GW - 21

MONITORING REPORTS

DATE:

1995

INDIAN BASIN GAS PLANT TREATMENT PROJECT QUARTERLY REPORT

FIRST QUARTER 1993

MAY 1993

INDIAN BASIN TREATMENT PROJECT QUARTERLY REPORT

FIRST QUARTER 1993

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

May 11, 1993

INDIAN BASIN GAS PLANT TREATMENT PROJECT QUARTERLY REPORT

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MARATHON OIL COMPANY

INDIAN BASIN TREATMENT PROJECT

QUARTERLY REPORT - MAY 1993

INTRODUCTION

This report summarizes treatment activities which have taken place during the first quarter of 1993 related to environmental problems resulting from a produced liquid gathering line leak discovered in April 1991 near the Indian Basin Gas Plant. Preparation of this report is in accordance with the April 2, 1992 New Mexico Oil Conservation Division (OCD) directive for quarterly reporting on Indian Basin Treatment Project activities.

QUARTERLY REPORT SUMMARY

The overall Treatment Project is fully operational and functioning as designed per Marathon's March 1992 technical submittal to OCD. Water withdrawal from the Lower Queen horizon is on-going with an air stripper used to remove volatile hydrocarbons. Shallow water withdrawal has been re-initiated with withdrawal volumes commingled with Lower Queen withdrawals. Water discharged from the air stripper continues to be utilized by the plant for process water. Soil venting operations continue to remove volatile hydrocarbons from soil and shallow bedrock horizons. Water analyses from rancher wells and nearby surface springs have not

exceeded any State or Federal drinking water standards for hydrocarbons or chlorides. Local ranchers are kept informed of treatment project activities via a quarterly update letter.

QUARTERLY POINT-IN-TIME SAMPLING AND RESULTS

A point-in-time sampling of the Indian Basin treatment project monitor wells was conducted January 19 - 21, 1993. Fifty-six wells were sampled by Southwestern Laboratories using EPA sampling protocol. The attached field log in Appendix A was prepared by Southwestern Laboratories from field notes taken during sample acquisition and identifies the fluid levels, purge volumes and other field analysis data of all wells evaluated.

Marathon's Petroleum Technology Center (PTC) in Littleton, Colorado, performed BTEX and chloride analyses for the quarterly point-in-time samples. High performance liquid chromatography (HPLC) was used to analyze water samples for BTEX concentrations and a titration method was used for chloride analysis. The results from the point-in-time analyses are contained in Appendix B.

Core Laboratories, Aurora, Colorado, performed four BTEX analyses using EPA method 8020 purge and trap gas chromatography as a quality assurance comparison of PTC's HPLC analytical techniques. Core Labs also conducted four chlorides analyses using EPA method 325.2. The following four wells (3 shallow and 1 Lower Queen) were analyzed for BTEX concentrations using both HPLC and purge and trap analytical techniques: B-62, B-67, B-81 and B-90. A chart comparing the BTEX analytical results for the two analysis

techniques is attached in Appendix C.

Appendix D (Tables 1 and 2) compares the results of the September 1991, December 1991, April 1992, July 1992, October 1992 and January 1993 point-in-time benzene concentration data for the Lower Queen and shallow wells. Graphs depicting benzene concentrations over time for each routinely sampled borehole/monitoring well are also included in Appendix D.

MONTHLY SAMPLING

Monthly water samples of nearby rancher water wells and springs were taken on January 18, February 12, and March 4. Analytical results from the monthly water samples indicate the water to be within standards for hydrocarbons and chlorides as established by EPA for drinking water. The attached table in Appendix E provides a summary of the monthly analyses performed on the Lyman water well, the closest down gradient water well to the leak site, and a surface water spring in Rocky Arroyo. The quarterly analysis for the Biebelle water well, the second closest down gradient well, is also reported. All rancher water well and arroyo spring samples were obtained using EPA sampling and handling procedures. Core Labs performed the BTEX and chloride analyses using EPA approved methods. Analytical data from rancher water well samples and surface water springs is provided to the local ranchers each month with letters of explanation. Copies of these letters are also provided to the New Mexico Oil Conservation Division (Santa Fe) and the Bureau of Land Management (Roswell)

upon distribution to the ranchers.

The plant water supply well and backup well are also sampled and analyzed on a monthly basis. Analytical reports for all the rancher wells, springs and plant wells are included in Appendix E.

WATER AND CONDENSATE RECOVERY

Water withdrawals from the Lower Queen and shallow water wells are individually 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 1993 are attached in Appendix F. Appendix F also contains stacked bar graphs depicting weekly water withdrawals from Lower Queen and shallow soil water wells. A third graph shows the combined weekly water withdrawals from the Lower Queen and shallow zone.

Six Lower Queen wells (B-84, B-85, B-87A, B-88, B-91A, and B-94) were routinely pumped for water withdrawal during the quarter. Monthly water withdrawals for each well are listed in the following table.

LOWER QUEEN MONTHLY WATER WITHDRAWALS

WELL NUMBER	JAN	FEB	MAR	QTR. TOTAL	
B-84	5,238	3,320	7,873	16,431	BBL.
B-85	1,205	0	2,340	3,545	BBL.
B-87A	5,399	4,634	5,560	15,593	BBL.
B-88	3,417	2,133	3,698	9,248	BBL.
B-91A	7,442	5,647	9,118	22,207	BBL.
B-94	5,518	4,344	4,291	14,153	BBL.
LQ TOTAL	**28,219**	**20,078**	**32,880**	**81,177**	**BBL.**

Two shallow water wells, B-36 and B-37, were pumped during the first quarter. Shallow withdrawal wells were previously shut-in due to cold weather freezing the pneumatic pumps. Shallow withdrawal resumed at B-37 in February and B-36 in March.

In addition, Sump A11 was routinely pumped and/or bailed during the first quarter of 1993. Free product was identified in the sump during the January Point-in-Time sampling. Monthly shallow water withdrawals for each well are listed in the following table.

SHALLOW SOIL WATER MONTHLY WITHDRAWALS

WELL NUMBER	JAN	FEB	MAR	QTR. TOTAL	
B-36	0	0	35	35	BBL.
B-37	0	387	1,218	1,605	BBL
Sump A-11	0.3	3	2	6	BBL
SHALLOW TOTAL	**0.3**	**390**	**1,255**	**1,646**	**BBL.**

Fluids from the Lower Queen and shallow withdrawal wells are piped to an air stripper facility for hydrocarbon separation and eventual plant usage. An oil/water separator is used to remove free product prior to soluble hydrocarbon removal. The free product is transferred to a holding tank which is gauged on a weekly basis. The measured volume of free condensate recovered during the first quarter of 1993 is 9 barrels. This volume also reflects free product recovered from Sump A11. The cumulative free product recovery for the second quarter of 1992 through the first quarter of 1993 is 47 barrels. This brings the cumulative free product recovered to date (not including volumes volatilized by the air stripper and soil vent) to 3,334 barrels.

POTENTIOMETRIC MAPPING

Lower Queen fluid levels were measured once a month for all non-pumping wells. The table in Appendix G lists the Lower Queen fluid levels (elevations) obtained during the first quarter of 1993. Cumulative monthly rainfall as measured at the gas plant is also recorded. The cumulative rainfall for the quarter was 2.24 inches. Monthly Lower Queen potentiometric maps, based on these monthly fluid level readings are also attached in Appendix G. The Lower Queen potentiometric maps reflect continued lower fluid levels throughout the quarter.

A shallow water potentiometric map based on data accumulated during the January point-in-time sampling round is attached in Appendix H.

SOIL VENTING ACTIVITIES

The Phase I soil venting program, which included wells B-39, B-40 and B-44, is complete. Venting during the first quarter was continuous during January and February. Shallow water withdrawal wells, selectively located in the vicinity of the soil vent wells, helped promote soil venting by lowering the water table and exposing more soil to hydrocarbon vapor extraction.

The soil vent has been relocated to BH-82, a shallow bedrock well approximately 2000 feet east of the Phase I venting wells. Prior to installation of the Phase I soil venting program a pilot soil venting test was conducted at B-82. The well indicated it has excellent air permeability to allow for soil venting remediation techniques.

OTHER ACTIVITIES

An interference test utilizing four observation wells was conducted at BH-87A in February, 1993.

APPENDIX A

JANUARY POINT-IN-TIME FIELD NOTES

SWL
ENVIRONMENTAL SERVICES

1703 West Industrial
P.O. Box 2150
Midland, Texas 79702
Phone: (915) 683-3349
Fax: (915) 686-0492

January 29, 1992

Mr. Jeffrey S. Lynn
Marathon Oil Company
P.O. Box 552
Midland, TX 79702

RE: INDIAN BASIN REMEDIATION PROJECT

Dear Mr. Lynn:

The quarterly monitoring was started at 8:00 am on January 19, 1993. During a three day period, a total of fifty six wells were checked. The monitoring project was completed at 1:00 pm on January 21, 1993.

Several of the sample vials that were stored in the cooler at the plant were frozen, which caused them to break. The broken vials are as follows: 1 BTEX vial from BH-92 MW-66, 1 chloride vial from SW-1, 1 chloride vial from BH-95 MW-69, and 1 BTEX vial from sample No. 1 which was sent to Core Laboratories.

If you have any questions, please do not hesitate to call.

Sincerely,

Lorri L. Church

Lorri L. Church
Project Manager, Midland EAS

LLC:abj

FEB 11 1993

Environmental & Safety

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

QUEENS WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.		Reported Total Depth (ft.)	FTC Water Level (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
BH-83	MW-57	177.20	156.68	20.52	01-20-93	N	40.2	69	6.44	824	
BH-84	MW-58	218.71	---	---	01-19-93	N	Pump Present	---	6.18	1538	
BH-85	MW-59	211.29	---	---	01-19-93	N	Pump Present	---	6.45	1027	
BH-86	MW-60	223.08	184.75	38.33	01-19-93	N	75.1	70.5	6.14	1002	
BH-87A	MW-61A	216.37	---	---	01-19-93	Y	Pump Present	---	6.48	1030	
BH-88	MW-62	225.90	---	---	01-19-93	N	Pump Present	---	6.50	1507	
BH-89	MW-63	221.19	195.55	25.64	01-19-93	N	50.2	69	6.75	575	
BH-90	MW-64	202.37	167.99	34.08	01-19-93	N	67.3	68.5	6.84	967	
BH-91A	MW-65A	168.56	---	---	01-19-93	N	Pump Present	---	6.58	818	
BH-92	MW-66	235.18	199.10	36.08	01-19-93	N	70.6	68	6.21	1024	
BH-93	MW-67	165.77	135.10	30.67	01-19-93	N	60.1	68.5	6.52	647	
BH-94	MW-68	203.43	---	---	01-19-93	N	Pump Present	---	6.46	691	
BH-97	MW-70	225.20	191.52	33.68	01-20-93	N	65.9	68	6.51	570	
SW-1	Plant Well	255.00	---	---	01-20-93	N	Pump Present	---	---	---	
SW-2	Backup Well	292.00	178.88	113.12	01-20-93		None	---	6.52	812	

Note: BH-83, BH-86, BH-89, BH-90, BH-92, BH-93 and BH-97 were wells that SwL Field Services pumped.

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

SHALLOW WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.		Reported Total Depth (ft.)	FTC Water Level (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
BH-24	MW-3	17.40	---	Dry	01-20-93	---	40.2	---	---	---	
BH-26	MW-4	18.68	18.57	0.11	01-20-93	N	0.1	---	---	---	Insufficient Sample to bail
BH-28	MW-5	13.10	---	Dry	01-20-93	---	---	---	---	---	
BH-29	MW-6	13.98	---	Dry	01-19-93	---	---	---	---	---	
BH-55	MW-31	19.93	19.44	0.49	01-21-93	N	0.96	---	---	---	(a)
BH-30	MW-7	17.31	---	Dry	01-19-93	---	---	---	---	---	
BH-45	MW-22	17.30	17.29	0.01	01-20-93	N	---	---	---	---	Insufficient Sample to bail
BH-31	MW-8	17.74	---	Dry	01-20-93	---	---	---	---	---	
BH-32	MW-9	13.65	---	Dry	01-20-93	---	---	---	---	---	
BH-33	MW-10	19.08	17.74	1.34	01-21-93	N	2.6	---	---	---	(a)
BH-34	MW-11	24.85	24.03	0.82	01-21-93	Y	1.6	---	6.65	2420	3.0" Free Product
BH-36	MW-13	22.07	---	---	---	---	Pump Present	---	---	---	Inaccesible
BH-42	MW-19	19.11	18.85	0.26	01-21-93	N	0.5	---	---	---	(a)
BH-47	MW-24	14.09	---	Dry	01-20-93	---	---	---	---	---	

(a) Bailed dry, no recovery in two hours.

Note: BH-55, BH-33, BH-34 and BH-42 were purged with a bailer.

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

SHALLOW WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.		Reported Total Depth (ft.)	FTC Water Level (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
BH-41	MW-18	17.42	17.05	0.37	01-21-93	N	0.7	---	---	---	(a)
BH-53	MW-29	14.76	---	Dry	01-20-93	---	---	---	---	---	
BH-49	MW-26	21.51	20.41	1.10	01-21-93	Y	2.2	---	6.69	1903	0.125" Free Product
BH-56	MW-32	16.77	---	Dry	01-20-93	---	---	---	---	---	
BH-44	MW-21	23.31	---	---	01-20-93	---	Pump Inaccesible	---	---	---	
BH-61	MW-38	20.62	20.24	0.38	01-21-93	N	0.7	---	---	---	(a)
BH-67	MW-44	25.34	21.20	4.14	01-21-93	N	8.1	---	6.45	2530	
BH-71	MW-48	19.98	19.58	.40	01-21-93	N	0.2	---	---	---	Insufficient Sample to bail
BH-73	MW-50	37.15	25.52	11.63	01-21-93	N	5.7	---	6.42	5700	
BH-75	MW-52	21.44	---	Dry	01-19-93	---	---	---	---	---	
BH-77	MW-53	16.02	---	Dry	01-20-93	---	---	---	---	---	
BH-80	MW-54	78.15	45.54	32.61	01-20-93	N	63.9	69	6.30	3190	(b)
BH-81	MW-55	66.80	26.57	40.23	01-20-93	N	78.8	69	6.69	2690	
BH-82	MW-56	43.76	40.40	3.36	01-21-93	Y	6.6	---	6.76	2100	1.50" Free Product
BH-95	MW-69	59.41	33.61	25.81	01-20-93	Y	50.5	68	6.37	1173	1.00" Free Product
Sump A-11		17.20	16.62	0.58	01-21-93	Y	13.9	---	---	---	(c)

Note: BH-80, BH-81 and BH-95 are wells that were pumped. BH-49, BH-67, BH-73, and BH-82 are wells that were bailed.

(a) Bailed dry, no recovery in 2 hours. (b) Pumped dry after approx. 31 gallons. (c) 22 gallons of free product was bailed. No incoming water was ever present.

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

SHALLOW WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.	Reported Total Depth (ft.)	FTC Water Level (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
Sump 16-A	15.46	13.00	2.46	01-21-93	N	59.0	70	6.83	1593	(a)
BH-62 MW-39	20.54	17.15	3.39	01-20-93	N	6.6	---	7.10	2060	
MW-25	---	---	Dry	---	---	---	---	---	---	
BH-54 MW-30	---	---	Dry	---	---	---	---	---	---	
BH-23 MW-2	---	---	Dry	---	---	---	---	---	---	
BH-50 MW-27	---	---	Dry	---	---	---	---	---	---	
BH-64 MW-41	---	19.18	---	---	---	---	---	---	---	Not Sampled
BH-46 MW-23	---	---	Dry	---	---	---	---	---	---	
BH-52 MW-28	---	---	Dry	---	---	---	---	---	---	
MW-33	---	19.91	---	---	---	---	---	---	---	

(a) This well was pumped.

APPENDIX B

JANUARY POINT-IN-TIME ANALYTICAL RESULTS

Indian Basin BTEX Analysis Results by HPLC (1/93)

Sample	(ppb) Benzene	(ppb) Toluene	(ppb) o-Xylene	(ppb) Ethylbenzene	(ppb) m,p-Xylene	(ppb) Total Xylenes	(ppb) Total BTEX	(mg/L) Chloride
BH-34 MW-11	2746	1821	662	475	3618	4280	9322	544
BH-49 MW-26	1708	82	10	399	1073	1083	3272	177
BH-62 MW-39	66	26	19	6	23	42	140	231
BH-67 MW-44	21	11	ND	59	3	3	94	321
BH-73 MW-50	8	5	5	ND	ND	5	18	337
BH-80 MW-54	14	4	16	15	97	113	146	134
BH-81 MW-55	518	23	11	78	43	54	673	304
BH-82 MW-56	1128	40	4	10	800	804	1982	269
BH-83 MW-57	21	40	19	165	ND	19	245	131
BH-84 MW-58	192	30	18	23	21	39	284	175
BH-85 MW-59	26	ND	10	55	ND	10	91	46
BH-86 MW-60	138	4	6	260	ND	6	408	6
BH-87A MW-61A	585	82	19	397	2349	2368	3432	12
BH-88 MW-62	78	18	4	74	203	207	377	202
BH-89 MW-63	12	4	6	ND	7	13	29	3
BH-90 MW-64	15	ND	3	ND	7	10	25	9
BH-91A MW-65A	3	ND	6	ND	5	11	14	35
BH-92 MW-66	3	6	6	3	14	20	32	12
BH-93 MW-67	8	3	3	ND	9	12	23	4
BH-94 MW-68	376	944	253	246	2123	2376	3942	27
BH-95 MW-69	1284	49	209	309	1722	1931	3573	NS
BH-97 MW-70	ND	ND	5	8	ND	5	13	8
Equip Blank No. 1	16	12	ND	ND	ND	ND	28	NS
Equip Blank No. 1	3	ND	4	5	ND	4	12	NS
Equip Blank No. 2	9	12	21	10	11	32	63	NS
Equip Blank No. 2	13	14	8	79	ND	8	114	NS
Lab Blank	ND	8	3	ND	ND	3	11	NS
Sump 16A	741	40	91	96	1264	1355	2232	229
SW-1	6	ND	ND	ND	ND	ND	6	NS
SW-2	47	6	3	7	6	9	69	344
Trip Blank	16	4	ND	ND	ND	ND	20	NS
Trip Blank	13	4	ND	ND	ND	ND	17	NS

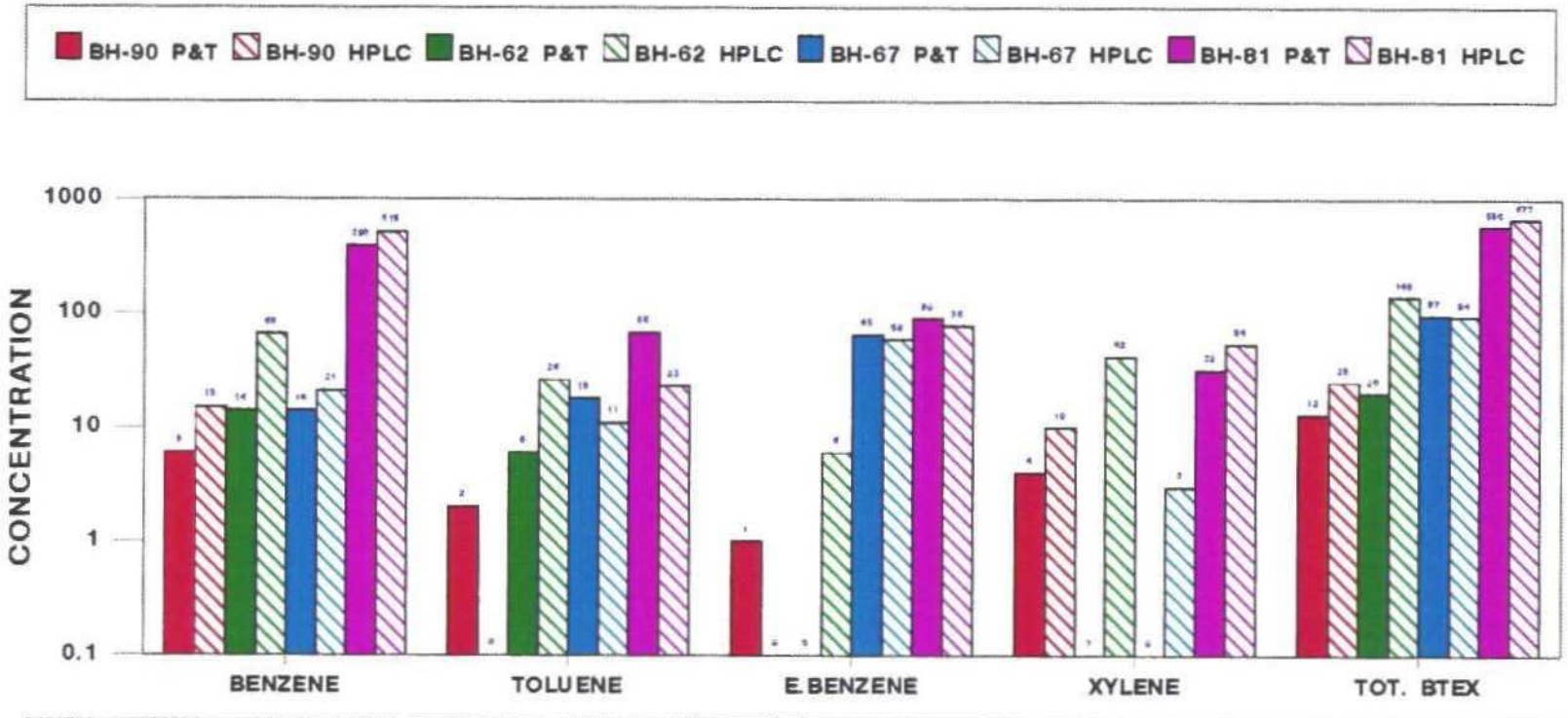
ND=No detection at or above detection limit of 3 ppb. **NS=No sample available.**

APPENDIX C

JANUARY POINT-IN-TIME ANALYSIS TECHNIQUE COMPARISON

INDIAN BASIN TREATMENT PROJECT

JANUARY 1993 QUARTERLY POINT IN TIME SAMPLING RESULTS
CORE LABS P & T VERSUS MARATHON HPLC ANALYSIS COMPARISON



	BENZENE	TOLUENE	E.BENZENE	XYLENE	TOT. BTEX
BH-90 P&T	6	2	1	4	13
BH-90 HPLC	15	0	0	10	25
BH-62 P&T	14	6	0	0	20
BH-62 HPLC	66	26	6	42	140
BH-67 P&T	14	18	65	0	97
BH-67 HPLC	21	11	59	3	94
BH-81 P&T	390	68	90	32	580
BH-81 HPLC	518	23	78	54	673

BTEX COMPONENTS

HPLC - HIGH PERFORMANCE LIQUID CHROMOTOGRAPHY ANALYSIS
P & T - STANDARD PURGE AND TRAP ANALYSIS
ALL CONCENTRATIONS GIVEN IN PPB

APPENDIX D

ANALYTICAL RESULTS COMPARISON OVER TIME

APPENDIX D TABLE 1

LOWER QUEEN BENZENE ANALYSES
POINT-IN-TIME SAMPLINGS

(Data in PPB)

Well Number	September 1991^	December 1991^	April 1992#	July 1992#	October 1992#	January 1993#
BH-83	1600	350	12.9*@	948*	15.1	21
BH-83	--	290	125.4*	--	--	--
BH-83	--	--	150.^	--	--	--
BH-84+	40	90	202.*	178*	190	192
BH-85+	540	420	40.4*	268*	98.8	26
BH-86	33	<1	2.7*@	19*	31.7	138
BH-86	--	--	3.5	16.6~	--	--
BH-87A+	190	10	5.0*	359*	470.1	585
BH-87A+	--	--	--	59.8~	--	--
BH-88+	2200	1400	257.5*	357*	212.3	78
BH-89	<1	<1	4.1*	12*	4.3	12
BH-90	150	130	233.*@	115*	37.1	15
BH-90	--	--	68.3*	--	14.^	--
BH-91A+	680	150	25.3*	413*	10.6	3
BH-92	<1	<1	2.9*@	8*	12.1	3
BH-92	--	--	3.3*	--	--	--
BH-93	280	320	4.3#	103*	2.6	8
BH-93	--	--	--	69.1~	--	--
BH-94+	240	1900	1865.*	160*	2208.2*	376
BH-97	<1	<1	1.7*	15*	10.7	<3
BH-97	--	--	--	<1^	--	--

\+ Withdrawal Well

^ Analysis by Core Labs

\# Analysis by PTC HPLC method except as noted

* Average of more than one analysis

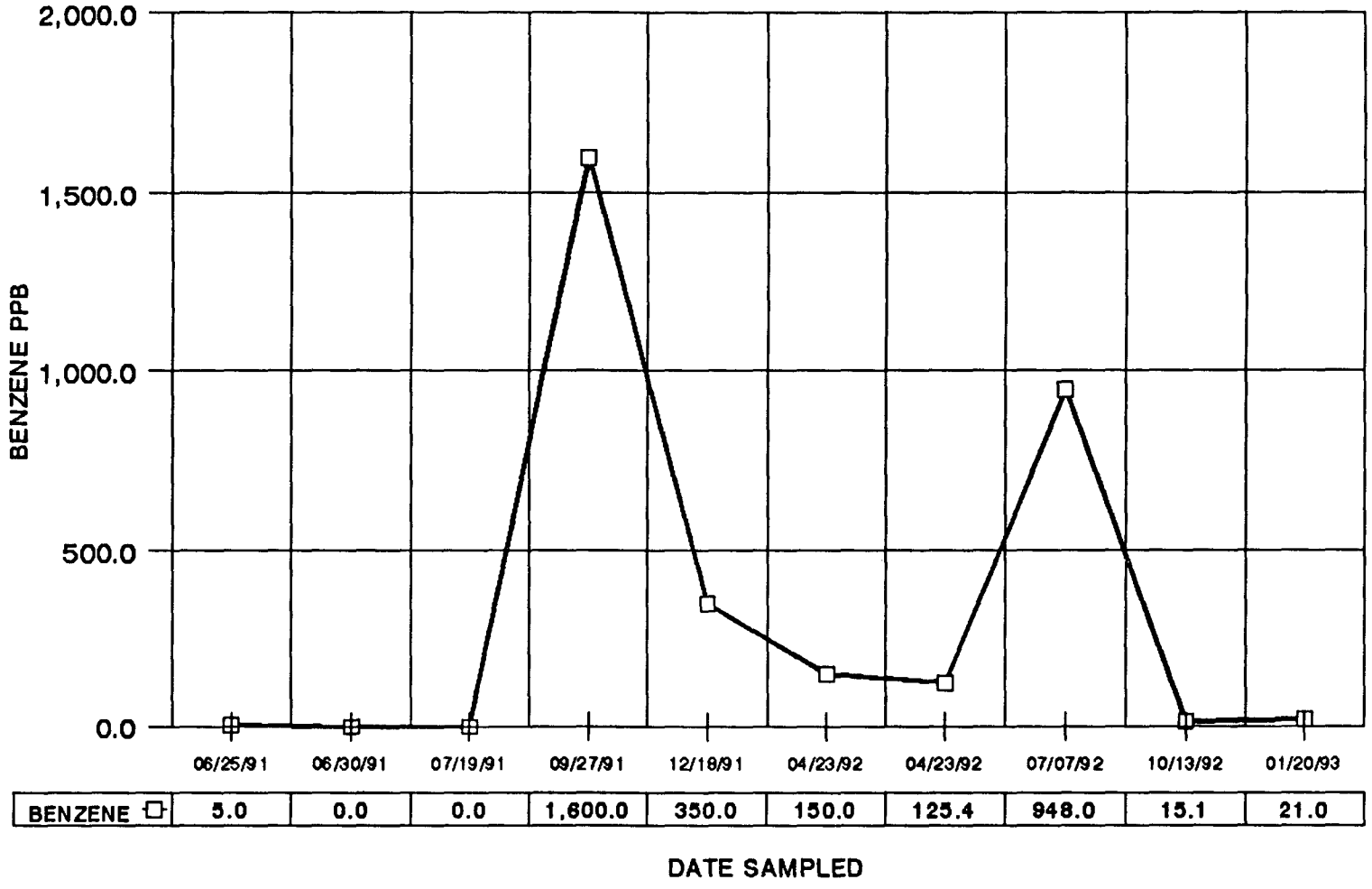
@ Bailed sample; all others collected by pump

~ Analysis by State Dept. of Health

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#57 BH-83



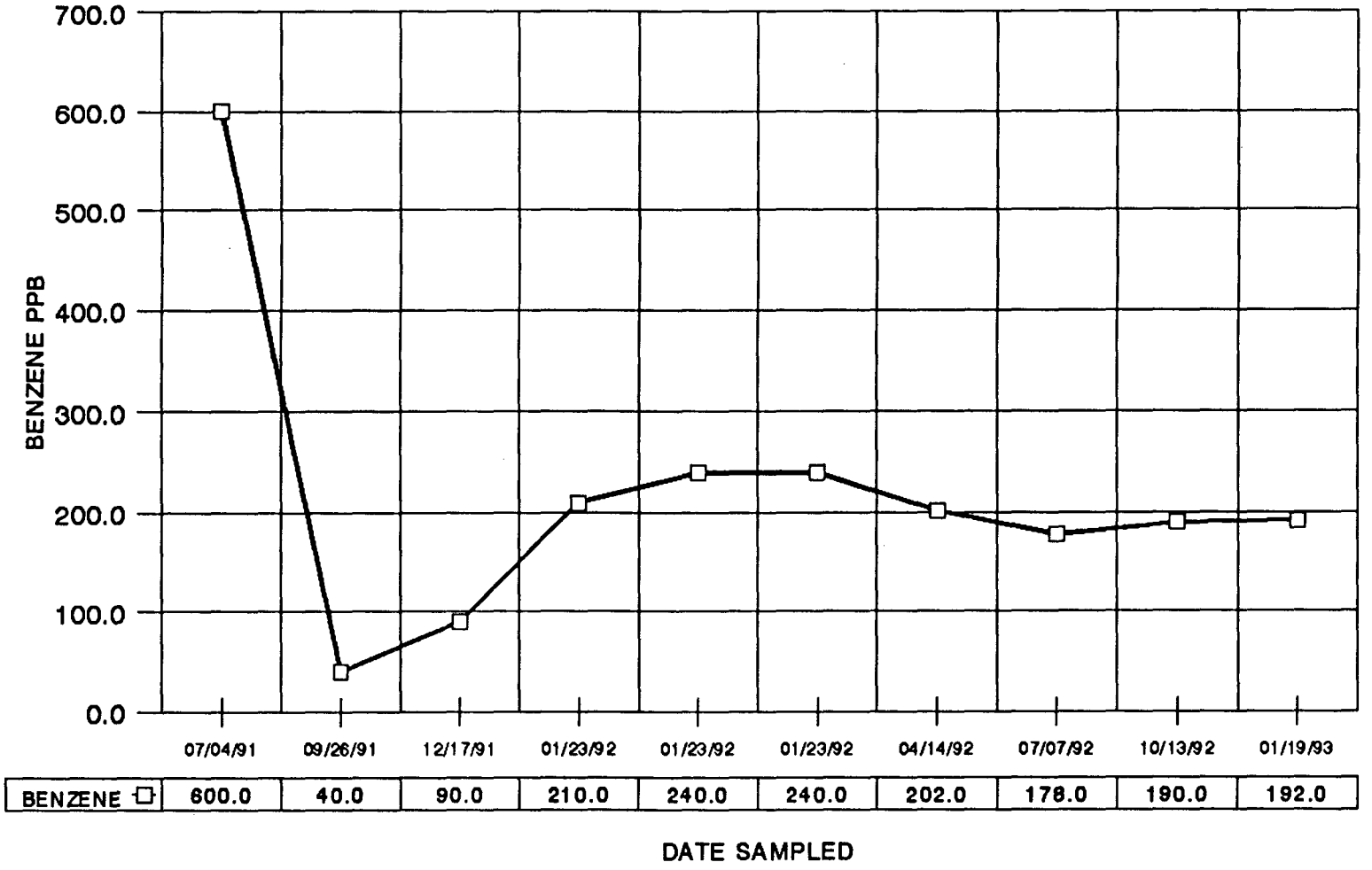
BENZENE	06/25/91	06/30/91	07/19/91	09/27/91	12/18/91	04/23/92	04/23/92	07/07/92	10/13/92	01/20/93
	5.0	0.0	0.0	1,600.0	350.0	150.0	125.4	948.0	15.1	21.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#58 BH-84

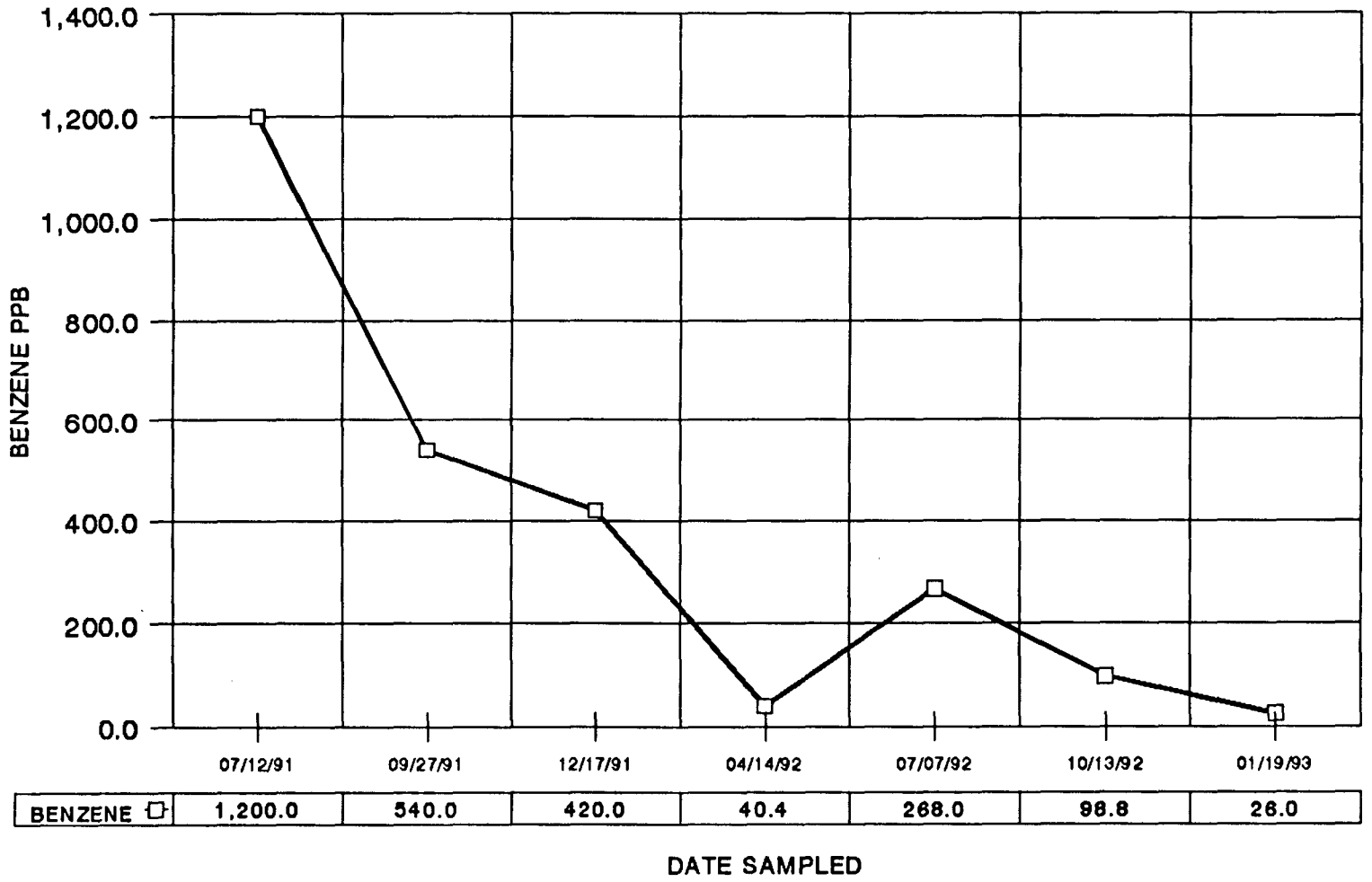


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#59 BH-85

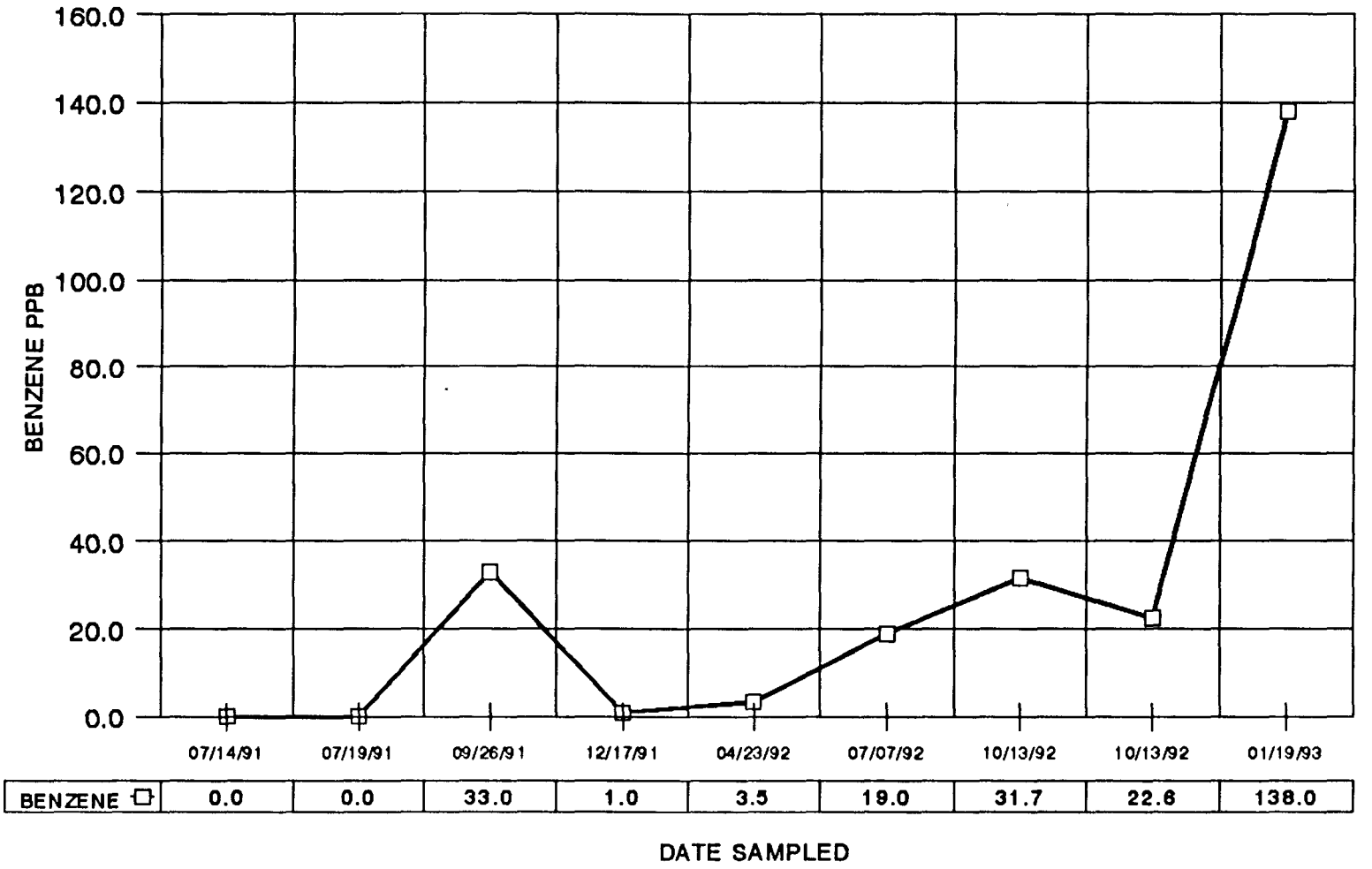


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#60 BH-86



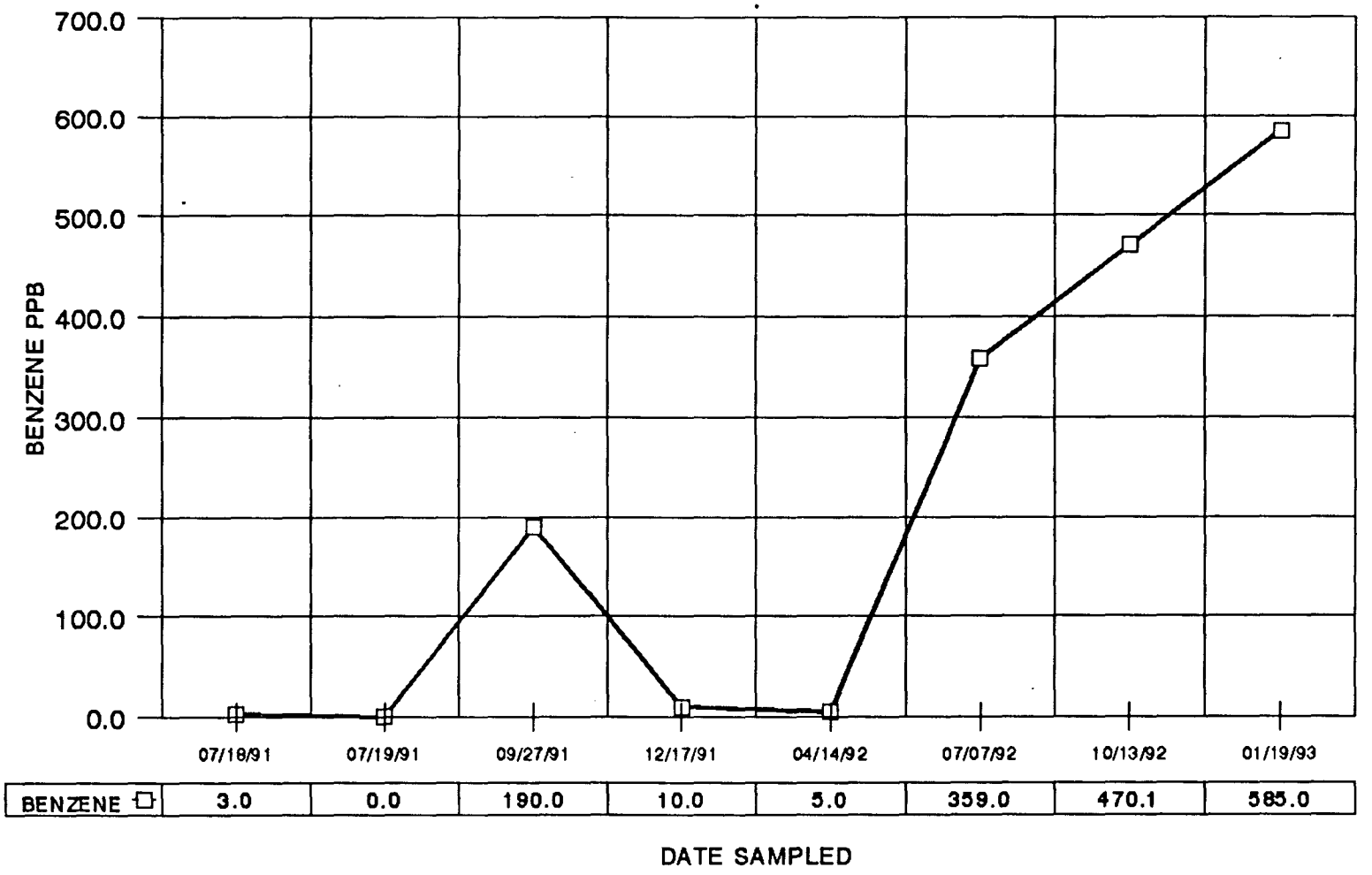
BENZENE	0.0	0.0	33.0	1.0	3.5	19.0	31.7	22.6	138.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#61A BH-87A

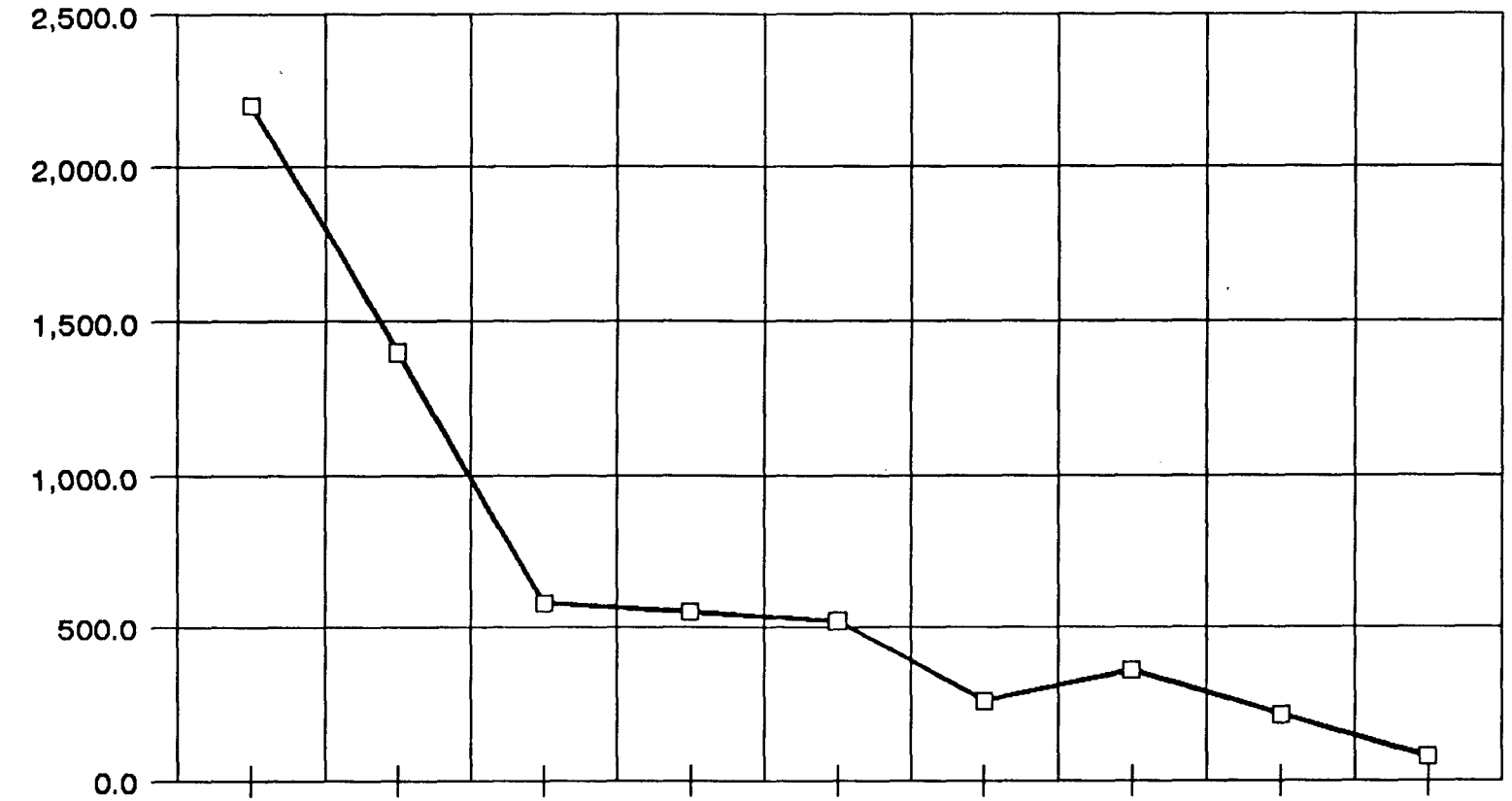


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#62 BH-88

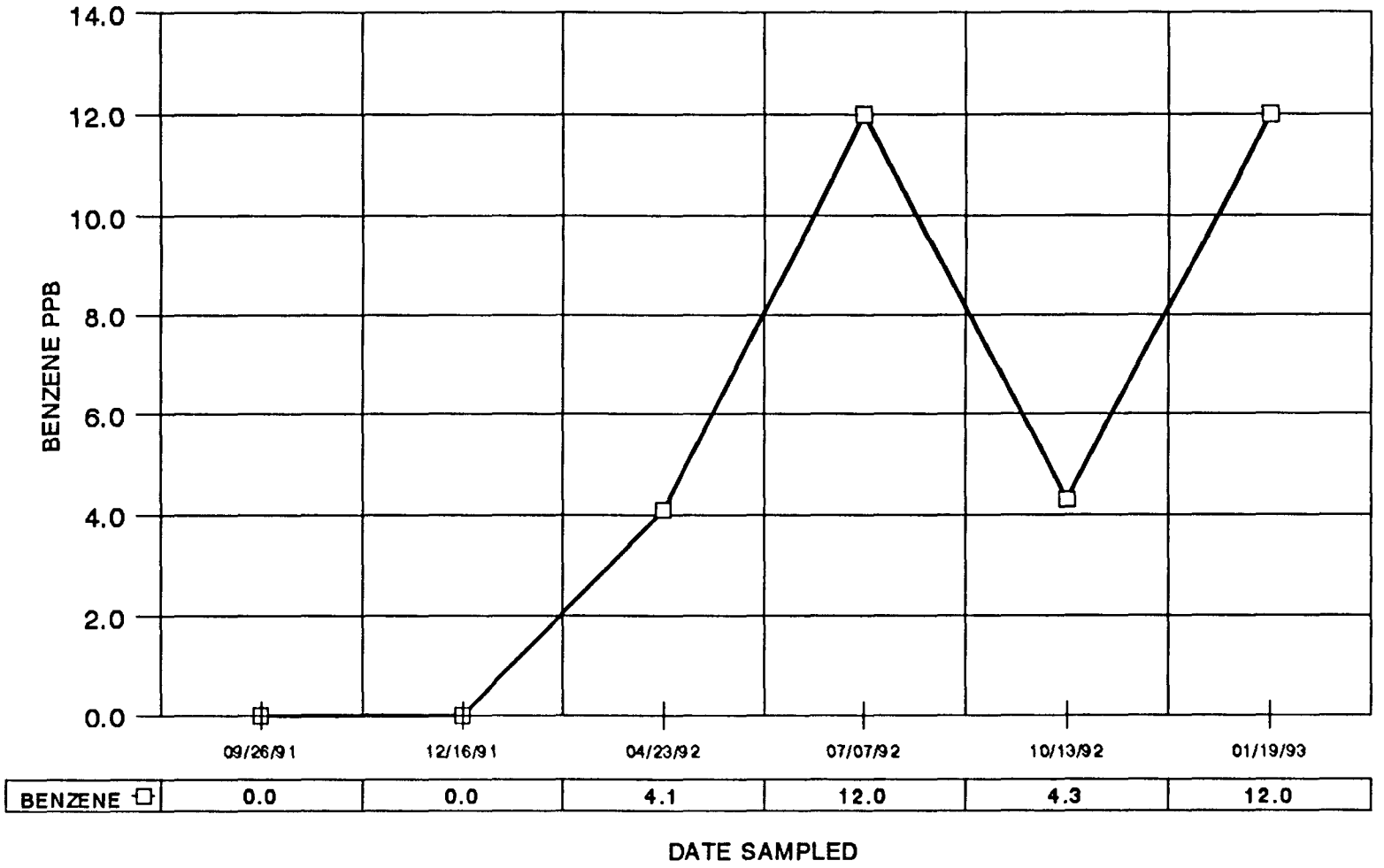


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#63 BH-89

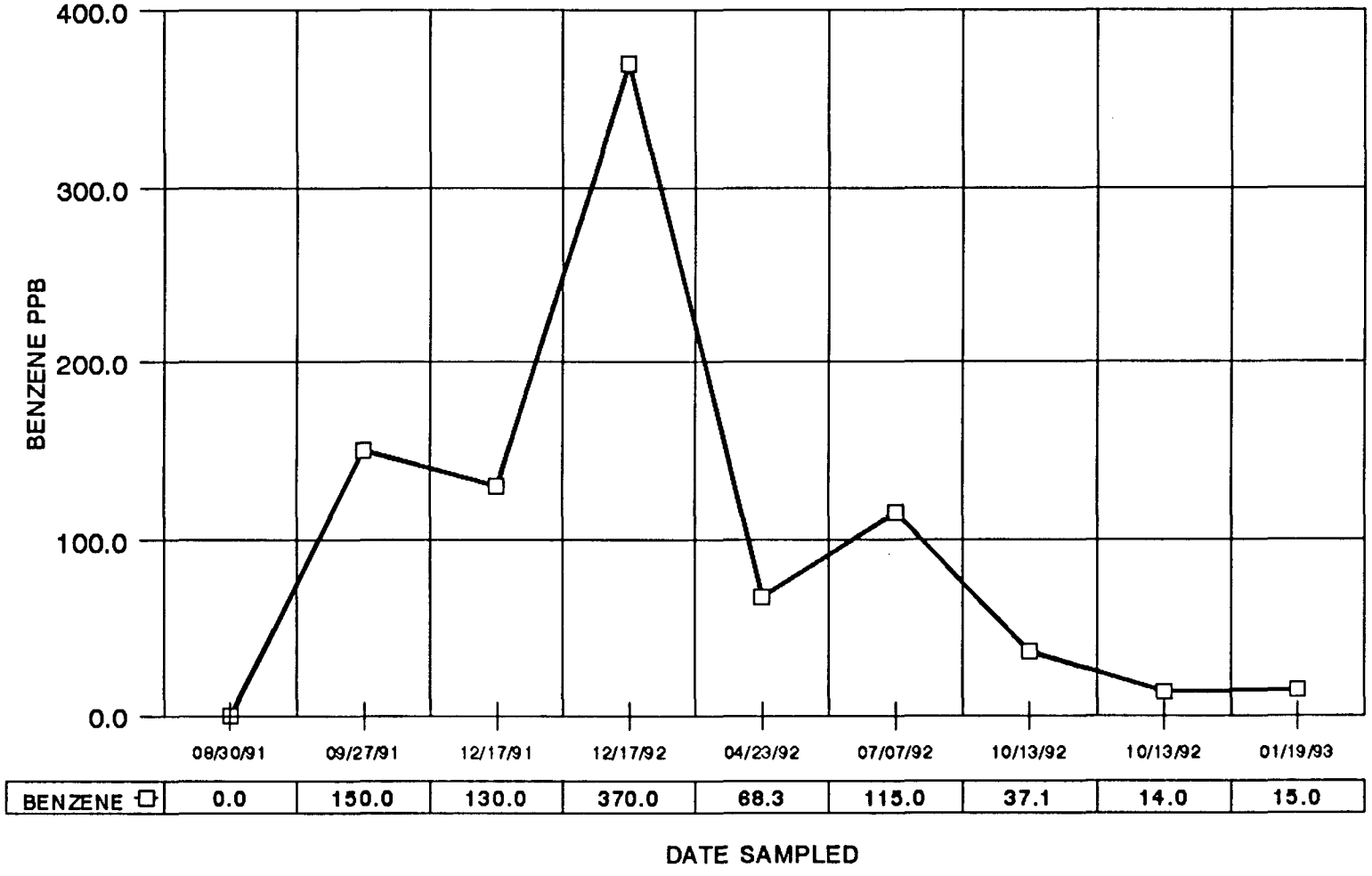


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#64 BH-90

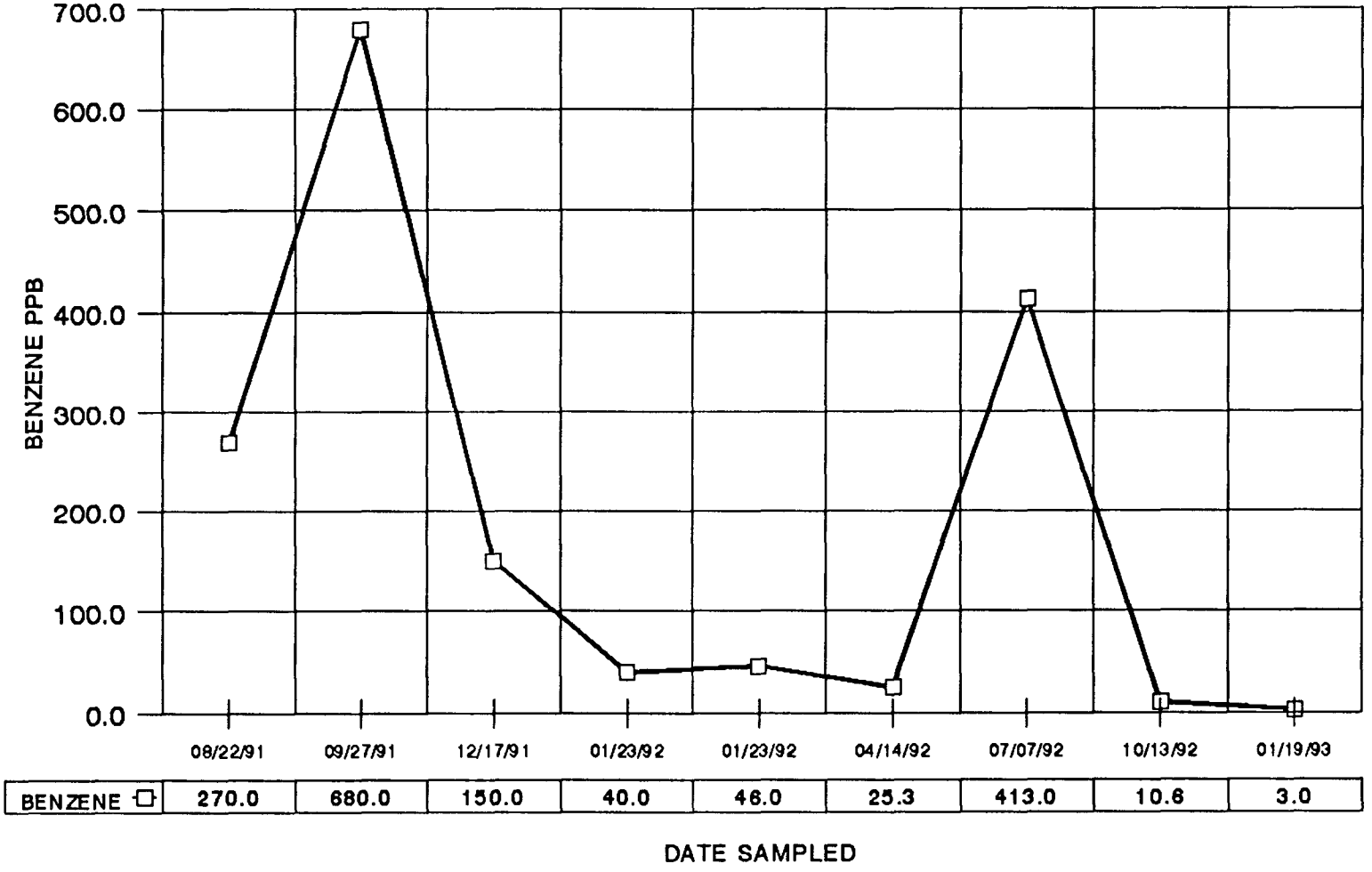


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#65A BH-91A

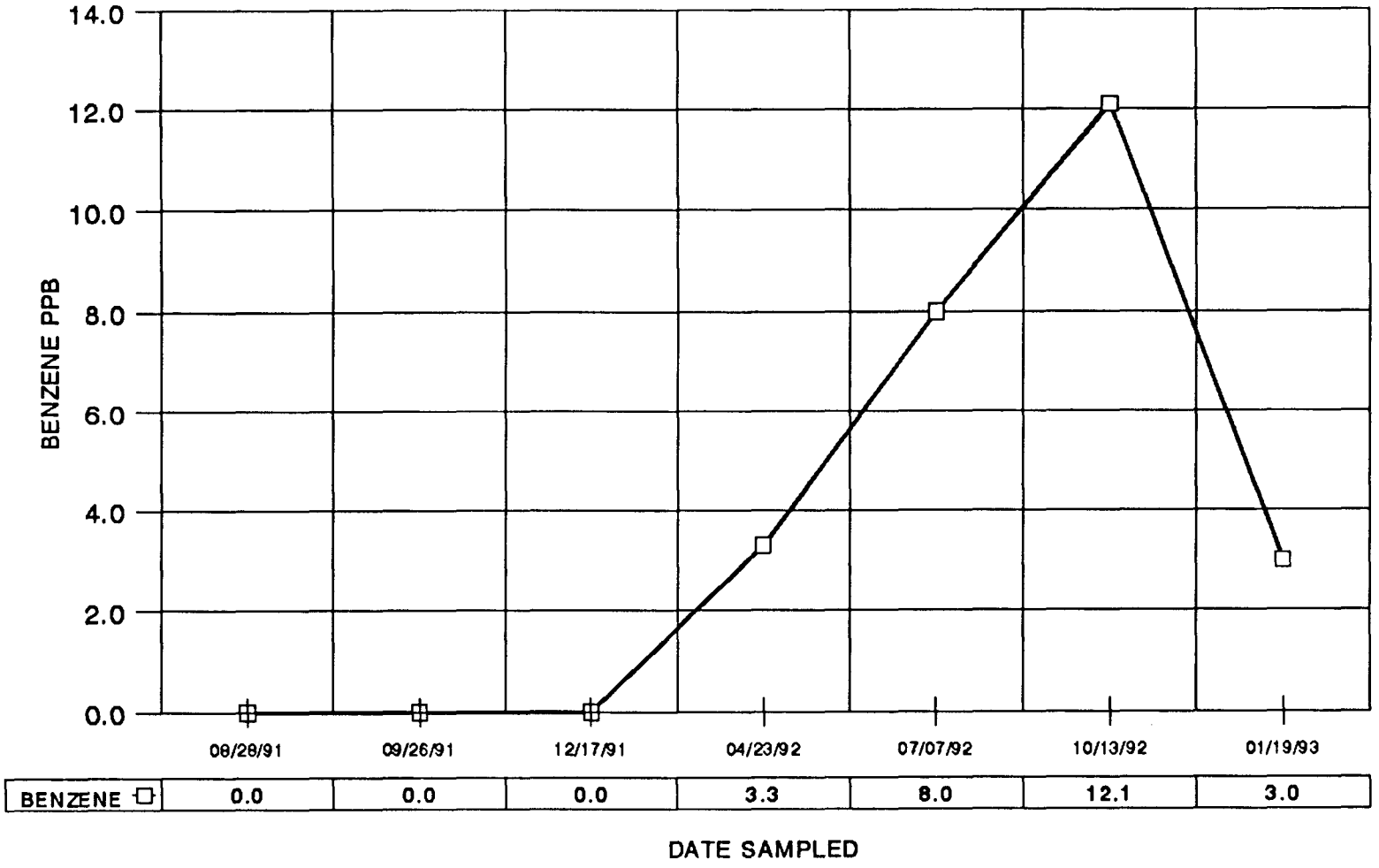


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#66 BH-92

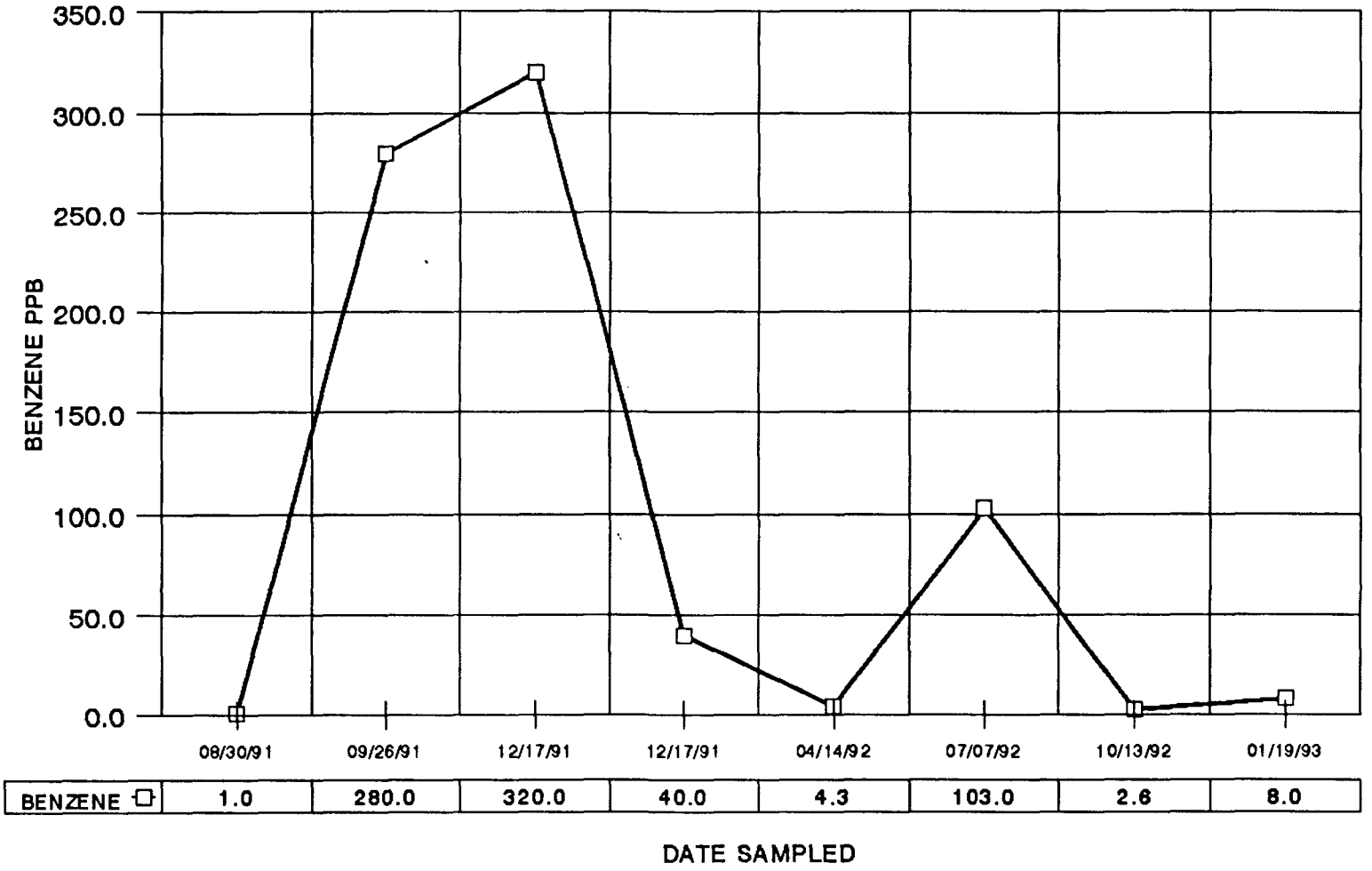


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#67 BH-93

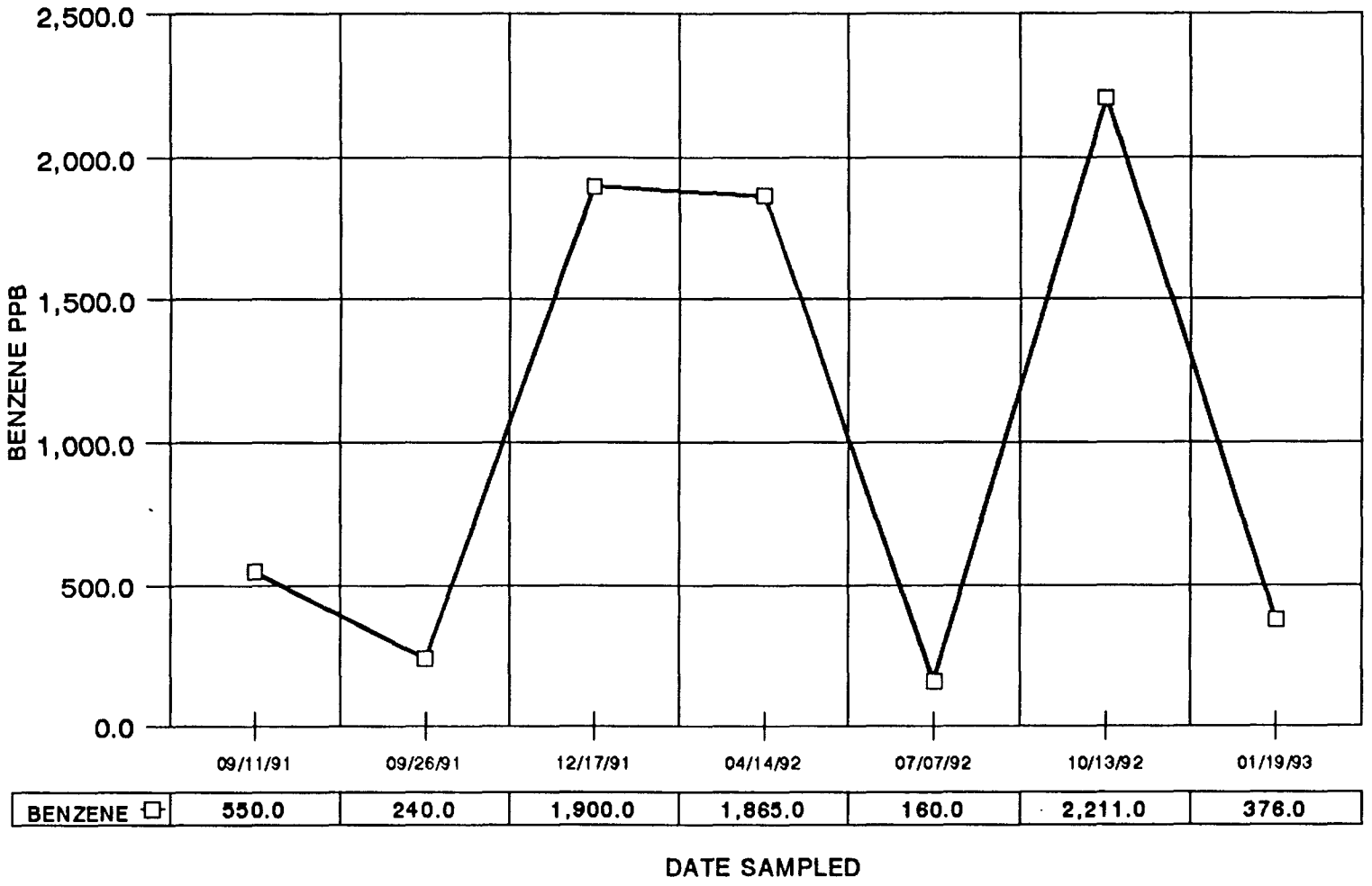


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#68 BH-94

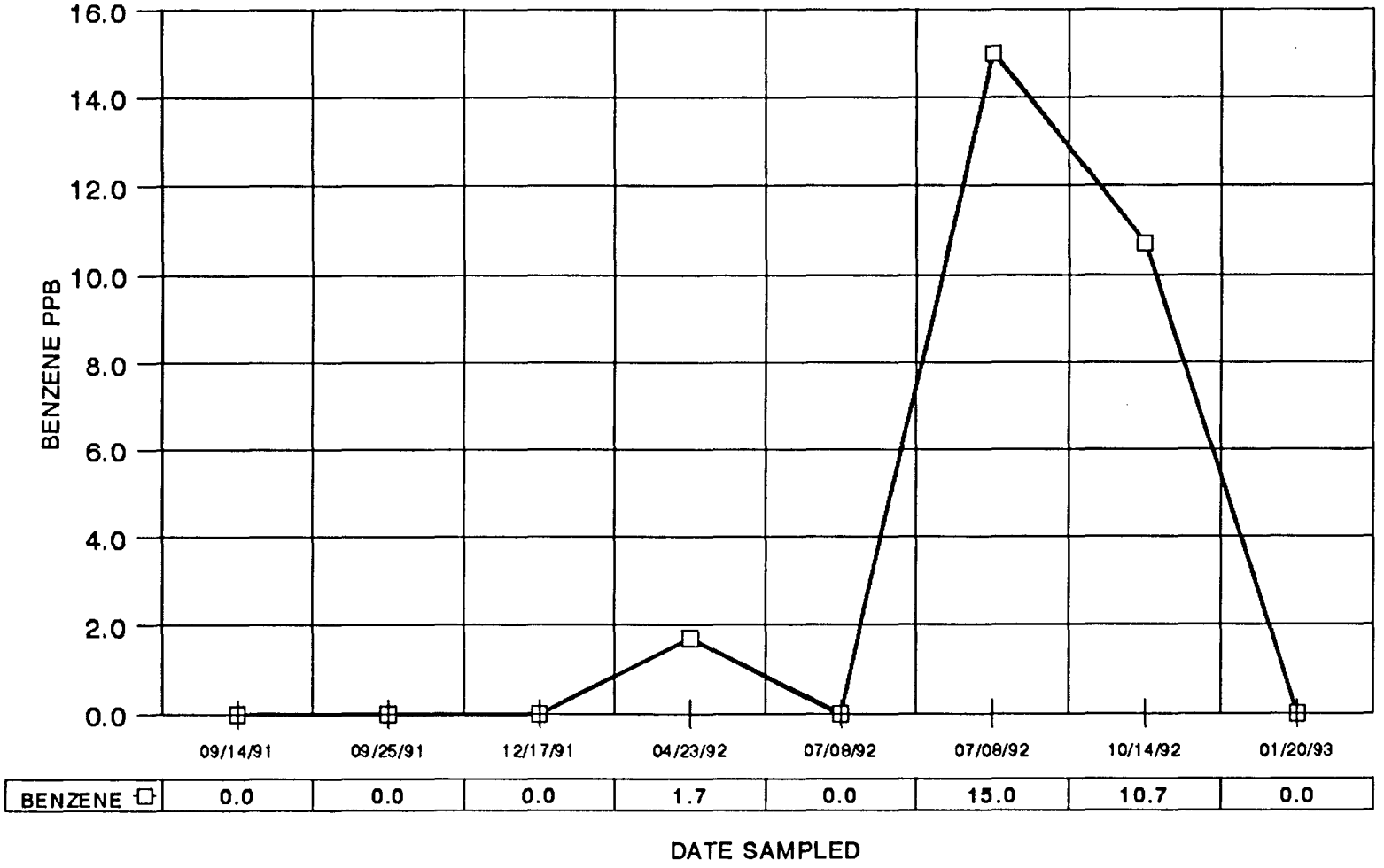


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#70 BH-97



BY R.M. GRAY

APPENDIX D TABLE 2

SHALLOW WELL BENZENE ANALYSES
POINT-IN-TIME SAMPLINGS

(Data in PPB)

Well Number	September 1991^	December 1991^	April 1992≠	July 1992≠	October 1992≠	January 1993≠
BH-14	250	200	NS	NS	NS	NS
BH-33	2300	2300	1780.*@	1842.*@	1668.@	QNS
BH-33	--	--	--	--	2100.@^	--
BH-34	3000	3800	3087.*@	2199.*@	2942.@	2746@
BH-35	3800	Dry	NS	NS	NS	NS
BH-36	3100	3000	3492.*@	2708.*	NS	NS
BH-38	5100	Dry	NS	NS	NS	NS
BH-39	1700	Dry	NS	NS	NS	NS
BH-41	4300	NS	2639.*	3105.*	3923.@	QNS
BH-41	--	--	--	2700.^	3300.@^	--
BH-42	4700	Dry	3195.*@	2742.*	3032.	QNS
BH-42	--	--	--	3000.^	--	--
BH-44	1000	1100	NS	NS	NS	NS
BH-45	4	NS	Dry	NS	Dry	Dry
BH-47	3400	--	--	4353.*	Dry	Dry
BH-49	3100	3000	NS	1939.*@	1992.@	1708@
BH-49	--	--	--	2000.^	--	--
BH-55	<1	NS	Dry	332.*	9.@	QNS
BH-61	15	15	36.*	37.*	166.@	QNS
BH-61	--	--	101.*@	--	--	--
BH-62	--	--	--	--	--	66
BH-62	--	--	--	--	--	14^
BH-64	200	170	NS	NS	NS	NS
BH-65	<1	<1	NS	NS	NS	NS
BH-67	59	NS	13.*	97.*@	41.@	21@
BH-67	--	--	16.*@	--	12.@^	14@^
BH-68	<1	<1	NS	NS	NS	NS
BH-70	2600	2000	NS	NS	NS	NS
BH-71	<1	<1	Dry	47.*@	Dry	QNS

