



NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

CF 6008
R-5530

January 22, 1997

Texaco Exploration & Production, Inc.
P.O. Box 730
Hobbs, New Mexico 88241-0730

Attn: Mr. James Anderson

**RE: *Injection Pressure Increase,
Central Vacuum Unit Waterflood Project,
Lea County, New Mexico***

Dear Mr. Anderson:

Reference is made to your request dated December 5, 1996 to increase the surface injection pressure on 15 wells in the above referenced waterflood project. This request is based on step rate tests conducted on the subject wells. The results of the tests have been reviewed by my staff and we feel an increase in injection pressure on these wells is justified at this time.

You are therefore authorized to increase the surface injection pressure on the following wells:

<i>Well and Location</i>	<i>Maximum Surface Injection Pressure</i>
Central Vacuum Unit Well No.26, Unit Letter J, Section 25, Twp. 17S, Rge. 34E	1500 PSIG
Central Vacuum Unit Well No.27, Unit Letter I, Section 25, Twp.17S, Rge. 34E	1500 PSIG
Central Vacuum Unit Well No.28, Unit Letter L, Section 30, Twp.17S, Rge. 35E	1550 PSIG
Central Vacuum Unit Well No.41, Unit Letter O, Section 25, Twp.17S, Rge.34E	1520 PSIG

Injection Pressure Increase

Texaco Exploration & Production, Inc.

January 22, 1997

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<i>Well and Location</i>	<i>Maximum Surface Injection Pressure</i>
Central Vacuum Unit Well No.42, Unit Letter P, Section 25, Twp. 17S, Rge. 34E	1450 PSIG
Central Vacuum Unit Well No.43, Unit Letter M, Section 30, Twp. 17S, Rge. 35E	1500 PSIG
Central Vacuum Unit Well No.55, Unit Letter D, Section 36, Twp. 17S, Rge. 34E	1500 PSIG
Central Vacuum Unit Well No.57, Unit Letter A, Section 36, Twp. 17S, Rge. 34E	1530 PSIG
Central Vacuum Unit Well No.58, Unit Letter D, Section 31, Twp. 17S, Rge. 35E	1500 PSIG
Central Vacuum Unit Well No.71, Unit Letter G, Section 36, Twp. 17S, Rge. 34E	1500 PSIG
Central Vacuum Unit Well No.74, Unit Letter E, Section 31, Twp. 17S, Rge. 35E	1500 PSIG
Central Vacuum Unit Well No.84, Unit Letter M, Section 31, Twp. 17S, Rge. 35E	1450 PSIG
Central Vacuum Unit Well No.93, Unit Letter M, Section 31, Twp. 17S, Rge. 35E	1400 PSIG
Central Vacuum Unit Well No.94, Unit Letter N, Section 31, Twp. 17S, Rge. 35E	1550 PSIG
Central Vacuum Unit Well No.138, Unit Letter P, Section 36, Twp. 17S, Rge. 34E	1550 PSIG
All wells located in Lea County, New Mexico.	

Injection Pressure Increase

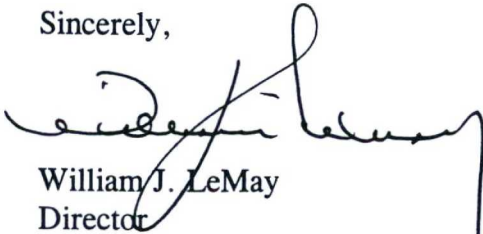
Texaco Exploration & Production, Inc.

January 22, 1997

Page 3

The Division Director may rescind this injection pressure increase if it becomes apparent that the injected water is not being confined to the injection zone or is endangering any fresh water aquifers.

Sincerely,

A handwritten signature in dark ink, appearing to read "William J. LeMay", is written over the typed name and title. The signature is fluid and cursive, with a large loop at the end.

William J. LeMay
Director

WJL/BES

cc: Oil Conservation Division - Hobbs
Files: Case File No.6008 (R-5530); PSI-X 2nd QTR 97

3rd

PSI-X N/R



Texaco E & P

205 E. Bender Blvd.
Hobbs NM 88240
505 393 7191

NEW MEXICO OIL CONSERVATION DIVISION
RECEIVED
DEC 8 1996

December 5, 1996

New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87501

Attention: Mr. David R. Catanach

Re: Request for Increase in Surface Injection Pressure Limits
Texaco Exploration and Production Inc.
Central Vacuum Unit
T-17/18-S, R-34/35-E, Lea County, New Mexico

Dear Mr. Catanach

Texaco requests that the surface injection pressure limit be increased for the attached list of wells. Step rate tests were run and the results of those tests are attached. A summary of the results of the step rate tests is shown in the list of wells.

The higher injection limits are request to obtain better sweep efficiency in the patterns and will be necessary for the miscible CO₂ flood planned to begin early 1997. If additional information is needed, please contact me at (505) 397-0420.

Yours very truly,

James Anderson
Production Engineer

attachments

cc: Mr. Jerry Sexton
Hobbs NMOCD

R 5530

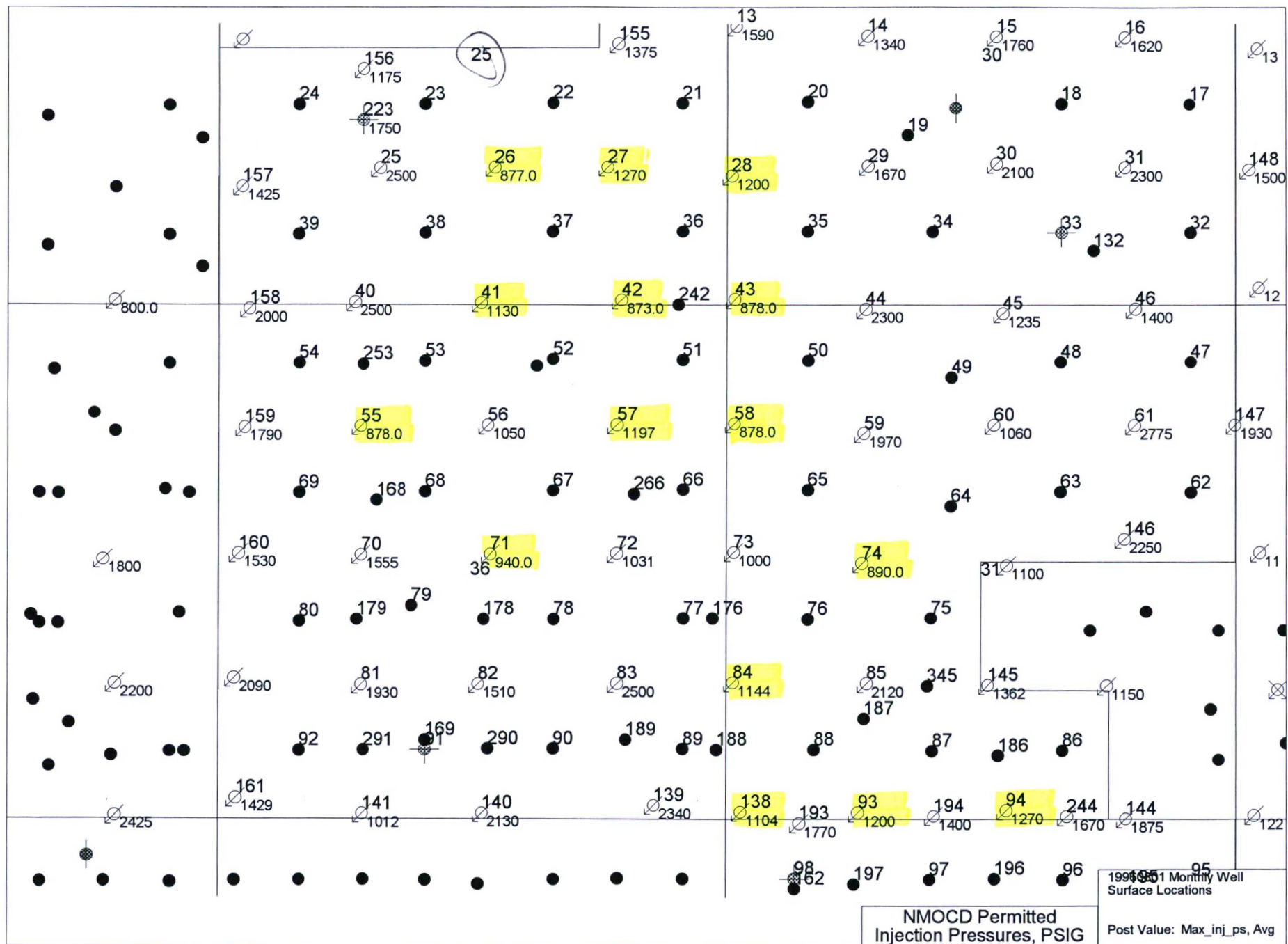
List of Wells and Summary of Step Rate Tests

