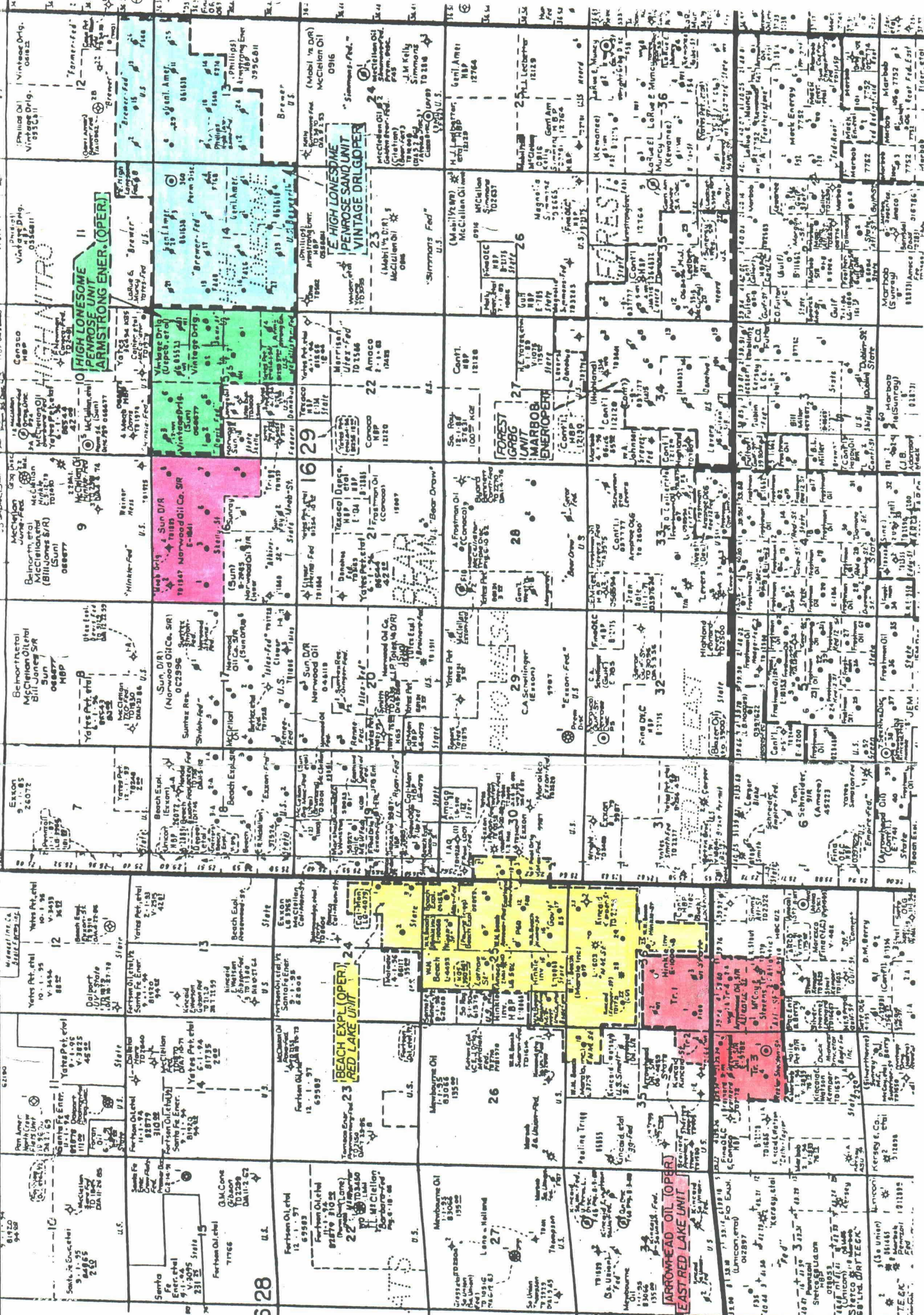




LEGEND



BEACH EXPLORATION: RED LAKE UNIT - CURRENT LIMITED PRESSURE = 900 psi

ARROWHEAD OIL: EAST RED LAKE UNIT - MAXIMUM PRESSURE USED = 1450 psi

NORWOOD OIL: SKELLY STATE LEASE - MAXIMUM PRESSURE USED = 1600 psi

ARMSTRONG ENERGY: HIGH LONESOME PENROSE UNIT - MAXIMUM PRESSURE = 1360 psi

VINTAGE DRLG: E. HIGH LONESOME PENROSE SD. UNIT - MAXIMUM PRESS. = 1800 psi

BEACH EXPLORATION, INC.
EDDY COUNTY, NEW MEXICO

PENROSE SAND WATERFLOODS:
RED LAKE UNIT AREA

SCALE: 1"= 4000' 4/92

BEFORE EXAMINER CATANACH

OIL CONSERVATION DIVISION

Beach EXHIBIT NO. 1

CASE NO. 10495

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

May, 1992

BEFORE EXAMINER CATANACH

OIL CONSERVATION DIVISION

Beach EXHIBIT NO. 4

CASE NO. 10495

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	1,715	18,655
WATER	4,009	39,455

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	1,285	23,447
RLU #5	900	966	20,130
RLU #7	900	3,094	55,742
RLU #9	850	3,784	51,498
RLU #10	750	4,675	58,118
RLU #12	750	4,938	79,454
RLU #14	900	1,699	57,172
RLU #16	400	5,772	83,429
RLU #19	900	3,057	53,553
RLU #21	900	1,774	34,474
RLU #22	900	-0-	10
RLU #24	900	2	3,127
RLU #25	900	1	6,260
TOTAL		31,044	496,414

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	5-02
RLU #3	3.0	1.0	5-04
RLU #4	3.0	1.0	5-07
RLU #6	12.0	65.0	5-10
RLU #8	10.0	2.0	5-20
RLU #11	10.0	23.0	5-13
RLU #13	9.0	70.0	5-24
RLU #15	7.0	-0-	5-17
RLU #17	3.0	6.0	5-27
RLU #18	1.0	-0-	5-31
RLU #20	1.0	-0-	5-29
RLU #23	1.0	-0-	5-30

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

April, 1992

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	1,808	17,142
WATER	5,190	35,446

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	1,464	22,162
RLU #5	900	978	19,164
RLU #7	900	3,250	52,648
RLU #9	850	3,801	47,714
RLU #10	750	4,165	53,443
RLU #12	750	5,081	74,516
RLU #14	900	1,754	25,473
RLU #16	400	6,096	77,657
RLU #19	900	3,128	50,496
RLU #21	900	1,860	32,700
RLU #22	900	-0-	10
RLU #24	900	2	3,127
RLU #25	900	1	6,260
TOTAL		31,577	465,370

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	4-21
RLU #3	3.0	1.0	4-23
RLU #4	3.0	2.0	4-19
RLU #6	15.0	67.0	4-16
RLU #8	9.0	6.0	4-24
RLU #11	10.0	25.0	4-10
RLU #13	8.0	70.0	4-27
RLU #15	5.0	-0-	4-13
RLU #17	4.0	2.0	4-29
RLU #18	1.0	-0-	4-07
RLU #20	1.0	-0-	4-04
RLU #23	1.0	-0-	4-02

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

March, 1992

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	1,745	15,334
WATER	8,145	30,256

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	1,563	20,698
RLU #5	900	1,042	18,186
RLU #7	900	3,552	49,398
RLU #9	850	3,976	43,913
RLU #10	750	4,416	49,278
RLU #12	750	5,965	69,435
RLU #14	900	1,760	23,719
RLU #16	400	6,790	71,561
RLU #19	900	3,339	47,368
RLU #21	900	2,004	30,840
RLU #22	900	-0-	10
RLU #24	900	2	3,127
RLU #25	900	1	6,260
TOTAL		34,409	433,793

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	3-14
RLU #3	3.0	1.0	3-17
RLU #4	3.0	2.0	3-21
RLU #6	15.0	66.0	3-24
RLU #8	9.0	6.0	3-10
RLU #11	10.0	25.0	3-07
RLU #13	8.0	69.0	3-03
RLU #15	1.0	-0-	3-01
RLU #17	3.0	-0-	3-27
RLU #18	1.0	-0-	3-29
RLU #20	1.0	-0-	3-30
RLU #23	1.0	-0-	3-31

BEACH EXPLORATION, INC.
RED LAKE UNIT
MONTHLY STATUS REPORT

February, 1992

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	1,602	13,589
WATER	8,050	22,111

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	1,643	19,135
RLU #5	900	1,109	17,144
RLU #7	900	3,539	45,846
RLU #9	850	3,597	39,937
RLU #10	750	4,234	44,862
RLU #12	750	5,873	63,470
RLU #14	900	1,733	21,959
RLU #16	400	6,439	64,771
RLU #19	900	3,426	44,029
RLU #21	900	1,946	28,836
RLU #22	900	-0-	10
RLU #24	900	24	3,125
RLU #25	900	1	6,260
TOTAL		33,540	399,384

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	2-21
RLU #3	8.0	4.0	2-19
RLU #4	6.0	2.0	2-16
RLU #6	15.0	63.0	2-26
RLU #8	10.0	4.0	2-23
RLU #11	8.0	21.0	2-05
RLU #13	6.0	57.0	2-14
RLU #15	1.0	-0-	2-12
RLU #17	2.0	-0-	2-01
RLU #18	2.0	-0-	2-10
RLU #20	1.0	-0-	2-03
RLU #23	2.0	-0-	2-08

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

January, 1992

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	1,530	11,987
WATER	5,502	14,061

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	2,171	17,492
RLU #5	900	1,508	16,035
RLU #7	900	4,415	42,307
RLU #9	850	4,089	36,340
RLU #10	700	4,277	40,628
RLU #12	700	6,824	57,597
RLU #14	900	2,060	20,226
RLU #16	500	7,131	58,332
RLU #19	900	4,575	40,603
RLU #21	900	2,438	26,890
RLU #22	900	-0-	10
RLU #24	900	24	3,125
RLU #25	900	16	6,259
TOTAL		39,504	365,844

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	1-27
RLU #3	7.0	2.0	1-11
RLU #4	5.0	3.0	1-13
RLU #6	11.0	54.0	1-06
RLU #8	2.0	1.0	1-17
RLU #11	8.0	7.0	1-09
RLU #13	17.0	27.0	1-19
RLU #15	1.0	-0-	1-23
RLU #17	2.0	-0-	1-25
RLU #18	2.0	-0-	1-29
RLU #20	1.0	-0-	1-02
RLU #23	2.0	-0-	1-04

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

December, 1991

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	1,700	10,457
WATER	2,480	8,559

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	2,472	15,321
RLU #5	900	1,835	14,527
RLU #7	900	4,747	37,892
RLU #9	850	4,266	32,251
RLU #10	700	4,873	36,351
RLU #12	550	6,578	50,773
RLU #14	900	2,629	18,166
RLU #16	400	6,479	51,201
RLU #19	900	5,080	36,028
RLU #21	900	2,827	24,452
RLU #22	900	-0-	10
RLU #24	900	24	3,125
RLU #25	900	336	6,243
TOTAL		42,146	326,340

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	12-16
RLU #3	7.0	2.0	12-26
RLU #4	6.0	3.0	12-20
RLU #6	26.0	41.0	12-22
RLU #8	2.0	1.0	12-04
RLU #11	8.0	7.0	12-10
RLU #13	17.0	27.0	12-02
RLU #15	1.0	-0-	12-14
RLU #17	2.0	-0-	12-01
RLU #18	2.0	-0-	12-12
RLU #20	1.0	-0-	12-29
RLU #23	2.0	-0-	12-07

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

November, 1991

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	1,779	8,757
WATER	2,280	6,079

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	2,533	12,849
RLU #5	900	2,135	12,692
RLU #7	900	5,252	33,145
RLU #9	850	4,485	27,985
RLU #10	700	5,018	31,478
RLU #12	550	7,068	44,195
RLU #14	900	3,305	15,537
RLU #16	400	7,249	44,722
RLU #19	900	5,543	30,948
RLU #21	900	3,424	21,625
RLU #22	900	-0-	10
RLU #24	900	-0-	3,101
RLU #25	900	749	5,907
TOTAL		46,761	284,194

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	11-20
RLU #3	8.0	1.0	11-30
RLU #4	6.0	2.0	11-23
RLU #6	21.0	40.0	11-26
RLU #8	2.0	1.0	11-08
RLU #11	8.0	6.0	11-23
RLU #13	17.0	27.0	11-06
RLU #15	1.0	-0-	11-18
RLU #17	2.0	-0-	11-03
RLU #18	2.0	-0-	11-15
RLU #20	2.0	-0-	11-01
RLU #23	2.0	-0-	11-11

RED LAKE UNIT
MONTHLY STATUS REPORT

October, 1991

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	2,020	6,978
WATER	1,829	3,799

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	3,364	10,316
RLU #5	900	3,120	10,557
RLU #7	900	6,522	27,893
RLU #9	850	5,145	23,500
RLU #10	700	5,533	26,460
RLU #12	550	8,197	37,127
RLU #14	900	3,802	12,232
RLU #16	400	8,078	37,473
RLU #19	900	6,695	25,405
RLU #21	900	4,479	18,201
RLU #22	900	-0-	10
RLU #24	900	-0-	3,101
RLU #25	900	1,417	5,158
TOTAL		56,352	237,433

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	10-14
RLU #3	8.0	1.0	10-11
RLU #4	6.0	-0-	10-19
RLU #6	17.0	28.0	10-08
RLU #8	2.0	1.0	10-31
RLU #11	9.0	4.0	10-22
RLU #13	16.0	26.0	10-29
RLU #15	1.0	-0-	10-02
RLU #17	1.0	-0-	10-06
RLU #18	2.0	-0-	10-17
RLU #20	1.0	-0-	10-27
RLU #23	2.0	-0-	10-25

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

September, 1991

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	1,743	4,958
WATER	990	1,970

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	900	3,852	6,952
RLU #5	900	3,376	7,437
RLU #7	900	7,042	21,371
RLU #9	850	5,642	18,355
RLU #10	700	6,827	20,927
RLU #12	550	7,757	28,930
RLU #14	900	3,954	8,430
RLU #16	400	7,745	29,395
RLU #19	900	6,910	18,710
RLU #21	900	4,834	13,722
RLU #22	900	4	10
RLU #24	900	665	3,101
RLU #25	900	1,674	3,741
TOTAL		60,292	181,081

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	-0-	09-18
RLU #3	10.0	1.0	09-16
RLU #4	5.0	-0-	09-20
RLU #6	17.0	26.0	09-26
RLU #8	2.0	1.0	09-11
RLU #11	6.0	4.0	09-28
RLU #13	3.0	1.5	09-07
RLU #15	1.0	-0-	09-03
RLU #17	1.0	-0-	09-01
RLU #18	2.0	-0-	09-13
RLU #20	1.0	-0-	09-09
RLU #23	2.0	-0-	09-23

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

July and August, 1991

<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>		<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
	July	August	
OIL	293	2132	2425
WATER	204	372	576

UNIT INJECTION (Bbls)

	July	August	
Produced Water	372	608	980
Make-Up Water	38,298	42,128	80,426
Total	38,670	42,736	81,406

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>		<u>BWPM</u>		<u>CUMULATIVE</u>
	July	August	July	August	
RLU #2	350	350	152	2,948	3,100
RLU #5	350	350	1,303	1,004	4,061
RLU #7	350	350	5,094	4,656	14,329
RLU #9	350	350	4,363	3,707	12,703
RLU #10	350	305	5,084	4,535	14,100
RLU #12	250	250	6,779	9,102	21,173
RLU #14	350	350	1,212	1,317	14,476
RLU #16	225	225	6,772	9,763	21,650
RLU #19	350	350	4,243	3,330	11,800
RLU #21	350	350	2,940	2,312	8,888
RLU #22	350	350	0	1	6
RLU #24	350	350	23	56	2,436
RLU #25	350	350	29	5	2,067
TOTAL			37,994	42,736	120,789

<u>MONTHLY WELL TESTS</u>	<u>BOPD</u>	<u>BWPD</u>	<u>DATE OF TEST</u>
RLU #1	2.0	0.2	08-17
RLU #3	9.0	0.5	08-19
RLU #4	5.0	0	08-25
RLU #6	15.0	3.0	08-21
RLU #8	2.0	1.0	08-06
RLU #11	6.0	1.0	08-02
RLU #13	1.0	0.5	08-29
RLU #15	2.0	0	08-27
RLU #17	2.0	0	08-08
RLU #18	2.0	0	08-28
RLU #20	1.0	0.5	08-12
RLU #23	2.0	0	08-23

BEACH EXPLORATION, INC.

RED LAKE UNIT

MONTHLY STATUS REPORT

June, 1991

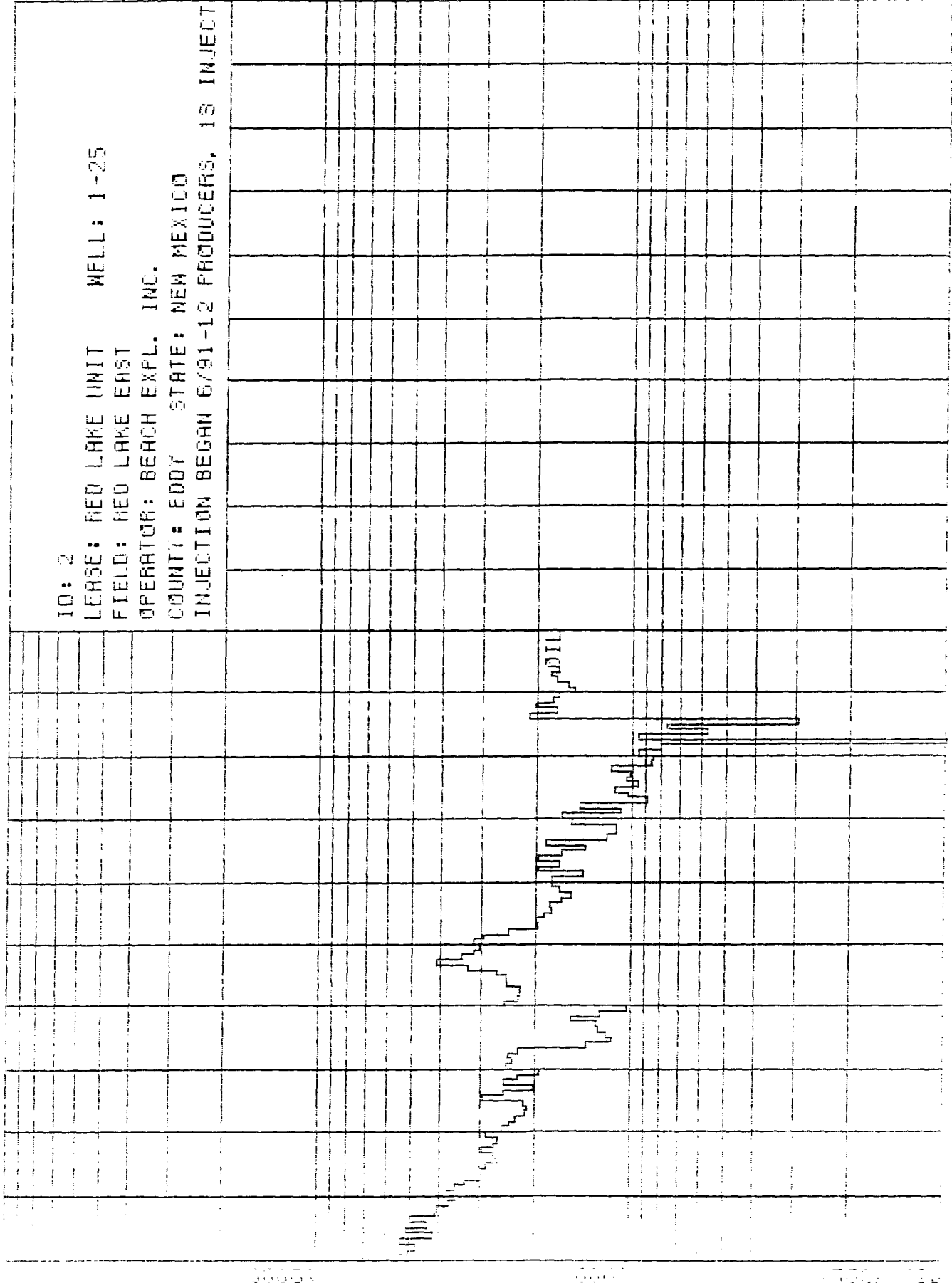
<u>UNIT PRODUCTION (Bbls)</u>	<u>MONTHLY</u>	<u>CUMULATIVE (SINCE UNITIZATION 4-1-91)</u>
OIL	790	790
WATER	-0-	-0-