Well Number	September 1991^	December 1991^	April 1992#	July 1992#	October 1992#	January 1993#
BH-73	<1	<1	4.*	4.*@	8.@	8.@
BH-73	--	--	4.*@	--	--	--
BH-74	800	<1	NS	NS	NS	NS
BH-75	<1	--	--	5.*@	Dry	Dry
BH-80	<1	<1	9.*	8.*	62.	14
BH-81	940	400	296.*	483.*	215.	518
BH-81	--	--	--	--	--	390^
BH-82	2200	1000	NS	1114.*	1026.	1128
BH-90	--	--	--	--	--	6^
BH-95	2400	2100	--	568.	1598.	1284
Sump A11	1400	2900	3033.*	1258.*	2815.	Free Product
Sump 16A	240	2000	1233.*	1495.*	632.	741
Sump 16A	--	--	1137.*@	--	--	--

Note: See footnotes

^ Analysis by Core Labs

Analysis by PTC HPLC method except as noted

* Average of more than one analysis

@ Bailed sample; all others collected by pump

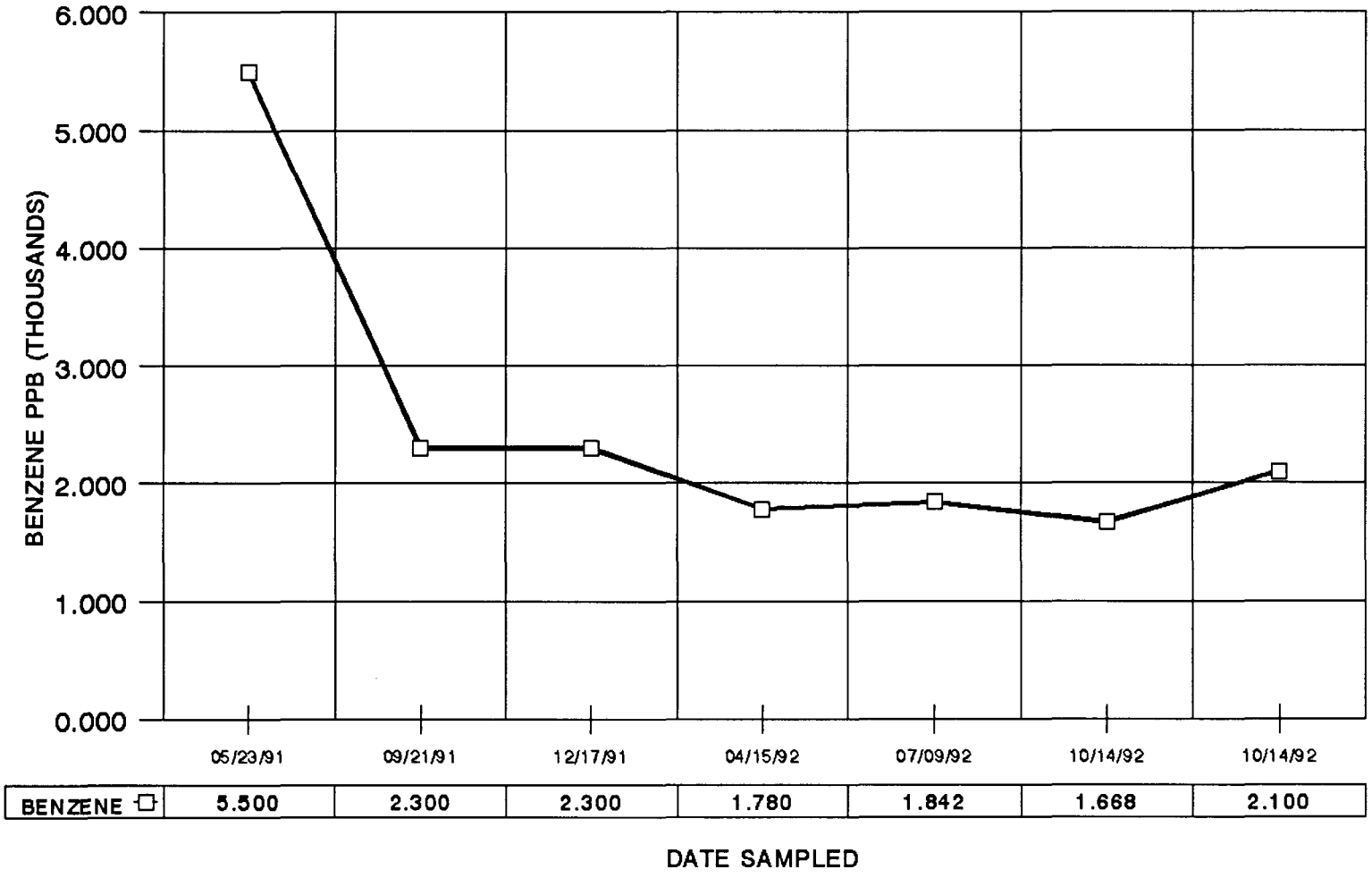
NS Not sampled

QNS Water quantity not sufficient to sample

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#10 BH-33



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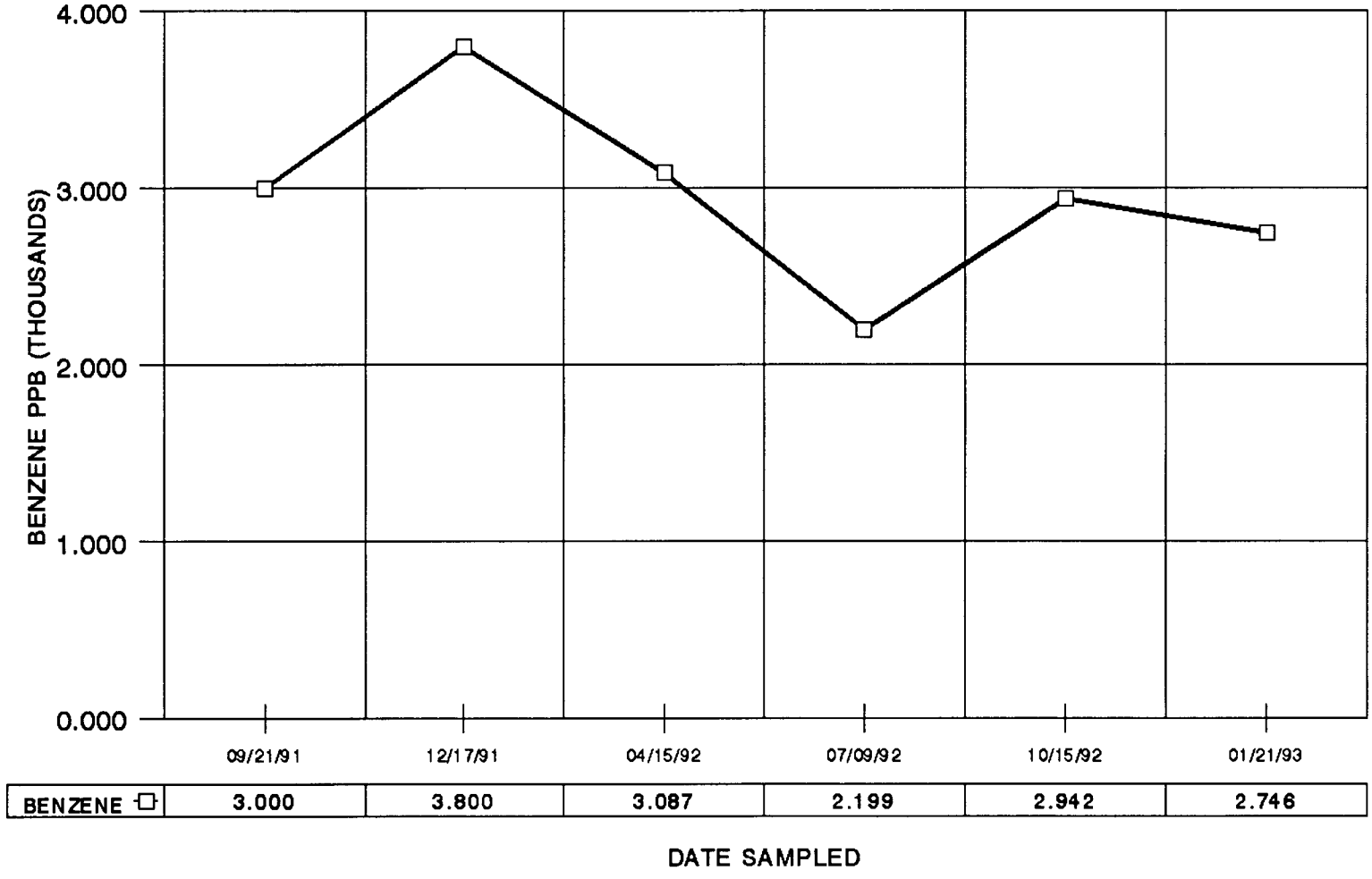
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#11 BH-34



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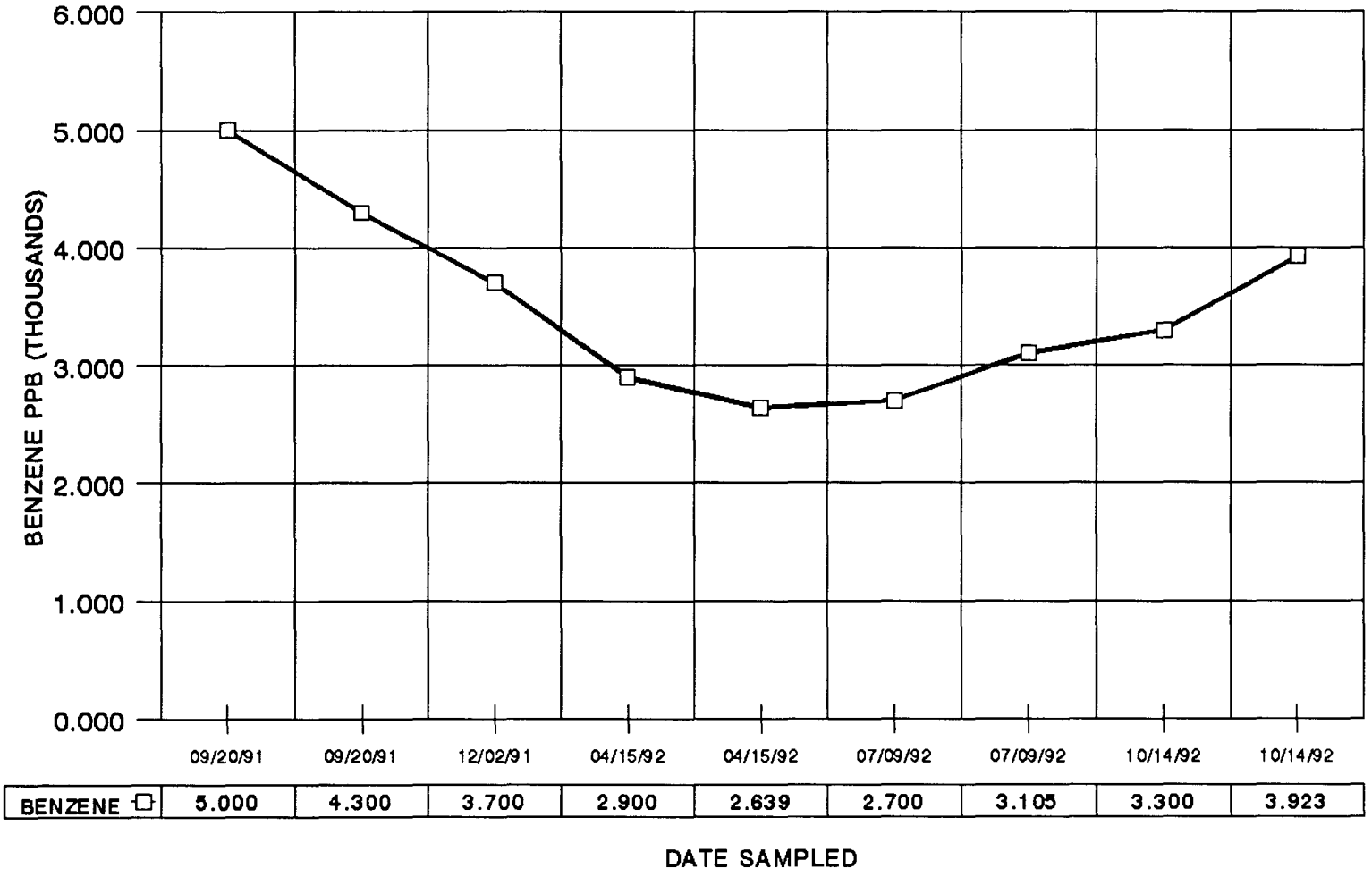
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#18 BH-41



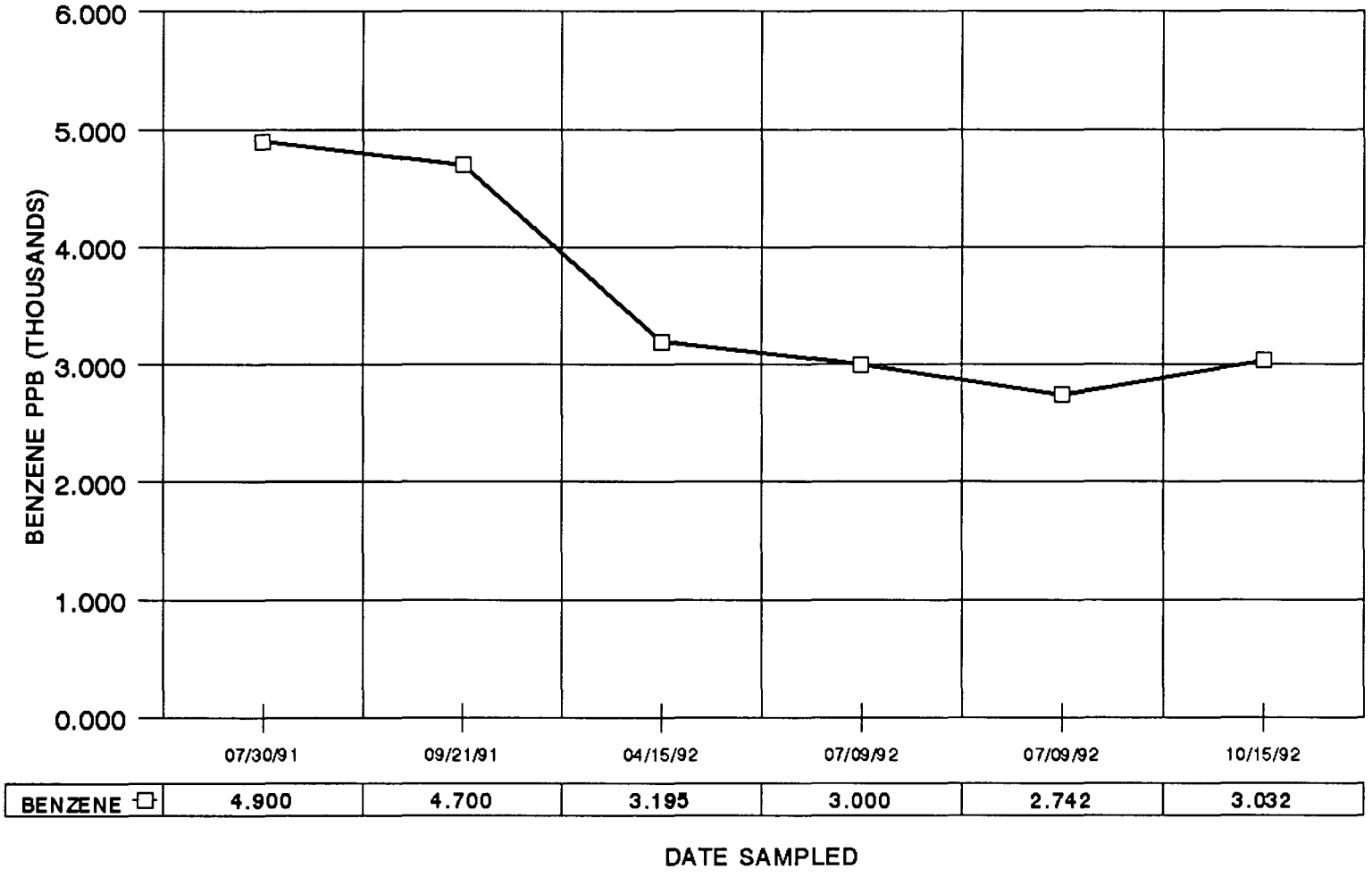
BENZENE	5.000	4.300	3.700	2.900	2.639	2.700	3.105	3.300	3.923

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#19 BH-42



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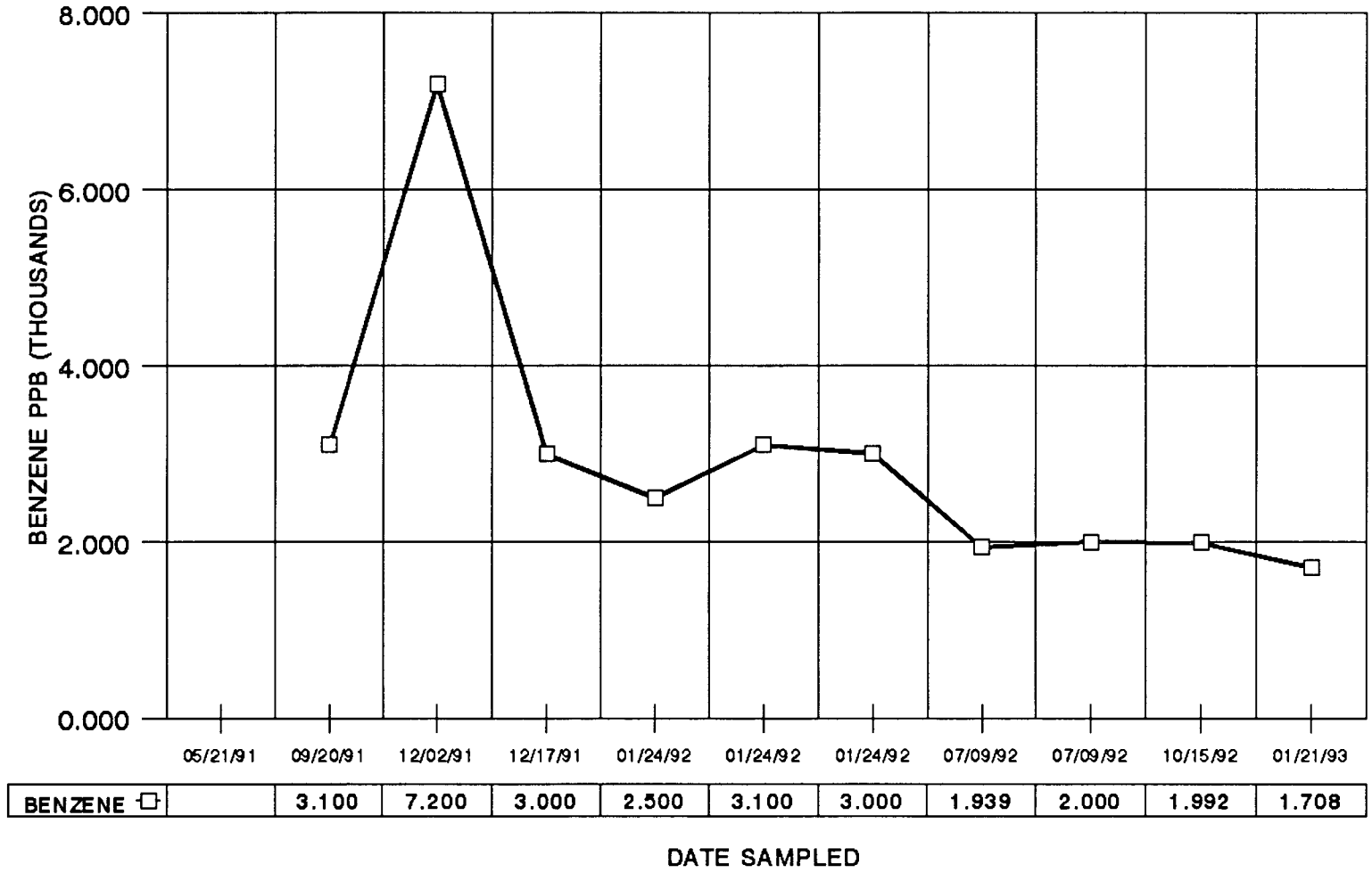
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#26 BH-49



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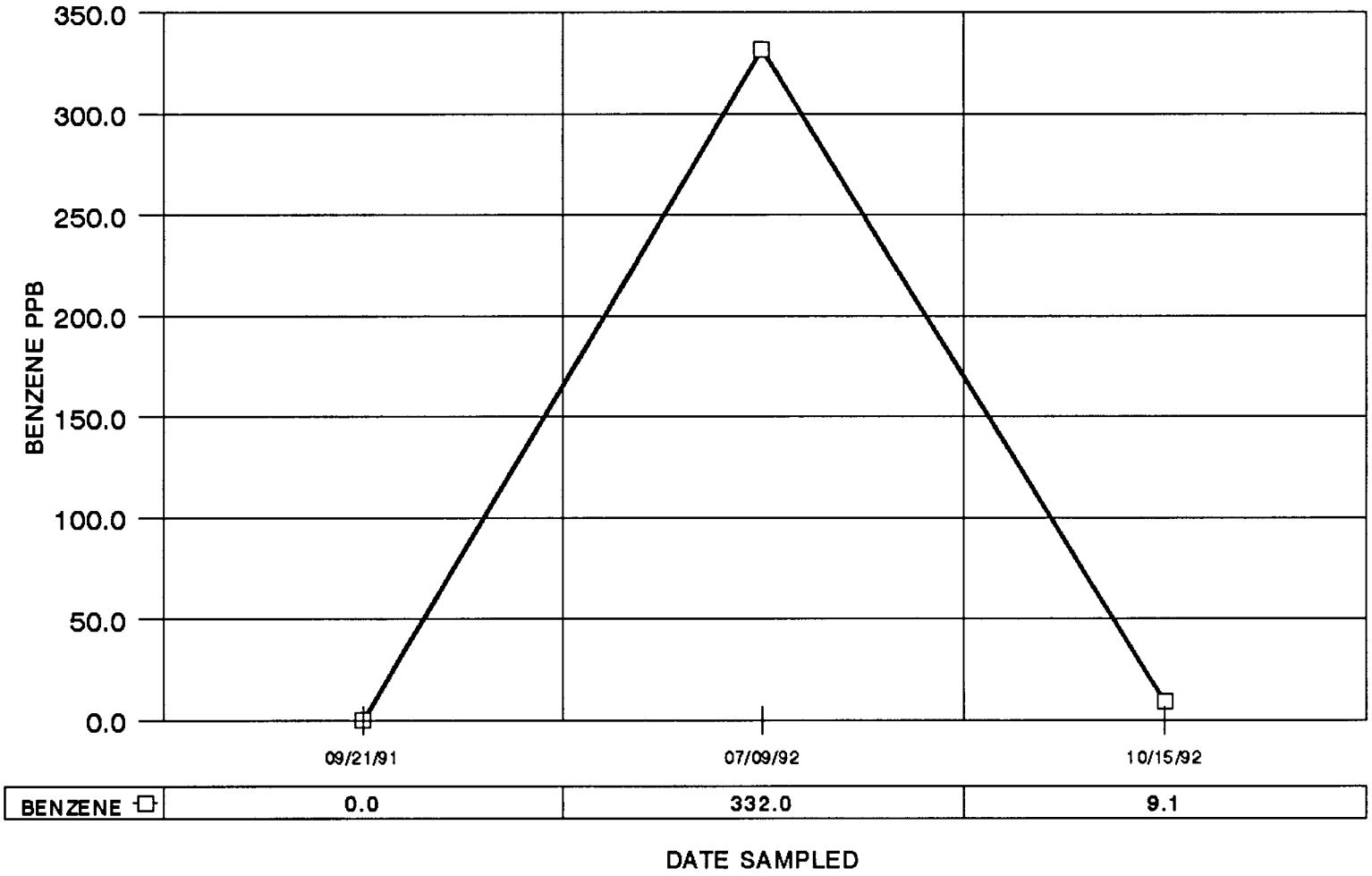
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#31 BH-55



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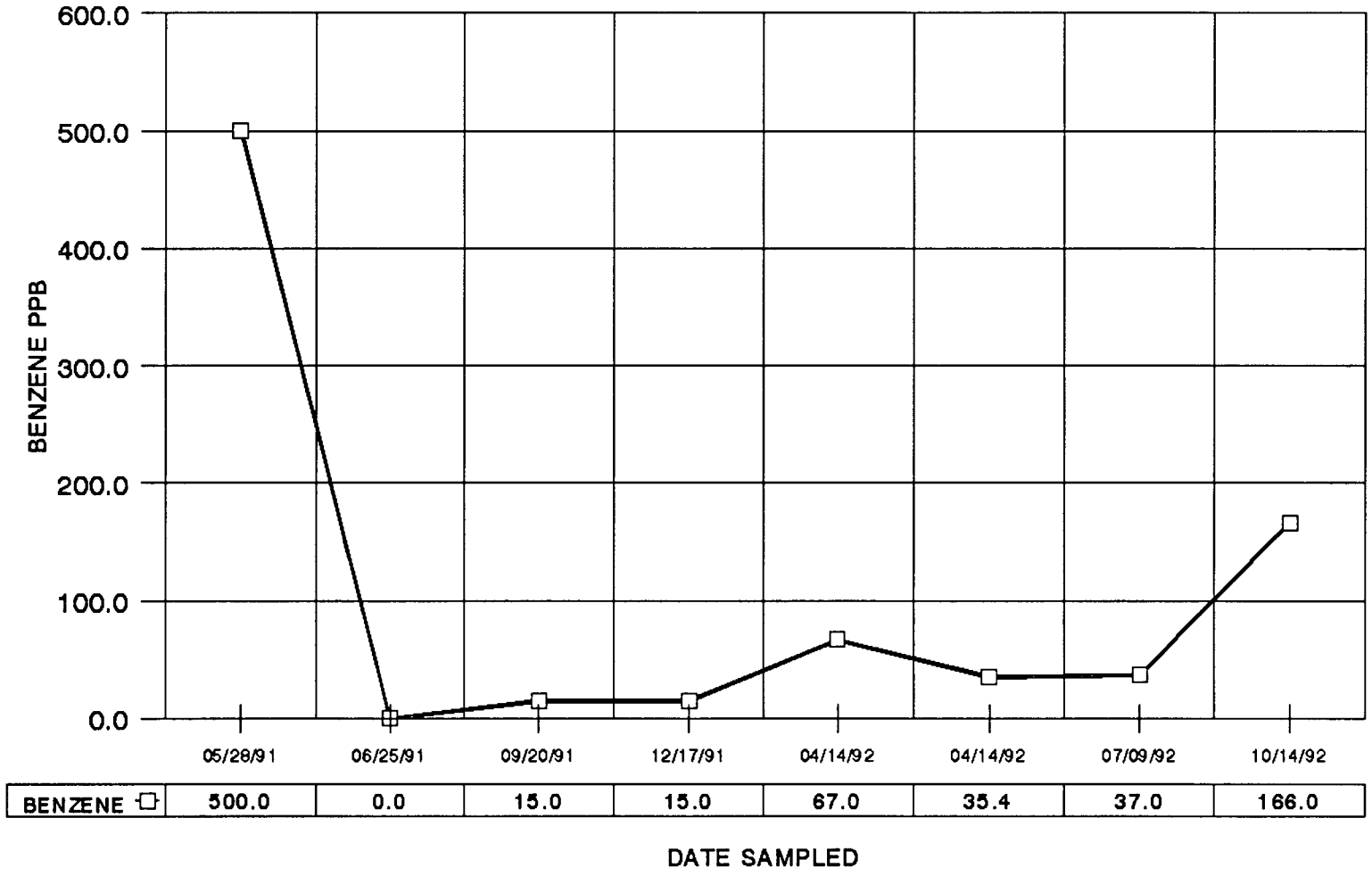
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#38 BH-61



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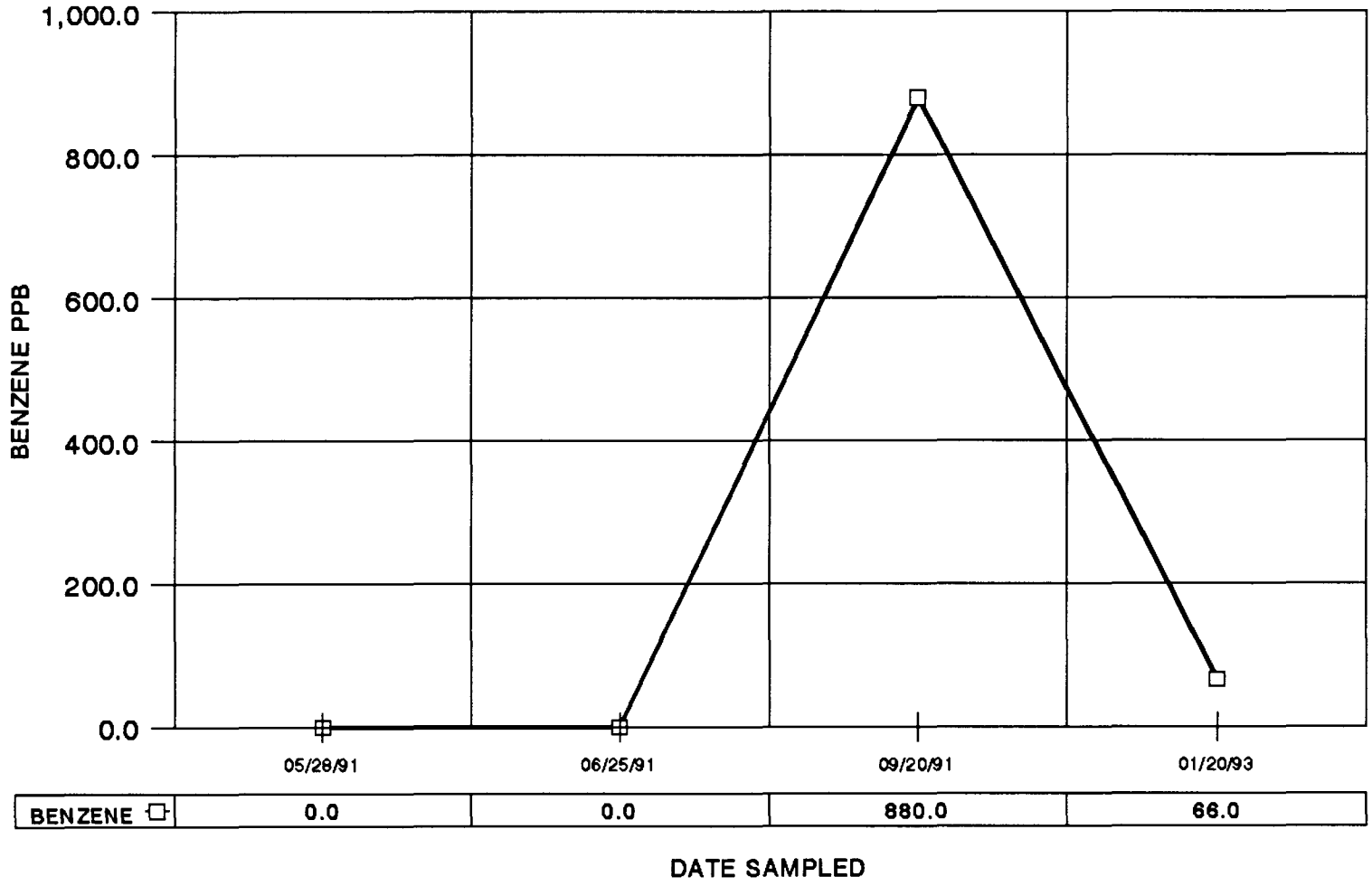
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#39 BH-62

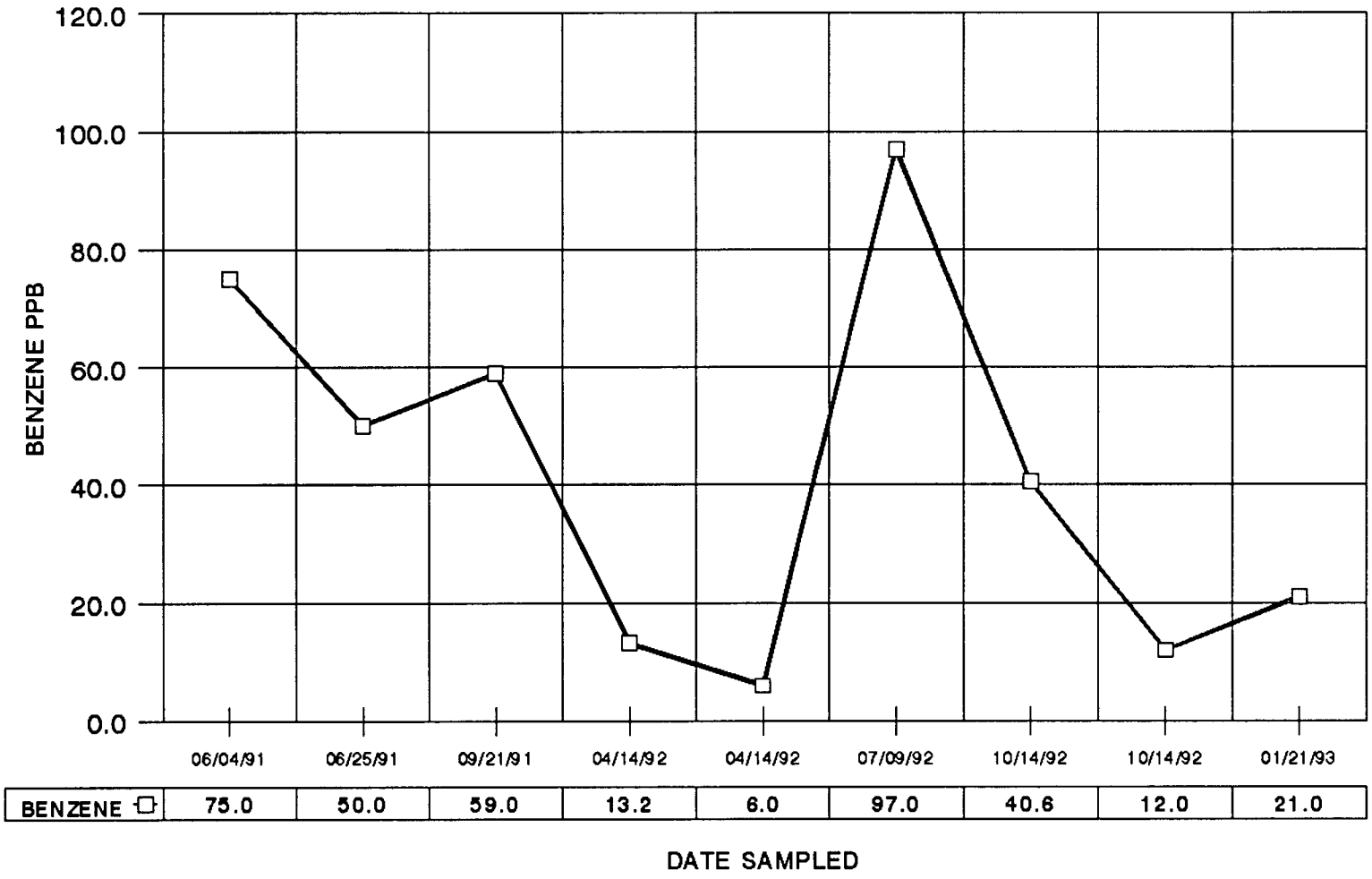


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#44 BH-67



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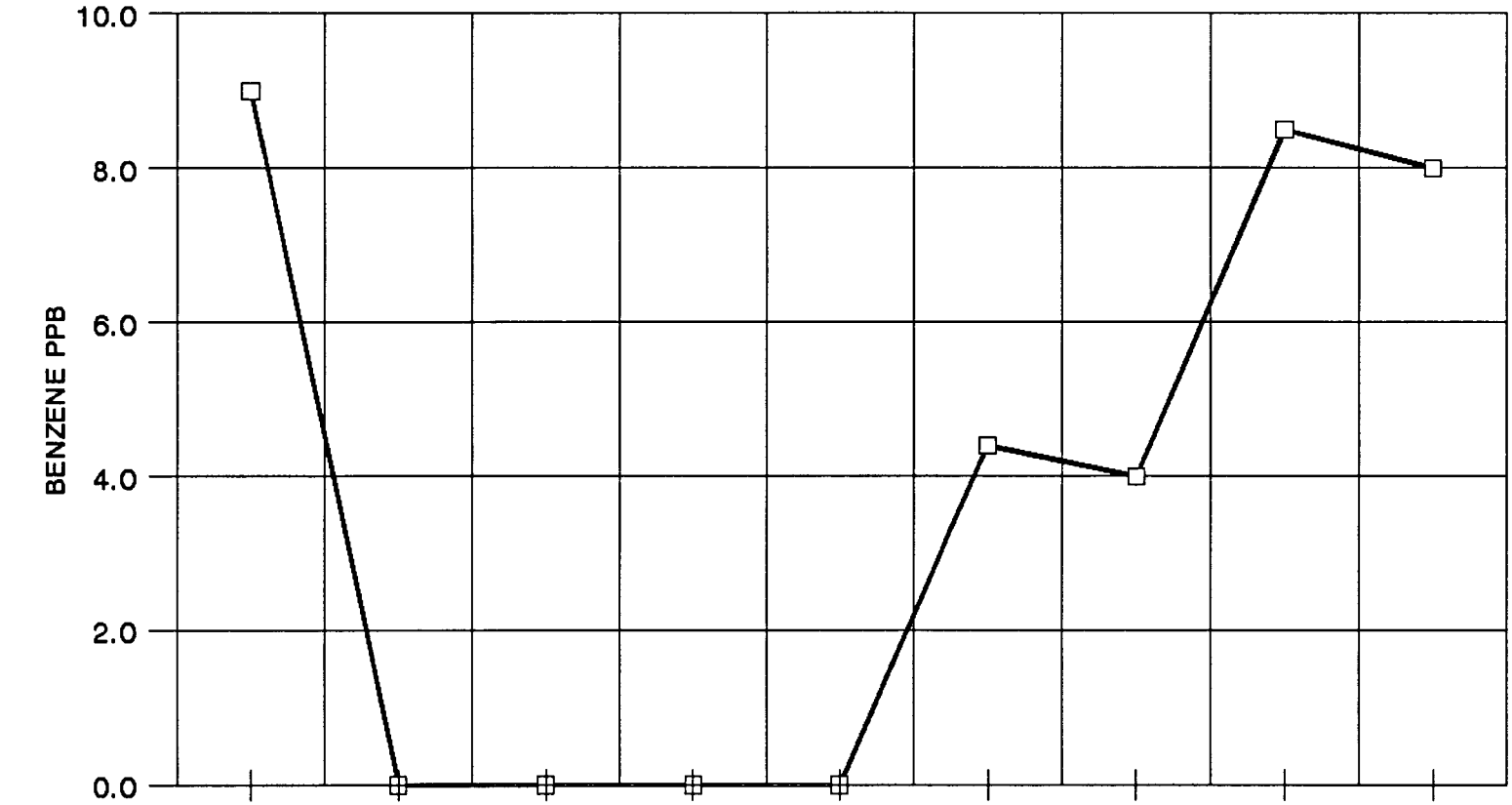
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#50 BH-73



BENZENE	9.0	0.0	0.0	0.0	0.0	4.4	4.0	8.5	8.0

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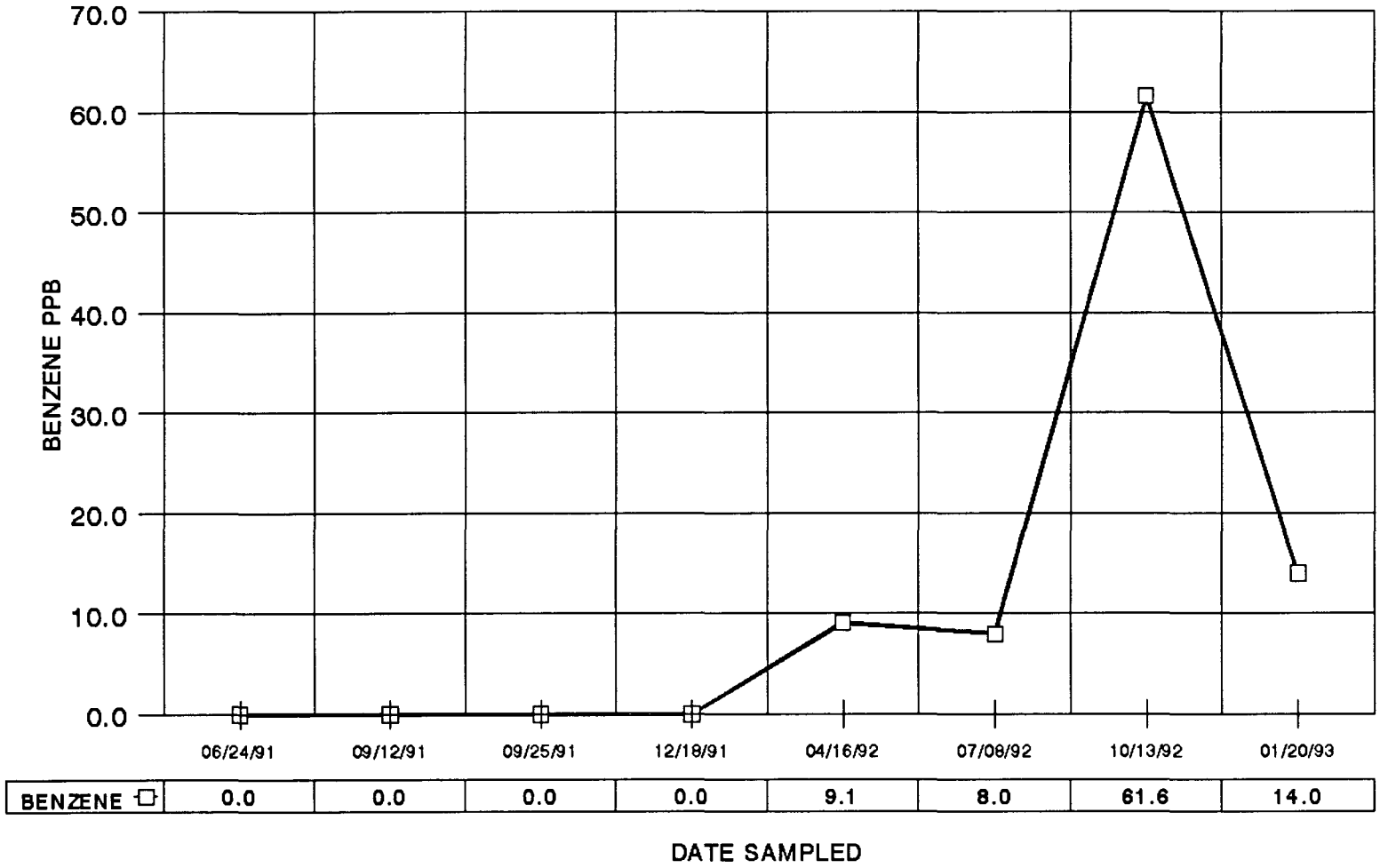
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#54 BH-80

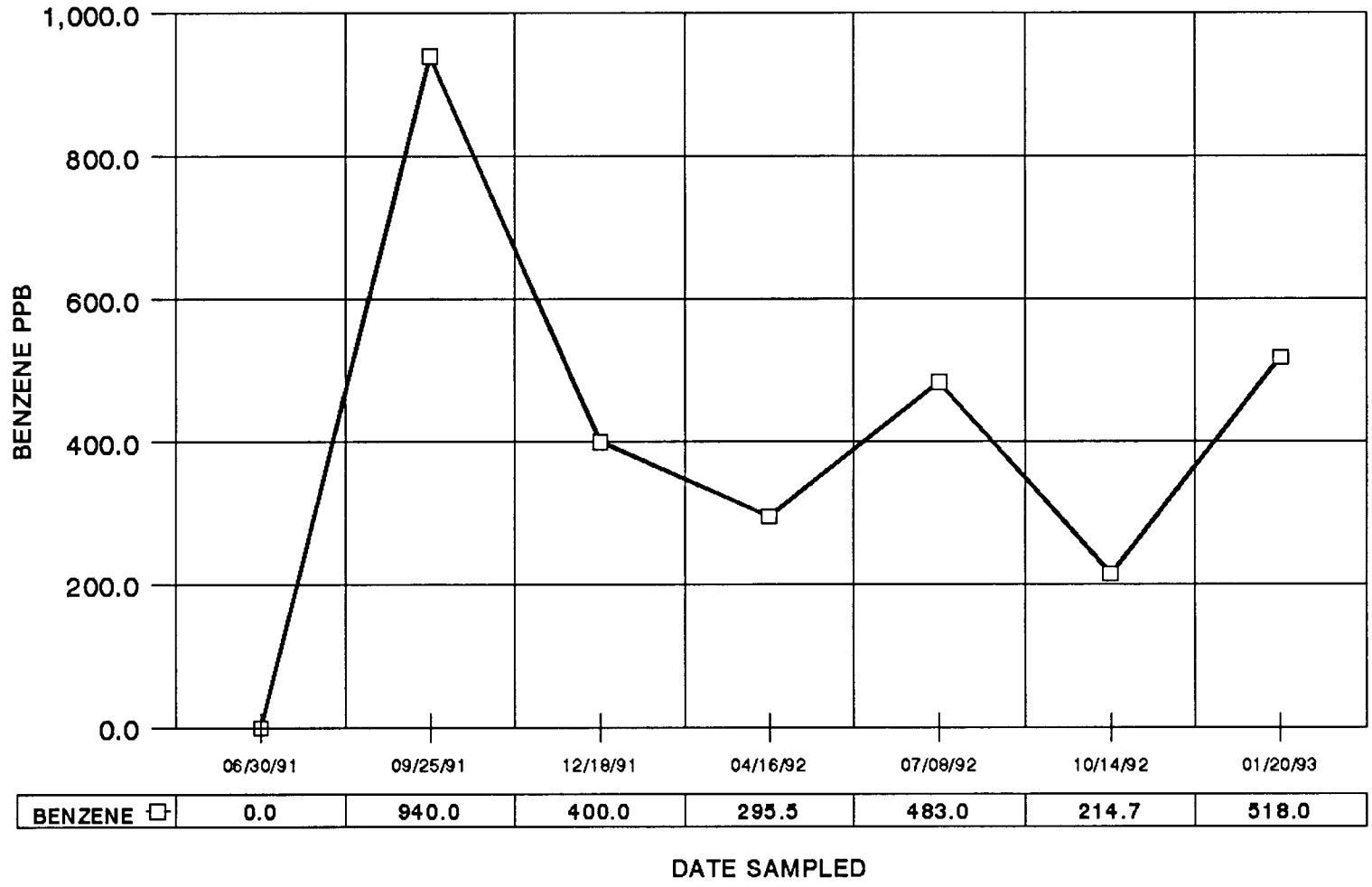


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#55 BH-81



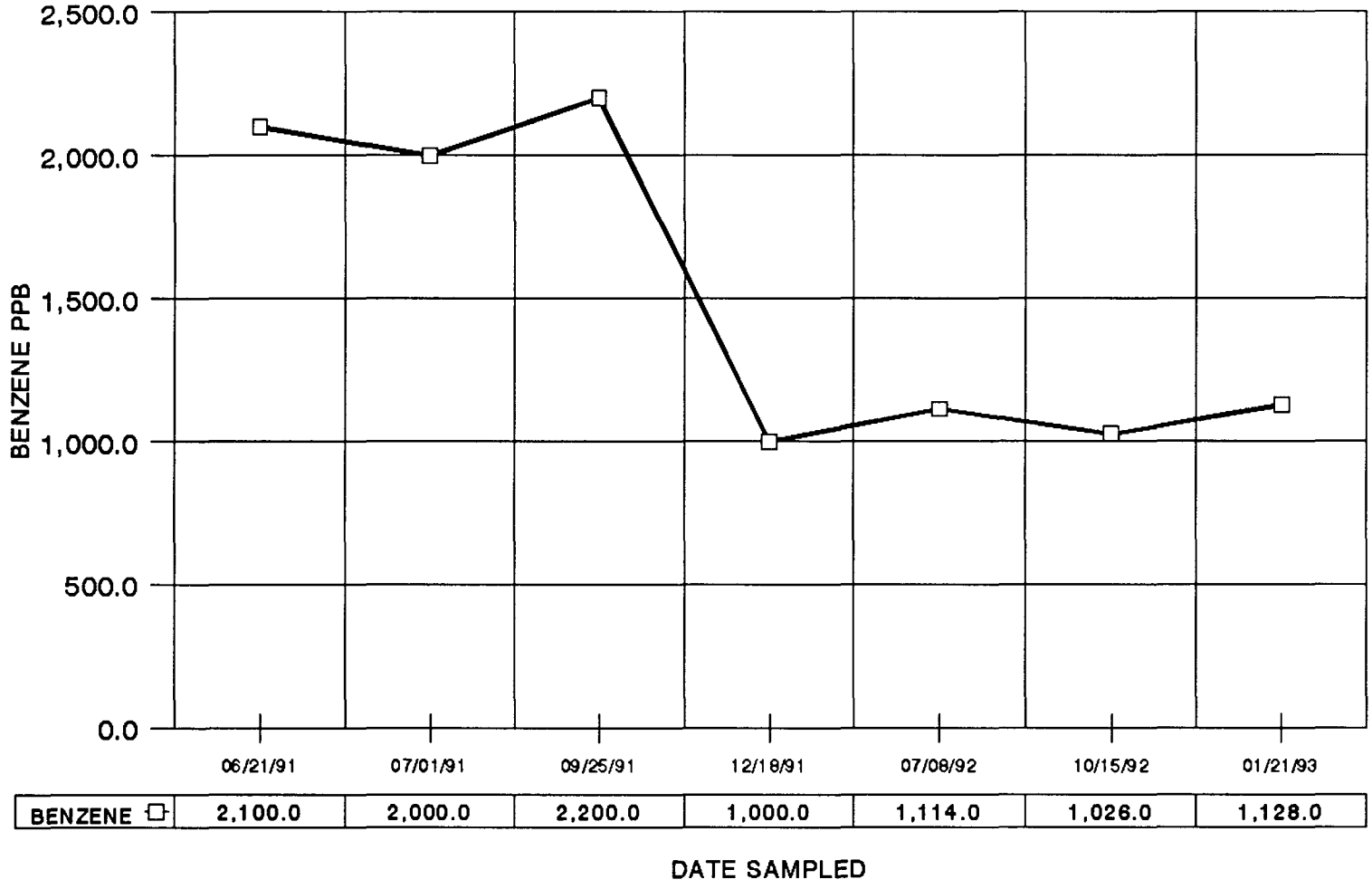
	06/30/91	09/25/91	12/18/91	04/16/92	07/08/92	10/14/92	01/20/93
BENZENE	0.0	940.0	400.0	295.5	483.0	214.7	518.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#56 BH-82

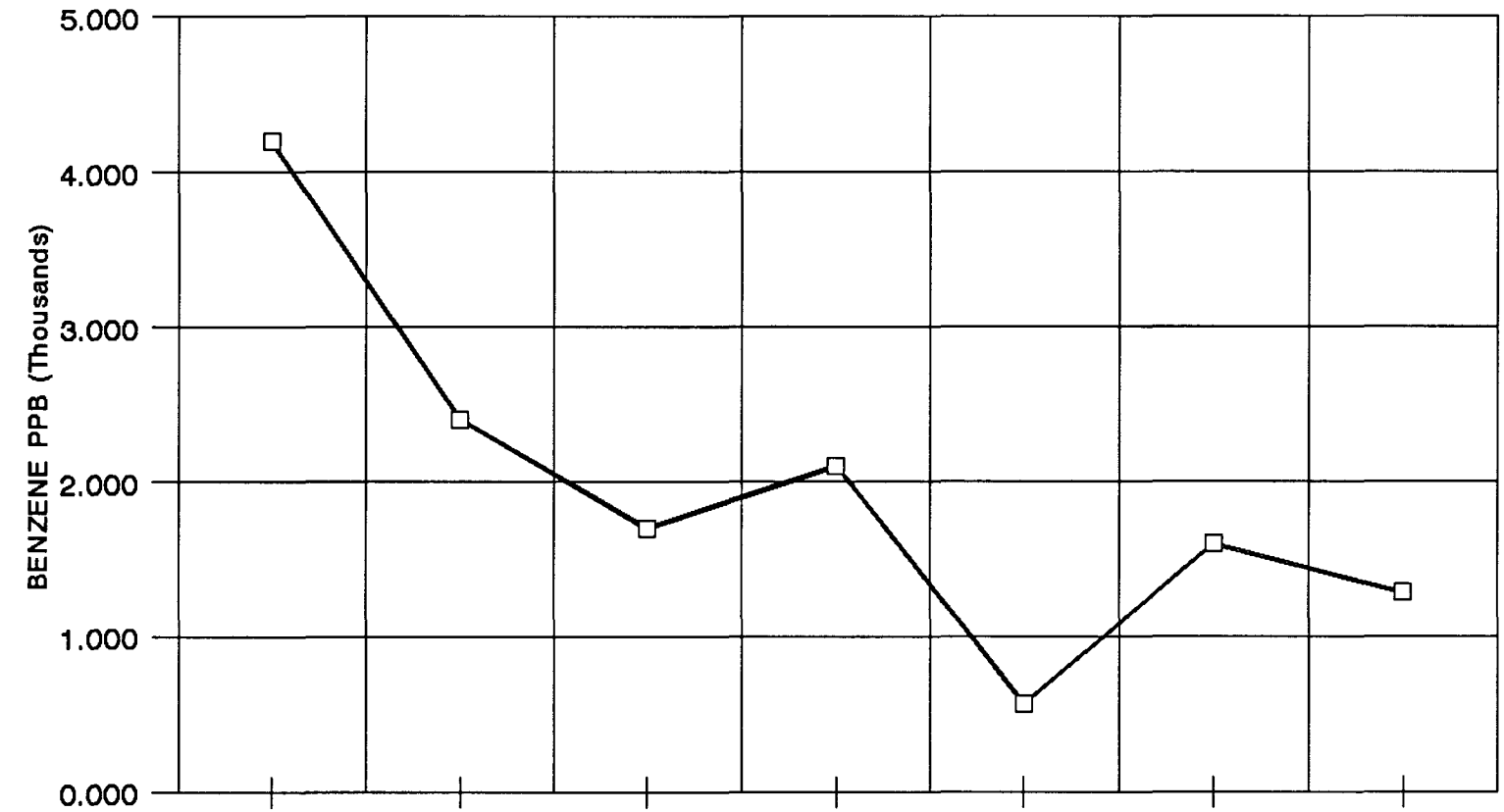


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#69 BH-95



	09/11/91	09/19/91	09/25/91	12/18/91	07/08/92	10/14/92	01/20/93
BENZENE	4.200	2.400	1.700	2.100	0.568	1.598	1.284

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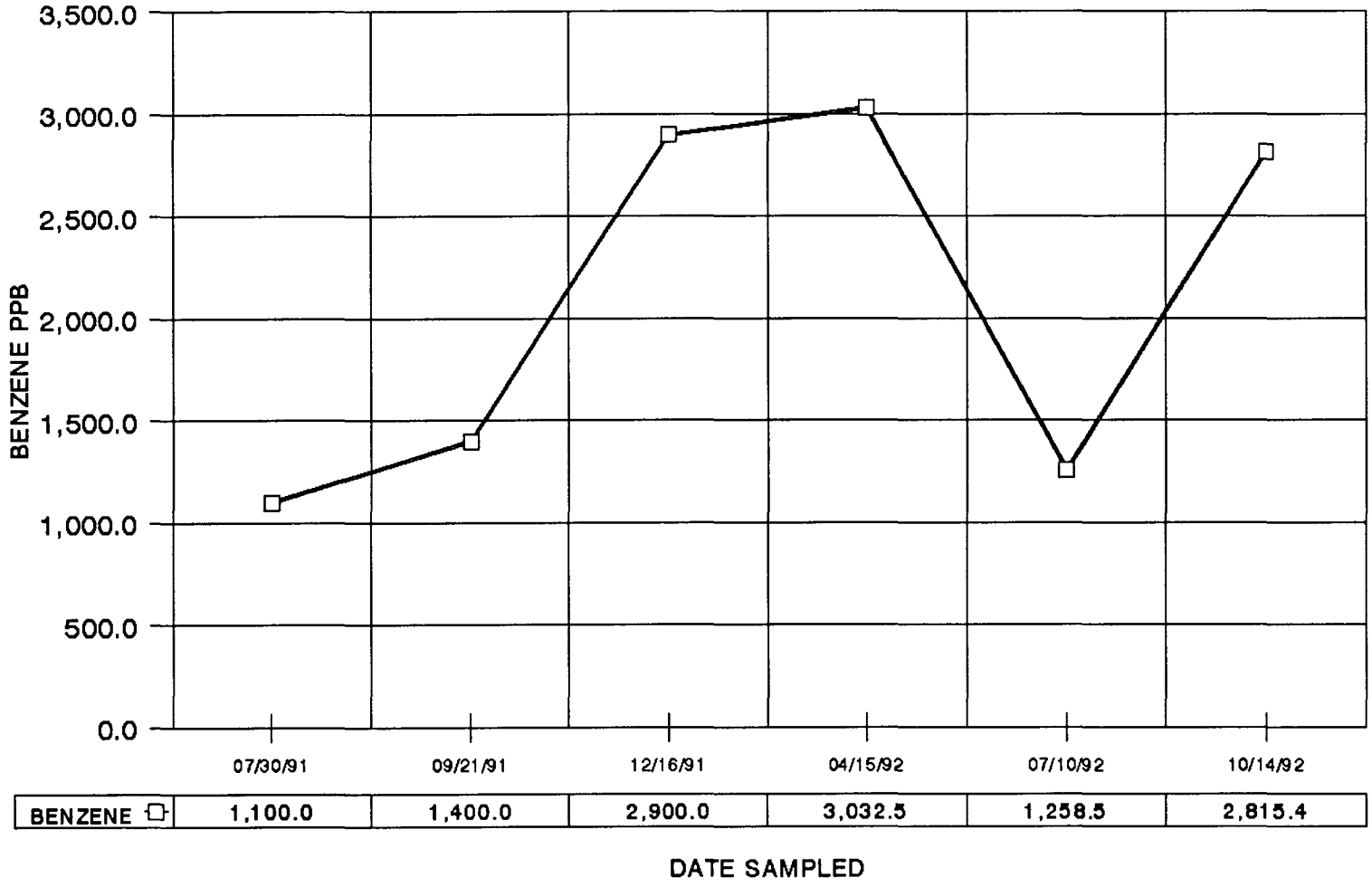
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

SUMP 11A



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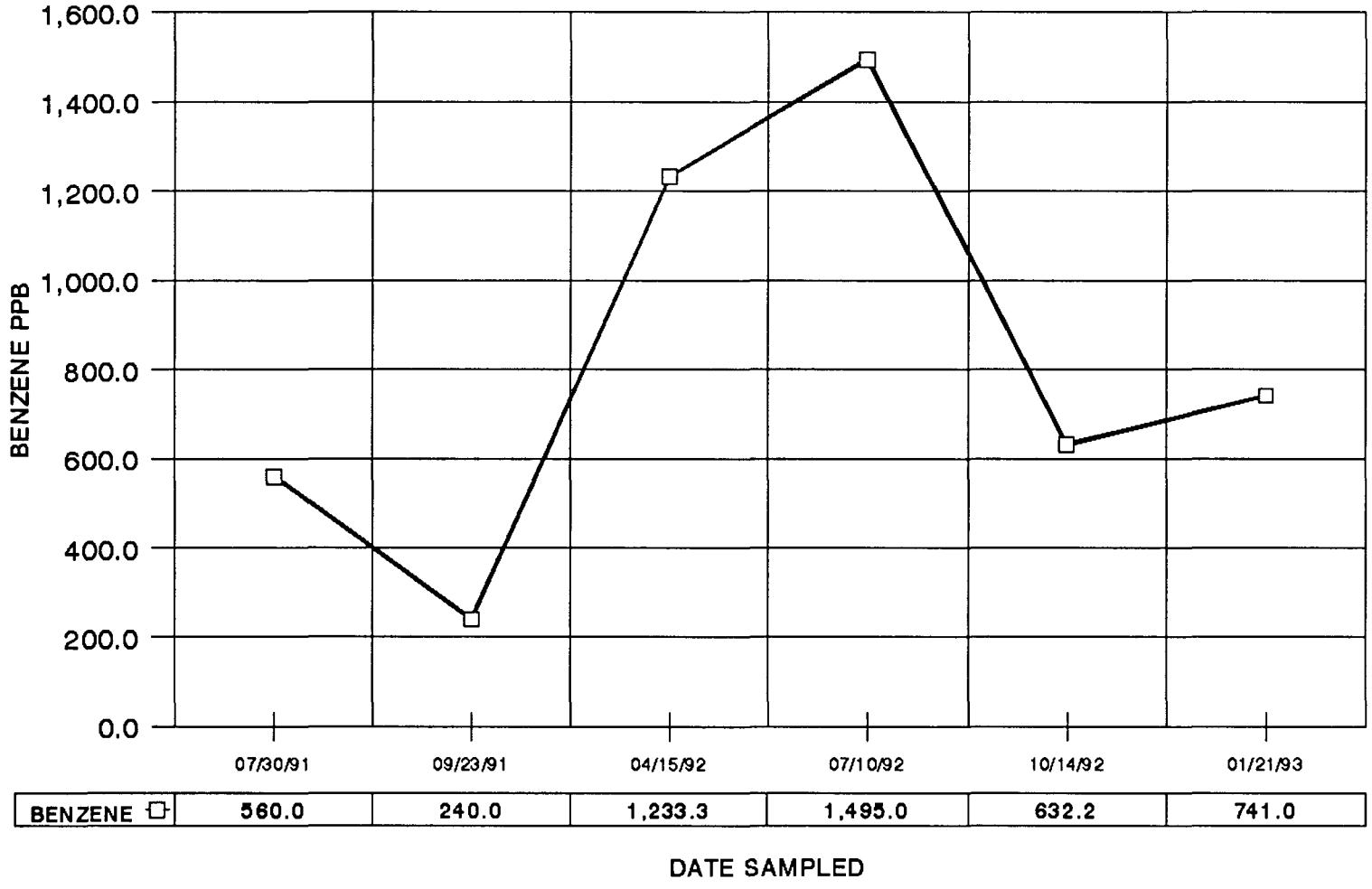
INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

SUMP 16A



	07/30/91	09/23/91	04/15/92	07/10/92	10/14/92	01/21/93
BENZENE	560.0	240.0	1,233.3	1,495.0	632.2	741.0

BY R.M. GRAY

APPENDIX E

RANCHER WATER WELLS, PLANT WATER WELLS AND SPRINGS ANALYSES

INDIAN BASIN TREATMENT PROJECT

RANCHER WATER WELL SAMPLE RESULTS
FIRST QUARTER 1993

LOCATION	JANUARY	FEBRUARY	MARCH	MARCH RESAMPLE
LYMAN WATER WELL				
BENZENE	ND	ND	ND	ND
TOLUENE	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND
XYLENE	ND	ND	ND	ND
CHLORIDE	13.2	13.1	12.5	12.7
UPPER INDIAN HILLS SPRING WEST				
BENZENE	ND	ND	ND	ND
TOLUENE	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND
XYLENE	ND	ND	ND	ND
CHLORIDE	11.4	10.8	11.7	10.7
BIEBELLE WATER WELL				
BENZENE	ND	-	-	-
TOLUENE	ND	-	-	-
ETHYLBENZENE	ND	-	-	-
XYLENE	ND	-	-	-
CHLORIDE	10.6	-	-	-

BTEX GIVEN IN PPB
CHLORIDE GIVEN IN PPM
ND - BELOW DETECTION LIMIT

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CORE LABORATORIES

LABORATORY TESTS RESULTS
02/08/93

JOB NUMBER: 930097 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL CO
DATE SAMPLED.....: 01/18/93
TIME SAMPLED.....: 14:05
WORK DESCRIPTION...: #1 Lyman Water Well

LABORATORY I.D...: 930097-0001
DATE RECEIVED....: 01/26/93
TIME RECEIVED....: 10:00
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	13.2	0.5	mg/L	325.2 (1)	02/01/93	KJA
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	01/29/93	MAD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
02/08/93

JOB NUMBER: 930097 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL CO
DATE SAMPLED.....: 01/18/93
TIME SAMPLED.....: 14:28
WORK DESCRIPTION...: #2 Upper Indian Hills Spring West

LABORATORY I.D...: 930097-0002
DATE RECEIVED....: 01/26/93
TIME RECEIVED....: 10:00
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	11.4	0.5	mg/L	325.2 (1)	02/01/93	KJA
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	01/29/93	MAD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
02/08/93

JOB NUMBER: 930097 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL CO
DATE SAMPLED.....: 01/18/93
TIME SAMPLED.....: 14:50
WORK DESCRIPTION...: #4 Bicbelle Water Well

LABORATORY I.D...: 930097-0003
DATE RECEIVED....: 01/26/93
TIME RECEIVED....: 10:00
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	10.6	0.5	mg/L	325.2 (1)	02/01/93	KJA
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	01/29/93	MAD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
03/16/93

JOB NUMBER: 930250 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 02/12/93
TIME SAMPLED.....: 11:44
WORK DESCRIPTION...: LYMAN #1

LABORATORY I.D...: 930250-0003
DATE RECEIVED....: 02/17/93
TIME RECEIVED....: 13:00
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	13.1	0.5	mg/L	325.2 (1)	03/05/93	PJM
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	02/19/93	MAD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
03/16/93

JOB NUMBER: 930250 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 02/12/93
TIME SAMPLED.....: 11:22
WORK DESCRIPTION...: ARROYO #2 Upper Indian Hill Spring West

LABORATORY I.D...: 930250-0004
DATE RECEIVED....: 02/17/93
TIME RECEIVED....: 13:00
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	10.8	0.5	mg/L	325.2 (1)	03/05/93	PJM
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	02/19/93	MAD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
03/16/93

JOB NUMBER: 930250 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 02/12/93
TIME SAMPLED.....: 10:48
WORK DESCRIPTION...: SW-1 Plant Supply Well

LABORATORY I.D...: 930250-0002
DATE RECEIVED....: 02/17/93
TIME RECEIVED....: 13:00
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	21	1	mg/L	325.2 (1)	03/05/93	PJM
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	02/19/93	MAD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
03/16/93

JOB NUMBER: 930250 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 02/12/93
TIME SAMPLED.....: 09:56
WORK DESCRIPTION...: SW-2 Plant Backup Well

LABORATORY I.D...: 930250-0001
DATE RECEIVED....: 02/17/93
TIME RECEIVED....: 13:00
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	300	4	mg/L	325.2 (1)	03/05/93	PJM
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	02/19/93	MAD
Benzene	9	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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Aurora, CO 80014
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A Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
04/20/93

JOB NUMBER: 930389 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 03/04/93
TIME SAMPLED.....: 11:03
WORK DESCRIPTION...: #1 Lyman Water Well

LABORATORY I.D...: 930389-0001
DATE RECEIVED....: 03/12/93
TIME RECEIVED....: 13:30
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	12.5	0.5	mg/L	325.2 (1)	03/30/93	KJA
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	03/17/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

AMENDED REPORT

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

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CORE LABORATORIES

LABORATORY TESTS RESULTS
04/20/93

JOB NUMBER: 930389 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 03/04/93
TIME SAMPLED.....: 10:30
WORK DESCRIPTION...: #2 Arroyo - Upper Indian Hills Spring West

LABORATORY I.D...: 930389-0002
DATE RECEIVED....: 03/12/93
TIME RECEIVED....: 13:30
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	11.7	0.5	mg/L	325.2 (1)	03/30/93	KJA
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	03/17/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

AMENDED REPORT

10703 East Bethany Drive
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CORE LABORATORIES

LABORATORY TESTS RESULTS
04/20/93

JOB NUMBER: 930389 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 03/04/93
TIME SAMPLED.....: 08:45
WORK DESCRIPTION...: #7 Plant Supply Well SW-1

LABORATORY I.D...: 930389-0003
DATE RECEIVED....: 03/12/93
TIME RECEIVED....: 13:30
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	18.9	0.5	mg/L	325.2 (1)	03/30/93	KJA
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	03/17/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

AMENDED REPORT

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A Litton Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
04/20/93

JOB NUMBER: 930389 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 03/04/93
TIME SAMPLED.....: 08:00
WORK DESCRIPTION...: #8 Plant Backup Well SW-2

LABORATORY I.D....: 930389-0004
DATE RECEIVED.....: 03/12/93
TIME RECEIVED.....: 13:30
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	364	4	mg/L	325.2 (1)	03/23/93	PJM
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	03/17/93	MLD
Benzene	17	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

AMENDED REPORT

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Aurora, CO 80014
(303) 751-1780

Western Atlas International
A Litton Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
04/30/93

JOB NUMBER: 930580 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL -- INDIAN BASIN
DATE SAMPLED.....: 04/13/93
TIME SAMPLED.....: 07:55
WORK DESCRIPTION...: #1 Lyman Water Well

LABORATORY I.D...: 930580-0001
DATE RECEIVED....: 04/14/93
TIME RECEIVED....: 09:30
REMARKS.....: SAMPLES RECEIVED @ 10C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	12.7	0.5	mg/L	325.2 (1)	04/28/93	VKN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/14/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
04/30/93

JOB NUMBER: 930580 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL -- INDIAN BASIN
DATE SAMPLED.....: 04/13/93
TIME SAMPLED.....: 08:38
WORK DESCRIPTION...: #2 Upper Indian Hills Spring West

LABORATORY I.D...: 930580-0002
DATE RECEIVED....: 04/14/93
TIME RECEIVED....: 09:30
REMARKS.....: SAMPLES RECEIVED @ 10C

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	10.7	0.5	mg/L	325.2 (1)	04/28/93	VKN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/14/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

APPENDIX F

STATE ENGINEER'S WATER PRODUCTION REPORTS

Mid-Continent Region
Production United States

Marathon Oil Company

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

February 5, 1993

Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Attention: Robert R. Marr

Re: Indian Basin Treatment Project

Dear Mr. Marr:

The below list of monitor wells (NW)/boreholes (BH) indicates the meter readings for fluid removed from the Lower Queen as of February 4, 1993.

LOCATION	SERIAL NUMBER	DATE READ	METER READING	WATER REMOVED
MW-58/BH-84	10239118	02/1/93	2332281.0	2332281.0 Gals
MW-59/BH-85	10259114	02/1/93	63278.8	63278.8 Bbls
MW-61A/BH-87A	10239116	02/1/93	2249780.0	2249780.0 Gals
*MW-62/BH-88	10239115	02/1/93	1604342.0	1798272.7 Gals
MW-65A/BH-91A	10239117	02/1/93	3535918.0	3535918.0 Gals
MW-68/BH-94	10239114	02/1/93	2118198.0	2118198.0 Gals
		LOWER QUEEN TOTAL		14,692,159.3 Gals

* The volume of water removed from BH-88 reflects an additional 193,930.7 gallons which was metered prior to the installation of an automatic sampling device on 1/25/92.

Cumulative Lower Queeen fluid removal as of 02/1/93 is 15,013,627.3 Gals. This number reflects the 321,468 gallons removed prior to installation of the present meters in December, 1991.

The below list of monitor wells (MW)/boreholes (BH) indicates the meter readings for fluid removed from shallow wells under permit RA-8015 as of December 11, 1992 when meters and pumps were removed from these wells due to pump freeze potential. The meters and pumps will be reinstalled upon the arrival of warmer weather.

LOCATION	SERIAL NUMBER	DATE READ	METER READING	WATER REMOVED
** MW-13/BH-36	02209213	12/11/92	122623.9	115911.4 Gals.
*** MW-14/BH-37	02209214	12/11/92	323788.1	323977.1 Gals.
****MW-35/BH-59	02209212	12/11/92	98236.2	98303.5 Gals.
		SHALLOW TOTAL		538,192.0 Gals.

** The meter reading on MW-13/BH-36 reflects 6712.5 gallons attributed to MW-1/BH-14 prior to removal and reinstallation on MW-13/BH-36.

*** The meter on MW-14/BH-37 has been repaired. As indicated in the December 1992 monthly statement the December meter reading of 323788.1 was below the November reading of 323965.0. The difference between the two readings is 176.9 gallons while the actual withdrawal was 12.1 gallons. The 12.1 gallons has been added to the total water removed volume.

**** The meter on MW-35/BH-59 has been repaired. As indicated in the August 1992 monthly statement the August meter reading of 37760.9 was below the July reading of 38017.0. The difference between the two readings is 256.1 gallons. This amount has been added to the total water withdrawal volume. The meter reading on MW-35/BH-59 also reflects 188.8 gallons attributed to MW-21/BH-44 prior to meter removal and reinstallation on MW-35/BH-59.

The cumulative shallow fluid removal as of December 11, 1992 is 545,093.3 gals. This number reflects the 6901.3 gallons removed from MW-1/BH-14 and MW-21/BH-44 prior to meter removal.

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

Very truly yours,

Jeffrey S. Lynn
Advanced Environmental Representative

JSL039/nrt

xc: T. C. Lowry - Midland
D. E. Kenyon - PTC, Littleton
R. F. Unger - Midland
R. A. Biernbaum - Midland
C. M. Schweser- IBGP, Artesia

Mid-Continent Region
Production United States

Marathon Oil Company

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

March 2, 1993

Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Attention: Robert R. Marr

Re: Indian Basin Treatment Project

Dear Mr. Marr:

The below list of monitor wells (NW)/boreholes (BH) indicates the meter readings for fluid removed from the Lower Queen as of March 1, 1993.

LOCATION	SERIAL NUMBER	DATE READ	METER READING	WATER REMOVED
MW-58/BH-84	10239118	03/1/93	2477036.0	2477036.0 Gals
MW-59/BH-85	10259114	03/1/93	63278.8	63278.8 Bbls
*MW-61A/BH-87A	10239116	03/1/93	2360111.3	2444383.3 Gals
**MW-62/BH-88	10239115	03/1/93	1693654.0	1887584.7 Gals
MW-65A/BH-91A	10239117	03/1/93	3773108.0	3773108.0 Gals
MW-68/BH-94	10239114	03/1/93	2300625.0	2300625.0 Gals
LOWER QUEEN TOTAL				15,540,446.6 Gals

* The volume of water removed from BH-87A reflects an additioinal 84,272.0 gallons which was metered during an interference test of the aquifer conducted on February 19-24, 1993.

** The volume of water removed from BH-88 reflects an additional 193,930.7 gallons which was metered prior to the installation of an automatic sampling device on 1/25/92.