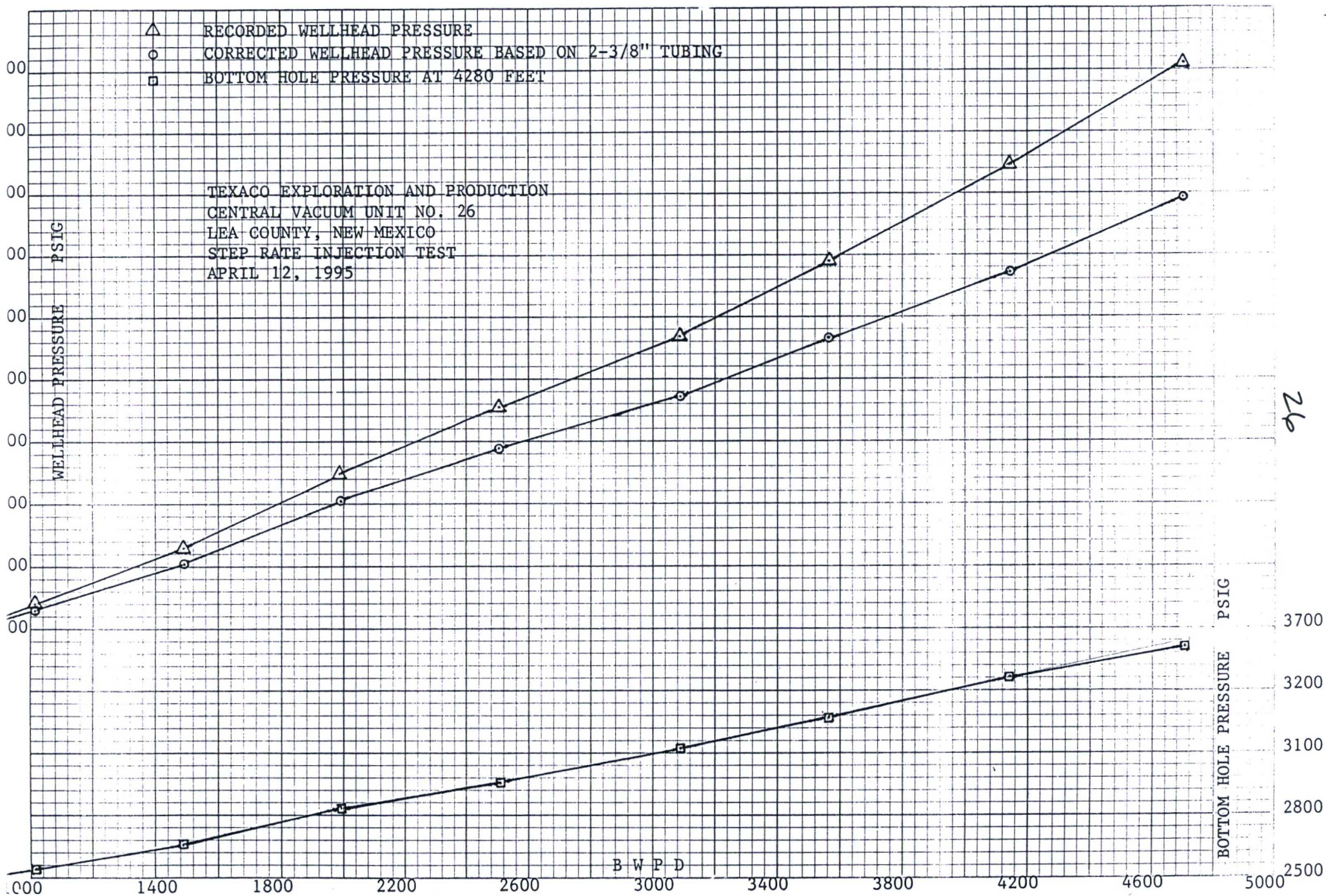
<u>Well No.</u>	<u>Observed Surface Parting Pressure</u>	<u>Requested Injection Pressure Limit</u>
26	No break to 2800 psig	1500 psig 25.17.35
27	No break to 3000 psig	1500 psig
28	1600 psig	1550 psig
41	1570 psig	1520 psig
42	No break to 1450 psig	1450 psig
43	No break to 2800 psig	1500 psig
55	No break to 2500 psig	1500 psig
57	1580 psig	1530 psig
58	No break to 2300 psig	1500 psig
71	No break to 2500 psig	1500 psig
74	No break to 4000 psig	1500 psig
84	1500 psig	1450 psig
93	1450 psig	1400 psig
94	1600 psig	1550 psig
138	1600 psig	1550 psig

Requested pressures are 50 psig below the Surface Parting Pressure, unless no break occurred during the test. Wells showing no break have a requested pressure of 1500 psig, except for No. 42 which was only run to 1450 psig.

17-34

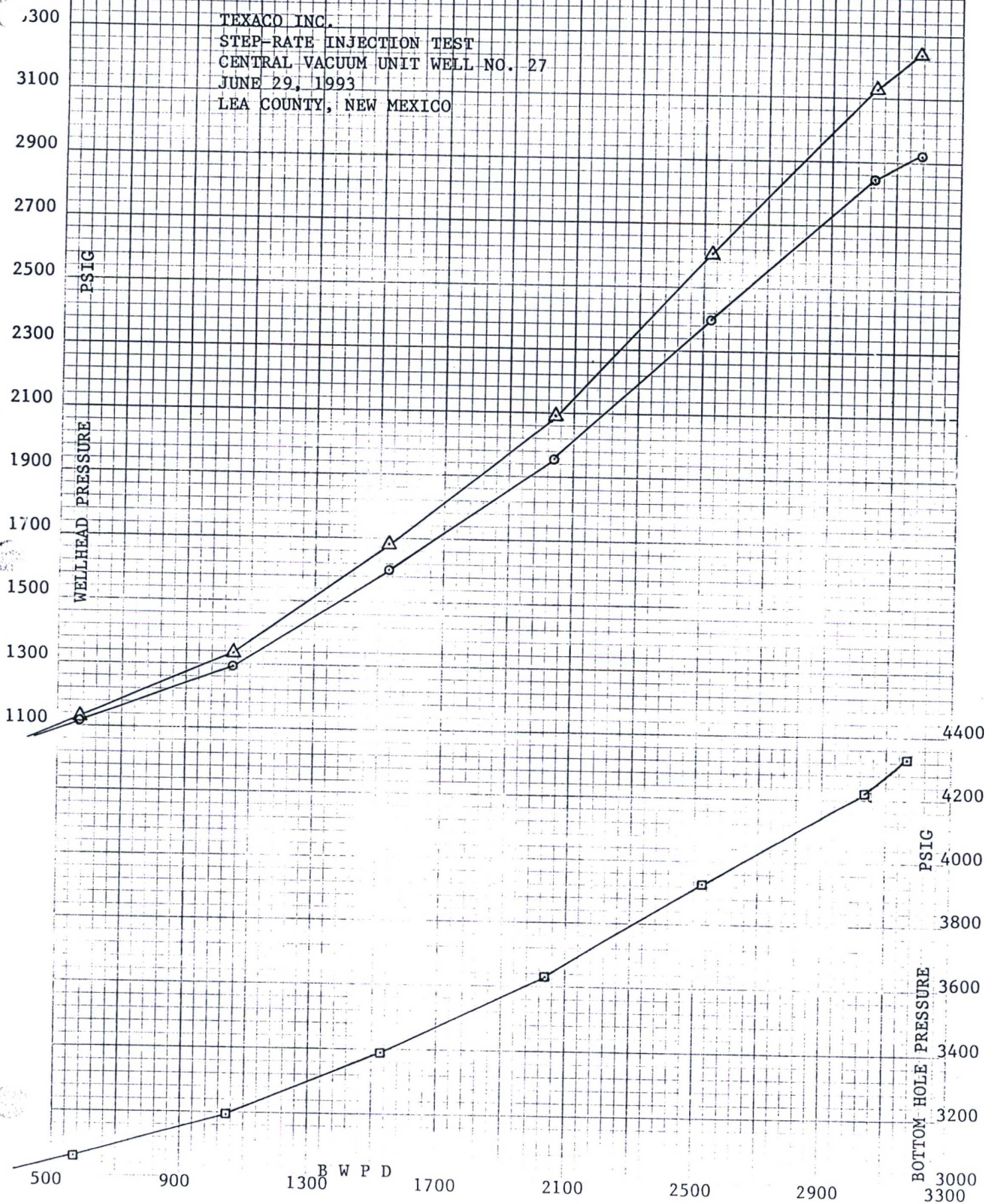
17-35





- △ RECORDED WELLHEAD PRESSURE
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
□ BOTTOM HOLE PRESSURE @ 4329 FEET

TEXACO INC.
STEP-RATE INJECTION TEST
CENTRAL VACUUM UNIT WELL NO. 27
JUNE 29, 1993
LEA COUNTY, NEW MEXICO



- △ RECORDED WELLHEAD PRESSURE
○ CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
□ BOTTOM HOLE PRESSURE @ 4371 FEET

