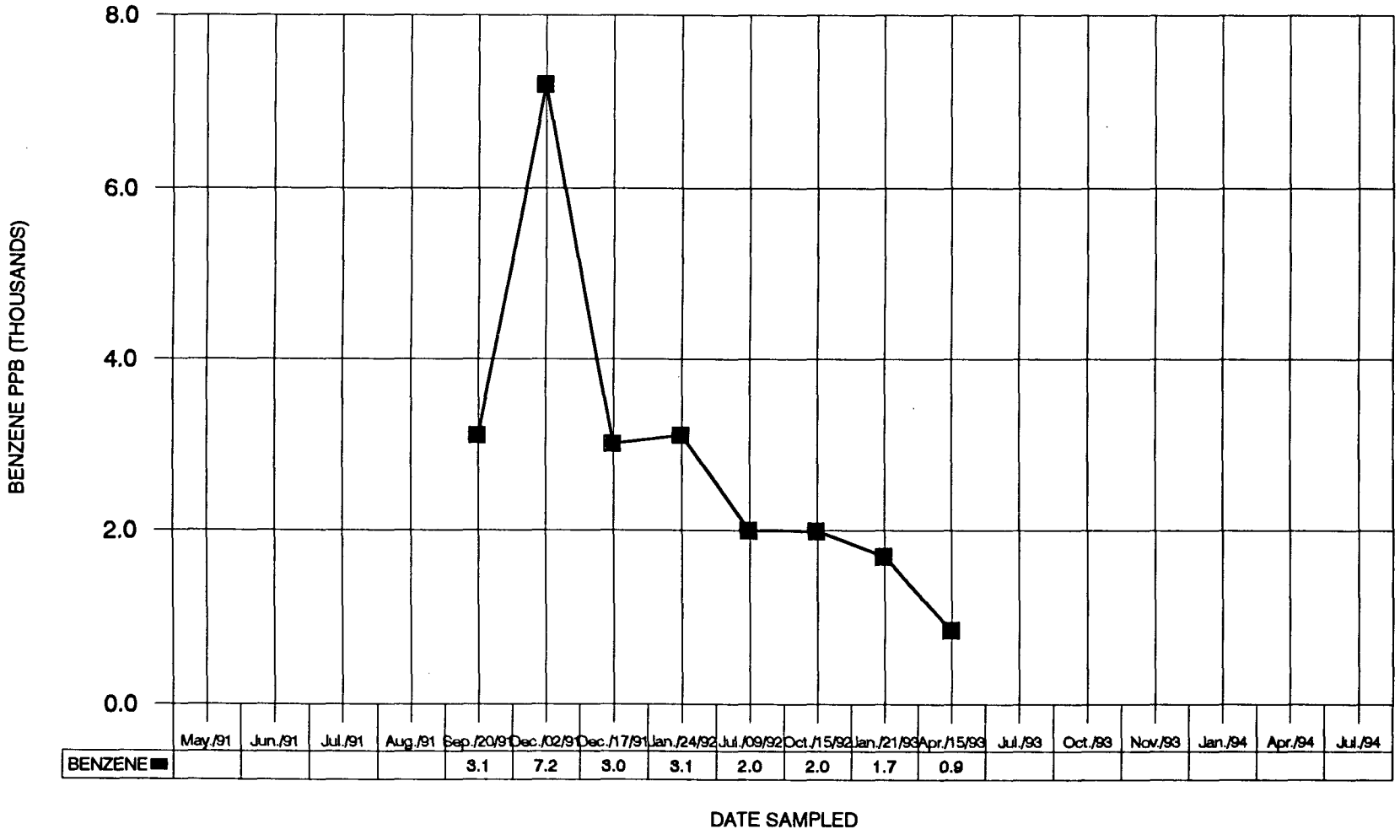
GROUNDWATER ANALYSIS DATA
MW#18 BH-41



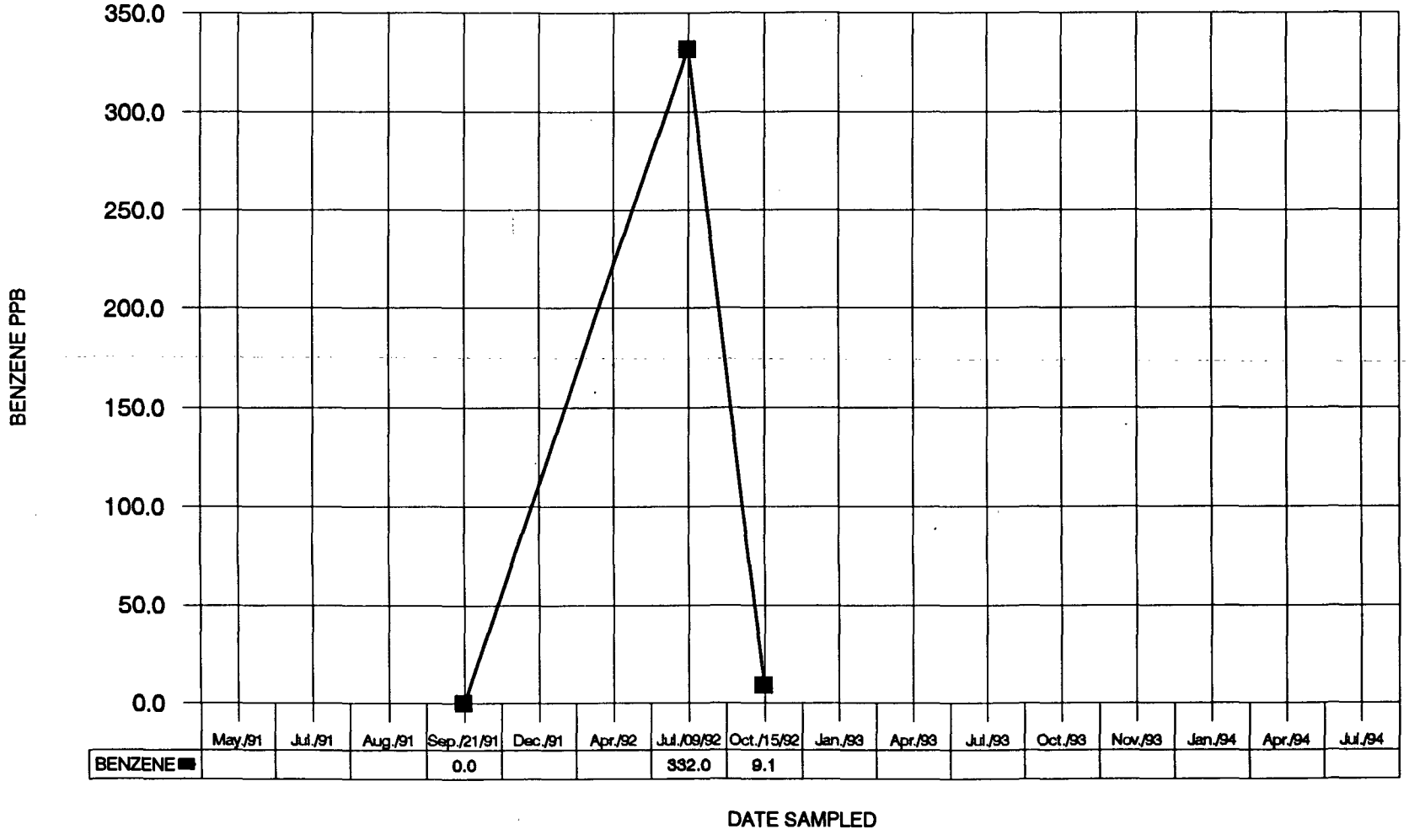
GROUNDWATER ANALYSIS DATA
MW#19 BH-42



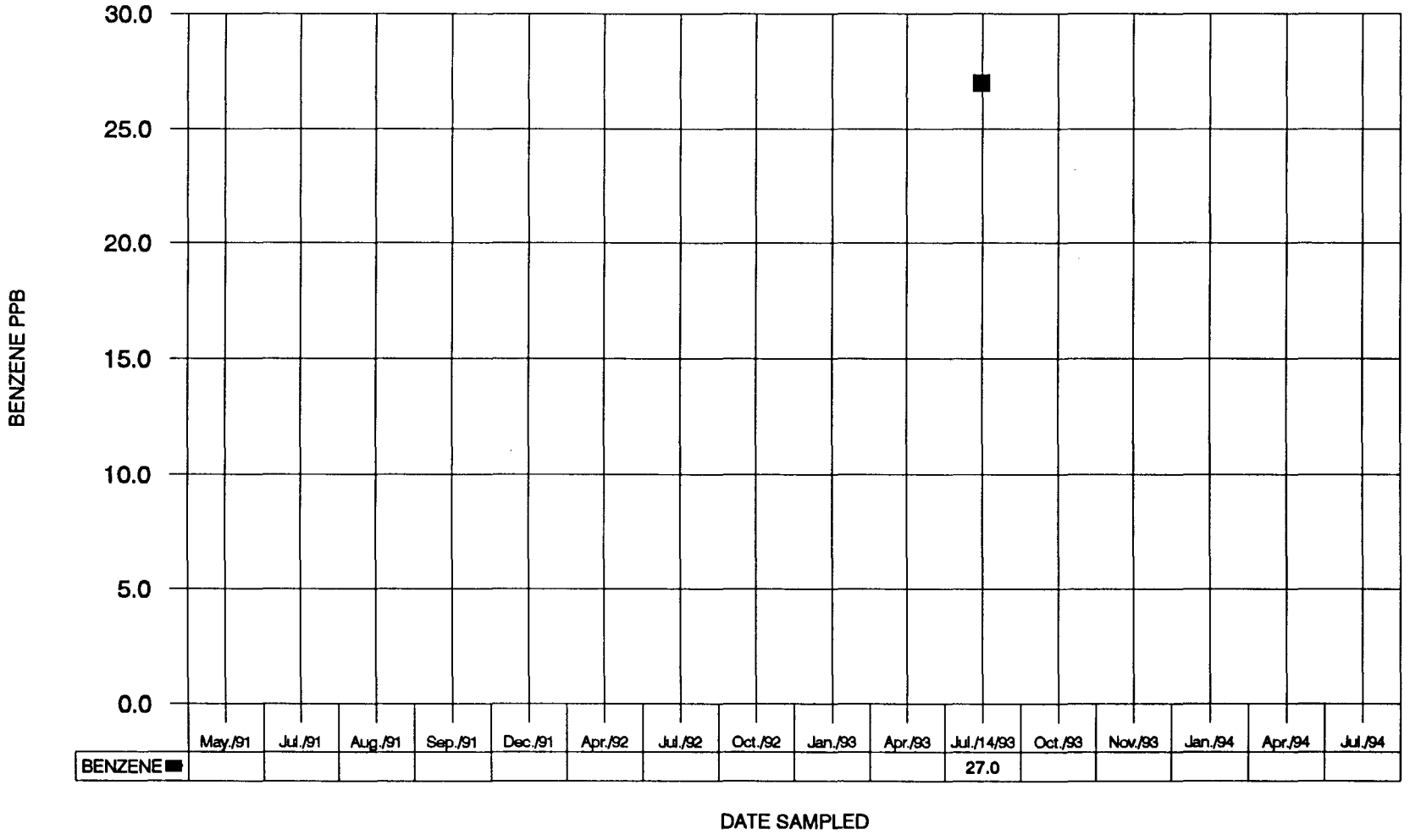
GROUNDWATER ANALYSIS DATA
MW#26 BH-49



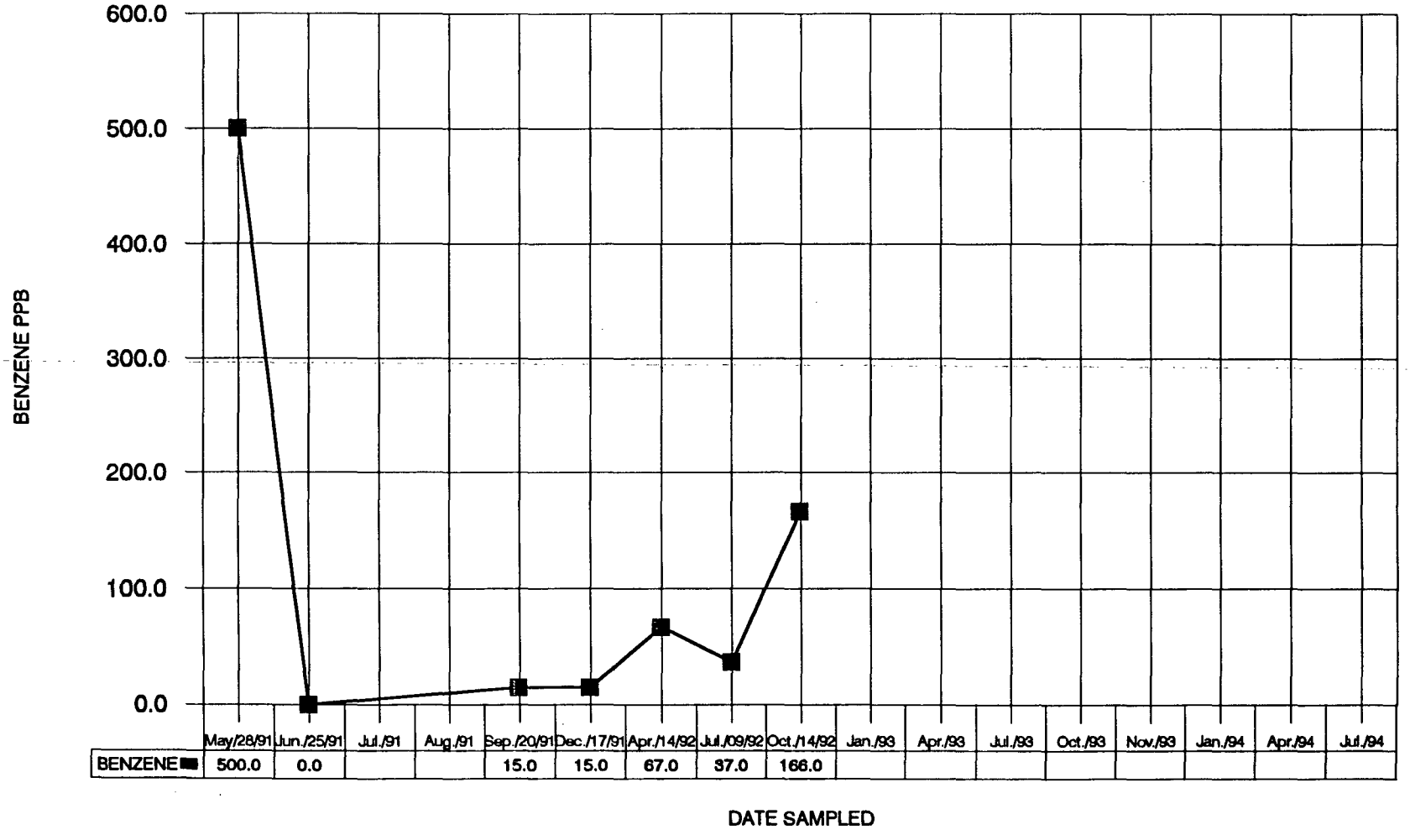
GROUNDWATER ANALYSIS DATA
MW#31 BH-55



GROUNDWATER ANALYSIS DATA
MW#37 BH-60

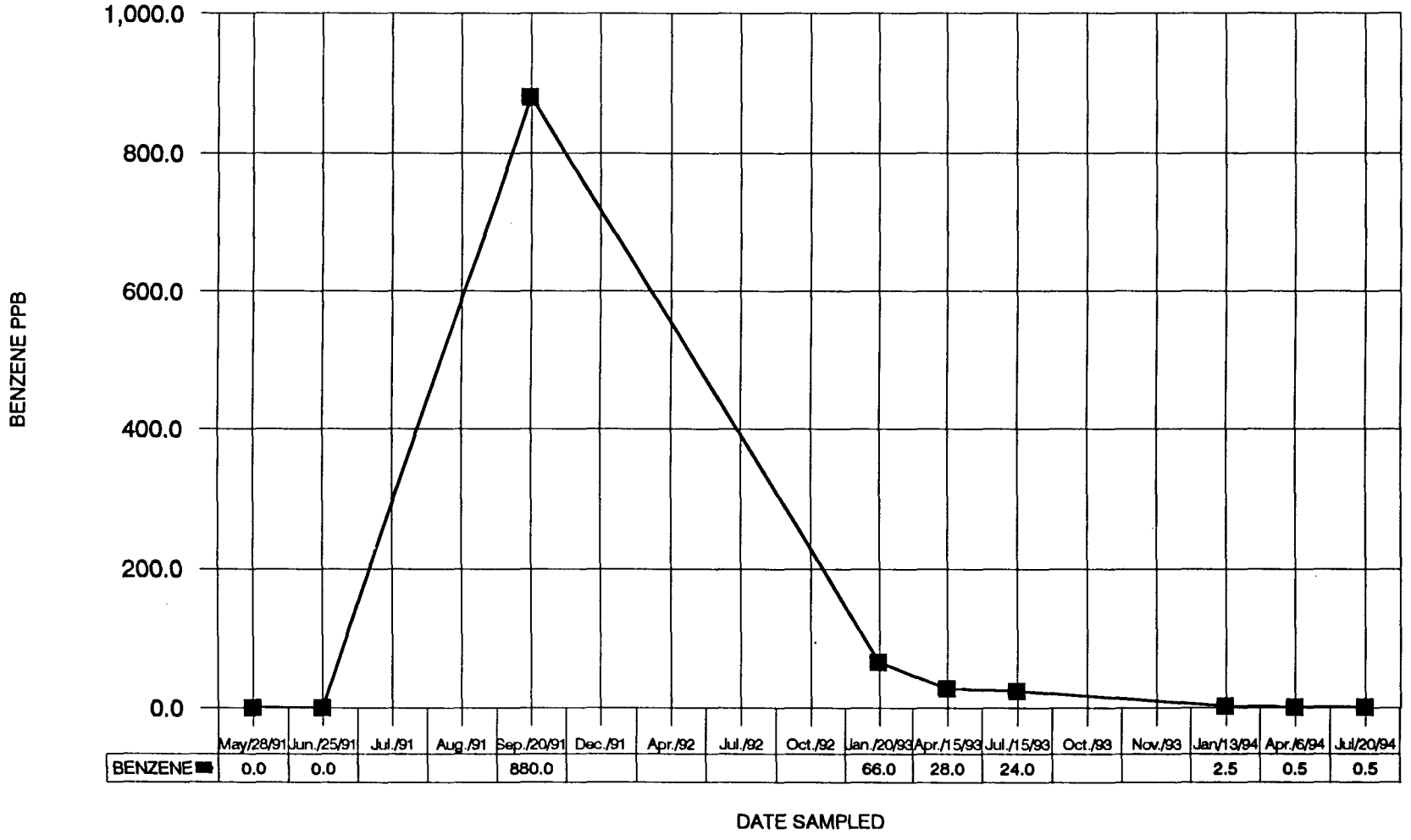


GROUNDWATER ANALYSIS DATA
MW#38 BH-61



	May/28/91	Jun./25/91	Jul./91	Aug./91	Sep./20/91	Dec./17/91	Apr./14/92	Jul./09/92	Oct./14/92	Jan./93	Apr./93	Jul./93	Oct./93	Nov./93	Jan./94	Apr./94	Jul./94
BENZENE	500.0	0.0			15.0	15.0	67.0	37.0	166.0								

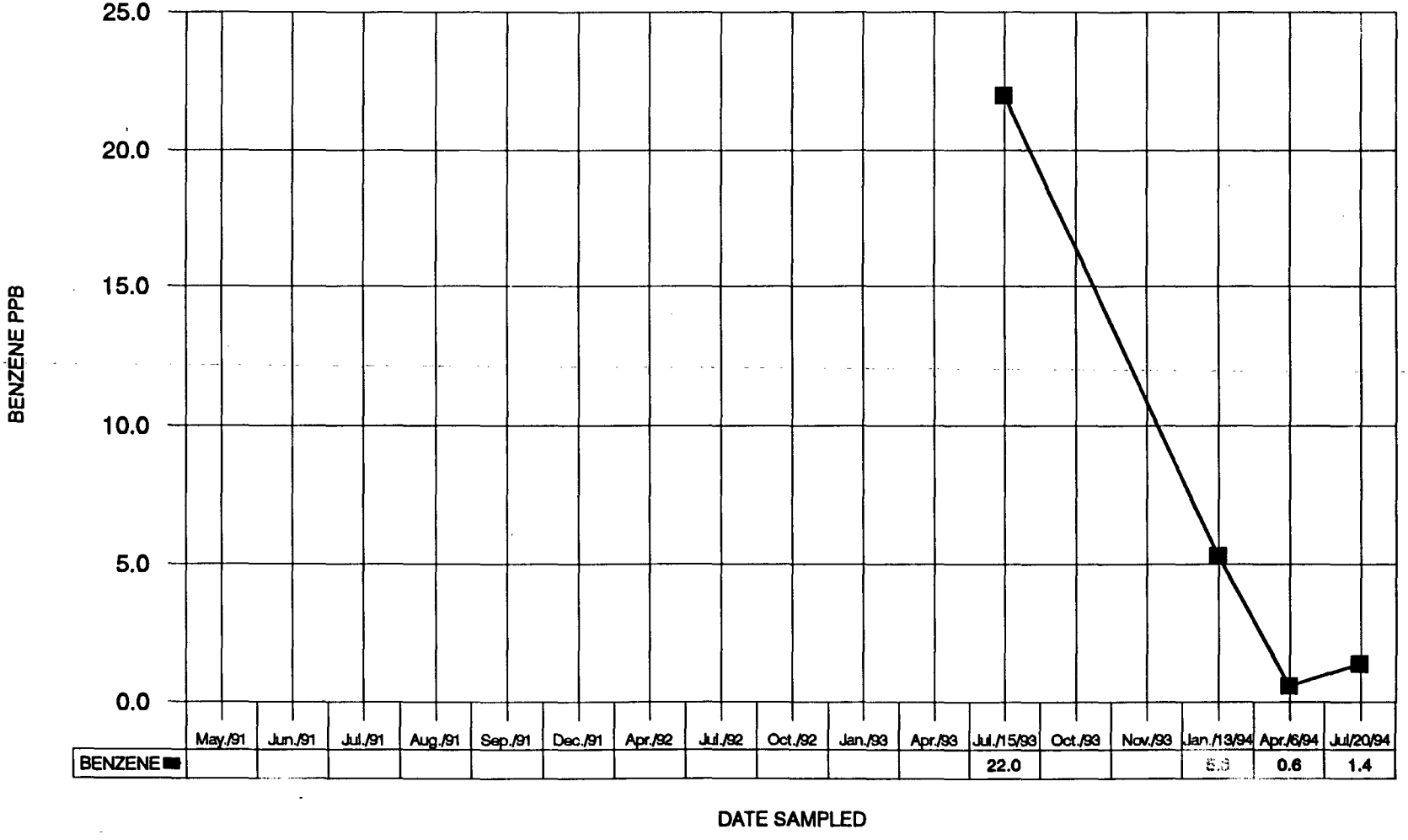
GROUNDWATER ANALYSIS DATA
MW#39 BH-62



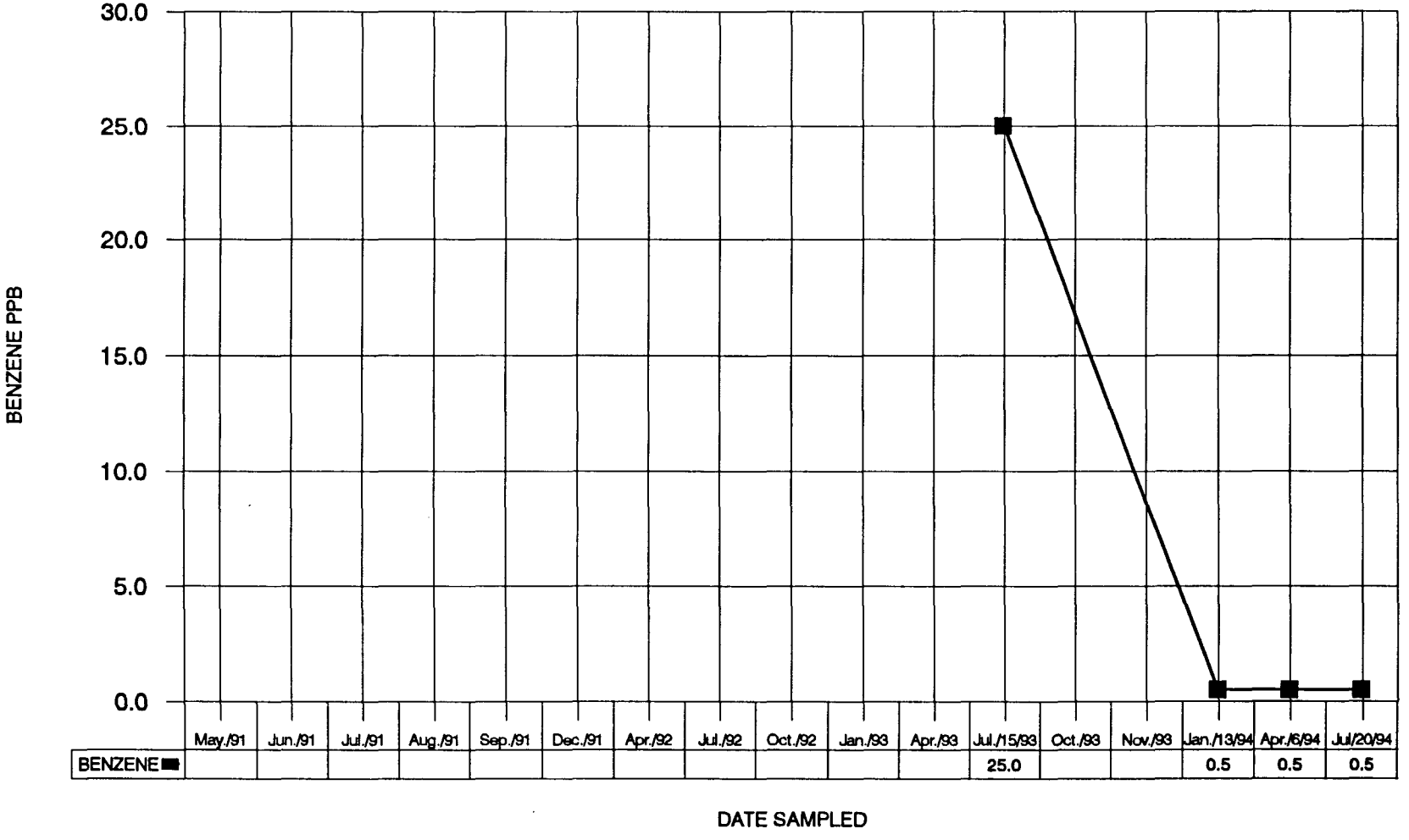
	May/28/91	Jun./25/91	Jul./91	Aug./91	Sep./20/91	Dec./91	Apr./92	Jul./92	Oct./92	Jan./20/93	Apr./15/93	Jul./15/93	Oct./93	Nov./93	Jan/13/94	Apr./6/94	Jul/20/94
BENZENE	0.0	0.0			880.0					66.0	28.0	24.0			2.5	0.5	0.5

DATE SAMPLED

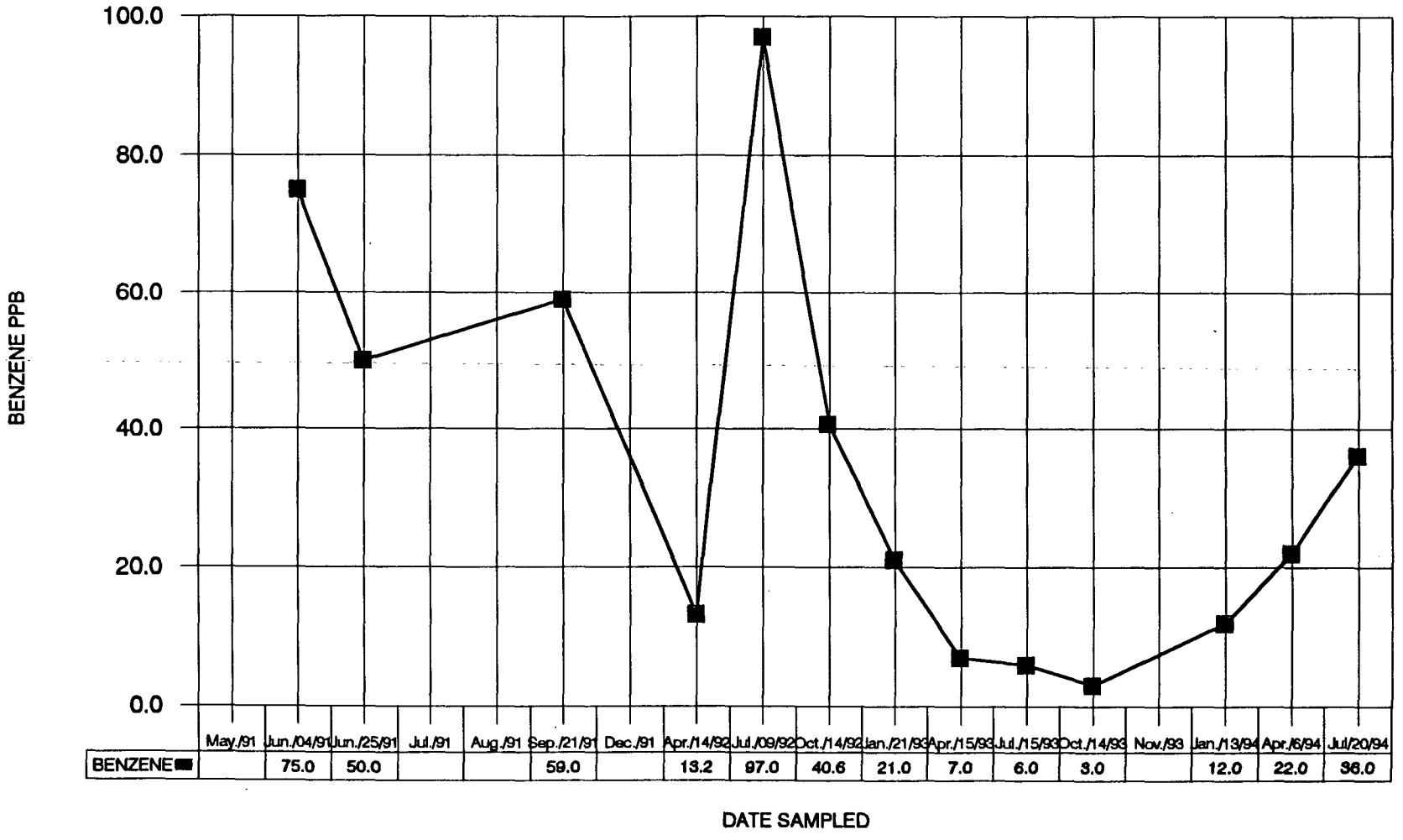
GROUNDWATER ANALYSIS DATA
MW#41 BH-64



GROUNDWATER ANALYSIS DATA
MW#43 BH-66



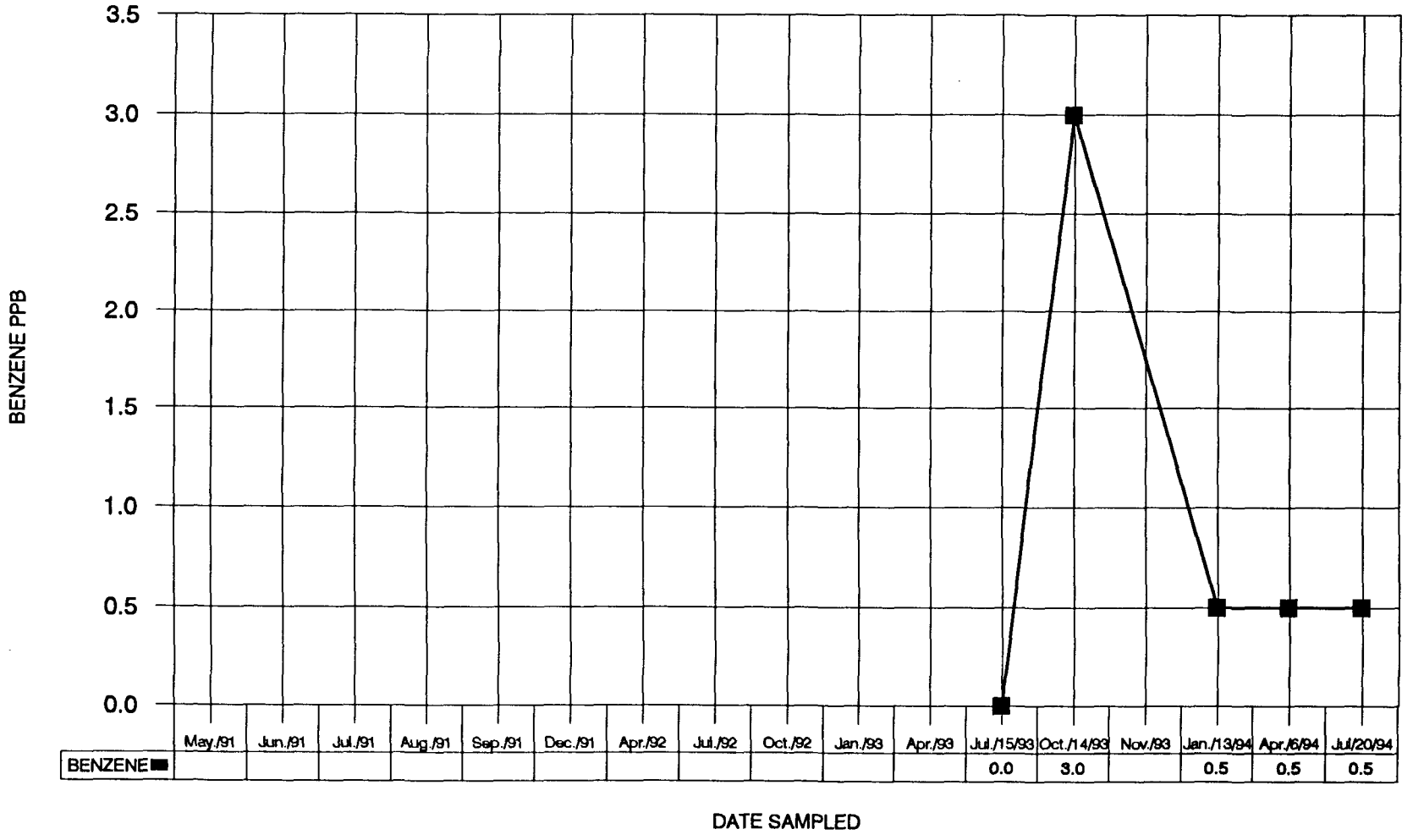
BOREHOLE WATER ANALYSIS DATA
MW#44 BH-67



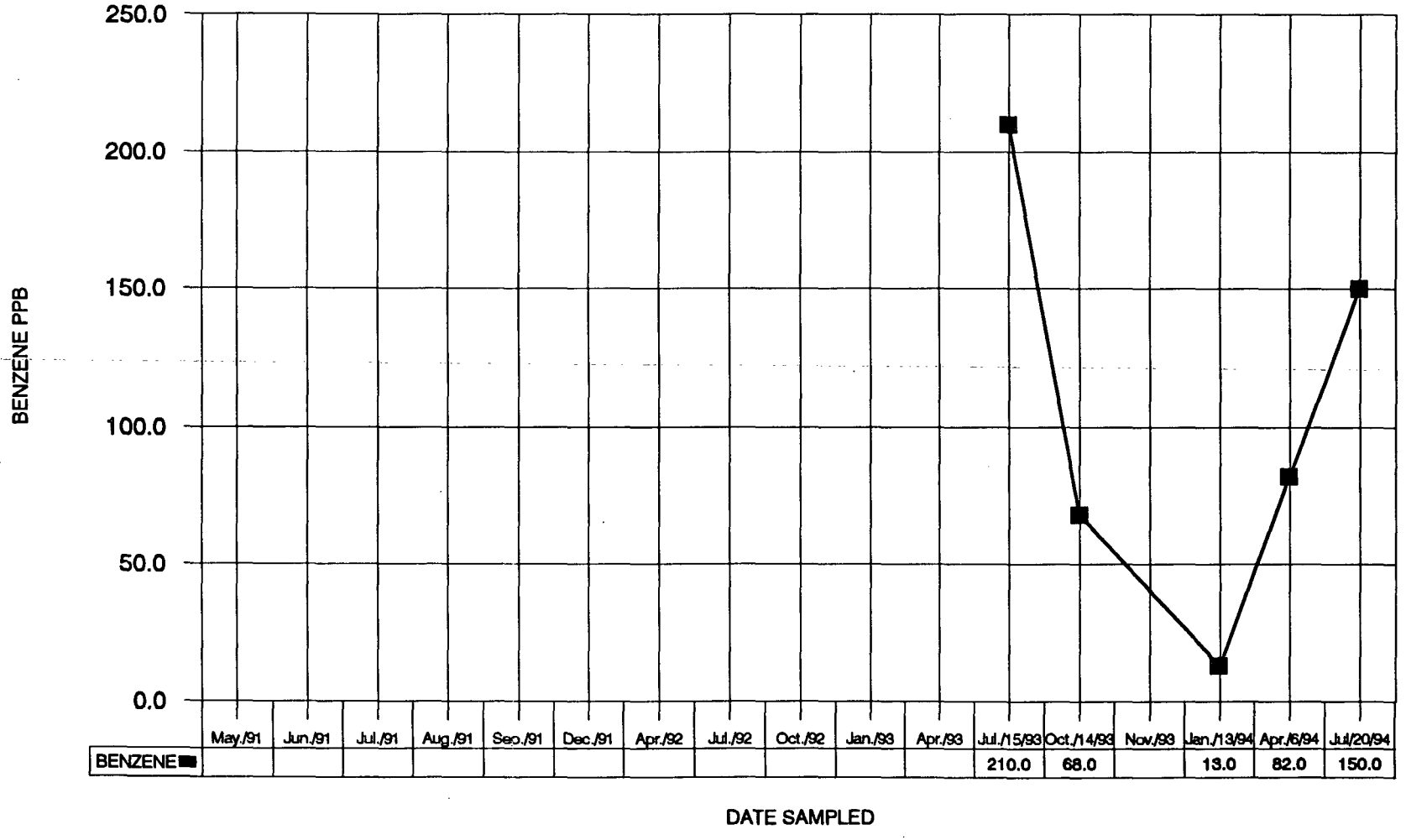
	May./91	Jun./04/91	Jun./25/91	Jul./91	Aug./91	Sep./21/91	Dec./91	Apr./14/92	Jul./09/92	Oct./14/92	Jan./21/93	Apr./15/93	Jul./15/93	Oct./14/93	Nov./93	Jan./13/94	Apr./6/94	Jul/20/94
BENZENE		75.0	50.0			59.0		13.2	97.0	40.6	21.0	7.0	6.0	3.0		12.0	22.0	36.0

DATE SAMPLED

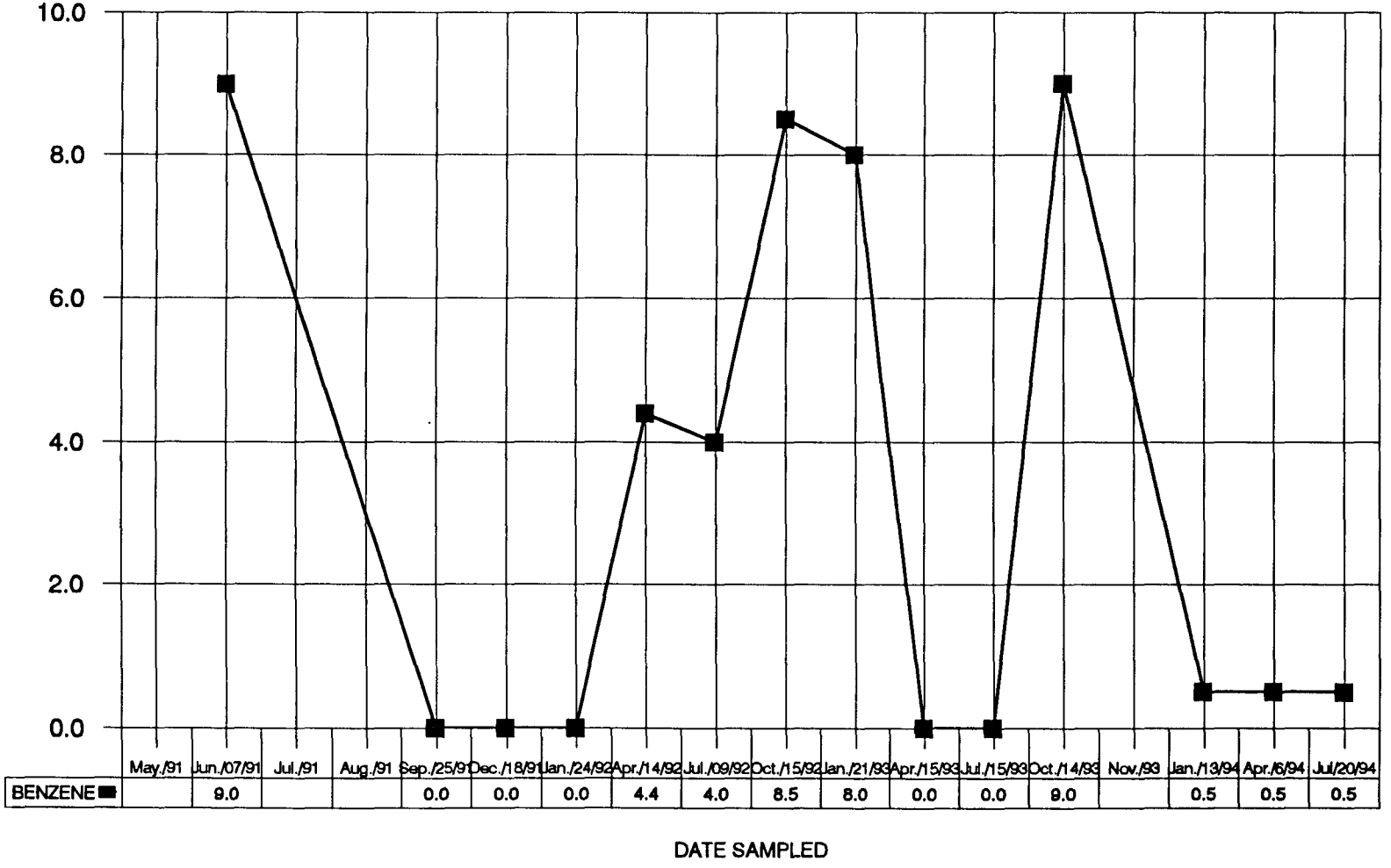
BOREHOLE WATER ANALYSIS DATA
MW#45 BH-68



BOREHOLE WATER ANALYSIS DATA
MW#49 BH-72

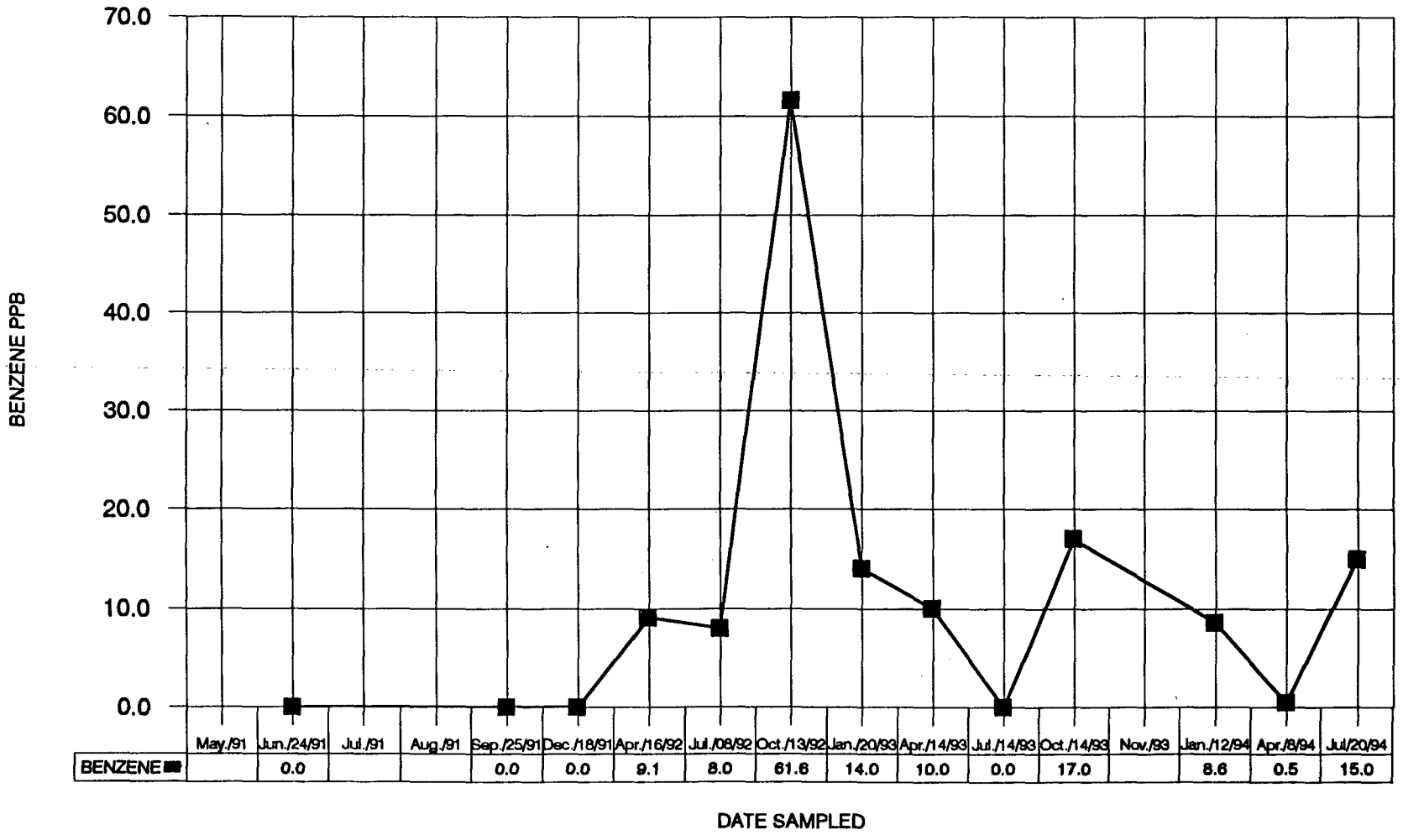


GROUNDWATER ANALYSIS DATA
MW#50 BH-73



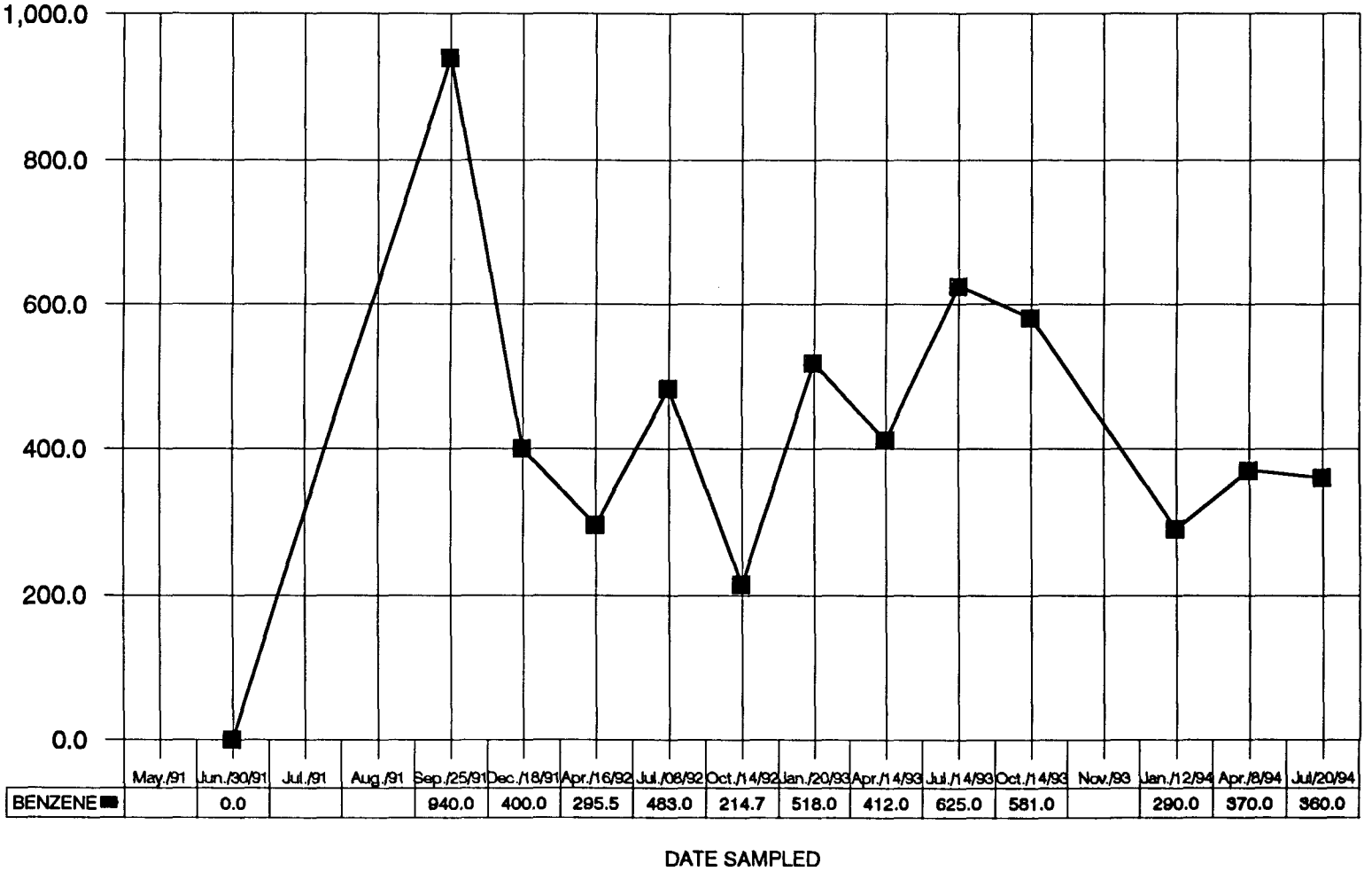
	May./91	Jun./07/91	Jul./91	Aug./91	Sep./25/91	Dec./18/91	Jan./24/92	Apr./14/92	Jul./09/92	Oct./15/92	Jan./21/93	Apr./15/93	Jul./15/93	Oct./14/93	Nov./93	Jan./13/94	Apr./6/94	Jul/20/94
BENZENE		9.0			0.0	0.0	0.0	4.4	4.0	8.5	8.0	0.0	0.0	9.0		0.5	0.5	0.5

GROUNDWATER ANALYSIS DATA
MW#54 BH-80



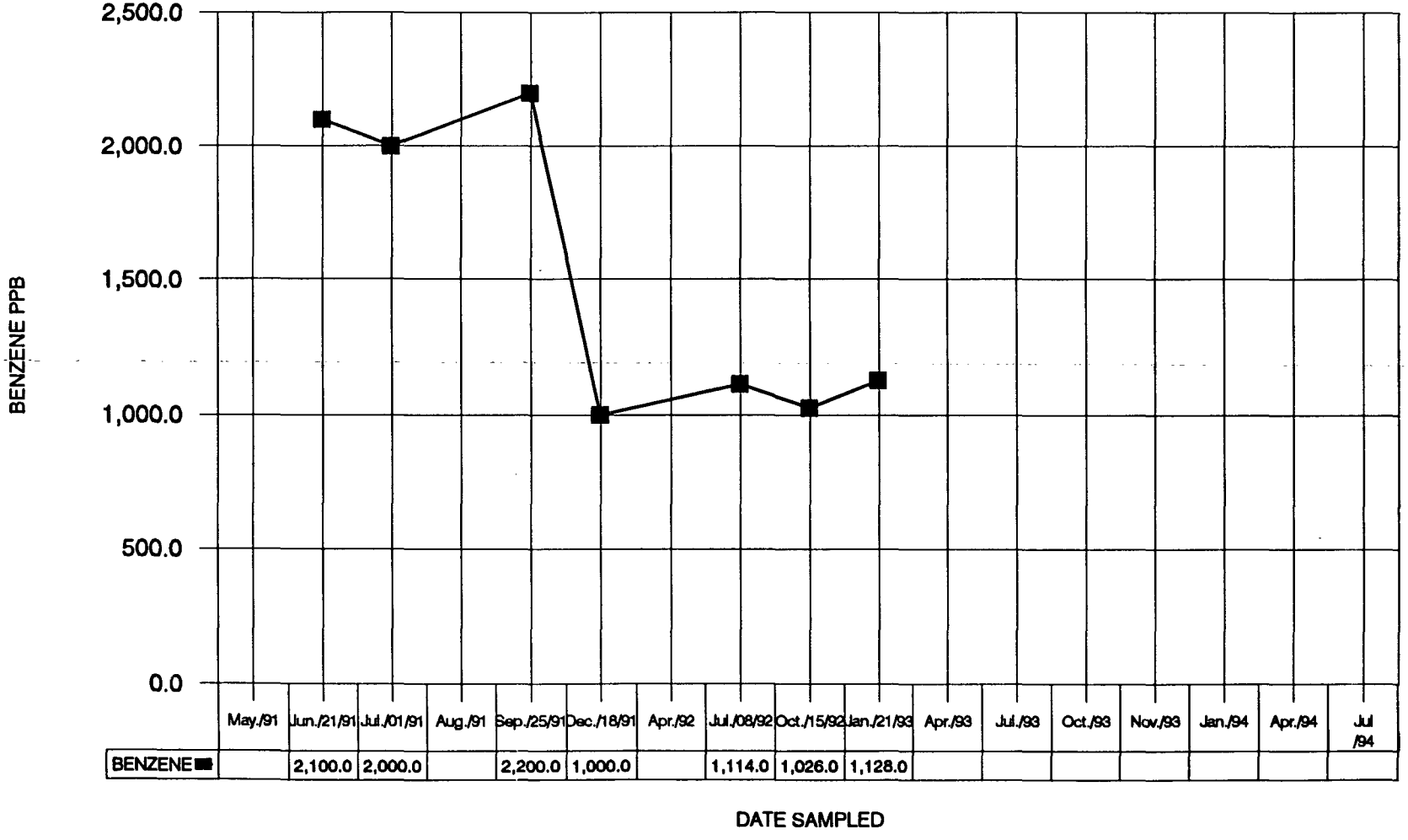
	May./91	Jun./24/91	Jul./91	Aug./91	Sep./25/91	Dec./18/91	Apr./16/92	Jul./08/92	Oct./13/92	Jan./20/93	Apr./14/93	Jul./14/93	Oct./14/93	Nov./93	Jan./12/94	Apr./6/94	Jul/20/94
BENZENE		0.0			0.0	0.0	9.1	8.0	61.6	14.0	10.0	0.0	17.0		8.6	0.5	15.0

GROUNDWATER ANALYSIS DATA
MW#55 BH-81

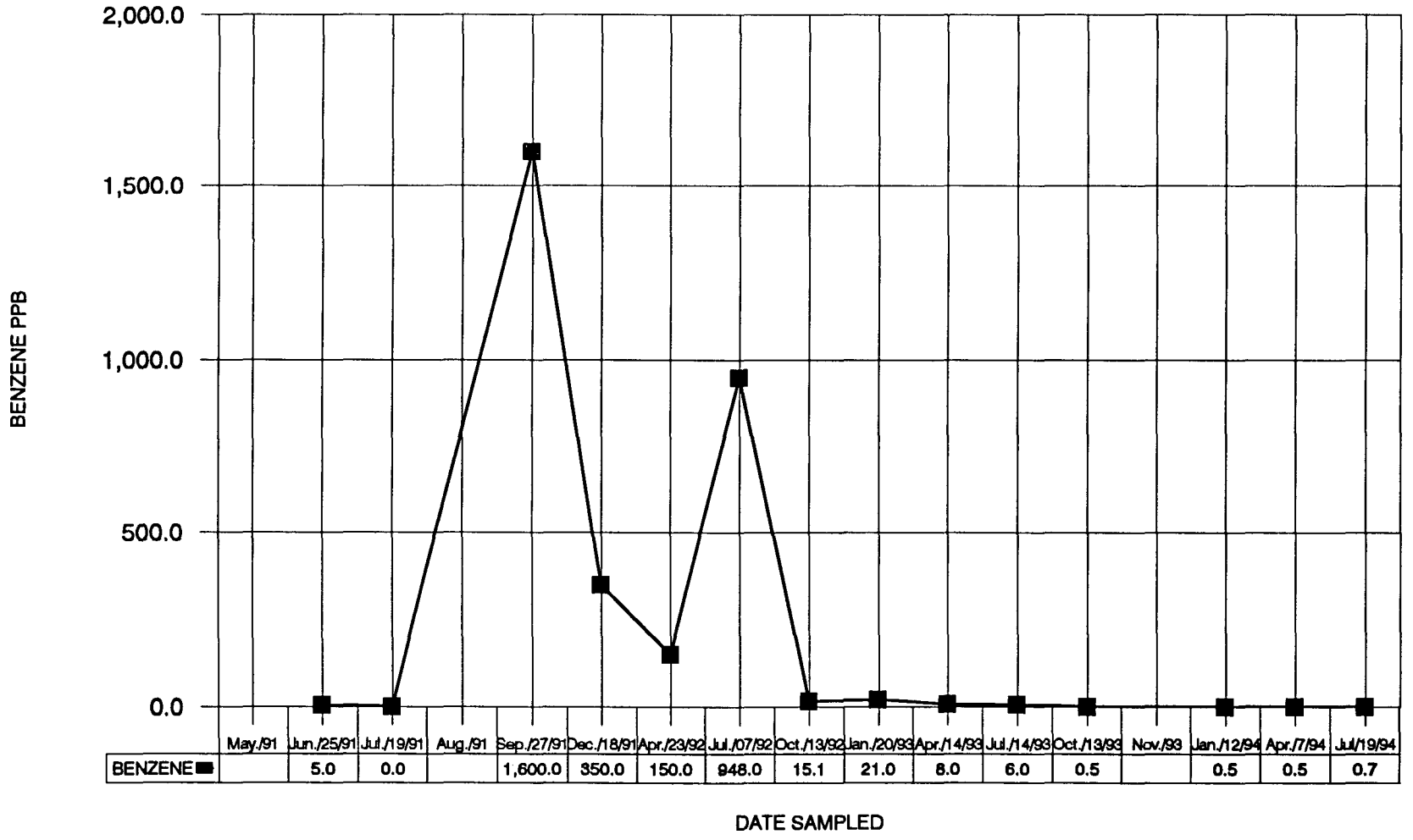


	May./91	Jun./30/91	Jul./91	Aug./91	Sep./25/91	Dec./18/91	Apr./16/92	Jul./08/92	Oct./14/92	Jan./20/93	Apr./14/93	Jul./14/93	Oct./14/93	Nov./93	Jan./12/94	Apr./8/94	Jul/20/94
BENZENE		0.0			940.0	400.0	295.5	483.0	214.7	518.0	412.0	625.0	581.0		290.0	370.0	360.0

GROUNDWATER ANALYSIS DATA
MW#56 BH-82



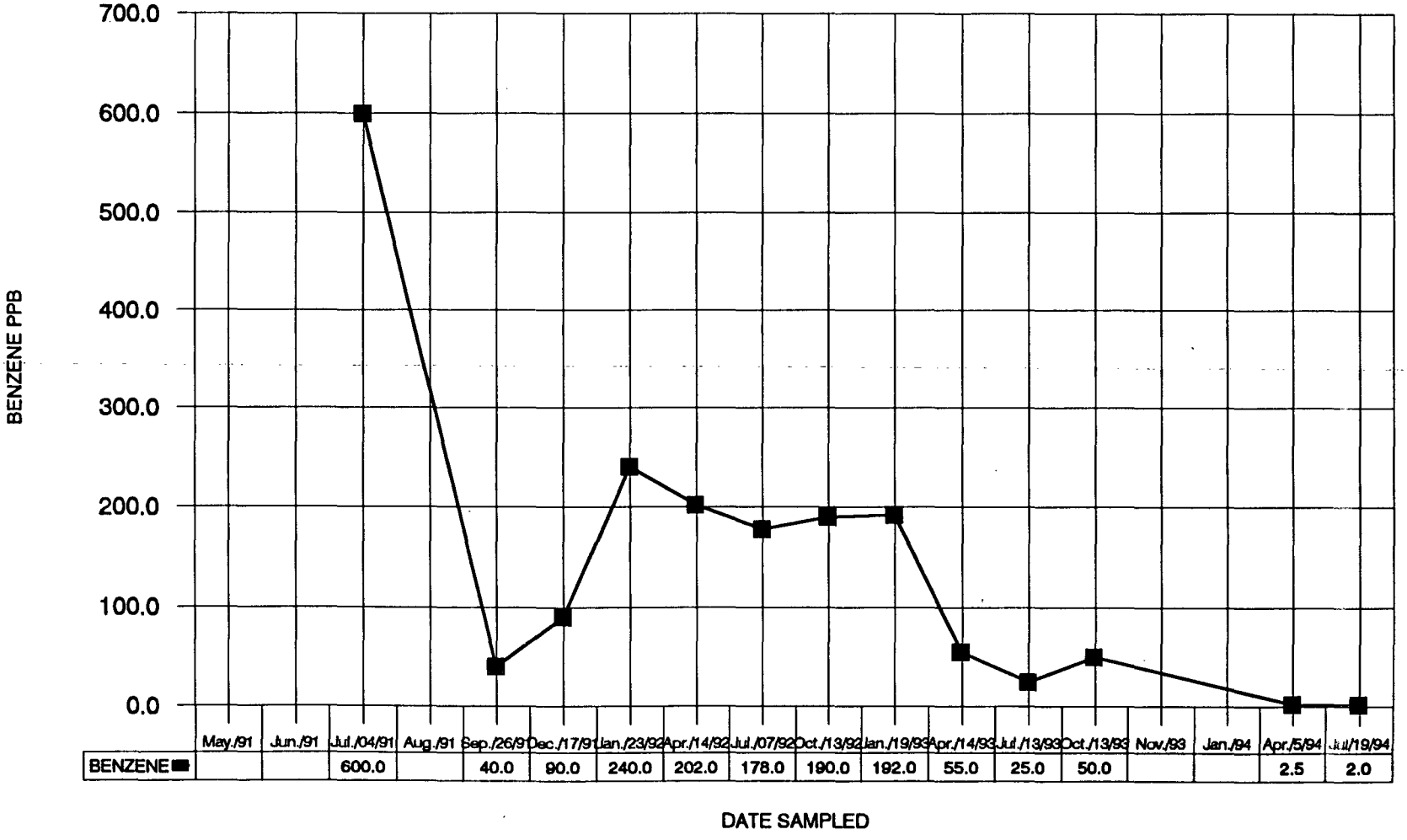
GROUNDWATER ANALYSIS DATA
MW#57 BH-83



	May./91	Jun./25/91	Jul./19/91	Aug./91	Sep./27/91	Dec./18/91	Apr./23/92	Jul./07/92	Oct./13/92	Jan./20/93	Apr./14/93	Jul./14/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94	Jul/19/94
BENZENE		5.0	0.0		1,600.0	350.0	150.0	948.0	15.1	21.0	8.0	6.0	0.5		0.5	0.5	0.7

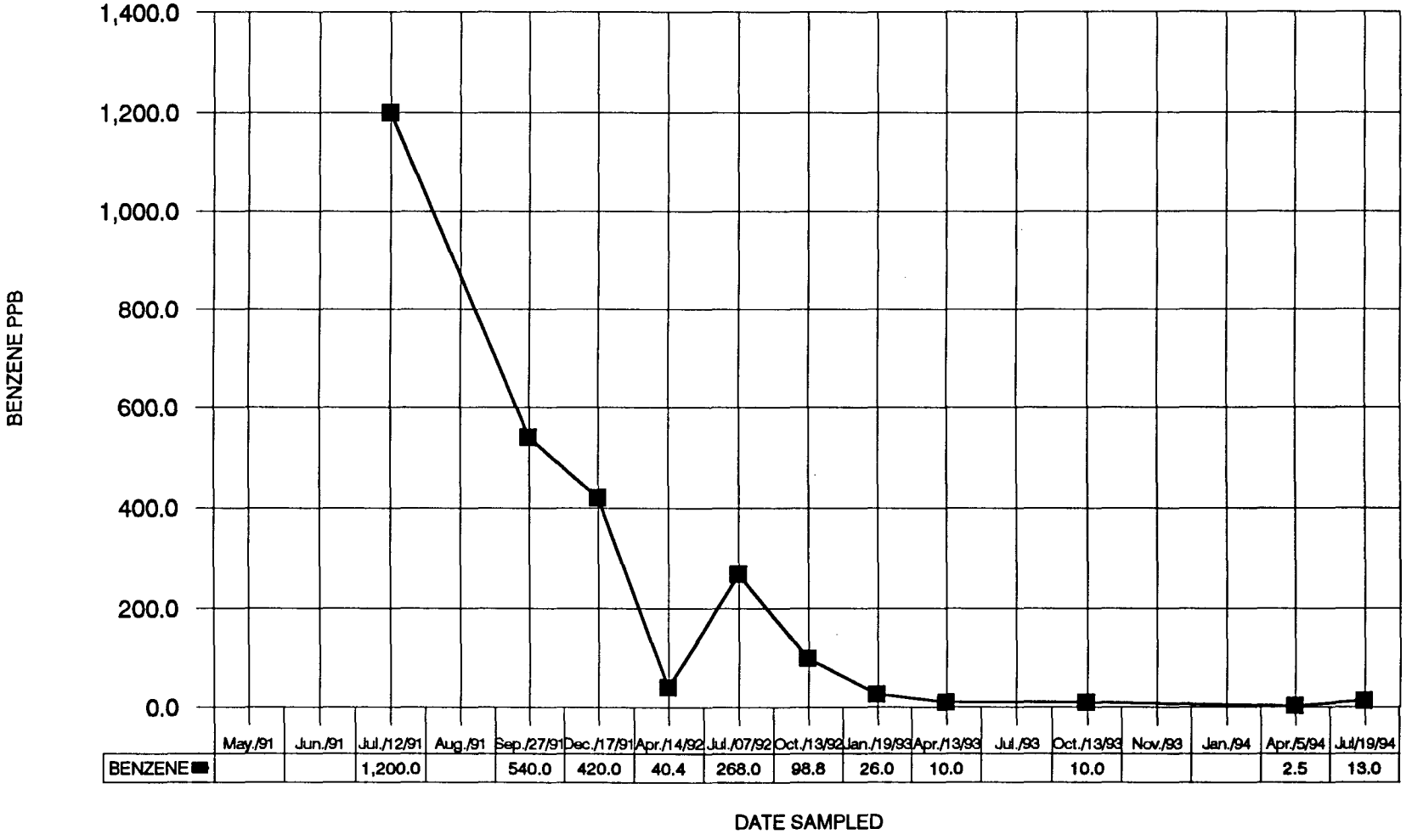
DATE SAMPLED

GROUNDWATER ANALYSIS DATA
MW#58 BH-84



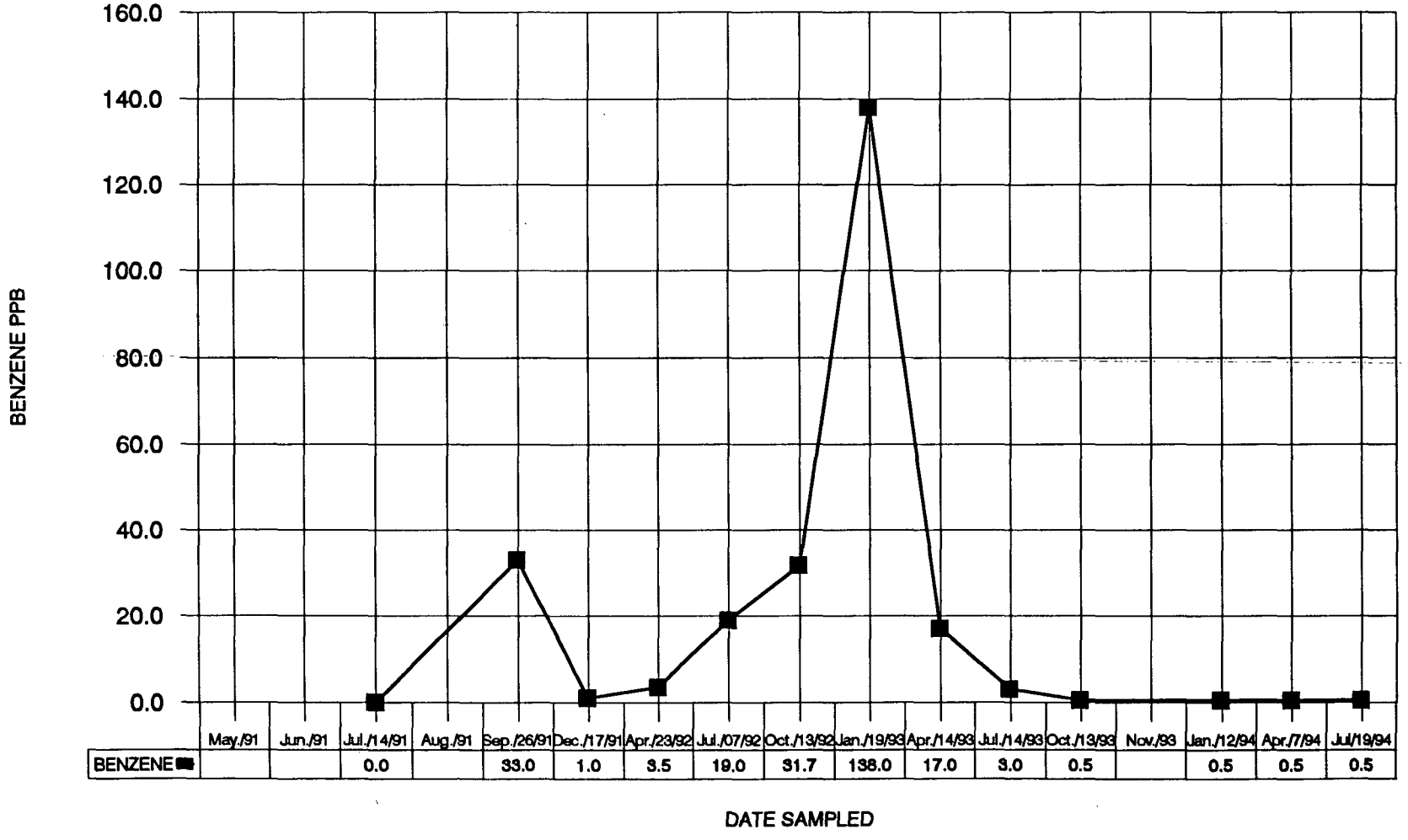
	May./91	Jun./91	Jul./04/91	Aug./91	Sep./26/91	Dec./17/91	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./14/93	Jul./13/93	Oct./13/93	Nov./93	Jan./94	Apr./5/94	Jul/19/94
BENZENE			600.0		40.0	90.0	240.0	202.0	178.0	190.0	192.0	55.0	25.0	50.0			2.5	2.0

GROUNDWATER ANALYSIS DATA
MW#59 BH-85



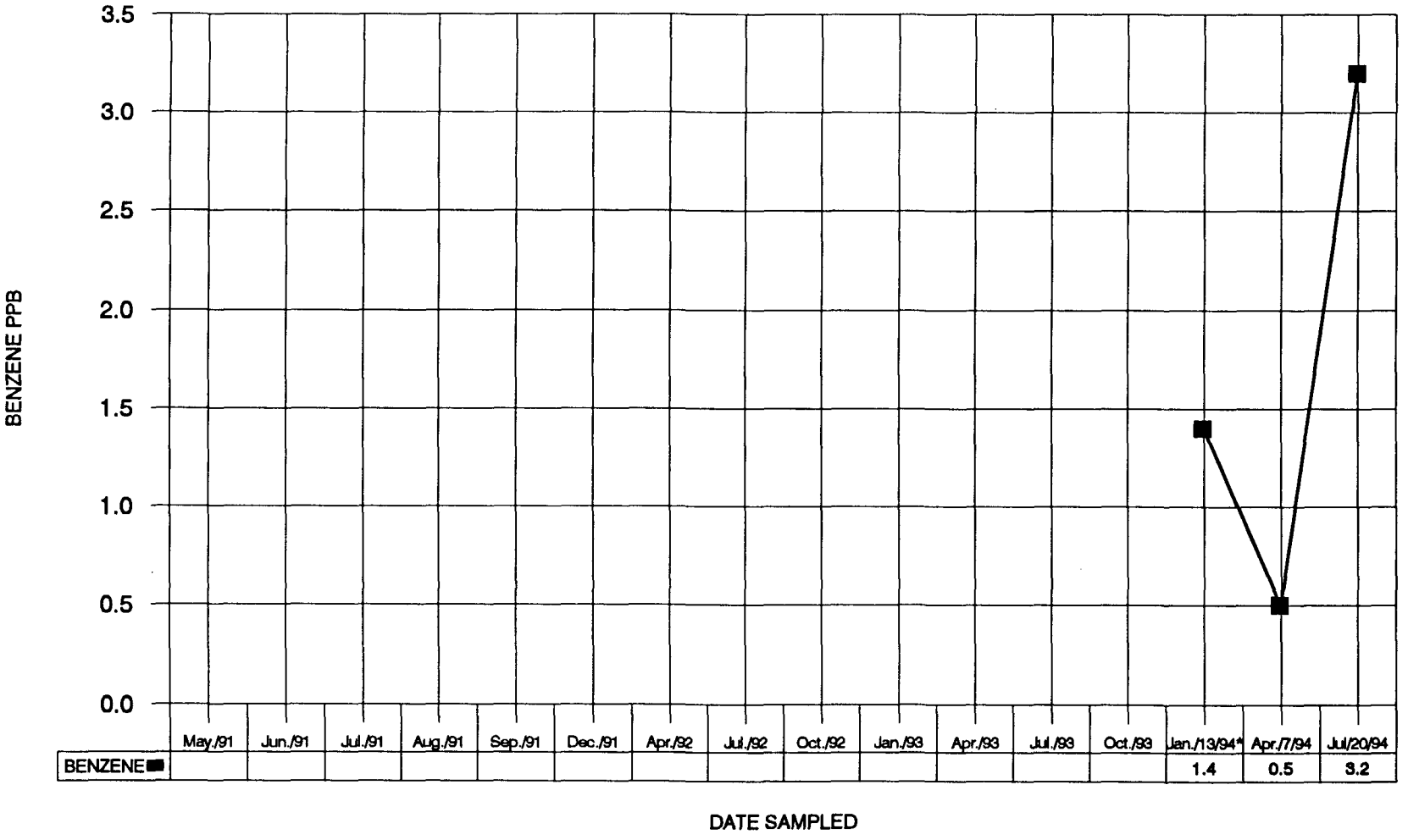
	May./91	Jun./91	Jul./12/91	Aug./91	Sep./27/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./93	Oct./13/93	Nov./93	Jan./94	Apr./5/94	Jul/19/94
BENZENE			1,200.0		540.0	420.0	40.4	268.0	98.8	26.0	10.0		10.0			2.5	13.0

GROUNDWATER ANALYSIS DATA
MW#60 BH-86



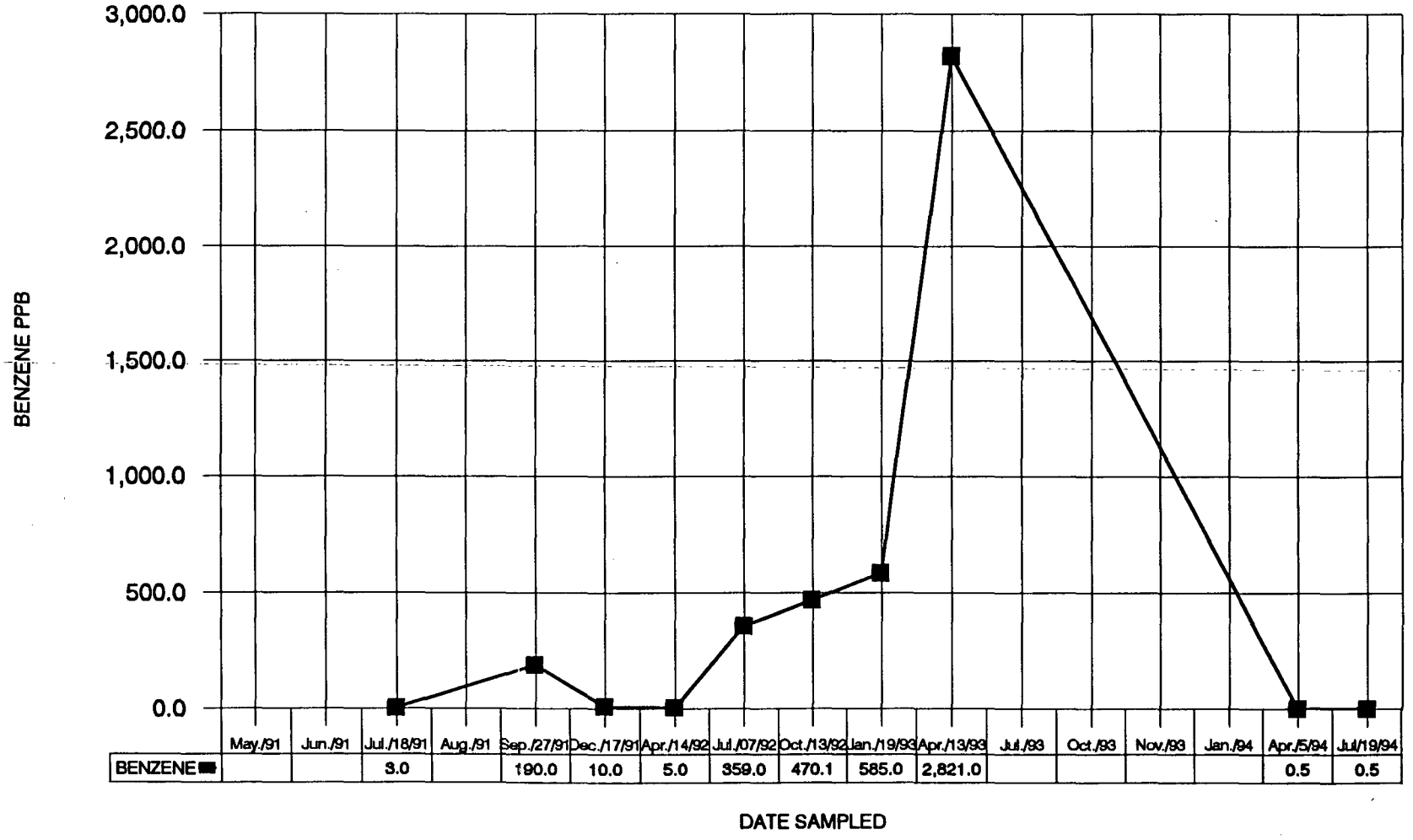
	May./91	Jun./91	Jul./14/91	Aug./91	Sep./26/91	Dec./17/91	Apr./23/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./14/93	Jul./14/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94	Jul/19/94
BENZENE			0.0		33.0	1.0	3.5	19.0	31.7	138.0	17.0	3.0	0.5		0.5	0.5	0.5

BOREHOLE WATER ANALYSIS DATA
MW#61 BH-87



*- Jan. 1994 is the first time to sample this well.