Cumulative Lower Queeen fluid removal as of 03/1/93 is 15,861,914.6 Gals. This number reflects the 321,468 gallons removed prior to installation of the present meters in December, 1991.

The below list of monitor wells (MW)/boreholes (BH) indicates the meter readings for fluid removed from shallow wells under permit RA-8015 as of March 1, 1993. The meters and pumps for BH-36 amd BH-59 have not been reinstalled to date.

LOCATION	SERIAL NUMBER	DATE READ	METER READING	WATER REMOVED
*** MW-13/BH-36	02209213	12/11/92	122623.9	115911.4 Gals.
****MW-14/BH-37	02209214	03/1/93	342081.1	342270.1 Gals.
*****MW-35/BH-59	02209212	12/11/92	98236.2	98303.5 Gals.
		SHALLOW TOTAL		556,485.0 Gals

*** The meter reading on MW-13/BH-36 reflects 6712.5 gallons attributed to MW-1/BH-14 prior to removal and reinstallation on MW-13/BH-36.

**** The meter on MW-14/BH-37 has been repaired. As indicated in the December 1992 monthly statement the December meter reading of 323788.1 was below the November reading of 323965.0. The difference between the two readings is 176.9 gallons while the actual withdrawal was 12.1 gallons. The 12.1 gallons has been added to the total water removed volume.

***** The meter on MW-35/BH-59 has been repaired. As indicated in the August 1992 monthly statement the August meter reading of 37760.9 was below the July reading of 38017.0. The difference between the two readings is 256.1 gallons. This amount has been added to the total water withdrawal volume. The meter reading on MW-35/BH-59 also reflects 188.8 gallons attributed to MW-21/BH-44 prior to meter removal and reinstallation on MW-35/BH-59.

The cumulative shallow fluid removal as of March 1, 1993 is 563,386.3 Gals. This number reflects the 6901.3 gallons removed from MW-1/BH-14 and MW-21/BH-44 prior to meter removal.

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

Very truly yours,

Jeffrey S. Lynn
Advanced Environmental Representative

JSL039/nrt

xc: T. C. Lowry - Midland
D. E. Kenyon - PTC, Littleton
R. F. Unger - Midland
R. A. Biernbaum - Midland
C. M. Schweser- IBGP, Artesia

Mid-Continent Region
Production United States

Marathon Oil Company

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

April 9, 1993

Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Attention: Robert R. Marr

Re: Indian Basin Treatment Project

Dear Mr. Marr:

The below list of monitor wells (MW)/boreholes (BH) indicates the meter readings for fluid removed from the Lower Queen as of April 5, 1993.

LOCATION	SERIAL NUMBER	DATE READ	METER READING	WATER REMOVED
MW-58/BH-84	10239118	04/05/93	2807712	2,807,712 Gals
MW-59/BH-85	10259114	04/05/93	65618.9	65,618.9 Bbls
*MW-61A/BH-87A	10239116	04/05/93	2593678	2,677,950 Gals
**MW-62/BH-88	10239115	04/05/93	1848971	2,042,902 Gals
MW-65A/BH-91A	10239117	04/05/93	4156070	4,156,070 Gals
***MW-68/BH-94	10239114 02209213	03/24/93 04/05/93	2421888 181568	2,480,838 Gals
		LOWER QUEEN TOTAL		16,921,466 Gals

* The volume of water removed from BH-87A reflects an additional 84,272 gallons which was metered during an interference test of the aquifer conducted on February 19-24, 1993.

** The volume of water removed from BH-88 reflects an additional 193,931 gallons which was metered prior to the installation of an automatic sampling device on 1/25/92.

*** On March 24, 1993 the meter on MW-68/BH-94, was replaced. The final reading on meter serial no. 10239114 was 2,421,888 gallons. The 3/24/93 initial reading of 122,618 gallons on replacement meter serial no. 02209213 reflects 6,713 gallons attributed to MW-1/BH-14 and 115,905 gallons attributed to MW-13/BH-36.

Cumulative Lower Queeen fluid removal as of 04/5/93 is 17,183,984 Gals. This number reflects the 321,468 gallons removed prior to installation of the present meters in December, 1991.

The below list of monitor wells (MW)/boreholes (BH) indicates the meter readings for fluid removed from shallow wells under permit RA-8015 as of April 5, 1993. Meter 02209213, previously installed on MW-13/BH-36, was reinstalled on MW-68/BH-94. Meter 02209212, previously installed on MW-35/BH-59, was reinstalled on MW-13/BH-36.

LOCATION	SERIAL NUMBER	DATE READ	METER READING	WATER REMOVED
**** MW-13/BH-36	02209212	04/05/93	99722.5	117397.7 Gals.
***** MW-14/BH-37	02209214	04/05/93	393202.1	393391.1 Gals.
****** MW-35/BH-59	----	----	----	98303.5 Gals
SHALLOW TOTAL				609,092.3 Gals

**** Meter 02209212 on MW-13/BH-36 reflects 98,236 gallons pumped from other locations prior to reinstallation on BH-36, including 189 gallons attributed to MW-21/BH-44. Refer to the March 1993 statement for further discussion.

***** The volume of water removed from MW-14/BH-37 reflects an additional 189 gallons not included on the meter reading as discussed in the December 1992 monthly statement.

****** The meter and pump are not installed in MW-35/BH-59 at this time. The previous meter, serial no. 02209212, has been moved to MW-13/BH-36.

The cumulative shallow fluid removal as of April 5, 1993 is 615,994.3 Gals. This number reflects the 6,902 gallons removed from MW-1/BH-14 and MW-21/BH-44 prior to meter removal.

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

Very truly yours,

Al Learned

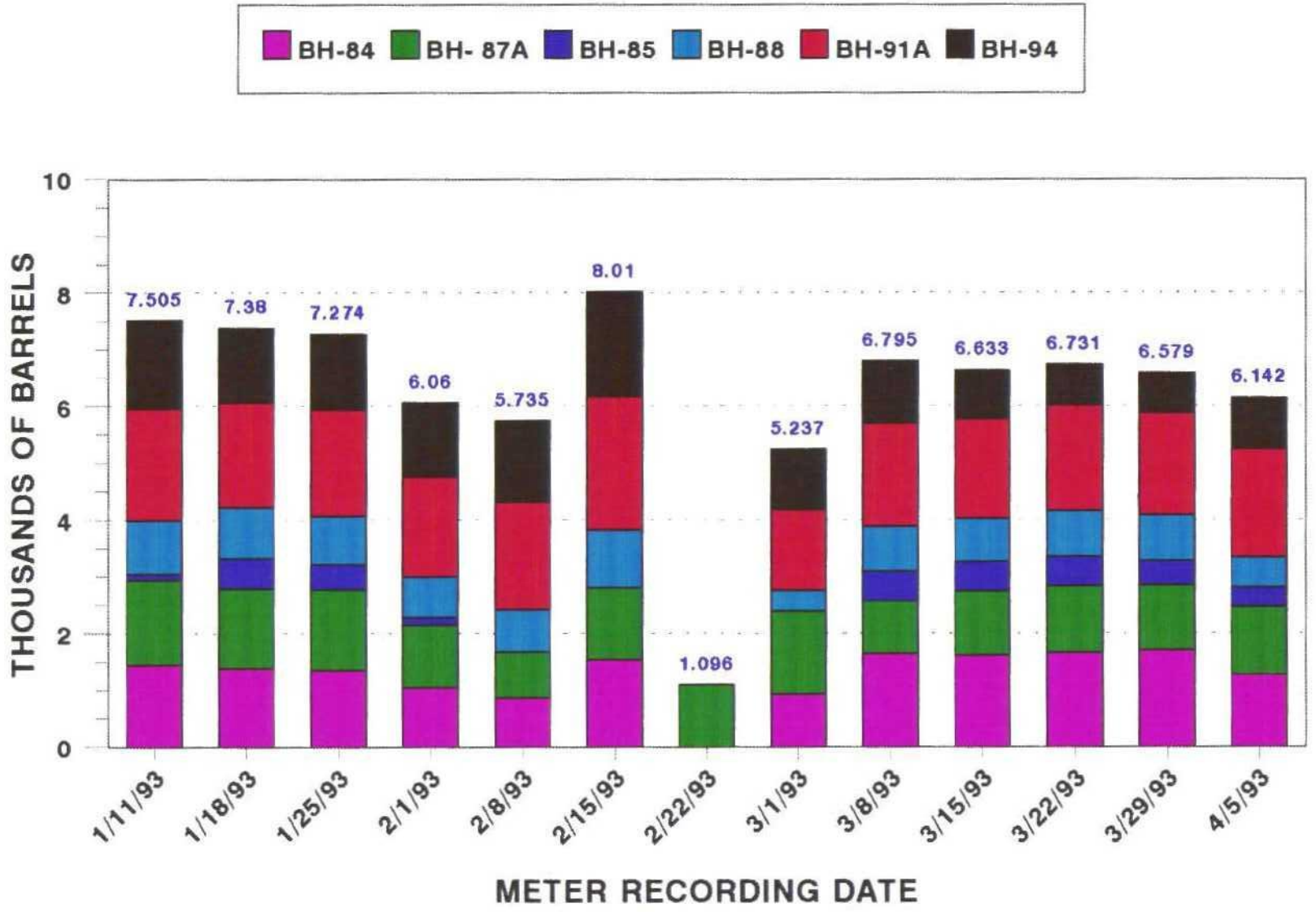
Al Learned

AOL93412/nrt

xc: T. C. Lowry - Midland
D. E. Kenyon - PTC, Littleton
R. F. Unger - Midland
R. A. Biernbaum - Midland
C. M. Schweser- IBGP, Artesia

INDIAN BASIN TREATMENT PROJECT

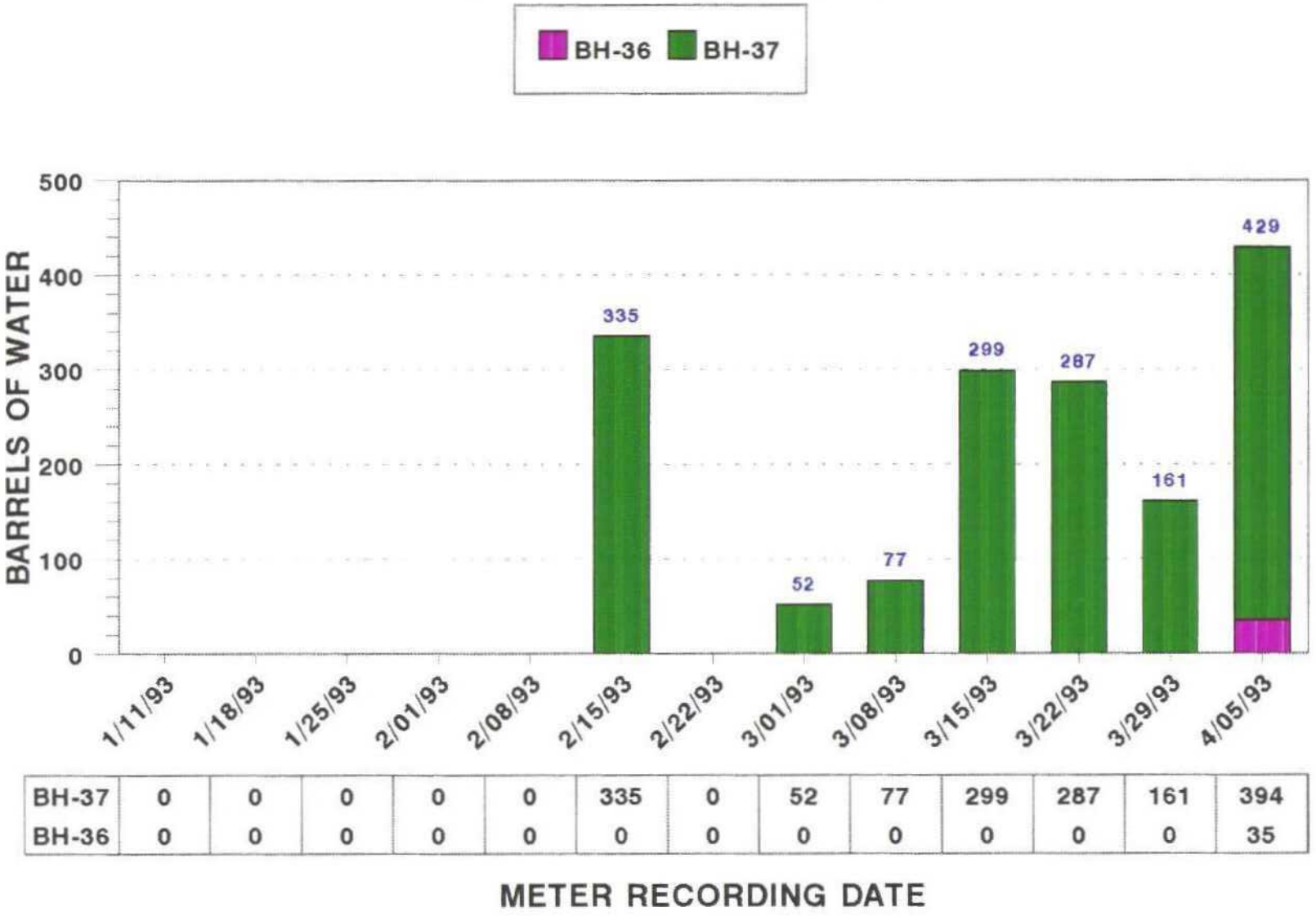
WEEKLY LOWER QUEEN WATER WITHDRAWALS
FIRST QUARTER 1993



LQPROWA2

INDIAN BASIN TREATMENT PROJECT

WEEKLY SHALLOW WATER WITHDRAWALS
FIRST QUARTER 1993



BH-37	0	0	0	0	0	335	0	52	77	299	287	161	394
BH-36	0	0	0	0	0	0	0	0	0	0	0	0	35

SHPROWA2

INDIAN BASIN TREATMENT PROJECT

WEEKLY TOTAL WATER WITHDRAWALS
FIRST QUARTER 1993

SHALLOW TOTAL	0	0	0	0	0	0.335	0	0.052	0.077	0.299	0.287	0.161	0.429
LOWER QUEEN TOTAL	7.505	7.38	7.274	6.06	5.735	8.01	1.096	5.237	6.795	6.633	6.731	6.579	6.143

METER RECORDING DATE

IBPROWAT

APPENDIX G

LOWER QUEEN FLUID LEVEL DATA AND POTENTIOMETRIC MAPS

INDIAN BASIN TREATMENT PROJECT

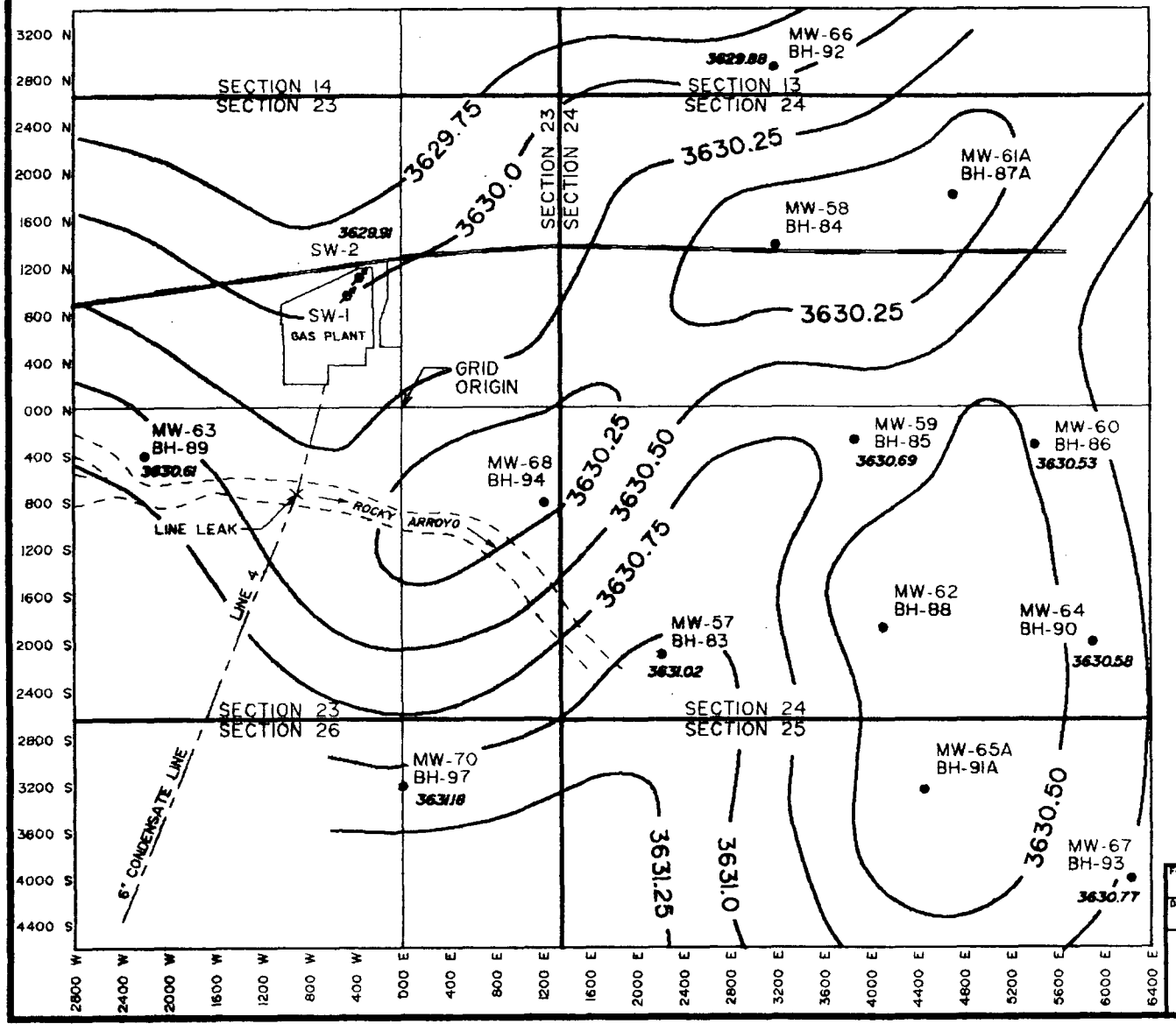
LOWER QUEEN MONTHLY FLUID LEVELS

FIRST QUARTER 1993

WELL NUMBER	CSG. ELEVATION DATUM	DATE JAN.	DEPTH TO WATER	FLUID ELEVATION	DATE FEB.	DEPTH TO WATER	FLUID ELEVATION	DATE MAR.	DEPTH TO WATER	FLUID ELEVATION
BH-83	3787.7	1-18-93	156.68	3631.02	2-12-93	156.79	3630.91	3-4-93	157	3630.7
BH-84*	3824.31				2-18-93	193.94	3630.37			
BH-85*	3819.59	1-5-93	188.9	3630.69	2-12-93	189.18	3630.41	3-1-93	189.2	3630.39
BH-86	3815.28	1-18-93	184.75	3630.53	2-12-93	184.86	3630.42	3-4-93	185.08	3630.2
BH-87A*	3815.97				2-4-93	187	3628.97			
BH-88*	3819.9									
BH-89	3826.16	1-18-93	195.55	3630.61	2-12-93	195.84	3630.32	3-4-93	196.14	3630.02
BH-90	3798.57	1-18-93	167.99	3630.58	2-12-93	168.08	3630.49	3-4-93	168.26	3630.31
BH-91A*	3763.26									
BH-92	3828.98	1-18-93	199.1	3629.88	2-12-93	199.23	3629.75	3-4-93	199.49	3629.49
BH-93	3765.87	1-18-93	135.1	3630.77	2-12-93	135.19	3630.68	3-4-93	135.39	3630.48
BH-94*	3797.83									
BH-97	3822.7	1-18-93	191.52	3631.18	2-12-93	191.67	3631.03	3-4-93	191.9	3630.8
SW-1*	3808.19									
SW-2	3808.79	1-20-93	178.88	3629.91	2-12-93	179.08	3629.71	3-4-93	179.31	3629.48
MONTHLY RAINFALL		1.04 in.			1.2 in.			0.0 in.		

* LOWER QUEEN WITHDRAWAL WELL
ALL MEASUREMENTS IN FEET

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

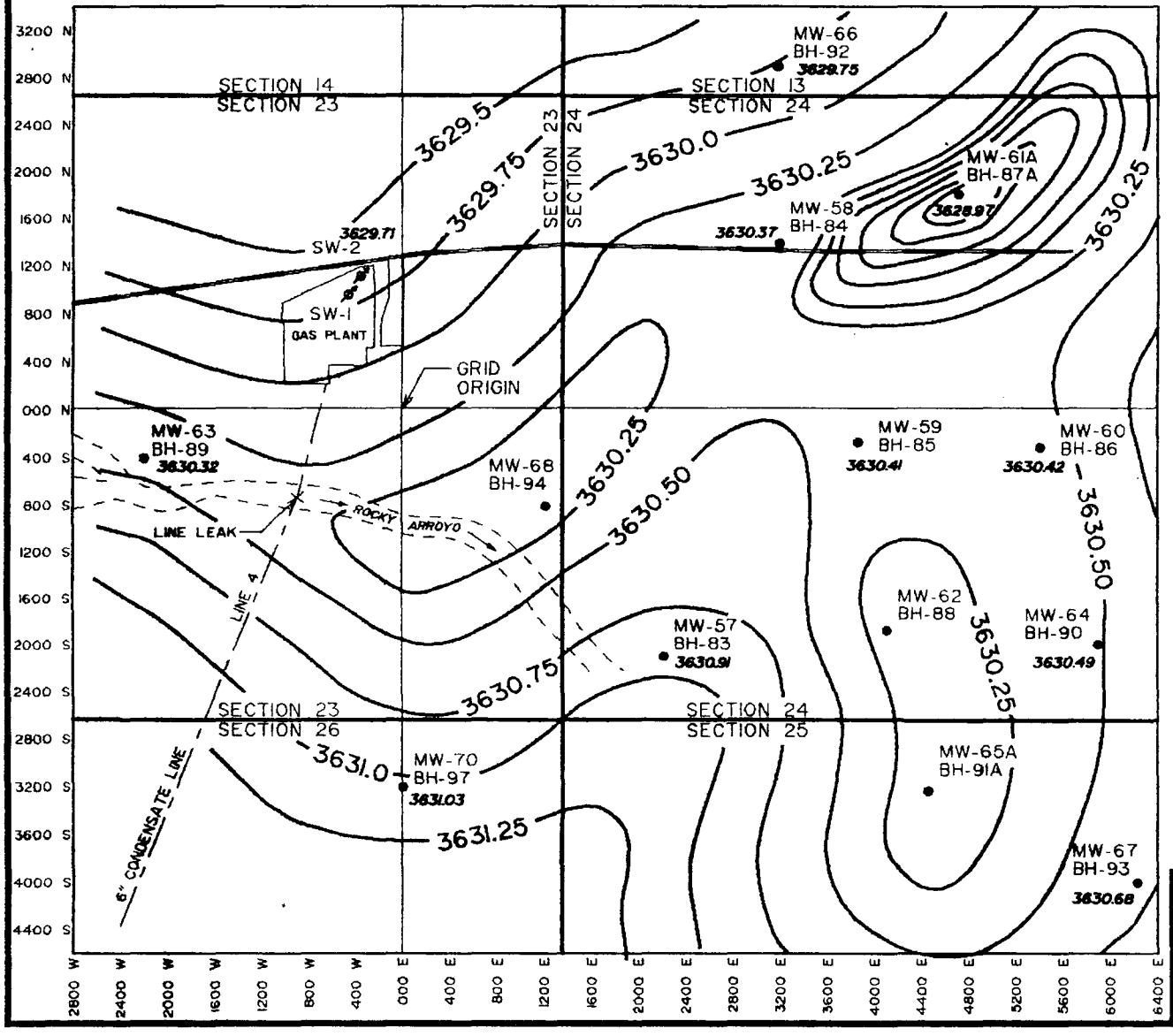
SW-1 — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

C.I.: 0.25'

IBGASPLT2.STY OP

Figure Title:	MARATHON OIL COMPANY
Document Title:	Location: INDIAN BASIN GAS PLANT
JANUARY 1993 LOWER QUEEN POTENTIOMETRIC SURFACE	DATE: 2/93 PREPARED BY: SCALE: CHECKED BY: PROJECT NO: DRAFTED BY: FIGURE NO:

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

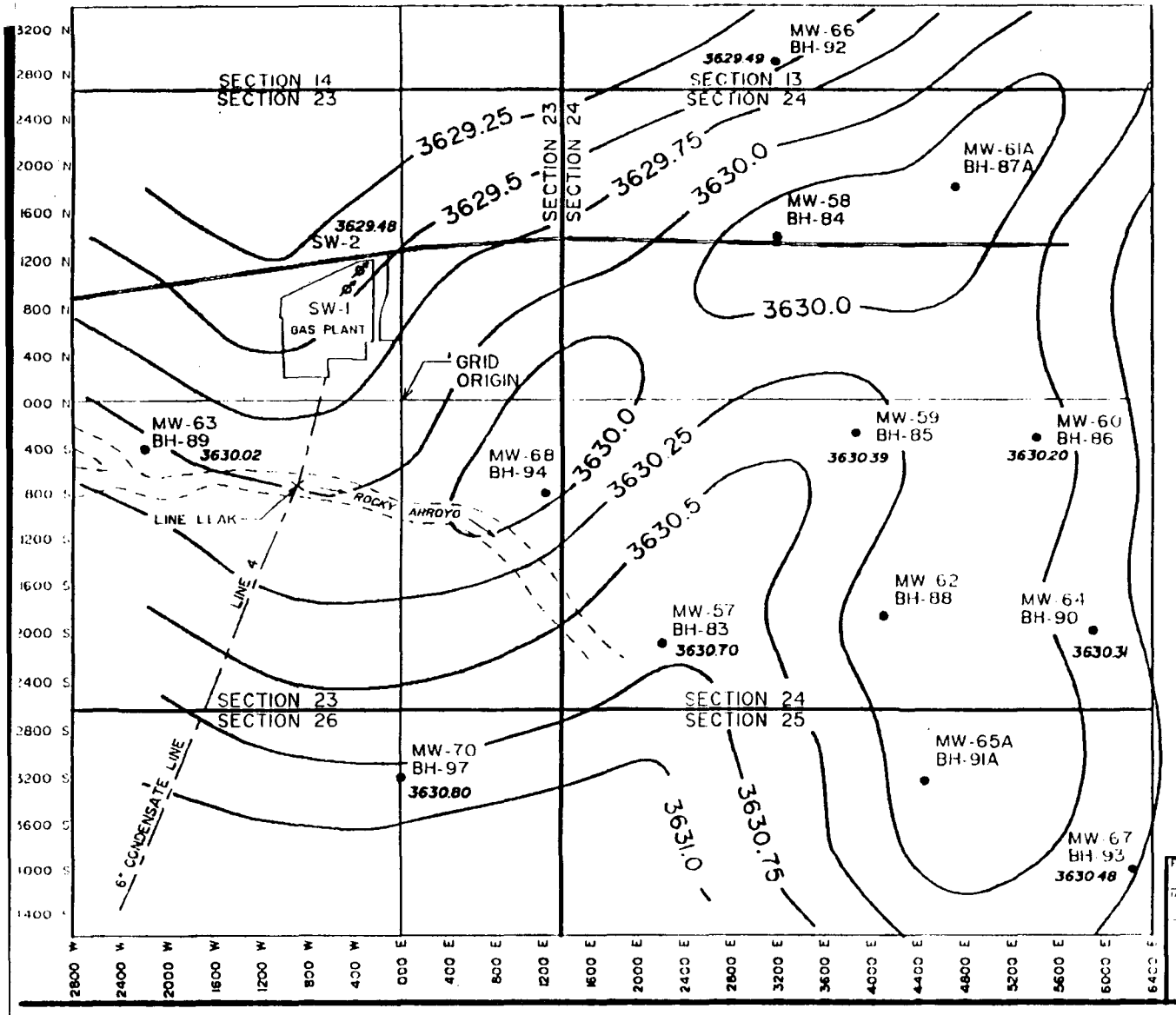
SW-1 — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

C.I.: 0.25'

18GASPLT2.STY OPE

Figure Title:	MARATHON OIL COMPANY
Document Title:	Location: INDIAN BASIN GAS PLANT
FEBRUARY 1993 LOWER QUEEN POTENTIOMETRIC SURFACE	DATE: 2/93 PREPARED BY: SCALE: CHECKED BY: PROJECT NO. DRAFTED BY: FIGURE NO.

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

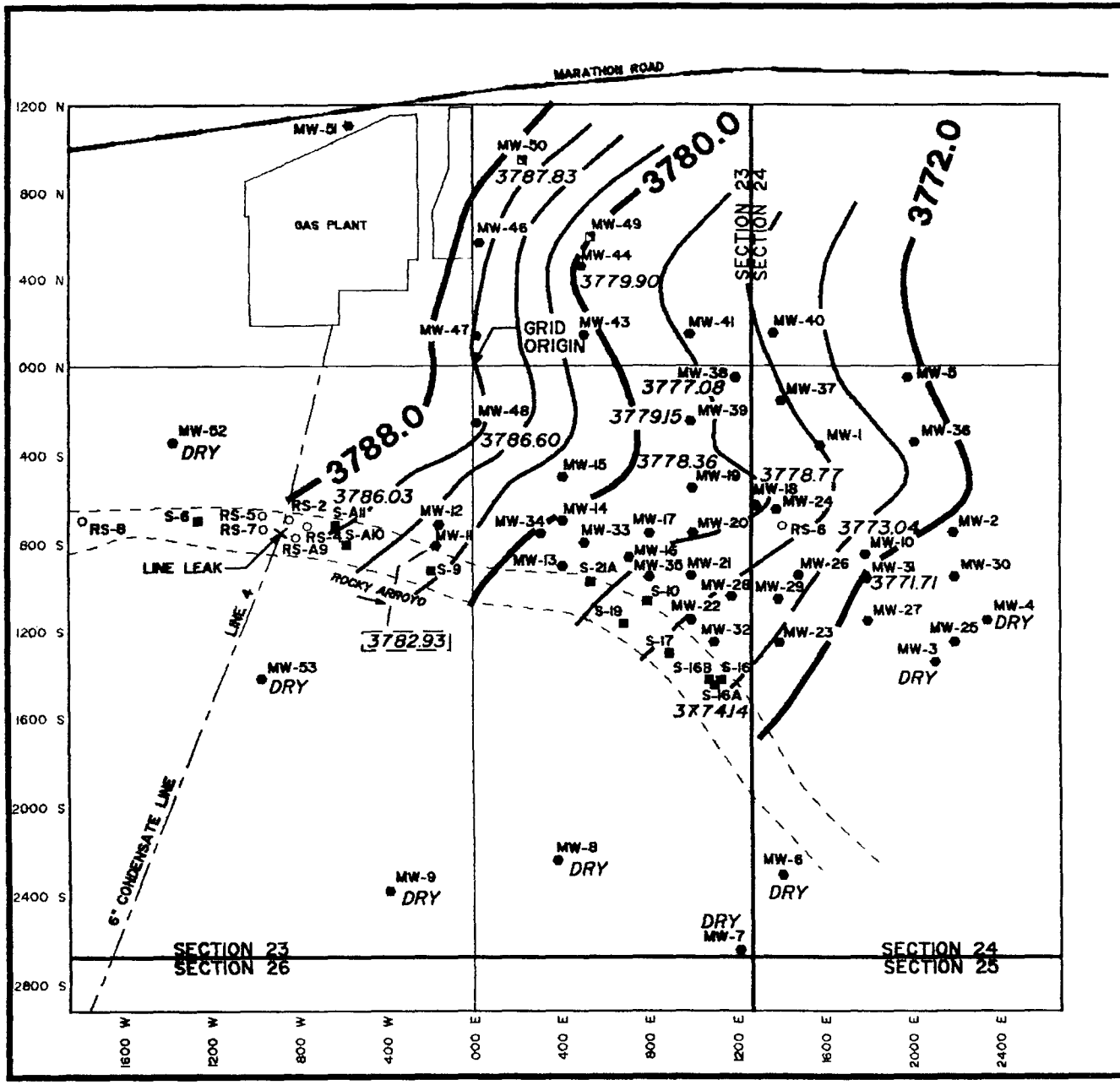
SW-1 — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

Figure Title:	MARATHON OIL COMPANY
Document Title:	Location: INDIAN BASIN GAS PLANT
MARCH 1993 LOWER QUEEN POTENTIOMETRIC SURFACE	DATE: 3/93 PREPARED BY:
	SCALE: CHECKED BY:
	PROJECT NO. DRAFTED BY: FIGURE NO.

APPENDIX H

SHALLOW SOIL WATER POTENTIOMETRIC MAP

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. 2.0'

BGASPLT.STY OPE

Figure Title:	MARARTHON OIL COMPANY
Document Title:	Location: INDIAN BASIN GAS PLANT
JANUARY 1993 SHALLOW GROUND WATER POTENTIOMETRIC MAP	DATE: 4/93 · SCALE: · PROJECT NO: · PREPARED BY: · CHECKED BY: · DRAFTED BY: · FIGURE NO:

INDIAN BASIN GAS PLANT TREATMENT PROJECT QUARTERLY REPORT

SECOND QUARTER 1993

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

August 11, 1993

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INTRODUCTION

This report summarizes groundwater and unsaturated zone treatment activities conducted during the Second 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 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 and brine spill from a production pipeline discovered in April 1991 near the Indian Basin Gas Plant.

QUARTERLY REPORT SUMMARY

The overall remediation system is fully operational and functioning as set forth in the Treatment Project Plan document. Fluid recovery from the Lower Queen aquifer is continuing with volatile hydrocarbon compounds being removed by air stripping. Shallow zone fluid recovery continues with recovery volumes commingled with pumped Lower Queen fluids. Water discharged from the air stripper continues to be utilized by the plant for process water. The vapor extraction operation continues and is currently removing volatile hydrocarbons from the shallow alluvium. Water analyses from rancher wells and nearby surface springs have not exceeded any State or Federal drinking water standards for benzene, toluene, ethylbenzene, total xylene or chloride. Local ranchers are kept informed of treatment project activities via a quarterly letter.

GROUNDWATER ELEVATION

Lower Queen

Depth-to-water measurements were acquired from nonpumping, Lower Queen aquifer monitoring wells in April, May, and June 1993. Table 1 in part presents groundwater elevations calculated from casing elevation data and depth-to-water measurements obtained from eight (May and June 1993) or nine (April 1993) Lower Queen wells. Figures 1, 2, and 3 are potentiometric maps of the Lower Queen aquifer based on gauging conducted in April, May, and June, respectively. The Lower Queen data indicate decreasing groundwater elevations in monitoring wells during the quarter.

Shallow Zone

A potentiometric map was constructed using depth-to-water measurements collected from shallow monitoring wells in April 1993 during the quarterly sampling event (Figure 4). Table 1 shows the depth-to-water measurements and calculated groundwater elevations for shallow zone wells.

Groundwater Recharge

Daily rainfall is gauged at the gas plant. Monthly rainfall for April, May, and June was 0.52, 0.60, and 0.67 inches, respectively (Table 1). Cumulative rainfall for the Second Quarter was 1.79 inches.

QUARTERLY SAMPLING LABORATORY RESULTS

Gauging, purging, and sampling of 24 monitoring wells were conducted on April 13 through 15, 1993. All 15 Lower Queen wells including the plant water supply well (SW-1) and backup well (SW-2) were sampled. Seven of these Lower Queen wells have downhole pumps installed and were sampled through the pump. Ten of the fifty-nine Shallow zone wells and one of several sumps completed in the shallow fluvial deposits were sampled in April. Of these, five of the original twenty-three shallow zone monitoring wells and one (Sump 16A) of the two sumps designated for quarterly sampling in the Treatment Project Plan were sampled. The remaining 18 wells were either dry (14), contain free product (MW-11, MW-56, MW-69, Sump A10), or inaccesible (MW-13; pumping well). Five Shallow zone wells other than those designated in the Treatment Project Plan were sampled (MW-16, MW-17, MW-21, MW-26, and MW-39). Samples were collected by Southwestern Laboratories in Midland, Texas using Environmental Protection Agency (EPA) sampling protocol. A table was prepared by Southwestern Laboratories 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 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 during the quarterly monitoring episode. 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 duplicate BTEX analysis using EPA Method 8020 purge and trap gas chromatography of four select samples. This practice will enable a quality assurance comparison of the HPLC analytical technique. Core Laboratories also conducted four duplicate chloride analyses using EPA Method 325.2. Three shallow wells (MW-17, MW-50, MW-68) and one Lower Queen well (MW-63) were analyzed for BTEX concentrations using both the HPLC and EPA 8020 methods. Figure 5 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 wells 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 of one nearby rancher well (Lyman) and surface water from one natural spring in Rocky Arroyo (Upper Indian Hills Spring West; Hendrickson and Jones, 1952) were collected on April 15, May 12, and June 28, 1993. In addition, another rancher well which is sampled quarterly (Biebelle), was sampled on April 15, 1993. Analytical results from these samples show that groundwater and spring water do not exceed the EPA drinking water standards for chloride, benzene, toluene, ethylbenzene, and total xylenes.

Table 4 provides a summary of the monthly analyses performed on the natural spring in Rocky Arroyo and the Lyman well which is the closest downgradient well to the remediation site. The quarterly analysis for the Biebelle well, the second closest downgradient well, is also reported. The rancher well and the natural spring samples were obtained using EPA sampling and handling procedures. Core Laboratories 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.

The plant water supply well and backup well are also sampled and analyzed monthly. Laboratory reports for all the rancher wells, natural spring, and plant wells are included in Appendix D.

GROUNDWATER PUMPING

Lower Queen

Fluid recovery from the Lower Queen aquifer and shallow saturated 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 1993 are attached in Appendix E. Figures 6, 7 and 8 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.

Six Lower Queen wells (MW-58 (BH-84), MW-59 (BH-85), MW-61A (BH-87A), MW-62 (BH-88), MW-65A (BH-91A), and MW-68 (BH-94) were intermittently pumped for plume control during the quarter. Monthly fluid recovery for each well is listed in the following table.

LOWER QUEEN FLUID RECOVERY

Well Number	April	May	June	Quarter Total (Bbls)
MW-58 (BH-84)	6,042	5,112	4,401	15,555
MW-59 (BH-85)	1,990	3,677	3,653	9,320
MW-61A (BH-87A)	5,735	4,027	4,977	14,739
MW-62 (BH-88)	1,967	3,114	2,806	7,887
MW-65A (BH-91A)	7,414	8,497	6,634	22,545
MW-68 (BH-94)	4,843	5,010	4,920	14,773
TOTAL	27,991	29,437	27,391	84,819

Shallow Zone

Shallow zone fluid recovery during the second quarter was from two intermittent pumping wells (MW-13 and MW-14) and two shallow zone sumps completed in the fluvial gravels of Rocky Arroyo (sumps 11A and 16A). Sump A11 was periodically pumped between April 12 and May 4 before pumping was discontinued there and the diesel-fueled, portable pump moved to Sump 16A (Figure 4). Shallow zone fluid recovery from Sump 16A commenced on May 7. Monthly shallow zone fluid recovery volumes for each well and sump are listed in the following table.

Free product recovery from sumps A11 and 16A during the second quarter totaled 4.4 barrels.

SHALLOW ZONE FLUID RECOVERY

Well Number	APRIL Cond./Water	MAY Cond./Water	JUNE Cond./Water	Quarter Total (Bbls) Cond./Water
MW-13 (BH-36)	228*	116.2*	56.6*	400.8*
MW-14 (BH-37)	121*	NP	NP	121*
Sump A11	0.6/0.7	0.1/0.2	NP	0.7/0.9
Sump 16A	NA	3.4/2.8	0.3/0	3.7/2.8
TOTAL (Bbls)	0.6/349.7	3.5/119.2	0.3/56.6	4.4/525.5

* Total fluid volume because condensate and produced groundwater are not separated at the well. NP = Not Pumped during this period.

GROUNDWATER TREATMENT

Commingled fluids pumped from the six Lower Queen and two shallow zone recovery wells were pumped through piping to a treatment compound that includes an oil/water separator, air stripper, and three 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 weekly basis. The measured volume of free condensate recovered from the commingled groundwater during the second quarter was 2.1 barrels. Cumulative condensate separated from the recovered groundwater since product separation began in April 1992 is 45.2 barrels.

Groundwater from the separator is pumped through the air stripper to remove dissolved-phase 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 second quarter was 6.5 barrels. Cumulative free product recovered to date excluding the volume volatilized by the air stripper and vapor extraction system is 3,340.5 barrels.

VAPOR EXTRACTION SYSTEM

Phase I of the unsaturated zone remediation using vapor extraction technology was completed in March 1993. The Phase I program vented from shallow zone wells MW-16 (BH-39), MW-17 (BH-40), and MW-21 (BH-44).

The mobile soil vapor extraction system was relocated in March 1993 to prepare for venting of shallow zone monitoring well MW-56 (BH-82). Vent well MW-56 is completed within the shallow bedrock (Upper Queen) approximately 2000 feet east of the Phase I extraction wells (Figure 4). Necessary generator repairs delayed initiation of venting until April 8, 1993. Venting was continuous from this start date to the end of the quarter. Organic vapor concentrations of the extracted air effluent measured with a Foxboro Model 108 flame ionization detector (FID) on May 20 and 26, 1993 from MW-56 indicated a concentration greater than 10,000 ppm calibrated to methane.

OTHER ACTIVITIES

A right-of-way amendment application was submitted to the BLM on June 17, 1993 for the proposed downgradient Lower Queen monitoring well MW-71. In addition, the amendment includes the right-of-way for an additional Lower Queen recovery well (MW-72) that may be

drilled between MW-58 (BH-84) and MW-59 (BH-85) (Figure 3). Right-of-way amendment approval was gained on July 9, 1993.

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
INDIAN BASIN REMEDIATION PROJECT
MONTHLY GROUNDWATER ELEVATIONS
SECOND QUARTER 1993

	WELL NUMBER	TOP OF CASING ELEV. (FT AMSL)	Apr-93 DEPTH TO WATER (FT)	Apr-93 GROUND-WATER ELEV.	May-93 DEPTH TO WATER (FT)	May-93 GROUND-WATER ELEV.	Jun-93 DEPTH TO WATER (FT)	Jun-93 GROUND-WATER ELEV.
LOWER QUEEN WELLS	MW-57 (BH-83)	3787.70	156.95	3630.75	157.23	3630.47	157.13	3630.57
	MW-58 (BH-84)*	3824.31						
	MW-59 (BH-85)*	3819.59	189.38	3630.21				
	MW-60 (BH-86)	3815.28	185.02	3630.26	185.29	3629.99	185.23	3630.05
	MW-61A (BH-87A)*	3815.97						
	MW-62 (BH-88)*	3819.90						
	MW-63 (BH-89)	3826.16	195.99	3630.17	196.34	3629.82	196.43	3629.73
	MW-64 (BH-90)	3798.57	168.22	3630.35	168.52	3630.05	168.46	3630.11
	MW-65A (BH-91A)*	3763.26						
	MW-66 (BH-92)	3828.98	199.38	3629.60	199.63	3629.35	199.59	3629.39
	MW-67 (BH-93)	3765.87	135.37	3630.50	135.63	3630.24	135.58	3630.29
	MW-68 (BH-94)*	3797.83						
	MW-70 (BH-97)	3822.57	191.80	3630.77	192.09	3630.48	192.18	3630.39
	SW-1* (SUPPLY)	3808.19						
	SW-2 (BACKUP)	3808.79	179.04	3629.75	179.22	3629.57	179.39	3629.40
SHALLOW ZONE WELLS	MW-4 (BH-26)	3785.88	18.57	3767.31	Not Gauged		Not Gauged	
	MW-10 (BH-33)	3790.78	18.31	3772.47	Not Gauged		Not Gauged	
	MW-11 (BH-34)	3806.96	24.38	3782.58	Not Gauged		Not Gauged	
	MW-16 (BH-39)	3801.04	22.32	3778.72	Not Gauged		Not Gauged	
	MW-17 (BH-40)	3799.55	18.68	3780.87	Not Gauged		Not Gauged	
	MW-18 (BH-41)	3795.82	17.13	3778.69	Not Gauged		Not Gauged	
	MW-19 (BH-42)	3797.21	18.93	3778.28	Not Gauged		Not Gauged	
	MW-21 (BH-44)	3798.21	22.63	3775.58	Not Gauged		Not Gauged	
	MW-22 (BH-45)	3799.20	17.29	3781.91	Not Gauged		Not Gauged	
	MW-26 (BH-49)	3793.01	20.72	3772.29	Not Gauged		Not Gauged	
	MW-31 (BH-55)	3791.15	19.64	3771.51	Not Gauged		Not Gauged	
	MW-38 (BH-61)	3797.32	20.42	3776.90	Not Gauged		Not Gauged	
	MW-39 (BH-62)	3796.20	22.32	3773.88	Not Gauged		Not Gauged	
	MW-40 (BH-63)	3803.12	18.68	3784.44	Not Gauged		Not Gauged	
	MW-44 (BH-67)	3804.14	21.48	3782.66	Not Gauged		Not Gauged	
	MW-50 (BH-73)	3813.35	26.16	3787.19	Not Gauged		Not Gauged	
	MW-54 (BH-80)	3823.86	46.11	3777.75	Not Gauged		Not Gauged	
	MW-55 (BH-81)	3794.40	28.70	3765.70	Not Gauged		Not Gauged	
	MW-69 (BH-95)	3805.11	39.58	3765.53	Not Gauged		Not Gauged	
MONTHLY RAINFALL (INCHES)			0.52		0.60		0.67	

GWELEV2Q.XLS

*Pump present in well

TABLE 2
INDIAN BASIN REMEDIATION PROJECT
HISTORICAL SUMMARY
LOWER QUEEN BENZENE CONCENTRATIONS VS TIME
SECOND 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
MW-57 (BH-83)	1600	350	150	948**	15.1*	21*	8*
MW-58 (BH-84)	40	90	202**	178**	190*	192*	55*
MW-59 (BH-85)	540	420	40.4**	268**	98.8*	26*	10*
MW-60 (BH-86)	33	<1	3.5**	19**	31.7*	138*	17*
MW-61A (BH-87A)	190	10	5.0**	359**	470.1*	585*	2821*
MW-62 (BH-88)	2200	1400	257.5**	357**	212.3*	78*	33*
MW-63 (BH-89)	<1	<1	4.1**	12**	4.3*	12*	7*
MW-64 (BH-90)	150	130	233**	115**	14	15*	5*
MW-65A (BH-91A)	680	150	25.3**	413**	10.6*	3*	4*
MW-66 (BH-92)	<1	<1	3.3**	8**	12.1*	3*	<3*
MW-67 (BH-93)	280	320	4.3*	103**	2.6*	8*	7*
MW-68 (BH-94)	240	1900	1865**	160**	2208.2**	376*	1890*
MW-70 (BH-97)	<1	<1	1.7**	<1	10.7*	<3*	9*
SW-1 (SUPPLY)	<1	<1	5*	17.5*	15.7*	6*	<1
SW-2 (BACKUP)	<1	<1	7.9*	7*	69.4*	47*	4

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

TABLE 3
INDIAN BASIN REMEDIATION PROJECT
HISTORICAL SUMMARY
SHALLOW ZONE BENZENE CONCENTRATIONS VS TIME
SECOND 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
MW-1 (BH-14)	250	200	NS	NS	NS	NS	NS
MW-2 (BH-23)	NS	NS	NS	NS	NS	NS	NS
MW-3 (BH-24)	NS	NS	NS	NS	NS	NS	NS
MW-4 (BH-26)	NS	NS	NS	NS	NS	NS	NS
MW-5 (BH-28)	NS	NS	NS	NS	NS	NS	NS
MW-6 (BH-29)	NS	NS	NS	NS	NS	NS	NS
MW-7 (BH-30)	NS	NS	NS	NS	NS	NS	NS
MW-8 (BH-31)	NS	NS	NS	NS	NS	NS	NS
MW-9 (BH-32)	NS	NS	NS	NS	NS	NS	NS
MW-10 (BH-33)	2300	2300	1780**	1842**	2100	NS	NS
MW-11 (BH-34)	3000	3800	3087**	2199**	2942*	2746*	NS
MW-12 (BH35)	3800	NS	NS	NS	NS	NS	NS
MW-13 (BH-36)	3100	3000	3492**	2708**	NS	NS	NS
MW-14 (BH-37)	5100**	NS	NS	NS	NS	NS	NS
MW-15 (BH-38)	5100	NS	NS	NS	NS	NS	NS
MW-16 (BH-39)	1700	NS	NS	NS	NS	NS	514*
MW-17 (BH-40)	2000	NS	NS	NS	NS	NS	1500
MW-18 (BH-41)	4300	NS	2639**	2700	3300	NS	NS
MW-19 (BH-42)	4700	NS	3195**	3000	3032*	NS	3926*
MW-20 (BH-43)	110	NS	NS	NS	NS	NS	NS
MW-21 (BH-44)	1000	1100	NS	NS	NS	NS	114*
MW-22 (BH-45)	4	NS	NS	NS	NS	NS	NS
MW-23 (BH-46)	NS	NS	NS	NS	NS	NS	NS
MW-24 (BH-47)	3400	NS	NS	4353**	NS	NS	NS
MW-25 (BH-48)	NS	NS	NS	NS	NS	NS	NS
MW-26 (BH-49)	3100	3000	NS	2000	1992*	1708*	861*
MW-27 (BH-50)	NS	NS	NS	NS	NS	NS	NS
MW-28 (BH-52)	2200	NS	NS	NS	NS	NS	NS
MW-29 (BH-53)	NS	NS	NS	NS	NS	NS	NS
MW-30 (BH-54)	NS	NS	NS	NS	NS	NS	NS
MW-31 (BH-55)	<1	NS	NS	332**	9*	NS	NS
MW-32 (BH-56)	200	NS	NS	NS	NS	NS	NS
MW-33 (BH-57)	6300	NS	NS	NS	NS	NS	NS
MW-34 (BH-58)	2500	NS	NS	NS	NS	NS	NS
MW-35 (BH-59)	5700	NS	NS	NS	NS	NS	NS
MW-36 (BH-21)	NS	NS	NS	NS	NS	NS	NS
MW-37 (BH-60)	150	NS	NS	NS	NS	NS	NS
MW-38 (BH-61)	15	15	51**	37*	166**	NS	NS
MW-39 (BH-62)	880	NS	NS	NS	NS	14	29*
MW-40 (BH-63)	NS	NS	NS	NS	NS	NS	NS
MW-41 (BH-64)	200	170	NS	NS	NS	NS	NS
MW-42 (BH-65)	<1	<1	NS	NS	NS	NS	NS
MW-43 (BH-66)	320	NS	NS	NS	NS	NS	NS
MW-44 (BH-67)	59	NS	10**	97**	12	14	7*
MW-45 (BH-68)	<1	<1	NS	NS	NS	NS	NS
MW-46 (BH-69)	140	25	NS	NS	NS	NS	NS
MW-47 (BH-70)	2600	2200	NS	NS	NS	NS	NS
MW-48 (BH-71)	<1	<1	NS	47**	NS	NS	NS
MW-49 (BH-72)	35	NS	NS	NS	NS	NS	NS
MW-50 (BH-73)	<1	<1	4**	4**	8*	8*	<1
MW-51 (BH-74)	800	<1	NS	NS	NS	NS	NS
MW-52 (BH-75)	<1	NS	NS	5**	NS	NS	NS
MW-53 (BH-77)	<1	NS	NS	NS	NS	NS	NS
MW-54 (BH-80)	<1	<1	9**	8**	62*	14*	10*
MW-55 (BH-81)	940	400	296**	483**	215*	390	412*
MW-56 (BH-82)	2200	1000	NS	1114**	1026*	1128*	NS
MW-61 (BH-87)	<1	NS	NS	NS	NS	NS	NS
MW-65 (BH-91)	<1	NS	NS	NS	NS	NS	NS
MW-69 (BH-95)	2400	2100	NS	568*	1598*	1284*	NS
SUMP A-11	1400	2900	3033**	1258**	2815*	NS	NS
SUMP A-16	240	2000	1233**	1495**	632*	741**	707*
U. Indian Hills Spring W.	<1	<1	<1	<1	<1	<1	<1

* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.
NS = Not Sampled.
FP = Free Product

TABLE 4

INDIAN BASIN REMEDIATION PROJECT

RANCHER WELL AND SPRING WATER SAMPLE RESULTS

SECOND QUARTER 1993

	1993														
	APRIL					MAY					JUNE				
WELL/ SPRING	Benzene	Toluene	Ethylbenzene	Xylenes	Chloride	Benzene	Toluene	Ethylbenzene	Xylenes	Chloride	Benzene	Toluene	Ethylbenzene	Xylenes	Chloride
Lyman (#1)	ND	ND	ND	ND	13.0	ND	ND	ND	ND	13.0	ND	ND	ND	ND	12.5
Upper Indian Hills Spring West (#2)	ND	ND	ND	ND	13.5	ND	ND	ND	ND	11.0	ND	ND	ND	ND	11.4
Biebelle (#3)	ND	ND	ND	ND	11.4	NOT SAMPLED					NOT SAMPLED				

BENZENE, TOLUENE, ETHYLBENZENE, & XYLENE CONCENTRATION IN ug/L

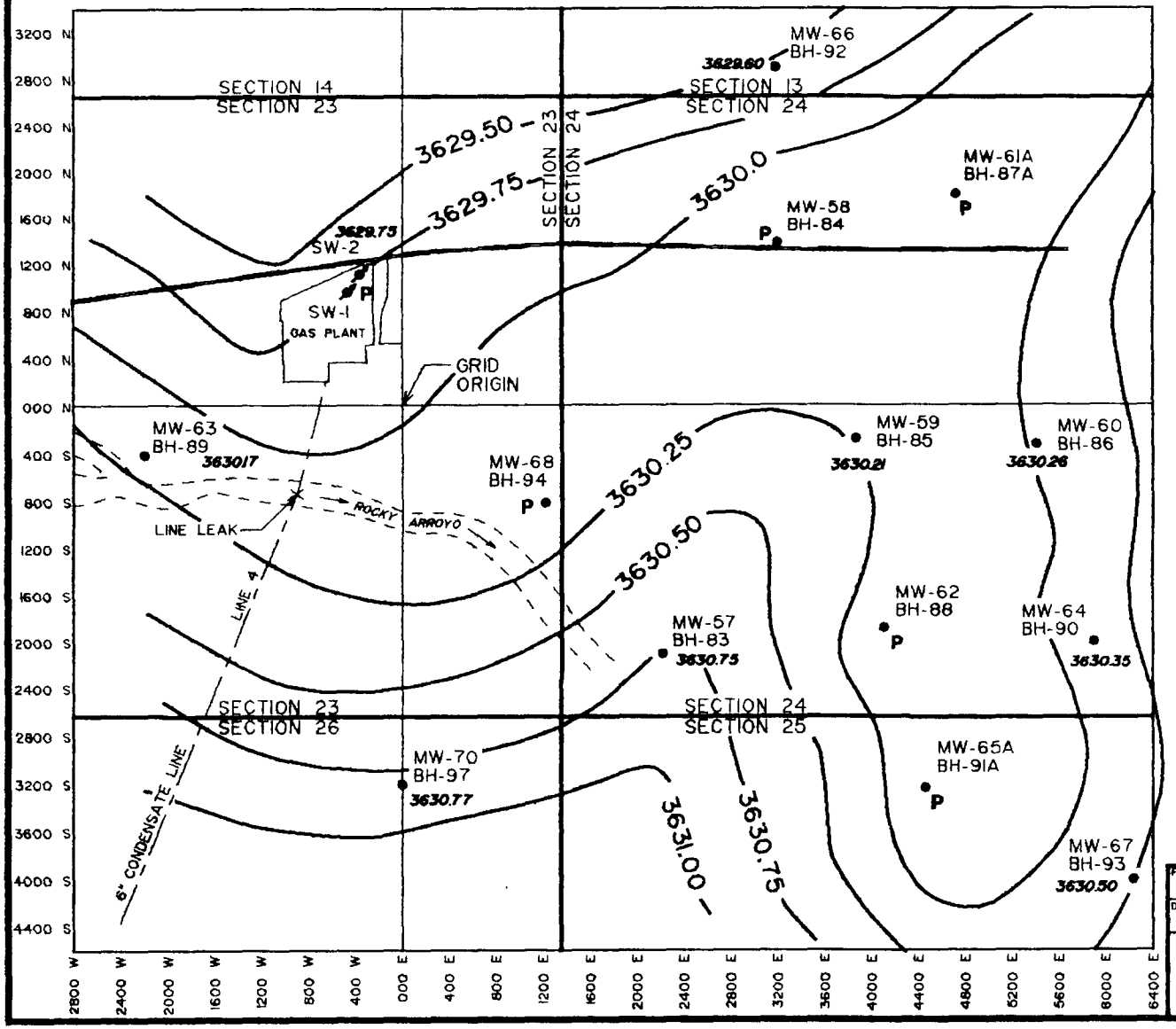
CHLORIDE CONCENTRATION IN mg/L

ND = NOT DETECTED AT METHOD DETECTION LIMIT

TABLE4.XLS

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 — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

P — PUMPING WELL

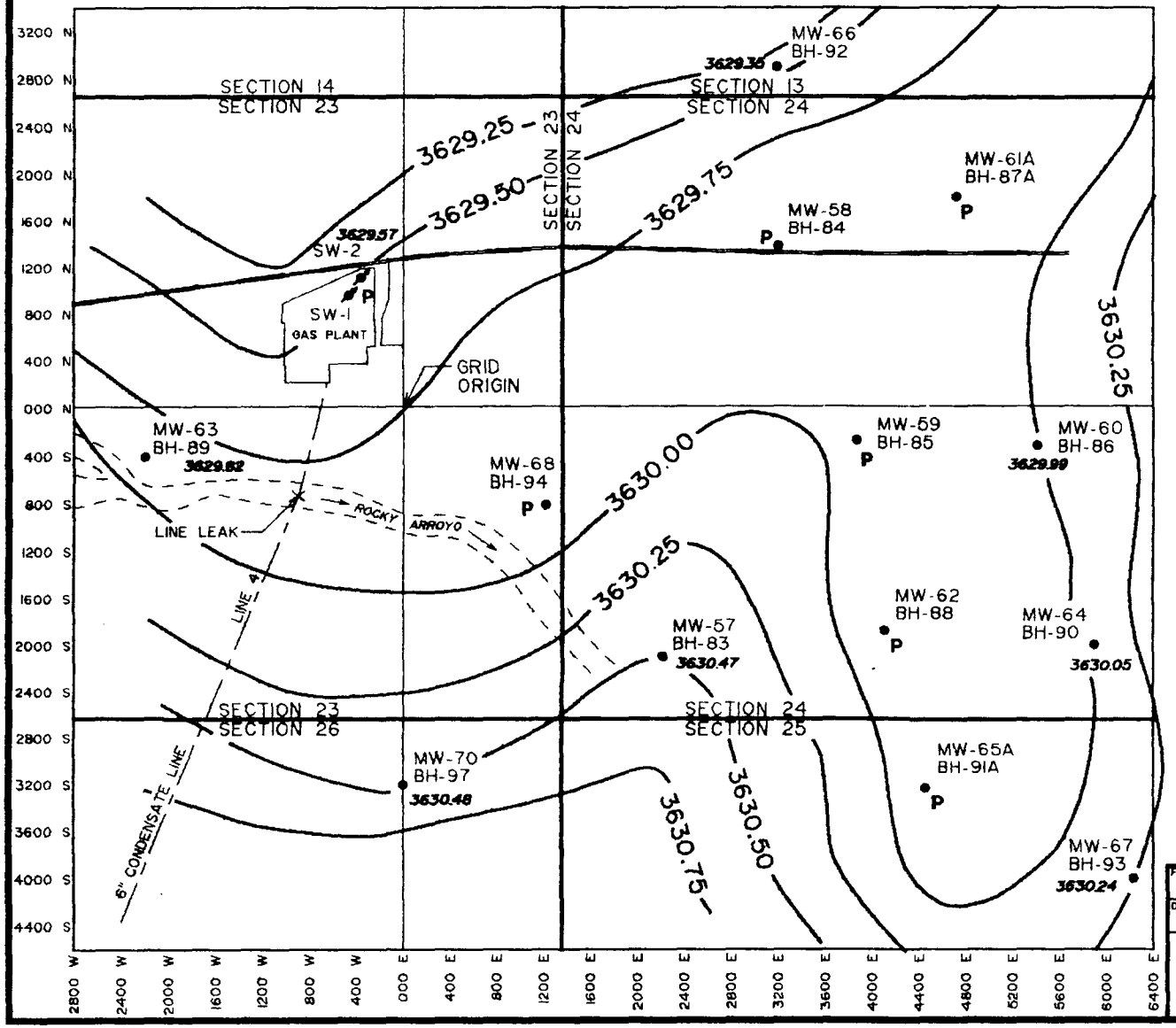
3630.50 — GROUNDWATER ELEVATION (FEET AMSL)

CONTOUR INTERVAL = 0.25 FEET

180ASPLT3.STY OPER

Figure Title: **FIGURE 1**		**MARATHON OIL COMPANY**	
Document Title: **APRIL 1993 LOWER QUEEN POTENTIOMETRIC SURFACE**		Location: **INDIAN BASIN GAS PLANT**	
	DATE: 8/93	PREPARED BY:	
	SCALE:	CHECKED BY:	
	PROJECT NO.	DRAFTED BY:	
		FIGURE NO.	

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 — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)

P — PUMPING WELL

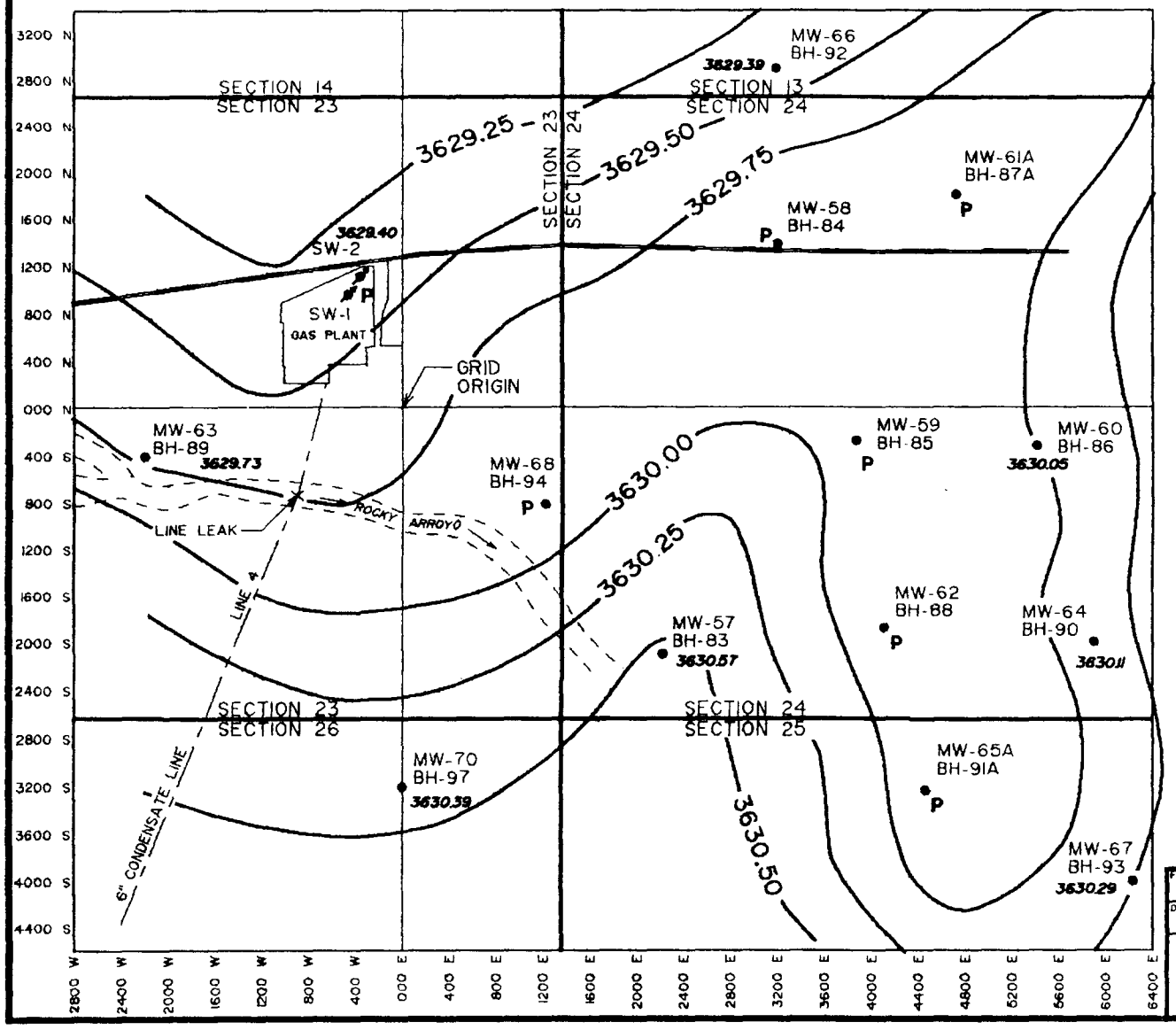
3630.50 — GROUNDWATER ELEVATION (FEET AMSL)

CONTOUR INTERVAL = 0.25 FEET

IBGASPLT3.STY OPER

Figure Title: **FIGURE 2**	**MARATHON OIL COMPANY**	
Document Title:	Location: INDIAN BASIN GAS PLANT	
MAY 1993 LOWER QUEEN POTENTIOMETRIC SURFACE	DATE: 8/93	PREPARED BY:
	SCALE:	CHECKED BY:
		DRAFTED BY:
	PROJECT NO.	FIGURE NO:

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO



SCALE

0 1000' 2000'

FEET

L E G E N D

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

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

P — PUMPING WELL

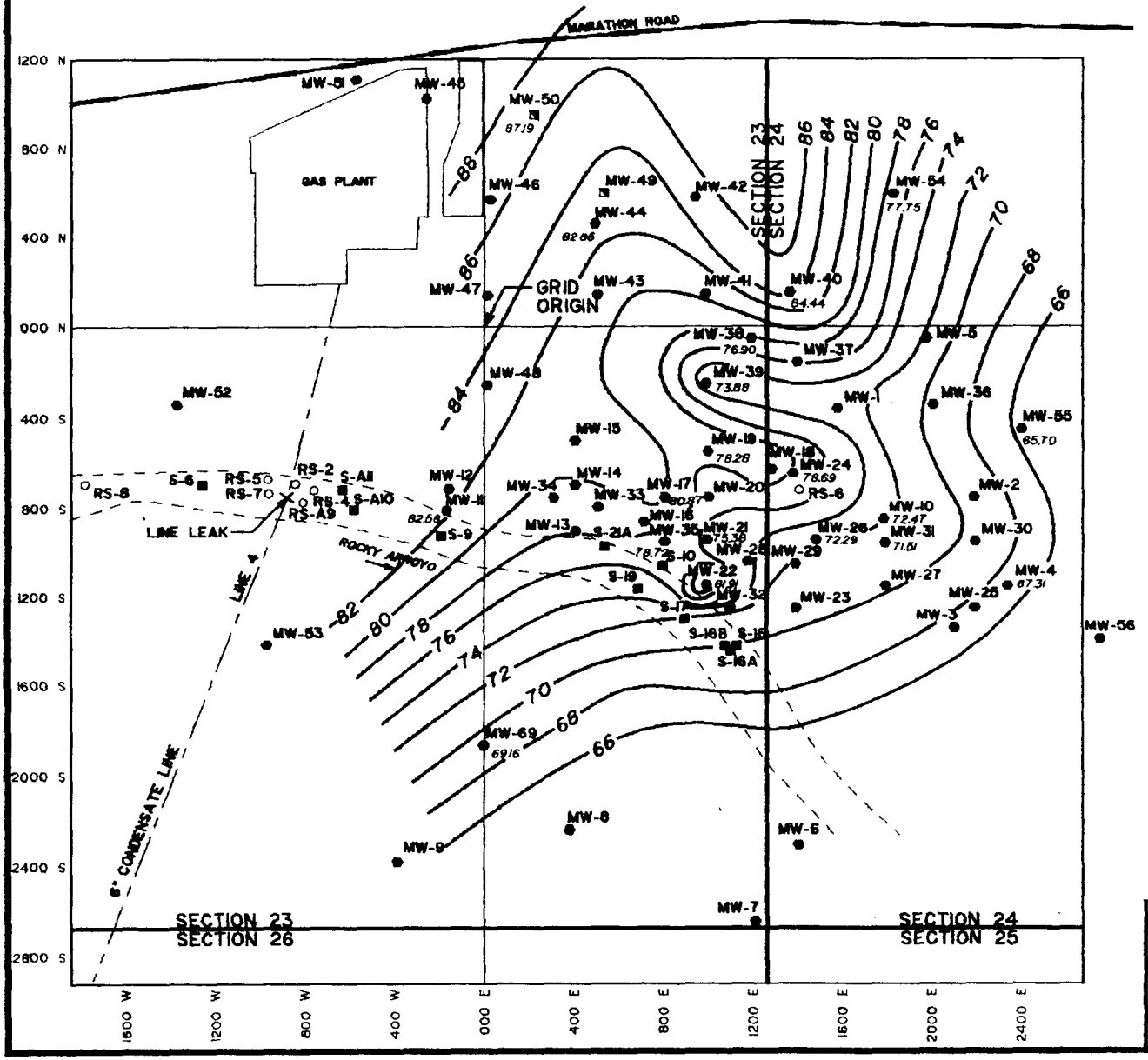
3630.50 — GROUNDWATER ELEVATION (FEET AMSL)

CONTOUR INTERVAL = 0.25 FEET

18GASPLT3.STY OPER

Figure Title: **FIGURE 3**		**MARATHON OIL COMPANY**	
Document Title:		Location: INDIAN BASIN GAS PLANT	
JUNE 1993 LOWER QUEEN POTENTIOMETRIC SURFACE		DATE: 8/93	PREPARED BY:
		SCALE:	CHECKED BY:
		PROJECT NO.	DRAFTED BY:
			FIGURE NO.