1900

1700

1500

1300

1100

900

700

500

300

100

PSIG

WELLHEAD PRESSURE

TEXACO PRODUCTION INC.
STEP-RATE INJECTION TEST
CENTRAL VACUUM UNIT NO. 28
MAY 19, 1992
W.O. NO. 92140695

3200

3000

2800

2600

2400

2200

2000

PSIG

BOTTOM HOLE PRESSURE

B W P D

600

1200

1800

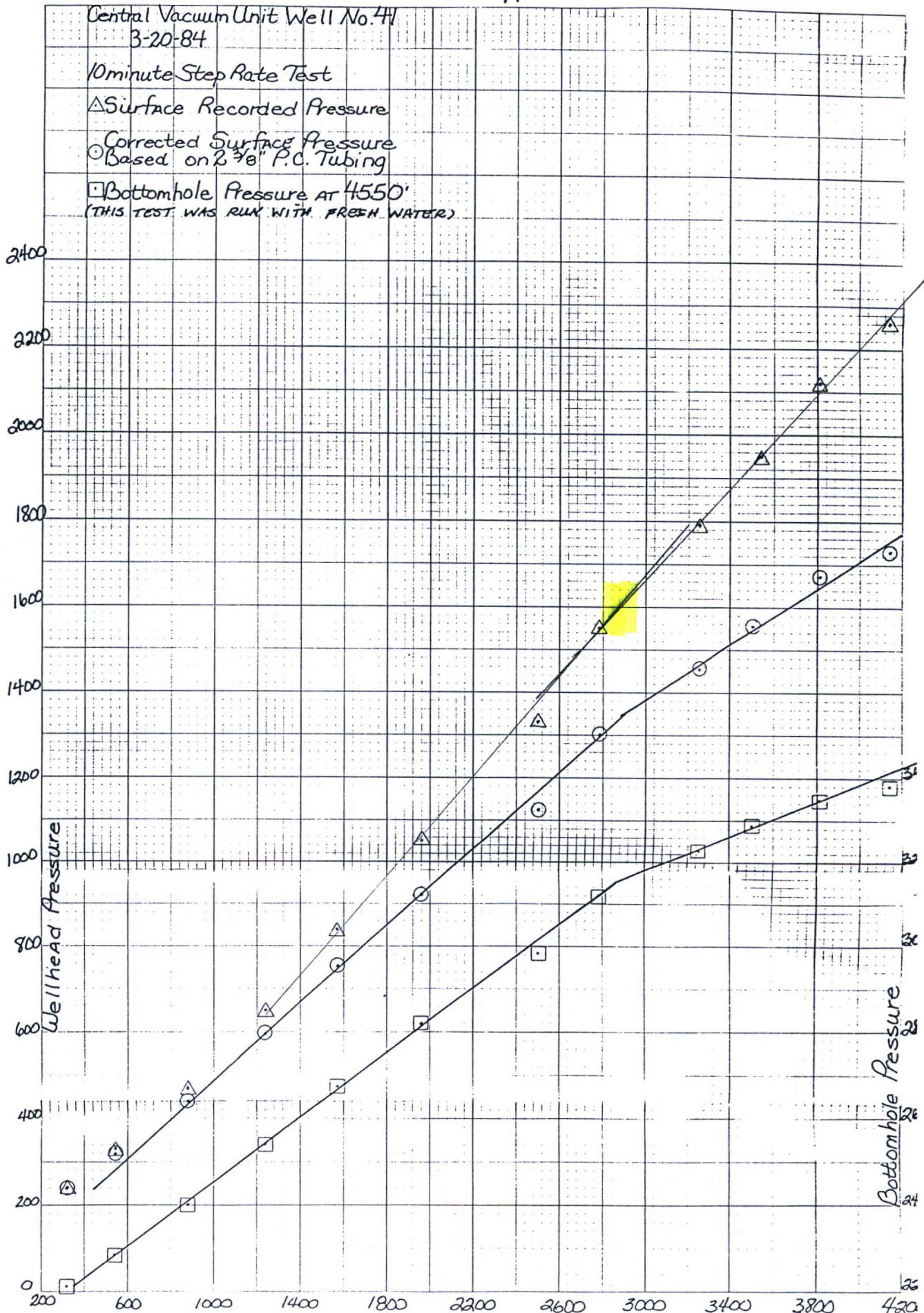
2400

3000

3600

4200

41



PETRO LOG INC.

(806) 637-4993

P. O. Box 588

Brownfield, Texas 79316

TEXACO

CENTRAL VACUUM UNIT WELL NO. 41

10 MINUTE STEP RATE TEST

MARCH 20, 1984

2 3/8" P.C. TUBING

BOMB DEPTH 4550'

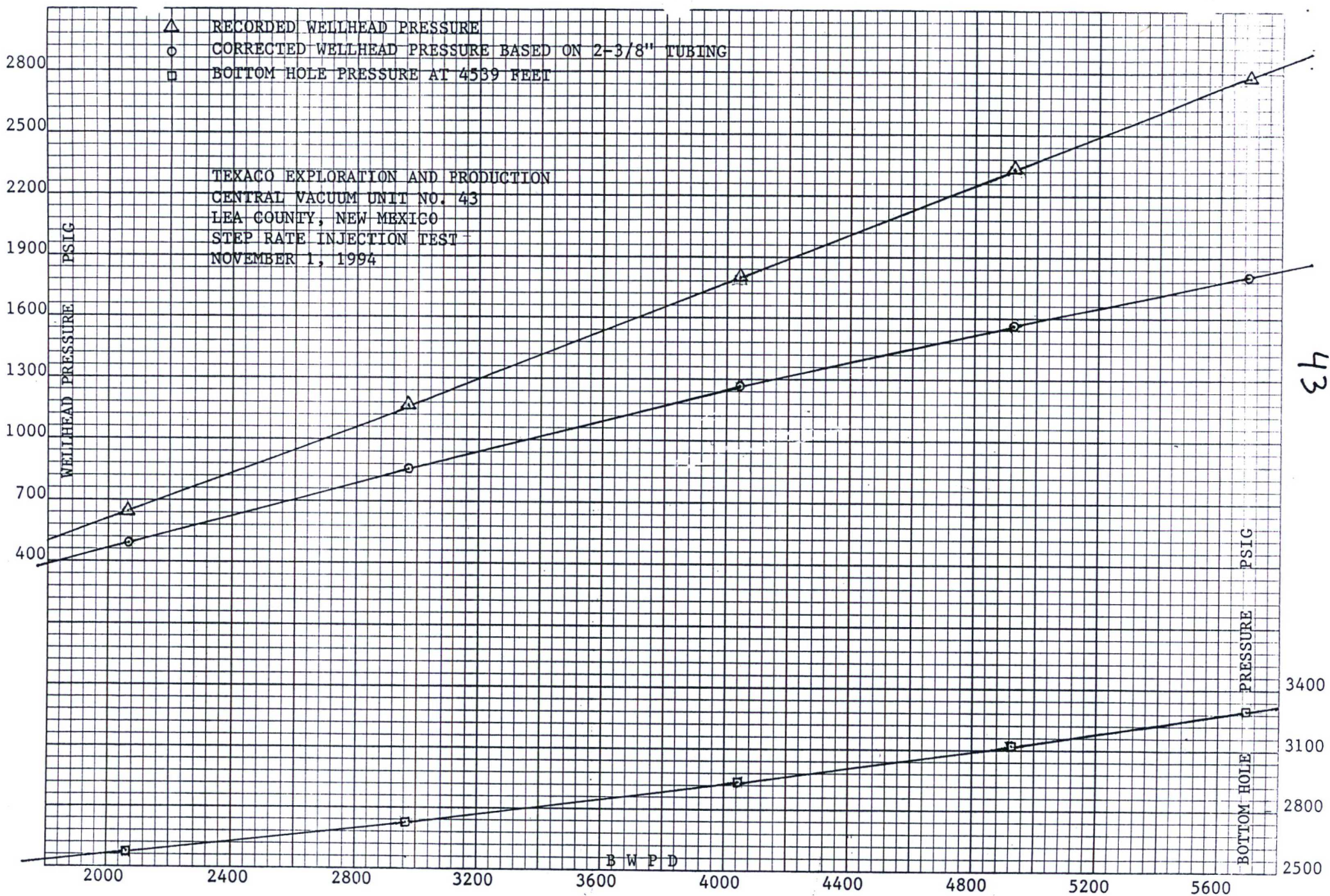
<u>POINT NO.</u>	<u>TIME</u>	<u>RATE (BWPD)</u>	<u>GAUGE</u>	<u>FRICTION</u>	<u>CORRECTED</u>	<u>BHP</u>
1	10:55	320	240		240	2212
2	11:05	540	330	12	318	2284
3	11:15	880	470	28	442	2400
4	11:25	1240	650	55	595	2541
5	11:35	1570	840	85	755	2675
6	11:45	1960	1050	127	923	2818
7	11:55	2500	1330	204	1126	2984
8	12:05	2780	1550	249	1301	3120
9	12:15	3250	1790	334	1456	3227
10	12:25	3540	1950	395	1555	3287
11	12:35	3810	2120	447	1673	3347
12	12:45	4140	2260	529	1731	3382

