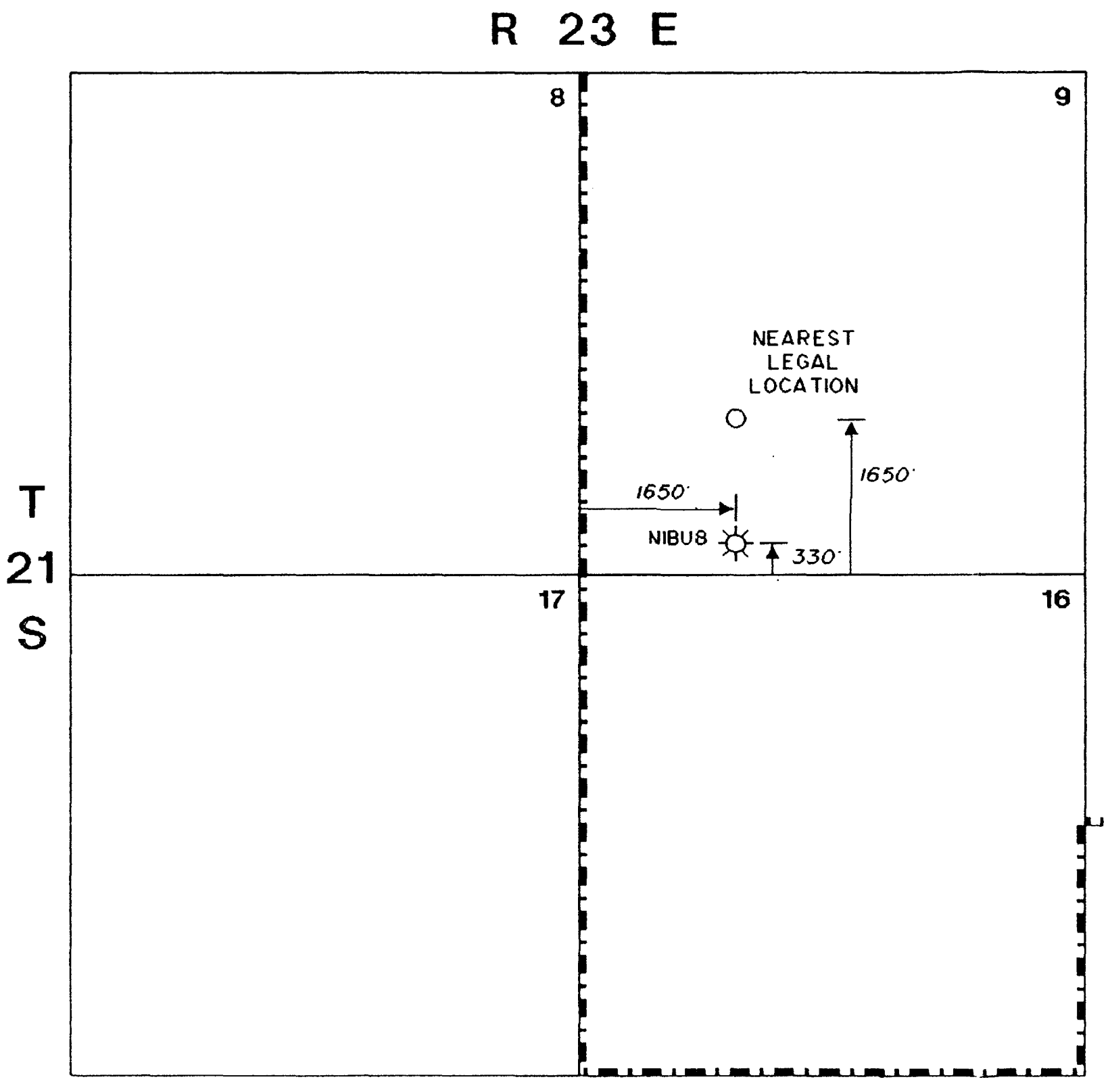
MARATHON OIL COMPANY

INDIAN BASIN FIELD

NORTH INDIAN BASIN UNIT NO. 8
PENALTY CALCULATION

RATIO OF DISTANCE METHOD



PENALTY BASED ON DIRECT OFFSET

$$\text{PENALTY} = \frac{(1650' - 330')}{1650'}$$

PENALTY = 80%

NORTH INDIAN BASIN UNIT BOUNDARY

0 1/2 1

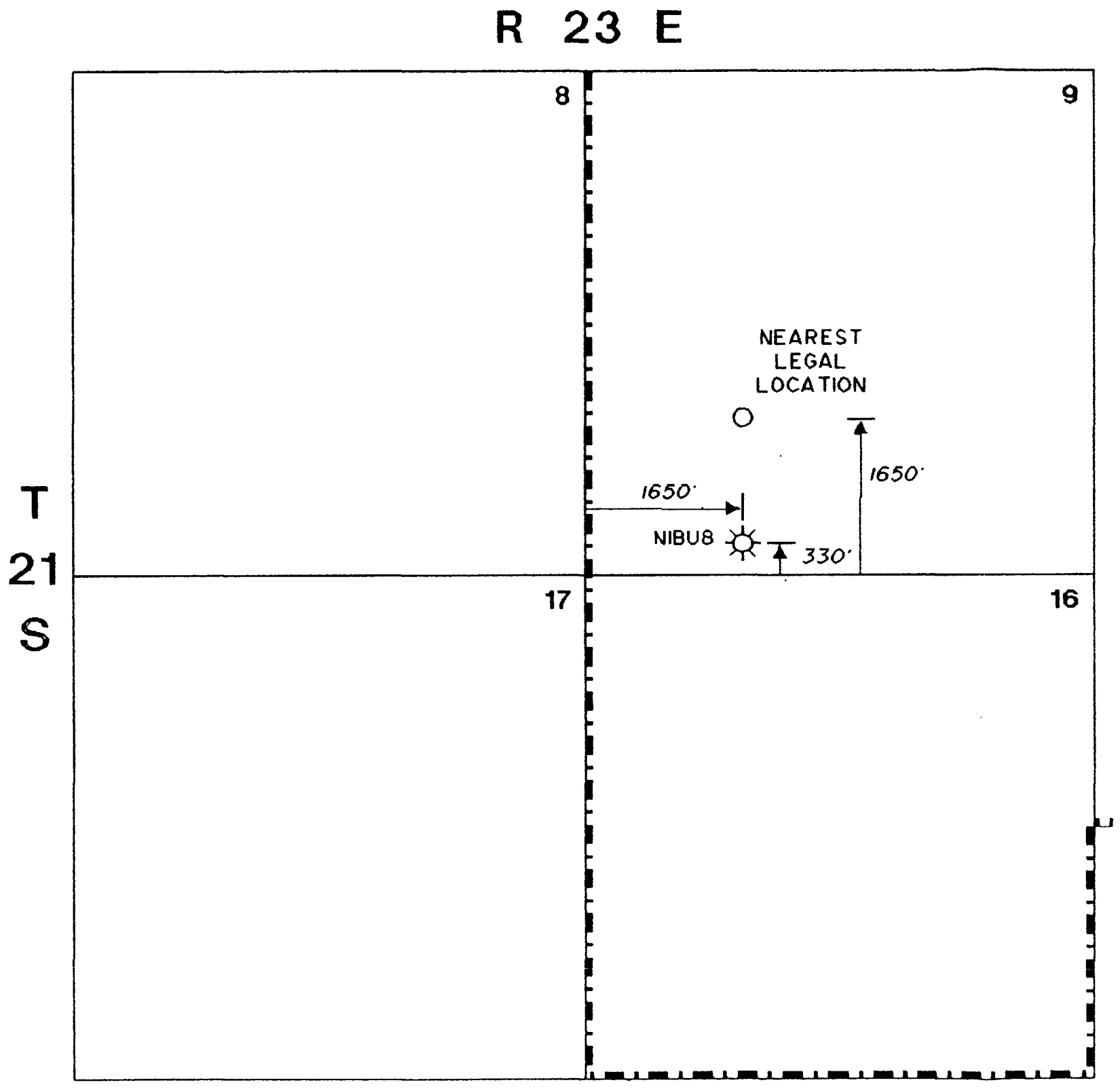
MILE

MARATHON OIL COMPANY

INDIAN BASIN FIELD

NORTH INDIAN BASIN UNIT NO. 8
PENALTY CALCULATION

DOUBLE VARIANCE METHOD



PENALTY BASED ON VARIANCE
FROM A LEGAL LOCATION
IN BOTH DIRECTIONS

$$\text{PENALTY} = \frac{(1650' - 1650') + (1650' - 330')}{1650' + 1650'}$$

PENALTY = 40%

NORTH INDIAN BASIN UNIT BOUNDARY

0 1/2 1

MILE

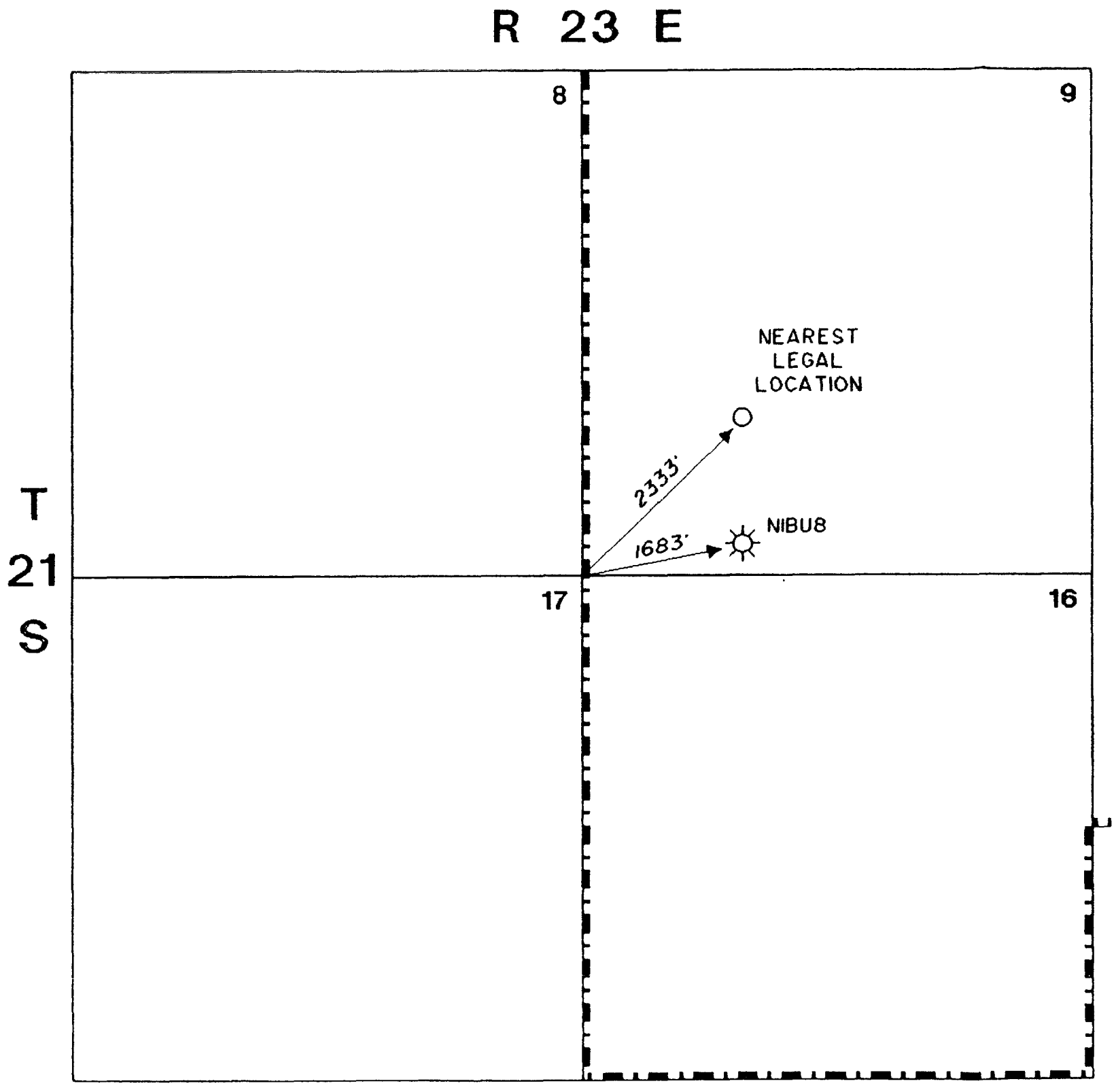
9954
MARATHON
10/25/90

MARATHON OIL COMPANY

INDIAN BASIN FIELD

NORTH INDIAN BASIN UNIT NO. 8
PENALTY CALCULATION

RATIO OF DISTANCE METHOD



PENALTY BASED ON DISTANCE TO NEAREST POINT OF ORYX OWNERSHIP

$$\text{PENALTY} = \frac{2333' - 1683'}{2333'}$$

PENALTY = 28%

NORTH INDIAN BASIN UNIT BOUNDARY

0 1/2 1

MILE

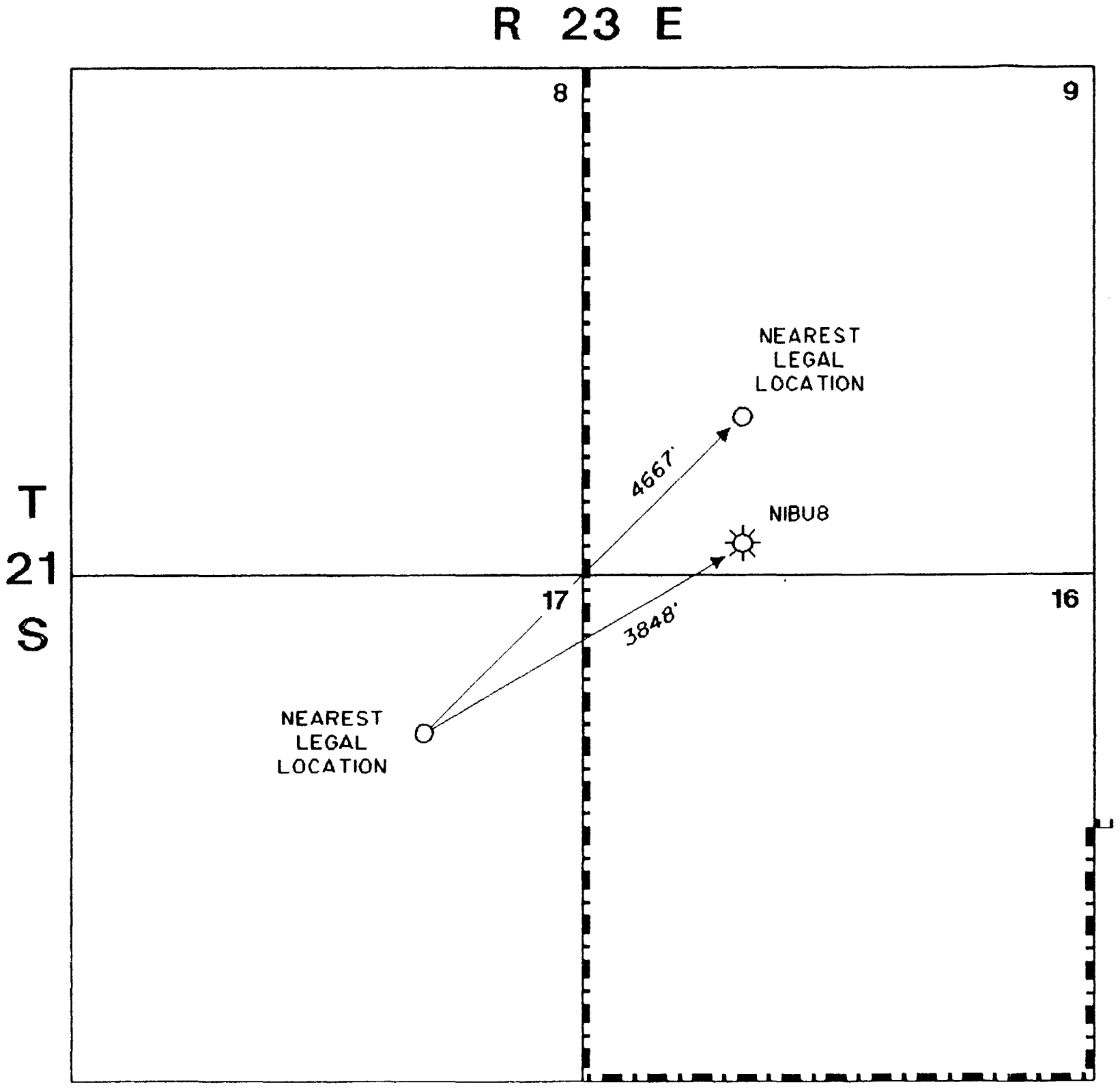
Case No. 9954 Exhibit No. 3
Submitted By: MARATHON
Hearing Date: 10/25/90