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO



SCALE

0 — 1000' — 2000'

FEET

LEGEND

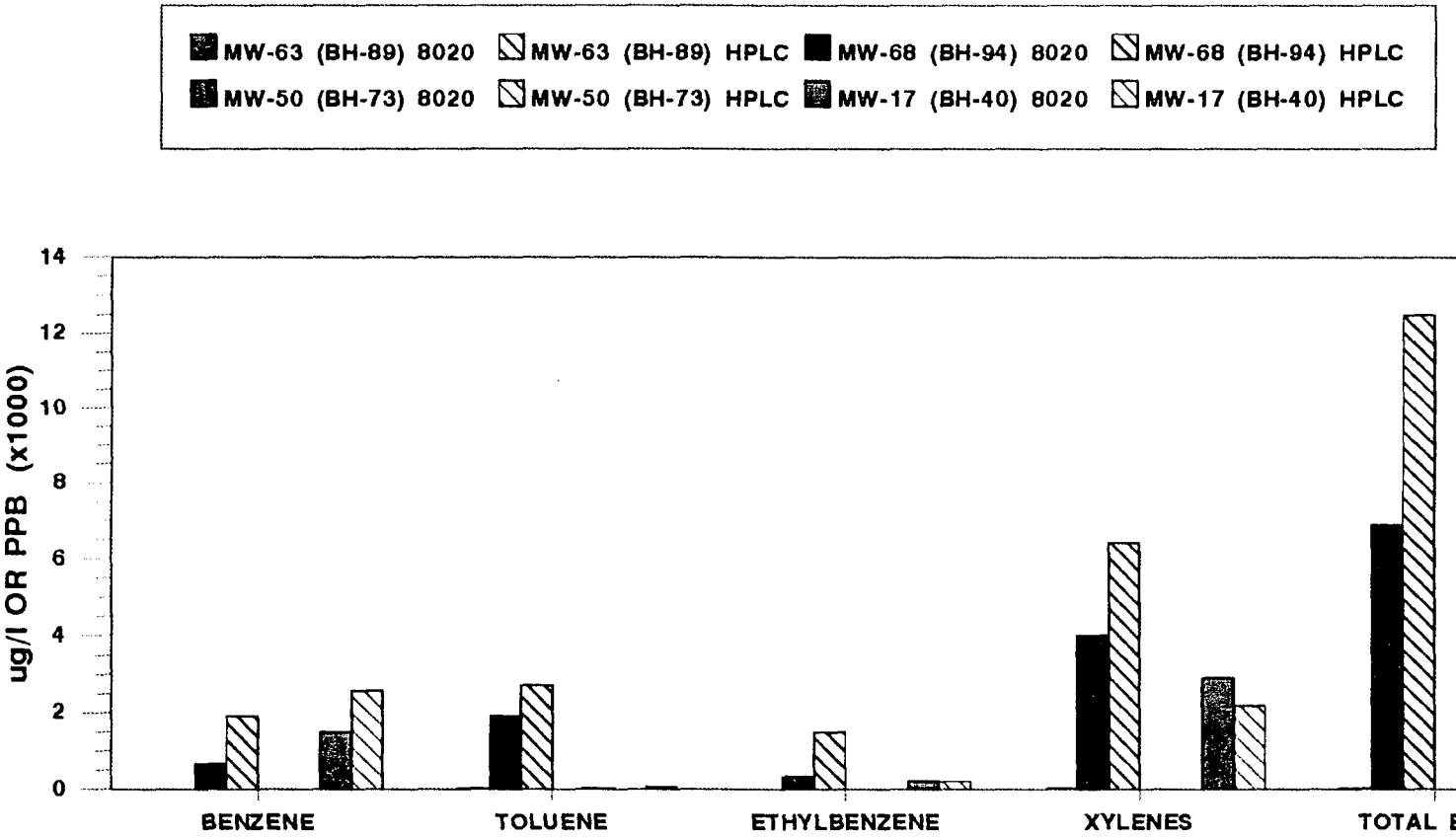
- MW-9 ● SHALLOW ALLUVIAL GROUNDWATER MONITORING WELL
- RS-4 ○ 4 INCH PVC RECOVERY SUMP
- S-19 ■ 24 INCH GALVANIZED RECOVERY SUMP

DATA SHOWN IS WATER ELEVATION ABOVE MSL MINUS 3700 FEET

BGASPLTA.STY OPER

Figure Title: FIGURE 4		MARARTHON OIL COMPANY
Document Title:	Location:	INDIAN BASIN GAS PLANT
APRIL 1993 SHALLOW ZONE POTENTIOMETRIC SURFACE	DATE:	PREPARED BY:
	SCALE:	CHECKED BY:
		DRAFTED BY:
	PROJECT NO:	FIGURE NO:

FIGURE 5
COMPARISON OF EPA METHOD 8020 VS HPLC LABORATORY RESULTS
APRIL 1993, SECOND QUARTER

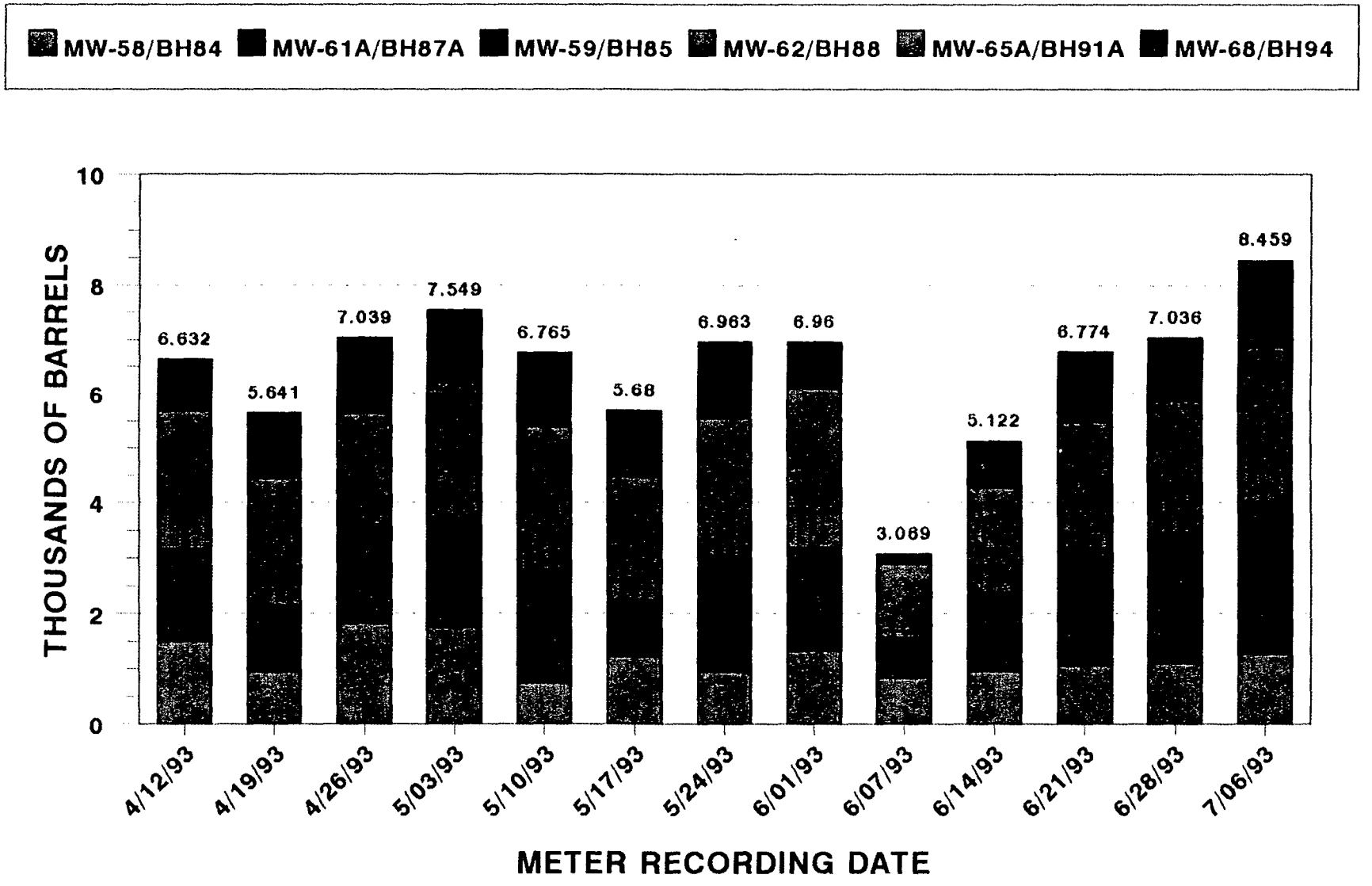


	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	TOTAL BTEX
MW-63 (BH-89) 8020	0	0	0	0	0
MW-63 (BH-89) HPLC	0.007	0.013	0.003	0.015	0.038
MW-68 (BH-94) 8020	0.65	1.9	0.33	4	6.88
MW-68 (BH-94) HPLC	1.89	2.704	1.489	6.401	12.484
MW-50 (BH-73) 8020	0	0	0	0	0
MW-50 (BH-73) HPLC	0	0.017	0	0.012	0.029
MW-17 (BH-40) 8020	1.5	0	0.23	2.9	4.63
MW-17 (BH-40) HPLC	2.575	0.068	0.205	2.174	5.012

ANALYTES

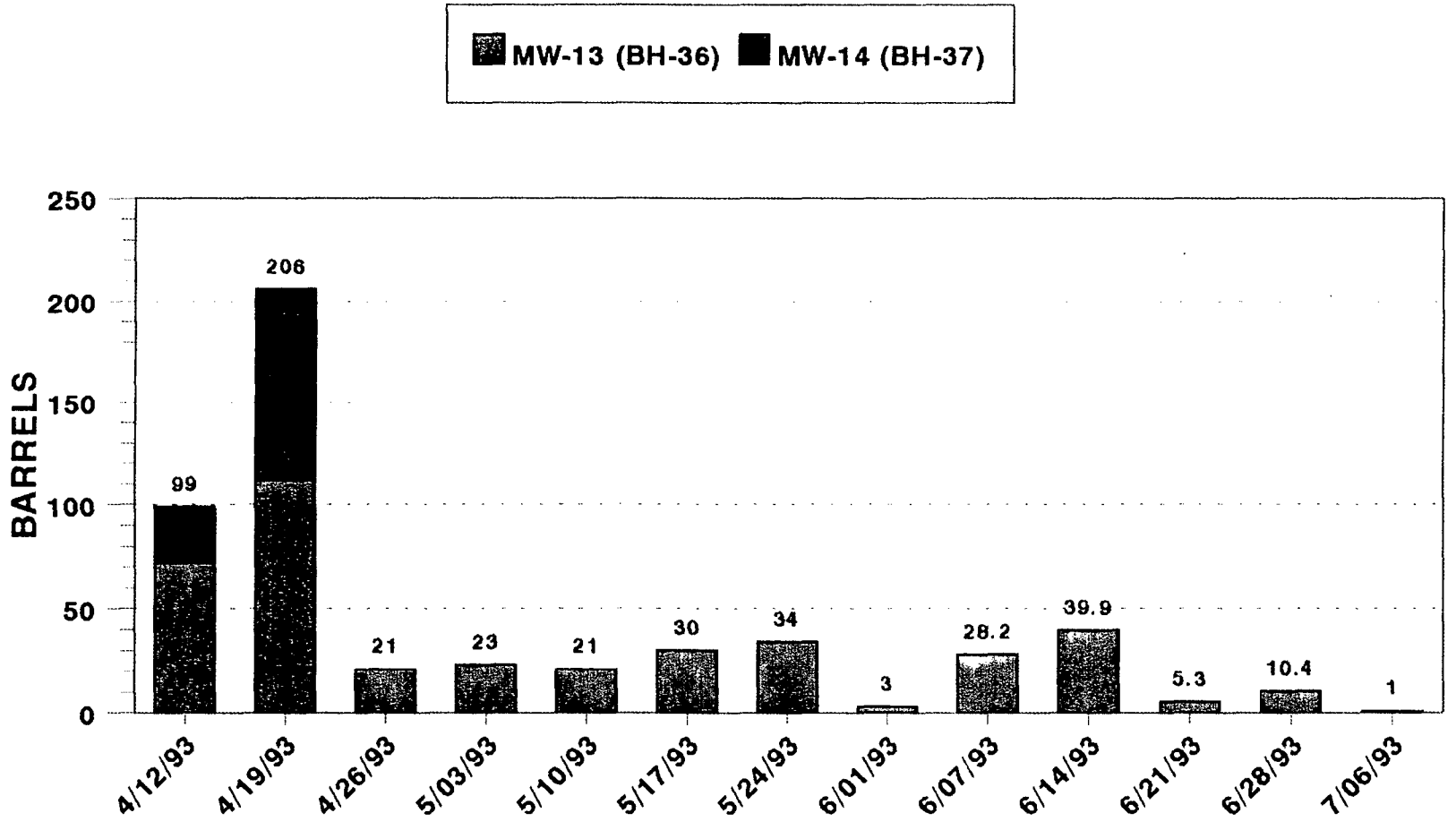
HPLC = HIGH PERFORMANCE LIQUID CHROMOTOGRAPHY

FIGURE 6
WEEKLY LOWER QUEEN FLUID RECOVERY
SECOND QUARTER 1993



WKLQREC2Q

FIGURE 7
WEEKLY SHALLOW FLUID RECOVERY
SECOND QUARTER 1993

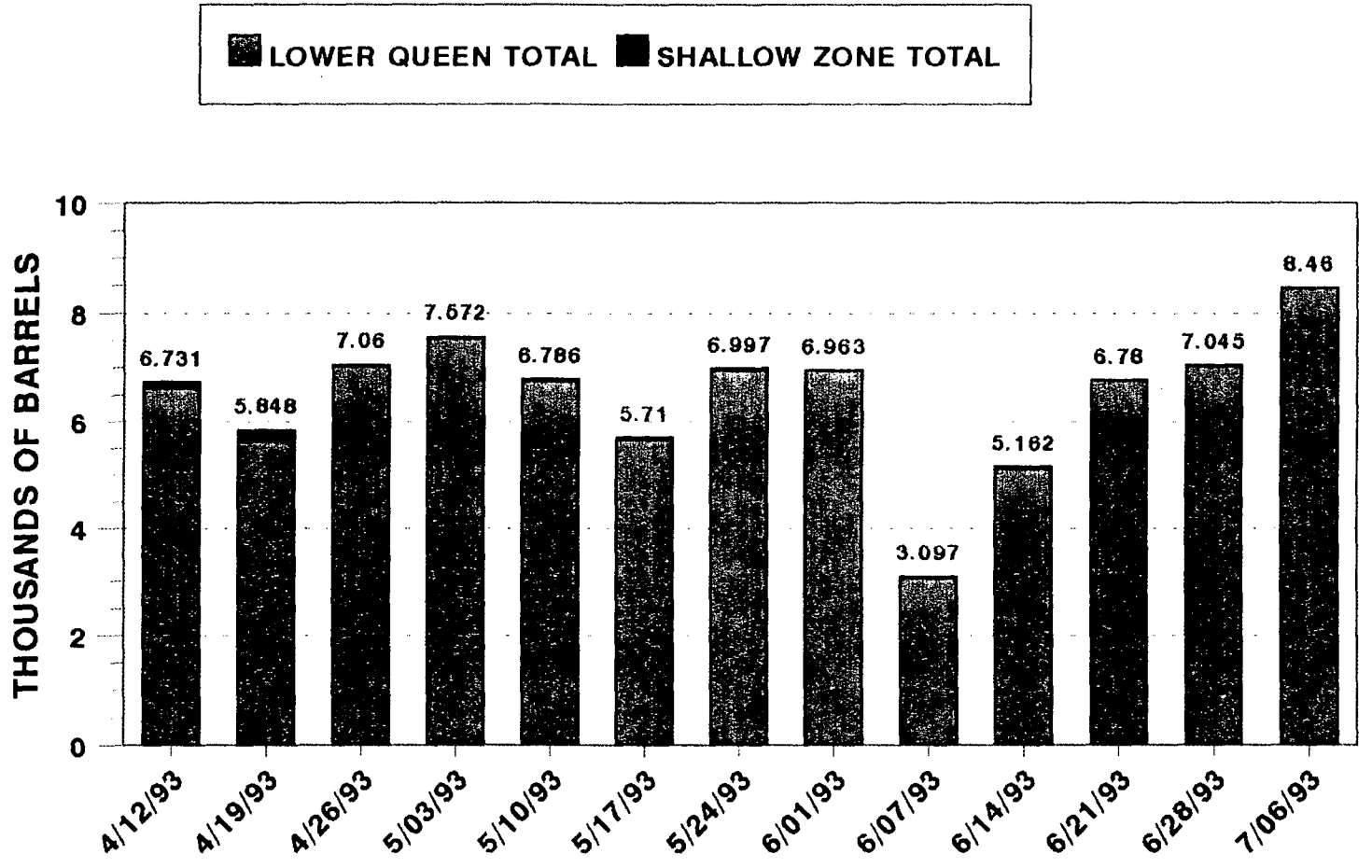


MW-14 (BH-37)	27	94	0	0	0	0	0	0	0	0	0	0	0
MW-13 (BH-36)	72	112	21	23	21	30	34	3	28.2	39.9	5.3	10.4	1

METER RECORDING DATE

WKSHREC2Q

FIGURE 8
WEEKLY TOTAL FLUID RECOVERY
SECOND QUARTER 1993



SHALLOW ZONE TOTAL	0.099	0.206	0.021	0.023	0.021	0.03	0.034	0.003	0.028	0.04	0.005	0.01	0.001
LOWER QUEEN TOTAL	6.632	5.642	7.039	7.549	6.765	5.68	6.963	6.96	3.069	5.122	6.775	7.035	8.459

METER RECORDING DATE

WKREC2Q

APPENDIX A

APRIL 1993 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY

SWL
ENVIRONMENTAL SERVICES

1703 West Industrial
P.O. Box 2150
Midland, Texas 79702
Phone: (915) 683-3349
Fax: (915) 686-0492

April 28, 1993

Mr. Al Learned
Marathon Oil Company
P. O. Box 552
Midland, Texas 79702

Re: Marathon Indian Basin Remediation Project

Gentlemen:

The quarterly monitoring project was started at 7:00 a.m. on April 13, 1993. During a three (3) day period, a total of fifty (50) wells was checked. The monitoring project was completed at 11:00 a.m. on April 15, 1993.

Sampling of the wells which were pumped are listed below in the order in which they were pumped.

April 13, 1993	April 14, 1993
Trip Blank	Trip Blank
Equipment Blank No. 1	Equipment Blank No. 6
BH-85 MW-59	BH-97 MW-70
Equipment Blank No. 2	BH-86 MW-60
BH-90 MW-64	Equipment Blank No. 7
BH-93 MW-67	Changed water in Decon Barrels
Equipment Blank No. 3	BH-83 MW-57
Water out of Fresh Water tank	BH-81 MW-55
Equipment Blank No. 4 (w/water out of tank)	Equipment Blank No. 8
BH-89 MW-63	BH-80 MW-54
BH-92 MW-66	Sump 16A
Equipment Blank No. 5	

When samples were prepared to be shipped to Core and PTC Laboratories on Monday, April 19, 1993, the Corrossive label on the side of the PTC cooler was not removed, and Federal Express brought the PTC cooler back to SwL on Tuesday, April 20, 1993. At that time an office employee knew what was in the box, so she removed the sticker and sent Federal Express back on their way with the package. Later this same day, I received a phone call from Charlie Kerley acknowledging that PTC had not yet received their samples. He also had concern over whether or not we had repacked the samples on ice. After this, I called Federal Express to see if they could bring my package back to me to insure us that our samples were still cold. Upon

MCR

APR 30 1993

Environmental & Safety

arrival, we took a temperature inside the cooler which was 43°F. Before shipping samples on Tuesday, April 20 1993, we re-packed them with frozen cold packs.

If you have any further questions, please do not hesitate to call.

Thank you.

Sincerely,

Lorri L. Church

Lorri L. Church
Project Manager
Midland EAS

LLC:jjc

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

QUEENS WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.		Reported Total Depth (ft.)	FTC Water Level (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
BH-83	MW-57	177.20	156.95	20.25	04-14-93	N	39.6	69	6.72	768	
BH-84	MW-58	218.71	---	---	04-13-93	N	Pump Present	---	6.47	1354	
BH-85	MW-59	211.29	189.38	21.91	04-13-93	N	42.9	70	6.50	1417	
BH-86	MW-60	223.08	185.02	38.06	04-14-93	N	74.5	69	7.07	998	
BH-87A	MW-61A	216.37	---	---	04-13-93	Y	Pump Present	---	6.49	941	
BH-88	MW-62	225.90	---	---	04-13-93	N	Pump Present	---	6.65	1433	
BH-89	MW-63	221.19	195.99	25.20	04-13-93	N	49.3	70	6.56	591	
BH-90	MW-64	202.37	168.22	34.15	04-13-93	N	66.9	71	6.42	985	
BH-91A	MW-65A	168.56	---	---	04-13-93	N	Pump Present	---	6.62	819	
BH-92	MW-66	235.18	199.38	35.80	04-13-93	N	70.1	69	6.73	1031	
BH-93	MW-67	165.77	135.37	30.40	04-13-93	N	59.5	71	6.29	651	
BH-94	MW-68	203.43	---	---	04-13-93	N	Pump Present	---	6.51	736	
BH-97	MW-70	225.20	191.80	33.40	04-14-93	N	65.4	69	7.25	563	
SW-1	Plant Well	255.00	---	---	04-15-93	N	Pump Present	---	---	---	
SW-2	Backup Well	292.00	179.04	112.96	04-15-93		None	---	---	---	

Note: BH-83, BH-86, BH-89, BH-90, BH-92, BH-93 and BH-97 were wells that SwL Field Services pumped.

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

SHALLOW WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.		Reported Total Depth (ft.)	FTC Water Level (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
BH-24	MW-3	17.40	---	Dry	04-14-93	---	---	---	---	---	
BH-26	MW-4	18.68	18.57	0.11	04-14-93	---	QNS	---	---	---	Insufficient Sample to bail
BH-28	MW-5	13.10	---	Dry	04-14-93	---	---	---	---	---	
BH-29	MW-6	13.98	---	Dry	04-14-93	---	---	---	---	---	
BH-55	MW-31	19.93	19.64	0.29	04-14-93	---	QNS	---	---	---	Insufficient Sample to bail
BH-30	MW-7	17.31	---	Dry	04-14-93	---	---	---	---	---	
BH-45	MW-22	17.30	17.29	0.01	04-14-93	---	---	---	---	---	Insufficient Sample to bail
BH-31	MW-8	17.74	---	Dry	04-14-93	---	---	---	---	---	
BH-32	MW-9	13.65	---	Dry	04-14-93	---	---	---	---	---	
BH-33	MW-10	19.08	18.31	0.77	04-15-93	---	1.5	---	---	---	Insufficient Sample to bail
BH-34	MW-11	24.85	24.38	0.47	04-15-93	Y3"-5"	0.9	---	---	---	(b)
BH-36	MW-13	22.07	---	---	04-14-93	---	Pump Present	---	---	---	Inaccesible
BH-42	MW-19	19.11	18.93	0.18	04-15-93	N	0.4	---	---	---	(a)
BH-47	MW-24	14.09	---	Dry	04-14-93	---	---	---	---	---	

(a) Bailed dry but did recover enough to fill one VOA vial for BTEX.

(b) Bailed dry of water, but did recover enough for one VOA vial half full.

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

SHALLOW WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.		Reported Total Depth (ft.)	FTC Water Level (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
BH-41	MW-18	17.42	17.13	0.29	04-15-93	N	0.6	---	---	---	(a)
BH-53	MW-29	14.76	---	Dry	04-14-93	---	---	---	---	---	
BH-49	MW-26	21.51	20.72	0.79	04-15-93	Y 0.6"	1.5	---	6.69	---	0.125" (b)
BH-56	MW-32	16.77	---	Dry	04-14-93	---	---	---	---	---	
BH-44	MW-21	23.31	22.63	0.68	04-15-93	---	0.33	---	7.56	1910	(c)
BH-61	MW-38	20.62	20.42	0.20	04-15-93	---	0.4	---	---	---	Insufficient Sample to bail
BH-67	MW-44	25.34	21.48	3.86	04-15-93	N	7.6	---	7.03	2730	
BH-71	MW-48	19.98	---	Dry	04-14-93	N	---	---	---	---	
BH-73	MW-50	37.15	26.16	10.99	04-15-93	N	5.4	---	6.84	5230	
BH-75	MW-52	21.44	---	Dry	04-13-93	---	---	---	---	---	
BH-77	MW-53	16.02	---	Dry	04-14-93	---	---	---	---	---	
BH-80	MW-54	78.15	46.11	32.04	04-14-93	N	62.7	70	6.94	3180	(d)
BH-81	MW-55	66.80	28.70	38.10	04-14-83	N	74.6	70	7.02	2500	
BH-82	MW-56	43.76	---	---	04-14-93	Inaccesible/ Soil vent well	---	---	---	---	
BH-95	MW-69	59.41	39.58	19.83	04-14-93	3'7" FP	38.8	---	---	---	Not Sampled
Sump A-11		17.20	16.49	0.71	04-14-93	---	Pump present	---	---	---	

(a) Bailed dry, no recovery in 2 Hours. (b) Enough recovery to fill one vial. (c) Bailed dry after 0.1 gallons.
(d) Pumped dry after 40 gallons then sample caught with bailer.

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

SHALLOW WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.	Reported Total Depth (ft.)	FTC Water Level (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
Sump 16-A	15.46	14.15	1.31	04-14-93	1.5"	31.4	---	---	---	In Report
BH-62 MW-39	20.54	17.13	3.37	04-15-93	N	6.6	---	---	---	(a)
BH-62 MW-37	20.81	19.96	0.85	04-15-93	N	1.7	---	---	---	QNS to Bail
BH-39 MW-16	22.45	22.32	0.13	04-15-93	N	0.25	---	7.84	1840	
BH-40 MW-17	19.73	18.68	1.05	04-15-93	N	0.51	---	7.17	1990	

(a) Bailed dry after 4 gallons, but did recover enough to fill vials.

APPENDIX B

APRIL 1993 LABORATORY REPORTS

Indian Basin BTEX Analysis Results by HPLC (4/93)

Sample	(ppb) Benzene	(ppb) Toluene	(ppb) o-Xylene	(ppb) Ethylbenzene	(ppb) m,p-Xylene	(ppb) Total Xylenes	(ppb) Total BTEX	(mg/L) Chloride
BH-39/MW-16	514	53	19	39	2115	2134	2740	246
BH-40/MW-17	2575	58	121	205	2053	2174	5012	294
BH-42/MW-19	3926	130	23	16	59	82	4154	NS
BH-44/MW-21	114	19	9	38	29	38	209	283
BH-49/MW-26	861	62	16	600	1998	2014	3537	NS
BH-62/MW-39	28	15	4	4	7	11	58	83
BH-67/MW-44	7	15	14	18	ND	14	54	365
BH-73/MW-50	ND	17	7	ND	5	12	29	347
BH-80/MW-54	10	ND	ND	ND	8	8	18	145
BH-81/MW-55	412	20	10	89	8	18	539	301
BH-83/MW-57	8	21	7	15	9	16	60	80
BH-84/MW-56 58	55	16	5	31	4	9	111	133
BH-85/MW-59	10	14	5	12	ND	5	41	29
BH-86/MW-60	17	16	12	ND	ND	12	45	9
BH-88/MW-62	33	15	3	16	21	24	88	207
BH-89/MW-63	7	13	3	3	12	15	38	5
BH-90/MW-64	5	11	3	5	6	9	30	10
BH-91A/MW-65A	4	9	3	3	5	8	24	26
BH-92/MW-66	ND	5	ND	5	ND	ND	10	8
BH-93/MW-67	7	18	5	7	14	19	51	8
BH-97/MW-20 70	9	20	ND	ND	4	4	33	8
Equip Blank No. 1	17	6	ND	ND	8	8	31	NS
Equip Blank No. 2	3	8	ND	3	ND	ND	14	NS
Equip Blank No. 3	ND	3	ND	ND	5	5	8	NS
Equip Blank No. 4	4	ND	ND	ND	8	8	12	NS
Equip Blank No. 5	5	5	ND	ND	3	3	13	NS
Equip Blank No. 6	11	9	3	ND	4	4	27	NS
Equip Blank No. 7	10	30	ND	4	ND	ND	44	NS
Equip Blank No. 8	16	16	ND	6	4	4	42	NS
H2O Out of Tank	17	36	ND	ND	ND	ND	53	NS
Sump 16A	707	881	810	298	3416	4226	6112	218
Trip Blank	5	11	ND	3	3	3	22	NS

Indian Basin BTEX Analysis Results by HPLC (4/93)

Sample	(ppb) Benzene	(ppb) Toluene	(ppb) o-Xylene	(ppb) Ethylbenzene	(ppb) m,p-Xylene	(ppb) Total Xylenes	(ppb) Total BTEX	(mg/L) Chloride
Trip Blank	27	11	ND	ND	4	4	42	NS
Lab Blank	ND	ND	ND	7	ND	ND	7	NS

*** Notes:** **ND=No detection at or below detection limit of 3 ppb.**
NS=No sample available.

Samples from Well 87A, and from Well 94 had visible free condensate in the sample vial.
For this reason, BTEX results are reported separately for these samples, and are shown below.*

	Benzene	Toluene	o-Xylene	Ethylbenzene	m,p-Xylene	Total Xylenes	Total BTEX	Chloride
BH-87A/MW-61A	2821	173	113	817	3880	3993	7804	15
BH-94/MW-68	1890	2704	1416	1489	4985	6401	12484	27

*** BTEX results for samples with free condensate in the sample vial are of dubious value because it is impossible to assure representative, reproducible sampling for analysis.**

Analysis Request/Chain of Custody Form

From:
Marathon Oil Company
329 Marathon Road
Lakewood, New Mexico 88254
CONTACT: _____
PTC Project: 32-03-144

Laboratory Address:
Marathon Oil Company
% R. G. Thompson
7400 South Broadway
Littleton, Co. 80122

Packing Information:
Packed by: L. Church Date: 4-19-93
VOA vials: ✓ Yes ___ No
Coolant: ___ Ice ✓ Cold Pack
Comments: _____

As-Received Sample Status:
Seal Intact: ___ Yes ___ No
Sample Temp: ___ Thawed or warm ___ Cool
Box/Shiping: ___ OK ___ Damaged

Sample Date	Sample Time	Sampler (Person)	Sample Label	Sample Type	No. of bottles	Analysis Required
4-13-93	8:00	L. Church	Trip Blank	Water	2	BTEX
4-13-93	8:15	"	Equip Blk No. 1	"	2	BTEX
"	8:50	"	BH-85 mw-59	"	2	BTEX
"	"	"	"	"	1	Cl^-
"	9:39	"	Equip Blk No. 2	"	2	BTEX
"	10:40	"	BH-90 mw-64	"	2	BTEX
"	"	"	"	"	1	Cl^-
"	12:02	"	BH-93 mw-67		2	BTEX
"	"	"	"		1	Cl^-
"	"	"	" Dup 1		2	BTEX
"	1:30	"	Equip Blank No. 3		2	BTEX
"	1:35	"	Out of New Tank		2	BTEX

SHIPPING INFORMATION

Delivered To Shipper By: Federal Express
Method of Shipment: Overnight
Airbill No. 151858458 3
Shipment Date/Time: 4-19-93 / 1600

LABORATORY RECEIT OF SHIPMENT

Name: _____ Date: _____ Time: _____

Rev: 4/8/92

Analysis Request/Chain of Custody Form

From:
Marathon Oil Company
329 Marathon Road
Lakewood, New Mexico 88254
CONTACT:_____
PTC Project: 32-03-144

Laboratory Address:
Marathon Oil Company
% R. G. Thompson
7400 South Broadway
Littleton, Co. 80122

Packing Information: Same
Packed by:_____ Date:_____
VOA vials:___Yes ___No
Coolant: ___Ice ___Cold Pack
Comments:

As-Received Sample Status:
Seal Intact:___Yes ___No
Sample Temp:___Thawed or warm ___Cool
Box/Shiping:___OK ___Damaged

Sample Date	Sample Time	Sampler (Person)	Sample Label	Sample Type	No. of bottles	Analysis Required
4-13-93	2:00	L. Church	Equip Blk No. 4	water	2	BTEX
"	2:45	"	BH-89 mw-63	"	2	BTEX
"	"	"	"	"	1	Cl^-
"	4:20	"	BH-92 mw-66	"	2	BTEX
"	"	"	"	"	1	Cl^-
"	"	"	" Dup1	"	2	BTEX
"	5:35	"	Equip Blank No. 5	"	2	BTEX
"	10:38	R.M Gray	BH-91A mw65A	"	2	BTEX
"	"	"	"		1	Cl^-
"	13:20	"	BH-87A mw61A		2	BTEX
"	"	"	"		1	Cl^-

SHIPPING INFORMATION

Delivered To Shipper By:_____
Method of Shipment: SAME
Airbill No._____
Shipment Date/Time:_____

LABORATORY RECEIT OF SHIPMENT

Name:_____ Date:_____ Time:_____

Rev: 4/8/92

Analysis Request/Chain of Custody Form

From:
Marathon Oil Company
329 Marathon Road
Lakewood, New Mexico 88254
CONTACT:_____
PTC Project: 32-03-144

Laboratory Address:
Marathon Oil Company
% R. G. Thompson
7400 South Broadway
Littleton, Co. 80122

Packing Information: Same
Packed by:_____ Date:_____
VOA vials:___Yes ___No
Coolant: ___Ice ___Cold Pack
Comments:

As-Received Sample Status:
Seal Intact:___Yes ___No
Sample Temp:___Thawed or warm ___Cool
Box/Shiping:___OK ___Damaged

Sample Date	Sample Time	Sampler (Person)	Sample Label	Sample Type	No. of bottles	Analysis Required
4-13-93	1305	R.M. Gray	BH-84 MW-58 ✓	Water	2	BTEX
"	"	"	"	"	1	Cl⁻
"	1455	"	BH-94 MW-68	Water	2	BTEX
"	"	"	"	"	1	Cl⁻
"	1610	"	BH-88 MW-62	"	2	BTEX
"	"	"	"	"	1	Cl⁻
4-14-93	823	L. Church	Trip Blank	"	2	BTEX
"	850	"	Equip Blank No 6	"	2	BTEX
"	954	"	BH-97 MW-70	"	2	BTEX
"	"	"	"	"	1	Cl⁻
"	"	"	" Dupl	"	2	BTEX

SHIPPING INFORMATION

Delivered To Shipper By:_____
Method of Shipment: SAME
Airbill No._____
Shipment Date/Time:_____

LABORATORY RECEIT OF SHIPMENT

Name:_____ Date:_____ Time:_____

Rev: 4/8/92

Analysis Request/Chain of Custody Form

From:
Marathon Oil Company
329 Marathon Road
Lakewood, New Mexico 88254
CONTACT:_____
PTC Project: 32-03-144

Laboratory Address:
Marathon Oil Company
% R. G. Thompson
7400 South Broadway
Littleton, Co. 80122

Packing Information: Same
Packed by:_____ Date:_____
VOA vials:___Yes ___No
Coolant: ___Ice ___Cold Pack
Comments:

As-Received Sample Status:
Seal Intact:___Yes ___No
Sample Temp:___Thawed or warm ___Cool
Box/Shiping:___OK ___Damaged

Sample Date	Sample Time	Sampler (Person)	Sample Label	Sample Type	No. of bottles	Analysis Required
4-14-93	1140	L. Church	BH-86 MW-60	water	2	BTEX
"	"	"	"	"	1	Cl^-
"	1215	"	Equip Blank No 7	"	2	BTEX
"	1435	"	BH-83 MW-57	"	2	BTEX
"	"	"	"	"	1	Cl^-
"	1526	"	BH-81 MW-55	"	2	BTEX
"	"	"	"	"	1	Cl^-
"	"	"	" Dupl	"	2	BTEX
"	1550	"	Equip Blank No 8	"	2	BTEX
"	1625	"	BH-80 MW-54	"	2	BTEX
"	"	"	"	"	1	Cl

SHIPPING INFORMATION

Delivered To Shipper By:_____
Method of Shipment: SAME
Airbill No._____
Shipment Date/Time:_____

LABORATORY RECEIT OF SHIPMENT

Name:_____ Date:_____ Time:_____

Rev: 4/8/92

Analysis Request/Chain of Custody Form

From:
Marathon Oil Company
329 Marathon Road
Lakewood, New Mexico 88254
CONTACT: _____
PTC Project: 32-03-144

Laboratory Address:
Marathon Oil Company
% R. G. Thompson
7400 South Broadway
Littleton, Co. 80122

Packing Information: Same
Packed by: _____ Date: _____
VOA vials: ___Yes ___No
Coolant: ___Ice ___Cold Pack
Comments: _____

As-Received Sample Status:
Seal Intact: ___Yes ___No
Sample Temp: ___Thawed or warm ___Cool
Box/Shiping: ___OK ___Damaged

Sample Date	Sample Time	Sampler (Person)	Sample Label	Sample Type	No. of bottles	Analysis Required
4-14-93	1707	L. Church	Sump 16A	Water	2	BTEX
"	"	"	"	"	1	Cl⁻
4-15-93	750	B. Ruhmann	BH-73 MW-50	"	2	BTEX
"	750	B. Ruhmann	"	"	1	Cl⁻
"	839	L. Church	BH-67 MW-44	"	2	BTEX
"	"	"	"	"	1	Cl⁻
"	9:40	B. Ruhmann	BH-62 MW-39	"	2	BTEX
"	"	"	"	"	1	Cl⁻
"	10:36	L. Church	BH-42 MW-19	"	1	BTEX
"	1008	"	BH-44 MW-21	"	2	BTEX
"	"	"	"	"	1	Cl⁻
"	"	"	" Dup1	"	2	BTEX

SHIPPING INFORMATION

Delivered To Shipper By: _____
Method of Shipment: SAME
Airbill No. _____
Shipment Date/Time: _____

LABORATORY RECEIT OF SHIPMENT

Name: _____ Date: _____ Time: _____

Rev: 4/8/92

Analysis Request/Chain of Custody Form

From:
Marathon Oil Company
329 Marathon Road
Lakewood, New Mexico 88254
CONTACT:_____
PTC Project: 32-03-144

Laboratory Address:
Marathon Oil Company
% R. G. Thompson
7400 South Broadway
Littleton, Co. 80122

Packing Information: same
Packed by:_____ Date:_____
VOA vials:___Yes ___No
Coolant: ___Ice ___Cold Pack
Comments:

As-Received Sample Status:
Seal Intact:___Yes ___No
Sample Temp:___Thawed or warm ___Cool
Box/Shiping:___OK ___Damaged

Sample Date	Sample Time	Sampler (Person)	Sample Label	Sample Type	No. of bottles	Analysis Required
4-15-93	1030	L. Church	BH-39 MW-16	Water	2	BTEX
"	"	"	"	"	1	Cl^-
"	922	"	BH-40 MW-17	"	2	BTEX
"	"	"	"	"	1	Cl^-
"	1145	"	BH-49 MW-26	"	1	BTEX

SHIPPING INFORMATION

Delivered To Shipper By:_____
Method of Shipment: SAME
Airbill No._____
Shipment Date/Time:_____

LABORATORY RECEIT OF SHIPMENT

Name:_____ Date:_____ Time:_____

Rev: 4/8/92

Western Atlas International
a Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 04/13/93
TIME SAMPLED.....: 14:45
WORK DESCRIPTION...: BH-89 MW-63

LABORATORY I.D...: 930603-0007
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	5.6	0.5	mg/L	325.2 (1)	05/05/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/25/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 04/13/93
TIME SAMPLED.....: 15:00
WORK DESCRIPTION...: BH-94 MW-68

LABORATORY I.D...: 930603-0008
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	27	1	mg/L	325.2 (1)	05/06/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*10		8020 (2)	04/25/93	MLD
Benzene	650	10	ug/L			
Toluene	1900	100	ug/L			
Ethyl Benzene	330	10	ug/L			
Xylenes	4000	100	ug/L			

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Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 04/15/93
TIME SAMPLED.....: 07:50
WORK DESCRIPTION...: BH-73 MW-50

LABORATORY I.D...: 930603-0009
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	955	5	mg/L	325.2 (1)	05/05/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/27/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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Aurora, CO 80014
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Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.........: MARATHON OIL
DATE SAMPLED.......: 04/15/93
TIME SAMPLED.......: 09:22
WORK DESCRIPTION...: BH-40 MW-17

LABORATORY I.D...: 930603-0010
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	306	3	mg/L	325.2 (1)	05/05/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*100		8020 (2)	04/27/93	MLD
Benzene	1500	100	ug/L			
Toluene	ND	100	ug/L			
Ethyl Benzene	230	100	ug/L			
Xylenes	2900	100	ug/L			

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(303) 751-1780

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A Litton / Dresser Company

CORE LABORATORIES

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION		PROJECT INFORMATION	
COMPANY:	Marathon Oil	PROJECT NAME/NUMBER:	
SEND REPORT TO:	Al Learned	**BILLING INFORMATION**	
ADDRESS:	PO Box 552	BILL TO:	
	Midland, TX 79702	ADDRESS:	
PHONE:	(915) 687-8312	PHONE:	
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	ANALYSIS / METHOD REQUEST: Cl	REMARKS / PRECAUTIONS
#1	#1 Lyman	4-15-93	08:25	water	40ml VOA			✓	✓	
#2	#2 Arroyo	4/15/93	08:45	water	" "			✓	✓	
#4	#4 Bicbble	4/15/93	09:07	water	" "			✓	✓	
#7	#7 SW-1	4/15/93	07:38	water	" "			✓	✓	
#8	#8 SW-2	4/15/93	07:45	water	" "			✓	✓	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			✓		
	[illegible] 63	[illegible]	[illegible]	[illegible]	[illegible]			✓	✓	
	[illegible] 66	[illegible]	[illegible]	[illegible]	[illegible]			✓	✓	
	[illegible] 50	[illegible]	750	[illegible]	[illegible]			✓	✓	
	[illegible] 17	[illegible]	[illegible]	[illegible]	[illegible]			✓	✓	

LAB JOB NO.

SAMPLER: RM Gray, Al Learned

SHIPMENT METHOD: [illegible]

AIRBILL NO.: [illegible] 91 XXC

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: [illegible]	[illegible]	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: [illegible]	TIME 1600	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

CLIENT COPY

SwL

SOUTHWESTERN LABORATORIES

Materials, environmental and geotechnical engineering, nondestructive, metallurgical and analytical services
1703 West Industrial Avenue • P.O. Box 2150 • Midland, Texas 79702

Report of tests on	Water	**File No.**	6546001
Client	Marathon Oil Company	**Report No.**	80653
Delivered by	Lorri Church	**Report Date**	04-29-93
		Date Received	04-15-93

Identification Indian Basin

REPORT OF ORGANICS ANALYSIS

Date of BTEX Analysis 04-19-93
BTEX Analyst L. Duty

Method SW846 5030/8020A
MDL 0.004 mg/L

Report Number	Sample Identification	Results, mg/L Benzene	Toluene	Ethylbenzene	Xylenes
80653-1	Equipment Blank #1, 4-13-93	*0.004	*0.004	*0.004	0.004
80653-2	Equipment Blank #2, 4-13-93	*0.004	*0.004	*0.004	0.004
80653-3	Equipment Blank #3, 4-13-93	*0.004	*0.004	*0.004	0.007
80653-4	Equipment Blank #4, 4-13-93	*0.004	*0.004	*0.004	0.004
80653-5	Equipment Blank #5, 4-13-93	*0.004	*0.004	*0.004	*0.004
80653-6	Out of Tank @ Plant	*0.004	*0.004	*0.004	*0.004
80653-7	Out of Hose @ Station	*0.004	*0.004	*0.004	*0.004
80653-8	Trip Blank, 4-13-93	*0.004	*0.004	*0.004	*0.004
80653-9	BH-93 MW 67	*0.004	*0.004	*0.004	*0.004

NOTE: Just wanted you to see these.

Copies: Marathon Oil Company
Attn: Al Learned

Reviewed by

SOUTHWESTERN LABORATORIES

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
	SWL	4-13-93

Field Sample No./ Identification	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LAB I.D. NO.
Equip Blk. NO 1 4-13						BTEX	
2							
3							
4							
5							
Out of Tank @ Plant							
Out of Hose @ Station							
Trip Blank 4-13							
BH-93 MW-67							

Samplers: (Print)	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	COC Seal No.
Lorri Church					
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
SWL Field Service	Relinquished by: (Signature) Lorri Church	Date: 4-15-93 Time: 4:55	Received by Laboratory: (Signature) Shelly Stovall	Date: 4-15-93 Time: 4:55	Intact:
Results by _____	REMARKS:		Data Results To:		Laboratory No.
Rush Charges Authorized	Hi, Just thought you might like a copy of these.		1.		
Yes ____ No ____			2.		

There will be no charge

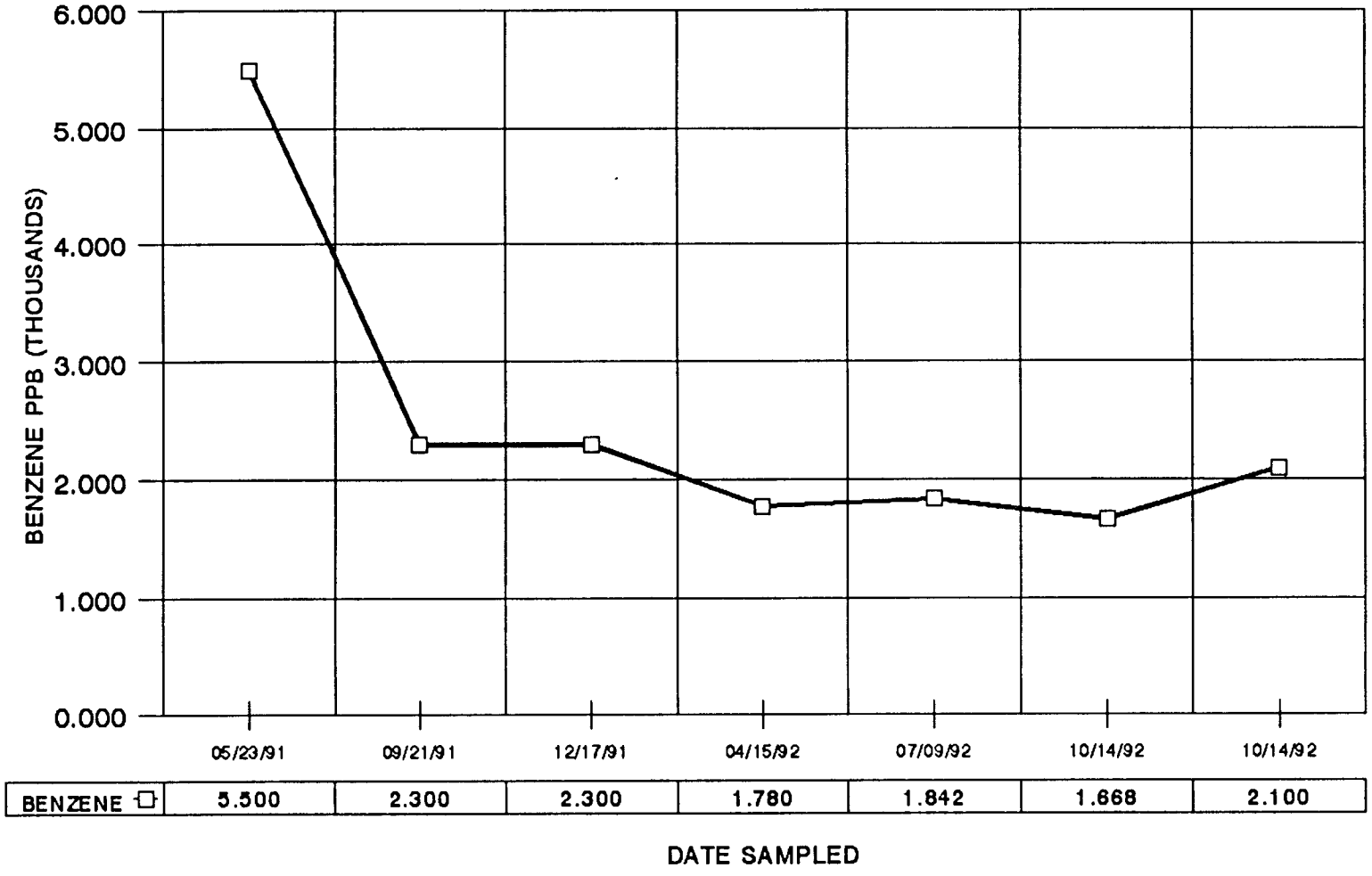
APPENDIX C

BENZENE CONCENTRATION VS TIME GRAPHS

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#10 BH-33

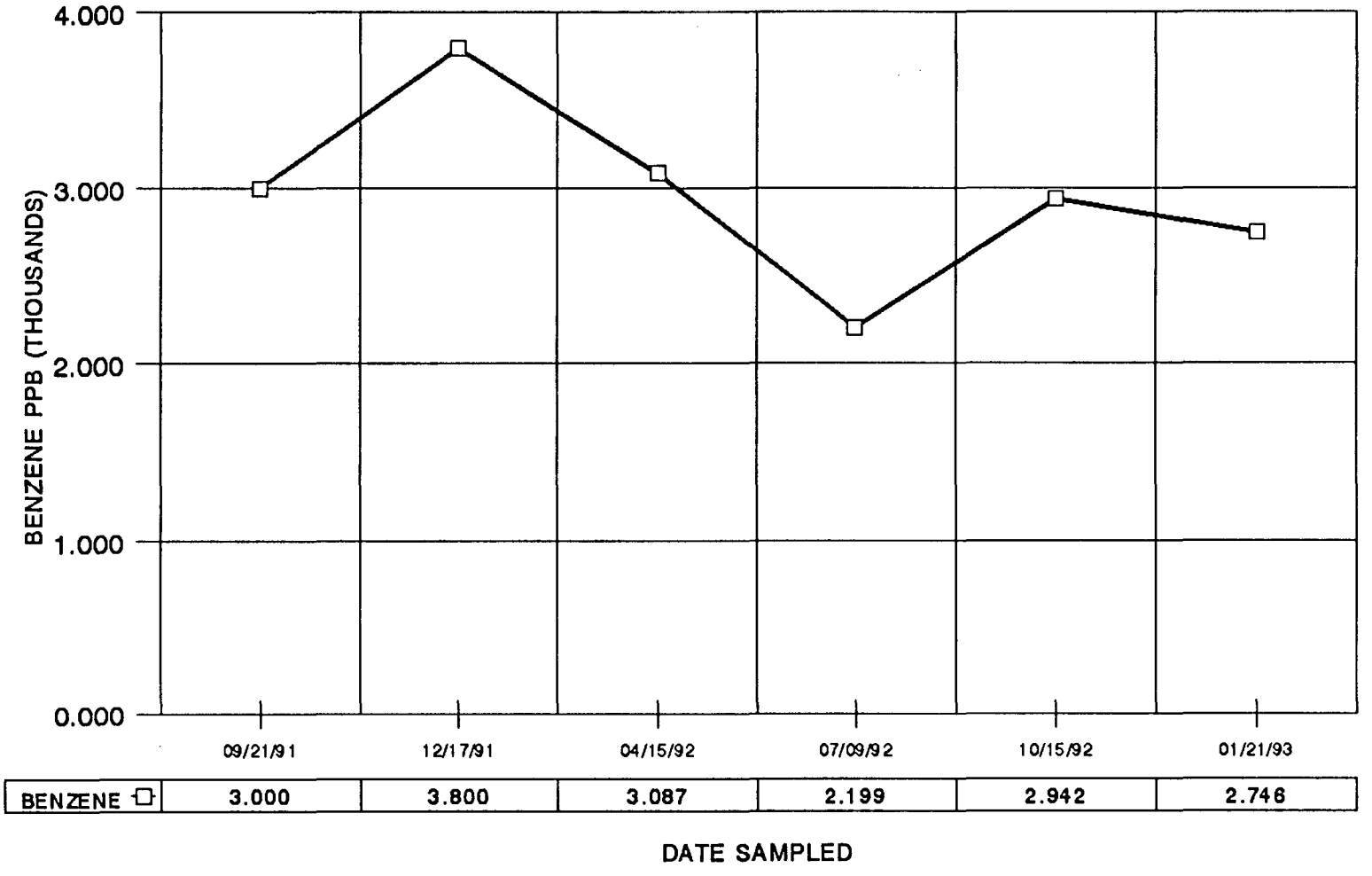


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#11 BH-34

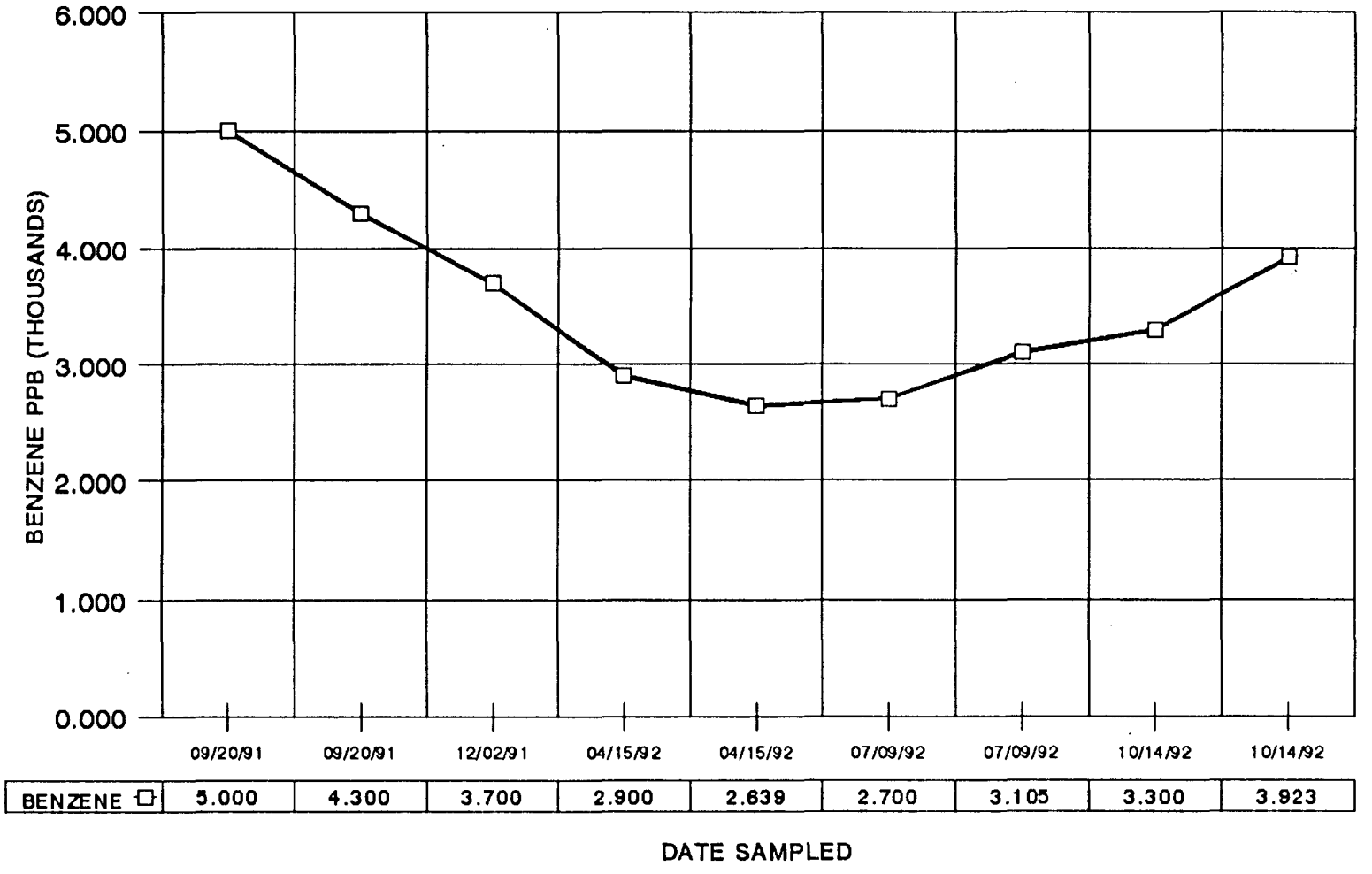


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#18 BH-41

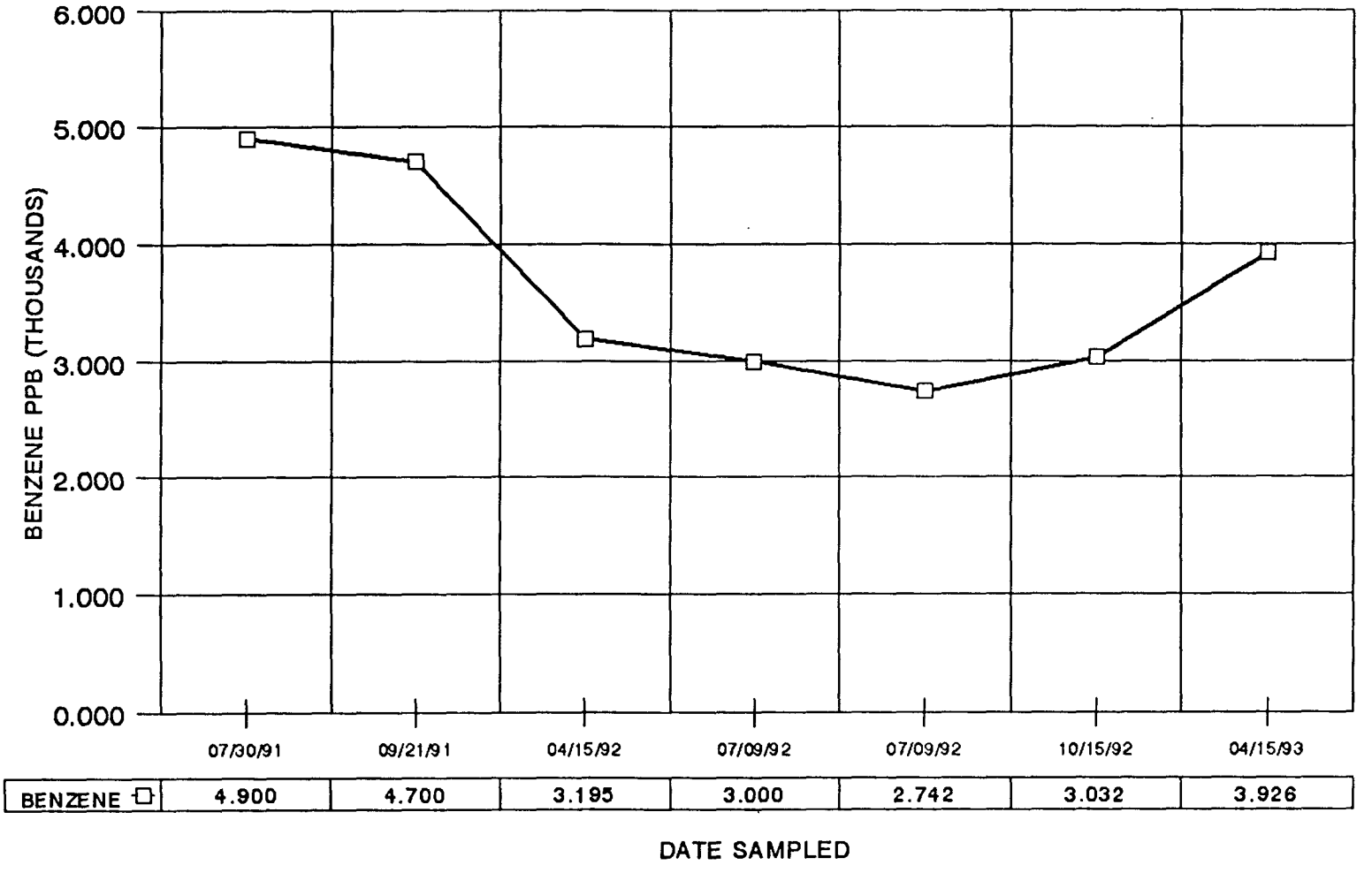


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#19 BH-42

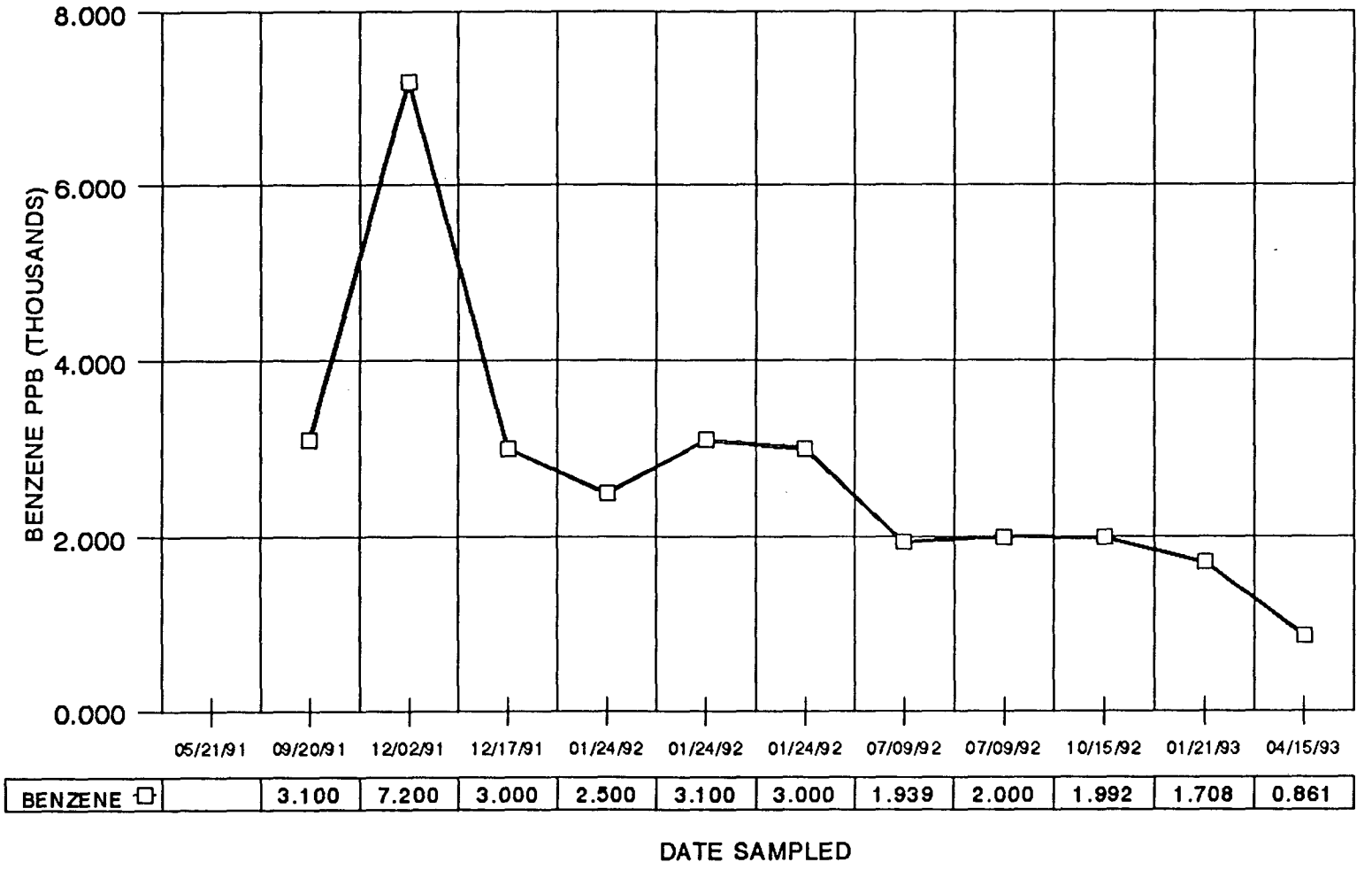


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#26 BH-49

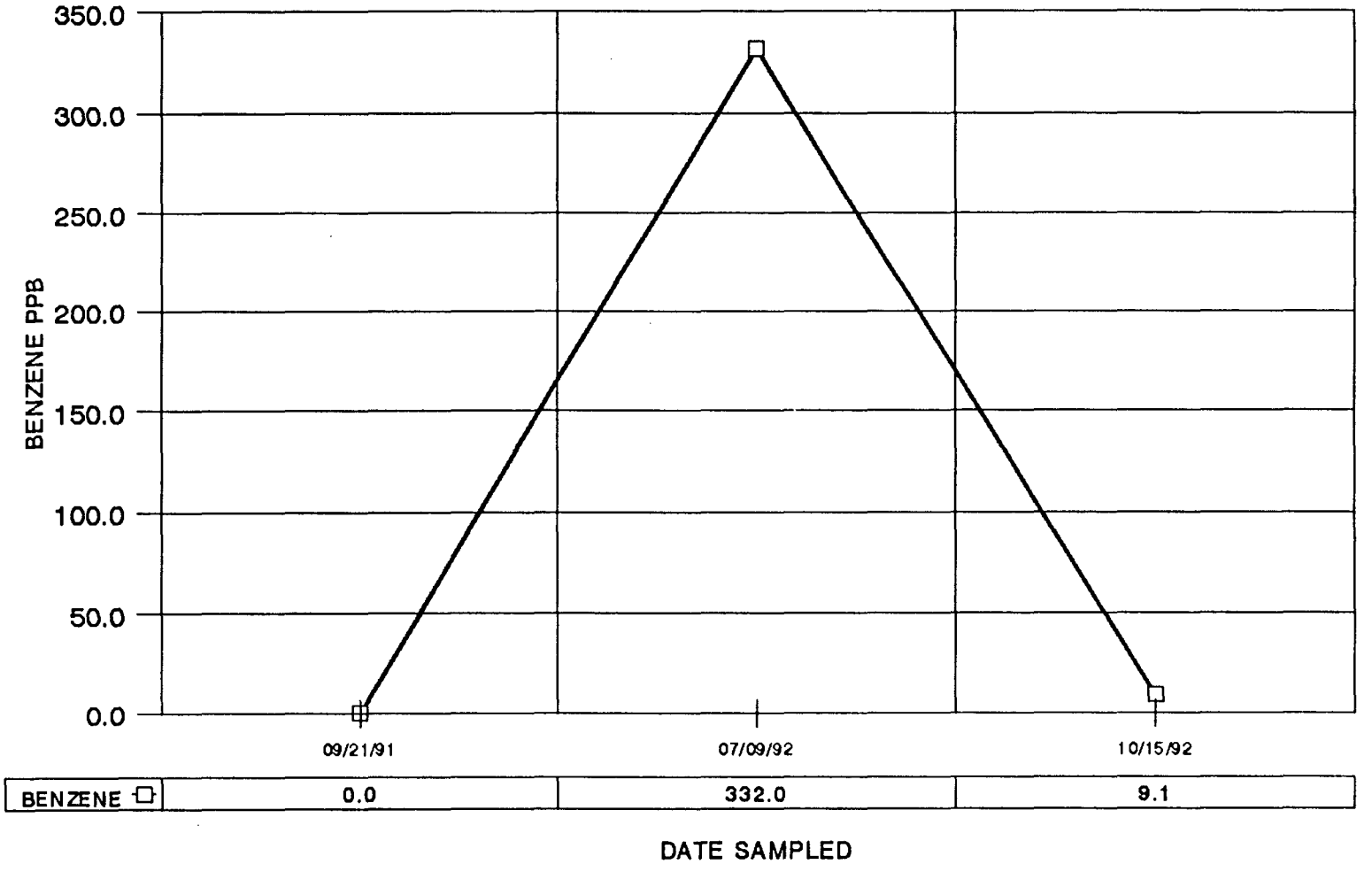


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#31 BH-55

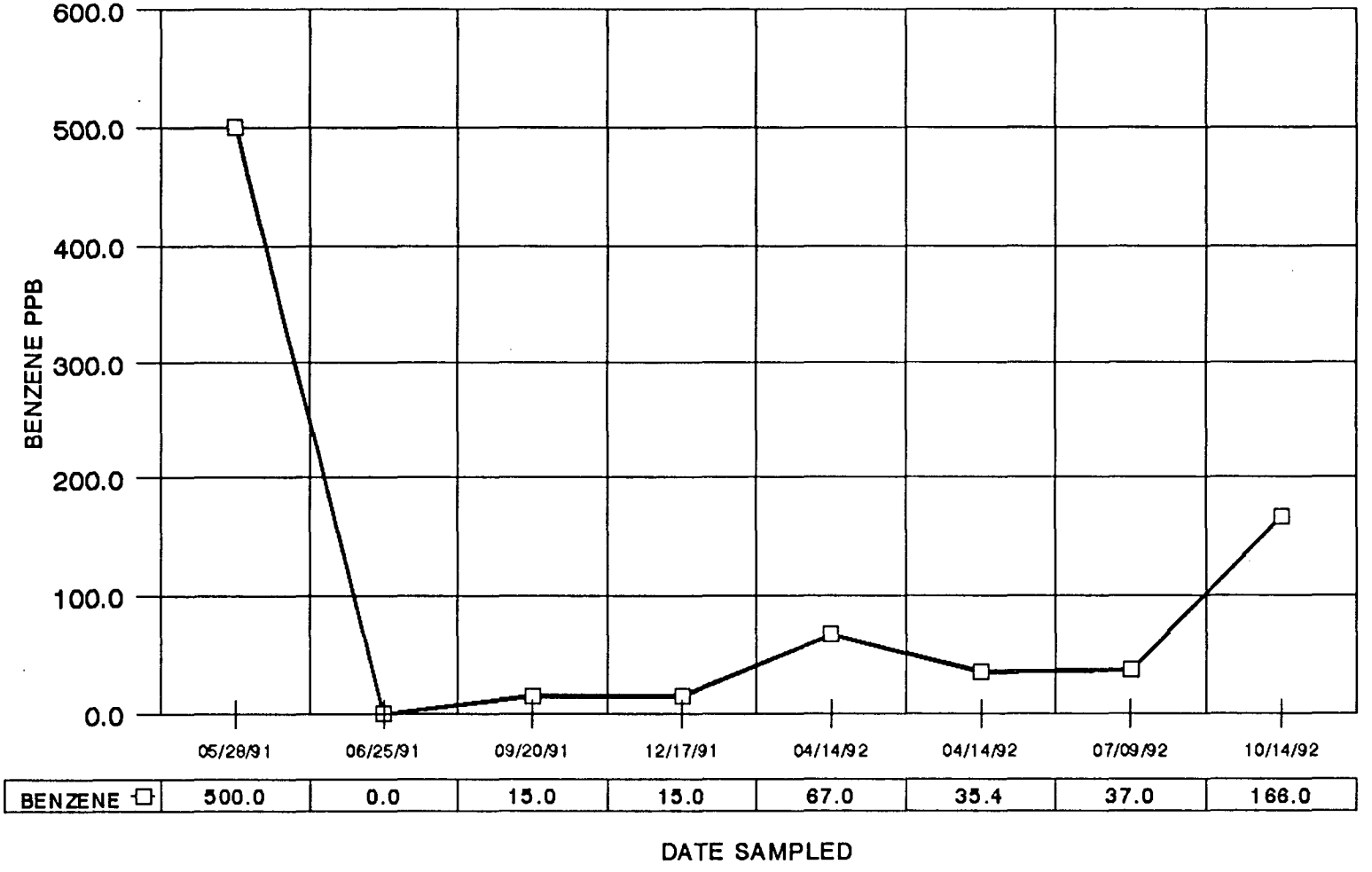


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#38 BH-61

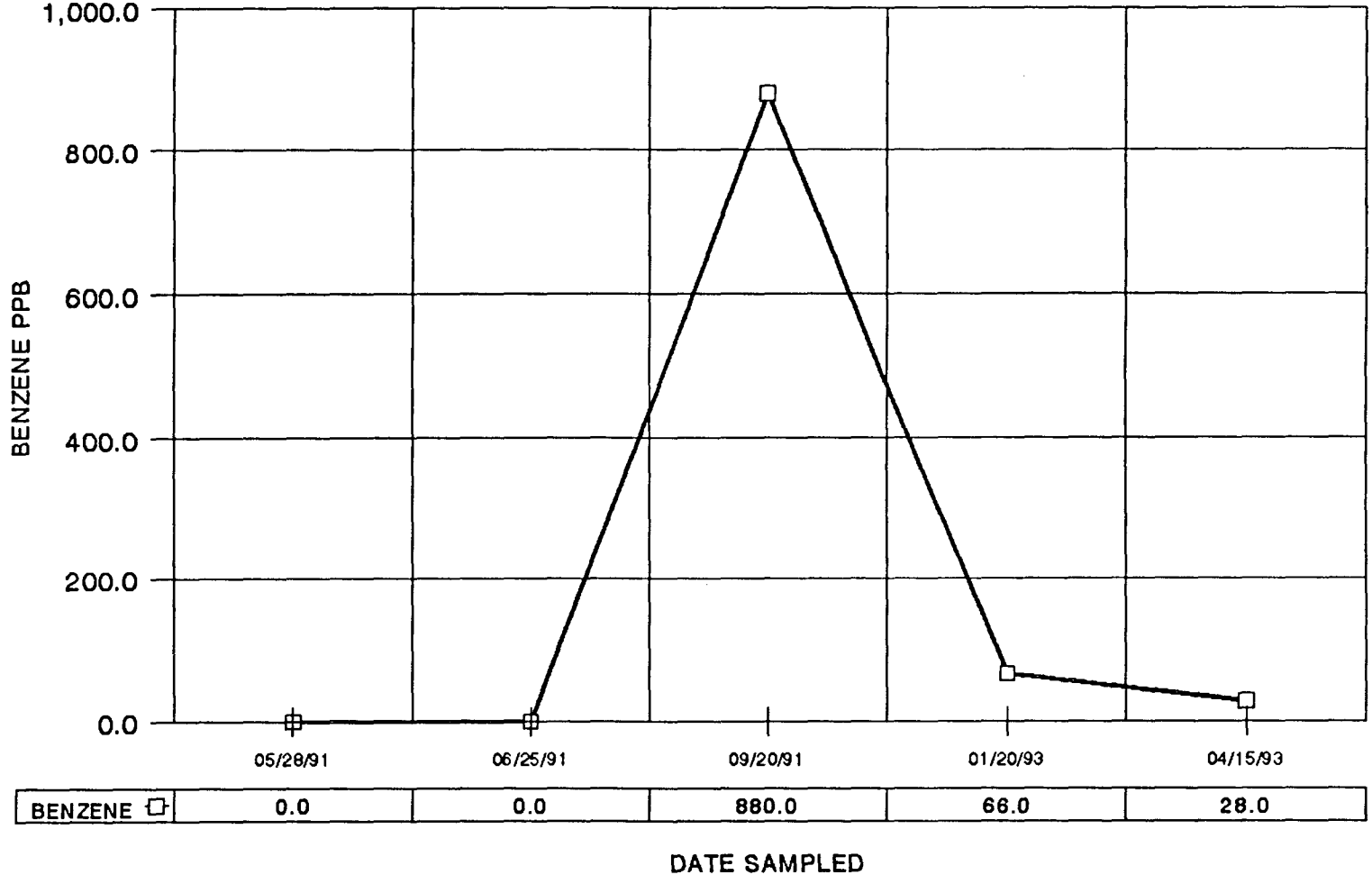


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#39 BH-62



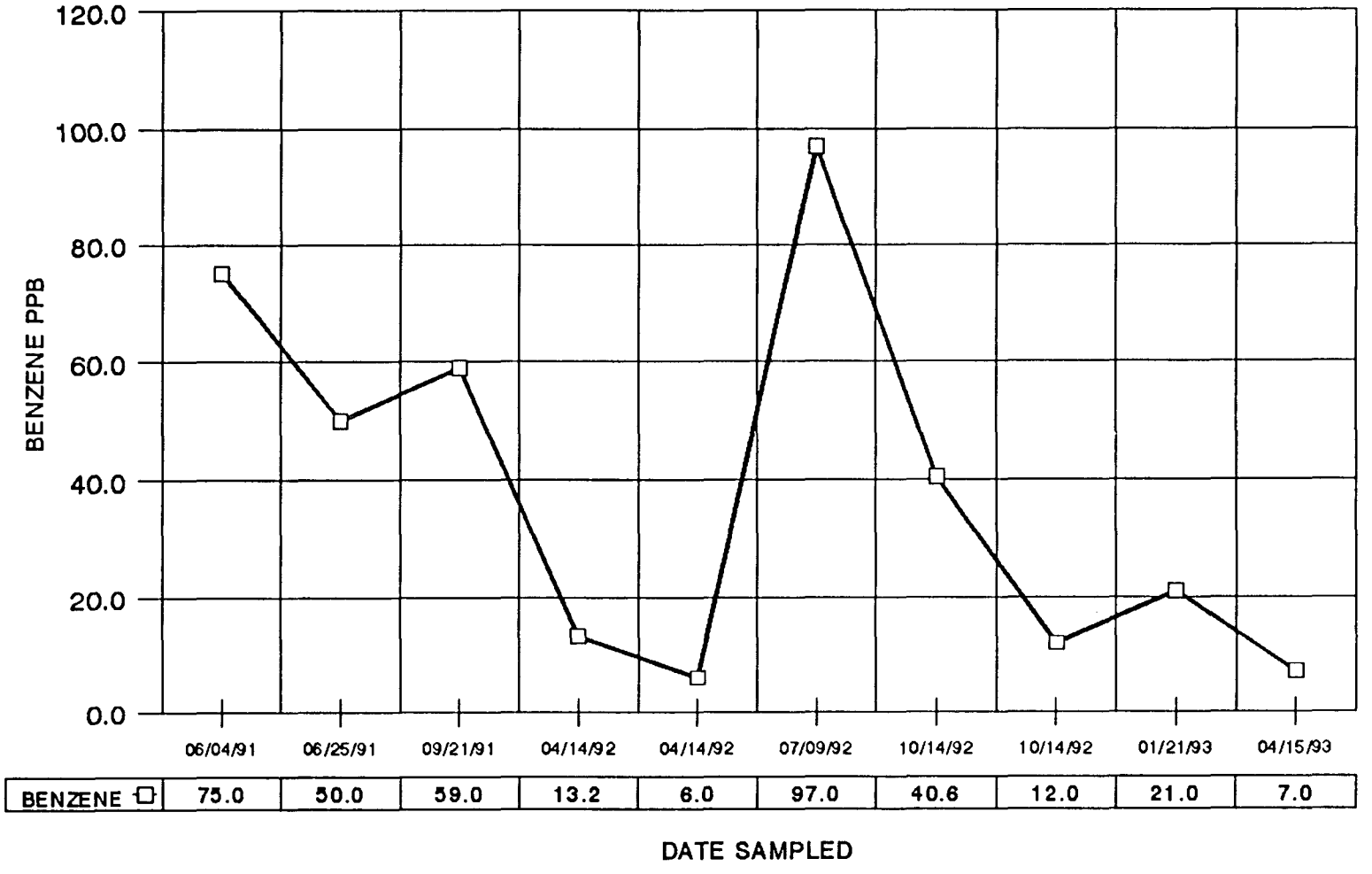
	05/28/91	06/25/91	09/20/91	01/20/93	04/15/93
BENZENE	0.0	0.0	880.0	66.0	28.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#44 BH-67