<u>UNIT INJECTION (Bbls)</u>		
Produced Water	-0-	-0-
Make-Up Water	<u>42,231</u>	<u>42,231</u>
Total	42,231	42,231

INJECTION BEGAN 6-07-91

<u>INJECTION BY WELL</u>	<u>PRESSURE</u>	<u>BWPM</u>	<u>CUMULATIVE</u>
RLU #2	-0-	-0-	-0-
RLU #5	350	1,754	1,754
RLU #7	200	4,579	4,579
RLU #9	150	4,633	4,633
RLU #10	250	4,481	4,481
RLU #12	-0-	5,292	5,292
RLU #14	350	1,947	1,947
RLU #16	-0-	5,115	5,115
RLU #19	325	4,226	4,226
RLU #21	300	3,636	3,636
RLU #22	350	5	5
RLU #24	325	2,357	2,357
RLU #25	350	<u>2,032</u>	<u>2,032</u>
TOTAL		40,059	40,059
Water used to fill tanks, flowlines		<u>2,262</u>	<u>2,262</u>
GRAND TOTAL		42,321	42,321

ID: 2
 LEASE: RED LAKE UNIT WELL: 1-25
 FIELD: RED LAKE EAST
 OPERATOR: BEACH EXPL. INC.
 COUNTY: EDDY STATE: NEW MEXICO
 INJECTION BEGAN 6/91-12 PRODUCERS, IS INJECT



1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002
 DATE: 06/10/92
 TIME: 16:04

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED
BY THE OIL CONSERVATION DIVISION
FOR THE PURPOSE OF CONSIDERING:

CASE NO. 10495

APPLICATION FOR BEACH EXPLORATION INC.
FOR AMENDMENT OF DIVISION ORDER NO.
R-9453 TO INCREASE THE INJECTION
PRESSURE LIMITATION IN ITS RED LAKE
UNIT PENROSE WATERFLOOD PROJECT,
EDDY COUNTY, NEW MEXICO

CERTIFICATE OF MAILING

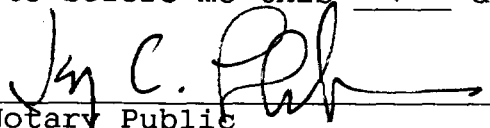
AND

COMPLIANCE WITH ORDER R-8054

W. THOMAS KELLAHIN, attorney in fact and authorized representative of BEACH EXPLORATION INC., states that the notice provisions of Division Rule 1207 (Order R-8054) have been complied with, that Applicant has caused to be conducted a good faith diligent effort to find the correct addresses of all interested parties entitled to receive notice, that on JUNE 2, 1992, I caused to be mailed by certified mail return-receipt requested notice of this hearing and a copy of the application for the above referenced case along with the cover letter, at least twenty days prior to the hearing set for JUNE 25, 1992 to the parties shown in the application as evidenced by the attached copies of return receipt cards, and that pursuant to Division Rule 1207, notice has been given at the correct addresses provided by such rule.


W. Thomas Kellahin

SUBSCRIBED AND SWORN to before me this 24TH day of
JUNE, 1992.


Notary Public

My Commission Expires:

10/7/95

CERT624.642

BEFORE EXAMINER CATANACH

OIL CONSERVATION DIVISION

Beach EXHIBIT NO. 14

CASE NO. 10495

SENDER: Complete Items 1 and 2 when additional services are desired, and complete Items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. (Extra charge) 2. ☐ Restricted Delivery (Extra charge)

3. Article Addressed to: Arrowhead Oil 11352 Lovington Hwy Artesia, NM 88210	4. Article Number P 676-666-323 Type of Service: ☒ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail ☐ Return Receipt for Merchandise Always obtain signature of addressee or agent and <u>DATE DELIVERED</u> .
5. Signature - Address X	8. Addressee's Address (ONLY if requested and fee paid)
6. Signature - Agent X <i>Crisa Carter</i>	
7. Date of Delivery <i>6-4-92</i>	

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT
BEACH-RED LAKE-WTK

SENDER: Complete Items 1 and 2 when additional services are desired, and complete Items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. (Extra charge) 2. ☐ Restricted Delivery (Extra charge)

3. Article Addressed to: Blanco Engineering 116 N. First Street Artesia, NM 88210	4. Article Number P 676-666-324 Type of Service: ☒ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail ☐ Return Receipt for Merchandise Always obtain signature of addressee or agent and <u>DATE DELIVERED</u> .
5. Signature - Address X <i>W. H. Hagan</i>	8. Addressee's Address (ONLY if requested and fee paid)
6. Signature - Agent X	
7. Date of Delivery <i>6-4-92</i>	

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT
BEACH-RED LAKE-WTK

SENDER: Complete Items 1 and 2 when additional services are desired, and complete Items 3 and 4.
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1. ☐ Show to whom delivered, date, and addressee's address. (Extra charge) 2. ☐ Restricted Delivery (Extra charge)

3. Article Addressed to: Bogle Farms, Inc. P.O. Box 358 460 Dexter, NM 88230	4. Article Number P 676-666-325 Type of Service: ☒ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail ☐ Return Receipt for Merchandise Always obtain signature of addressee or agent and <u>DATE DELIVERED</u> .
5. Signature - Address X <i>[Signature]</i>	8. Addressee's Address (ONLY if requested and fee paid)
6. Signature - Agent X	
7. Date of Delivery <i>6/5/92</i>	

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT
BEACH-WTK-RED LAKE

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt Fee will provide you the signature of the person delivered to and the date of delivery.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address

2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Mewbourne Oil Co.
P.O. Box 7698
Tyler, TX 75711

4a. Article Number

P 676-666-329

4b. Service Type

☐ Registered ☐ Insured

☒ Certified ☐ COD

☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery

JUN - 4 1992

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

Maurice Johnson

PS Form 3811, November 1990 ☆ U.S. GPO: 1991-287-066

DOMESTIC RETURN RECEIPT

Beach - Red Lake - WTK

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt Fee will provide you the signature of the person delivered to and the date of delivery.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address

2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Snow Oil & Gas
P.O. Box 1277
Andrews, TX 79714

4a. Article Number

P438 - 025 - 472

4b. Service Type

☐ Registered ☐ Insured

☒ Certified ☐ COD

☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery

6/5/92

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

Cinda Chapman

PS Form 3811, November 1990 ☆ U.S. GPO: 1991-287-066

DOMESTIC RETURN RECEIPT

Beach - Red Lake - WTK

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt Fee will provide you the signature of the person delivered to and the date of delivery.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address

2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Santa Fe Energy Co.
1616 Voss Road
Houston, TX 77057

4a. Article Number

P438 - 025 - 471

4b. Service Type

☐ Registered ☐ Insured

☒ Certified ☐ COD

☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

[Signature]

PS Form 3811, November 1990 ☆ U.S. GPO: 1991-287-066

DOMESTIC RETURN RECEIPT

Beach - Red Lake - WTK

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt Fee will provide you the signature of the person delivered to and the date of delivery.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Amando Lopez
Bureau of Land Mgmt
P.O. Box 1397
Roswell, NM 88201

4a. Article Number

P676-666-328

4b. Service Type

- ☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery

5. Signature (Addressee)

6. Signature (Agent)

Addressee's Address (Only if requested and fee is paid)

PS Form 3811, November 1990 ☆ U.S. GPO: 1991-287-066

DOMESTIC RETURN RECEIPT

Beach - Red Lake - WTK

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1. ☐ Show to whom delivered, date, and addressee's address. (Extra charge)
2. ☐ Restricted Delivery (Extra charge)

3. Article Addressed to:

Exxon Corporation
P.O. Box 1547
Houston, TX 77251

4. Article Number

P 676-666-327

Type of Service:

- ☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature - Address

X

6. Signature - Agent

X

7. Date of Delivery

JUN 08 1992

8. Addressee's Address (ONLY if requested and fee paid)

PS Form 3811, Mar. 1988

☆ U.S.G.P.O. 1988-212-865

DOMESTIC RETURN RECEIPT

Beach - Red Lake - WTK

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt Fee will provide you the signature of the person delivered to and the date of delivery.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Floyd Prando
Comm. of Public Lands
P.O. Box 1148
Santa Fe, NM 87504

4a. Article Number

P355-567-706

4b. Service Type

- ☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery

5. Signature (Addressee)

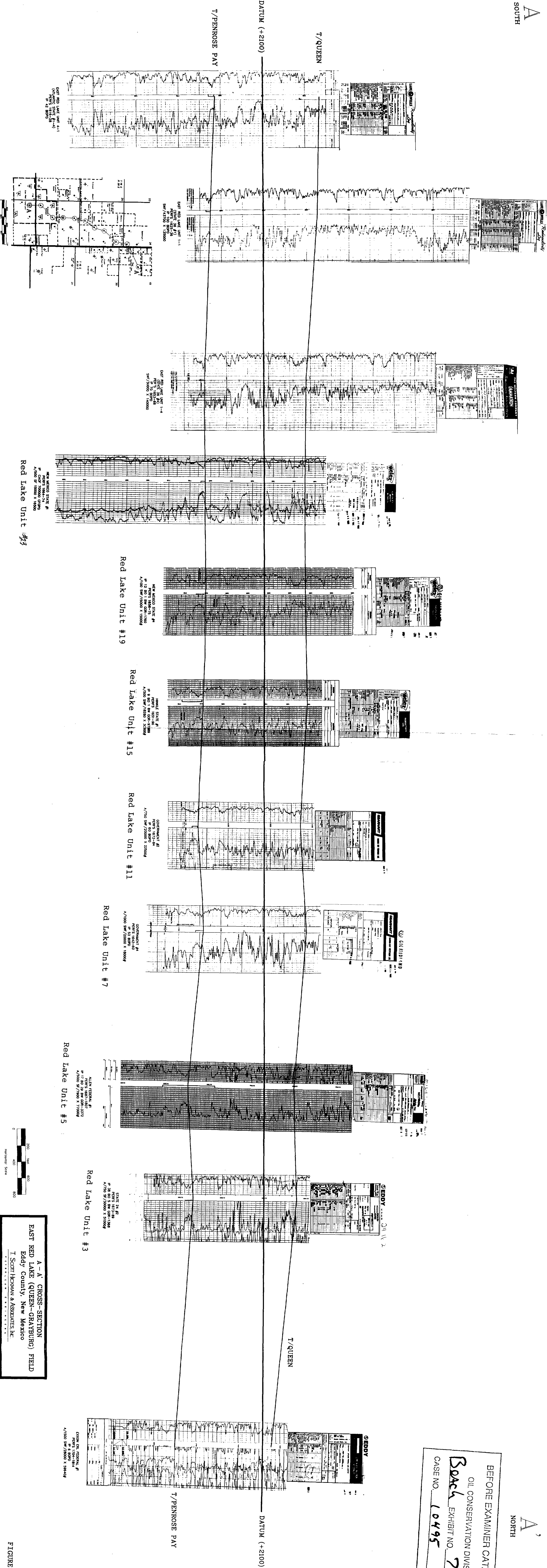
6. Signature (Agent)

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, November 1990 ☆ U.S. GPO: 1991-287-066

DOMESTIC RETURN RECEIPT

A
SOUTH



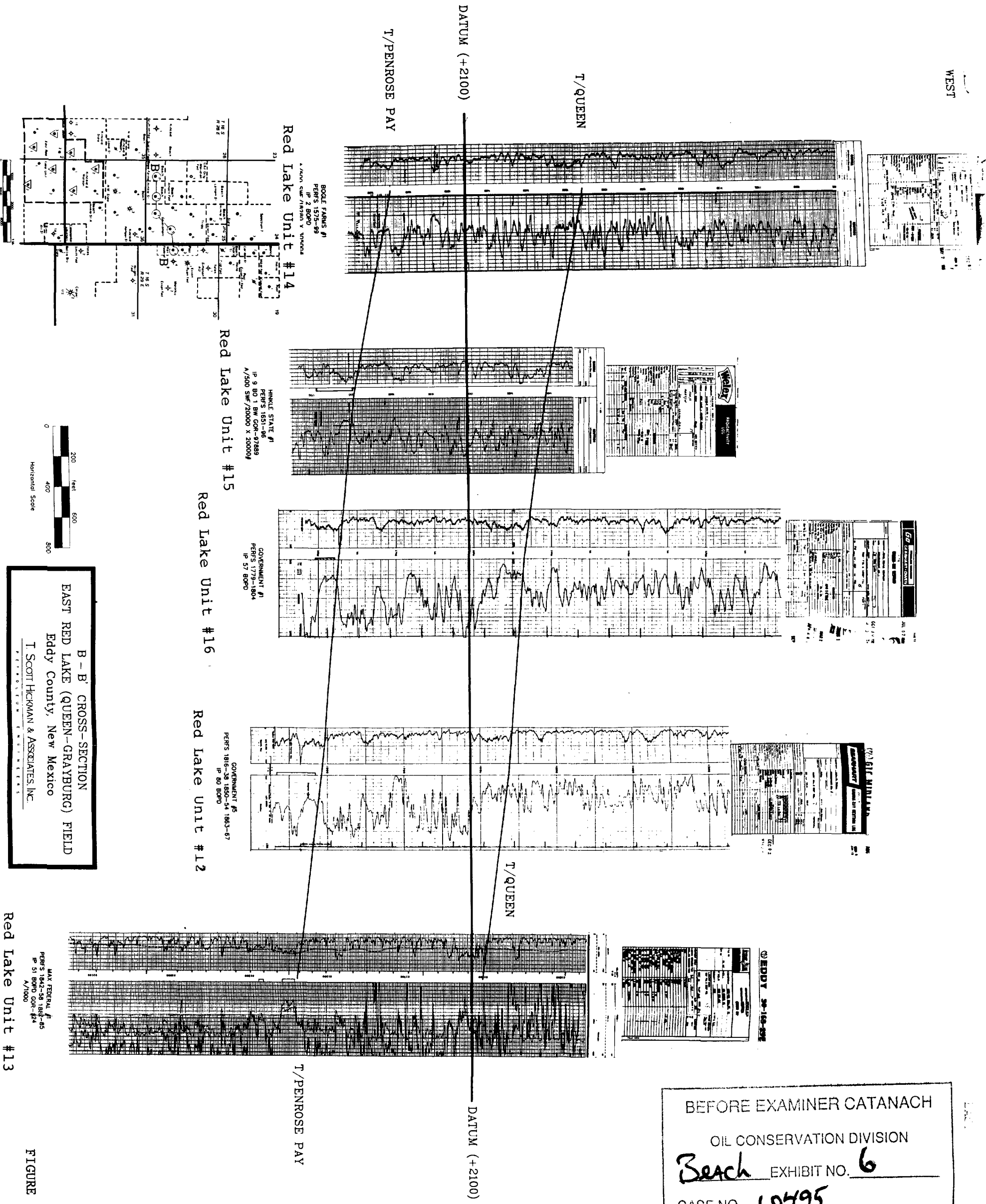


FIGURE 5

HOLMES

WIRELINE SERVICE

PRODUCTION LOGGING

BEFORE EXAMINER CATANACH
ON CONSERVATION DIVISION
INJECTIVITY PROFILE
EXHIBIT NO. **8**
Beach
CASE NO. **10495**

COMPANY BEACH Exploration, Inc.

FILE NO.

WELL NAME & NO. RED LAKE UNIT # 2

92-3621

FIELD RED LAKE - Queen Grayburg

ELEVATIONS:

KB 3585

COUNTY ERRY STATE NEW MEXICO

DF --

LOCATION 1980' FEL : 660' PSL

GL 3571

BLK. -- SEC. 24 TWP. 16-S RGE. 28-E

Perm. Dat. GROUND LEVEL Elev. 3571

L.M.F. 14' ABOVE G.L.

Date 6-17-92

Run No. ONE

Type Log INJECTION Profile w/ channel checks

Depth - (Driller) 2258

Depth - (Logger) 1632

Bottom Logged Interval G/R 1628

Top Logged Interval 1350

Type Hole Fluid water

Fluid Level Full

Max. Rec. Temp. °F. BHT 74.6°

Recorded By C. Dugger, M. Holmes

Witnessed By Mr. Hal Gill

EQUIPMENT AND TEST DATA

Run No.	ONE	Casing and Tubing Record			
Well Status	INJECTION	Size	Wgt.	From	To
Production--Oil, b/d	--	5 1/2		0	T.O.
Water, b/d	--				
Gas, mcf	--	2 3/8	Duo.	0	1501
Injection Rate	2.9 BPM = 4176 BPD				
Pressure--TBG. psi	1500 psi				
CSG. psi	0 psi	Packer @		1501 - 04	
Log Speed-fpm	30 - 40	Tbg. Tail to		1504	
Temp. Sens. °F / inch	ONE DEGREE	Truck No.		T-105	
G. R. Sens.	1400	Tool No.		1 1/2"	

HOLMES

WIRELINE SERVICE

PRODUCTION LOGGING

BEFORE EXAMINER CATANACH
CONSERVATION DIVISION
INJECTIVITY PROFILE
EXHIBIT NO. **9**
Beach
CASE NO. **10495**

COMPANY Beach Exploration, Inc. FILE NO. 92-3622
WELL NAME & NO. RED LAKE Unit #10 ELEVATIONS:
FIELD RED LAKE East - Queen Grayburg KB 3582.2
COUNTY Eddy STATE New Mexico DF --
LOCATION 2310' FSL : 2287' FWL GL 3580.2
BLK. -- SEC. 25 TWP. 16-S R6E: 28-E

Perm. Dat. GROUND LEVEL Elev. 3580.2' L.M.F. 2' Above G.L.
Date 6-18-92
Run No. ONE
Type Log 10 hr Shut-in In Section Profile w/ Channel ch
Depth - (Driller) 1632
Depth - (Logger) 1632
Bottom Logged Interval G/R 1628
Top Logged Interval 1350
Type Hole Fluid WATER
Fluid Level Full
Max. Rec. Temp. °F. BHT 74.8°
Recorded By C. Dugger, M. Holmes
Witnessed By Mr. Hal Gill

EQUIPMENT AND TEST DATA

Run No.	ONE	Casing and Tubing Record			
Well Status	INJECTION	Size	Wgt.	From	To
Production--Oil, b/d	--	8 5/8		0	300
Water, b/d	--	4 1/2	10.5"	0	1688
Gas, mcf	--				
Injection Rate	3 BPM = 4320 BPD	2 3/8	0.00	0	1560
Pressure--TBG. psi	1500 psi				
CSG. psi	0 psi	Packer @		1560-64	
Log Speed--fpm	30-40	Tbg. Tail to		1564	
Temp. Sens. °F / inch	ONE DEGREE	Truck No.		7-105	
G. R. Sens.	1200	Tool No.		1 3/8	

HOLMES

WIRELINE SERVICE

PRODUCTION LOGGING

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
INJECTIVITY PROFILE
EXHIBIT NO. 10
CASE NO. 10495

COMPANY BEACH Exploration, Inc. FILE NO. 92-3620
WELL NAME & NO. RED LAKE Unit #21 ELEVATIONS:
FIELD RED LAKE EAST - QUEEN KB 3718
COUNTY EDDY STATE NEW MEXICO DF --
LOCATION 330' FNL : 981' FEL GL 3716
BLK. SEC. 36 TWP: 16-S RGE: 28-E
Perm. Dat. GROUND LEVEL Elev. 3716 L.M.F. 2' ABOVE G.L

Date	<u>6-17-92</u>
Run No.	<u>ONE</u>
Type Log	<u>CHANNEL checks</u>
Depth - (Driller)	<u>1899</u>
Depth - (Logger)	<u>1856</u>
Bottom Logged Interval	<u>6/R 1852</u>
Top Logged Interval	<u>1600</u>
Type Hole Fluid	<u>WATER</u>
Fluid Level	<u>FULL</u>
Max. Rec. Temp. °F.	<u>BHT 75.4°</u>
Recorded By	<u>M. HOLMES, C. DUGGER</u>
Witnessed By	<u>Mr. Hal Gill</u>

EQUIPMENT AND TEST DATA

Run No.	<u>ONE</u>	Casing and Tubing Record			
Well Status	<u>INJECTION</u>	Size	Wgt.	From	To
Production--Oil, b/d	<u>-</u>	<u>8 3/8</u>		<u>0</u>	<u>330</u>
Water, b/d	<u>-</u>	<u>4 1/2</u>		<u>0</u>	<u>1899</u>
Gas, mcf	<u>-</u>	<u>2 3/8</u>	<u>Duo.</u>	<u>0</u>	<u>1748</u>
Injection Rate	<u>3 BPM = 4320 BPD</u>				
Pressure--TBG. psi	<u>1500 PSI</u>				
CSG. psi	<u>0 PSI</u>	Packer @	<u>1748-50</u>		
Log Speed-fpm	<u>30 - 40</u>	Tbg. Tail to	<u>1750</u>		
Temp. Sens. °F / inch	<u>ONE DEGREE</u>	Truck No.	<u>T-105</u>		
G. R. Sens.	<u>1000</u>	Tool No.	<u>1 3/8"</u>		

HOLMES

WIRELINE SERVICE

PRODUCTION LOGGING

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
INJECTIVITY PROFILE
EXHIBIT NO. **11**
CASE NO. **10495**

COMPANY BEACH Exploration, Inc.