True ↑
Surface

no ↑
friction

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
- BOTTOM HOLE PRESSURE AT 4539 FEET

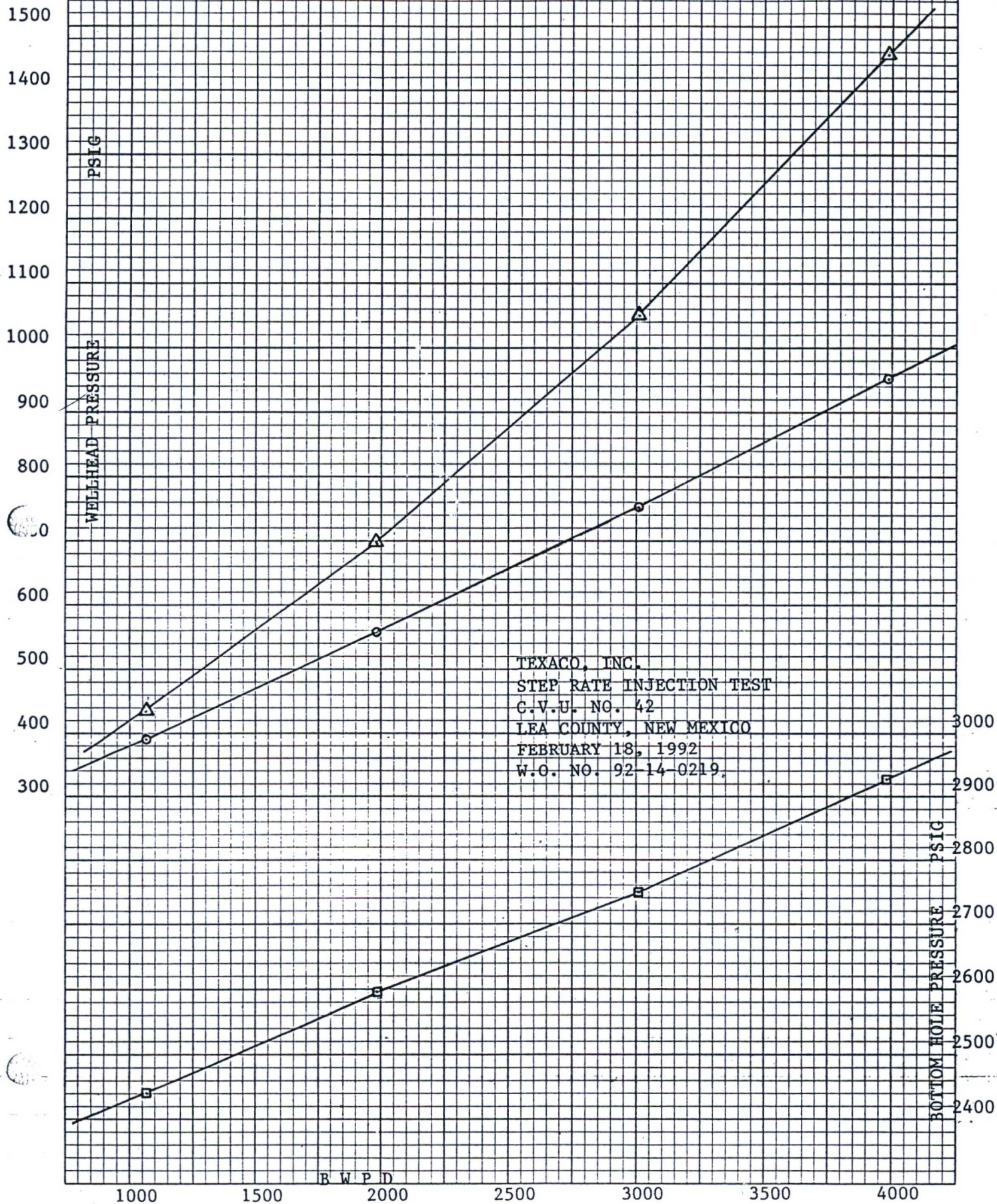
TEXACO EXPLORATION AND PRODUCTION
CENTRAL VACUUM UNIT NO. 43
LEA COUNTY, NEW MEXICO
STEP RATE INJECTION TEST
NOVEMBER 1, 1994



43

42

- △ RECORDED WELLHEAD PRESSURE
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
□ BOTTOM HOLE PRESSURE @ 4532 FEET



- Bottom Hole Pressure @ 4,554 Feet
- △ Recorded Wellhead Pressure
- Corrected Wellhead Pressure Based on 2 3/8" Tubing
(No friction)

TEXACO PRODUCING, INC.
Central Vacuum Unit No. 57
Step-rate Injection Test

PSIG
Bottom Hole Pressure

PSIG
Wellhead Pressure

B W P D

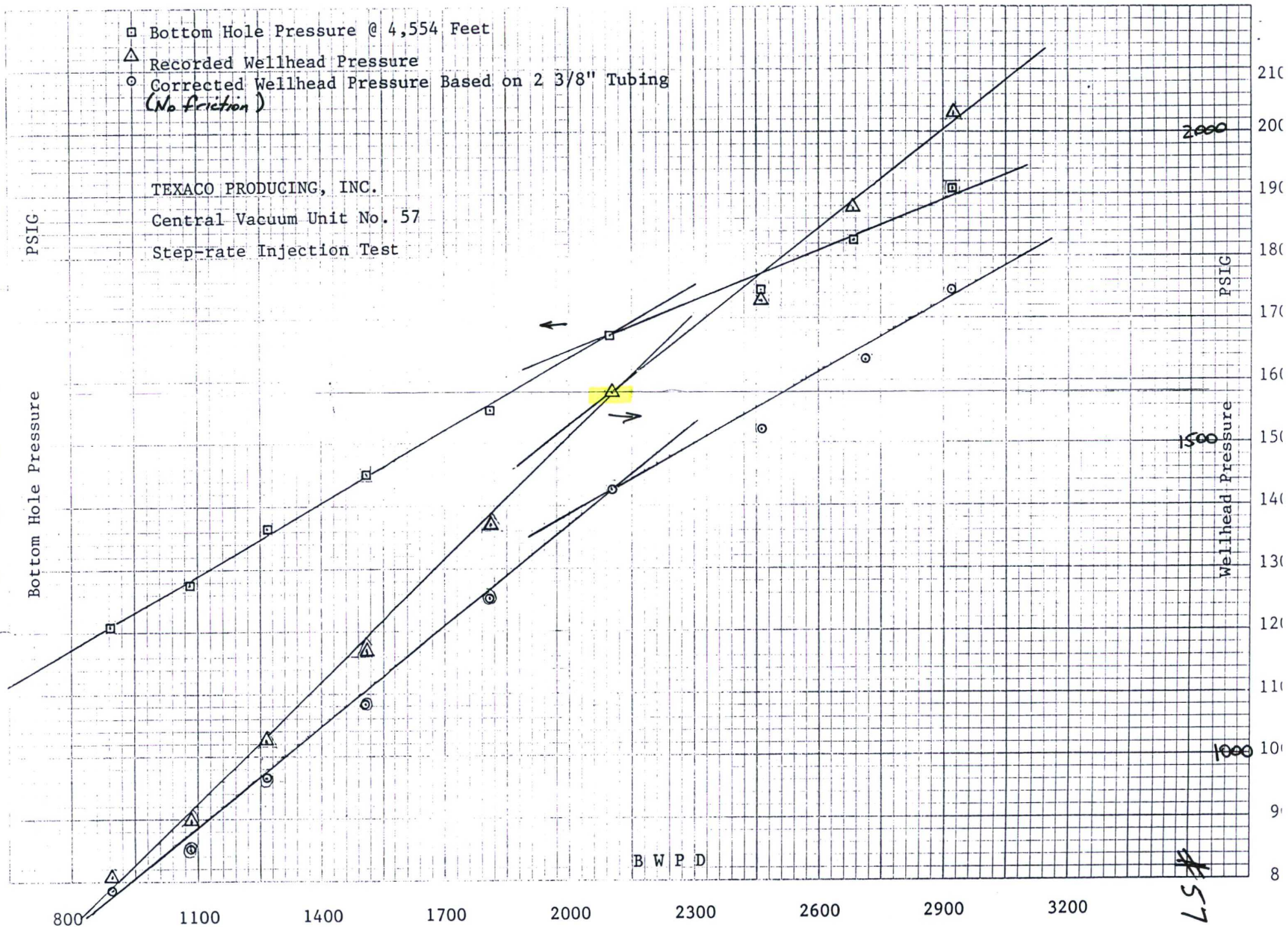
800 1100 1400 1700 2000 2300 2600 2900 3200