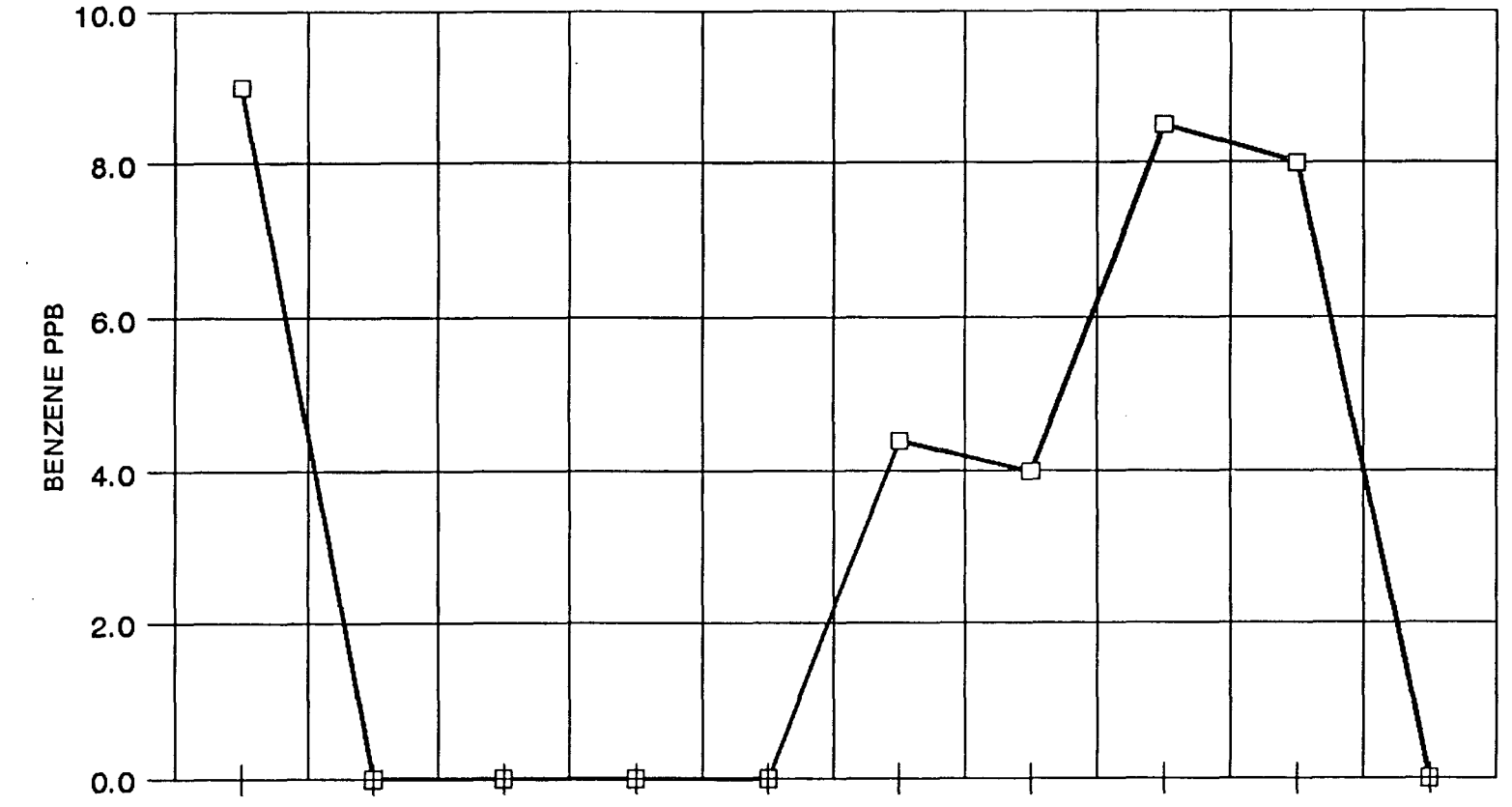


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#50 BH-73



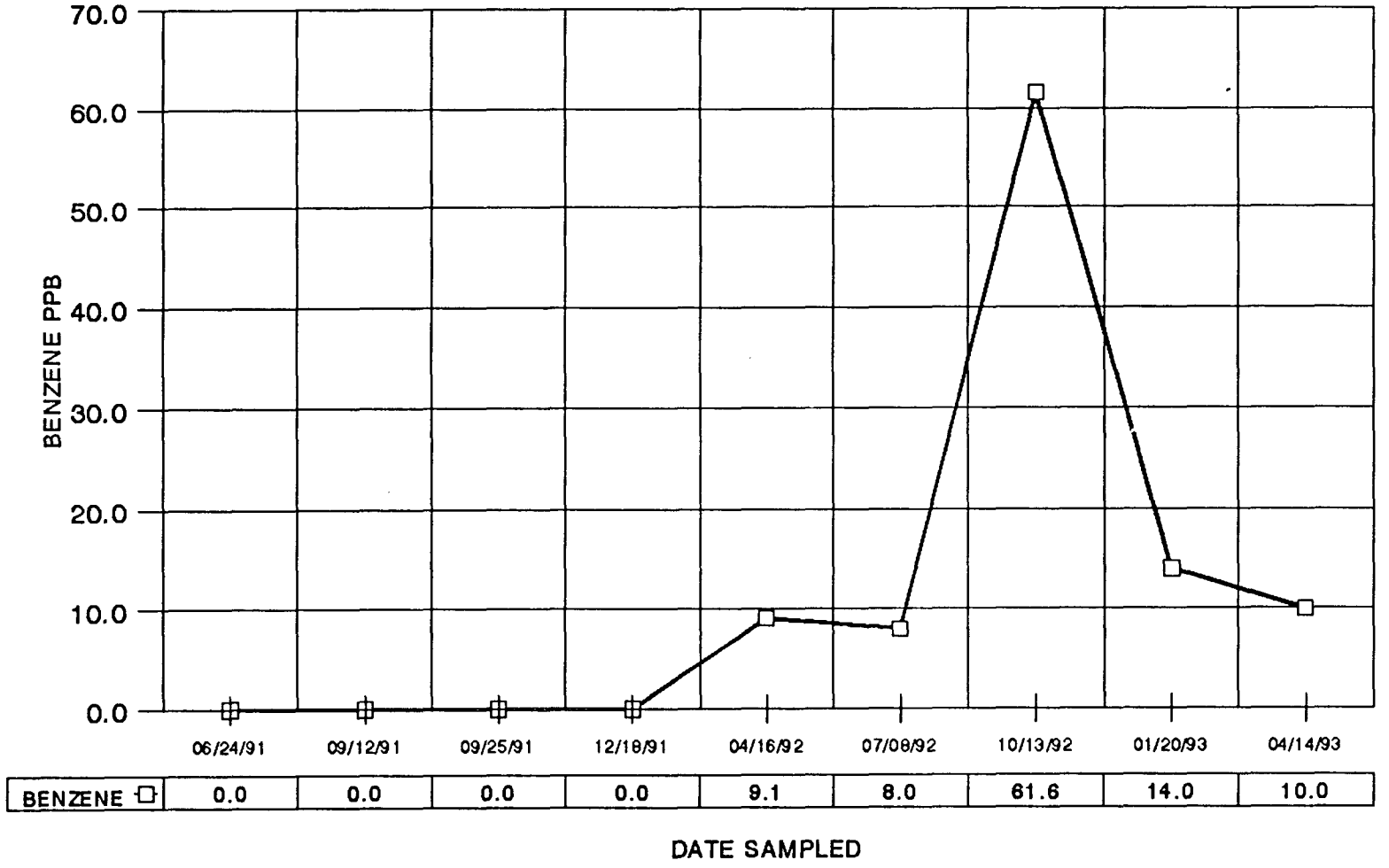
	06/07/91	06/25/91	09/25/91	12/18/91	01/24/92	04/14/92	07/09/92	10/15/92	01/21/93	04/15/93
BENZENE	9.0	0.0	0.0	0.0	0.0	4.4	4.0	8.5	8.0	0.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#54 BH-80



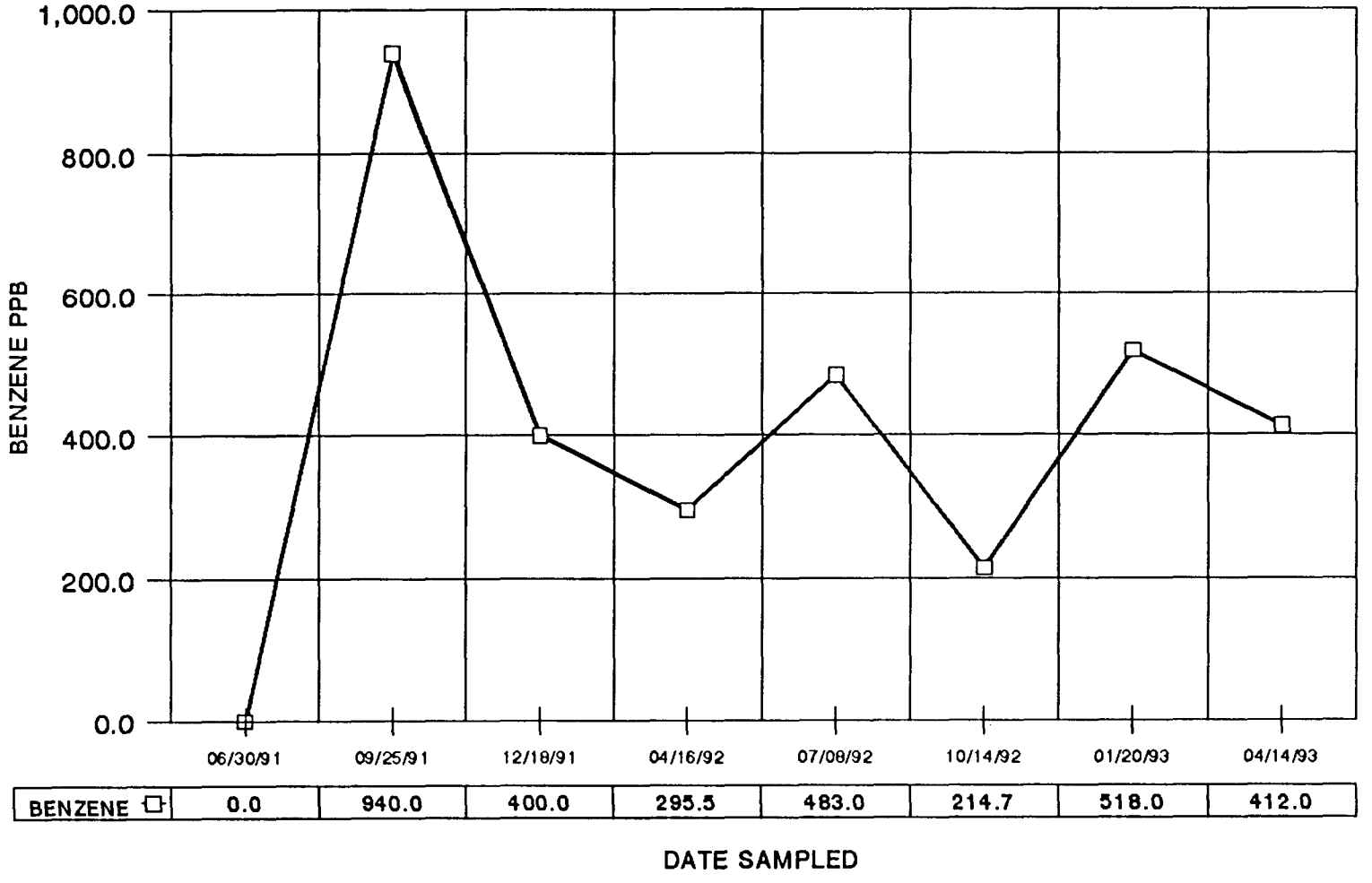
BENZENE	0.0	0.0	0.0	0.0	9.1	8.0	61.6	14.0	10.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#55 BH-81

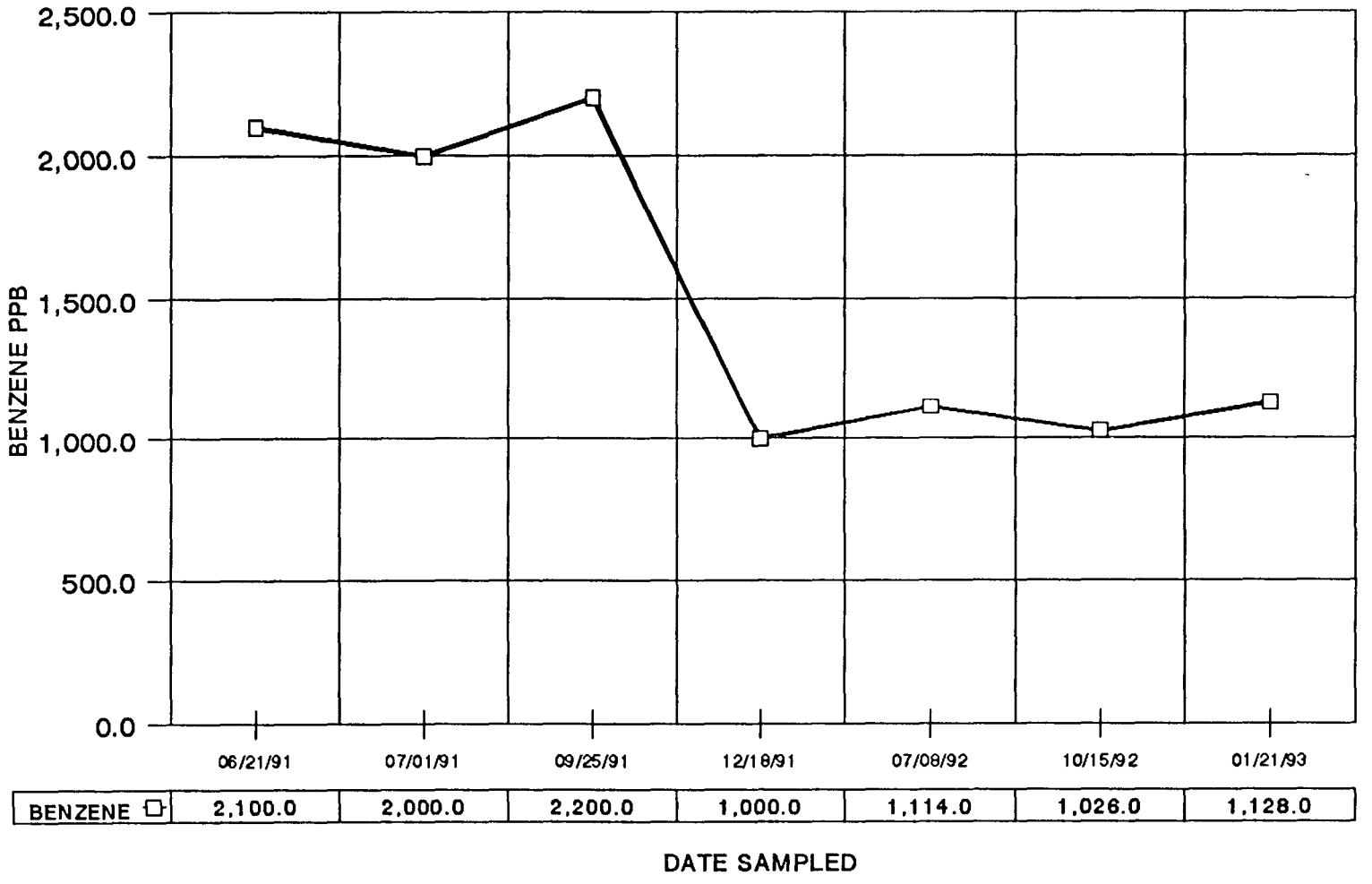


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#56 BH-82

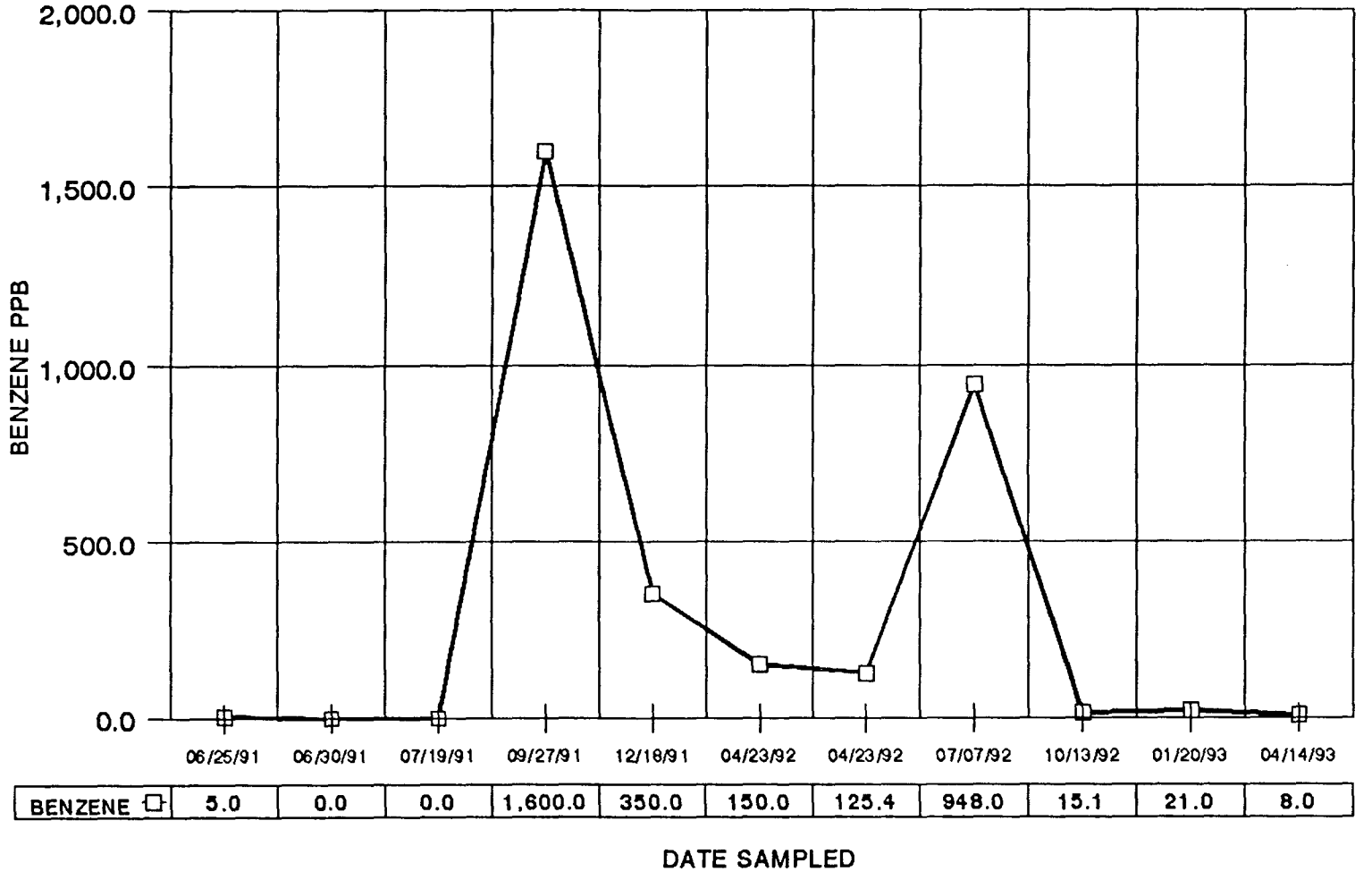


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#57 BH-83

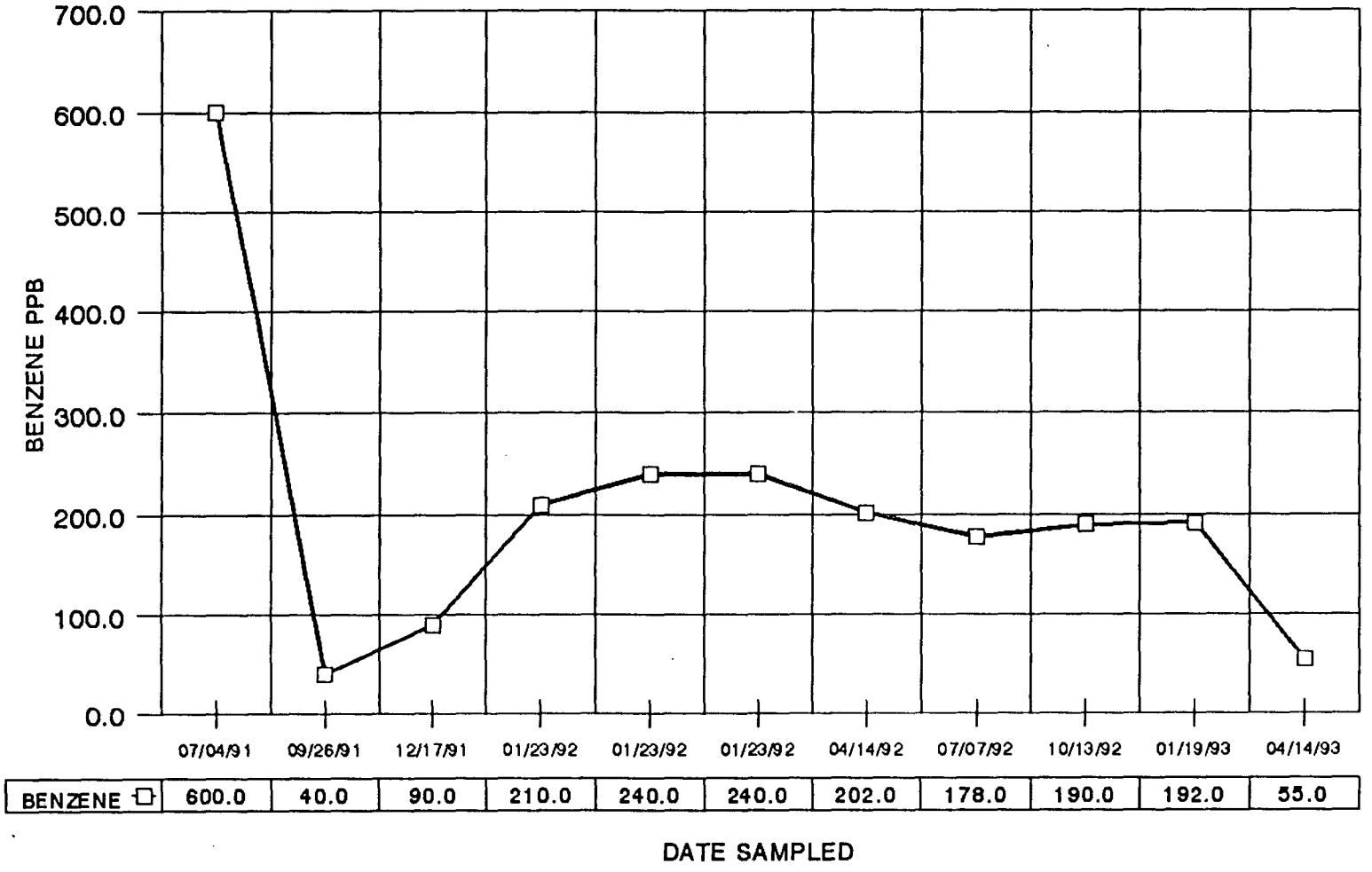


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#58 BH-84

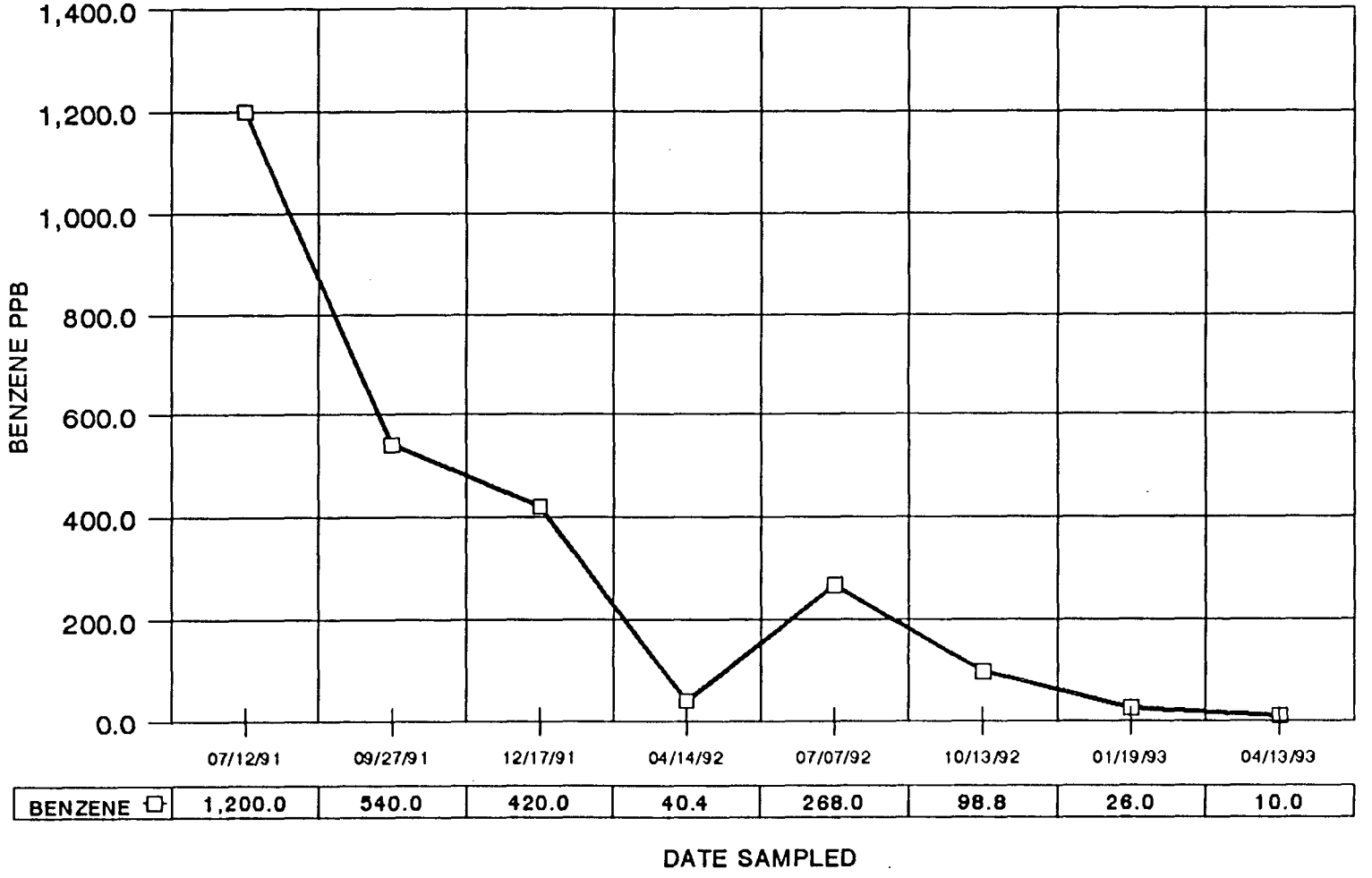


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#59 BH-85

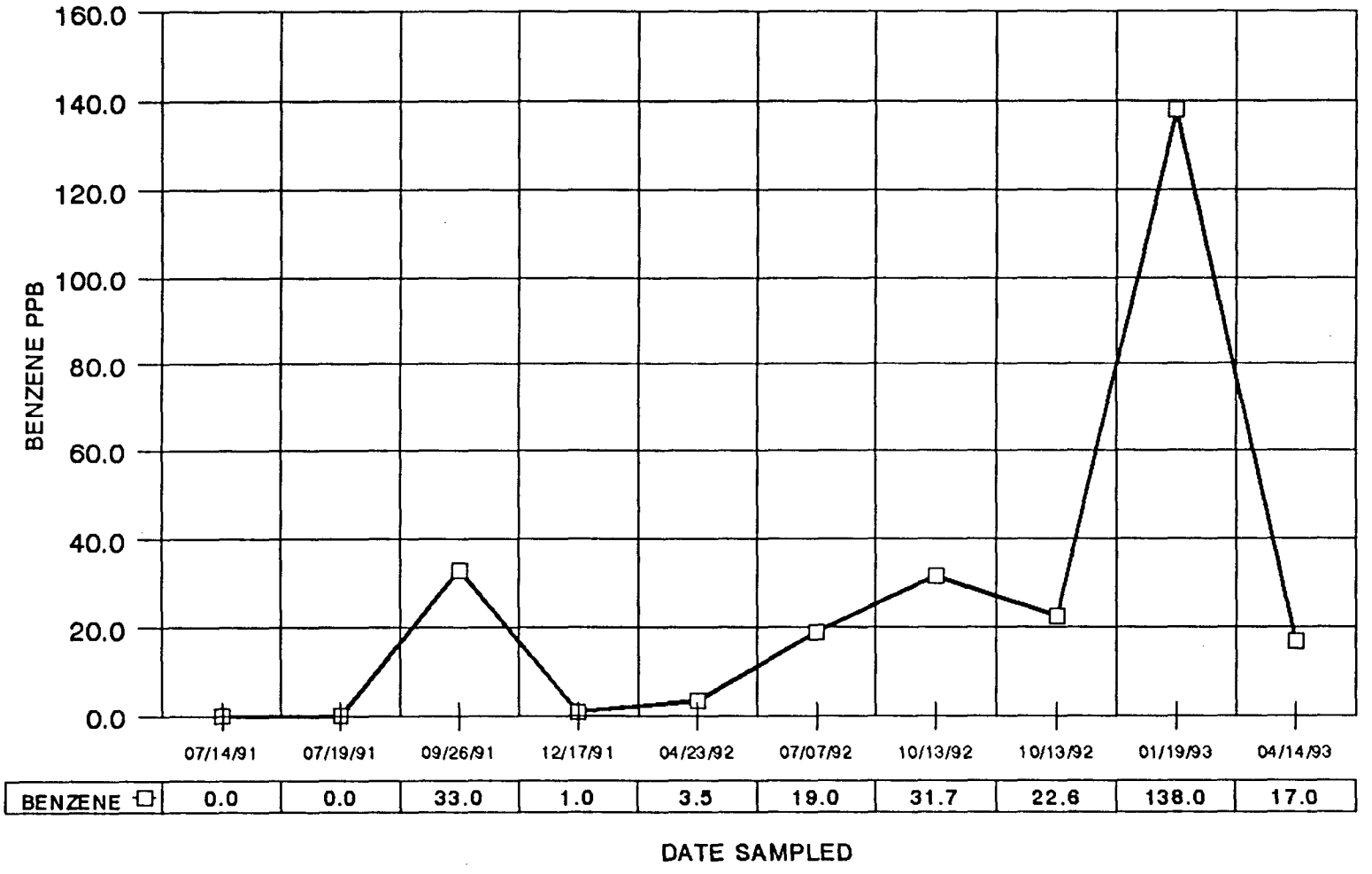


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#60 BH-86

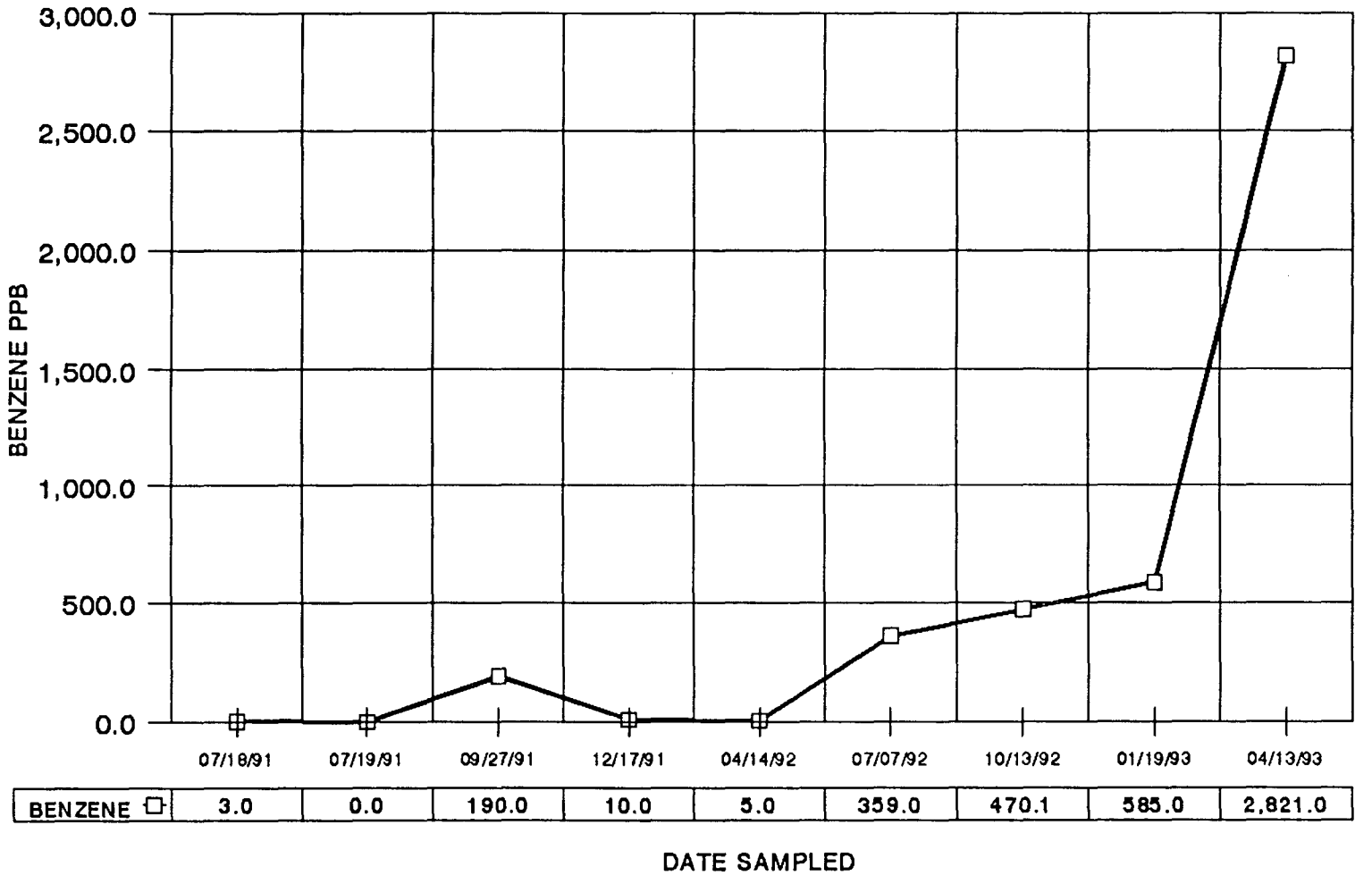


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#61A BH-87A

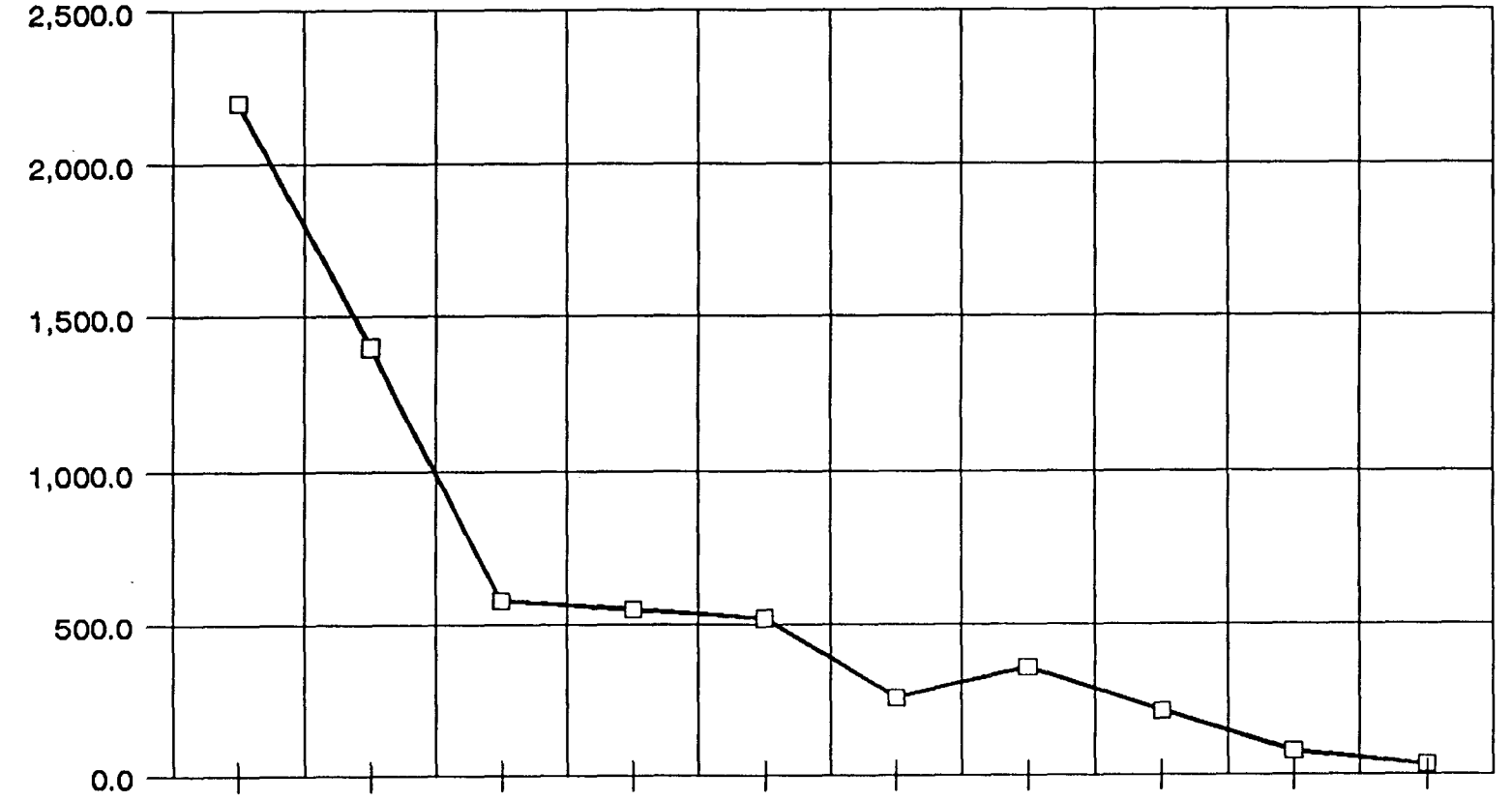


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#62 BH-88



	09/26/91	12/17/91	01/23/92	01/23/92	01/23/92	04/14/92	07/07/92	10/13/92	01/19/93	04/13/93
BENZENE	2,200.0	1,400.0	580.0	550.0	520.0	257.5	357.0	212.3	78.0	33.0

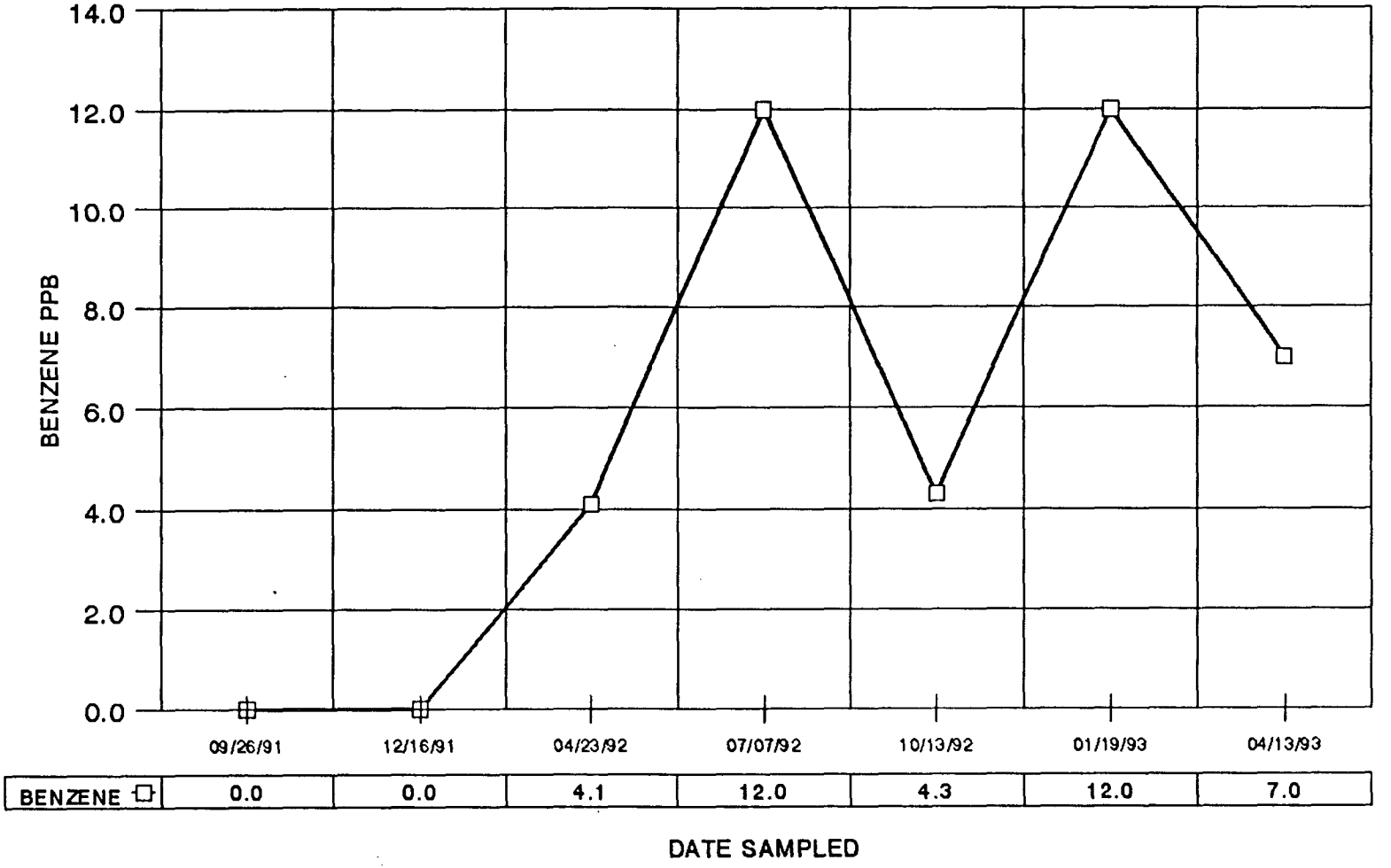
DATE SAMPLED

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#63 BH-89



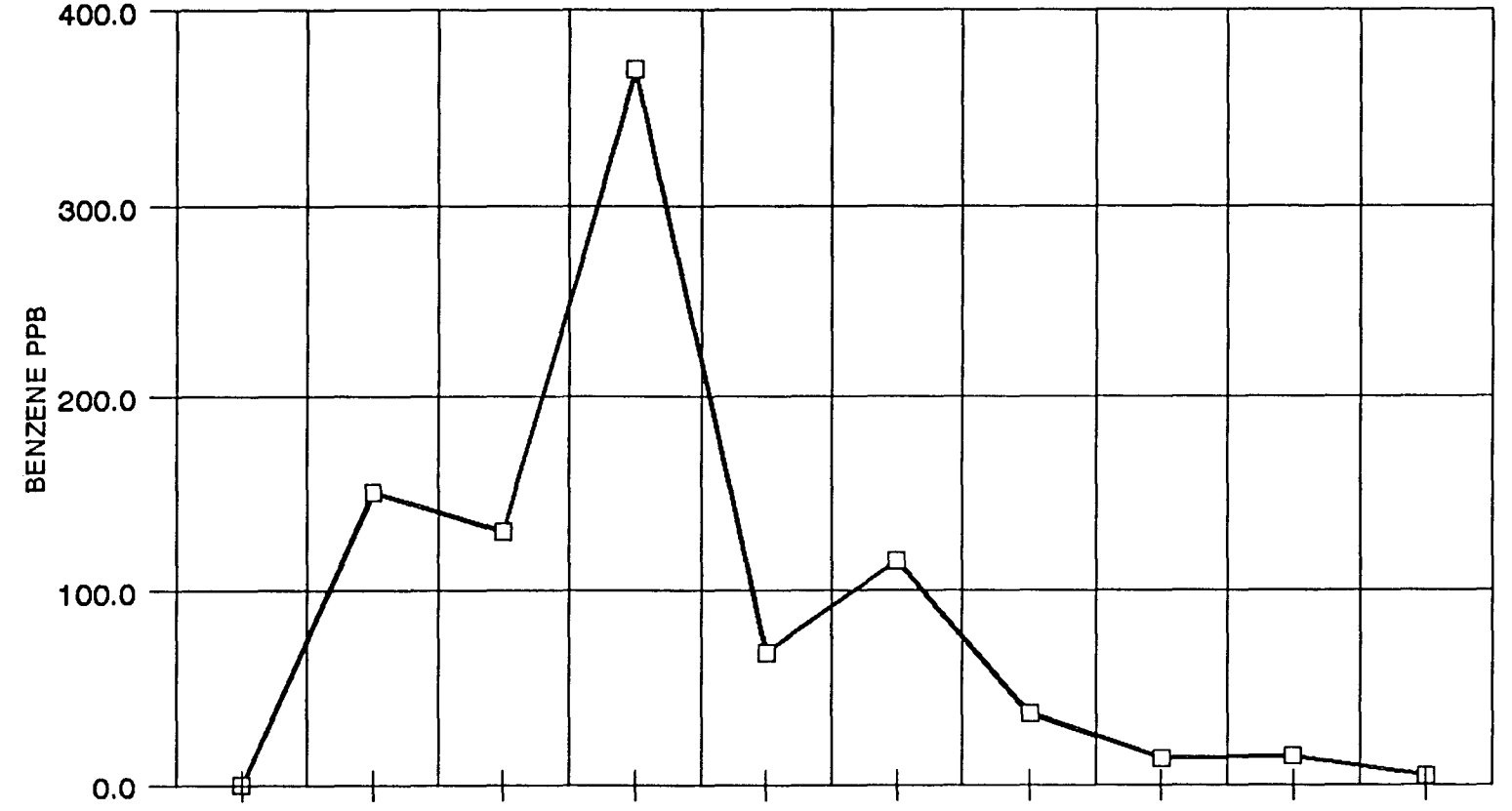
	09/26/91	12/16/91	04/23/92	07/07/92	10/13/92	01/19/93	04/13/93
BENZENE	0.0	0.0	4.1	12.0	4.3	12.0	7.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#64 BH-90



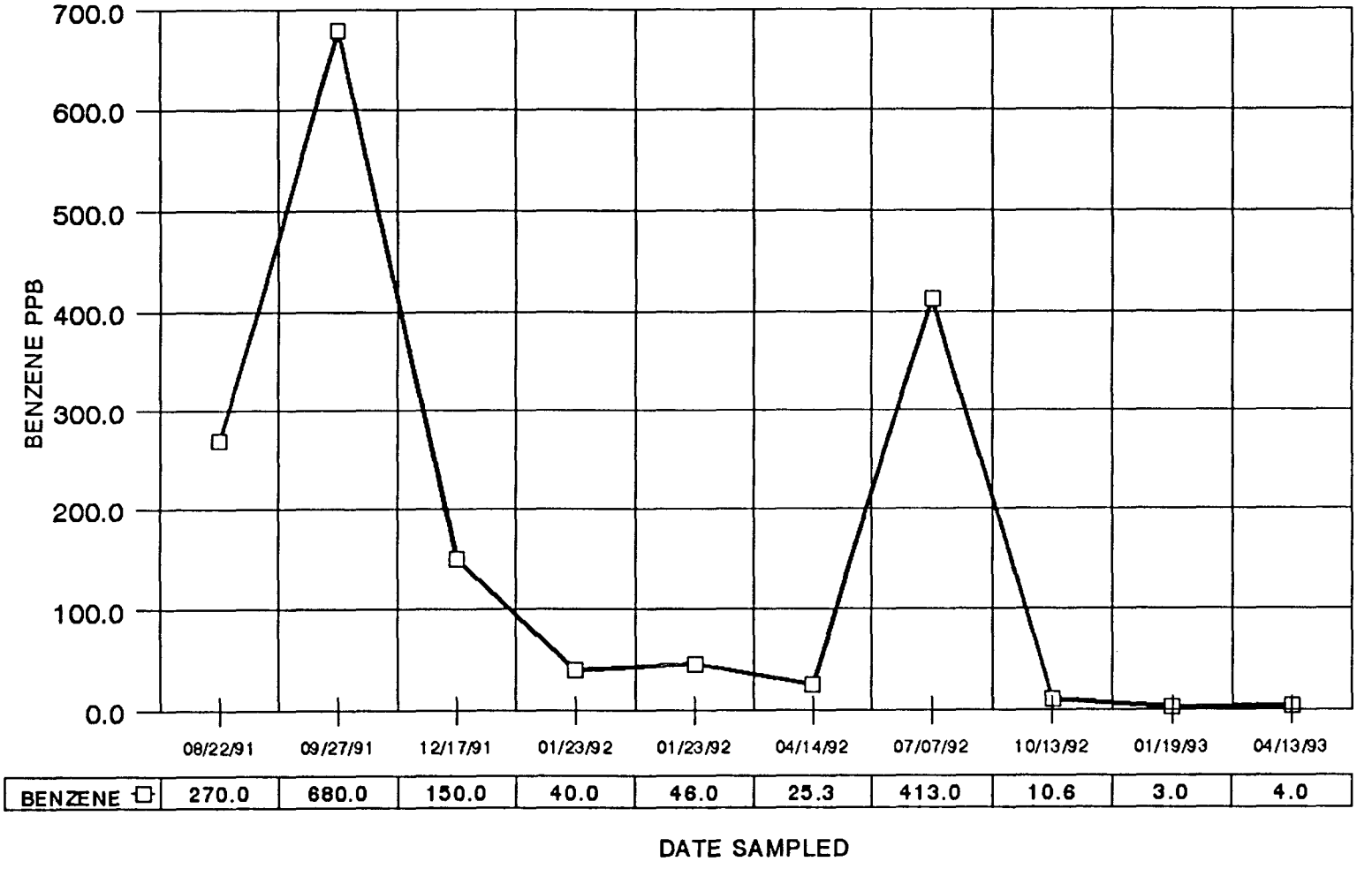
BENZENE	0.0	150.0	130.0	370.0	68.3	115.0	37.1	14.0	15.0	5.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#65A BH-91A

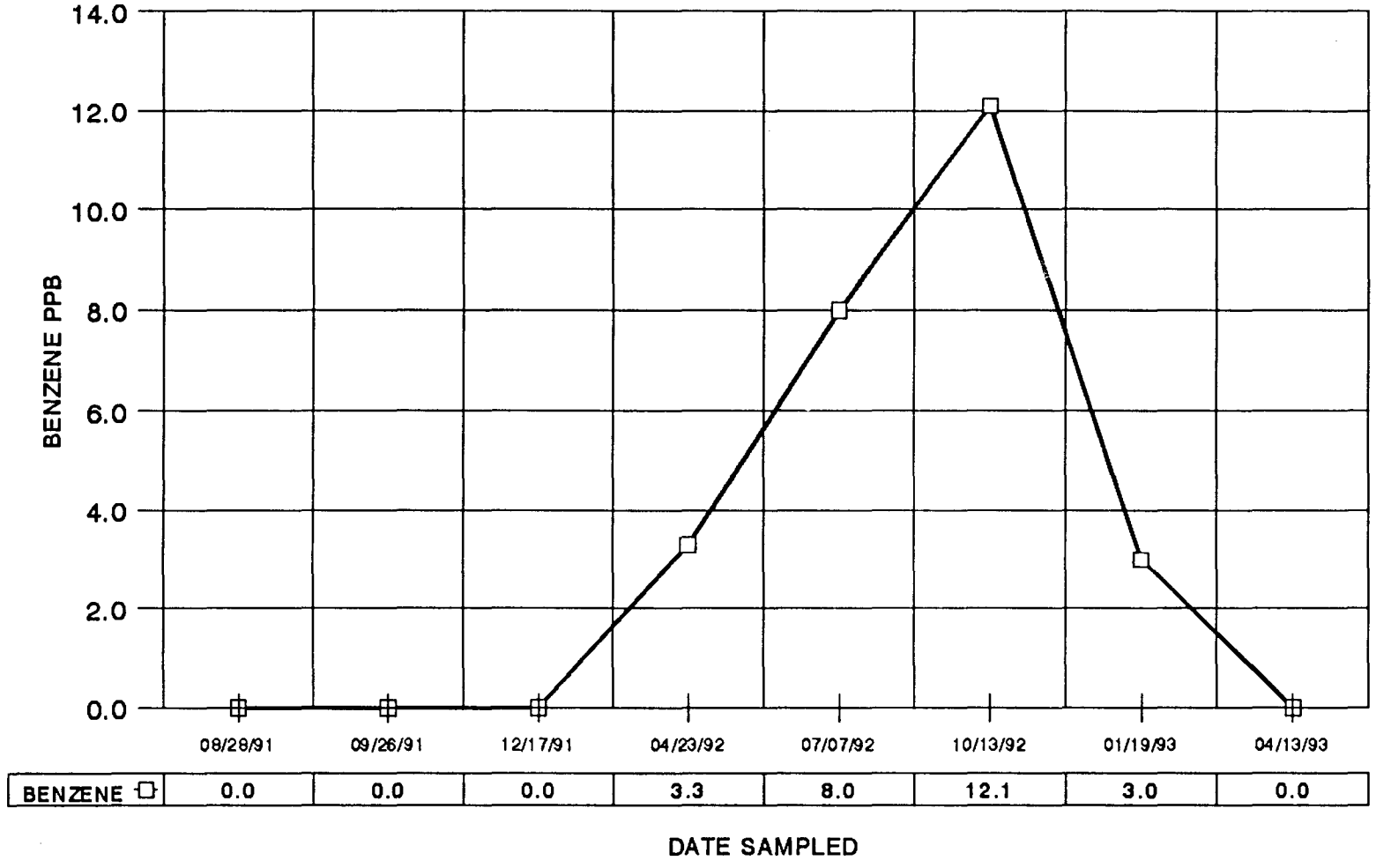


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#66 BH-92



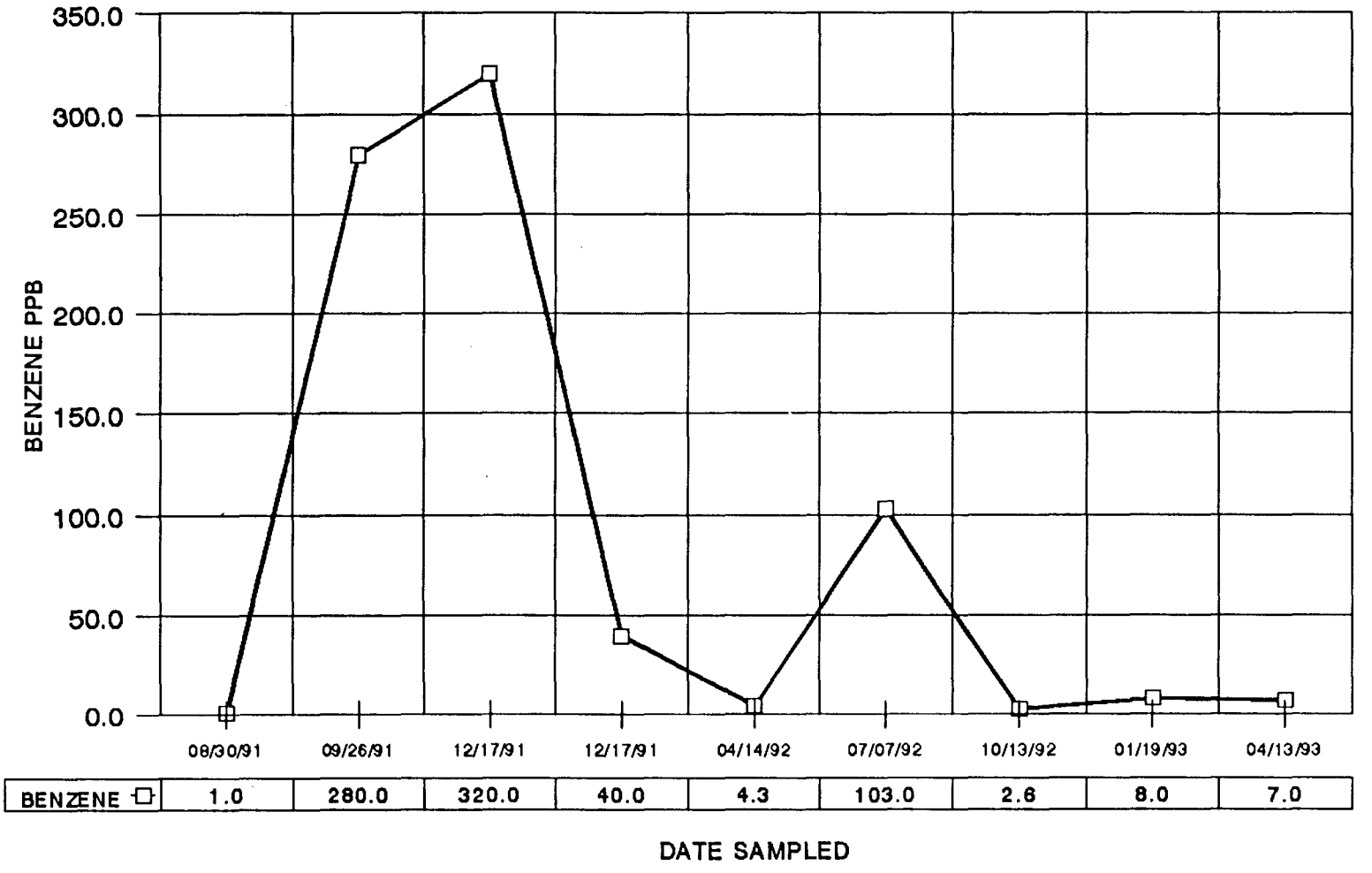
	08/28/91	09/26/91	12/17/91	04/23/92	07/07/92	10/13/92	01/19/93	04/13/93
BENZENE	0.0	0.0	0.0	3.3	8.0	12.1	3.0	0.0

BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#67 BH-93

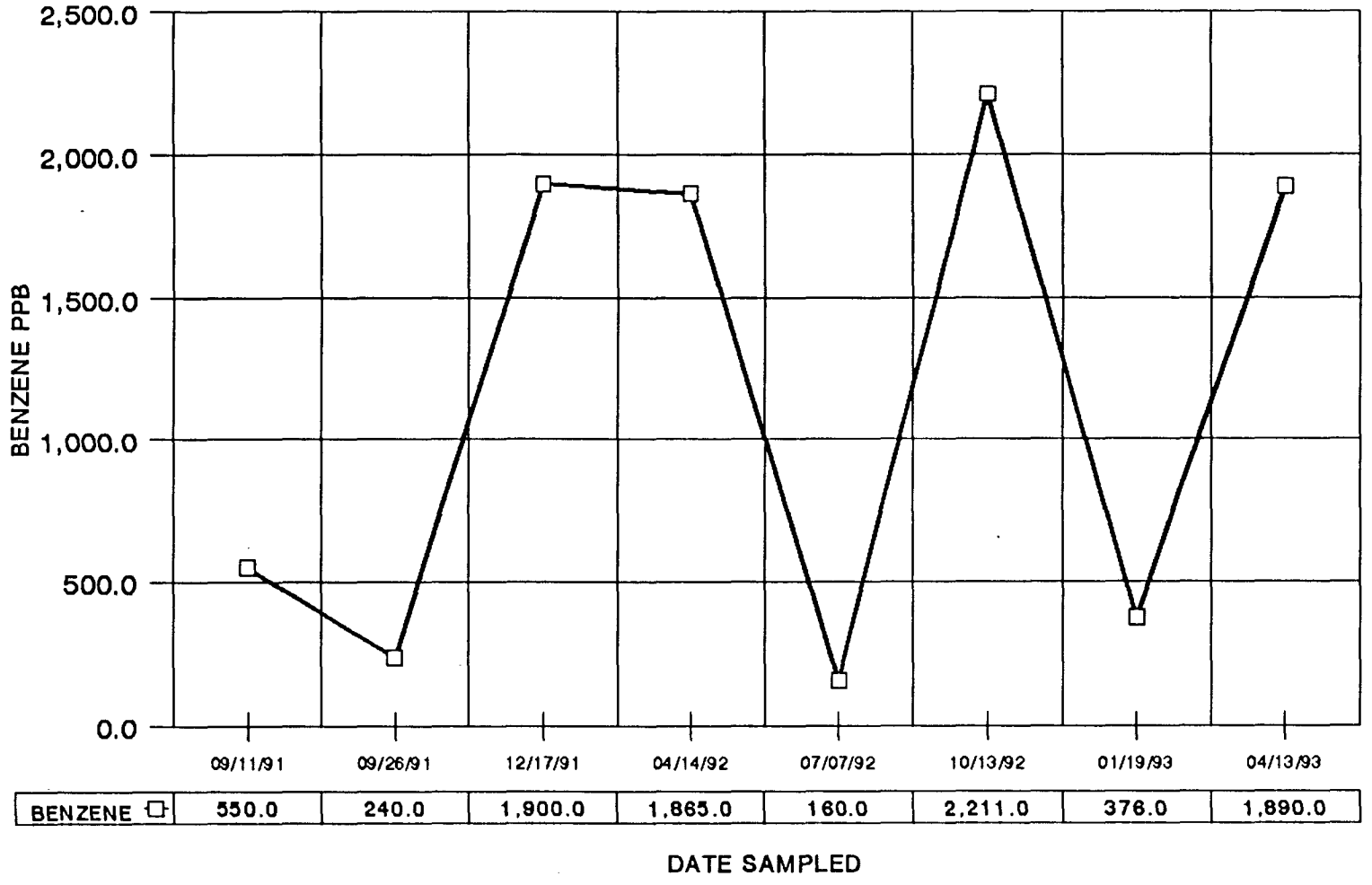


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#68 BH-94

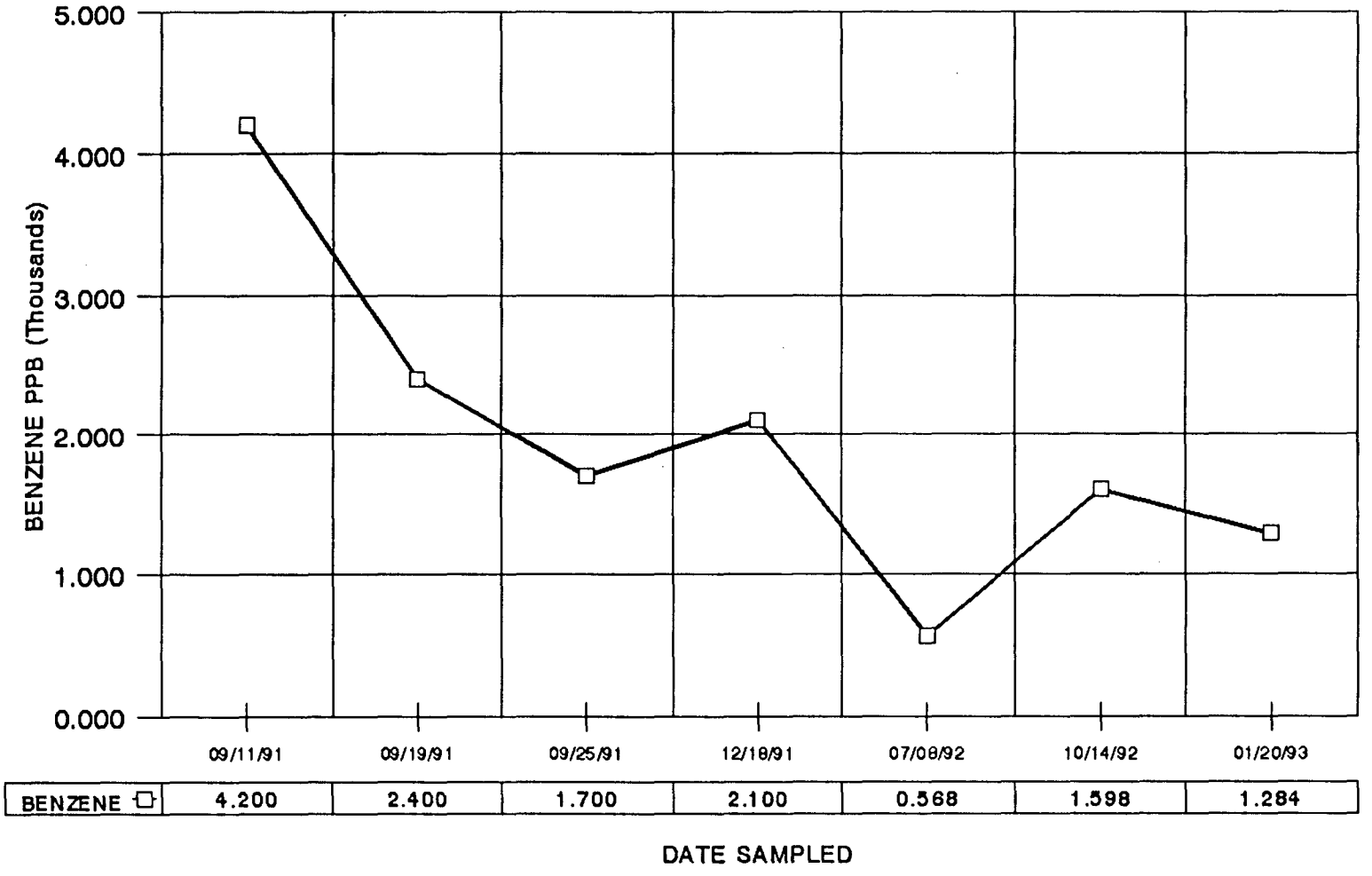


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#69 BH-95

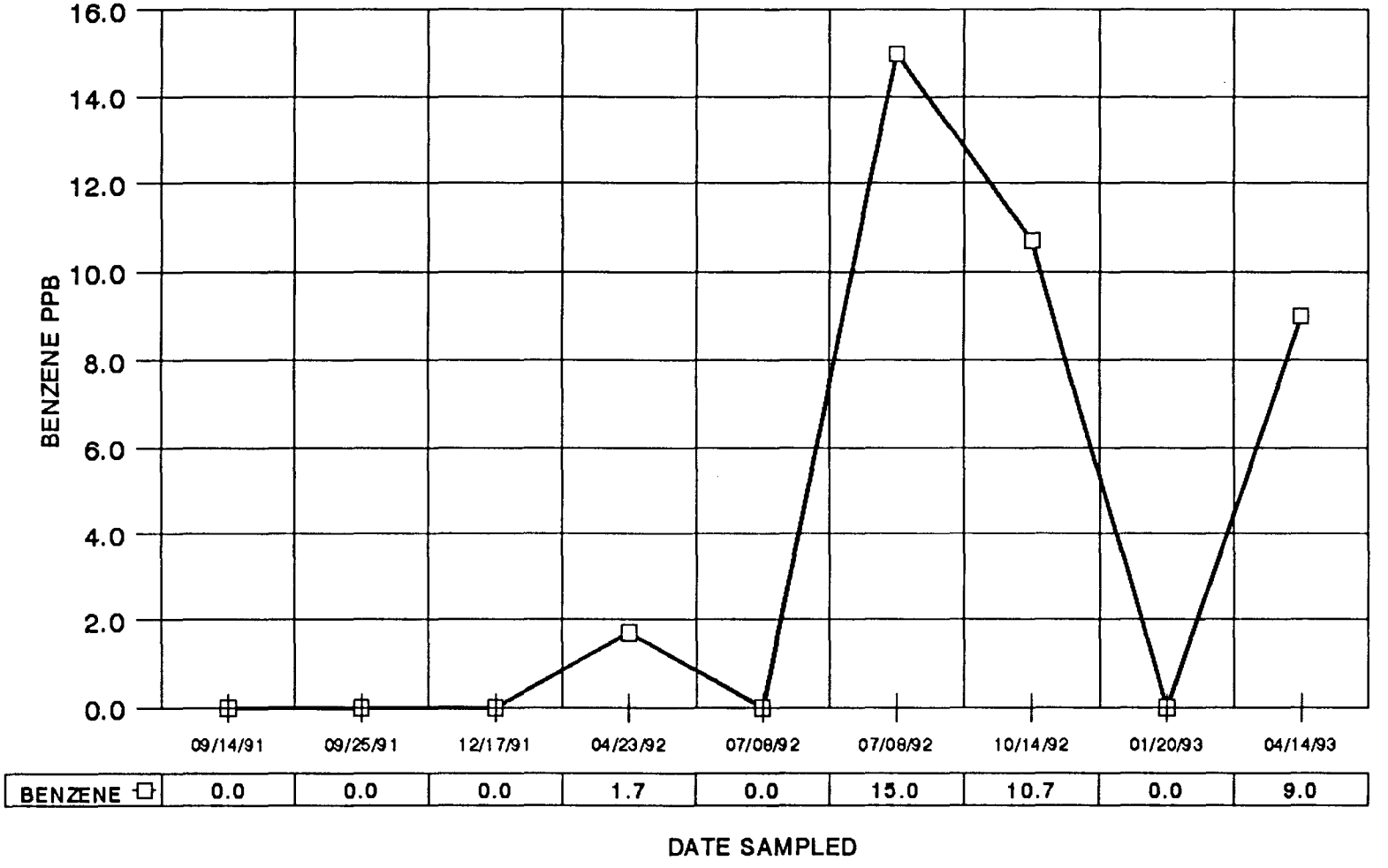


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

MW#70 BH-97

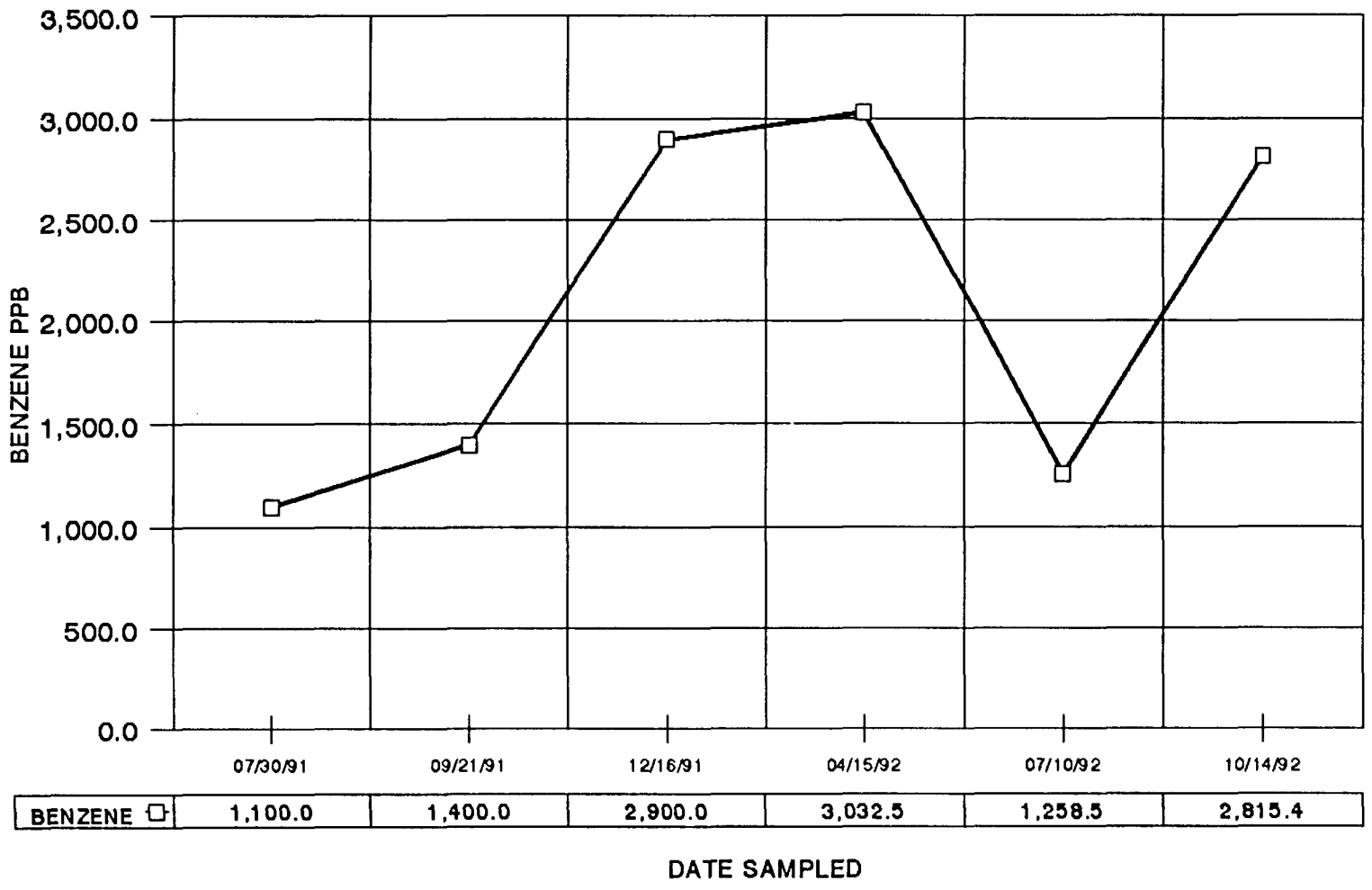


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

SUMP 11A

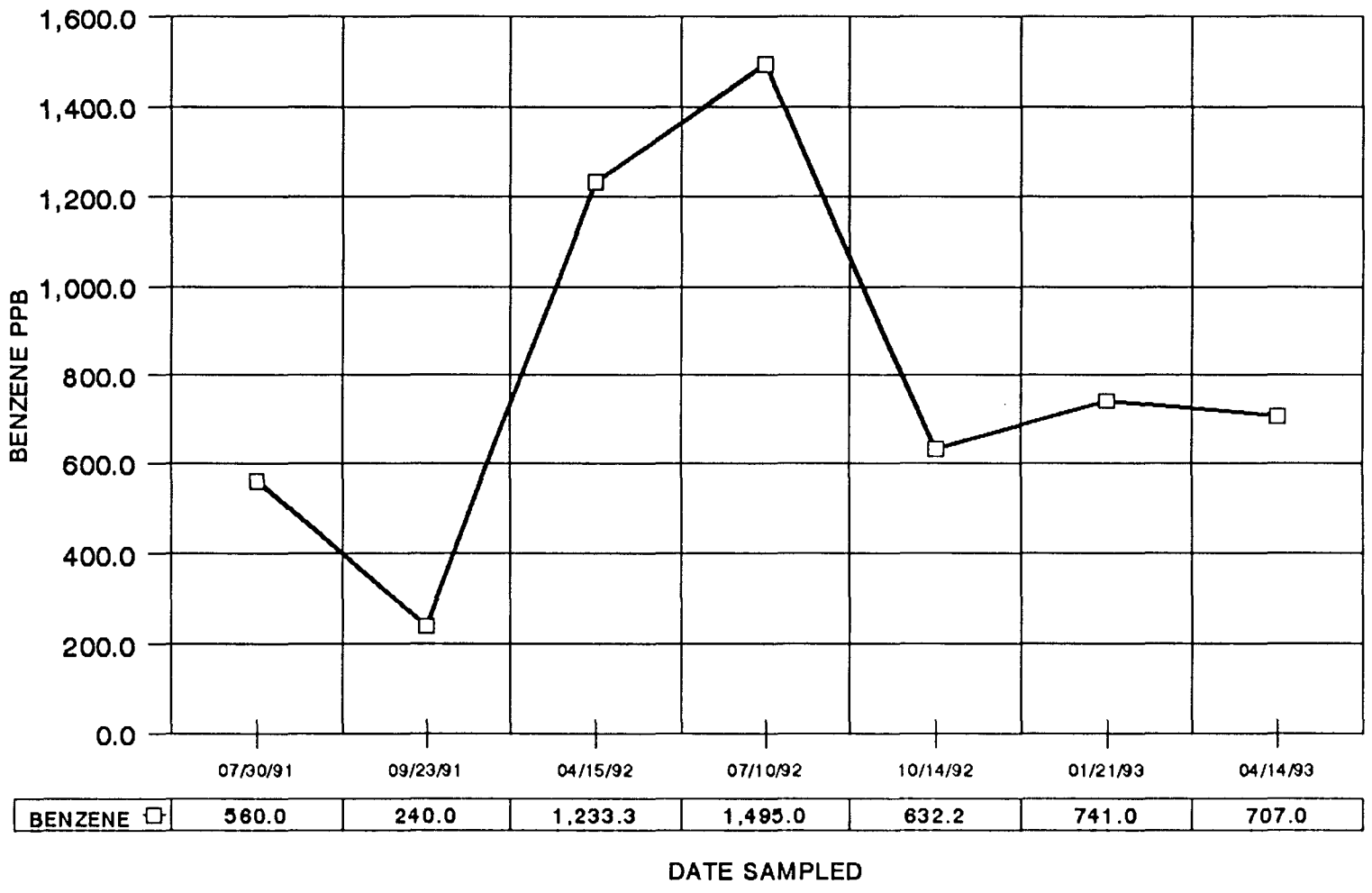


BY R.M. GRAY

INDIAN BASIN TREATMENT PROJECT

BOREHOLE WATER ANALYSIS DATA

SUMP 16A



BY R.M. GRAY

APPENDIX D

RANCHER WELL, PLANT WELL, AND SPRING LABORATORY REPORTS

Western Atlas International

CORE LABCRATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 04/15/93
TIME SAMPLED.....: 08:45
WORK DESCRIPTION...: #2 ARROYO

LABORATORY I.D...: 930603-0002
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	13.5	0.5	mg/L	325.2 (1)	05/06/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/24/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.....: MARATHON OIL
DATE SAMPLED.....: 04/15/93
TIME SAMPLED.....: 09:07
WORK DESCRIPTION...: #4 BIEBBLE

LABORATORY I.D...: 930603-0003
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	11.4	0.5	mg/L	325.2 (1)	05/06/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/24/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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A Litton Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.........: MARATHON OIL
DATE SAMPLED.......: 04/15/93
TIME SAMPLED.......: 08:25
WORK DESCRIPTION...: #1 LYMAN

LABORATORY I.D...: 930603-0001
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	13.0	0.5	mg/L	325.2 (1)	05/06/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/24/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.........: MARATHON OIL
DATE SAMPLED.......: 04/15/93
TIME SAMPLED.......: 07:38
WORK DESCRIPTION...: #7 SW-1

LABORATORY I.D...: 930603-0004
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	20	1	mg/L	325.2 (1)	05/05/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/24/93	MLD
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
05/11/93

JOB NUMBER: 930603 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

CLIENT I.D.........: MARATHON OIL
DATE SAMPLED.......: 04/15/93
TIME SAMPLED.......: 07:45
WORK DESCRIPTION...: #8 SW-2

LABORATORY I.D...: 930603-0005
DATE RECEIVED....: 04/20/93
TIME RECEIVED....: 10:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	363	3	mg/L	325.2 (1)	05/05/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	04/24/93	MLD
Benzene	4	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

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CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Marathon Oil	PROJECT NAME/NUMBER:
SEND REPORT TO: Al Learned	**BILLING INFORMATION**
ADDRESS: PO Box 552	BILL TO:
Midland, TX 79702	ADDRESS:
PHONE: (915) 687-8312	PHONE:
FAX: (915) 687-8337	FAX: PO NO.:

NUMBER OF CONTAINERS

ANALYSIS / METHOD REQUEST: BTEX, Cl-

LAB JOB NO. 930603

SAMPLE NO.	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	PRES.	REMARKS / PRECAUTIONS
#1	#1 Lyman	4-15-93	08:25	water	40ml VOA		
#2	#2 Arroyo	4/15/93	08:45	water	" "		
#4	#4 Bicbbk	4/15/93	09:07	water	" "		
#7	#7 SW-1	4/15/93	07:38	water	" "		
#8	#8 SW-2	4/15/93	07:45	water	" "		
	Equip Blk (Bottled Drinking Water)	4/15/93	11:15	water	" "		
	BH-89 mw-63	4/13/93	1445	water	" "		
	BH-94 mw-68	4/13/93	1500	water	" "		
	BH-73 mw-50	4/15/93	750	water	" "		
	BH-40 mw-17	4/15/93	922	water	" "		

SAMPLER: RM Gray, Al Learned, L. Church

SHIPMENT METHOD: Federal Express

AIRBILL NO.: 236007968O

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: Lorri L. Church	4/19/93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: Lorri L. Church / SWL	TIME 1600	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	2. RECEIVED BY:	DATE	3. RECEIVED BY:	DATE
SIGNATURE: Beth Chism	4.20.93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: Core Labs	TIME 10:15	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

ORIGINAL

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A Litton Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
06/04/93

JOB NUMBER: 930780 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

LIENT I.D.....: MARATHON OIL
ATE SAMPLED.....: 05/12/93
TIME SAMPLED.....: 08:15
WORK DESCRIPTION...: #1 LYMAN

LABORATORY I.D...: 930780-0001
DATE RECEIVED....: 05/13/93
TIME RECEIVED....: 09:45
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
hloride (Unfilt.)	13.0	0.5	mg/L	325.2 (1)	05/19/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	05/14/93	KJA
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
06/04/93

JOB NUMBER: 930780 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

IENT I.D.....: MARATHON OIL
TE SAMPLED.....: 05/12/93
TIME SAMPLED.....: 08:40
WORK DESCRIPTION...: #2 ARROYO

LABORATORY I.D...: 930780-0002
DATE RECEIVED....: 05/13/93
TIME RECEIVED....: 09:45
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
loride (Unfilt.)	11.0	0.5	mg/L	325.2 (1)	05/19/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	05/14/93	KJA
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
06/04/93

JOB NUMBER: 930780 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

IENT I.D.....: MARATHON OIL
TE SAMPLED.....: 05/12/93
TIME SAMPLED.....: 09:51
WORK DESCRIPTION...: #7 SW-1

LABORATORY I.D...: 930780-0003
DATE RECEIVED....: 05/13/93
TIME RECEIVED....: 09:45
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
loride (Unfilt.)	19.5	0.5	mg/L	325.2 (1)	05/19/93	KDS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	05/14/93	KJA
Benzene	ND	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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a Baker Hughes company

CORE LABORATORIES

LABORATORY TESTS RESULTS
06/04/93

JOB NUMBER: 930780 CUSTOMER: MARATHON OIL COMPANY ATTN: JEFFREY S. LYNN

IENT I.D.....: MARATHON OIL
TE SAMPLED.....: 05/12/93
TIME SAMPLED.....: 09:18
ORK DESCRIPTION...: #8 SW-2

LABORATORY I.D...: 930780-0004
DATE RECEIVED....: 05/13/93
TIME RECEIVED....: 09:45
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
loride (Unfilt.)	522	3	mg/L	325.2 (1)	05/18/93	VKN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	05/19/93	KJA
Benzene	3	1	ug/L			
Toluene	ND	1	ug/L			
Ethyl Benzene	ND	1	ug/L			
Xylenes	ND	1	ug/L			

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CORE LABORATORIES

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CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Marathon Oil Company	PROJECT NAME/NUMBER:
SEND REPORT TO: Al Learned	**BILLING INFORMATION**
ADDRESS: PO Box 552	BILL TO: Same
Midland, TX 79704	ADDRESS:
PHONE: (915)(687-8312)	PHONE:
FAX:	FAX: PO NO.:

NUMBER OF CONTAINERS | ANALYSIS / METHOD REQUEST: BTEX, Cl- | LAB JOB NO. 930780

SAMPLE NO.	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	PRES.	BTEX	Cl-	REMARKS / PRECAUTIONS
#1	#1 Lyman	5/12/93	08:15	water	40 ml		✓	✓	
#2	#2 Arroyo	5/12/93	08:40	"	"		✓	✓	
#7	#7 SW-1	5/12/93	09:51	"	"		✓	✓	
#8	#8 SW-2	5/12/93	09:18	"	"		✓	✓	

SAMPLER: R M Gray | SHIPMENT METHOD: Federal Express | AIRBILL NO.: 2373362692

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: R M Gray	5/12/93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: Marathon Oil Co.	TIME 10:47A	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	2. RECEIVED BY:	DATE	3. RECEIVED BY:	DATE
SIGNATURE: [illegible]	5.13.93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: Core Lab	TIME 945	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 Anzona Street, Sulphur, Louisiana 70663, (318) 583-4926

ORIGINAL

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
07/27/93

JOB NUMBER: 931230 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....: MARATHON OIL CO.
DATE SAMPLED.....: 06/28/93
TIME SAMPLED.....: 11:39
WORK DESCRIPTION...: SW-1

LABORATORY I.D...: 931230-0001
DATE RECEIVED....: 06/29/93
TIME RECEIVED....: 10:18
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	20.2	1.0	mg/L	325.2 (1)	07/19/93	SLS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	07/12/93	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)	108	1	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
07/27/93

JOB NUMBER: 931230 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....: MARATHON OIL CO.
DATE SAMPLED.....: 06/28/93
TIME SAMPLED.....: 12:12
WORK DESCRIPTION...: #1

LABORATORY I.D...: 931230-0002
DATE RECEIVED....: 06/29/93
TIME RECEIVED....: 10:18
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	12.5	0.5	mg/L	325.2 (1)	07/19/93	SLS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	07/13/93	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	1	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

Western Atlas International
A unit of Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
07/27/93

JOB NUMBER: 931230 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....: MARATHON OIL CO.
DATE SAMPLED.....: 06/28/93
TIME SAMPLED.....: 12:30
WORK DESCRIPTION...: #2

LABORATORY I.D...: 931230-0003
DATE RECEIVED....: 06/29/93
TIME RECEIVED....: 10:18
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	11.4	0.5	mg/L	325.2 (1)	07/19/93	SLS
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	07/12/93	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)	102	1	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

CHAIN OF CUSTODY

Marathon Oil Company
5929 Marathon Road
Lakewood, New Mexico 88254
(505) 457-2621 / Fax (505) 457-2544

CONTACT: Bob Menzie, Jr.