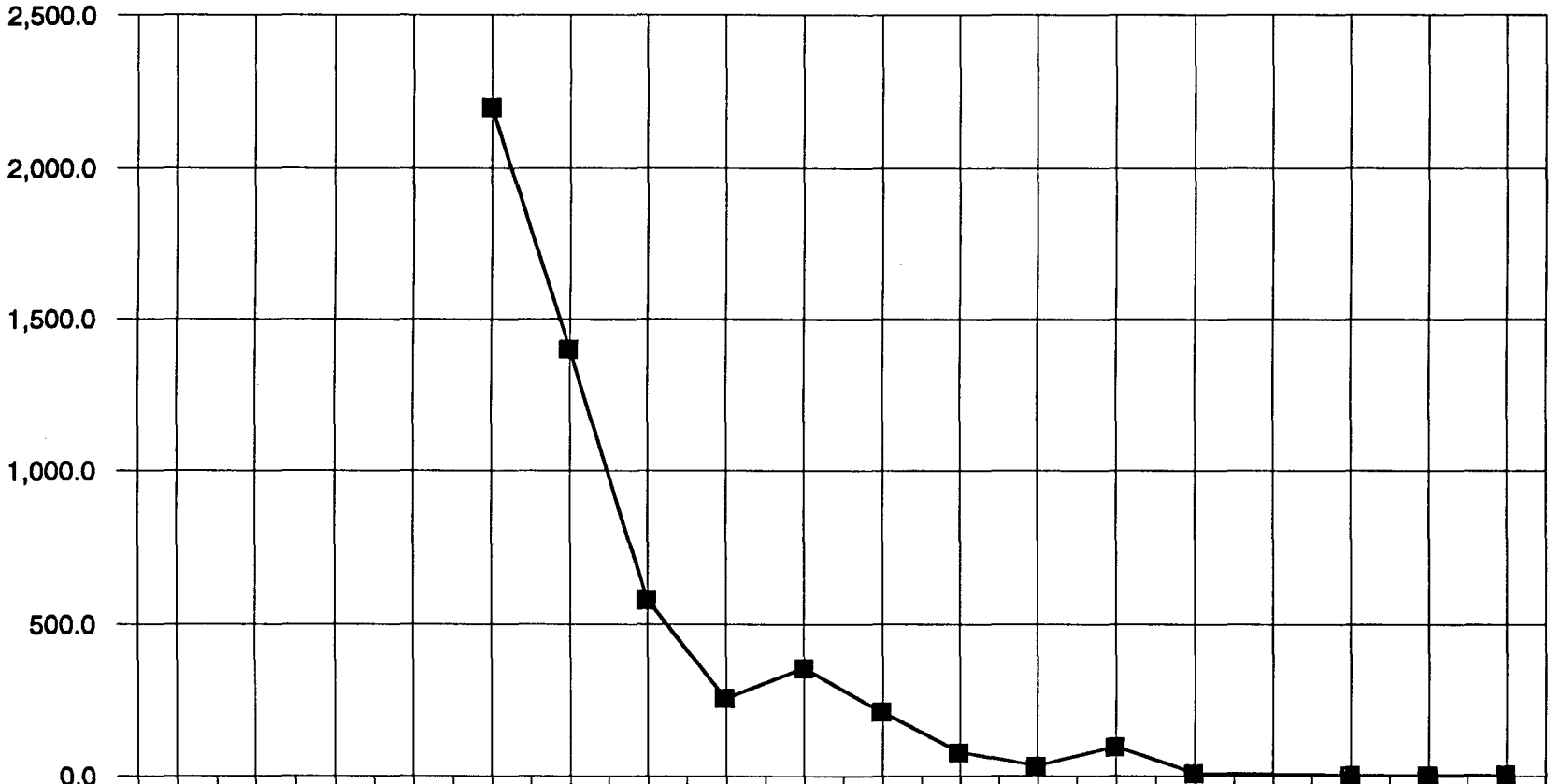
GROUNDWATER ANALYSIS DATA
MW#61A BH-87A



	May./91	Jun./91	Jul./18/91	Aug./91	Sep./27/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./93	Oct./93	Nov./93	Jan./94	Apr./5/94	Jul/19/94
BENZENE			3.0		190.0	10.0	5.0	359.0	470.1	585.0	2,821.0					0.5	0.5

DATE SAMPLED

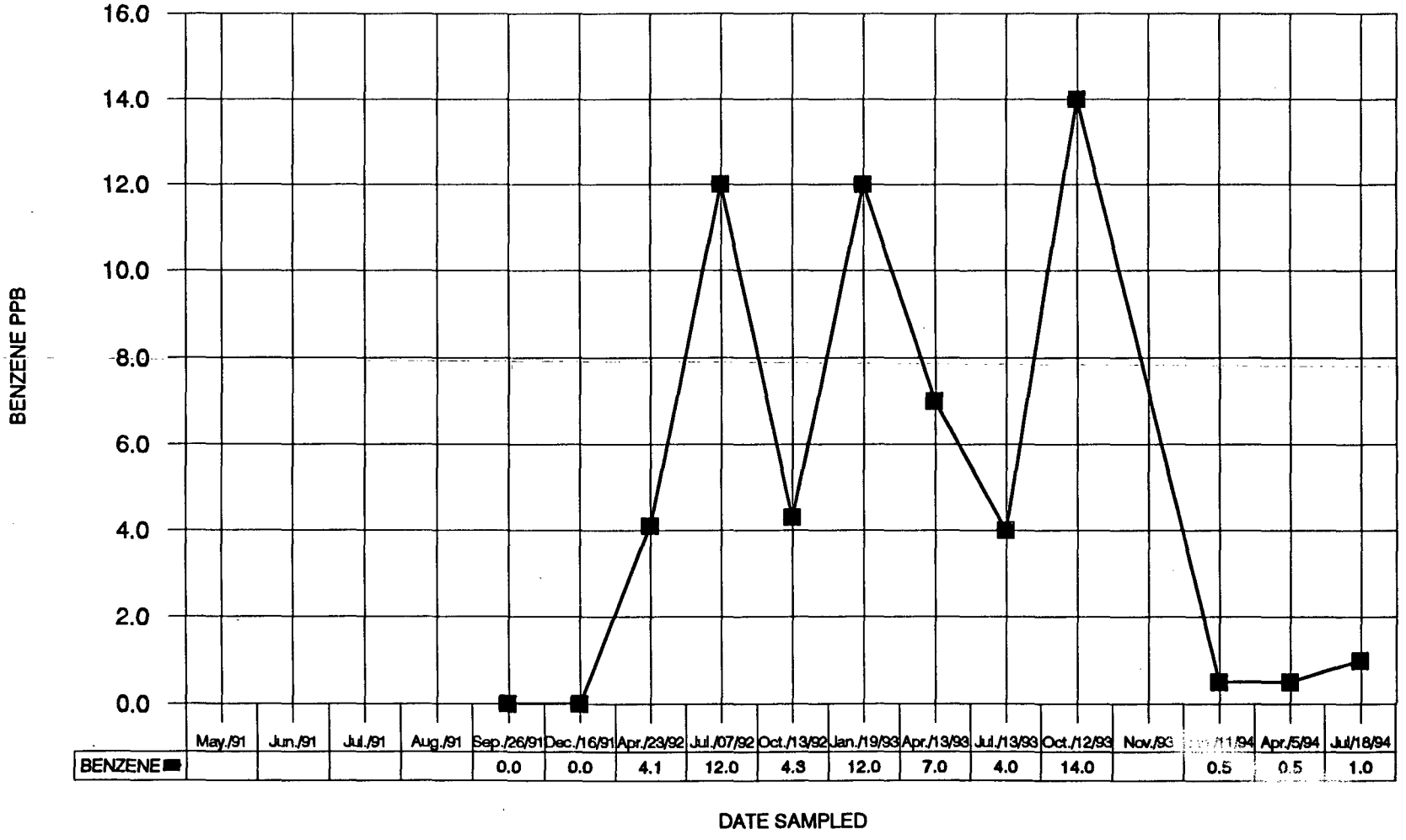
GROUNDWATER ANALYSIS DATA
MW#62 BH-88



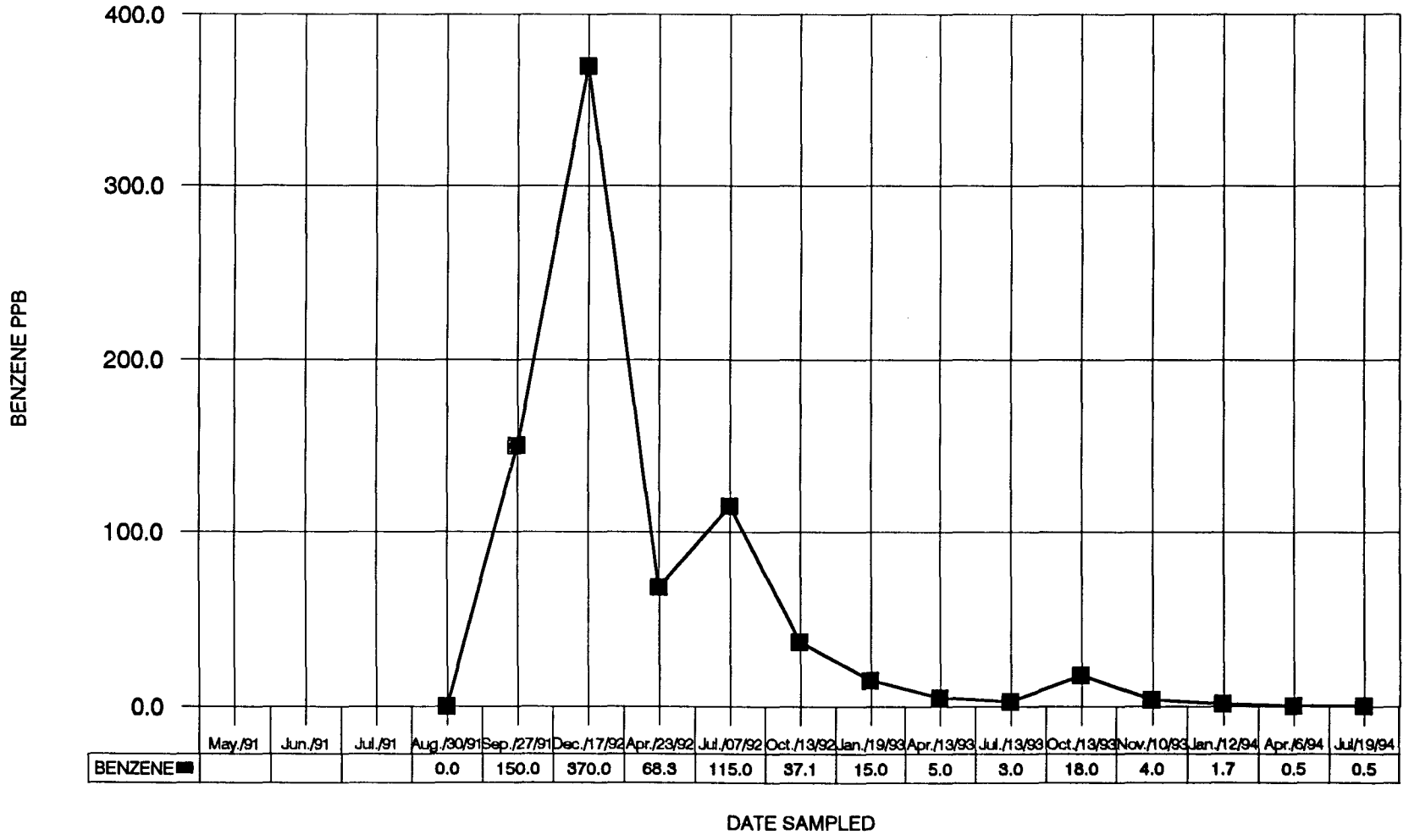
	May./91	Jun./91	Jul./91	Aug./91	Sep./26/91	Dec./17/91	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./14/93	Oct./13/93	Nov./93	Jan./11/94	Apr./5/94	Jul/19/94
BENZENE					2,200.0	1,400.0	580.0	257.5	357.0	212.3	78.0	33.0	98.0	10.0		4.1	2.5	4.3

DATE SAMPLED

GROUNDWATER ANALYSIS DATA
MW#63 BH-89



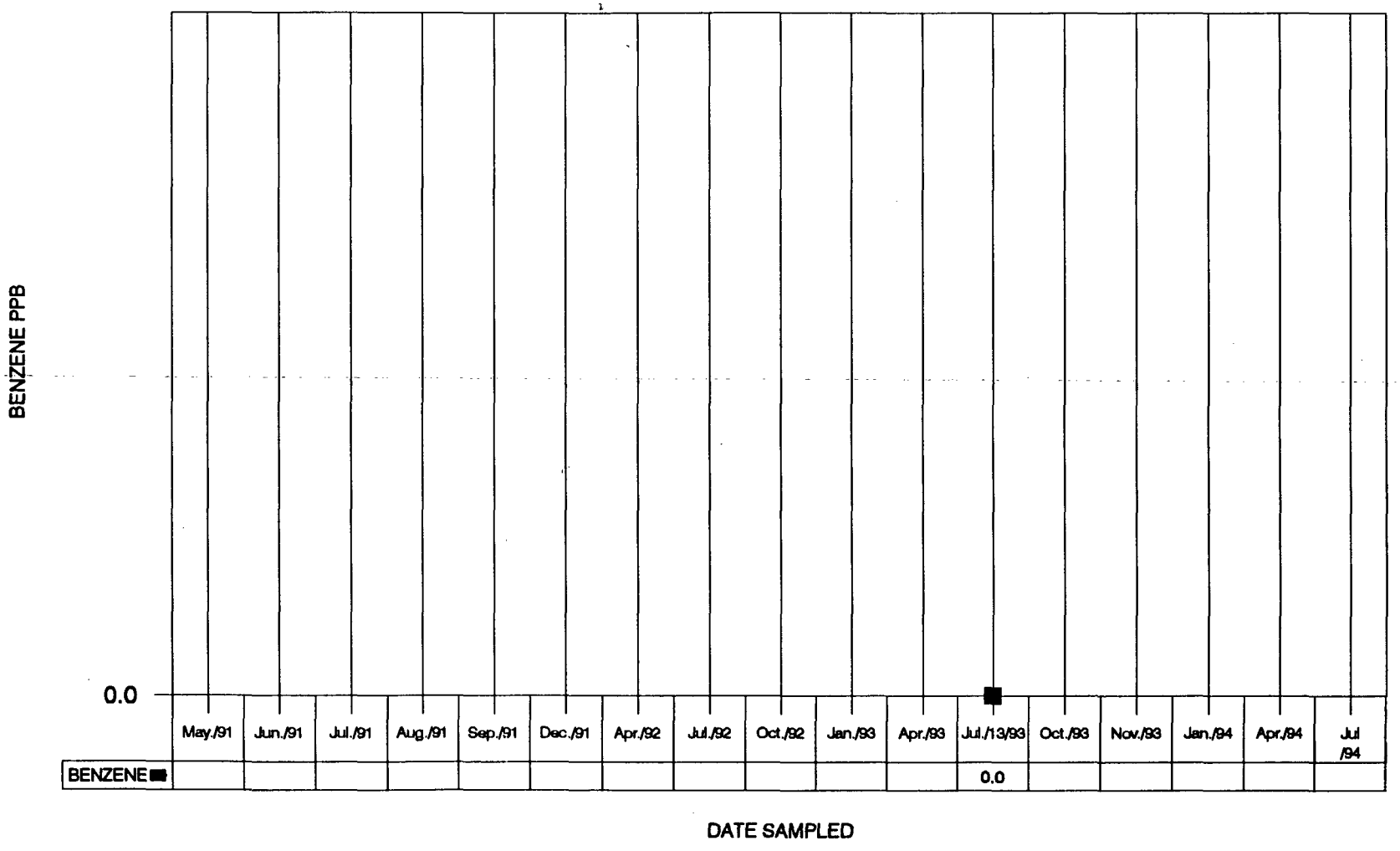
BOREHOLE WATER ANALYSIS DATA
MW#64 BH-90



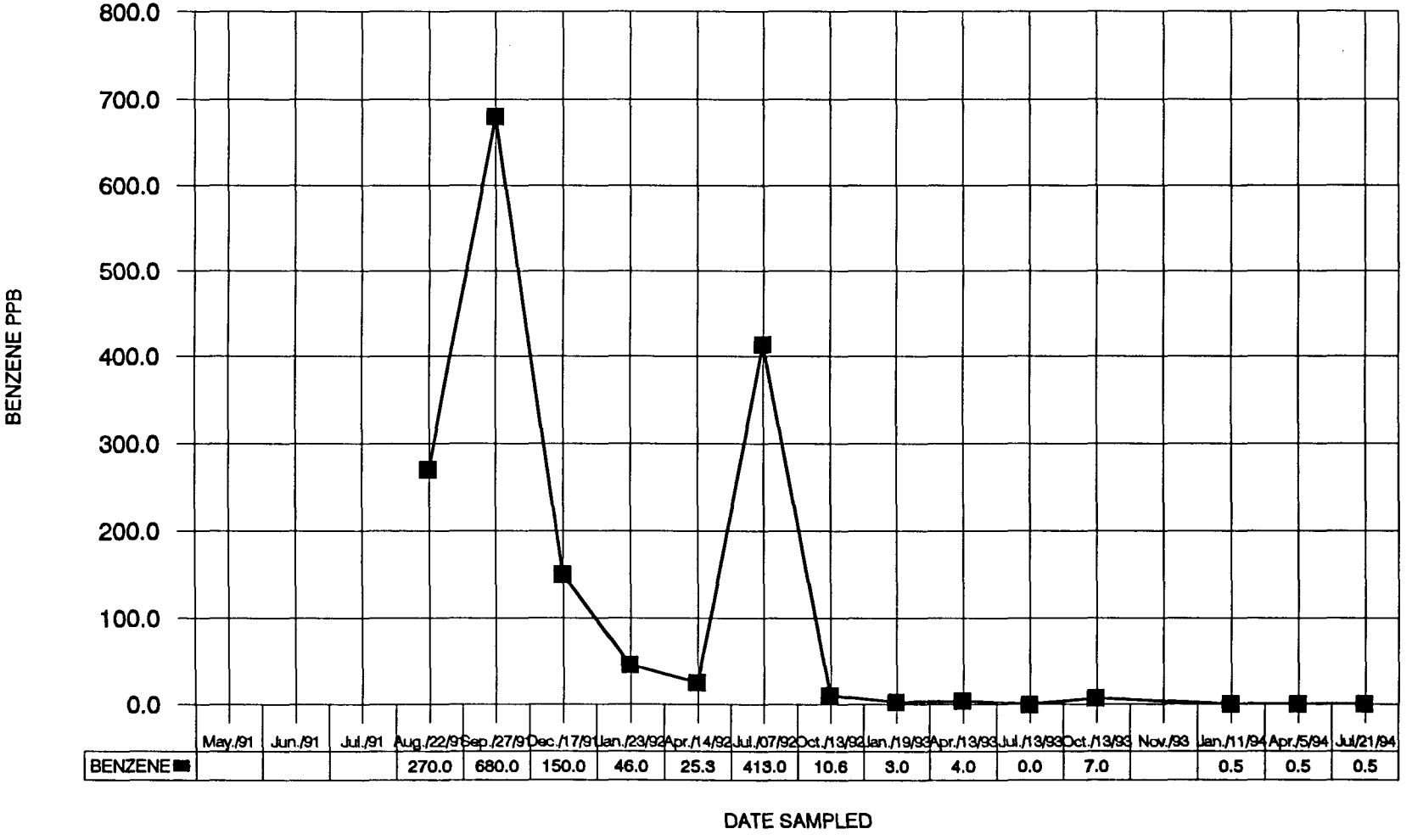
	May./91	Jun./91	Jul./91	Aug./30/91	Sep./27/91	Dec./17/92	Apr./23/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./10/93	Jan./12/94	Apr./6/94	Jul/19/94
BENZENE				0.0	150.0	370.0	68.3	115.0	37.1	15.0	5.0	3.0	18.0	4.0	1.7	0.5	0.5

DATE SAMPLED

BOREHOLE WATER ANALYSIS DATA
MW#65 BH-91

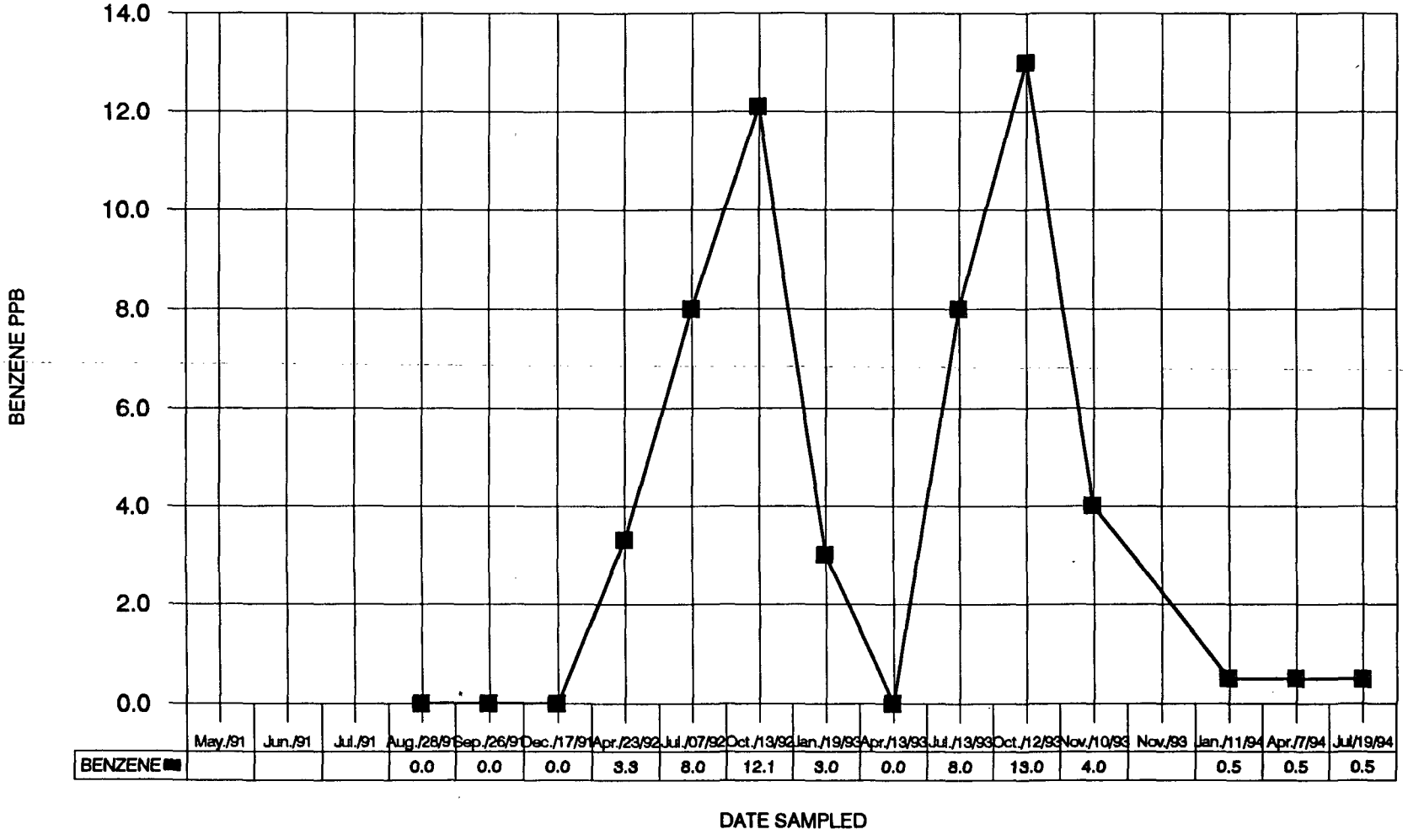


BOREHOLE WATER ANALYSIS DATA
MW#65A BH-91A



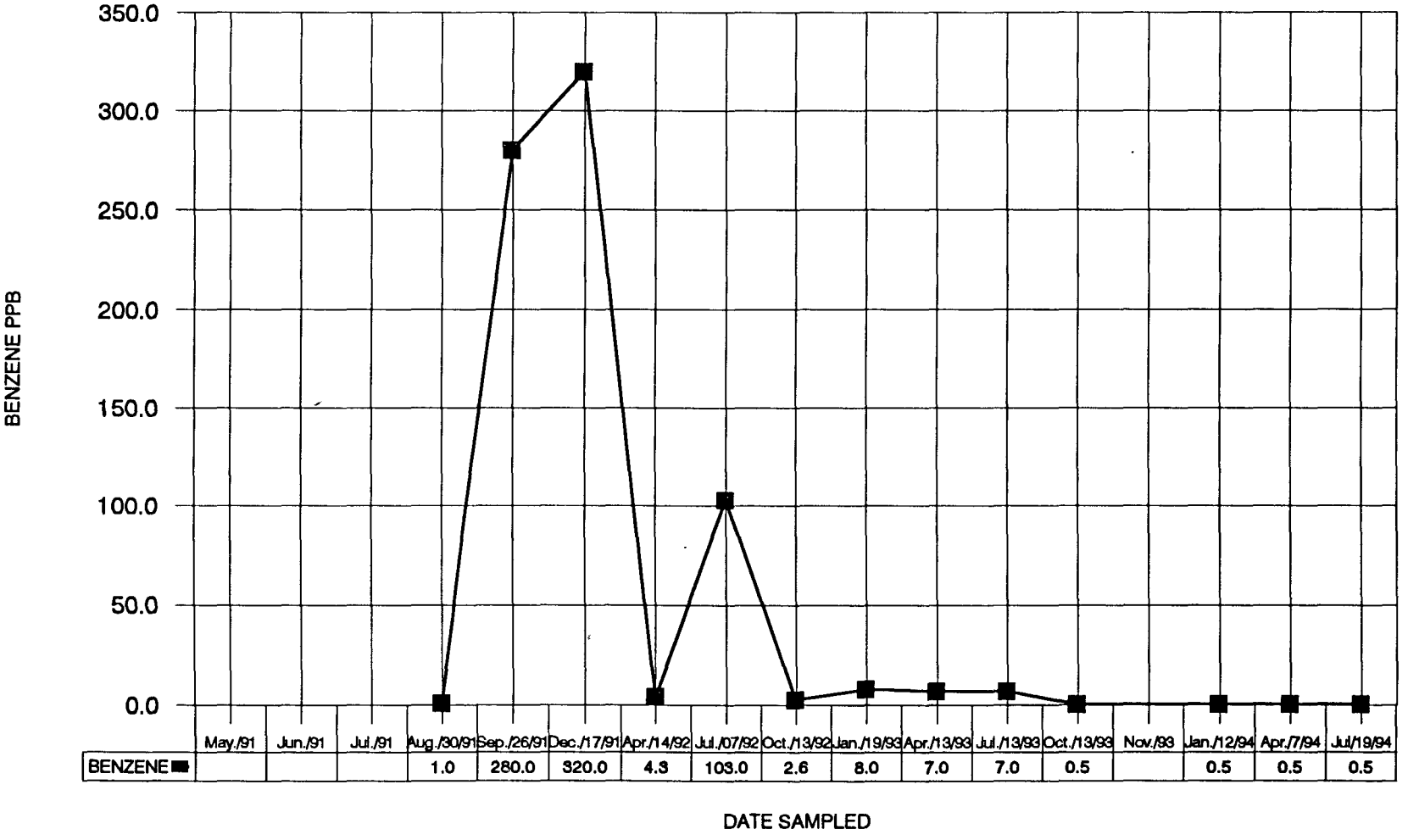
	May./91	Jun./91	Jul./91	Aug./22/91	Sep./27/91	Dec./17/91	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./93	Jan./11/94	Apr./5/94	Jul/21/94
BENZENE				270.0	680.0	150.0	46.0	25.3	413.0	10.6	3.0	4.0	0.0	7.0		0.5	0.5	0.5

GROUNDWATER ANALYSIS DATA
MW#66 BH-92



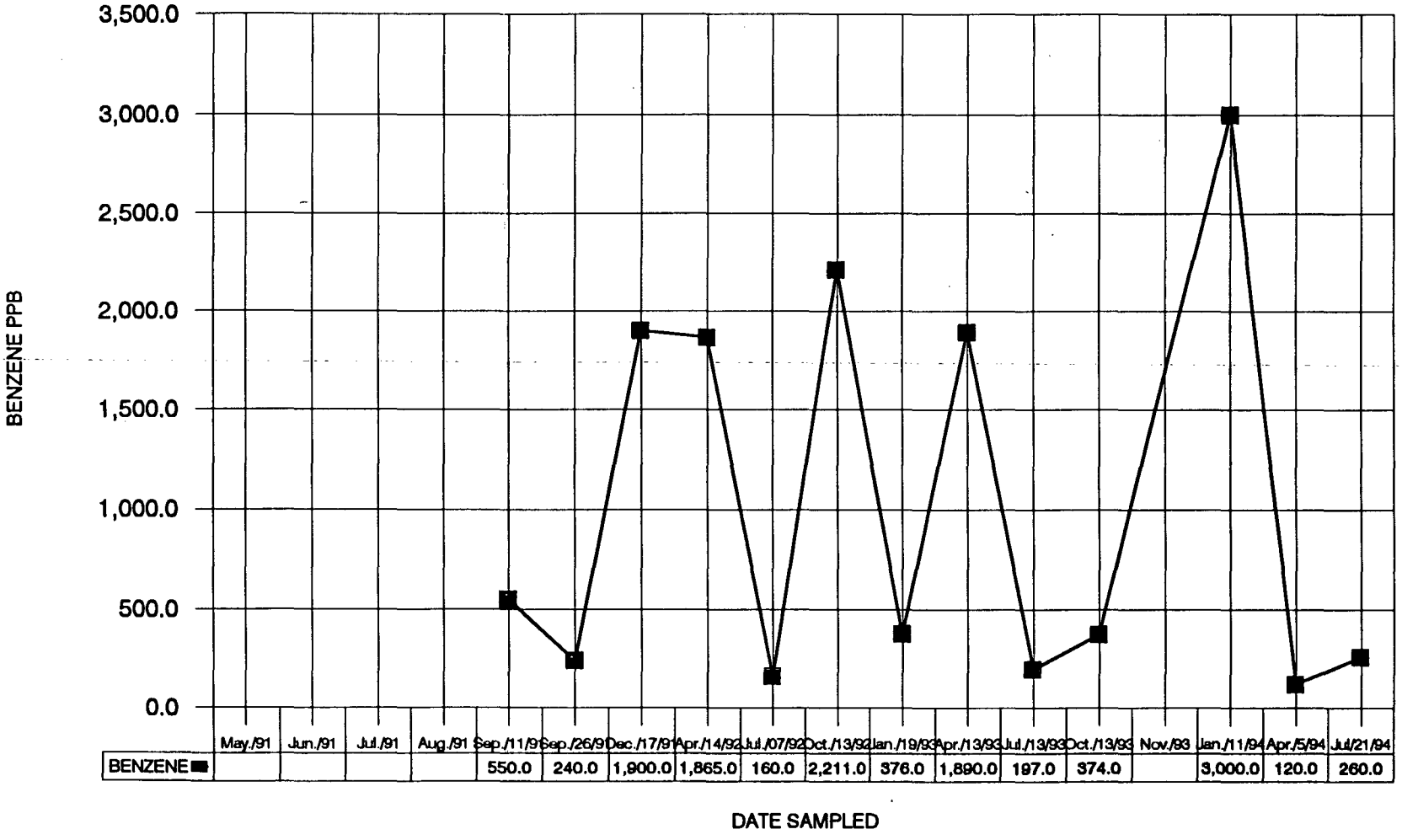
	May./91	Jun./91	Jul./91	Aug./28/91	Sep./26/91	Dec./17/91	Apr./23/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./12/93	Nov./10/93	Nov./93	Jan./11/94	Apr./7/94	Jul/19/94
BENZENE				0.0	0.0	0.0	3.3	8.0	12.1	3.0	0.0	8.0	13.0	4.0		0.5	0.5	0.5

GROUNDWATER ANALYSIS DATA
MW#67 BH-93



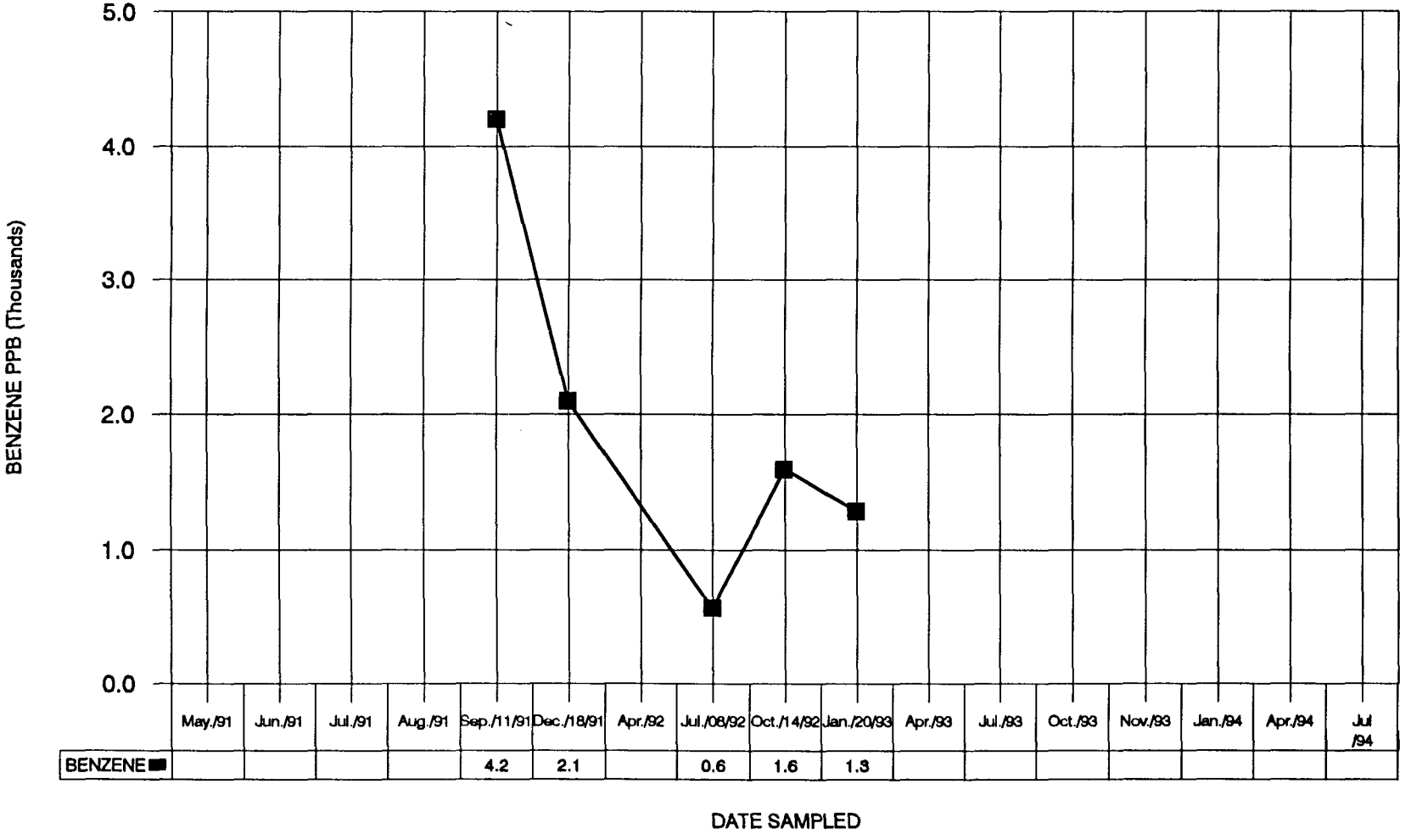
	May./91	Jun./91	Jul./91	Aug./30/91	Sep./26/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94	Jul/19/94
BENZENE				1.0	280.0	320.0	4.3	103.0	2.6	8.0	7.0	7.0	0.5		0.5	0.5	0.5

GROUNDWATER ANALYSIS DATA
MW#68 BH-94

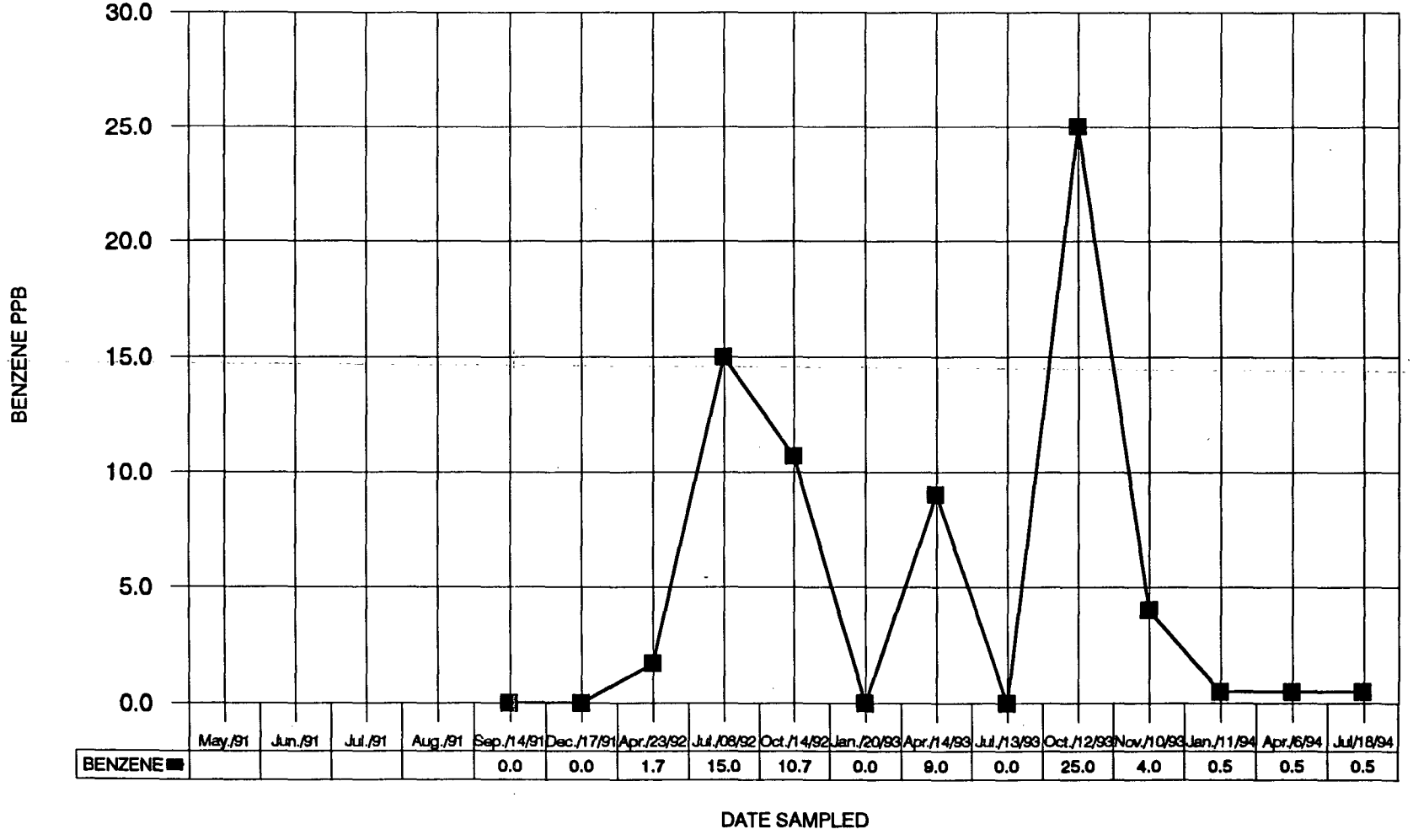


	May./91	Jun./91	Jul./91	Aug./91	Sep./11/91	Sep./26/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./93	Jan./11/94	Apr./5/94	Jul/21/94
BENZENE					550.0	240.0	1,900.0	1,865.0	160.0	2,211.0	376.0	1,890.0	197.0	374.0		3,000.0	120.0	260.0

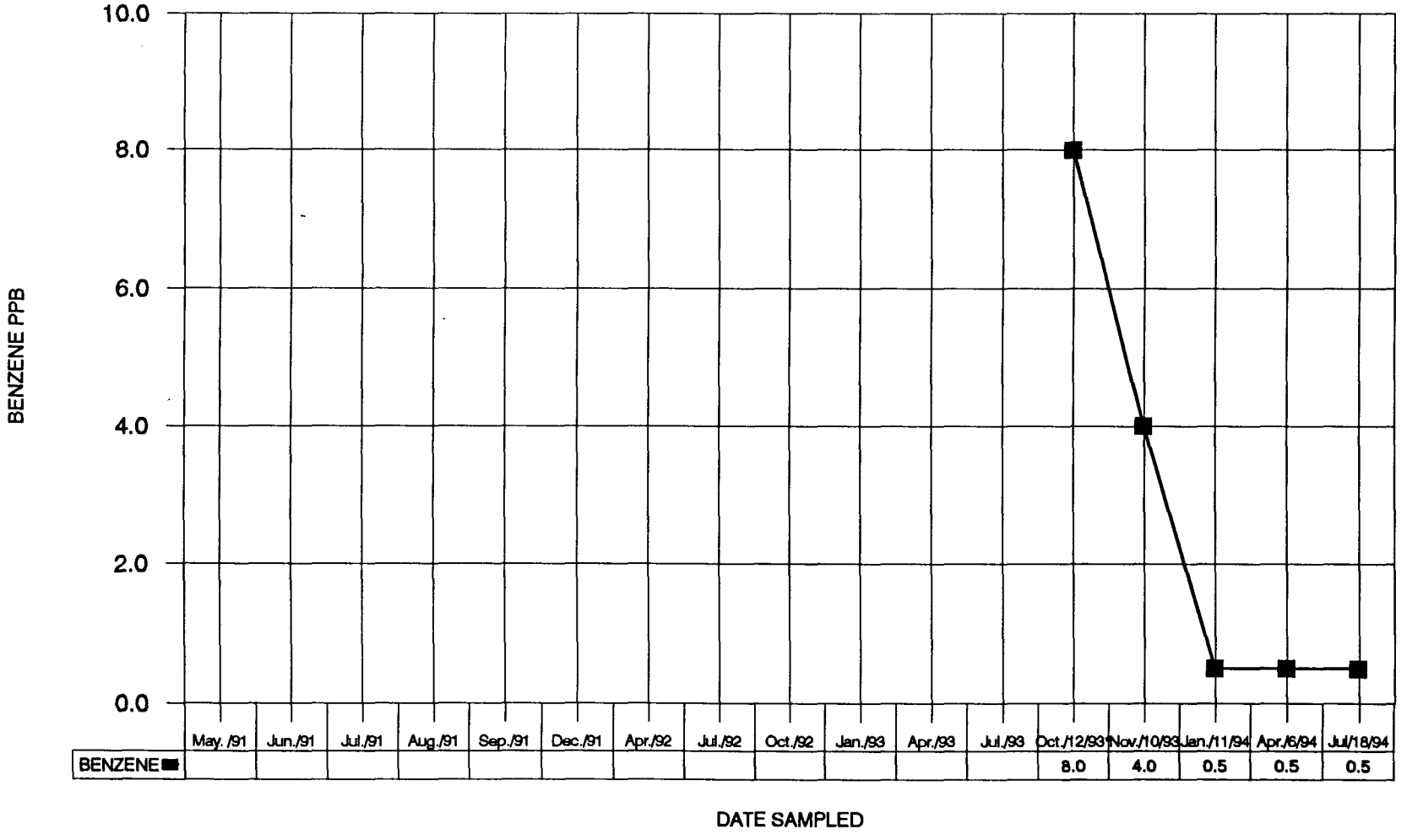
GROUNDWATER ANALYSIS DATA
MW#69 BH-95



GROUNDWATER ANALYSIS DATA
MW#70 BH-97

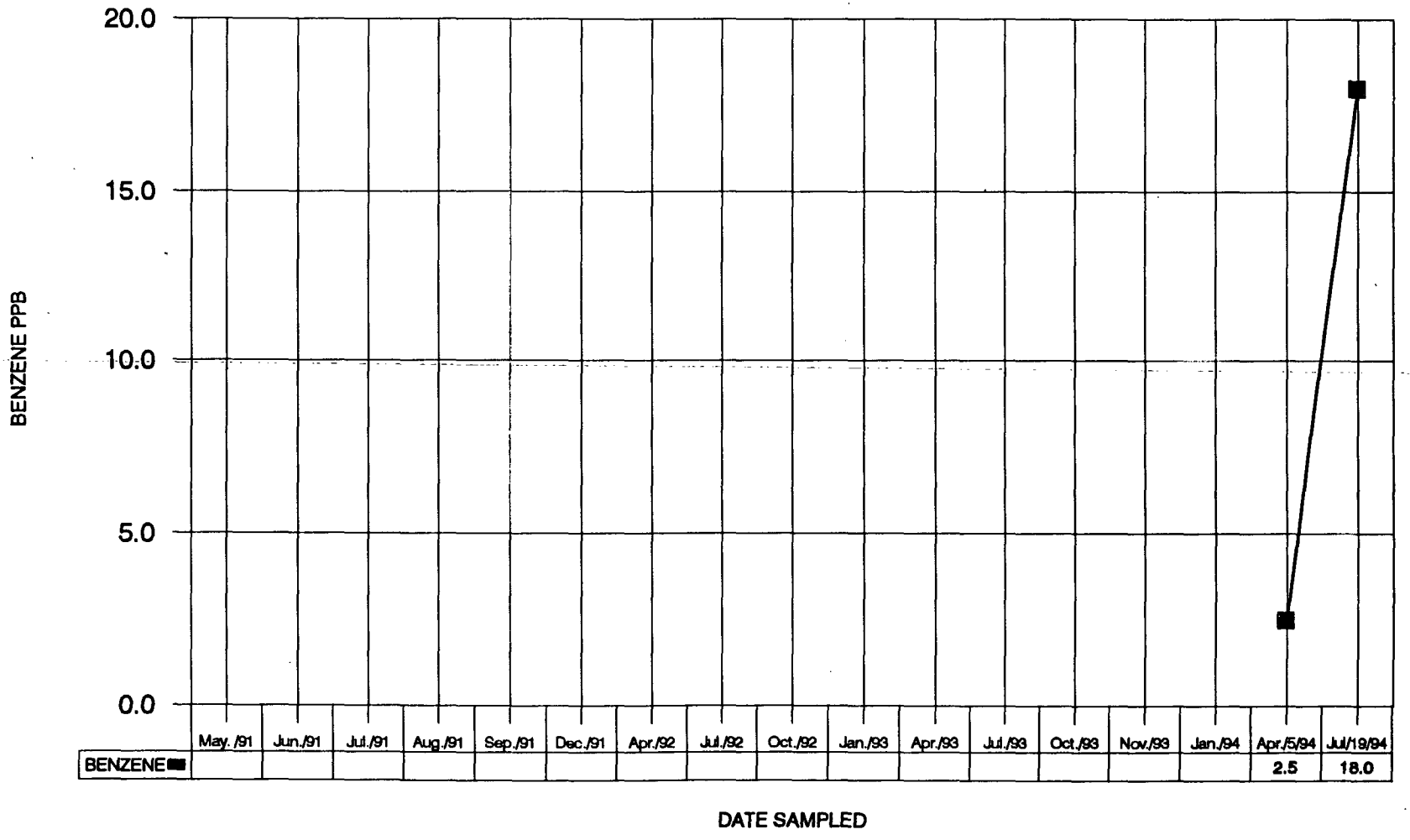


GROUNDWATER ANALYSIS DATA
MW#71 BH-98



* 10/12/93 is the first time to sample this well.

GROUNDWATER ANALYSIS DATA
MW#72 BH-99



APPENDIX D

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

MONTHLY LABORATORY RESULTS

(AUGUST)

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **408398**

September 13, 1994

Marathon Oil Company
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: INDIAN BASIN REMED. 44999

Attention: Bob Menzie

On **08/25/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Chloride analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

All other analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Analytical Technologies, Inc.

CLIENT	: MARATHON OIL CO.	DATE RECEIVED	: 08/25/94
PROJECT #	: 44999		
PROJECT NAME	: INDIAN BASIN REMED.	REPORT DATE	: 09/13/94

ATI ID: 408398

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	LYMAN	AQUEOUS	08/24/94
02	ARROYO	AQUEOUS	08/24/94
03	SW-1	AQUEOUS	08/24/94
04	TRIP BLANK	AQUEOUS	08/09/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	4

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 408398

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED.

DATE RECEIVED : 08/25/94
REPORT DATE : 09/13/94

PARAMETER	UNITS	01	02	03
CHLORIDE (EPA 325.2)	MG/L	11.5	12.7	21

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : INDIAN BASIN REMED. ATI I.D. : 408398

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	40892601	260	270	4	520	250	104
CHLORIDE	MG/L	40839802	12.7	12.6	0.8	23.2	10.0	105

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 408398

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	LYMAN	AQUEOUS	08/24/94	NA	08/28/94	1
02	ARROYO	AQUEOUS	08/24/94	NA	08/28/94	1
03	SW-1	AQUEOUS	08/24/94	NA	08/28/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		102	103	105

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 408398

PROJECT # : 44999

PROJECT NAME : INDIAN BASIN REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	TRIP BLANK	AQUEOUS	08/09/94	NA	08/28/94	1

PARAMETER	UNITS	04
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5

SURROGATE:

BROMOFLUOROBENZENE (%) 104

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 408398
BLANK I.D.	: 082894	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 08/28/94
PROJECT NAME	: INDIAN BASIN REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		108

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40839801	ATI I.D.	: 408398
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 08/28/94
PROJECT NAME	: INDIAN BASIN REMED.	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40839801	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.9	99	9.9	99	0
TOLUENE	<0.5	10	9.8	98	10	100	2
ETHYLBENZENE	<0.5	10	10	100	10	100	0
TOTAL XYLENES	<0.5	30	31	103	32	107	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego ▪ Phoenix ▪ Seattle ▪ Pensacola ▪ Ft. Collins ▪ Portland ▪ Albuquerque

CHAIN OF CUSTODY

DATE: 8-24-94 PAGE 1 OF 1

ATI LAB I.D. 408398

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO: Bob Menzie
COMPANY: Marathon Oil Company
ADDRESS: 125 W. Missouri St
Midland, TX 79701

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/~~MTBE~~ (8020)	Chloride	NUMBER OF CONTAINERS
Lyman	8-24-94	1:34PM	Water	01	✓	✓	3
Arroyo	↓	1:56PM	↓	02	✓	✓	3
SWL1	↓	2:29PM	↓	03	✓	✓	3
TRIP BLANK	8-9-94	9:30AM	↓	04	✓		1

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Volatile Organics GC/MS (624/8240)
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:	44999	NO. CONTAINERS	10
PROJ. NAME:	Indian Basin Remed.	CUSTODY SEALS	(Y) / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:	Greyhound	RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Bob Menzie Time: 4:30 PM	Signature: Time:	Signature: Time:
Printed Name: Bob Menzie Date: 8-24-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY:(LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1335
Printed Name: Date:	Printed Name: Date:	Printed Name: Daniel Witter Date: 8/25/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 ▪ Phoenix (602) 496-4400 ▪ Seattle (206) 228-8335 ▪ Pensacola (904) 474-1001 ▪ Portland (503) 684-0447 ▪ Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI ▪ Pink - ORIGINATOR

Analytical**Technologies,** Inc. Albuquerque, NM

Chain of Custody

DATE 8/25/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER: [illegible]

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310			8240 (TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
408398-01	8/24	1334	AQ	1						X																						1
-02	↓	1356	↓	2						X																						1
-03	↓	1429	↓	3						X																						1

ANALYSIS REQUEST

PROJECT INFORMATION	
PROJECT NUMBER:	408398
PROJECT NAME:	Marathon
QC LEVEL:	(STD) IV
QC REQUIRED:	MS MSD BLANK
TAT:	(STANDARD) RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	✓
INTACT?	✓
RECEIVED GOOD COND./COLD	✓
LAB NUMBER	408398

DUE DATE: 9/[illegible]9
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

WO# LK959

SAMPLES SENT TO:	
SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PORTLAND	
PHOENIX	X
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: [signature] Time: 1730
Printed Name: Dianne Lutter Date: 8/25/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Rosella Vidal 1016
Printed Name: Rosella Vidal Date: 8/26/94
Company: ATI

APPENDIX E

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

MONTHLY LABORATORY RESULTS

(SEPTEMBER)

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **409392**

October 11, 1994

Marathon Oil Co.
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: IB REMED. 44999

Attention: Bob Menzie

On **09/21/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Chloride analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

All other analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

OCT 14 1994

Analytical Technologies, Inc.

CLIENT	: MARATHON OIL CO.	DATE RECEIVED	: 09/21/94
PROJECT #	: 44999		
PROJECT NAME	: IB REMED.	REPORT DATE	: 10/11/94

ATI ID: 409392

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	SW-1	AQUEOUS	09/20/94
02	LYMAN	AQUEOUS	09/20/94
03	ARROYO	AQUEOUS	09/20/94
04	TRIP BLANK	AQUEOUS	09/16/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	4

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 409392

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMED.

DATE RECEIVED : 09/21/94
REPORT DATE : 10/11/94

PARAMETER	UNITS	01	02	03
CHLORIDE (EPA 325.2)	MG/L	20	11	11

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMED. ATI I.D. : 409392

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	40983001	66	65	2	163	100	97

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 409392

PROJECT # : 44999

PROJECT NAME : IB REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	SW-1	AQUEOUS	09/20/94	NA	09/22/94	1
02	LYMAN	AQUEOUS	09/20/94	NA	09/22/94	1
03	ARROYO	AQUEOUS	09/20/94	NA	09/22/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	0.8	<0.5	<0.5
TOTAL XYLENES	UG/L	2.2	0.8	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		102	104	110

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL CO. ATI I.D.: 409392

PROJECT # : 44999

PROJECT NAME : IB REMED.

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	TRIP BLANK	AQUEOUS	09/16/94	NA	09/22/94	1

PARAMETER	UNITS	04
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5

SURROGATE:

BROMOFLUOROBENZENE (%) 104

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 409392
BLANK I.D.	: 092194	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 09/21/94
PROJECT NAME	: IB REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		101

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 409392
BLANK I.D.	: 092294	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 09/22/94
PROJECT NAME	: IB REMED.	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		101

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 40939203	ATI I.D.	: 409392
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 09/22/94
PROJECT NAME	: IB REMED.	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 40939203	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	10	100	10	100	0
TOLUENE	<0.5	10	10	100	10	100	0
ETHYLBENZENE	<0.5	10	10	100	10	100	0
TOTAL XYLENES	<0.5	30	32	107	31	103	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical**Technologies,**Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 9-20-94 PAGE 1 OF 1

ATI LAB I.D.: 409392

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Co.
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO:
COMPANY: Same
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020) only / Chloride	NUMBER OF CONTAINERS
SW-1	9-20-94	12:45 pm	Water	01	✓ ✓	3
Lyman	"	2:55 pm	"	02	✓ ✓	3
Arroyo	"	1:10 pm	"	03	✓ ✓	3
Trip Blank	9-16-94	3:15 pm	Water	04	✓	1

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:	44999	NO. CONTAINERS	10
PROJ. NAME:	IB Remed.	CUSTODY SEALS	(Y) / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:	Greyhound	RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Time: 2:30 pm	Signature: Time:	Signature: Time:
Printed Name: Robert J. Menzie Jr. Date: 9-20-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY:(LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1150
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 9/21/94
Company:	Company:	Analytical Technologies, Inc.

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 9/21/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
409392-01	9/20	1245	AQ	1
-02	↓	1255	AQ	2
-03	↓	1310	AQ	3

ANALYSIS REQUEST

SAMPLE ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310		8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
409392-01						X																					1
-02						X																					1
-03						X																					1

PROJECT INFORMATION	
PROJECT NUMBER:	409392
PROJECT NAME:	MD
QC LEVEL:	(STD) IV
QC REQUIRED:	MS MSD BLANK
TAT:	(STANDARD) RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	NA
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	409392

DUE DATE: 10/5
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

LOG# LK1004

SAMPLES SENT TO:

SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PORTLAND	
PHOENIX	X
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: Time: 1730
Printed Name: Date: 9/21/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 937A
Printed Name: Linda Eshelman Date: 9/22/94
Company: ATI

APPENDIX F

STATE ENGINEER'S FLUID RECOVERY REPORTS

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, Texas 79702
Telephone 915/682-1626

August 9, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, August 1, 1994. Cumulative Lower Queen fluid removal through that date is 40,452,993 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	8/01/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	5948291	5,948,291 26,922[1]	5,975,213
MW-59 (BH-85)	10259114	0	111303*	4,674,726 83,454[1]	4,758,180
MW-61A (BH-87A)	10239116	0	6046908	6,046,908 130,850[1]	6,177,758
MW-62 (BH-88)	10239115	0	4642858	4,642,858 256,553[1]	4,899,411
MW-65A (BH-91A)	10239117	0	8316448	8,316,448 39,774[1]	8,356,222
MW-68 (BH-94)	02209213	122618	2976323	2,853,705 2,484,076[1]	5,337,781
MW-72 (BH-99)	02881532	470	4948898	4,948,428	4,948,428
LOWER QUEEN TOTAL 40,452,993 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, August 1, 1994. The cumulative shallow fluid removal through that date is 763,109 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	8/01/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	226324	243,999[1]	243,999
MW-14	02209214	0	398204.3	398,391[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	1,172[2] 14,342[1]	15,514
SHALLOW TOTAL				763,109 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM71294/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, Texas 79702
Telephone 915/682-1626

September 8, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Tuesday, September 6, 1994. Cumulative Lower Queen fluid removal through that date is 41,303,700 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	9/06/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	6003103	6,003,103 26,922[1]	6,030,025
MW-59 (BH-85)	10259114	0	113572*	4,770,024 83,454[1]	4,853,478
MW-61A (BH-87A)	10239116	0	6204299	6,204,299 130,850[1]	6,335,149
MW-62 (BH-88)	10239115	0	4736898	4,736,898 256,553[1]	4,993,451
MW-65A (BH-91A)	10239117	0	8387019	8,387,019 39,774[1]	8,426,793
MW-68 (BH-94)	02209213	122618	3035299	2,912,681 2,484,076[1]	5,396,757
MW-72 (BH-99)	02881532	470	5268517	5,268,047	5,268,047
LOWER QUEEN TOTAL 41,303,700 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Tuesday, September 6, 1994. The cumulative shallow fluid removal through that date is 763,109 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	9/06/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	226324	243,999[1]	243,999
MW-14	02209214	0	398204.3	398,391[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	15,514[1]	15,514
SHALLOW TOTAL				763,109 Gallons	

[1] Previously metered recovered volumes.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM90894/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood

C

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

October 10, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, October 3, 1994. Cumulative Lower Queen fluid removal through that date is 42,593,265 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	10/03/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	6123589	6,123,589 26,922[1]	6,150,511
MW-59 (BH-85)	10259114	0	117317*	4,927,314 83,454[1]	5,010,768
MW-61A (BH-87A)	10239116	0	6264877	6,264,877 130,850[1]	6,395,727
MW-62 (BH-88)	10239115	0	4890144	4,890,144 256,553[1]	5,146,697
MW-65A (BH-91A)	10239117	0	8557280	8,557,280 39,774[1]	8,597,054
MW-68 (BH-94)	02209213	122618	3227302	3,104,684 2,484,076[1]	5,588,760
MW-72 (BH-99)	02881532	470	5704218	5,703,748	5,703,748
LOWER QUEEN TOTAL 42,593,265 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, October 3, 1994. The cumulative shallow fluid removal through that date is 768,321 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	10/03/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	226324	243,999[1]	243,999
MW-14	02209214	0	398204.3	398,391[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	5,212[2] 15,514[1]	20,726
SHALLOW TOTAL				768,321 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM90894/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood

INDIAN BASIN GAS PLANT
TREATMENT PROJECT
QUARTERLY REPORT

RECEIVED

FEB 10 1994

OIL CONSERVATION DIV.
SANTA FE

FOURTH QUARTER 1994
OCTOBER, NOVEMBER, AND DECEMBER

Submitted by
Marathon Oil Company
on behalf of the
Indian Basin Gas Plant Owners

February 9, 1994

EXECUTIVE SUMMARY

The pump-and-treat groundwater remediation system is fully operational and functioning as set forth in the Treatment Project Plan document (March 1992). Light nonaqueous phase liquids (condensate) remain in two (2) Lower Queen wells. Fluid recovery from the Lower Queen aquifer averaged 5669 barrels per week with volatile hydrocarbon compounds being removed by air stripping. Lower Queen dissolved benzene concentrations range from 0.5 to 374 micrograms per liter or parts per billion. The benzene concentration in all five (5) downgradient wells was below the State maximum allowable concentration of 10 micrograms per liter indicating continued hydrocarbon plume containment. Chloride concentrations in all Lower Queen wells are below the State maximum allowable concentration of 250 milligrams per liter.

Light nonaqueous phase liquids (condensate) remain in seven (7) Shallow zone wells. Shallow zone pumping continues from two (2) wells. Seven (7) of nine (9) Shallow zone wells sampled in October indicate chloride concentrations above the State maximum allowable concentration of 250 milligrams per liter. Fluid recovery from the Shallow zone aquifer averaged 203 barrels per week. During the Fourth Quarter, the vapor extraction system withdrew fuel hydrocarbon vapor with concentrations ranging from 500 to 41,000 micrograms per liter from three (3) Shallow zone wells.

Concentrations of benzene, toluene, ethylbenzene, and total xylene in groundwater collected from Shallow zone rancher wells and the Upper Indian Hills Spring West (Rocky Arroyo spring) have not exceeded State or Federal drinking water standards. November chloride concentrations in one rancher well and the Upper Indian Hills Spring West exceeded the State maximum allowable concentration of 250 milligrams per liter, but December sample results suggest the November results are anomalous. December chloride results returned to levels consistent with results prior to November.

Light nonaqueous phase liquids (condensate) recovery from the Lower Queen and Shallow zone for the Fourth Quarter was 35.9 barrels, a 219% increase compared to the Third Quarter. Cumulative recovery excluding the volume volatilized by the air stripper and vapor extraction system is 3,392.8 barrels or 9.7 % of the total spill volume.

TABLE OF CONTENTS

INTRODUCTION 1

QUARTERLY REPORT SUMMARY 1

GROUNDWATER ELEVATION 1
- Lower Queen 1
- Shallow Zone 1
- Groundwater Recharge 2

QUARTERLY SAMPLING LABORATORY RESULTS 2

RANCHER WELLS, SPRING, AND PLANT WELL LABORATORY RESULTS 3

GROUNDWATER PUMPING 4
- Lower Queen 4
- Shallow Zone 5

GROUNDWATER TREATMENT 5

VAPOR EXTRACTION SYSTEM 6

OTHER ACTIVITIES 6

REFERENCES CITED 6

TABLES

TABLE 1	DEPTH-TO-WATER, GROUNDWATER ELEVATION, AND RAINFALL DATA
TABLE 2	HISTORICAL SUMMARY OF BENZENE IN LOWER QUEEN GROUNDWATER
TABLE 3	HISTORICAL SUMMARY OF BENZENE IN SHALLOW ZONE GROUNDWATER
TABLE 4	RANCHER WELL GROUNDWATER AND SPRING WATER SAMPLE RESULTS

FIGURES

FIGURE 1	OCTOBER 1993 LOWER QUEEN POTENTIOMETRIC SURFACE
FIGURE 2	LOWER QUEEN GROUNDWATER ELEVATION VS. TIME
FIGURE 3	OCTOBER 1993 SHALLOW ZONE POTENTIOMETRIC SURFACE
FIGURE 4	COMPARISON OF EPA METHOD 8020 VS. HPLC METHOD LABORATORY RESULTS
FIGURE 5	WEEKLY LOWER QUEEN FLUID RECOVERY
FIGURE 6	WEEKLY SHALLOW ZONE FLUID RECOVERY
FIGURE 7	WEEKLY TOTAL FLUID RECOVERY

APPENDICES

APPENDIX A	OCTOBER 1993 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY
APPENDIX B	OCTOBER 1993 LABORATORY REPORTS - GROUNDWATER
APPENDIX C	BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS
APPENDIX D	RANCHER WELL, PLANT WELL, AND SPRING MONTHLY LABORATORY REPORTS
APPENDIX E	STATE ENGINEER'S FLUID RECOVERY REPORTS
APPENDIX F	LABORATORY RESULTS - AIR (VAPOR EXTRACTION WELLS)

INTRODUCTION

This report summarizes groundwater and unsaturated zone treatment activities conducted during the Fourth Quarter of 1993 in accordance with the Indian Basin Environmental Treatment Project Plan submitted on March 5, 1992 by Marathon Oil Company on behalf of the Indian Basin Gas Plant owners. Preparation of this report is also in accordance with the April 2, 1992 New Mexico Oil Conservation Division (OCD) directive for quarterly reporting of remediation project activities. Remediation activities are continuing to reduce the impact of a liquid gas condensate and brine spill from a production pipeline discovered in April 1991 near the Indian Basin Gas Plant.

GROUNDWATER ELEVATION

Lower Queen Aquifer

Depth-to-water measurements were acquired from nonpumping, Lower Queen monitoring wells in November and December 1993. In October, depth-to-water measurements were obtained from monitoring and pumping wells. In addition, light nonaqueous phase liquid (LNAPL) thickness was measured in nonpumping wells in October and December. Table 1 presents groundwater elevations calculated from casing elevation data, depth-to-water measurements, and LNAPL (condensate) thicknesses.

Figure 1 is a potentiometric map of the Lower Queen aquifer based on gauging conducted in October. Groundwater elevation data were obtained from all monitoring and recovery wells except for two pumping wells. Depth-to-water measurements in the pumping wells were obtained while pumping continued by raising the production tubing and pump assembly with a winch truck a few inches to allow the probe to be inserted into the well. These depth-to-water measurements approximate the drawdown at the well.

Fourth Quarter monitoring data generally indicate decreasing groundwater elevations (Figure 2). The exception is the plant backup supply well, SW-2 (this well is idle and does not have a pump installed), which showed a higher groundwater elevation in December. This increase is the result of reduced pumping during the winter from the plant supply well (SW-1) which is located just south of SW-2.

Shallow Zone

A potentiometric map was constructed using depth-to-water measurements collected from shallow monitoring wells in October 1993 (Figure 3). Table 1 shows depth-to-water measurements, calculated groundwater elevations, and LNAPL thickness for Shallow zone wells. These Shallow zone data indicate both decreasing and increasing groundwater elevations in

monitoring wells during the quarter. Increased groundwater elevations are the result of recharge from rainfall.

Groundwater Recharge (Rainfall)

Daily rainfall is gauged at the gas plant. Monthly rainfall for October, November, and December was 0.78, 0.53, and 0.23 inches, respectively (Table 1). Cumulative rainfall for the Fourth Quarter was 1.54 inches.

QUARTERLY SAMPLING LABORATORY RESULTS

Gauging, purging, and sampling of 22 monitoring wells were conducted on October 11 through 15, 1993. Fourteen Lower Queen wells including the plant water supply well (SW-1) were sampled. The backup well (SW-2) was gauged but not sampled because the purge time (three casing volumes) for this well is 5.7 hours. Seven of these Lower Queen wells have downhole pumps installed and were sampled through the pump. One of the Lower Queen pumping wells contained LNAPL and was not submitted for laboratory analysis (MW-61A).

Four Lower Queen wells were resampled on November 10 because laboratory results indicated that the benzene concentration in these wells exceeded the State maximum allowable concentration (MAC) of 10 micrograms per liter (ug/l). These samples were submitted to Southwestern Laboratories, Inc. (SWL) located in Midland, Texas for analysis.

Nine of the 59 Shallow zone wells were sampled in October. Four of the original 25 Shallow zone monitoring wells (included two sumps) designated for quarterly sampling in the Treatment Project Plan were sampled (see ***bolded and italicized*** well designations in Table 3). The remaining 21 wells were either dry or bailed dry during well sampling, contain LNAPL (MW-11 and MW-69), or are inaccesible (MW-13; pumping well). Three Shallow zone wells other than those designated in the Treatment Project Plan were sampled (MW-45, MW-49, and MW-65). Samples were collected by SWL using Environmental Protection Agency (EPA) sampling protocol. A table was prepared by SWL of field observations from notes recorded during gauging, purging, and sampling activities. This table documents the depth-to-water measurement, purge volume, temperature, pH, conductivity, and whether LNAPL or free-phase product was observed in the well (Appendix A).

Marathon Oil Company's Petroleum Technology Center (PTC) in Littleton, Colorado performed chloride and benzene, toluene, ethylbenzene, and total xylene (BTEX) analyses on the samples collected in October. High performance liquid chromatography (HPLC) was used to analyze groundwater samples for BTEX concentrations and a titration method was used for chloride analysis. These results are contained in Appendix B.

Core Laboratories in Aurora, Colorado performed five duplicate BTEX analysis using EPA Method 8020 (purge and trap gas chromatography). The OCD directive dated April 2, 1992 required Marathon to verify the HPLC results since the HPLC analytical technique is not an EPA-approved method for determining BTEX concentations. Core Laboratories also conducted five duplicate chloride analyses using EPA Method 325.2. Two Shallow zone wells (MW-41 and MW-44) and three Lower Queen wells (MW-57, MW-60, and MW-67) were analyzed for BTEX using both the HPLC and EPA 8020 methods. Figure 4 compares BTEX analytical results for the two analytical techniques. Duplicate laboratory results performed by Core Laboratories using EPA Method 8020 and 325.2 are included in Appendix B.

Tables 2 and 3 are historical summaries of quarterly benzene concentration data since September 1991 for the Lower Queen and Shallow zone wells, respectively. Benzene concentration (in ug/l) versus time graphs for each routinely sampled monitoring well are provided in Appendix C.

RANCHER WELLS, SPRING, AND PLANT WELL LABORATORY RESULTS

Monthly groundwater samples from the closest downgradient rancher well to the Shallow zone plume (Lyman) and surface water from a natural spring in Rocky Arroyo (Upper Indian Hills Spring West; Hendrickson and Jones, 1952) were collected on October 14, November 10, and December 6, 1993. In addition, another rancher well which is sampled quarterly (Biebelle), was sampled on October 14. The plant water supply well (SW-1), completed in the Lower Queen aquifer, is also sampled and analyzed monthly.

The rancher well and natural spring samples were obtained using EPA sampling and handling procedures. Core Laboratories, Inc. performed the BTEX and chloride analyses in October and November using EPA approved methods. Analytical Technologies, Inc. conducted the BTEX and chloride analyses in December using EPA approved methods. Laboratory results of groundwater from the rancher wells and the natural spring are transmitted to the local ranchers each month with letters of explanation. Copies of these letters are also provided to the OCD and the Bureau of Land Management (BLM) in Santa Fe and Roswell, New Mexico, respectively. Laboratory reports for the rancher wells, Rocky Arroyo spring, and SW-1 are included in Appendix D.

Concentrations of benzene, toluene, ethylbenzene, and total xylene in groundwater collected from the Lyman and Biebelle Shallow zone wells and the Indian Hills Spring West (Rocky Arroyo spring) have not exceeded State or Federal drinking water standards (Table 4). November chloride concentrations in the Lyman well and the Indian Hills Spring West exceeded the State maximum allowable concentration of 250 milligrams per liter, but December sample results suggest the November results are anomalous. December chloride results returned to levels consistent with results prior to November.

GROUNDWATER PUMPING

Lower Queen

Fluid recovery from the Lower Queen aquifer and Shallow zone is metered and reported to the State Engineer's Office (SEO) on a monthly basis, per SEO directive. The reports filed with the SEO for the Fourth Quarter of 1993 are attached in Appendix E. Figures 5, 6, and 7 are stacked bar graphs depicting weekly fluid recovery from the Lower Queen, weekly fluid recovery from the Shallow zone recovery wells, and combined weekly fluid recovery from the Lower Queen aquifer and Shallow zone, respectively.

Seven Lower Queen wells (MW-58, MW-59, MW-61A, MW-62, MW-65A, MW-68, and MW-72) were intermittently pumped for plume control during the quarter. Monthly fluid recovery for each well and the plant supply well SW-1 is listed in the following table.

LOWER QUEEN FLUID RECOVERY

Well Number	October	November	December	Quarter Total (Bbls)
MW-58 (BH-84)	4,690	5,086	2,064	11,840
MW-59 (BH-85)	1,621	2,283	2,495	6,399
MW-61A (BH-87A)	5,346	4,242	3,191	12,779
MW-62 (BH-88)	5,070	5,979	4,404	15,453
MW-65A (BH-91A)	6,422	6,206	4,880	17,508
MW-68 (BH-94)	4,046	6,350	2,621	13,017
MW-72 (BH-99)	0	0	2	2
Plant Supply SW-1	6,772	12,778	13,622	33,172
TOTAL	33,967	42,924	33,279	110,170

Shallow Zone

Shallow zone fluid recovery during the Fourth Quarter was from two intermittent pumping wells (MW-13 and MW-69). Monthly shallow zone fluid recovery volumes for each well and sump are listed in the following table. Free product recovery from MW-69 during the Fourth Quarter totaled 27 barrels.

SHALLOW ZONE FLUID RECOVERY

Well Number	OCTOBER Cond./Water	NOVEMBER Cond./Water	DECEMBER Cond./Water	Quarter Total (Bbls) Cond./Water
MW-13 (BH-36)	330*	1644*	590*	2564*
MW-69 (BH-95)	5.2/4	9.9/4.9	11.9/10.7	27/19.7
TOTAL (Bbls)	5.2/334*	9.9/1649*	11.9/601*	27/2584*

** Total fluid volume because condensate and produced groundwater are not separated at the well.*

GROUNDWATER TREATMENT AND PRODUCT RECOVERY

Commingled fluids pumped from seven Lower Queen and one Shallow zone recovery wells were pumped through piping to a treatment compound that includes an oil/water separator, air stripper, and two aboveground tanks. The oil/water separator is used to remove free product from the produced groundwater. The free product is transferred to a condensate holding tank which is gauged on a daily basis. The measured volume of free condensate recovered from the commingled groundwater during the Fourth Quarter was 8.9 barrels. Cumulative condensate separated from the recovered groundwater since product separation began in April 1992 is 64.0 barrels.

Groundwater from the separator is pumped through the air stripper to remove dissolved-phase, volatile hydrocarbon compounds. Stripped hydrocarbon compounds are vented to the atmosphere through a stack. Treated groundwater is used as make-up water for the gas plant.

Total free product recovery from the Lower Queen and Shallow zone for the Fourth Quarter was 35.9 barrels, a 219% increase compared to the Third Quarter. Cumulative free product recovered to date excluding the volume volatilized by the air stripper and vapor extraction system is 3,392.8 barrels or 9.7% of the total spill volume.

VAPOR EXTRACTION SYSTEM

Phase I of the unsaturated zone remediation using vapor extraction (VE) was completed in March 1993. The Phase I program vented Shallow zone wells MW-16 (BH-39), MW-17 (BH-40), and MW-21 (BH-44). Shallow venting continued from MW-56 (BH-82) between April 8 and July 20, 1993. On October 7 the VE system commensed operation at MW-18, MW-19, and

MW-20 and has operated continuously during the Fourth Quarter.

Air samples of the extracted vapor at each extraction well were collected in 1-liter Tedlar bags on October 25. A sampling system was designed to acquire an air sample directly from the vacuum at the wellhead. Air samples were collected from MW-18, MW-19, and MW-20 and shipped to Analytical Technologies, Inc. in Albuquerque, New Mexico for BTEX (EPA Method 8020) and fuel hydrocarbon (EPA Method 8015 Modified) analysis. Fuel hydrocarbon concentrations were quantified using the Indian Basin Gas Condensate Standard on file at the laboratory. Fuel hydrocarbon results were 4800, 41000, and 500 ug/l for MW-18, MW-19, and MW-20, respectively (Appendix F). Benzene, toluene, and total xylene concentrations were not detected in the three wells. Ethylbenzene concentrations were 5.5, 42, and 0.37 ug/l for MW-18, MW-19, and MW-20, respectively.

OTHER ACTIVITIES

Downgradient Lower Queen monitoring well MW-71 was connected to the existing water treatment gathering line on December 13, 1993 and electric power was installed at the well on January 4, 1994. A permit to supplement the Lower Queen aquifer was obtained from the SEO on December 9. Fluid withdrawals began on January 4, 1994. Lower Queen recovery well MW-72 was completed on September 10, 1993 and is located at the midpoint between monitoring wells MW-58 and MW-59 (Figure 1).

REFERENCES CITED

Hendrickson, G. E., and Jones, R. S., 1952, Geology and Ground-water Resources of Eddy County, New Mexico: New Mexico Bureau of Mines & Mineral Resources Ground-water Report 3, 169 p., 4 pls.

TABLES

TABLE 1
DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
FOURTH QUARTER 1993

LOWER QUEEN WELL	Top of Casing Elev. (ft AMSL)	Oct-12-93			Nov-10-93		Dec-13-93		
		Depth to water (ft)	Ground-water Elev. (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)	Condensate thickness (in)
MW-57 (BH-83)	3787.70	157.65	3630.05	NG	157.89	3629.81	157.96	3629.74	
MW-58 (BH-84)p	3824.31	209.06	3615.25	p					p
MW-59 (BH-85)p	3819.59			p					p
MW-60 (BH-86)	3815.28	185.70	3629.58	NG	185.96	3629.32	185.98	3629.30	
MW-61A (BH-87A)p	3815.97	189.87	3626.10	present					present
MW-62 (BH-88)p	3819.90	205.32	3614.58	p					p
MW-63 (BH-89)	3826.16	196.89	3629.27	NG	197.32	3628.84	197.43	3628.73	
MW-64 (BH-90)	3798.57	168.88	3629.69	NG	169.09	3629.48	169.13	3629.44	
MW-65A (BH-91A)p	3763.26	133.67	3629.59	p					p
MW-66 (BH-92)	3828.98	200.09	3628.89	NG	200.35	3628.63	200.42	3628.56	
MW-67 (BH-93)	3765.87	136.04	3629.83	NG	136.26	3629.61	136.31	3629.56	
MW-68 (BH-94)p	3797.83	174.50	3623.33	p					p
MW-70 (BH-97)	3822.57	192.65	3629.92	NG	192.91	3629.66	192.96	3629.61	
MW-71 (BH-98)	3778.05	149.68	3628.37	NG	149.90	3628.15	149.93	3628.12	
MW-72 (BH-99)	3819.32	189.68	3629.64	0.50	189.91	3629.41	190.29	3629.03	3.72
SW-1 (SUPPLY)p	3808.19			p					p
SW-2 (BACKUP)	3808.79	179.63	3629.16	NG	180.39	3628.40	179.62	3629.17	
SHALLOW ZONE WELL									
MW-3 (BH-24)	3787.50	DRY			NG		NG		
MW-4 (BH-26)	3785.88	DRY			NG		NG		
MW-5 (BH-28)	3801.69	DRY			NG		NG		
MW-6 (BH-29)	3785.17	DRY			NG		NG		
MW-7 (BH-30)	3784.46	DRY			NG		NG		
MW-8 (BH-31)	3795.04	DRY			NG		NG		
MW-9 (BH-32)	3807.85	DRY			NG		NG		
MW-10 (BH-33)	3790.78	DRY		strong odor	NG		18.16	3772.62	odor
MW-11 (BH-34)	3806.96	24.43	3782.53	0.25	NG		24.25	3782.71	0.48
MW-13 (BH-36)p	3801.58	p			NG		NG		
MW-14 (BH-37)	3803.61	22.55	3781.06	present	NG		22.76	3780.85	4.56
MW-16 (BH-39)	3801.04	DRY			NG		NG		
MW-17 (BH-40)	3799.55	19.11	3780.44		NG		19.17	3780.38	odor
MW-18 (BH-41)	3795.82	VE			VE		16.68	3779.14	odor
MW-19 (BH-42)	3797.21	VE			VE		VE		
MW-21 (BH-44)	3798.21	23.13	3775.08	dissolved	NG		DRY		odor
MW-22 (BH-45)	3799.20	DRY			NG		NG		
MW-26 (BH-49)	3793.01	20.78	3772.23	0.50	NG		20.76	3772.25	1.2
MW-31 (BH-55)	3791.15	DRY			NG		NG		
MW-33 (BH-57)	3802.48	20.21	3782.27	dissolved	NG		NG		
MW-35 (BH-59)	3800.81	19.81	3781.00	0.25	NG		19.86	3780.95	0.48
MW-37 (BH-60)	3795.03	20.19	3774.84	present	NG		NG		
MW-38 (BH-61)	3797.32	20.30	3777.02		NG		NG		
MW-39 (BH-62)	3796.20	18.10	3778.10		NG		NG		
MW-40 (BH-63)	3803.12	DRY			NG		NG		
MW-41 (BH-64)	3799.04	19.74	3779.30	present	NG		NG		
MW-42 (BH-65)	3804.73	22.89	3781.84		NG		NG		
MW-43 (BH-66)	3802.05	21.18	3780.87		NG		NG		
MW-44 (BH-67)	3804.14	21.58	3782.56		NG		NG		
MW-45 (BH-68)	3808.68	21.47	3787.21		NG		21.52	3787.16	
MW-46 (BH-69)	3805.54	19.87	3785.67		NG		NG		
MW-47 (BH-70)	3805.09	DRY			NG		NG		
MW-49 (BH-72)	3805.61	21.93	3783.68		NG		NG		
MW-50 (BH-73)	3813.35	26.43	3786.92		NG		NG		
MW-54 (BH-80)	3823.86	46.73	3777.13		NG		46.57	3777.29	
MW-55 (BH-81)	3794.40	30.76	3763.64		NG		30.99	3763.41	
MW-56 (BH-82)	3782.45	DRY			NG		DRY		odor
MW-61 (BH-87)	3816.20	NG			NG		35.29	3780.91	
MW-65 (BH-91)	3763.31	56.81	3706.50		NG		56.75	3706.56	
MW-69 (BH-95)	3805.11	41.26	3763.85	present	NG		43.55	3761.56	FP
Sump 4	NS	NG			NG		10.10		
Sump 9A	NS	NG			NG		10.75		odor
Sump A11	3802.65	NG			NG		DRY		
Sump 16	NS	NG			NG		DRY		
Sump 16A	3785.14	NG			NG		DRY		
Sump 16B	3785.90	NG			NG		DRY		
Sump 19	3790.70	NG			NG		NG		
Sump 21A	3793.04	NG			NG		11.90	3781.14	
Stock well (SE1/4 Sec. 13)	3779.76	NG			NG		19.30	3760.46	
Monthly Rainfall (in)		0.78			0.53		0.23		

p = Pump present in well; unable to measure
VE = Vapor Extraction Well
NG = Not Gauged

AMSL = Above Mean Sea Level
FP = Free Product (condensate) being recovered
NS = Not Surveyed

TABLE 2
INDIAN BASIN REMEDIATION PROJECT
HISTORICAL SUMMARY
LOWER QUEEN BENZENE CONCENTRATIONS VS TIME
FOURTH QUARTER 1993

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise									
WELL	SEP 1991	DEC 1991	APR 1992	JUL 1992	OCT 1992	JAN 1993	APR 1993	JUL 1993	OCT 1993	NOV 1993
MW-57	1600	350	150	948**	15.1*	21*	8*	6*	<0.5	NS
MW-58	40	90	202**	178**	190*	192*	55*	25*	50*	NS
MW-59	540	420	40.4**	268**	98.8*	26*	10*	FP	10*	NS
MW-60	33	<1	3.5**	19**	31.7*	138*	17*	<1	<0.5	NS
MW-61A	190	10	5.0**	359**	470.1*	585*	2821*	FP	FP	NS
MW-62	2200	1400	257.5**	357**	212.3*	78*	33*	98*	10*	NS
MW-63	<1	<1	4.1**	12**	4.3*	12*	7*	4*	14*	NS
MW-64	150	130	233**	115**	14	15*	5*	2	18*	<4
MW-65A	680	150	25.3**	413**	10.6*	3*	4*	<1*	7*	NS
MW-66	<1	<1	3.3**	8**	12.1*	3*	<3*	8*	13*	<4
MW-67	280	320	4.3*	103**	2.6*	8*	7*	7*	<0.5	NS
MW-68	240	1900	1865**	160**	2208.2**	376*	1890*	150	374*	NS
MW-70	<1	<1	1.7**	<1	10.7*	<3*	9*	<1*	25*	<4
MW-71	NI	NI	NI	NI	NI	NI	NI	NI	8*	<4
MW-72	NI	NI	NI	NI	NI	NI	NI	NI	FP	FP
SW-1	<1	<1	5*	17.5*	15.7*	6*	<1	<1	<0.5	<0.5
SW-2	<1	<1	7.9*	7*	69.4*	47*	4	NS	NS	NS

* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.