FILE NO.

WELL NAME & NO. RED LAKE Unit #24

92-3619

FIELD RED LAKE EAST - QUEEN GRAYBURG

ELEVATIONS:

KB 3698.6

COUNTY EODY STATE NEW MEXICO

DF --

LOCATION 1986' FNL & 1983' FEL

GL 3696.6

BLK. -- SEC. 36, TWP: 16-S RGE: 28-E

Perm. Dat. GROUND LEVEL Elev. 3696.6' L.M.F. 2' Above G.L.

Date	<u>6-17-92</u>	
Run No.	<u>ONE</u>	
Type Log	<u>CHANNEL checks</u>	
Depth - (Driller)	<u>1882</u>	
Depth - (Logger)	<u>1843</u>	
Bottom Logged Interval	<u>G/R 1839:1810</u>	
Top Logged Interval	<u>1550</u>	
Type Hole Fluid	<u>WATER</u>	
Fluid Level	<u>FULL</u>	
Max. Rec. Temp. °F.	<u>BHT 72.8</u>	
Recorded By	<u>M. Holmes</u>	
Witnessed By	<u>Mr. Hal Gill</u>	

EQUIPMENT AND TEST DATA

Run No.	<u>ONE</u>	Casing and Tubing Record			
Well Status	<u>INJECTION</u>	Size	Wgt.	From	To
Production--Oil, b/d	<u>-</u>	<u>4 1/2</u>	<u>10.5-11.6</u>	<u>0</u>	<u>1882</u>
Water, b/d	<u>-</u>				
Gas, mcf	<u>-</u>	<u>2 3/8"</u>	<u>Duo</u>	<u>0</u>	<u>1712</u>
Injection Rate	<u>2.1 BWPM = 3024 BPD</u>				
Pressure--TBG, psi	<u>1500 psi</u>				
CSG, psi	<u>0 psi</u>	Packer @		<u>1712-15</u>	
Log Speed--fpm	<u>30-40</u>	Tbg. Tail to		<u>1715</u>	
Temp. Sens. °F / inch	<u>ONE DEGREE</u>	Truck No.		<u>T-105</u>	
G. R. Sens.	<u>1000</u>	Tool No.		<u>1 3/8"</u>	

A black silhouette of an oil well derrick is positioned on the left side of the page, partially obscured by a large black circle.

FRACPRESSURE

Fracture Height

Formation
Evaluation

BEFORE EXAMINER CATANACH
Systems

OIL CONSERVATION DIVISION

Beach EXHIBIT NO. 12

CASE NO.

10495

COMPANY WILLIAM N. BEACH
WELL RED LAKE UNIT NO.23
FIELD RED LAKE
COUNTY PROV EDDY

STATE COUNTRY NEW MEXICO

ID: 2

LEASE: RED LAKE UNIT WELL: 1-25

FIELD: RED LAKE EAST

OPERATOR: BEACH EXPL. INC.

COUNTY: EDDY STATE: NEW MEXICO

INJECTION BEGAN 6/91-12 PRODUCERS, 13 INJECTORS

1000000

100000

MONTHLY OIL PRODUCTION

OIL (BBL)

10,000

DAILY WATER INJECTION

2,000

1,000

OIL

NO RESPONSE TO WATER INJECTION TO 6-1-92

PRODUCTION INCREASE DUE TO RE-WORKING PRODUCERS

(NOT DUE TO WATER INJECTION)

1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001

BEFORE EXAMINER CATANACH

OIL CONSERVATION DIVISION

Boach EXHIBIT NO. 3

CASE NO. 10495

TYPE LOG

BEACH EXPLORATION, INC.
RED LAKE UNIT #23

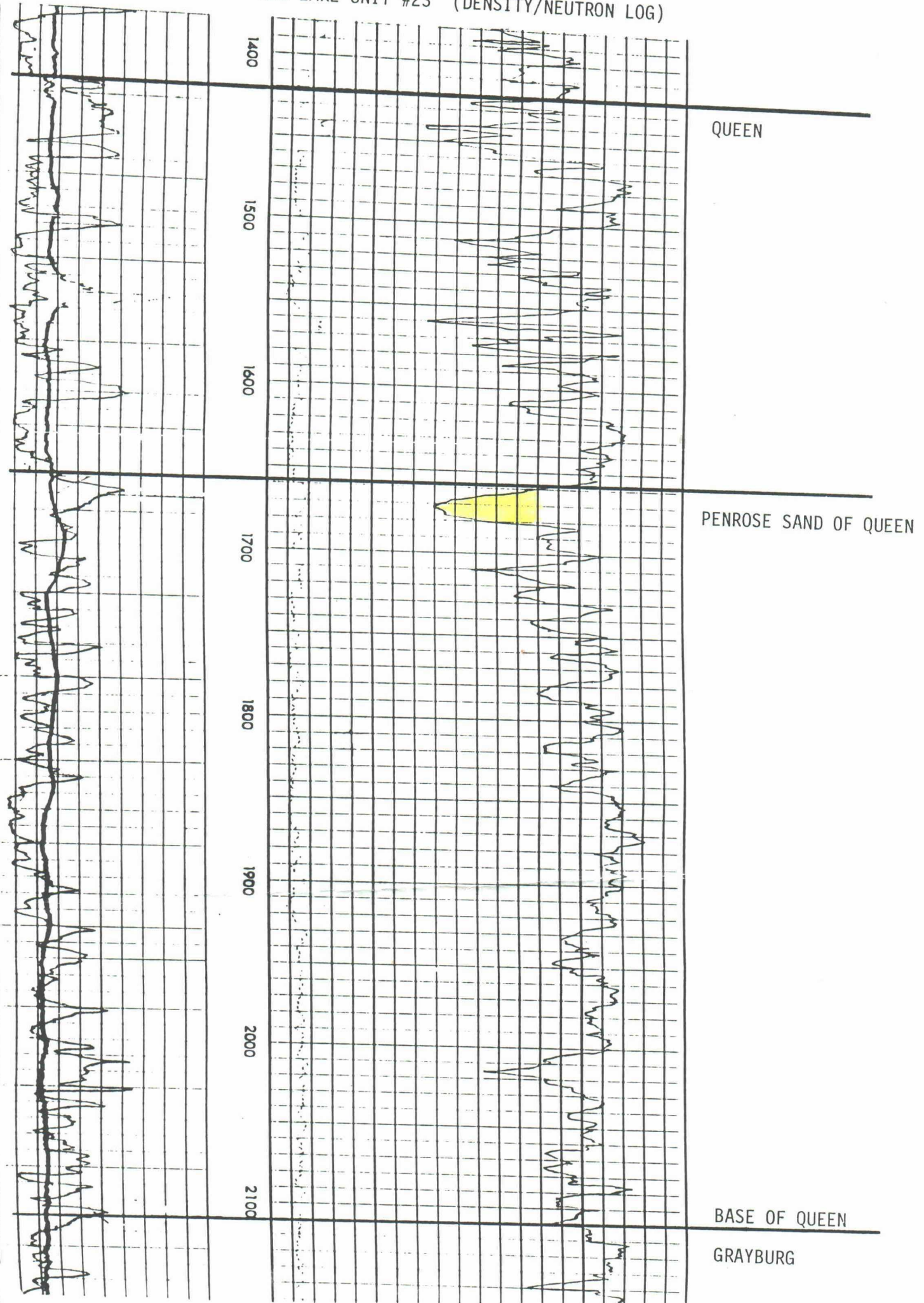
BEFORE EXAMINER CATANACH

OIL CONSERVATION DIVISION

Beach EXHIBIT NO. 5

CASE NO. 10495

BEACH EXPLORATION: RED LAKE UNIT #23 (DENSITY/NEUTRON LOG)



**EXHIBITS FOR ENGINEERING STUDY
OF WATER INJECTION IN THE
RED LAKE UNIT,
EDDY CO., NM**

prepared for

**Beach Exploration, Inc.
Midland, TX**

prepared by

**S. A. Holditch & Associates, Inc.
College Station, TX**

June 1992

BEFORE EXAMINER CATANACH	
OIL CONSERVATION DIVISION	
Beach	EXHIBIT NO. 13
CASE NO.	10495

STUDY OF INCREASED WATER INJECTION PRESSURE IN RED LAKE UNIT

Purpose of Study

To determine if increasing maximum allowable surface injection pressure to 1500 psi will cause hydraulic fractures in injections wells to grow out of zone.

Approach to Problem

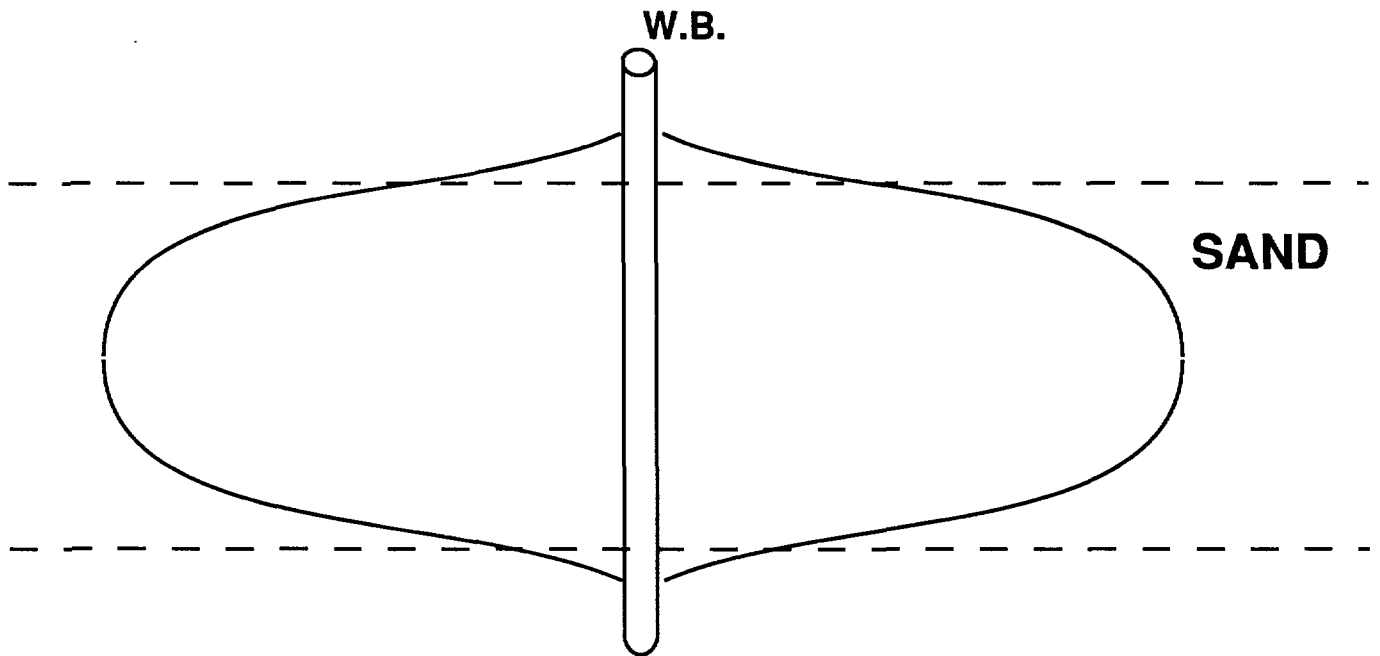
- Analyze existing fracture treatment and step rate injection data
- Conduct and analyze injection/falloff tests
- Determine vertical stress profile for zones above and below Penrose sand
- Predict fracture dimensions with increased water injection pressure

SUMMARY OF RESULTS

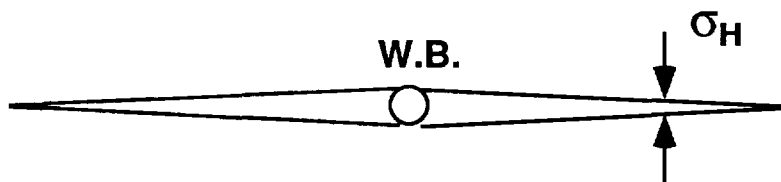
- Data analysis supports the presence of horizontal fractures in the Red Lake Unit.
- If horizontal fractures exist, fracture height growth out of zone will not be a problem.
- If vertical fractures are present, sufficient stress contrast exists to contain fracture height growth.
- For horizontal or vertical fractures, an equilibrium condition will eventually occur where water injection equals fluid leakoff from the fracture. When this occurs, the fracture will stop growing.