2000

1500

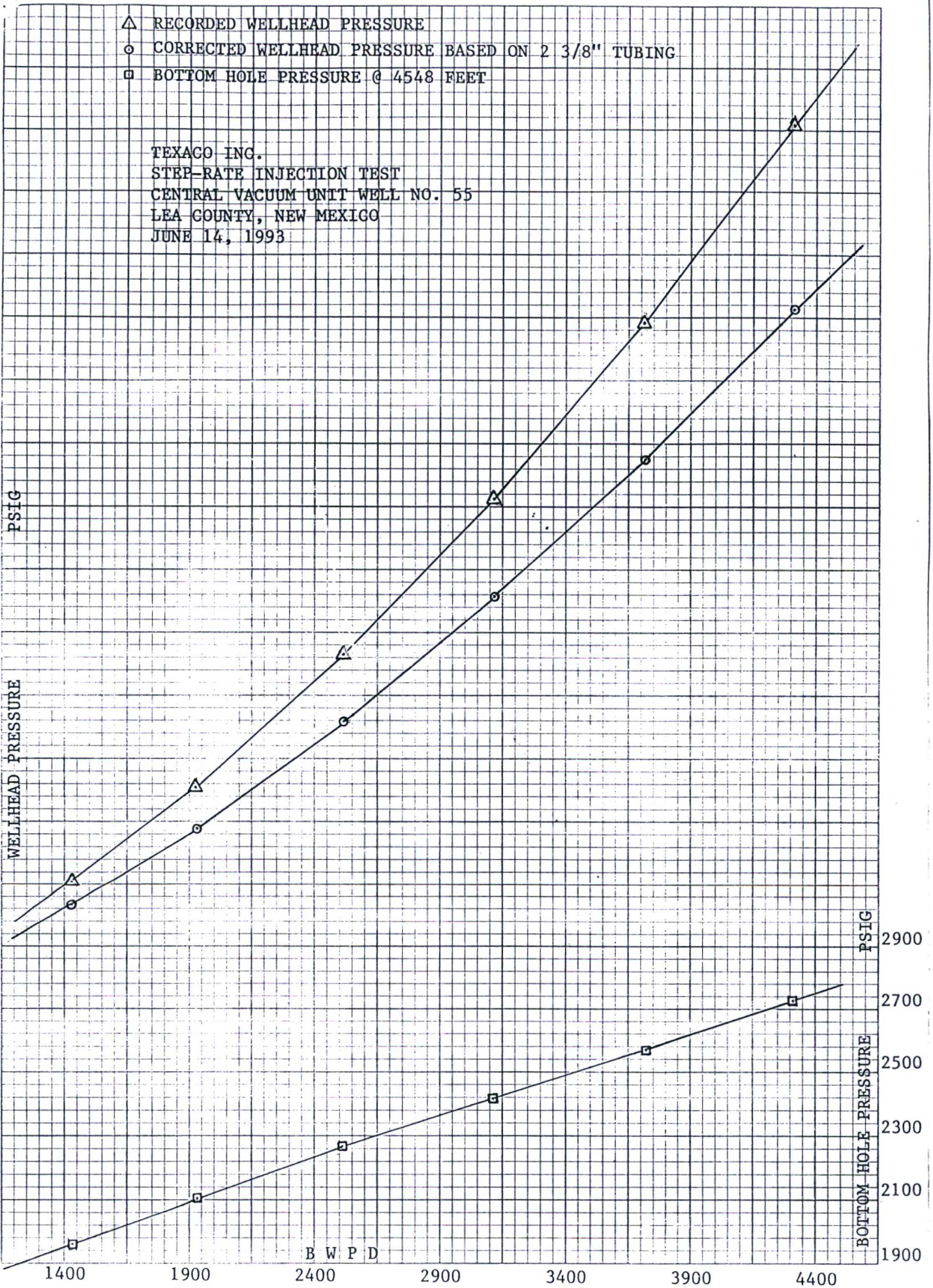
1000

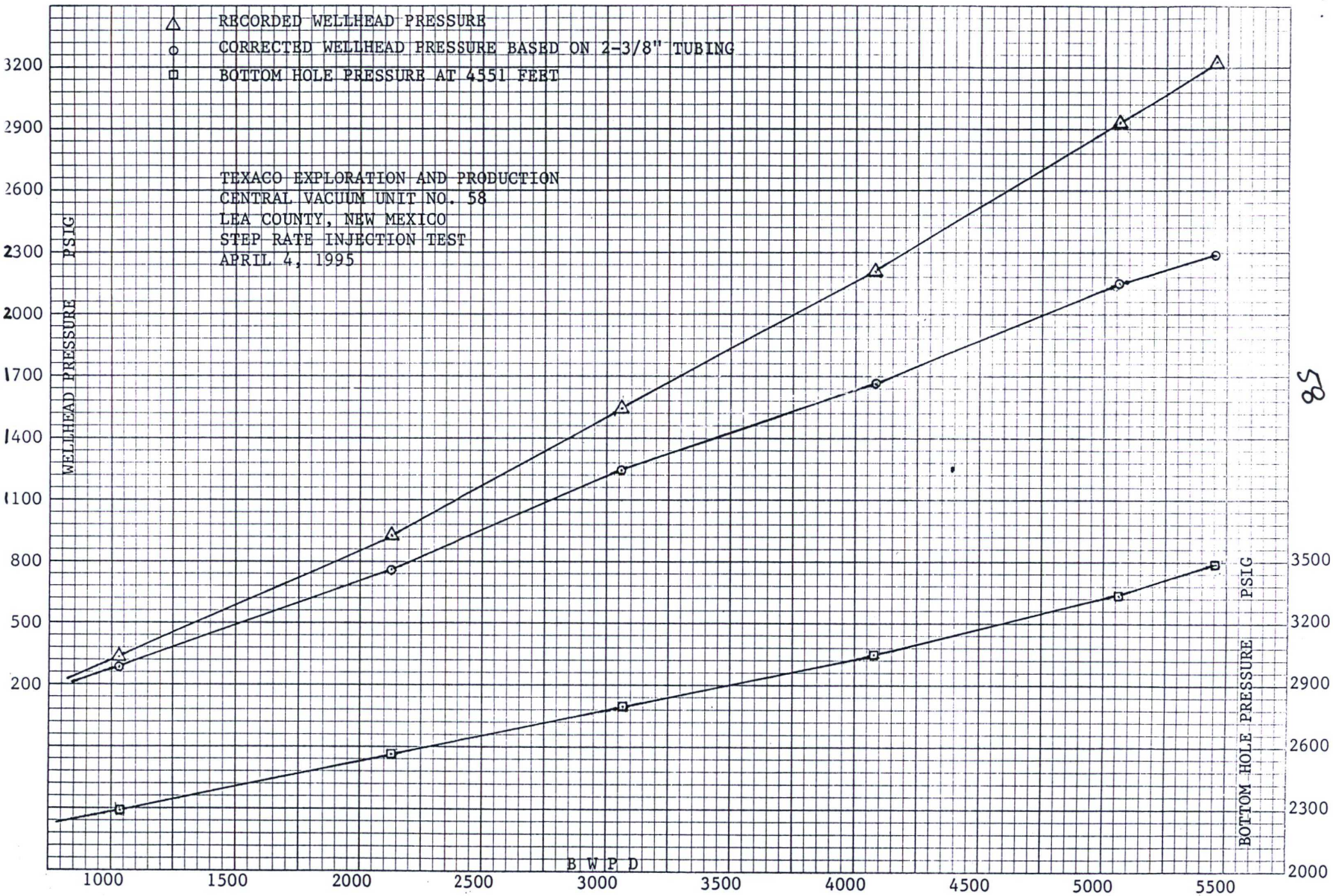
#57



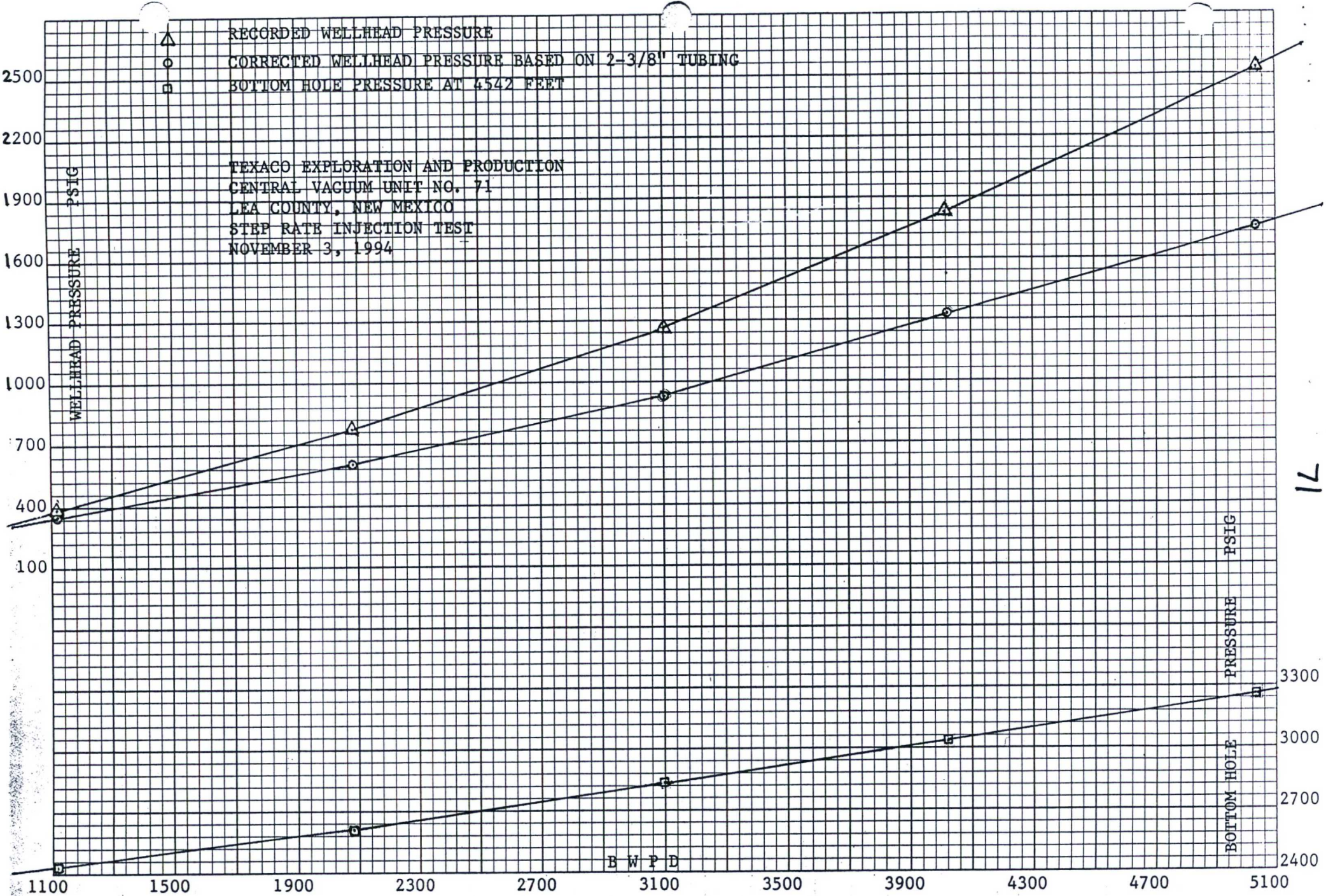
- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