MARATHON OIL COMPANY

INDIAN BASIN FIELD

NORTH INDIAN BASIN UNIT NO. 8
PENALTY CALCULATION

RATIO OF DISTANCE METHOD



PENALTY BASED ON DISTANCE
TO NEAREST LEGAL LOCATION
IN SECTION 17

$$\text{PENALTY} = \frac{(4667' - 3848')}{4667'}$$

PENALTY = 17.5%

NORTH INDIAN BASIN UNIT BOUNDARY

0 1/2 1

MILE

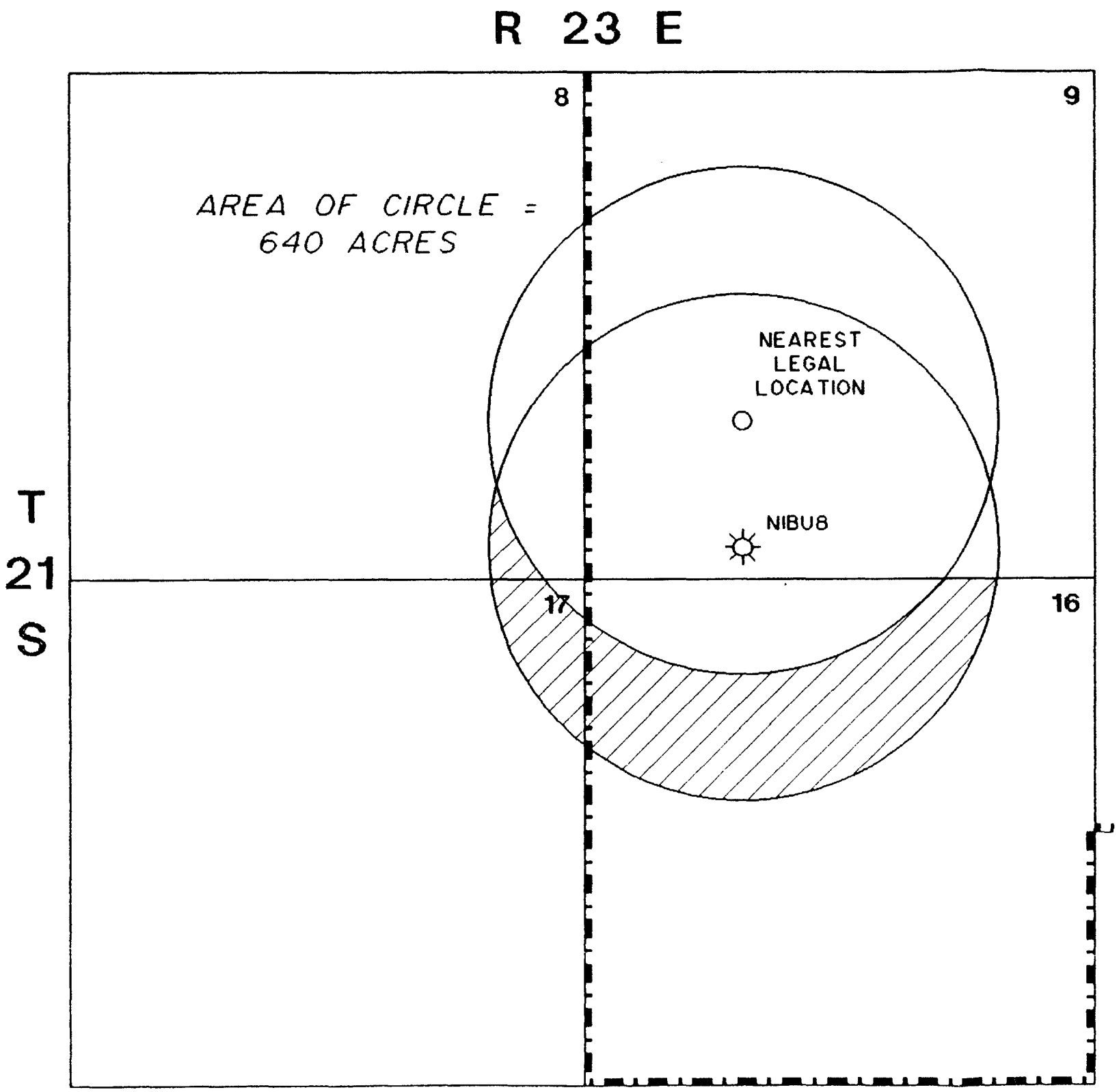
995# MARATHON 4
10/25/90

MARATHON OIL COMPANY

INDIAN BASIN FIELD

NORTH INDIAN BASIN UNIT NO. 8
PENALTY CALCULATION

DOUBLE CIRCLE METHOD



PENALTY BASED ON ADDITIONAL ACREAGE DRAINED OUTSIDE OF SECTION 9

$$\text{PENALTY} = \frac{178 \text{ ACRES}}{640 \text{ ACRES}}$$

PENALTY = 28%

NORTH INDIAN BASIN UNIT BOUNDARY

0 1/2 1

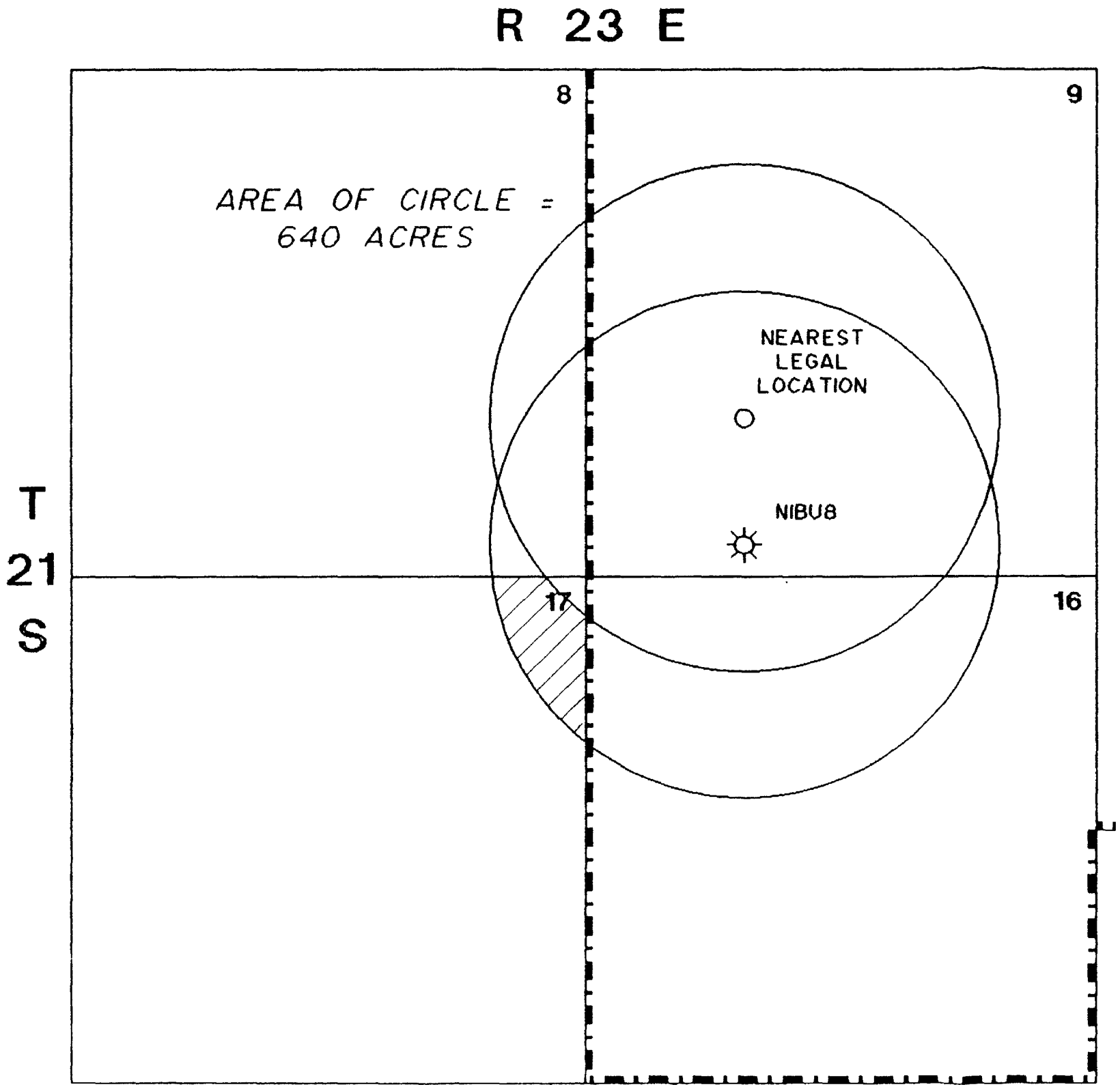
MILE

MARATHON OIL COMPANY

INDIAN BASIN FIELD

NORTH INDIAN BASIN UNIT NO. 8
PENALTY CALCULATION

DOUBLE CIRCLE METHOD



PENALTY BASED ON ADDITIONAL ACREAGE DRAINED IN SECTION 17

$$\text{PENALTY} = \frac{32 \text{ ACRES}}{640 \text{ ACRES}}$$

PENALTY = 5%

NORTH INDIAN BASIN UNIT BOUNDARY

0 1/2 1

MILE

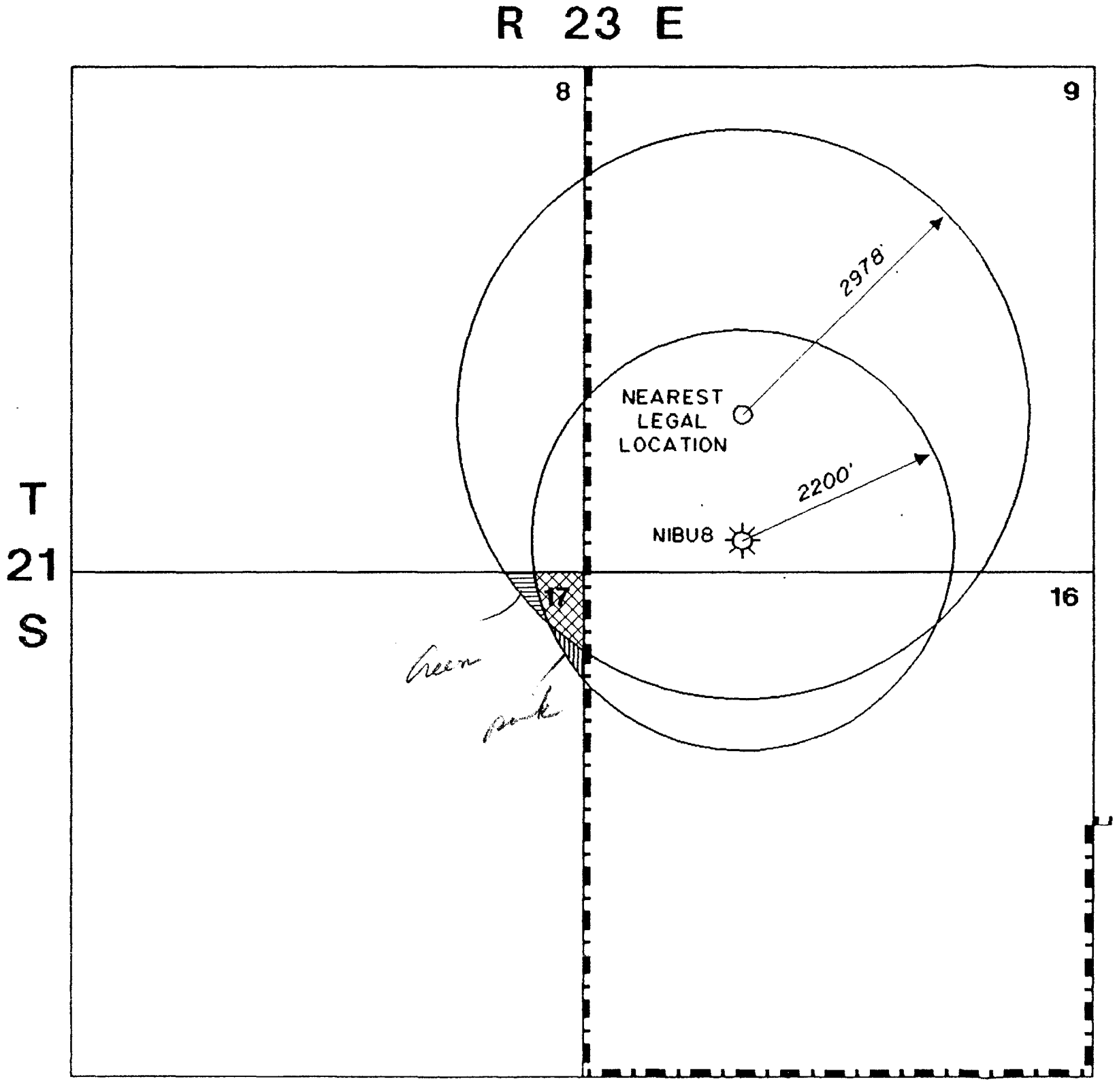
9954 6
MARATHON
10/25/90

MARATHON OIL COMPANY

INDIAN BASIN FIELD

NORTH INDIAN BASIN UNIT NO. 8
PENALTY CALCULATION

MODIFIED DOUBLE CIRCLE METHOD



PENALTY BASED ON REDUCING DRAINAGE AREA SO THAT THE SAME NUMBER OF ACRES ARE DRAINED IN SECTION 17 WITH A WELL AT EITHER LOCATION

$$\text{PENALTY} = 1 - \frac{(2200')^2}{(2978')^2}$$

PENALTY = 45%

NORTH INDIAN BASIN UNIT BOUNDARY

0 1/2 1

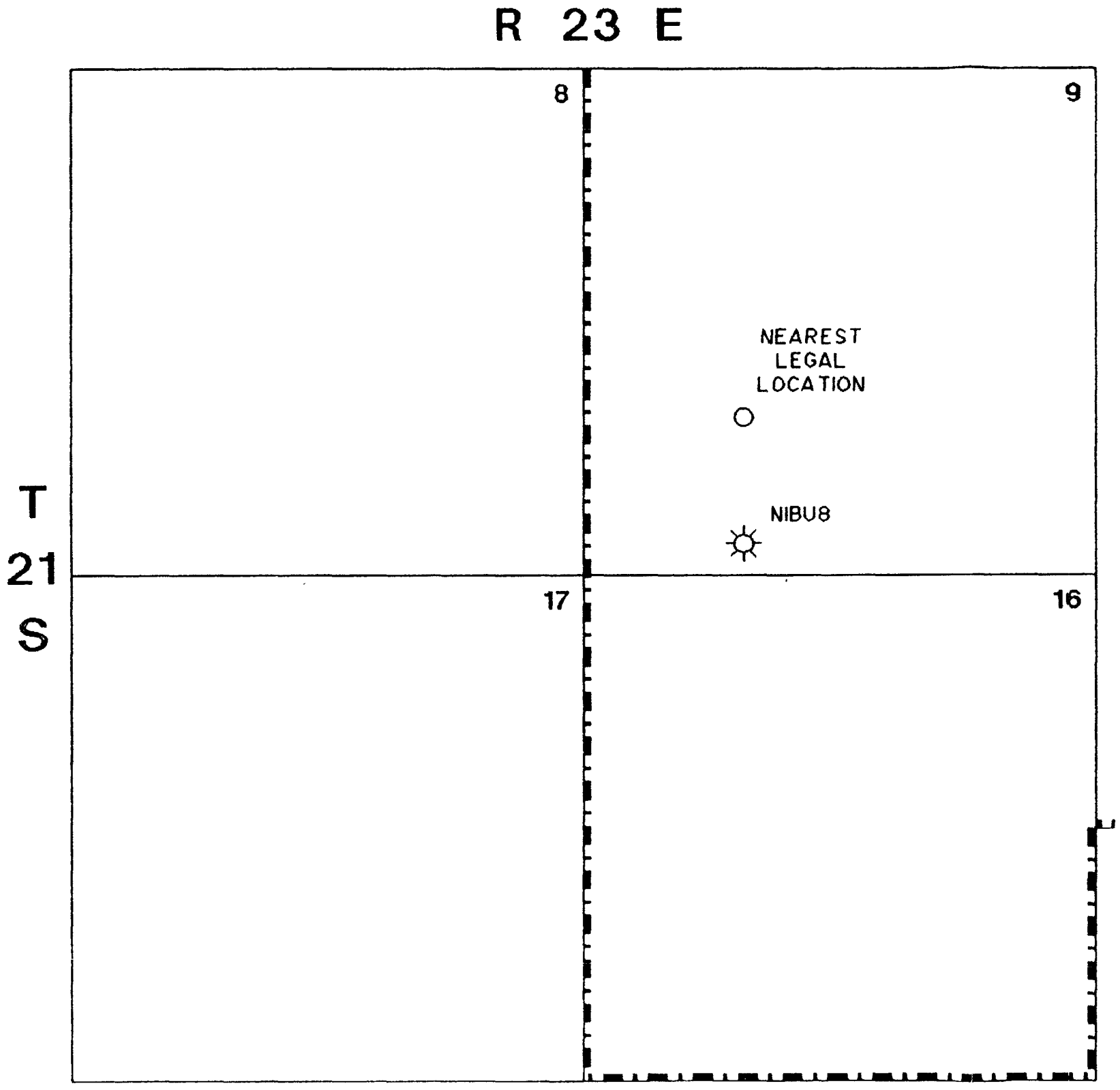
MILE

OIL CONSERVATION DIVISION
State
Case No. 9954
Submitted by MARATHON
Hearing Date 10/25/90

MARATHON OIL COMPANY

INDIAN BASIN FIELD

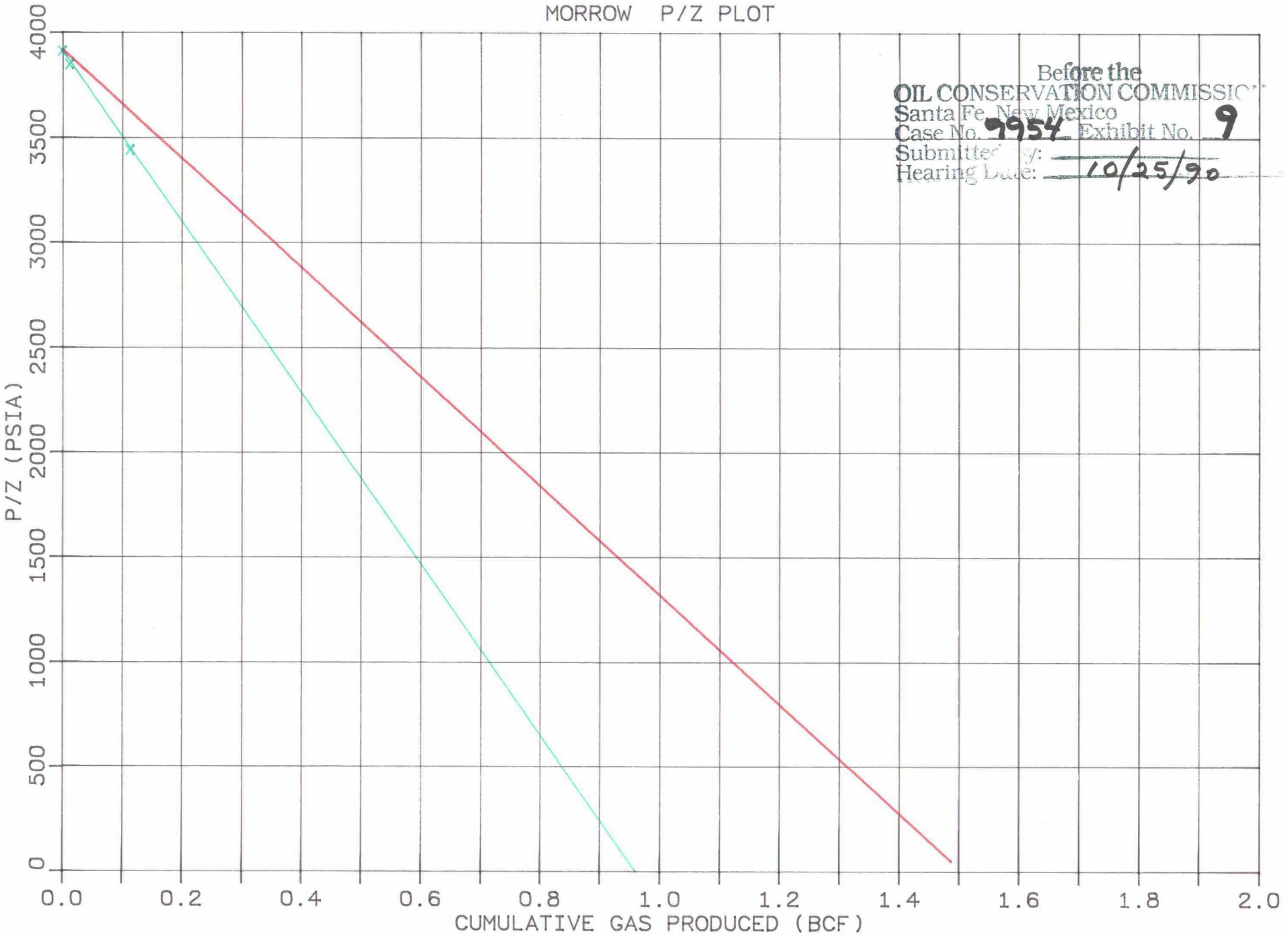
NORTH INDIAN BASIN UNIT NO. 8
PENALTY CALCULATION



9954
MARATHON
10/25/90
B

NORTH INDIAN BASIN UNIT No. 8

MORROW P/Z PLOT



Before the
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 9954 Exhibit No. 9
Submitted by:
Hearing Date: 10/25/90

NIBU #8 LIMITS TEST PBU

1

3832.700	12.000	0.130	0.000	0.000			
0.333	0.00000000	3533.200	-0.0002	81			
0.585	0.0000	0.0000	0.0000	60.000	14.700	150.000	0.00000600

0.0417	3566.500
0.0834	3567.400
0.7084	3569.400
1.1167	3569.900
1.2167	3570.100
1.8000	3570.800
1.8667	3571.200
2.3500	3571.400
3.1250	3572.100
3.3000	3572.100
3.7000	3572.100
3.8417	3572.100
4.1834	3572.500
4.5417	3572.600
5.4334	3572.600
5.6250	3572.800
5.7000	3573.000
5.7917	3572.800
6.2334	3572.800
6.3084	3573.200
6.4667	3572.800
6.5250	3573.000
6.7750	3573.200
6.9750	3573.000
7.2834	3573.400
7.3584	3573.500
7.6334	3573.400
8.0917	3573.400
8.7334	3573.900
8.8500	3573.900
8.9584	3574.100
9.0250	3573.700
9.0834	3573.700
9.1417	3573.500
9.3584	3573.900
9.7167	3573.900
10.0667	3574.100
10.3834	3574.100
10.5417	3574.300
10.6167	3574.100
10.6750	3573.900
10.7834	3573.900
11.0584	3574.300
11.2917	3574.100
11.8584	3574.400
12.1834	3574.600
12.2917	3574.400
12.5584	3574.400
12.7000	3574.600
12.8667	3574.600
12.9334	3574.400
13.2584	3574.800
13.8250	3574.400
13.8834	3574.800
14.3584	3574.800
14.4334	3575.000
14.7667	3574.800
15.1500	3574.800
15.2417	3574.600
15.4834	3574.600
15.6667	3574.800
15.9417	3574.800
16.1084	3574.800
16.2834	3575.000
16.6584	3575.000
16.9167	3575.000
17.2750	3575.000
17.5834	3575.200
17.7167	3575.200
17.9000	3575.000
18.0917	3575.200
18.2917	3575.000
18.5917	3575.200
18.7584	3575.200
20.3584	3575.300
20.8917	3575.200
21.6334	3575.300
22.0500	3575.300
23.1584	3575.500
23.4667	3575.700
5.6250	3572.800