(915) 687-8312

1. Packed By: RM Gray Date: 6-28-93
2. VOA Vials? YES NO
   Caps sealed w/tape? YES NO
3. Caps sealed w/tape? YES NO
4. Coolant? ICE COLD PAK
   Other:
5. SEAL Date/Time: 6-28-93 14:45
6. Notes/Comments: Please return our cooler and also as many blue ice packs as possible.

ANALYTICAL LABORATORY ADDRESS:

Company: Core Laboratories
Street Address: 10703 East Bethany Drive
City/State/ZIP: Aurora, Colorado 80014-2696
Phone: (303) 751-1780
FAX: (303) 751-1784

ANALYTICAL LABORATORY RECEIPT-OBSERVATIONS:

1. SEAL Intact? YES NO
2. Coolant Condition: Cold
3. Condition of Contents? Good

DATE	TIME	SAMPLE ID	SAMPLE TYPE	NO. CONTAINERS	ANALYSIS PARAMETERS
6-28-93	11:39	SW-1	Water	4	BTEX & Cl⁻
6-28-93	12:12	#1	Water	4	BTEX & Cl⁻
6-28-93	12:30	#2	Water	4	BTEX & Cl⁻

INITIAL CUSTODY TRANSFERS

	Signature	Date	Time
Relinquished by: (signed):	RM Gray	6-28-93	14:45
Received by: (signed):	D. Mg-A-Qui	6/29/93	10:18
Relinquished by: (signed):			
Received by: (signed):			

SHIPPING DETAILS

Delivered to Shipper by: RM Gray
Method of Shipment: UPS Next Day
Airbill #: 1763 1755 808
Rec'd for Lab: D. Mg-A-Qui Date: 6/29/93 Time: 10:18
Assigned Laboratory Number: 931230

Original: To Laboratory Copy: Sender Retains 4/26/91

APPENDIX E

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, 1993

Roswell Basin Watermaster
State Engineer Office
1900 West Second Street
Roswell, New Mexico 88201

Attention: Robert R. Marr

Re: Indian Basin Treatment Project

Dear Mr. Marr:

The below list of monitor wells (NW)/boreholes (BH) indicates the meter readings for fluid removed from the Lower Queen as of May 3, 1993.

LOWER QUEEN				
LOCATION	SERIAL NUMBER	DATE READ	METER READING	WATER REMOVED
MW-58/BH-84	10239118	05/03/93	3061493	3,061,493 Gals
MW-59/BH-85	10259114	05/03/93	67609.7	67,609.7 Bbls
*MW-61A/BH-87A	10239116	05/03/93	2787144	2,871,416 Gals
**MW-62/BH-88	10239115	05/03/93	1931575	2,125,506 Gals
MW-65A/BH-91A	10239117	05/03/93	4467419	4,467,419 Gals
***MW-68/BH-94	02209213	05/03/93	384992	2,684,262 Gals
LOWER QUEEN TOTAL				18,049,703 Gals

* The volume of water removed from BH-87A reflects an additional 84,272.0 gallons which was metered during an interference test of the aquifer conducted on February 19-24, 1993.

** The volume of water removed from BH-88 reflects an additional 193,931 gallons which was metered prior to the installation of an automatic sampling device on 1/25/92.

*** Meter 00209213 on MW-68/BH-94 reflects 122,618 gallons previously attributed to other locations (6,713 gallons to MW-1/BH-14 and 115,905 gallons to MW-13/BH-36.

Cumulative Lower Queeen fluid removal as of May 3,1993 is 18,371,171 Gals. This number reflects the 321,468 gallons removed prior to installation of the present meters in December, 1991.

The below list of monitor wells (MW)/boreholes (BH) indicates the meter readings for fluid removed from shallow wells under permit RA-8015 as of May 3, 1993.

SHALLOW WELLS				
LOCATION	SERIAL NUMBER	DATE READ	METER READING	WATER REMOVED
**** NW-13/BH-36	02209212	05/03/93	109305.9	126.981.1 gals.
***** NW-14/BH-37	02209214	05/03/93	398213.3	398.402.3 gals
******MW-35/BH-59	----	----	----	98303.5 gals.
			SHALLOW TOTAL	623,686.9 gals.

**** Meter 02209212 on MW-13/BH-36 reflects 98,236.2 gallons previously attributed to other locations (188.8 gallons to MW-21/BH-44, 98,047.4 gallons to MW-35/BH-59).

***** The volume of water removed from MW-14/BH-37 reflects an additional 189 gallons not included on the meter reading as discussed in the December 1992 monthly statement.

****** A meter and pump are not installed in MW-35/BH-59 at this time. The previous meter, serial No. 02209212, has been moved to MW-13/BH-36.

The cumulative shallow fluid removal as of May 3, 1993 is 630,588.9 Gals. This number reflects the 6,902 gallons removed from MW-1/BH-14 and MW-21/BH-44 prior to meter removal.

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

Very truly yours,

Al Learned

Al Learned

AL93510/nrt

xc: T. C. Lowry - Midland
D. E. Kenyon - PTC, Littleton
R. F. Unger - Midland
R. A. Biernbaum - Midland
C. M. Schweser- IBGP, Artesia

Mid-Continent Region
Production United States

Marathon Oil Company

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

June 14, 1993

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

Re: Indian Basin Treatment Project

Dear Mr. Marr:

The following list of monitoring wells (MW) and their corresponding borehole (BH) designations indicates the recorded meter readings for fluid removed from the Lower Queen as of Tuesday, June 1, 1993. Cumulative Lower Queen fluid removal as of June 1, 1993 is 19,478,506 Gal.

WELL/ BOREHOLE	SERIAL NUMBER	INIT'L METER START	6/01/93 METER READING	WATER REMOVED (Gal)	PER-WELL WATER REMOVED (Gal)
MW-58/ BH-84	10239118 36285324	0	3240692	3,240,692 26,922	3,267,614
MW-59/ BH-85	10259114 45120581	0	71108.2	71,108.2* 83,454	3,069,998
MW-61A/ BH-87A	10239116 36285325	0	2933008.0	2,933,008 84,272[1] 46,578	3,063,858
MW-62/ BH-88	10239115 45473975	0	2057529.9	2,057,529.9 193,931[2] 62,622	2,314,083
MW-65A/ BH-91A	10239117 45473977	0	4773486.0	4,773,486 39,774	4,813,260
MW-68/ BH-94	02209213 10239114 45473979 45473978	122618 0	588234.6	465,616.6 2,421,888 57,862 4,326	2,949,693
				LOWER QUEEN TOTAL	19,478,506

* Barrels.

[1] Water recovered during interference test conducted 2/19-24/93.

[2] Total prior to automatic sampling device installation on 1/25/92.

The following list of SHALLOW ZONE monitoring wells (MW) and their corresponding borehole (BH) designations indicates the meter readings for fluid removed under permit RA-8015 as of Tuesday, June 1, 1993. The cumulative shallow fluid removal as of Tuesday June 1, 1993 is 634,270.8 Gal.

WELL/ BOREHOLE	SERIAL NUMBER	INIT'L METER START	06/01/93 METER READING	WATER REMOVED (Gal)	PER-WELL WATER REMOVED (Gal)
MW-1/BH-14[3]	02209213	0	—	6,712.5	6,712.5
MW-13/BH-36	02209212 02209213	98236.2 6712.5	113000.6 —	14,764.4 115,911.4	130,675.8
MW-14/BH-37	02209214	0	398203.7 —	398,203.7 9.6[4] 176.9[5]	398,390.2
MW-21/BH-44[3]	02209212	0	—	188.8	188.8
MW-35/BH-59[3]	02209212	188.8	—	98,047.4 256.1[6]	98,303.5
				SHALLOW TOTAL	634,270.8 Gal

[3] Pump and meter not installed currently.
[4] Meter reading indicated reverse flow equaling this volume (5/93 report).
[5] Meter reading indicated reverse flow equaling this volume (12/92 report).
[6] Meter reading indicated reverse flow equaling this volume (8/92 report).

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

Very truly yours,

Robert J. Menzie, Jr.

RJM93614/nrt

xc: T. C. Lowry - Midland
D. E. Kenyon - PTC, Littleton
R. F. Unger - Midland
R. A. Biernbaum - Midland
C. M. Schweser- IBGP, Artesia

Mid-Continent Region
Production United States

Marathon Oil Company

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

July 12, 1993

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

Re: Indian Basin Treatment Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells as of Tuesday, July 6, 1993. Cumulative Lower Queen fluid removal through that date is 20,757,729 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	7/06/93 METER READING	WATER REMOVED (Gal)	PER-WELL WATER REMOVED (Gal)
MW-58	10239118	0	3461016	3,451,016 26,922[1]	3,487,938
MW-59	10259114	0	74936.8*	3,147,346 83,454[1]	3,230,800
MW-61A	10239116	0	3165326	3,165,326 46,578[1] 84,272[2]	3,296,176
MW-62	10239115	0	2180148	2,180,148 193,931[3] 62,622[1]	2,436,701
MW-65A	10239117	0	5102850	5,102,850 39,774[1]	5,142,624
MW-68	02209213	122618	802032	679,414 2,484,076[1]	3,163,490
			LOWER QUEEN TOTAL	20,757,729 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 Tuesday, July 6, 1993. The cumulative shallow fluid removal through that date is 637,835 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	07/06/93 METER READING	WATER REMOVED (Gal)	PER-WELL WATER REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	116564.2	18,328 115,911[1]	134,239
MW-14	02209214	0	398203.7	398,204 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	-----	----	----	98,303[1]	98,303
				SHALLOW TOTAL	637,835 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.

Very truly yours,

Robert J. Menzie Jr. By nrt

RJM93714/nrt

xc: T. C. Lowry - Midland
D. E. Kenyon - PTC, Littleton
R. F. Unger - Midland
R. A. Biernbaum - Midland
C. M. Schweser- IBGP, Artesia

INDIAN BASIN GAS PLANT TREATMENT PROJECT QUARTERLY REPORT

THIRD QUARTER 1993
JULY, AUGUST, AND SEPTEMBER

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

November 11, 1993

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INTRODUCTION

This report summarizes groundwater and unsaturated zone treatment activities conducted during the Third 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.

QUARTERLY REPORT SUMMARY

The groundwater remediation system is fully operational and functioning as set forth in the Treatment Project Plan document. Fluid recovery from the Lower Queen aquifer is continuing with volatile hydrocarbon compounds being removed by air stripping. Shallow zone pumping continues from two wells. Water discharged from the air stripper continues to be utilized by the plant for process water and excess treated groundwater not used by the plant is disposed of in the Class II injection well. The vapor extraction system was not operated during the Third Quarter. Concentrations of benzene, toluene, ethylbenzene, total xylene, and chloride in groundwater collected from rancher wells and nearby surface springs have not exceeded State or Federal drinking water standards. Local ranchers are informed of treatment project activities via a quarterly letter.

GROUNDWATER ELEVATION

Lower Queen

Depth-to-water measurements were acquired from nonpumping, Lower Queen aquifer monitoring wells in July, August, and September 1993. Table 1 in part presents groundwater elevations calculated from casing elevation data and depth-to-water measurements obtained from nine Lower Queen wells. Figure 1 is a potentiometric map of the Lower Queen aquifer based on gauging conducted in July. These Lower Queen data indicate decreasing groundwater elevations in monitoring wells during the quarter (Figure 2).

Shallow Zone

A potentiometric map was constructed using depth-to-water measurements collected from shallow monitoring wells during the quarterly sampling event in July 1993 (Figure 3). Table 1 shows the depth-to-water measurements and calculated groundwater elevations for shallow zone wells. These Shallow zone data also indicate decreasing groundwater elevations in monitoring wells during the quarter.

Groundwater Recharge (Rainfall)

Daily rainfall is gauged at the gas plant. Monthly rainfall for July, August, and September was 0.55, 0.63, and 0.62 inches, respectively (Table 1). Cumulative rainfall for the Third Quarter was 1.80 inches.

QUARTERLY SAMPLING LABORATORY RESULTS

Gauging, purging, and sampling of 23 monitoring wells were conducted on July 12 through 15, 1993 and new downgradient monitoring well MW-71 was sampled on September 1, 1993. Fifteen Lower Queen wells including the plant water supply well (SW-1) were sampled. The backup well (SW-2) was gauged but not 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. Two of the Lower Queen pumping wells contained free product (condensate) and were not submitted for laboratory analysis (MW-59 and MW-61A).

Eleven of the fifty-nine Shallow zone wells were sampled in July. Three of the original twenty-three shallow zone monitoring wells designated for quarterly sampling in the Treatment Project Plan were sampled (see bolded well designations in Table 3). The remaining 20 wells were either dry (17), contain free product (MW-11, MW-69), or inaccesible (MW-13; pumping well). Seven Shallow zone wells other than those designated in the Treatment Project Plan were sampled (MW-37, MW-39, MW-41, MW-43, MW-45, MW-49, and MW-65). None of the sumps completed in the shallow fluvial deposits were sampled because the current Shallow zone groundwater elevation is below these wells. Samples were collected by Southwestern Laboratories, Inc. (SWL) in Midland, Texas 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 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 during the quarterly monitoring episode. 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). This practice is required 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. One Shallow zone well (MW-41) and four Lower Queen

wells (SW-1, MW-60, MW-64, and MW-68) 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 wells 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 of one nearby rancher well (Lyman) and surface water from one natural spring in Rocky Arroyo (Upper Indian Hills Spring West; Hendrickson and Jones, 1952) were collected on July 15, August 3, and September 21, 1993. In addition, another rancher well which is sampled quarterly (Biebelle), was sampled on July 15, 1993. Analytical results indicate that groundwater and spring water do not exceed the EPA drinking water standards for chloride, benzene, toluene, ethylbenzene, and total xylenes.

Table 4 provides a summary of the monthly analyses performed on Upper Indian Hills Spring West and the Lyman well which is the closest downgradient well to the remediation site. The quarterly analysis for the Biebelle well, the second closest downgradient well, is also reported. The rancher well and natural spring samples were obtained using EPA sampling and handling procedures. Core Laboratories 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.

The plant water supply well (SW-1) is also sampled and analyzed monthly. Laboratory reports for all the rancher wells, natural spring, and plant supply well are included in Appendix D.

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 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.

Six Lower Queen wells (MW-58, MW-59, MW-61A, MW-62, MW-65A, and MW-68) 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	July	August	September	Quarter Total (Bbls)
MW-58 (BH-84)	3,300	6,859	4,643	14,802
MW-59 (BH-85)	3,125	3,914	2,275	9,314
MW-61A (BH-87A)	4,929	6,747	4,824	16,500
MW-62 (BH-88)	3,355	4,712	3,263	11,330
MW-65A (BH-91A)	6,486	8,890	6,025	21,401
MW-68 (BH-94)	5,377	5,119	3,658	14,154
Plant Supply SW-1	14,460*	25,752	20,542	60,754
TOTAL	41,032	61,993	45,230	148,255

** Average recovery determined by dividing the quarterly recovered volume for May, June, and July of 14,460 by three.*

Shallow Zone

Shallow zone fluid recovery during the Third Quarter was from two intermittent pumping wells (MW-13 and MW-69). Shallow zone fluid recovery from MW-69 commenced on August 11, 1993. 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 Third Quarter totaled 6.5 barrels.

SHALLOW ZONE FLUID RECOVERY

Well Number	JULY Cond./Water	AUGUST Cond./Water	SEPTEMBER Cond./Water	Quarter Total (Bbls) Cond./Water
MW-13 (BH-36)	9.6*	10.5*	12.9*	33*
MW-14 (BH-37)	NP (DRY)	NP (DRY)	NP (DRY)	0*
Sump A11	NP (DRY)	NP (DRY)	NP (DRY)	0/0
Sump 16A	NP (DRY)	NP (DRY)	NP (DRY)	0/0
MW-69 (BH-95)	NP	1.8/2.5	4.7/4.2	6.5/6.7
TOTAL (Bbls)	9.6*	1.8/13*	4.7/17.1*	6.5/39.7*

** Total fluid volume because condensate and produced groundwater are not separated at the well. NP = Not pumped during this period.*

GROUNDWATER TREATMENT

Commingled fluids pumped from the six 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 Third Quarter was 9.92 barrels. Cumulative condensate separated from the recovered groundwater since product separation began in April 1992 is 55.12 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 Third Quarter was 16.42 barrels. Cumulative free product recovered to date excluding the volume volatilized by the air stripper and vapor extraction system is 3,356.92 barrels.

VAPOR EXTRACTION SYSTEM

Phase I of the unsaturated zone remediation using vapor extraction 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.

The vapor extraction (VE) equipment was only operated for a few days in early July. The electric generator that was supplying power to the VE unit was moved to operate a submersible pump that was installed to recover free condensate from MW-69 (BH-95).

OTHER ACTIVITIES

Downgradient Lower Queen monitoring well MW-71 was drilled and completed between August 22 and August 25. The well was developed by pumping, purged and sampled on September 1, 1993. The OCD split samples with Marathon for laboratory analysis comparison. Lower Queen recovery well MW-72 was completed on September 10 and is located at the midpoint between monitoring wells MW-58 and MW-59 (Figure 1). Right-of-way amendment approval was gained on July 9, 1993.

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, AND RAINFALL DATA
THIRD QUARTER 1993

	WELL NUMBER	TOP OF CASING ELEV. (FT AMSL)	Jul-12-93 DEPTH TO WATER (FT)	Jul-12-93 GROUND-WATER ELEV.	Aug-26-93 DEPTH TO WATER (FT)	Aug-26-93 GROUND-WATER ELEV.	Sep-21-93 DEPTH TO WATER (FT)	Sep-21-93 GROUND-WATER ELEV.
LOWER	MW-57 (BH-83)	3787.70	157.42	3630.28	157.5	3630.20	157.57	3630.13
QUEEN	MW-58 (BH-84)p	3824.31						
WELLS	MW-59 (BH-85)p	3819.59						
	MW-60 (BH-86)	3815.28	185.47	3629.81	185.59	3629.69	185.66	3629.62
	MW-61A (BH-87A)p	3815.97						
	MW-62 (BH-88)p	3819.90						
	MW-63 (BH-89)	3826.16	196.62	3629.54	196.88	3629.28	196.93	3629.23
	MW-64 (BH-90)	3798.57	168.70	3629.87	168.78	3629.79	168.83	3629.74
	MW-65A (BH-91A)p	3763.26						
	MW-66 (BH-92)	3828.98	199.82	3629.16	200.02	3628.96	200.01	3628.97
	MW-67 (BH-93)	3765.87	135.81	3630.06	135.88	3629.99	135.99	3629.88
	MW-68 (BH-94)p	3797.83						
	MW-70 (BH-97)	3822.57	192.32	3630.25	192.45	3630.12	192.53	3630.04
	MW-71 (BH-98)	3778.05	WNC		149.85		149.66	3628.39
	MW-72 (BH-99)	3819.32	WNC		WNC		189.59	3629.73
	SW-1 (SUPPLY)p	3808.19						
	SW-2 (BACKUP)	3808.79	179.76	3629.03	180	3628.79	179.86	3628.93
SHALLOW	MW-4 (BH-26)	3785.88	DRY		Not Gauged		Not Gauged	
ZONE	MW-10 (BH-33)	3790.78	DRY		Not Gauged		Not Gauged	
WELLS	MW-11 (BH-34)	3806.96	DRY		Not Gauged		Not Gauged	
	MW-16 (BH-39)	3801.04	22.25	3778.79	Not Gauged		Not Gauged	
	MW-17 (BH-40)	3799.55	19.13	3780.42	Not Gauged		Not Gauged	
	MW-18 (BH-41)	3795.82	DRY		Not Gauged		Not Gauged	
	MW-19 (BH-42)	3797.21	DRY		Not Gauged		Not Gauged	
	MW-21 (BH-44)	3798.21	22.88	3775.33	Not Gauged		Not Gauged	
	MW-22 (BH-45)	3799.20	DRY		Not Gauged		Not Gauged	
	MW-26 (BH-49)	3793.01	20.77	3772.24	Not Gauged		Not Gauged	
	MW-31 (BH-55)	3791.15	DRY		Not Gauged		Not Gauged	
	MW-33 (BH-57)	3802.48	19.91	3782.57	Not Gauged		Not Gauged	
	MW-35 (BH-59)	3800.81	19.77	3781.04	Not Gauged		Not Gauged	
	MW-37 (BH-60)	3795.03	20.11	3774.92	Not Gauged		Not Gauged	
	MW-38 (BH-61)	3797.32	20.23	3777.09	Not Gauged		Not Gauged	
	MW-39 (BH-62)	3796.20	17.78	3778.42	Not Gauged		Not Gauged	
	MW-40 (BH-63)	3803.12	DRY		Not Gauged		Not Gauged	
	MW-41 (BH-64)	3799.04	19.28	3779.76	Not Gauged		Not Gauged	
	MW-42 (BH-65)	3804.73	22.63	3782.10	Not Gauged		Not Gauged	
	MW-43 (BH-66)	3802.05	21.33	3780.72	Not Gauged		Not Gauged	
	MW-44 (BH-67)	3804.14	21.63	3782.51	Not Gauged		Not Gauged	
	MW-45 (BH-68)	3808.68	21.49	3787.19	Not Gauged		Not Gauged	
	MW-47 (BH-70)	3805.09	21.37	3783.72	Not Gauged		Not Gauged	
	MW-49 (BH-72)	3805.61	21.98	3783.63	Not Gauged		Not Gauged	
	MW-50 (BH-73)	3813.35	26.43	3786.92	Not Gauged		Not Gauged	
	MW-54 (BH-80)	3823.86	46.61	3777.25	Not Gauged		Not Gauged	
	MW-55 (BH-81)	3794.40	30.02	3764.38	Not Gauged		Not Gauged	
	MW-61 (BH-87)	3816.20	36.66	3779.54	Not Gauged		Not Gauged	
	MW-65 (BH-91)	3763.31	56.34	3706.97	Not Gauged		Not Gauged	
	MW-69 (BH-95)	3805.11	41.96	3763.15	Not Gauged		Not Gauged	
MONTHLY RAINFALL (INCHES)			0.55		0.63		0.62	

3QTABLE1.XLS

p = Pump present in well; unable to measure depth-to-water
WNC = Well Not Completed

TABLE 2
HISTORICAL SUMMARY OF BENZENE IN LOWER QUEEN GROUNDWATER
THIRD QUARTER 1993

	Benzene (ug/L) using EPA Method 8020 unless indicated otherwise								
DOWNGRADIENT WELLS	SEP 1991	DEC 1991	APR 1992	JUL 1992	OCT 1992	JAN 1993	APR 1993	JUL 1993	SEP 1993
MW-60 (BH-86)	33	<1	3.5**	19**	31.7*	138*	17*	3*	NS
MW-64 (BH-90)	150	130	233**	115**	14	15*	5*	3*	NS
MW-66 (BH-92)	<1	<1	3.3**	8**	12.1*	3*	<3*	8*	NS
MW-67 (BH-93)	280	320	4.3*	103**	2.6*	8*	7*	7*	NS
MW-71 (BH-98)	WNC	WNC	WNC	WNC	WNC	WNC	WNC	WNC	<1
PUMPING & MIDPLUME WELLS									
MW-57 (BH-83)	1600	350	150	948**	15.1*	21*	8*	6*	NS
MW-58 (BH-84)p	40	90	202**	178**	190*	192*	55*	25*	NS
MW-59 (BH-85)p	540	420	40.4**	268**	98.8*	26*	10*	FP	NS
MW-61A (BH-87A)p	190	10	5.0**	359**	470.1*	585*	2821*	FP	NS
MW-62 (BH-88)p	2200	1400	257.5**	357**	212.3*	78*	33*	98*	NS
MW-65A (BH-91A)p	680	150	25.3**	413**	10.6*	3*	4*	<1*	NS
MW-68 (BH-94)p	240	1900	1865**	160**	2208.2**	376*	1890*	197*	NS
SW-1 (SUPPLY)p	<1	<1	5*	17.5*	15.7*	6*	<1	9*	NS
SW-2 (BACKUP)i	<1	<1	7.9*	7*	69.4*	47*	4	NS	NS
UPGRADIENT WELLS									
MW-63 (BH-89)	<1	<1	4.1**	12**	4.3*	12*	7*	4*	NS
MW-70 (BH-97)	<1	<1	1.7**	<1	10.7*	<3*	9*	<1*	NS

p = pumping well
i = idled pumping well
* High Performance Liquid Chromatography (HPLC)
** Average of more than one sample result using HPLC.

FP = Free Product (Condensate)
NS = Not Sampled
WNC = Well Not Completed

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

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

DRY = Dry well
* 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

THIRD QUARTER 1993

	1993														
	Jul-15					Aug-3					Sep-21				
WELL/ SPRING	Benzene	Toluene	Ethylbenzen	Xylene	Chloride	Benzene	Toluene	Ethylbenzen	Xylene	Chloride	Benzene	Toluene	Ethylbenzen	Xylene	Chloride
Lyman (#1)	ND	ND	ND	ND	15.0	ND	ND	ND	ND	13.1	ND	ND	ND	ND	12.4
Upper Indian Hills Spring West (#2)	ND	ND	ND	ND	12.9	ND	ND	ND	ND	11.8	ND	ND	ND	ND	11.5
Biebelle (#3)	ND	ND	ND	ND	13.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

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

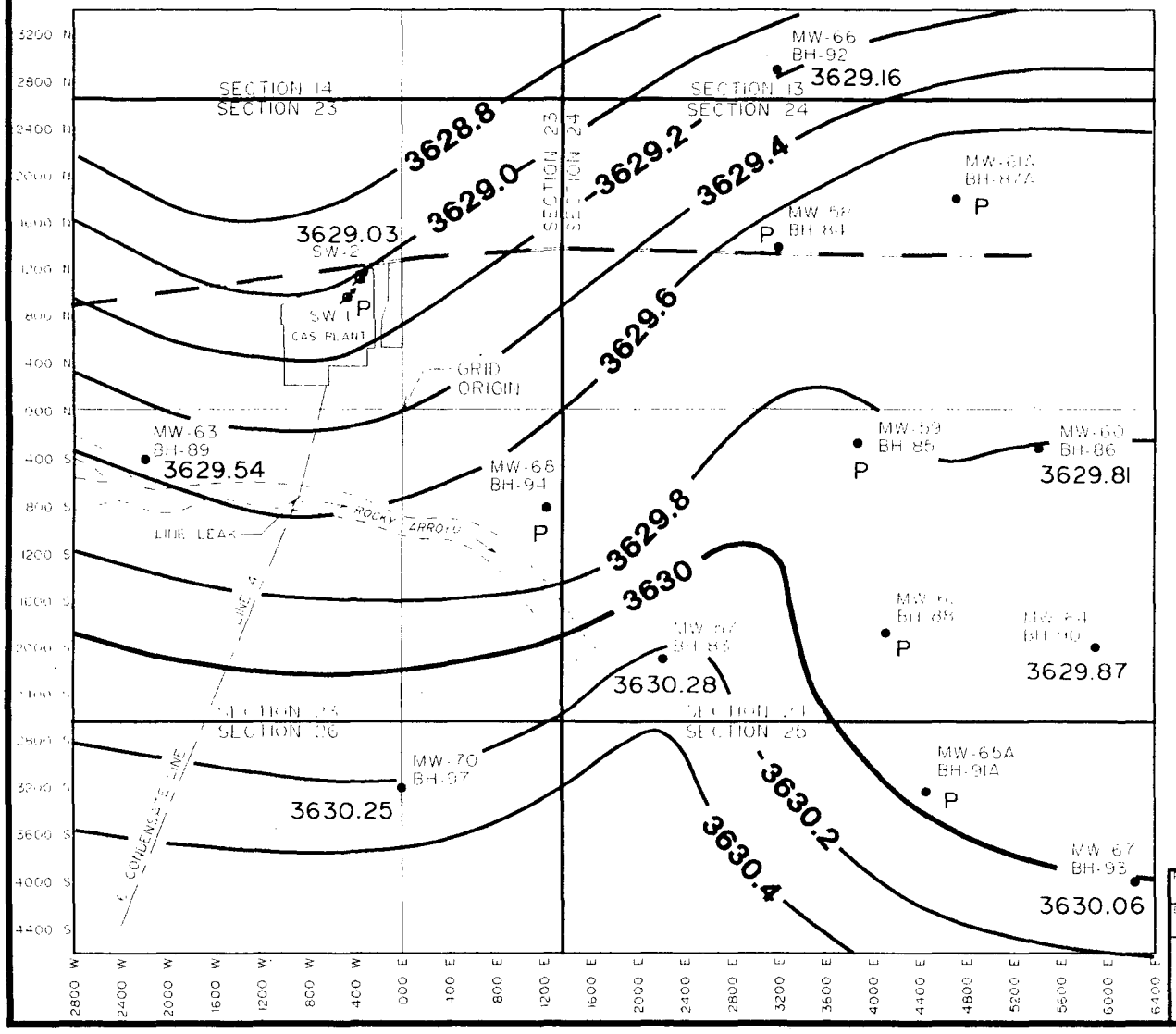
Chloride concentration in mg/L.

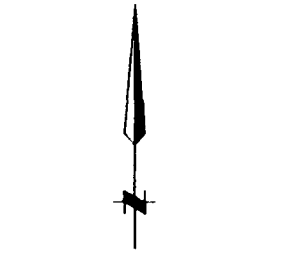
ND = Not Detected at method detection limit of 0.5 ug/L.

NS = Not Sampled.

FIGURES

INDIAN BASIN GAS PLANT
ARTESIA, NEW MEXICO





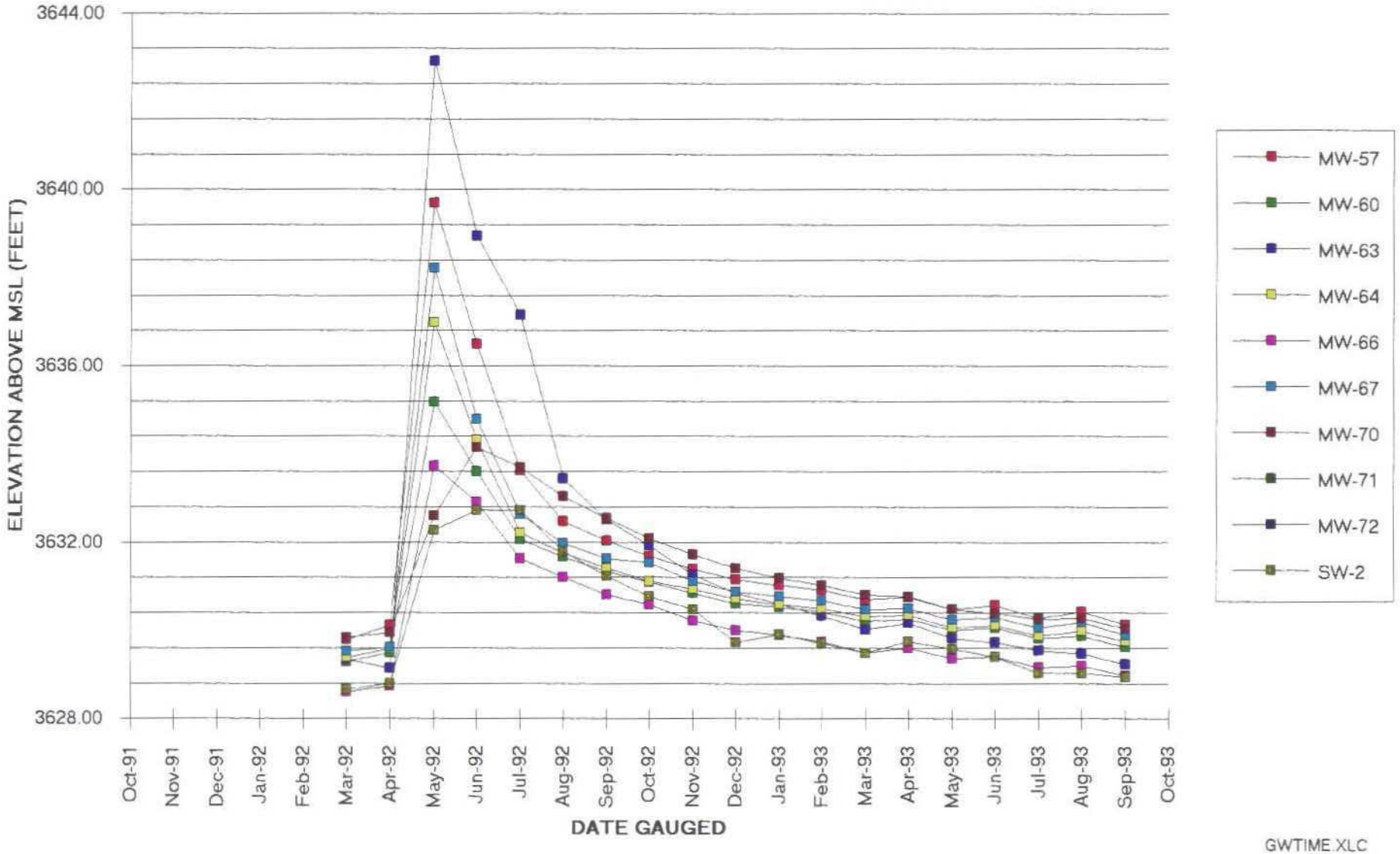
L E G E N D

- MW-64 / BH-90 ● — DEEP BEDROCK (LOWER QUEEN) WELL AND SOIL BORING LOCATION
- ⊕ — WATER SUPPLY WELL (DEEP BEDROCK, LOWER QUEEN)
- P — PUMPING WELL
- 3629.87 — GROUNDWATER ELEVATION (FEET AMSL)

IBGA:PLT14.SIY OPER

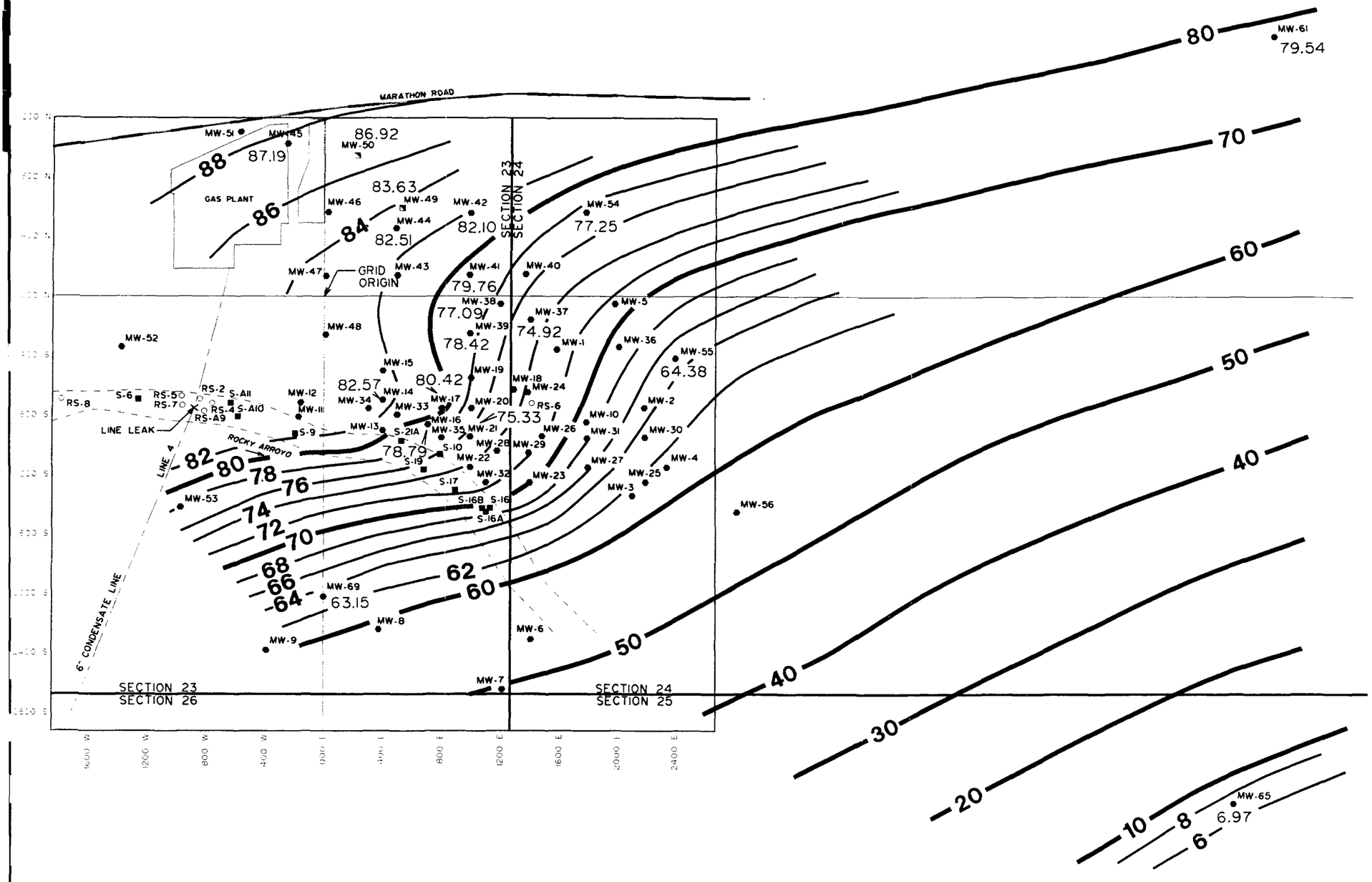
Figure Title: FIGURE 1	MARATHON OIL COMPANY
Document Title: JULY 1993 LOWER QUEEN POTENTIOMETRIC SURFACE	Location: INDIAN BASIN GAS PLANT
	DATE: 11-94 — PREPARED BY:
	SCALE: — CHECKED BY:
	PROJECT NO. — DRAFTED BY:
	FIGURE NO.

FIGURE 2. LOWER QUEEN GROUNDWATER ELEVATION VS. TIME



GWTIME.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

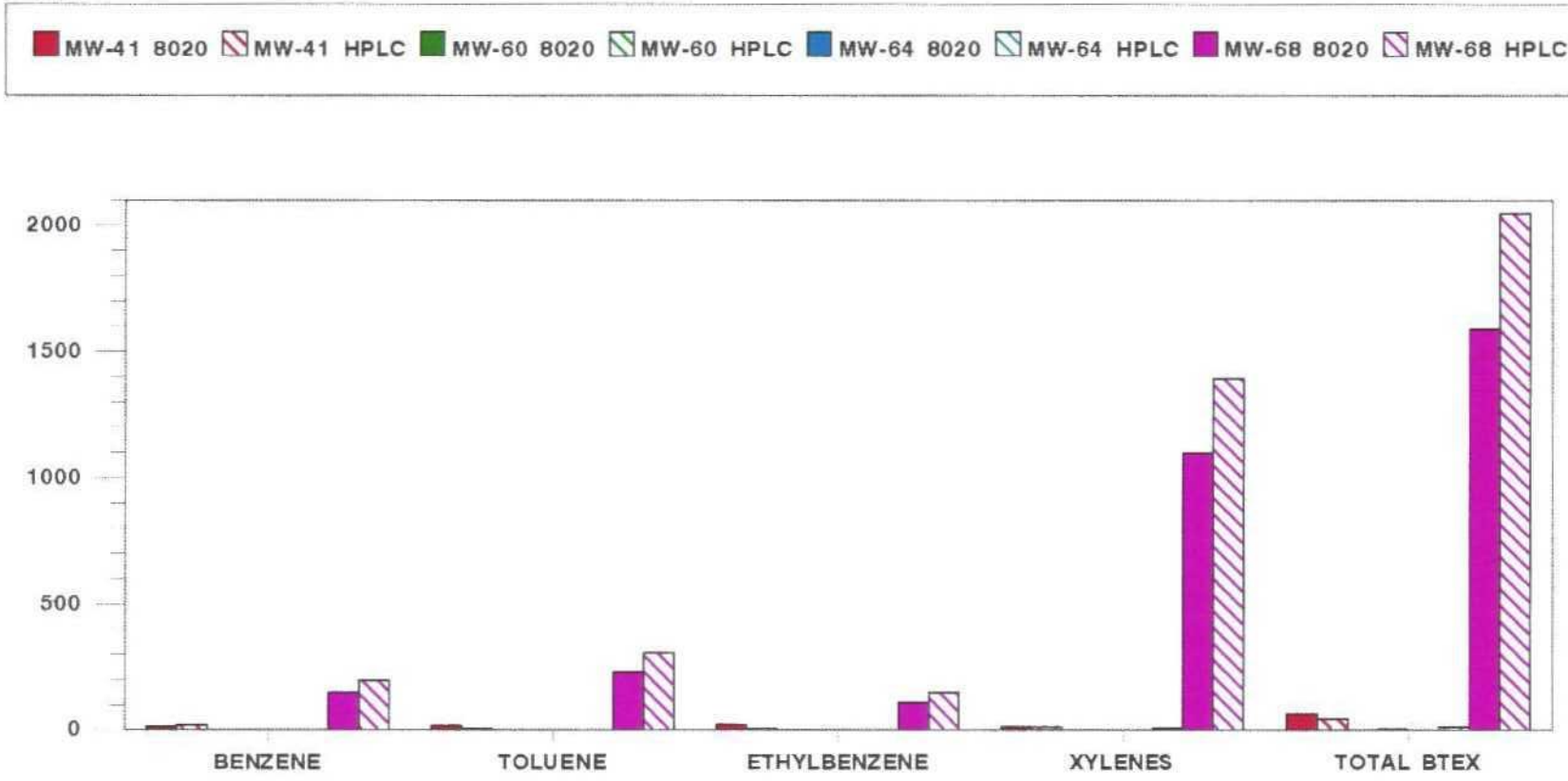
GROUNDWATER ELEVATION (FEET AMSL) PLUS 3700 FEET

IBGASPLT5 STY OPER

Figure Title: FIGURE 3	MARARTHON OIL COMPANY
Document Title: JULY 1993 SHALLOW ZONE POTENTIOMETRIC SURFACE	Location: INDIAN BASIN GAS PLANT
	DATE 11/93 — PREPARED BY:
	SCALE — CHECKED BY:
	PROJECT NO — DRAFTED BY:
	FIGURE NO

FIGURE 4

JULY 1993, THIRD QUARTER LABORATORY RESULTS
CORE LAB EPA METHOD 8020 VS MARATHON HPLC ANALYSIS COMPARISON

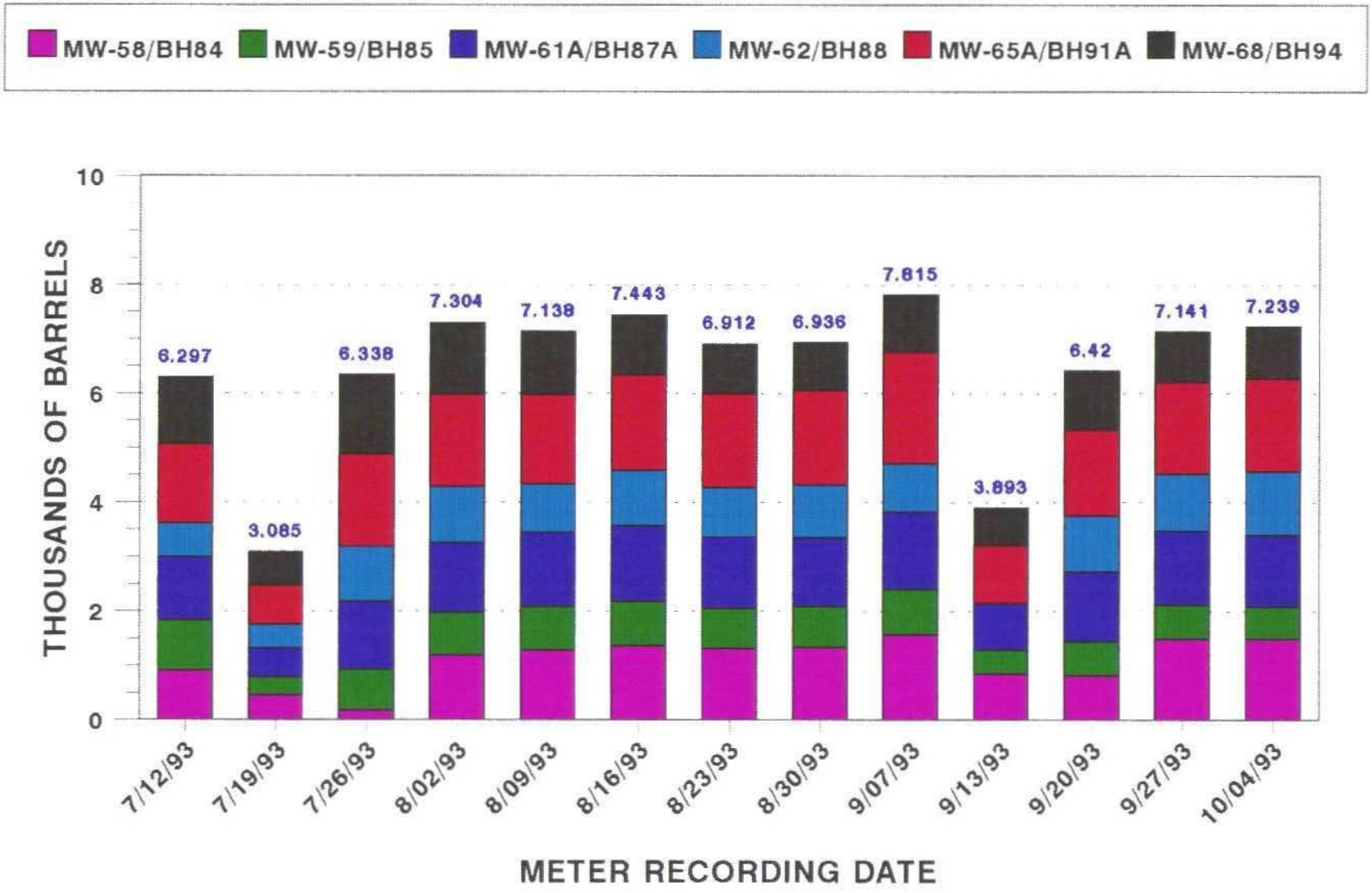


	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	TOTAL BTEX
MW-41 8020	12	18	22	15	67
MW-41 HPLC	22	5	5	12	44
MW-60 8020	0	0	0	0	0
MW-60 HPLC	3	1	0	1	5
MW-64 8020	2	0	0	0	2
MW-64 HPLC	3	0	0	10	13
MW-68 8020	150	230	110	1100	1590
MW-68 HPLC	197	306	148	1396	2047

ANALYTES

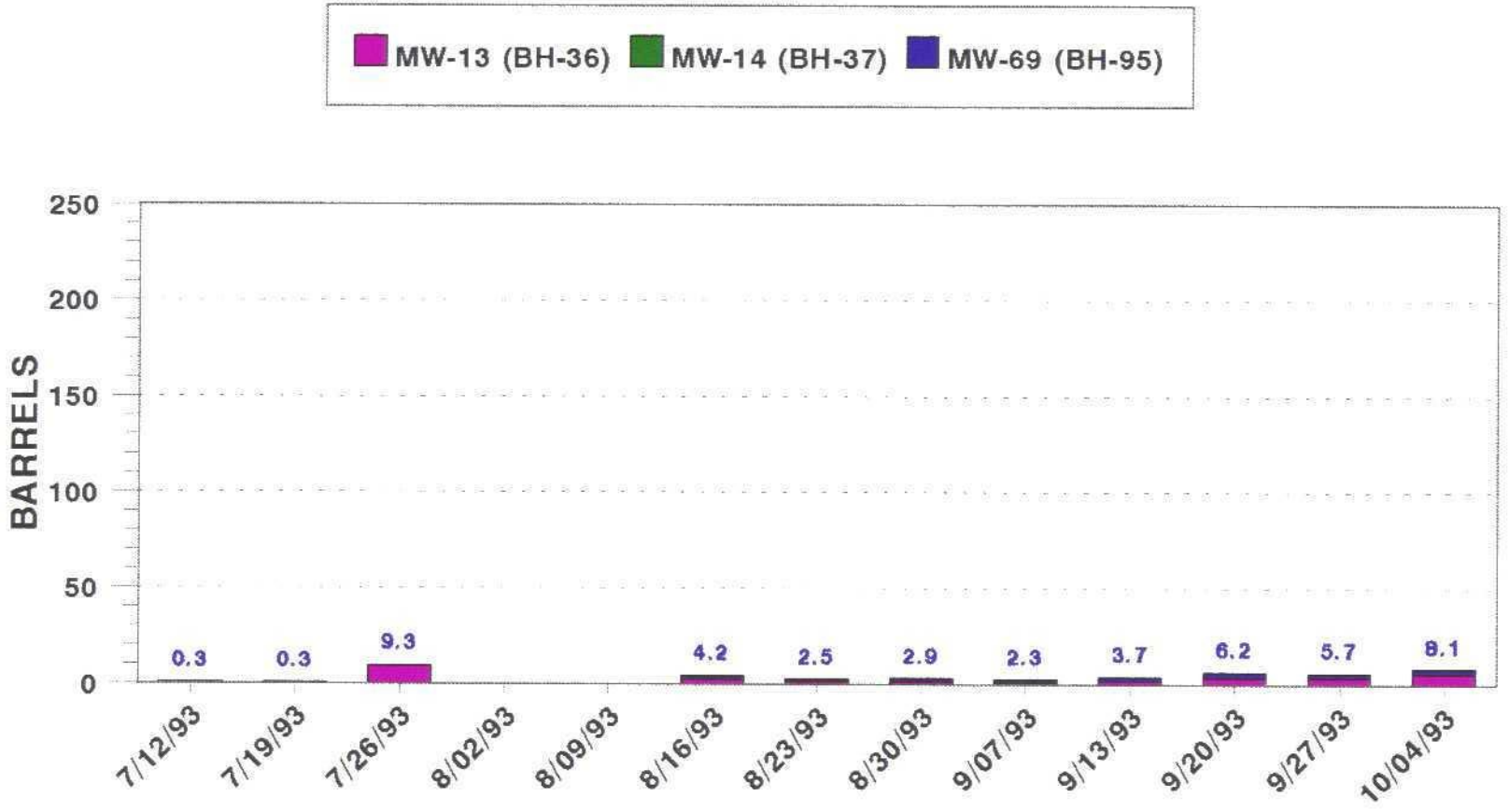
HPLC = HIGH PERFORMANCE LIQUID CHROMOTOGRAPHY

FIGURE 5
WEEKLY LOWER QUEEN FLUID RECOVERY
THIRD QUARTER 1993



WKLQREC3Q

FIGURE 6
WEEKLY SHALLOW FLUID RECOVERY
THIRD QUARTER 1993



MW-69 (BH-95)						1.9	0.8	1.3	1.3	1.9	2.8	2	2.4
MW-14 (BH-37)	0	0	0	0	0	0	0	0	0	0	0	0	0
MW-13 (BH-36)	0.3	0.3	9.3	0	0	2.3	1.7	1.6	1	1.8	3.4	3.7	5.7

METER RECORDING DATE

WKSHREC3Q

FIGURE 7
WEEKLY TOTAL FLUID RECOVERY
THIRD QUARTER 1993

SHALLOW ZONE TOTAL	0.0003	0.0003	0.0093	0	0.0038	0.0042	0.0025	0.0029	0.0023	0.0037	0.0062	0.0057	0.0081
LOWER QUEEN TOTAL	6.296	3.084	6.339	7.304	7.137	7.442	6.912	6.935	7.815	3.893	6.42	7.141	7.241

METER RECORDING DATE

WKREC3Q

APPENDIX A

JULY 1993 GAUGING, PURGING, AND SAMPLING FIELD SUMMARY

SWL

July 21, 1993

Mr. Bob Menzie
Marathon Oil Company
P. O. Box 552
Midland, Texas 79702

Re: Indian Basin Remediation Project

Dear Mr. Menzie:

On Tuesday, July 12, 1993 at 7:00 a.m., Southwestern Laboratories (SwL) began the quarterly sampling project at the Indian Basin Gas Plant. This sampling project was completed on Thursday, July 15, 1993 at 1:00 p.m. During the 3 day period, 30 wells were examined and 23 wells were sampled. Of these 23 sampled wells, 9 were pumped using the Grundfos pump. The order in which they were sampled was based on the January data and discussion with you. The order is as follows:

Tuesday, July 13, 1993	Wednesday, July 14, 1993
MW-70	MW-54
MW-67	MW-60
Equipment Blank No. 1	Equipment Blank No. 2
MW-64	MW-55
MW-66	MW-57
MW-63	

On Tuesday, July 20, 1993, the samples were shipped to PTC and Core Laboratories. The samples shipped to PTC are:

MW-37	MW-54	MW-65
MW-39	MW-55	MW-65A
MW-41	MW-57	MW-66
MW-43	MW-58	MW-67
MW-44	MW-60	MW-68
MW-45	MW-62	MW-70
MW-49	MW-63	SW-1
MW-50	MW-64	Equipment Blank No. 1
		Equipment Blank No. 2

The samples shipped to Core Laboratories are:

MW-41 dup.	MW-68 dup.	Sample No. 3
MW-60 dup.	Sample No. 1	SW-1 dup.
MW-64 dup.	Sample No. 2	

If you have any questions, please feel free to call me at (915) 683-3340.

Sincerely,

Allan B. Johnston
Project Manager
Southwestern Laboratories - Midland EAS

ABJ/jjc

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

SHALLOW WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.	Reported Total Depth FTC (ft.)	Water Level FTC (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
MW-15	19.47	19.33	0.14	07/15/93 -----	N	0.08	-----	-----	-----	Note (1)
MW-17	19.75	19.13	0.62	07/15/93 -----	N	0.36	-----	-----	-----	Note (1)
MW-33	20.29	19.91	0.38	07/15/93 -----	N	0.74	-----	-----	-----	Note (1)
MW-37	20.83	20.11	0.72	07/14/93 10:22	N	1.40	-----	-----	-----	Sampled by R.M. Gray Note (2)
MW-39	20.54	17.78	2.76	07/15/93 10:40	N	5.40	74.5	-----	-----	Note (2)
MW-41	24.04	19.28	4.76	07/15/93 10:50	N	9.32	69.5	7.69	2498	Sample dup. Taken
MW-43	24.55	21.33	3.22	07/15/93 11:10	N	6.31	69.5	7.24	2529	
MW-44	25.24	21.63	3.61	07/15/93 09:05	N	7.07	70.0	7.16	3205	
MW-45	26.62	21.49	5.13	07/15/93 10:08	N	3.03	-----	7.15	5570	Note (1)
MW-47	21.79	21.37	0.42	07/15/93 -----	N	0.25	-----	-----	-----	Note (1)
MW-49	25.91	21.98	3.93	07/15/93 09:28	N	2.32	-----	6.84	4761	
MW-50	37.15	26.43	10.72	07/15/93 10:00	N	6.32	-----	6.79	5765	
MW-54	78.15	46.61	31.54	07/14/93 08:35	N	61.77	70.0	6.74	3963	
MW-55	66.32	30.02	36.30	07/14/93 13:30	N	71.09	73.0	7.06	2816	
MW-65	57.69	56.34	1.35	07/15/93 11:02	N	2.64	-----	-----	-----	Sampled by R M Gray Note (1)

Note (1): Well was bailed dry. There was no recovery in two (2) hours.

Note (2): Well was bailed dry. Insufficient recovery to collect sample for pH and conductivity.

SOUTHWESTERN LABORATORIES, INC.

FIELD LOG

QUEENS WELLS

Indian Basin Gas Plant

Artesia, N.M.

Well I.D.	Reported Total Depth FTC (ft.)	Water Level FTC (ft.)	Water Column (ft.)	Sample Date	Free Product (Y/N)	Purge Volume (gal.)	Temperature °F	pH	Conductivity µmhos/cm @ 25° C	Remarks
MW-57	177.20	157.42	19.78	07/14/93 15:45	N	38.74	73.0	7.23	881	
MW-58	218.03	-----	-----	07/13/93 09:09	N	Pump Present	-----	7.01	1200	Sampled by R.M. Gray
MW-59	211.29	-----	-----	-----	Y	Pump Present	-----	-----	-----	No Sample Taken
MW-60	223.00	185.47	37.53	07/14/93 10:50	N	73.50	73.0	7.25	1071	Sample dup. Taken
MW-61A	215.67	-----	-----	-----	Y	Pump Present	-----	-----	-----	No Sample Taken
MW-62	224.69	-----	-----	07/14/93 15:25	N	Pump Present	-----	6.57	824	Sampled by R.M. Gray
MW-63	220.49	196.62	23.87	07/13/93 17:45	N	46.75	71.5	7.26	580	
MW-64	201.89	168.70	33.19	07/13/93 13:05	N	65.00	71.0	7.24	1028	Sample dup. Taken
MW-65A	168.56	-----	-----	07/13/93 12:35	N	Pump Present	-----	7.23	935	Sampled by R.M. Gray
MW-66	235.18	199.82	35.36	07/13/93 15:50	N	69.25	71.5	7.05	1092	
MW-67	165.77	135.81	29.96	07/13/93 11:30	N	58.67	72.0	7.17	815	
MW-68	203.43	-----	-----	07/13/93 14:50	Sheen	Pump Present	-----	7.19	755	Sample dup taken Sampled by R M Gray
MW-70	225.07	192.32	32.75	07/13/93 08:39	N	64.14	70.5	7.27	620	
SW-1 Plant Well	255.00	-----	-----	07/15/93 07:42	N	Pump Present	-----	7.14	2294	Sample dup taken Sampled by R M Gray
SW-2 Backup Well	292.00	179.76	112.24	-----	N	-----	-----	-----	-----	No Sample Taken

CLIENT: Marathon Oil Company
LOCATION: Indian Basin Gas Plant

NOTES:

MW-39 - Bailed dry after approximately 3 gals.

MW-41 - Bailed dry after approximately 5 gals.

MW-43 - Bailed dry after approximately 3.5 gals.

MW-65 - Bailed dry after approximately 1 gal.

APPENDIX B

JULY 1993 LABORATORY REPORTS

Indian Basin BTEX Analysis Results by HPLC (7/93)

Sample	(ppb) Benzene	(ppb) Toluene	(ppb) o-Xylene	(ppb) Ethylbenzene	(ppb) m,p-Xylene	(ppb) Total Xylenes	(ppb) Total BTEX	(mg/L) Chloride
BH-60/MW-37	27	7	ND	ND	ND	ND	34	173
BH-62/MW-39	24	3	ND	ND	ND	ND	27	296
BH-64/MW-41	22	5	ND	5	11	11	43	310
BH-66/MW-43	25	17	ND	ND	3	3	45	232
BH-67/MW-44	6	16	11	ND	7	18	40	445
BH-68/MW-45	ND	6	ND	7	4	4	17	434
BH-72/MW-49	210	27	4	42	26	30	309	399
BH-73/MW-50	ND	12	4	10	ND	4	26	347
BH-80/MW-54	ND	ND	3	ND	ND	3	3	146
BH-81/MW-55	625	21	ND	8	50	50	704	312
BH-83/MW-57	6	8	ND	ND	ND	ND	14	72
BH-84/MW-58	25	42	6	14	7	13	94	133
BH-86/MW-60	3	ND	ND	ND	ND	ND	3	10
BH-88/MW-62	98	12	5	70	199	204	384	459
BH-89/MW-63	4	ND	ND	ND	ND	ND	4	3
BH-90/MW-64	3	ND	9	ND	ND	9	12	15
BH-91/MW-65	ND	6	3	ND	ND	3	9	4
BH-91A/MW-65A	ND	3	ND	ND	ND	ND	3	19
BH-92/MW-66	8	4	ND	ND	ND	ND	12	15
BH-93/MW-67	7	ND	ND	ND	ND	ND	7	6
BH-94/MW-68	197	306	141	148	1255	1396	2047	30
BH-97/MW-70	ND	11	ND	3	ND	ND	14	8
Equip. Blank No.1	17	8	ND	16	4	4	45	NS
Equip. Blank No.2	ND	ND	ND	6	3	3	9	NS
SW-1	9	12	ND	ND	ND	ND	21	NS

*** Notes:**

R.M.G. is R.M. Gray
B.R. is B. Ruhmann
SWL is Southwestern Laboratories
A.J. is otherwise unidentified

ND=No detection, minimum detection limit = 3 ppb.
NS=No sample available.

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, Tx. 79702

Attn: Bob Menzie

Client No. 6546001
Report No. M3-09-025
Report Date 09/07/93 12:38

Project Indian Basin Gas Plant

Date Sampled 09/01/93

Sampled By SwL Field Services

Sample Type Water

Transported by SwL Field Services

P.O. # _____

Date Received 09/02/93

Lab No.	Sample Identification
M3-09-025-01	Equipment Blank
M3-09-025-02	MW-71

Reviewed By

SOUTHWESTERN LABORATORIES

ALLAN B. JOHNSTON

TEST RESULTS BY SAMPLE

Sample: 02A MW-71 Collected: 09/01/93 14:21

Test Name	Method	Result	Units	Detection Limit	Date Started	Analyst
CHLORIDE	SM 4500-CL,B	9	mg/L		09/02/93	WJJ

TEST RESULTS BY SAMPLE

Sample Description: Equipment Blank Lab No: 01A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 09/01/93

Date Started	09/02/93	Analyst	LWD
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENE	< 0.004

Sample Description: MW-71 Lab No: 02A
Test Description: BTEX - WATER SAMPLE Method: EPA 602 Test Code: BTEX_W
Collected: 09/01/93 14:21

Date Started	09/02/93	Analyst	LWD
Detection Limit	0.004	Units	mg/L
Method	EPA 602		

Compound	Results
BENZENE	< 0.004
TOLUENE	< 0.004
ETHYLBENZENE	< 0.004
XYLENE	< 0.004

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: Marathon Oil Company / Indian Basin Gas Plant

Sample Date: 09101193

Field Sample No./ Identification	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LAB I.D. NO.
Equipment Blank, 09:01			3 40mL Vials	H_2O		BTEX	
MW-71, 14:21			3 40mL 1pl. pint	H_2O		BTEX, $Cl^{\ominus}$	

Samplers: *(Print)*
Allan Johnston
Bill Ruhmann
Affiliation
SwL

Relinquished by: *(Signature)* — Date: — Time:

Relinquished by: *(Signature)* — Date: — Time:

Relinquished by: *(Signature)* Allan Johnston — Date: 09102193 Time: 08:00

Received by: *(Signature)* — Date: — Time:

Received by: *(Signature)* — Date: — Time:

Received by Laboratory: *(Signature)* — Date: 9/2/93 Time: 08:00

COC Seal No.

Intact:

Results by _____

Rush Charges Authorized

Yes _____ No _____

REMARKS:

Data Results To:
1. Bob Menzie
2.

Laboratory No.