- BOTTOM HOLE PRESSURE @ 4548 FEET

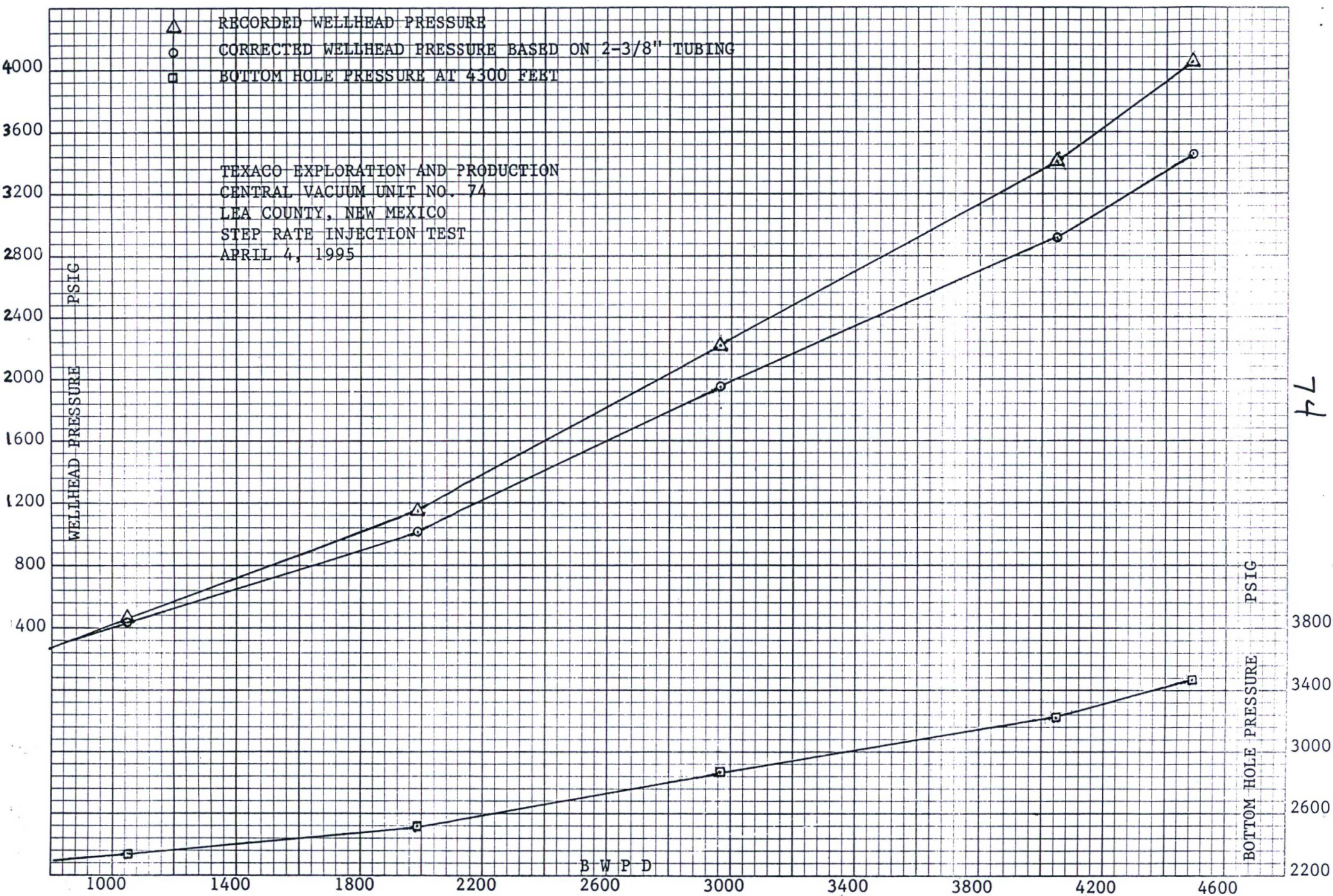
TEXACO INC.
STEP-RATE INJECTION TEST
CENTRAL VACUUM UNIT WELL NO. 55
LEA COUNTY, NEW MEXICO
JUNE 14, 1993