VERTICAL FRACTURES

SIDE VIEW

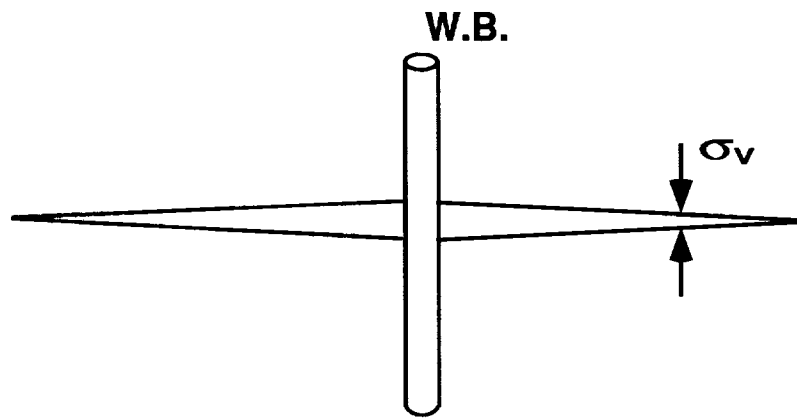


TOP VIEW

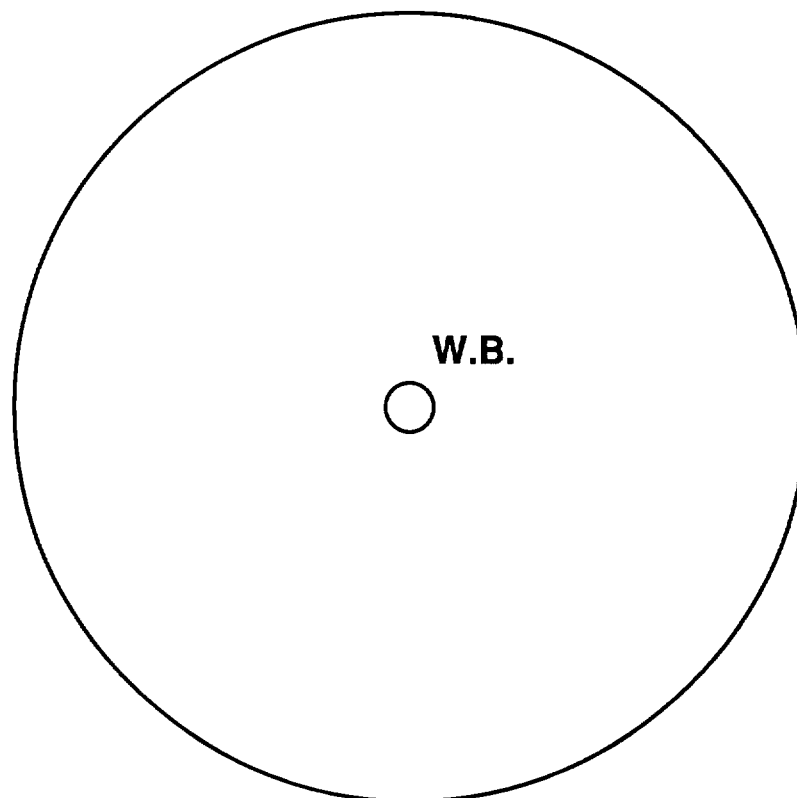


HORIZONTAL FRACTURES

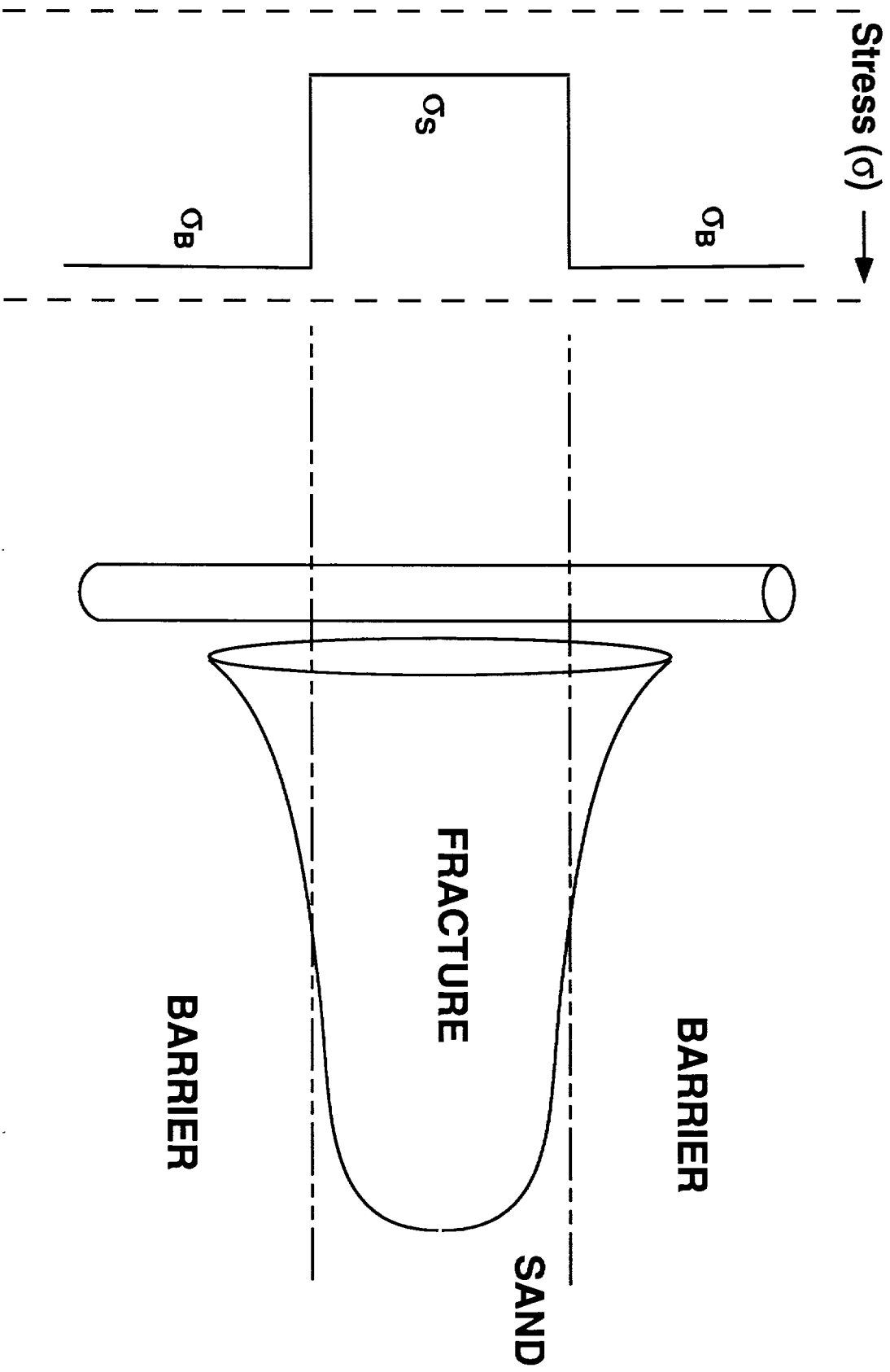
SIDE VIEW



TOP VIEW

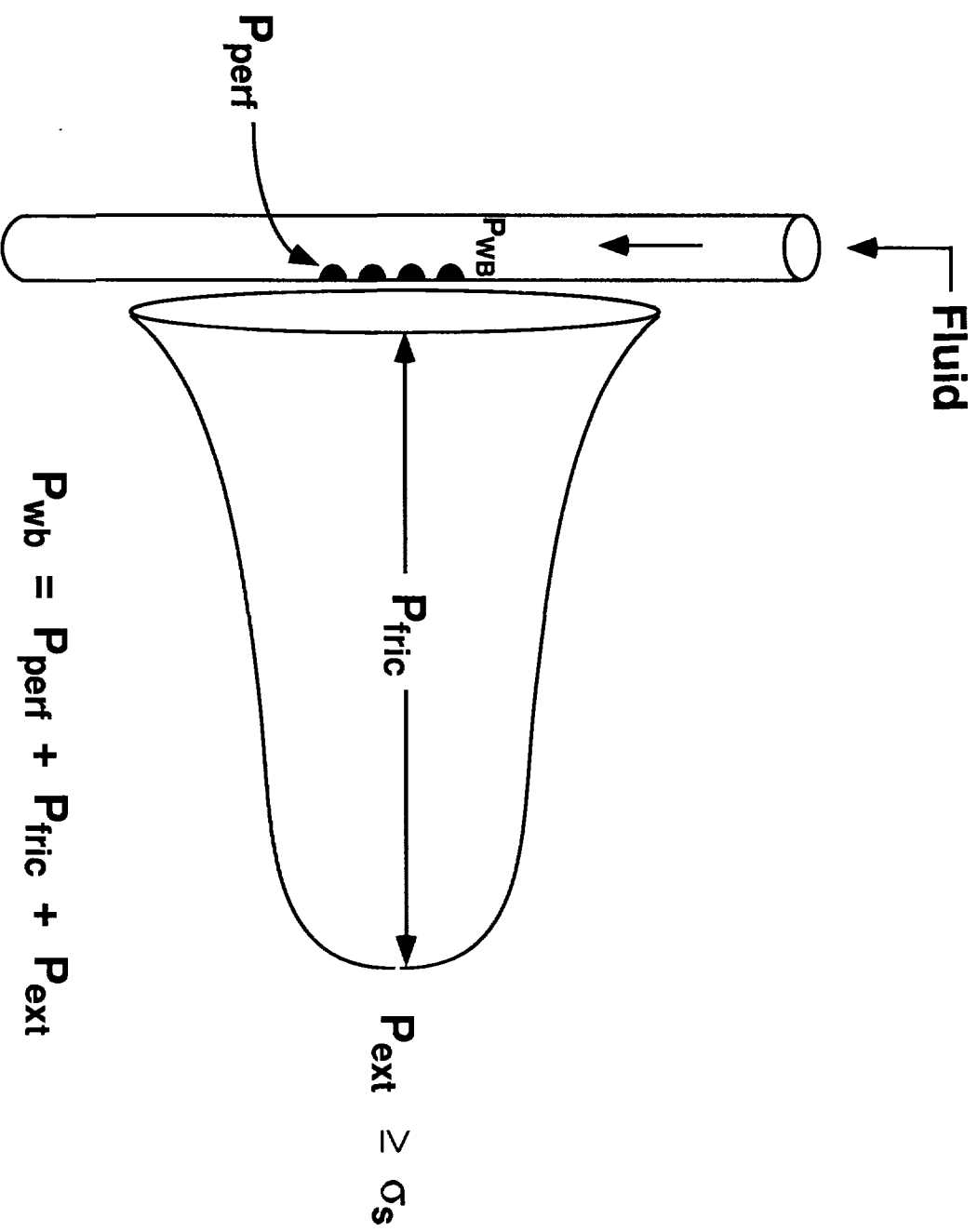


FRACTURE CONTAINMENT

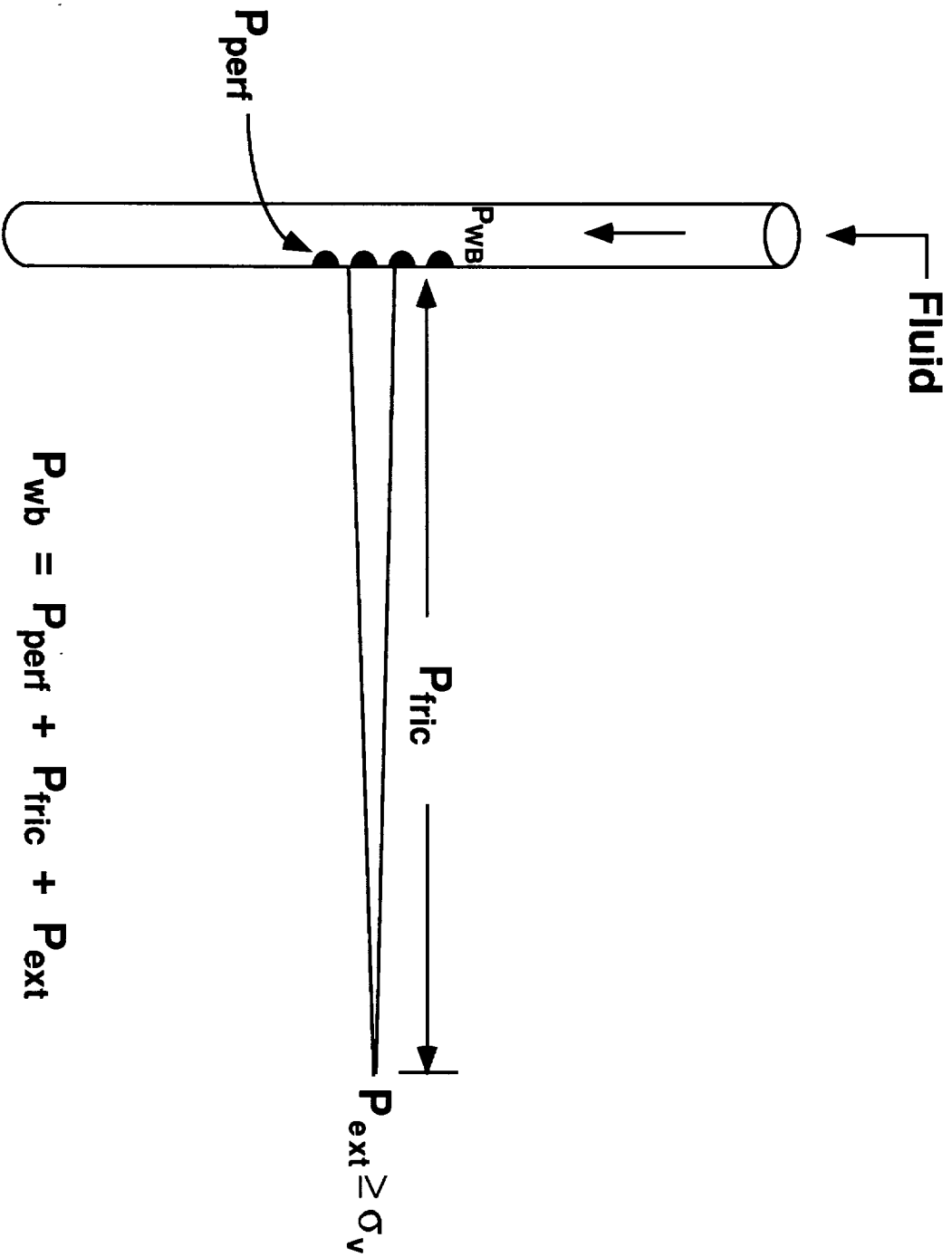


Containment when $\sigma_S \ll \sigma_B$

FRACTURING PRESSURES



FRACTURING PRESSURES - HORIZONTAL CASE

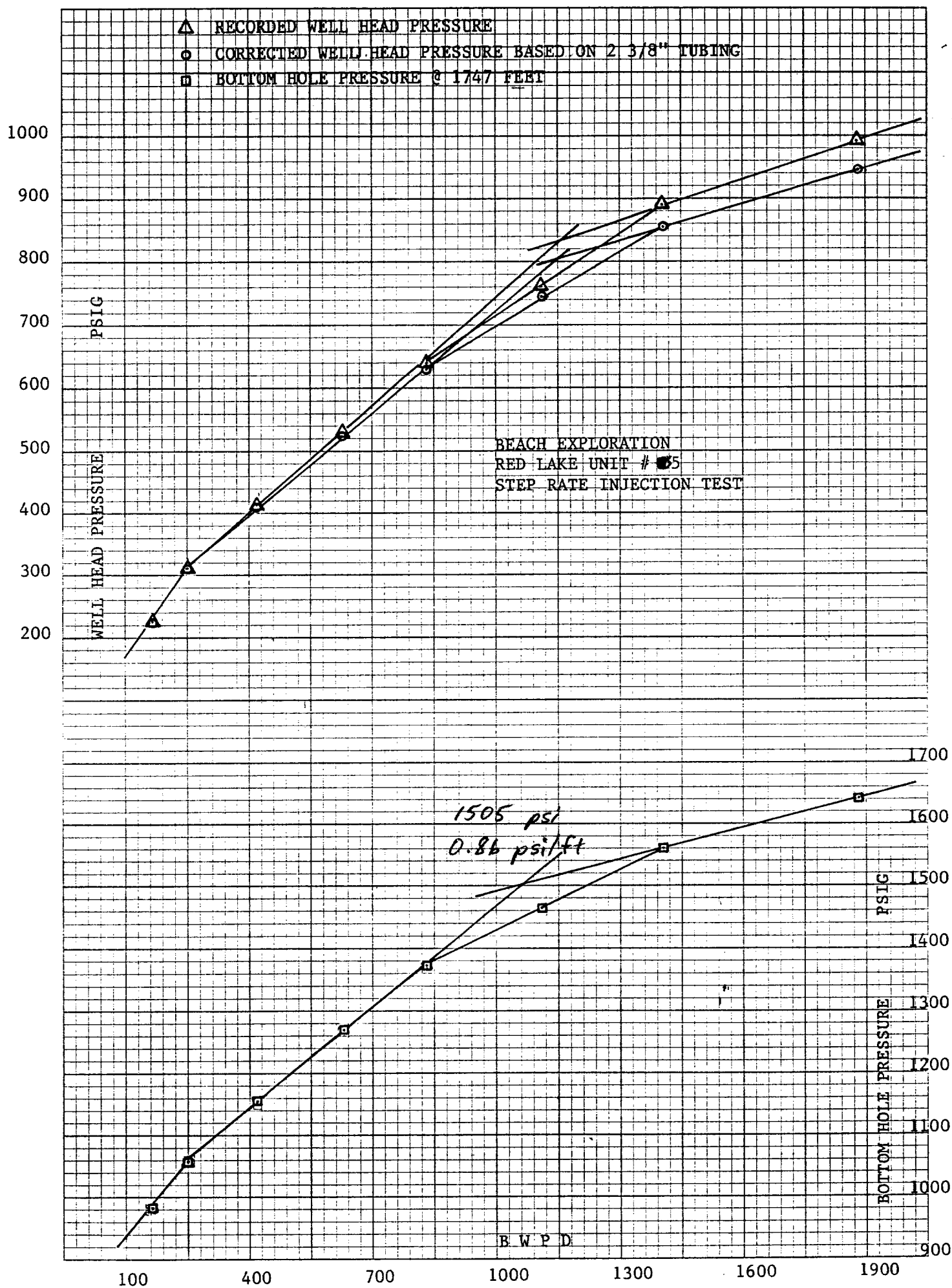


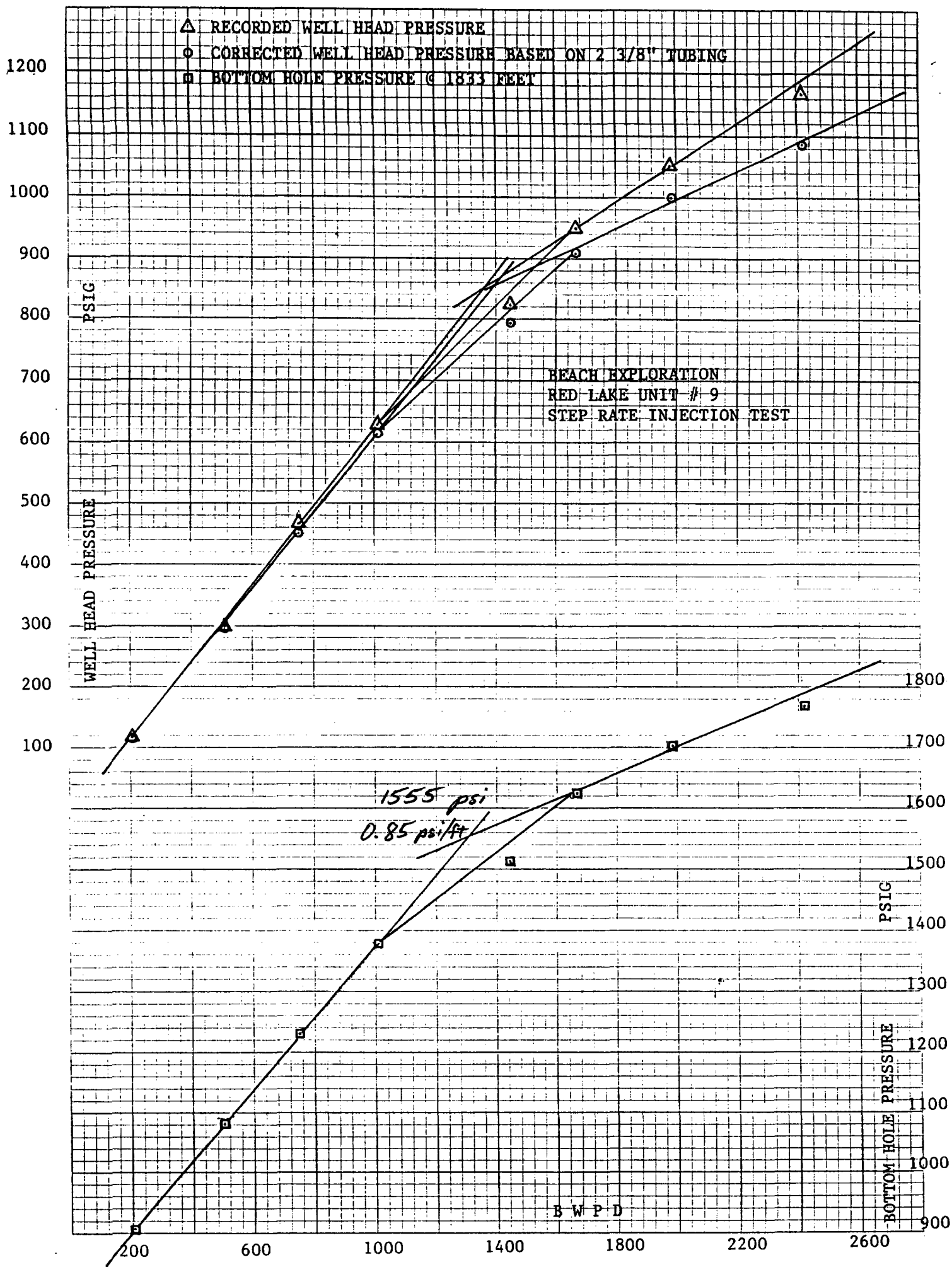
$$P_{wb} = P_{perf} + P_{fric} + P_{ext}$$

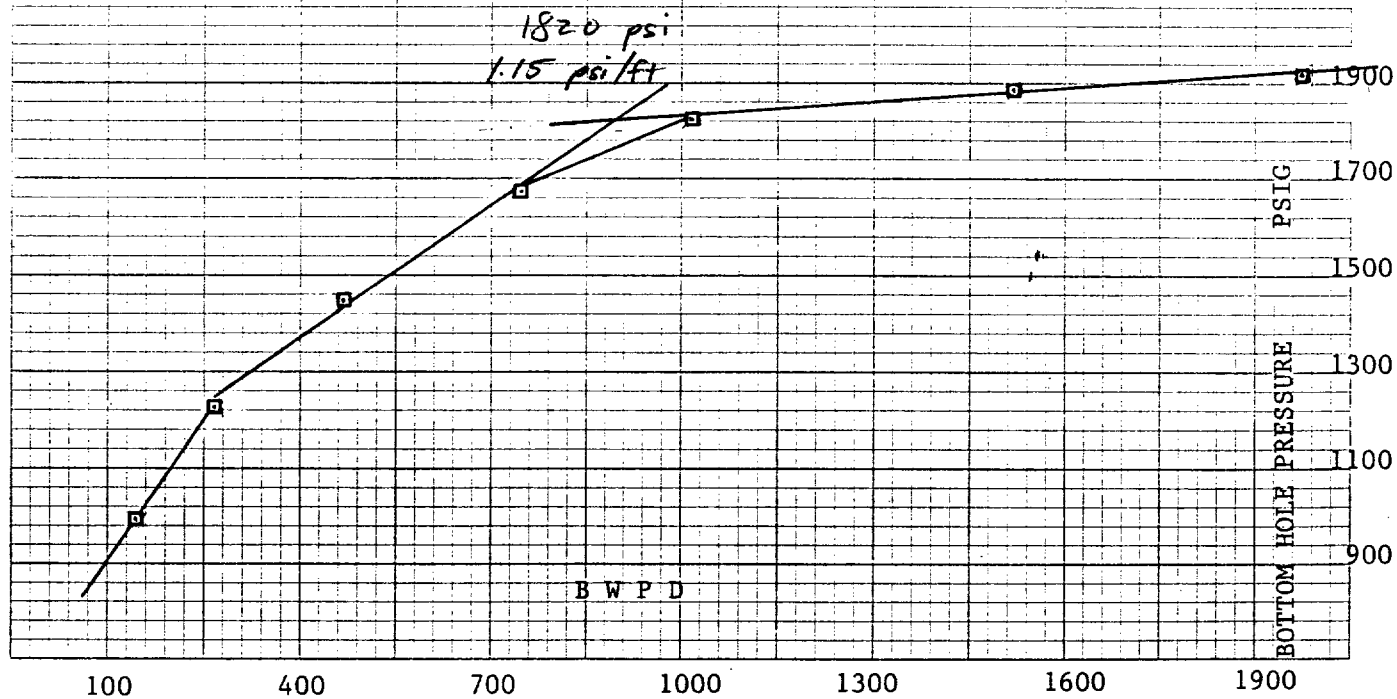
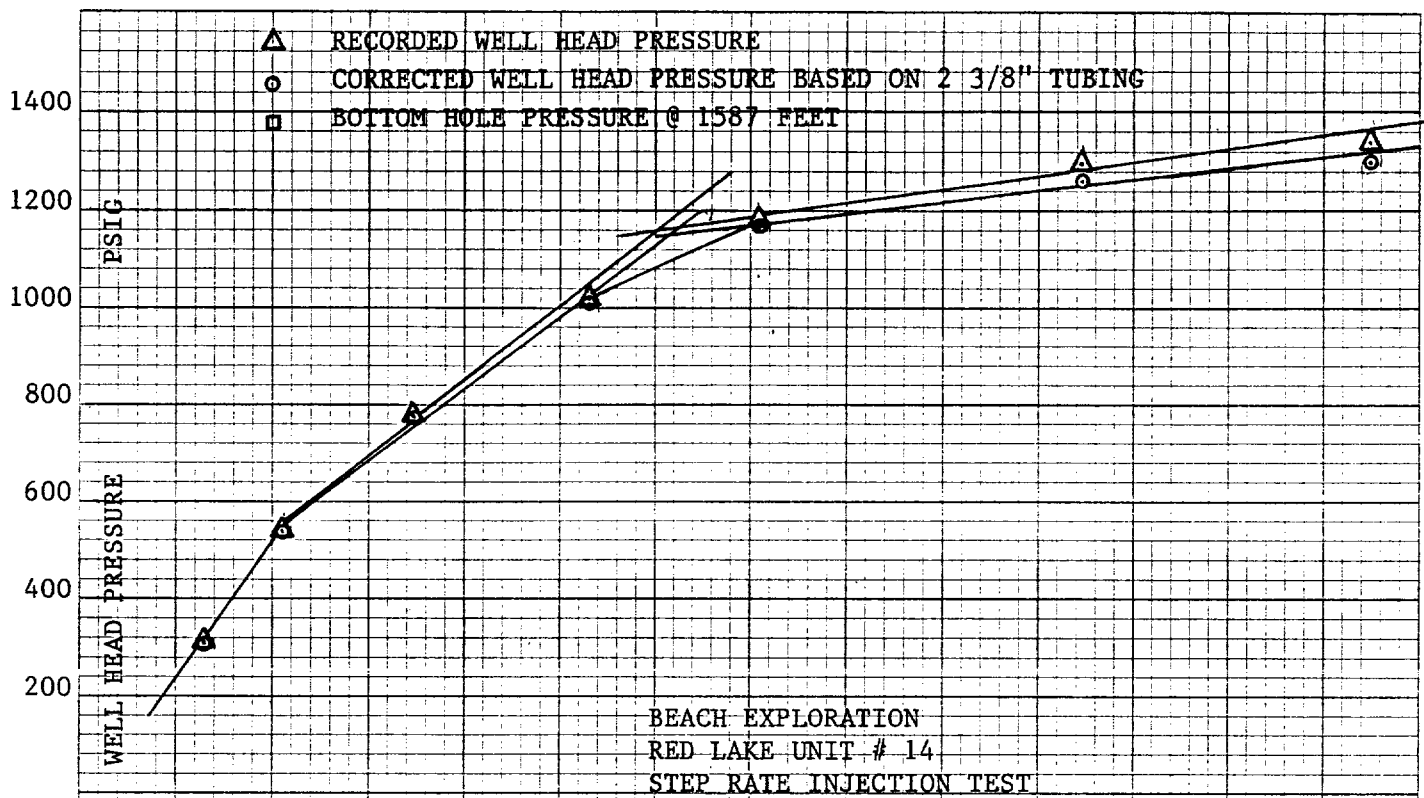
STEP RATE INJECTION/FRACTURING DATA