FP = Free Product (Condensate)
NS = Not Sampled
NI = Not Installed

TABLE 3
HISTORICAL SUMMARY OF BENZENE IN SHALLOW ZONE GROUNDWATER
FOURTH QUARTER 1993

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise								
WELL	SEP 1991	DEC 1991	APR 1992	JUL 1992	OCT 1992	JAN 1993	APR 1993	JUL 1993	OCT 1993
MW-1 (BH-14)	250	200	NS	NS	NS	NS	NS	DRY	DRY
MW-2 (BH-23)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-3 (BH-24)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-4 (BH-26)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-5 (BH-28)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-6 (BH-29)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-7 (BH-30)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-8 (BH-31)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-9 (BH-32)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-10 (BH-33)	2300	2300	1780**	1842**	2100	NS	NS	DRY	DRY
MW-11 (BH-34)	3000	3800	3087**	2199**	2942*	2746*	FP	FP	FP
MW-12 (BH35)	3800	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-13 (BH-36)	3100	3000	3492**	2708**	NS	NS	PUMP	PUMP	PUMP
MW-14 (BH-37)	5100**	NS	NS	NS	NS	NS	PUMP	PUMP	FP
MW-15 (BH-38)	5100	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-16 (BH-39)	1700	NS	NS	NS	NS	NS	514*	DRY	DRY
MW-17 (BH-40)	2000	NS	NS	NS	NS	NS	1500	DRY	BDDS
MW-18 (BH-41)	4300	NS	2639**	2700	3300	NS	NS	DRY	VE
MW-19 (BH-42)	4700	NS	3195**	3000	3032*	NS	3926*	DRY	VE
MW-20 (BH-43)	110	NS	NS	NS	NS	NS	NS	DRY	VE
MW-21 (BH-44)	1000	1100	NS	NS	NS	NS	114*	FP	NS
MW-22 (BH-45)	4	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-23 (BH-46)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-24 (BH-47)	3400	NS	NS	4353**	NS	NS	NS	DRY	DRY
MW-25 (BH-48)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-26 (BH-49)	3100	3000	NS	2000	1992*	1708*	861*	FP	FP
MW-27 (BH-50)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-28 (BH-52)	2200	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-29 (BH-53)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-30 (BH-54)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-31 (BH-55)	<1	NS	NS	332**	9*	NS	NS	DRY	DRY
MW-32 (BH-56)	200	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-33 (BH-57)	6300	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-34 (BH-58)	2500	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-35 (BH-59)	5700	NS	NS	NS	NS	NS	NS	FP	FP
MW-36 (BH-21)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-37 (BH-60)	150	NS	NS	NS	NS	NS	NS	27*	BDDS
MW-38 (BH-61)	15	15	51**	37*	166**	NS	NS	DRY	BDDS
MW-39 (BH-62)	880	NS	NS	NS	NS	14	29*	24*	BDDS
MW-40 (BH-63)	NS	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-41 (BH-64)	200	170	NS	NS	NS	NS	NS	22*	BDDS
MW-42 (BH-65)	<1	<1	NS	NS	NS	NS	NS	NS	BDDS
MW-43 (BH-66)	320	NS	NS	NS	NS	NS	NS	25*	BDDS
MW-44 (BH-67)	59	NS	10**	97**	12	14	7*	6*	3*
MW-45 (BH-68)	<1	<1	NS	NS	NS	NS	NS	<3*	<3*
MW-46 (BH-69)	140	25	NS	NS	NS	NS	NS	NS	BDDS
MW-47 (BH-70)	2600	2200	NS	NS	NS	NS	NS	DRY	DRY
MW-48 (BH-71)	<1	<1	NS	47**	NS	NS	NS	DRY	DRY
MW-49 (BH-72)	35	NS	NS	NS	NS	NS	NS	210*	68*
MW-50 (BH-73)	<1	<1	4**	4**	8*	8*	<1	<3*	9*
MW-51 (BH-74)	800	<1	NS	NS	NS	NS	NS	DRY	DRY
MW-52 (BH-75)	<1	NS	NS	5**	NS	NS	NS	DRY	DRY
MW-53 (BH-77)	<1	NS	NS	NS	NS	NS	NS	DRY	DRY
MW-54 (BH-80)	<1	<1	9**	8**	62*	14*	10*	<3*	17*
MW-55 (BH-81)	940	400	296**	483**	215*	390	412*	625*	581*
MW-56 (BH-82)	2200	1000	NS	1114**	1026*	1128*	VE	DRY	DRY
MW-61 (BH-87)	<1	NS	NS	NS	NS	NS	NS	NS	NS
MW-65 (BH-91)	<1	NS	NS	NS	NS	NS	NS	<3*	BDDS
MW-69 (BH-95)	2400	2100	NS	568*	1598*	1284*	FP	FP	FP
SUMP A-10	FP	FP	FP	FP	FP	FP	FP	DRY	DRY
SUMP A-11	1400	2900	3033**	1258**	2815*	NS	NS	DRY	DRY
SUMP A-16	240	2000	1233**	1495**	632*	741**	707*	DRY	DRY
U. Indian Hills Spring W.	<1	<1	<1	<1	<1	<1	<1	<1	<1

Bolded Italicized well numbers = Designated wells for quarterly sampling in Marathon Treatment Plan (March 1992)

DRY = Dry well
BDDS = Bailed Dry During Sampling
* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.

FP = Free Product (condensate)
NS = Not Sampled.
VE = Vapor Extraction well

TABLE 4

RANCHER WELL GROUNDWATER AND SPRING WATER SAMPLE RESULTS

FOURTH QUARTER 1993

	1993														
	Oct-14					Nov-10					Dec-6				
WELL/ SPRING	Benzene	Toluene	Ethylbenzene	Xylene	Chloride	Benzene	Toluene	Ethylbenzene	Xylene	Chloride	Benzene	Toluene	Ethylbenzene	Xylene	Chloride
Lyman (#1)	ND	ND	ND	ND	14.6	ND	ND	ND	ND	482	ND	ND	ND	ND	14
Upper Indian Hills Spring West (#2)	ND	ND	ND	ND	10.3	ND	ND	ND	ND	493	ND	ND	ND	ND	10.7
Biebelle (#3)	ND	ND	ND	ND	10.4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Benzene, Toluene, Ethylbenzene, and total Xylene concentration in ug/L.

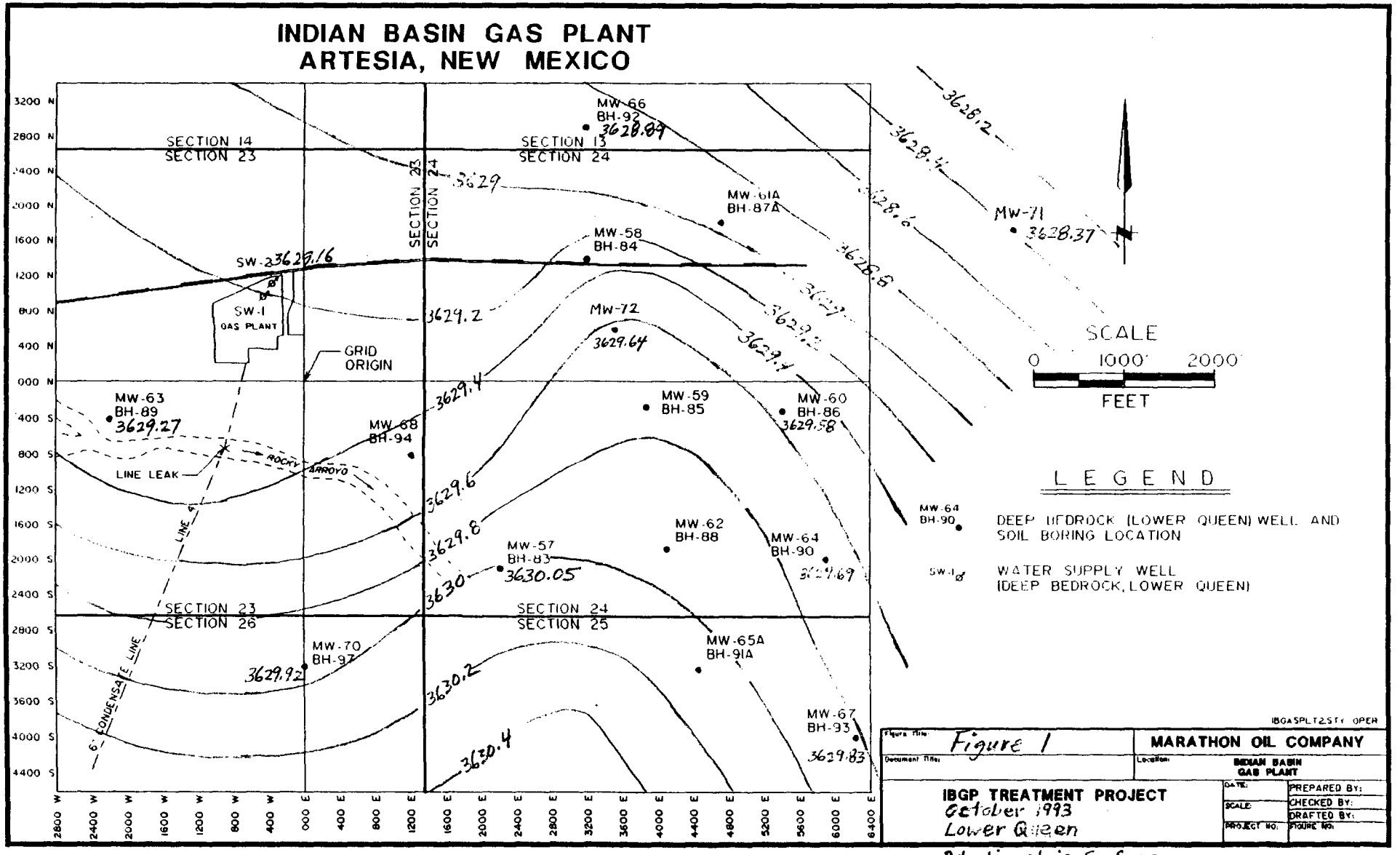
Chloride concentration in mg/L.

ND = Not Detected at method detection limit of 0.5 ug/L.

NS = Not Sampled.

FIGURES

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO



LEGEND

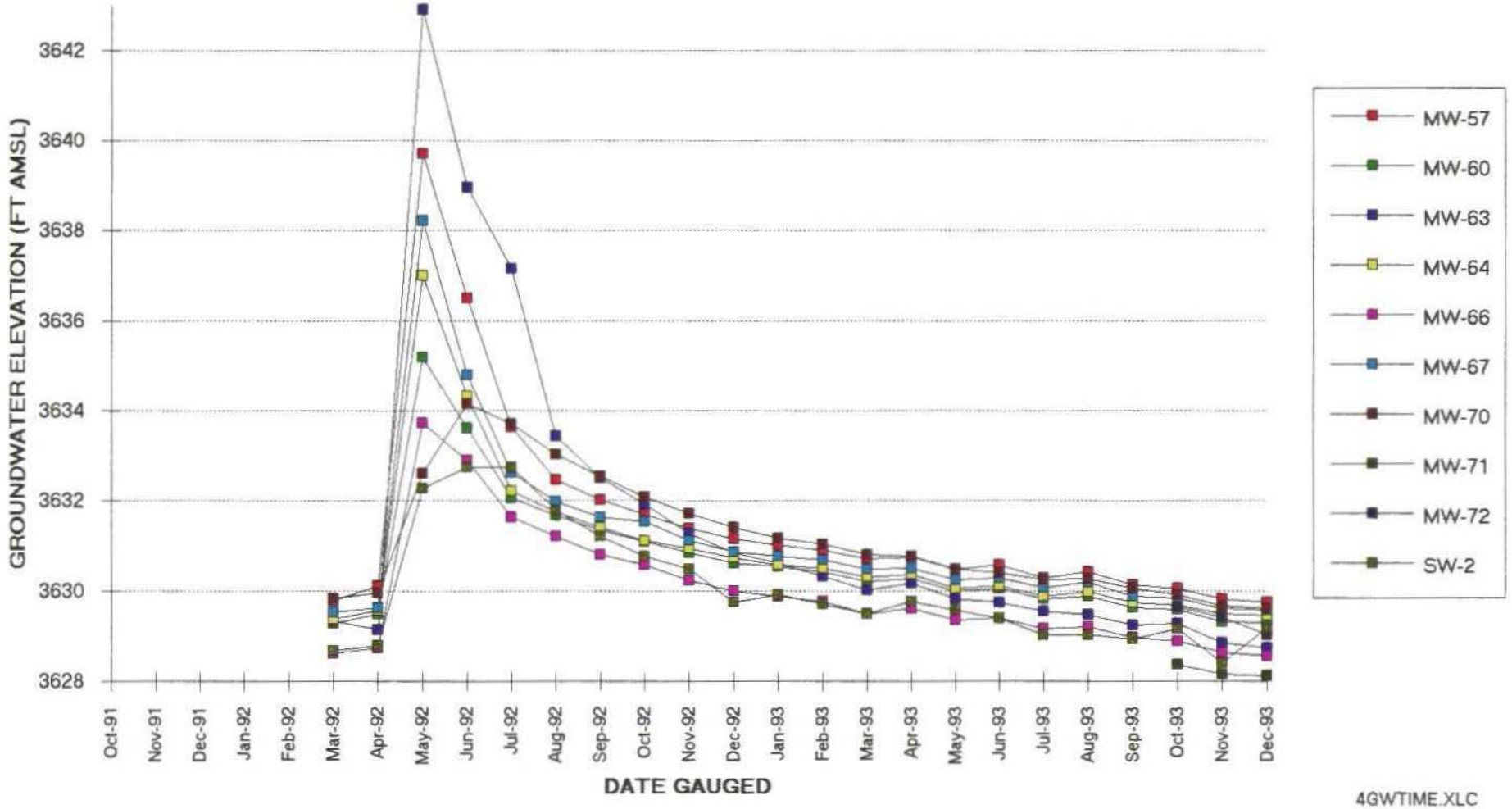
MW-64 BH-90 — DEEP BEDROCK (LOWER QUEEN) WELL AND SOIL BORING LOCATION

SW-1 — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

IBGASPLT2.STY OPER

Figure Title: Figure 1	MARATHON OIL COMPANY
Document Title:	Location: INDIAN BASIN GAS PLANT
IBGP TREATMENT PROJECT October 1993 Lower Queen Potentiometric Surface	DATE: PREPARED BY: SCALE: CHECKED BY: DRAFTED BY: PROJECT NO: FIGURE NO:

FIGURE 2. LOWER QUEEN GROUNDWATER ELEVATION VS. TIME



4GWTIME.XLC

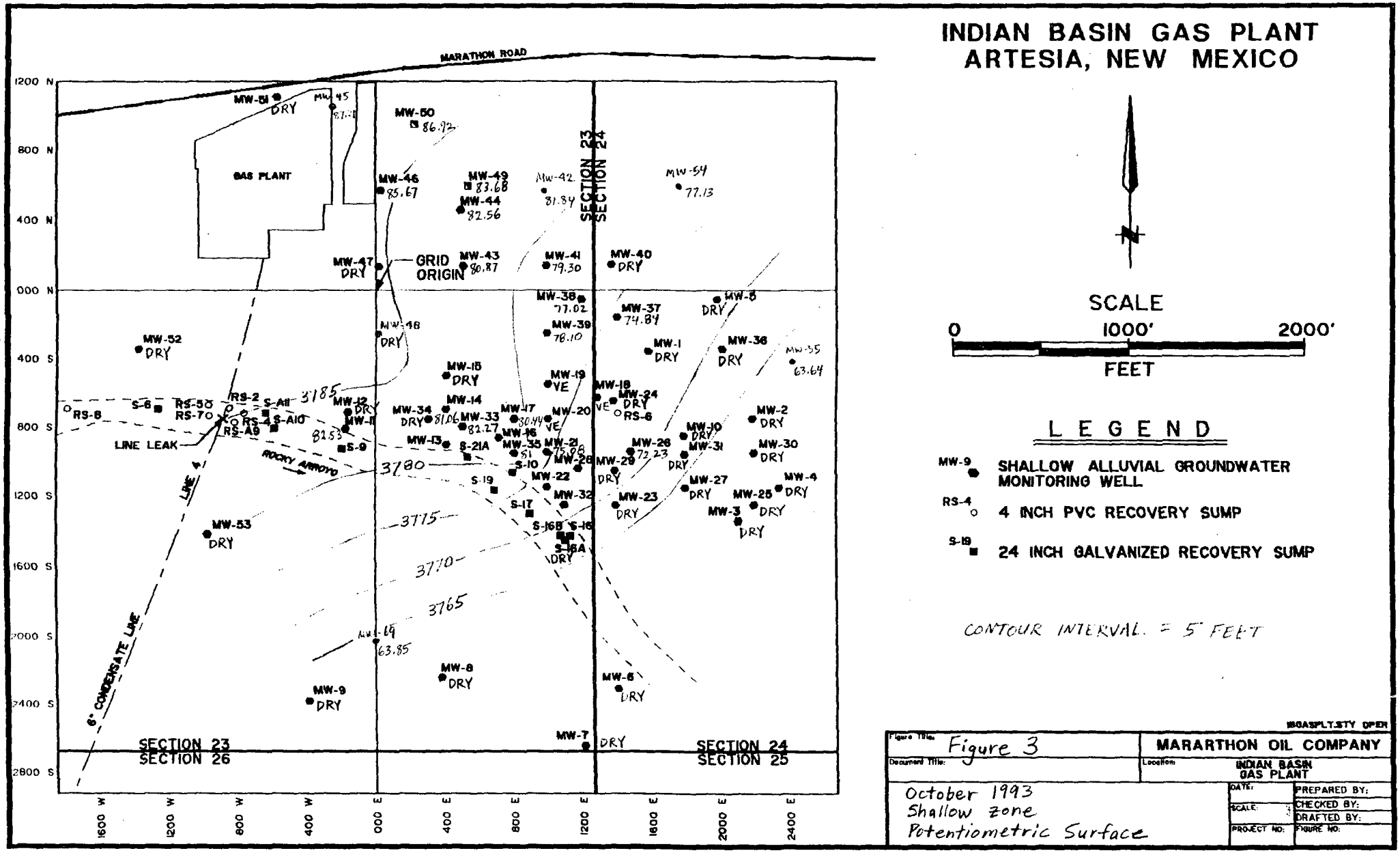
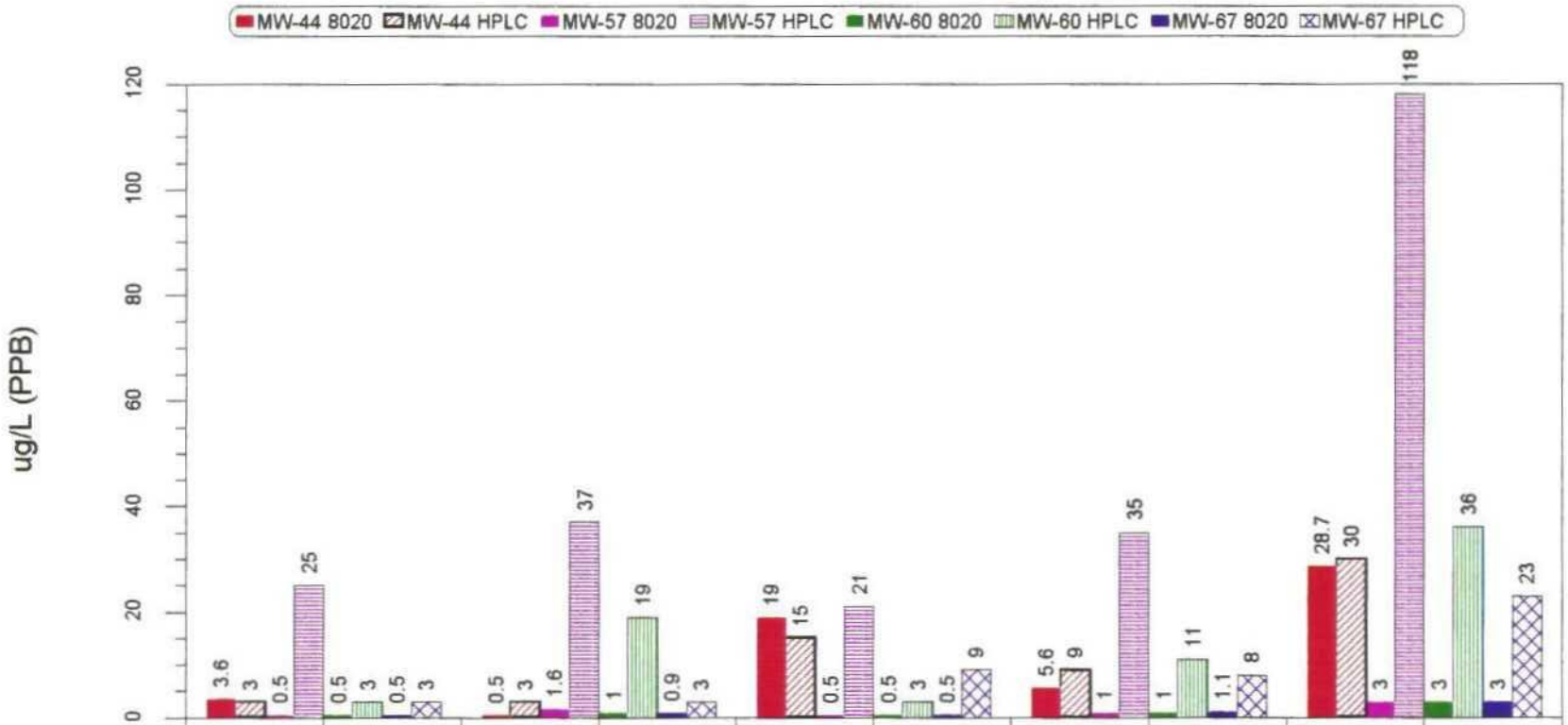

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO
MARATHON ROAD
GAS PLANT
GRID ORIGIN
SECTION 23
SECTION 24
SECTION 26
SECTION 25
LINE LEAK
ROCKY ARROYO
6" CONDENSATE LINE
3185
3180
3175
3170
3165
SCALE
0
1000'
2000'
FEET
LEGEND
MW-9 SHALLOW ALLUVIAL GROUNDWATER MONITORING WELL
RS-4 4 INCH PVC RECOVERY SUMP
S-19 24 INCH GALVANIZED RECOVERY SUMP
CONTOUR INTERVAL = 5' FEET
Figure 3
MARARTHON OIL COMPANY
INDIAN BASIN GAS PLANT
October 1993
Shallow zone
Potentiometric Surface

FIGURE 4

OCTOBER 1993, FOURTH QUARTER LABORATORY RESULTS
CORE LAB EPA METHOD 8020 VS MARATHON HPLC ANALYSIS COMPARISON

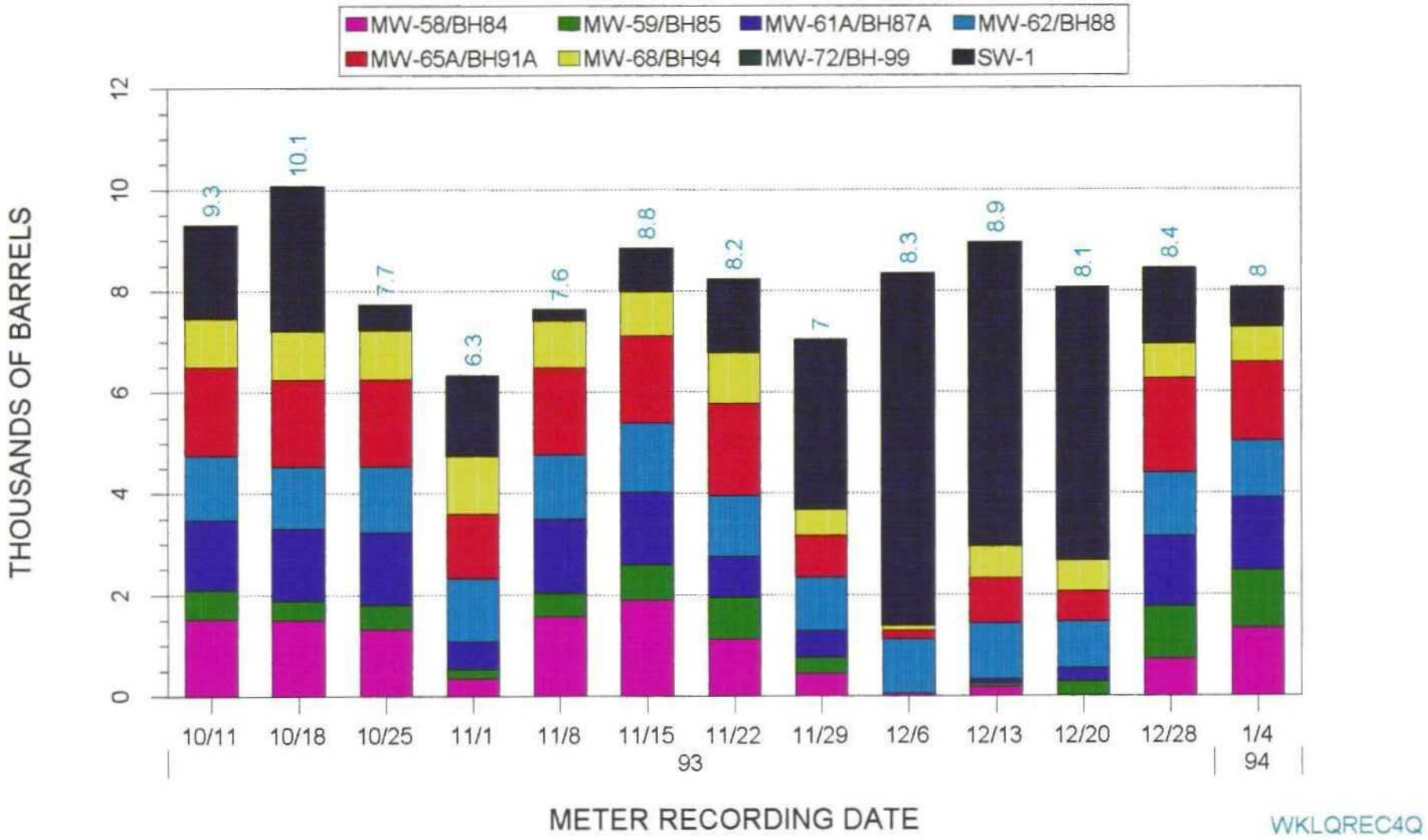


	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	TOTAL BTEX
MW-44 8020	3.6	0.5	19	5.6	28.7
MW-44 HPLC	3	3	15	9	30
MW-57 8020	0.5	1.6	0.5	1	3
MW-57 HPLC	25	37	21	35	118
MW-60 8020	0.5	1	0.5	1	3
MW-60 HPLC	3	19	3	11	36
MW-67 8020	0.5	0.9	0.5	1.1	3
MW-67 HPLC	3	3	9	8	23

ANALYTES

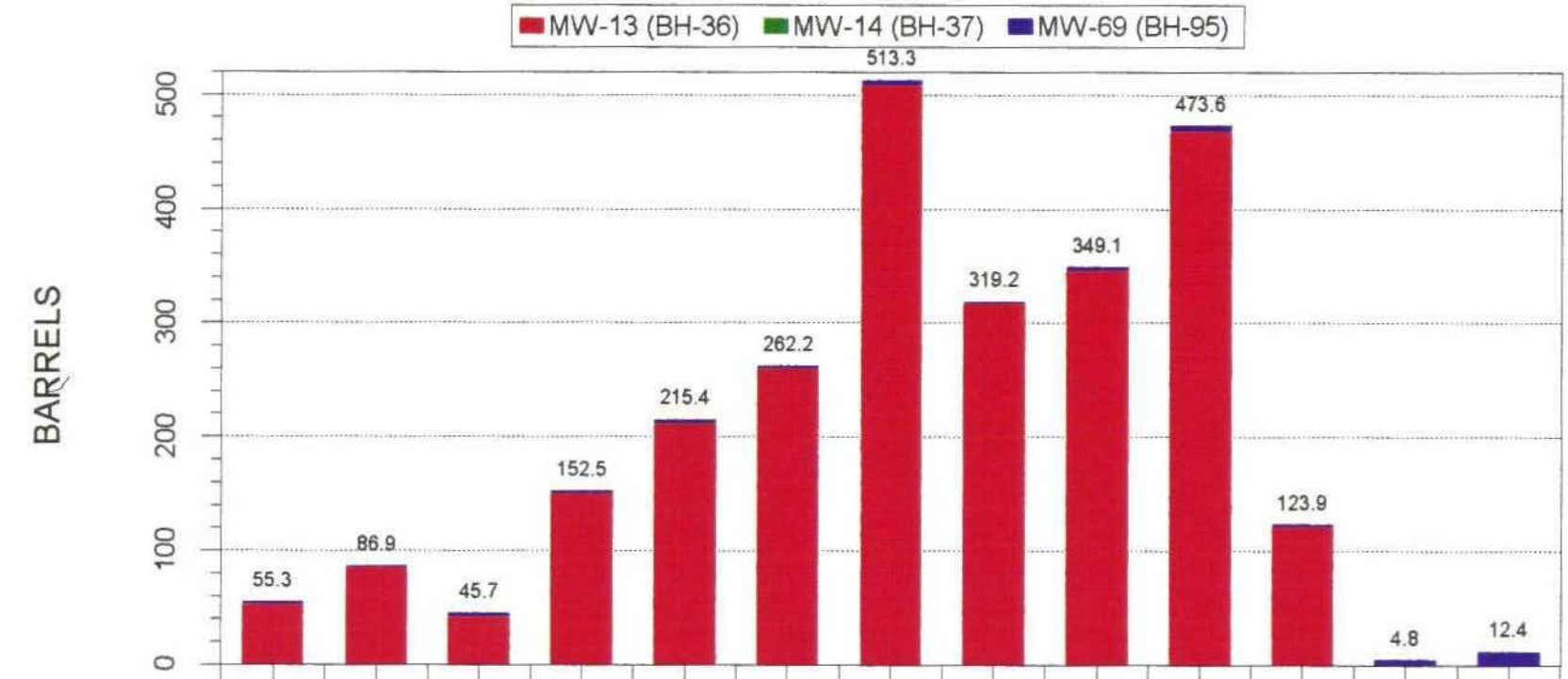
HPLC = HIGH PERFORMANCE LIQUID CHROMOTOGRAPHY

FIGURE 5
WEEKLY LOWER QUEEN FLUID RECOVERY
FOURTH QUARTER 1993



WKLQREC4Q

FIGURE 6
WEEKLY SHALLOW FLUID RECOVERY FOURTH QUARTER 1993

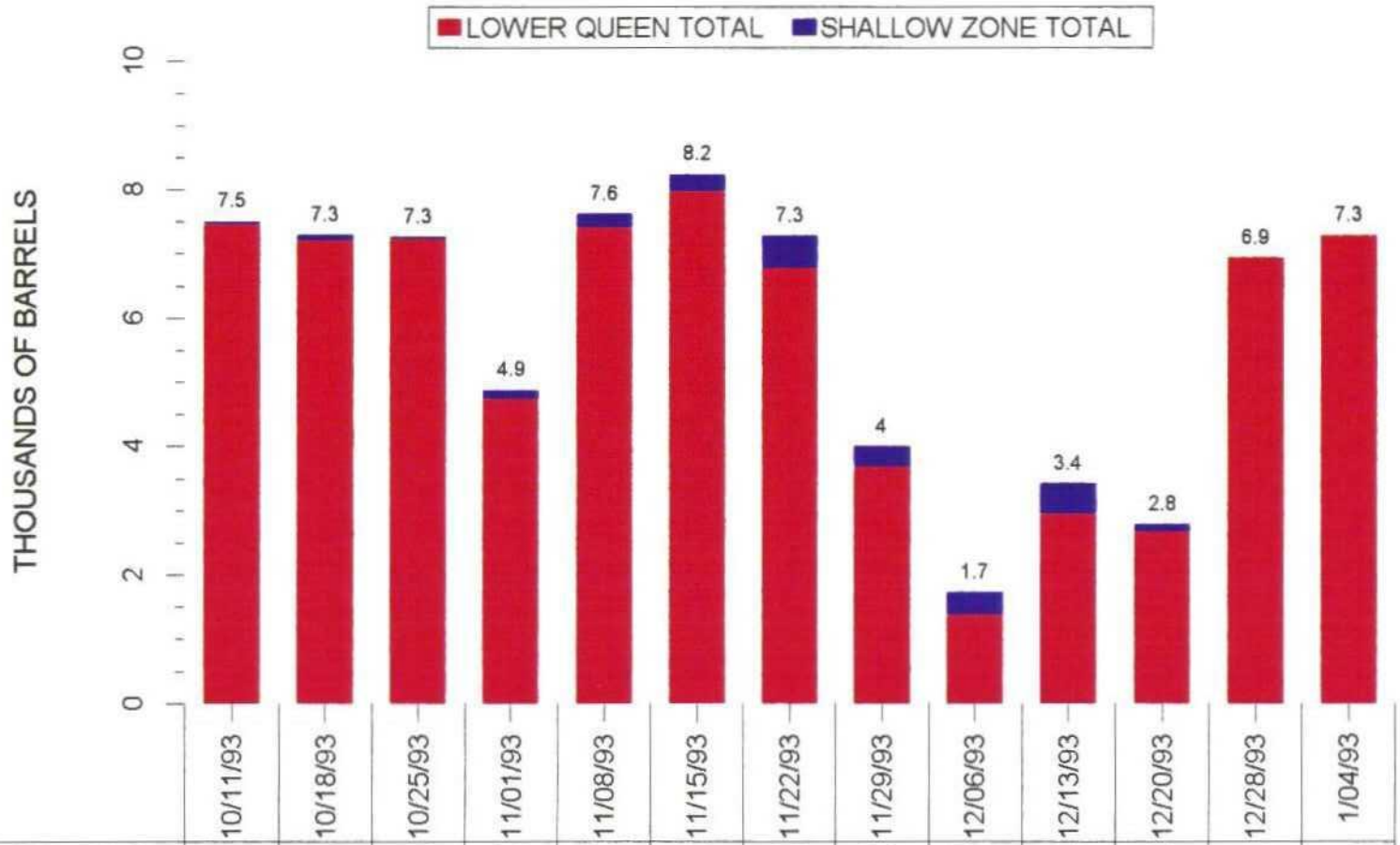


	10/11/93	10/18/93	10/25/93	11/1/93	11/8/93	11/15/93	11/22/93	11/29/93	12/6/93	12/13/93	12/20/93	12/28/93	1/4/94
MW-69 (BH-95)	2.8	1.5	3.6	2.1	3.9	2.1	4.4	1.8	3.4	5.2	3.1	4.5	12.4
MW-14 (BH-37)	0	0	0	0	0	0	0	0	0	0	0	0	0
MW-13 (BH-36)	52.5	85.4	42.1	150.4	211.5	260.1	508.9	317.4	345.7	468.4	120.8	0.3	0

METER RECORDING DATE

WKSHREC4Q

FIGURE 7
WEEKLY TOTAL FLUID RECOVERY
FOURTH QUARTER 1993



	10/11/93	10/18/93	10/25/93	11/01/93	11/08/93	11/15/93	11/22/93	11/29/93	12/06/93	12/13/93	12/20/93	12/28/93	1/04/93
SHALLOW ZONE TOTAL	0.1	0.1	0	0.2	0.2	0.3	0.5	0.3	0.4	0.5	0.1	0	0
LOWER QUEEN TOTAL	7.5	7.2	7.2	4.7	7.4	8	6.8	3.7	1.4	3	2.7	6.9	7.3

METER RECORDING DATE

WKREC4Q

APPENDIX A

OCTOBER 1993 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY

SWL SOUTHWESTERN LABORATORIES

1703 West Industrial Avenue * P.O. Box 2150, Midland, Texas 79702 * 915/683-3349

Client Marathon Oil Company
P.O. Box 552
Midland, Texas 79702

Attn: Bob Menzie

Client No. 26546001
Report No. M3-11-023
Report Date 11/17/93 16:56

Project Indian Basin

Date Sampled 10/14/93

Sampled By SwL Field Services

Sample Type Sampling

Transported by SwL Field Services

P.O. # _____

Date Received 10/14/93

Lab No.	Sample Identification
M3-11-023-01	Indian Basin Gas Plant

SOUTHWESTERN LABORATORIES

Reviewed By

ALLAN B. JOHNSTON

SWL

November 29, 1993

Mr. Bob Menzie
Marathon Oil Company
P. O. Box 552
Midland, TX 79702

Re: Indian Basin Remediation Project

Dear Mr. Menzie:

On Tuesday, October 12, 1993, at 7:00 a.m., Southwestern Laboratories began the sampling for the third quarter at the Indian Basin Gas Plant. The sampling was completed on Thursday, October 15, 1993, at 12:30 pm. During the three day event, a total of 28 wells were examined and 22 wells were sampled, 10 by the Grundfos pump. The sampling order was:

Tuesday, October 12, 1993

MW-70
MW-63
MW-71
MW-66
Equipment Blank #1

Wednesday, October 13, 1993

MW-64
MW-60
MW-67
MW-57
MW-55
MW-54
Equipment Blank #2

Thursday, October 14, 1993

MW-45
MW-49
MW-44
MW-50
MW-43
MW-41
MW-39

On Friday, October 15, 1993, the samples were shipped to PTC and Core Laboratories for Saturday delivery. The samples shipped to PTC were:

MW-39	MW-55	MW-65A
MW-41	MW-57	MW-66
MW-43	MW-58	MW-67
MW-44	MW-59	MW-70
MW-45	MW-60	MW-71

MW-49	MW-62	MW-68
MW-50	MW-63	Equipment Blank #1
MW-54	MW-64	Equipment Blank #2

The Samples Shipped to Core Laboratories were:

MW-41	SW-1
MW-44	No. 1 Lyman
MW-57	No. 2 Arroyo
MW-60	No. 3 Biebble
MW-67	Trip Blank

If you have any questions, please feel free to contact me at (916) 683-3340.

Sincerely,

Southwestern Laboratories - Midland EAS

Allan B. Johnston
Project Manager

ABJ:jjc

SOUTHWESTERN LABORATORIES, INC.

LOWER QUEENS WELLS
Indian Basin Gas Plant
Artesia, N.M.

Well I.D.	Well Depth TOC (ft)	Water Level TOC (ft)	Water Column (ft)	Purge Volume (gal)	Free Product (Y/N)	Temperature °C	pH	Conductivity µmhos/cm @ 25° C	Date Sampled	Time Sampled	Remarks
MW-57	177.20	159.67	17.53	34.33	N	21	6.83	794	10/13/93	15:45	
MW-58	218.03				N	19	6.91	1126	10/13/93	08:58	(a)
MW-59	211.29				N	20	7.03	1057	10/13/93	09:10	(a)
MW-60	223.00	188.74	34.26	67.10	N	22	6.94	1060	10/13/93	11:45	
MW-61A	215.67				Y						
MW-62	224.69				N	21	6.86	1308	10/13/93	10:15	(a)
MW-63	220.49	198.12	22.37	43.81	N	23	7.07	594	10/12/93	11:40	
MW-64	201.89	171.30	30.59	59.91	N	19	6.99	983	10/13/93	09:15	
MW-65A	168.56				N	20	6.97	903	10/13/93	09:56	(a)
MW-66	235.18	202.69	32.49	63.64	N	23	6.88	1082	10/12/93	18:05	
MW-67	165.77	138.76	27.01	52.90	N	21	6.84	688	10/13/93	14:15	
MW-68	203.43				N	19	6.99	725	10/13/93	08:35	(a)
MW-70	225.07	195.60	29.47	57.72	N	22	7.03	640	10/12/93	09:40	
MW-71	227.17	151.83	75.34	147.56	N	24	7.16	825	10/12/93	15:55	
MW-72											
SW-1	255.00										
SW-2	292.00										

(a) Sampled by R.M. Gray

SOUTHWESTERN LABORATORIES, INC.

SHALLOW WELLS
Indian Basin Gas Plant
Artesia, N.M.

Well I.D.	Well Depth TOC (ft)	Water Level TOC (ft)	Water Column (ft)	Purge Volume (gal)	Free Product (Y/N)	Temperature °C	pH	Conductivity µmhos/cm @ 25° C	Date Sampled	Time Sampled	Remarks
MW-17	19.75	19.11	0.64	0.3							(b) (c)
MW-37	20.83	20.19	0.64	1.2							(b) (c)
MW-38	20.57	20.30	0.27	0.5							(b) (c)
MW-39	20.54	18.10	2.44	4.8	N	23	7.28	2230	10/14/93	12:20	(b)
MW-41	24.04	19.74	4.30	8.4	N	21	7.19	2580	10/14/93	12:15	(b)
MW-42	23.59	22.89	0.70	0.3							(b) (c)
MW-43	24.55	21.18	3.37	6.6	N	22	7.19	2700	10/14/93	12:05	(b)
MW-44	25.24	21.58	3.66	7.1	N	21	6.98	3230	10/14/93	10:25	
MW-45	26.62	21.47	5.15	2.5	N	20	7.02	5490	10/14/93	08:30	
MW-46	20.24	19.87	0.37	0.7							(b) (c)
MW-49	25.91	21.93	3.98	1.9	N	21	6.72	5120	10/14/93	09:00	
MW-50	37.15	26.43	10.72	5.1	N	21	6.87	5480	10/14/93	11:50	
MW-54	78.15	46.73	31.42	61.3	N	20	6.80	3380	10/14/93	18:30	
MW-55	66.32	30.76	35.56	69.3	N	21	6.91	2750	10/14/93	17:10	
MW-65	57.69	56.81	0.88	1.7							(b) (c)

(b) Bailed Dry
(c) No Recovery in 2 hours

APPENDIX B

OCTOBER 1993 LABORATORY REPORTS - GROUNDWATER

Indian Basin BTEX Analysis Results by HPLC (10/93)

Sample	(ppb) Benzene	(ppb) Toluene	(ppb) o-Xylene	(ppb) Ethylbenzene	(ppb) m,p-Xylene	(ppb) Total Xylenes	(ppb) Total BTEX	(mg/L) Chloride
BH-62/MW-39	19	23	3	ND	7	10	52	277
BH-64/MW-41	29	6	8	16	4	10	61	282
BH-66/MW-43	10	11	ND	ND	ND	ND	21	230
BH-67/MW-44	3	ND	ND	15	9	9	27	599
BH-68/MW-45	ND	3	ND	ND	3	3	6	408
BH-72/MW-49	68	28	6	9	14	20	125	397
BH-73/MW-50	9	15	ND	ND	ND	ND	24	292
BH-60/MW-54	17	35	12	16	12	24	92	122
BH-61/MW-55	581	27	8	102	12	18	726	287
BH-63/MW-57	25	37	9	21	26	35	118	87
BH-64/MW-58	50	21	9	212	546	555	836	59
BH-65/MW-59	10	13	9	89	424	433	545	56
BH-66/MW-60	3	19	5	ND	6	11	33	8
BH-68/MW-62	19	20	10	20	22	32	91	181
BH-69/MW-63	14	48	19	11	20	39	112	4
BH-60/MW-64	18	12	21	ND	50	71	101	8
BH-61A/MW-65A	7	3	ND	ND	ND	ND	10	17
BH-62/MW-66	13	60	6	4	29	29	106	7
BH-63/MW-67	ND	3	ND	9	8	8	20	6
BH-64/MW-68	374	628	258	285	2140	2398	3685	27
BH-67/MW-70	25	19	7	19	11	18	81	11
BH-7/MW-71	8	5	4	4	12	16	33	15
Equip Blank No. 1	ND	30	4	4	8	12	46	NS
Equip Blank No. 2	18	34	3	3	9	6	61	NS
Lab Blank	ND	7	ND	ND	3	3	10	NS

* Notes:

ND=No detection at or below detection limit of 3 ppb.

NS=No sample available.

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/14/93
TIME SAMPLED.....: 12:15
WORK DESCRIPTION...: MW-41

LABORATORY I.D...: 932031-0001
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	264	1.0	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	8.9	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	17	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	135 *	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/14/93
TIME SAMPLED.....: 10:25
WORK DESCRIPTION...: MW-44

LABORATORY I.D...: 932031-0002
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	543	2.5	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	3.6	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	19	0.5	ug/L			
Xylenes	5.6	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	94	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/13/93
TIME SAMPLED.....: 15:45
WORK DESCRIPTION...: MW-57

LABORATORY I.D...: 932031-0003
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	73.6	0.5	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	1.6	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	1.2	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	102	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/13/93
TIME SAMPLED.....: 11:45
WORK DESCRIPTION...: MW-60

LABORATORY I.D...: 932031-0004
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	13.5	0.5	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	1.0	0.5	ug/L			
Ethyl benzene	0.5	0.5	ug/L			
Xylenes	1.0	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	96	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/13/93
TIME SAMPLED.....: 14:15
WORK DESCRIPTION...: MW-67

LABORATORY I.D...: 932031-0005
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	9.5	0.5	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	0.9	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	1.1	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	98	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: / /
TIME SAMPLED.....: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 932031-0011
DATE RECEIVED....: / /
TIME RECEIVED....: :
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	101	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International

CORE LABORATORIES

QUALITY CONTROL REPORT
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Chloride (Unfilt.)				DATE/TIME ANALYZED:11/01/93 07:00						QC BATCH NUMBER:282116
REPORTING LIMIT/DF: 0.5	UNITS:mg/L			METHOD REFERENCE :325.2 (1)						TECHNICIAN:DME
BLANK	ICB	931101	<0.5							
BLANK	CCB	931101	<0.5							
BLANK	CCB	931101	<0.5							
BLANK	CCB	931101	<0.5							
STANDARD	ICV/LCS	G930930A	48.3			50.0	97			
STANDARD	CCV	S120	118			120	98			
STANDARD	CCV	S120	118			120	98			
STANDARD	CCV	S120	116			120	97			
SPIKE	MS	932025-2	83.8					36.9	50.0	94
SPIKE	MS	932035-1	55.3					3.1	50.0	104
SPIKE	MS	932051-3	124					80.5	50.0	87
DUPLICATE	MD	932025-2	36.9	37.3	1					
DUPLICATE	MD	932035-1	3.1	3.1	0					
DUPLICATE	MD	932051-3	80.5	81.5	1					

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

QUALITY ASSURANCE REPORT
11-05-93

CUSTOMER: MARATHON OIL

File No.: 932031

VOLATILE ANALYSIS - DATE AND TIME ANALYZED SUMMARY

Laboratory Sample I.D.	Client Sample I.D.	Date/Time Sampled	Date Received	Date/Time Analyzed
932031-1	MW-41	10-14-93 1215	10-16-93	10-29-93 0404
932031-2	MW-44	10-14-93 1025	10-16-93	10-29-93 0456
932031-3	MW-57	10-13-93 1545	10-16-93	10-29-93 0549
932031-4	MW-60	10-13-93 1145	10-16-93	10-29-93 0642
932031-5	MW-67	10-13-93 1415	10-16-93	10-29-93 0735
METHOD BLANK			10-16-93	10-28-93 1914

10703 East Bethany Drive
Aurora, Colorado 80014
Tele. (303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Litton-Dresser Company

CORE LABORATORIES

QUALITY ASSURANCE REPORT
11-05-93

CUSTOMER: MARATHON OIL

File No.: 932031

SURROGATE PERCENT RECOVERY SUMMARY

Client Sample I.D.....	MW-41	MW-44	MW-57	MW-60	MW-67
Remark/Project.....					
Sample Matrix.....	Water	Water	Water	Water	Water
Laboratory Sample I.D.....	932031-1	932031-2	932031-3	932031-4	932031-5
VOLATILE ORGANIC COMPOUNDS					
1,2-Dichloroethane (d4)	107	118	103	103	112
Toluene (d8)	105	116	98	100	101
4-Bromofluorobenzene	106	111	95	95	97

Client Sample I.D.....	
Remark/Project.....	10-29-93
Sample Matrix.....	Water
Laboratory Sample I.D.....	METHOD BLANK
VOLATILE ORGANIC COMPOUNDS	
1,2-Dichloroethane (d4)	104
Toluene (d8)	97
4-Bromofluorobenzene	97

SURROGATE RECOVERIES - ACCEPTANCE CRITERION

	Water Samples	Soil Samples
VOLATILE ORGANIC COMPOUNDS		
1,2-Dichloroethane (d4)	76 - 114 %	70 - 121 %
Toluene (d8)	88 - 110 %	81 - 117 %
4-Bromofluorobenzene	86 - 115 %	74 - 121 %

10703 East Bethany Drive
Aurora, Colorado 80014
Tele. (303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories

Western Atlas International
A Unit of Dresser Company

CORE LABORATORIES

QUALITY CONTROL FOOTER

METHOD REFERENCES

(1) EPA 600/4-79-020, Methods For Chemical Analysis Of Water And Wastes, March 1983

(2) EPA SW-846, Test Methods For Evaluating Solid Waste, Third Edition, November 1986

(3) Standard Methods For The Examination Of Water And Wastewater, 17th Edition, 1989

(4) EPA 600/4-80-032, Prescribed Procedures For Measurement Of Radioactivity In Drinking Water, August 1980

(5) EPA 600/8-78-017, Microbiological Methods For Monitoring The Environment, December 1978

(6) Federal Register, July 1, 1990 (40 CFR Part 136)

(7) EPA 600/4-88-039, Methods For The Determination Of Organics Compounds In Drinking Water, December 1988

(8) U.S.G.S. Methods For The Determination Of Inorganic Substances In Water And Fluvial Sediments, Book 5, Chapter A1, 1985

(9) Federal Register, Friday, June 7, 1991, (40 CFR Parts 141 and 142)

(10) Standard Methods For The Examination Of Water And Wastewater, 16th Edition, 1985

(11) ASTM, Section 11 Water And Environmental Technology, Volume 11.01 Water (1), 1991

(12) Methods Of Soil Analysis, American Society Of Agronomy, Agronomy No. 9, 1965

(13) EPA SW-846, Test Methods For Evaluating Solid Waste, Third Edition, Revision 1, November 1990

(14) ASTM, Section 5, Petroleum Products, Lubricants, and Fossil Fuels, Volume 05.05, Gaseous Fuels, Coal and Coke

(15) EPA 600/2-78-054, Field and Laboratory Methods Applicable To Overburdens and Mine Soils, March 1978

(16) ASTM, Part 19, Soils and Rock; Building Stones, 1981

COMMENTS: Data in QA report may differ from final results due to digestion and/or dilution of sample into analytical ranges.

The "Time Analyzed" in the QA report refers to the start time of the analytical batch which may not reflect the actual time of each analysis. The "Date Analyzed" is the actual date of analysis.

NC = Not Calculable Due To Value(s) Lower Than The Detection Limit.

Analyses performed by a subcontract laboratory are indicated on the analytical and/or quality control reports under "Technician" using the following codes:

Subcontract Laboratory	Code	
Core Laboratories - Anaheim, CA	*AN	
Core Laboratories - Casper, WY	*CA	
Core Laboratories - Corpus Christi, TX	*CC	
Core Laboratories - Houston, TX	*HP	
Core Laboratories - Lake Charles, LA	*LC	
Core Laboratories - Long Beach, CA	*LB	
Other Subcontract Laboratories	*XX	Laboratory ID Provided Upon Request

* The asterisk in the "Technician" data field signifies that the analysis was performed by a subcontract laboratory.

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International

CORE LABORATORIES

EXPLANATION OF DATA FLAGS

B - This flag is used to indicate that an analyte is present in the method blank as well as in the sample. It indicates that the user should consider this when evaluating the results.

E - This data flag indicates that a sample result is an estimate because the concentration exceeded the calibration range of the instrument.

J - Indicates that a value is an estimate. It is used when a compound is determined to be present based on the mass spectral data, but at a concentration less than the practical quantitation limit of the method. This flag is also used when estimating the concentration of a tentatively identified compound.

*** -** Used to indicate matrix interference.

X - This flag refers the client to an included case narrative for additional information which may be useful in data evaluation.

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Litton / Dresser Company

CORE LABORATORIES

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Marathon Oil	PROJECT NAME/NUMBER:
SEND REPORT TO: Bob Menzie	**BILLING INFORMATION**
ADDRESS: P.O. Box 552	BILL TO:
Midland, Tx 79702	ADDRESS: SAME
PHONE: (915)687-8312	PHONE:
FAX: (915)687-8557	FAX: PO NO.:

NUMBER OF CONTAINERS

ANALYSIS / METHOD REQUEST: BTEX 8020

LAB JOB NO.

SAMPLE NO.	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	PRES.	REMARKS / PRECAUTIONS
1	MW-4i	10/14/93	12.15	H_2O	40mL vials (4)		
2	MW-44	↓	10:25	↓	↓		
3	MW-57	10/13/93	15:45				
4	MW-60	↓	11:45				
5	MW-67	↓	14:15	↓	↓		

SAMPLER: | SHIPMENT METHOD: | AIRBILL NO.:

REQUIRED TURNAROUND:* [ ] SAME DAY [ ] 24 HOURS [ ] 48 HOURS [ ] 72 HOURS [ ] 5 DAYS [ ] 10 DAYS [ ] ROUTINE OTHER

1. RELINQUISHED BY: SIGNATURE: Allan B. Johnston	DATE 10/15/93	2. RELINQUISHED BY: SIGNATURE:	DATE	3. RELINQUISHED BY: SIGNATURE:	DATE
PRINTED NAME/COMPANY: Allan B. Johnston ISW2	TIME 1600	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY: SIGNATURE: Mary Scott	DATE 10/16/93	2. RECEIVED BY: SIGNATURE:	DATE	3. RECEIVED BY: SIGNATURE:	DATE
PRINTED NAME/COMPANY: Core	TIME 915	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME

* RUSH TURNAROUND MAY REQUIRE SURCHARGE

☐ **Anaheim, California** 1250 E. Gene Autry Way, Anaheim, California 92805, (714) 937-1094

☐ **Long Beach, California** 3700 Cherry Avenue, Long Beach, California 90807, (310) 595-8401

☐ **Denver (Aurora), Colorado** 1300 S. Potomac St. - Suite 130, Aurora, Colorado 80012, (303) 751-1780

☐ **Casper, Wyoming** 420 West 1st Street, Casper, Wyoming 82601, (307) 235-5741

☐ **Houston, Texas** 10201 Westheimer, Bldg. 1-A, Houston, Texas 77042, (713) 972-6700

☐ **Houston, Texas** 8210 Mosely Road, Houston, Texas 77075, (713) 943-9776

☐ **Corpus Christi, Texas** 1733 North Padre Island Dr., Corpus Christi, Texas 78408, (512) 289-2673

☐ **Lake Charles, Louisiana** 3645 Arizona Street, Sulphur, Louisiana 70663, (318) 583-4926

SWL SOUTHWESTERN LABORATORIES

1703 West Industrial Avenue * P.O. Box 2150, Midland, Texas 79702 * 915/683-3349

Client Marathon Oil Company
P.O. Box 552
Midland, Texas 79702

Attn: Bob Menzie

Client No. 26546001
Report No. M3-11-104
Report Date 11/19/93 16:16

Project Indian Basin Gas Plant

Date Sampled 10/10/93 11/10/93

Sampled By SwL Field Services

Sample Type Water

Transported by SwL Field Services

P.O. # _____

Date Received 11/11/93

Lab No.	Sample Identification
M3-11-104-01	Initial Decon Water Well
M3-11-104-02	MW-71
M3-11-104-03	Equipment Blank #1
M3-11-104-04	MW-66
M3-11-104-05	Equipment Blank #2
M3-11-104-06	MW-64
M3-11-104-07	Equipment Blank #3
M3-11-104-08	MW-70

RBB

Reviewed By

SOUTHWESTERN LABORATORIES

ALLAN B. JOHNSTON

TEST RESULTS BY SAMPLE

Sample Description: Initial Decon Water Well Lab No: 01A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 11/10/93 10:00

Date Started	11/15/93	Analyst	RBB
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENES	< 0.004

Sample Description: MW-71 Lab No: 02A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 11/10/93 10:20

Date Started	11/15/93	Analyst	RBB
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENES	< 0.004

Sample Description: Equipment Blank #1 Lab No: 03A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 10/10/93 11:18

Date Started	11/15/93	Analyst	RBB
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENES	< 0.004

Sample Description: MW-66 Lab No: 04A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 11/10/93 12:15

Date Started	11/15/93	Analyst	RBB
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENES	< 0.004

TEST RESULTS BY SAMPLE

Sample Description: Equipment Blank #2 Lab No: 05A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 11/10/93 13:14

Date Started	11/15/93	Analyst	RBB
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENES	< 0.004

Sample Description: MW-64 Lab No: 06A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 11/10/93 14:16

Date Started	11/15/93	Analyst	RBB
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENES	< 0.004

TEST RESULTS BY SAMPLE

Sample Description: Equipment Blank #3 Lab No: 07A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 11/10/93 15:14

Date Started	11/18/93	Analyst	RBB
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENES	< 0.004

Sample Description: MW-70 Lab No: 08A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 11/10/93 16:30

Date Started	11/18/93	Analyst	RBB
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENES	0.04

889078

Page 1 of

SwL **SOUTHWESTERN LABORATORIES**

Materials, environmental and geotechnical engineering, nondestructive, metallurgical and analytical services

1703 West Industrial • P.O. Box 2150, Midland, Texas 79702 • 915/683-3349

Analysis Request and Chain of Custody Record

Project no.	Client/Project	Sample Date
	Marathon Oil Company / IBGP	11/10/93

Field Sample No./ Identification	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LAB I.D. NO.
Initial Decon Water 10:30			3 40mL	Water	HCl Ice	BTEX	
MW-71 10 20							
Equipment Blank No. 1 11.18							
MW-66 12:15							
Equipment Blank No 2 13.14							
MW-64 14:16							
Equipment Blank No. 3 15:14							
MW-70 16:30							

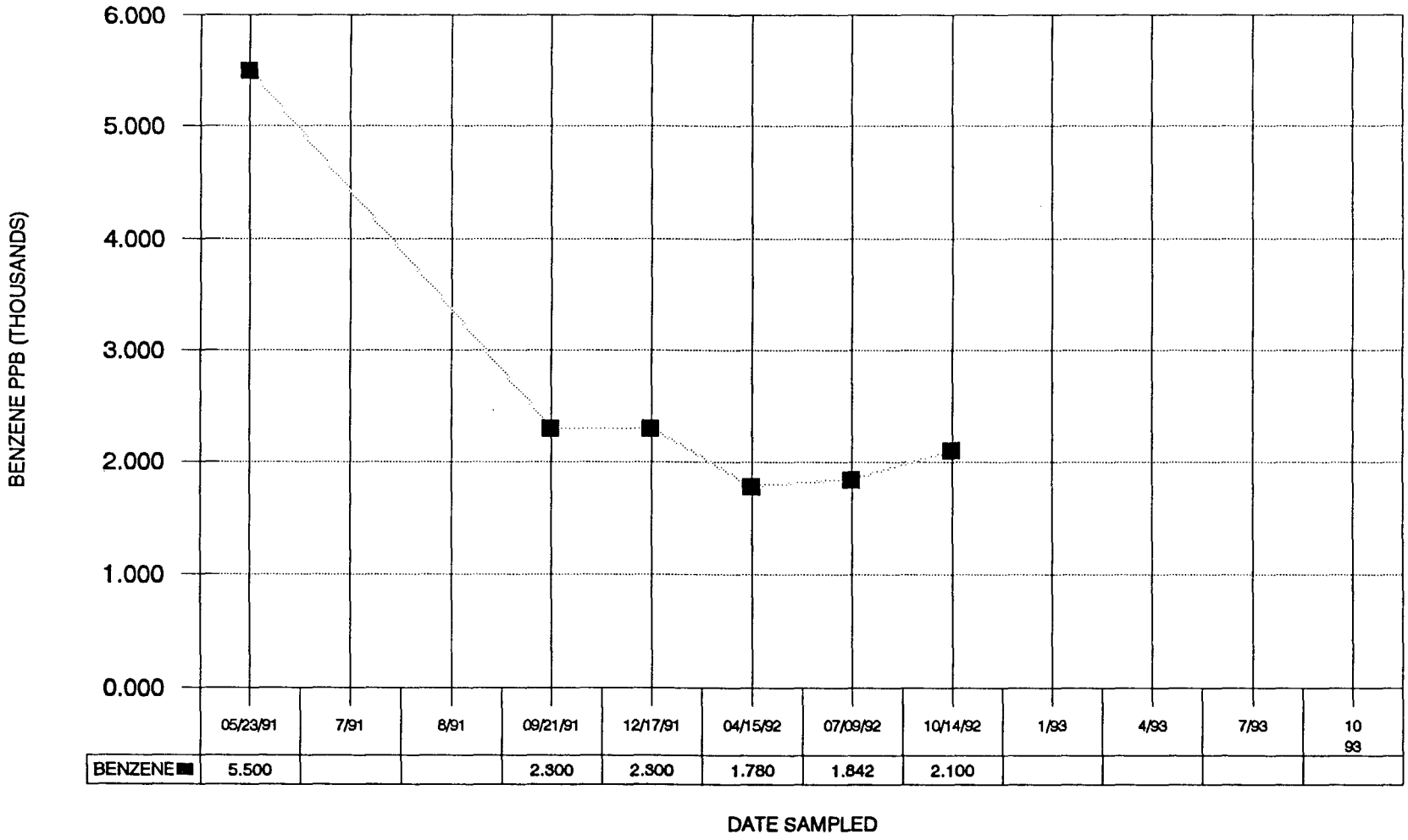
Samplers: (Print)	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	COC Seal No.
Allan Johnston Richard Brantley Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
SwL	Relinquished by: (Signature) Richard Brantley	Date: 11/11/93 Time: 8 AM	Received by Laboratory: (Signature) M. Bunch	Date: 11-11-93 Time: 8:00AM	Intact:
Results by _____ Rush Charges Authorized Yes ____ No ____	REMARKS:		Data Results To: 1. Bob Menzie 2.		Laboratory No.