TIME HOURS | PRESSURE PSIG

PRESSURE @ Δt=0 3533.215#

CLOCK RAN OUT 24 HOURS INTO TEST

TEST LATE 8/26/96

C & W WIRELINE, INC.
dba
Bennett & Cathey

P.O. Box 787
Artesia, New Mexico
88211-0787
Phone (505) 748-3354

2610 W. Marland
Hobbs, New Mexico
88240
Phone (505) 393-8784

Company	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE	PAGE OF
MARATHON OIL CO.	NORTH INDIAN BASIN UNIT #8	5000# RECORDER/1⅛MM BTU	8-23-90	1

Company Rep.	Phone	FIELD	FORMATION
STEVE YORK(PLANT)457-2621	HOME 756-3374	INDIAN BASIN	N/A

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS H_2O)	STATIC PRESSURE TAKEN
N/A (FT.)	NONE (FT.)	[X] PIPELINE [ ] FLARE	3 (INS)	0"-100"	[ ] UPSTREAM [X] DOWNSTREAM

Date	TIME		WELLHEAD DATA			FLOW CONTROL	GAS METERING									
	DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	HEATER CHOKE (64th IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN H_2O)	TEMP. (°F)	WATER HR.	WATER TOT	CONDENSATE HR.	CONDENSATE TOT	MCF/DAY	REMARKS
8-23/24	PM 1:30	0	2190	60°	1100	16/64	1.875	6.7	5.7	66°	0	0	0	0	3739	START FLOW TEST @ 1:30 P.M.
	2 2:30	1	2190	60°	1100	16/64	1.875	6.7	5.7	66°	0	0	0	0	3739	
	3 3:30	2	2190	60°	1100	16/64	1.875	6.7	5.8	66°	0	0	0	0	3804	
	4 4:30	3	2190	60°	1100	16/64	1.875	6.7	5.8	66°	0	0	0	0	3804	
	5 5:30	4	2190	60°	1100	16/64	1.875	6.7	5.7	66°	0	0	0	0	3739	
	6 6:30	5	2190	60°	1100	16/64	1.875	6.7	6.9	66°	0	0	0	0	4526	
	7 7:30	6	2190	60°	1100	16/64	1.875	6.7	6.5	66°	0	0	0	0	4263	
	8 8:30	7	2190	60°	1100	16/64	1.875	6.7	6.6	66°	0	0	0	0	4329	
	9 9:30	8	2180	60°	1095	16/64	1.875	6.7	6.6	66°	0	0	0	0	4329	
	10 10:30	9	2170	60°	1090	16/64	1.875	6.7	6.7	66°	0	0	0	0	4395	
	11 11:30	10	2160	60°	1090	16/64	1.875	6.7	6.6	66°	0	0	0	0	4329	
	12 MID 12:30	11	2150	60°	1090	16/64	1.875	6.7	6.6	67°	0	0	0	0	4325	
	13 1:30	12	2150	60°	1090	16/64	1.875	6.7	6.8	67°	0	0	0	0	4456	
	14 2:30	13	2150	60°	1090	16/64	1.875	6.7	6.6	67°	0	0	0	0	4325	

C & W WIRELINE, INC.
dba
Bennett & Cathey

P.O. Box 787
Artesia, New Mexico
88211-0787
Phone (505) 748-3354

2610 W. Marland
Hobbs, New Mexico
88240
Phone (505) 393-8784

Company	Well Name or Number	Test Unit Description	Date	Page of
MARATHON OIL CO.	NORTH INDIAN BASIN UNIT # 8	5000# RECORDER/ 1½BTU	8-24-90	2

Company Rep.	Phone	Field	Formation
STEVE YORK (PLANT)457-2621		INDIAN BASIN	N/A

Interval Tested	BHP Survey Depth	Gas Produced To	Gas Meter Run Size	Diff Range (ins H_2O)	Static Pressure Taken
N/A (FT.)	NONE (FT.)	☐ PIPELINE ☒ FLARE	3 (INS)	0"-100"	☐ UPSTREAM ☒ DOWNSTREAM

Date	Time: Day / 24 Hour Clock	Time: Flow or Shut-in Duration (Hours)	Wellhead Data: Tubing Press. (PSIG)	Wellhead Data: Temp. (°F)	Wellhead Data: Casing Press. (PSIG)	Flow Control: Heater Choke (64th IN)	Gas Metering: Orifice Size (INS)	Gas Metering: Static Press. (PSIG)	Gas Metering: Diff Press. (IN H_2O)	Gas Metering: Temp. (°F)	Water HR.	Water TOT	Condensate HR.	Condensate TOT	MCF/DAY	Remarks
8-24-90	1 AM 3:30	14	2150	60°	1090	16/64	1.875	6.7	6.6	66°	0	0	0	0	43 29	
	2 4:30	15	2150	60°	1090	16/64	1.875	6.7	6.5	66°	0	0	0	0	4263	
	3 5:30	16	2150	60°	1090	16/64	1.875	6.7	6.6	67°	0	0	0	0	4325	
	4 6:30	17	2100	60°	1085	16/64	1.875	6.7	6.7	67°	0	0	3	3	4390	
	5 7:30	18	2150	60°	1080	16/64	1.875	6.7	6.8	67°	0	0	0	3	4456	PINCHED BACK TO 12/64 @8:20 AM
	6 8:30	19	2190	60°	1085	12/64	1.875	6.7	5.3	72°	0	0	0	0	3457	
	7 9:30	20	2190	60°	1085	12/64	1.875	6.7	5.3	76°	0	0	0	3	3444	
	8 10:30	21	2190	60°	1085	12/64	1.875	6.7	5.3	78°	0	0	0	3	3437	
	9 11:30	22	2190	60°	1085	12/64	1.875	6.8	5.3	78°	0	0	0	3	3488	
	10 NOON 12:30	23	2190	60°	1085	12/64	1.875	6.7	5.2	80°	0	0	0	3	3366	
	11 1:30	24	2190	60°	1085	12/64	1.875	6.7	5.2	80°	0	0	0	3	3366	
	12 2:30	25	2190	60°	1085	12/64	1.875	6.7	5.2	80°	0	0	0	3	3366	
	13 3:30	26	2190	60°	1085	12/64	1.875	6.7	5.2	80°	0	0	1	4	3366	
	14 4:30	27	2200	60°	1085	12/64	1.875	6.7	5.2	78°	0	0	0	4	3372	

C & W WIRELINE, INC.
dba
Bennett & Cathey

P.O. Box 787
Artesia, New Mexico
88211-0787
Phone (505) 748-3354

2610 W. Marland
Hobbs, New Mexico
88240
Phone (505) 393-8784

Company	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE	PAGE OF
MARATHON OIL CO.	NORTH INDIAN BASIN UNIT #8	5000# RECORDER	8-24-90	3

Company Rep. / Phone	FIELD	FORMATION
STEVE YORK (PLANT 457-2621) 746-3374	INDIAN BASIN	N/A

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS H_2O)	STATIC PRESSURE TAKEN
N/A (FT.)	NONE (FT.)	☐ PIPELINE ☑ FLARE	3. (INS)	0"-100"	☐ UPSTREAM ☒ DOWNSTREAM

Date	TIME		WELLHEAD DATA			FLOW CONTROL	GAS METERING									
	DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	HEATER CHOKE (64th IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN_{H_2O})	TEMP. (°F)	WATER HR.	WATER TOT	CONDENSATE HR.	CONDENSATE TOT	MCF/DAY	REMARKS
8-24/25	1 PM 5:30	28	2200	60°	1085	12/64	1.875	6.7	5.3	76°	0	0	0	.4	3444	
	2 6:30	29	2200	60°	1080	12/64	1.875	6.7	5.3	73°	0	0	0	.4	3453	
	3 7:30	30	2200	60°	1080	12/64	1.875	6.7	5.3	73°	0	0	0	.4	3453	
	4 8:30	31	2200	60°	1080	12/64	1.875	6.7	5.3	73°	0	0	1	.5	3453	
	5 9:30	32	2200	60°	1080	12/64	1.875	6.6	5.3	74°	0	0	0	.5	3691	
	6 10:30	33	2200	60°	1080	12/64	1.875	6.6	5.3	74°	0	0	0	.5	3691	
	7 11:30	34	2200	60°	1080	12/64	1.875	6.6	5.3	74°	0	0	0	5	3691	
	8 MID 12:30	35	2200	60°	1080	12/64	1.875	6.6	5.3	74°	0	0	0	.5	3691	
	9 1:30	36	2100	60°	1080	12/64	1.875	6.6	5.2	74°	0	0	0	.5	3621	
	10 2:30	37	2100	60°	1070	12/64	1.875	6.6	5.2	72°	0	0	1	6	3628	
	11 3:30	38	2100	60°	1070	12/64	1.875	6.6	5.2	72°	0	0	0	6	3698	
	12 4:30	39	2100	60°	1070	12/64	1.875	6.6	5.2	72°	0	0	0	6	3628	
	13 5:30	40	2100	60°	1070	12/64	1.875	6.6	5.2	70°	0	0	0	6	3635	
	14 6:30	41	2100	60°	1070	12/64	1.875	6.6	5.2	72°	0	0	1	7	3628	

C & W WIRELINE, INC.
dba
Bennett & Cathey

P.O. Box 787
Artesia, New Mexico
88211-0787
Phone (505) 748-3354

2610 W. Marland
Hobbs, New Mexico
88240
Phone (505) 393-8784

Company	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE	PAGE OF
MARATHON OIL CO.	NORTH INDIAN BASIN UNIT #8	5000# RECORDER	8-24-90	4.
Company Rep. / **Phone**	**FIELD**	**FORMATION**		
STEVE YORK (PLANT457-2621) 746-3374	INDIAN BASIN	N/A		

INTERVAL TESTED	DHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS H_2O)	STATIC PRESSURE TAKEN
N/A (FT.)	NONE (FT.)	[X] PIPELINE [ ] FLARE	3. (INS)	0"-100"	[ ] UPSTREAM [X] DOWNSTREAM

TIME		WELLHEAD DATA			FLOW CONTROL	GAS METERING									
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	METER CHOKE (64th IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN H_2O)	TEMP. (°F)	WATER HR.	WATER TOT	CONDENSATE HR.	CONDENSATE TOT	MCF/DAY	REMARKS
Date															GRAVITY .585
1 7:30	42	2100	60	1070	12/64	1.875	6.6	5.0	75	0	0	1	8	3479	
2 8:30	43	2100	60	1070	13/64	1.875	6.6	5.5	74	0	0	1	9	3830	OPEN CHOKE TO 13/64 @8:00 AM
3 9:30	44	2100	60	1070	13/64	1.875	6.6	5.5	73	0	0	0	9	3834	
4 10:30	45	2100	60	1070	13/64	1.875	6.6	5.5	73	0	0	0	9	3834	
5 11:30	46	2100	60	1070	13/64	1.875	6.6	5.5	73	0	0	0	9	3834	
6 12:30	47	2100	60	1070	13/64	1.875	6.6	5.5	73	0	0	1	10	3834	
7 P,M 1:30	48	2100	60	1100	13/64	1.875	7.7	5.0	75	0	0	0	10	4066	
8 2:30	49	2200	60	1100	13/64	1.875	7.1	5.1	74	0	0	0	10	3821	
9 3:30	50	2200	60	1100	13/64	1.875	7.1	5.0	75	0	0	1	11	3746	
10 4:30	51	2200	60	1100	13/64	1.875	7.1	5.1	76	0	0	0	11	3814	
11 5:30	52	2200	60	1100	13/64	1.875	7.1	5.1	75	0	0	0	11	3817	
12 6:30	53	2200	60	1100	13/64	1.875	7.1	5.1	76	0	0	1	12	3814	
13 7:30	54	2200	60	1100	13/64	1.875	7.1	5.1	76	0	0	0	12	3814	
14 8:30	55	2200	60	1100	13/64	1.875	7.1	5.0	74	0	0	0	12	3746	

C & W WIRELINE, INC.
dba
Bennett & Cathey

P.O. Box 787
Artesia, New Mexico
88211-0787
Phone (505) 748-3354

2610 W. Marland
Hobbs, New Mexico
88240
Phone (505) 393-8784

Company	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE	PAGE OF
MARATHON OIL CO.	NORTH INDIAN BASIN UNIT #8	5000# RECORDER	8-24-90	5

Company Rep. Phone	FIELD	FORMATION
STEVE YORK (PLANT 457-2621) 746-3374	INDIAN BASIN	N/A

INTERVAL TESTED	DMP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS H_2O)	STATIC PRESSURE TAKEN
N/A (FT.)	NONE — (FT.)	[X] PIPELINE [ ] FLARE	3. (INS)	0"-100"	[ ] UPSTREAM [X] DOWNSTREAM

Date

TIME		WELLHEAD DATA			FLOW CONTROL	GAS METERING									
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	METER CHOKE (64th IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN_{H_2O})	TEMP. (°F)	WATER HR.	WATER TOT	CONDENSATE HR.	CONDENSATE TOT	MCF/DAY	REMARKS
1 PM 9:30	56	2200	60	1100	13/64	1.875	7.1	5.1	74	0	0	0	12	3821	GRAVITY 585
2 10:30	57	2200	60	1100	13/64	1.875	7.1	5.1	73	0	0	0	12	3824	
3 11:30	58	2200	60	1100	13/64	1.875	7.1	5.1	72	0	0	0	12	3828	
4 12:30	59	2190	60	1070	13/64	1.875	7.1	5.1	74	0	0	1	12	3821	
5 AM 1:30	60	2190	60	1070	13/64	1.875	7.1	5.1	74	0	0	1	13	3821	
6 2:30	61	2190	60	1070	13/64	1.875	7.1	5.0	74	0	0	0	12	3746	
7 3:30	62	2190	60	1070	13/64	1.875	7.1	5.0	74	0	0	0	12	3746	
8 4:30	63	2190	60	1070	13/64	1.875	7.1	5.0	74	0	0	0	12	3746	
9 5:30	64	2190	60	1070	13/64	1.875	7.1	5.0	74	0	0	1	13	3746	
10 6:30	65	2190	60	1070	13/64	1.875	7.1	5.0	74	0	0	0	13	3746	
11 7:30	66	2190	60	1070	13/64	1.875	7.1	5.0	74	0	0	0	13	3746	
12 8:30	67	2190	60	1060	13/64	1.875	7.1	5.0	74	0	0	0	13	3746	
13 9:30	68	2190	60	1060	13/64	1.875	7.1	5.3	74	0	0	1	14	3971	
14 10:30	69	2190	60	1060	13/64	1.875	7.1	5.3	73	0	0	1	15	3974	

C & W WIRELINE, INC.
dba
Bennett & Cathey

P.O. Box 787
Artesia, New Mexico
88211-0787
Phone (505) 748-3354

2610 W. Marland
Hobbs, New Mexico
88240
Phone (505) 393-8784

Company	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE	PAGE OF
MARATHON OIL CO.	NORTH INDIAN BASIN UNIT #8	5000# RECORDER	8-24-90	6

Company Rep. / Phone	FIELD	FORMATION
STEVE YORK (PLANT 457-2621) 746-3374	INDIAN BASIN	N/A

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS H_2O)	STATIC PRESSURE TAKEN
N/A (FT.)	NONE (FT.)	[X] PIPELINE [ ] FLARE	3. (INS)	0"-100"	[ ] UPSTREAM [X] DOWNSTREAM

Date

TIME		WELLHEAD DATA			FLOW CONTROL	GAS METERING				WATER		CONDENSATE		MCF/DAY	REMARKS
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	HEATER CHOKE (64th IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN H_2O)	TEMP. (°F)	HR.	TOT	HR.	TOT		
1 AM 11:30	70	2190	60	1070	13/64	1.875	7.2	5.2	74	0	0	0	15	3951	GRAVITY 585
2 PM 12:30	71	2190	60	1070	13/64	1.875	7.2	5.2	74	0	0	0	15	3951	
3 1:30	72	2190	60	1070	13/64	1,875	7.2	5.2	74	0	0	0	15	3951	SHUT IN @ 1:30
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															

Laboratory Services

1331 Tasker Drive
Hobbs, New Mexico 88240

Telephone: (505) 397-3713

FOR: Bennett & Cathey
Attention: Mr. Monty Randolph
P. O. Box 1784
Hobbs, New Mexico 88240

SAMPLE IDENTIFICATION: North Indian Basin #8
COMPANY: Marathon Oil Co.
LEASE:
PLANT:

SAMPLE DATA:
DATE SAMPLED: 06/04/90 11:00AM
ANALYSIS DATE: 06-05-90
PRESSURE - PSIG 610.0
SAMPLE TEMP. °F
ATMOS. TEMP. °F 84

GAS (XX) LIQUID ( )
SAMPLED BY: B&C
ANALYSIS BY: Rolland Perry

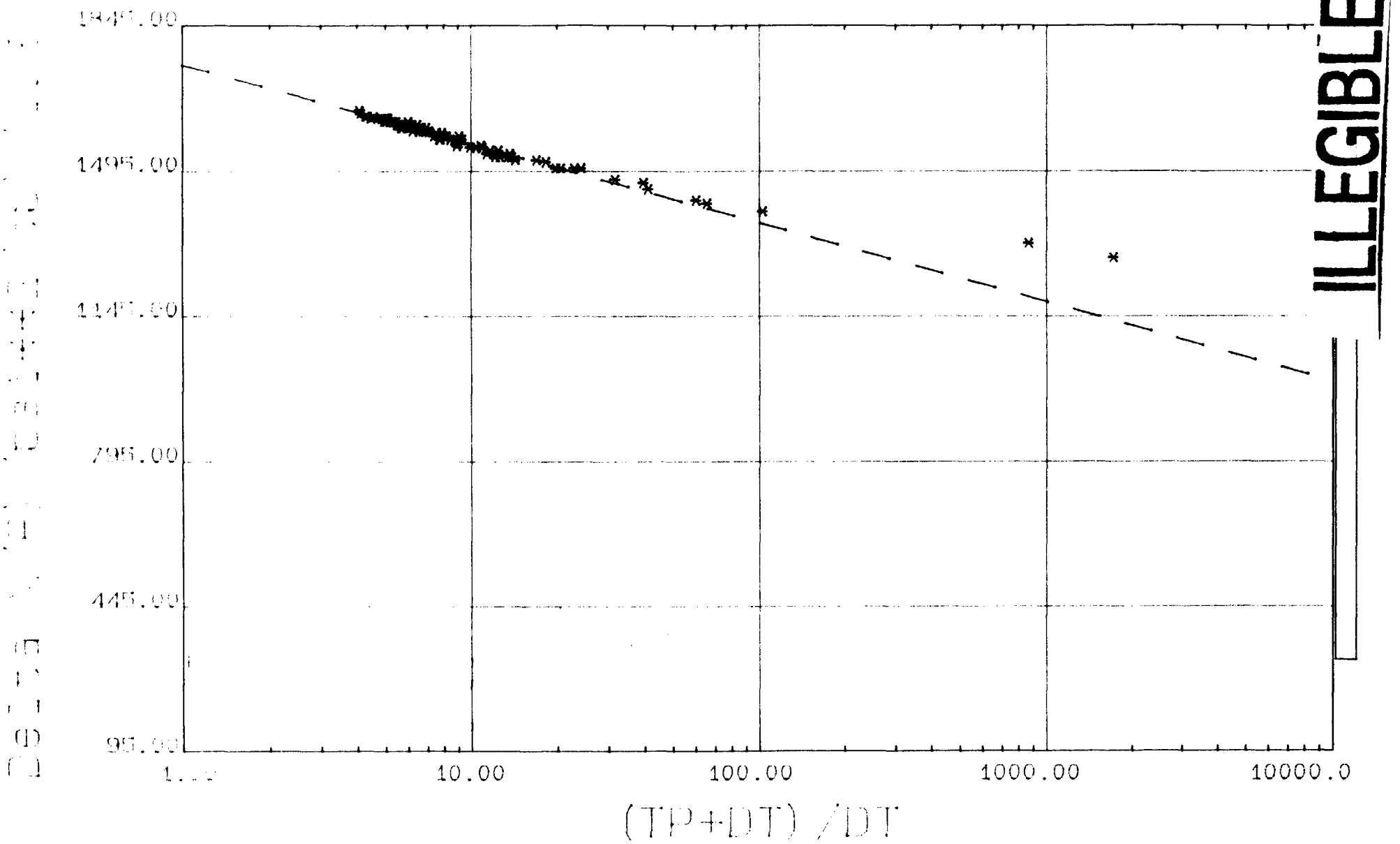
REMARKS:

COMPONENT ANALYSIS

COMPONENT		MOL PERCENT	GPM
Hydrogen Sulfide	(H2S)	0.00	
Nitrogen	(N2)	0.18	
Carbon Dioxide	(CO2)	0.80	
Methane	(C1)	95.45	
Ethane	(C2)	2.81	0.746
Propane	(C3)	0.58	0.159
I-Butane	(IC4)	0.08	0.026
N-Butane	(NC4)	0.00	0.000
I-Pentane	(IC5)	0.00	0.000
N-Pentane	(NC5)	0.00	0.000
Hexane	(C6)	0.10	0.045
Heptanes Plus	(C7+)	0.00	0.000
		100.00	0.976

BTU/CU.FT. - DRY	1036	MOLECULAR WT	16.9468
AT 14.650 DRY	1033		
AT 14.650 WET	1015	26# GASOLINE -	0.045
AT 15.025 DRY	1059		
AT 15.025 WET	1041		
SPECIFIC GRAVITY -			
CALCULATED	0.585		
MEASURED	0.000		

NIBU #8 LIMITS TEST PBU

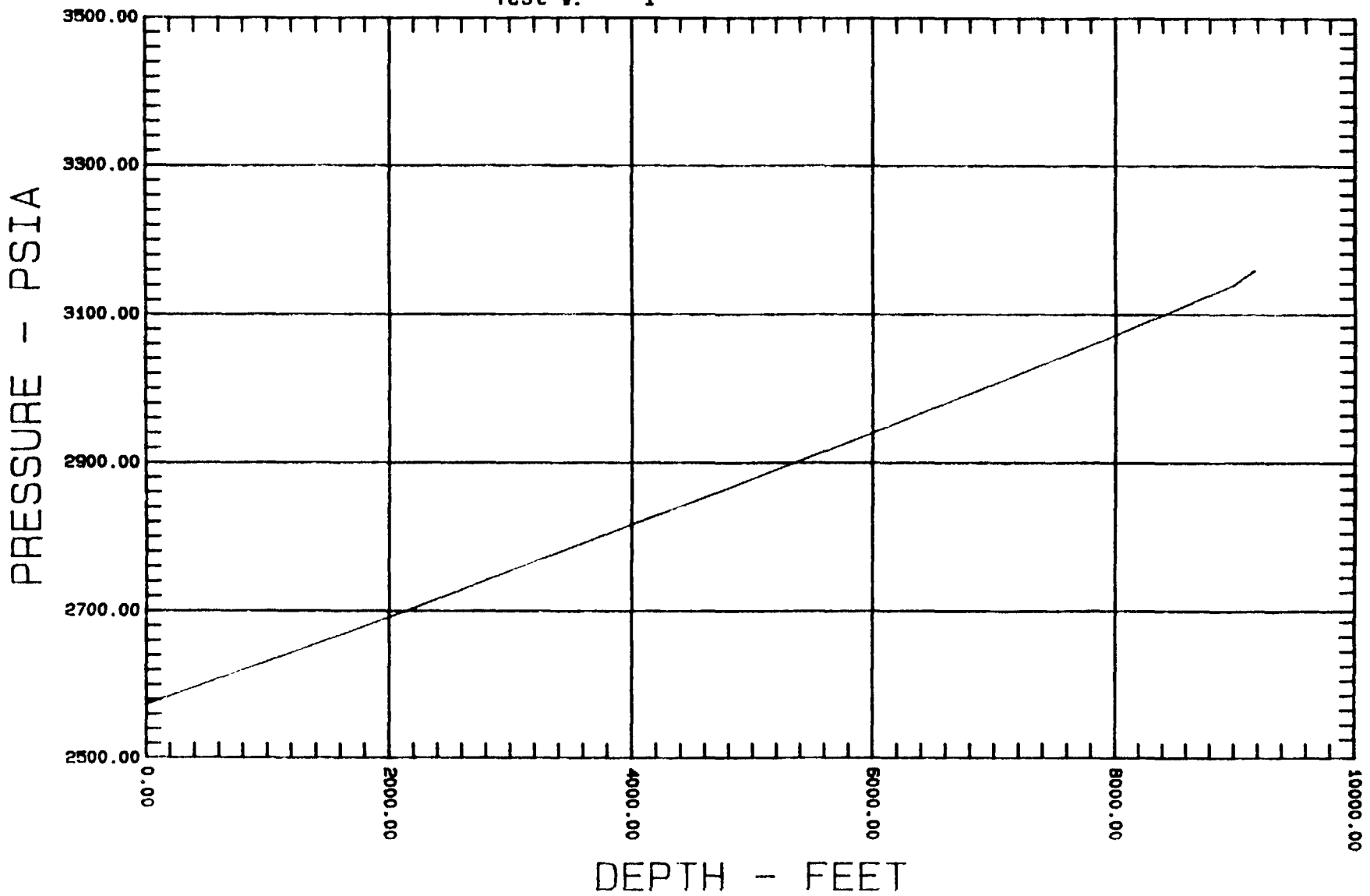


ILLEGIBLE

Plot starting date: 9/28/90
time: 10: 45: 0
Gauge S/N

Company: PRO WIRELINE
Client: MARATHON OIL
Well name: NORTH INDIAN BASIN
Well #: 8
Test #: 1

Location:
Operator: BURRELL
Comments: STATIC GRADIENT RUN TO 9100'
EXTRAPULATED TO MID-POINT



PAGE START DATE: 9/28/90 GAUGE S/N: 53217
PAGE START TIME: 10:45: 0
DATA FILE: 1

DELTA TIME HRS	DEPTH FEET	PRESSURE PSIA	TEMPERATURE 'F	COMMENTS
0.000	0.00	2573.00		GRADIENT LB/FT.
0.167	2000.00	2691.00		.059
0.333	4000.00	2816.00		.062
0.500	6000.00	2940.00		.062
0.667	8000.00	3072.00		.066
0.833	9000.00	3140.00		.068
0.917	9100.00	3151.00		.110
0.917	9176.00	3159.00		EXT.@ MID.PT.

Indian Basin Gas Plant
Station Report -- by Station # & Date

STA	SIDE	DATE	Press, PSIA	Cond, BBLS	Wtr, BBLS	Rate, MCFPD
209M	N	08/23/90	871	2.0	3.0	3491
		08/24/90	871	4.0	0.0	3796
		08/25/90	952	5.0	1.0	3898
		08/26/90	1037	2.0	1.0	848
		08/27/90	0	0.0	0.0	0
		08/28/90	0	0.0	0.0	0
		08/29/90	0	0.0	0.0	0
		08/30/90	0	0.0	0.0	0
		09/04/90	871	5.0	1.0	2382
		09/05/90	0	0.0	0.0	0
		09/06/90	0	0.0	0.0	0
		09/07/90	845	6.0	3.0	3002
		09/08/90	952	13.0	5.0	6238
		09/09/90	980	12.0	5.0	7007
		09/10/90	980	12.0	3.0	6968
		09/11/90	925	13.0	5.0	7189
		09/12/90	952	12.0	4.0	7133
		09/13/90	952	14.0	4.0	7113
		09/14/90	925	12.0	4.0	6927
		09/15/90	952	11.0	4.0	6868
		09/16/90	987	10.0	3.0	6809
		09/17/90	952	11.0	4.0	6688
		09/18/90	952	4.0	1.0	1901
		09/19/90	952	10.0	3.0	6067
		09/20/90	925	9.0	4.0	6207
		09/21/90	925	10.0	3.0	6125
		09/22/90	0	0.0	0.0	0
		09/23/90	0	0.0	0.0	0

Indian Basin Gas Plant
Station Report -- by Station # & Date

STA	SIDE	DATE	Press, PSIA	Cond, BBLS	Wtr, BBLS	Rate, MCFPD
209M	N	09/27/90	0	0.0	0.0	0
		09/28/90	0	0.0	0.0	0
		09/29/90	0	0.0	0.0	0
		09/30/90	0	0.0	0.0	0
		10/01/90	769	4.0	0.0	4615
		10/02/90	769	5.0	2.0	3149
		10/03/90	769	5.0	1.0	3129
		10/04/90	744	7.0	3.0	4536
		10/05/90	794	6.0	2.0	3597
		10/06/90	845	5.0	2.0	3607
		10/07/90	819	5.0	2.0	3600
		10/08/90	845	5.0	2.0	3607
		10/09/90	898	5.0	2.0	3614
		10/10/90	794	7.0	2.0	3709
		10/11/90	819	4.0	2.0	3658
		10/12/90	769	6.0	2.0	3643
		10/13/90	819	5	1	3606
		10/14/90	769	5	2	3604
		10/15/90	1008	5	2	3641
		10/16/90	952	5	2	3597
		10/17/90	925	4	2	3548
		8/31	NO REPORT			
		9/1	?	?	?	3991
		9/2	845	10	0	3991
		9/3	0	0	0	0
		9/24-9/26	0	0	0	0

REPORT NO.
15447 DST 1

PAGE NO. 1

TEST DATE:
30-APR-1990

WELL PERFORMANCE TESTING™ REPORT

Schlumberger

COMPANY: MARATHON OIL COMPANY

WELL: NORTH INDIAN BASIN UNIT #8

TEST IDENTIFICATION

Test Type	OH-DST/SPRO
Test No.	ONE
Formation	MORROW
Test Interval (ft)	9150 to 9303
Depth Reference	GL

WELL LOCATION

Field	INDIAN BASIN
County	EDDY
State	NEW MEXICO
Sec/Twn/Rng	S9T21SR23E
Elevation (ft)	3973

HOLE CONDITIONS

Total Depth (MD/TVD) (ft)	
Hole Size (in)	7.875
Casing/Liner I.D. (in)	8.625
Perf'd Interval/Net Pay (ft)	/ 23
Shot Density/Diameter (in)	

MUD PROPERTIES

Mud Type	POLY PLUS
Mud Weight (lb/gal)	8.9
Mud Resistivity (ohm.m)	
Filtrate Resistivity (ohm.m)	
Filtrate Chlorides (ppm)	600

INITIAL TEST CONDITIONS

Initial Hydrostatic (psi)	4201
Gas Cushion Type	
Surface Pressure (psi)	
Liquid Cushion Type	
Cushion Length (ft)	

TEST STRING CONFIGURATION

Pipe Length (ft)/I.D. (in)	0 / 3.83
Collar Length (ft)/I.D. (in)	514 / 2.375
Packer Depths (ft)	9144,9150
Bottomhole Choke Size (in)	.5
Gauge Depth (ft)/Type	9115/SPRO-86943

NET PIPE RECOVERY

Volume	Fluid Type	Properties
	Circulated	
	out to Pit	
	Not measured	

NET SAMPLE CHAMBER RECOVERY

Volume	Fluid Type	Properties
10.58 cuft	Gas	
Pressure: 1550	GOR: 0	GLR: 0

INTERPRETATION RESULTS

Model of Behavior	
Fluid Type Used for Analysis	
Reservoir Pressure (psi)	
Transmissibility (md.ft/cp)	
Effective Permeability (md)	
Skin Factor/Damage Ratio	
Storativity Ratio, Omega	
Interporos.Flow Coef..Lambda	
Distance to an Anomaly (ft)	
Radius of Investigation (ft)	
Potentiometric Surface (ft)	

ROCK/FLUID/WELLBORE PROPERTIES

Oil Density (deg. API)	
Basic Solids (%)	
Gas Gravity	
GOR (scf/STB)	
Water Cut (%)	
Viscosity (cp)	
Total Compressibility (1/psi)	
Porosity (%)	10
Reservoir Temperature (F)	170
Form.Vol.Factor (bbl/STB)	

PRODUCTION RATE DURING TEST: Data Report

COMMENTS:

This drill stem test was mechanically successful. Surface rate information was measured by a Marathon provided separator and was not available for this drill stem testing report. The gas analysis is on page 3.

WELL TEST INTERPRETATION REPORT #:115447 DST 1 CLIENT : MARATHON OIL COMPANY		PAGE: 2, 1-MAY-90
REGION :SOUTH DISTRICT:HOBBS BASE :MDS ENGINEER:J.BROWNING	SEQUENCE OF EVENTS	FIELD:INDIAN BASIN ZONE :MORROW WELL :N.I.B.U. #8 LOCATION:S9T21SR23E

DATE	TIME (HR:MIN)	DESCRIPTION	ET (MINS)	BHP (PSIA)	WHP (PSIG)
30-APR	08:36	SET PACKER	-2	4201	
	08:38	START FLOW	0	2878	
		BOTTOM OF BUCKET <1MIN			
	08:39		1		100
	08:40	OPEN TO SEPARATOR	2		400
	08:43	END FLOW & START SHUTIN	5	2667	1400
	10:04	END SHUTIN	86	3657	450
	10:05	START FLOW	87	2793	450
		OPEN TO SEPARATOR			
	10:07	Rate readings taken by	89		900
	10:09	customer furnished	91		1400
	10:10	separator and crew	92		1600
	10:15		97		2500
	10:20		102		2800
	10:30		112		2800
	12:05	END FLOW & START SHUTIN	207	3599	2800
	16:03	END SHUTIN	445	3642	0
	16:08	Pulled Loose	450		

*** GAS COMPOSITION (Mole %) ***

N2	.42
CH4	95.57
CO2	.57
C2H6	2.69
H2S	.00
C3H8	.59
IC4H10	.08
NC4H10	.09
IC5H12	.00
NC5H12	.00
C6+	.00

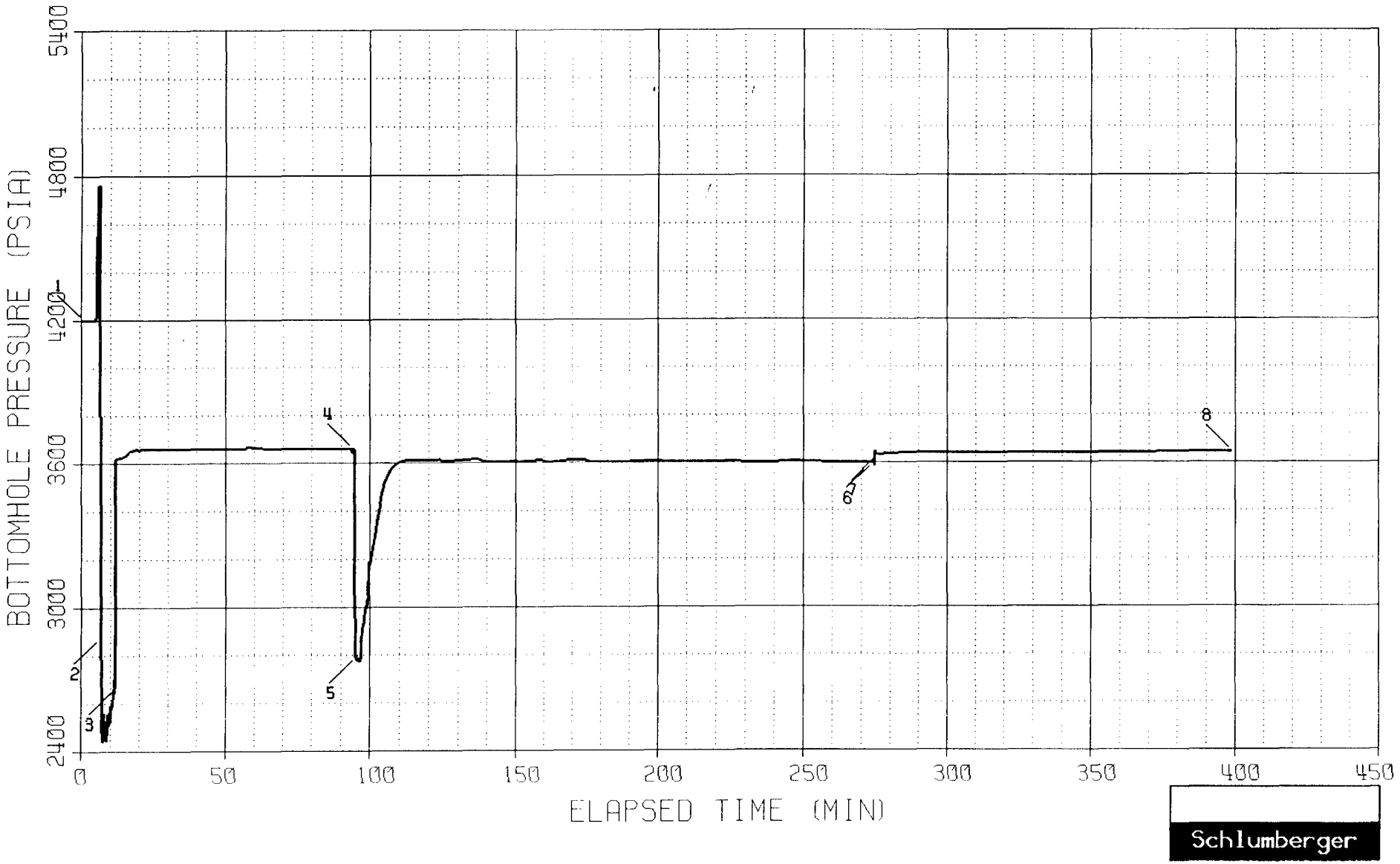
Average Molar Mass (g/mol) : 16.8
Specific Gravity (Air=1) : .581
Gross Heat Content (BTU/cft) : 1035.5