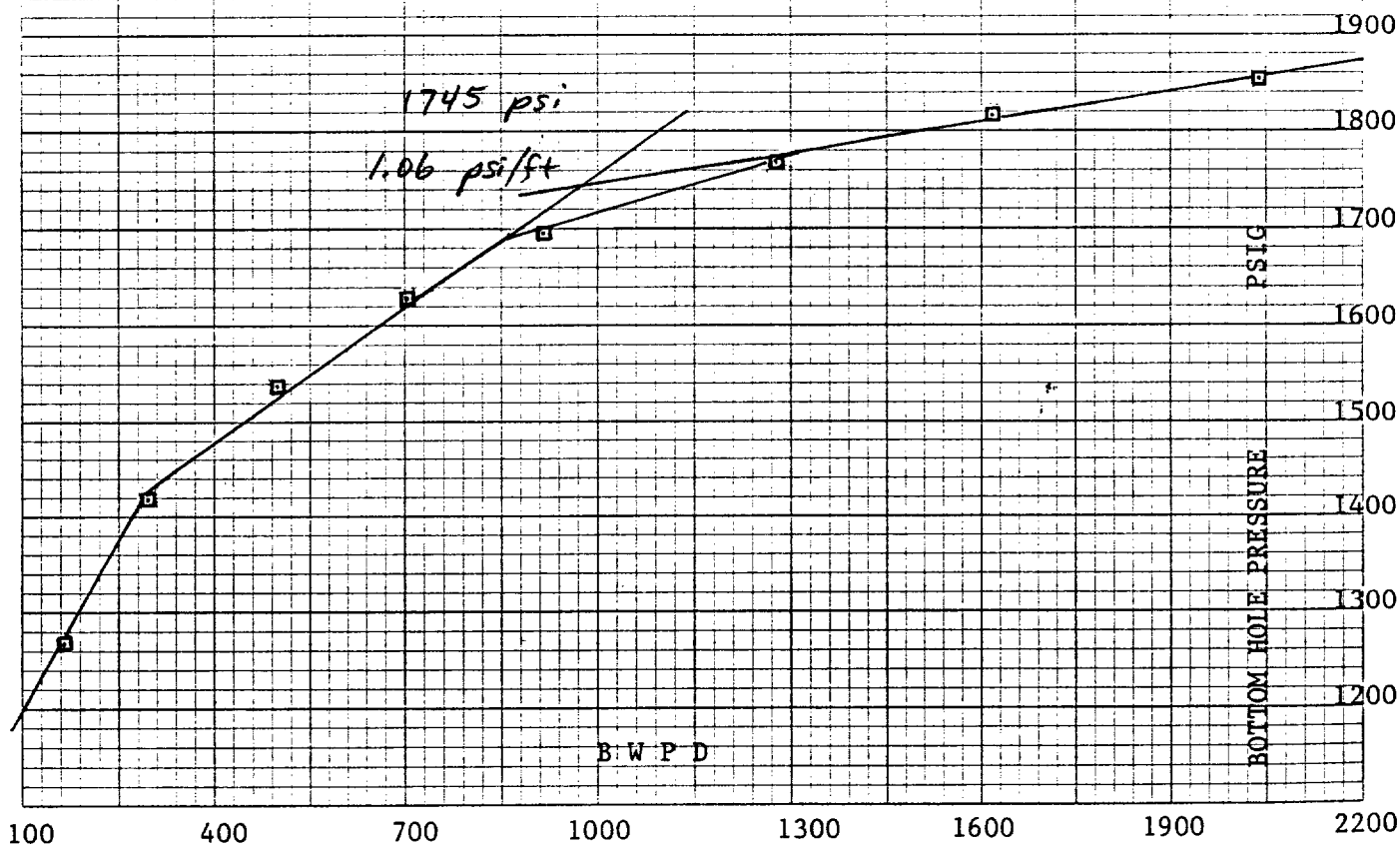
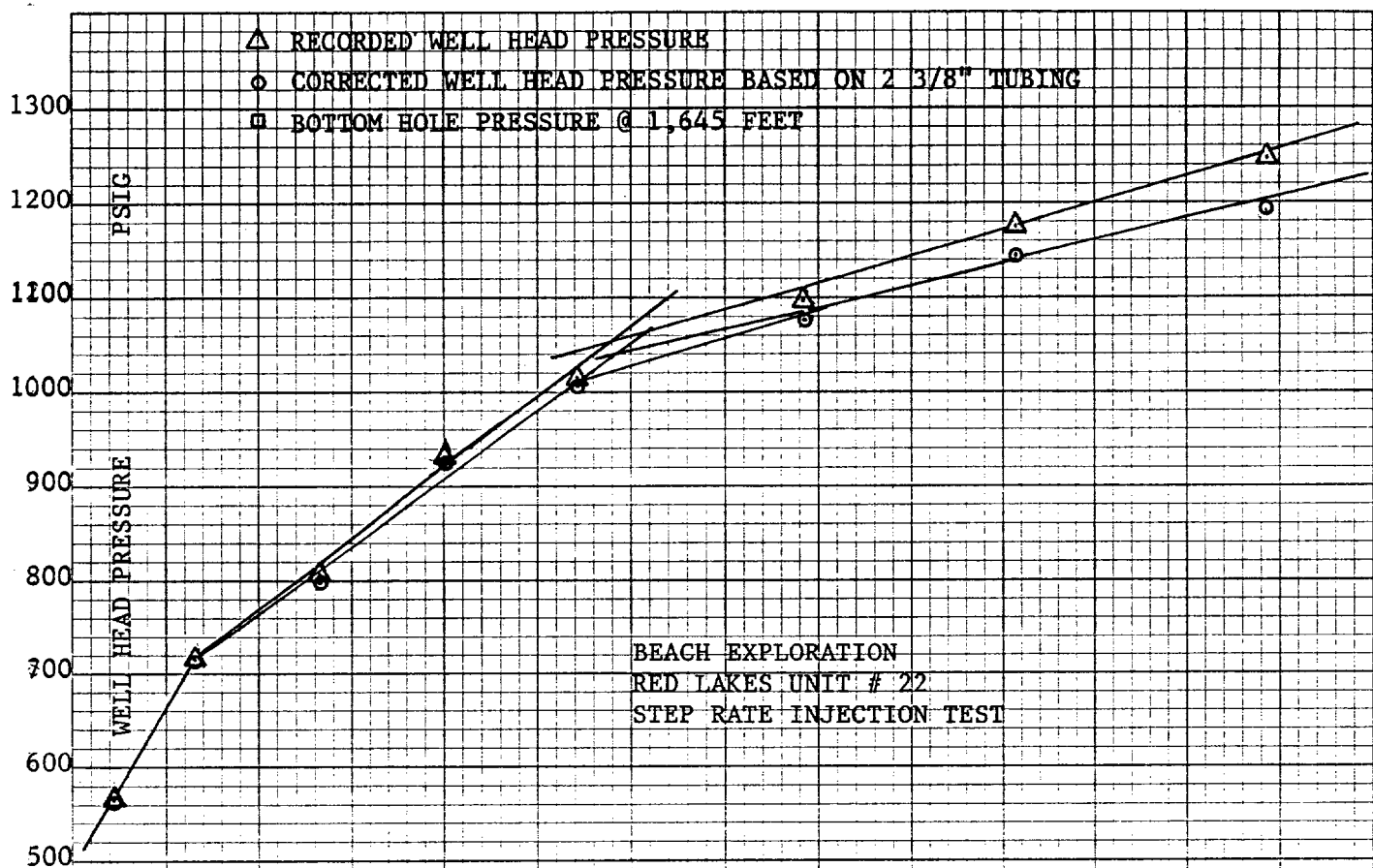
PREVIOUS RESULTS FROM STEP RATE TESTS RED LAKE UNIT

Well No.	Avg. Depth (ft)	BH Parting Pressure (psia)	Surf. Parting Pressure (psig)	Fracture Gradient (psi/ft)	Fracture Inj. Rate (BPD)
5	1747	1505	800	0.86	1060
9	1833	1555	800	0.85	1300
14	1587	1820	1150	1.15	900
22	1645	1745	1100	1.06	950
25	1786	1580	820	0.88	1000









- △ RECORDED WELL HEAD PRESSURE
- CORRECTED WELL HEAD PRESSURE BASED ON 2 3/8" TUBING
- BOTTOM HOLE PRESSURE @ 1,786 FEET