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS

08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/15/93
TIME SAMPLED.....: 10:50
WORK DESCRIPTION...: MW-41

LABORATORY I.D...: 931392-0001
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	242	3	mg/L	325.2 (1)	07/28/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*10		8020 (2)	08/02/93	CLT
Benzene	12	5	ug/L			
Toluene	ND	5	ug/L			
Ethyl Benzene	22	5	ug/L			
Xylenes	ND	5	ug/L			
4-Bromofluorobenzene (surrogate)	112	[illegible]	% Recovery	Limits (85-115)		

10703 East Bethany Drive
Aurora, CO 80014
(303) 751-1780

Western Atlas International
A unit of Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/14/93
TIME SAMPLED.....: 10:50
WORK DESCRIPTION...: MW-60

LABORATORY I.D...: 931392-0002
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	10.7	0.5	mg/L	325.2 (1)	08/02/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	07/26/93	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)	107	0	% Recovery	Limits (85-115)		

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Aurora, CO 80014
(303) 751-1780

Western Atlas International
A Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/13/93
TIME SAMPLED.....: 13:05
WORK DESCRIPTION...: MW-64

LABORATORY I.D...: 931392-0003
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	12.0	0.5	mg/L	325.2 (1)	08/02/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	07/26/93	CLT
Benzene	2	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)	106	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/13/93
TIME SAMPLED.....: 14:50
WORK DESCRIPTION...: MW-68

LABORATORY I.D...: 931392-0004
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	28	1	mg/L	325.2 (1)	07/28/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*50		8020 (2)	08/02/93	CLT
Benzene	150	25	ug/L			
Toluene	230	25	ug/L			
Ethyl Benzene	110	25	ug/L			
Xylenes	1100	25	ug/L			
4-Bromofluorobenzene (surrogate)	113	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/15/93
TIME SAMPLED.....: 08:50
WORK DESCRIPTION...: SAMPLE NO. 2

LABORATORY I.D...: 931392-0005
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	12.9	0.5	mg/L	325.2 (1)	08/02/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	07/26/93	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)	106	0	% Recovery	Limits (85-115)		

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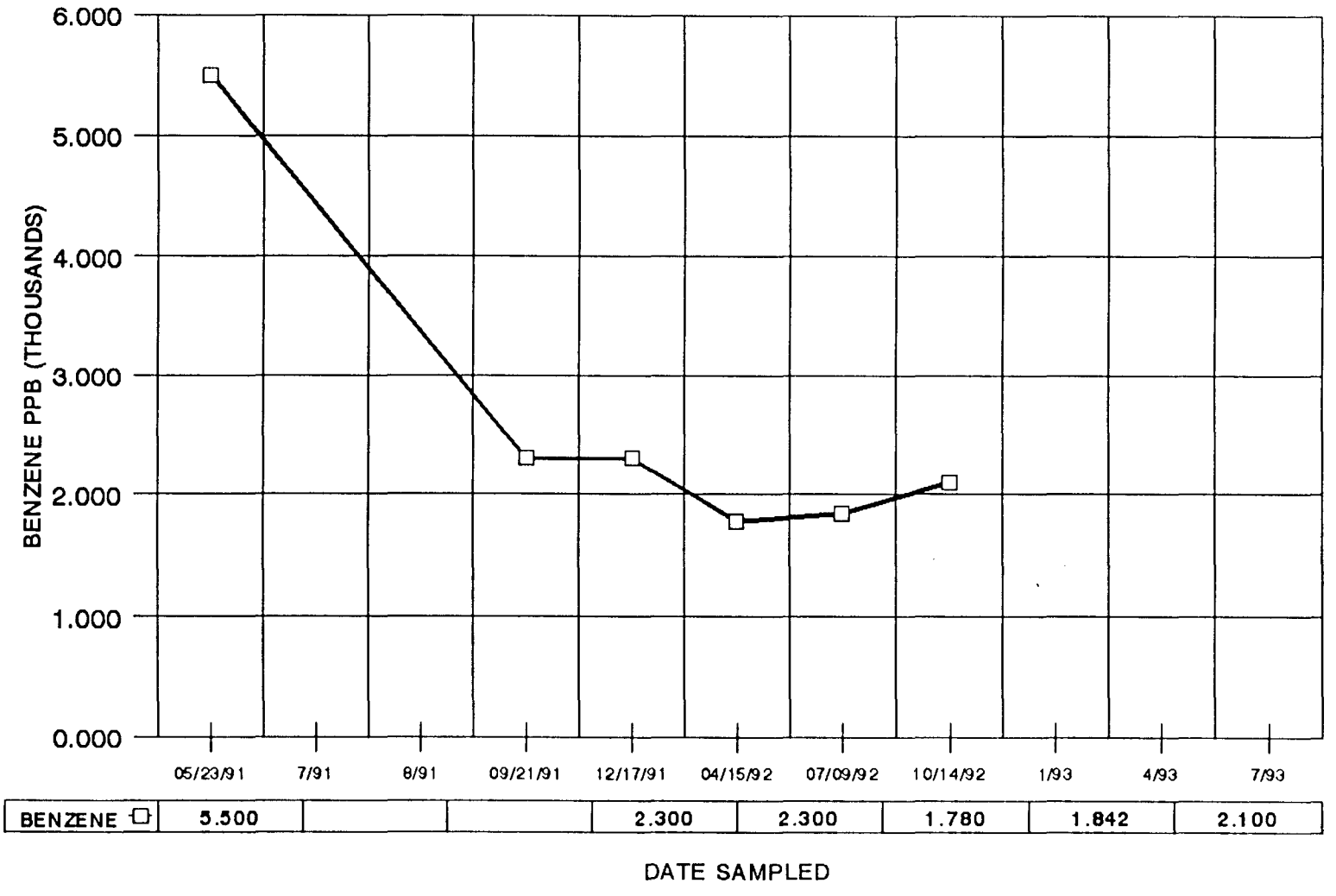
APPENDIX C

BENZENE CONCENTRATION VS TIME GRAPHS

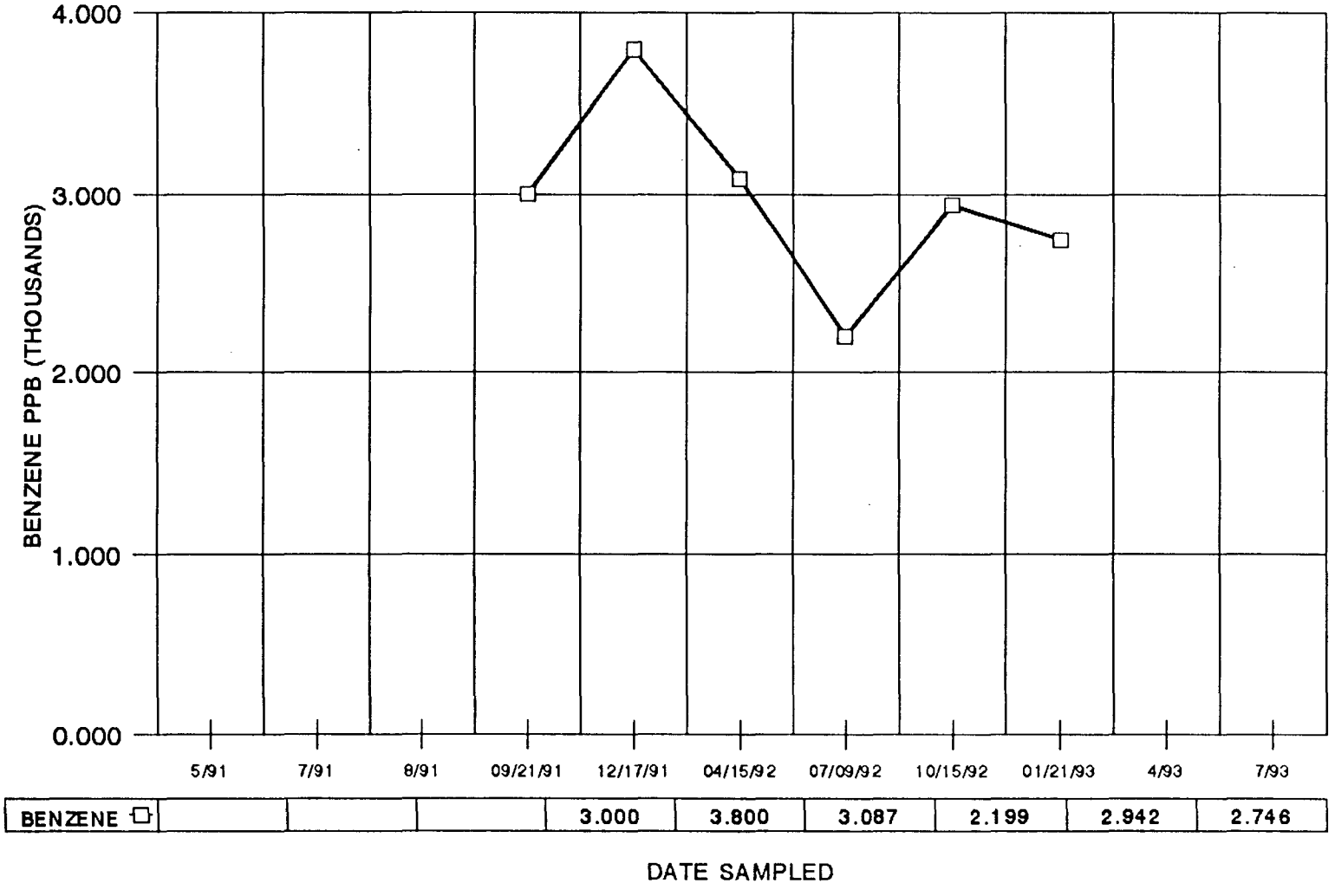
GROUNDWATER ANALYSIS DATA

MW#10 BH-33



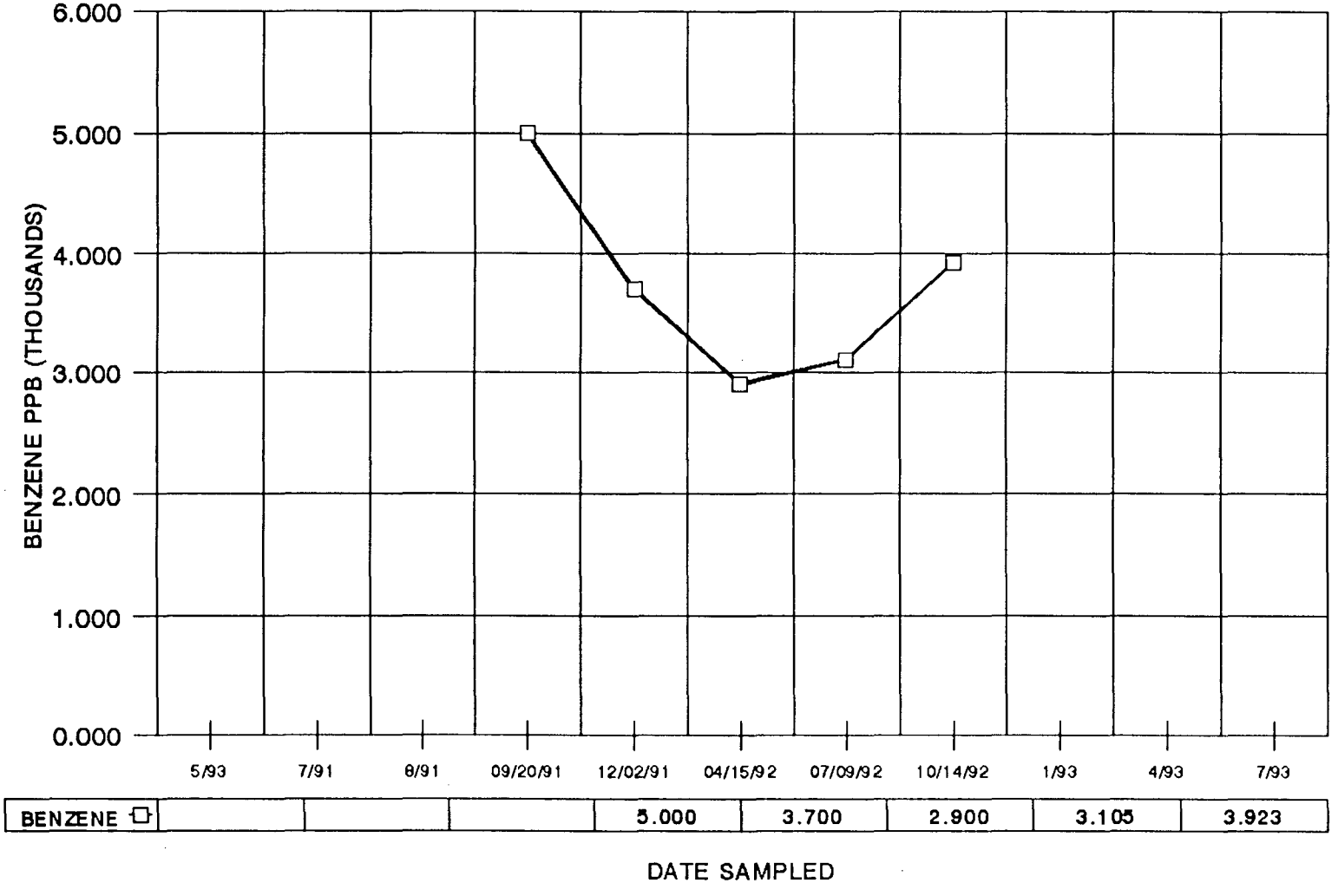
GROUNDWATER ANALYSIS DATA

MW#11 BH-34



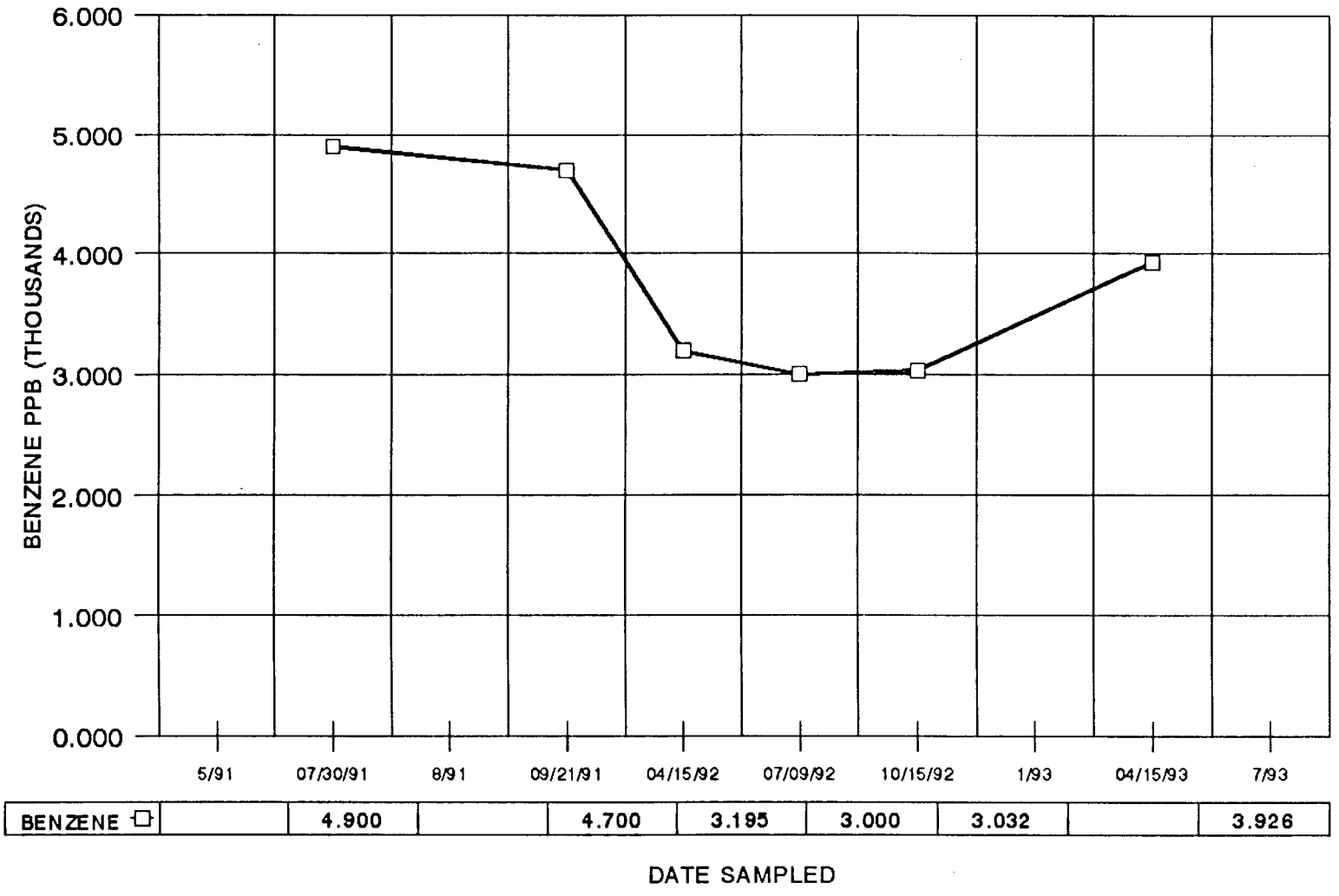
GROUNDWATER ANALYSIS DATA

MW#18 BH-41



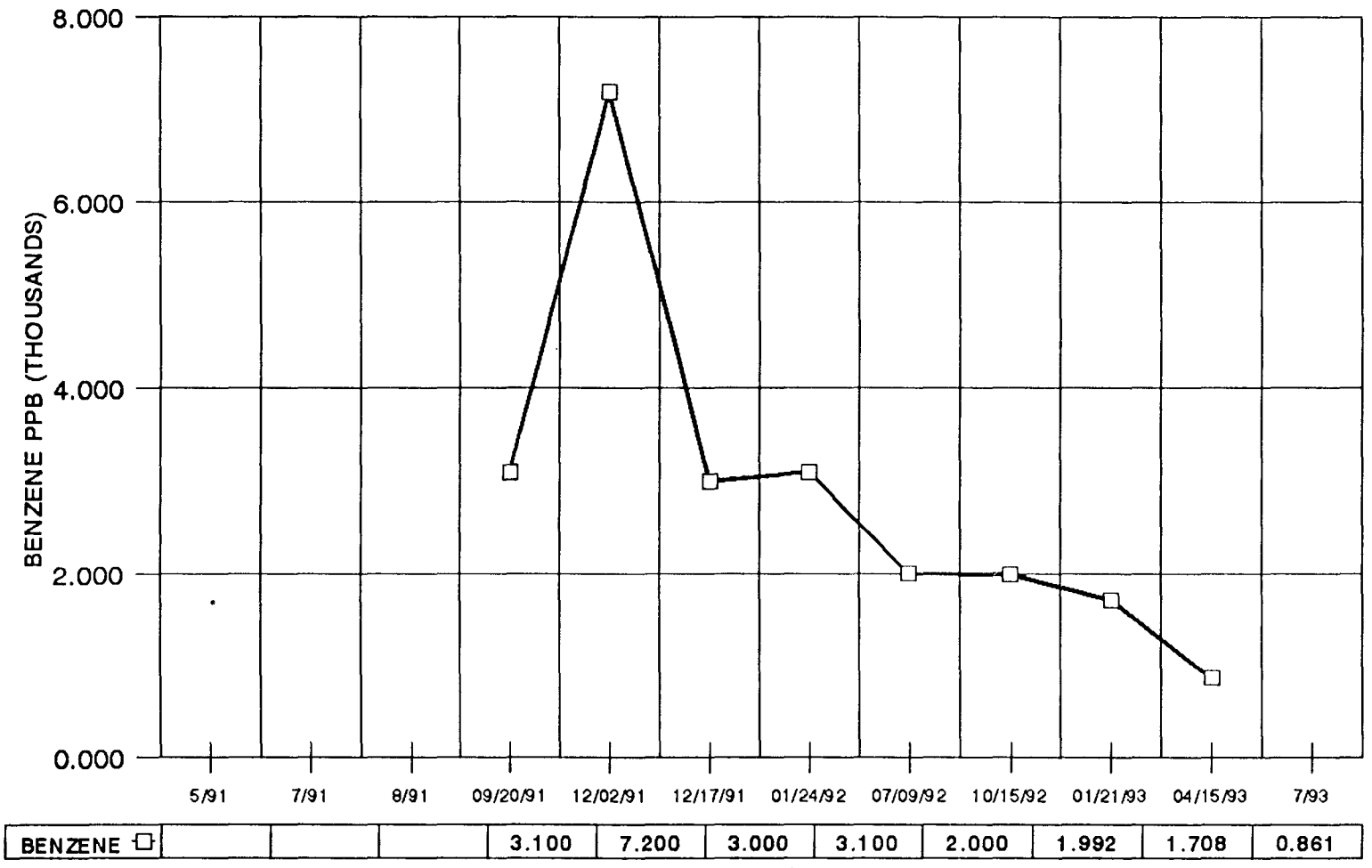
GROUNDWATER ANALYSIS DATA

MW#19 BH-42



GROUNDWATER ANALYSIS DATA

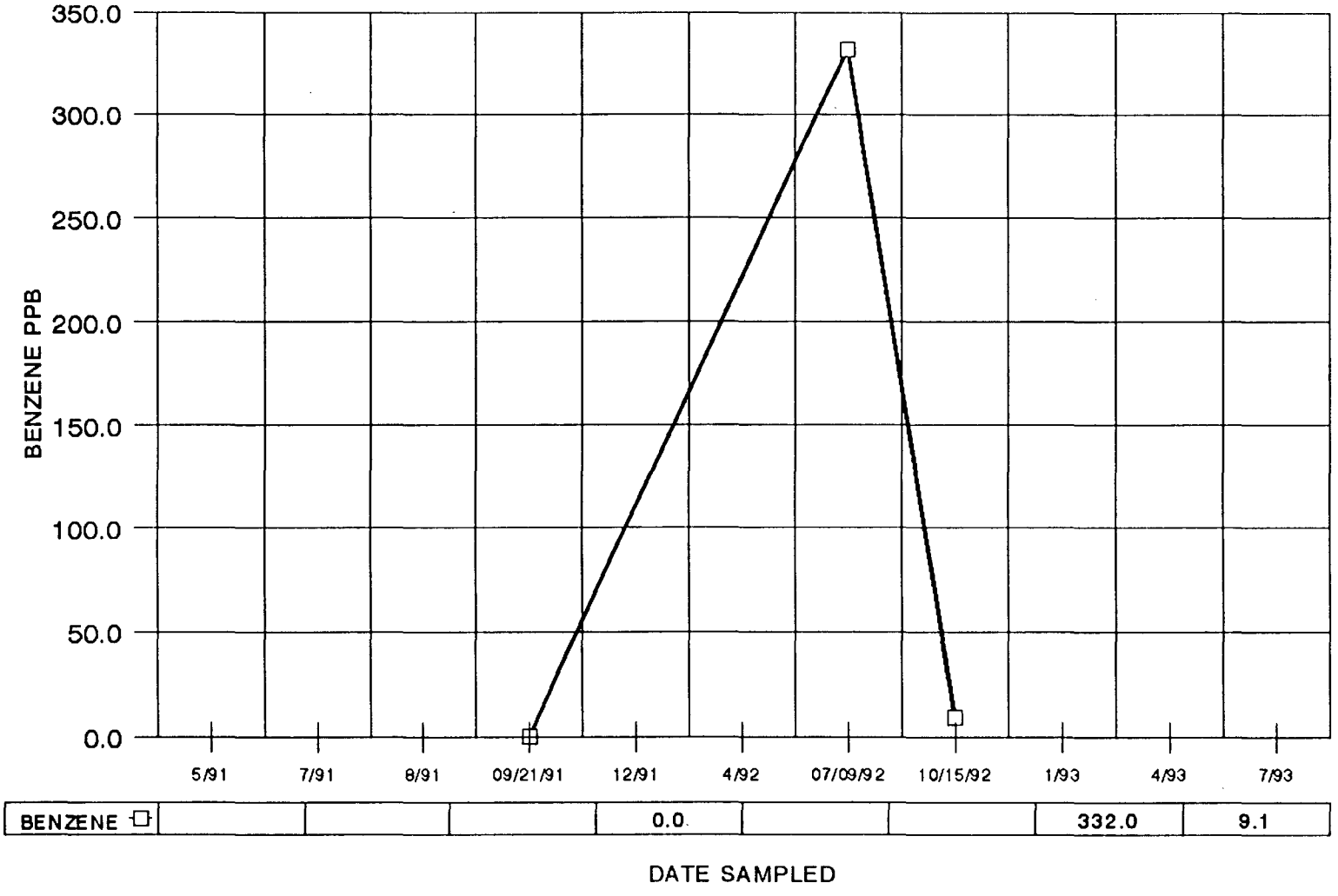
MW#26 BH-49



BENZENE				3.100	7.200	3.000	3.100	2.000	1.992	1.708	0.861

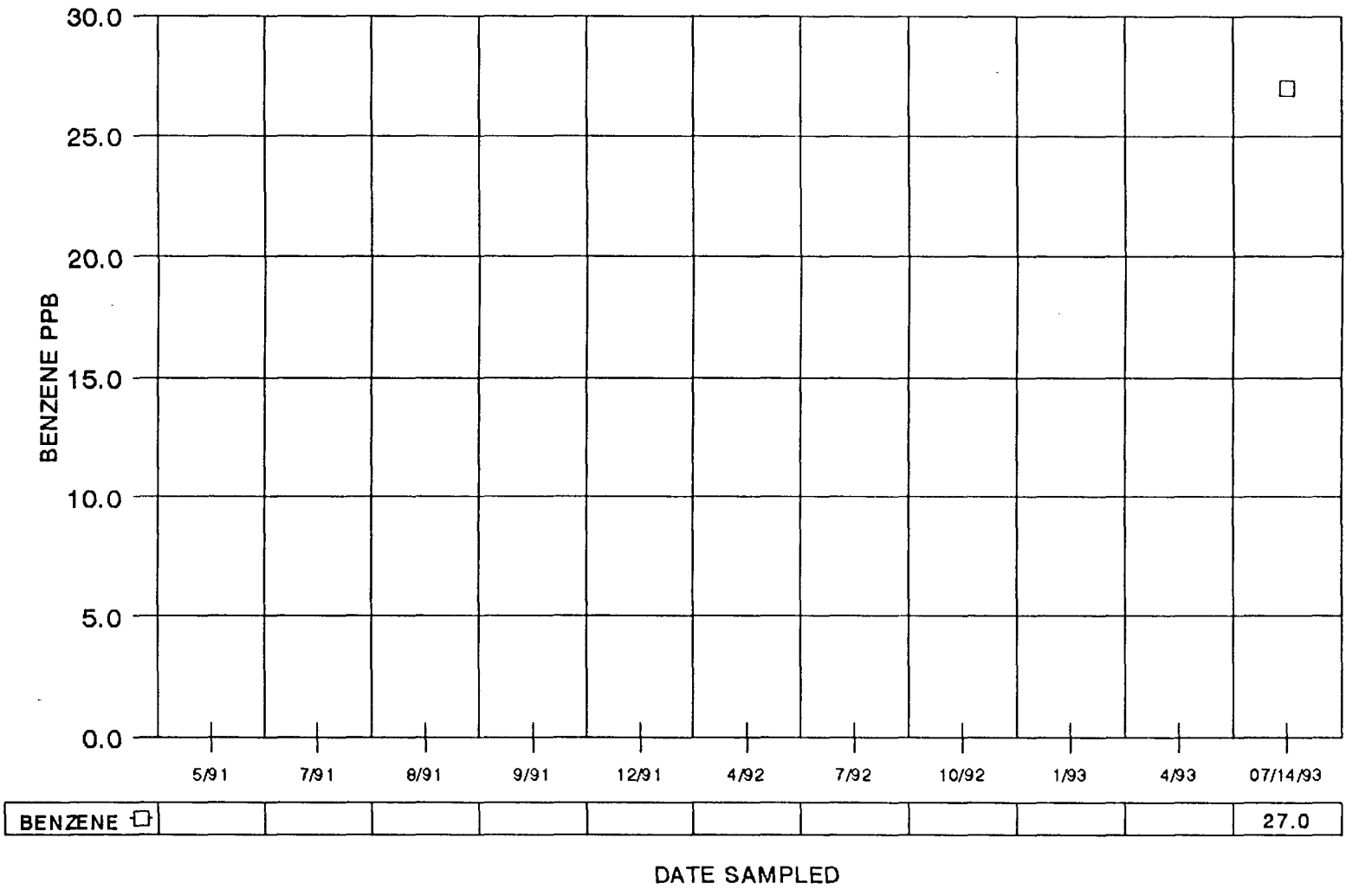
GROUNDWATER ANALYSIS DATA

MW#31 BH-55



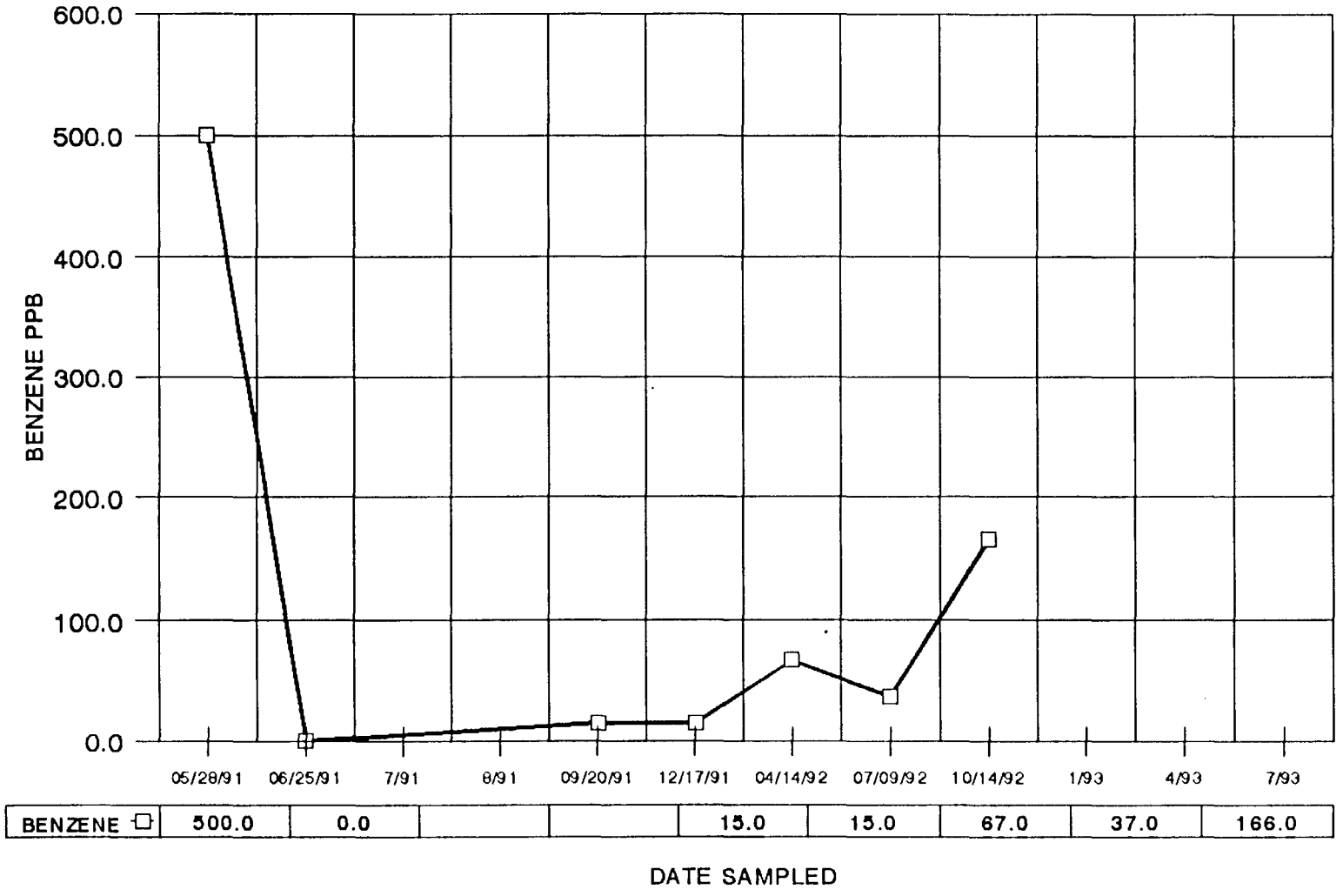
GROUNDWATER ANALYSIS DATA

MW#37 BH-60



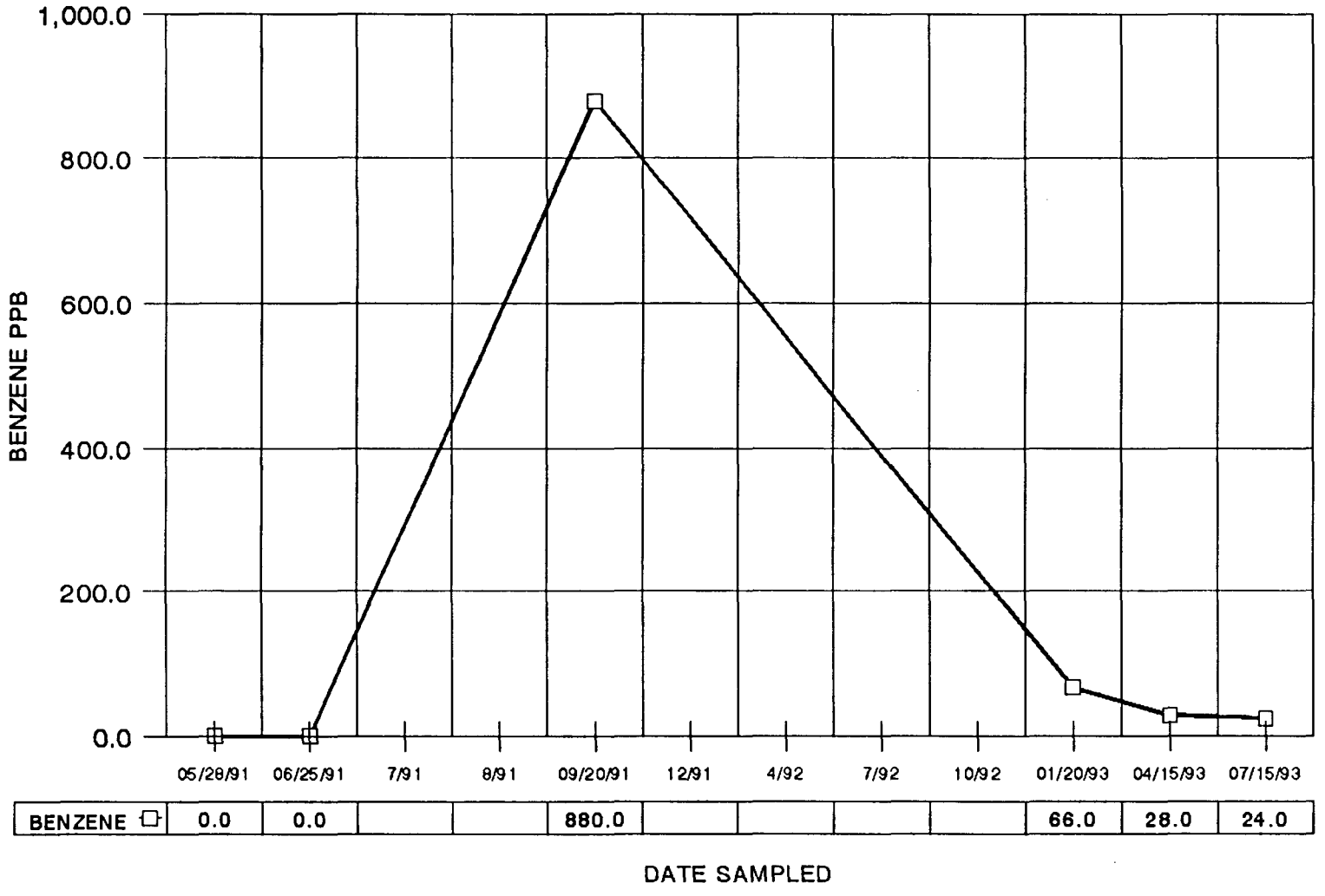
GROUNDWATER ANALYSIS DATA

MW#38 BH-61



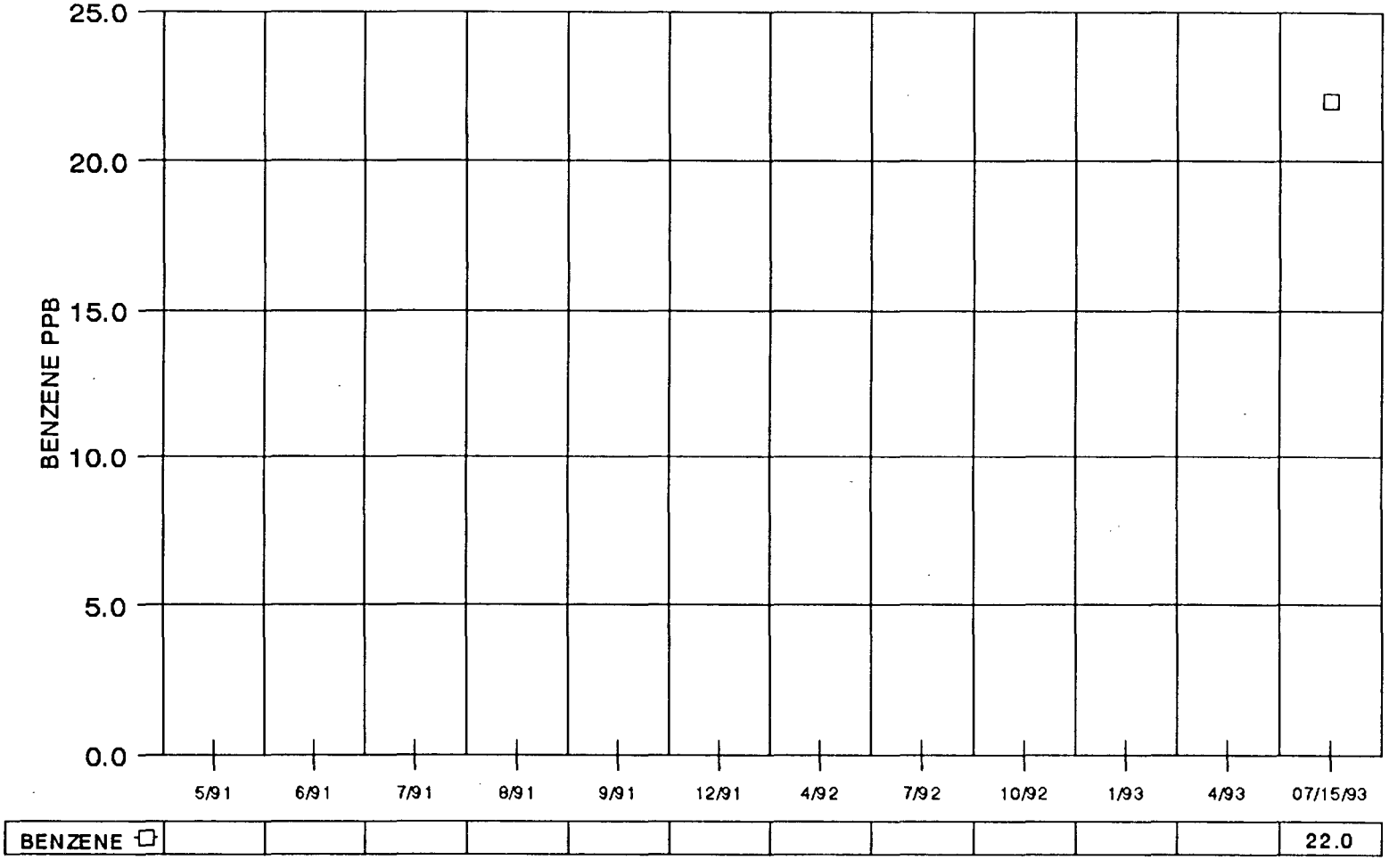
GROUNDWATER ANALYSIS DATA

MW#39 BH-62



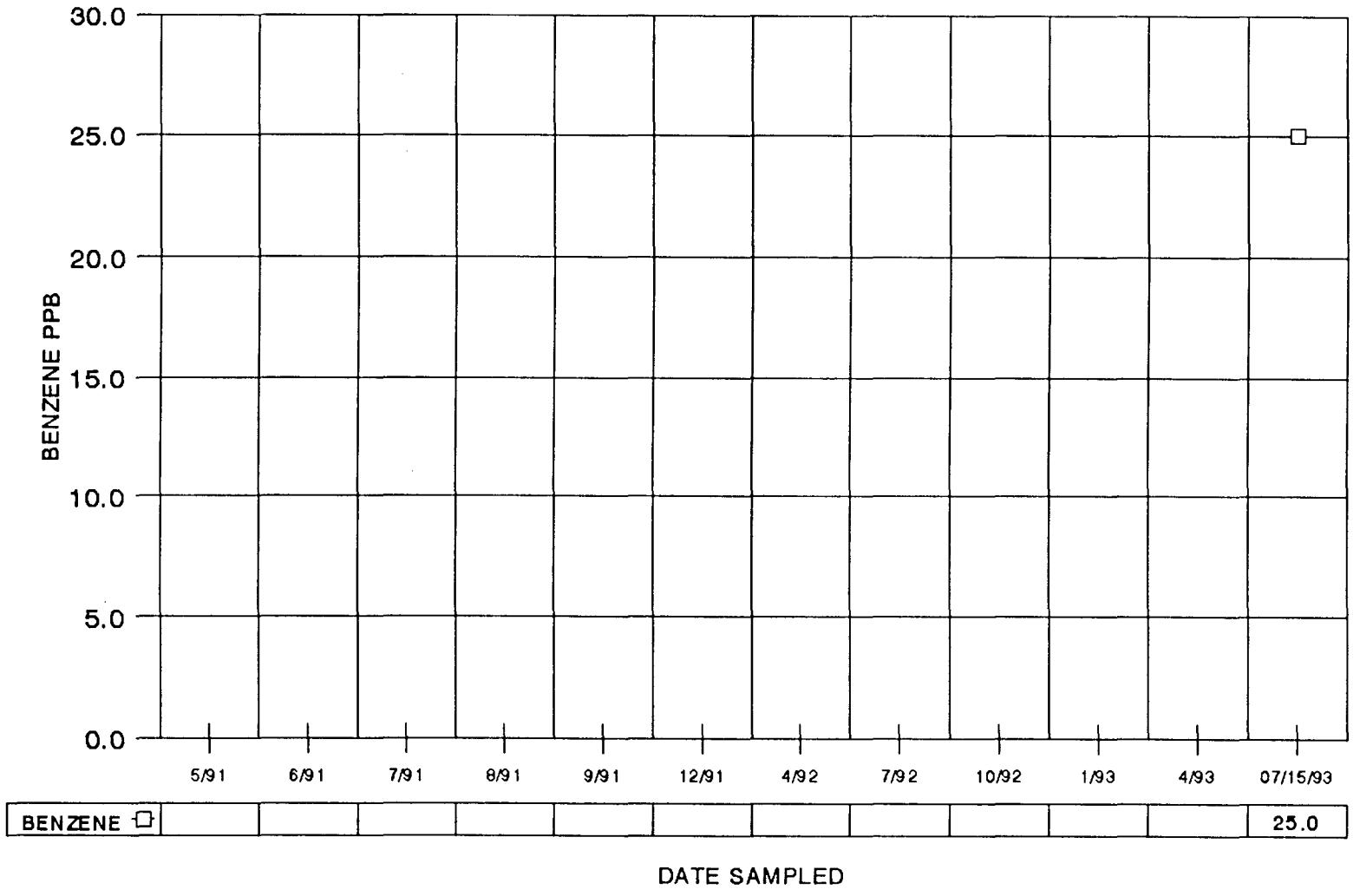
GROUNDWATER ANALYSIS DATA

MW#41 BH-64



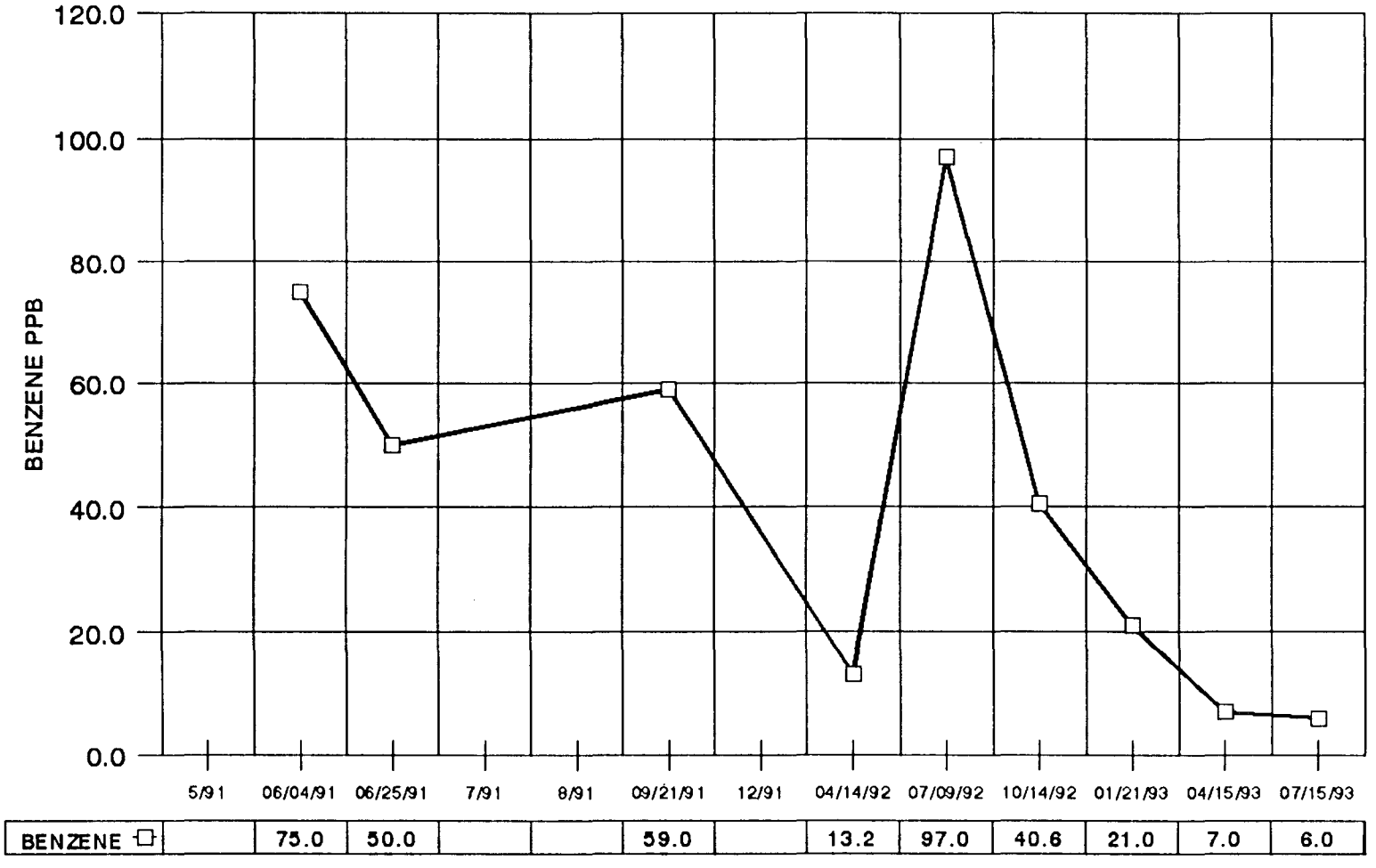
GROUNDWATER ANALYSIS DATA

MW#43 BH-66



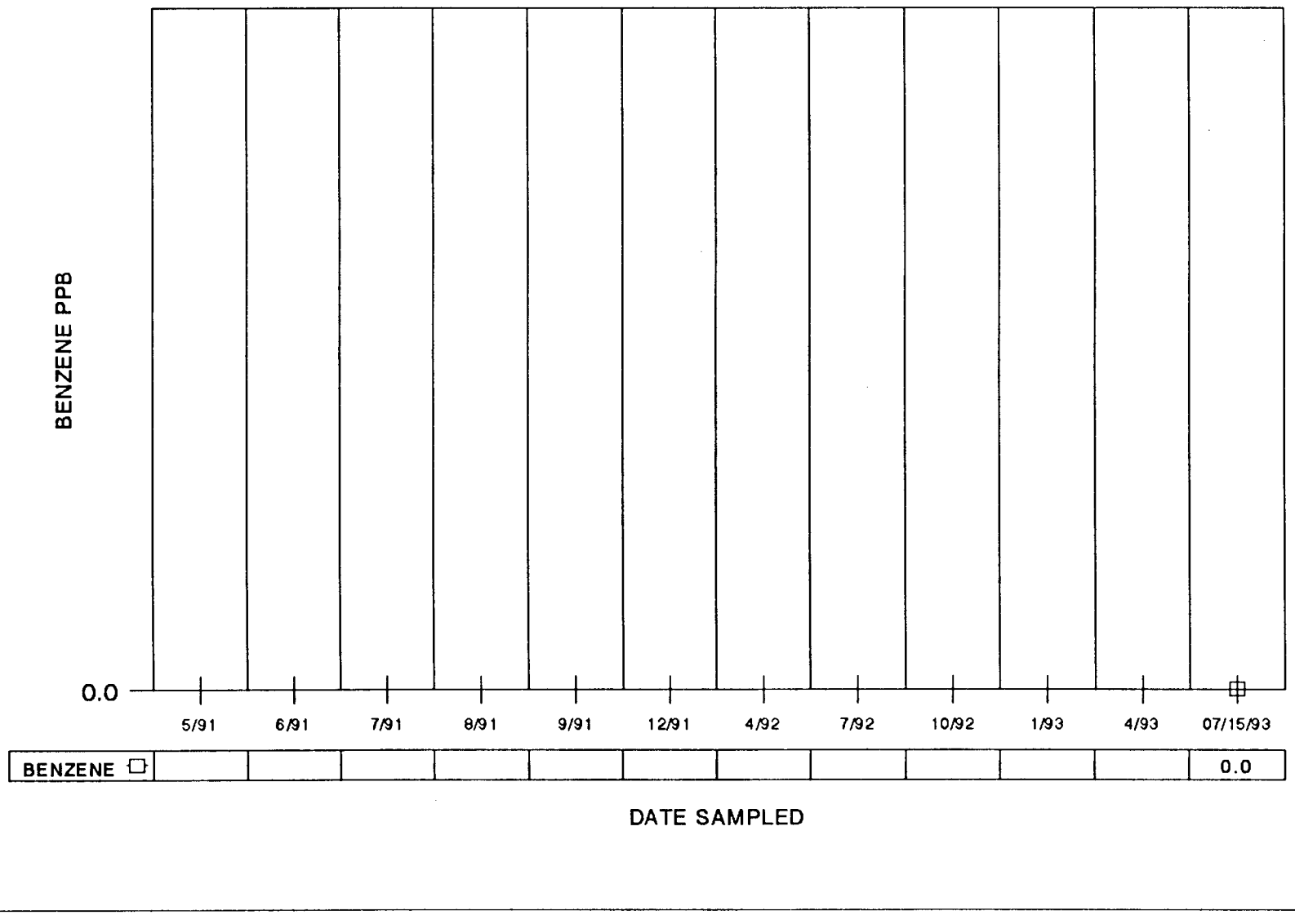
BOREHOLE WATER ANALYSIS DATA

MW#44 BH-67



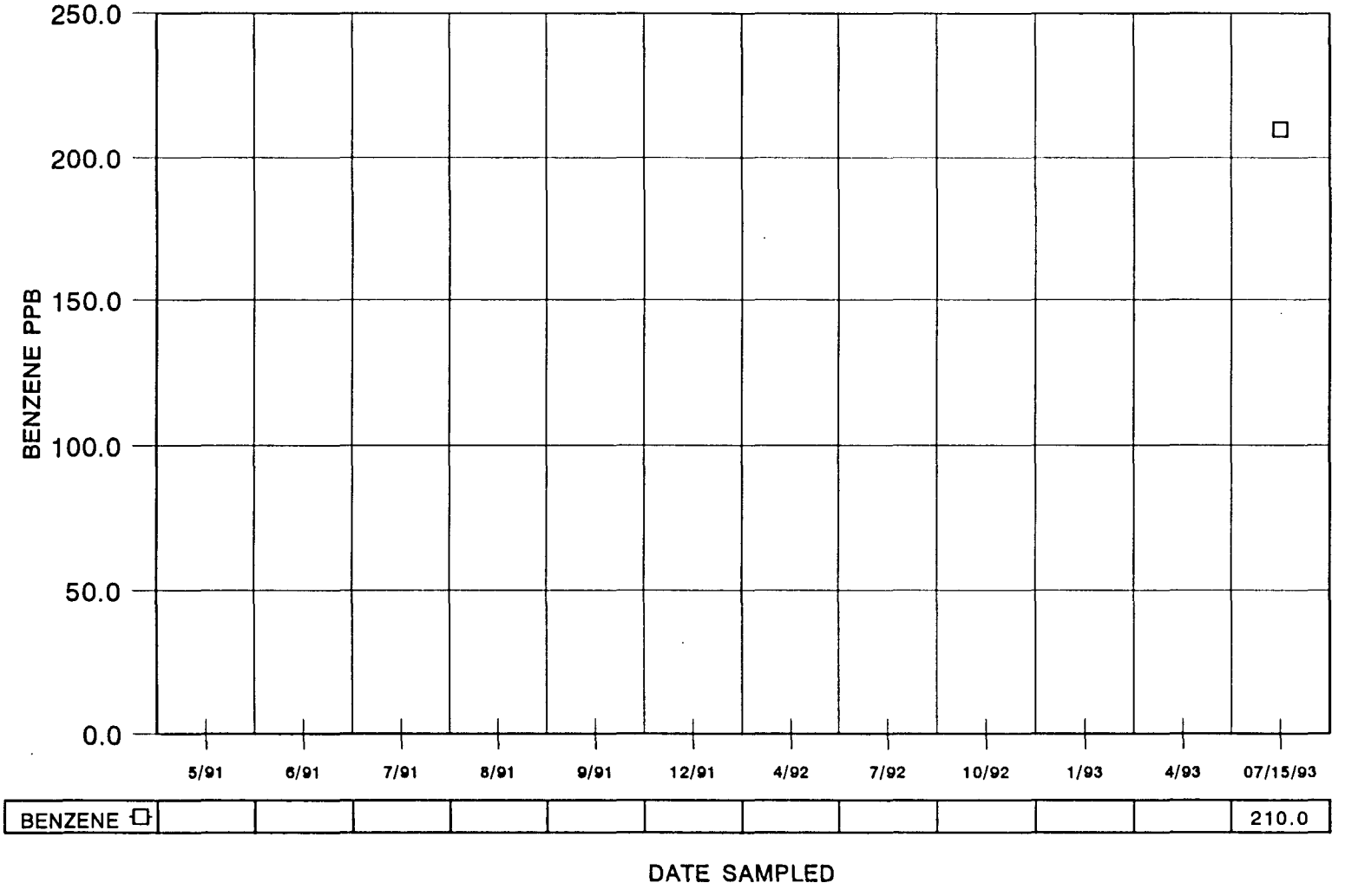
BOREHOLE WATER ANALYSIS DATA

MW#45 BH-68



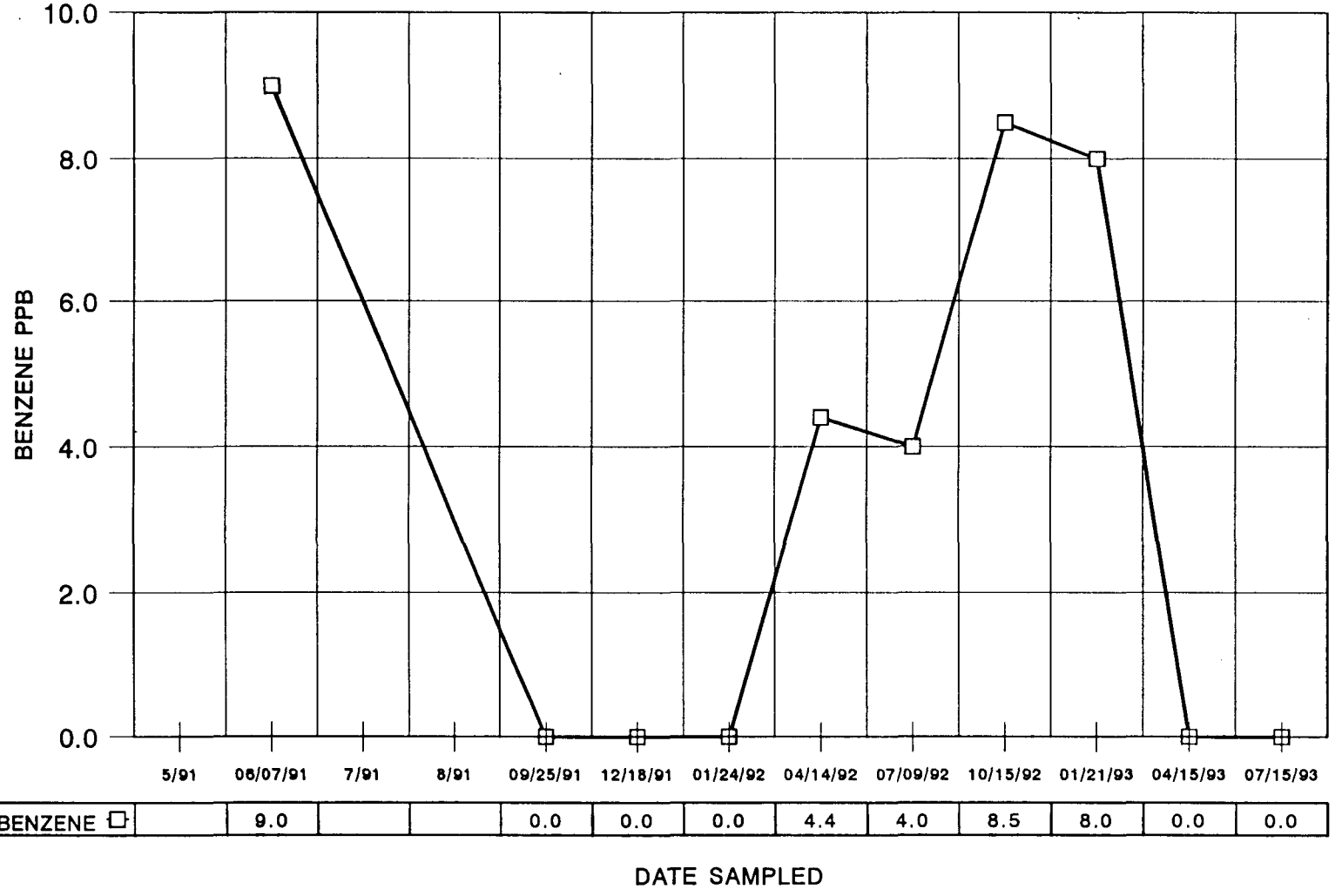
BOREHOLE WATER ANALYSIS DATA

MW#49 BH-72



GROUNDWATER ANALYSIS DATA

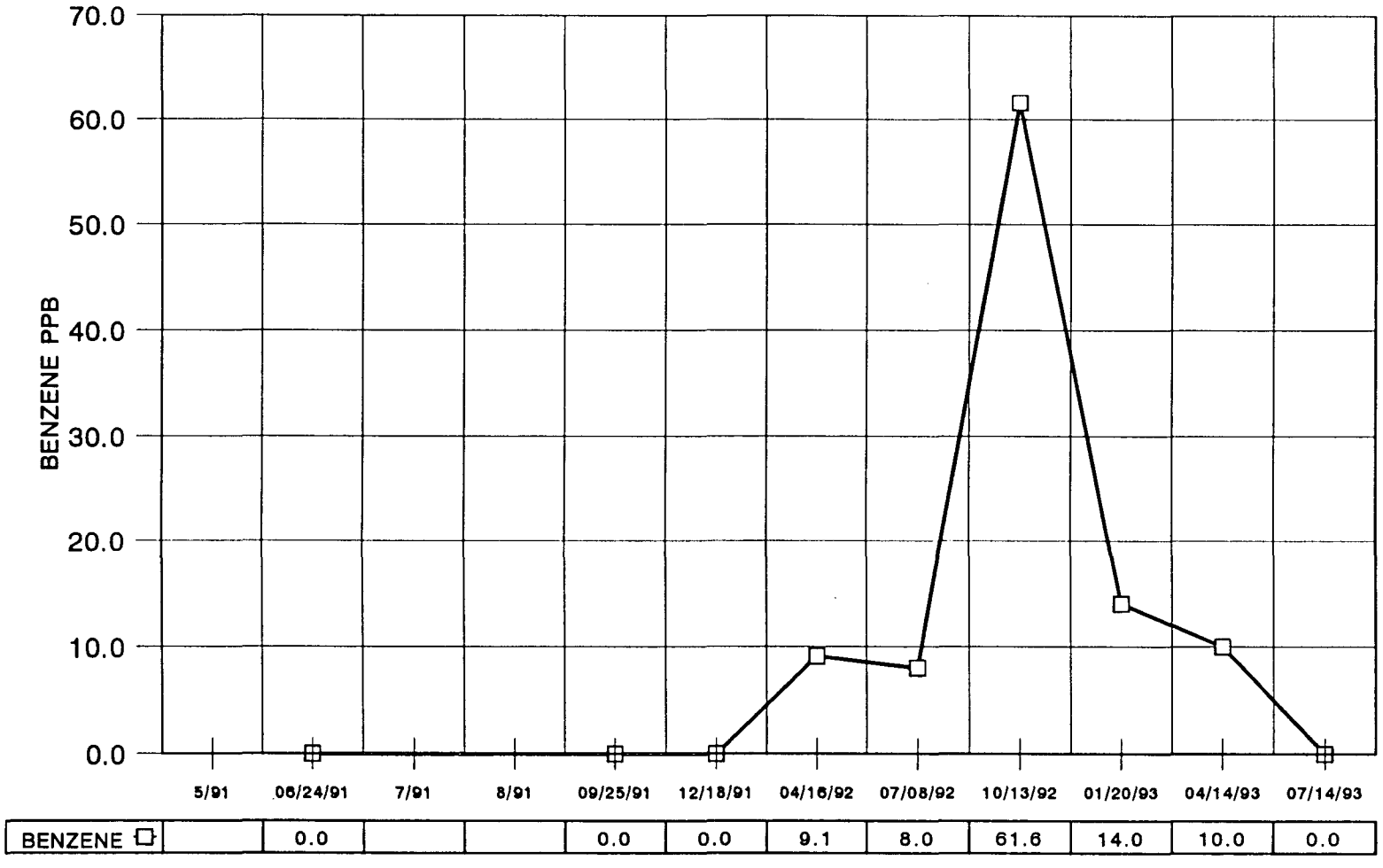
MW#50 BH-73



	5/91	06/07/91	7/91	8/91	09/25/91	12/18/91	01/24/92	04/14/92	07/09/92	10/15/92	01/21/93	04/15/93	07/15/93
BENZENE		9.0			0.0	0.0	0.0	4.4	4.0	8.5	8.0	0.0	0.0