APPENDIX C

BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS

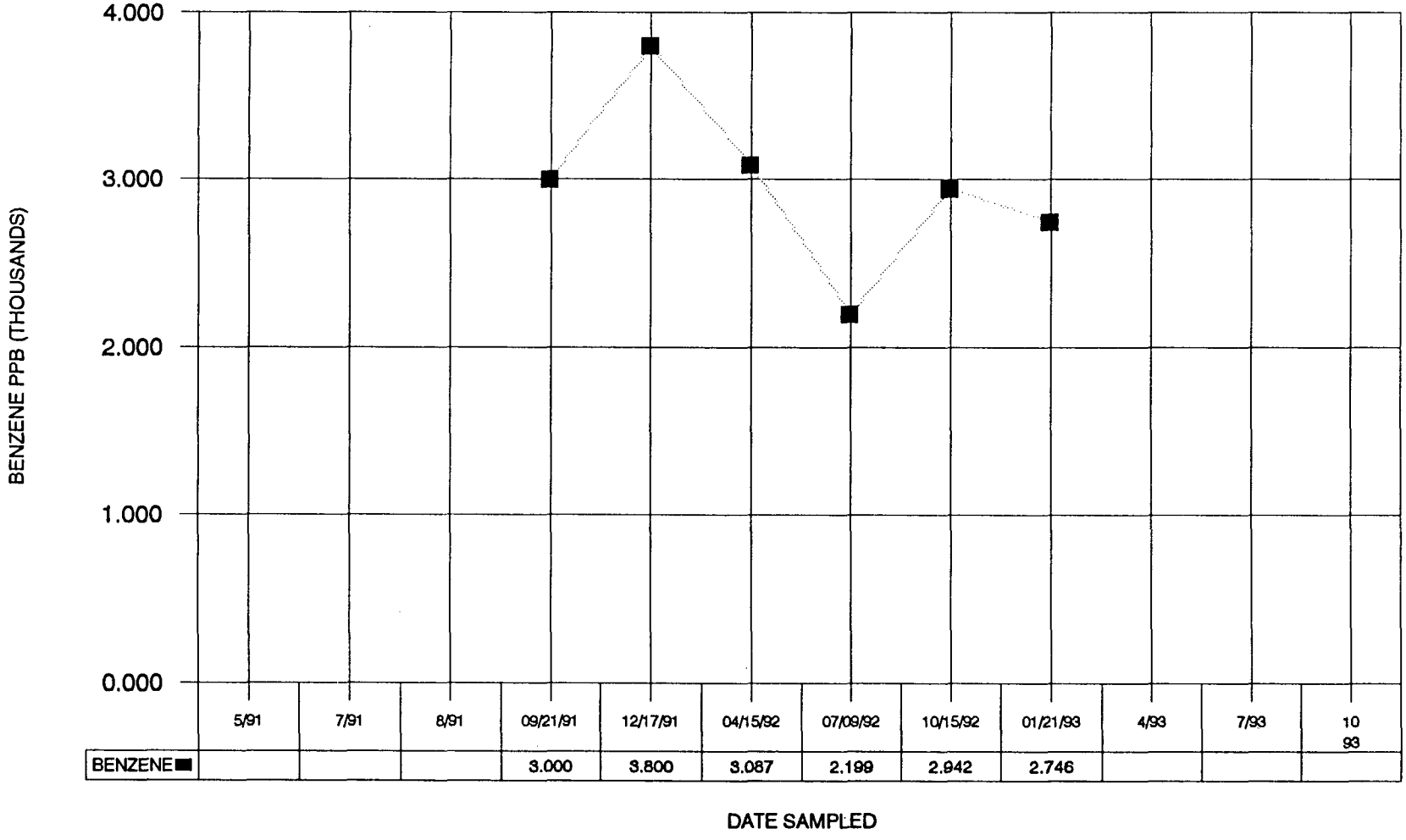
GROUNDWATER ANALYSIS DATA

MW#10 BH-33



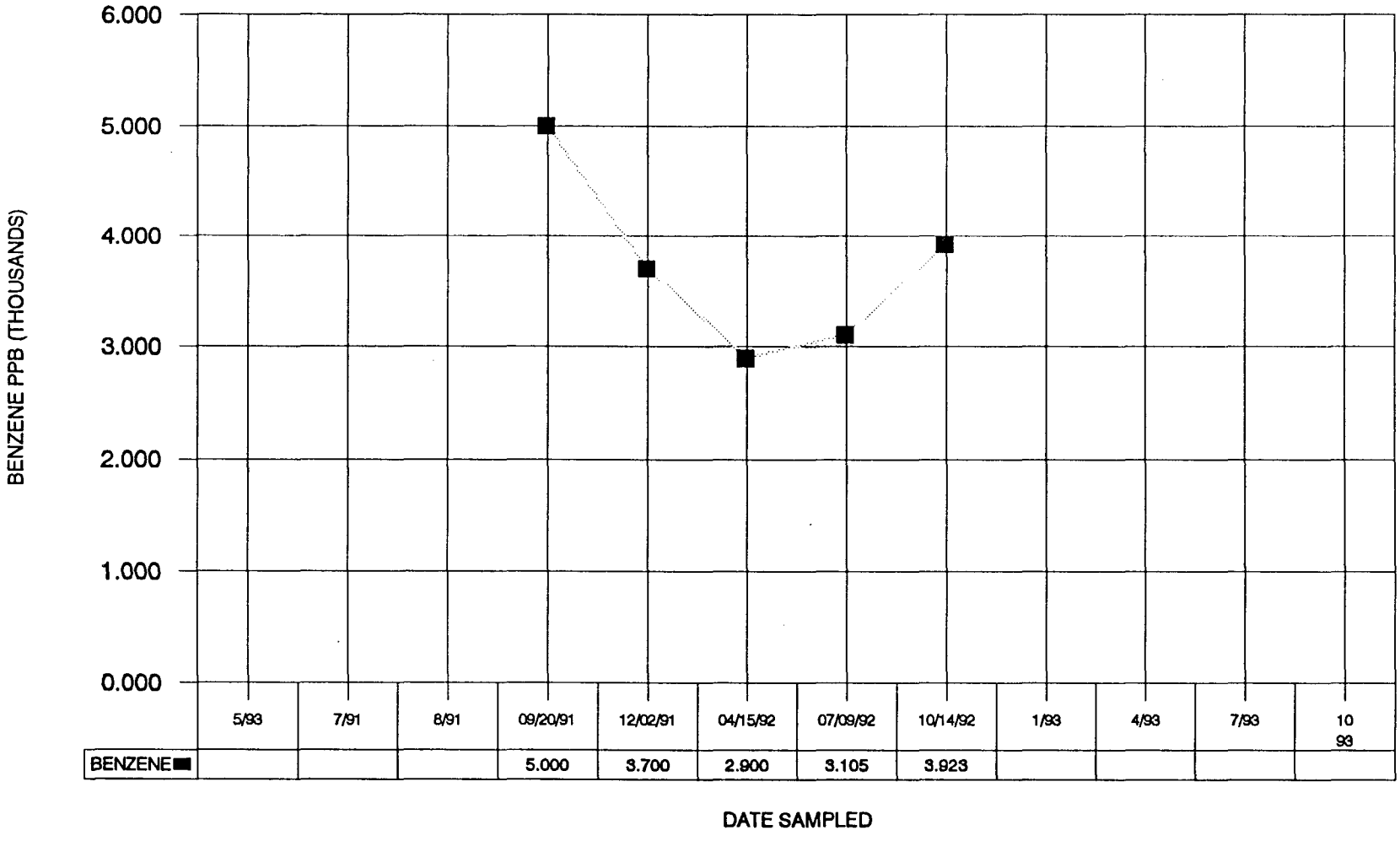
GROUNDWATER ANALYSIS DATA

MW#11 BH-34



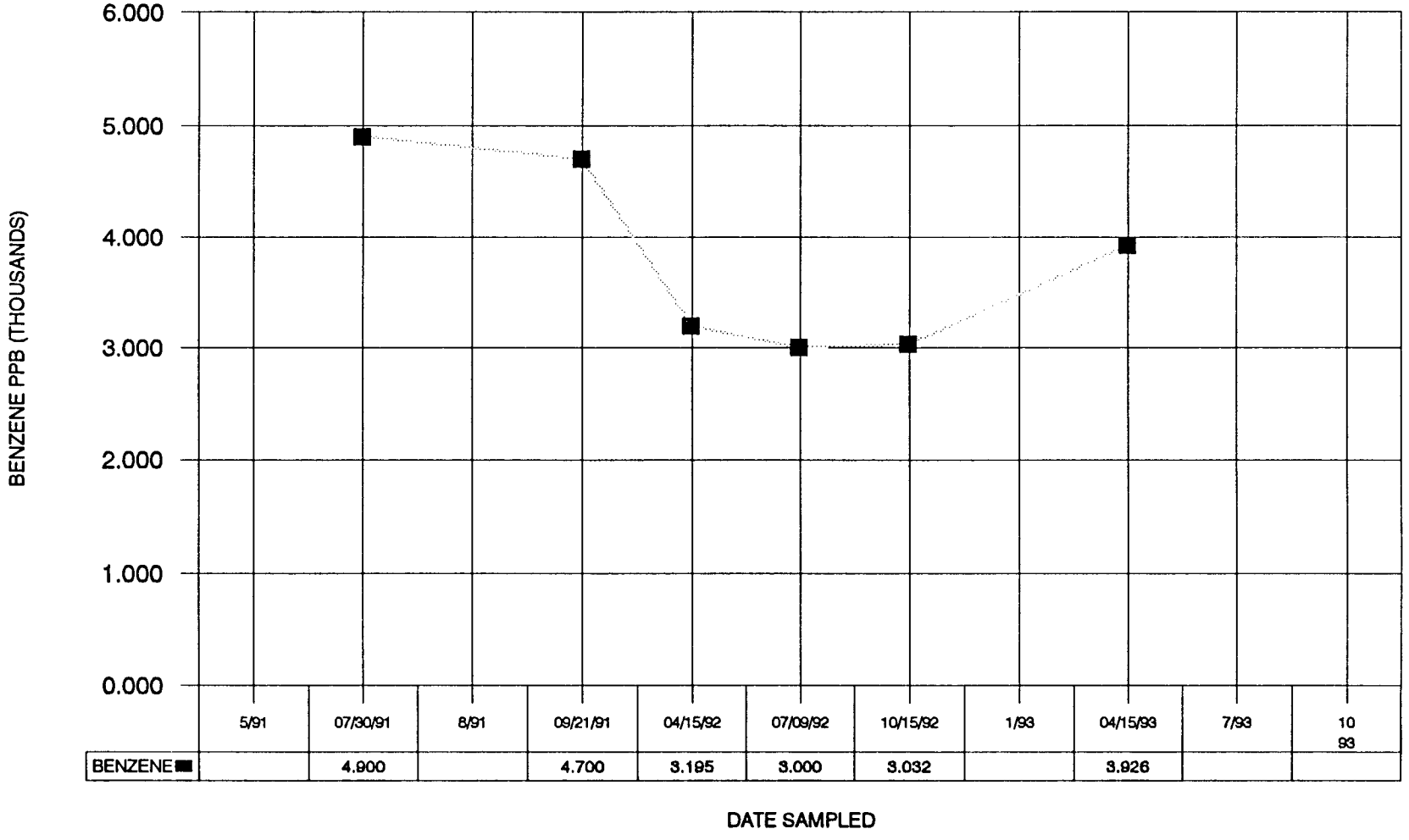
GROUNDWATER ANALYSIS DATA

MW#18 BH-41



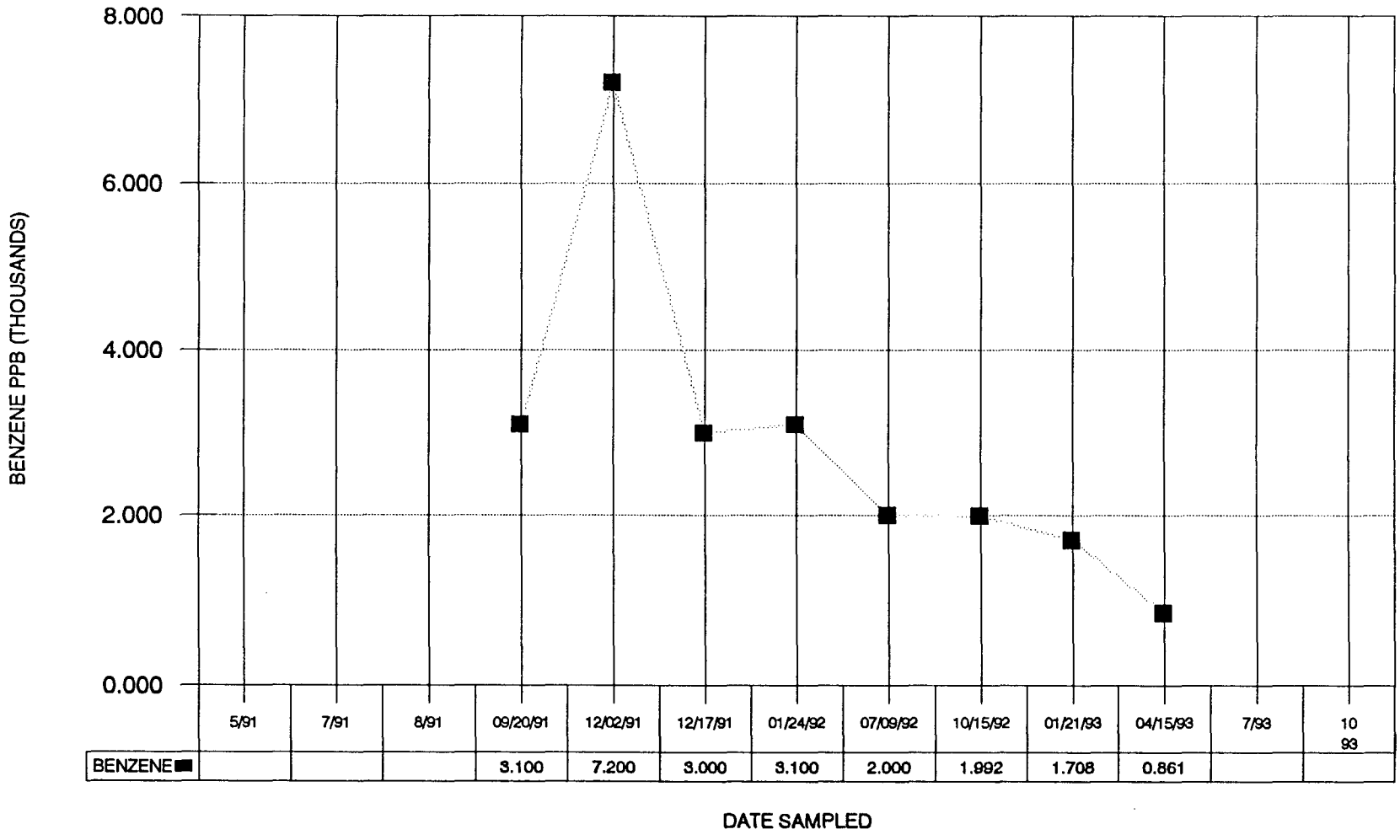
GROUNDWATER ANALYSIS DATA

MW#19 BH-42



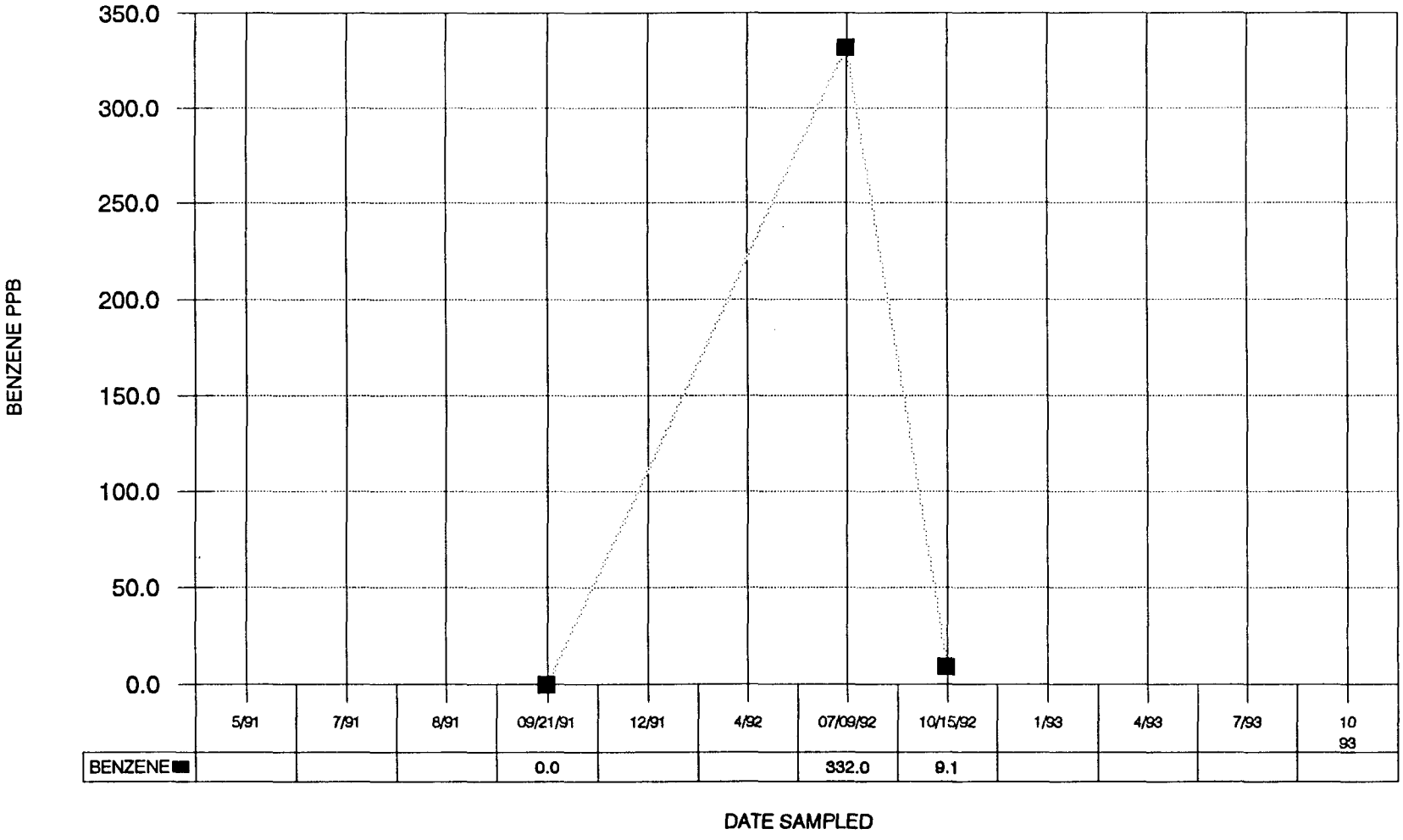
GROUNDWATER ANALYSIS DATA

MW#26 BH-49



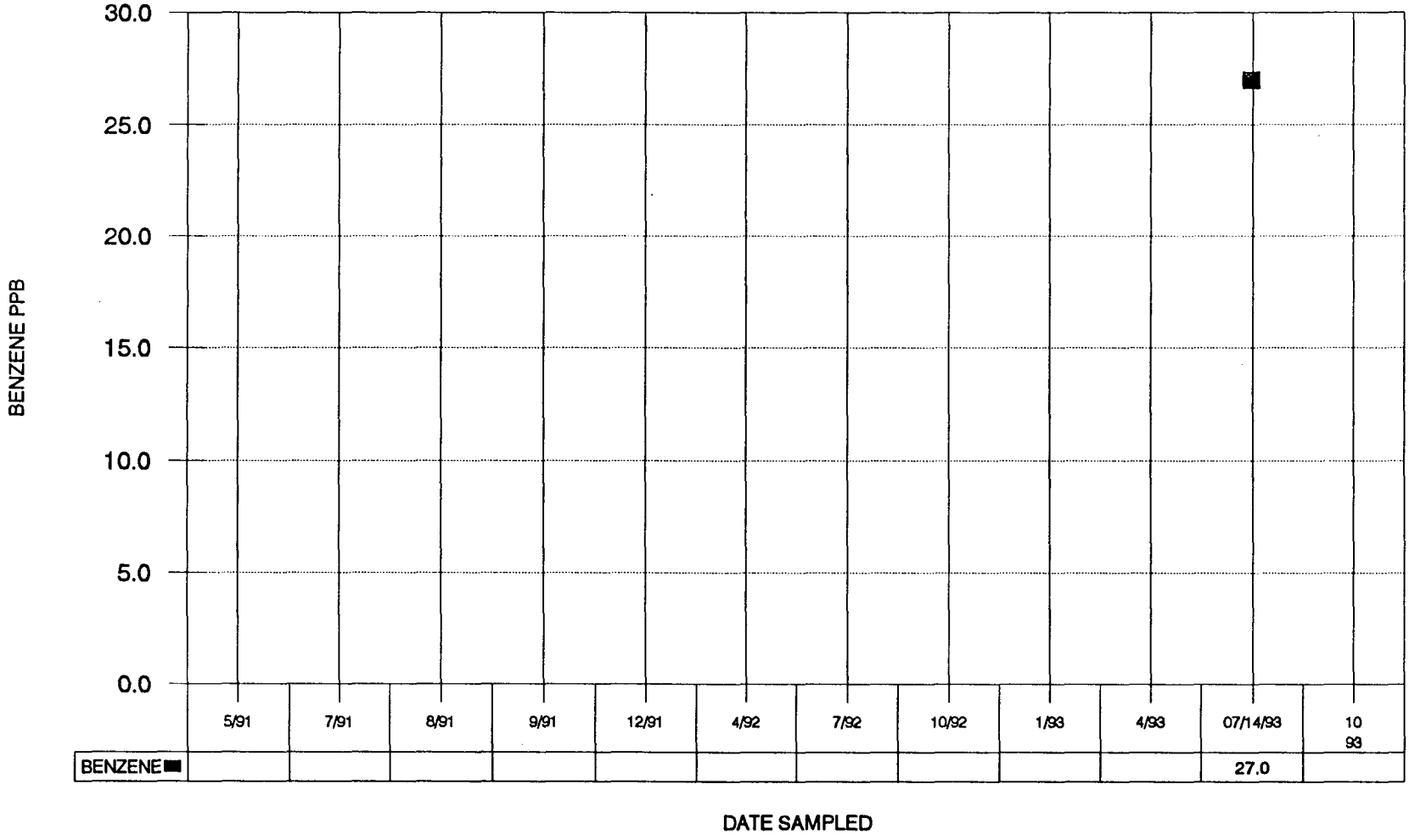
GROUNDWATER ANALYSIS DATA

MW#31 BH-55



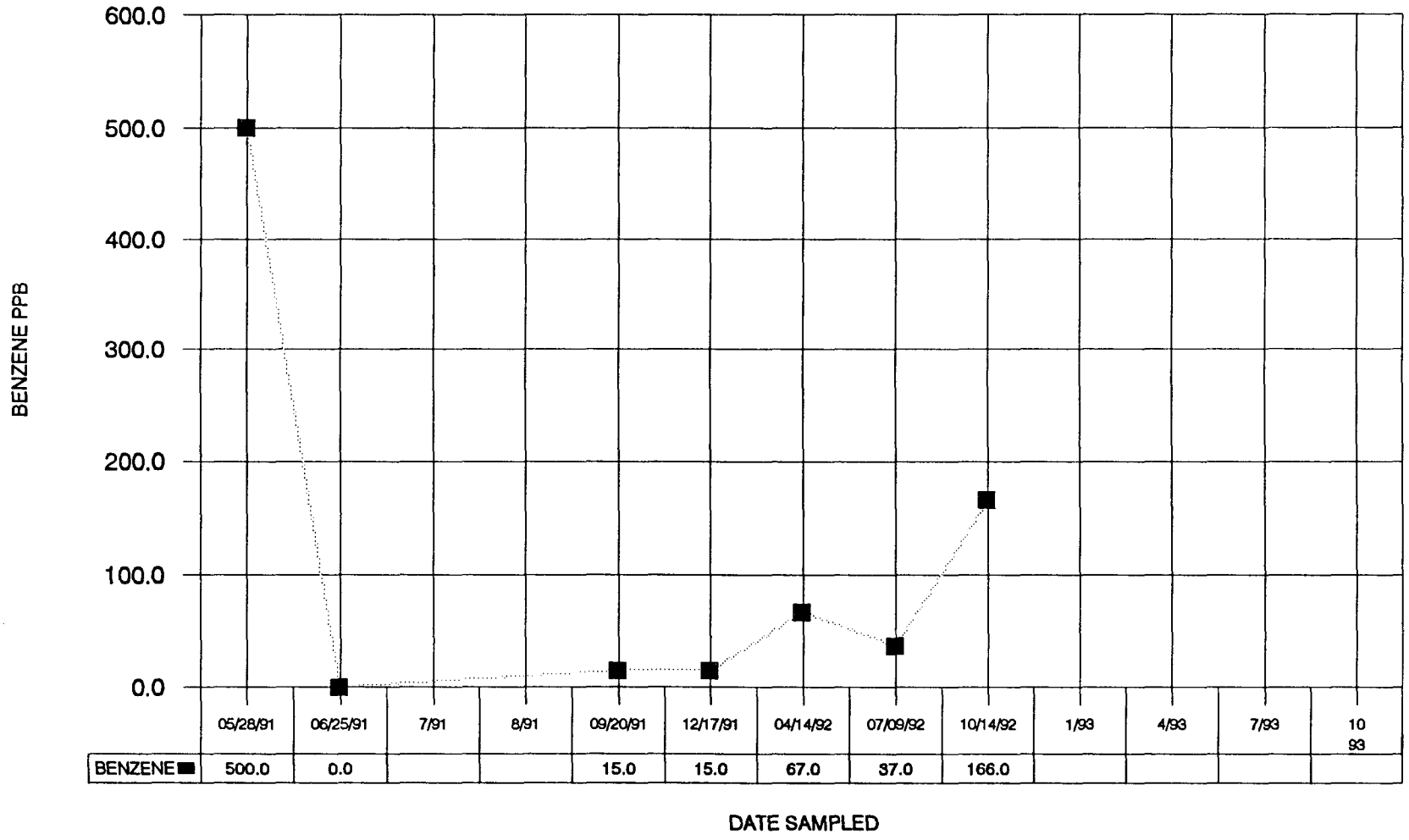
GROUNDWATER ANALYSIS DATA

MW#37 BH-60



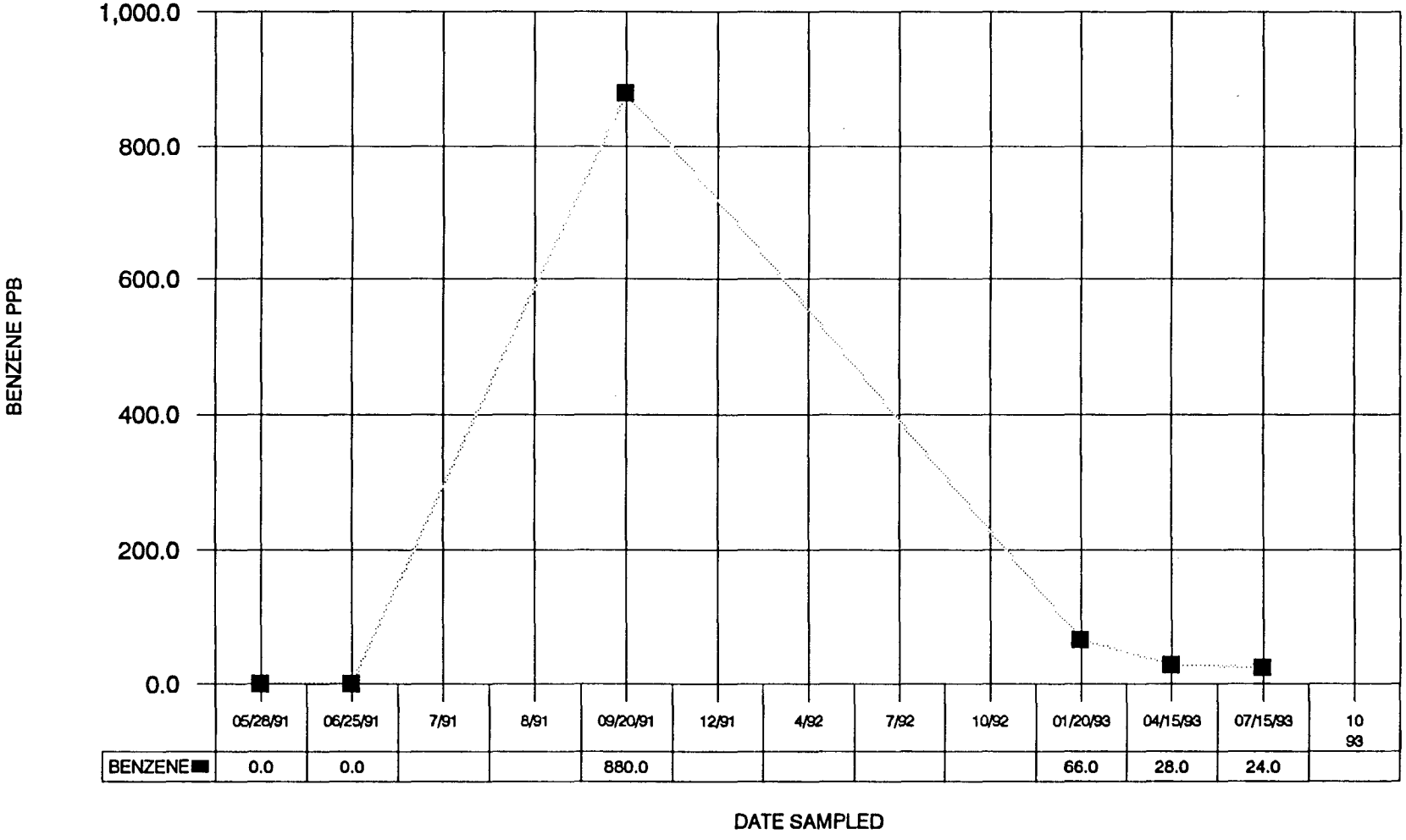
GROUNDWATER ANALYSIS DATA

MW#38 BH-61



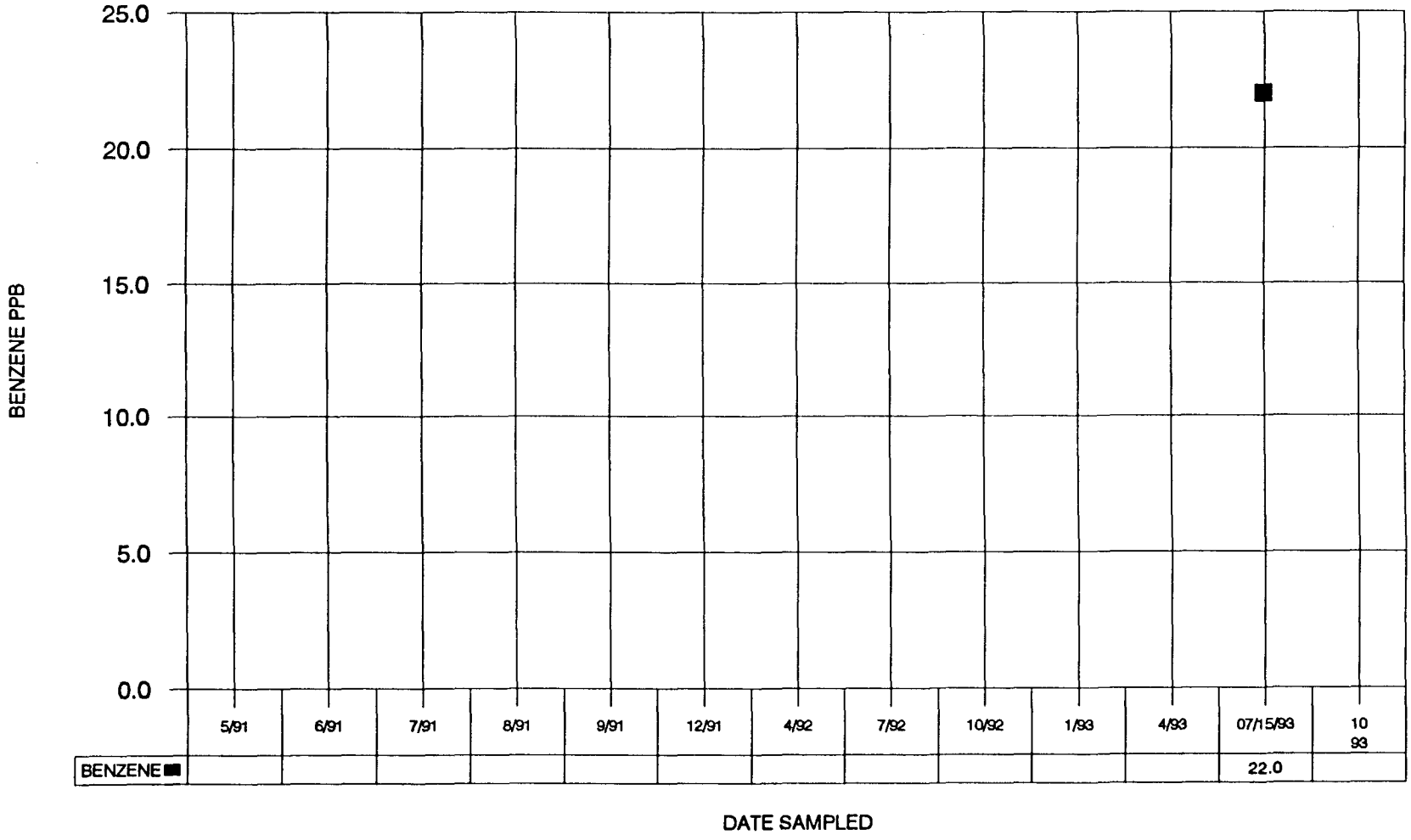
GROUNDWATER ANALYSIS DATA

MW#39 BH-62



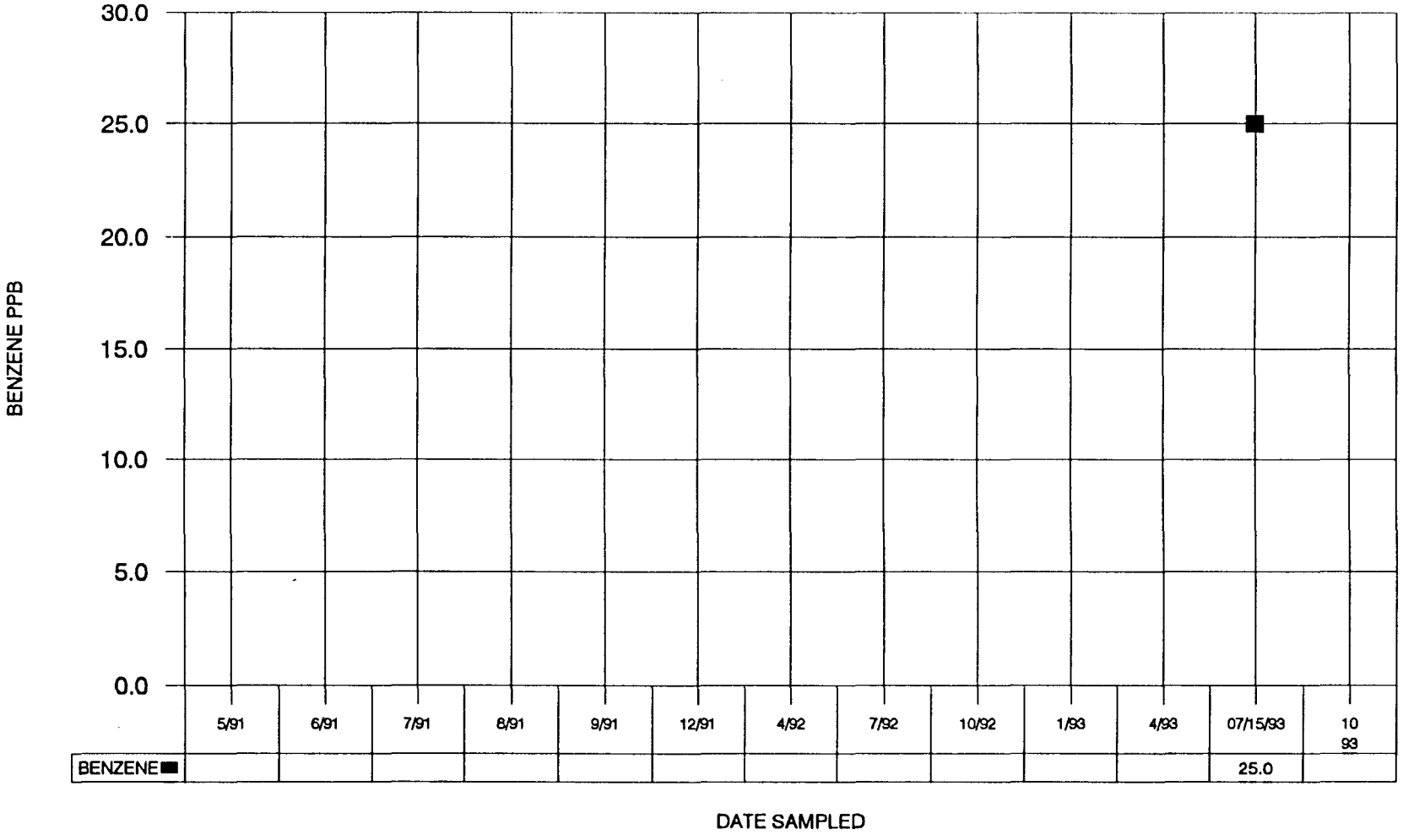
GROUNDWATER ANALYSIS DATA

MW#41 BH-64



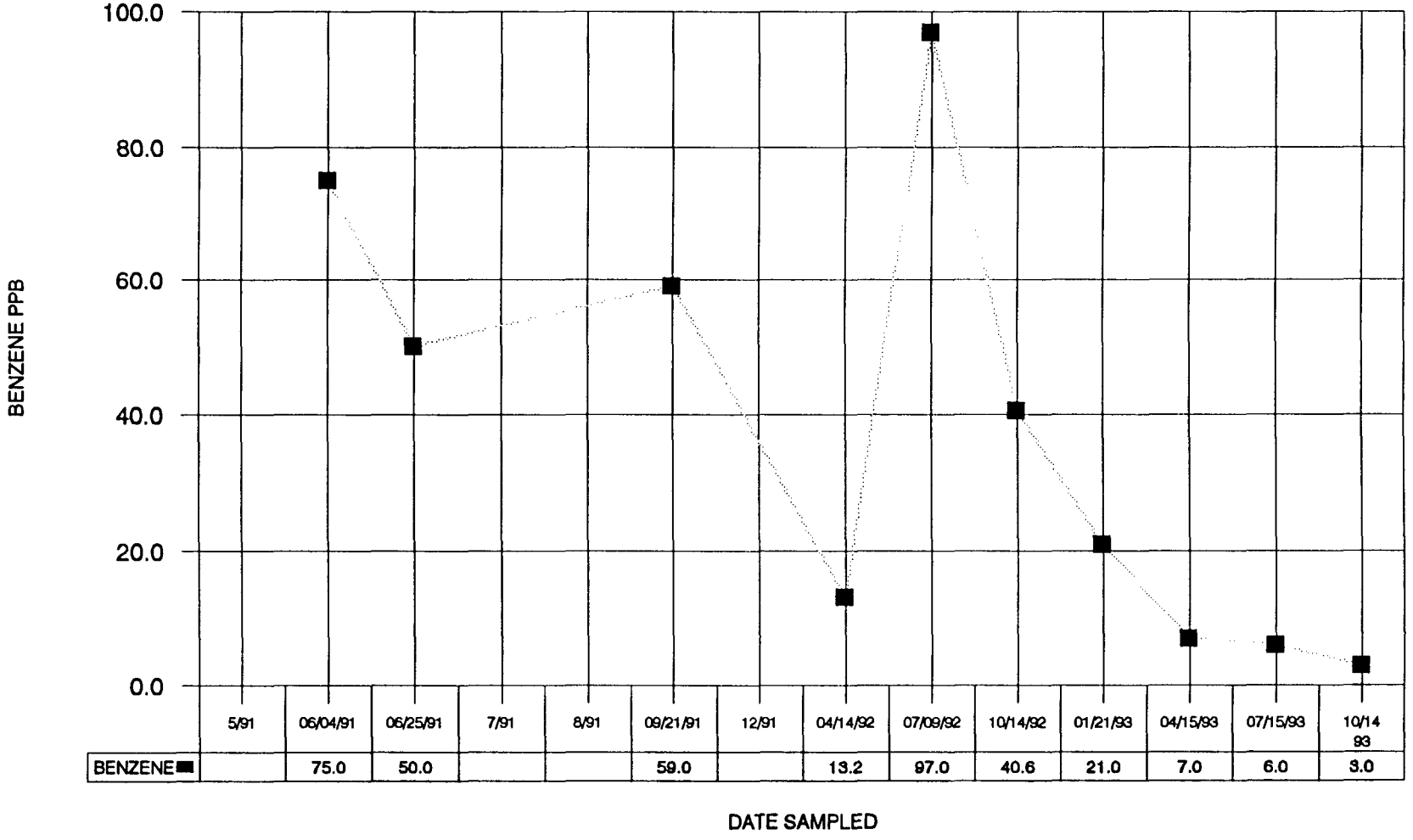
GROUNDWATER ANALYSIS DATA

MW#43 BH-66



BOREHOLE WATER ANALYSIS DATA

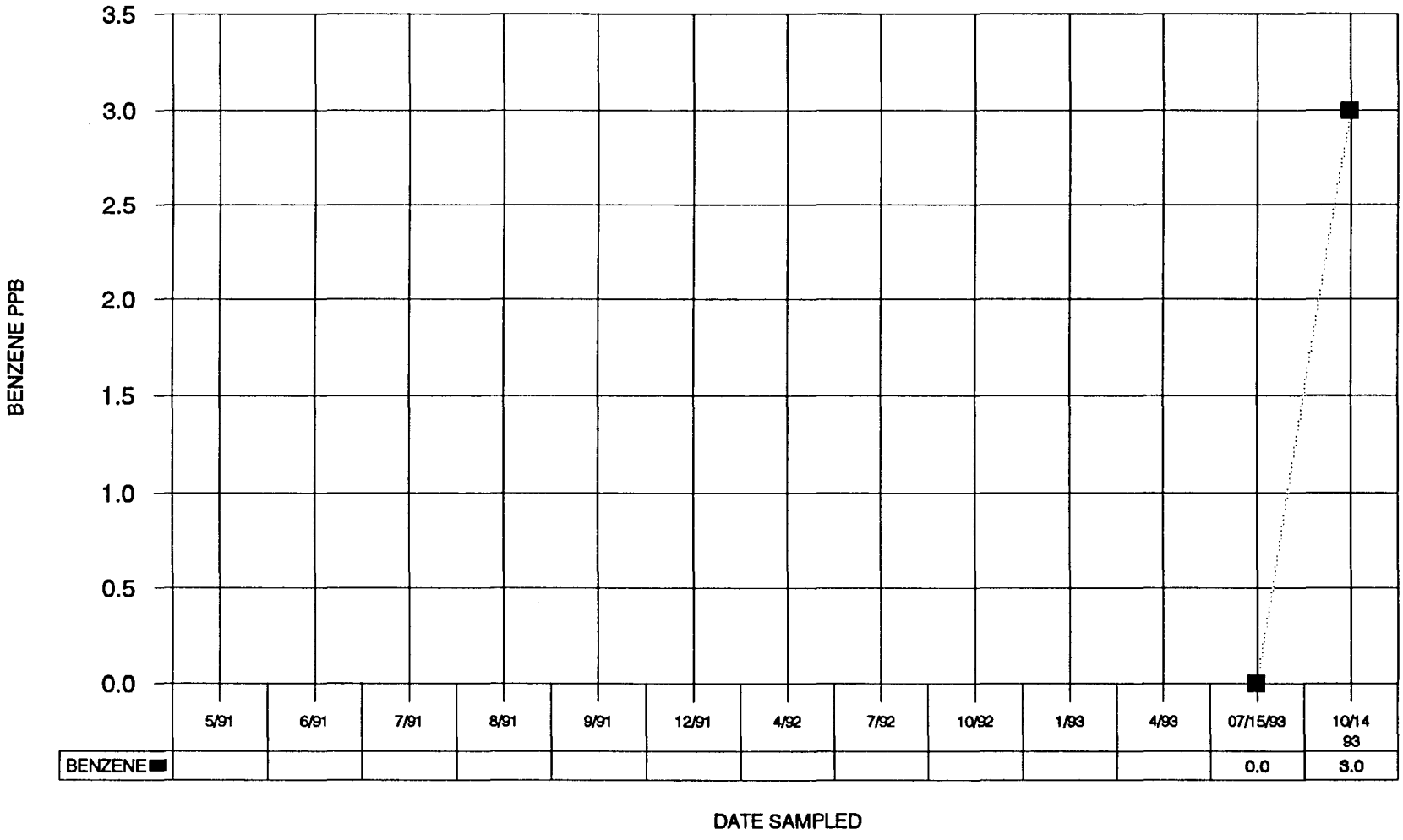
MW#44 BH-67



	5/91	06/04/91	06/25/91	7/91	8/91	09/21/91	12/91	04/14/92	07/09/92	10/14/92	01/21/93	04/15/93	07/15/93	10/14 93
BENZENE		75.0	50.0			59.0		13.2	97.0	40.6	21.0	7.0	6.0	3.0

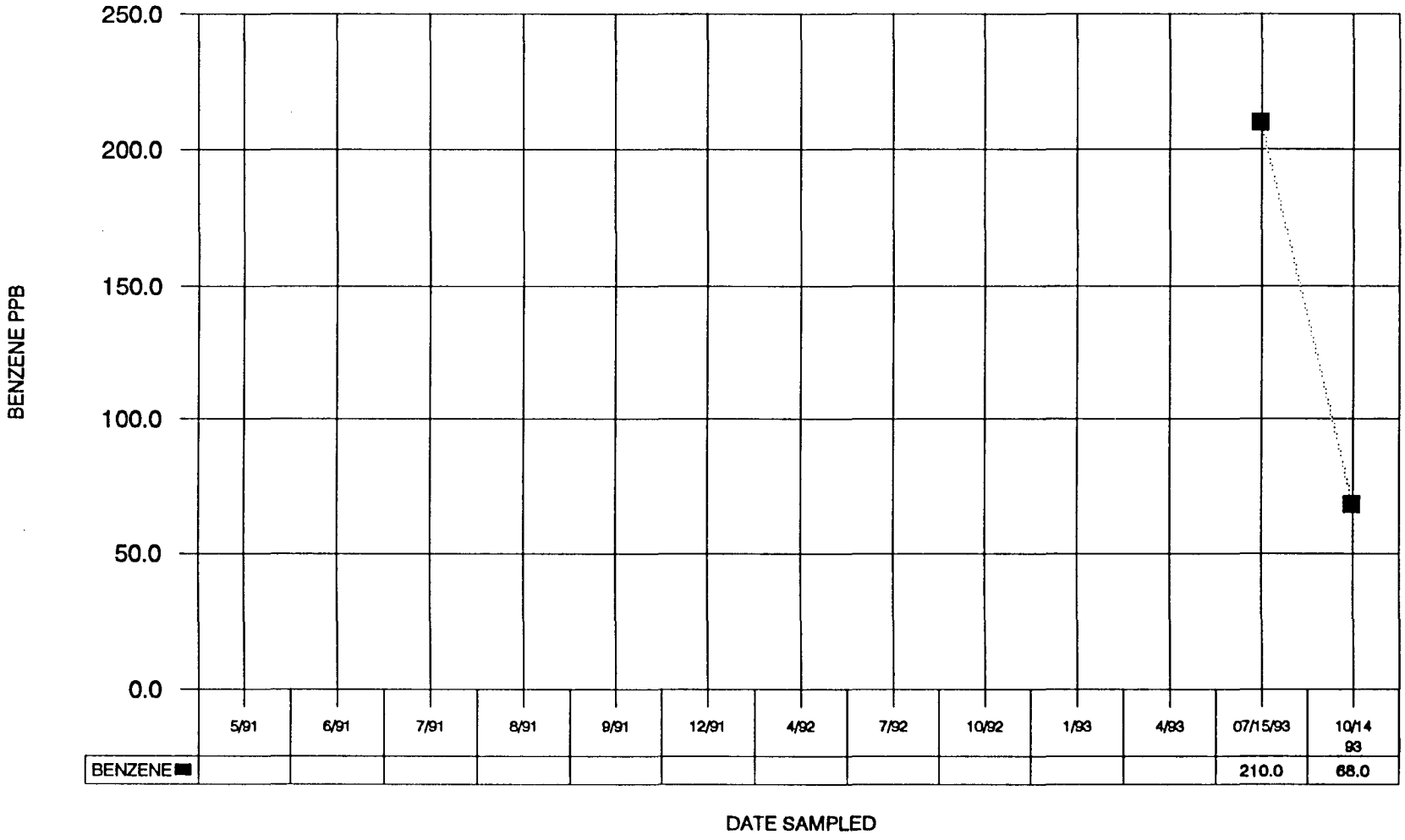
BOREHOLE WATER ANALYSIS DATA

MW#45 BH-68



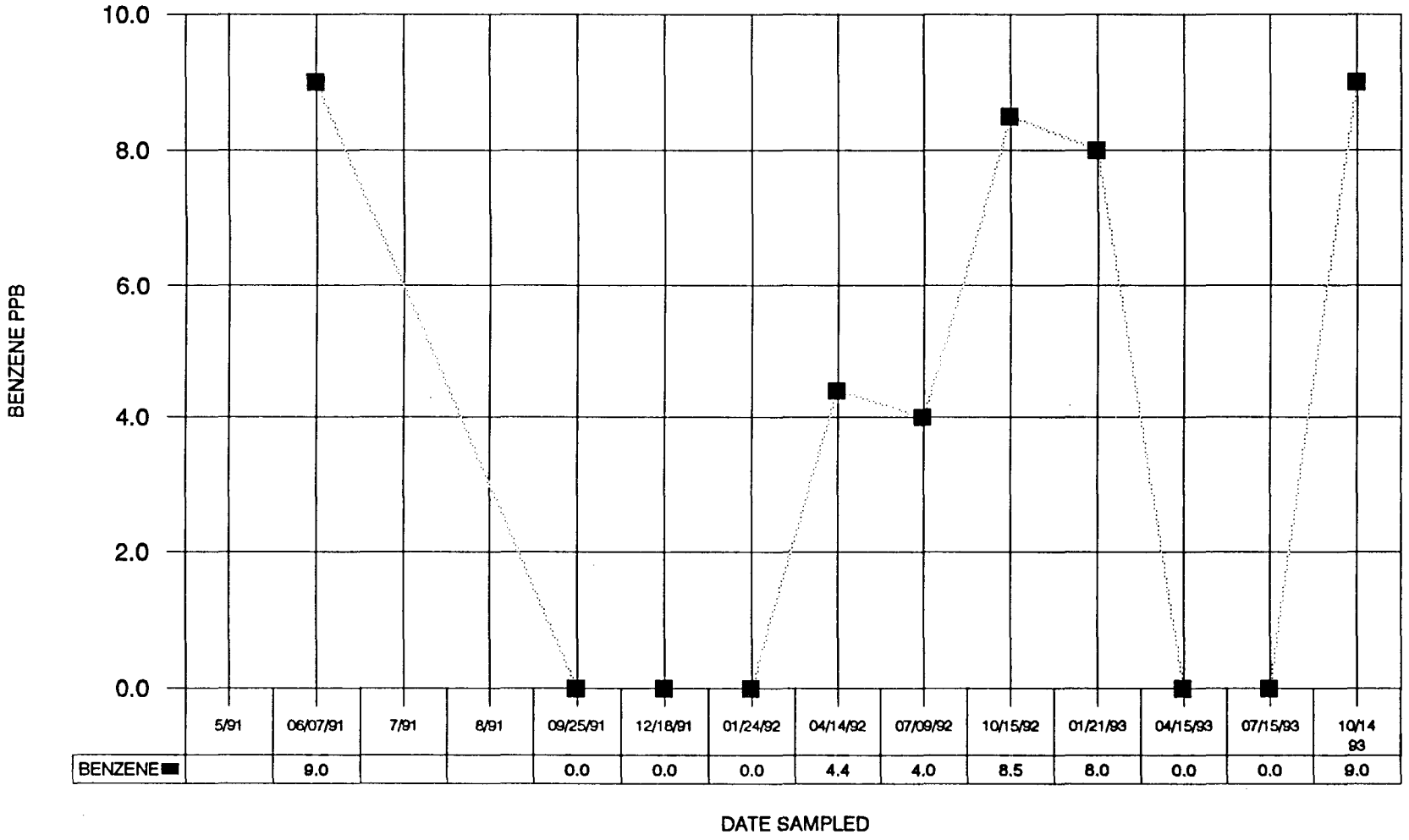
BOREHOLE WATER ANALYSIS DATA

MW#49 BH-72



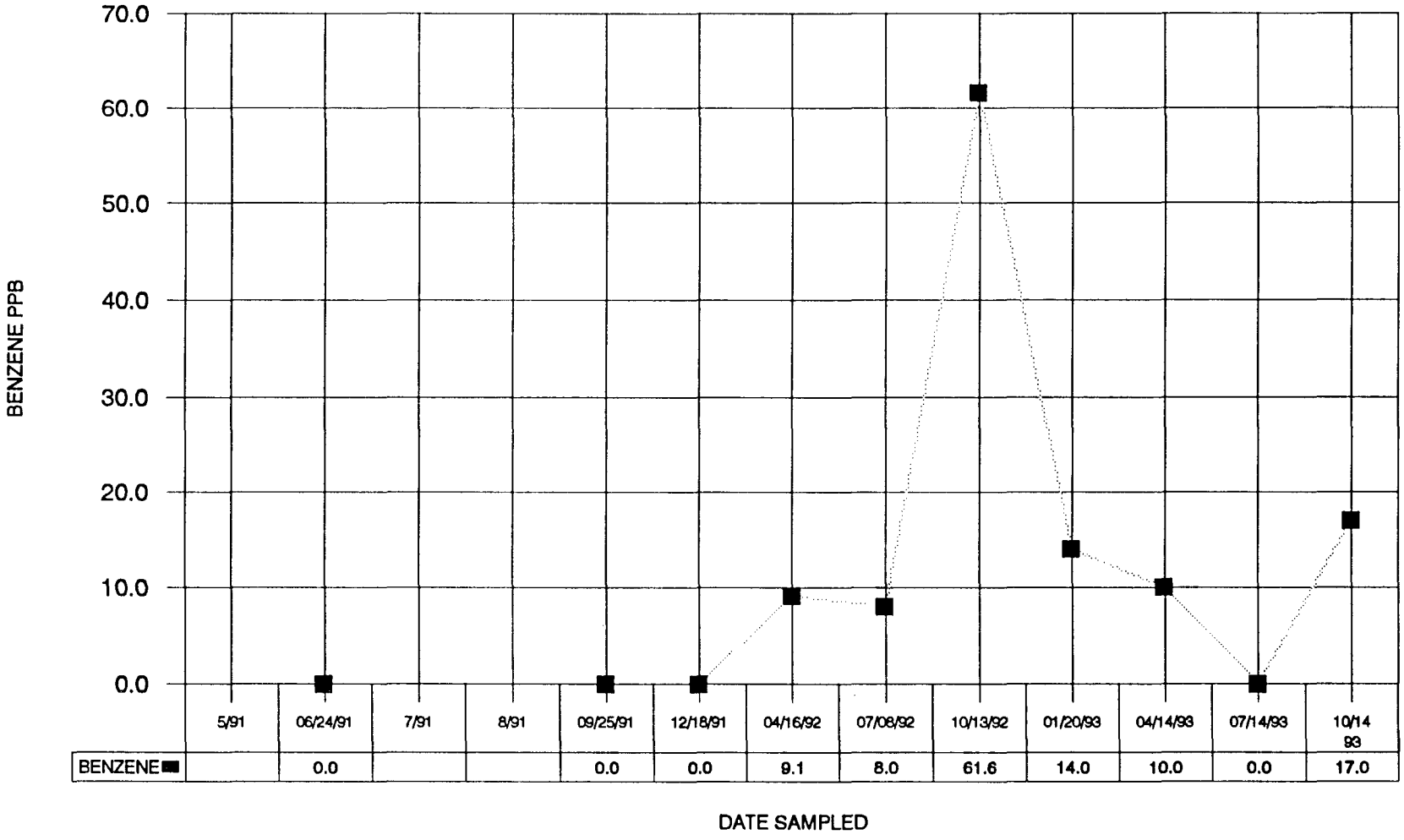
GROUNDWATER ANALYSIS DATA

MW#50 BH-73



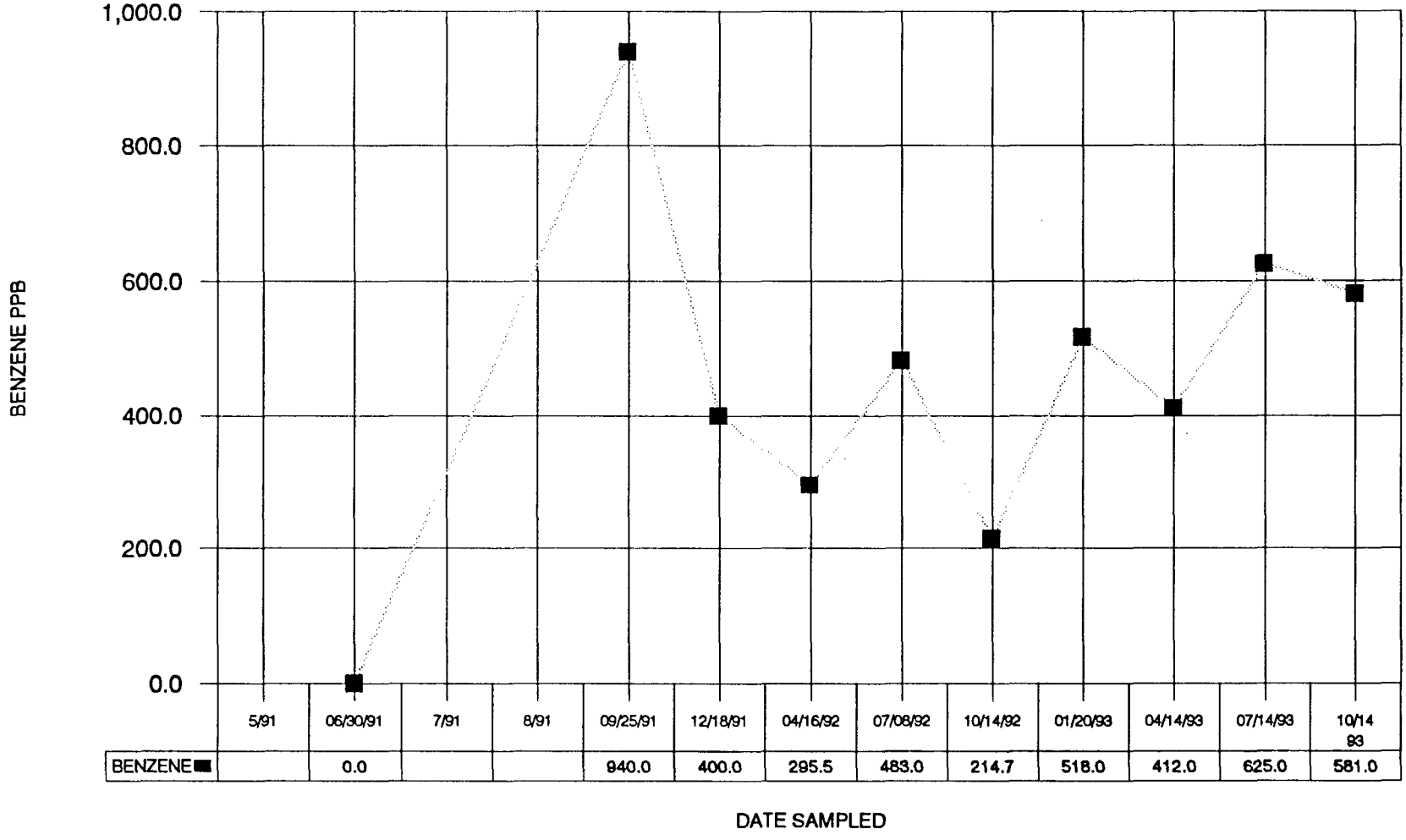
GROUNDWATER ANALYSIS DATA

MW#54 BH-80



GROUNDWATER ANALYSIS DATA

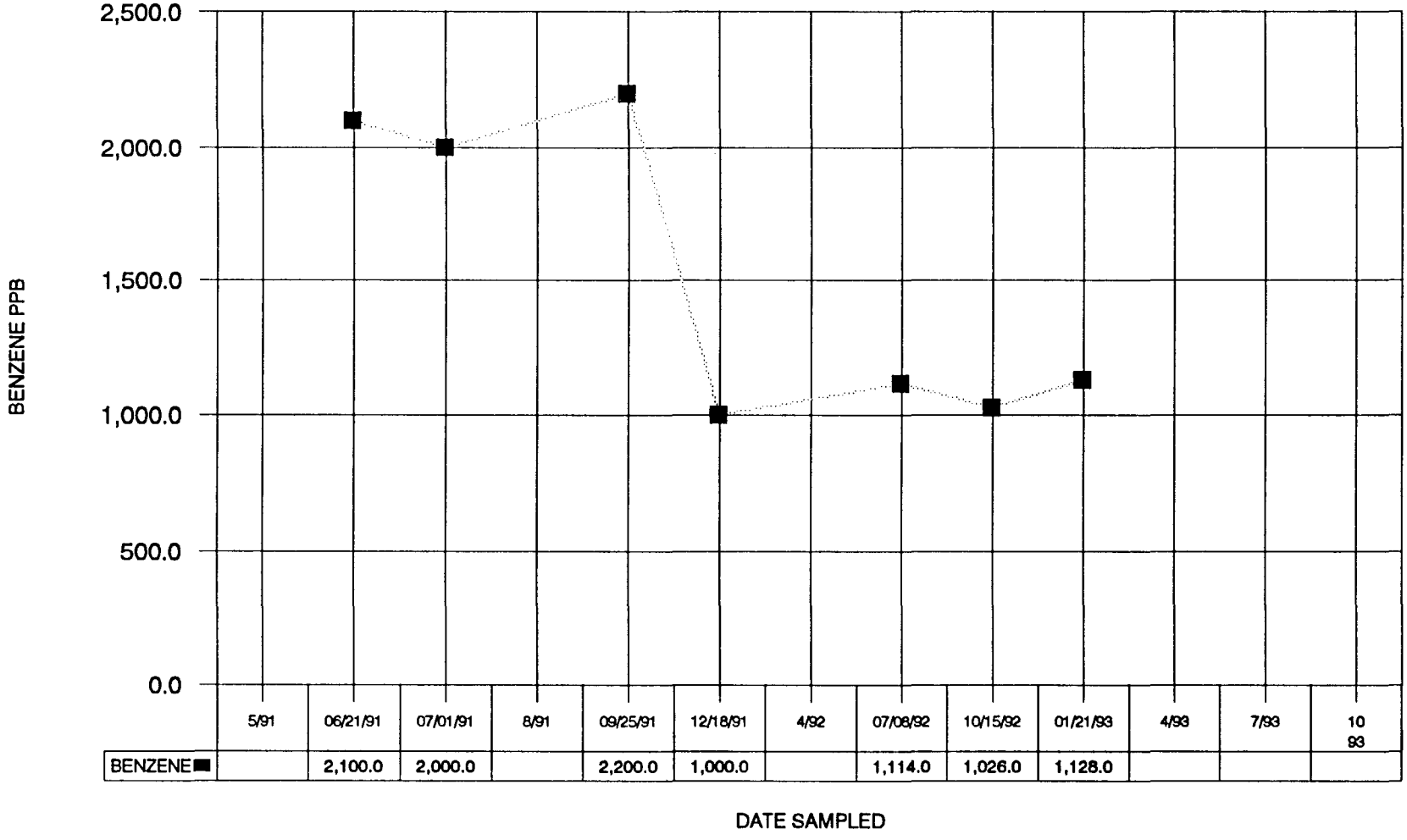
MW#55 BH-81



	5/91	06/30/91	7/91	8/91	09/25/91	12/18/91	04/16/92	07/08/92	10/14/92	01/20/93	04/14/93	07/14/93	10/14 93
BENZENE		0.0			940.0	400.0	295.5	483.0	214.7	518.0	412.0	625.0	581.0

GROUNDWATER ANALYSIS DATA

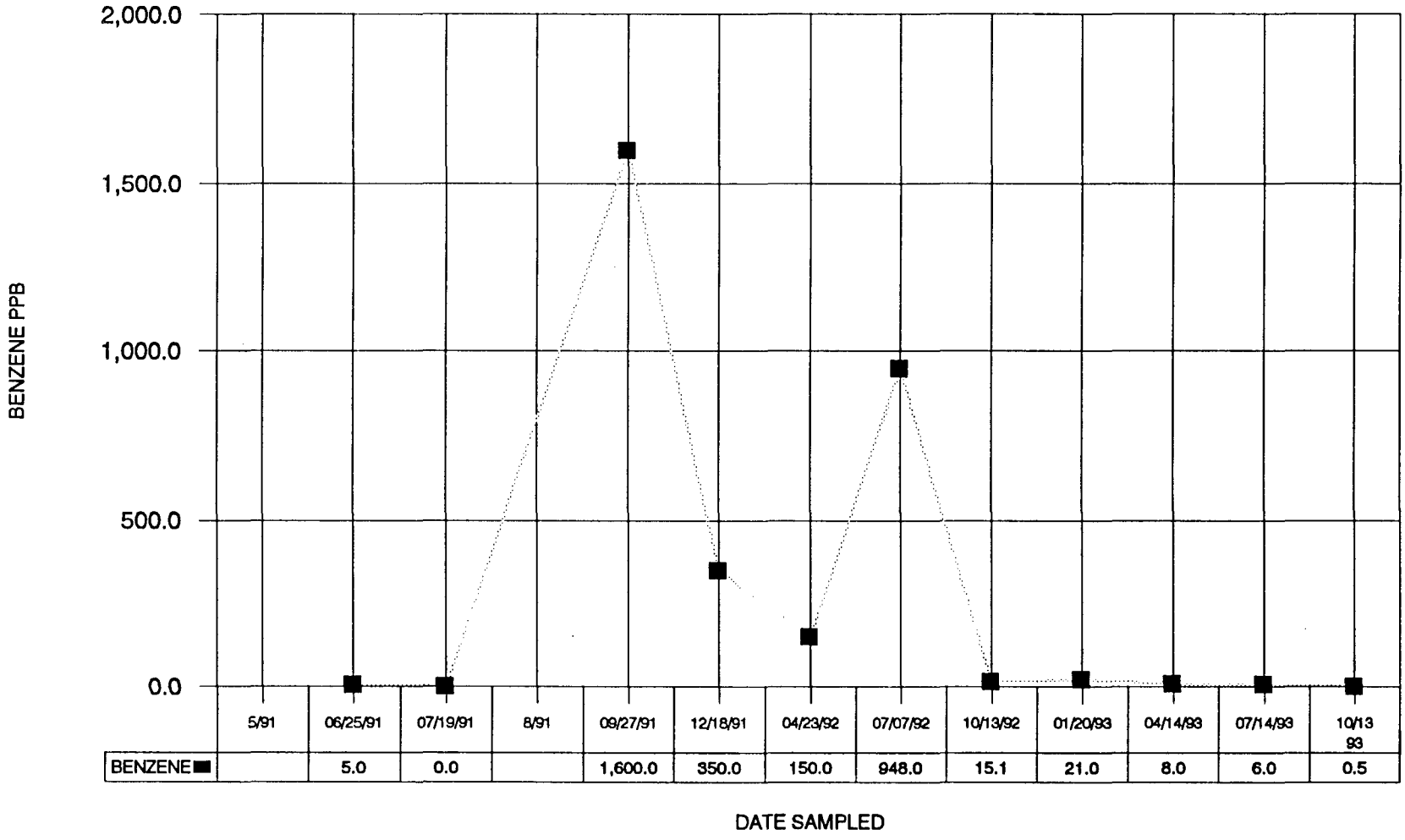
MW#56 BH-82



	5/91	06/21/91	07/01/91	8/91	09/25/91	12/18/91	4/92	07/08/92	10/15/92	01/21/93	4/93	7/93	10 93
BENZENE		2,100.0	2,000.0		2,200.0	1,000.0		1,114.0	1,026.0	1,128.0			

GROUNDWATER ANALYSIS DATA

MW#57 BH-83

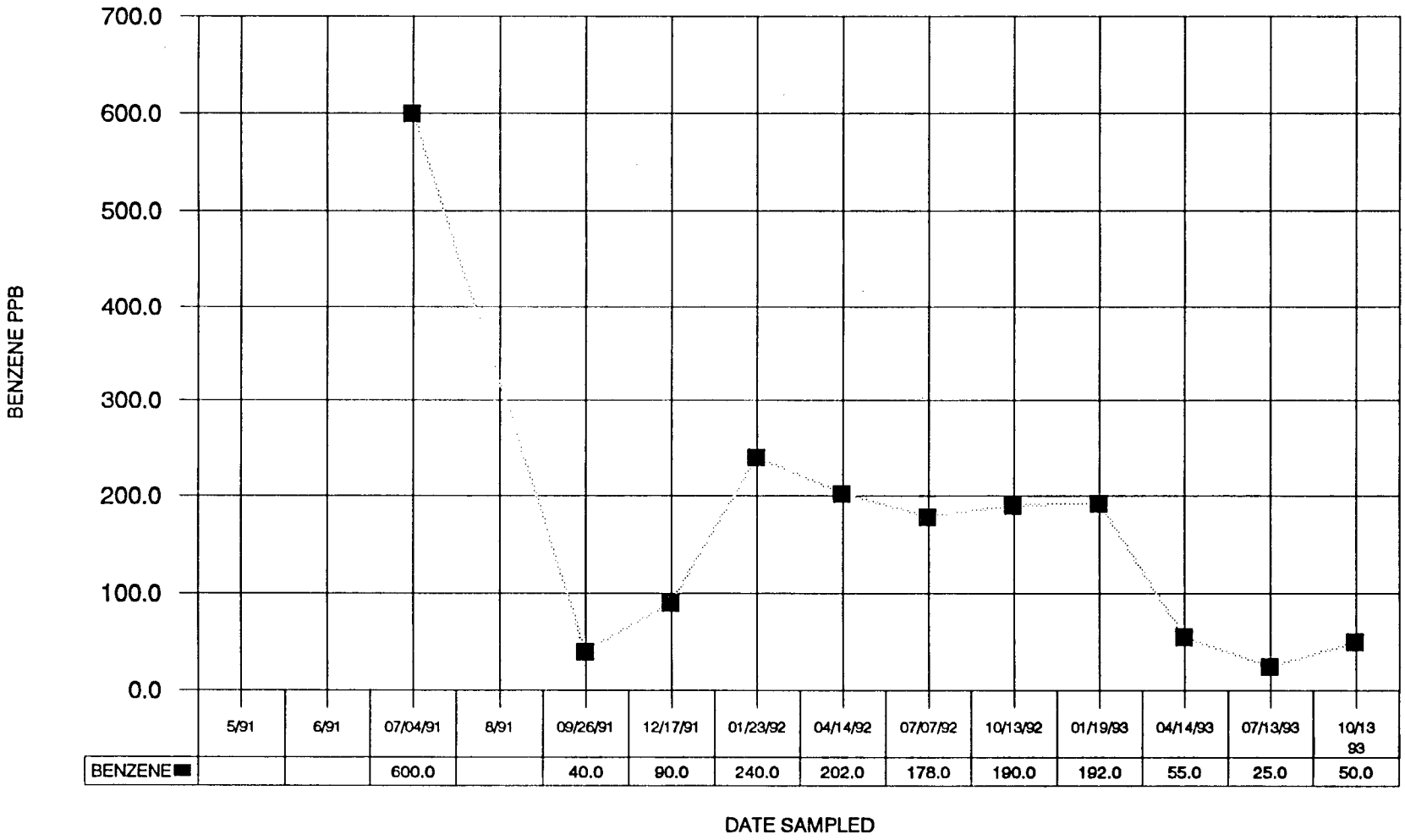


	5/91	06/25/91	07/19/91	8/91	09/27/91	12/18/91	04/23/92	07/07/92	10/13/92	01/20/93	04/14/93	07/14/93	10/13 93
BENZENE		5.0	0.0		1,600.0	350.0	150.0	948.0	15.1	21.0	8.0	6.0	0.5

DATE SAMPLED

GROUNDWATER ANALYSIS DATA

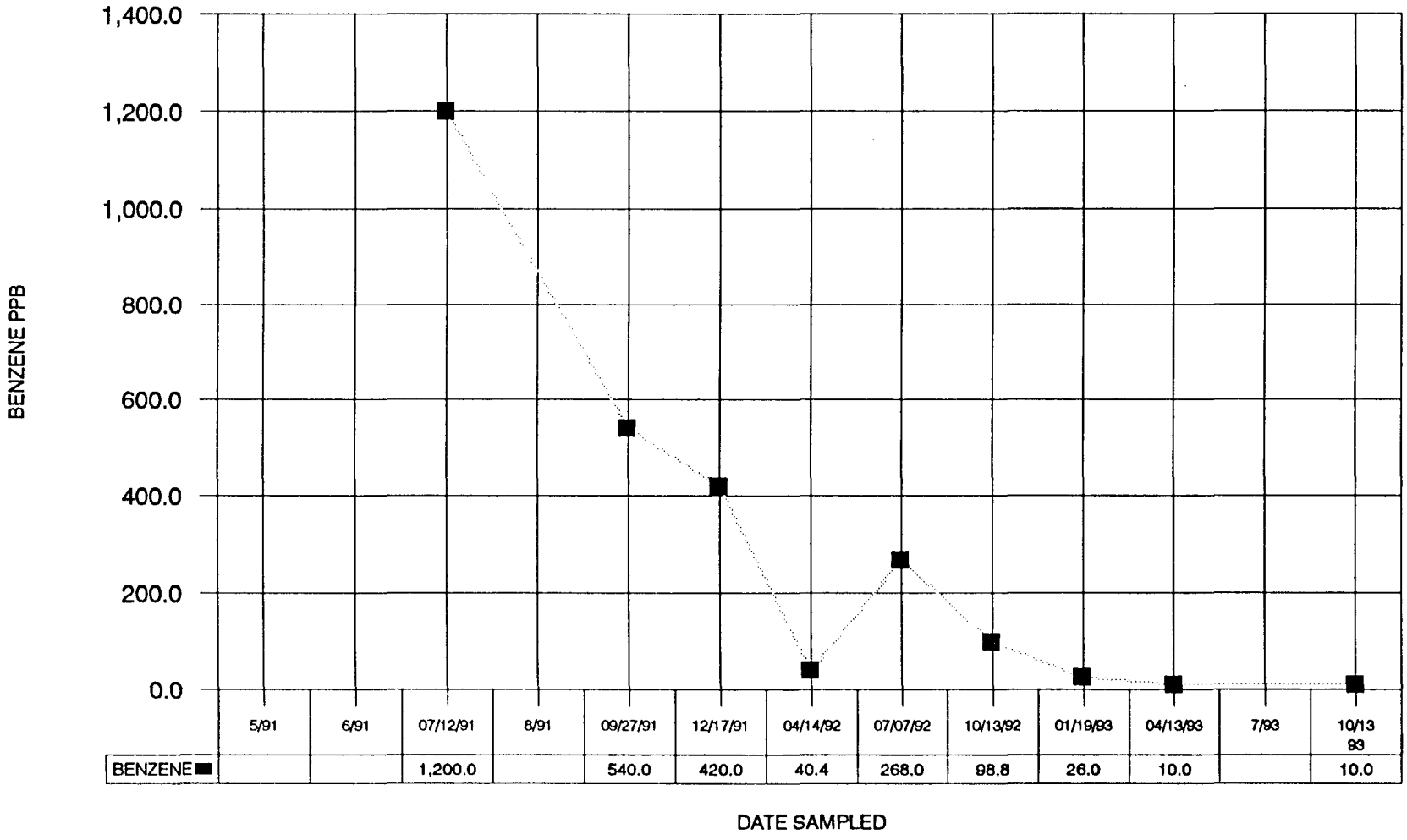
MW#58 BH-84



	5/91	6/91	07/04/91	8/91	09/26/91	12/17/91	01/23/92	04/14/92	07/07/92	10/13/92	01/19/93	04/14/93	07/13/93	10/13 93
BENZENE			600.0		40.0	90.0	240.0	202.0	178.0	190.0	192.0	55.0	25.0	50.0

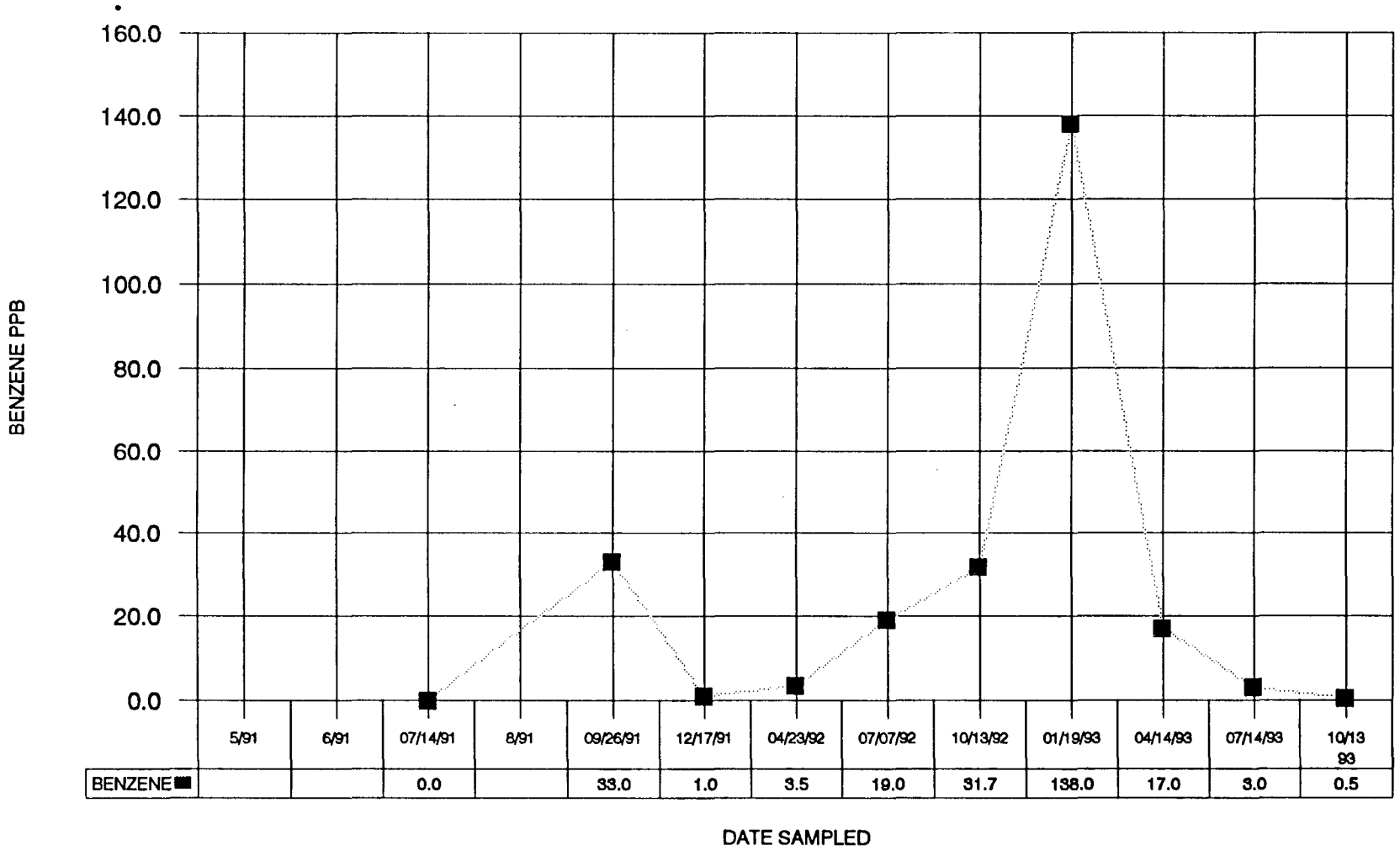
GROUNDWATER ANALYSIS DATA

MW#59 BH-85



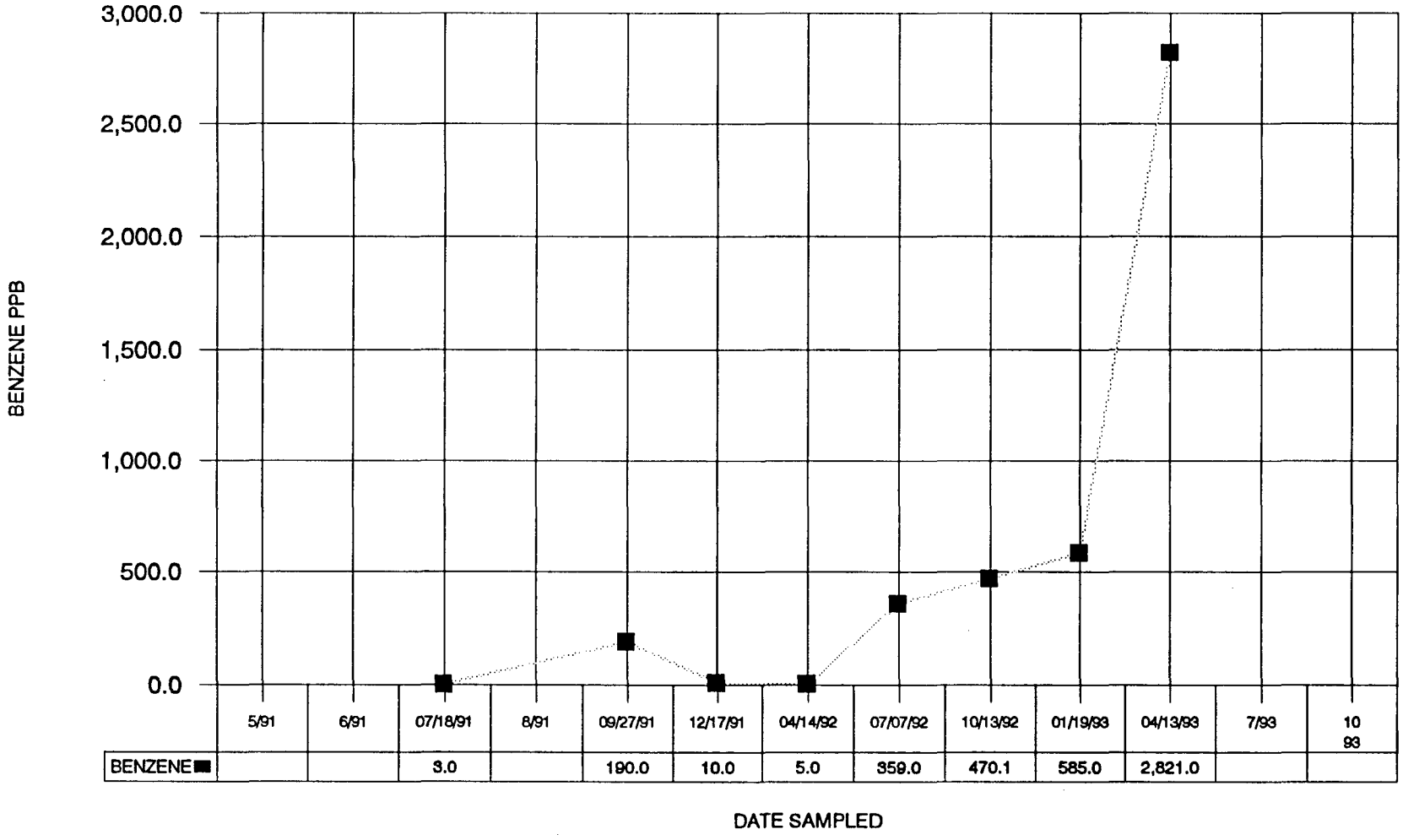
GROUNDWATER ANALYSIS DATA

MW#60 BH-86



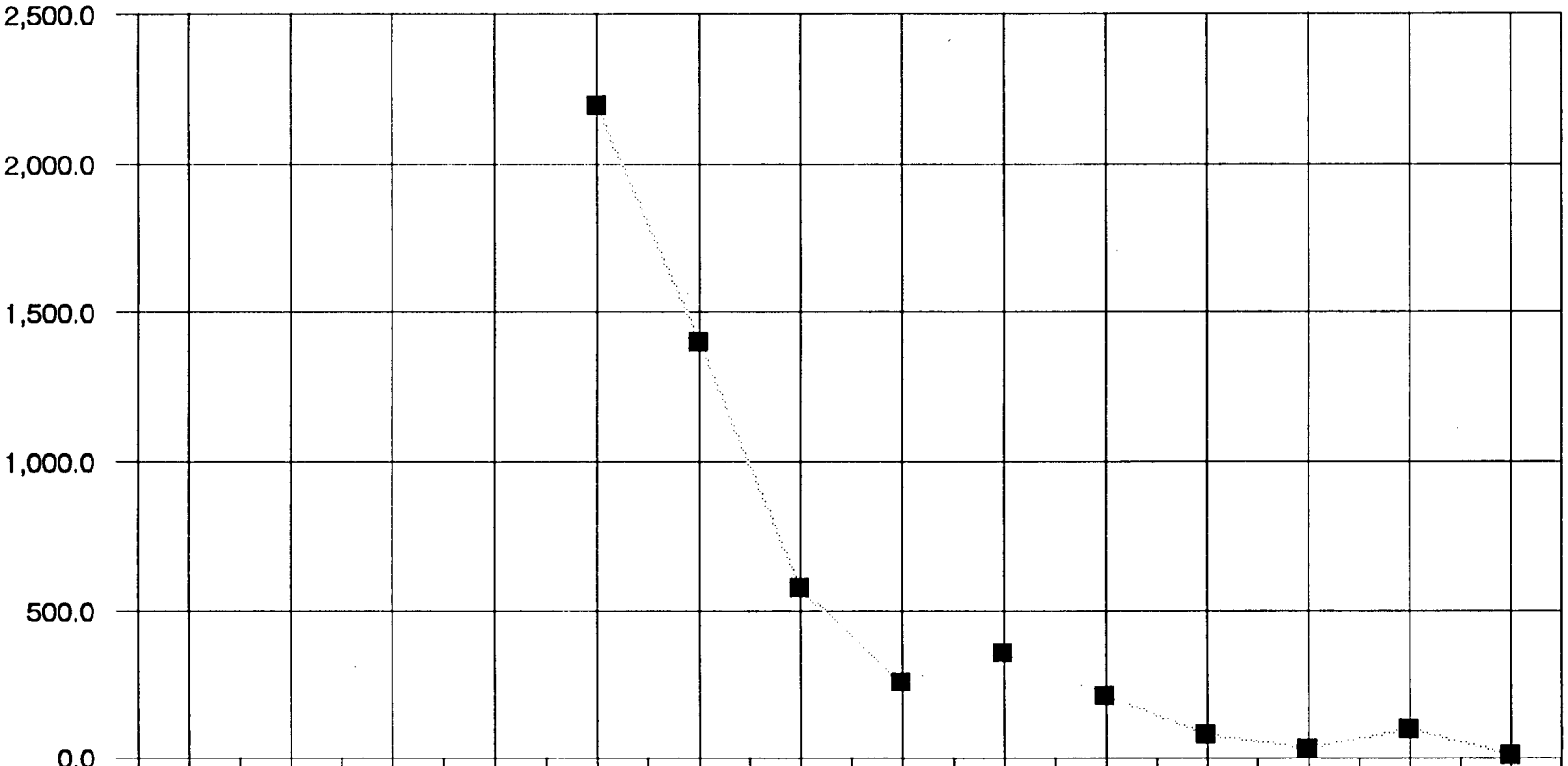
GROUNDWATER ANALYSIS DATA

MW#61A BH-87A



GROUNDWATER ANALYSIS DATA

MW#62 BH-88

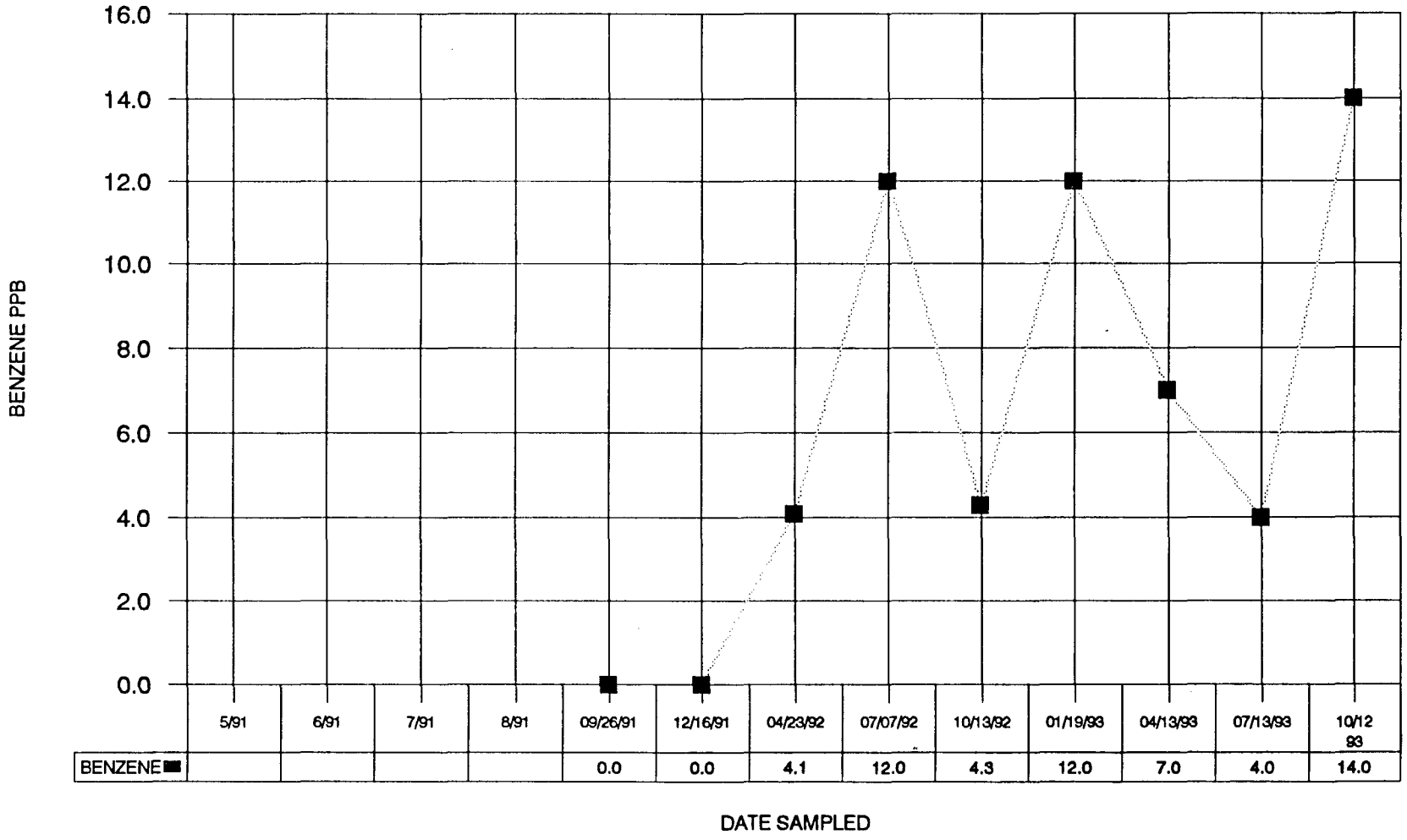


	5/91	6/91	7/91	8/91	09/26/91	12/17/91	01/23/92	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93	07/14/93	10/13/93
BENZENE					2,200.0	1,400.0	580.0	257.5	357.0	212.3	78.0	33.0	98.0	10.0