1200

1100

1000

PSIG

900

800

700

600

500

400

300

200

WELL HEAD PRESSURE

BEACH EXPLORATION
RED LAKE UNIT # 25
STEP RATE INJECTION TEST

1580 psi
0.88 psi/ft

PSIG

1800

1700

1600

1500

1400

1300

1200

1100

1000

900

BOTTOM HOLE PRESSURE

B W P D

100

400

700

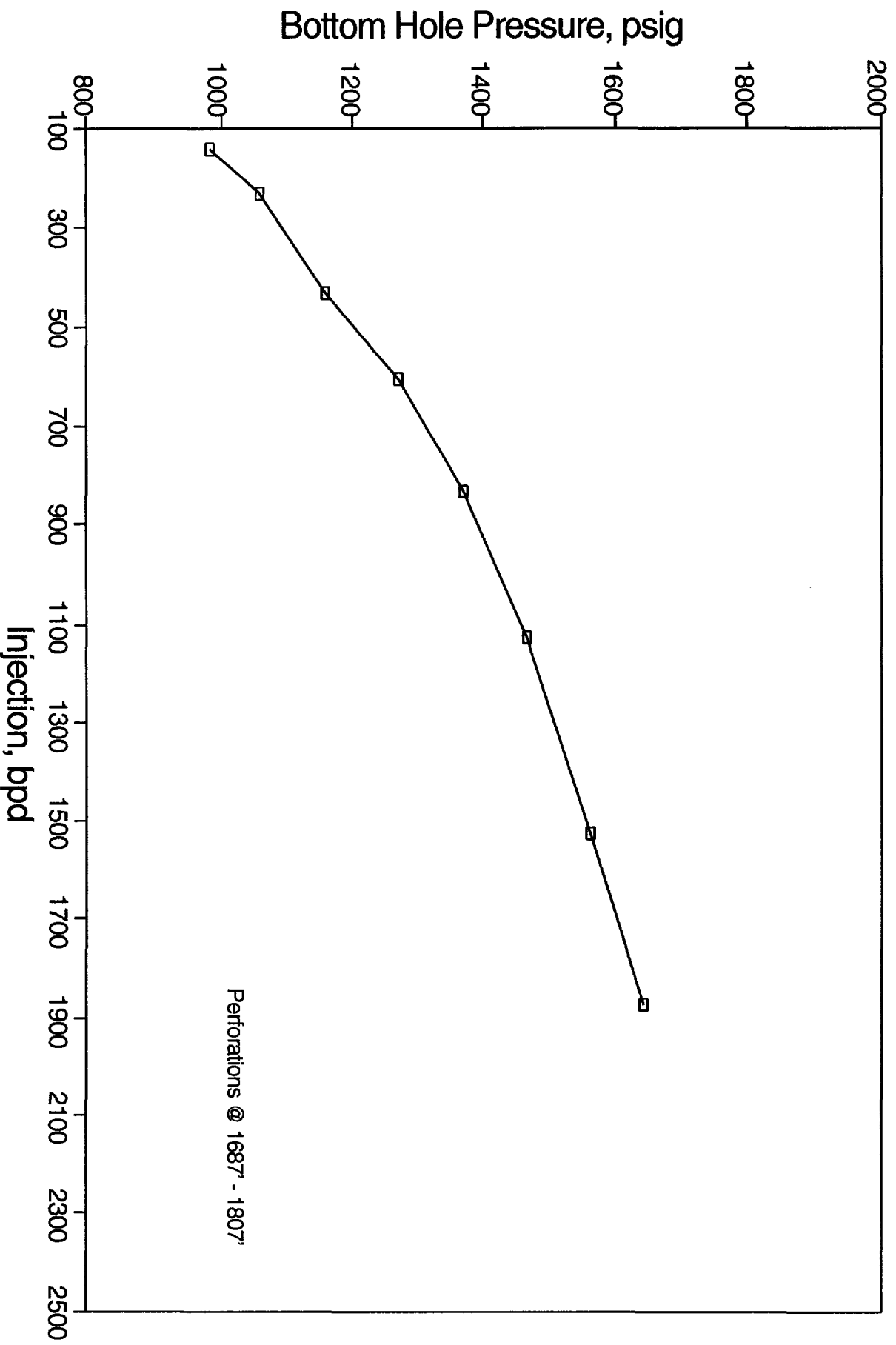
1000

1300

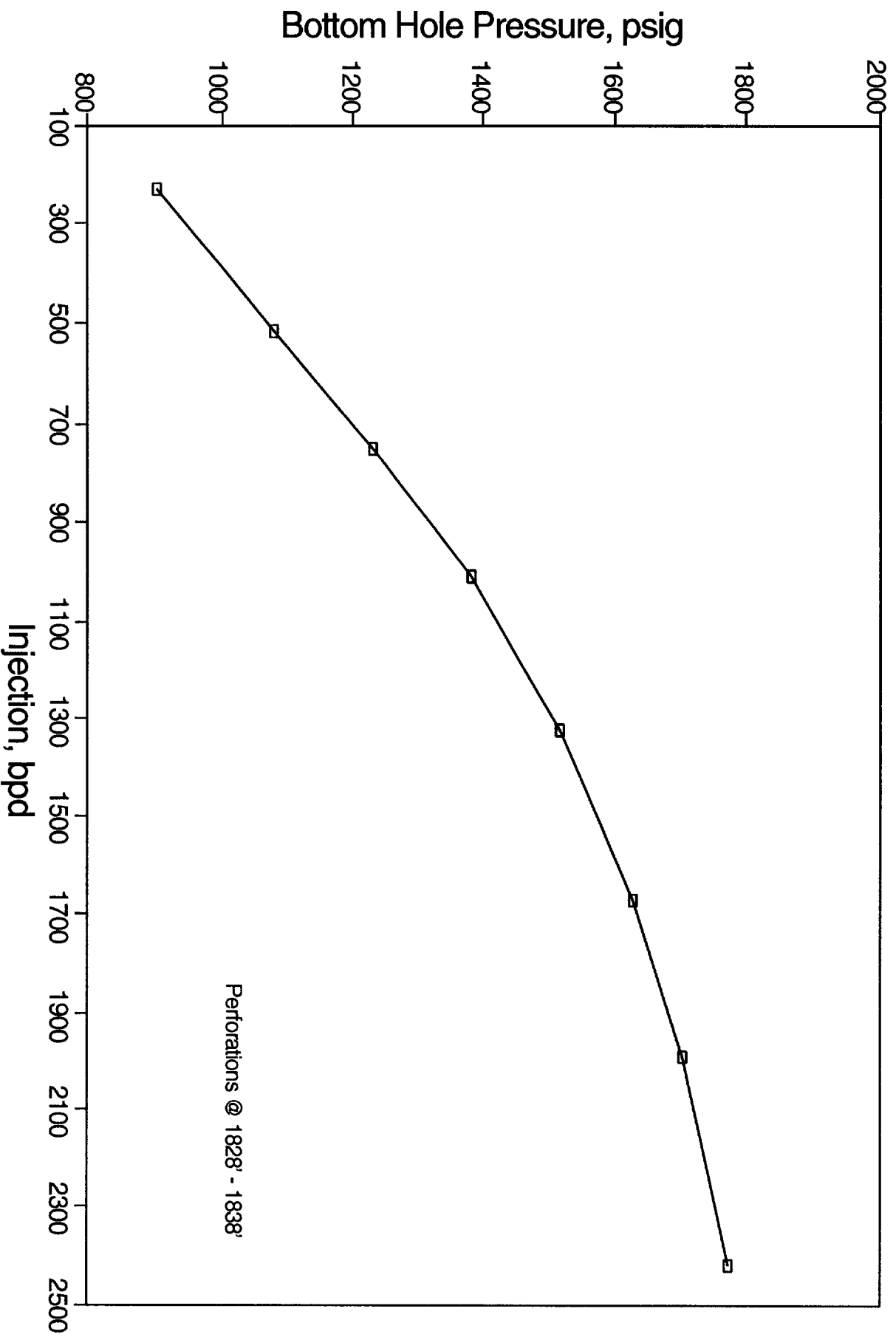
1600

1900

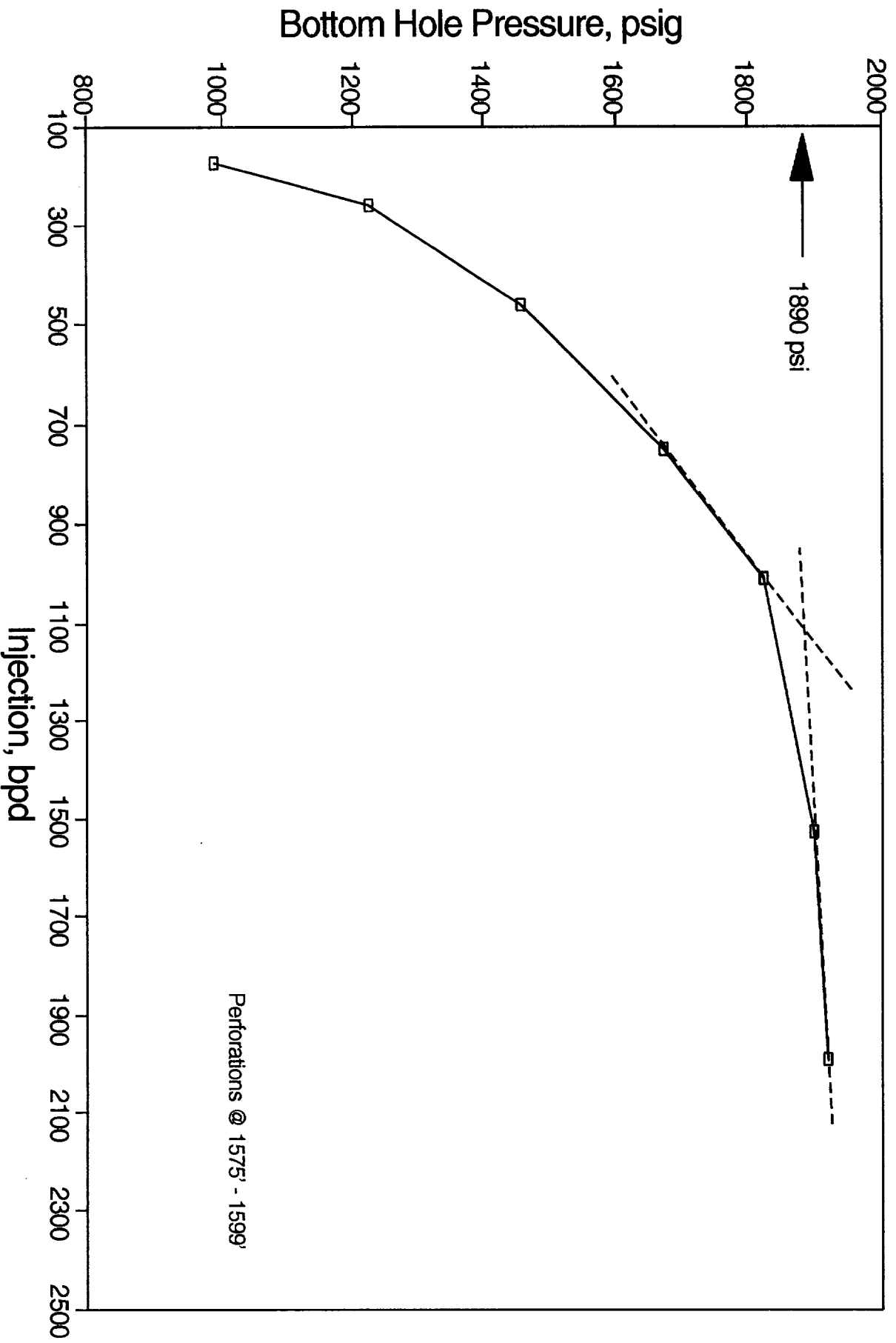
Beach Exploration Red Lake Unit #5



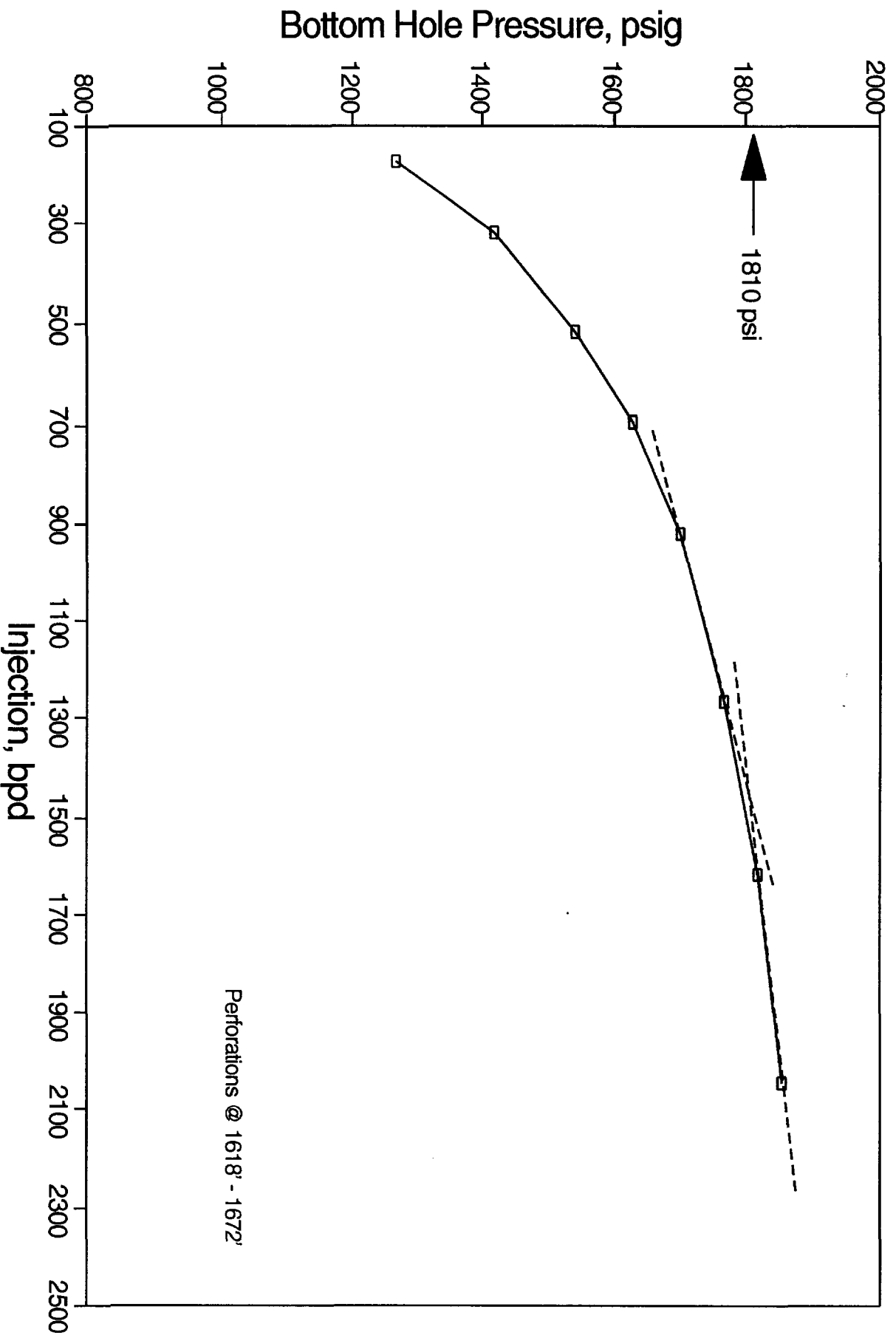
Beach Exploration Red Lake Unit #9



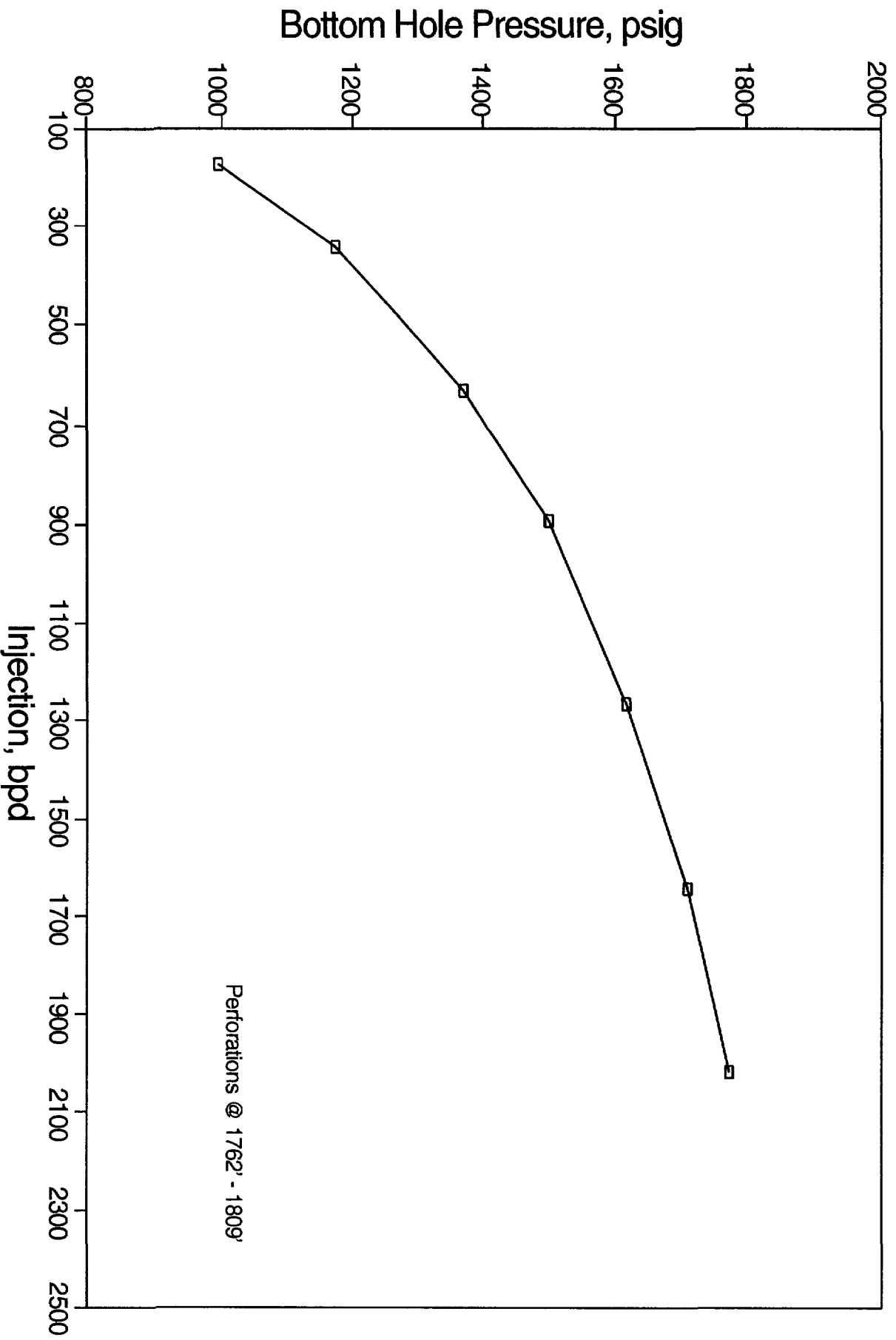
Beach Exploration Red Lake Unit #14



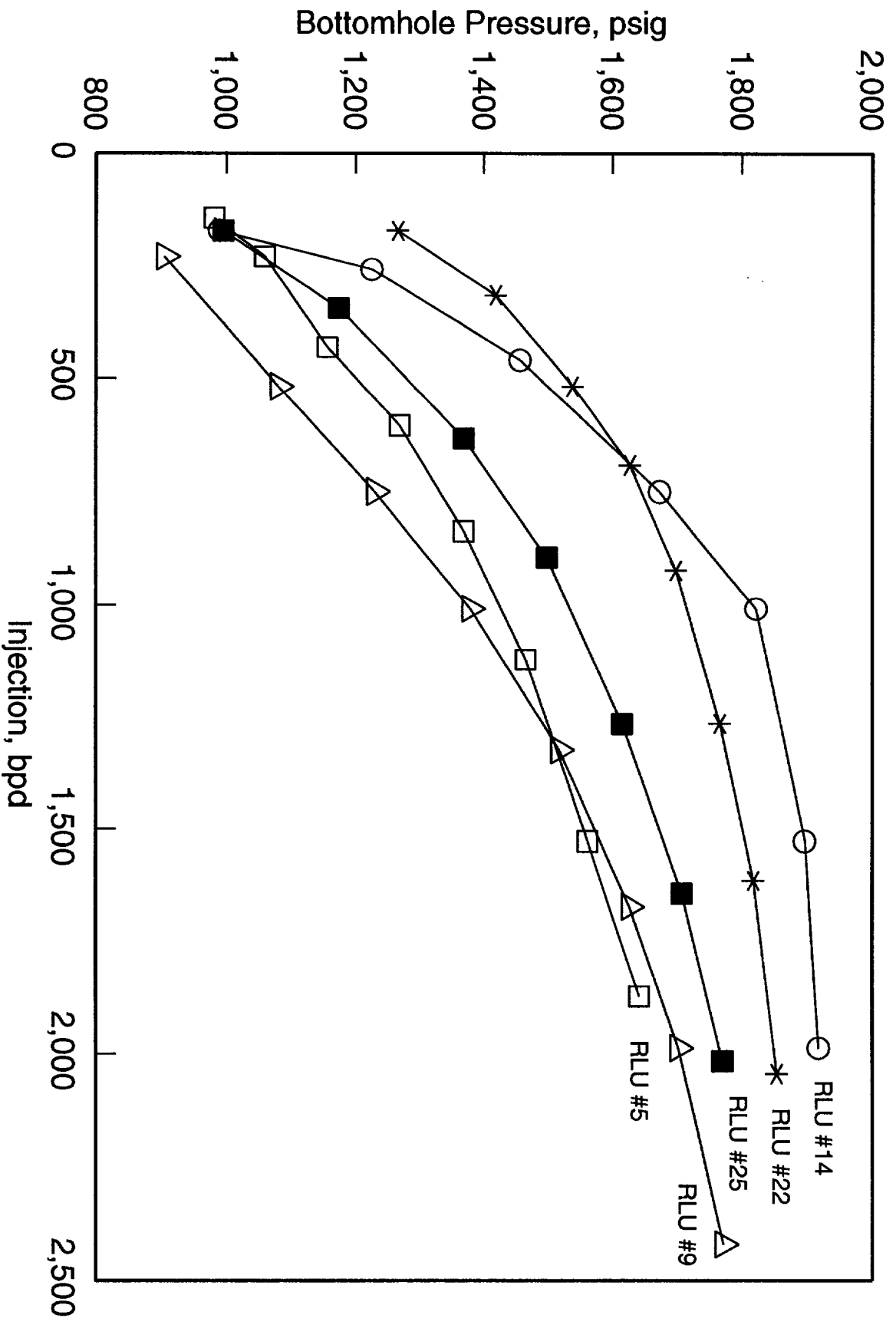
Beach Exploration Red Lake Unit #22



Beach Exploration
Red Lake Unit #25



Step Rate Tests - All Wells



SAH CONCLUSIONS FROM STEP RATE TESTS

1. Horizontal fractures exist in RLU and fractures were not reopened on Well Nos. 5, 9, 25

or

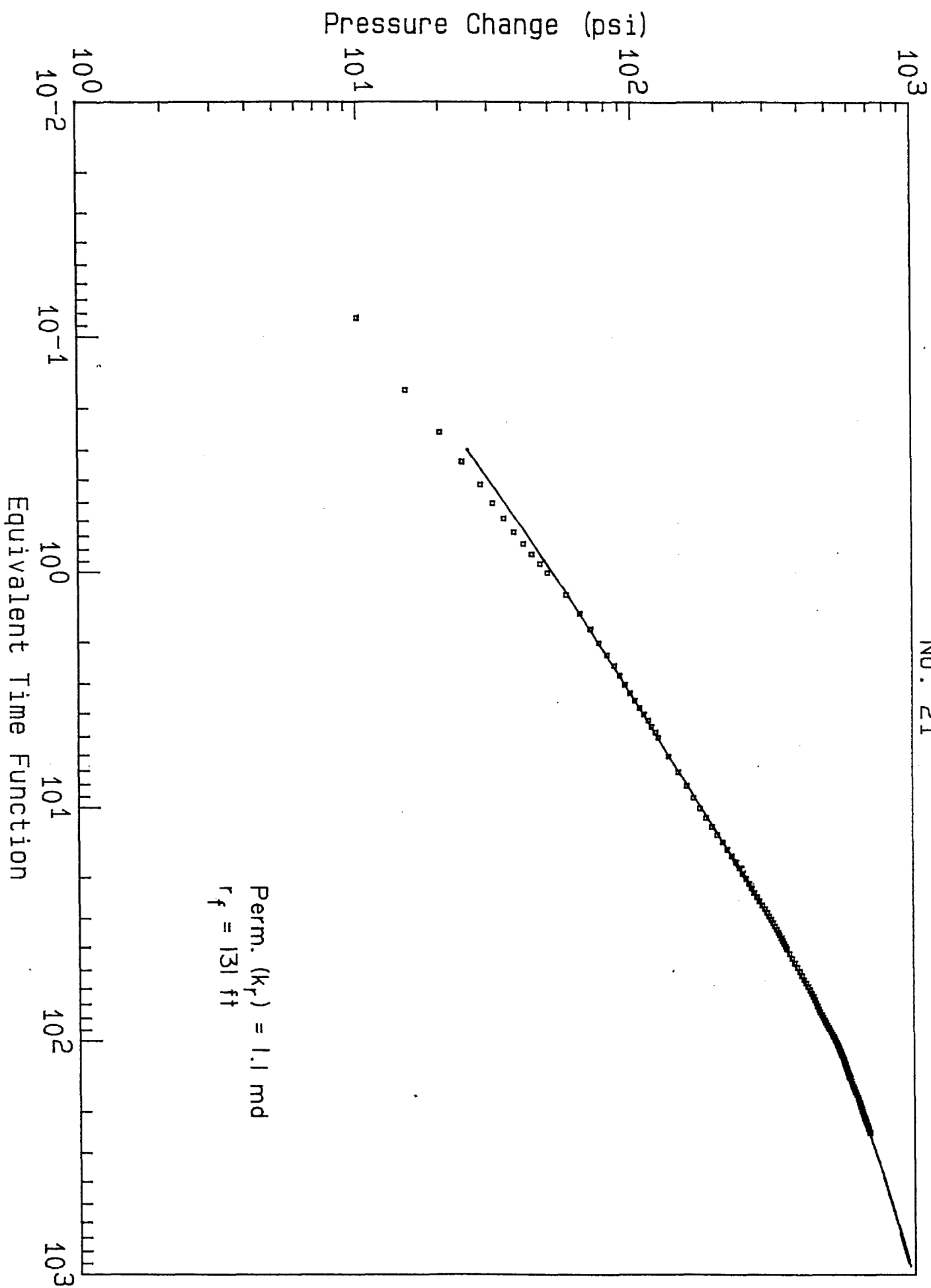
2. Horizontal fractures exist on Well Nos. 14 and 22, vertical fractures exist on Well Nos. 5, 9, 25.