BOTTOMHOLE PRESSURE LOG

FIELD REPORT NO. 115447
INSTRUMENT NO. 86943
DEPTH : 9115 FT
CAPACITY : 10000 PSI
PORT OPENING : INSIDE

COMPANY : MARATHON OIL COMPANY
WELL : N. INDIAN BASIN #8

Electronic Pressure Data

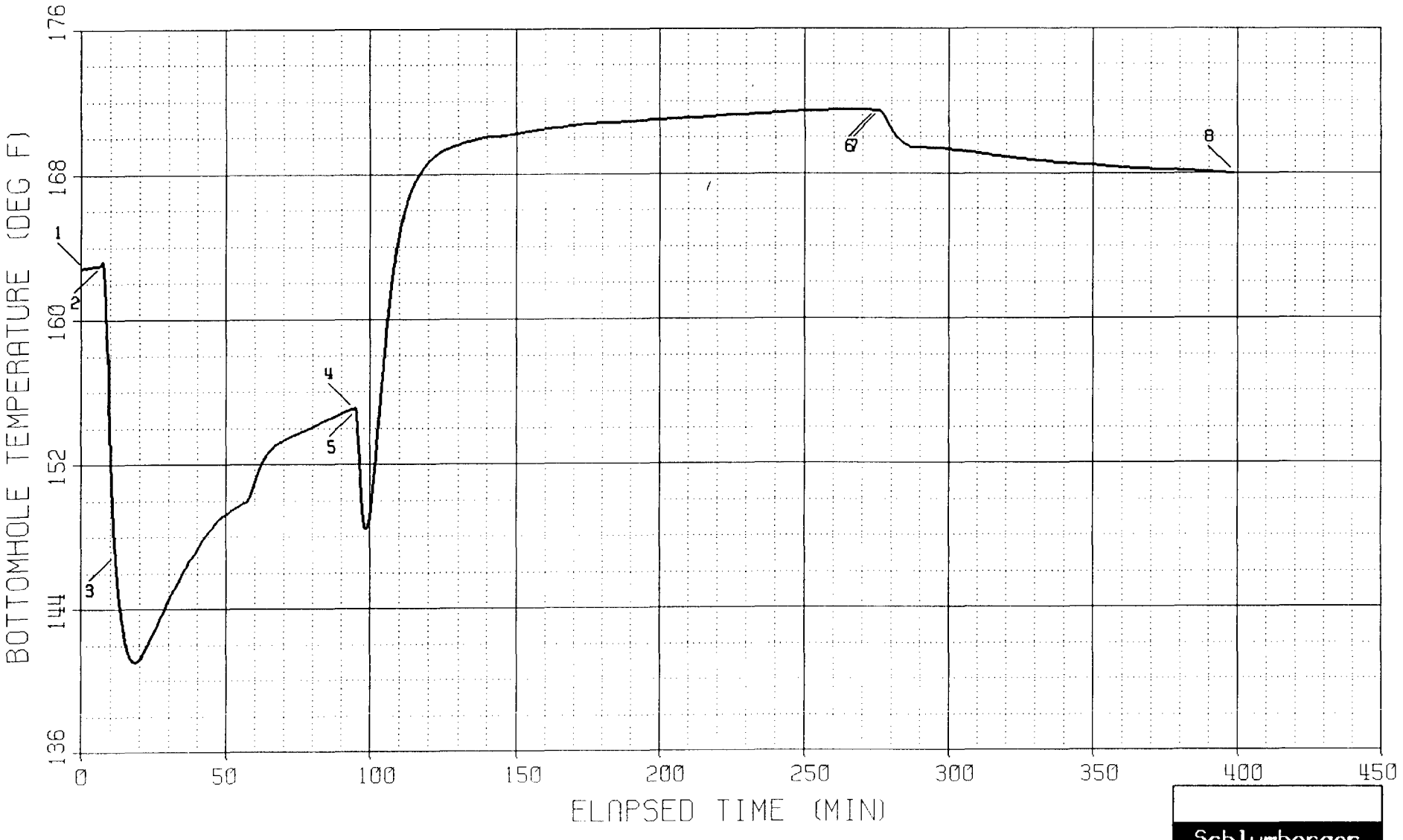


BOTTOMHOLE TEMPERATURE LOG

FIELD REPORT NO. 115447
INSTRUMENT NO. 86943
DEPTH : 9115 FT

COMPANY : MARATHON OIL COMPANY
WELL : N. INDIAN BASIN #8

Electronic Temperture Data

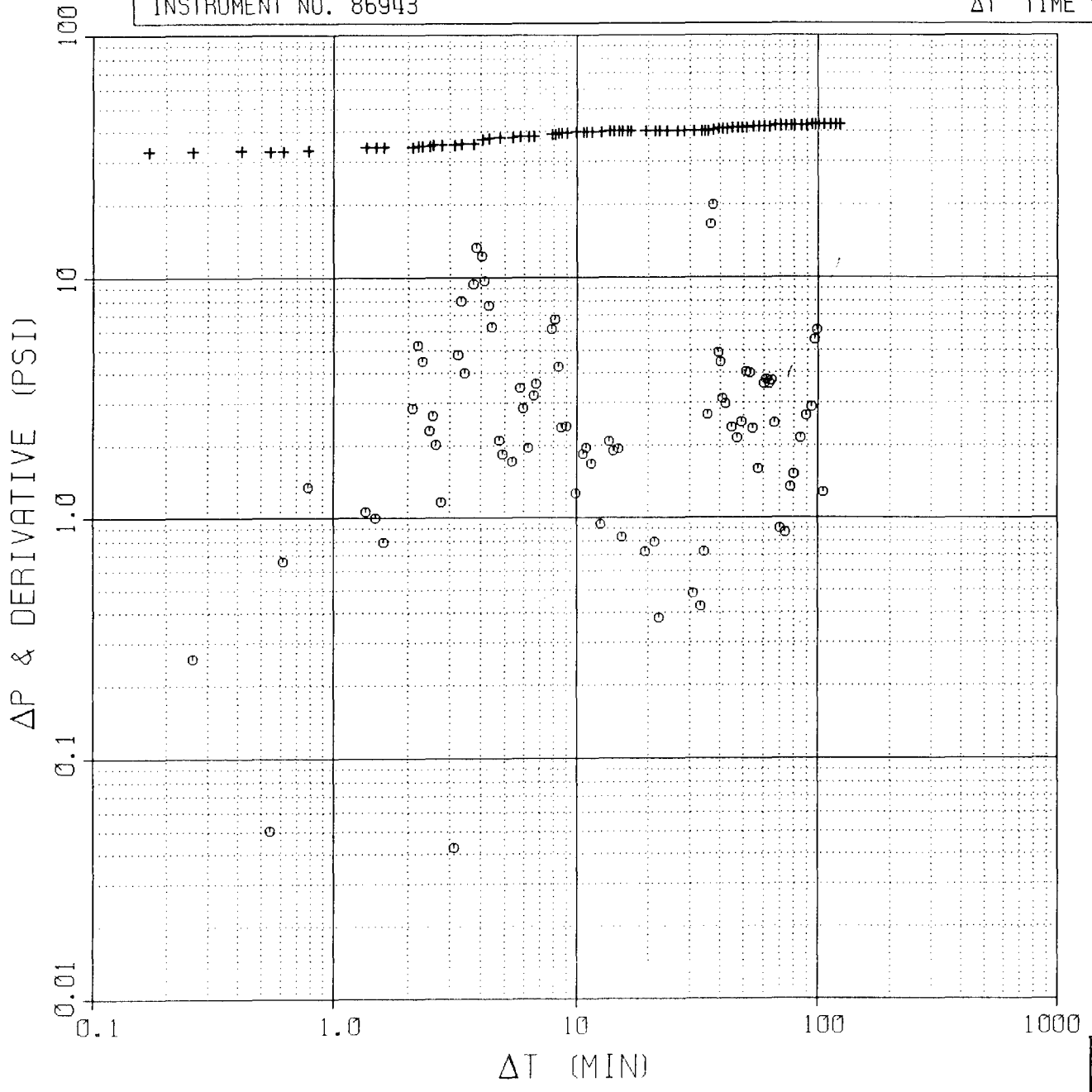


Schlumberger

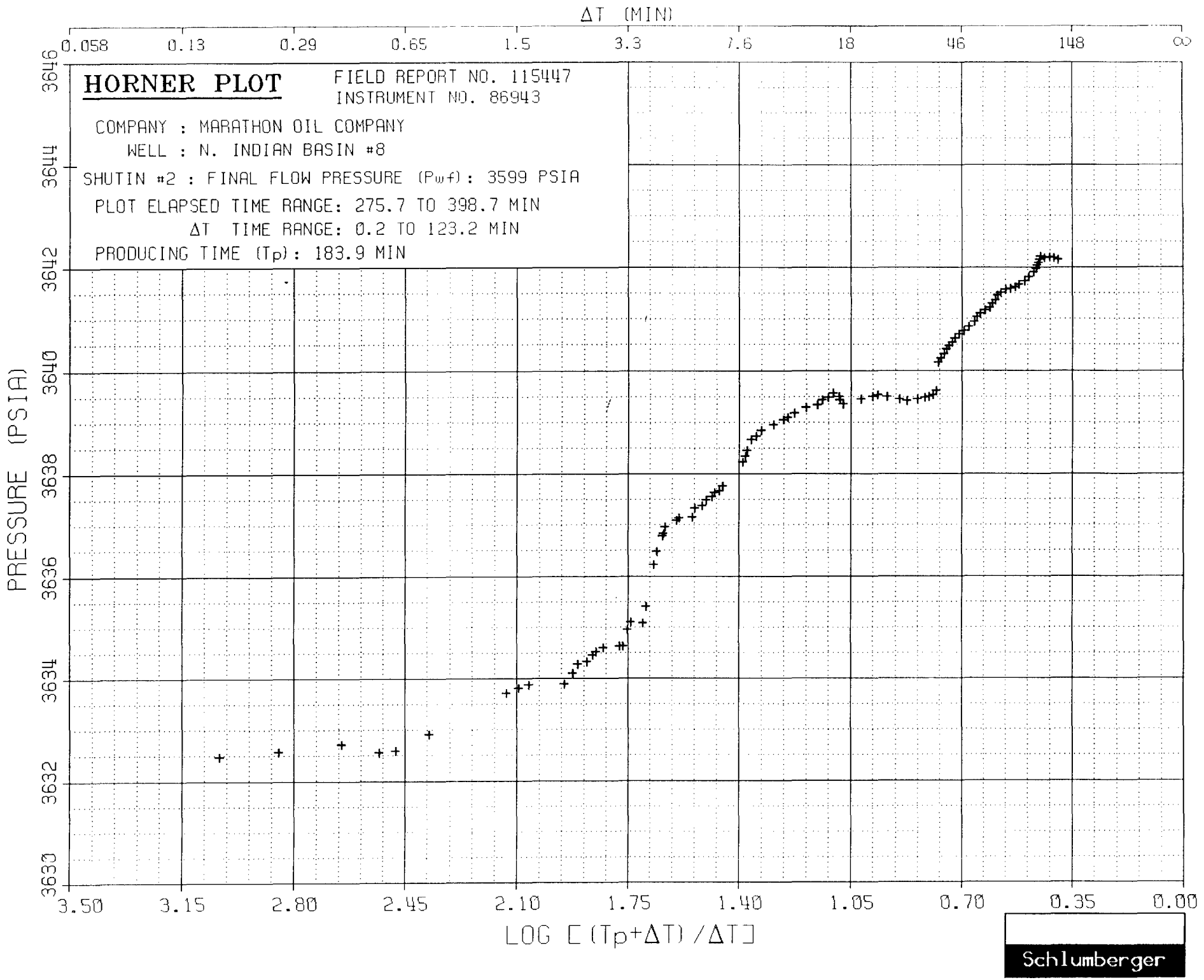
LOG LOG PLOT

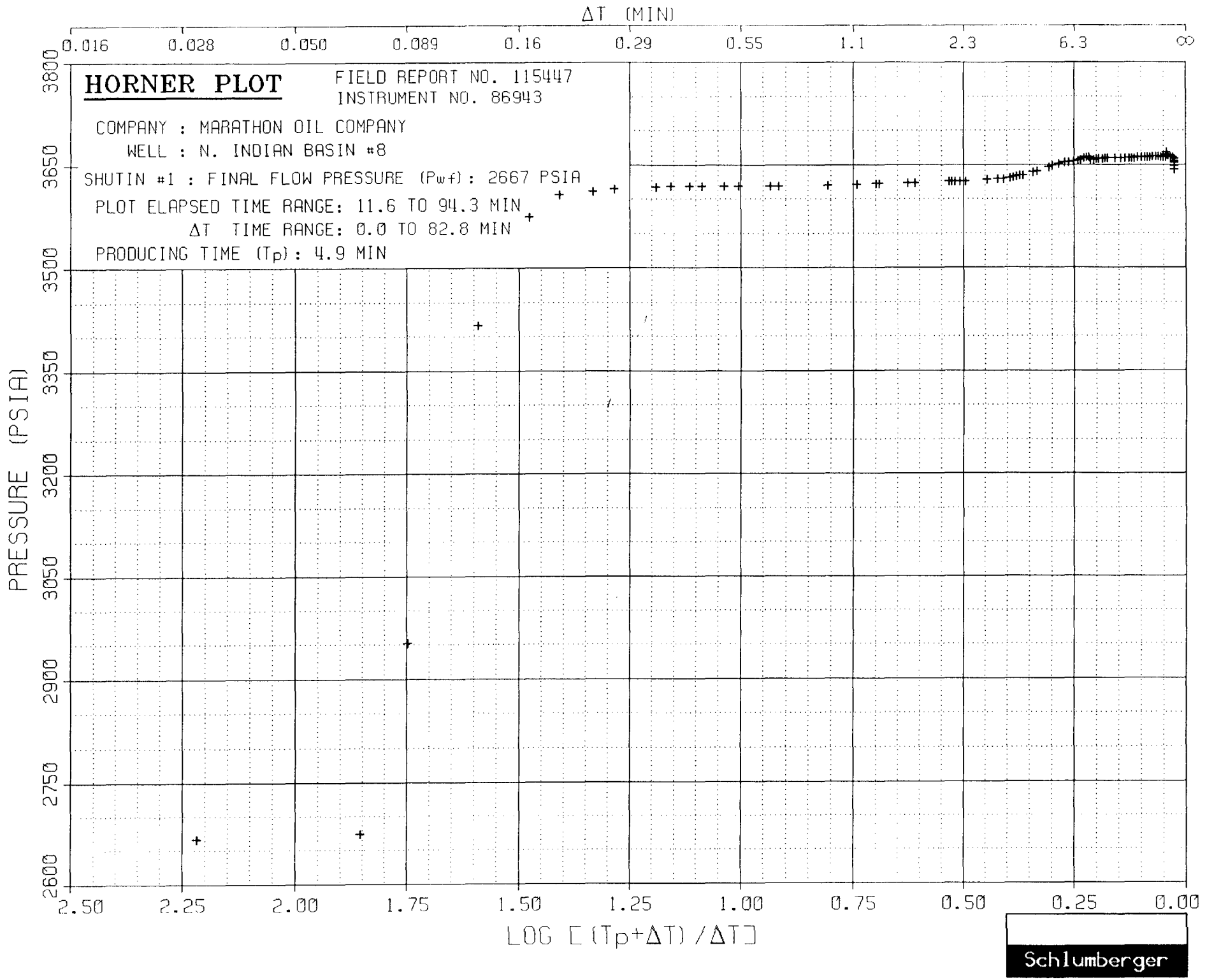
COMPANY : MARATHON OIL COMPANY
WELL : N. INDIAN BASIN #8
FIELD REPORT NO. 115447
INSTRUMENT NO. 86943

SHUTIN #2 : PRODUCING TIME (Tp) : 183.9 MIN
FINAL FLOW PRESSURE (Pwf) : 3599 PSIA
PLOT ELAPSED TIME RANGE: 275.7 TO 398.7 MIN
ΔT TIME RANGE: 0.2 TO 123.2 MIN



Schlumberger


ΔT (MIN)
0.058
0.13
0.29
0.65
1.5
3.3
7.6
18
46
148
∞
HORNER PLOT
FIELD REPORT NO. 115447
INSTRUMENT NO. 86943
COMPANY : MARATHON OIL COMPANY
WELL : N. INDIAN BASIN #8
SHUTIN #2 : FINAL FLOW PRESSURE (Pwf): 3599 PSIA
PLOT ELAPSED TIME RANGE: 275.7 TO 398.7 MIN
ΔT TIME RANGE: 0.2 TO 123.2 MIN
PRODUCING TIME (Tp): 183.9 MIN
PRESSURE (PSIA)
3646
3644
3642
3640
3638
3636
3634
3632
3630
3.50
3.15
2.80
2.45
2.10
1.75
1.40
1.05
0.70
0.35
0.00
LOG [(Tp+ΔT)/ΔT]
Schlumberger


ΔT (MIN)
0.016
0.028
0.050
0.089
0.16
0.29
0.55
1.1
2.3
6.3
∞
HORNER PLOT
FIELD REPORT NO. 115447
INSTRUMENT NO. 86943
COMPANY : MARATHON OIL COMPANY
WELL : N. INDIAN BASIN #8
SHUTIN #1 : FINAL FLOW PRESSURE (Pwf) : 2667 PSIA
PLOT ELAPSED TIME RANGE: 11.6 TO 94.3 MIN
ΔT TIME RANGE: 0.0 TO 82.8 MIN
PRODUCING TIME (Tp) : 4.9 MIN
PRESSURE (PSIA)
3800
3650
3500
3350
3200
3050
2900
2750
2600
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
LOG [(Tp+ΔT)/ΔT]
Schlumberger

****
* WELL TEST DATA PRINTOUT *
****

FIELD REPORT # : 115447

COMPANY : MARATHON OIL COMPANY
WELL : N. INDIAN BASIN #8

INSTRUMENT # : 86943
CAPACITY [PSI] : 10000.
DEPTH [FT] : 9115.0
PORT OPENING : INSIDE

LABEL POINT INFORMATION

#	TIME OF DAY HH:MM:SS	DATE DD-MM	EXPLANATION	ELAPSED TIME,MIN	BOT HOLE PRESSURE PSIA	BOT HOLE TEMP. DEG F
1	7:29:15	30-AP	HYDROSTATIC MUD	0.98	4201.24	162.9
2	7:34:51	30-AP	START FLOW	6.58	2878.31	163.0
3	7:39:47	30-AP	END FLOW & START SHUT-IN	11.52	2667.16	147.1
4	9:02:35	30-AP	END SHUT-IN	94.32	3657.44	155.1
5	9:03:24	30-AP	START FLOW	95.14	2793.04	155.0
6	12:02:22	30-AP	END FLOW	274.10	3599.40	171.5
7	12:03:46	30-AP	START SHUT-IN	275.50	3632.41	171.5
8	14:06:57	30-AP	END SHUT-IN	398.68	3642.14	168.0

SUMMARY OF FLOW PERIODS

PERIOD	START ELAPSED TIME,MIN	END ELAPSED TIME,MIN	DURATION MIN	START PRESSURE PSIA	END PRESSURE PSIA
1	6.58	11.52	4.94	2878.31	2667.16
2	95.14	274.10	178.96	2793.04	3599.40

SUMMARY OF SHUTIN PERIODS

PERIOD	START ELAPSED TIME,MIN	END ELAPSED TIME,MIN	DURATION MIN	START PRESSURE PSIA	END PRESSURE PSIA	FINAL FLOW PRESSURE PSIA	PRODUCING TIME, MIN
1	11.52	94.32	82.80	2667.16	3657.44	2667.16	4.94
2	275.50	398.68	123.18	3632.41	3642.14	3599.40	183.90

TEST PHASE : FLOW PERIOD # 1

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE TEMP. DEG F	BOT HOLE PRESSURE PSIA
7:34:51	30-AP	6.58	0.00	163.0	2878.31
7:39:47	30-AP	11.52	4.94	147.1	2667.16

TEST PHASE : SHUTIN PERIOD # 1
FINAL FLOW PRESSURE [PSIA] = 2667.16
PRODUCING TIME [MIN] = 4.94

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE TEMP. DEG F	BOT HOLE PRESSURE PSIA	DELTA P PSI	LOG HORNER TIME
7:39:47	30-AP	11.52	0.00	147.1	2667.16	0.00	
7:40:47	30-AP	12.52	1.00	145.2	3620.23	953.07	0.774
7:41:47	30-AP	13.52	2.00	143.8	3624.73	957.57	0.540
7:42:47	30-AP	14.52	3.00	142.7	3628.52	961.36	0.423
7:43:47	30-AP	15.52	4.00	141.9	3636.95	969.79	0.349
7:44:47	30-AP	16.52	5.00	141.4	3648.04	980.88	0.298
7:45:47	30-AP	17.52	6.00	141.1	3653.49	986.33	0.261
7:46:47	30-AP	18.52	7.00	141.0	3658.07	990.91	0.232
7:47:47	30-AP	19.52	8.00	141.1	3656.64	989.48	0.209
7:48:47	30-AP	20.52	9.00	141.3	3658.07	990.91	0.190
7:49:47	30-AP	21.52	10.00	141.6	3658.84	991.68	0.174
7:51:47	30-AP	23.52	12.00	142.3	3659.13	991.97	0.150
7:53:47	30-AP	25.52	14.00	143.0	3659.31	992.15	0.131
7:55:47	30-AP	27.52	16.00	143.7	3659.50	992.34	0.117
7:57:47	30-AP	29.52	18.00	144.4	3660.03	992.87	0.105
7:59:47	30-AP	31.52	20.00	145.0	3660.09	992.93	0.096
8:01:47	30-AP	33.52	22.00	145.6	3660.51	993.35	0.088
8:03:47	30-AP	35.52	24.00	146.2	3660.64	993.48	0.081
8:05:47	30-AP	37.52	26.00	146.7	3660.82	993.66	0.076
8:07:47	30-AP	39.52	28.00	147.2	3661.13	993.97	0.071
8:09:47	30-AP	41.52	30.00	147.7	3660.98	993.82	0.066
8:14:47	30-AP	46.52	35.00	148.7	3660.44	993.28	0.057
8:19:47	30-AP	51.52	40.00	149.4	3659.79	992.63	0.051
8:24:47	30-AP	56.52	45.00	149.9	3659.72	992.56	0.045
8:29:47	30-AP	61.52	50.00	151.7	3662.67	995.51	0.041
8:34:47	30-AP	66.52	55.00	153.0	3660.59	993.43	0.037
8:39:47	30-AP	71.52	60.00	153.4	3659.58	992.42	0.034
8:44:47	30-AP	76.52	65.00	153.8	3660.30	993.14	0.032
8:49:47	30-AP	81.52	70.00	154.2	3661.20	994.04	0.030
8:54:47	30-AP	86.52	75.00	154.6	3661.33	994.17	0.028
8:59:47	30-AP	91.52	80.00	154.9	3661.18	994.02	0.026
9:02:35	30-AP	94.32	82.80	155.1	3657.44	990.28	0.025