DATE SAMPLED

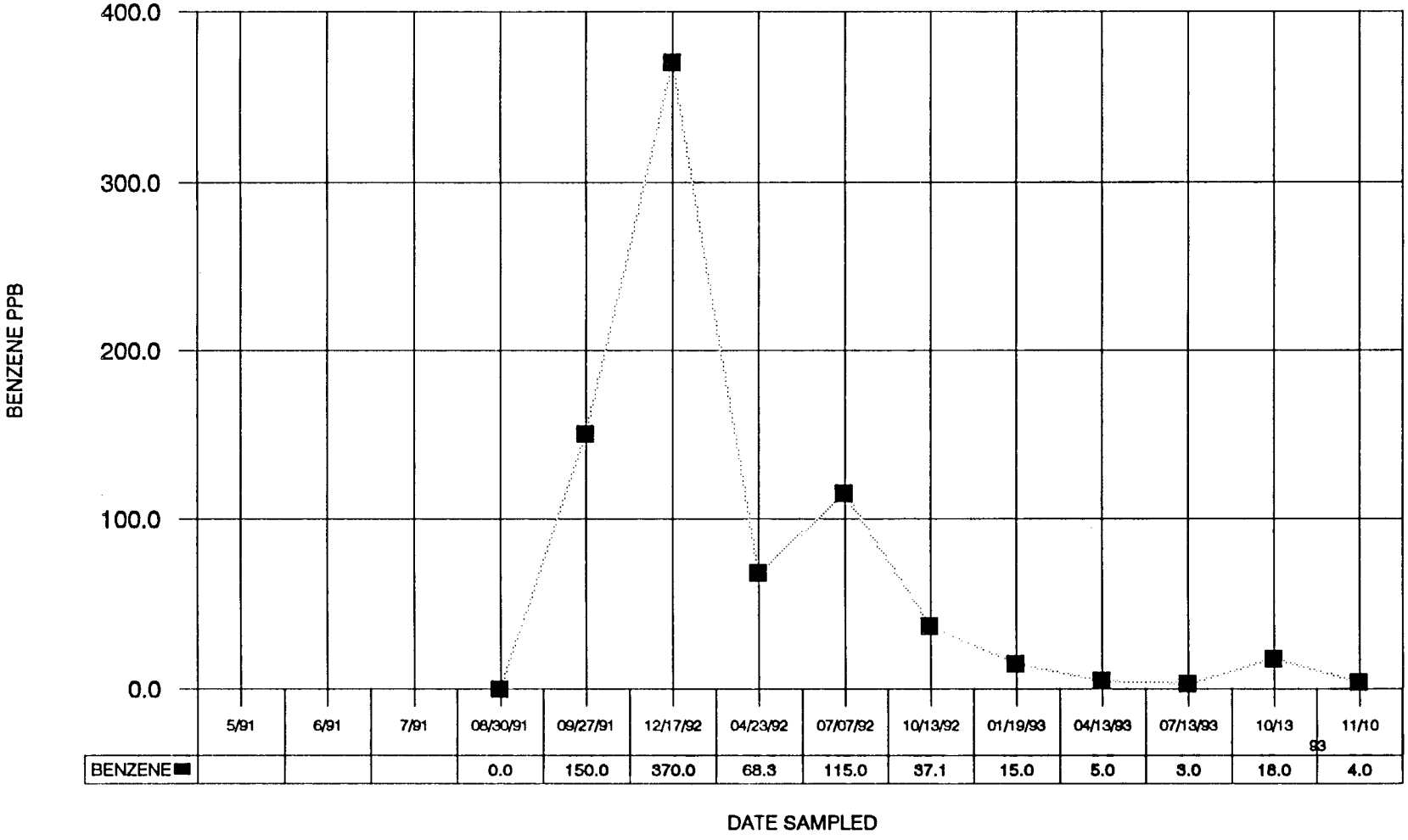
GROUNDWATER ANALYSIS DATA

MW#63 BH-89



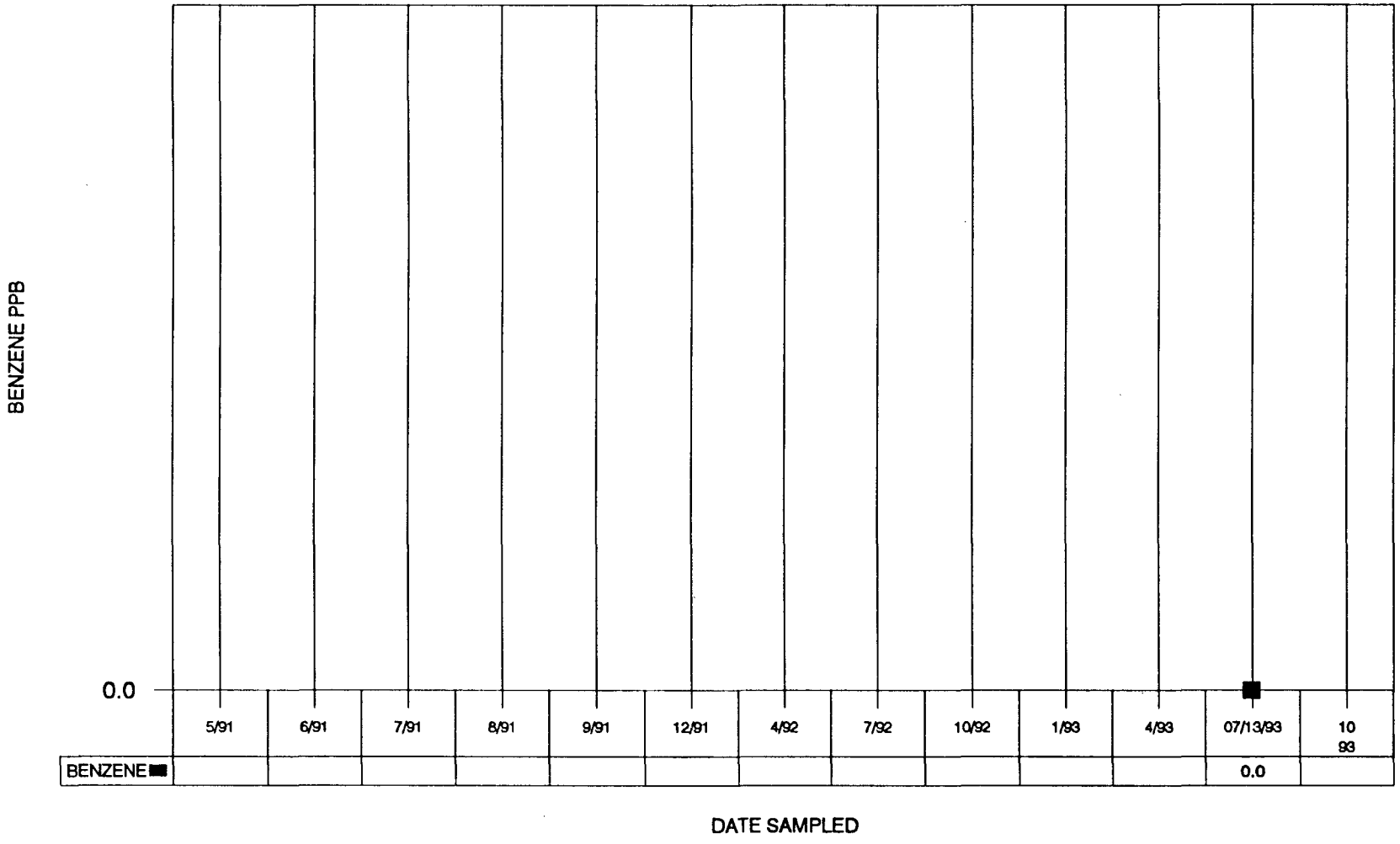
BOREHOLE WATER ANALYSIS DATA

MW#64 BH-90



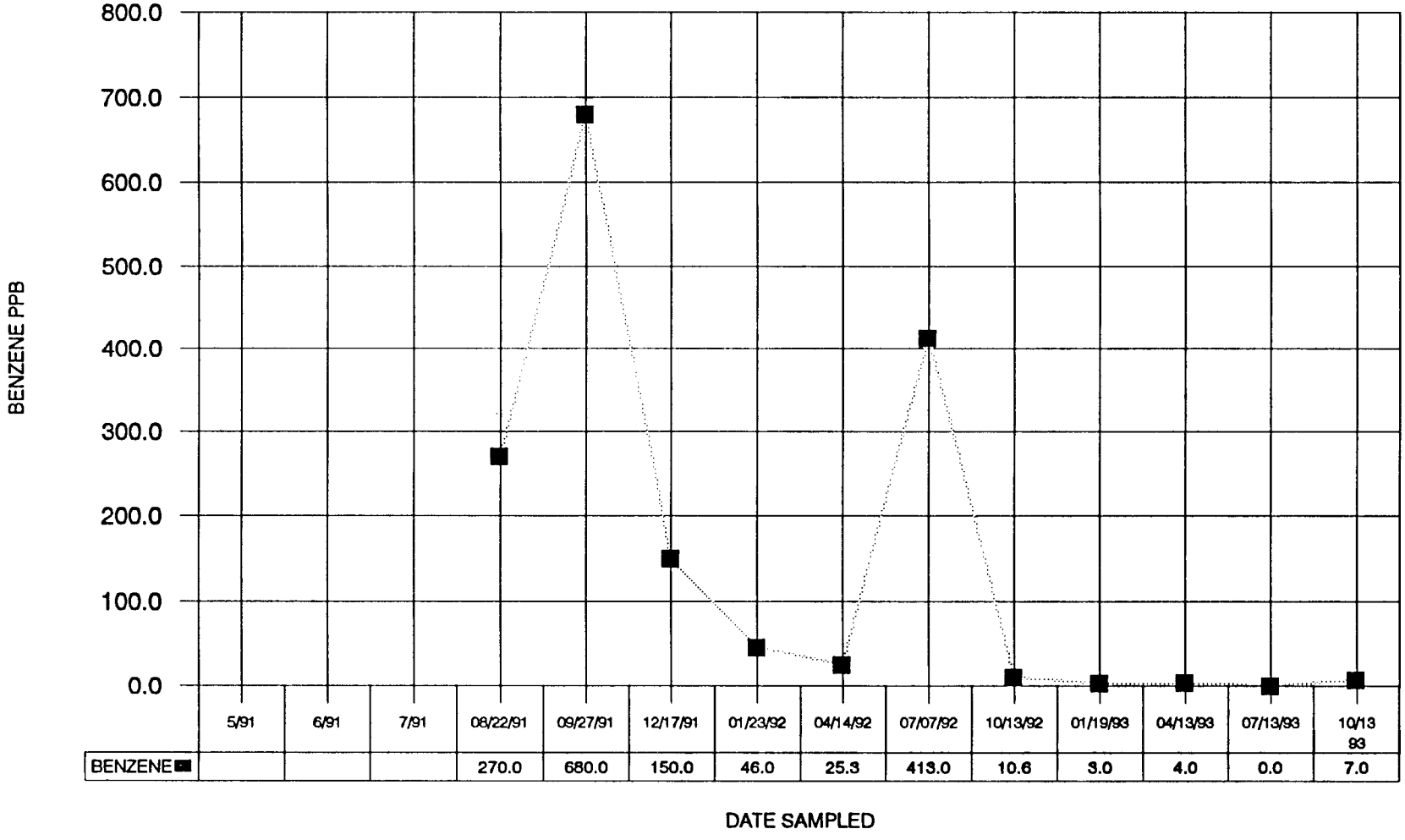
BOREHOLE WATER ANALYSIS DATA

MW#65 BH-91



BOREHOLE WATER ANALYSIS DATA

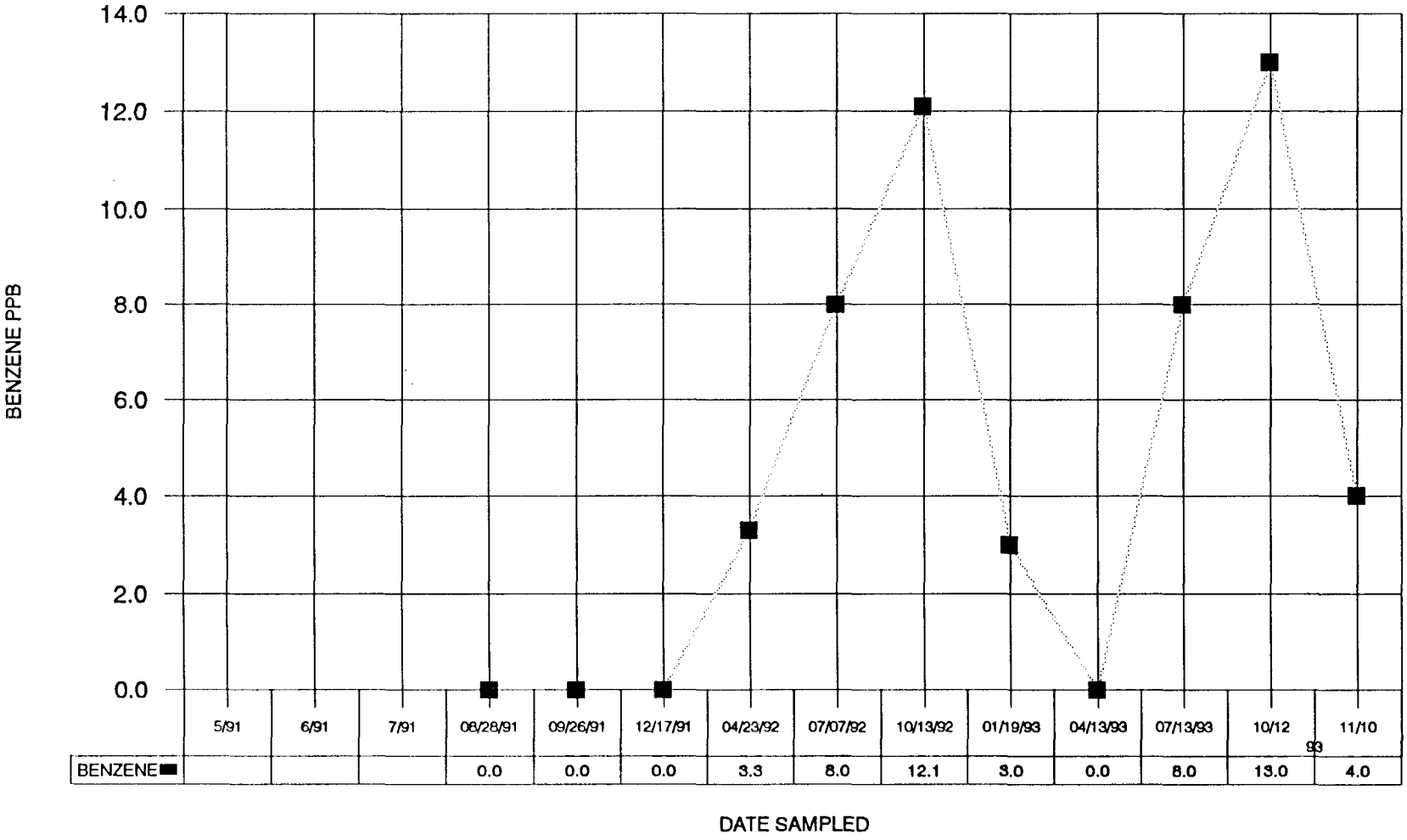
MW#65A BH-91A



	5/91	6/91	7/91	08/22/91	09/27/91	12/17/91	01/23/92	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93	07/13/93	10/13 93
BENZENE				270.0	680.0	150.0	46.0	25.3	413.0	10.6	3.0	4.0	0.0	7.0

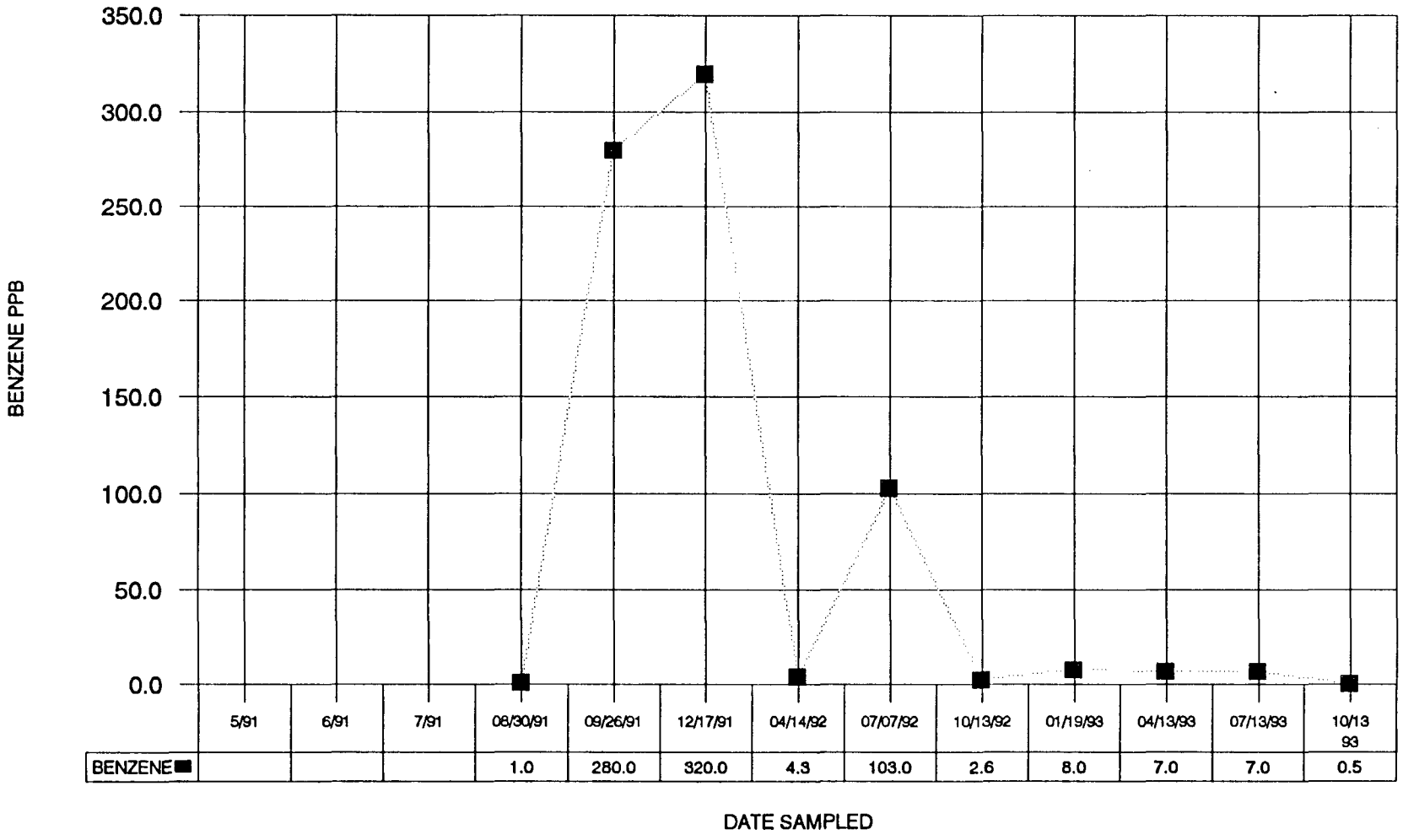
GROUNDWATER ANALYSIS DATA

MW#66 BH-92



GROUNDWATER ANALYSIS DATA

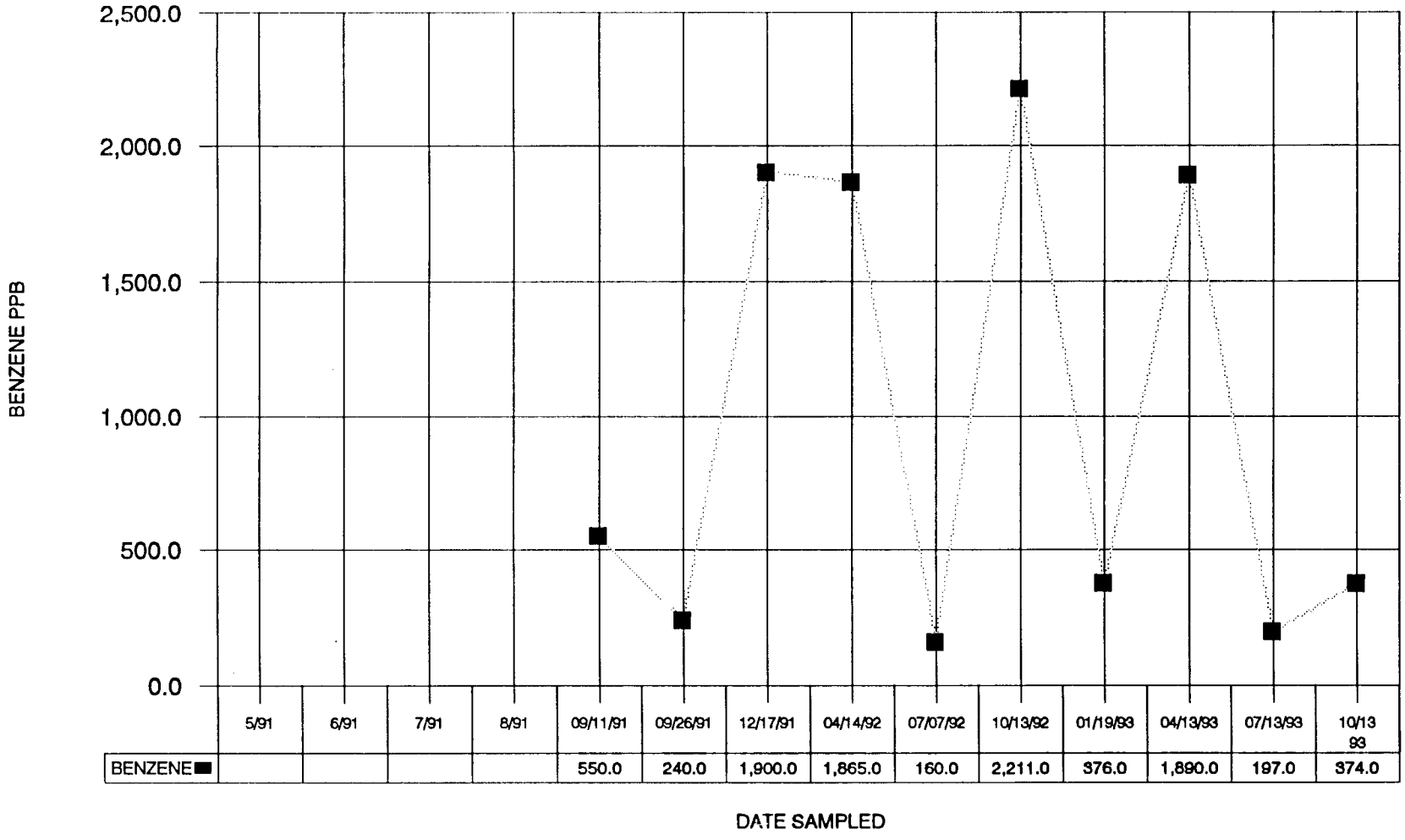
MW#67 BH-93



	5/91	6/91	7/91	08/30/91	09/26/91	12/17/91	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93	07/13/93	10/13 93
BENZENE				1.0	280.0	320.0	4.3	103.0	2.6	8.0	7.0	7.0	0.5

GROUNDWATER ANALYSIS DATA

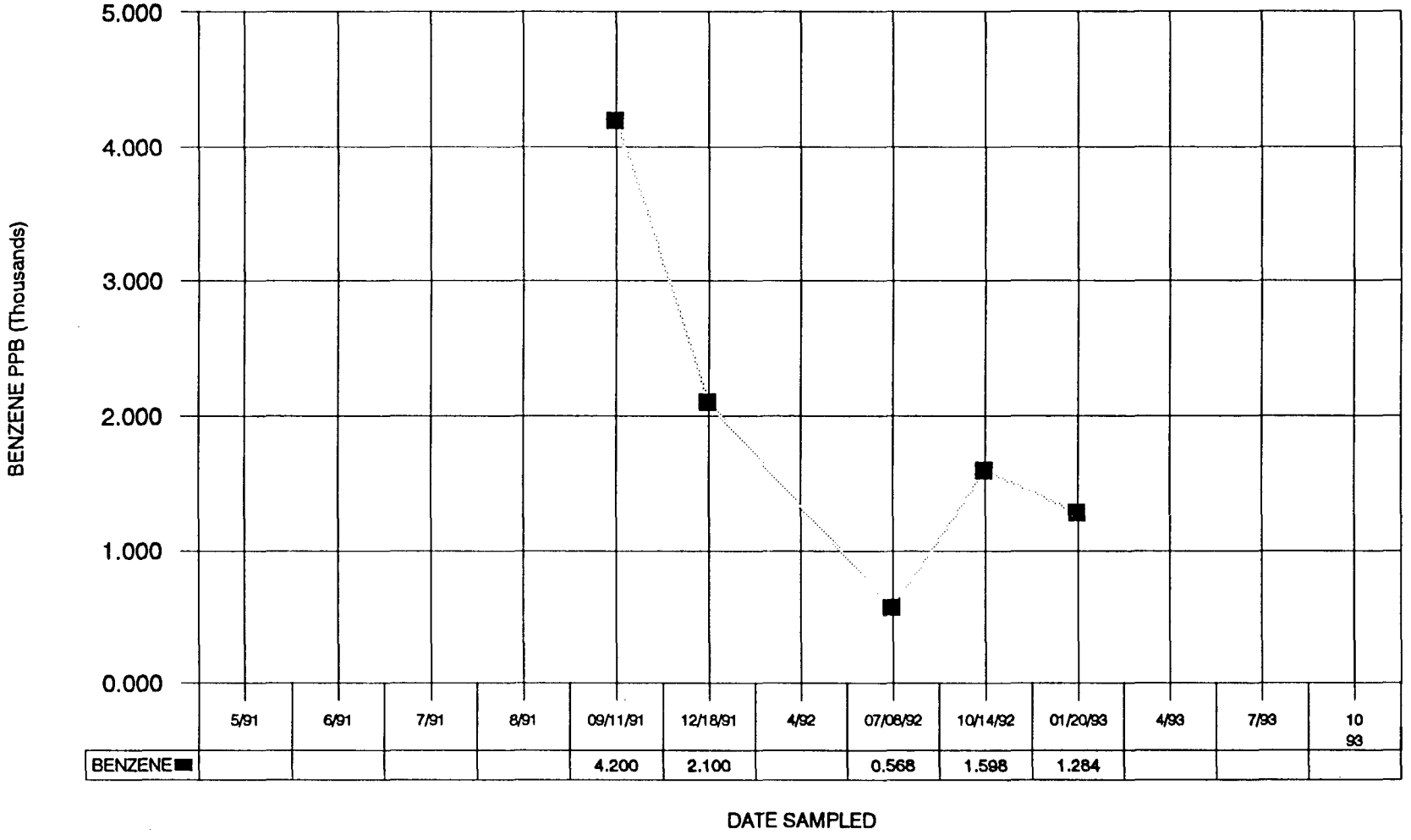
MW#68 BH-94



	5/91	6/91	7/91	8/91	09/11/91	09/26/91	12/17/91	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93	07/13/93	10/13 93
BENZENE					550.0	240.0	1,900.0	1,865.0	160.0	2,211.0	376.0	1,890.0	197.0	374.0

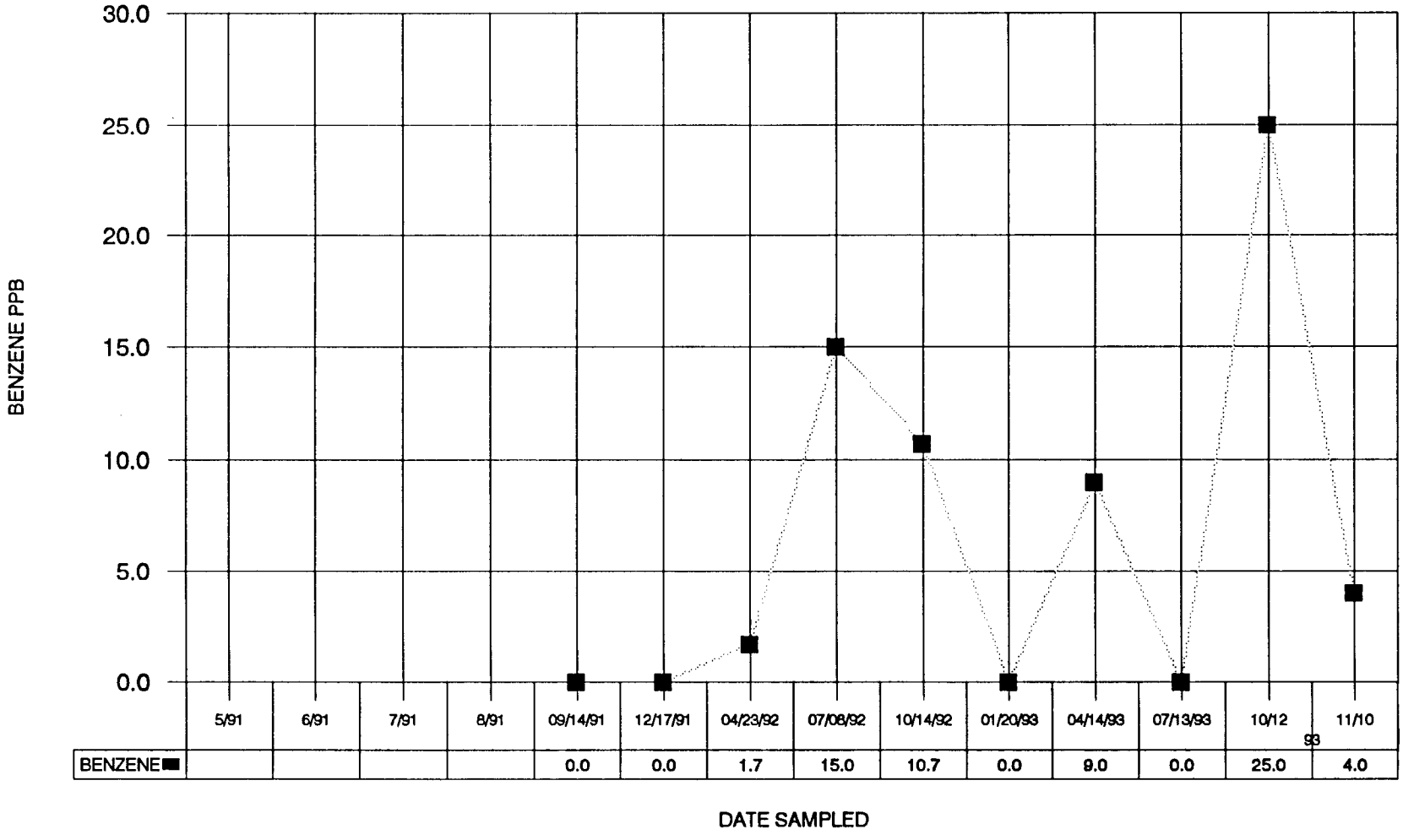
GROUNDWATER ANALYSIS DATA

MW#69 BH-95



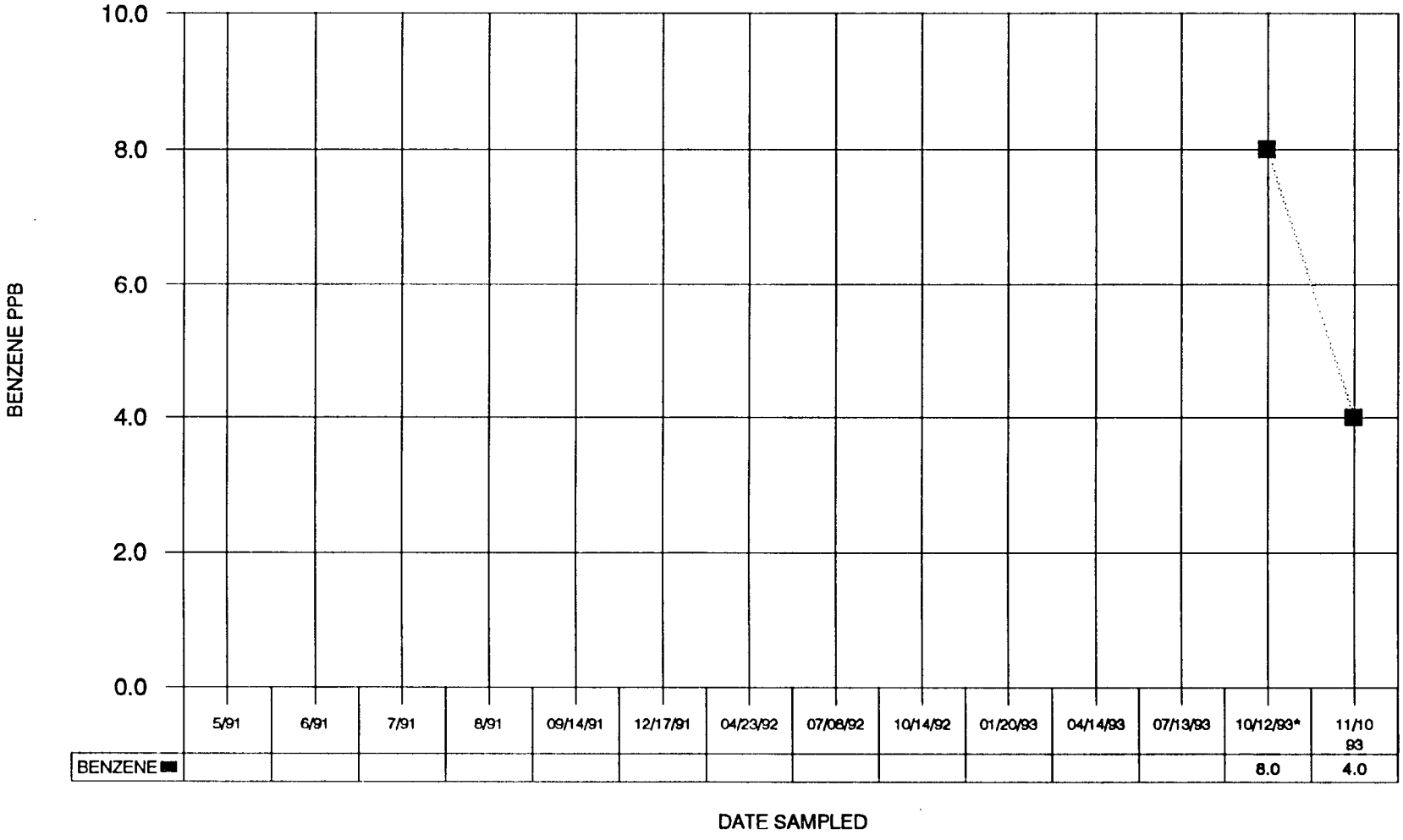
GROUNDWATER ANALYSIS DATA

MW#70 BH-97



GROUNDWATER ANALYSIS DATA

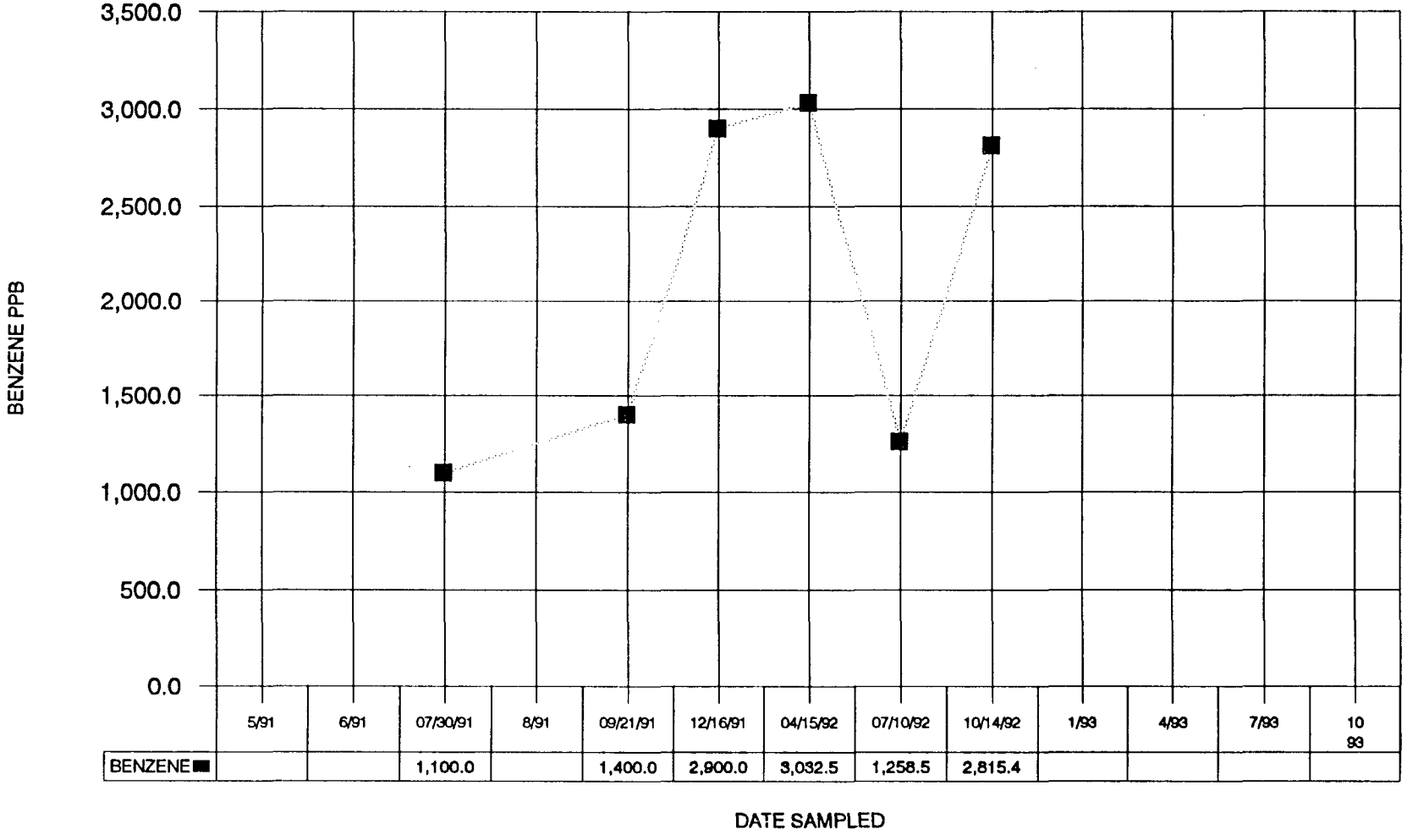
MW#71 BH-98



* 10/12/93 is the first time to sample this well.

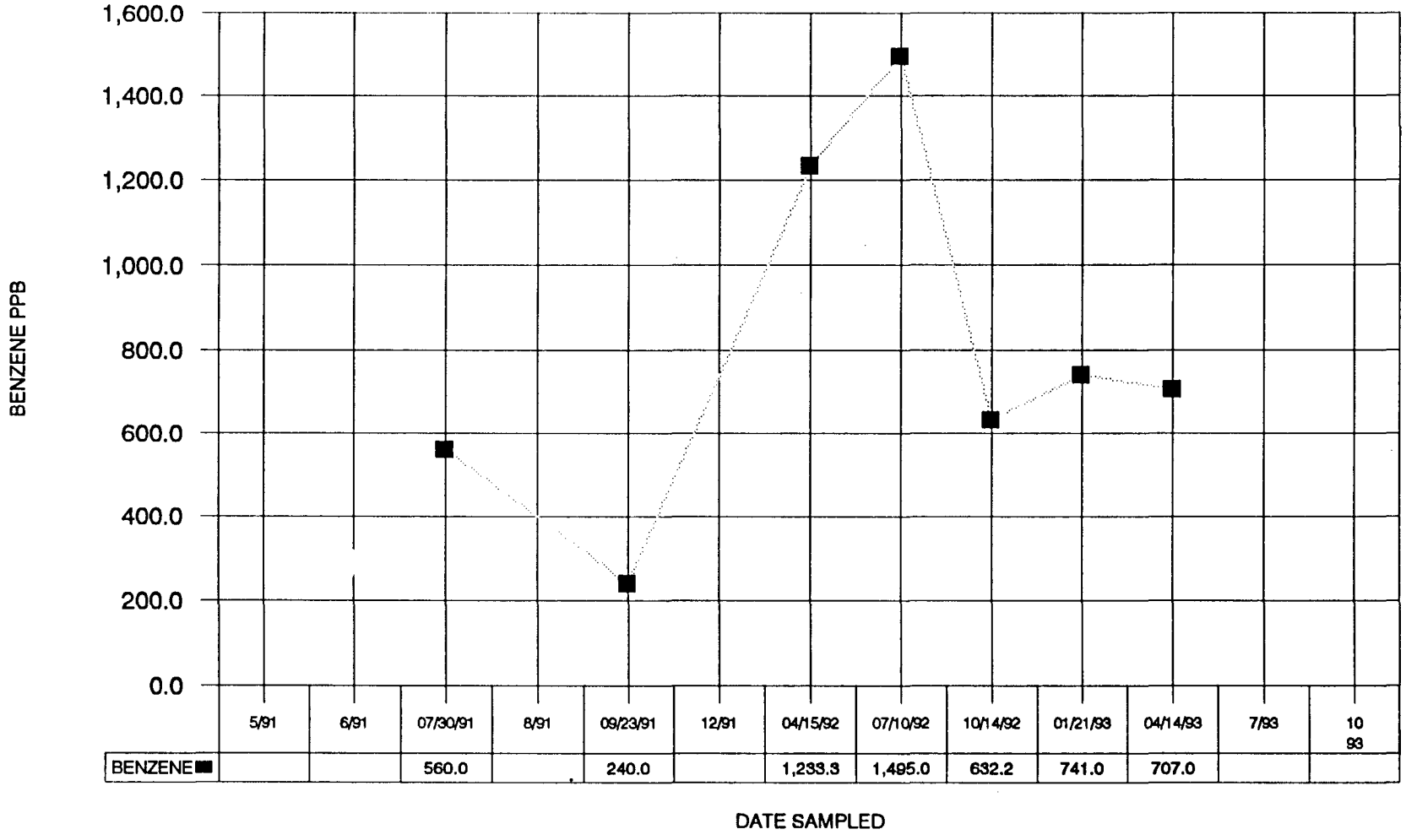
GROUNDWATER ANALYSIS DATA

SUMP 11A



GROUNDWATER ANALYSIS DATA

SUMP 16A



APPENDIX D

RANCHER WELL, PLANT WELL, AND SPRING MONTHLY LABORATORY REPORTS

(OCTOBER)

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

LIENT I.D.....:
DATE SAMPLED.....: 10/14/93
TIME SAMPLED.....: 07:45
ORK DESCRIPTION...: SW-1

LABORATORY I.D...: 932031-0006
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
hloride (Unfilt.)	21.3	0.5	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	97	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Litton Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/14/93
TIME SAMPLED.....: 08:16
WORK DESCRIPTION...: #1 LYMAN

LABORATORY I.D...: 932031-0007
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	14.6	0.5	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	99	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Litton Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/14/93
TIME SAMPLED.....: 08:45
WORK DESCRIPTION...: #2 ARROYO

LABORATORY I.D...: 932031-0008
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	10.3	0.5	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	114	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/14/93
TIME SAMPLED.....: 09:10
WORK DESCRIPTION...: #3 BIEBBLE

LABORATORY I.D...: 932031-0009
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	10.4	0.5	mg/L	325.2 (1)	11/01/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	110	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
an Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/05/93

JOB NUMBER: 932031 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 09/21/93
TIME SAMPLED.....: 09:05
WORK DESCRIPTION...: TRIP BLANK

LABORATORY I.D...: 932031-0010
DATE RECEIVED....: 10/16/93
TIME RECEIVED....: 09:15
REMARKS.....: REC'D @ 15 DEGREE C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	10/26/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	103	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International
A Litton / Dresser Company

CORE LABORATORIES

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Marathon Oil	PROJECT NAME/NUMBER:
SEND REPORT TO: Bob Menzie	**BILLING INFORMATION**
ADDRESS: PO Box 552	BILL TO: Marathon Oil
Midland, TX 79702	ADDRESS: PO Box 552
	Midland, TX 79702
PHONE: (915) 687-8312	PHONE: (915) 682-1626
FAX: (915) 687-8337	FAX: PO NO.:

SAMPLE NO.	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	PRES.	NUMBER OF CONTAINERS	ANALYSIS / METHOD REQUEST: BTEX	Cl⁻	REMARKS / PRECAUTIONS
1	SW-1	10/14/93	07:45	Water	40ml VOA	HCl	4	✓	✓	Cl⁻ not preserved
2	#1 Lyman	"	08:16	"	"	"	4	✓	✓	" "
3	#2 Arroyo	"	08:45	"	"	"	4	✓	✓	" "
4	#3 Biebble	"	09:10	"	"	"	4	✓	✓	" "
5	trip blank	9/21/93	09:05	"	"	HCl	1	✓		" "

LAB JOB NO.:

SAMPLER: R M Gray

SHIPMENT METHOD:

AIRBILL NO.:

REQUIRED TURNAROUND:* [ ] SAME DAY [ ] 24 HOURS [ ] 48 HOURS [ ] 72 HOURS [ ] 5 DAYS [ ] 10 DAYS [X] ROUTINE OTHER

1. RELINQUISHED BY:	DATE	2. RELINQUISHED BY:	DATE	3. RELINQUISHED BY:	DATE
SIGNATURE: R M Gray	10-14-93	SIGNATURE: Allan B. Johnston	10/15/93	SIGNATURE:	
PRINTED NAME/COMPANY: R M Gray Marathon	TIME 09:55	PRINTED NAME/COMPANY:	TIME 10:30	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	2. RECEIVED BY:	DATE	3. RECEIVED BY:	DATE
SIGNATURE: Allan B. Johnston	10/14/93	SIGNATURE: Mary Scott	10/16/93	SIGNATURE:	
PRINTED NAME/COMPANY: Allan B. Johnston Jr. CL	TIME 09:55	PRINTED NAME/COMPANY: Core	TIME 915	PRINTED NAME/COMPANY:	TIME

* RUSH TURNAROUND MAY REQUIRE SURCHARGE

☐ **Anaheim, California** 1250 E. Gene Autry Way, Anaheim, California 92805, (714) 937-1094

☐ **Long Beach, California** 3700 Cherry Avenue, Long Beach, California 90807, (310) 595-8401

☒ **Denver (Aurora), Colorado** 1300 S. Potomac St. - Suite 130, Aurora, Colorado 80012, (303) 751-1780

☐ **Casper, Wyoming** 420 West 1st Street, Casper, Wyoming 82601, (307) 235-5741

☐ **Houston, Texas** 10201 Westheimer, Bldg. 1-A, Houston, Texas 77042, (713) 972-6700

☐ **Houston, Texas** 8210 Mosely Road, Houston, Texas 77075, (713) 943-9776

☐ **Corpus Christi, Texas** 1733 North Padre Island Dr., Corpus Christi, Texas 78408, (512) 289-2673

☐ **Lake Charles, Louisiana** 3645 Arizona Street, Sulphur, Louisiana 70663, (318) 583-4926

RANCHER WELL, PLANT WELL, AND SPRING MONTHLY LABORATORY REPORTS

(NOVEMBER)

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/29/93

JOB NUMBER: 932203 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 11/10/93
TIME SAMPLED.....: 10:26
WORK DESCRIPTION...: SW-1

LABORATORY I.D...: 932203-0001
DATE RECEIVED....: 11/12/93
TIME RECEIVED....: 10:42
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	516	1.5	mg/L	325.2 (1)	11/17/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	11/17/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	96	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/29/93

JOB NUMBER: 932203 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 11/10/93
TIME SAMPLED.....: 13:23
WORK DESCRIPTION...: #1 LYMAN

LABORATORY I.D...: 932203-0002
DATE RECEIVED....: 11/12/93
TIME RECEIVED....: 10:42
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	482	1.5	mg/L	325.2 (1)	11/17/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	11/17/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	96	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/29/93

JOB NUMBER: 932203 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 11/10/93
TIME SAMPLED.....: 13:45
WORK DESCRIPTION...: #2 ARROYO

LABORATORY I.D...: 932203-0003
DATE RECEIVED....: 11/12/93
TIME RECEIVED....: 10:42
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	493	1.5	mg/L	325.2 (1)	11/17/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	11/17/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	94	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/29/93

JOB NUMBER: 932203 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 10/21/93
TIME SAMPLED.....: :
WORK DESCRIPTION...: TRIP BLANK

LABORATORY I.D...: 932203-0004
DATE RECEIVED....: 11/12/93
TIME RECEIVED....: 10:42
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	11/17/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	96	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/29/93

JOB NUMBER: 932203 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: / /
TIME SAMPLED.....: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 932203-0005
DATE RECEIVED....: / /
TIME RECEIVED....: :
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	11/16/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl benzene	ND	0.5	ug/L			
Xylenes	ND	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	96	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

Western Atlas International

CORE LABORATORIES

QUALITY CONTROL REPORT
11/29/93

JOB NUMBER: 932203 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Chloride (Unfilt.)				DATE/TIME ANALYZED:11/17/93 12:10						QC BATCH NUMBER:283347
REPORTING LIMIT/DF: 0.5 UNITS:mg/L				METHOD REFERENCE :325.2 (1)						TECHNICIAN:DME
BLANK	ICB	931117	<0.5							
BLANK	CCB	931117	<0.5							
BLANK	CCB	931117	<0.5							
STANDARD	ICV/LCS	G930930A	48.3			50.0	97			
STANDARD	CCV	S80.0	81.1			80.0	101			
STANDARD	CCV	S80.0	85.5			80.0	107			
SPIKE	MS	932224-7	62.6					13.8	50.0	98
SPIKE	MS	932224-12	64.8					14.6	50.0	100
DUPLICATE	MD	932224-7	13.8	14.3	4					
DUPLICATE	MD	932224-12	14.6	14.3	2					

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however, assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories

QUALITY CONTROL FOOTER
11/29/93

(1) EPA 600/4-79-020, Methods For Chemical Analysis Of Water And Wastes, March 1983
(2) EPA SW-846, Test Methods For Evaluating Solid Waste, Third Edition, November 1986
(3) Standard Methods For The Examination Of Water And Wastewater, 17th Edition, 1989
(4) EPA 600/4-80-032, Prescribed Procedures For Measurement Of Radioactivity In Drinking Water, August 1980
(5) EPA 600/8-78-017, Microbiological Methods For Monitoring The Environment, December 1978
(6) Federal Register, July 1, 1990 (40 CFR Part 136)
(7) EPA 600/4-88-039, Methods For The Determination Of Organics Compounds In Drinking Water, December 1988
(8) U.S.G.S. Methods For Determination Of Inorganic Substances In Water And Fluvial Sediments, Book 5, Chapter A1, 1985
(9) Federal Register, Friday, June 7,1991 (40 CFR Parts 141 & 142)
(10) Standard Methods For The Examination Of Water And Wastewater, 16th Edition, 1985
(11) ASTM, Section 11 Water And Environmental Technology, Volume 11.01 Water (1), 1991
(12) Methods Of Soil Analysis, American Society Of Agronomy, Agronomy No. 9, 1965

NC = Not Calculable Due To Value(s) Lower Than The Detection Limit

COMMENTS: Data in QA report may differ from final results due to digestion and/or dilution of sample into analytical ranges. The "Time Analyzed" in the QA report refers to the start time of the analytical batch which may not reflect the actual time of each analysis. The "Date Analyzed" is the actual date of analysis.

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories, however assumes no responsibility and makes no warranty or representations, express or implied, as to the productivity, proper operations, or profitableness of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced except in its entirety, without the written approval of Core Laboratories.

CORE LABORATORIES

Western Atlas International
A Litton / Dresser Company

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION

COMPANY: Marathon Oil Co.
SEND REPORT TO: R.J. Menzie Jr.
ADDRESS: PO Box 552
Midland, Tx 79702
PHONE: 687-8312
FAX: (915) 687-8337

PROJECT INFORMATION

PROJECT NAME/NUMBER:

BILLING INFORMATION

BILL TO: Marathon Oil
ADDRESS: PO Box 552
Midland, Tx 79702
PHONE: (915) 682-1626
FAX: (915) 687-8337
PO NO.:

LAB JOB NO.

SAMPLE NO.	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	PRES.	NUMBER OF CONTAINERS	ANALYSIS / METHOD REQUEST: BTEX 8020	CL	REMARKS / PRECAUTIONS
SW-1	SW-1	11-10-93	10:26A	water	40mL VOA	HCl	4	✓	✓	
#1	#1 Lyman	"	13:23	"	"	"	4	✓	✓	
#2	#2 Arroyo	"	13:45	"	"		4	✓	✓	
	Trip Blank	10-21-93		"	"	"	1	✓		

SAMPLER: RM Gray
SHIPMENT METHOD: Airborne Express
AIRBILL NO.: 6779864921

REQUIRED TURNAROUND:* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☒ ROUTINE OTHER

1. RELINQUISHED BY:	DATE	2. RELINQUISHED BY:	DATE	3. RELINQUISHED BY:	DATE
SIGNATURE: RM Gray	11/11/93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: RM Gray Marathon	TIME 14:25	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	2. RECEIVED BY:	DATE	3. RECEIVED BY:	DATE
SIGNATURE:		SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME

* RUSH TURNAROUND MAY REQUIRE SURCHARGE

☐ **Anaheim, California** 1250 E. Gene Autry Way, Anaheim, California 92805, (714) 937-1094
☐ **Long Beach, California** 3700 Cherry Avenue, Long Beach, California 90807, (310) 595-8401
☒ **Denver (Aurora), Colorado** 1300 S. Potomac St. - Suite 130, Aurora, Colorado 80012, (303) 751-1780
☐ **Casper, Wyoming** 420 West 1st Street, Casper, Wyoming 82601, (307) 235-5741
☐ **Houston, Texas** 10201 Westheimer, Bldg. 1-A, Houston, Texas 77042, (713) 972-6700
☐ **Houston, Texas** 8210 Mosely Road, Houston, Texas 77075, (713) 943-9776
☐ **Corpus Christi, Texas** 1733 North Padre Island Dr., Corpus Christi, Texas 78408, (512) 289-2673
☐ **Lake Charles, Louisiana** 3645 Arizona Street, Sulphur, Louisiana 70663, (318) 583-4926

RANCHER WELL, PLANT WELL, AND SPRING MONTHLY LABORATORY REPORTS

(DECEMBER)

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY DATE RECEIVED: 12/07/93
PROJECT # : (NONE)
PROJECT NAME: INDIAN BASIN REMEDIATION REPORT DATE : 12/29/93

ATI I.D.: 312321

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	SW-1	AQUEOUS	12/06/93
02	#1 LYMAN	AQUEOUS	12/06/93
03	#1 LYMAN DUP	AQUEOUS	12/06/93
04	#1 LYMAN DUP2	AQUEOUS	12/06/93
05	#2 ARROYO	AQUEOUS	12/06/93
06	TRIP BLANK	AQUEOUS	12/01/93

----TOTALS----

MATRIX	# SAMPLES
AQUEOUS	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

2709-D Pan American Freeway NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **312321**

December 29, 1993

Marathon Oil Company
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: INDIAN BASIN REMEDIATION

Attention: Robert Menzie

On **12/07/93**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

EPA Method 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jd

Enclosure

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 312321

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN REMEDIATION

DATE RECEIVED : 12/07/93
REPORT DATE : 12/29/93

PARAMETER	UNITS	01	02	03	04	05
CHLORIDE (EPA 325.2)	MG/L	20	14	15	4400	10.7

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : INDIAN BASIN REMEDIATION ATI I.D. : 312321

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	31265302	16	16	0	35	20	95
CHLORIDE	MG/L	31232105	10.7	9.8	9	20.7	10.0	100

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 312321
PROJECT # : (NONE)
PROJECT NAME: INDIAN BASIN REMEDIATION

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	SW-1	AQUEOUS	12/06/93	NA	12/09/93	1
02	#1 LYMAN	AQUEOUS	12/06/93	NA	12/09/93	1
05	#2 ARROYO	AQUEOUS	12/06/93	NA	12/09/93	1
06	TRIP BLANK	AQUEOUS	12/01/93	NA	12/09/93	1

PARAMETER	UNITS	01	02	05	06
BENZENE	UG/L	<0.5	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5	<0.5
BROMOFLUOROBENZENE (%)		100	95	98	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 312321
BLANK I.D.	: 120993	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 12/09/93
PROJECT #	: (NONE)	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN REMEDIATION		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)	ATI I.D.	: 312321
MSMSD #	: 31232001	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL COMPANY	DATE ANALYZED	: 12/09/93
PROJECT #	: (NONE)	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: INDIAN BASIN REMEDIATION	REF. I.D.	: 31232001
		UNITS	: UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	11	110	11	110	0
TOLUENE	<0.5	10	11	110	11	110	0
ETHYL BENZENE	<0.5	10	11	110	11	110	0
TOTAL XYLENES	0.5	30	32	105	33	108	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 12-6-93 PAGE 1 OF 1

ATI LAB I.D. 312321

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert Menzie

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert Menzie
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	BTXE (602c)	Chloride	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.		Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)		SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal		The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
Sw-1	12-6-93	14:05	W	01					2	1																		3
#1 Lyman		14:38	W	02					2	1																		3
#1 Lyman Dup		14:38	W	03						✓																		2
#1 Lyman Dup2		14:38	W	04						✓																		2
#2 Arroyo		14:51	W	05					2	1																		3
Trip Blank	12/1/93		AQ	06					1																			1

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:		NO. CONTAINERS	14
PROJ. NAME: Indian Basin Remediation		CUSTODY SEALS	(Y) N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: RM Gray Time: 16:00	Signature: Time:	Signature: Time:
Printed Name: RM Gray Date: 12-6-93	Printed Name: Date:	Printed Name: Date:
Company: Marathon (GC) Phone: 687-8314	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY:(LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 15:55
Printed Name: Date:	Printed Name: Date:	Printed Name: Terri Dettre Date: 12/7/93
Company:	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 12/7/93 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
312321-1	12/6/93	1405	DW	1
-2		1435		2
-3		"		3
-4		"		4
-5		1451		5

ANALYSIS REQUEST

TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Chloride	632/632 MOD	619/619 MOD	610/8310			8240 (TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
					X																							1
					X																							1
					X																							1
					X																							1
					X																							1

PROJECT INFORMATION	
PROJECT NUMBER:	312321
PROJECT NAME:	MOC
QC LEVEL:	STD IV
QC REQUIRED:	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	7
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	312321

DUE DATE: 12/21/93 W.O. #LL806

RUSH SURCHARGE: ____

CLIENT DISCOUNT: 15 %

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX X
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: Terri Dettie Time: 1715
Printed Name: Terri Dettie Date: 12/7/93
Analytical Technologies, Inc. Albuquerque
RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:
RECEIVED BY: (LAB) 2.
Signature: Time: 932
Printed Name: Linda Eshelman Date: 12/8/93
Company: ATI

APPENDIX E

STATE ENGINEER'S FLUID RECOVERY REPORTS

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

November 5, 1993

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells as of Monday, November 1, 1993. Cumulative Lower Queen fluid removal through that date is 25,574,621 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	11/1/93 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	4279656	4,279,656 26,922[1]	4,306,578
MW-59 (BH-85)	10259114	0	85871*	3,606,582 83,454[1]	3,690,036
W-61A (BH-87A)	10239116	0	4082834	4,082,834 46,578[1] 84,272[2]	4,213,684
MW-62 (BH-88)	10239115	0	2868946	2,868,946 193,931[3] 62,622[1]	3,125,499
MW-65A (BH-91A)	10239117	0	6271444	6,271,444 39,774[1]	6,311,218
MW-68 (BH-94)	02209213	122618	1566148	1,443,530 2,484,076[1]	3,927,606
LOWER QUEEN TOTAL 25,574,621 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.
[2] Water recovered during interference test conducted 2/19-24/93.
[3] Total prior to automatic sampling device installation on 1/25/92.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, November 1, 1993. The cumulative shallow fluid removal through that date is 654,122 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	11/01/93 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	131826.0	33,589.8 115,911[1]	149,501
MW-14	02209214	0	398204.3	398,204[1] 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	420[2] *604.8[1]	1025
SHALLOW TOTAL				654,122 Gallons	

[1] Previously metered recovered volumes.
[2] Well is pumped off once or twice daily and gauged in portable fiberglass tank.
* Corrected fluid removed.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.

RJM939115/nrt

xc: T. C. Lowry - Midland
D. E. Kenyon - PTC, Littleton
R. F. Unger - Midland
R. A. Biernbaum - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

December 10, 1993

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells as of Monday, December 6, 1993. Cumulative Lower Queen fluid removal through that date is 26,840,745 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	12/6/93 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	4493253	4,493,253 26,922[1]	4,520,175
MW-59 (BH-85)	10259114	0	88153.5*	3,702,447 83,454[1]	3,785,901
W-61A (BH-87A)	10239116	0	4260993	4,260,993 130,850[1]	4,391,843
MW-62 (BH-88)	10239115	0	3120082	3,120,082 256,553[1]	3,376,635
MW-65A (BH-91A)	10239117	0	6532108.3	6,532,108 39,774[1]	6,571,882
MW-68 (BH-94)	02209213	122618	1710233	1,710,233 2,484,076[1]	4,194,309
LOWER QUEEN TOTAL 26,840,745 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, December 6, 1993. The cumulative shallow fluid removal through that date is 723,775 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	12/06/93 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	200858	102,622 115,911[1]	218,533
MW-14	02209214	0	398204.3	398,204[1] 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	621.6[2] 1024.8[1]	1,646.4
SHALLOW TOTAL				723,775 Gallons	

[1] Previously metered recovered volumes.
[2] Well is pumped off once or twice daily and gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.

RJM93121/nrt

xc: R. A. Biernbaum - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

January 6, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Tuesday, January 4, 1994. Cumulative Lower Queen fluid removal through that date is 27,666,377 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	1/4/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	4579954	4,579,954 26,922[1]	4,606,876
MW-59 (BH-85)	10259114	0	90648.4*	3,807,233 83,454[1]	3,890,687
MW-61A (BH-87A)	10239116	0	4395012	4,395,012 130,850[1]	4,525,862
MW-62 (BH-88)	10239115	0	3305070	3,305,070 256,553[1]	3,561,623
MW-65A (BH-91A)	10239117	0	6737060	6,737,060 39,774[1]	6,776,834
MW-68 (BH-94)	02209213	122618	1820318	1,820,318 2,484,076[1]	4,304,394
MW-72 (BH-99)	02881532	470	571	101	101
LOWER QUEEN TOTAL 27,666,377 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Tuesday, January 4, 1994. The cumulative shallow fluid removal through that date is 749,553 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	1/4/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	225577.3	127,341.1 115,911[1]	243,252
MW-14	02209214	0	398204.3	398,204[1] 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	1058.4[2] 1646.4[1]	2,704.8
SHALLOW TOTAL				749,553 Gallons	

[1] Previously metered recovered volumes.
[2] Well is pumped off once or twice daily and gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM10394/nrt

xc: R. A. Biernbaum - Midland
C. M. Schweser - IBGP, Lakewood

APPENDIX F

LABORATORY RESULTS - AIR (VAPOR EXTRACTION WELLS)

Analytical Technologies, Inc.

CLIENT : MARATHON OIL CO. DATE RECEIVED: 10/26/93
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REM. REPORT DATE : 10/29/93

ATI I.D.: 310395

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-19	AIR	10/25/93
02	MW-18	AIR	10/25/93
03	MW-20	AIR	10/25/93

----TOTALS----

MATRIX	# SAMPLES
AIR	3

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED
CLIENT : MARATHON OIL CO. ATI I.D.: 310395
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REM.

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MW-19	AIR	10/25/93	NA	10/27/93	100
02	MW-18	AIR	10/25/93	NA	10/27/93	5
03	MW-20	AIR	10/25/93	NA	10/27/93	1

PARAMETER	UNITS	01	02	03
FUEL HYDROCARBONS	UG/L	41000	4800	500
HYDROCARBON RANGE		C6-C14	C6-C14	C6-C14
HYDROCARBONS QUANTITATED USING		GAS CONDENSATE	GAS CONDENSATE	GAS CONDENSATE
BROMOFLUOROBENZENE (%)		108	107	114

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: EPA 8015 MODIFIED	ATI I.D.	: 310395
BLANK I.D.	: 102793	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL CO.	DATE ANALYZED	: 10/27/93
PROJECT #	: 44999	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN REM.		

PARAMETER	UNITS	
FUEL HYDROCARBONS	UG/L	<5
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : MARATHON OIL CO. ATI I.D.: 310395
PROJECT # : 44999
PROJECT NAME: INDIAN BASIN REM.

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MW-19	AIR	10/25/93	NA	10/27/93	100
02	MW-18	AIR	10/25/93	NA	10/27/93	5
03	MW-20	AIR	10/25/93	NA	10/27/93	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<5.0	<0.25	<0.05
TOLUENE	UG/L	<5.0	<0.25	<0.05
ETHYLBENZENE	UG/L	42	5.5	0.37
TOTAL XYLENES	UG/L	<5.0	<0.25	<0.05
METHYL-t-BUTYL ETHER	UG/L	<25	<1.2	0.63
BROMOFLUOROBENZENE (%)		108	107	114

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX, MTBE (EPA 8020)	ATI I.D.	: 310395
BLANK I.D.	: 102793	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL CO.	DATE ANALYZED	: 10/27/93
PROJECT #	: 44999	DILUTION FACTOR:	1
PROJECT NAME:	INDIAN BASIN REM.		

PARAMETER	UNITS	
BENZENE	UG/L	<0.05
TOLUENE	UG/L	<0.05
ETHYLBENZENE	UG/L	<0.05
TOTAL XYLENES	UG/L	<0.05
METHYL-t-BUTYL ETHER	UG/L	<0.25
BROMOFLUOROBENZENE (%)		100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEXM (EPA 8020)/8015, MOD (C6-C16)

MSMSD #	: 102793	ATI I.D.	: 310395
CLIENT	: MARATHON OIL CO.	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 10/27/93
PROJECT NAME	: INDIAN BASIN REM.	SAMPLE MATRIX	: AIR
		REF. I.D.	: 102793
		UNITS	: UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.05	1.0	1.1	110	1.0	100	10
TOLUENE	<0.05	1.0	1.1	110	1.0	100	10
ETHYL BENZENE	<0.05	1.0	1.1	110	1.0	100	10
TOTAL XYLENES	<0.05	3.0	3.3	110	3.1	103	6
METHYL-t-BUTYL ETHER	<0.25	2.0	2.3	115	2.1	105	9

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

315595

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 10-25-93 PAGE 1 OF 1

ATI LAB ID:

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER:

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: (915) 687-8312
FAX: (915) 687-8337

BILL TO: Robert J. Menzie Jr.
COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
MW-19	10-25-93	12:20	Air		X	X																		1
MW-18	10-25-93	12:40	Air		X	X																		1
MW-20	10-25-93	13:00	Air		X	X																		1

PROJECT INFORMATION

PROJ. NO: 44999
PROJ. NAME: Indian Basin Rem.
P.O. NO:
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	3	
CUSTODY SEALS	NA	Y / N / NA
RECEIVED INTACT	Y	
RECEIVED COOL	N	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

Tedlar bags not completely filled.

Please Return Cooler

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: RM Gray	Signature:	Signature:
Time: 13:34	Time:	Time:
Printed Name: RM Gray	Printed Name:	Printed Name:
Date: 10-25-93	Date:	Date:
Company: Marathon	Company:	Company:
Phone: (915) 687-8314		

RECEIVED BY: 1.	RECEIVED BY 2	RECEIVED BY LAB: 1.
Signature:	Signature:	
Time:	Time:	
Printed Name:	Printed Name:	
Date:	Date:	
Company:	Company:	

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Tami Dettre 10/26
Tami Dettre 10/26/93

OCT 25 '93 01:22PM ATI ALBUQUERQUE P.1

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEXM (EPA 8020)/8015, MOD (C6-C16)

		ATI I.D.	: 310395
MSMSD #	: 102793	DATE EXTRACTED	: NA
CLIENT	: MARATHON OIL CO.	DATE ANALYZED	: 10/27/93
PROJECT #	: 44999	SAMPLE MATRIX	: AIR
PROJECT NAME	: INDIAN BASIN REM.	REF. I.D.	: 102793
		UNITS	: UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.05	1.0	1.1	110	1.0	100	10
TOLUENE	<0.05	1.0	1.1	110	1.0	100	10
ETHYL BENZENE	<0.05	1.0	1.1	110	1.0	100	10
TOTAL XYLENES	<0.05	3.0	3.3	110	3.1	103	6
METHYL-t-BUTYL ETHER	<0.25	2.0	2.3	115	2.1	105	9

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

INDIAN BASIN GAS PLANT
TREATMENT PROJECT
QUARTERLY REPORT

FOURTH QUARTER 1994
OCTOBER, NOVEMBER, AND DECEMBER

Submitted by
Marathon Oil Company
on behalf of the
Indian Basin Gas Plant Owners

February 8, 1995

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO

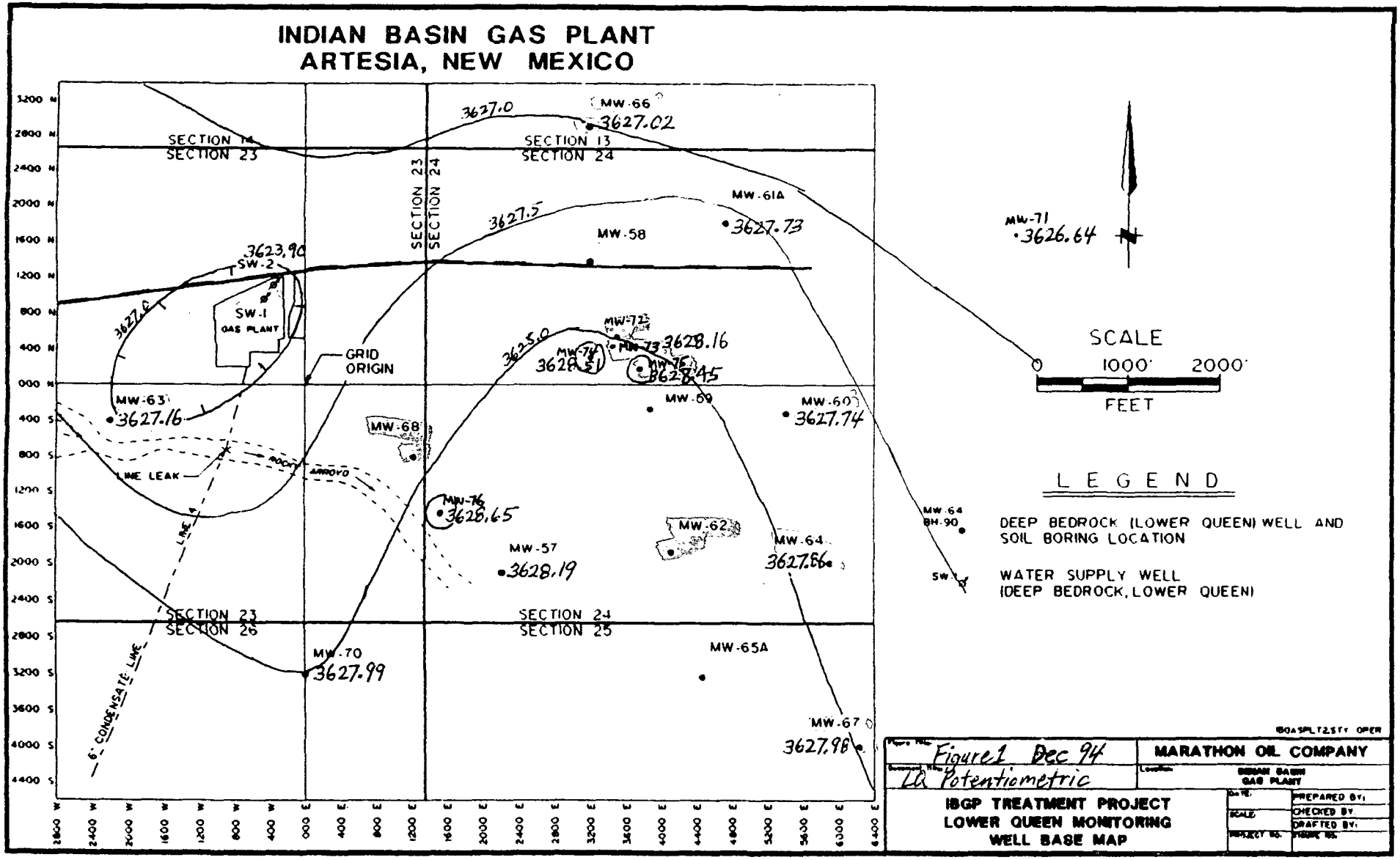


Figure 1 Dec 94	MARATHON OIL COMPANY
Potentiometric	INDIAN BASIN GAS PLANT
IBGP TREATMENT PROJECT LOWER QUEEN MONITORING WELL BASE MAP	DATE: PREPARED BY: SCALE: CHECKED BY: PROJECT NO.: DRAFTED BY: FIGURE NO.:

EXECUTIVE SUMMARY

The pump-and-treat groundwater remediation system is fully operational and functioning as set forth in the Treatment Project Plan document (March 1992). During the quarterly sampling event in October, light nonaqueous phase liquid (condensate) was observed in two Lower Queen wells. Fluid recovery from the Lower Queen aquifer averaged 6998 barrels per week with volatile hydrocarbon compounds being removed by air stripping. Lower Queen dissolved benzene concentrations range from 0.5 to 13 micrograms per liter or parts per billion. The benzene concentrations in six downgradient wells were below the State maximum allowable concentration of 10 micrograms per liter indicating continued hydrocarbon plume containment. Chloride concentrations in all Lower Queen wells are below the State maximum allowable concentration of 250 milligrams per liter.

Light nonaqueous phase liquid (condensate) was observed in four Shallow zone wells. Shallow zone pumping continues from one well. Seven Shallow zone wells sampled in October indicate chloride concentrations above the State maximum allowable concentration of 250 milligrams per liter. Fluid recovery from the Shallow zone aquifer averaged 29 barrels per week. The vapor extraction system was not operated during the Fourth Quarter.

Concentrations of benzene, toluene, ethylbenzene, total xylene, and chloride in groundwater collected from a rancher well completed in the Shallow alluvium, a rancher well completed in Seven Rivers Formation, and the Upper Indian Hills Spring West (Rocky Arroyo spring) have not exceeded State or Federal drinking water standards.

Light nonaqueous phase liquid (condensate) recovery from the Lower Queen and Shallow zone for the Fourth Quarter was 16.1 barrels. Excluding the volume volatilized by the air stripper and vapor extraction system, cumulative recovery is 3,541.9 barrels or 10.1% of the total spill volume.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

INTRODUCTION 1

GROUNDWATER ELEVATION 1
- Lower Queen Aquifer 1
- Shallow Zone 1
- Groundwater Recharge (Rainfall) 1

QUARTERLY SAMPLING LABORATORY RESULTS 1

RANCHER WELLS, SPRING, AND PLANT WELL LABORATORY RESULTS . . 2

GROUNDWATER PUMPING 3
- Lower Queen 3
- Shallow Zone 4

GROUNDWATER TREATMENT AND PRODUCT RECOVERY 4

VAPOR EXTRACTION SYSTEM 4

OTHER ACTIVITIES 5

REFERENCES CITED 5

TABLES

TABLE 1	LOWER QUEEN DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
TABLE 2	SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
TABLE 3	HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN LOWER QUEEN GROUNDWATER
TABLE 4	HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN SHALLOW ZONE GROUNDWATER
TABLE 5	RANCHER WELL GROUNDWATER AND NATURAL SPRING WATER SAMPLE RESULTS

FIGURES

FIGURE 1	DECEMBER 1994 LOWER QUEEN POTENTIOMETRIC SURFACE
FIGURE 2	LOWER QUEEN GROUNDWATER ELEVATION VS. TIME
FIGURE 3	OCTOBER 1994 SHALLOW ZONE POTENTIOMETRIC SURFACE
FIGURE 4	SHALLOW ZONE GROUNDWATER ELEVATION VS. TIME
FIGURE 5	WEEKLY LOWER QUEEN FLUID RECOVERY
FIGURE 6	WEEKLY SHALLOW ZONE FLUID RECOVERY
FIGURE 7	WEEKLY TOTAL FLUID RECOVERY

APPENDICES

APPENDIX A	OCTOBER 1994 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY
APPENDIX B	BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS
APPENDIX C	OCTOBER 1994 LABORATORY RESULTS - PROJECT WELLS, RANCHER WELLS, PLANT WELL, AND NATURAL SPRING
APPENDIX D	RANCHER WELL, PLANT WELL, AND NATURAL SPRING MONTHLY LABORATORY RESULTS - NOVEMBER
APPENDIX E	RANCHER WELL, PLANT WELL, AND NATURAL SPRING MONTHLY LABORATORY RESULTS - DECEMBER
APPENDIX F	STATE ENGINEER'S FLUID RECOVERY REPORTS

INTRODUCTION

This report summarizes groundwater and unsaturated zone treatment activities conducted during the Fourth Quarter of 1994 in accordance with the Indian Basin Environmental Treatment Project Plan submitted on March 5, 1992 by Marathon Oil Company on behalf of the Indian Basin Gas Plant owners. Preparation of this report is also in accordance with the April 2, 1992 New Mexico Oil Conservation Division (OCD) directive for quarterly reporting of remediation project activities. Remediation activities are continuing to reduce the impact of a liquid gas condensate and brine spill from a production pipeline discovered in April 1991 near the Indian Basin Gas Plant.

GROUNDWATER ELEVATION

Lower Queen Aquifer

Depth-to-water measurements were acquired from nonpumping, Lower Queen monitoring wells in October and December 1994. Table 1 presents groundwater elevations calculated from casing elevation data, depth-to-water measurements, and light nonaqueous phase liquid (LNAPL) thicknesses. Figure 1 is a potentiometric map of the Lower Queen aquifer based on depth-to-groundwater gauging conducted in December. Fourth Quarter monitoring data indicate decreasing groundwater elevations (Figure 2).

Shallow Zone

A potentiometric map was constructed using depth-to-water measurements collected from Shallow zone monitoring wells in October 1994 (Figure 3). Table 2 shows depth-to-water measurements, calculated groundwater elevations, and LNAPL thickness for Shallow zone wells. These Shallow zone data generally indicate increasing groundwater elevations in monitoring wells during the quarter (Figure 4). Increased groundwater elevations are the result of recharge from rainfall and both subsurface and surface inflow to the project area.

Groundwater Recharge (Rainfall)

Daily rainfall is gauged at the gas plant. Monthly rainfall for October, November, and December was 0.14, 0.45, and 0.09 inches, respectively (Tables 1 and 2). Cumulative rainfall for the Fourth Quarter was 0.68 inches.

QUARTERLY SAMPLING LABORATORY RESULTS

Thirty-one Shallow zone and ten Lower Queen monitoring wells were gauged on October 4 and 5, 1994. Sixteen Lower Queen wells including the plant water supply well (SW-1) were sampled. The backup plant supply well (SW-2) was gauged, but not sampled. Seven Lower

Queen wells have downhole pumps installed and were sampled through the pump. Two of the Lower Queen wells sampled through the downhole pump contained LNAPL (MW-68 and MW-72).

Twelve Shallow zone wells were sampled in October. Seven of the original twenty-five Shallow zone monitoring wells (including two sumps) designated for quarterly sampling in the Treatment Project Plan (see ***bolded and italicized*** well designations in Table 4) were sampled. The remaining 18 Shallow zone compliance wells were either dry or bailed dry during sampling (16), contain LNAPL (MW-69), or are inaccessible (MW-13; pump in well). Five Shallow zone wells other than those designated in the Treatment Project Plan were sampled (MW-41, MW-43, MW-49, MW-61, and MW-65). Samples were collected by Carter and Burgess, Inc. using Environmental Protection Agency (EPA) sampling protocol. Analytical Technologies, Inc. performed the BTEX (EPA Method 8020) and chloride (EPA Method 325.2) analyses. Appendix A contains tables prepared by Carter and Burgess, Inc. of field observations (well depth, depth-to-water measurement, gauge date and time, presence of LNAPL or free-phase product, measured hydrocarbon and hydrogen sulfide vapor concentrations at the wellhead, purge method and volume, temperature, specific conductance, pH, and dissolved oxygen) from notes recorded during field activities.

Tables 3 and 4 are historical summaries of quarterly benzene concentration data since September 1991 for the Lower Queen and Shallow zone wells, respectively. Benzene concentration (in ug/l) versus time graphs for each routinely sampled monitoring well are provided in Appendix B.

RANCHER WELLS, SPRING, AND PLANT WELL LABORATORY RESULTS

Monthly groundwater samples from the closest downgradient rancher well to the Shallow zone plume (Lyman) and from the Upper Indian Hills Spring West (Hendrickson and Jones, 1952) were collected on October 6, November 30, and December 16, 1994. In addition, the Biebelle rancher well, which is sampled quarterly, was sampled on October 6. The plant water supply well (SW-1), completed in the Lower Queen aquifer, is also sampled and analyzed monthly. Concentrations of BTEX and chloride in groundwater collected from the Lyman and Biebelle wells and surface water from the Upper Indian Hills Spring West (Rocky Arroyo spring) did not exceed State or Federal drinking water standards during the quarter (Table 5).

The rancher well and natural spring samples were obtained using EPA sampling and handling procedures. Analytical Technologies, Inc. performed the BTEX and chloride analyses using EPA approved methods. Laboratory results of groundwater from the rancher wells and the surface water from the natural spring are transmitted to the local ranchers each month with letters of explanation. Copies of these letters are also provided to the OCD and the Bureau of

Shallow Zone

Monthly Shallow zone fluid recovery during the Fourth Quarter from MW-69 is listed in the following table. Free product (condensate) recovery from MW-69 during the Fourth Quarter totaled 6.9 barrels.

SHALLOW ZONE FLUID RECOVERY

Well Number	October (Bbls) Cond./Water	November (Bbls) Cond./Water	December (Bbls) Cond./Water	Quarter Total (Bbls) Cond./Water
MW-69	3.1/171.7	3.3/176.7	0.5/17.3	6.9/365.7

GROUNDWATER TREATMENT AND PRODUCT RECOVERY

Fluids from six Lower Queen recovery wells were pumped through piping to a treatment compound that includes an oil/water separator, air stripper, and two aboveground tanks. The oil/water separator is used to remove free product from the produced groundwater. The free product is transferred to a condensate holding tank which is gauged on a daily basis. The measured volume of free condensate recovered from the commingled groundwater during the Fourth Quarter was 9.2 barrels. Cumulative condensate separated from the recovered groundwater since product separation began in April 1992 through the Fourth Quarter is 99.2 barrels.

Groundwater from the separator is pumped through the air stripper to remove dissolved-phase, volatile organic compounds. Stripped volatile organic compounds are vented to the atmosphere through a stack. Treated groundwater is used as make-up water for the gas plant.

Total free product recovery from the Lower Queen and Shallow zone for the Fourth Quarter was 16.1 barrels, a 17% decrease compared to the Third Quarter. Cumulative free product recovered to date excluding the volume volatilized by the air stripper and vapor extraction system is 3,541.9 barrels or 10.1% of the total spill volume.

VAPOR EXTRACTION SYSTEM

The vapor extraction system was not operated during the Fourth Quarter. On May 5, 1994, the vapor extraction system ceased operation when it was determined that a New Mexico Air Pollution Control Bureau air emission permit is required for system operation. The system

has been shut in since then and is being stored at the gas plant. Permit preparation and submittal is pending the written results of two Shallow alluvial conducted in December 1994 and three Lower Queen bedrock vapor extraction pilot tests conducted in January 1995.

OTHER ACTIVITIES

During the Fourth Quarter, four Lower Queen (MW-73, MW-74, MW-75, MW-76) and four Shallow zone wells (MW-77, MW-78, MW-79, MW-80) were drilled and completed as open hole, nominal eight-inch diameter wells. In addition, two Shallow zone vapor extraction pilot tests were conducted in December 1994 on monitoring well MW-18 and an extraction well near monitoring well MW-14 which was installed in November 1991.

REFERENCES CITED

Hendrickson, G. E., and Jones, R. S., 1952, Geology and Ground-water Resources of Eddy County, New Mexico: New Mexico Bureau of Mines & Mineral Resources Ground-water Report 3, 169 p., 4 pls.