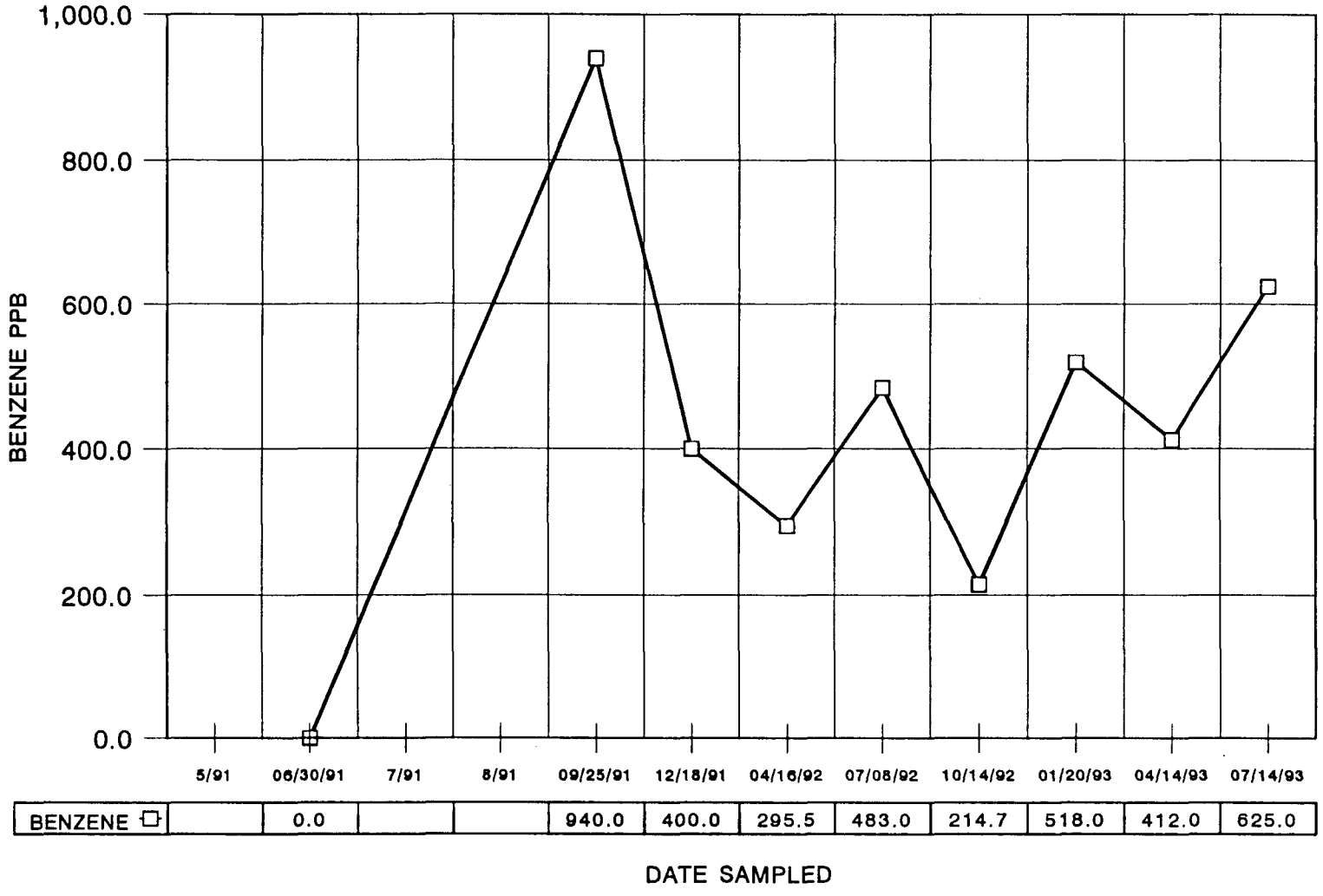
GROUNDWATER ANALYSIS DATA

MW#54 BH-80



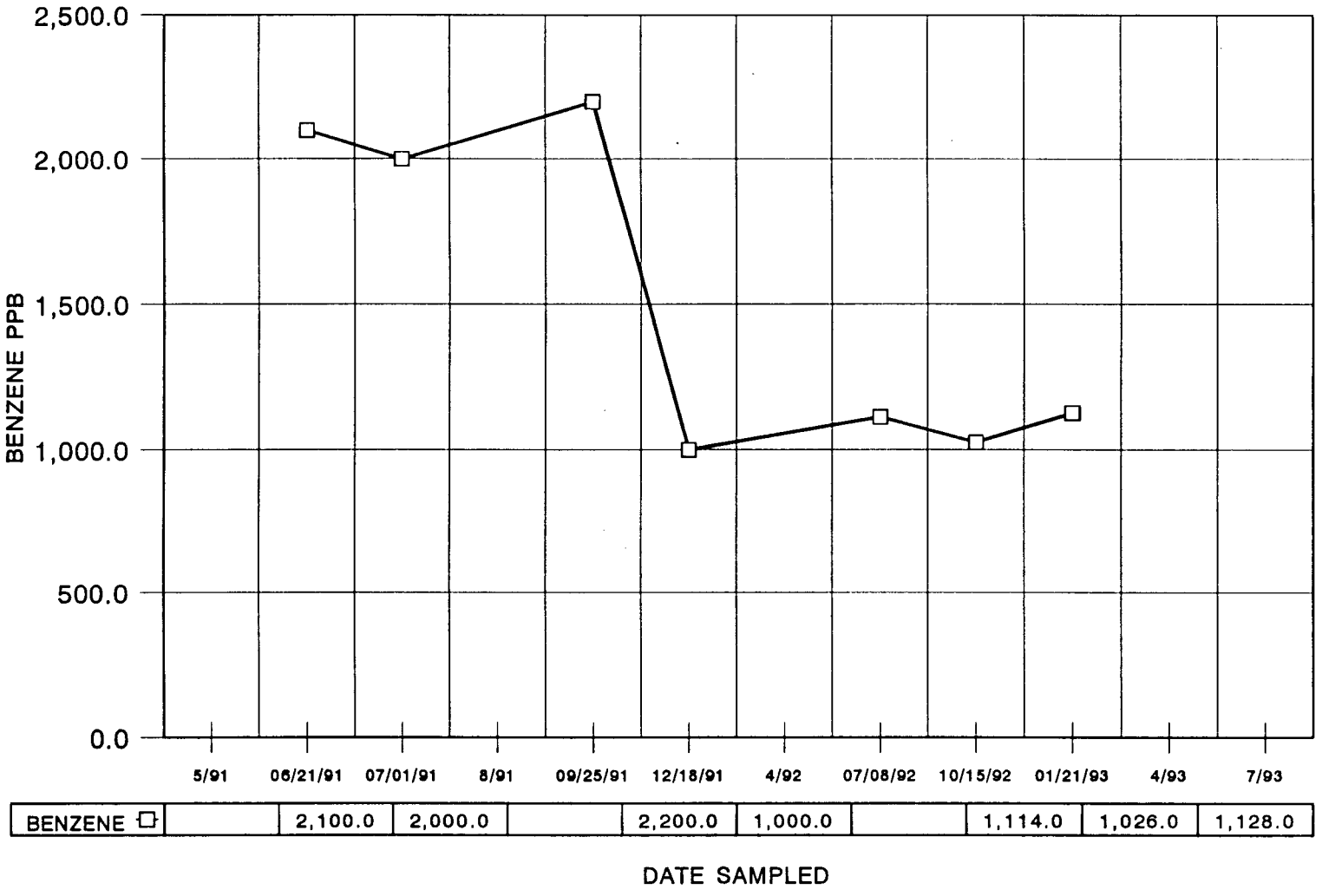
GROUNDWATER ANALYSIS DATA

MW#55 BH-81



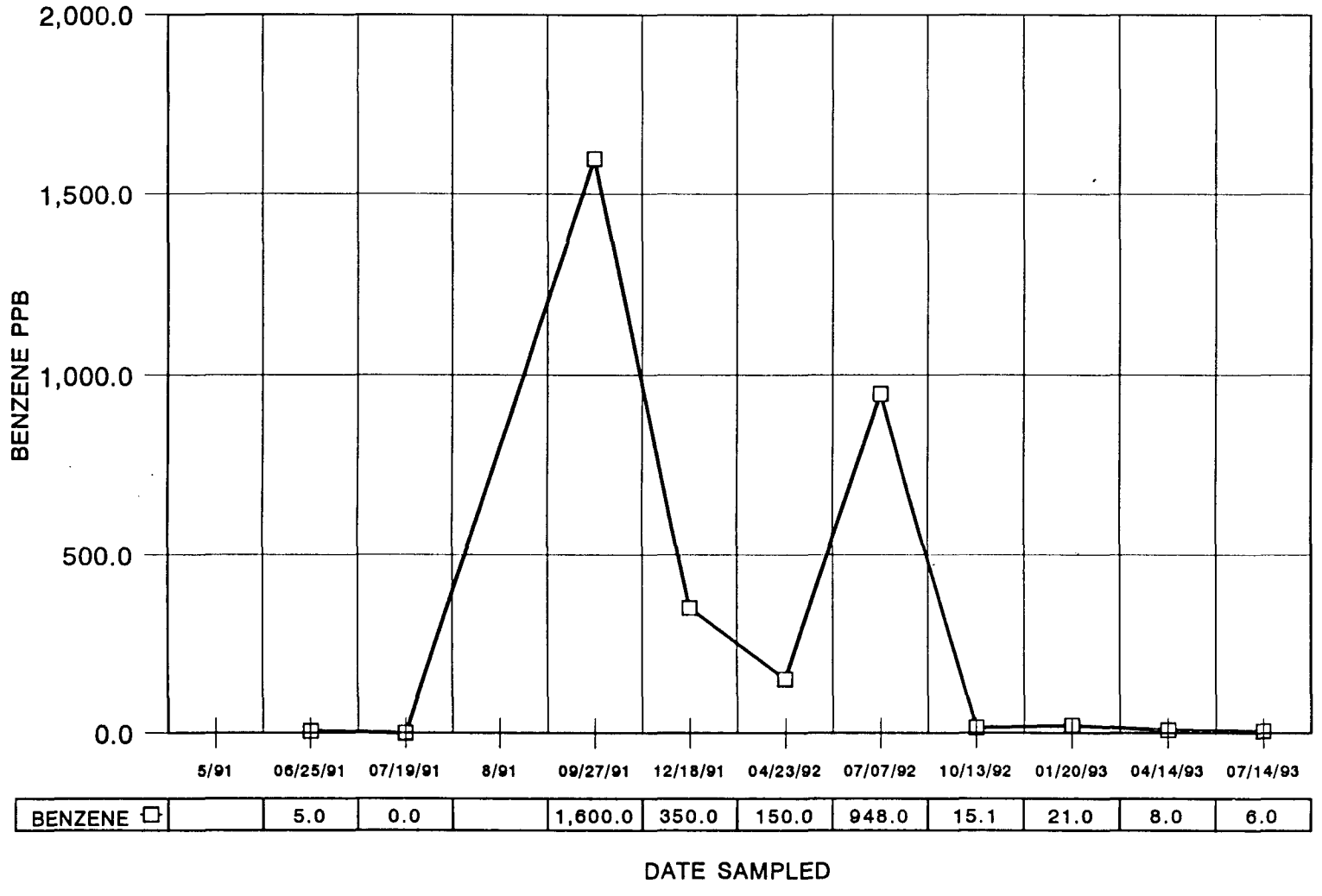
GROUNDWATER ANALYSIS DATA

MW#56 BH-82



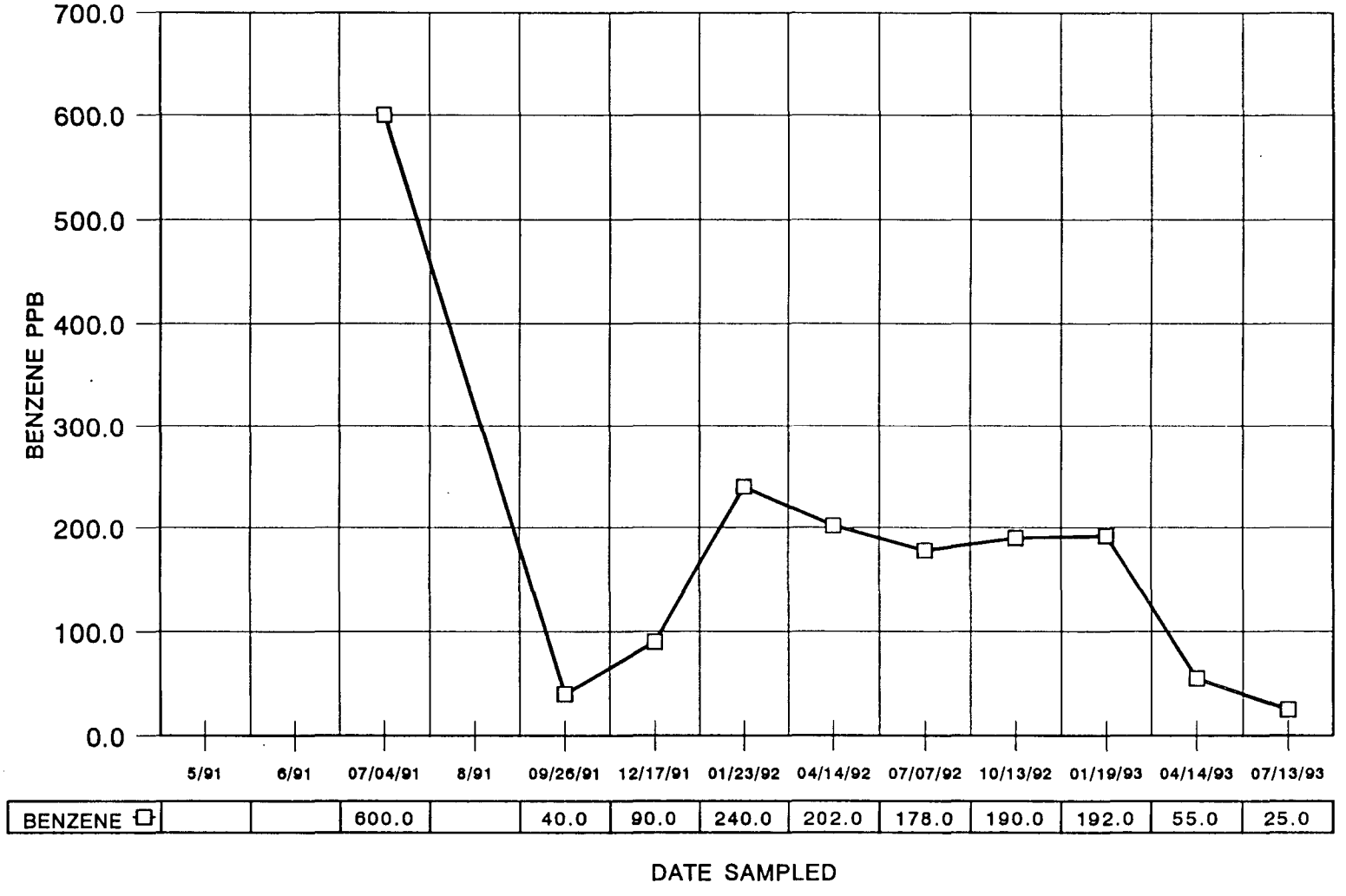
GROUNDWATER ANALYSIS DATA

MW#57 BH-83



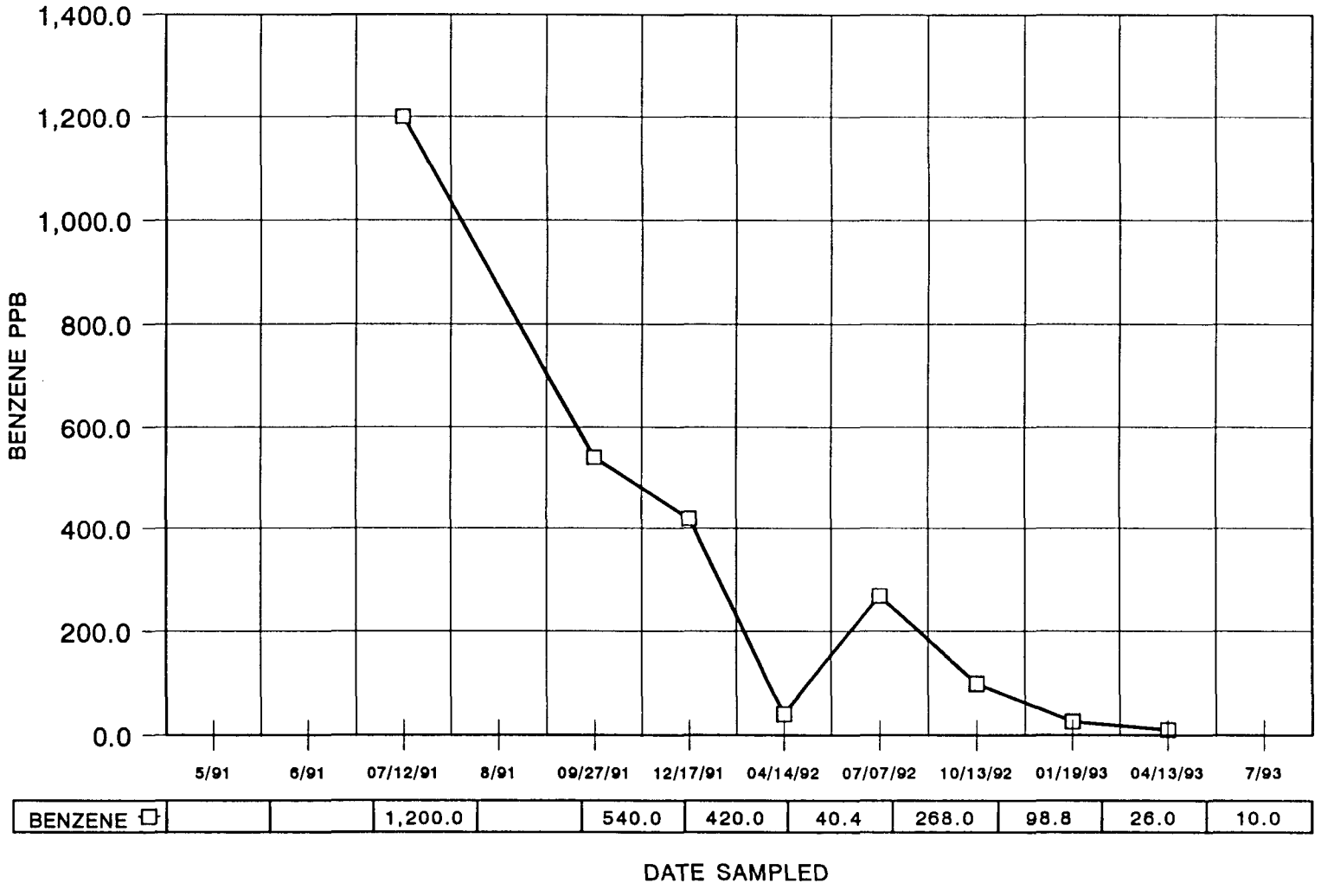
GROUNDWATER ANALYSIS DATA

MW#58 BH-84



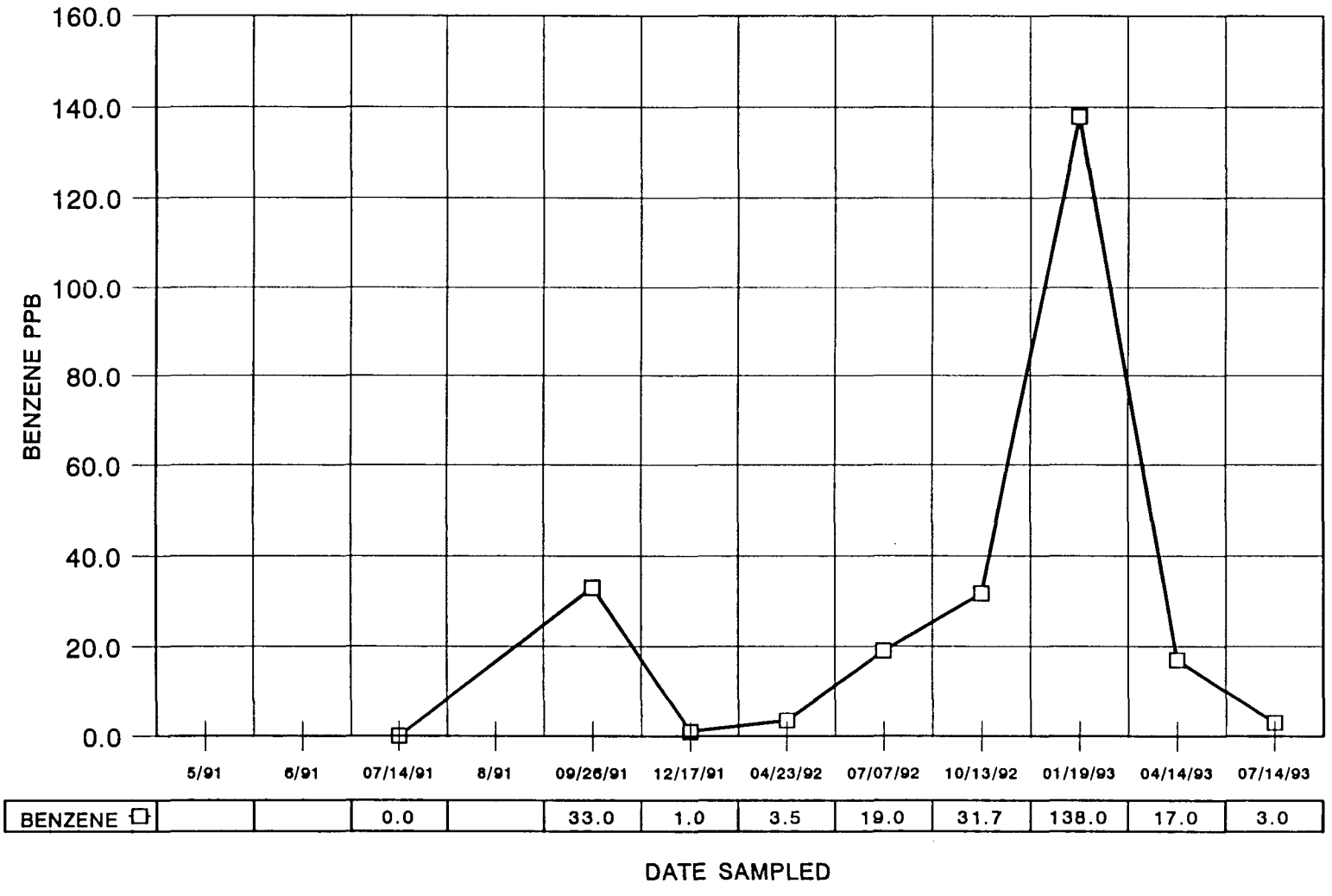
GROUNDWATER ANALYSIS DATA

MW#59 BH-85



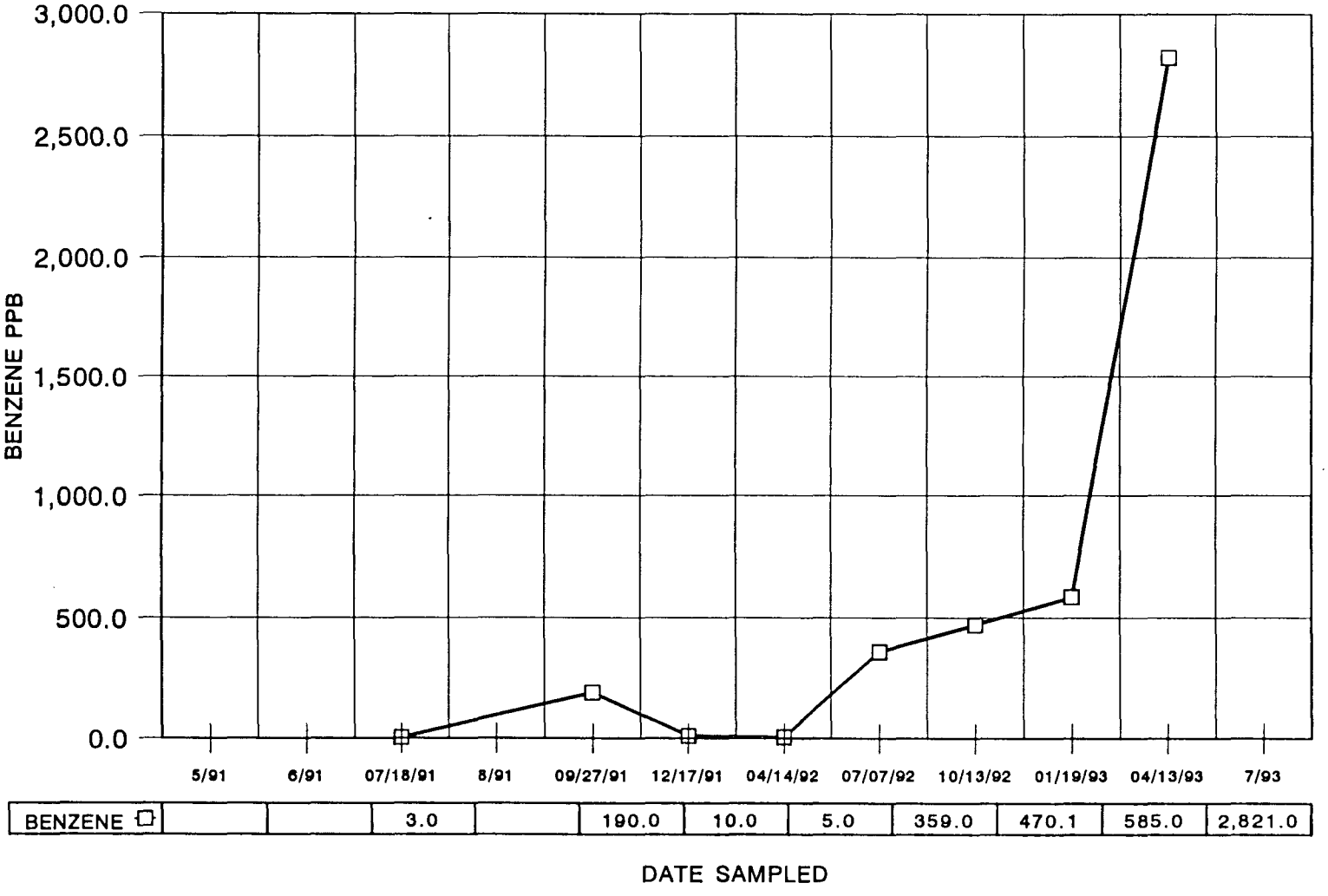
GROUNDWATER ANALYSIS DATA

MW#60 BH-86



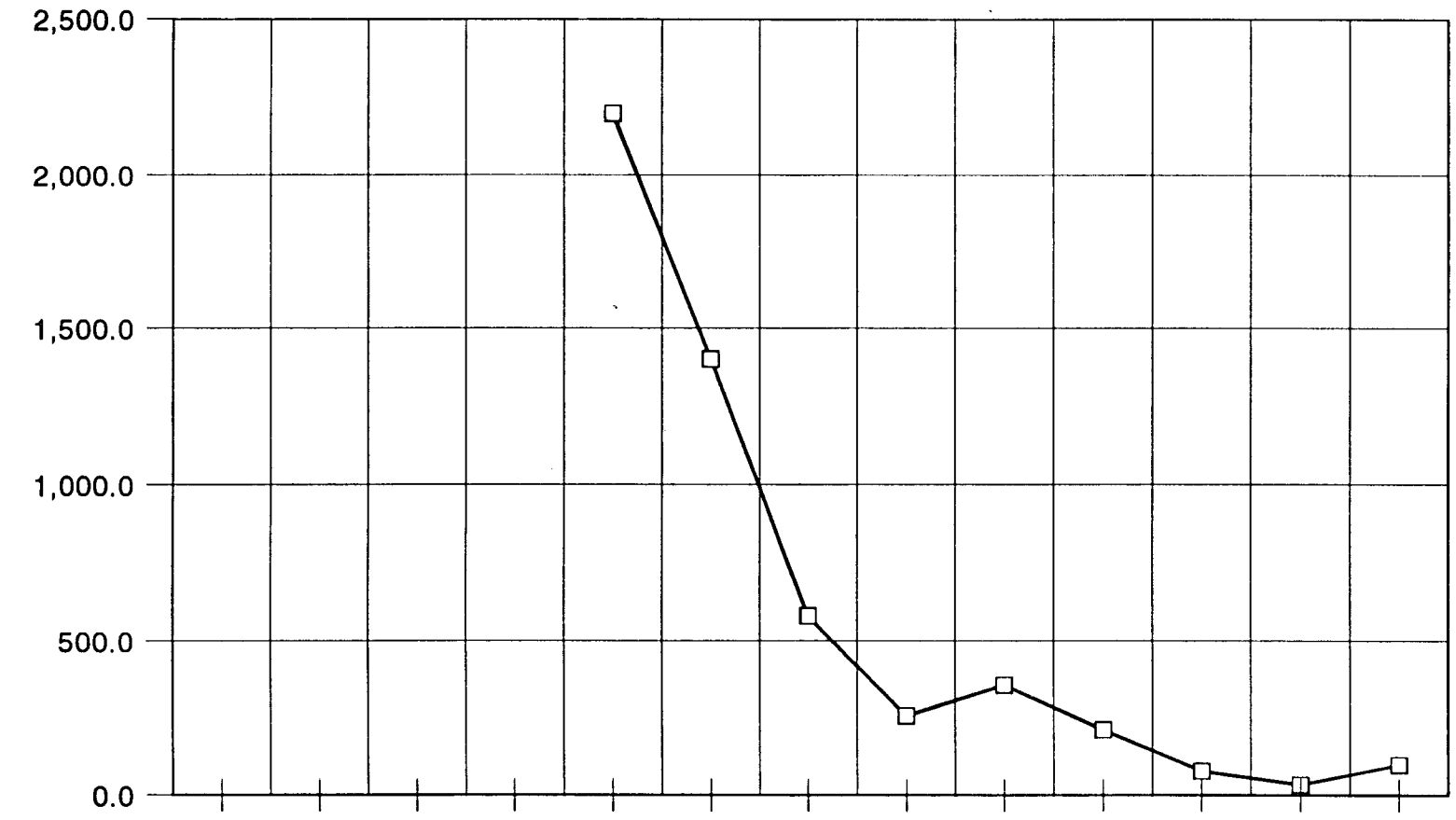
GROUNDWATER ANALYSIS DATA

MW#61A BH-87A



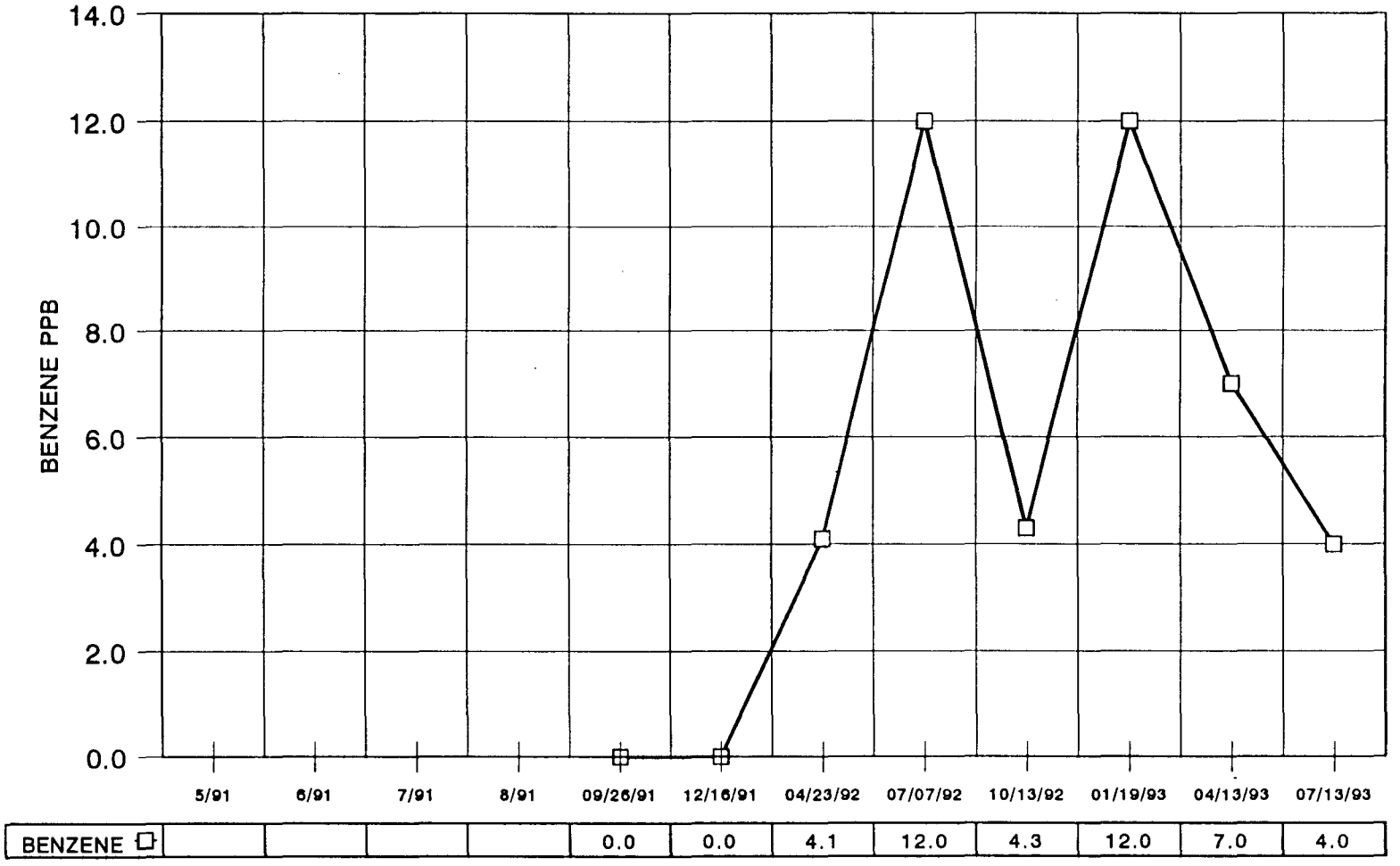
GROUNDWATER ANALYSIS DATA

MW#62 BH-88



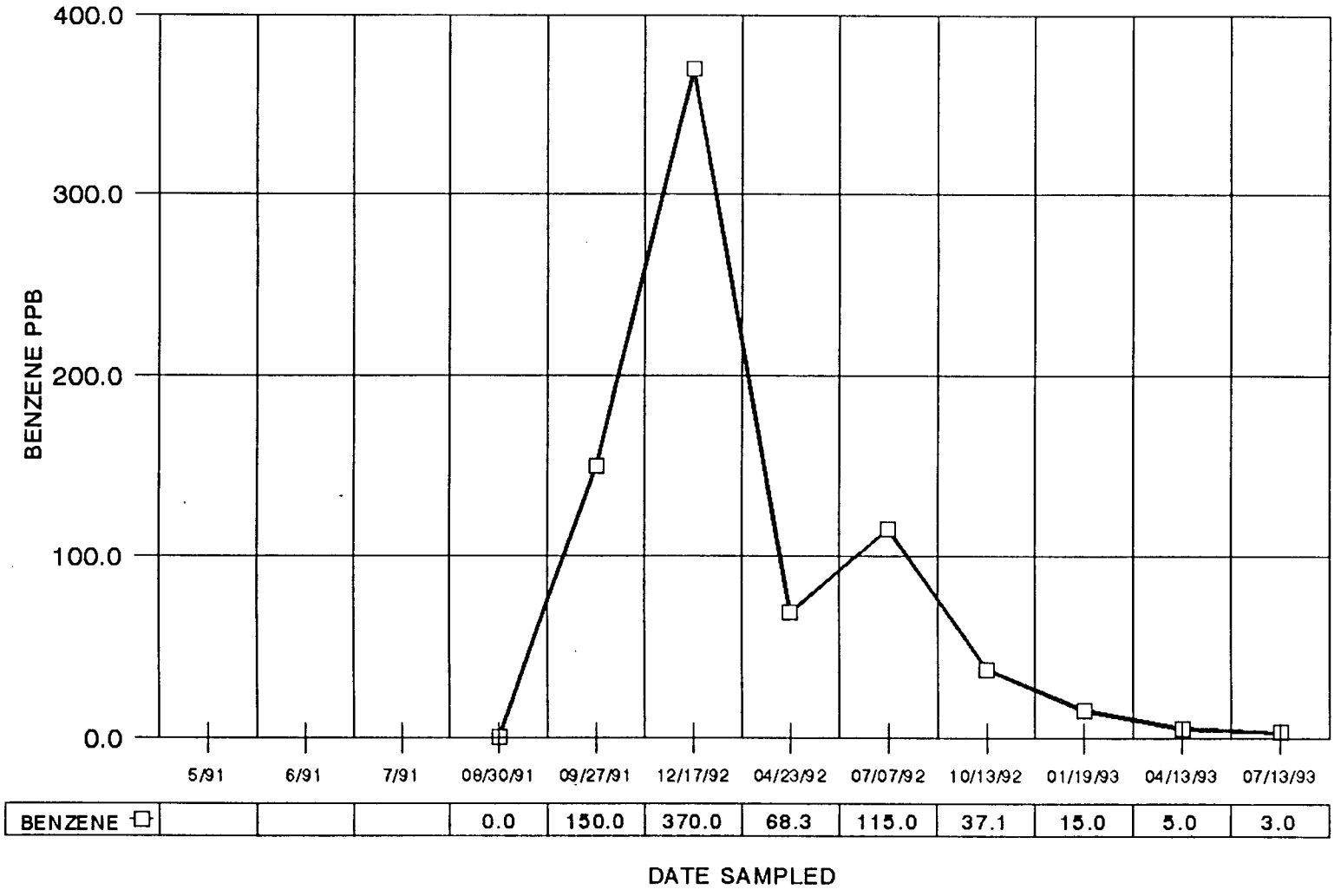
GROUNDWATER ANALYSIS DATA

MW#63 BH-89



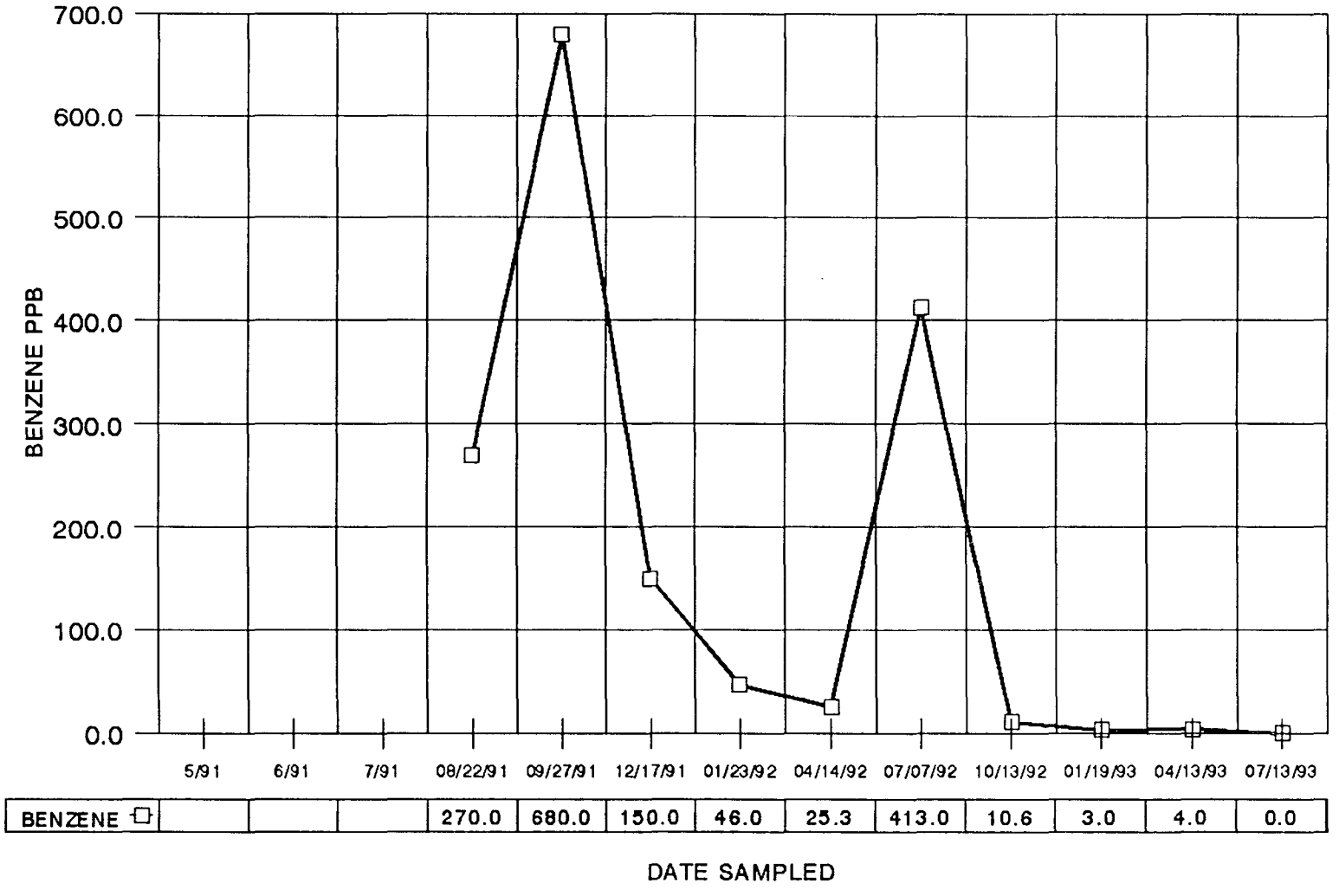
BOREHOLE WATER ANALYSIS DATA

MW#64 BH-90



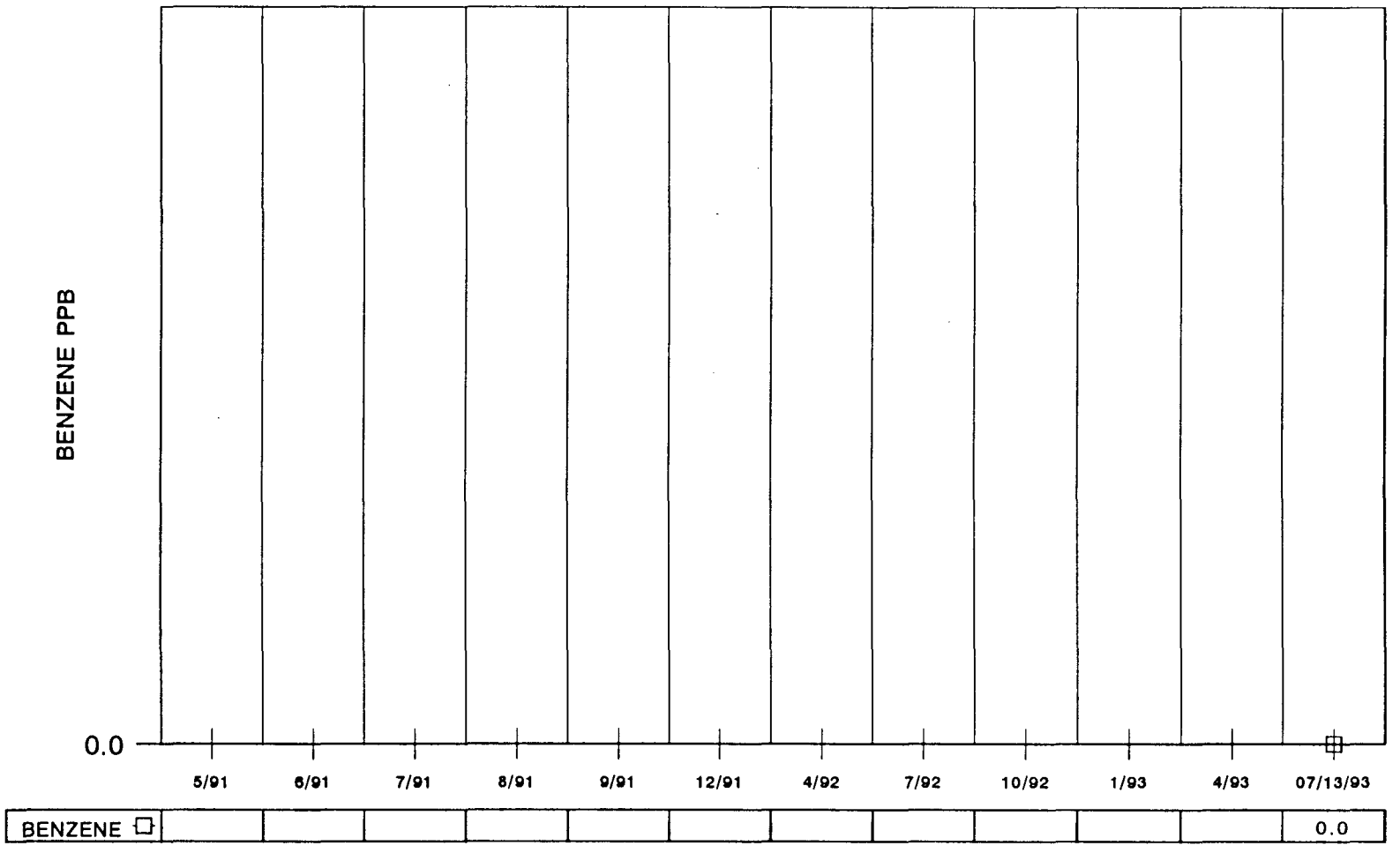
BOREHOLE WATER ANALYSIS DATA

MW#65A BH-91A



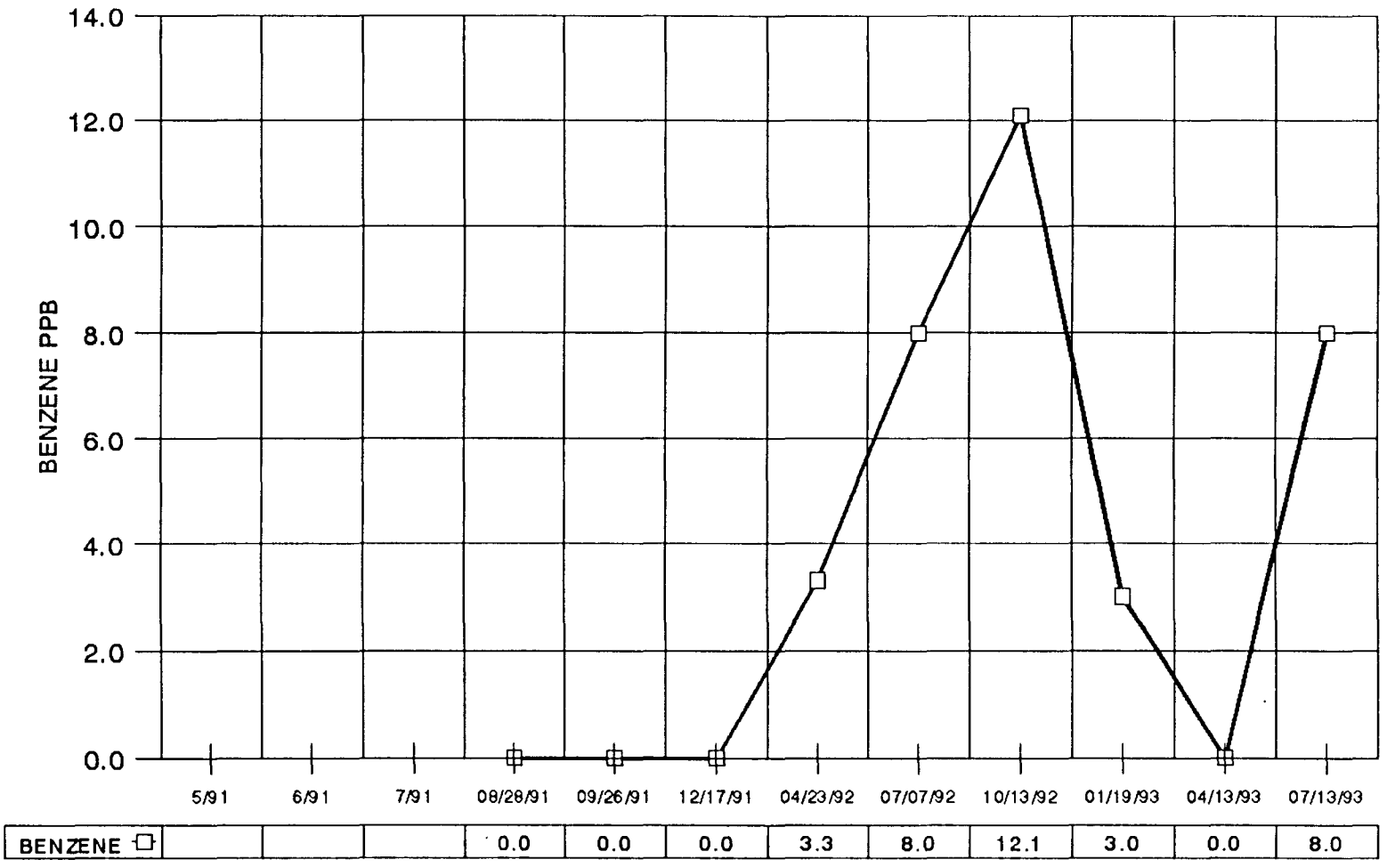
BOREHOLE WATER ANALYSIS DATA

MW#65 BH-91



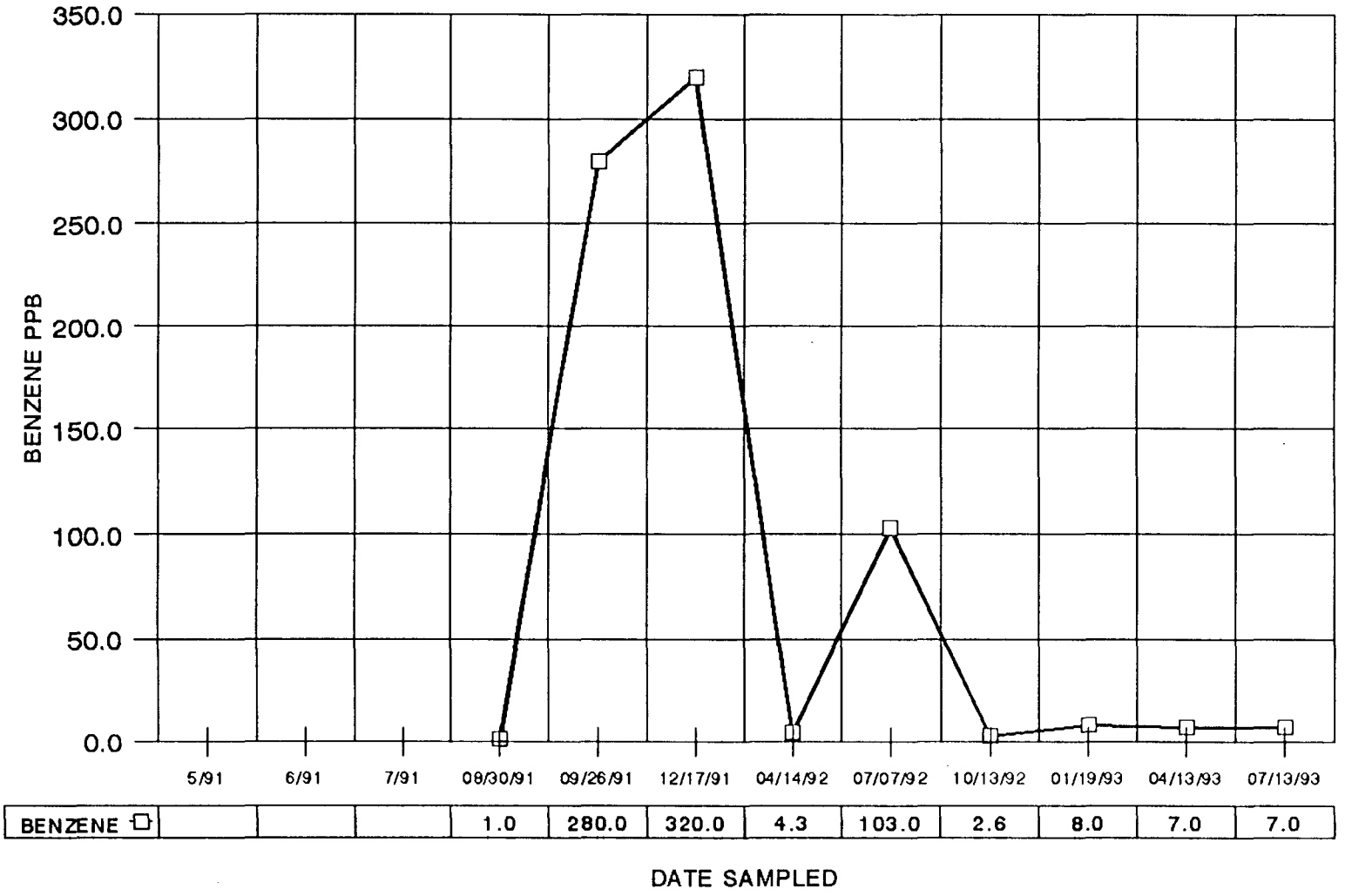
GROUNDWATER ANALYSIS DATA

MW#66 BH-92



GROUNDWATER ANALYSIS DATA

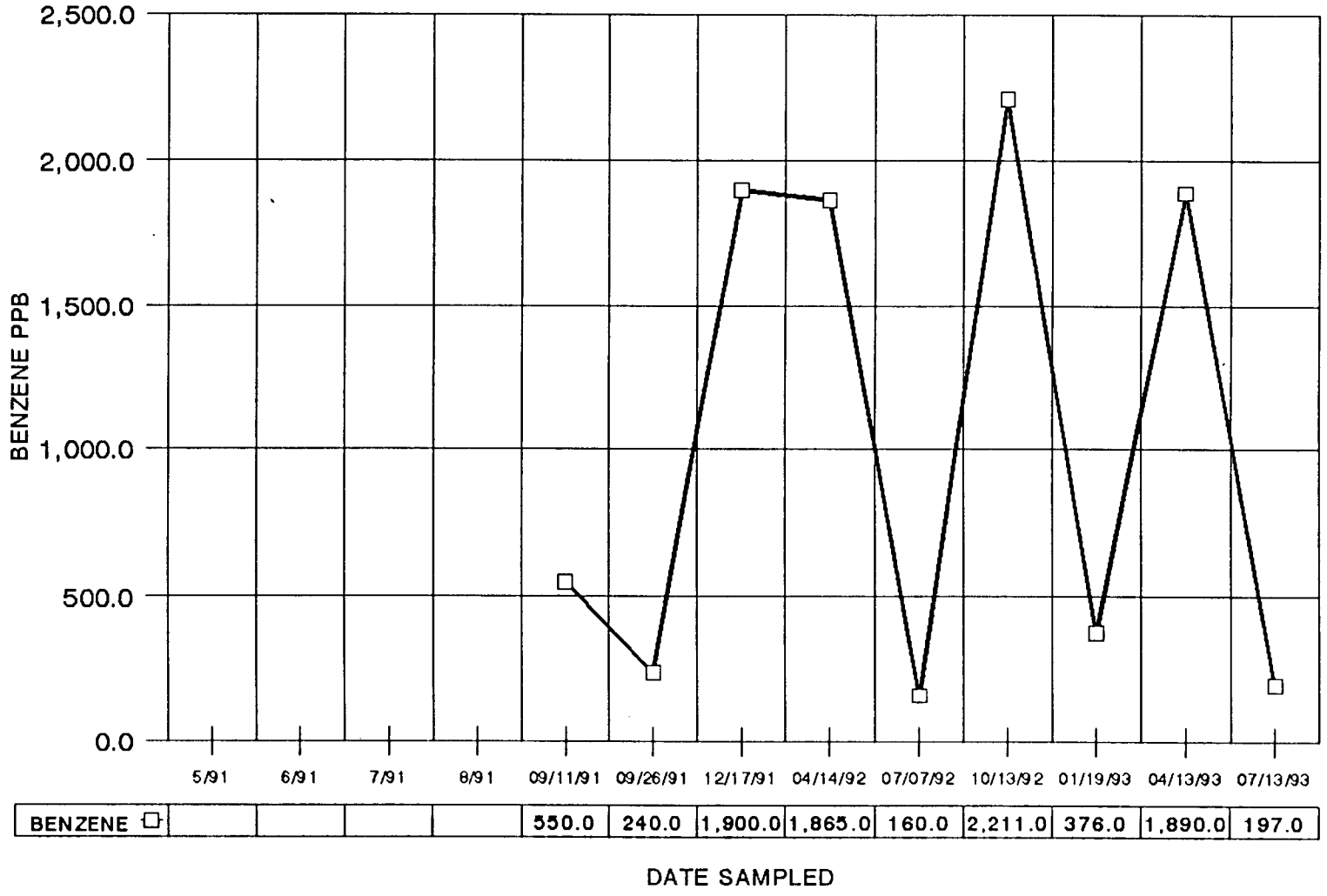
MW#67 BH-93



	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
BENZENE				1.0	280.0	320.0	4.3	103.0	2.6	8.0	7.0	7.0

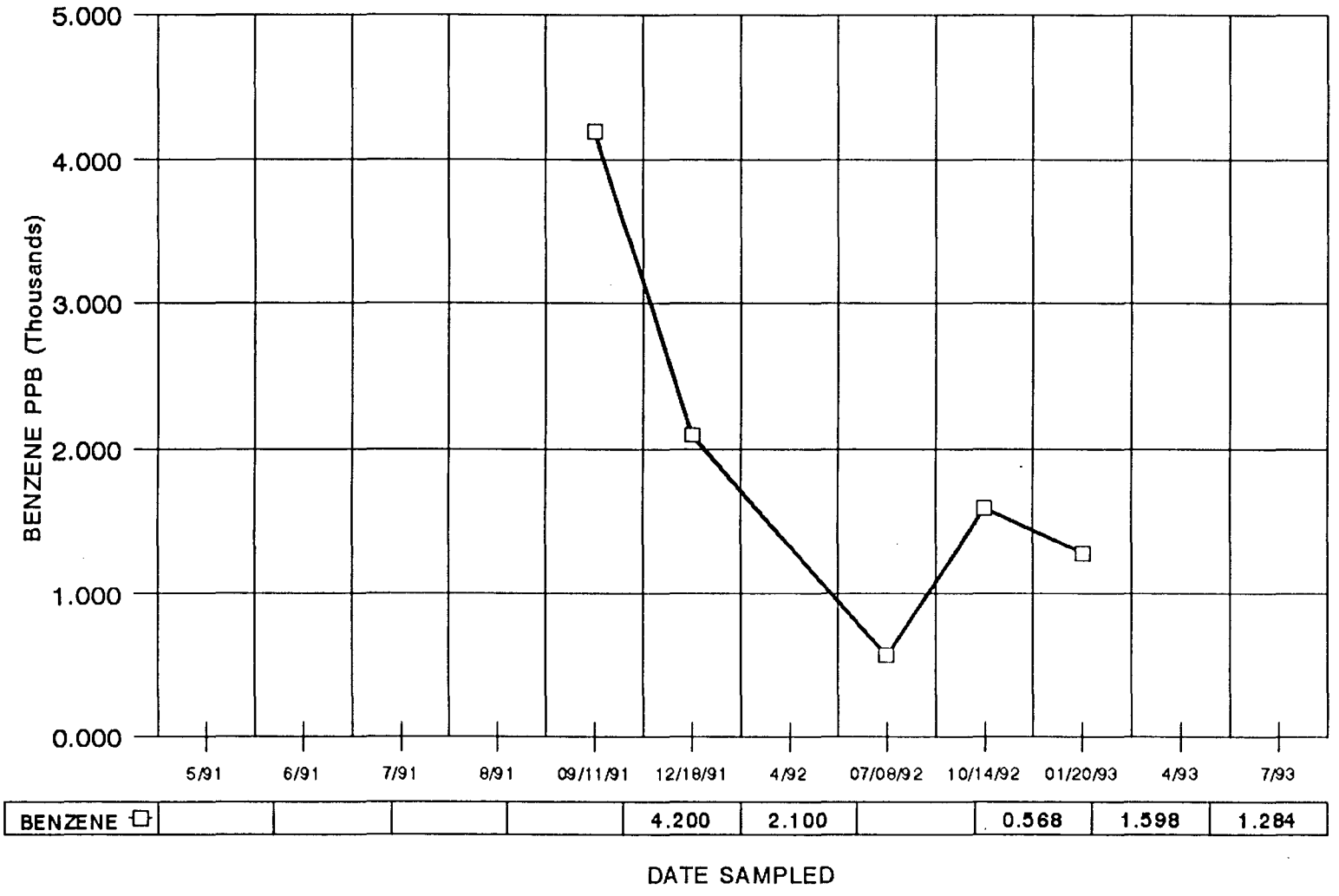
GROUNDWATER ANALYSIS DATA

MW#68 BH-94



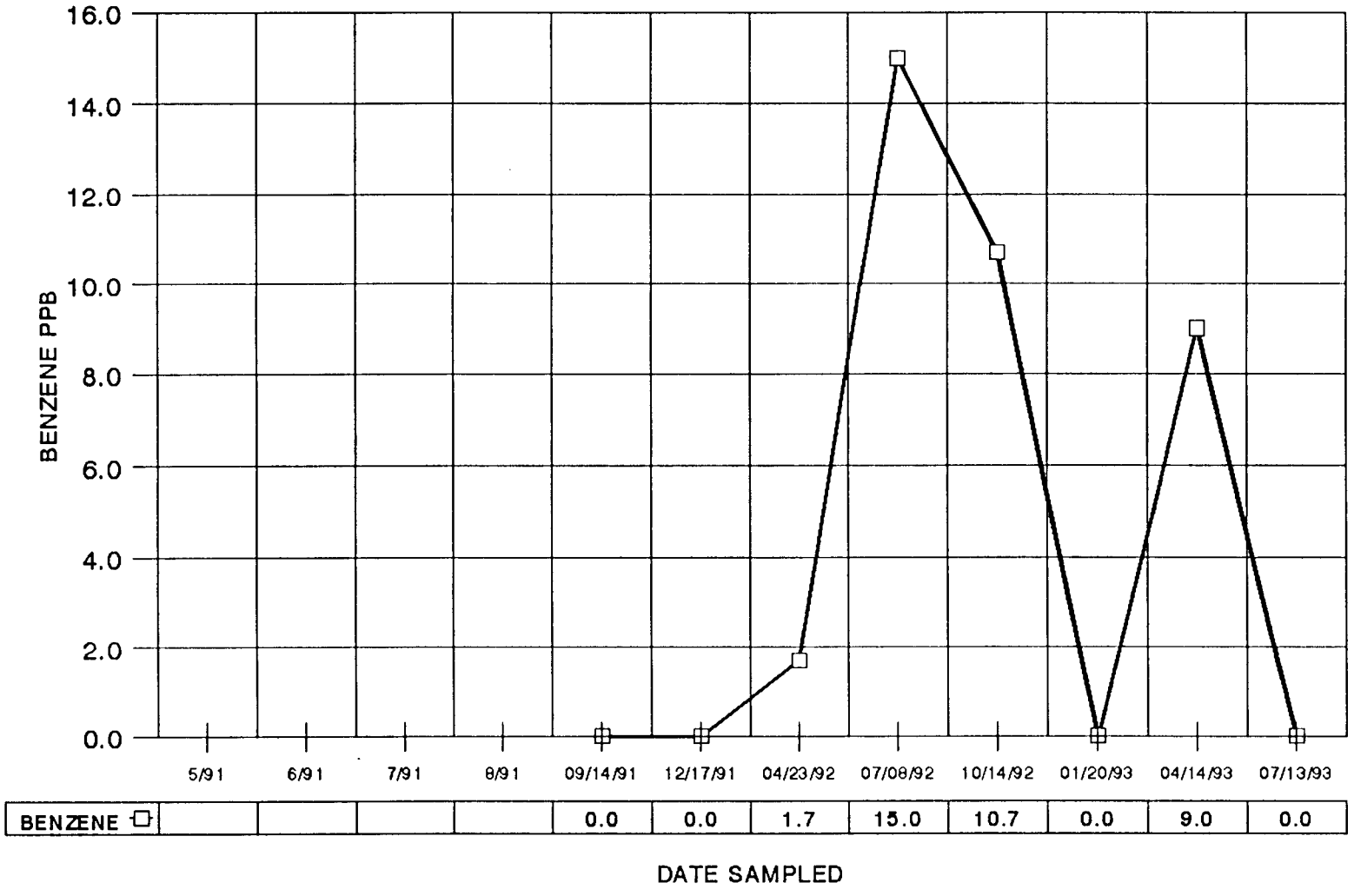
GROUNDWATER ANALYSIS DATA

MW#69 BH-95



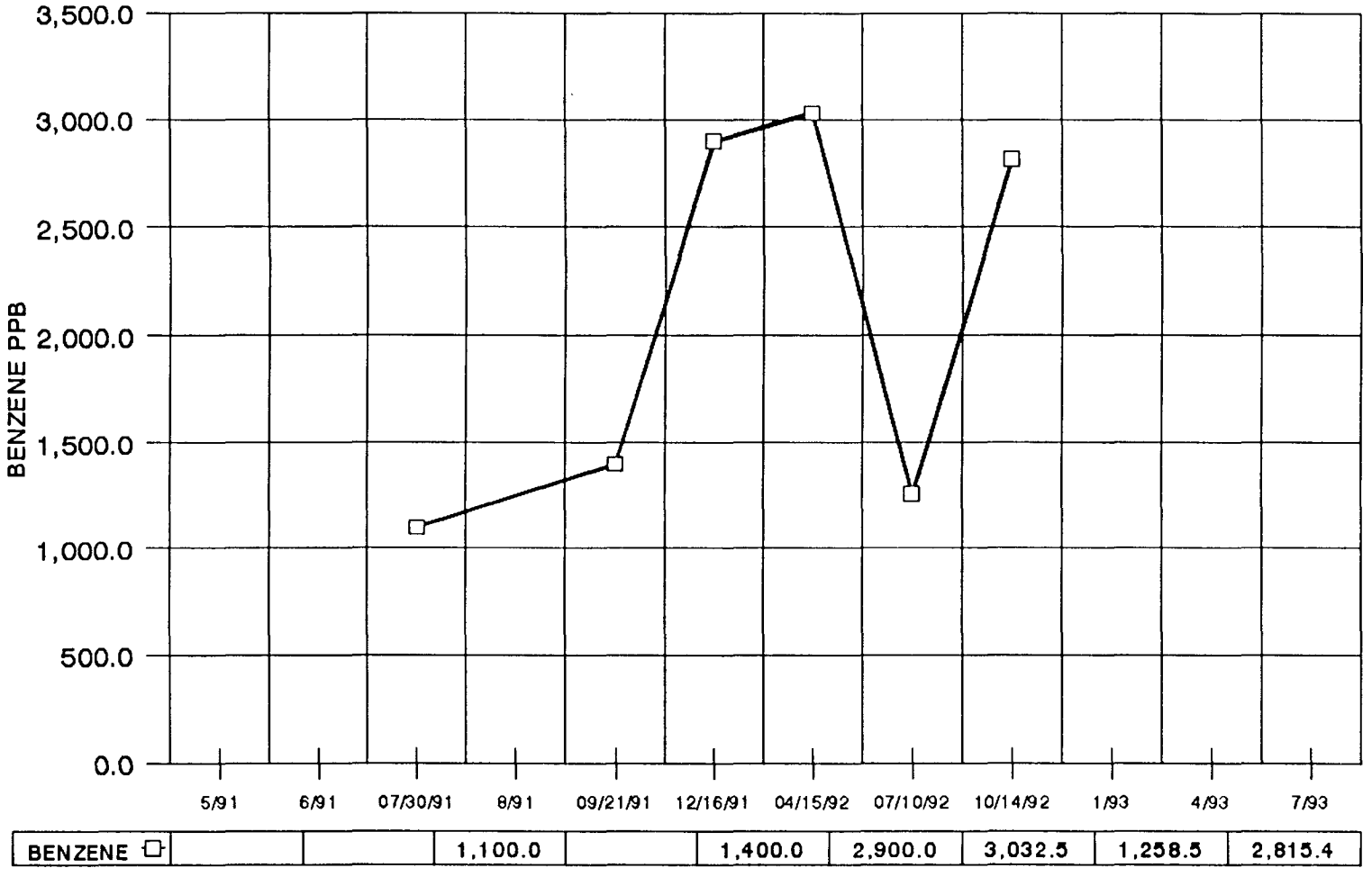
GROUNDWATER ANALYSIS DATA

MW#70 BH-97



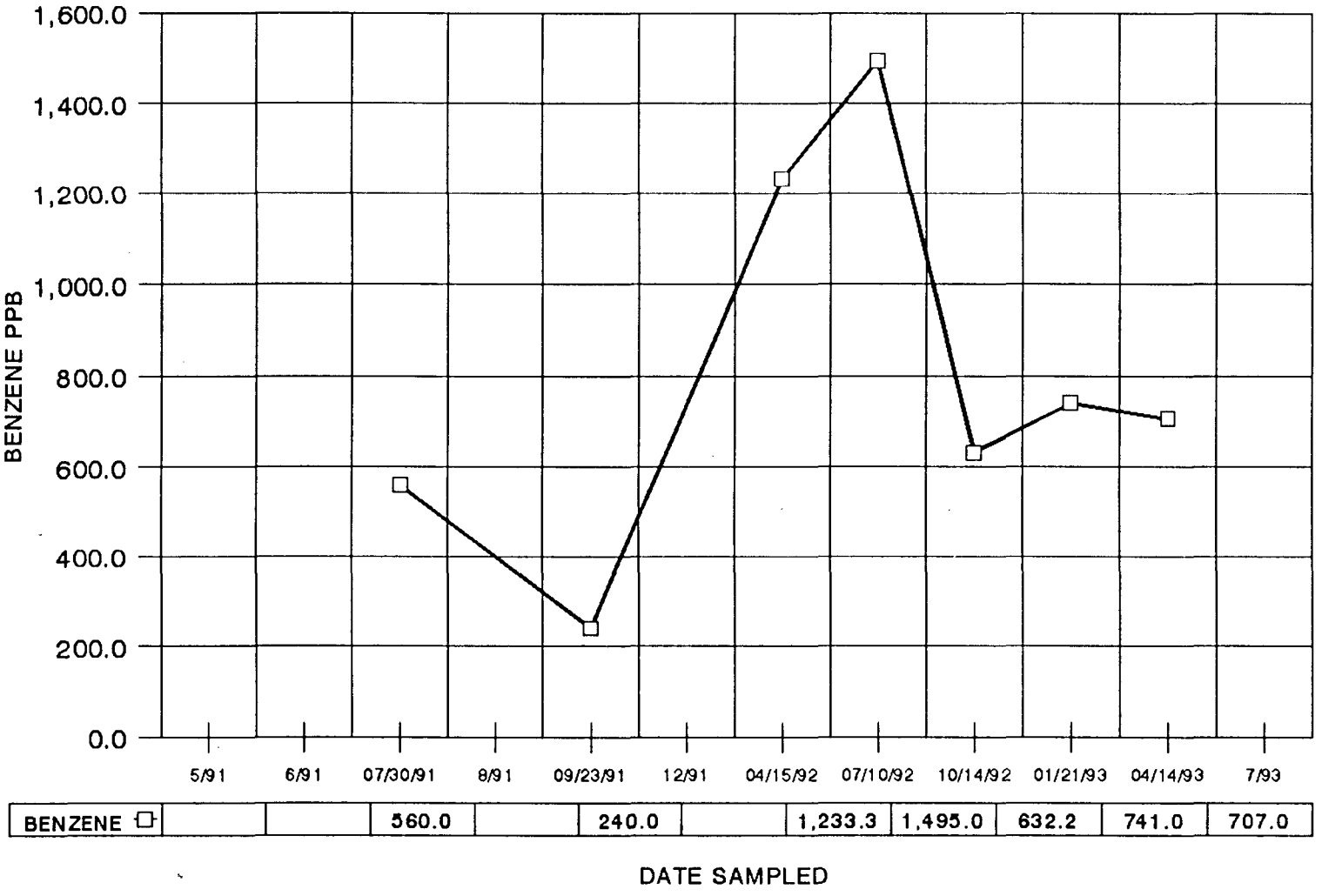
GROUNDWATER ANALYSIS DATA

SUMP 11A



GROUNDWATER ANALYSIS DATA

SUMP 16A



APPENDIX D

RANCHER WELL, PLANT WELL, AND SPRING LABORATORY REPORTS

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/15/93
TIME SAMPLED.....: 08:31
WORK DESCRIPTION...: SAMPLE NO. 1

LABORATORY I.D...: 931392-0006
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	15.0	0.5	mg/L	325.2 (1)	08/02/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	07/27/93	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)	104	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/15/93
TIME SAMPLED.....: 09:44
WORK DESCRIPTION...: SAMPLE NO. 3

LABORATORY I.D...: 931392-0007
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	13.3	1.5	mg/L	325.2 (1)	08/02/93	DME
8020 - AROMATIC VOLATILE ORGANICS				8020 (2)	07/27/93	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)	109	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/15/93
TIME SAMPLED.....: 07:42
WORK DESCRIPTION...: SW-1

LABORATORY I.D...: 931392-0008
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	21		mg/L	325.2 (1)	08/05/93	DME
8020 - AROMATIC VOLATILE ORGANICS				8020 (2)	07/27/93	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)	104		% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: 07/13/93
TIME SAMPLED.....: 13:05
WORK DESCRIPTION...: TRIP BLANK

LABORATORY I.D...: 931392-0009
DATE RECEIVED....: 07/21/93
TIME RECEIVED....: 10:25
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	07/26/93	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)	109	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

QUALITY CONTROL REPORT
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

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:07/28/93 12:34							QC BATCH NUMBER:275349
REPORTING LIMIT/DF: 1	UNITS:mg/L		METHOD REFERENCE :325.2 (1)							TECHNICIAN:DME
BLANK	ICB	930728	<1							
BLANK	CCB	930728	<1							
STANDARD	ICV	G930728B	49			50	98			
STANDARD	CCV	S160	171			160	107			
SPIKE	MS	931381-2	61					10	50	102
DUPLICATE	MD	931381-2	10	10	0					
PARAMETER:Chloride (Unfilt.)			DATE/TIME ANALYZED:08/02/93 10:47							QC BATCH NUMBER:275671
REPORTING LIMIT/DF: 0.5	UNITS:mg/L		METHOD REFERENCE :325.2 (1)							TECHNICIAN:DME
BLANK	ICB	930802	<0.5							
BLANK	CCB	930802	<0.5							
BLANK	CCB	930802	<0.5							
BLANK	CCB	930802	<0.5							
STANDARD	ICV	G930728C	5.0			5.0	100			
STANDARD	CCV	S16.0	16.5			16.0	103			
STANDARD	CCV	S16.0	16.5			16.0	103			
STANDARD	CCV	S16.0	15.2			16.0	95			
SPIKE	MS	931367-2	5.1					<0.5	5.0	102
SPIKE	MS	931381-28	12.0					7.4	5.0	92
SPIKE	MS	931381-38	12.0					7.4	5.0	92
DUPLICATE	MD	931367-2	<0.5	<0.5	NC					
DUPLICATE	MD	931381-28	7.4	7.4	0					
DUPLICATE	MD	931381-38	7.4	7.4	0					
PARAMETER:Chloride (Unfilt.)			DATE/TIME ANALYZED:08/05/93 07:39							QC BATCH NUMBER:275890
REPORTING LIMIT/DF: 1	UNITS:mg/L		METHOD REFERENCE :325.2 (1)							TECHNICIAN:DME
BLANK	ICB	930805	<1							
BLANK	CCB	930805	<1							
BLANK	CCB	930805	<1							
STANDARD	ICV	G930728B	53			50	106			
STANDARD	CCV	S160	155			160	97			
STANDARD	CCV	S160	159			160	99			
SPIKE	MS	931373-4	60					7	50	106
DUPLICATE	MD	931373-4	7	7	0					

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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

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.

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CORE LABORATORIES

LABORATORY TESTS RESULTS

08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: / /
TIME SAMPLED.....: :
WORK DESCRIPTION...: METHOD BLANK-1

LABORATORY I.D...: 931392-0010
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)	07/26/93	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)	100	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/17/93

JOB NUMBER: 931392 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE

CLIENT I.D.....:
DATE SAMPLED.....: / /
TIME SAMPLED.....: :
WORK DESCRIPTION...: METHOD BLANK-2

LABORATORY I.D...: 931392-0011
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)	08/02/93	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)	105	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Marathon Oil Co.	PROJECT NAME/NUMBER:
SEND REPORT TO: Bob Menzie	**BILLING INFORMATION**
ADDRESS: P.O. Box 552	BILL TO:
Midland, Tx 79702	ADDRESS:
PHONE: (915) 687-8512	PHONE:
FAX:	FAX: PO NO.:

NUMBER OF CONTAINERS

ANALYSIS / METHOD REQUEST: BTEX, C10

LAB JOB NO.

SAMPLE NO.	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	PRES.	NUMBER OF CONTAINERS	BTEX	C10	REMARKS / PRECAUTIONS
	MW-41	07/15/93	10:50	H_2O				✓	✓	
	-60	07/14/93	10:50	↓				✓	✓	
	-64	07/13/93	13:05					✓	✓	
	-68	07/13/93	14:50					✓	✓	
	Sample No. 2	07/15/93	08:50					✓	✓	
	Sample No. 1	07/15/93	08:31					✓	✓	
	↓ No. 3	↓	09:44					✓	✓	
	SW-1	↓	07:42	↓				✓	✓	

SAMPLER: | SHIPMENT METHOD: | AIRBILL NO.:

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: [signature]	07/20/93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	2. RECEIVED BY:	DATE	3. RECEIVED BY:	DATE
SIGNATURE: Mary Scott	7-21-93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: Core Labs	TIME 10:25	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
10703 E. Bethany Dr ← New Address

☐ **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

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/27/93

JOB NUMBER: 931479 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....: MONTHLY
DATE SAMPLED.....: 08/03/93
TIME SAMPLED.....: 11:50
WORK DESCRIPTION...: #1

LABORATORY I.D...: 931479-0001
DATE RECEIVED....: 08/04/93
TIME RECEIVED....: 09:40
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	13.1	0.5	mg/L	325.2 (1)	08/25/93	VKN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	08/17/93	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)	106	0	% Recovery	Limits (85-115)		

10703 East Bethany Drive
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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/27/93

JOB NUMBER: 931479 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....: MONTHLY
DATE SAMPLED.....: 08/03/93
TIME SAMPLED.....: 12:15
WORK DESCRIPTION...: #2

LABORATORY I.D...: 931479-0002
DATE RECEIVED....: 08/04/93
TIME RECEIVED....: 09:40
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	11.8	0.5	mg/L	325.2 (1)	08/25/93	VKN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	08/16/93	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)	110	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/27/93

JOB NUMBER: 931479 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....: MONTHLY
DATE SAMPLED.....: 08/03/93
TIME SAMPLED.....: 13:50
WORK DESCRIPTION...: SW-1

LABORATORY I.D...: 931479-0003
DATE RECEIVED....: 08/04/93
TIME RECEIVED....: 09:40
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	21.0	1.0	mg/L	325.2 (1)	08/25/93	VKN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	08/16/93	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)	105	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/27/93

JOB NUMBER: 931479 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....: MONTHLY
DATE SAMPLED.....: 07/20/93
TIME SAMPLED.....: 14:55
WORK DESCRIPTION...: TRIP BLANK

LABORATORY I.D...: 931479-0004
DATE RECEIVED....: 08/04/93
TIME RECEIVED....: 09:40
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
8020 - AROMATIC VOLATILE ORGANICS		*1		8020 (2)	08/16/93	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)	107	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/27/93

JOB NUMBER: 931479 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: / /
TIME SAMPLED.....: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 931479-0005
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)	08/16/93	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)	106	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
08/27/93

JOB NUMBER: 931479 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: / /
TIME SAMPLED.....: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 931479-0006
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)	08/17/93	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)	109	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

QUALITY CONTROL REPORT
08/27/93

JOB NUMBER: 931479 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

8020 - AROMATIC VOLATILE ORGANICS DATE ANALYZED: 08/16/93 TIME ANALYZED: 11:19 METHOD: 8020 (2) QC NUMBER:276607

REFERENCE STANDARDS

TEST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	TRUE VALUE	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
Benzene	SB	V930816J	1	19.3	20.0	97	0.5	ug/L
	SBD	V930816J	1	20.0	20.0	100	0.5	ug/L
Toluene	SB	V930816J	1	19.1	20.0	96	0.5	ug/L
	SBD	V930816J	1	19.4	20.0	97	0.5	ug/L
Ethyl Benzene	SB	V930816J	1	20.6	20.0	103	0.5	ug/L
	SBD	V930816J	1	20.3	20.0	102	0.5	ug/L

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CORE LABORATORIES

QUALITY CONTROL REPORT
08/27/93

JOB NUMBER: 931479 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:08/25/93 19:00						QC BATCH NUMBER:277230
REPORTING LIMIT/DF: 0.5	UNITS:mg/L			METHOD REFERENCE :325.2 (1)						TECHNICIAN:VKN
BLANK	ICB	S0	<0.5							
BLANK	CCB	S0	<0.5							
STANDARD	ICV/LCS	G930728C	5.0			5.0	100			
STANDARD	CCV	S16.0	17.0			16.0	106			
SPIKE	MS	931479-3	15.8					10.5	5.0	106
DUPLICATE	MD	931479-3	10.5	10.5	0					

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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

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.

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Aurora, CO 80014
(303) 751-1780

CHAIN OF CUSTODY

larathon Oil Company
29 Marathon Road
ukewood, New Mexico 88254
05) 457-2621 / Fax (505) 457-2544

ONTACT: _____

1. Packed By: _____ Date: _____
2. VOA Vials? YES NO
   Caps sealed w/tape? YES NO
3. Caps sealed w/tape? YES NO
4. Coolant? ICE COLD PAK
   Other: _____
5. SEAL Date/Time: _____
6. Notes/Comments:

##########################

ANALYTICAL LABORATORY ADDRESS:

mpany: Core Laboratories
eet Address: 10703 East Bethany Drive
y/State/ZIP: Aurora, Colorado 80014-2696
one: (303) 751-1780
X: (303) 751-1784

ANALYTICAL LABORATORY RECEIPT-OBSERVATIONS:

1. SEAL Intact? YES NO
2. Coolant Condition: 4°C
3. Condition of Contents? good

DATE	TIME	SAMPLE ID	SAMPLE TYPE	NO. CONTAINERS	ANALYSIS PARAMETERS
8/3					
8/3					
8/3					

INITIAL CUSTODY TRANSFERS

	Signature	Date	Time
elinquished by: (signed):			
eceived by: (signed):	Mary Scott	8-4-93	940
linquished by: (signed):			
eceived by: (signed):			

SHIPPING DETAILS

Delivered to Shipper by: _____
Method of Shipment: UPS
Airbill #: _____
Rec'd for Lab: Mary Scott Date: 8-4-93 Time: 940
Assigned Laboratory Number: 931479

inal: To Laboratory Copy: Sender Retains 4/26/91

Western Atlas International

CORE LABORATORIES

LABORATORY TESTS RESULTS
10/14/93

JOB NUMBER: 931871 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 09/21/93
TIME SAMPLED.....: 12:29
WORK DESCRIPTION...: SW-1

LABORATORY I.D...: 931871-0001
DATE RECEIVED....: 09/24/93
TIME RECEIVED....: 12:05
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	19.0	0.5	mg/L	325.2 (1)	10/12/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		624 (1)	10/05/93	CLT
Benzene	ND	0.5	ug/L			
Toluene	ND	0.5	ug/L			
Ethyl Benzene	1	0.5	ug/L			
Xylenes	0.6	0.5	ug/L			
4-Bromofluorobenzene (surrogate)	94	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
10/14/93

JOB NUMBER: 931871 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 09/21/93
TIME SAMPLED.....: 12:55
WORK DESCRIPTION...: #1

LABORATORY I.D...: 931871-0002
DATE RECEIVED....: 09/24/93
TIME RECEIVED....: 12:05
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	12.4	0.5	mg/L	325.2 (1)	10/12/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		624 (1)	10/05/93	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)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
10/14/93

JOB NUMBER: 931871 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 09/21/93
TIME SAMPLED.....: 13:40
WORK DESCRIPTION...: #2

LABORATORY I.D...: 931871-0003
DATE RECEIVED....: 09/24/93
TIME RECEIVED....: 12:05
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chloride (Unfilt.)	11.5	0.5	mg/L	325.2 (1)	10/12/93	DME
8020 - AROMATIC VOLATILE ORGANICS		*1		624 (1)	10/05/93	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)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
10/14/93

JOB NUMBER: 931871 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: 08/23/93
TIME SAMPLED.....: 12:29
WORK DESCRIPTION...: TRIP BLANK

LABORATORY I.D...: 931871-0004
DATE RECEIVED....: 09/24/93
TIME RECEIVED....: 12:05
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
8020 - AROMATIC VOLATILE ORGANICS		*1		624 (1)	10/05/93	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)	100	0	% Recovery	Limits (85-115)		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
10/14/93

JOB NUMBER: 931871 CUSTOMER: MARATHON OIL COMPANY ATTN: BOB MENZIE, JR.

CLIENT I.D.....:
DATE SAMPLED.....: / /
TIME SAMPLED.....: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 931871-0005
DATE RECEIVED....: / /
TIME RECEIVED....: :
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
8020 - AROMATIC VOLATILE ORGANICS		*1		624 (1)	10/05/93	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)		

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CORE LABORATORIES

QUALITY CONTROL REPORT
10/14/93

JOB NUMBER: 931871 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:10/12/93 08:32						QC BATCH NUMBER:280750
REPORTING LIMIT/DF: 0.5	UNITS:mg/L			METHOD REFERENCE :325.2 (1)						TECHNICIAN:DME
BLANK	ICB	931012	<0.5							
BLANK	CCB	931012	<0.5							
BLANK	CCB	931012	<0.5							
STANDARD	ICV/LCS	G921222H	5.0			5.0	100			
STANDARD	CCV	S16.0	15.8			16.0	99			
STANDARD	CCV	S16.0	16.8			16.0	105			
SPIKE	MS	931865-4	6.0					1.1	5.0	98
DUPLICATE	MD	931837-4	18.4	18.0	2					
DUPLICATE	MD	931865-4	1.1	1.1	0.0					

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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.

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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: (915) 687-8337 PO NO.:

LAB JOB NO.: [redacted]

SAMPLE NO.	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	PRES.	NUMBER OF CONTAINERS	ANALYSIS / METHOD REQUEST: BTEX	ANALYSIS / METHOD REQUEST: Cl	REMARKS / PRECAUTIONS
1	SW-1	9-21-93	12:29	Water	40ml VOA		4	✓	✓	
2	# 1	9-21-93	12:55	Water	40ml VOA		4	✓	✓	
3	# 2	9-21-93	1:40	Water	40ml VOA		4	✓	✓	

SAMPLER: E.I Hill & R.M. Gray

SHIPMENT METHOD: Airborne Express

AIRBILL NO.: 492721353

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	9-23-93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: RM Gray Marathon	TIME 1600	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	2. RECEIVED BY:	DATE	3. RECEIVED BY:	DATE
SIGNATURE: Mary Scott	9-24-93	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: Core	TIME 1205	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

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

August 9, 1993

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

Re: Indian Basin Treatment Project

Dear Mr. Marr:

The following table indicates the recorded meter readings for fluid removed from the Lower Queen monitoring wells as of Monday, August 2, 1993. Cumulative Lower Queen fluid removal through that date is 21,873,758 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	8/02/93 METER READING	WATER REMOVED (Gal)	PER-WELL WATER REMOVED (Gal)
MW-58 (BH-84)	10239118	0	3599596	3,599,596 26,922[1]	3,626,588
MW-59 (BH-85)	10259114	0	78061.9*	3,278,600 83,454[1]	3,362,054
MW-61A (BH-87A)	10239116	0	3372324	3,372,324 46,578[1] 84,272[2]	3,503,174
MW-62 (BH-88)	10239115	0	2321046	2,321,046 193,931[3] 62,622[1]	2,577,599
MW-65A (BH-91A)	10239117	0	5375263	5,375,263 39,774[1]	5,415,037
MW-68 (BH-94)	02209213	122618	1027848	905,230 2,484,076[1]	3,389,306
				LOWER QUEEN TOTAL	21,873,758

* 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, August 2, 1993. The cumulative shallow fluid removal through that date is 638,238 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	08/02/93 METER READING	WATER REMOVED (Gal)	PER-WELL WATER REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13 (BH-36)	02209212	98236.2	116967.5	18,731 115,911[1]	134,642
MW-14 (BH-37)	02209214	0	398203.7	398,204 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
				SHALLOW TOTAL	638,238 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.

Very truly yours,

Robert J. Menzie, Jr.

RJM93714/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, Texas 79702
Telephone 915/682-1626

September 9, 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 Tuesday, September 7, 1993. Cumulative Lower Queen fluid removal through that date is 23,395,524 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	9/07/93 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	3887687	3,887,687 26,922[1]	3,914,609
MW-59 (BH-85)	10259114	0	81975.4*	3,442,967 83,454[1]	3,526,421
MW-61A (BH-87A)	10239116	0	3655711	3,655,711 46,578[1] 84,272[2]	3,786,561
MW-62 (BH-88)	10239115	0	2518946	2,518,946 193,931[3] 62,622[1]	2,775,499
MW-65A (BH-91A)	10239117	0	5748650	5,748,650 39,774[1]	5,788,424
MW-68 (BH-94)	02209213	122618	1242552	1,119,934 2,484,076[1]	3,604,010
LOWER QUEEN TOTAL 23,395,524 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 Tuesday, September 7, 1993. The cumulative shallow fluid removal through that date is 638,903 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	09/07/93 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13 (BH-36)	02209212	98236.2	117408.7	19,173 115,911[1]	135,084
MW-14 (BH-37)	02209214	0	398204.3	398,204 187[1]	398,391
MW-21	-----	----	----	189[1]	189
MW-35	02209212	188.8	----	98,303[1]	98,303
MW-69	-----	----	----	223[2]	223
SHALLOW TOTAL				638,903 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.

RJM93909/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, Texas 79702
Telephone 915/682-1626

October 6, 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, October 4, 1993. Cumulative Lower Queen fluid removal through that date is 24,432,430 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	10/4/93 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-58 (BH-84)	10239118	0	4082687	4,082,687 26,922[1]	4,109,609
MW-59 (BH-85)	10259114	0	84250*	3,538,500 83,454[1]	3,621,954
MW-61A (BH-87A)	10239116	0	3858306	3,858,306 46,578[1] 84,272[2]	3,989,156
MW-62 (BH-88)	10239115	0	2656002	2,656,002 193,931[3] 62,622[1]	2,912,555
MW-65A (BH-91A)	10239117	0	6001716	6,001,716 39,774[1]	6,041,490
MW-68 (BH-94)	02209213	122618	1396208	1,273,590 2,484,076[1]	3,757,666
LOWER QUEEN TOTAL 24,432,430 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, October 4, 1993. The cumulative shallow fluid removal through that date is 640,441 gallons.

MONITORING WELL	METER SERIAL NUMBER	INIT'L METER START	10/04/93 METER READING	FLUID REMOVED (Gal)	PER-WELL FLUID REMOVED (Gal)
MW-1	-------	----	-----	6,713[1]	6,713
MW-13	02209212	98236.2	117952.1	19,716 115,911[1]	135,627
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	-----	----	----	1218[2]	1218
SHALLOW TOTAL				640,441 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.

RJM93909/nrt

xc: T. C. Lowry - Midland
D. E. Kenyon - PTC, Littleton
R. F. Unger - Midland
R. A. Biernbaum - Midland
C. M. Schweser- IBGP, Lakewood