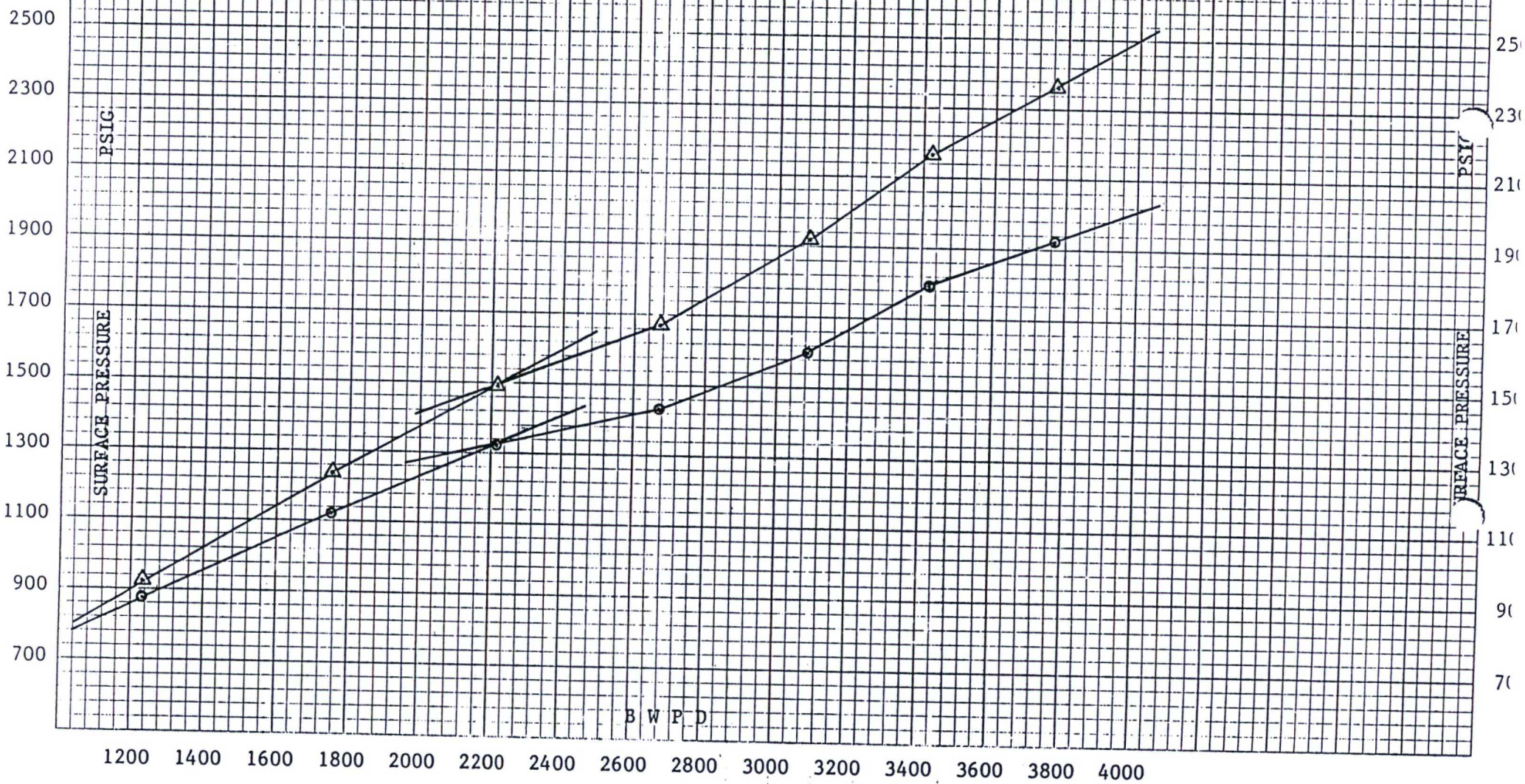


85

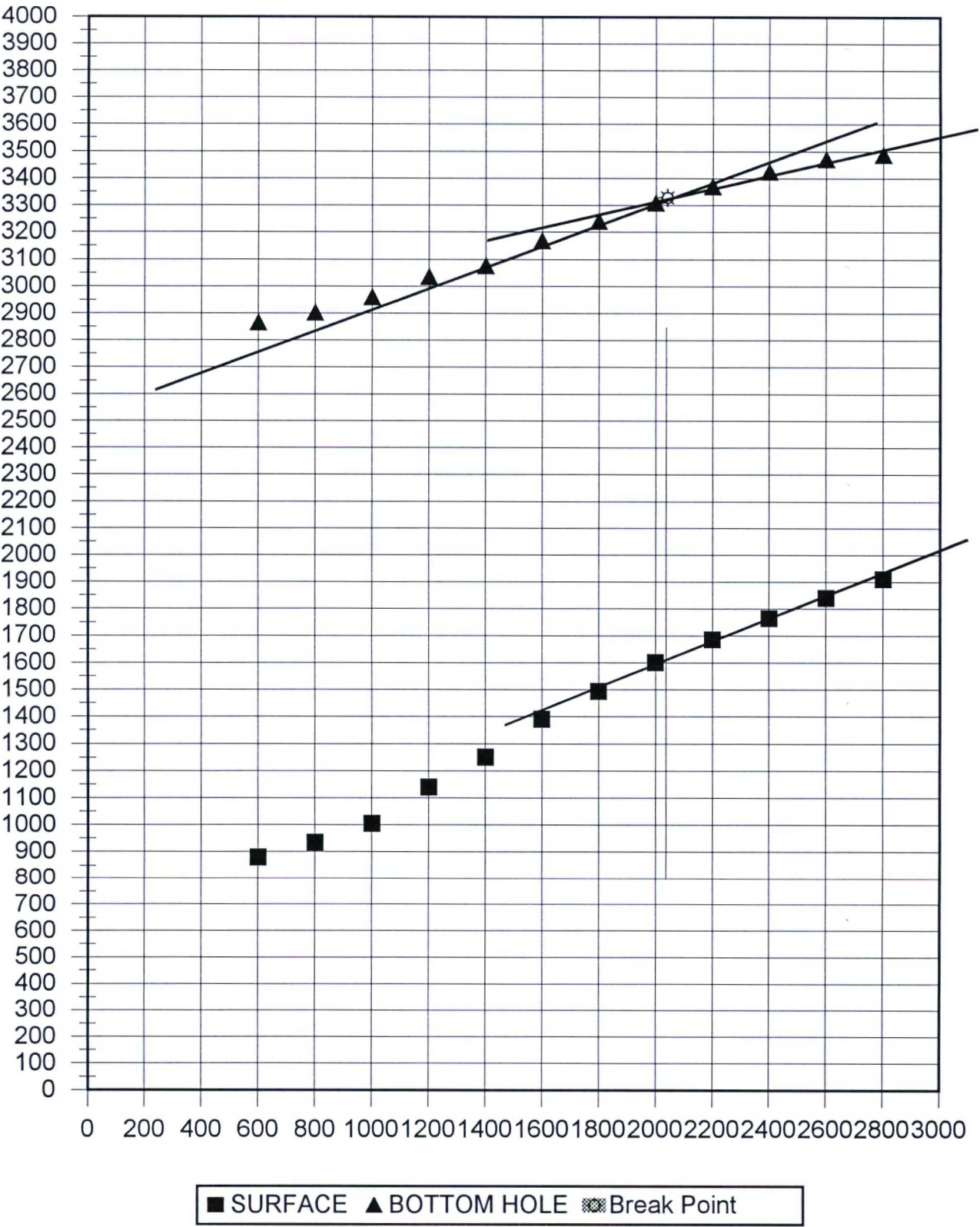




TEXACO, INC.
C V U # 84
Step-rate Injection Test



Central Vacuum Unit No. 94



STEP RATE TESTERS, INC.

915/366-3409

P. O. Box 13094

ODESSA, TEXAS 79768

No. _____

COMPANY Texaco Inc. DATE 9.14.88

ADDRESS _____

WELL # 94 LEASE Central Vacuum Unit

WELL FILE DATA:

T.D. 4239 PACKERS @ 4293 PERFS. 4343-4699

TBG. ID. 2 3/8 TBG. COATING _____ DEPTH SN. _____ BHP @ 4520'

STABILIZATION:

RATE 600 BWPD PRES. 2866 PSIG. CUMULATIVE _____ BBLS.

INCREMENTS:

RATE 200 BWPD PRES. _____ PSIG. STEP LENGTH 15 MINS.

TEST RESULTS:

FORMATION PARTING POINT 3328 PSIG. @ 2040 BWPD

	RATE BWPD	PRESSURE SURFACE PSIG.	PRESSURE MINUS FRICTION PSIG.	PRESSURE BOTTOM HOLE PSIG.
1.	600	880		2866
2.	800	935	89	2902
3.	1000	1005	92	2960
4.	1200	1140	106	3034
5.	1400	1250	107	3075
6.	1600	1390	109	3167
7.	1800	1495	122	3240
8.	2000	1600	120	3308
9.	2200	1685	125	3368
10.	2400	1765	126	3424
11.	2600	1840	123	3471
12.	2800	1910	170	3488
13.				
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19.				
20.				