TABLES

TABLE 1. LOWER QUEEN DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA FOURTH QUARTER 1994

LOWER QUEEN WELL	Top of Casing (TOC) Elev. (ft AMSL)	Total Depth from TOC (ft)	Oct-4-94		Nov-94		Dec-16-94				
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Measured Groundwater Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	True Groundwater Elev. (ft)
MW-57	3787.70	177.20	158.31	3629.39	NG		159.51	3628.19			
MW-58	3824.31	218.03	p		p		p				
MW-59	3819.59	211.29	p		p		p				
MW-60	3815.28	223.00	186.44	3628.84	NG		187.54	3627.74			
MW-61A	3815.97	215.67	187.26	3628.71	NG		188.24	3627.73			
MW-62	3819.90	224.69	p		p		p				
MW-63	3826.16	220.49	197.74	3628.42	NG		199.00	3627.16			
MW-64	3798.57	201.89	169.56	3629.01	NG		170.71	3627.86			
MW-65A	3763.26	168.56	p		p		p				
MW-66	3828.98	235.18	200.83	3628.15	NG		201.96	3627.02			
MW-67	3765.87	165.77	136.71	3629.16	NG		137.89	3627.98			
MW-68	3797.83	203.43	p		p		p				
MW-70	3822.57	225.07	193.38	3629.19	NG		194.58	3627.99			
MW-71	3778.05	233.49	150.41	3627.64	NG		151.41	3626.64			
MW-72	3819.32	236.55	p		p		p				
MW-73	3820.09	~222.5	NP		NP		192.31	3627.78	191.80	6.12	3628.16
MW-74	3820.82	~222.5	NP		NP		192.31	3628.51			
MW-75	3816.12	~222.5	NP		NP		189.10	3627.02	187.18	23.04	3628.45
MW-76	3796.01	~222.5	NP		NP		167.36	3628.65			
SW-1	3808.19	255.00	p		p		p				
SW-2	3808.79	292.00	181.56	3627.23	NG		184.89	3623.90			
Monthly Rainfall (in)			0.14		0.45		0.09				

p = pump present in well
NG = Not Gauged
NP = Well Not Present

AMSL = Above Mean Sea Level
FP = Free Product (condensate) being recovered

TABLE 2
SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, AND RAINFALL DATA
FOURTH QUARTER 1994

Shallow Zone Well	TOC Elev. (ft AMSL)	Total Depth from TOC (ft)	Oct-4-94				Nov-94		Dec-16-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-1	3792.50	16.10	NG				NG		NG	
MW-2	3788.82	15.52	NG				NG		NG	
MW-3	3787.50	16.97	DRY				NG		NG	
MW-4	3785.88	18.68	NG				NG		NG	
MW-5	3801.69	13.05	DRY				NG		NG	
MW-6	3785.17	14.25	DRY				NG		NG	
MW-7	3784.46	17.35	DRY				NG		NG	
MW-8	3795.04	17.38	DRY				NG		NG	
MW-9	3807.85	13.79	DRY				NG		NG	
MW-10	3790.78	18.20	DRY				NG		NG	
MW-11	3806.96	24.85	22.23	3784.73			NG		NG	
MW-12	3809.86	25.21	NG				NG		NG	
MW-13p	3801.58	22.07	p				NG		NG	
MW-14	3803.93	24.30	NG				NG		NG	
MW-15	3803.59	19.47	NG				NG		NG	
MW-16	3801.04	22.66	NG				NG		NG	
MW-17	3799.55	19.75	NG				NG		NG	
MW-18	3795.82	17.42	NG				NG		NG	
MW-19	3797.21	19.11	NG				NG		NG	
MW-20	3797.59	16.89	NG				NG		NG	
MW-21	3798.21	23.31	NG				NG		NG	
MW-22	3799.20	17.30	NG				NG		NG	
MW-23	3794.48	12.08	NG				NG		NG	
MW-24	3794.09	14.09	DRY				NG		NG	
MW-25	3786.97	10.27	NG				NG		NG	
MW-26	3793.01	21.11	NG				NG		NG	
MW-27	3790.93	18.23	NG				NG		NG	
Monthly Rainfall (in)				0.14				0.45		0.09

p = pump present in well
NG = Not Gauged

VE = Vapor Extraction Well
AMSl = Above Mean Sea Level
TOC = Top of Casing datum

TABLE 2 (CONTINUED) SHALLOW ZONE DEPTH-TO-WATER, GROUNDWATER ELEVATION, CONDENSATE THICKNESS, & RAINFALL DATA

Shallow Zone Well	TOC Elev. (ft AMSL)	Total Depth from TOC (ft)	Oct-4-94				Nov-94		Dec-16-94	
			Depth to water (ft)	Ground-water Elev. (ft)	Depth to product (ft)	Condensate thickness (in)	Depth to water (ft)	Ground-water Elev. (ft)	Depth to water (ft)	Ground-water Elev. (ft)
MW-28	3797.03	18.59	NG				NG		NG	
MW-29	3794.06	14.76	DRY				NG		NG	
MW-30	3788.30	14.82	NG				NG		NG	
MW-31	3791.15	19.93	NG				NG		NG	
MW-32	3797.47	16.77	DRY				NG		NG	
MW-33	3802.48	20.29	NG				NG		NG	
MW-34	3806.00	19.97	NG				NG		NG	
MW-35	3800.81	20.71	NG				NG		NG	
MW-36	3792.94	8.77	NG				NG		NG	
MW-37	3795.03	20.83	NG				NG		NG	
MW-38	3797.32	20.57	DRY				NG		NG	
MW-39	3796.20	20.54	19.23	3776.97			NG		NG	
MW-40	3803.12	14.07	NG				NG		NG	
MW-41	3799.04	24.04	19.60	3779.44		sheen	NG		NG	
MW-42	3804.73	23.59	NG				NG		NG	
MW-43	3802.05	24.55	21.41	3780.64			NG		NG	
MW-44	3804.14	25.24	21.58	3782.56			NG		NG	
MW-45	3808.68	26.62	21.52	3787.16		sheen	NG		NG	
MW-46	3805.54	20.24	19.20	3786.34		sheen	NG		NG	
MW-47	3805.09	21.79	DRY				NG		NG	
MW-48	3806.18	19.98	DRY				NG		NG	
MW-49	3805.61	25.91	22.30	3783.31			NG		NG	
MW-50	3813.35	37.15	26.87	3786.48			NG		NG	
MW-51	3810.86	20.06	NG				NG		NG	
MW-52	3817.49	21.44	DRY				NG		NG	
MW-53	3809.92	15.32	DRY				NG		NG	
MW-54	3823.86	78.15	46.65	3777.21			NG		NG	
MW-55	3794.40	66.32	28.61	3765.79			NG		NG	
MW-56	3782.45	43.76	DRY				NG		NG	
MW-61	3816.20	57.97	36.96	3779.24			NG		NG	
MW-65	3763.31	57.69	56.20	3707.11			NG		NG	
MW-69p	3805.11	51.27	NG			present	NG		NG	
MW-77	3775.48	~80	NP				NP		DRY	
MW-78	3785.82	~80	NP				NP		DRY	
MW-79	3788.39	~80	NP				NP		DRY	
MW-80	3821.64	92.78	NP				NP		DRY	
Sump A10		13.32	13.10				NG		NG	
Sump 16A	3785.14	15.08	11.25	3773.89			NG		NG	
Monthly Rainfall (in)			0.14				0.45		0.09	

p = pump present in well
NG = Not Gauged
NP = Not Present
AMSL = Above Mean Sea Level
TOC = Top of Casing datum

TABLE 3

HISTORICAL SUMMARY OF BENZENE CONCENTRATION IN LOWER QUEEN GROUNDWATER

FOURTH QUARTER 1994

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise												
WELL	Sep-91	Dec-91	Apr-92	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Oct-93	Jan-94	Apr-94	Jul-94	Oct-94
MW-57	1600	350	150	948**	15.1*	21*	8*	6*	<0.5	<0.5	<0.5	0.7	1.1
MW-58	40	90	202**	178**	190*	192*	55*	25*	50*	FP	<2.5	2.0	6.7
MW-59	540	420	40.4**	268**	98.8*	26*	10*	FP	10*	FP	<2.5	13	4.1
MW-60	33	<1	3.5**	19**	31.7*	138*	17*	<1	<0.5	<0.5	<0.5	<0.5	<0.5
MW-61A	190	10	5.0**	359**	470.1*	585*	2821*	FP	FP	FP	<0.5	<0.5	4.8
MW-62	2200	1400	257.5**	357**	212.3*	78*	33*	98*	10*	4.1	<2.5	4.3	13
MW-63	<1	<1	4.1**	12**	4.3*	12*	7*	4*	14*	<0.5	<0.5	1.0	<0.5
MW-64	150	130	233**	115**	14	15*	5*	2	18*	1.7	<0.5	<0.5	<0.5
MW-65A	680	150	25.3**	413**	10.6*	3*	4*	<1*	7*	<0.5	<0.5	<0.5	1.7
MW-66	<1	<1	3.3**	8**	12.1*	3*	<3*	8*	13*	<0.5	<0.5	<0.5	<0.5
MW-67	280	320	4.3*	103**	2.6*	8*	7*	7*	<0.5	<0.5	<0.5	<0.5	<0.5
MW-68	240	1900	1865**	160**	2208.2**	376*	1890*	150	374*	3000	120	260	FP
MW-70	<1	<1	1.7**	<1	10.7*	<3*	9*	<1*	25*	<0.5	<0.5	<0.5	1.2
MW-71	NI	NI	NI	NI	NI	NI	NI	NI	8*	<0.5	<0.5	<0.5	1.1
MW-72	NI	NI	NI	NI	NI	NI	NI	NI	FP	FP	<2.5	18	FP
SW-1	<1	<1	5*	17.5*	15.7*	6*	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5
SW-2	<1	<1	7.9*	7*	69.4*	47*	4	NS	NS	NS	NS	NS	NS
Max. Conc	2200	1900	1865	948	2208	585	2821	2821	2821	3000	120	260	FP

* High Performance Liquid Chromatography (HPLC)

** Average of more than one sample result using HPLC.

FP = Free Product (Condensate)

NS = Not Sampled

NI = Not Installed

TABLE 4. HISTORICAL SUMMARY OF BENZENE IN SHALLOW GROUNDWATER
FOURTH QUARTER 1994

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise												
WELL	Sep-91	Dec-91	Apr-92	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Oct-93	Jan-94	Apr-94	Jul-94	Oct-94
MW-1	250	200	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-2	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-3	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-4	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-5	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-6	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***NS***	***DRY***
MW-7	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-8	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-9	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-10	***2300***	***2300***	***1780****	***1842****	***2100***	***NS***	***NS***	***DRY***	***DRY***	***BD***	***DRY***	***DRY***	***DRY***
MW-11	***3000***	***3800***	***3087****	***2199****	***2942****	***2746****	***FP***	***FP***	***FP***	***FP***	***FP***	***FP***	***1800***
MW-12	3800	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-13	***3100***	***3000***	***3492****	***2708****	***NS***	***NS***	***PUMP***	***PUMP***	***PUMP***	***PUMP***	***PUMP***	***PUMP***	***PUMP***
MW-14	5100**	NS	NS	NS	NS	NS	PUMP	PUMP	FP	FP	NS	NS	NS
MW-15	5100	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-16	1700	NS	NS	NS	NS	NS	514*	DRY	DRY	DRY	NS	NS	NS
MW-17	2000	NS	NS	NS	NS	NS	1500	DRY	DRY	NS	NS	NS	NS
MW-18	4300	NS	2639**	2700	3300	NS	NS	DRY	VE	VE	VE	VE	NS
MW-19	***4700***	***NS***	***3195****	***3000***	***3032****	***NS***	***3926****	***DRY***	***VE***	***VE***	***VE***	***VE***	***NS***
MW-20	110	NS	NS	NS	NS	NS	NS	DRY	VE	VE	VE	VE	NS
MW-21	1000	1100	NS	NS	NS	NS	114*	FP	NS	DRY	NS	NS	NS
MW-22	4	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-23	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-24	***3400***	***NS***	***NS***	***4353****	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-25	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-26	3100	3000	NS	2000	1992*	1708*	861*	FP	FP	FP	NS	NS	NS
MW-27	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-28	2200	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-29	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-30	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-31	<1	NS	NS	332**	9*	NS	NS	DRY	DRY	NS	NS	NS	NS
MW-32	***200***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-33	6300	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-34	2500	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-35	5700	NS	NS	NS	NS	NS	NS	FP	FP	FP	NS	NS	NS
MW-36	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-37	150	NS	NS	NS	NS	NS	NS	27*	DRY	NS	NS	NS	NS
MW-38	***15***	***15***	***51****	***37****	***166****	***NS***	***NS***	***DRY***	***BD***	***NS***	***DRY***	***DRY***	***DRY***
MW-39	880	NS	NS	NS	NS	14	29*	24*	DRY	<2.5	<0.5	<0.5	DRY
MW-40	NS	NS	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-41	200	170	NS	NS	NS	NS	NS	22*	DRY	5.3	0.6	1.4	3.2
MW-42	<1	<1	NS	NS	NS	NS	NS	NS	DRY	NS	NS	NS	NS
MW-43	320	NS	NS	NS	NS	NS	NS	25*	DRY	<0.5	<0.5	<0.5	0.8
MW-44	***59***	***NS***	***10****	***97****	***12***	***14***	***7****	***6****	***3****	***12***	***22***	***36***	***130***
MW-45	<1	<1	NS	NS	NS	NS	NS	<3*	<3*	<0.5	<0.5	<0.5	NS
MW-46	140	25	NS	NS	NS	NS	NS	NS	DRY	NS	NS	DRY	NS
MW-47	2600	2200	NS	NS	NS	NS	NS	DRY	DRY	DRY	DRY	DRY	DRY
MW-48	***<1***	***<1***	***NS***	***47****	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-49	35	NS	NS	NS	NS	NS	NS	210*	68*	13	82	150	78
MW-50	***<1***	***<1***	***4****	***4****	***8****	***8****	***<1***	***<3****	***9****	***<0.5***	***<0.5***	***<0.5***	***<0.5***
MW-51	800	<1	NS	NS	NS	NS	NS	DRY	DRY	DRY	NS	NS	NS
MW-52	***<1***	***NS***	***NS***	***5****	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-53	***<1***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-54	***<1***	***<1***	***9****	***8****	***62****	***14****	***10****	***<3****	***17****	***8.6***	***<0.5***	***15***	***19***
MW-55	***940***	***400***	***296****	***483****	***215****	***390***	***412****	***625****	***581****	***290***	***370***	***360***	***910***
MW-56	***2200***	***1000***	***NS***	***1114****	***1026****	***1128****	***VE***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***
MW-61	<1	NS	NS	NS	NS	NS	NS	NS	NS	1.4	<0.5	3.2	<5.0
MW-65	<1	NS	NS	NS	NS	NS	NS	<3*	DRY	DRY	DRY	NS	<0.5
MW-69	***2400***	***2100***	***NS***	***568****	***1598****	***1284****	***FP***	***FP***	***FP/ P***	***FP/ P***	***FP/ P***	***FP/ P***	***FP/ P***
SUMP A10	***FP***	***FP***	***FP***	***FP***	***FP***	***FP***	***FP***	***DRY***	***DRY***	***DRY***	***DRY***	***NS***	***OCl***
SUMP A11	1400	2900	3033**	1258**	2815*	NS	NS	DRY	DRY	DRY	NS	NS	NS
SUMP 16A	***240***	***2000***	***1233****	***1495****	***632****	***741****	***707****	***DRY***	***DRY***	***DRY***	***DRY***	***DRY***	***170***
Lyman										<0.5	<0.5	<0.5	<0.5
U. Indian Hills	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5

Bolded Italicized well numbers = Designated wells for quarterly sampling in Marathon Treatment Plan (March 1992)

* High Performance Liquid Chromatography (HPLC)

** Average of more than one sample result using HPLC.

P = Pump

OCl = only Chloride sample

FP = Free Product (condensate)

NS = Not Sampled

VE = Vapor Extraction well

TABLE 5
RANCHER WELL GROUNDWATER AND NATURAL SPRING WATER SAMPLE RESULTS
FOURTH QUARTER 1994

		1994														
	Probable	Oct-6					Nov-30					Dec-16				
WELL/ SPRING	Aquifer	Benzene	Toluene	Ethylbenzene	Xylenes	Chloride	Benzene	Toluene	Ethylbenzene	Xylenes	Chloride	Benzene	Toluene	Ethylbenzene	Xylenes	Chloride
Lyman	Shallow Alluvial	ND	ND	ND	ND	14	ND	ND	ND	ND	12.1	ND	ND	ND	ND	11.8
Upper Indian Hills	Shallow Alluvial	ND	ND	ND	0.6	13	ND	ND	ND	ND	11.1	ND	ND	ND	ND	12.2
Biebelle	Seven Rivers	ND	ND	ND	ND	13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Benzene, Toluene, Ethylbenzene, and total Xylene concentration in ug/L.

Chloride concentration in mg/L.

ND = Not Detected at method detection limit of 0.5 ug/L.

NS = Not Sampled.

FIGURES

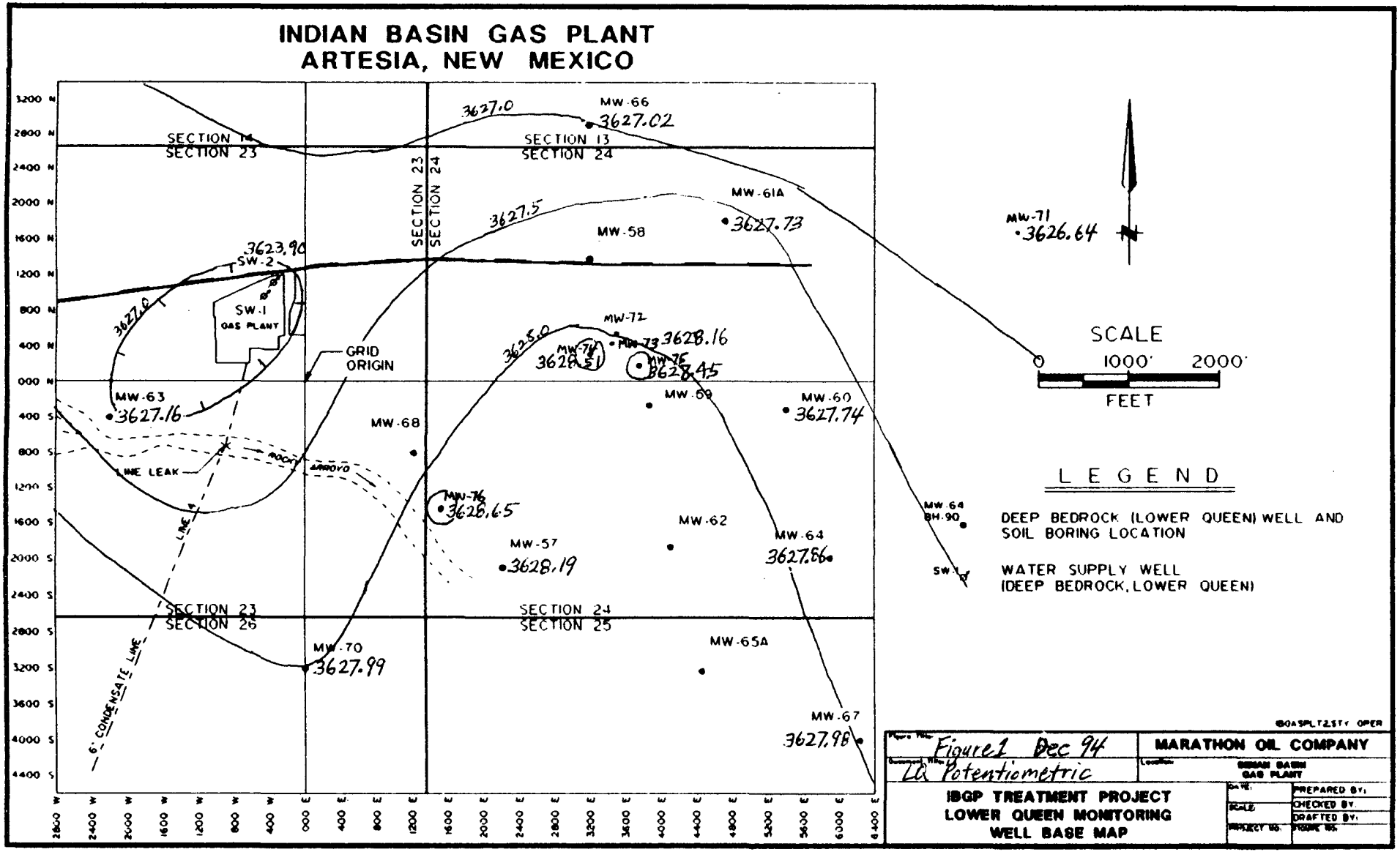

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO
SECTION 14
SECTION 23
SECTION 13
SECTION 24
SECTION 23
SECTION 26
SECTION 24
SECTION 25
SECTION 23
SECTION 24
MW-66
3627.02
3627.0
MW-61A
3627.73
3627.5
MW-58
MW-71
3626.64
3623.90
SW-2
SW-1
GAS PLANT
3627.0
MW-72
3628.16
3625.0
MW-74
3628.51
MW-73
MW-75
3628.45
GRID
ORIGIN
MW-63
3627.16
MW-68
MW-69
MW-60
3627.74
LINE LEAK
ARROYO
MW-76
3628.65
MW-62
MW-64
3627.86
MW-57
3628.19
MW-70
3627.99
MW-65A
MW-67
3627.98
6" CONDENSATE LINE
SCALE
0 1000' 2000'
FEET
LEGEND
MW-64
BH-90
DEEP BEDROCK (LOWER QUEEN) WELL AND
SOIL BORING LOCATION
SW-1
WATER SUPPLY WELL
(DEEP BEDROCK, LOWER QUEEN)
Figure 1 Dec 94
Potentiometric
MARATHON OIL COMPANY
INDIAN BASIN
GAS PLANT
IBGP TREATMENT PROJECT
LOWER QUEEN MONITORING
WELL BASE MAP
PREPARED BY:
CHECKED BY:
DRAFTED BY:

Figure 2. Lower Queen Groundwater Elevation vs. Time

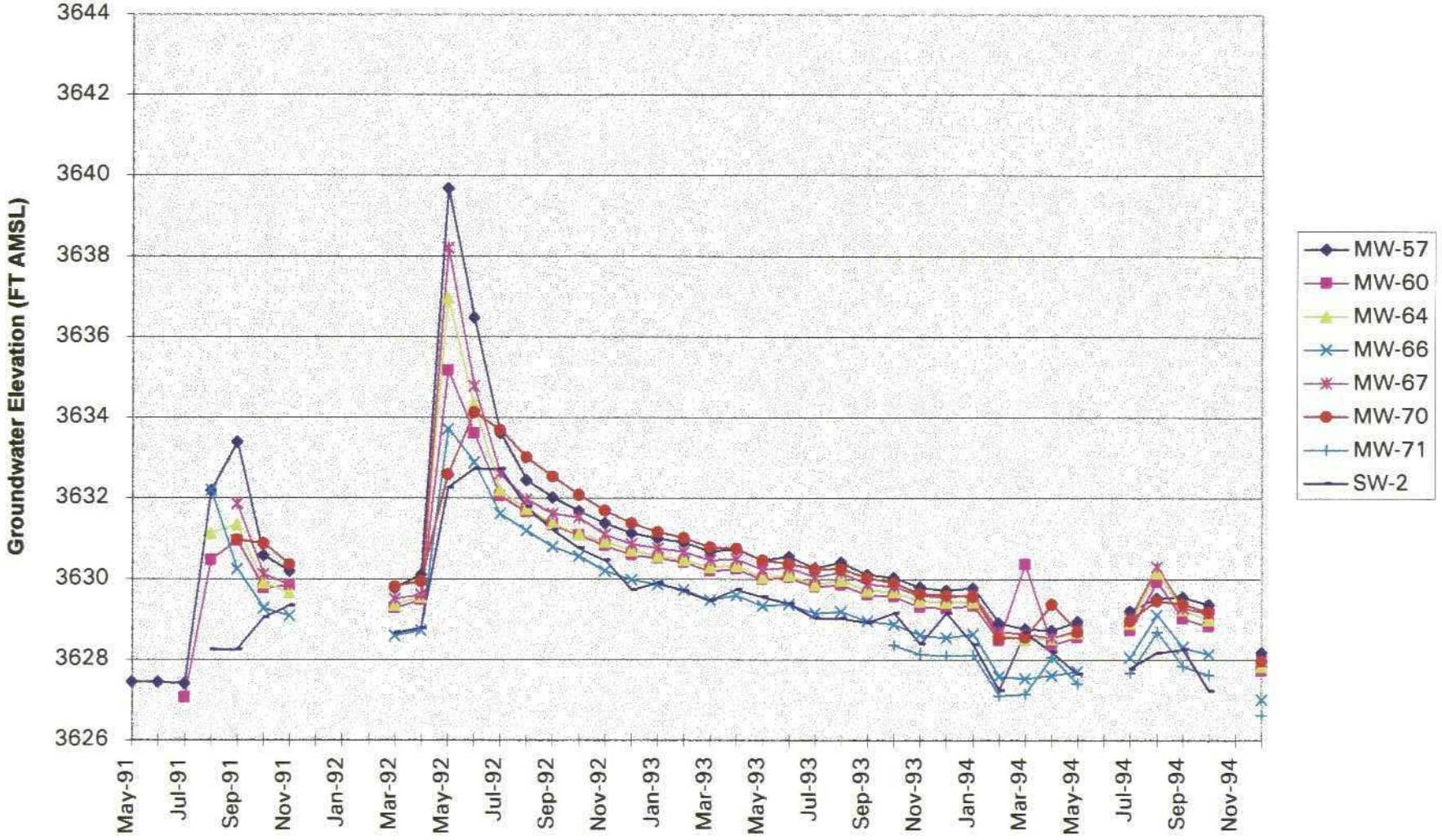


FIG2

Figure 3. Shallow zone Potentiometric

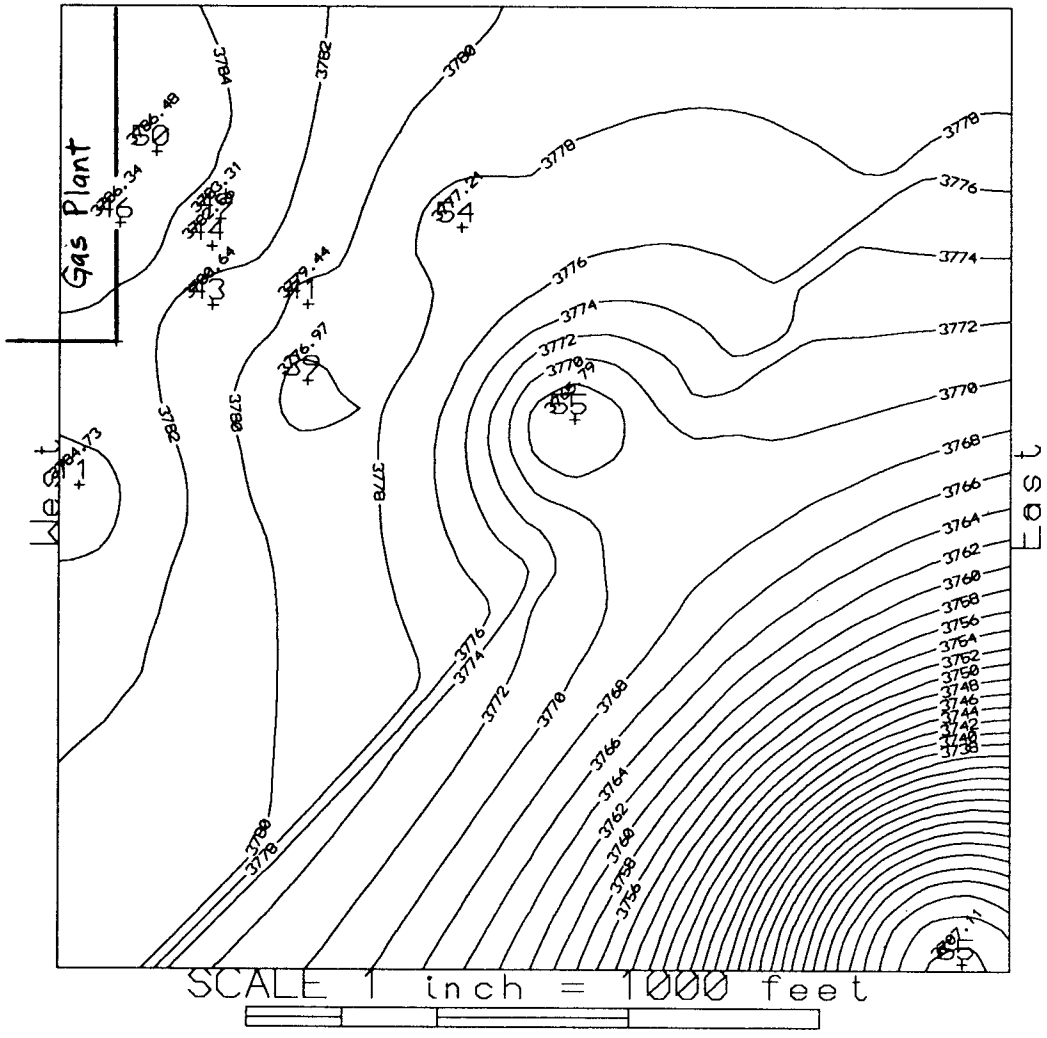


FIGURE 4. Shallow Zone Groundwater Elevation vs. Time

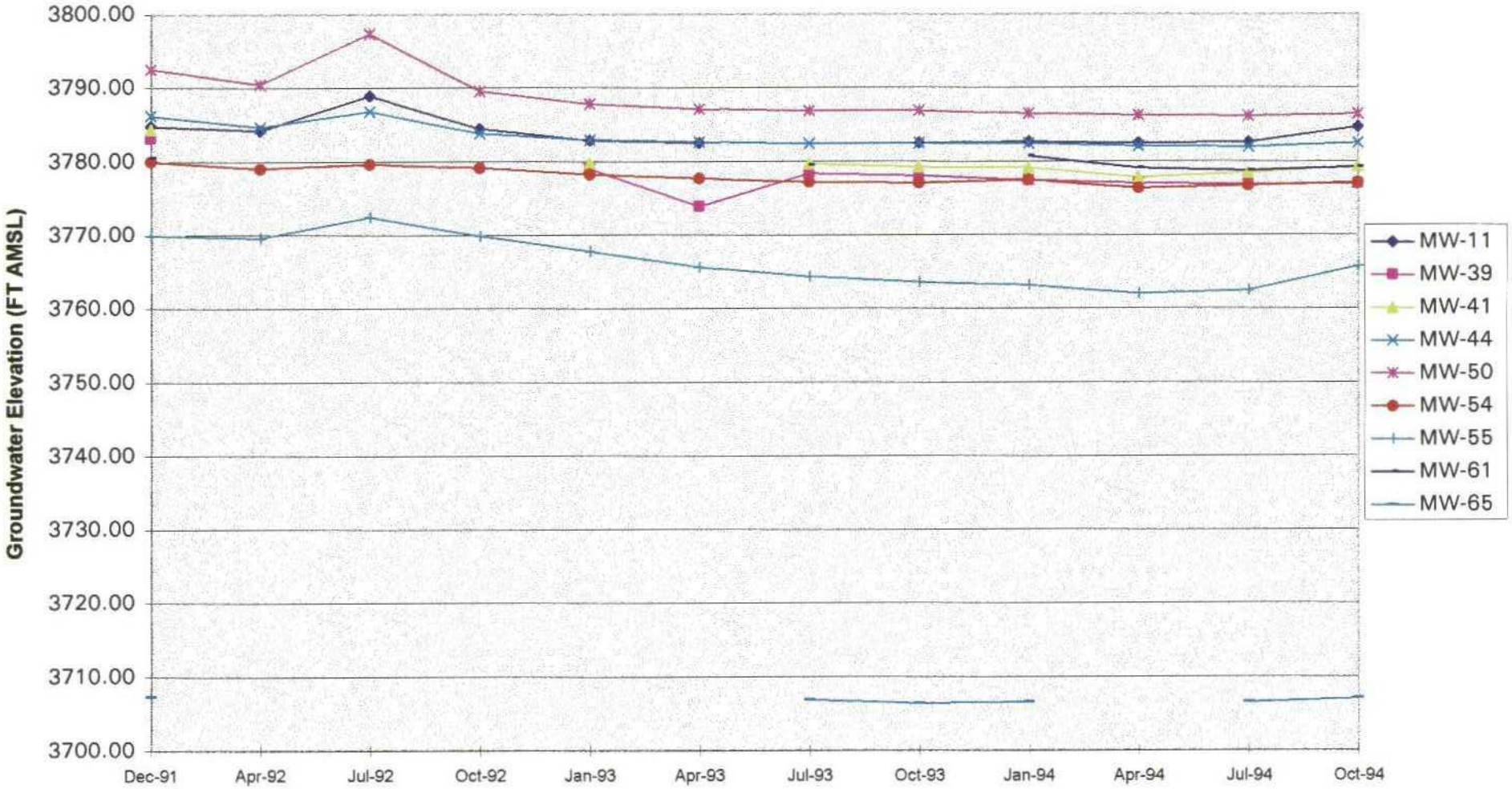
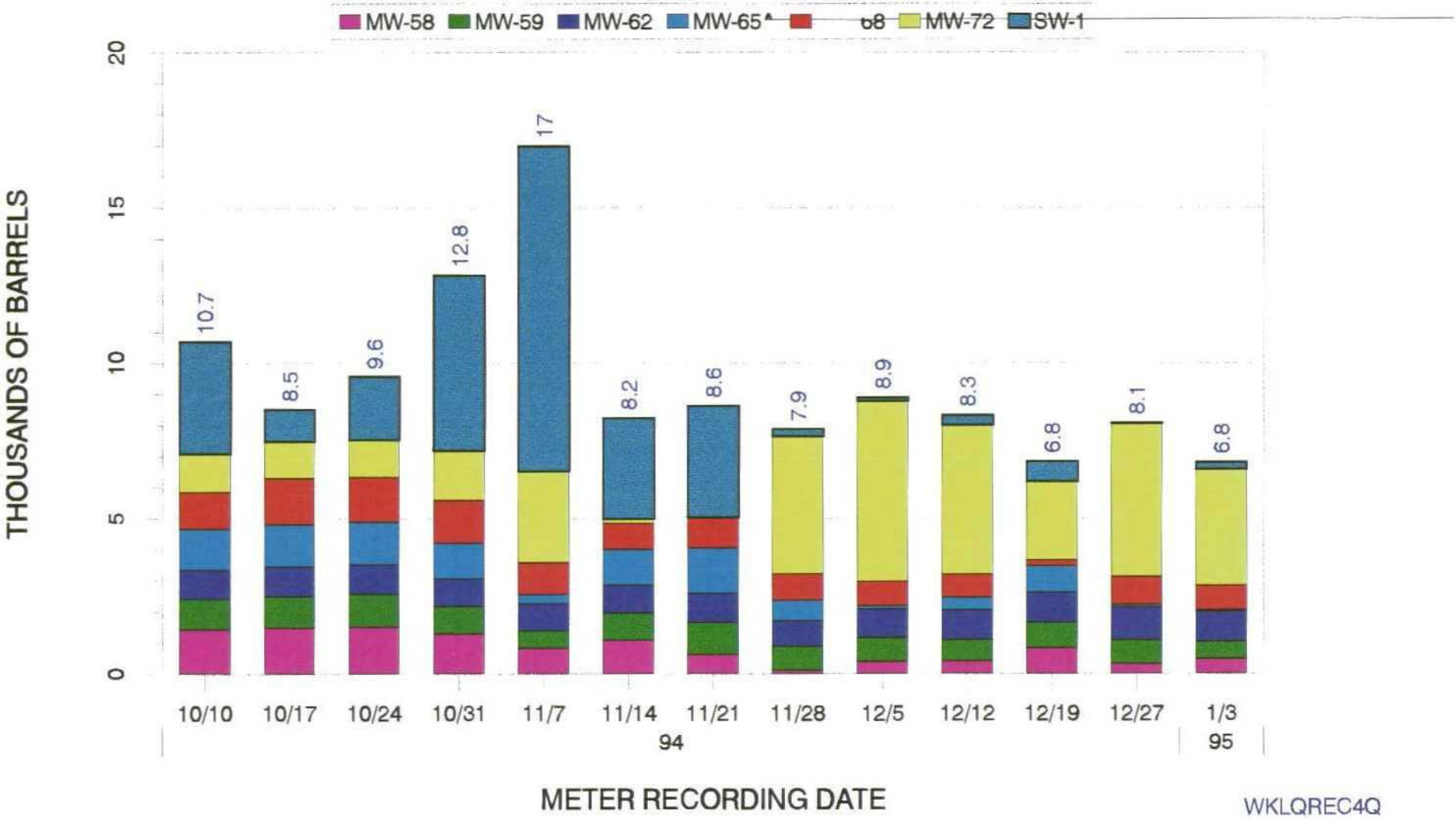
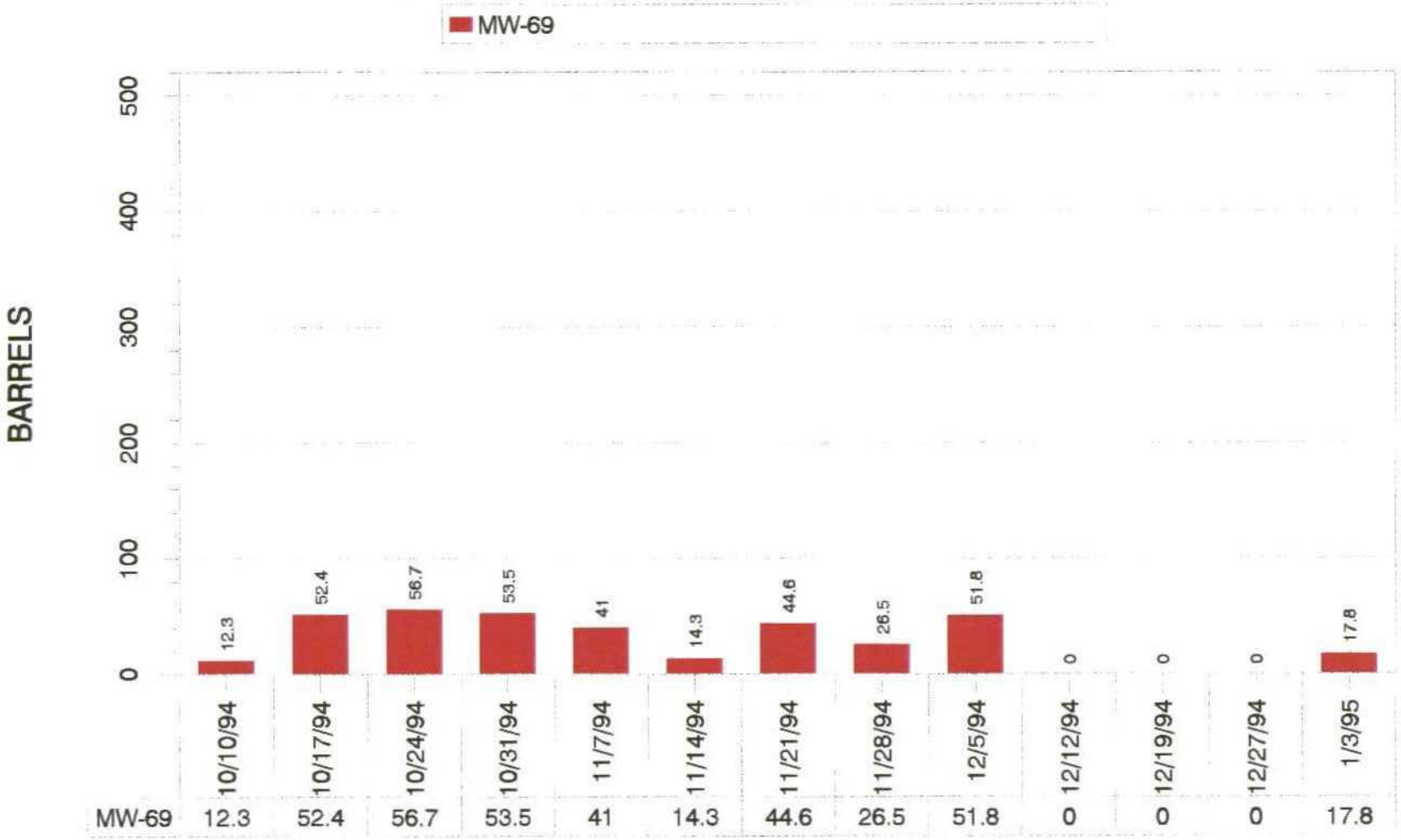


FIGURE 5
WEEKLY LOWER QUEEN FLUID RECOVERY
FOURTH QUARTER 1994



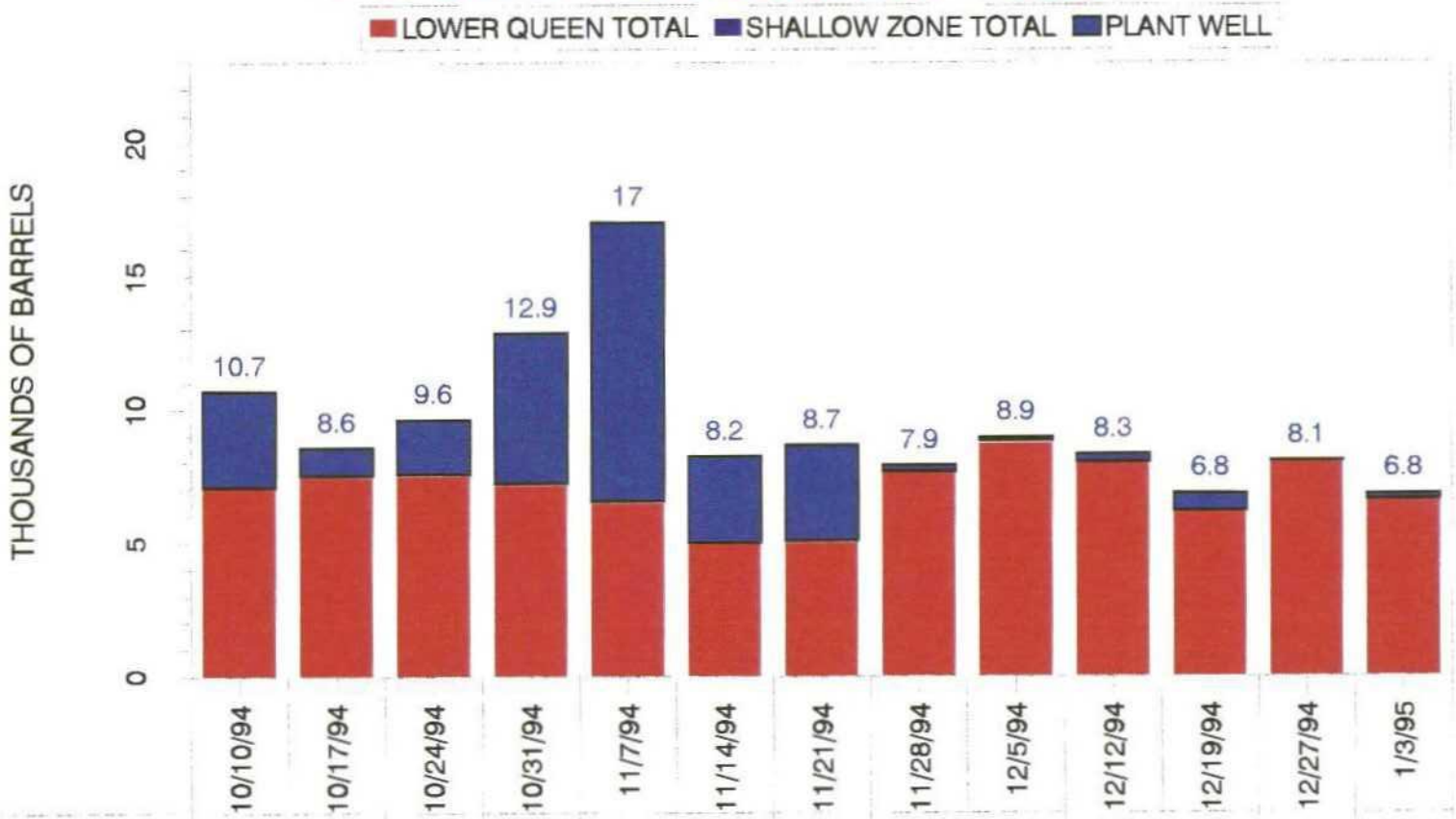
WKLQREC4Q

FIGURE 6
WEEKLY SHALLOW FLUID RECOVERY
FOURTH QUARTER 1994



WKSHREC4Q

FIGURE 7
WEEKLY TOTAL FLUID RECOVERY
FOURTH QUARTER 1994



	10/10/94	10/17/94	10/24/94	10/31/94	11/7/94	11/14/94	11/21/94	11/28/94	12/5/94	12/12/94	12/19/94	12/27/94	1/3/95
PLANT WELL	3.6	1	2	5.6	10.5	3.2	3.6	0.2	0.1	0.3	0.6	0	0.2
SHALLOW ZONE TOTAL	0	0.1	0.1	0.1	0	0	0	0	0.1	0	0	0	0
LOWER QUEEN TOTAL	7.1	7.5	7.5	7.2	6.5	5	5	7.6	8.8	8	6.2	8	6.6

METER RECORDING DATE

WKREC4Q

APPENDIX A

OCTOBER 1994 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. Sump A-10

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
13.32	13.10 / EIP	10-05-94	N/A			Did not purge, sampled immediately off the top		Disposable bailer	10-05-94	04:05 p.m.	Boerner/Vierzbicki	1-1 pint poly	Sump A-10	None	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

[redacted]MISC[redacted]0300[redacted]A10[redacted]

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. Sump 16A

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
15.08	11.255/EIP	10-04-94	11.25 / EIP			Did not purge, sampled immediately off the top		Disposable bailer	10-05-94	09:34 a.m.	Boerner/Vierzbicki	2 - 40 ml VOA / 1 - 1 pint poly	Sump 16A	HCl in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. SW - 2

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
Unknown	181.56 / EIP	10-04-94	N/A										Gauged only; not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

[redacted]MISC\[redacted]0300[redacted]

October, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO
WELL NO. MW - 3

Well Depth	Static Water Level Depth & Meas Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond (mohmos/cm)	pH	Diss. O_2 (mg/L)
16.97	Dry / EIP	10-05-94	N/A	*	*	*	*	*	*	*	*	*	Dry; monitor well not sampled	*	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-5

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
13.05	Dry / EIP	10-04-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

[redacted]

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-6

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
14.25	Dry / EIP	10-05-94	N.A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-7

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
17.35	Dry / EIP	10-05-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94WP\300\MW-7L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-8

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
17.38	Dry / EIP	10-04-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW 8b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-9

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
13.79	13.78 / EIP	10-04-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. Hydrogen sulfide vapor concentration
Cum Time Cumulative Time

Temp Temperature
Spec. Cond. Specific Conductivity in mohmos/cm
Diss. O_2 Dissolved oxygen in mg/L

MISC\94\9490300\MW-9b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-10

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
18.20	18.17 ' EIP	10-04-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-11

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss O_2 (mg/L)
24.81	22.23/EIP	10-04-94	Sheen / EIP	Disposable Bailer		5.0		Disposable Bailer	10-05-94	10:30 a.m.	Boerner/Vierzbicki	2-40 mL VOA / 1-1 pint poly	MW-41	HCL in VOA	0.5	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL Light non-aqueous phase liquid
HC Vapor Conc. Hydrocarbon vapor concentration
H_2S Vapor Conc. Hydrogen sulfide vapor concentration
Cum Time Cumulative Time

Temp. Temperature
Spec. Cond Specific Conductivity in mohmos/cm
Diss. O_2 Dissolved oxygen in mg/L

[redacted]MISC[redacted]0300[redacted]

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-13

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
	Has a pump, unable to gauge	10-04-94																				

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\9490306\MW 13

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-19

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
	Has a pump, unable to gauge	10-04-94																				

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW 19

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-24

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
13.25	13.21 - EIP	10-04-94	N.A										Dry; monitor well not sampled		7.8	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-29

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss O_2 (mg/L)
14.79	Dry ; EIP	10-04-94											Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-32

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss O_2 (mg/L)
15.80	15.60 - EIP	10-04-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-32b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-38

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
20.47	20.39 / EIP	10-04-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

[redacted]MISC[redacted]0300[redacted]BB

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-39

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
20.45	19.23 / EIP	10-04-94	N/A	Disposable bailer		2.0							Monitor well did not recharge; was not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/l

MISC\94\9490300I\MW 39b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-41

Well Depth	Static Water Level Depth & Meas Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond (mohmos/cm)	pH	Diss. O_2 (mg/L)
24.12	19.60 / EIP	10-04-94	Sheen / EIP	Disposable bailer		5.0		Disposable bailer	10-05-94	4:52 p.m.	Boerner / Vierzbicki	2 - 40 mL VOA / 1 - 1 pint poly	MW - 41	HCl in VOA	72	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

[redacted]

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-43

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss O_2 (mg/L)
24.49	21.41 / EIP	10-04-94	N/A	Disposable bailer		4.0		Disposable bailer	10-05-94	4:40 p.m.	Boerner / Vierzbicki	2-40 mL VOA / 1-1 pint poly	MW - 43	HCl in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW-43b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-44

Well Depth	Static Water Level Depth & Meas Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
25.45	21.58 / EIP	10-04-94	N/A	Disposable bailer		7.6		Disposable bailer	10-05-94	01:20 p.m.	Boerner / Vierzbicki	2-40 mL VOA / 1-1 pint poly	MW - 44	HCl in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-45

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
26.62	21.52 · EIP	10-04-94	Sheen / EIP										Monitor well not straight, bailer refused; no sample		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\[illegible]\MW-45b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-46

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
19.87	19.20 / EIP	10-04-94	Sheen / EIP										Dry; monitor well not sampled		14.5	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-47

Well Depth	Static Water Level Depth & Meas Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond (mohmos/cm)	pH	Diss O_2 (mg/L)
21.83	21.72 / EIP	10-04-94	N.A										Dry; monitor well not sampled		20	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903601\MW-47b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-48

Well Depth	Static Water Level Depth & Meas Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss O_2 (mg/L)
19.93	19.88 / EIP	10-04-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-49

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss O_2 (mg/L)
26.66	22.30 EIP	10-04-94	N.A	Disposable bailer		3.0		Disposable bailer	10-05-94	02:30 p.m.	Boerner / Vierzbicki	2-40 mL VOA 1-1 pint poly	MW-49	HCl in VOA	2	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL Light non aqueous phase liquid
HC Vapor Conc. Hydrocarbon vapor concentration
H_2S Vapor Conc. Hydrogen sulfide vapor concentration
Cum Time Cumulative Time
Temp. Temperature
Spec. Cond. Specific Conductivity in mohmos/cm
Diss O_2 Dissolved oxygen in mg/l

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-50

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc (ppm)	H_2S Vapor Conc (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
37.15	26.87 / EIP	10-04-94	N A	Disposable bailer		5.0		Disposable bailer	10-05-94	02:48 p.m.	Boerner / Vierzbicki	2-40 mL VOA / 1-1 pint poly	MW-50	HCl in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-52

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
21.31	Dry - EIP	10-05-94	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-53

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
15.26	Dry / EIP	10-04-95	N/A										Dry; monitor well not sampled		0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum T[redacted]mulat[redacted]e
MS(CV)[redacted]300)[redacted]

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/l

[redacted]

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-54

Well Depth	Static Water Level Depth & Meas Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss O_2 (mg/L)
74.78	46.65 / EIP	10-04-94	N A	Redi Flo 2	1.2	55	65, then 70 feet	Redi Flo 2	10-05-94	1636	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW-57 (EB-12 1533)	HCl in VOA	0	0	:00	1600	27.1	3240	7.62	2.71
																	:05	1605	22 9	3270	7.43	2 52
																	:10	1610	22 6	3300	7.32	2 73
																	:15	1615	22.5	3460	7.29	2 40
																	:25	1625	23 3	3680	7.39	6 54
																	:30	1630	22 1	3530	7.30	4.40

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL Light non aqueous phase liquid
HC Vapor Conc. Hydrocarbon vapor concentration
H_2S Vapor Conc. Hydrogen sulfide vapor concentration
Cum Time Cumulative Time
Temp. Temperature
Spec. Cond Specific Conductivity in mohmos/cm
Diss O_2 Dissolved oxygen in mg/l

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-55

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
66.49	28.61 / EIP	10-04-94	N A	Redi Flo 2		75	47 feet	Redi flo 2	10-05-94	1518	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW - 57 (EB-11 1427)	HCl in VOA	0	0	:00	1450	26.9	2020	7.50	3.71
																	.05	1455	21.3	2720	7.23	2.85
																	.10	1500	24.1	2720	7.15	2.52
																	.15	1505	21.4	2730	7.18	2.83
																	.20	1510	22.0	2730	7.15	2.68
																	.25	1515	22.4	2700	7.11	2.48

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/l

[redacted]

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-56

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
43.70	43.65 / EIP	10-04-94	N/A										Dry; monitor well not sampled		17	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MIS\C\94\94490.800\MW 56b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-57

Well Depth	Static Water Level Depth & Meas Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
176.49	158.31 / EIP	10-04-94	N/A	Redi flo 2	1.0	36	169 feet	Redi Flo 2	10-05-94	1413	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW-67 (EB-10 1309)	HCl in VOA	0	0	:00	1340	27.9	420	8.41	6.53
																	:05	1345	21.7	690	8.01	4.56
																	:09	1349	22.6	700	8.03	4.47
																	:15	1355	19.6	740	7.71	3.29
																	:20	1400	20.7	740	7.82	3.34
																	:25	1405	21.3	740	7.70	3.27
																	:30	1410	20.7	730	7.84	3.08

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL Light non-aqueous phase liquid
HC Vapor Conc. Hydrocarbon vapor concentration
H_2S Vapor Conc. Hydrogen sulfide vapor concentration
Cum [redacted]umula[redacted]e
MP[redacted] Temp. Temperature
Spec. Cond. Specific Conductivity in mohmos/cm
Diss. O_2 Dissolved oxygen in mg/L

October, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-60

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
221.74	186.44 \ EIP	10-04-94	N/A	Redi Flo 2	2.5	63	204 feet	Redi Flo 2	10-05-94	1002	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW-60 (EB-7 0916)	HCl in VOA	0	0	:00	1035	20.6	1030	7.75	3.20
																	:05	1040	19.7	1060	7.85	3.21
																	:10	1045	19.3	1060	8.03	3.89
																	:15	1050	19.2	1030	8.02	3.26
																	:20	1055	19.1	1080	8.01	3.53
																	:25	1100	19.8	1070	8.01	3.63

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-61

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss O_2 (mg/L)
57.73	36.96 / EIP	10-04-94	N/A	Redi flo 2	1.3	56	41 feet	Redi flo 2	10-04-94	1639	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW-71 (EB-5 1536)	HCl in VOA	0	0	:00	1555	24.2	3690	7.10	2.37
																	:05	1600	21.5	3820	7.08	2.73
																	:10	1605	21.6	3850	7.11	2.87
																	:25	1620	22.2	4110	7.10	6.20
																	:30	1625	21.4	4090	7.05	3.55
																	35	1630	21.4	4070	7.01	2.80

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss O_2 - Dissolved oxygen in mg/L

[redacted]

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-61A

Well Depth	Static Water Level Depth & Meas Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
215.46	187.26	10-4-94	N/A	Redi-Flo 2	1.5	55	205	Redi-Flo 2	10-4-94	1808	Brennan/Day	240 ml VOA / 1 1 pint poly	MW-61A / EB#6	HC1	0	0	:00	1725	24.7	1070	7.91	2.85
																	:05	1730	21.8	1070	7.79	2.38
																	:10	1735	21.2	1080	8.01	2.68
																	:15	1740	20.9	1080	7.93	2.74
																	:20	1745	21.5	1070	8.01	5.55
																	:25	1750	21.2	1080	7.95	4.06
																	:30	1755	21.1	1080	7.73	3.02
																	:35	1800	22.2	1080	7.80	1.93
																	:40	1805	22.2	1090	7.90	2.55

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MISC\94\94903001\MW61A

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-63

Well Depth	Static Water Level Depth & Meas Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
221.82	197.74 / EIP	10-04-94	N.A	Redi flo 2	3.0	87	211 feet	Redi flo 2	10-04-94	1134	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW-63 (EB-2 1053)	HCl in VOA	0	0	:00	1105	23.2	404	8.12	5.56
																	:05	1110	21.4	536	8.01	5.71
																	:10	1115	21.5	552	7.86	6.29
																	:15	1120	21.2	552	7.87	5.38
																	:20	1125	20.9	553	7.95	5.55
																	:25	1130	21.3	557	7.93	5.67

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/l

[redacted]HSC09[redacted]3001V[redacted]

October, 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-64

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
201.59	169.56 / EIP	10-04-94	N A	Redi flo 2	1.8	63	186 feet	Redi flo 2	10-05-94	1129	Brennan / Day	2-40 mL VOA ; 1-1 pint poly	MW-64 (EB-8 1019)	HCl in VOA	0	0	:00	1059	20.3	970	8.20	2 88
																	:06	1105	20.5	940	8 01	3 16
																	:11	1110	19.9	930	8 07	2 85
																	:16	1115	20.2	980	7 97	2 88
																	:21	1120	20 8	970	7 99	2 90
																	:26	1125	20 6	940	7 80	2 22

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - *Light non-aqueous phase liquid*
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

MB\CW\49490.0013\MW-64b

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-65

Well Depth	Static Water Level Depth & Meas. Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
57.42	56.20 / EIP	10-05-94	Sheen / EIP	Disposable bailer		Did not purge, sampled immediately		Disposable bailer	10-05-94	08:58 a.m.	Boerner , Vierzbicki	2-40 mL VOA / 1-1 pint poly	MW-65	HCl in VOA	0	0						

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss O_2 - Dissolved oxygen in mg/L

[redacted]

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-66

Well Depth	Static Water Level Depth & Meas Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc (ppm)	H_2S Vapor Conc (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
235.33	200.83 / EIP	10-04-94	N A	Redi flo 2	1.5	38	216 FEET	Redi flo 2	10-04-94	1458	Brennan / Dav	2-40 mL VOA / 1-1 pint poly	MW-66 (EB-4 1345)	HCl in VOA	0	0	:00	1435	25.4	811	7.94	4.73
																	:05	1440	22.2	1050	7.72	3.21
																	:10	1445	21.5	1050	7.68	3.15
																	:15	1450	21.5	1050	7.68	3.23
																	:20	1455	21.4	1050	7.68	3.15

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
MISC/94/94090801/MW 66b

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-67

Well Depth	Static Water Level Depth & Meas Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc (ppm)	H_2S Vapor Conc (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp (°C)	Spec. Cond (mohmos/cm)	pH	Diss O_2 (mg/L)
165.44	136.71 - EIP	10-04-94	N/A	Redi flo 2	1.8	56	151 feet	Redi flo 2	10-05-94	1249	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW-67 (EB-9 1138)	HCl in VOA	0.5	0	:00	1220	24.4	580	8.15	3.24
																	:05	1225	21.9	620	7.91	2.73
																	:10	1230	21.0	630	7.87	2.57
																	:15	1235	21.4	640	7.90	2.52
																	:20	1240	22.5	640	7.93	2.35
																	:25	1245	21.9	640	7.91	2.45

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD

INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY

CARLSBAD, NEW MEXICO

WELL NO. MW-69

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
	Has a pump, unable to gauge	10-04-94																				

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non-aqueous phase liquid
HC Vapor Conc - Hydrocarbon vapor concentration
H_2S Vapor Conc - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
MISC\94\94390.800\MW-69b

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/L

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-70

Well Depth	Static Water Level Depth & Meas Tech	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
222.66	193.38 / EIP	10-04-94	N/A	Redi flo 2	2.0	78	210 feet	Redi flo 2	10-04-94	0933	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW-70 (EB-1 0854)	HCl in VOA	0	0	:00	905	22.1	32	9.38	7.58
																	:05	910	19.8	512	8.07	5.20
																	:10	915	20.1	525	7.91	5.15
																	:15	920	19.8	525	7.96	5.22
																	:20	925	20.3	525	7.91	5.28
																	:25	930	20.5	529	7.91	5.80

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

LNAPL - Light non aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc - Hydrogen sulfide vapor concentration
Cum Time - Cumulative Time
Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/l

MIS[redacted]90306[redacted]706

October , 1994

FIELD GAUGE AND PURGE RECORD
INDIAN BASIN GAS PLANT - MARATHON OIL COMPANY
CARLSBAD, NEW MEXICO

WELL NO. MW-71

Well Depth	Static Water Level Depth & Meas. Tech.	Date Gauged	Depth LNAPL & Detection Method	Purge			Depth of Pump during Purging & Sampling	Sampling Equipment	Sample Collection			Types of Sample Containers Used	Sample ID	Preservatives Used	HC Vapor Conc. (ppm)	H_2S Vapor Conc. (ppm)	Parameters					
				Method	Rate (gal/min)	Volume (gal)			Date	Time	Name of Collector						Cum Time	Time	Temp. (°C)	Spec. Cond. (mohmos/cm)	pH	Diss. O_2 (mg/L)
221.00	150.41 / EIP	10-04-94	N/A	Redi flo 2	1.0	30	184 feet	Redi flo 2	10-04-94	1320	Brennan / Day	2-40 mL VOA / 1-1 pint poly	MW-71 (EB-3 1151)	HCl in VOA	0	0	:00	1245	25.1	1200	7.98	4.66
																	:05	1250	23.1	1400	7.63	3.16
																	:10	1255	23.2	1320	7.46	2.94
																	:15	1300	22.8	1300	7.43	2.46
																	:20	1305	23.6	1370	7.41	2.42
																	:25	1310	22.6	1380	7.41	2.52
																	:30	1315	22.9	1390	7.40	2.06

Well depth, static water level, LNAPL depth and depth of pump are provided in feet.

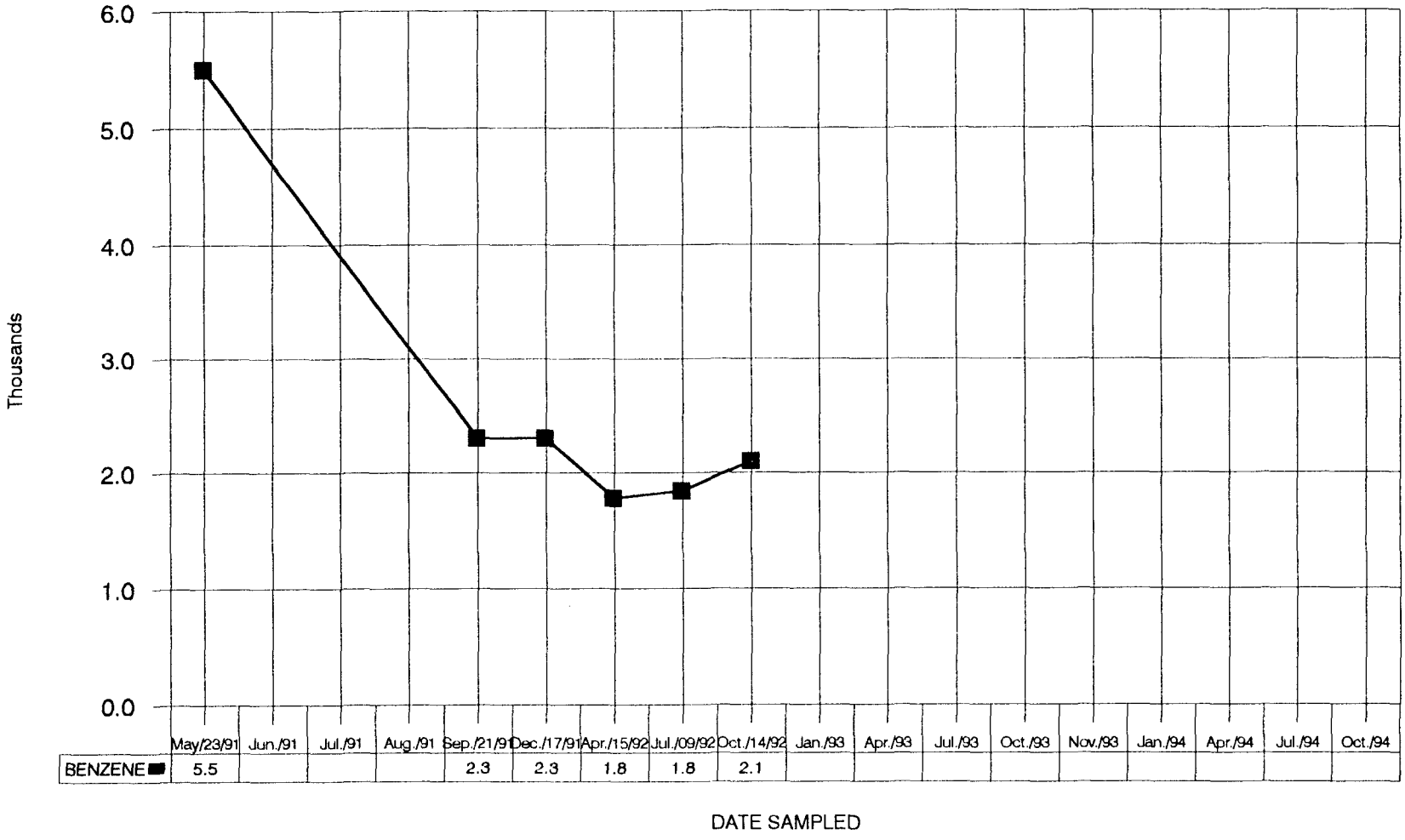
LNAPL - Light non-aqueous phase liquid
HC Vapor Conc. - Hydrocarbon vapor concentration
H_2S Vapor Conc. - Hydrogen sulfide vapor concentration
Cum Time - Cumulative time

Temp. - Temperature
Spec. Cond. - Specific Conductivity in mohmos/cm
Diss. O_2 - Dissolved oxygen in mg/l