TEST PHASE : FLOW PERIOD # 2

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE TEMP. DEG F	BOT HOLE PRESSURE PSIA
9:03:24	30-AP	95.14	0.00	155.0	2793.04
9:08:24	30-AP	100.14	5.00	149.3	3187.43
9:13:24	30-AP	105.14	10.00	158.4	3522.34
9:18:24	30-AP	110.14	15.00	164.8	3603.34
9:23:24	30-AP	115.14	20.00	167.5	3613.53
9:28:24	30-AP	120.14	25.00	168.7	3612.43
9:33:24	30-AP	125.14	30.00	169.3	3608.20
9:38:24	30-AP	130.14	35.00	169.6	3611.75
9:43:24	30-AP	135.14	40.00	169.9	3614.91
9:48:24	30-AP	140.14	45.00	170.1	3605.10
9:53:24	30-AP	145.14	50.00	170.1	3603.43
9:58:24	30-AP	150.14	55.00	170.2	3607.28
10:03:24	30-AP	155.14	60.00	170.4	3608.51
10:08:24	30-AP	160.14	65.00	170.5	3606.77
10:13:24	30-AP	165.14	70.00	170.6	3606.22
10:18:24	30-AP	170.14	75.00	170.7	3610.57
10:23:24	30-AP	175.14	80.00	170.8	3608.48
10:28:24	30-AP	180.14	85.00	170.8	3603.43
10:33:24	30-AP	185.14	90.00	170.8	3604.37
10:38:24	30-AP	190.14	95.00	170.9	3605.98
10:43:24	30-AP	195.14	100.00	170.9	3606.39
10:48:24	30-AP	200.14	105.00	171.0	3606.56
10:53:24	30-AP	205.14	110.00	171.0	3603.99
10:58:24	30-AP	210.14	115.00	171.1	3605.34
11:03:24	30-AP	215.14	120.00	171.1	3603.58
11:08:24	30-AP	220.14	125.00	171.2	3603.57
11:13:24	30-AP	225.14	130.00	171.2	3606.65
11:18:24	30-AP	230.14	135.00	171.3	3600.34
11:23:24	30-AP	235.14	140.00	171.3	3601.56
11:28:24	30-AP	240.14	145.00	171.4	3601.37
11:33:24	30-AP	245.14	150.00	171.4	3605.44
11:38:24	30-AP	250.14	155.00	171.5	3605.90
11:43:24	30-AP	255.14	160.00	171.5	3604.05
11:48:24	30-AP	260.14	165.00	171.5	3600.50
11:53:24	30-AP	265.14	170.00	171.5	3599.52
11:58:24	30-AP	270.14	175.00	171.5	3599.13
12:02:22	30-AP	274.10	178.96	171.5	3599.40

TEST PHASE : SHUTIN PERIOD # 2
FINAL FLOW PRESSURE [PSIA] = 3599.40
PRODUCING TIME [MIN] = 183.90

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE TEMP. DEG F	BOT HOLE PRESSURE PSIA	DELTA P PSI	LOG HORNER TIME
12:03:46	30-AP	275.50	0.00	171.5	3632.41	33.01	
12:04:46	30-AP	276.50	1.00	171.4	3633.21	33.81	2.267
12:05:46	30-AP	277.50	2.00	171.1	3633.88	34.48	1.968

TEST PHASE : SHUTIN PERIOD # 2
FINAL FLOW PRESSURE [PSIA] = 3599.40
PRODUCING TIME [MIN] = 183.90

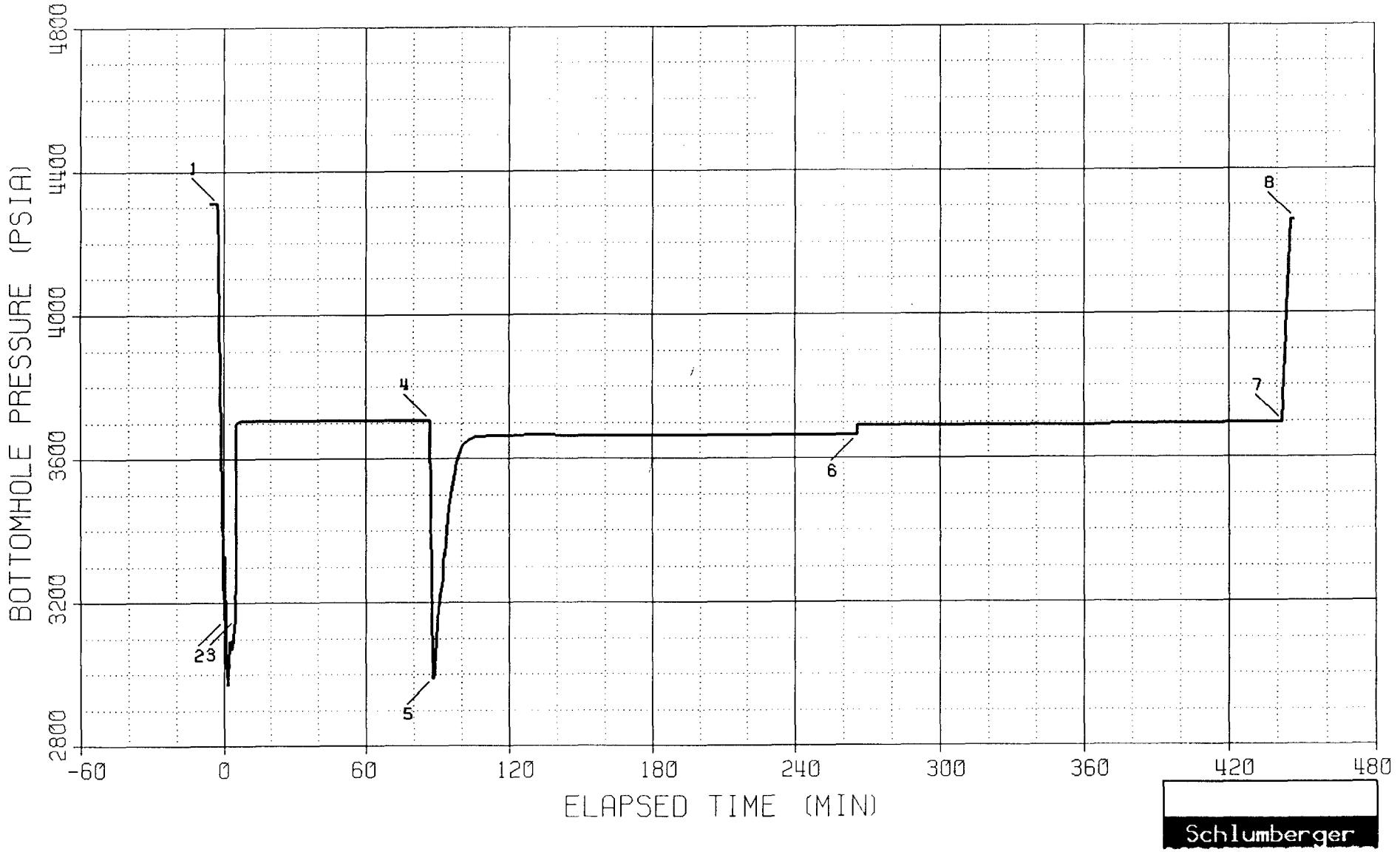
TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE TEMP. DEG F	BOT HOLE PRESSURE PSIA	DELTA P PSI	LOG HORNER TIME
12:06:46	30-AP	278.50	3.00	170.9	3634.61	35.21	1.794
12:07:46	30-AP	279.50	4.00	170.5	3636.13	36.73	1.672
12:08:46	30-AP	280.50	5.00	170.3	3637.14	37.74	1.577
12:09:46	30-AP	281.50	6.00	170.0	3637.49	38.09	1.500
12:10:46	30-AP	282.50	7.00	169.9	3637.88	38.48	1.436
12:11:46	30-AP	283.50	8.00	169.7	3638.39	38.99	1.380
12:12:46	30-AP	284.50	9.00	169.6	3638.84	39.44	1.331
12:13:46	30-AP	285.50	10.00	169.5	3638.96	39.56	1.288
12:15:46	30-AP	287.50	12.00	169.4	3639.24	39.84	1.213
12:17:46	30-AP	289.50	14.00	169.4	3639.38	39.98	1.150
12:19:46	30-AP	291.50	16.00	169.4	3639.52	40.12	1.097
12:21:46	30-AP	293.50	18.00	169.4	3639.39	39.99	1.050
12:23:46	30-AP	295.50	20.00	169.4	3639.46	40.06	1.008
12:25:46	30-AP	297.50	22.00	169.4	3639.52	40.12	0.971
12:27:46	30-AP	299.50	24.00	169.3	3639.50	40.10	0.938
12:29:46	30-AP	301.50	26.00	169.3	3639.46	40.06	0.907
12:31:46	30-AP	303.50	28.00	169.3	3639.42	40.02	0.879
12:33:46	30-AP	305.50	30.00	169.2	3639.44	40.04	0.853
12:38:46	30-AP	310.50	35.00	169.1	3639.51	40.11	0.796
12:43:46	30-AP	315.50	40.00	169.0	3640.42	41.02	0.748
12:48:46	30-AP	320.50	45.00	168.9	3640.72	41.32	0.706
12:53:46	30-AP	325.50	50.00	168.8	3640.90	41.50	0.670
12:58:46	30-AP	330.50	55.00	168.7	3641.13	41.73	0.638
13:03:46	30-AP	335.50	60.00	168.6	3641.23	41.83	0.609
13:08:46	30-AP	340.50	65.00	168.6	3641.46	42.06	0.583
13:13:46	30-AP	345.50	70.00	168.5	3641.56	42.16	0.560
13:18:46	30-AP	350.50	75.00	168.4	3641.59	42.19	0.538
13:23:46	30-AP	355.50	80.00	168.4	3641.66	42.26	0.518
13:28:46	30-AP	360.50	85.00	168.3	3641.72	42.32	0.500
13:33:46	30-AP	365.50	90.00	168.3	3641.83	42.43	0.483
13:38:46	30-AP	370.50	95.00	168.2	3641.93	42.53	0.468
13:43:46	30-AP	375.50	100.00	168.2	3642.17	42.77	0.453
13:48:46	30-AP	380.50	105.00	168.2	3642.18	42.78	0.440
13:53:46	30-AP	385.50	110.00	168.1	3642.18	42.78	0.427
13:58:46	30-AP	390.50	115.00	168.1	3642.18	42.78	0.415
14:03:46	30-AP	395.50	120.00	168.0	3642.16	42.76	0.404
14:06:57	30-AP	398.68	123.18	168.0	3642.14	42.74	0.397

BOTTOMHOLE PRESSURE LOG

FIELD REPORT NO. 115447
INSTRUMENT NO. J200-2104
DEPTH : 9296 FT
CAPACITY : 6400 PSI
PORT OPENING : OUTSIDE

COMPANY : MARATHON OIL COMPANY
WELL : NORTH INDIAN BASIN UNIT #8

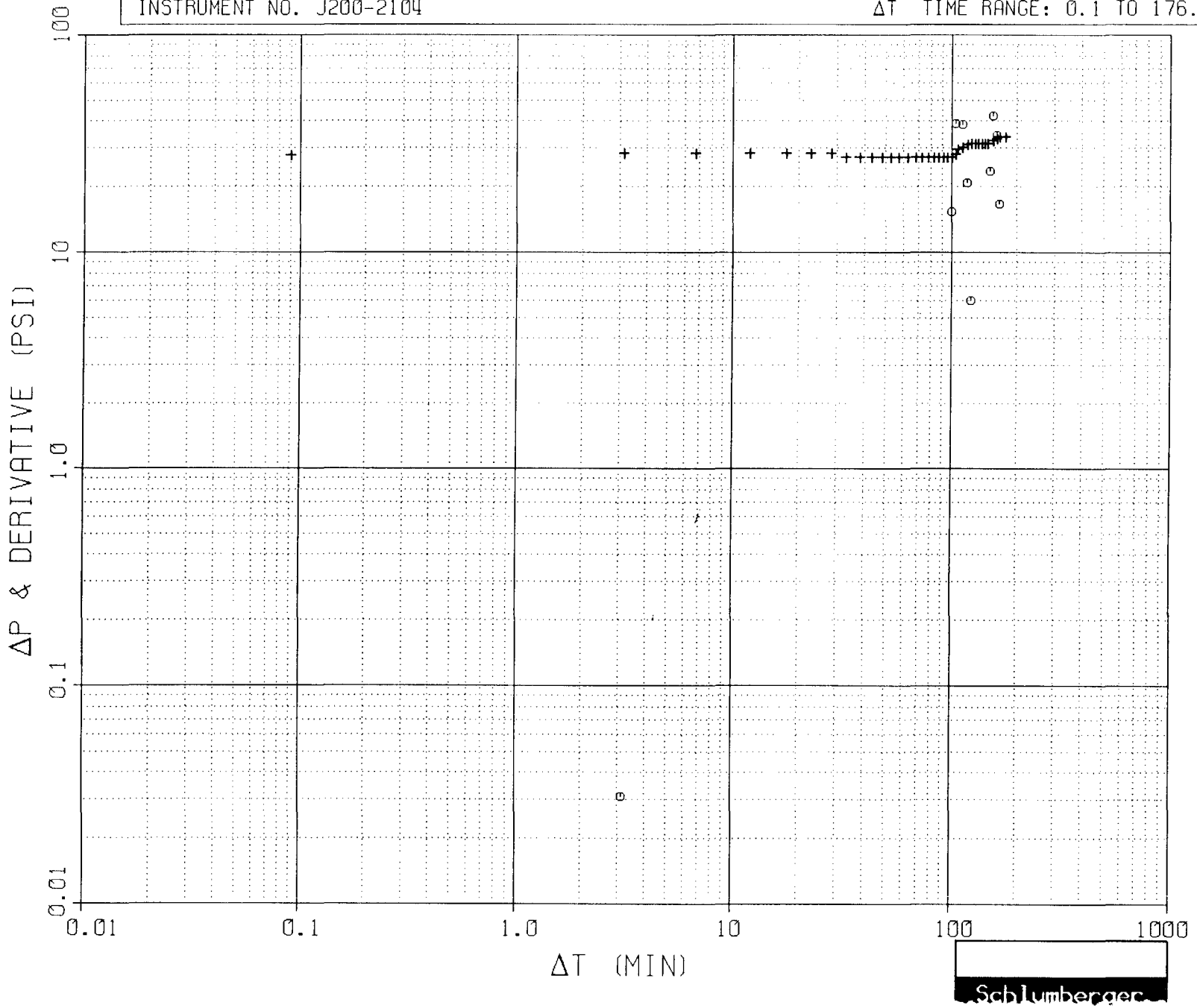
Mechanical Recorder Data

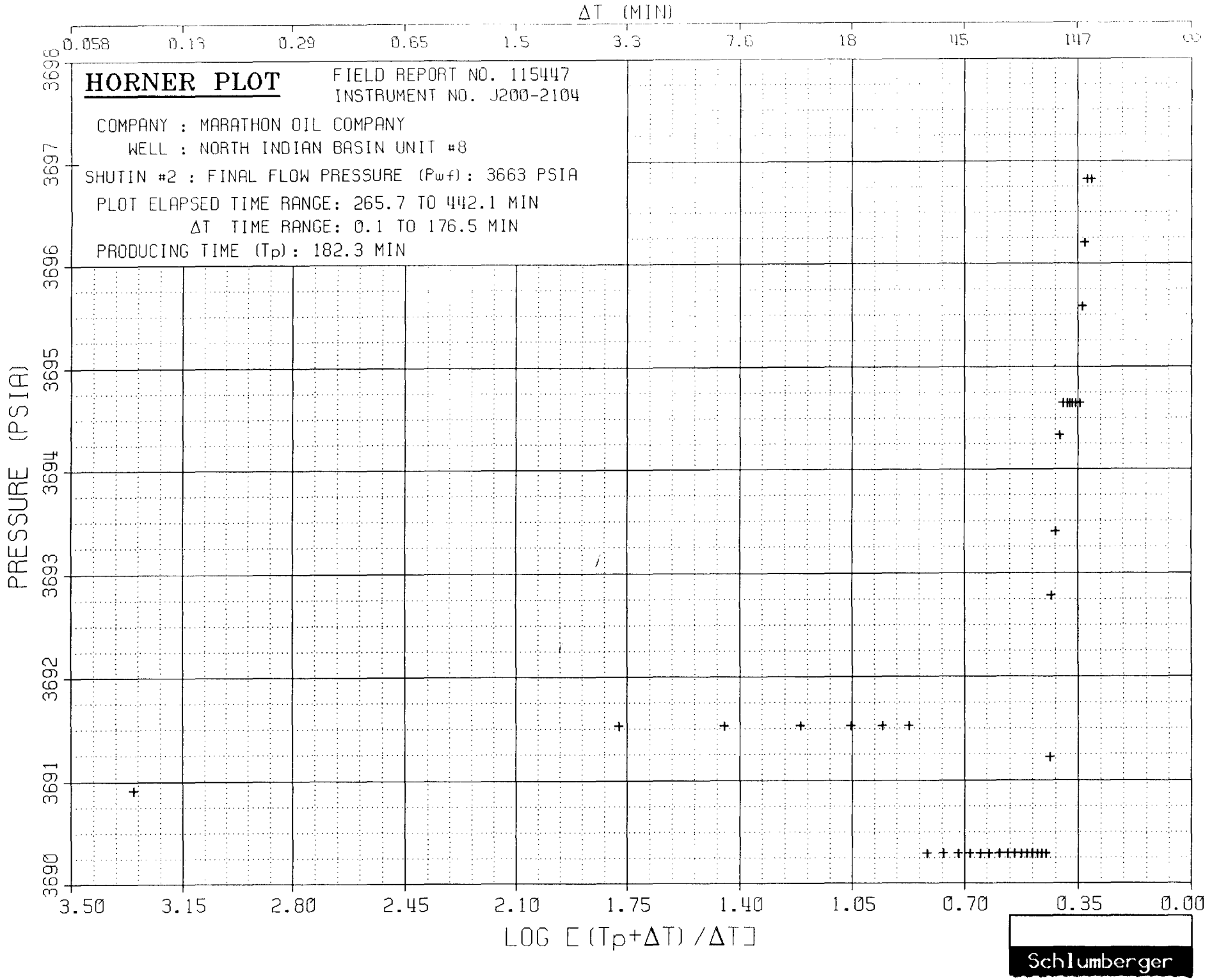


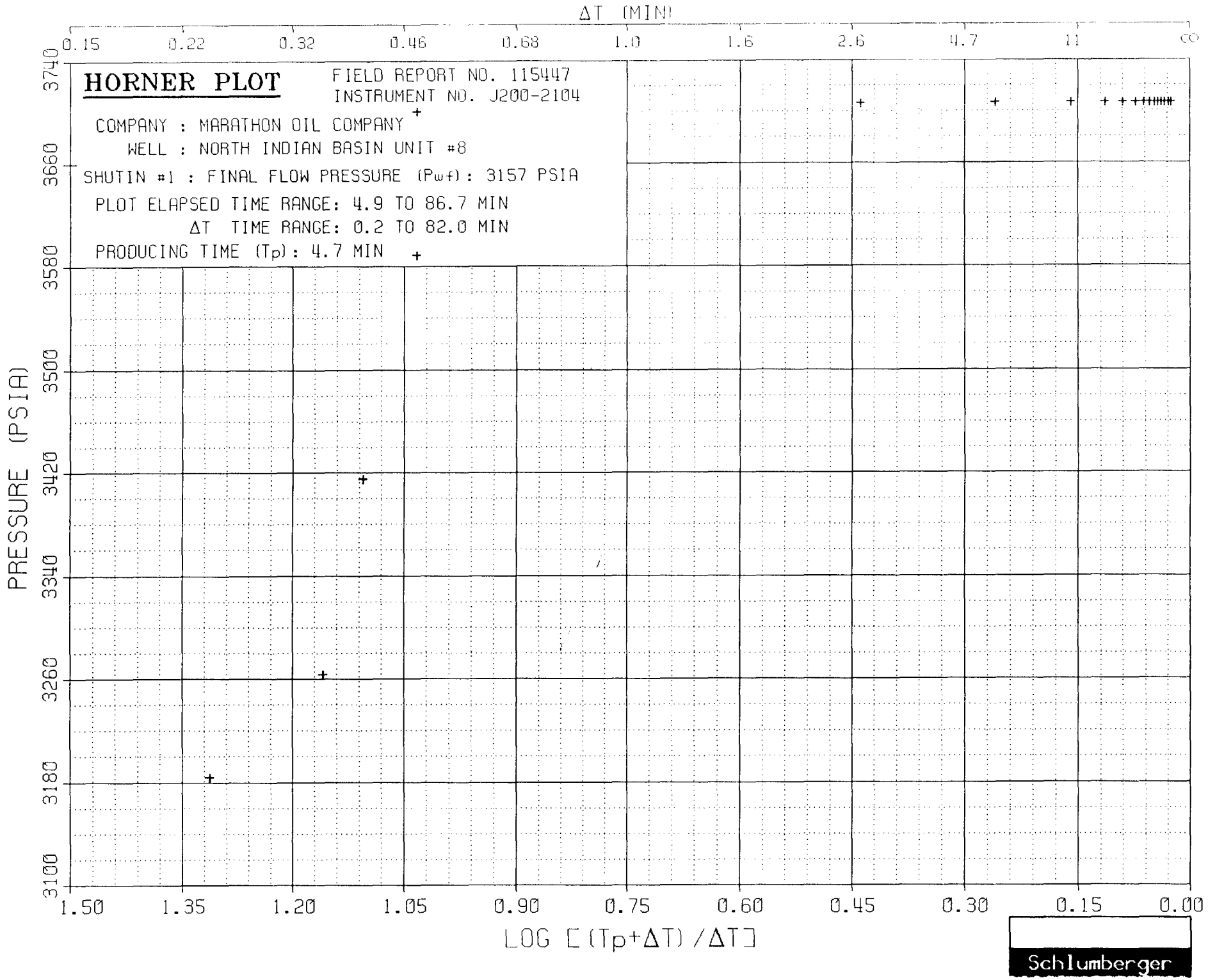
LOG LOG PLOT

COMPANY : MARATHON OIL COMPANY
WELL : NORTH INDIAN BASIN UNIT #8
FIELD REPORT NO. 115447
INSTRUMENT NO. J200-2104

SHUTIN #2 : PRODUCING TIME (Tp): 182.3 MIN
FINAL FLOW PRESSURE (Pwf): 3663 PSIA
PLOT ELAPSED TIME RANGE: 265.7 TO 442.1 MIN
ΔT TIME RANGE: 0.1 TO 176.5 MIN