**BEACH EXPLORATION
RED LAKE UNIT
SUMMARY OF INJECTION/
FRACTURE GRADIENTS**

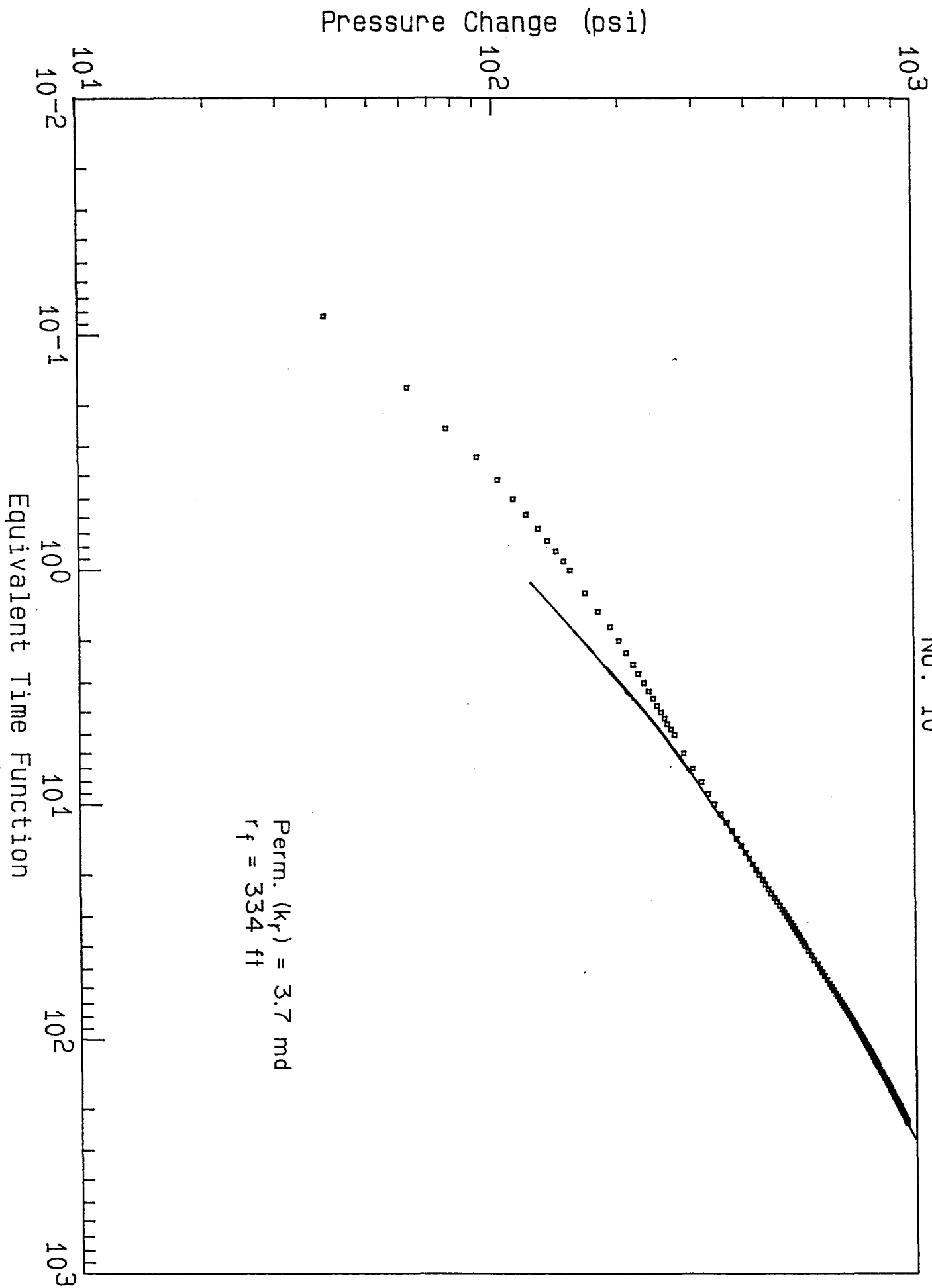
Well Number	K.B. Depth (ft)	Perforation Depth/Surf (ft)	Perforation Sea level Ref (ft)	Step Rate Injection (psi/ft)	Acid Treatment (psi/ft)	Fracture Treatment (psi/ft)
4		1575-1599				1.20
5		1687-1807		0.86	0.95	1.12
9		1828-1838		0.85		
10	3582.2	1609-1634	1973.2-1948.2		1.06	1.10
14	3578	1575-1599	2003-1979	1.15		1.20
15	3606	1651-1696	1955-1910			1.16
16	3707 (GL)	1778-1804	1929-1903			
19	3611.7	1656-1675	1955.7-1936.7		0.92	1.16
20	3713	1802-1856	1911-1857			1.08
21	3718	1814-1825	1904-1893			1.10
22	3583	1618-1672	1965-1911	1.06		1.20
23	3622.1	1664-1674	1958.1-1948.1			
24	3698.6	1778-1824	1920.6-1874.6			1.05
25	3684.4	1762-1809	1922.4-1875.4	0.88	1.00	1.06

INJECTION FALLOFF DATA

TYPE CURVE PLOT - HORIZONTAL FRACTURE No. 21



TYPE CURVE PLOT - HORIZONTAL FRACTURE No. 10



RESULTS FROM INJECTION FALLOFF TESTS

- Permeability is 1.0 - 4.0 md
- Fracture lengths range from 130-330 ft
- Pressure falloff data match solutions for both horizontal and vertical fractures, but best match is for horizontal fractures

FRACTURE GROWTH PREDICTIONS

FRACTURE PREDICTIONS

Case 1 - Current Conditions

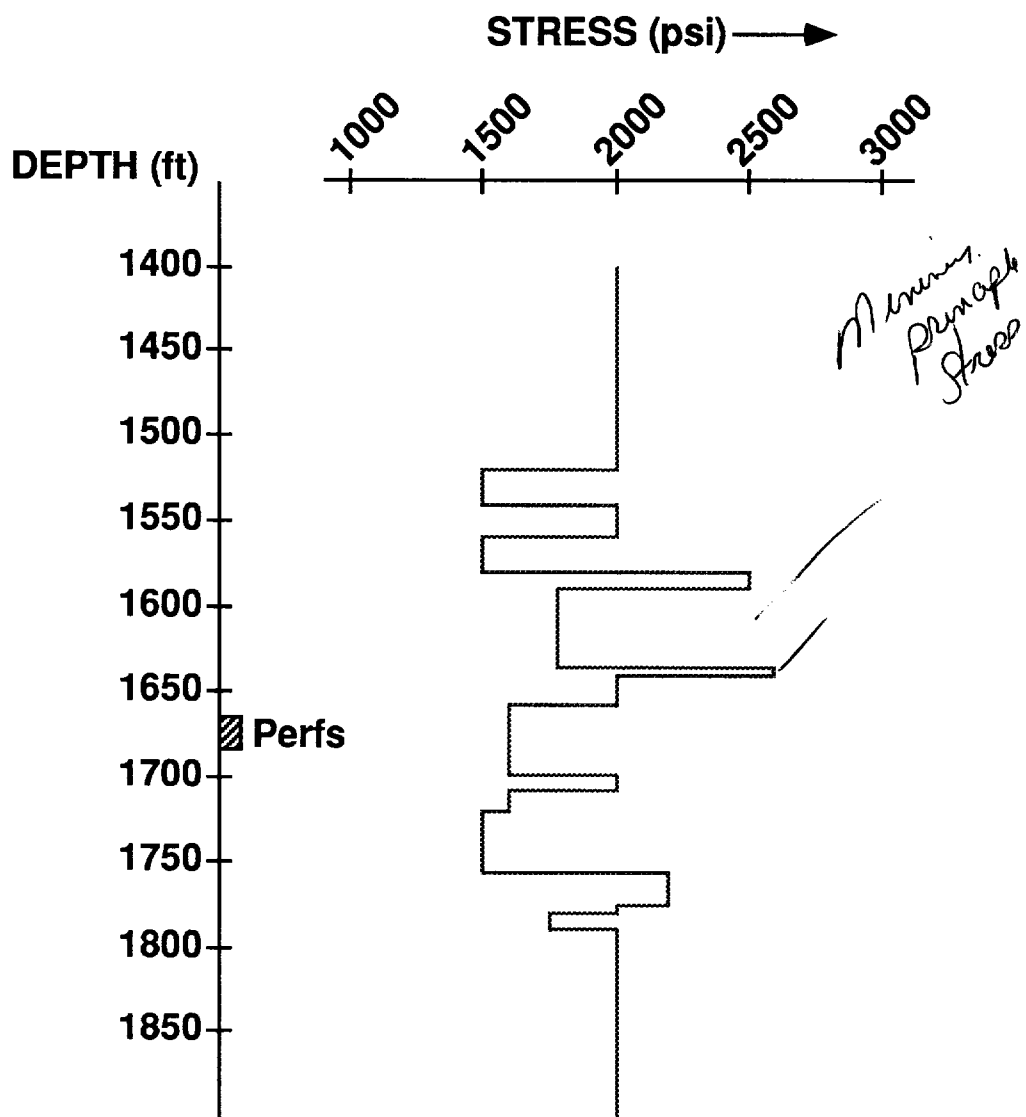
- 0.25 BPM (360 BPD)
- Stress profile from RLU #23
- Surface pressure = 1100 - 1200 psi

Case 2 - Repressurized (Higher Stress)

- 0.25 BPM (360 BPD)
- Higher stress in Penrose (1950 psi) due to repressurization
- Surface pressure = 1500 psi