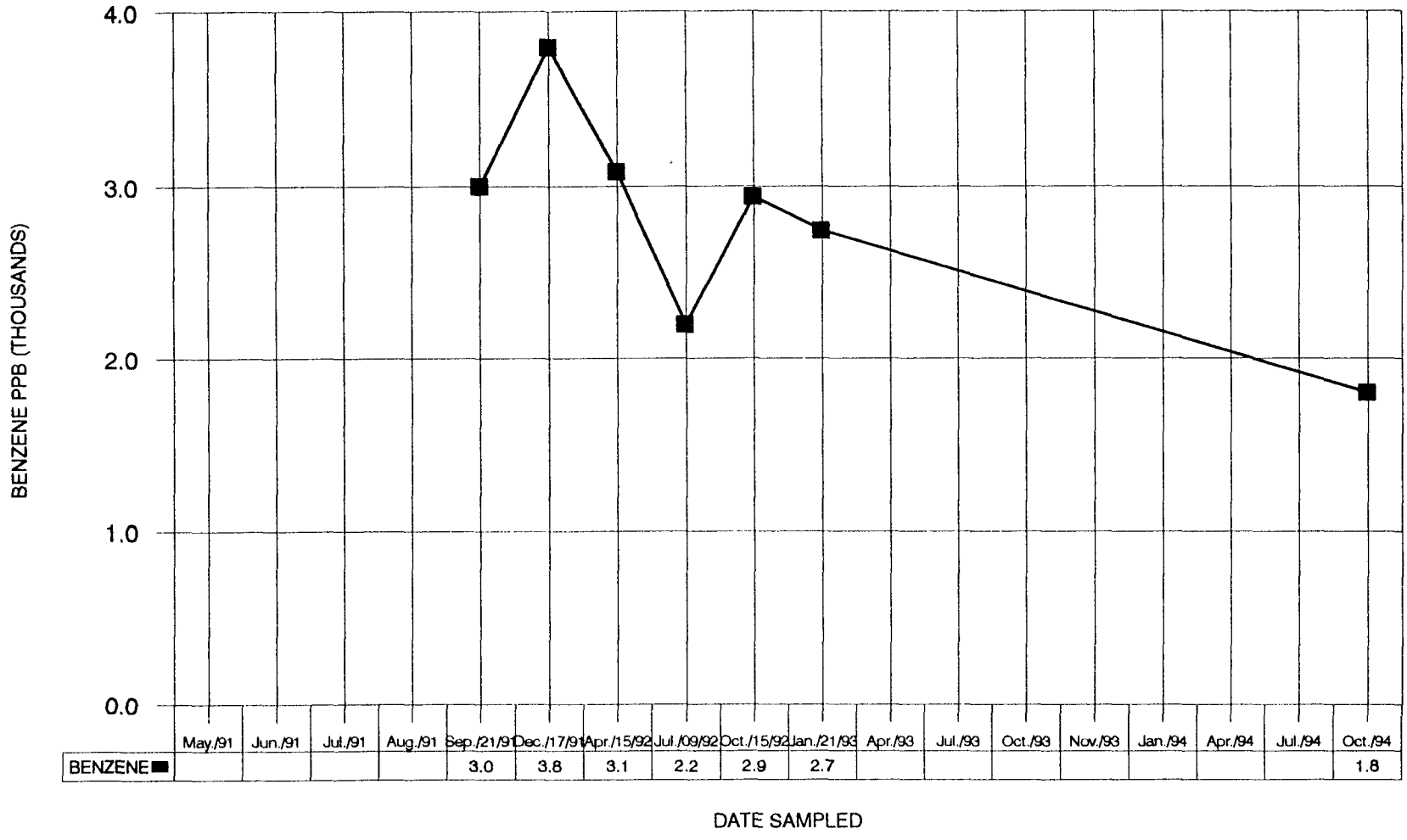
APPENDIX B

BENZENE CONCENTRATION IN GROUNDWATER VS. TIME GRAPHS

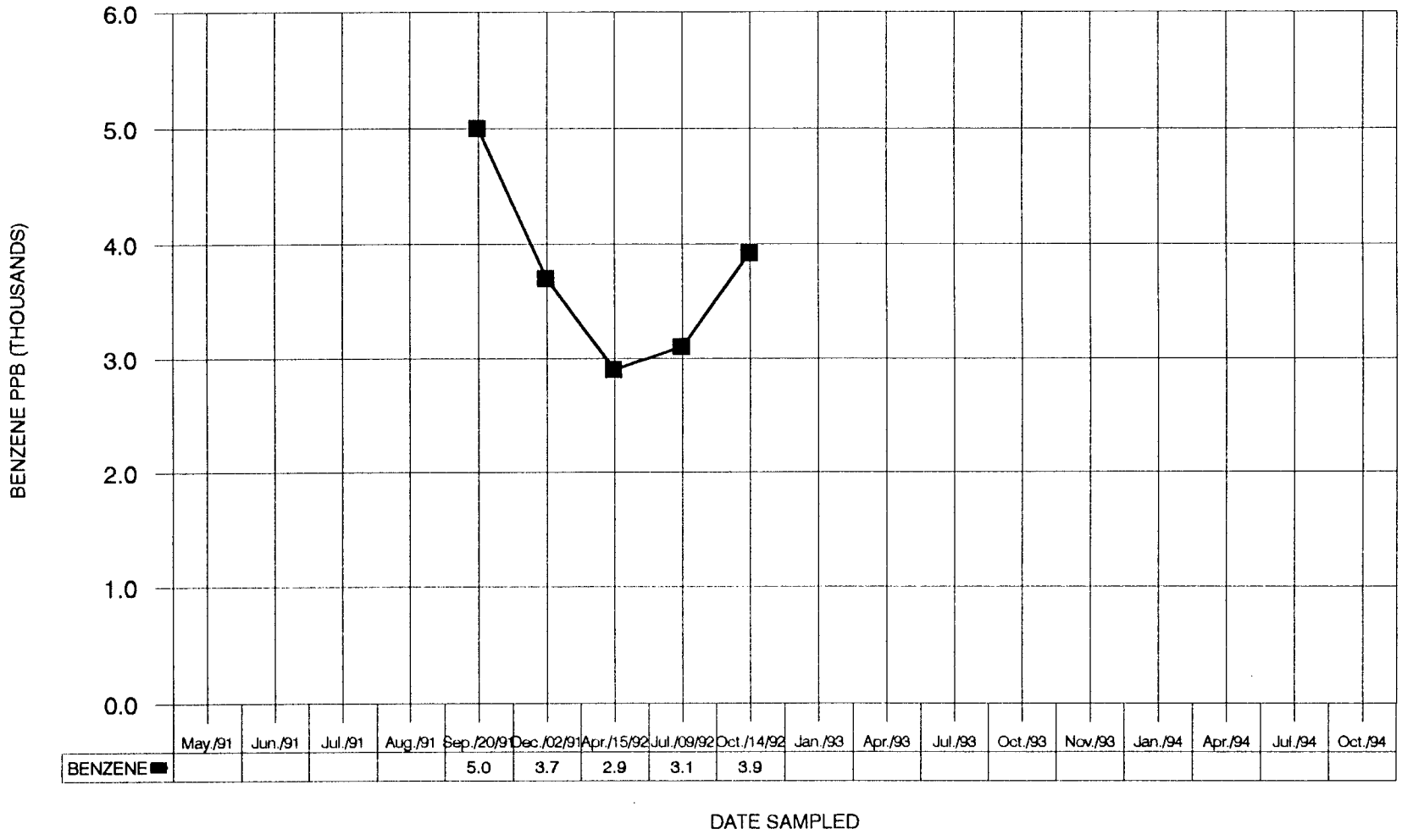
GROUNDWATER ANALYSIS DATA
MW#10 BH-33



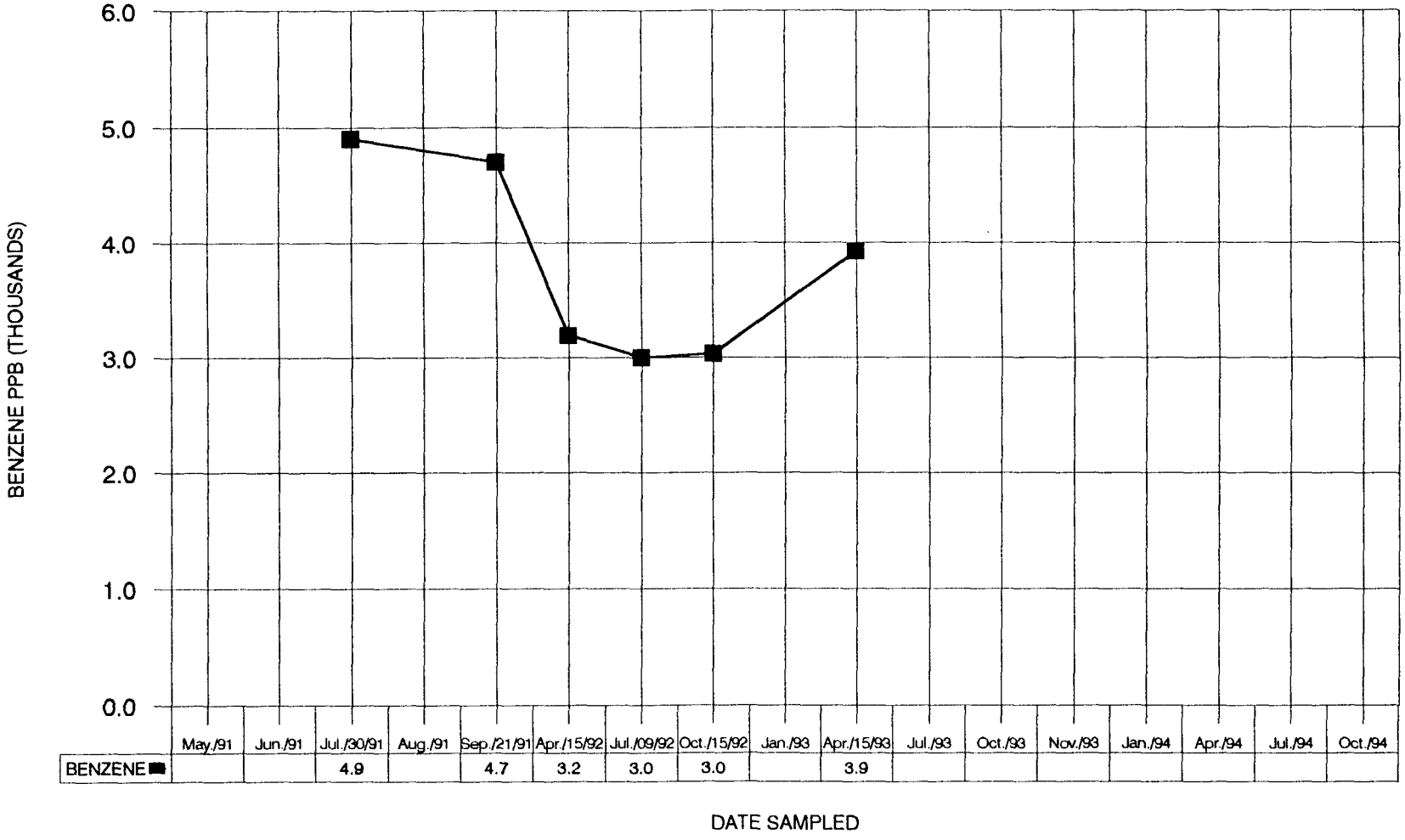
GROUNDWATER ANALYSIS DATA
MW#11 BH-34



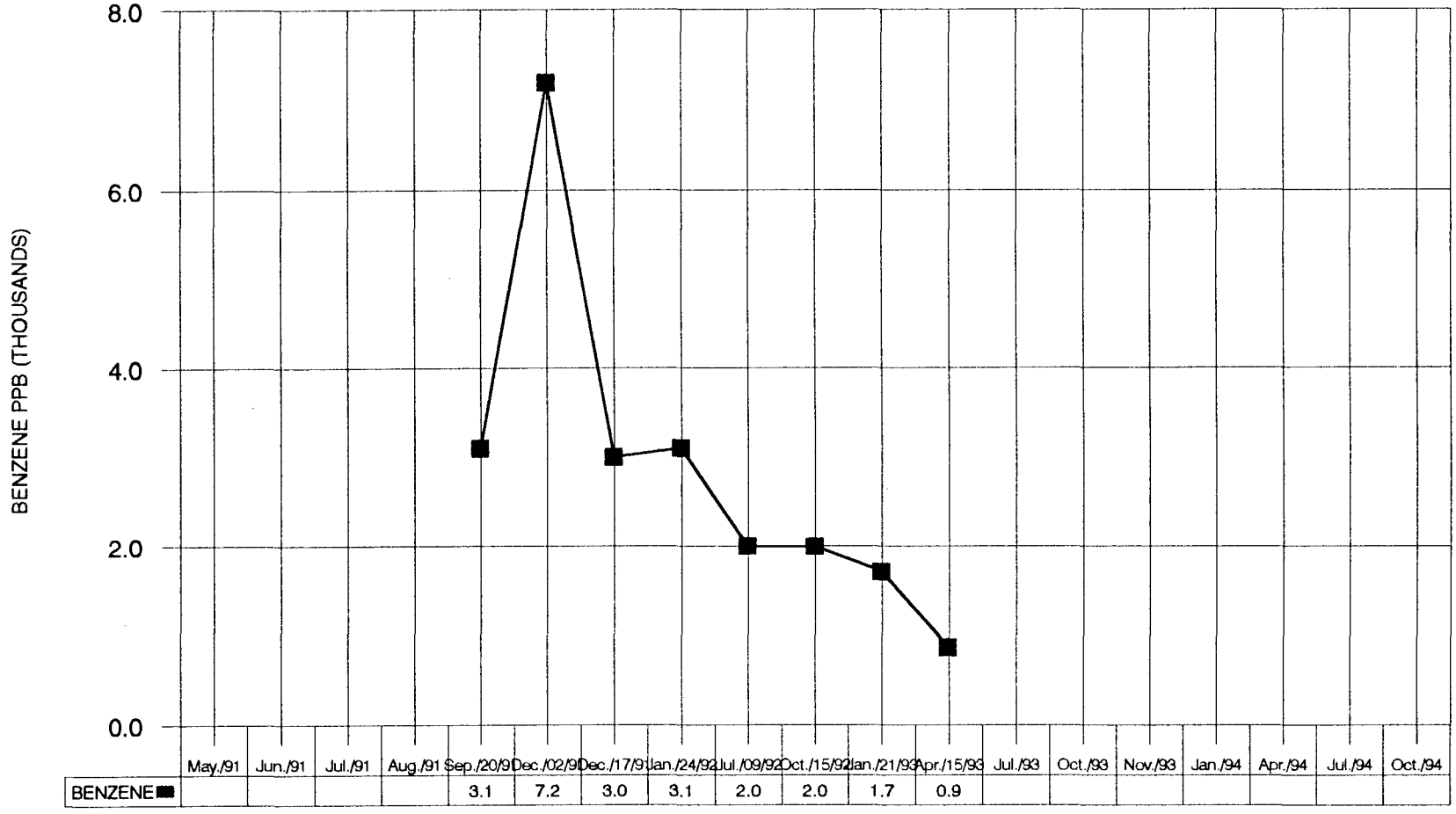
GROUNDWATER ANALYSIS DATA
MW#18 BH-41



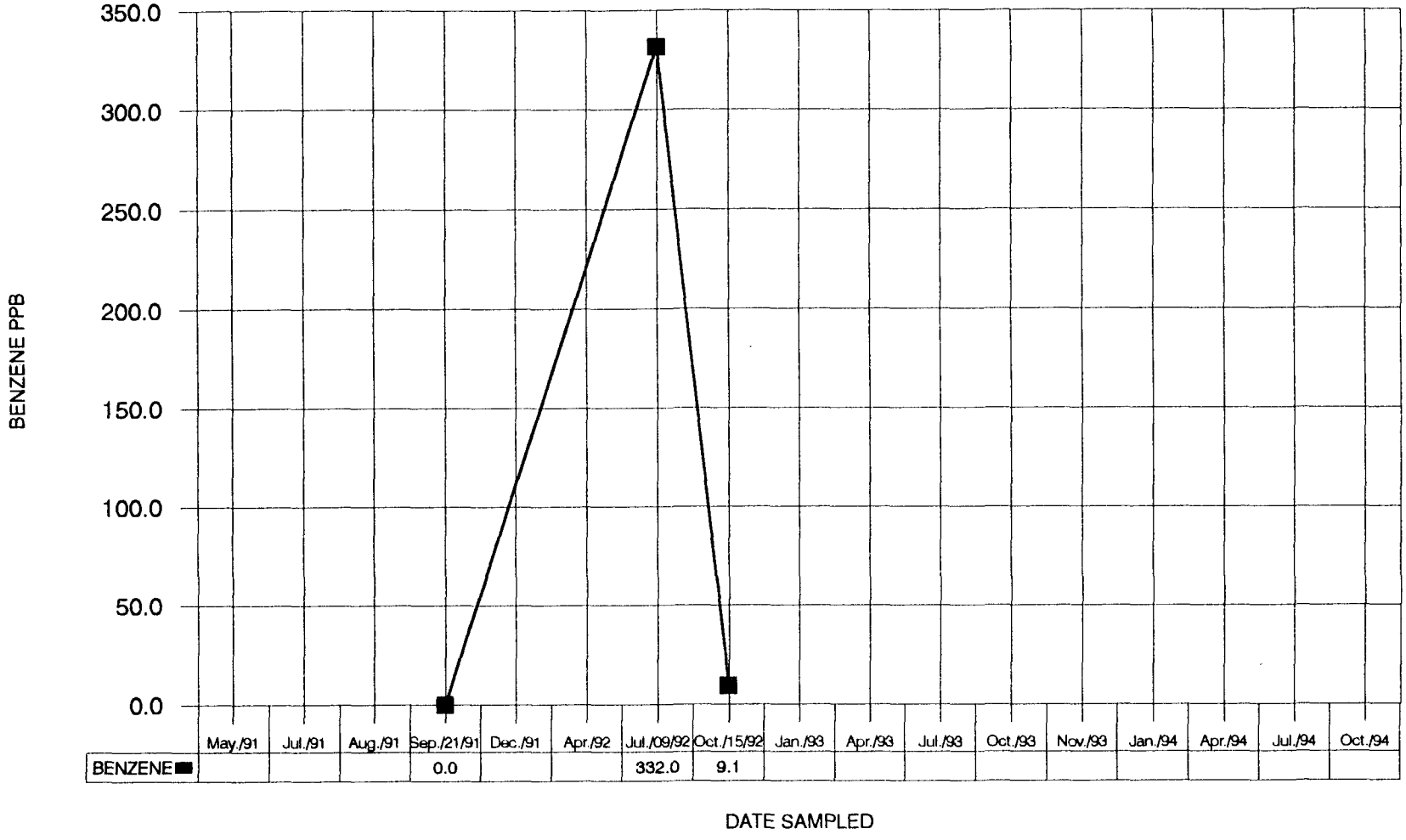
GROUNDWATER ANALYSIS DATA
MW#19 BH-42



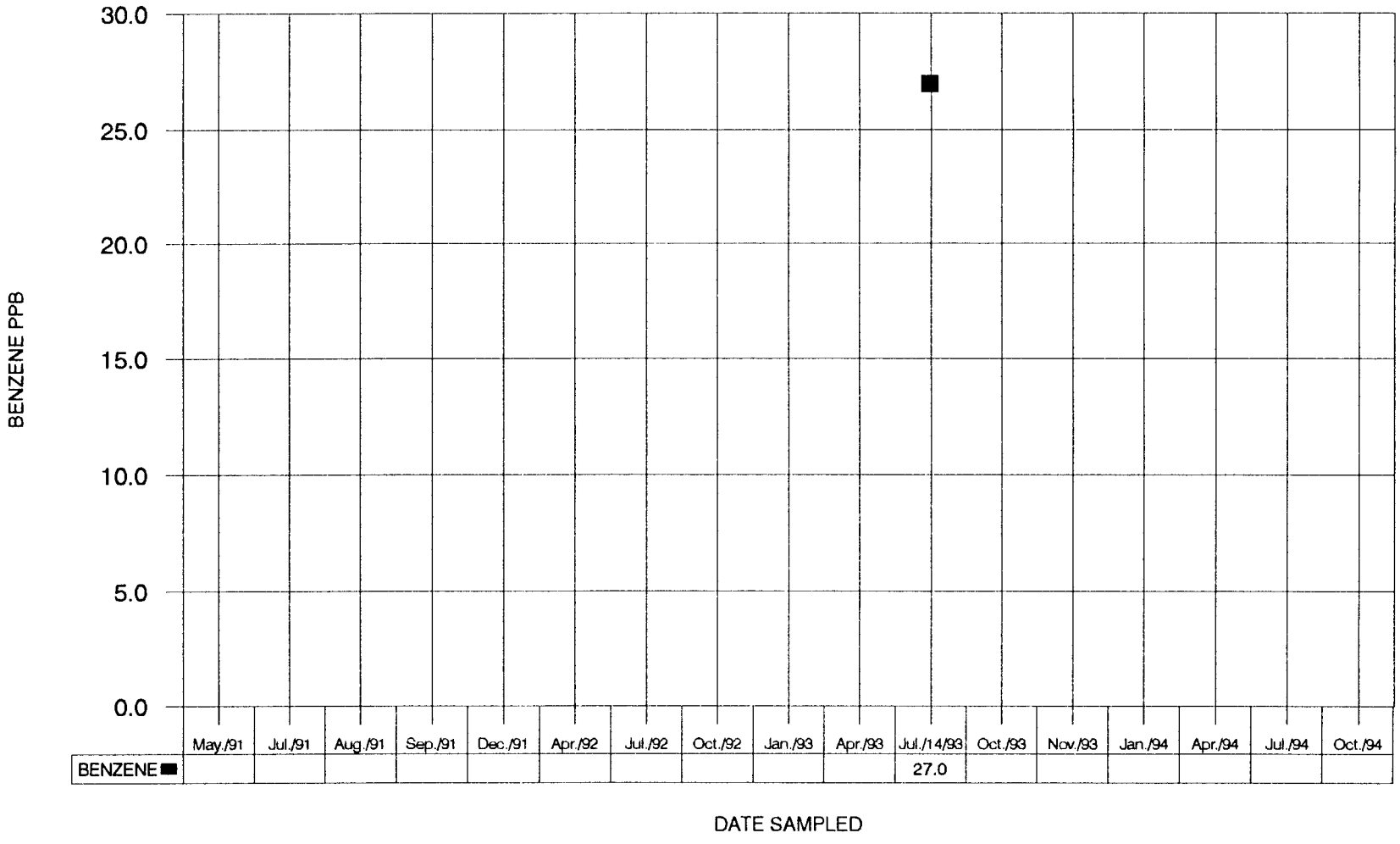
GROUNDWATER ANALYSIS DATA
MW#26 BH-49



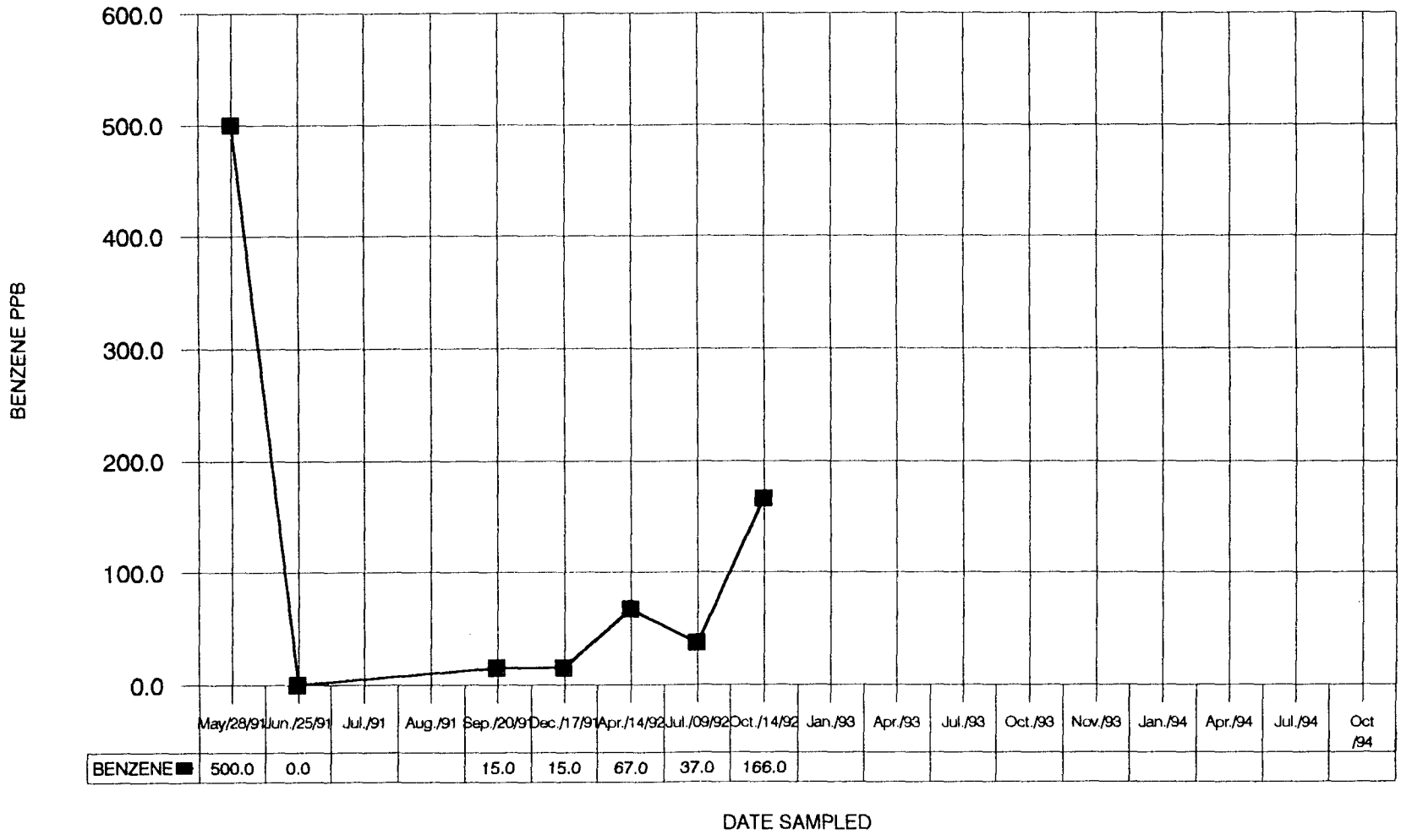
GROUNDWATER ANALYSIS DATA
MW#31 BH-55



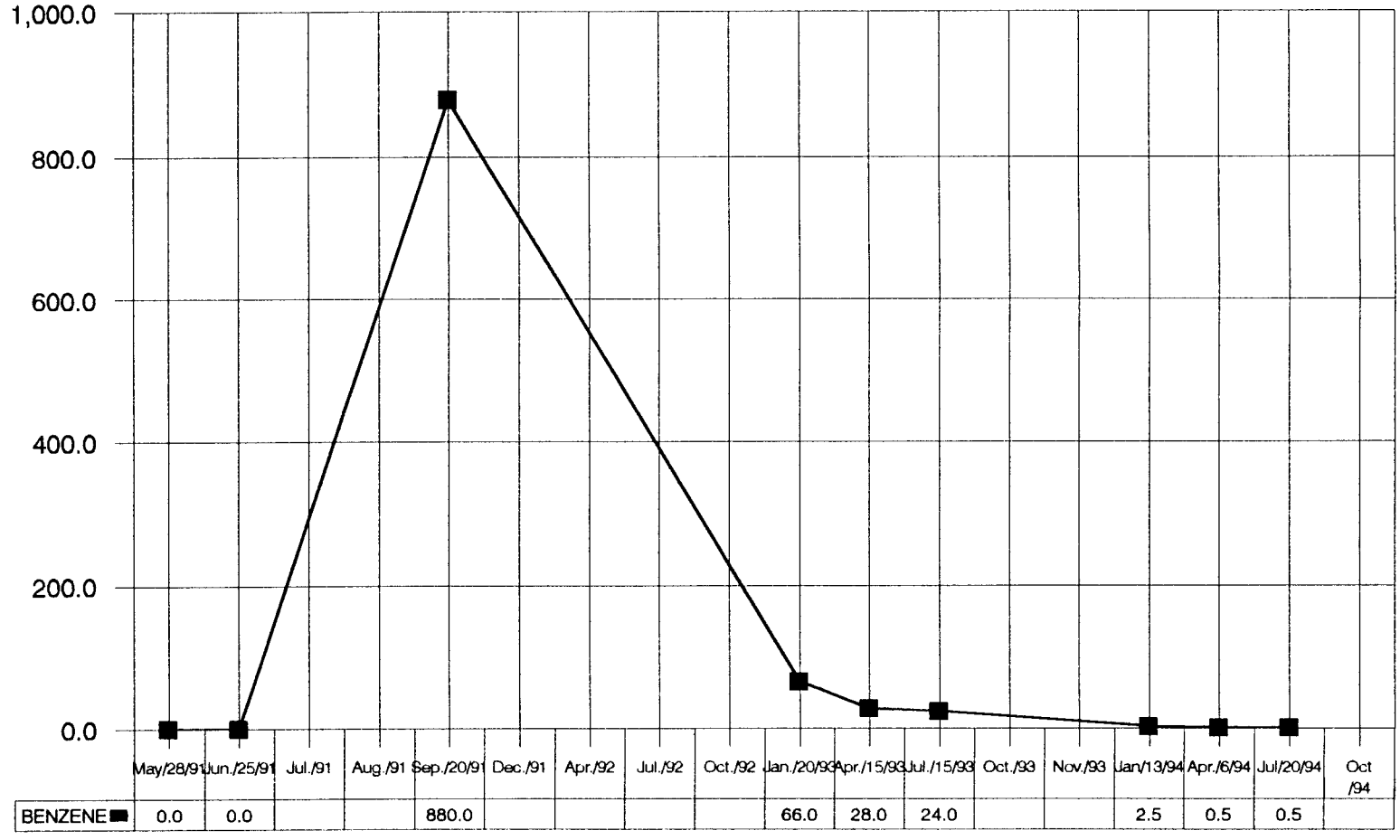
GROUNDWATER ANALYSIS DATA
MW#37 BH-60



GROUNDWATER ANALYSIS DATA
MW#38 BH-61



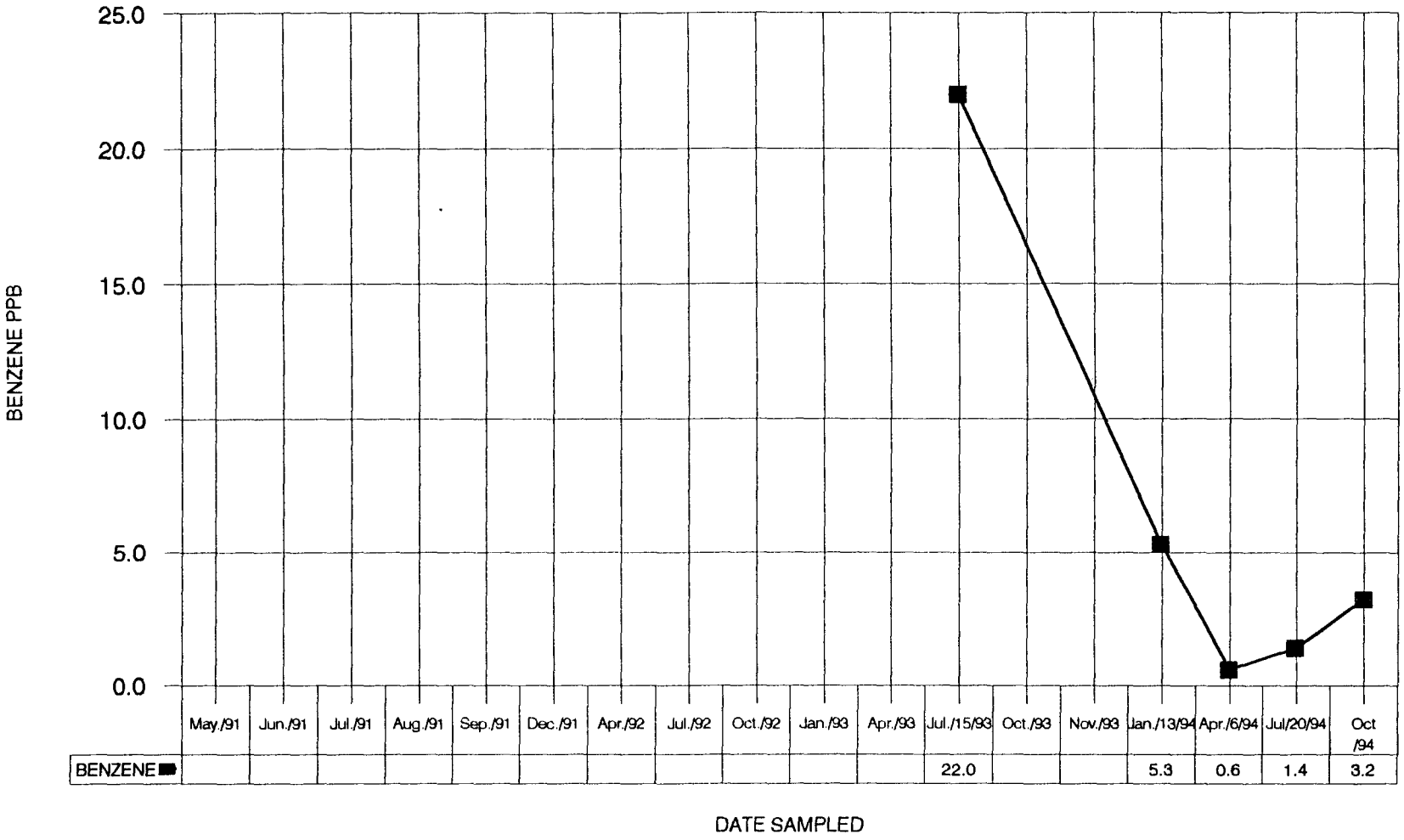
GROUNDWATER ANALYSIS DATA
MW#39 BH-62



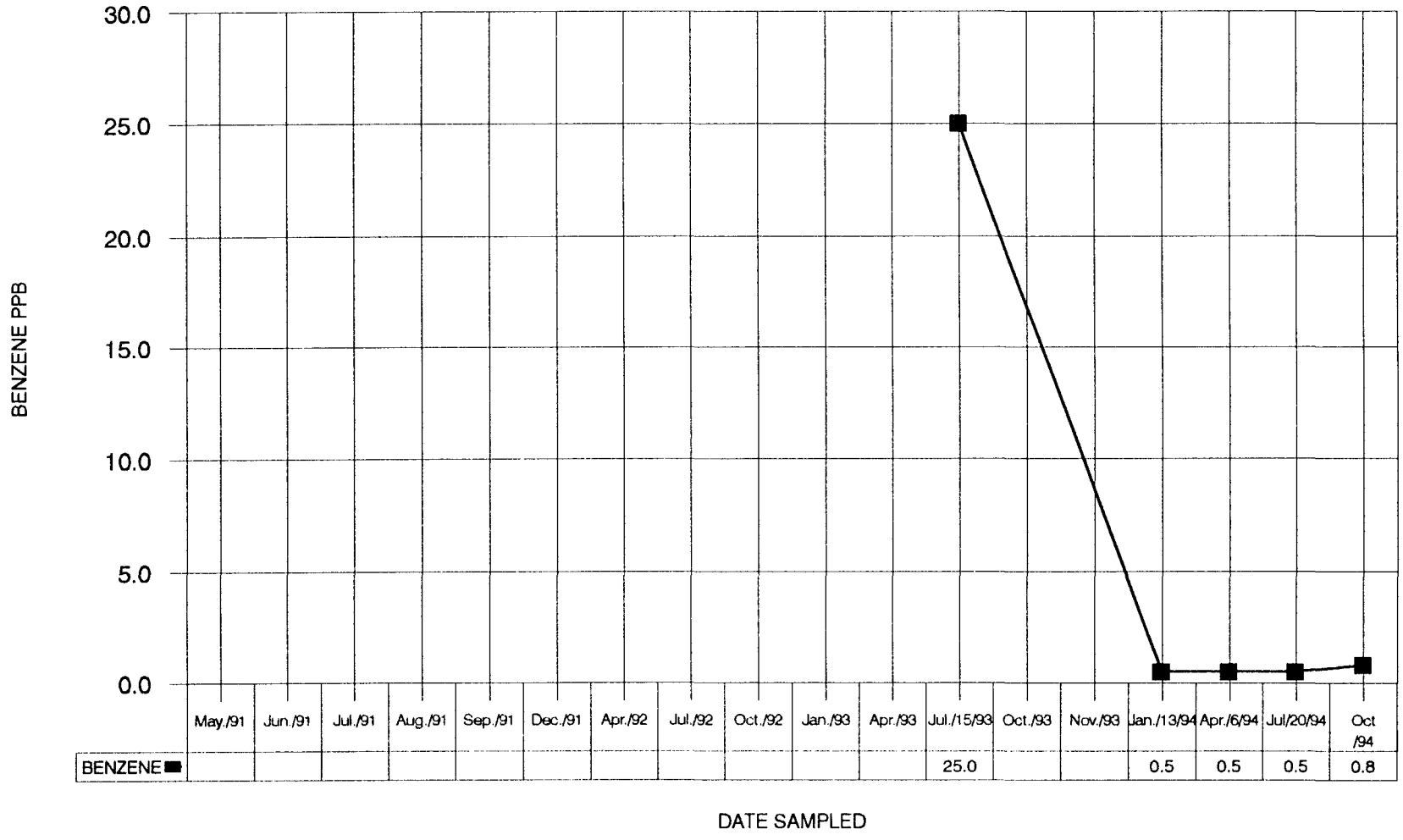
	May/28/91	Jun./25/91	Jul./91	Aug./91	Sep./20/91	Dec./91	Apr./92	Jul./92	Oct./92	Jan./20/93	Apr./15/93	Jul./15/93	Oct./93	Nov./93	Jan/13/94	Apr./6/94	Jul/20/94	Oct /94
BENZENE	0.0	0.0			880.0					66.0	28.0	24.0			2.5	0.5	0.5	

DATE SAMPLED

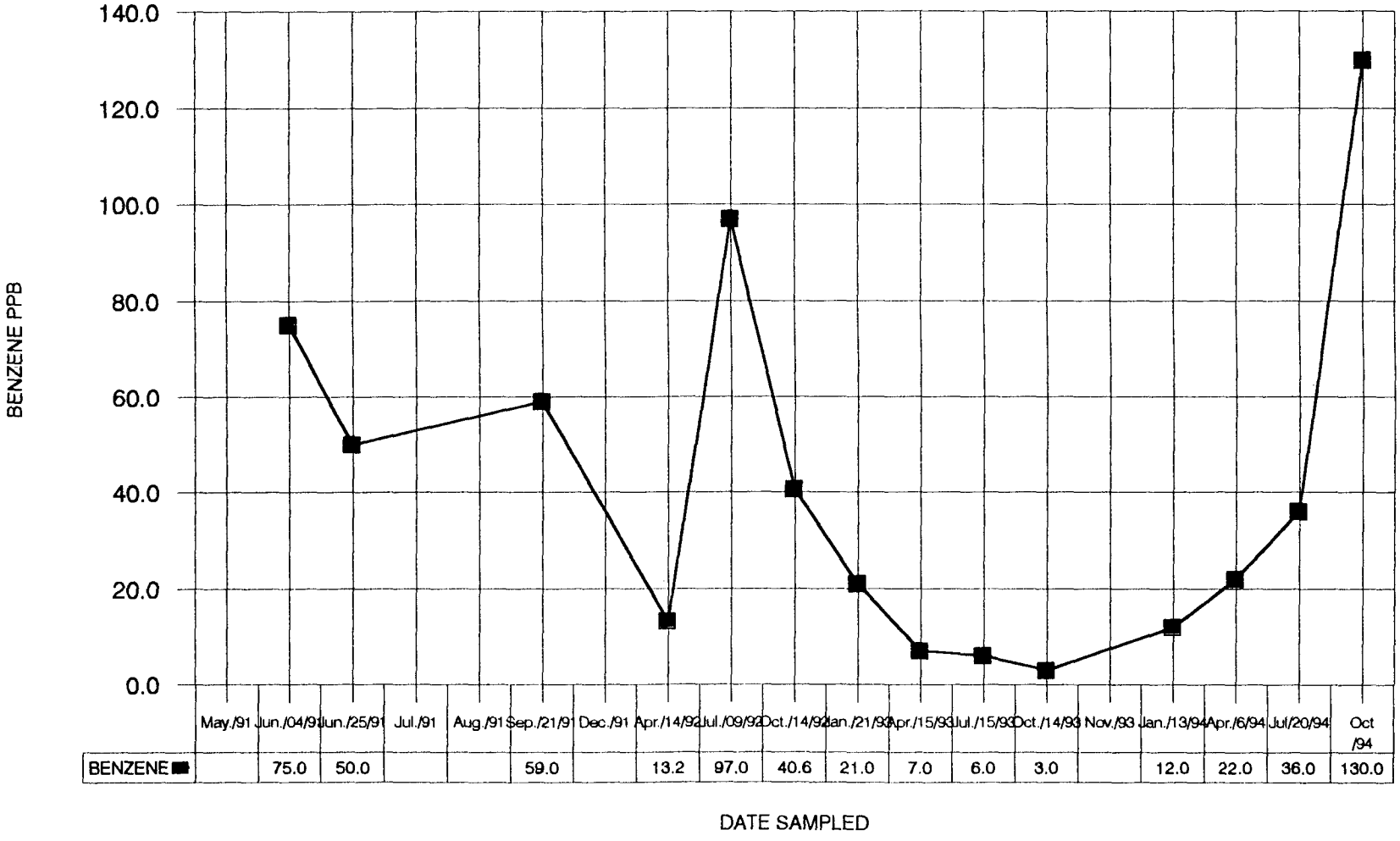
GROUNDWATER ANALYSIS DATA
MW#41 BH-64



GROUNDWATER ANALYSIS DATA
MW#43 BH-66

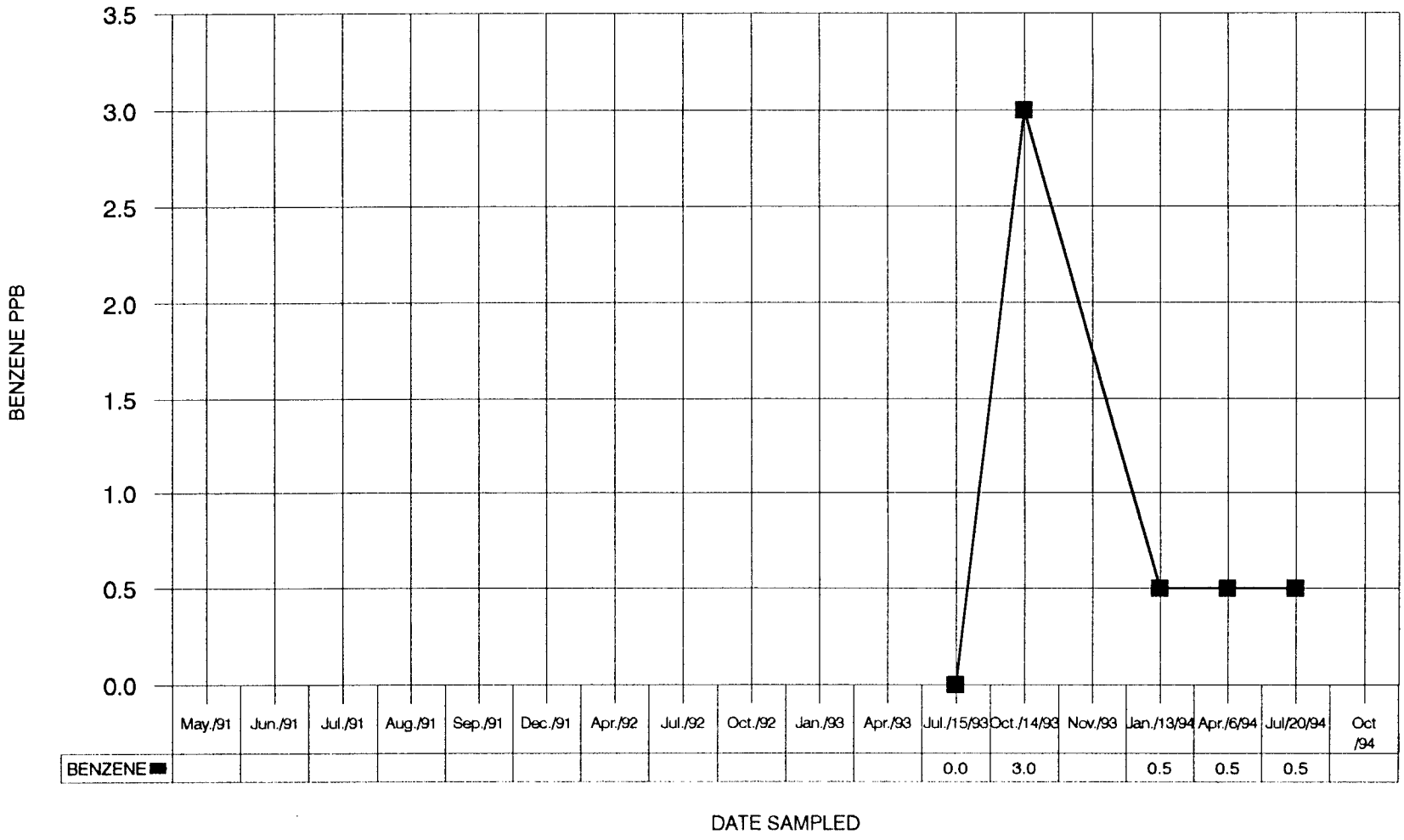


BOREHOLE WATER ANALYSIS DATA
MW#44 BH-67

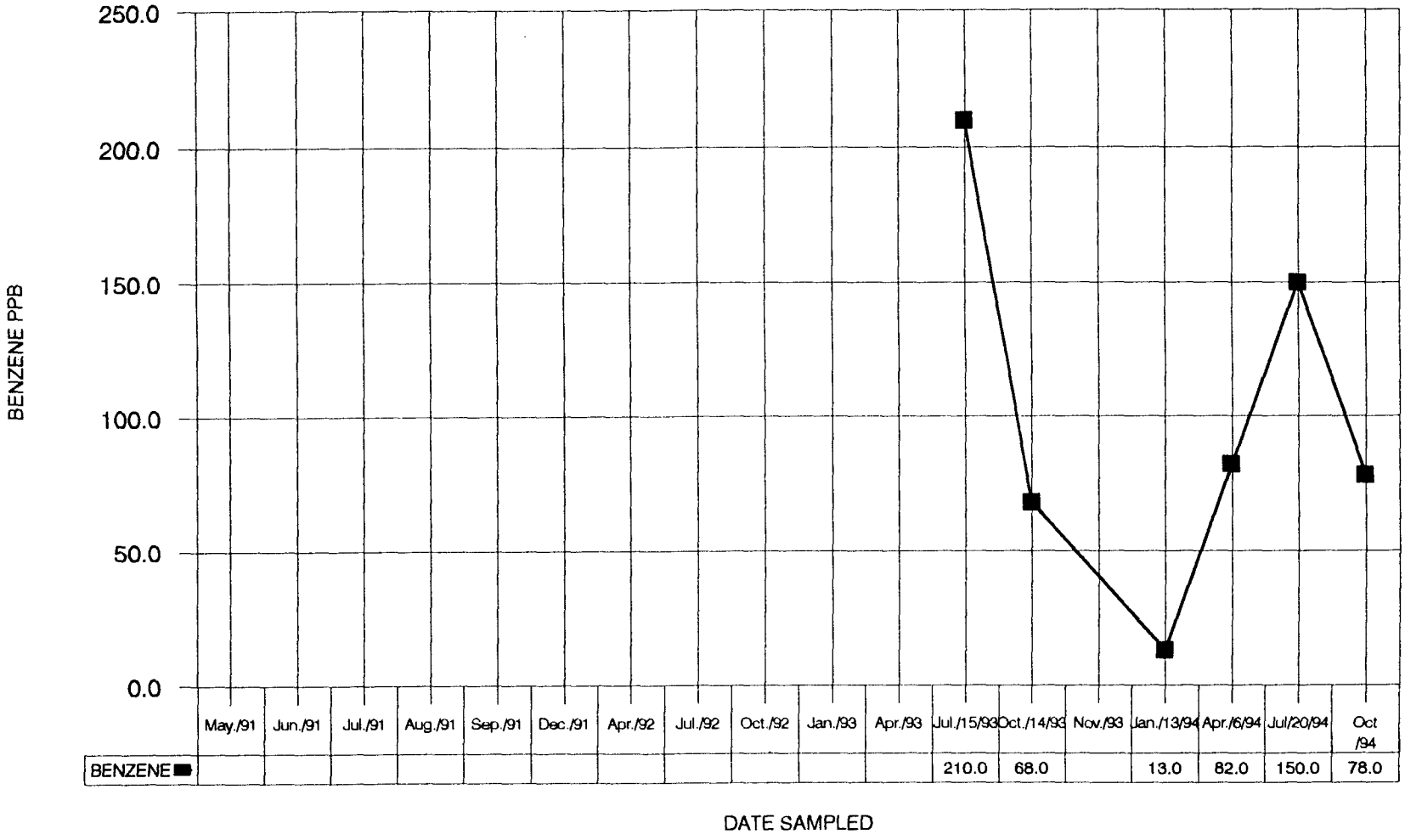


	May./91	Jun./04/91	Jun./25/91	Jul./91	Aug./91	Sep./21/91	Dec./91	Apr./14/92	Jul./09/92	Oct./14/92	Jan./21/93	Apr./15/93	Jul./15/93	Oct./14/93	Nov./93	Jan./13/94	Apr./6/94	Jul/20/94	Oct /94
BENZENE		75.0	50.0			59.0		13.2	97.0	40.6	21.0	7.0	6.0	3.0		12.0	22.0	36.0	130.0

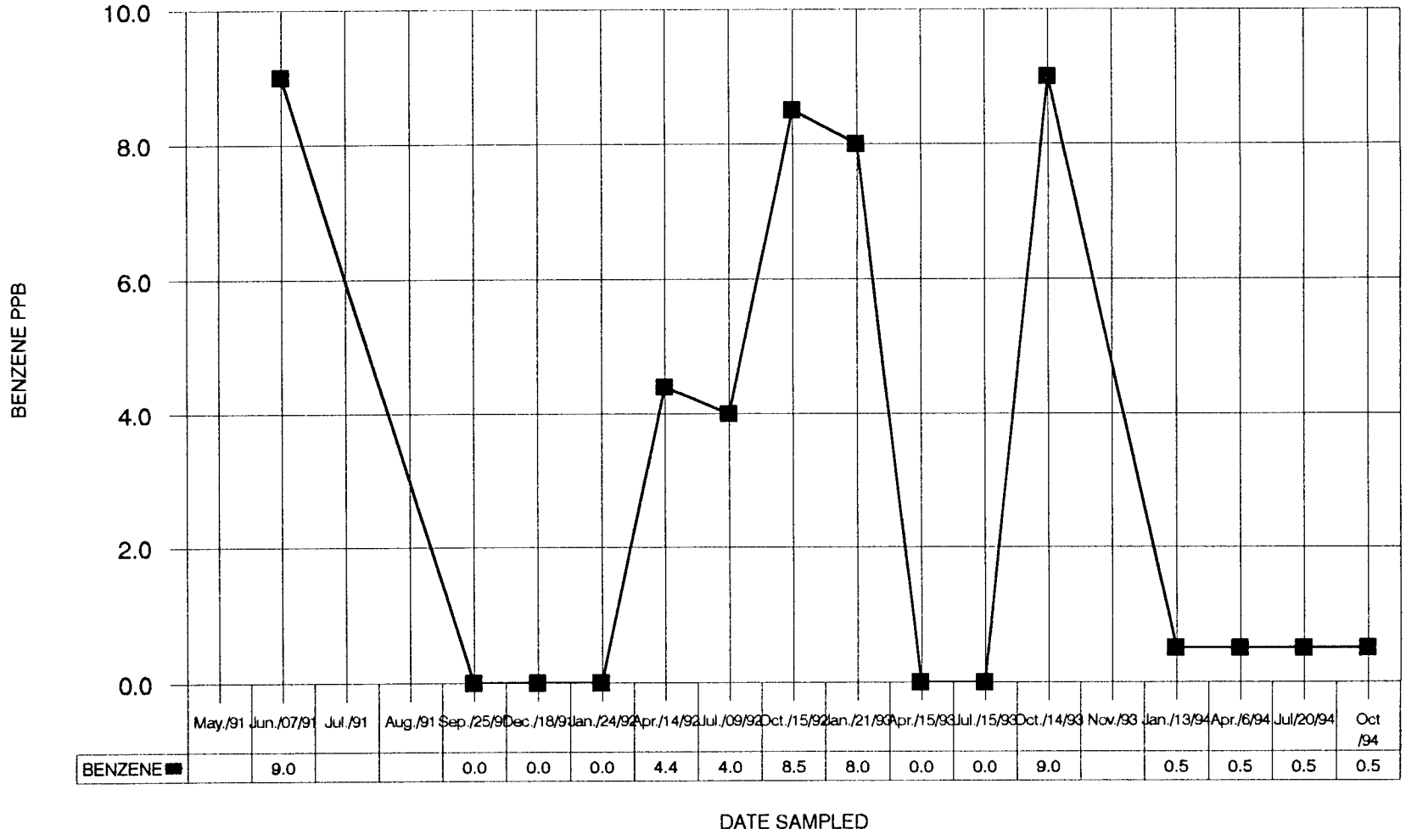
BOREHOLE WATER ANALYSIS DATA
MW#45 BH-68



BOREHOLE WATER ANALYSIS DATA
MW#49 BH-72

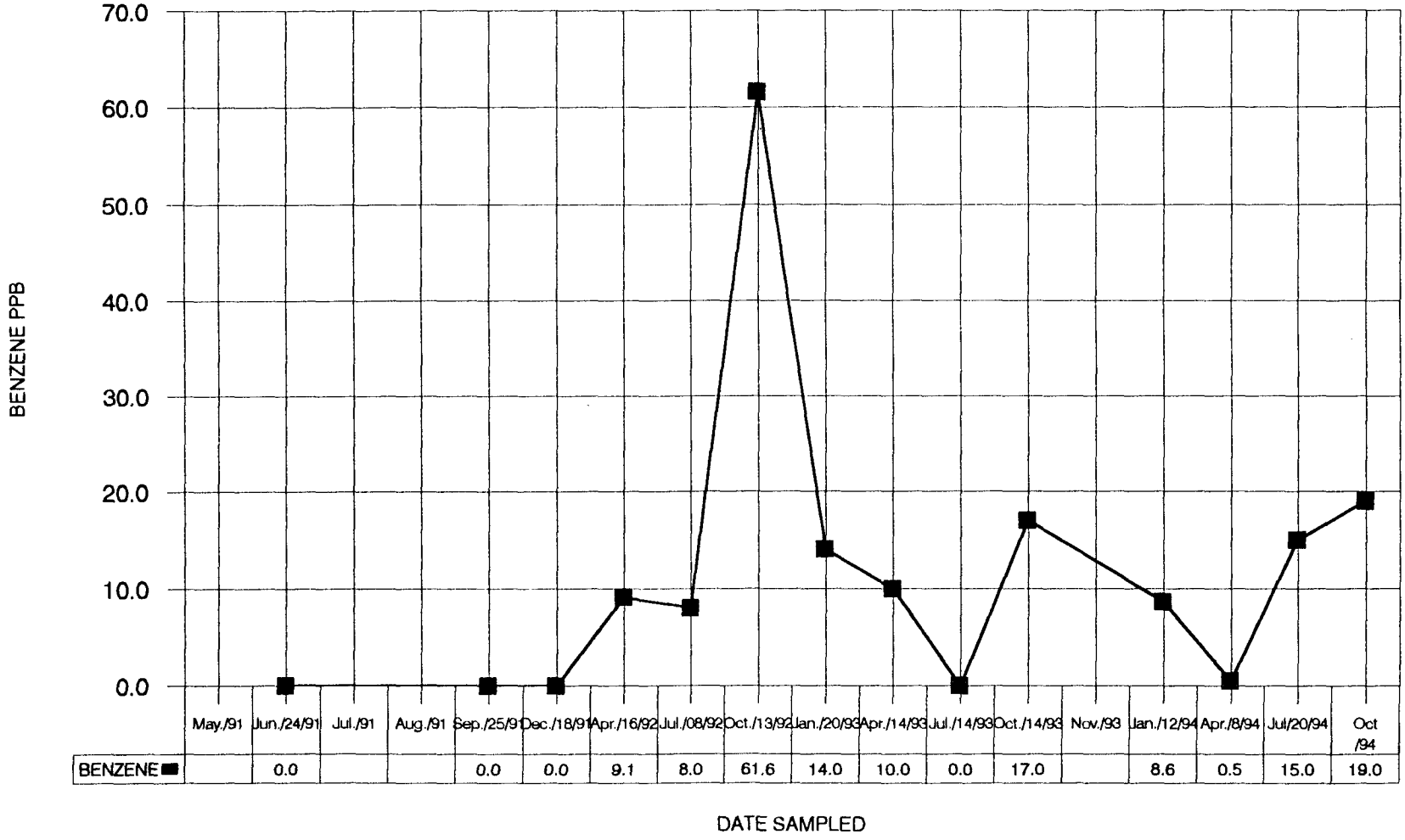


GROUNDWATER ANALYSIS DATA
MW#50 BH-73

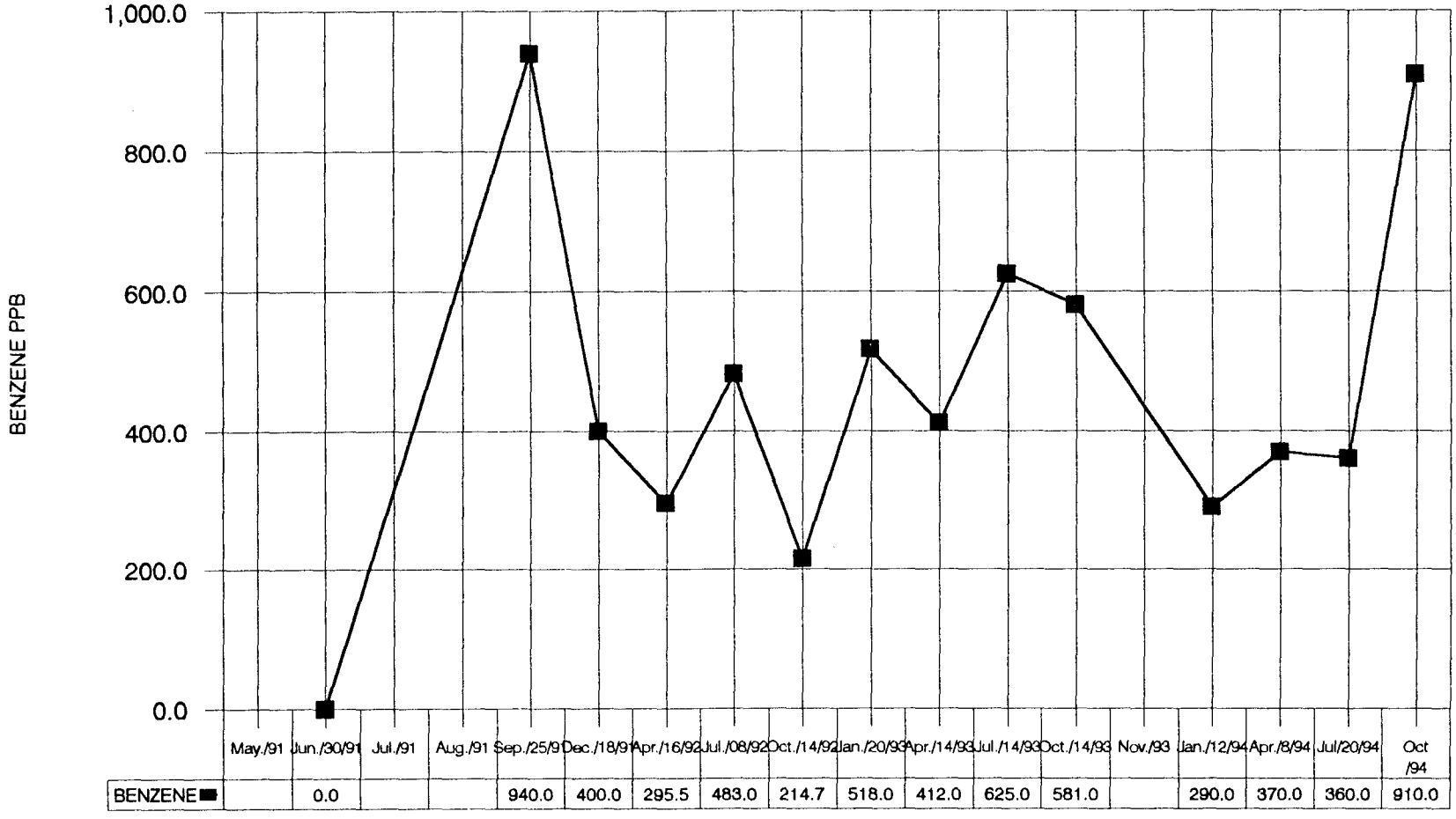


	May./91	Jun./07/91	Jul./91	Aug./91	Sep./25/91	Dec./18/91	Jan./24/92	Apr./14/92	Jul./09/92	Oct./15/92	Jan./21/93	Apr./15/93	Jul./15/93	Oct./14/93	Nov./93	Jan./13/94	Apr./6/94	Jul/20/94	Oct /94
BENZENE		9.0			0.0	0.0	0.0	4.4	4.0	8.5	8.0	0.0	0.0	9.0		0.5	0.5	0.5	0.5

GROUNDWATER ANALYSIS DATA
MW#54 BH-80



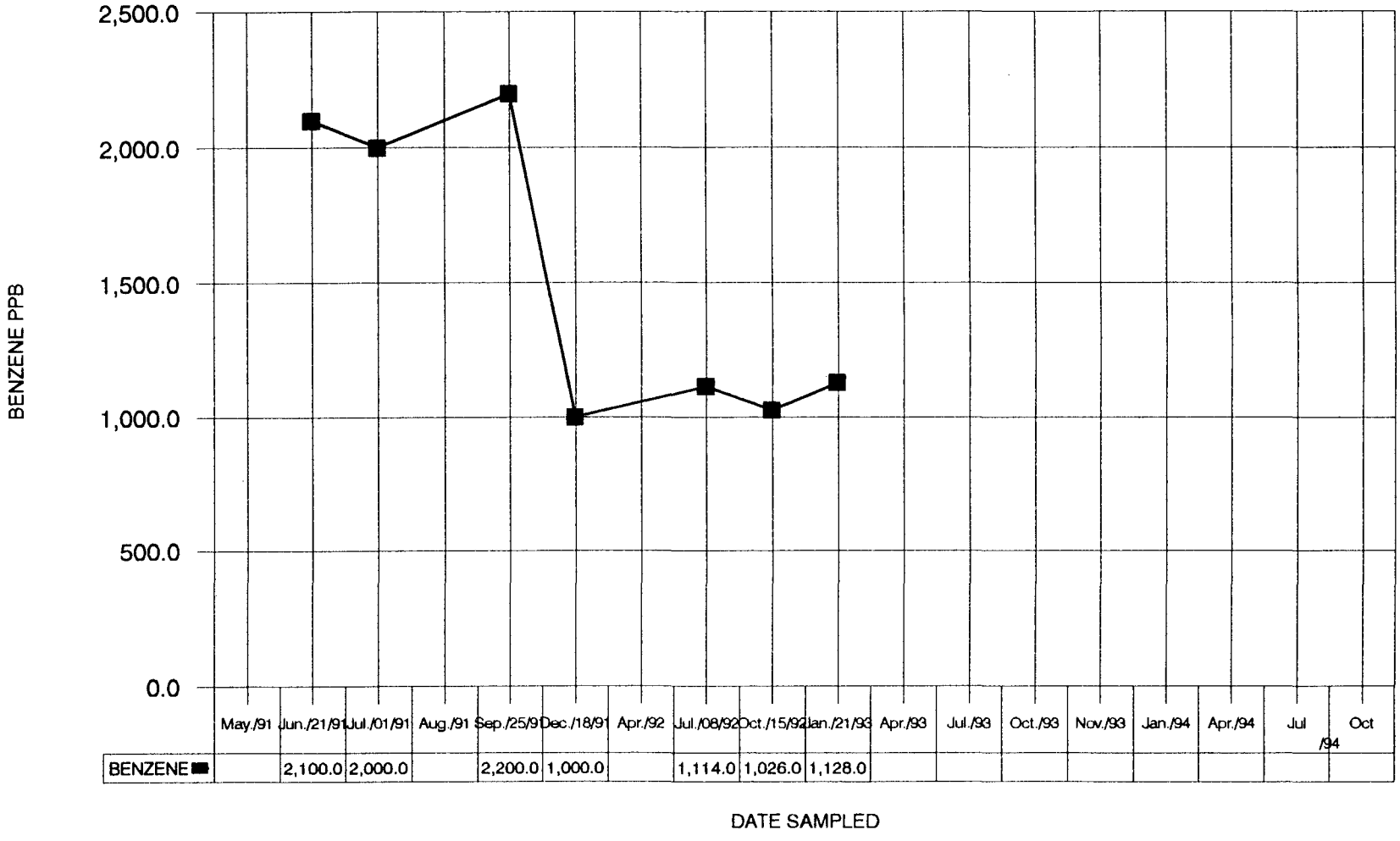
GROUNDWATER ANALYSIS DATA
MW#55 BH-81



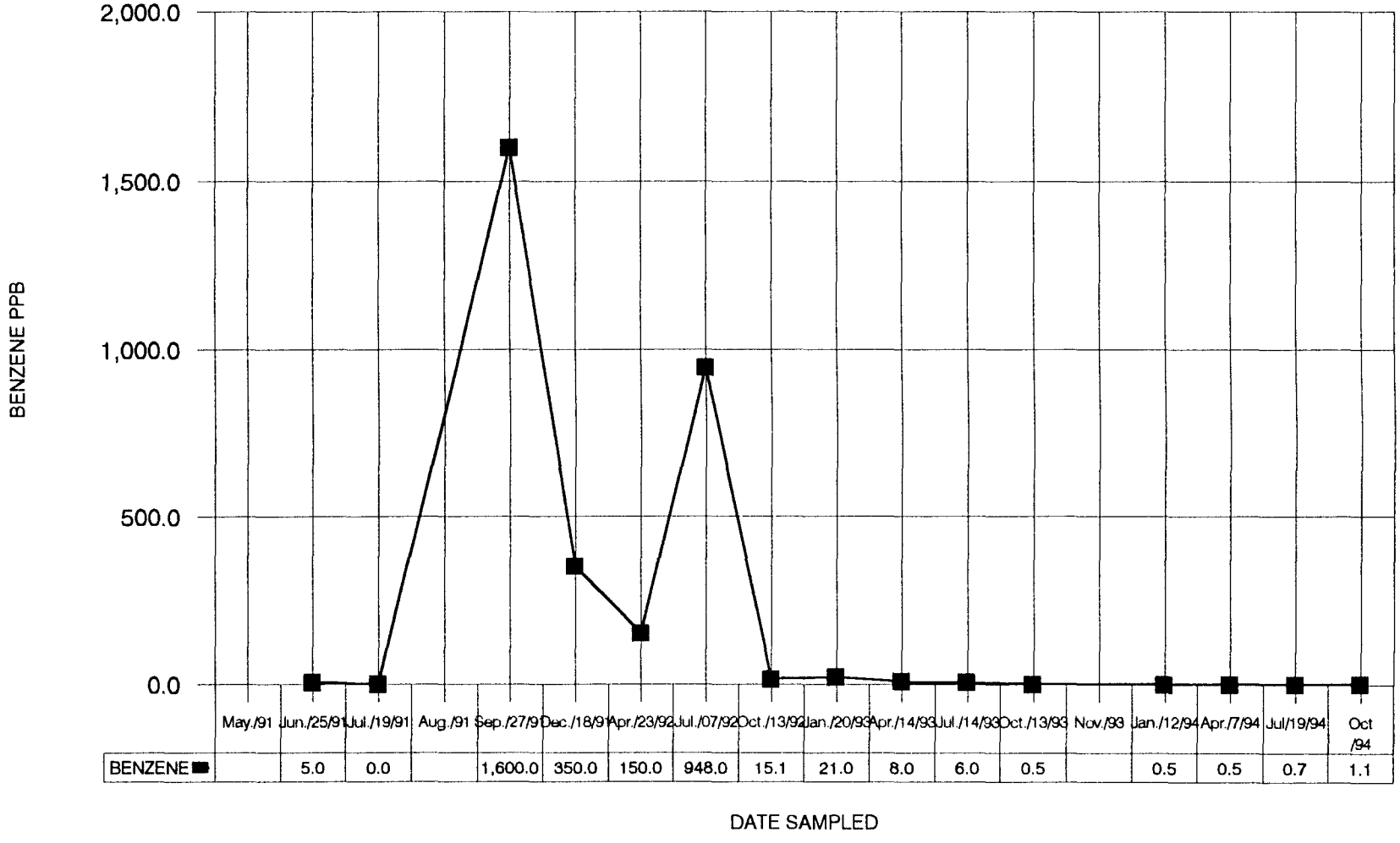
	May./91	Jun./30/91	Jul./91	Aug./91	Sep./25/9	Dec./18/91	Apr./16/92	Jul./08/92	Oct./14/92	Jan./20/93	Apr./14/93	Jul./14/93	Oct./14/93	Nov./93	Jan./12/94	Apr./8/94	Jul/20/94	Oct /94
BENZENE		0.0			940.0	400.0	295.5	483.0	214.7	518.0	412.0	625.0	581.0		290.0	370.0	360.0	910.0

DATE SAMPLED

GROUNDWATER ANALYSIS DATA
MW#56 BH-82

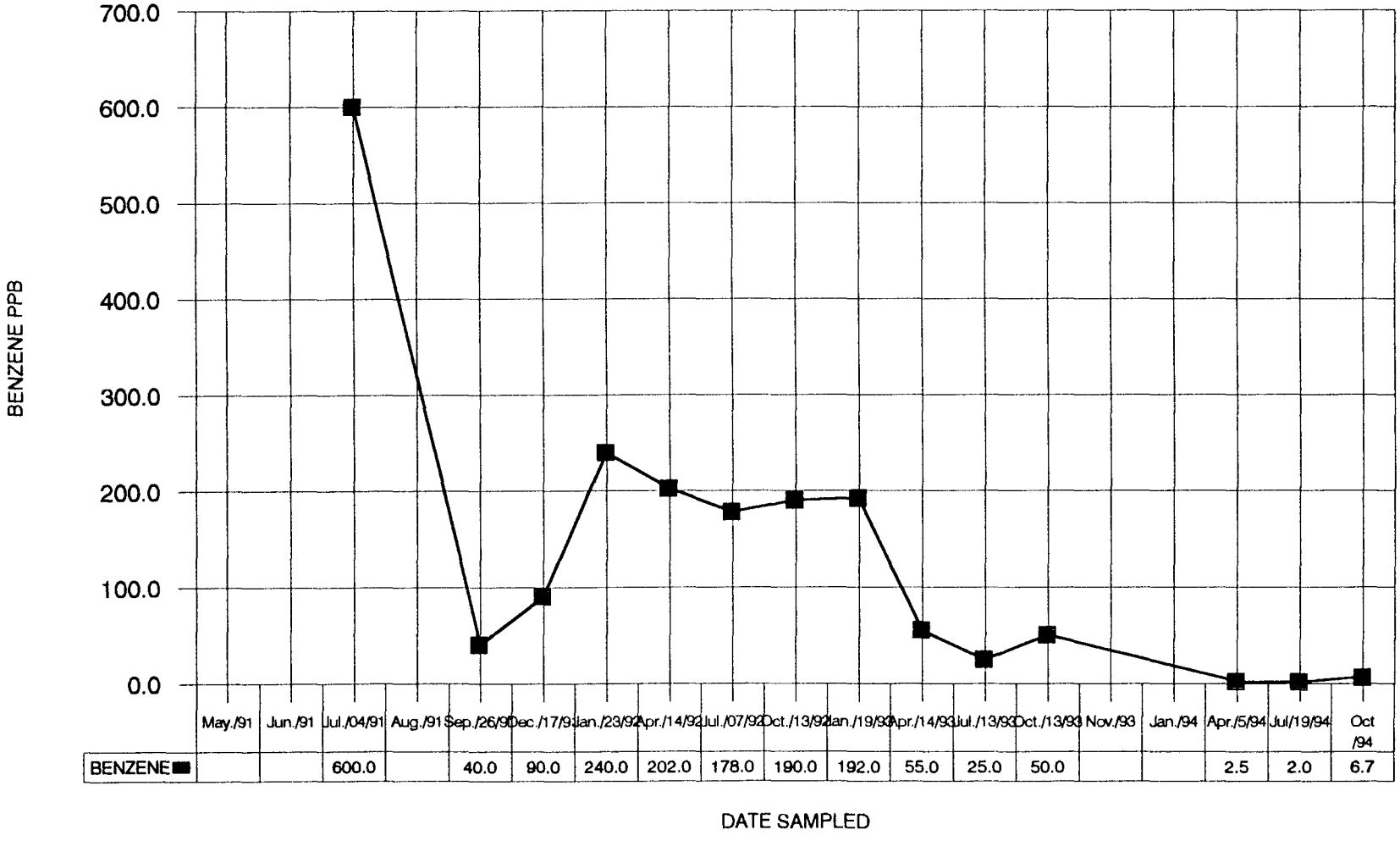


GROUNDWATER ANALYSIS DATA
MW#57 BH-83



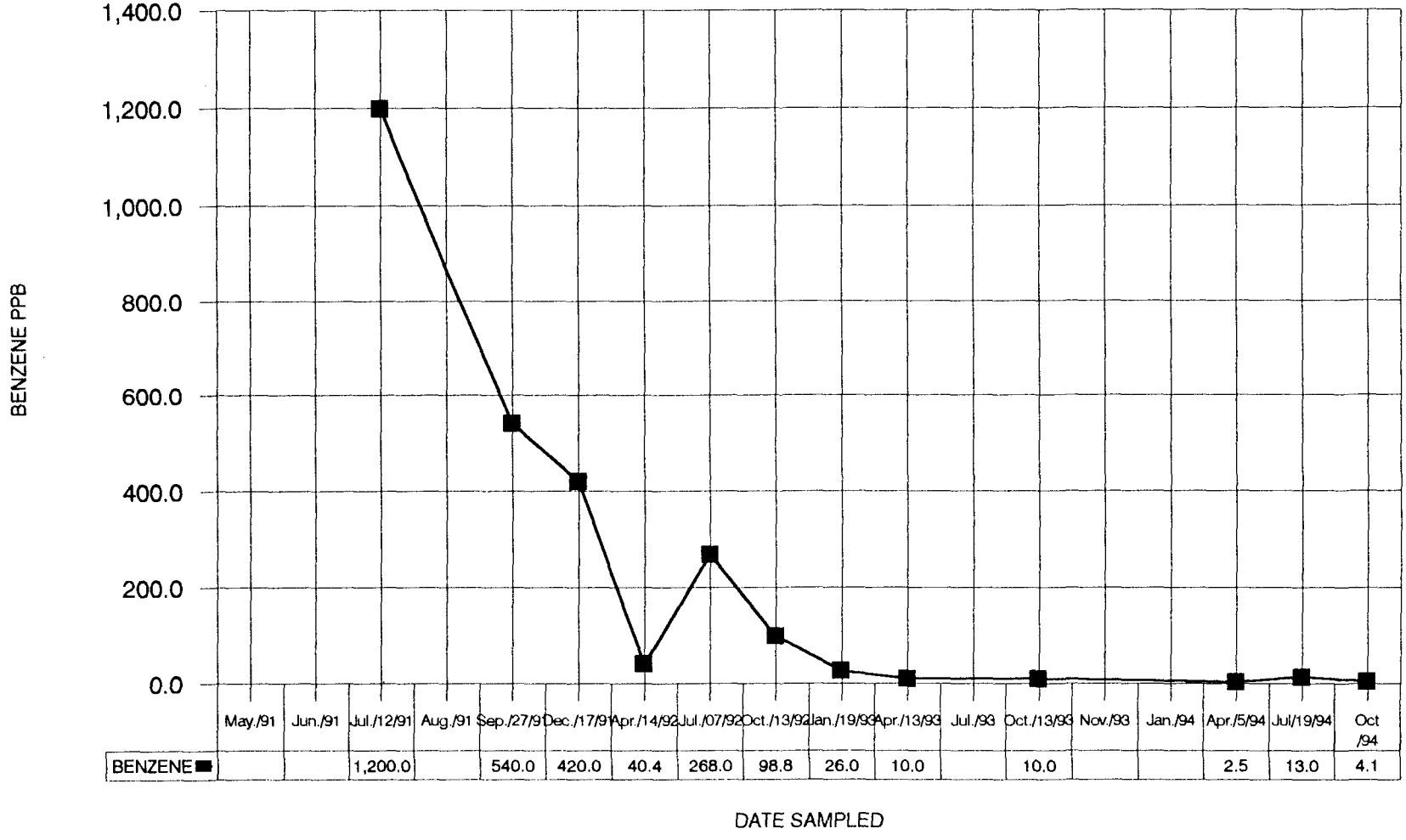
	May./91	Jun./25/91	Jul./19/91	Aug./91	Sep./27/9	Dec./18/91	Apr./23/92	Jul./07/92	Oct./13/92	Jan./20/93	Apr./14/93	Jul./14/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94	Jul/19/94	Oct /94
BENZENE		5.0	0.0		1,600.0	350.0	150.0	948.0	15.1	21.0	8.0	6.0	0.5		0.5	0.5	0.7	1.1

GROUNDWATER ANALYSIS DATA
MW#58 BH-84



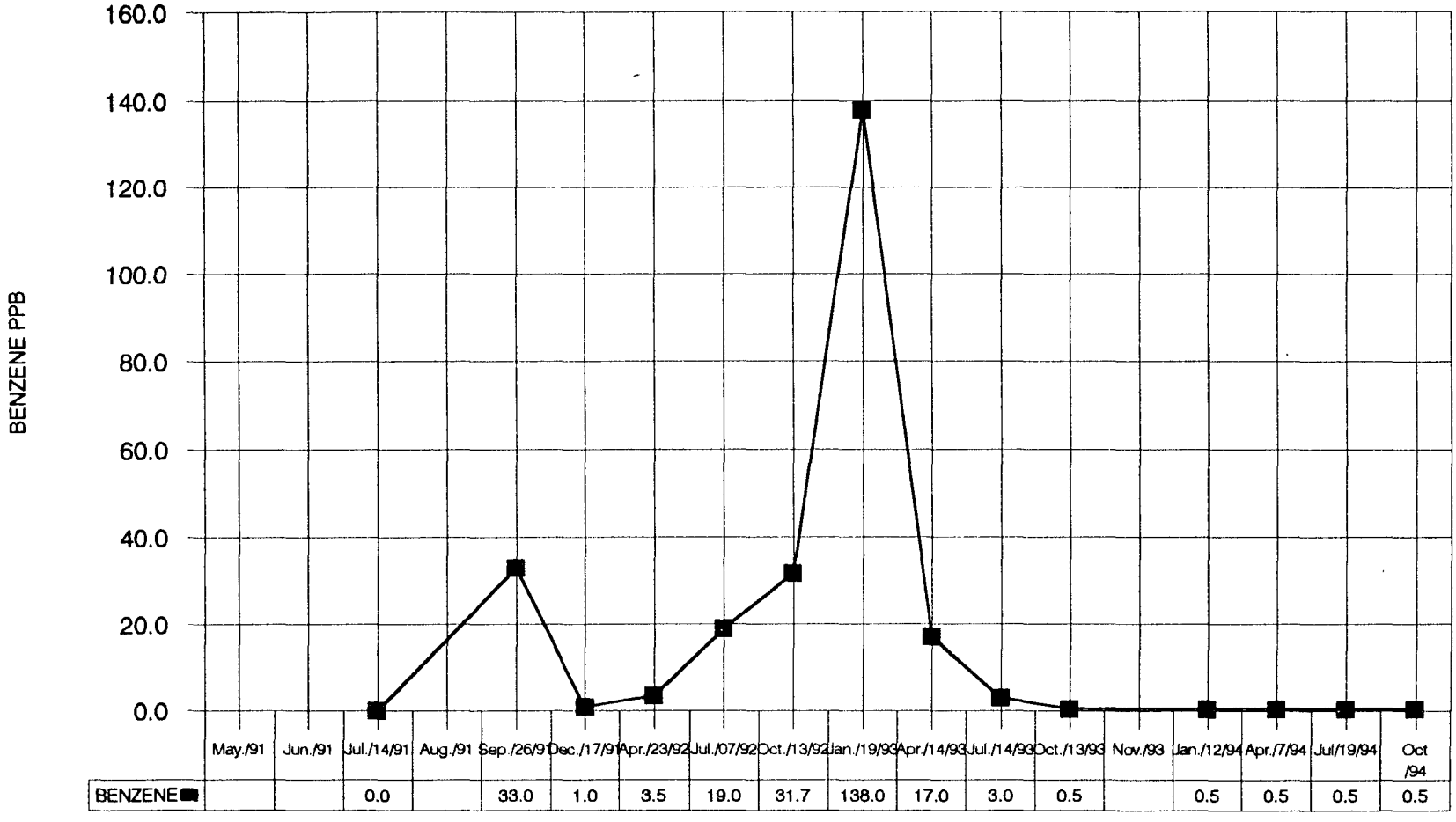
	May./91	Jun./91	Jul./04/91	Aug./91	Sep./26/91	Dec./17/91	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./14/93	Jul./13/93	Oct./13/93	Nov./93	Jan./94	Apr./5/94	Jul/19/94	Oct /94
BENZENE			600.0		40.0	90.0	240.0	202.0	178.0	190.0	192.0	55.0	25.0	50.0			2.5	2.0	6.7

GROUNDWATER ANALYSIS DATA
MW#59 BH-85



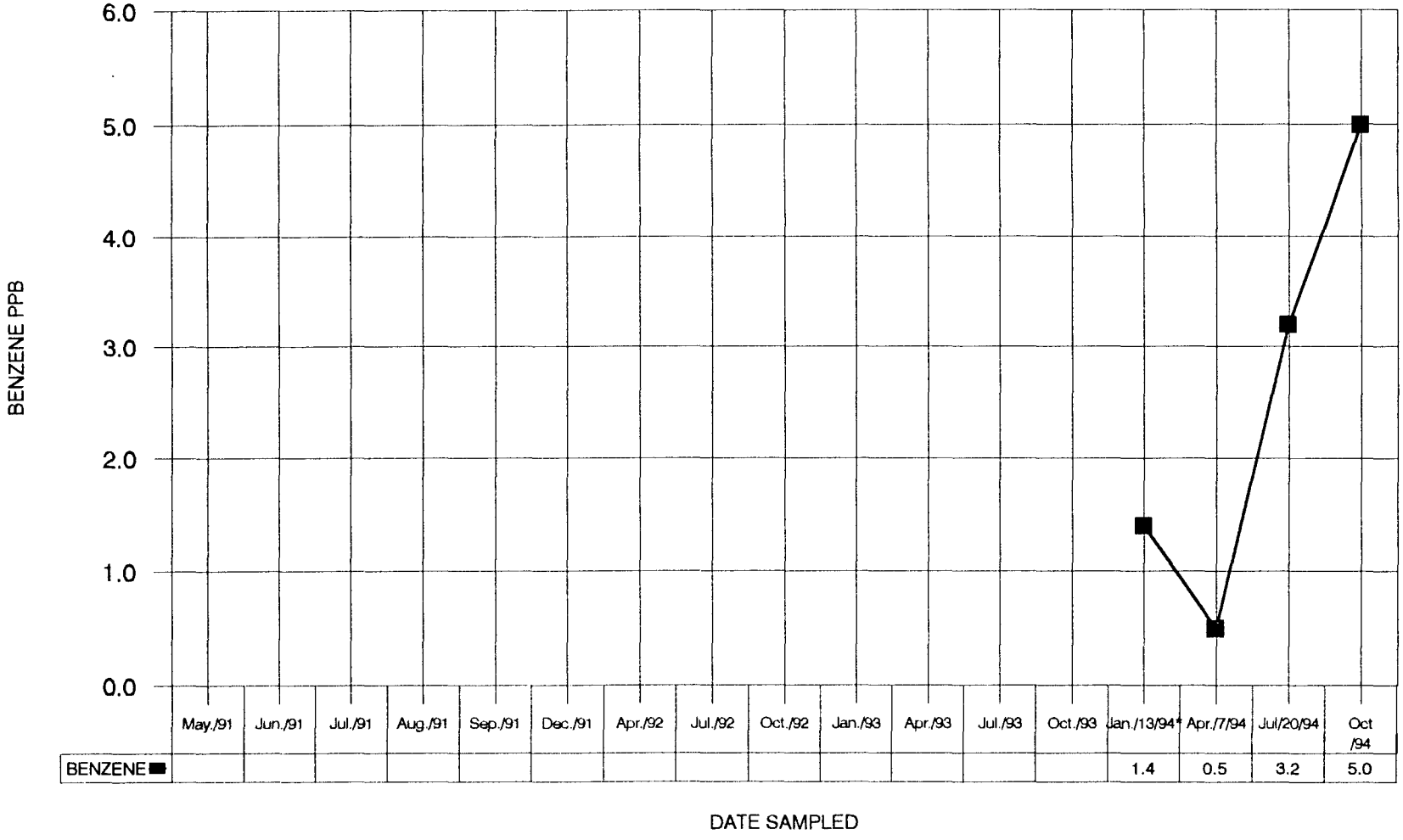
	May./91	Jun./91	Jul./12/91	Aug./91	Sep./27/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./93	Oct./13/93	Nov./93	Jan./94	Apr./5/94	Jul/19/94	Oct /94
BENZENE			1,200.0		540.0	420.0	40.4	268.0	98.8	26.0	10.0		10.0			2.5	13.0	4.1

GROUNDWATER ANALYSIS DATA
MW#60 BH-86



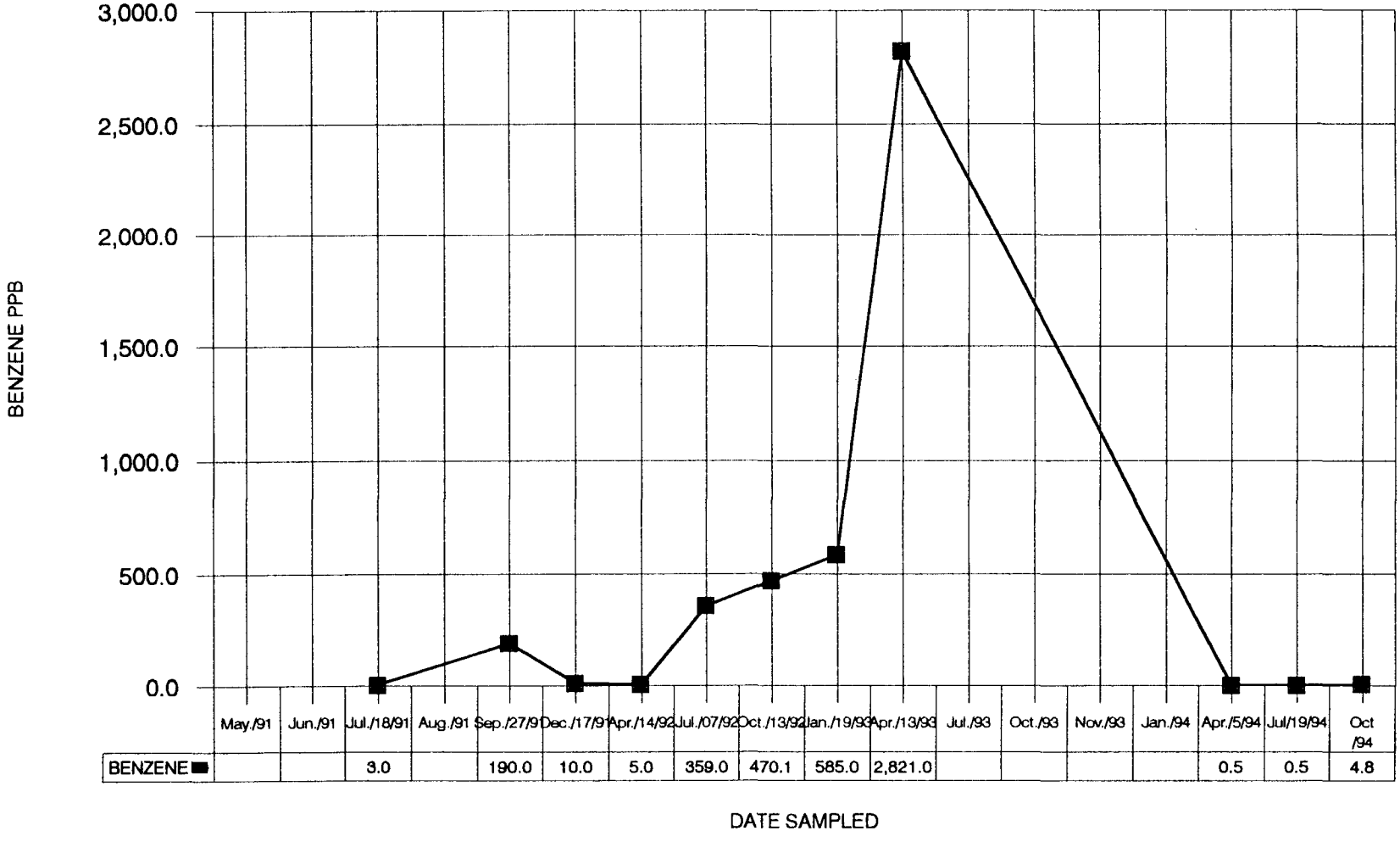
	May./91	Jun./91	Jul./14/91	Aug./91	Sep./26/91	Dec./17/91	Apr./23/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./14/93	Jul./14/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94	Jul/19/94	Oct /94
BENZENE			0.0		33.0	1.0	3.5	19.0	31.7	138.0	17.0	3.0	0.5		0.5	0.5	0.5	0.5

BOREHOLE WATER ANALYSIS DATA
MW#61 BH-87



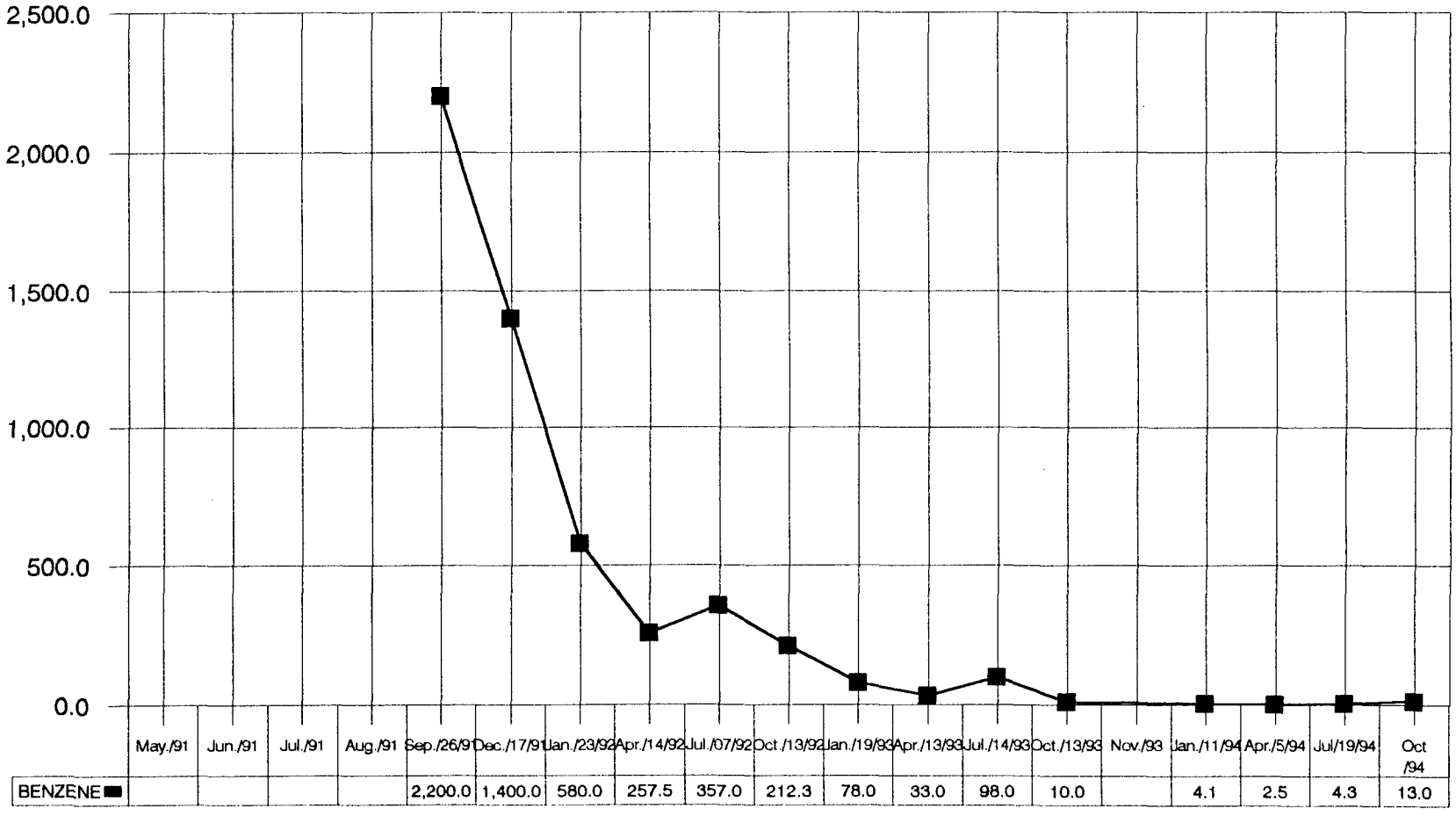
*- Jan. 1994 is the first time to sample this well.