ΔT (MIN)
0.058
0.13
0.29
0.65
1.5
3.3
7.6
18
45
147
∞
HORNER PLOT
FIELD REPORT NO. 115447
INSTRUMENT NO. J200-2104
COMPANY : MARATHON OIL COMPANY
WELL : NORTH INDIAN BASIN UNIT #8
SHUTIN #2 : FINAL FLOW PRESSURE (Pwf) : 3663 PSIA
PLOT ELAPSED TIME RANGE: 265.7 TO 442.1 MIN
ΔT TIME RANGE: 0.1 TO 176.5 MIN
PRODUCING TIME (Tp) : 182.3 MIN
PRESSURE (PSIA)
3698
3697
3696
3695
3694
3693
3692
3691
3690
3.50
3.15
2.80
2.45
2.10
1.75
1.40
1.05
0.70
0.35
0.00
LOG [(Tp+ΔT)/ΔT]
Schlumberger


ΔT (MIN)
0.15
0.22
0.32
0.46
0.68
1.0
1.6
2.6
4.7
11
∞
HORNER PLOT
FIELD REPORT NO. 115447
INSTRUMENT NO. J200-2104
COMPANY : MARATHON OIL COMPANY
WELL : NORTH INDIAN BASIN UNIT #8
SHUTIN #1 : FINAL FLOW PRESSURE (Pwf) : 3157 PSIA
PLOT ELAPSED TIME RANGE: 4.9 TO 86.7 MIN
ΔT TIME RANGE: 0.2 TO 82.0 MIN
PRODUCING TIME (Tp) : 4.7 MIN
PRESSURE (PSIA)
3740
3660
3580
3500
3420
3340
3260
3180
3100
1.50
1.35
1.20
1.05
0.90
0.75
0.60
0.45
0.30
0.15
0.00
LOG [(Tp+ΔT)/ΔT]
Schlumberger

****
* WELL TEST DATA PRINTOUT *
****

FIELD REPORT # : 115447

COMPANY : MARATHON OIL COMPANY
WELL : NORTH INDIAN BASIN UNIT #8

INSTRUMENT # : J200-2104
CAPACITY [PSI] : 6400.
DEPTH [FT] : 9296.0
PORT OPENING : OUTSIDE
TEMPERATURE [DEG F] : 170.0

LABEL POINT INFORMATION
****

#	TIME OF DAY HH:MM:SS	DATE DD-MM	EXPLANATION	ELAPSED TIME,MIN	BOT HOLE PRESSURE PSIA
1	8:35:17	30-AP	HYDROSTATIC MUD	-2.72	4312
2	8:38:00	30-AP	START FLOW	0.00	3155
3	8:42:42	30-AP	END FLOW & START SHUT-IN	4.70	3157
4	10:04:40	30-AP	END SHUT-IN	86.67	3707
5	10:05:59	30-AP	START FLOW	87.98	2990
6	13:03:36	30-AP	END FLOW & START SHUT-IN	265.60	3663
7	16:00:05	30-AP	END SHUT-IN	442.09	3697
8	16:05:17	30-AP	HYDROSTATIC MUD	447.29	4259

SUMMARY OF FLOW PERIODS
****

PERIOD	START ELAPSED TIME,MIN	END ELAPSED TIME,MIN	DURATION MIN	START PRESSURE PSIA	END PRESSURE PSIA
1	0.00	4.70	4.70	3155	3157
2	87.98	265.60	177.62	2990	3663

SUMMARY OF SHUTIN PERIODS
****

PERIOD	START ELAPSED TIME,MIN	END ELAPSED TIME,MIN	DURATION MIN	START PRESSURE PSIA	END PRESSURE PSIA	FINAL FLOW PRESSURE PSIA	PRODUCING TIME, MIN
1	4.70	86.67	81.97	3157	3707	3157	4.70
2	265.60	442.09	176.49	3663	3697	3663	182.32

TEST PHASE : FLOW PERIOD # 1

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE PRESSURE PSIA
8:38:00	30-AP	0.00	0.00	3155
8:42:42	30-AP	4.70	4.70	3157

TEST PHASE : SHUTIN PERIOD # 1
FINAL FLOW PRESSURE [PSIA] = 3157
PRODUCING TIME [MIN] = 4.70

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE PRESSURE PSIA	DELTA P PSI	LOG HORNER TIME
8:42:42	30-AP	4.70	0.00	3157	0	
8:43:42	30-AP	5.70	1.00	3701	544	0.756
8:44:42	30-AP	6.70	2.00	3704	547	0.525
8:45:42	30-AP	7.70	3.00	3706	549	0.409
8:46:42	30-AP	8.70	4.00	3706	549	0.337
8:47:42	30-AP	9.70	5.00	3706	549	0.288
8:48:42	30-AP	10.70	6.00	3706	549	0.251
8:49:42	30-AP	11.70	7.00	3706	549	0.223
8:50:42	30-AP	12.70	8.00	3706	549	0.201
8:51:42	30-AP	13.70	9.00	3706	549	0.182
8:52:42	30-AP	14.70	10.00	3706	549	0.167
8:54:42	30-AP	16.70	12.00	3706	549	0.144
8:56:42	30-AP	18.70	14.00	3706	549	0.126
8:58:42	30-AP	20.70	16.00	3706	549	0.112
9:00:42	30-AP	22.70	18.00	3706	549	0.101
9:02:42	30-AP	24.70	20.00	3706	549	0.092
9:04:42	30-AP	26.70	22.00	3706	549	0.084
9:06:42	30-AP	28.70	24.00	3706	549	0.078
9:08:42	30-AP	30.70	26.00	3706	549	0.072
9:10:42	30-AP	32.70	28.00	3706	549	0.067
9:12:42	30-AP	34.70	30.00	3706	549	0.063
9:17:42	30-AP	39.70	35.00	3706	549	0.055
9:22:42	30-AP	44.70	40.00	3706	549	0.048
9:27:42	30-AP	49.70	45.00	3706	549	0.043
9:32:42	30-AP	54.70	50.00	3706	549	0.039
9:37:42	30-AP	59.70	55.00	3707	549	0.036
9:42:42	30-AP	64.70	60.00	3707	549	0.033
9:47:42	30-AP	69.70	65.00	3707	549	0.030
9:52:42	30-AP	74.70	70.00	3707	549	0.028
9:57:42	30-AP	79.70	75.00	3707	549	0.026
10:02:42	30-AP	84.70	80.00	3707	549	0.025
10:04:40	30-AP	86.67	81.97	3707	549	0.024

TEST PHASE : FLOW PERIOD # 2

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE PRESSURE PSIA
10:05:59	30-AP	87.98	0.00	2990
10:10:59	30-AP	92.98	5.00	3333
10:15:59	30-AP	97.98	10.00	3588
10:20:59	30-AP	102.98	15.00	3652
10:25:59	30-AP	107.98	20.00	3662
10:30:59	30-AP	112.98	25.00	3664
10:35:59	30-AP	117.98	30.00	3665
10:40:59	30-AP	122.98	35.00	3665
10:45:59	30-AP	127.98	40.00	3666
10:50:59	30-AP	132.98	45.00	3666
10:55:59	30-AP	137.98	50.00	3666
11:00:59	30-AP	142.98	55.00	3664
11:05:59	30-AP	147.98	60.00	3664
11:10:59	30-AP	152.98	65.00	3664
11:15:59	30-AP	157.98	70.00	3664
11:20:59	30-AP	162.98	75.00	3664
11:25:59	30-AP	167.98	80.00	3664
11:30:59	30-AP	172.98	85.00	3664
11:35:59	30-AP	177.98	90.00	3664
11:40:59	30-AP	182.98	95.00	3664
11:45:59	30-AP	187.98	100.00	3664
11:50:59	30-AP	192.98	105.00	3664
11:55:59	30-AP	197.98	110.00	3663
12:00:59	30-AP	202.98	115.00	3663
12:05:59	30-AP	207.98	120.00	3663
12:10:59	30-AP	212.98	125.00	3663
12:15:59	30-AP	217.98	130.00	3663
12:20:59	30-AP	222.98	135.00	3663
12:25:59	30-AP	227.98	140.00	3663
12:30:59	30-AP	232.98	145.00	3663
12:35:59	30-AP	237.98	150.00	3663
12:40:59	30-AP	242.98	155.00	3663
12:45:59	30-AP	247.98	160.00	3663
12:50:59	30-AP	252.98	165.00	3663
12:55:59	30-AP	257.98	170.00	3663
13:00:59	30-AP	262.98	175.00	3663
13:03:36	30-AP	265.60	177.62	3663

TEST PHASE : SHUTIN PERIOD # 2
FINAL FLOW PRESSURE [PSIA] = 3663
PRODUCING TIME [MIN] = 182.32

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE PRESSURE PSIA	DELTA P PSI	LOG HORNER TIME
13:03:36	30-AP	265.60	0.00	3663	0	
13:04:36	30-AP	266.60	1.00	3691	28	2.263
13:05:36	30-AP	267.60	2.00	3691	28	1.965

TEST PHASE : SHUTIN PERIOD # 2
FINAL FLOW PRESSURE [PSIA] = 3663
PRODUCING TIME [MIN] = 182.32

TIME OF DAY HH:MM:SS	DATE DD-MM	ELAPSED TIME,MIN	DELTA TIME,MIN	BOT HOLE PRESSURE PSIA	DELTA P PSI	LOG HORNER TIME
13:06:36	30-AP	268.60	3.00	3692	28	1.791
13:07:36	30-AP	269.60	4.00	3692	28	1.668
13:08:36	30-AP	270.60	5.00	3692	28	1.574
13:09:36	30-AP	271.60	6.00	3692	28	1.497
13:10:36	30-AP	272.60	7.00	3692	28	1.432
13:11:36	30-AP	273.60	8.00	3692	28	1.376
13:12:36	30-AP	274.60	9.00	3692	28	1.328
13:13:36	30-AP	275.60	10.00	3692	28	1.284
13:15:36	30-AP	277.60	12.00	3692	28	1.209
13:17:36	30-AP	279.60	14.00	3692	28	1.147
13:19:36	30-AP	281.60	16.00	3692	28	1.093
13:21:36	30-AP	283.60	18.00	3692	28	1.046
13:23:36	30-AP	285.60	20.00	3692	28	1.005
13:25:36	30-AP	287.60	22.00	3692	28	0.968
13:27:36	30-AP	289.60	24.00	3692	28	0.934
13:29:36	30-AP	291.60	26.00	3692	28	0.904
13:31:36	30-AP	293.60	28.00	3692	28	0.876
13:33:36	30-AP	295.60	30.00	3691	28	0.850
13:38:36	30-AP	300.60	35.00	3690	27	0.793
13:43:36	30-AP	305.60	40.00	3690	27	0.745
13:48:36	30-AP	310.60	45.00	3690	27	0.703
13:53:36	30-AP	315.60	50.00	3690	27	0.667
13:58:36	30-AP	320.60	55.00	3690	27	0.635
14:03:36	30-AP	325.60	60.00	3690	27	0.606
14:08:36	30-AP	330.60	65.00	3690	27	0.580
14:13:36	30-AP	335.60	70.00	3690	27	0.557
14:18:36	30-AP	340.60	75.00	3690	27	0.535
14:23:36	30-AP	345.60	80.00	3690	27	0.516
14:28:36	30-AP	350.60	85.00	3690	27	0.498
14:33:36	30-AP	355.60	90.00	3690	27	0.481
14:38:36	30-AP	360.60	95.00	3690	27	0.465
14:43:36	30-AP	365.60	100.00	3690	27	0.451
14:48:36	30-AP	370.60	105.00	3692	29	0.437
14:53:36	30-AP	375.60	110.00	3693	30	0.424
14:58:36	30-AP	380.60	115.00	3694	31	0.413
15:03:36	30-AP	385.60	120.00	3694	31	0.401
15:08:36	30-AP	390.60	125.00	3695	31	0.391
15:13:36	30-AP	395.60	130.00	3695	31	0.381
15:18:36	30-AP	400.60	135.00	3695	31	0.371
15:23:36	30-AP	405.60	140.00	3695	31	0.362
15:28:36	30-AP	410.60	145.00	3695	31	0.354
15:33:36	30-AP	415.60	150.00	3695	31	0.345
15:38:36	30-AP	420.60	155.00	3695	32	0.338
15:43:36	30-AP	425.60	160.00	3696	33	0.330
15:48:36	30-AP	430.60	165.00	3697	33	0.323
15:53:36	30-AP	435.60	170.00	3697	34	0.316
15:58:36	30-AP	440.60	175.00	3697	34	0.310
16:00:05	30-AP	442.09	176.49	3697	34	0.308

SCHLUMBERGER has sent copies of this report to the following:

MARATHON OIL COMPANY
P.O. BOX 552
MIDLAND, TX 79702
Attn: GREG KENT
(8 copies)

INTRACOMPANY CORRESPONDENCE

To: C. T. Kent
Office: Midland
Subject: DST Analysis of North Indian Basin #8 (Morrow Sands)

From: Wei-Chun Chu
Office: E&PT
Date: May 2, 1990

Open-hole DST conducted on North Indian Basin #8 (Morrow Sands) was examined. Figures 1 and 2 are pressure history graphs of the entire test recorded by electronic and mechanical gauges, respectively.

Figures 3 and 4 are log-log and Horner graphs of the second buildup following three hours of flow at 4.5 MMscf/D. A straight line slope between 0.5 and 2 hours on a Horner graph yields an effective permeability to gas of 150 md, skin factor of +2, and extrapolated pressure of 3,645 psia at the gauge depth of 9,115 ft. Figure 5 shows a superposition graph including both shut-ins. The initial pressure from the initial shut-in was approximately 3,660 psia.

Knowing the reservoir and fluid properties, a graph (Figure 6) of time to reach pseudo-steady state (PSS) versus reservoir area was generated for a well at the center of a circular reservoir. For example, the time to reach PSS is approximately 45 hours in a circular reservoir of 1,000 acres with permeability of 150 md. A preliminary test design is recommended as follows.

1. Clean-up.
2. Initial buildup.
3. Extended drawdown.
4. Final buildup.

The purposes of the initial shut-in will be to obtain an extrapolated reservoir pressure as a referenced pressure before the limits test and to evaluate completion efficiency. If necessary, re-perforating will be required to minimize turbulence due to insufficient perforations. Positive chokes are required to keep the well producing at a constant flow rate. Test durations should be determined by examining the real-time data from downhole electronic gauge with surface readout. If absolute open flow potential (AOFP) is needed, we recommend a flow-after-flow test after the final buildup.

WCC:dk
cc: R. W. McAtee
Central Files (32 52 003)

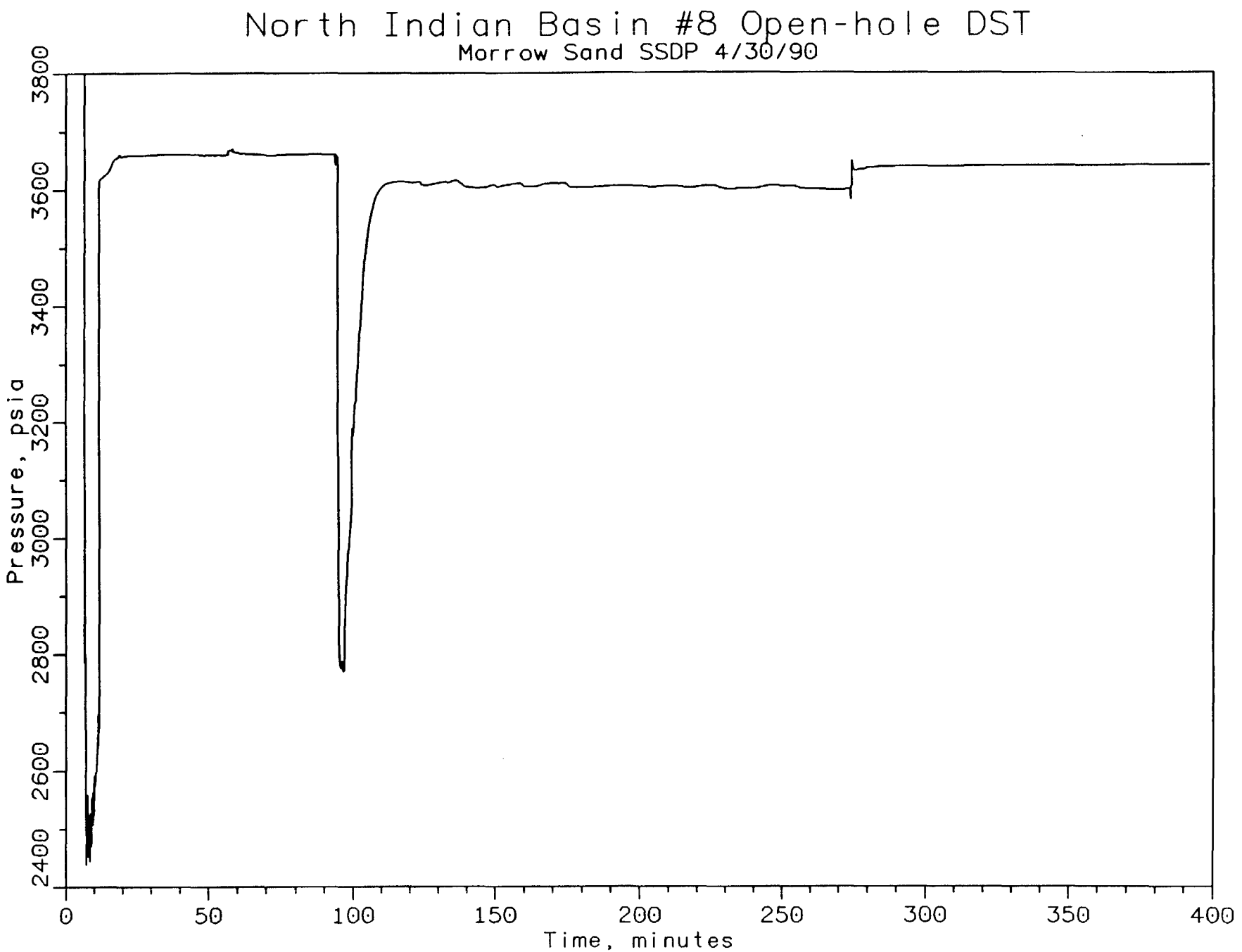

North Indian Basin #8 Open-hole DST
Morrow Sand SSDP 4/30/90
Pressure, psia
2400
2600
2800
3000
3200
3400
3600
3800
0
50
100
150
200
250
300
350
400
Time, minutes