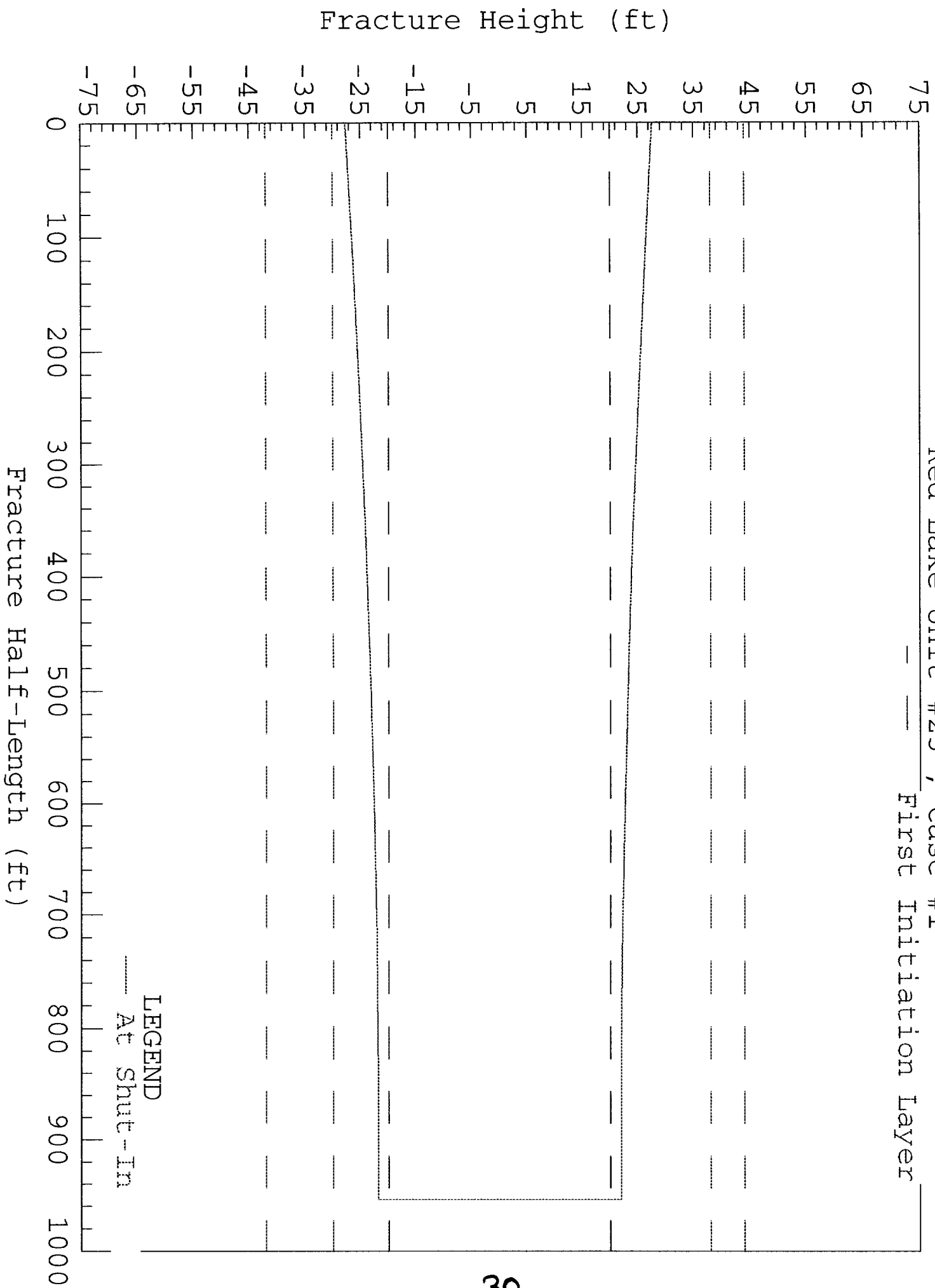
IN-SITU STRESS PROFILE

Red Lake Unit No. 23
Eddy County, New Mexico

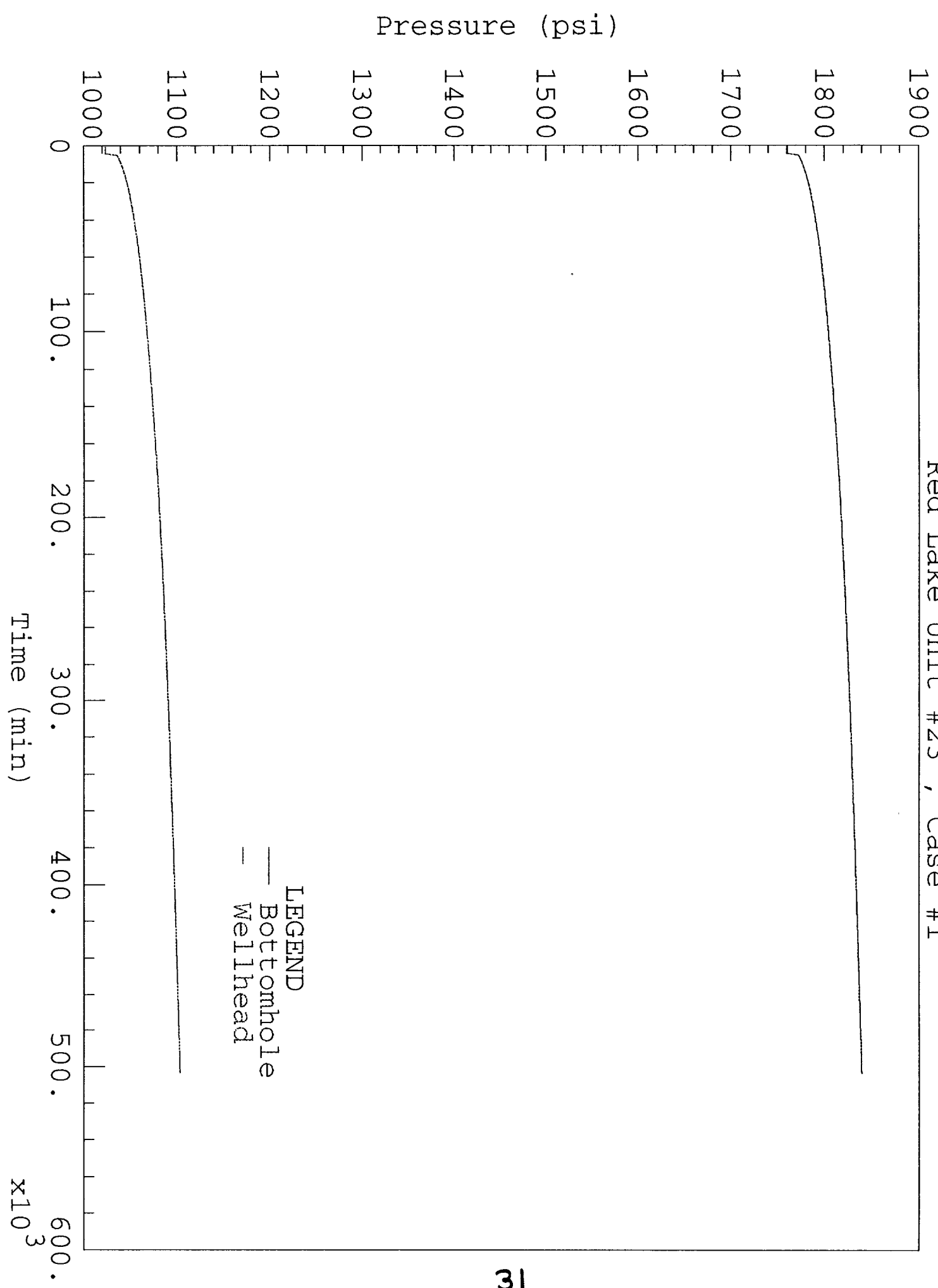


Fracture Height Profile Plot Red Lake Unit #23 , Case #1

— First Initiation Layer

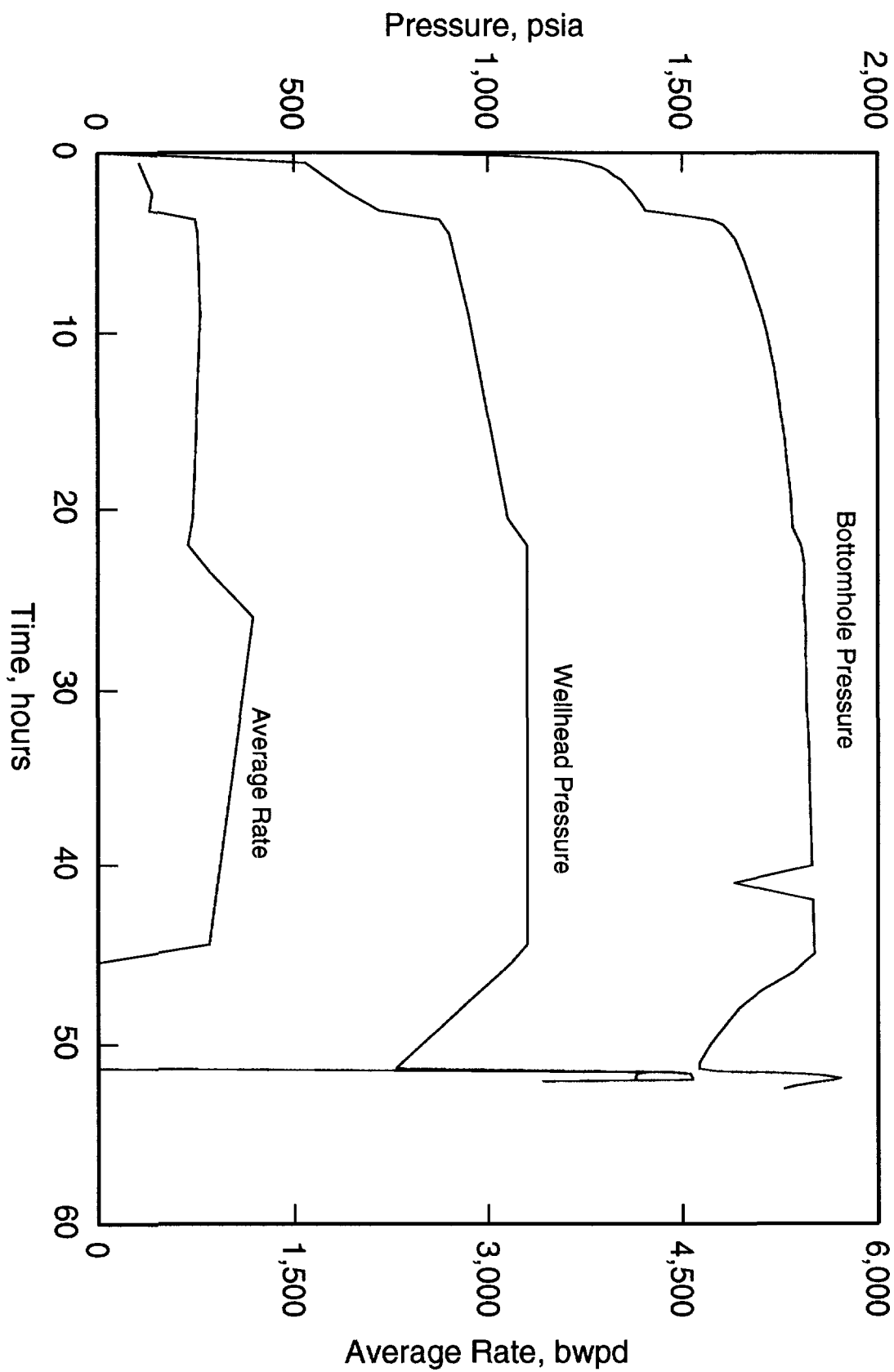


Treatment Pressure vs Time Plot
Red Lake Unit #23 , Case #1



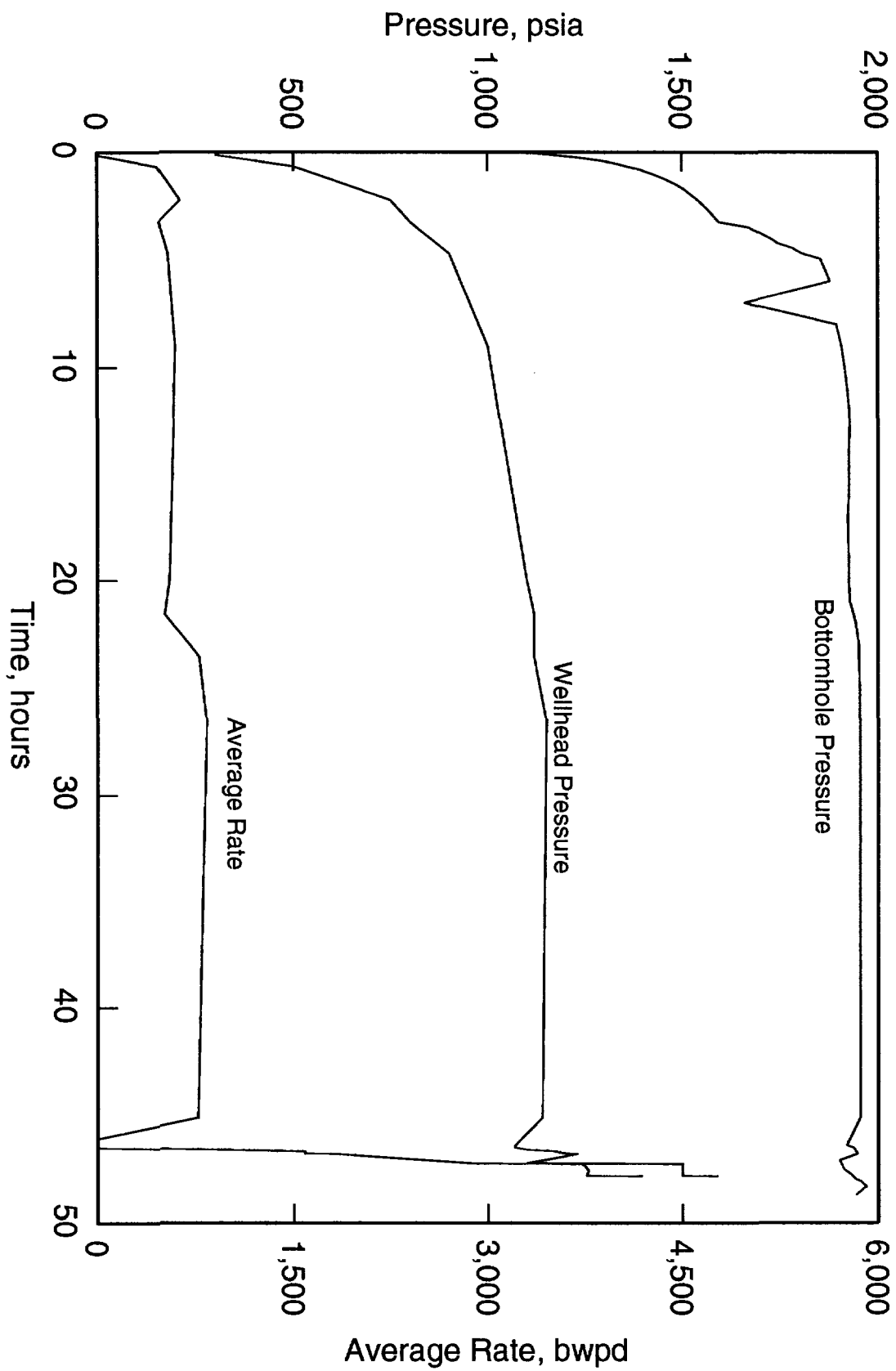
BEACH EXPLORATION

Red Lake Unit #10



BEACH EXPLORATION

Red Lake Unit #21



Fracture Height Profile Plot Red Lake Unit #23 , Case #2

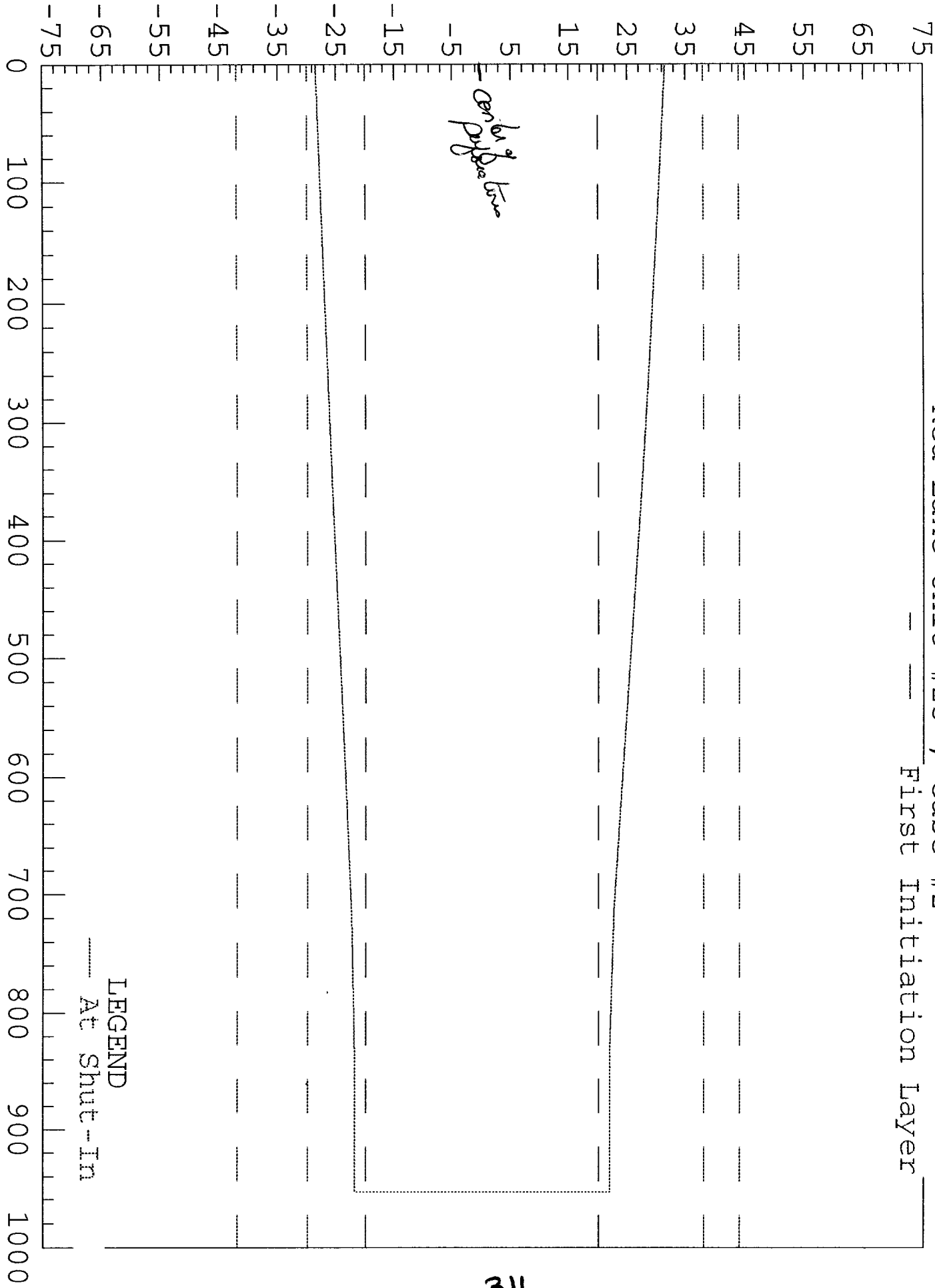
First Initiation Layer

Fracture Height (ft)

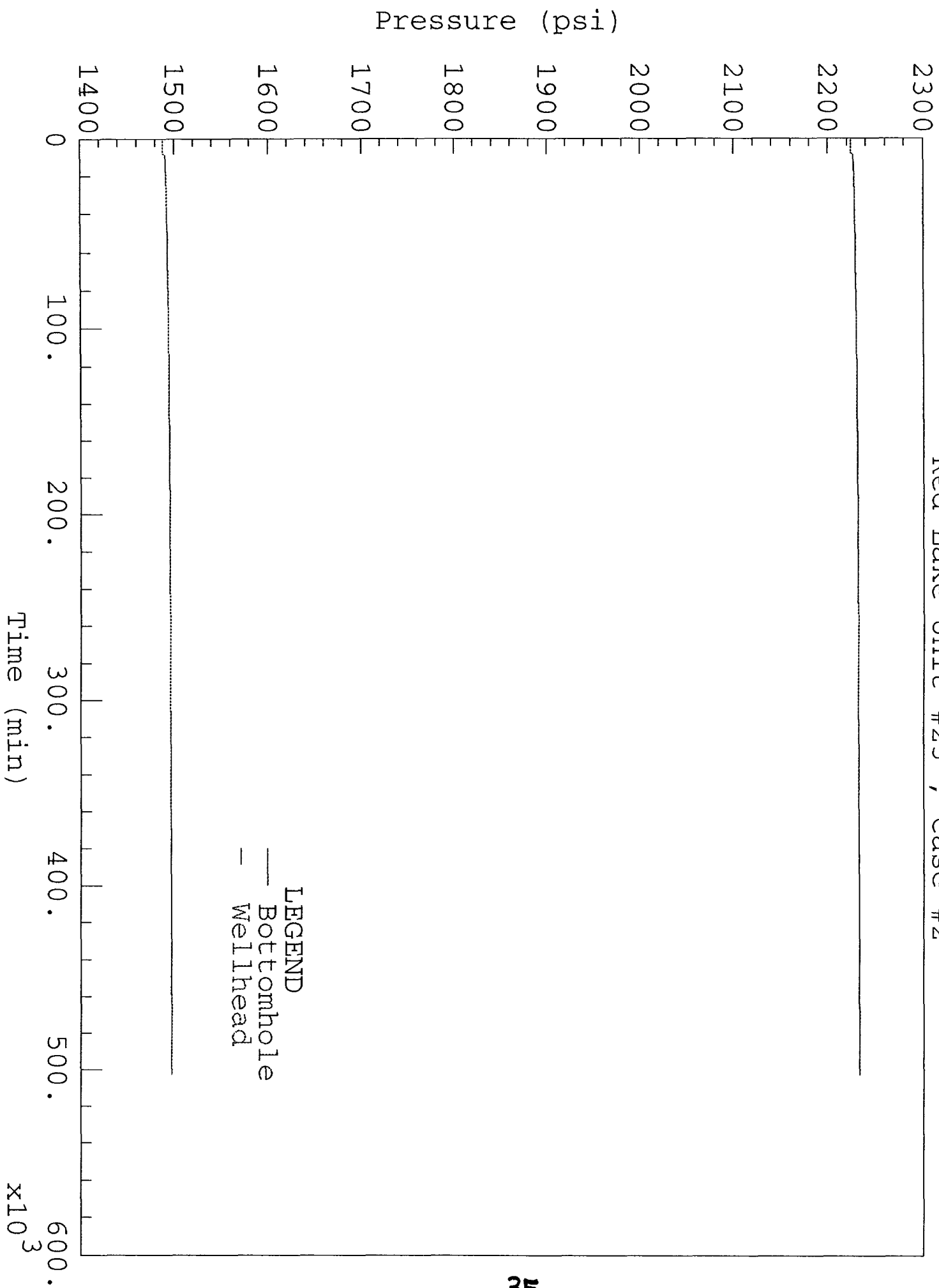
center of perforation

LEGEND
At Shut-In

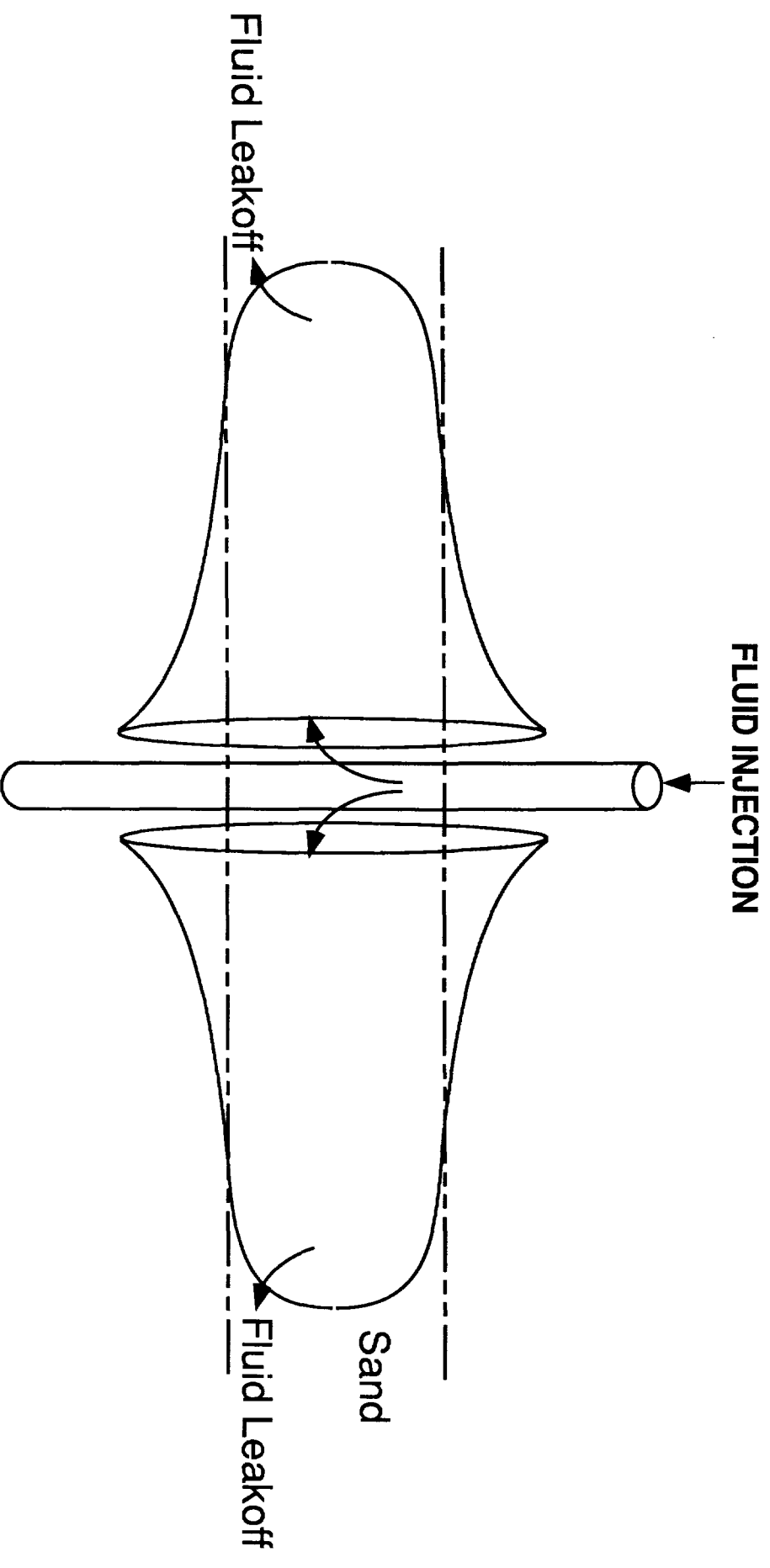
Fracture Half-Length (ft)



Treatment Pressure vs Time Plot
Red Lake Unit #23 , Case #2

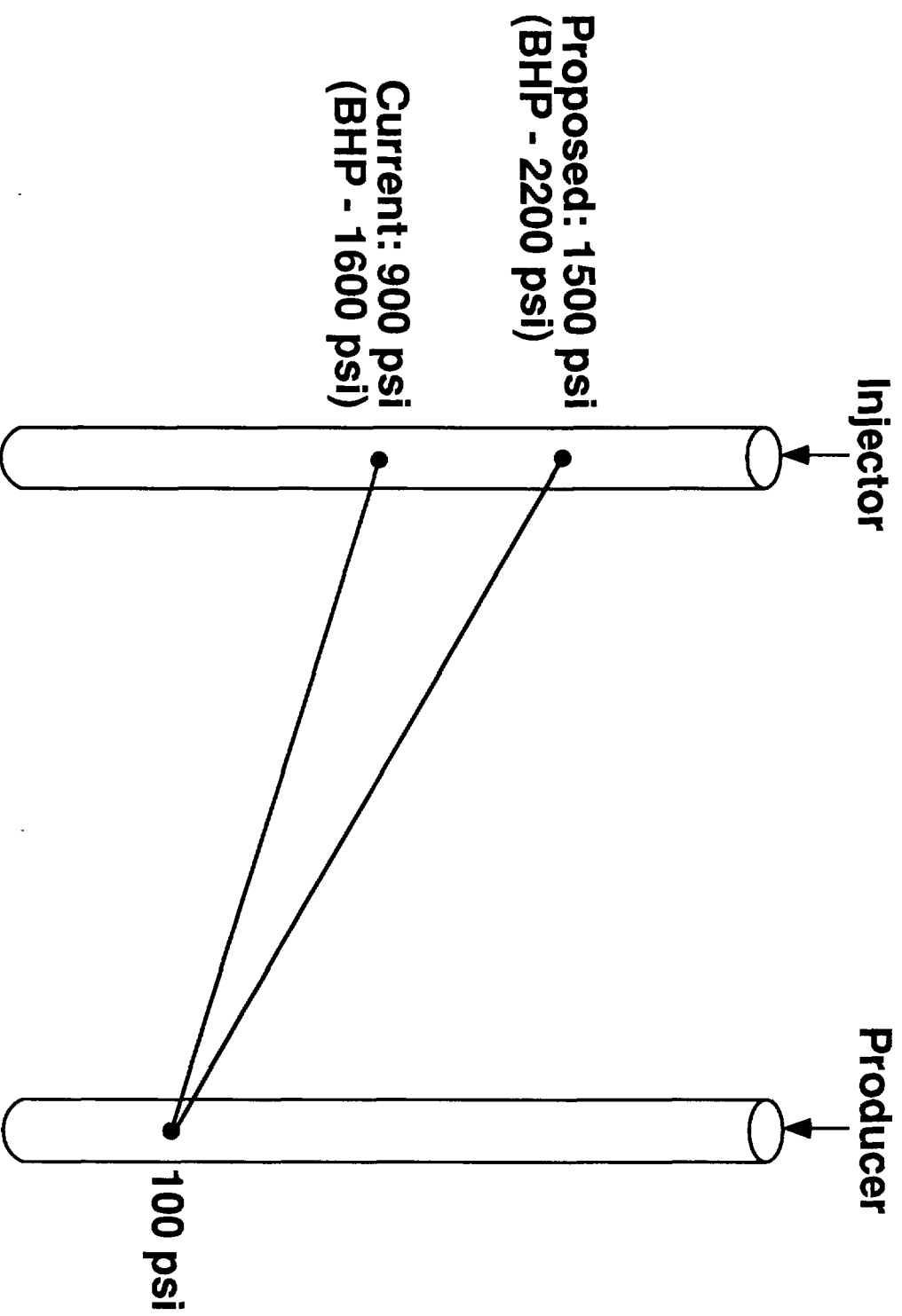


FRACTURE GROWTH EQUILIBRIUM



Fracture Quits Growing When Fluid Inj. = Fluid Leakoff

Pressure Equilibrium Between Wells



SUMMARY OF RESULTS

- Data analysis supports the presence of horizontal fractures in the Red Lake Unit.
- If horizontal fractures exist, fracture height growth out of zone will not be a problem.
- If vertical fractures are present, sufficient stress contrast exists to contain fracture height growth.
- For horizontal or vertical fractures, an equilibrium condition will eventually occur where water injection equals fluid leakoff from the fracture. When this occurs, the fracture will stop growing.