GROUNDWATER ANALYSIS DATA
MW#61A BH-87A



	May./91	Jun./91	Jul./18/91	Aug./91	Sep./27/91	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./93	Oct./93	Nov./93	Jan./94	Apr./5/94	Jul/19/94	Oct /94
BENZENE			3.0		190.0	10.0	5.0	359.0	470.1	585.0	2,821.0					0.5	0.5	4.8

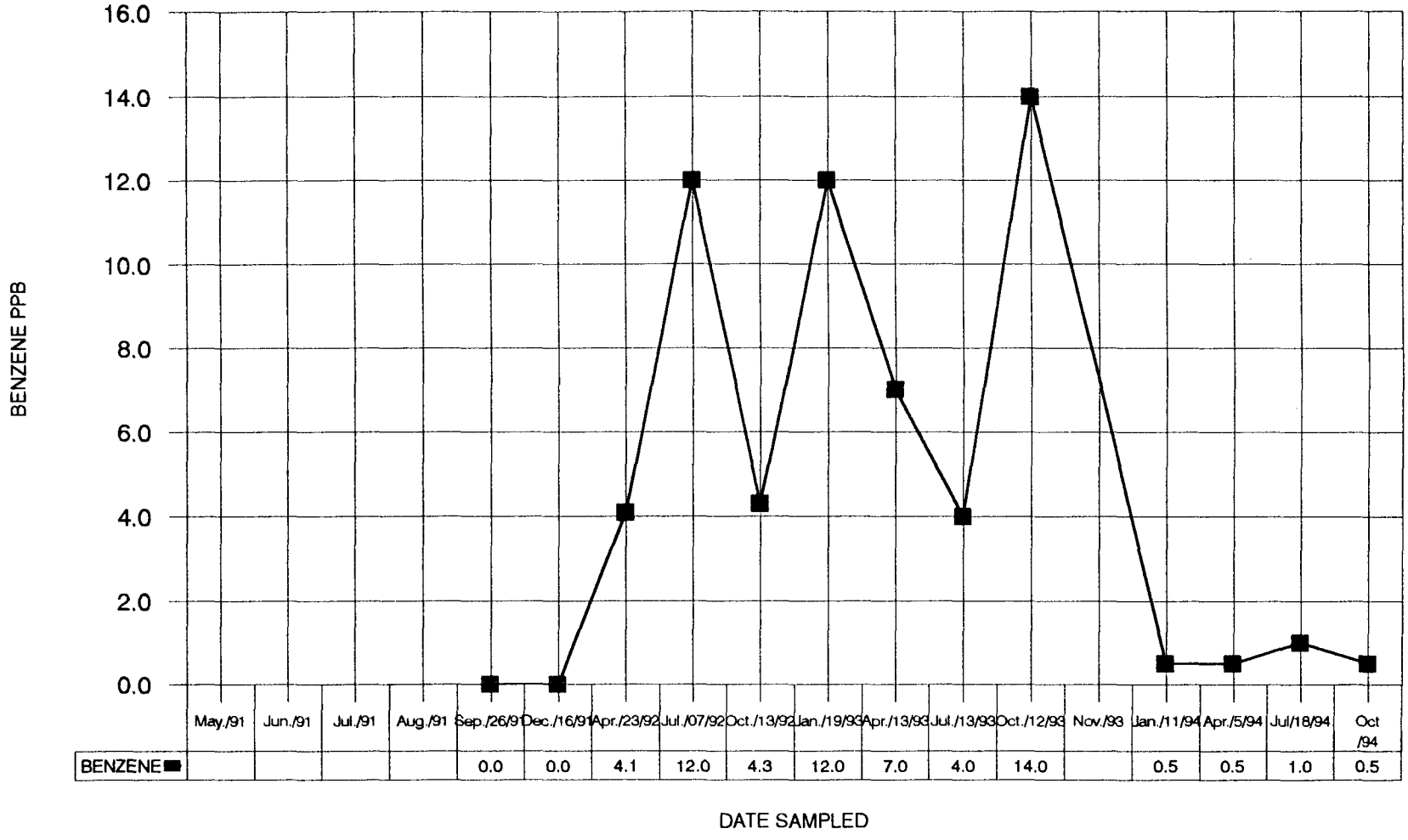
GROUNDWATER ANALYSIS DATA
MW#62 BH-88



	May./91	Jun./91	Jul./91	Aug./91	Sep./26/91	Dec./17/91	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./14/93	Oct./13/93	Nov./93	Jan./11/94	Apr./5/94	Jul/19/94	Oct /94
BENZENE					2,200.0	1,400.0	580.0	257.5	357.0	212.3	78.0	33.0	98.0	10.0		4.1	2.5	4.3	13.0

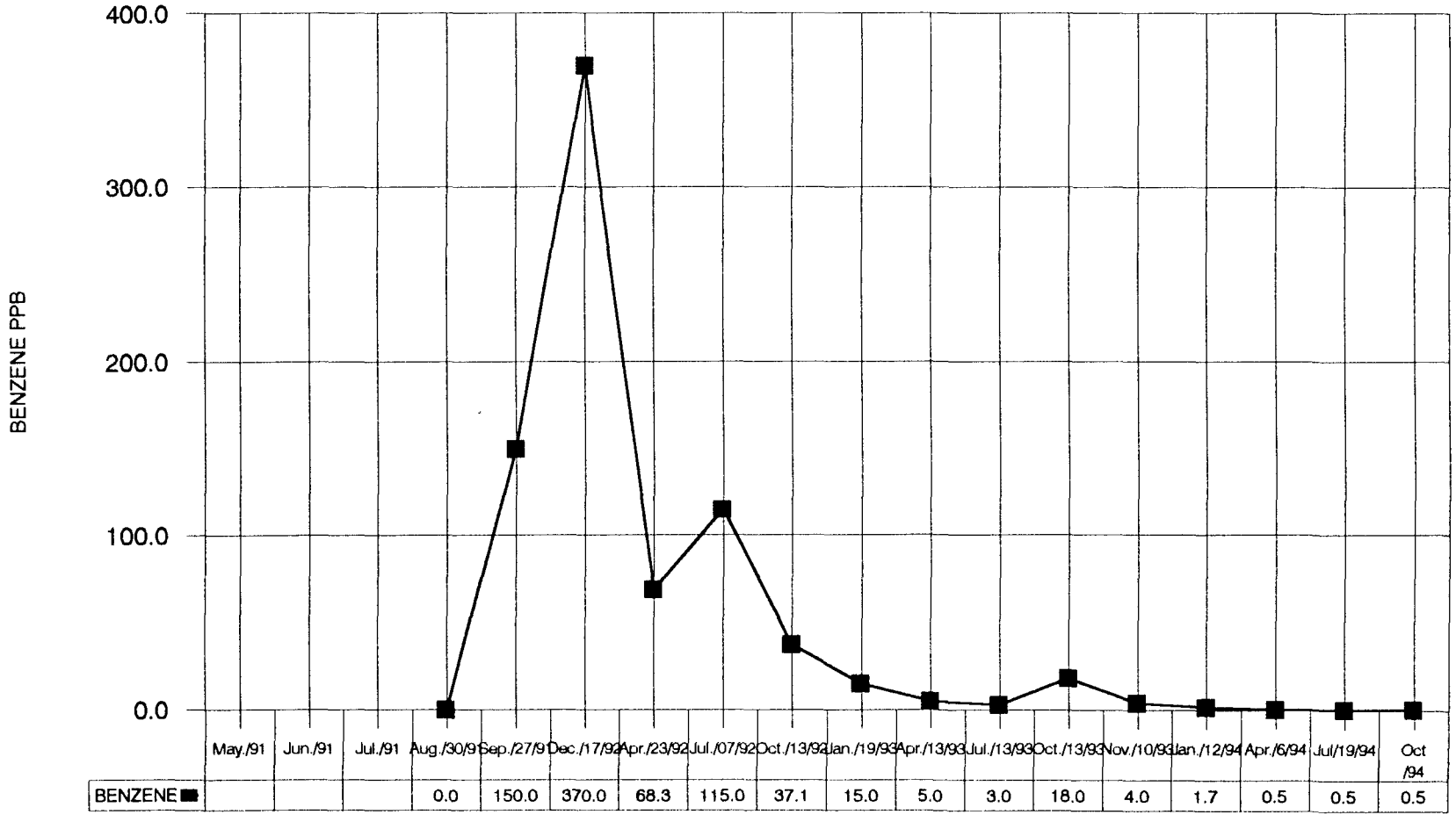
DATE SAMPLED

GROUNDWATER ANALYSIS DATA
MW#63 BH-89



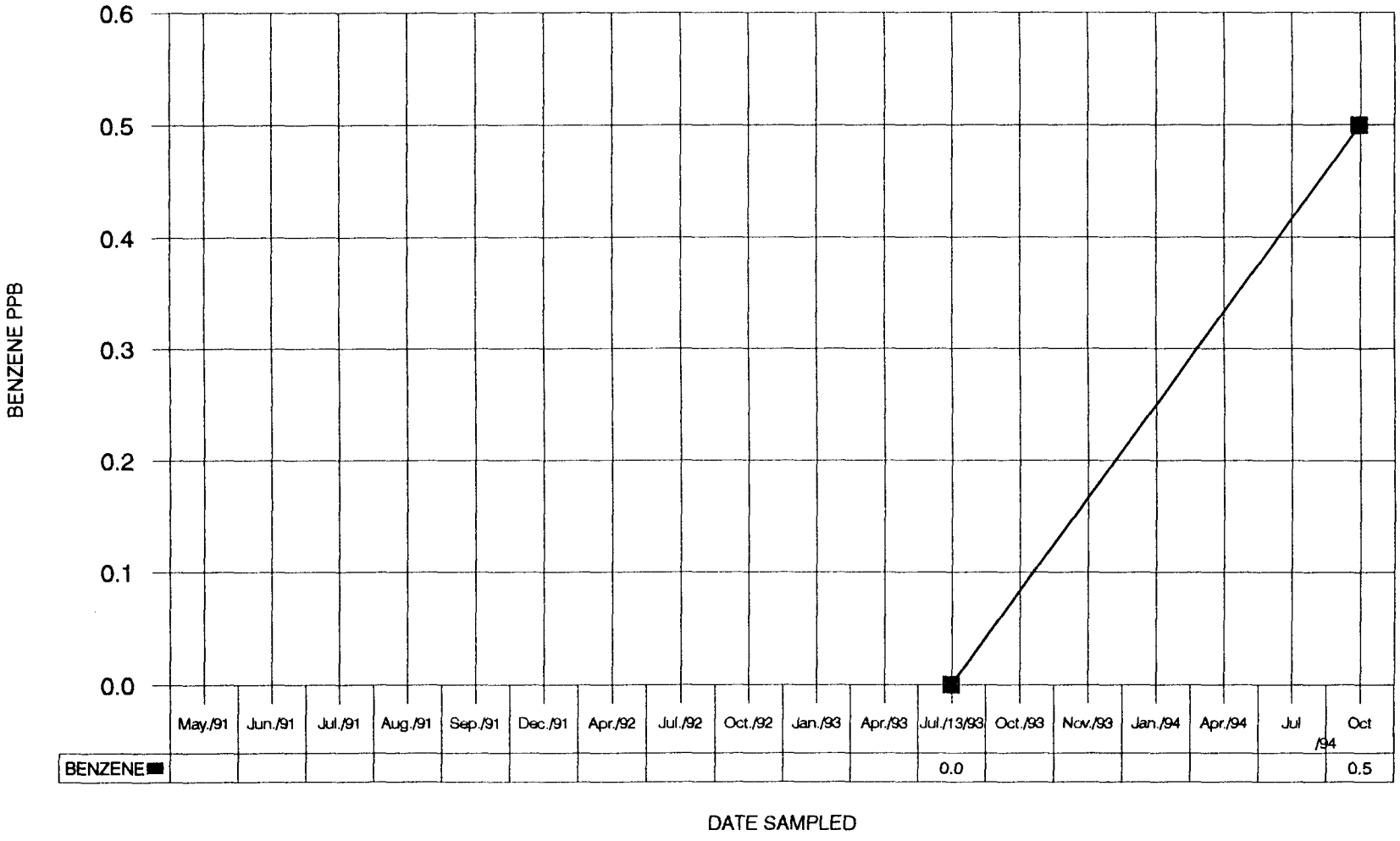
	May./91	Jun./91	Jul./91	Aug./91	Sep./26/91	Dec./16/91	Apr./23/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./12/93	Nov./93	Jan./11/94	Apr./5/94	Jul/18/94	Oct /94
BENZENE					0.0	0.0	4.1	12.0	4.3	12.0	7.0	4.0	14.0		0.5	0.5	1.0	0.5

BOREHOLE WATER ANALYSIS DATA
MW#64 BH-90

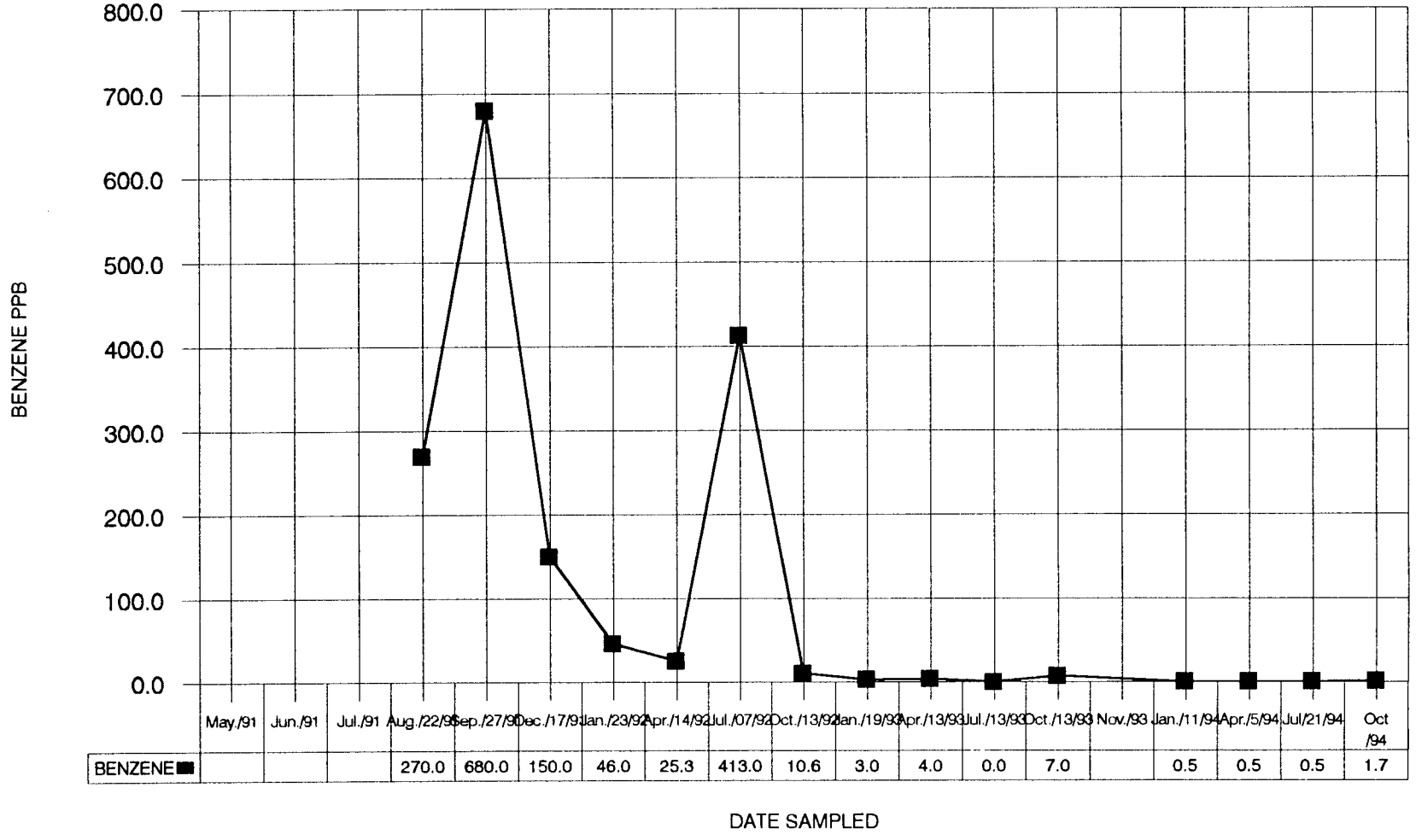


	May./91	Jun./91	Jul./91	Aug./30/9	Sep./27/9	Dec./17/92	Apr./23/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./10/93	Jan./12/94	Apr./6/94	Jul/19/94	Oct /94
BENZENE ■				0.0	150.0	370.0	68.3	115.0	37.1	15.0	5.0	3.0	18.0	4.0	1.7	0.5	0.5	0.5

BOREHOLE WATER ANALYSIS DATA
MW#65 BH-91



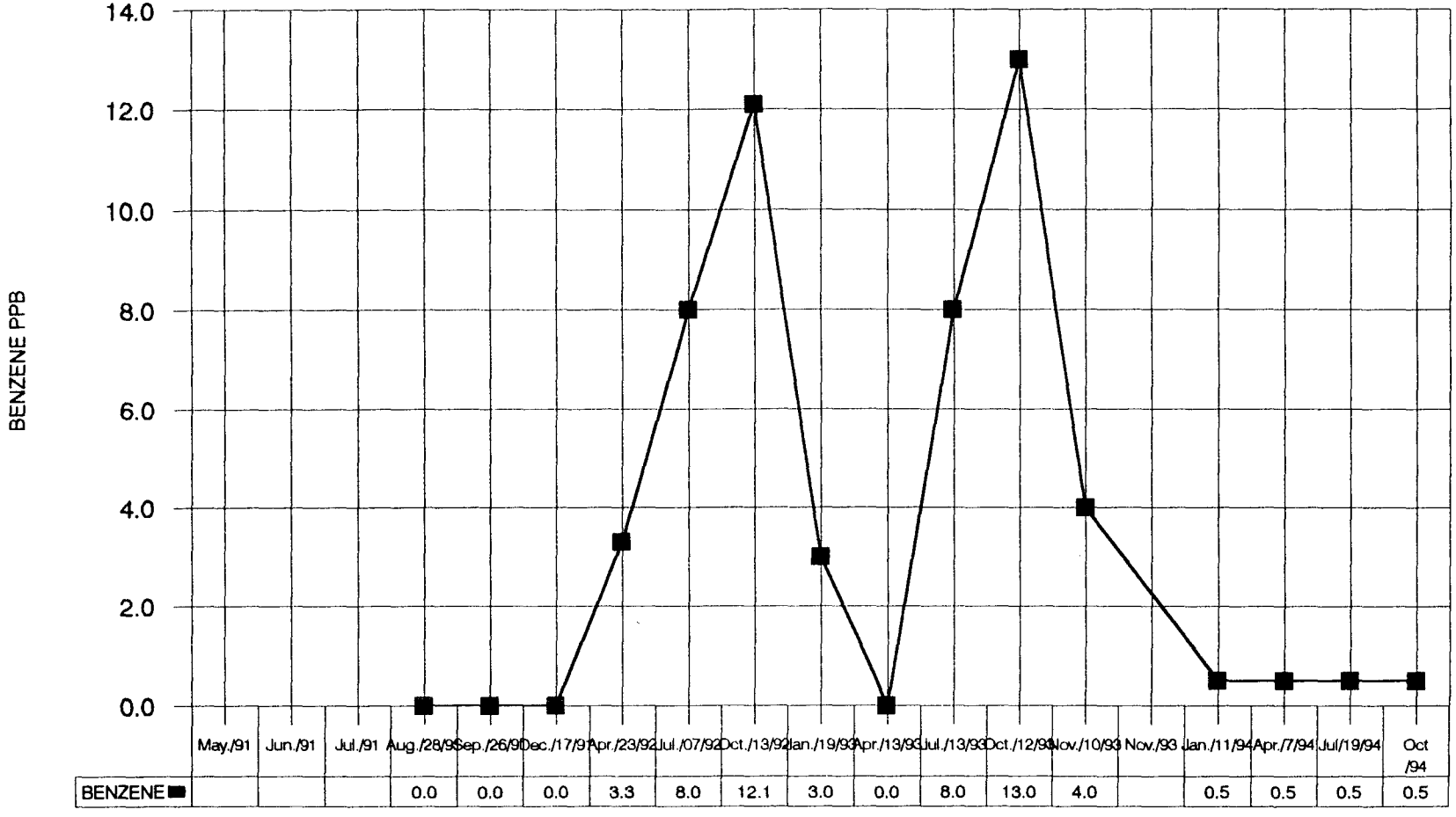
BOREHOLE WATER ANALYSIS DATA
MW#65A BH-91A



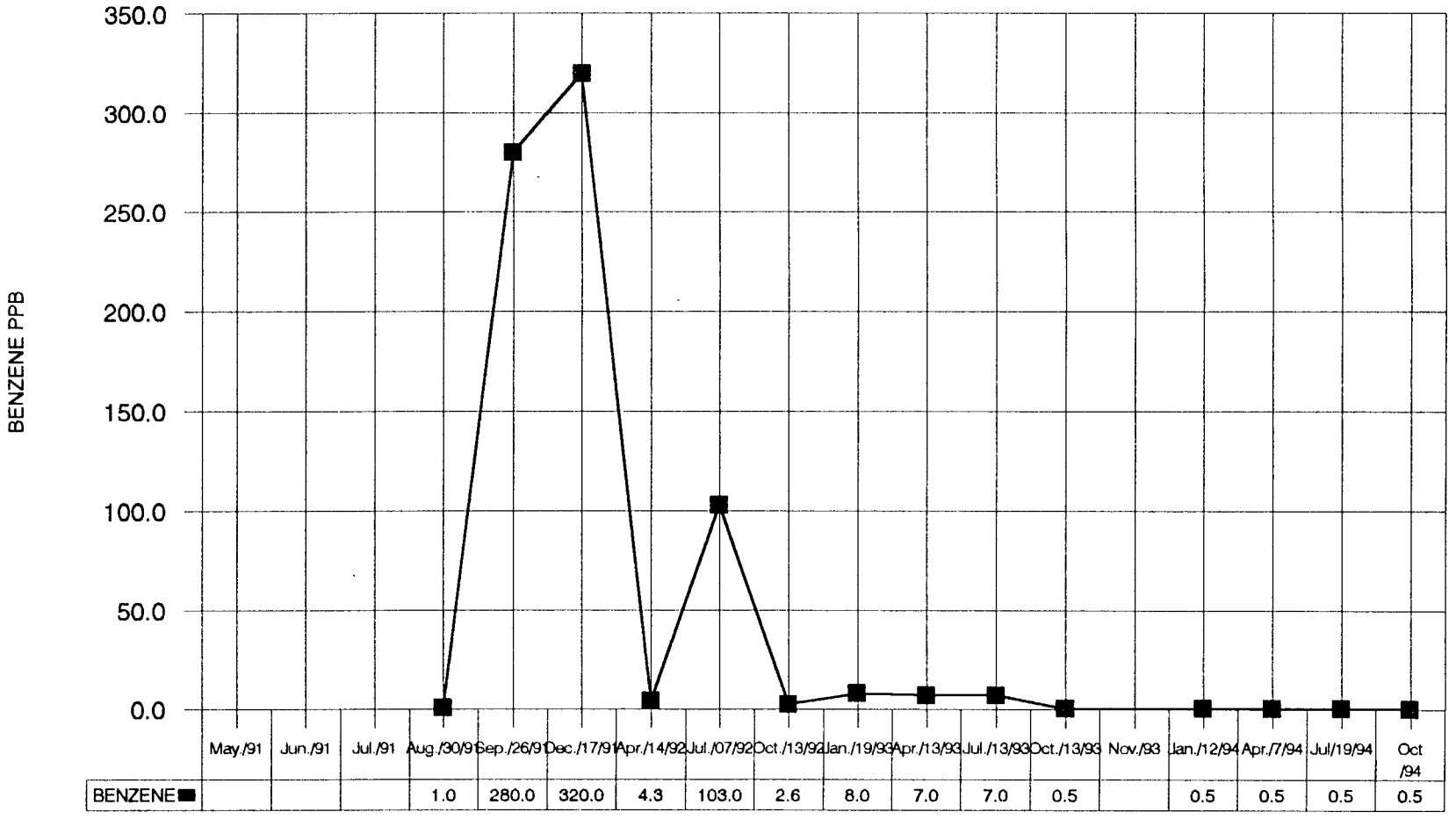
	May./91	Jun./91	Jul./91	Aug./22/9	Sep./27/9	Dec./17/9	Jan./23/92	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./93	Jan./11/94	Apr./5/94	Jul/21/94	Oct /94
BENZENE				270.0	680.0	150.0	46.0	25.3	413.0	10.6	3.0	4.0	0.0	7.0		0.5	0.5	0.5	1.7

DATE SAMPLED

GROUNDWATER ANALYSIS DATA
MW#66 BH-92

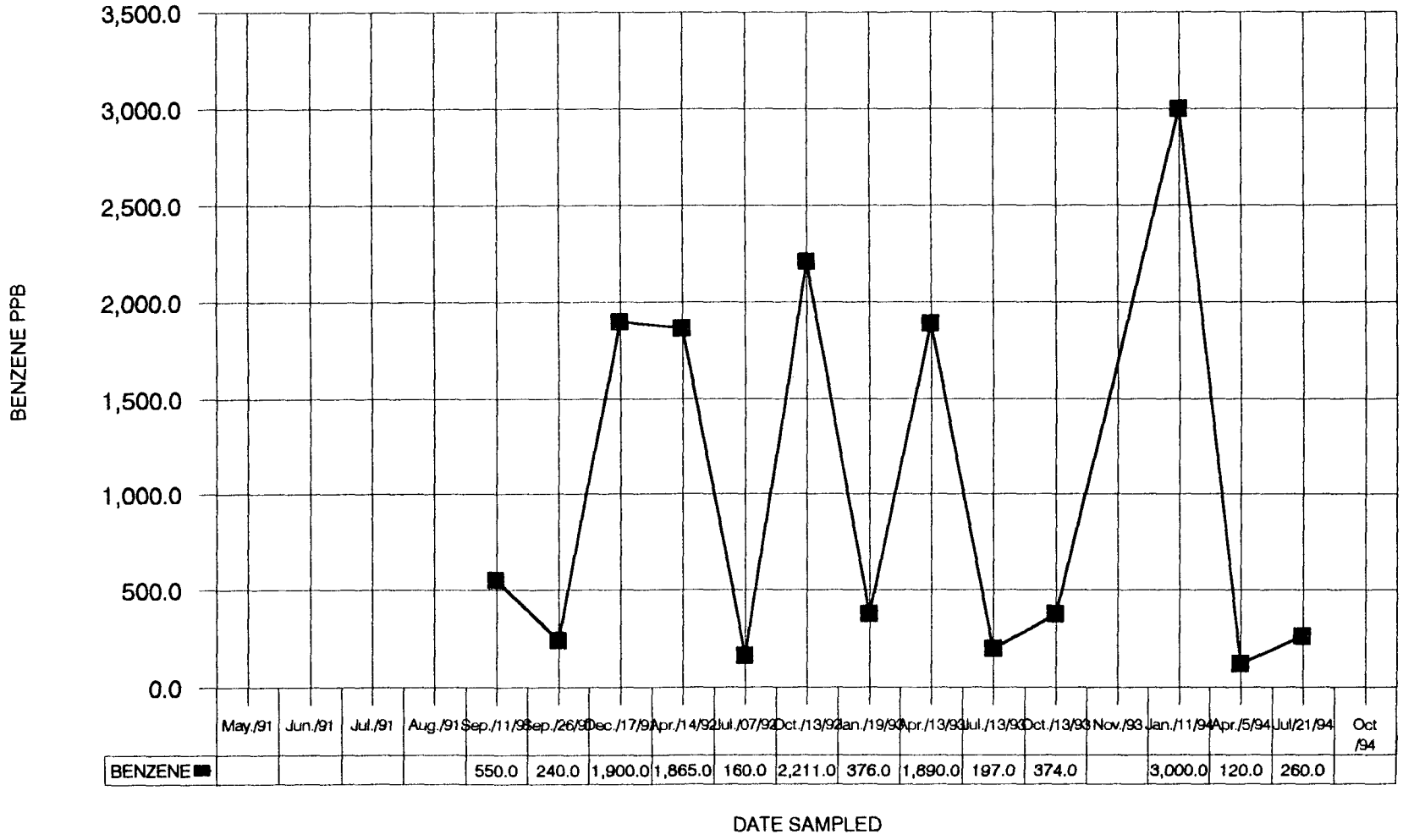


GROUNDWATER ANALYSIS DATA
MW#67 BH-93

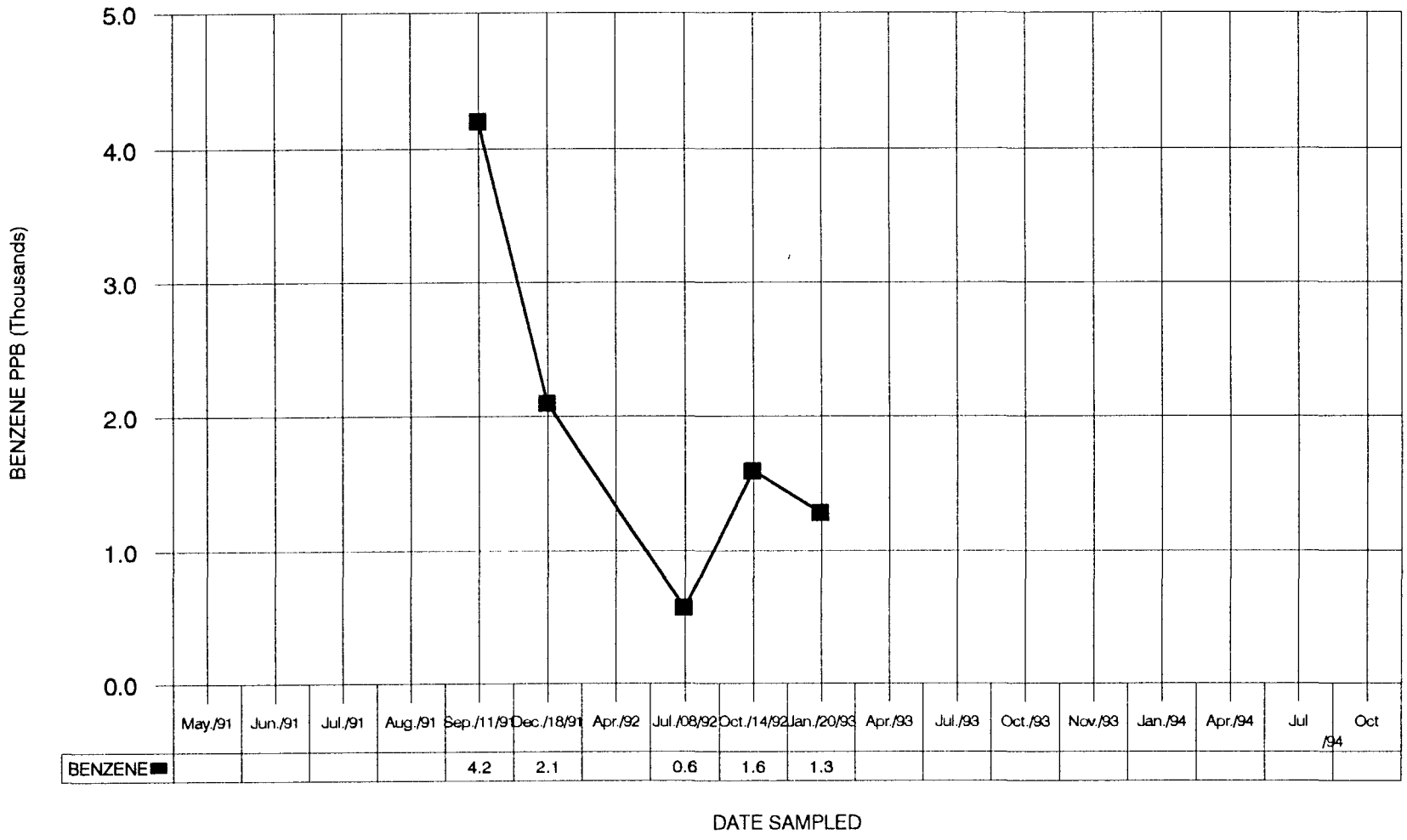


	May./91	Jun./91	Jul./91	Aug./30/9	Sep./26/9	Dec./17/91	Apr./14/92	Jul./07/92	Oct./13/92	Jan./19/93	Apr./13/93	Jul./13/93	Oct./13/93	Nov./93	Jan./12/94	Apr./7/94	Jul/19/94	Oct /94
BENZENE				1.0	280.0	320.0	4.3	103.0	2.6	8.0	7.0	7.0	0.5		0.5	0.5	0.5	0.5

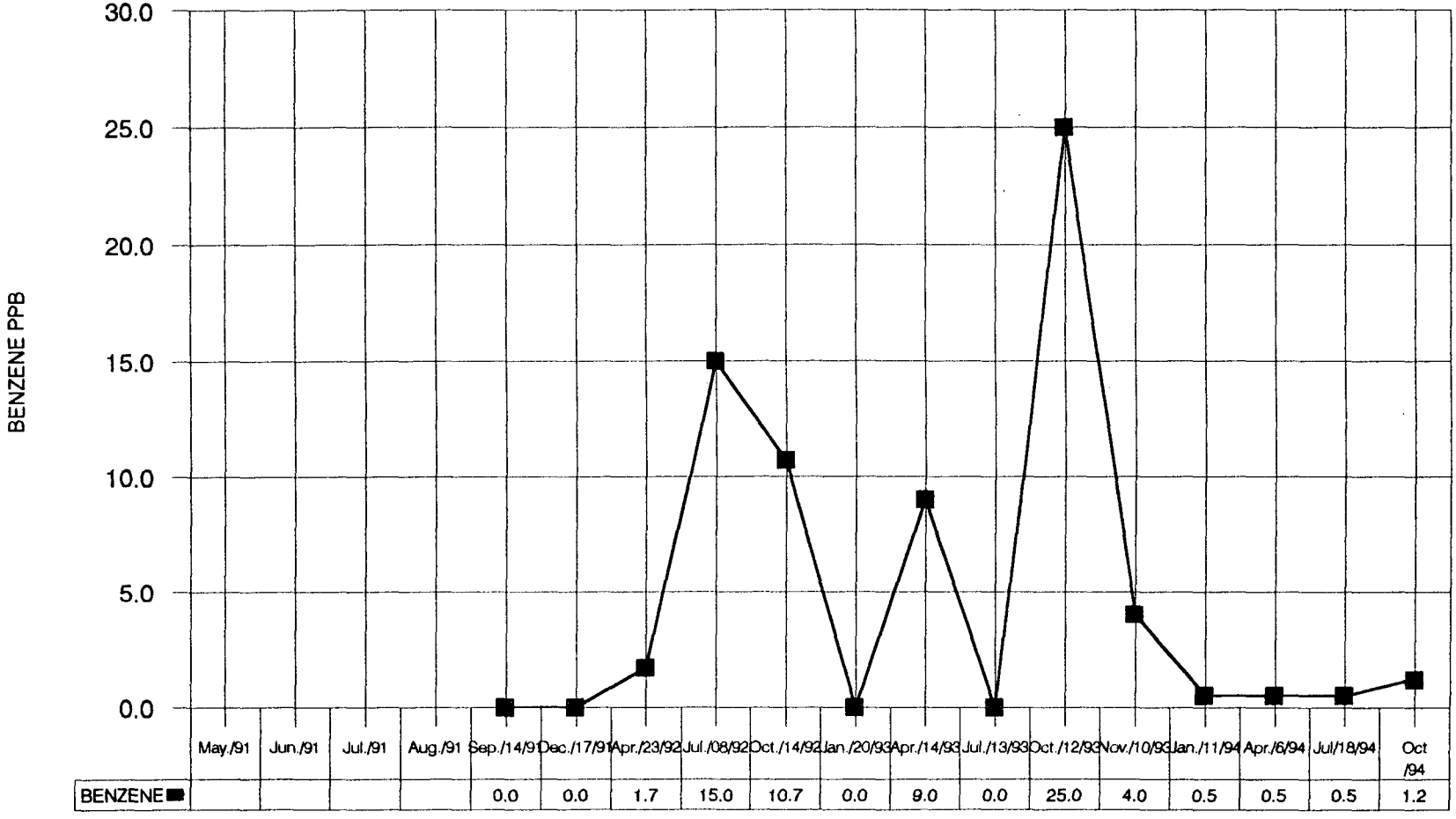
GROUNDWATER ANALYSIS DATA
MW#68 BH-94



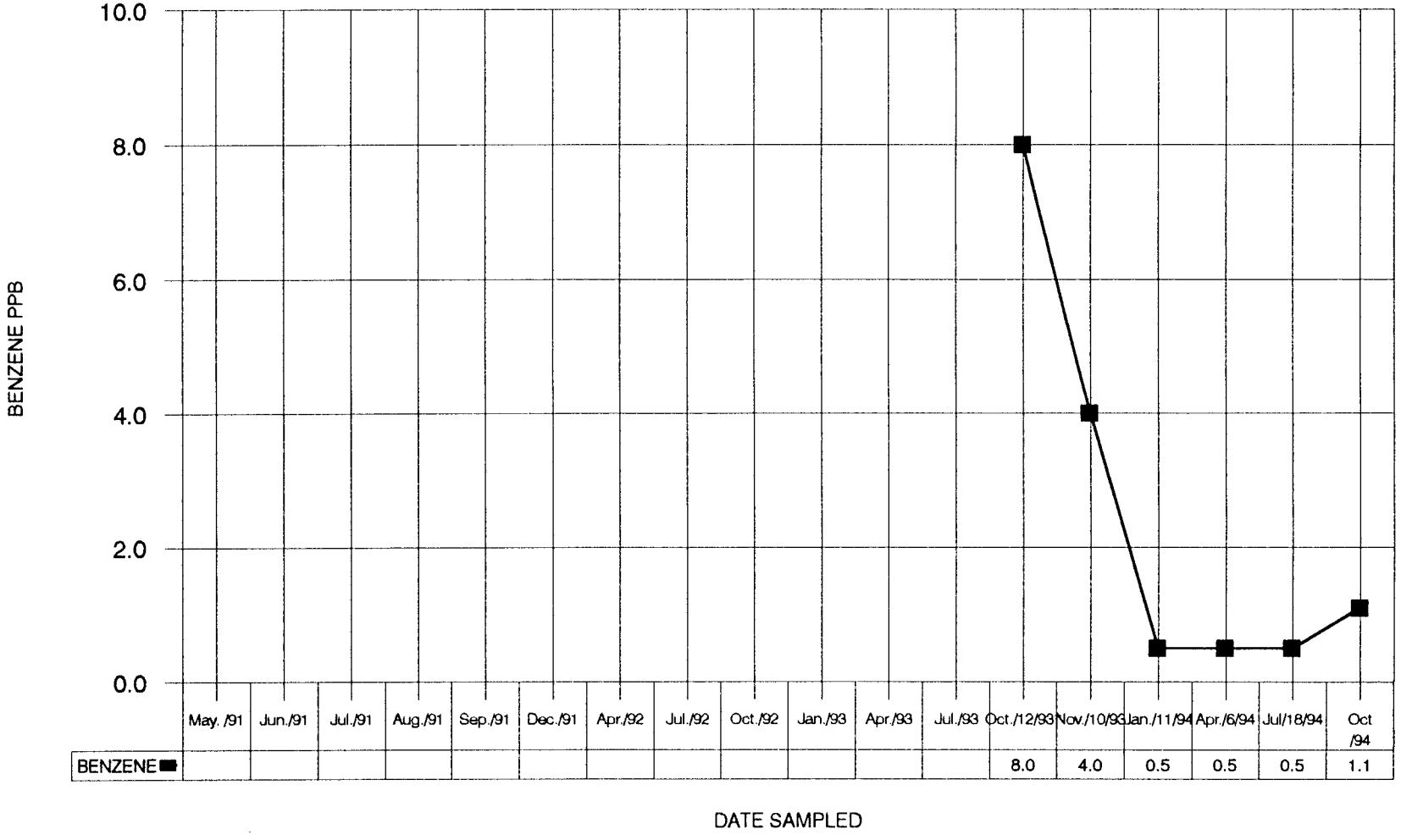
GROUNDWATER ANALYSIS DATA
MW#69 BH-95



GROUNDWATER ANALYSIS DATA
MW#70 BH-97

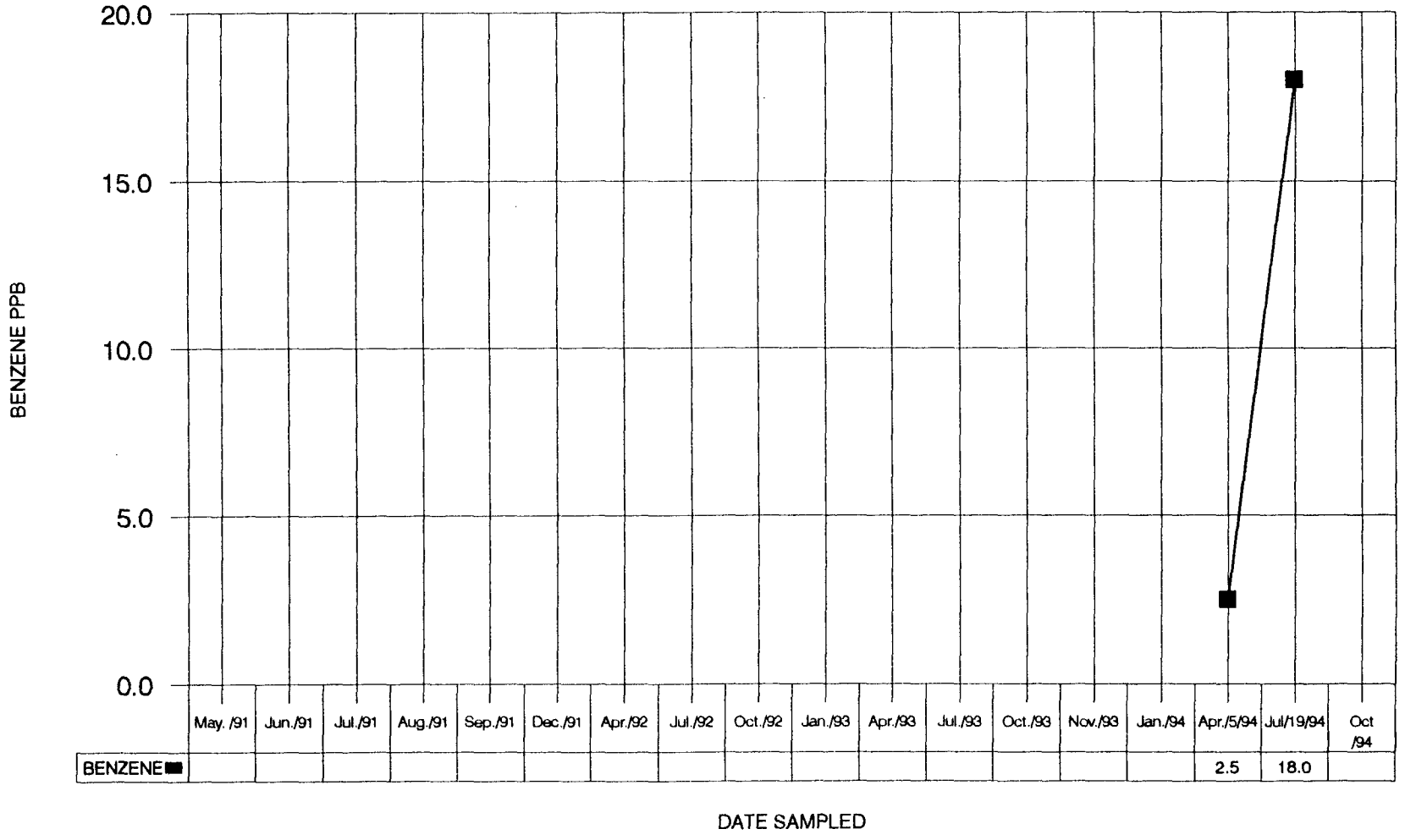


GROUNDWATER ANALYSIS DATA
MW#71 BH-98



* 10/12/93 is the first time to sample this well.

GROUNDWATER ANALYSIS DATA
MW#72 BH-99



APPENDIX C

OCTOBER 1994 LABORATORY RESULTS - GROUNDWATER

AND

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

Analytical **Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **410345**

October 28, 1994

Marathon Oil Company
125 W. Missouri St.
Midland, TX 79701

Project Name/Number: IB REMEDIATION 44999

Attention: Bob Menzie

On **10/07/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

After a discussion with the client, it appears that the cooler was inadvertly opened by a wrong party. Inspection (of the cooler by the Lab Manager) appears to indicate that the samples were undisturbed. All other aspects appear satisfactory. (Temperature 4°C.)

On 10/28/94 all analyses were cancelled for samples on hold per Bob Menzie.

EPA Method 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

Chloride analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION
ATI I.D. : 410345

DATE RECEIVED : 10/07/94
REPORT DATE : 10/28/94

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	TRIP BLANK	AQUEOUS	09/29/94
02	EB-1	AQUEOUS	10/04/94
03	MW-70	AQUEOUS	10/04/94
04	EB-2	AQUEOUS	10/04/94
05	MW-63	AQUEOUS	10/04/94
06	EB-3	AQUEOUS	10/04/94
07	MW-71	AQUEOUS	10/04/94
08	EB-4	AQUEOUS	10/04/94
09	MW-66	AQUEOUS	10/04/94
10	EB-5	AQUEOUS	10/04/94
11	MW-61	AQUEOUS	10/04/94
12	EB-6	AQUEOUS	10/04/94
13	MW-61A	AQUEOUS	10/04/94
14	EB-7	AQUEOUS	10/05/94
15	MW-60	AQUEOUS	10/05/94
16	EB-8	AQUEOUS	10/05/94
17	MW-65	AQUEOUS	10/05/94
18	SUMP 16A	AQUEOUS	10/05/94
19	MW-64	AQUEOUS	10/05/94
20	EB-9	AQUEOUS	10/05/94
21	MW-67	AQUEOUS	10/05/94
22	EB-10	AQUEOUS	10/05/94
23	MW-57	AQUEOUS	10/05/94
24	EB-11	AQUEOUS	10/05/94
25	MW-55	AQUEOUS	10/05/94
26	EB-12	AQUEOUS	10/05/94
27	MW-54	AQUEOUS	10/05/94
28	STRIPPER INLET	AQUEOUS	10/06/94
29	STRIPPER OUTLET	AQUEOUS	10/06/94
30	SW-1	AQUEOUS	10/06/94
31	MW-58	AQUEOUS	10/06/94
32	MW-59	AQUEOUS	10/06/94
33	MW-62	AQUEOUS	10/06/94
34	MW-65A	AQUEOUS	10/06/94
35	MW-68	AQUEOUS	10/06/94
36	BIEBBLE	AQUEOUS	10/06/94
37	MW-41	AQUEOUS	10/05/94
38	MW-43	AQUEOUS	10/05/94

(CONTINUED NEXT PAGE)

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION
ATI I.D. : 410345

DATE RECEIVED : 10/07/94
REPORT DATE : 10/28/94

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
39	MW-50	AQUEOUS	10/05/94
40	MW-11	AQUEOUS	10/05/94
41	SUMP A10	AQUEOUS	10/05/94
42	MW-44	AQUEOUS	10/05/94
43	MW-49	AQUEOUS	10/05/94
44	ARROYO	AQUEOUS	10/06/94
45	LYMAN WELL	AQUEOUS	10/06/94

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	45

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 410345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 10/07/94
REPORT DATE : 10/28/94

PARAMETER	UNITS	03	05	07	09	11
CHLORIDE (EPA 325.2)	MG/L	9.5	6.2	22	8.8	400

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 410345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 10/07/94
REPORT DATE : 10/28/94

PARAMETER	UNITS	13	15	17	18	19
CHLORIDE (EPA 325.2)	MG/L	11	9.1	5.9	128	10.2

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 410345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 10/07/94
REPORT DATE : 10/28/94

PARAMETER	UNITS	21	23	25	27	30
CHLORIDE (EPA 325.2)	MG/L	7.9	60	390	130	22

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 410345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 10/07/94
REPORT DATE : 10/28/94

PARAMETER	UNITS	31	32	33	34	35
CHLORIDE (EPA 325.2)	MG/L	36	25	130	18	32

Analytical Technologies, Inc. GENERAL CHEMISTRY RESULTS

ATI I.D. : 410345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 10/07/94
REPORT DATE : 10/28/94

PARAMETER	UNITS	36	37	38	39	40
CHLORIDE (EPA 325.2)	MG/L	13	300	270	290	130

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 410345

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 10/07/94
REPORT DATE : 10/28/94

PARAMETER	UNITS	41	42	43	44	45
CHLORIDE (EPA 325.2)	MG/L	4.2	360	380	13	14

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

ATI I.D. : 410345

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	41034515	9.1	9.2	1	19.5	10.0	104
CHLORIDE	MG/L	41034531	36	37	3	88	50	104
CHLORIDE	MG/L	41034543	380	380	0	890	500	102
CHLORIDE	MG/L	41034541	4.2	4.3	2	14.5	10.0	103

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	TRIP BLANK	AQUEOUS	09/29/94	NA	10/09/94	1
02	EB-1	AQUEOUS	10/04/94	NA	10/09/94	1
03	MW-70	AQUEOUS	10/04/94	NA	10/09/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	0.5	1.2
TOLUENE	UG/L	<0.5	<0.5	4.3
ETHYLBENZENE	UG/L	<0.5	<0.5	1.3
TOTAL XYLENES	UG/L	<0.5	78	12
SURROGATE:				
BROMOFLUOROBENZENE (%)		104	107	102

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
05	MW-63	AQUEOUS	10/04/94	NA	10/09/94	1
07	MW-71	AQUEOUS	10/04/94	NA	10/12/94	1
09	MW-66	AQUEOUS	10/04/94	NA	10/09/94	1

PARAMETER	UNITS	05	07	09
BENZENE	UG/L	<0.5	1.1	<0.5
TOLUENE	UG/L	2.6	6.8	3.0
ETHYLBENZENE	UG/L	1.0	2.7	1.5
TOTAL XYLENES	UG/L	8.0	31	17
SURROGATE:				
BROMOFLUOROBENZENE (%)		103	99	102

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
10	EB-5	AQUEOUS	10/04/94	NA	10/12/94	5
11	MW-61	AQUEOUS	10/04/94	NA	10/09/94	10
12	EB-6	AQUEOUS	10/04/94	NA	10/12/94	1

PARAMETER	UNITS	10	11	12
BENZENE	UG/L	<2.5	<5.0	0.6
TOLUENE	UG/L	4.4	23	2.6
ETHYLBENZENE	UG/L	<2.5	14	1.2
TOTAL XYLENES	UG/L	40	160	29
SURROGATE:				
BROMOFLUOROBENZENE (%)		99	97	94

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
13	MW-61A	AQUEOUS	10/04/94	NA	10/09/94	1
14	EB-7	AQUEOUS	10/05/94	NA	10/09/94	1
15	MW-60	AQUEOUS	10/05/94	NA	10/09/94	1

PARAMETER	UNITS	13	14	15
BENZENE	UG/L	4.8	0.5	<0.5
TOLUENE	UG/L	4.5	1.8	0.6
ETHYLBENZENE	UG/L	3.7	1.3	0.6
TOTAL XYLENES	UG/L	37	16	4.9
SURROGATE:				
BROMOFLUOROBENZENE (%)		105	97	101

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
17	MW-65	AQUEOUS	10/05/94	NA	10/09/94	1
18	SUMP 16A	AQUEOUS	10/05/94	NA	10/09/94	5
19	MW-64	AQUEOUS	10/05/94	NA	10/10/94	1

PARAMETER	UNITS	17	18	19
BENZENE	UG/L	<0.5	170	<0.5
TOLUENE	UG/L	<0.5	<2.5	0.5
ETHYLBENZENE	UG/L	<0.5	120	0.6
TOTAL XYLENES	UG/L	<0.5	680	5.6
SURROGATE:				
BROMOFLUOROBENZENE (%)		88	99	97

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
21	MW-67	AQUEOUS	10/05/94	NA	10/10/94	1
23	MW-57	AQUEOUS	10/05/94	NA	10/10/94	1
25	MW-55	AQUEOUS	10/05/94	NA	10/10/94	10

PARAMETER	UNITS	21	23	25
BENZENE	UG/L	<0.5	1.1	910 D(100)
TOLUENE	UG/L	<0.5	<0.5	<5.0
ETHYLBENZENE	UG/L	<0.5	<0.5	480 D(100)
TOTAL XYLENES	UG/L	4.3	4.0	<5.0
SURROGATE:				
BROMOFLUOROBENZENE (%)		100	77	97

D(100)=DILUTED 100X, ANALYZED 10/13/94

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
27	MW-54	AQUEOUS	10/05/94	NA	10/10/94	1
28	STRIPPER INLET	AQUEOUS	10/06/94	NA	10/10/94	10
29	STRIPPER OUTLET	AQUEOUS	10/06/94	NA	10/10/94	1

PARAMETER	UNITS	27	28	29
BENZENE	UG/L	19	450	<0.5
TOLUENE	UG/L	0.6	170	1.9
ETHYLBENZENE	UG/L	29	210	5.6
TOTAL XYLENES	UG/L	6.3	2800	30
SURROGATE:				
BROMOFLUOROBENZENE (%)		91	100	103

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
30	SW-1	AQUEOUS	10/06/94	NA	10/10/94	1
31	MW-58	AQUEOUS	10/06/94	NA	10/13/94	10
32	MW-59	AQUEOUS	10/06/94	NA	10/12/94	1

PARAMETER	UNITS	30	31	32
BENZENE	UG/L	<0.5	6.7	4.1
TOLUENE	UG/L	<0.5	<5	3.7
ETHYLBENZENE	UG/L	<0.5	15	23
TOTAL XYLENES	UG/L	0.6	39	37
SURROGATE:				
BROMOFLUOROBENZENE (%)		95	84	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
33	MW-62	AQUEOUS	10/06/94	NA	10/10/94	10
34	MW-65A	AQUEOUS	10/06/94	NA	10/10/94	1
36	BIEBBLE	AQUEOUS	10/06/94	NA	10/10/94	1

PARAMETER	UNITS	33	34	36
BENZENE	UG/L	13	1.7	<0.5
TOLUENE	UG/L	13	<0.5	<0.5
ETHYLBENZENE	UG/L	11	<0.5	<0.5
TOTAL XYLENES	UG/L	39	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		91	97	97

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
37	MW-41	AQUEOUS	10/05/94	NA	10/10/94	1
38	MW-43	AQUEOUS	10/05/94	NA	10/10/94	1
39	MW-50	AQUEOUS	10/05/94	NA	10/10/94	1

PARAMETER	UNITS	37	38	39
BENZENE	UG/L	3.2	0.8	<0.5
TOLUENE	UG/L	44	<0.5	<0.5
ETHYLBENZENE	UG/L	0.7	2.3	<0.5
TOTAL XYLENES	UG/L	90	17	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		96	101	84

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
40	MW-11	AQUEOUS	10/05/94	NA	10/10/94	100
42	MW-44	AQUEOUS	10/05/94	NA	10/10/94	50
43	MW-49	AQUEOUS	10/05/94	NA	10/10/94	50

PARAMETER	UNITS	40	42	43
BENZENE	UG/L	1800	130	78
TOLUENE	UG/L	<50	<25	49
ETHYLBENZENE	UG/L	450	120	40
TOTAL XYLENES	UG/L	3500	77	300
SURROGATE:				
BROMOFLUOROBENZENE (%)		90	96	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 410345

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
44	ARROYO	AQUEOUS	10/06/94	NA	10/10/94	1
45	LYMAN WELL	AQUEOUS	10/06/94	NA	10/10/94	1

PARAMETER	UNITS	44	45
BENZENE	UG/L	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5
TOTAL XYLENES	UG/L	0.6	<0.5
SURROGATE:			
BROMOFLUOROBENZENE (%)		95	105

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 410345
BLANK I.D.	: 100994	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 10/09/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		96

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 410345
BLANK I.D.	: 101094	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 10/10/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		97

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 410345
BLANK I.D.	: 101094B	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 10/10/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		97

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 410345
BLANK I.D.	: 101294	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 10/12/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		94

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 410345
BLANK I.D.	: 101394	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 10/13/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		95

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 41032103	ATI I.D.	: 410345
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 10/09/94
PROJECT NAME	: IB REMEDIATION	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 41032103	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	10	100	10	100	0
TOLUENE	<0.5	10	10	100	9.8	98	2
ETHYLBENZENE	0.5	10	10	95	10	95	0
TOTAL XYLENES	1.0	30	33	107	33	107	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 41034521	ATI I.D.	: 410345
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 10/10/94
PROJECT NAME	: IB REMEDIATION	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 41034521	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	8.9	89	9.3	93	4
TOLUENE	<0.5	10	10	100	11	110	10
ETHYLBENZENE	<0.5	10	10	100	11	110	10
TOTAL XYLENES	<0.5	30	30	100	32	107	6

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 10-4-94 PAGE 1 OF 5

ATI LAB I.D. 41045

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Company
ADDRESS: 125 W. Missouri St
Midland, TX 79701
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO:
COMPANY: Same
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Chloride	NUMBER OF CONTAINERS
Trip Blank	9-29-94	1035	Water	01	✓		2
EB-1	10-4-94	8:54a		02	✓		2
MW-70		9:33a		03	✓	✓	3
EB-2		10:53a		04			2
MW-63		11:34a		05	✓	✓	3
EB-3		11:51a		06			2
MW-71		1:20p		07	✓	✓	3
EB-4		1:47p		08			2
MW-66		2:58p		09	✓	✓	3

Hold for Marathon Approval

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	24
PROJ. NAME: IB Remediation		CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 2:00pm	Signature: Time:	Signature: Time:
Printed Name: R.J. Menzie Date: 10-6-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1520
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 10/7/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 10-4-94 PAGE 2 OF 5

ATI LAB I.D. 410345

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Company
ADDRESS: 125 W. Missouri St.
Midland, TX 79701
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO:
COMPANY: Same
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE (8020)	Chloride	NUMBER OF CONTAINERS
EB-5	10-4-94	3:35p	Water	10	✓		2
MW-61		4:39p		11	✓	✓	3
EB-6		4:51p		12	✓		2
MW-61A		6:08p		13	✓	✓	3
EB-7	10-5-94	9:16a	Water	14	✓		2
MW-60		10:02a		15	✓	✓	3
EB-8		10:19a		16			2
MW-65		8:58a		17	✓	✓	3
Sump 16A		9:34a		18	✓	✓	3

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311); Hold for Marathon approval

PROJECT INFORMATION

PROJ. NO.: 44999
PROJ. NAME: IB Remediation
P.O. NO.:
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS: 23
CUSTODY SEALS: (Y) N / NA
RECEIVED INTACT:
RECEIVED COLD:

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☑ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.

Signature: [signature] Time: 2:00pm
Printed Name: RJ Menzie Date: 10-6-94
Company: Marathon Phone: 915-687-8312

RELINQUISHED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.

Signature: [signature] Time: 1530
Printed Name: Dianne Cutler Date: 10/7/94
Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 10-5-94 PAGE 3 OF 5

ATI LAB I.D. 41045

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Company
ADDRESS: 125 W. Missouri St
Midland, TX 79701
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO:
COMPANY: Same
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE (8020)	Chloride	NUMBER OF CONTAINERS
MW-64	10-5-94	11:29a	Water	19	✓	✓	3
EB-9		11:38a		20			2
MW-67		12:49p		21	✓	✓	3
EB-10		1:09p		22			2
MW-57		2:13p		23	✓	✓	3
EB-11		2:29p		24			2
MW-55		3:18p		25	✓	✓	3
EB-12		3:33p		26			2
MW-54		4:36p		27	✓	✓	3

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311); Hold for Marathon approval

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	23
PROJ. NAME: IB Remediation		CUSTODY SEALS	(Y) N / NA
P.O. NO.:		RECEIVED INTACT	✓
SHIPPED VIA:		RECEIVED COLD	✓

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☑ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 2:00pm	Signature: Time:	Signature: Time:
Printed Name: RJ Menzie Date: 10-6-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: [signature] Time: 1535
Printed Name: Date:	Printed Name: Date:	Printed Name: Pamela Luther Date: 10/7/94
Company:	Company:	Analytical Technologies, Inc.

[redacted]s: San [redacted] (619) [redacted]1 • P[redacted]602) 4[redacted] • Se[redacted]6) 22[redacted] • Pens[redacted]904) 4[redacted] • Po[redacted]03) 68[redacted] • Albu[redacted]e (505) [redacted]777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 10-6-94 PAGE 1 OF 5

ATI LAB I.D.: 41034S

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Company
ADDRESS: 125 W. Missouri St.
Midland, TX 79701
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO: Same
COMPANY:
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE (8020)	Chloride	NUMBER OF CONTAINERS
Stripper Inlet	10-6-94	7:55a	Water	28	✓		2
Stripper Outlet		8:00a		29	✓		2
SW-1		8:10a		30	✓	✓	3
MW-58		8:26a		31	✓	✓	3
MW-59		8:56a		32	✓	✓	3
MW-62		9:15a		33	✓	✓	3
MW-65A		9:28a		34	✓	✓	3
MW-68		9:40a		35		✓	1
Biebble	↓	10:15a	↓	36	✓	✓	3

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Volatile Organics GC/MS (624/8240)
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	23
PROJ. NAME: IB Remediation		CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	✓
SHIPPED VIA:		RECEIVED COLD	✓

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☑ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 2:00 pm	Signature: Time:	Signature: Time:
Printed Name: Date: R.J. Menzie 10-6-94	Printed Name: Date:	Printed Name: Date:
Company: Phone: Marathon 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: D. Litter Time: 1540
Printed Name: Date:	Printed Name: Date:	Printed Name: Donna Litter Date: 10/7/94
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

AnalyticalTechnologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 10-6-94 PAGE 5 OF 5

ATI LAB I.D.: 410345

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Company
ADDRESS: 125 W. Missouri St
Midland, TX 79701
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO:
COMPANY: Same
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/~~MTBE~~ (8020)	Cl/Br, I2	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
MW-41	10-5-94	4:52p	Water	37				✓	✓																	3
MW-43		4:40p		38				✓	✓																	3
MW-50		2:48p		39				✓	✓																	3
MW-11		10:30a		40				✓	✓																	3
Sump A10		4:05p		41					✓																	1
MW-44		1:20p		42				✓	✓																	3
MW-49		2:30p		43				✓	✓																	3
Arroyo	10-6-94	10:50a		44				✓	✓																	2
Lyman Well		11:10a		45				✓	✓																	3

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:	94999	NO. CONTAINERS	24
PROJ. NAME:	IB Remediation	CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	
SHIPPED VIA:		RECEIVED COLD	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☑ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: R Menzie Time: 2:00 pm	Signature: Time:	Signature: Time:
Printed Name: R Menzie Date: 10-6-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 3:45
Printed Name: Date:	Printed Name: Date:	Printed Name: Dianne Luther Date: 10/7/94
Company:	Company:	Analytical Technologies, Inc.

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 10/7/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
410345-03	10-4	0933	AQ	3
-05		1134		5
-07		1320		7
-09		1458		9
-11		1639		11
-13	↓	1808		13
-15	10-5	1602		15
-17		0856		17
-18	↓	0934	↓	18

TOX, TOC, ORGANIC LEAD, SULFIDE, SURFACTANTS (MBAS), 632/632 MOD, 619/619 MOD, 610/8310, Cl-, 8240 (TCLP 1311) ZHE, Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020), Volatile Organics GC/MS (624/8240), NACE, ASBESTOS, BOD, TOTAL COLIFORM, FECAL COLIFORM, GROSS ALPHA/BETA, RADIUM 226/228, AIR - O2, CO2, METHANE, AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020), NUMBER OF CONTAINERS

PROJECT INFORMATION	
PROJECT NUMBER:	410345
PROJECT NAME:	MO
QC LEVEL:	(STD) IV
QC REQUIRED:	MS MSD BLANK
TAT:	(STANDARD) RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	NA
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	410345

DUE DATE: 10/21
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

WO# LK10316

SAMPLES SENT TO:	
SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PORTLAND	
PHOENIX	X
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: D. Lutter Time: 1730
Printed Name: Danny Lutter Date: 10/7/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time:
Printed Name: Linda Eshelman Date: 10/8/94
Company: ATI

AnalyticalTechnologies, Inc. Albuquerque, NM

Chain of Custody

DATE 10/7/94 PAGE 2 OF 4

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Cl-	632/632 MOD	619/619 MOD	610/8310		8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O_2, CO_2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
410345-19	10-5	1129	AQ	19																										1
-21		1249		21																										
-23		1413		23																										
-25		1518		25																										
-27	↓	1636		27																										
-30	10-6	0810		30																										
-31		0826		31																										
-32		0856		32																										
-33	↓	0915	↓	33						↓																				↓

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJECT NUMBER: 410345		TOTAL NUMBER OF CONTAINERS	9
PROJECT NAME: MO		CHAIN OF CUSTODY SEALS	N/A
QC LEVEL: (STD) IV		INTACT?	Y
QC (REQUIRED) MS MSD BLANK		RECEIVED GOOD COND./COLD	Y
TAT: (STANDARD) RUSH!		LAB NUMBER L10345	

DUE DATE: 10/21
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

COC# LK10346

SAMPLES SENT TO:

SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PORTLAND	
PHOENIX	X
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: Time: 1730
Printed Name: Date: 10/7/94
Analytical Technologies, Inc. Albuquerque
Company:

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 946A
Printed Name: Linda Eskelman Date: 10/8/94
Company: ATI

[redacted]ATI La[redacted] Diego [redacted]158-9[redacted] Phoenix [redacted]496-4400 • Seattle [redacted]928-8335 • Pensacola (904) 474-1001 • Portland [redacted]684-0447 • Albuquerque (505) 344-3777 [redacted] DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 10/7/94 PAGE 3 OF 4

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
410345-34	10-6	0928	AQ	34
-36	10-5	1015		36
-37		1052		37
-38		1640		38
-39		1448		39
-40		1630		40
-42		1320		42
-43		1430		43
-44	10-6	1050		44

TOX | TOC | ORGANIC LEAD | SULFIDE | SURFACTANTS (MBAS) | Cl⁻ | 632/632 MOD | 619/619 MOD | 610/8310 | 8240 (TCLP 1311) ZHE | Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020) | Volatile Organics GC/MS (624/8240) | NACE | ASBESTOS | BOD | TOTAL COLIFORM | FECAL COLIFORM | GROSS ALPHA/BETA | RADIUM 225/228 | AIR - O2, CO2, METHANE | AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020) | NUMBER OF CONTAINERS

PROJECT INFORMATION	
PROJECT NUMBER:	410345
PROJECT NAME:	MD
QC LEVEL:	(STD) IV
QC (REQUIRED)	MS MSD BLANK
TAT:	(STANDARD) RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	NA
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	410345

DUE DATE: 10/21
RUSH SURCHARGE: ~~0~~
CLIENT DISCOUNT: 10 %

WO#HK1036

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PORTLAND
- PHOENIX X
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: Dilutte Time: 1730
Printed Name: Dianne Cutler Date: 10/7/94
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 946A
Printed Name: Linda Eshelman Date: 10/8/94
Company: ATI

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 10/7/94 PAGE 4 OF 4

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	632/632 MOD	619/619 MOD	610/8310	8240 /TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
410345-45	10-6	1110	AQ	45																					
410345-35	10-6		AQ	35																					
410345-45 41	10-6		AQ	481																					
CE 10/18/94																									

PROJECT INFORMATION	
PROJECT NUMBER:	410345
PROJECT NAME:	MD
QC LEVEL:	~~STD~~ IV
QC REQUIRED:	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	1
CHAIN OF CUSTODY SEALS	NA
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	410345

DUE DATE: 10/21

RUSH SURCHARGE: 0

CLIENT DISCOUNT: 10 %

Work# LK634

SAMPLES SENT TO:	
SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PORTLAND	
PHOENIX	X
FIBERQUANT	

RELINQUISHED BY: 1.

Signature: Time: 1730

Printed Name: Date: 10/7/94

Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.

Signature: Time:

Printed Name: Date:

Company:

RELINQUISHED BY: 2.

Signature: Time:

Printed Name: Date

Company:

RECEIVED BY: (LAB) 2.

Signature: Time: 946A

Printed Name: Date: 10/8/94

Company: ATI

APPENDIX D

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

MONTHLY LABORATORY RESULTS

(NOVEMBER)

Analytical **Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **412308**

December 15, 1994

Marathon Oil Company
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: IB REMEDIATION 44999

Attention: Robert J. Menzie Jr.

On **12/02/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Chloride analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

EPA Method 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

DEC 2 0 1994

Analytical Technologies, Inc.

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 12/02/94
REPORT DATE : 12/15/94

ATI ID: 412308

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	TRIP BLANK	AQUEOUS	11/17/94
02	LYMAN	AQUEOUS	11/30/94
03	ARROYO	AQUEOUS	11/30/94
04	SW-1	AQUEOUS	11/30/94
05	STRIPPER INLET	AQUEOUS	11/30/94
06	STRIPPER OUTLET	AQUEOUS	11/30/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 412308

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 12/02/94
REPORT DATE : 12/15/94

PARAMETER	UNITS	02	03	04
CHLORIDE (EPA 325.2)	MG/L	12.1	11.1	24

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : 44999
PROJECT NAME : IB REMEDIATION ATI I.D. : 412308

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	41185701	126	126	0	226	100	100

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 412308

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	TRIP BLANK	AQUEOUS	11/17/94	NA	12/08/94	1
02	LYMAN	AQUEOUS	11/30/94	NA	12/08/94	1
03	ARROYO	AQUEOUS	11/30/94	NA	12/09/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		99	100	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 412308

PROJECT # : 44999

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	SW-1	AQUEOUS	11/30/94	NA	12/08/94	1
05	STRIPPER INLET	AQUEOUS	11/30/94	NA	12/09/94	100
06	STRIPPER OUTLET	AQUEOUS	11/30/94	NA	12/13/94	10

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	<0.5	270	<5.0
TOLUENE	UG/L	<0.5	<50	<5.0
ETHYLBENZENE	UG/L	<0.5	330	15
TOTAL XYLENES	UG/L	<0.5	240	26
SURROGATE:				
BROMOFLUOROBENZENE (%)		97	101	83

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX, MTBE (EPA 8020)	ATI I.D.	: 412308
BLANK I.D.	: 120994	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 12/09/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		103

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX, MTBE (EPA 8020)	ATI I.D.	: 412308
BLANK I.D.	: 120894	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 12/08/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX, MTBE (EPA 8020)	ATI I.D.	: 412308
BLANK I.D.	: 121394	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 12/13/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		95

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX, MTBE (EPA 8020)		
MSMSD #	: 41232805	ATI I.D.	: 412308
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: 44999	DATE ANALYZED	: 12/08/94
PROJECT NAME	: IB REMEDIATION	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 41232805	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	3.4	10	13	96	13	96	0
TOLUENE	1.7	10	12	103	11	93	9
ETHYLBENZENE	0.9	10	10	91	10	91	0
TOTAL XYLENES	3.3	30	34	102	33	99	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 11-30-94 PAGE 1 OF 1

ATI LAB I.D. 412308

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Robert J. Menzie Jr.

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-6552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO:
COMPANY: Same
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Chloride	NUMBER OF CONTAINERS
Trip Blank	11-17-94	11:30a	Water	01	✓		1
Lyman	11-30-94	2:45p		02	✓	✓	3
Arroyo		3:00p		03	✓	✓	3
SW-1		3:22p		04	✓	✓	3
Stripper Inlet		3:45p		05	✓		2
Stripper Outlet		3:50p		06	✓		2

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1); (MOD 8015) Gas/Diesel; Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020); Chlorinated Hydrocarbons (601/8010); Aromatic Hydrocarbons (602/8020); SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.; Pesticides/PCB (608/8080); Herbicides (615/8150); Base/Neutral/Acid Compounds GC/MS (625/8270); Volatile Organics GC/MS (624/8240); Polynuclear Aromatics (610/8310); SDWA Primary Standards - Arizona; SDWA Secondary Standards - Arizona; SDWA Primary Standards - Federal; SDWA Secondary Standards - Federal; The 13 Priority Pollutant Metals; RCRA Metals by Total Digestion; RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.: 44999		NO. CONTAINERS	14
PROJ. NAME: IB Remediation		CUSTODY SEALS	Y / N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA: Greyhound		RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Robert J. Menzie Time: 4:30 pm	Signature: Time:	Signature: Time:
Printed Name: RJ Menzie Jr. Date: 12-1-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 1310
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 12/2/94
Company:	Company:	Analytical Technologies, Inc.

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 12/2 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Cl-	632/632 MOD	619/619 MOD	610/8310	8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
412308-02	11/30	1445	AQ	2						X																1
-03	↓	1500	↓	3						X																1
-04	↓	1522	↓	4						X																1

ANALYSIS REQUEST

PROJECT INFORMATION

PROJECT NUMBER: 412308
PROJECT NAME: Marathon
QC LEVEL: (STD) IV
QC REQUIRED: MS MSD BLANK
TAT: (STANDARD) RUSH!

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	NA
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	412308

DUE DATE: 12/16
RUSH SURCHARGE: 0
CLIENT DISCOUNT: ~~10~~ %
16.00 each

Woatt LK 1139

SAMPLES SENT TO:
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PORTLAND
PHOENIX X
FIBERQUANT

RELINQUISHED BY: 1.
Signature: D. Luttrell Time: 1730
Printed Name: Dianne Luttrell Date: 12/2
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 1136
Printed Name: Linda Erickson Date: 12/3/94
Company: ATI

APPENDIX E

RANCHER WELL, PLANT WELL, AND NATURAL SPRING

MONTHLY LABORATORY RESULTS

(DECEMBER)

Analytical **Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **412394**

January 9, 1995

Marathon Oil Company
P.O. Box 552
Midland, TX 79702-0552

Project Name/Number: IB REMEDIATION

Attention: Bob Menzie

On **12/20/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Chloride analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

All other analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

MCR

JAN 12 1995

Environmental & Safety

Analytical Technologies, Inc.

CLIENT	: MARATHON OIL COMPANY	DATE RECEIVED	: 12/20/94
PROJECT #	: (NONE)		
PROJECT NAME	: IB REMEDIATION	REPORT DATE	: 01/09/95

ATI ID: 412394

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	SW-1	AQUEOUS	12/16/94
02	LYMAN	AQUEOUS	12/16/94
03	ARROYO	AQUEOUS	12/16/94
04	STRIPPER INLET	AQUEOUS	12/16/94
05	STRIPPER OUTLET	AQUEOUS	12/16/94
06	TRIP BLANK	AQUEOUS	12/02/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 412394

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : IB REMEDIATION

DATE RECEIVED : 12/20/94
REPORT DATE : 01/09/95

PARAMETER	UNITS	01	02	03
CHLORIDE (EPA 325.2)	MG/L	25	11.8	12.2

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : MARATHON OIL COMPANY
PROJECT # : (NONE)
PROJECT NAME : **IB REMEDIATION** ATI I.D. : 412394

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHLORIDE	MG/L	41238904	2.4	2.5	4	12.2	10.0	98

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 412394

PROJECT # : (NONE)

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	SW-1	AQUEOUS	12/16/94	NA	12/28/94	1
02	LYMAN	AQUEOUS	12/16/94	NA	12/28/94	1
03	ARROYO	AQUEOUS	12/16/94	NA	12/28/94	1

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	0.7	<0.5	<0.5
TOTAL XYLENES	UG/L	4.8	<0.5	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		109	100	100

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)

CLIENT : MARATHON OIL COMPANY ATI I.D.: 412394

PROJECT # : (NONE)

PROJECT NAME : IB REMEDIATION

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	STRIPPER INLET	AQUEOUS	12/16/94	NA	12/29/94	10
05	STRIPPER OUTLET	AQUEOUS	12/16/94	NA	12/27/94	5
06	TRIP BLANK	AQUEOUS	12/02/94	NA	12/27/94	1

PARAMETER	UNITS	04	05	06
BENZENE	UG/L	48	<2.5	<0.5
TOLUENE	UG/L	100	<2.5	<0.5
ETHYLBENZENE	UG/L	140	12	<0.5
TOTAL XYLENES	UG/L	190	86	<0.5
SURROGATE:				
BROMOFLUOROBENZENE (%)		89	93	104

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 412394
BLANK I.D.	: 122794	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 12/27/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		102

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 412394
BLANK I.D.	: 122994	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 12/29/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		105

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 412394
BLANK I.D.	: 122894	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 12/28/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		101

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX (EPA 8020)	ATI I.D.	: 412394
BLANK I.D.	: 122894	MATRIX	: AQUEOUS
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 12/28/94
PROJECT NAME	: IB REMEDIATION	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		98

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST	: BTEX (EPA 8020)		
MSMSD #	: 41239002	ATI I.D.	: 412394
CLIENT	: MARATHON OIL COMPANY	DATE EXTRACTED	: NA
PROJECT #	: (NONE)	DATE ANALYZED	: 12/29/94
PROJECT NAME	: IB REMEDIATION	SAMPLE MATRIX	: AQUEOUS
REF. I.D.	: 41239002	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	10	100	9.5	95	5
TOLUENE	<0.5	10	10	100	9.7	97	3
ETHYLBENZENE	<0.5	10	10	100	9.7	97	3
TOTAL XYLENES	<0.5	30	33	110	31	103	6

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM

San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 12-16-94 PAGE 1 OF 1

ATI LAB I.D. 412394

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Menzie

COMPANY: Marathon Oil Company
ADDRESS: P.O. Box 552
Midland, TX 79702-0552
PHONE: 915-687-8312
FAX: 915-687-8337

BILL TO:
COMPANY: Same
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/~~MTBE~~ (8020)	Chloride	NUMBER OF CONTAINERS
SW-1	12-16-94	3:30 PM	water	01	✓	✓	3
Lyman		4:02 PM		02	✓	✓	3
Arroyo		4:24 PM		03	✓	✓	3
STRIPPER INLET		4:46 PM		04	✓		2
STRIPPER OUTLET		4:40 PM		05	✓		2
TRIP BLANK	12-2-94	9:00 AM		06	✓		1

Petroleum Hydrocarbons (418.1)
(MOD 8015) Gas/Diesel
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)
Chlorinated Hydrocarbons (601/8010)
Aromatic Hydrocarbons (602/8020)
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.
Pesticides/PCB (608/8080)
Herbicides (615/8150)
Base/Neutral/Acid Compounds GC/MS (625/8270)
Volatile Organics GC/MS (624/8240)
Polynuclear Aromatics (610/8310)
SDWA Primary Standards - Arizona
SDWA Secondary Standards - Arizona
SDWA Primary Standards - Federal
SDWA Secondary Standards - Federal
The 13 Priority Pollutant Metals
RCRA Metals by Total Digestion
RCRA Metals by TCLP (1311)

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:		NO. CONTAINERS	14
PROJ. NAME:	IR Remediation	CUSTODY SEALS	(Y) N / NA
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:	Airborne	RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 12:00 PM	Signature: Time:	Signature: Time:
Printed Name: Bob Menzie Date: 12-19-94	Printed Name: Date:	Printed Name: Date:
Company: Marathon Phone: 915-687-8312	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: [signature] Time: 1:00
Printed Name: Date:	Printed Name: Date:	Printed Name: Dana Lehr Date: 12/20/94
Company:	Company:	Analytical Technologies, Inc.

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 12/20/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Cl⁻	632/632 MOD	619/619 MOD	610/3310		8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
412394-01	12/16	1530	AQ	1						X																	1
-02	↓	1602	↓	2						X																	1
-03	↓	1624	↓	3						X																	1

PROJECT INFORMATION	
PROJECT NUMBER:	412394
PROJECT NAME:	MD
QC LEVEL: (STD.) IV	
QC REQUIRED: MS MSD BLANK	
TAT: (STANDARD) RUSH!	

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	N/A
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	412394

DUE DATE: 1/5
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

WO# LK1187

SAMPLES SENT TO:

SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PORTLAND	
PHOENIX	X
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: Time: 1730
Printed Name: Date: 12/20/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 1005
Printed Name: Date: 12/21/94
Company: ATI

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

APPENDIX F

STATE ENGINEER'S FLUID RECOVERY REPORTS

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

November 10, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, November 7, 1994. Cumulative Lower Queen fluid removal through that date is 44,095,073 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	11/07/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	6397788	6,397,788 26,922[1]	6,424,710
MW-59 (BH-85)	10259114	0	121794.9*	5,115,386 83,454[1]	5,198,840
MW-61A (BH-87A)	10239116	0	6264877.2	6,264,877 130,850[1]	6,395,727
MW-62 (BH-88)	10239115	0	5082334	5,082,334 256,553[1]	5,338,887
MW-65A (BH-91A)	10239117	0	8790047.4	8,790,047 39,774[1]	8,829,821
MW-68 (BH-94)	02209213	122618	3500000.0	3,377,382 2,484,076[1]	5,861,458
MW-72 (BH-99)	02881532	470	6046100.0	6,045,630	6,045,630
LOWER QUEEN TOTAL 44,095,073 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, November 7, 1994. The cumulative shallow fluid removal through that date is 777,388 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	11/07/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	226324	243,999[1]	243,999
MW-14	02209214	0	398204.3	398,391[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	9,067[2] 20,726[1]	29,793
SHALLOW TOTAL				777,388 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM90894/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

December 12, 1994

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Monday, December 5, 1994. Cumulative Lower Queen fluid removal through that date is 45,201,860 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	12/05/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	6490182	6,490,182 26,922[1]	6,517,104
MW-59 (BH-85)	10259114	0	125215.8*	5,259,064 83,454[1]	5,342,518
MW-61A (BH-87A)	10239116	0	6264877	6,264,877 130,850[1]	6,395,727
MW-62 (BH-88)	10239115	0	5231434	5,231,434 256,553[1]	5,487,987
MW-65A (BH-91A)	10239117	0	8932867	8,932,867 39,774[1]	8,972,641
MW-68 (BH-94)	02209213	122618	3645648	3,523,030 2,484,076[1]	6,007,106
MW-72 (BH-99)	02881532	470	6479247	6,478,777	6,478,777
			LOWER QUEEN TOTAL	45,201,860 Gallons	

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Monday, December 5, 1994. The cumulative shallow fluid removal through that date is 783,150 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	12/05/94 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	226324	243,999[1]	243,999
MW-14	02209214	0	398204.3	398,391[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	5,762[2] 29,793[1]	35,555
SHALLOW TOTAL				783,150 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

R. J. Menzie, Jr.

Robert J. Menzie, Jr.
Environmental Representative

RJM90894/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

January 10, 1995

Robert R. Marr
Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Re: Indian Basin Remediation Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells under permit RA-5131 as of Tuesday, January 3, 1995. Cumulative Lower Queen fluid removal through that date is 46,437,096 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	01/03/95 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	6575029	6,575,029 26,922[1]	6,601,951
MW-59 (BH-85)	10259114	0	128029*	5,377,218 83,454[1]	5,460,672
MW-61A (BH-87A)	10239116	0	6264877	6,264,877 130,850[1]	6,395,727
MW-62 (BH-88)	10239115	0	5397554	5,397,554 256,553[1]	5,654,107
MW-65A (BH-91A)	10239117	0	8991540	8,991,540 39,774[1]	9,031,314
MW-68 (BH-94)	02209213	122618	3780478	3,657,860 2,484,076[1]	6,141,936
MW-72 (BH-99)	02881532	470	7151859	7,151,389	7,151,389
LOWER QUEEN TOTAL 46,437,096 Gallons					

* Metered units are barrels.
[1] Previously metered recovered volumes.

The following table indicates the meter readings for fluid removed from Shallow zone monitoring wells under permit RA-8015 as of Tuesday, January 3, 1994. The cumulative shallow fluid removal through that date is 783,898 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	01/03/95 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	226324	243,999[1]	243,999
MW-14	02209214	0	398204.3	398,391[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	748[2] 35,555[1]	36,303
SHALLOW TOTAL				783,898 Gallons	

[1] Previously metered recovered volumes.
[2] Gauged in portable fiberglass tank.

Please note the above tables have been revised to show only the meter serial numbers and readings for the meters currently installed on each well. Earlier readings from meters that have been replaced or switched to other wells have been summarized as "previously metered recovered volumes" to simplify the tables and associated footnotes.

If more information is required, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.
Environmental Representative

RJM90894/nrt

xc: L. J. Oswald - Midland
C. M. Schweser - IBGP, Lakewood