Figure 1

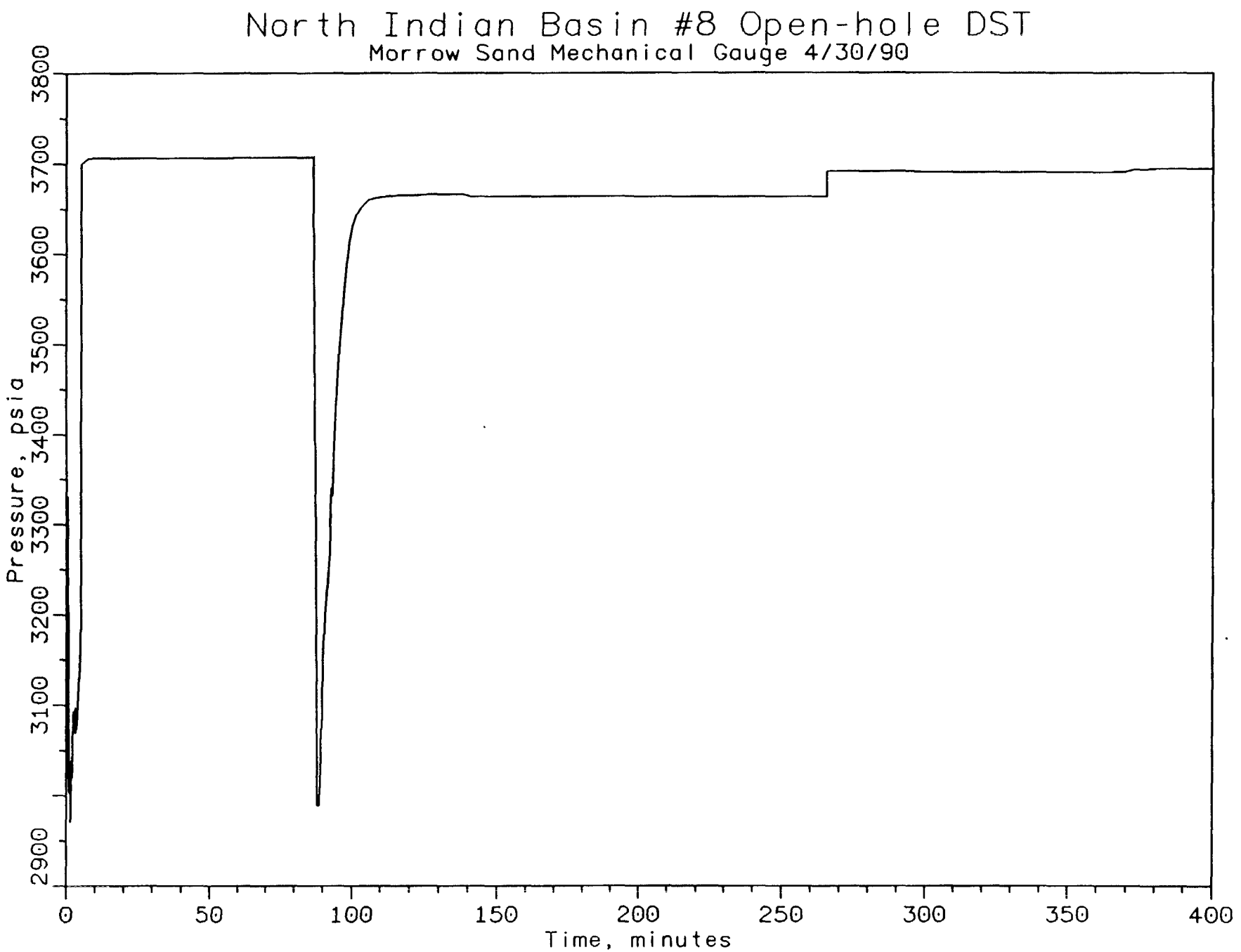

North Indian Basin #8 Open-hole DST
Morrow Sand Mechanical Gauge 4/30/90
Pressure, psia
2900
3100
3200
3300
3400
3500
3600
3700
3800
0
50
100
150
200
250
300
350
400
Time, minutes

Figure 2

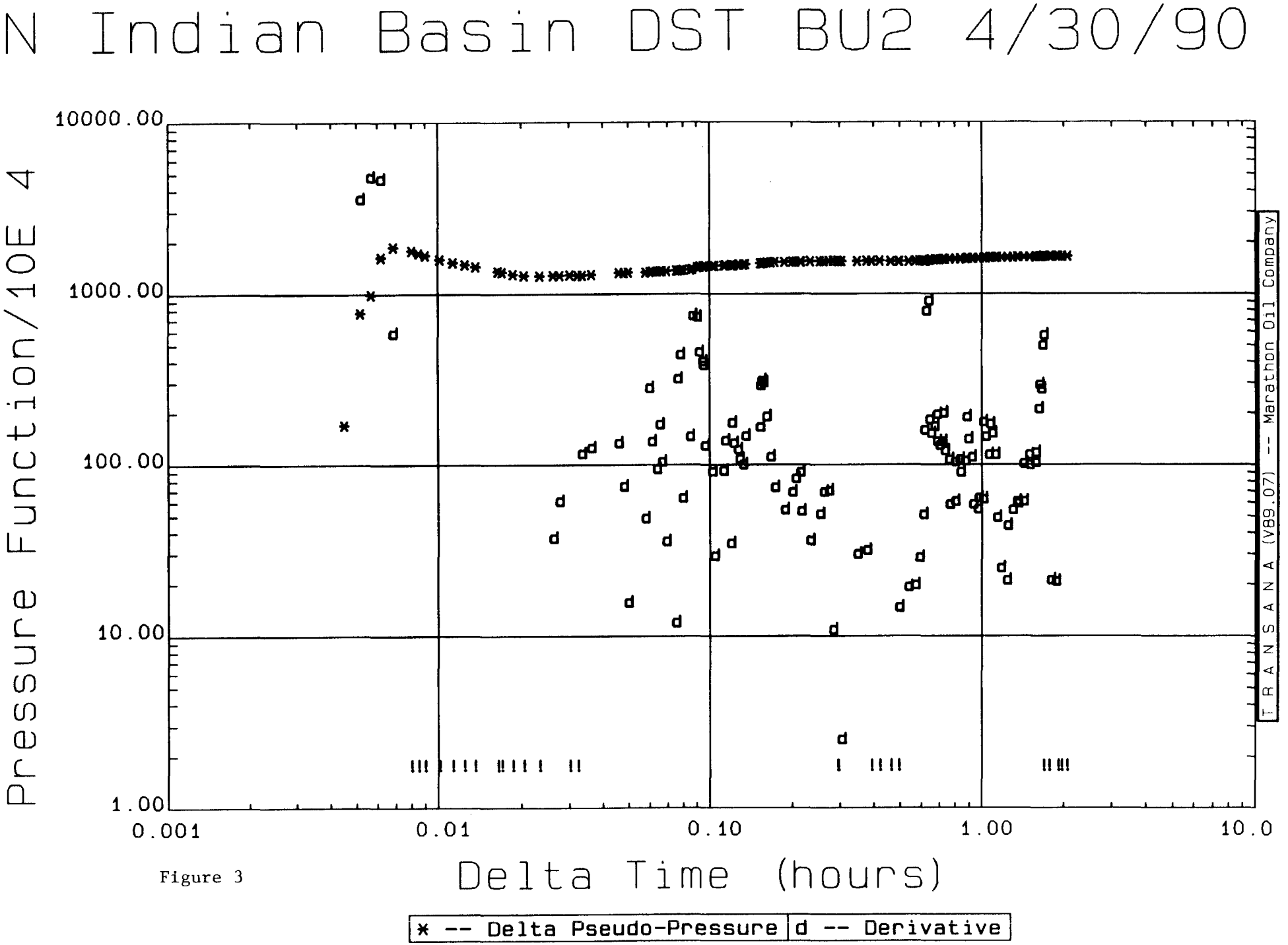

N Indian Basin DST BU2 4/30/90
Pressure Function/10E 4
10000.00
1000.00
100.00
10.00
1.00
0.001
0.01
0.10
1.00
10.0
Delta Time (hours)
TRANSANA (V89.07) -- Marathon Oil Company
* -- Delta Pseudo-Pressure
d -- Derivative

Figure 3

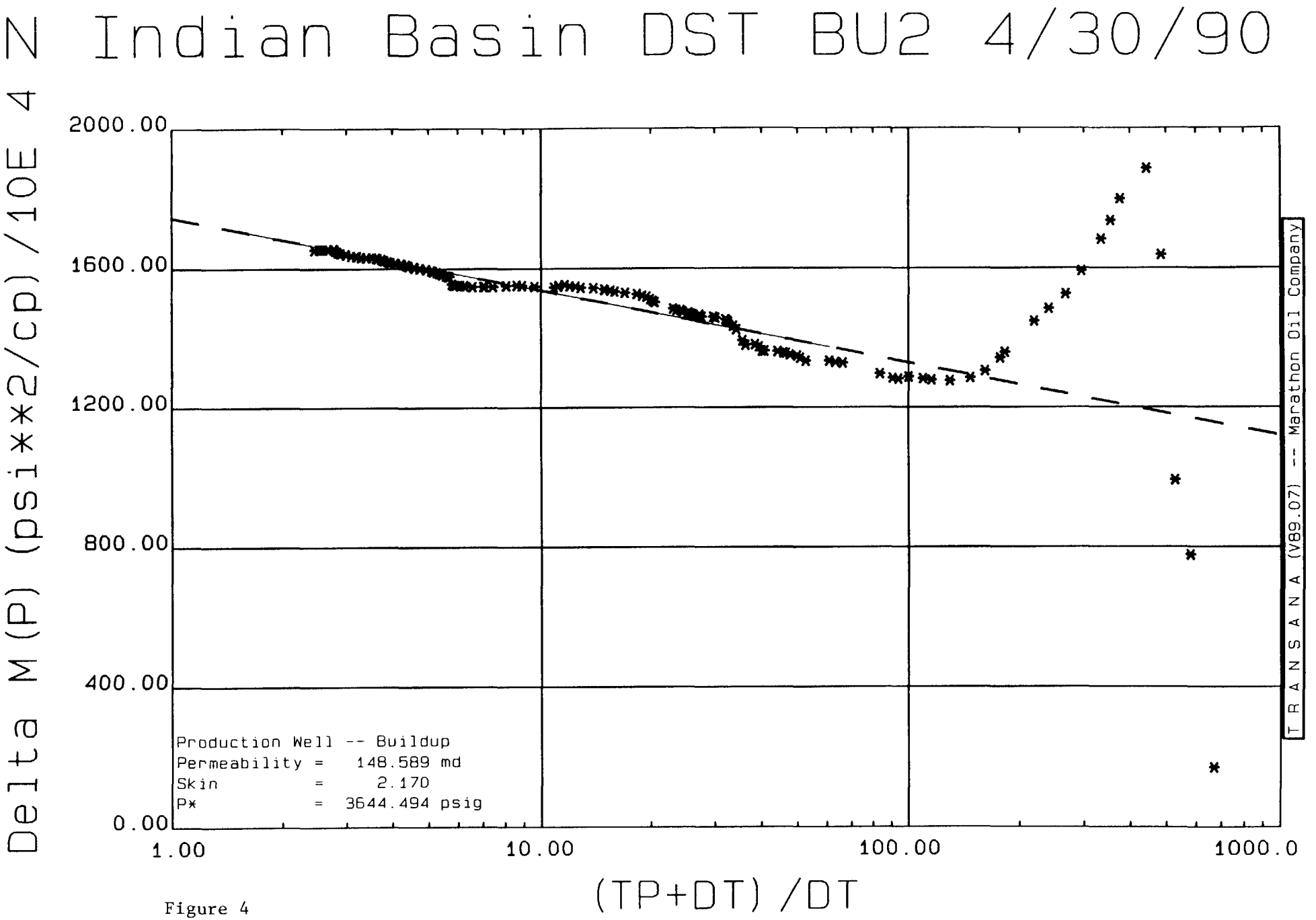

N Indian Basin DST BU2 4/30/90
Delta M(P) (psi**2/cp) /10E 4
2000.00
1600.00
1200.00
800.00
400.00
0.00
1.00
10.00
100.00
1000.0
(TP+DT) /DT
Production Well -- Buildup
Permeability = 148.589 md
Skin = 2.170
P* = 3644.494 psig
TRANSANA (V89.07) -- Marathon Oil Company

Figure 4

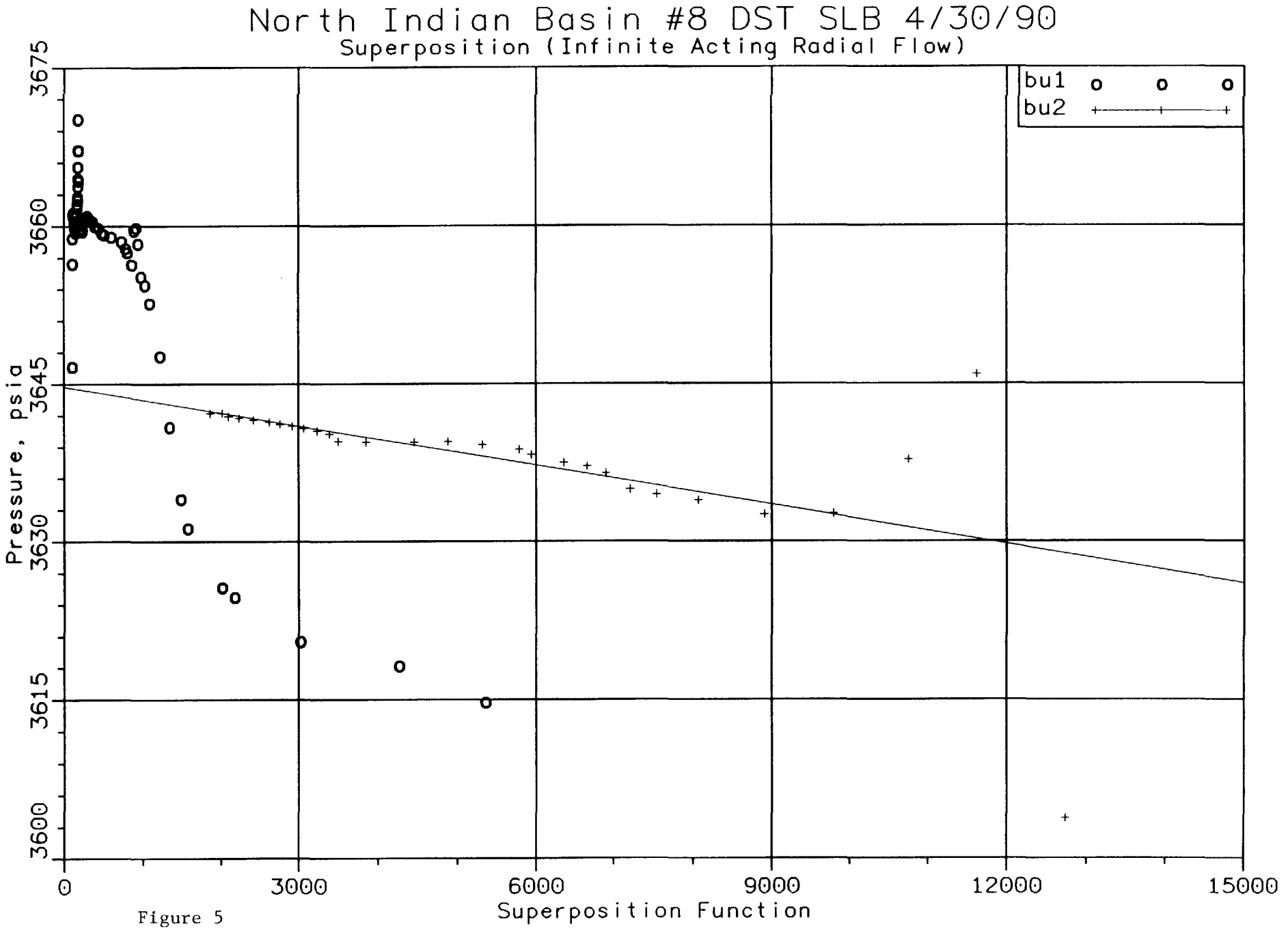

North Indian Basin #8 DST SLB 4/30/90
Superposition (Infinite Acting Radial Flow)
bu1
bu2
Pressure, psia
3675
3660
3645
3630
3615
3600
0
3000
6000
9000
12000
15000
Superposition Function

Figure 5

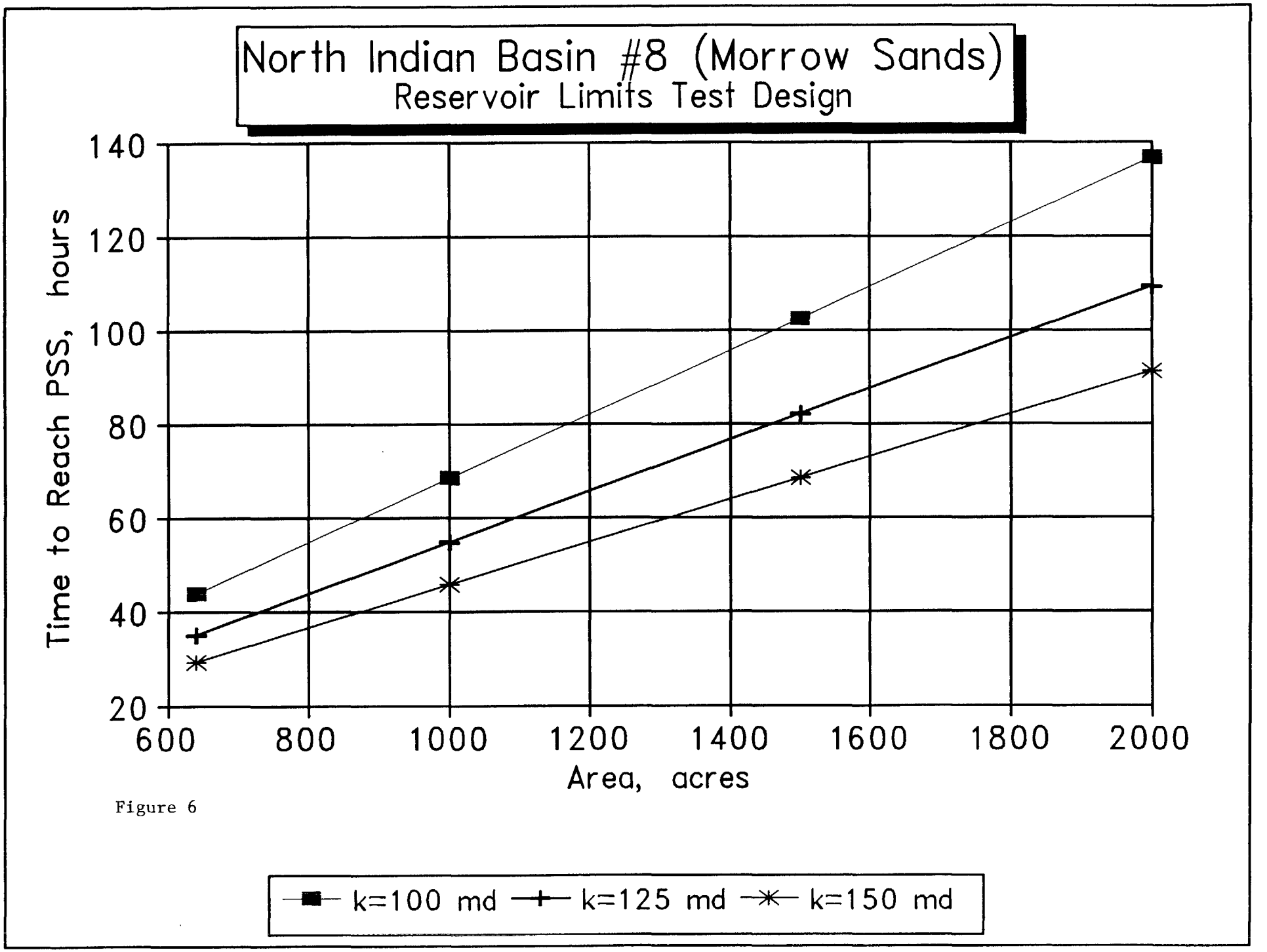

North Indian Basin #8 (Morrow Sands)
Reservoir Limits Test Design
Time to Reach PSS, hours
140
120
100
80
60
40
20
600
800
1000
1200
1400
1600
1800
2000
Area, acres
k=100 md
k=125 md
k=150 md

Figure 6