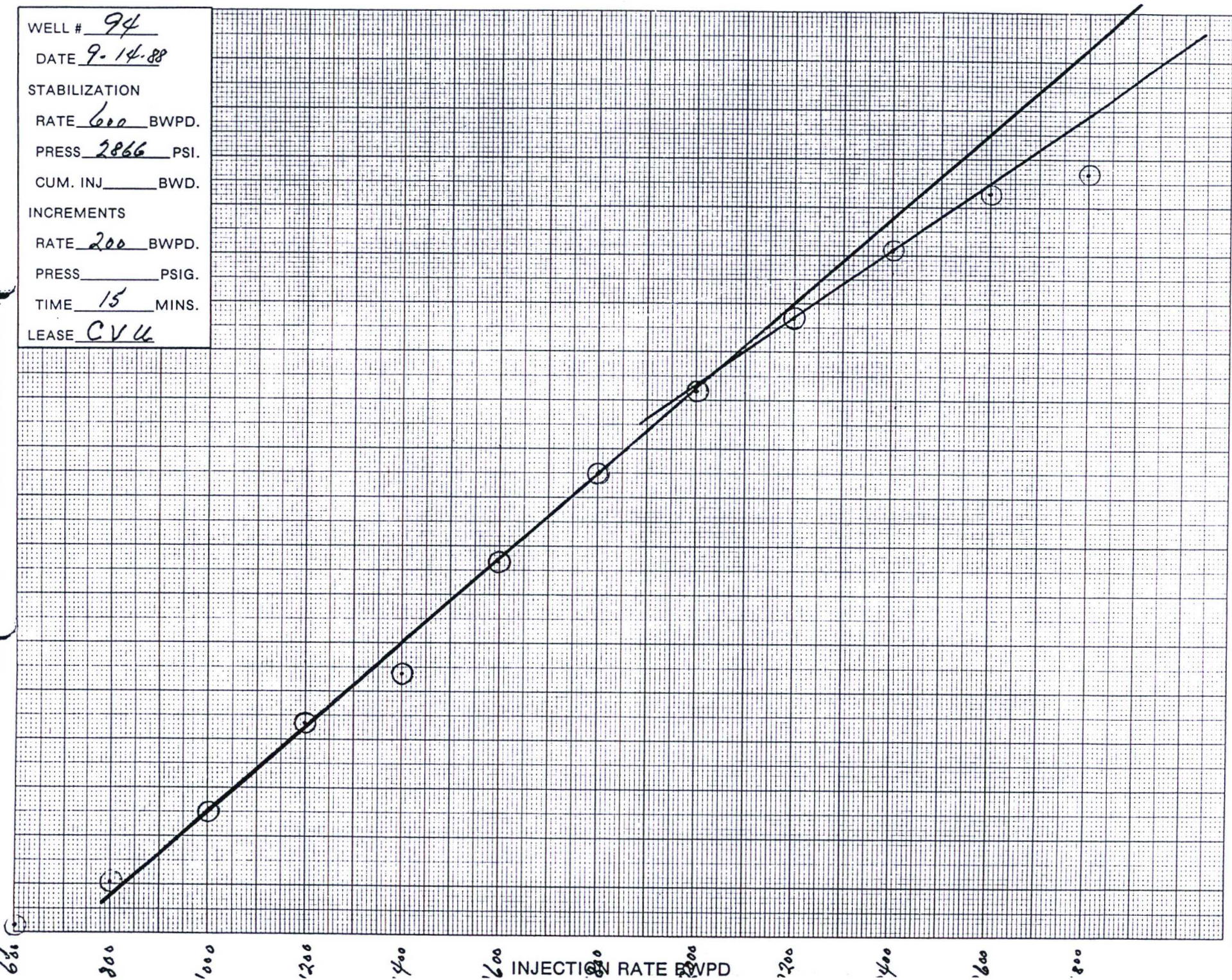
REMARKS _____

TESTER Mark Rice COMPANY REP. _____

STEP RATE TESTERS INC.

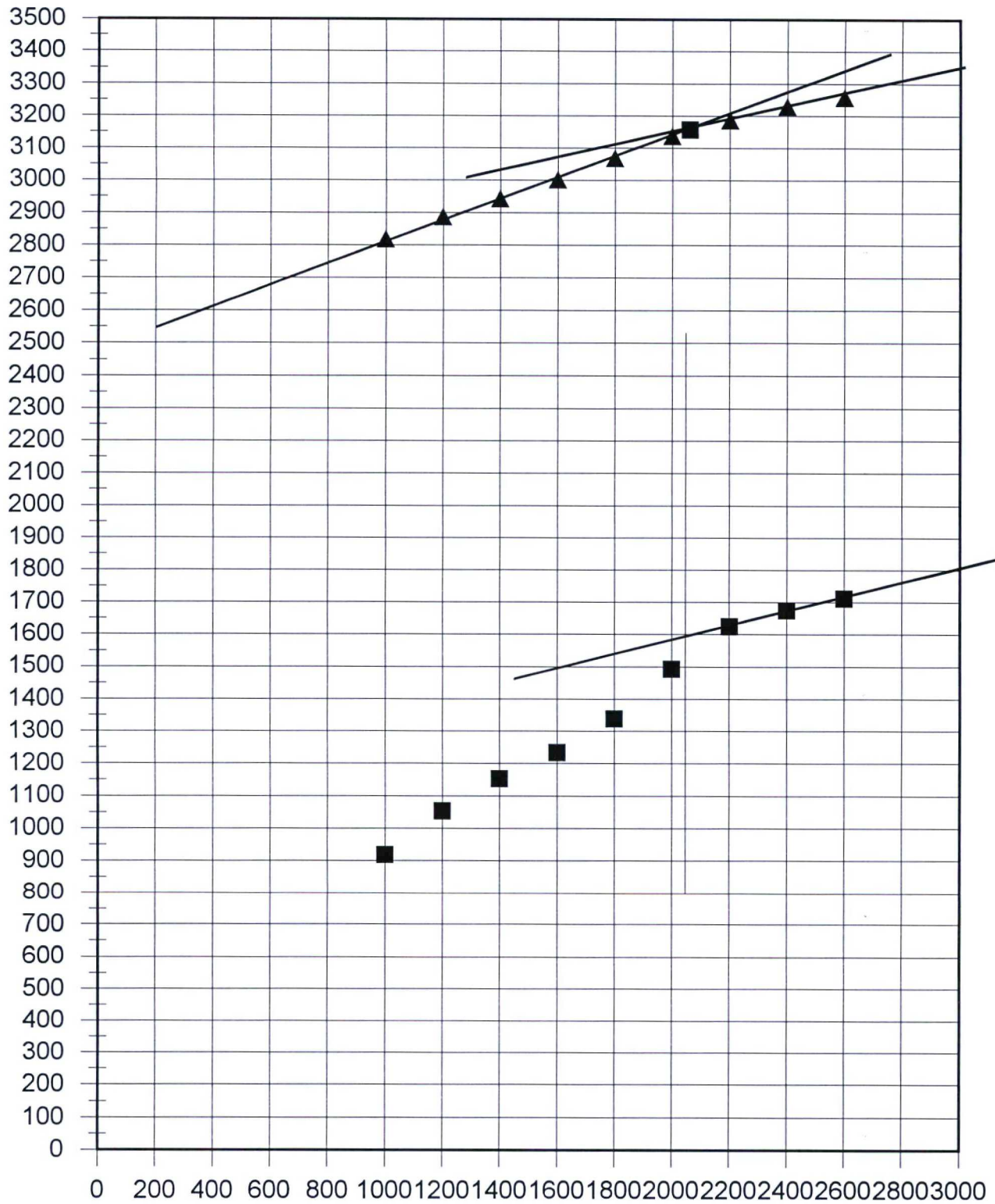
WELL # 94
 DATE 9-14-88
 STABILIZATION
 RATE 600 BWPD.
 PRESS 2866 PSI.
 CUM. INJ _____ BWD.
 INCREMENTS
 RATE 200 BWPD.
 PRESS _____ PSIG.
 TIME 15 MINS.
 LEASE CVU

BOTTOM HOLE OR SURFACE PRESSURE (PSI)



3600
 80
 60
 40
 20
 3500
 80
 60
 40
 20
 3400
 80
 60
 40
 20
 3300
 80
 60
 40
 20
 3200
 80
 60
 40
 20
 3100
 80
 60
 40
 20
 3000
 80
 60
 40
 20
 2900
 80
 2860

Central Vacuum Unit No. 138



■ SURFACE ▲ BOTTOM HOLE ■ Break Point

STEP RATE TESTERS, INC.

915/366-3409

P. O. Box 13094

ODESSA, TEXAS 79768

No. _____

COMPANY TEXACO INC. DATE 9-13-88

ADDRESS _____

WELL # 138 LEASE CENTRAL VACUUM UNIT

WELL FILE DATA:

T.D. 4226 PACKERS @ 4211 PERFS. 4226-4224
TBG. ID. 2 3/8 TBG. COATING _____ DEPTH SN. _____ BHP @ 4500'

STABILIZATION:

RATE 1000 BHPD PRES. 2818 PSIG. CUMULATIVE _____ BBLs.

INCREMENTS:

RATE 200 BHPD PRES. _____ PSIG. STEP LENGTH 15 MINS.

TEST RESULTS:

FORMATION PARTING POINT 3157 PSIG. @ 2060 BHPD

	RATE BHPD	PRESSURE SURFACE PSIG.	PRESSURE MINUS FRICTION PSIG.	PRESSURE BOTTOM HOLE PSIG.
1.	<u>1000</u>	<u>919</u>		<u>2818</u>
2.	<u>1200</u>	<u>1053</u>		<u>2886</u>
3.	<u>1400</u>	<u>1152</u>	<u>924</u>	<u>2942</u>
4.	<u>1600</u>	<u>1233</u>	<u>983</u>	<u>3001</u>
5.	<u>1800</u>	<u>1338</u>	<u>1050</u>	<u>3068</u>
6.	<u>2000</u>	<u>1492</u>	<u>1119</u>	<u>3137</u>
7.	<u>2200</u>	<u>1624</u>	<u>1167</u>	<u>3185</u>
8.	<u>2400</u>	<u>1674</u>	<u>1210</u>	<u>3228</u>
9.	<u>2600</u>	<u>1711</u>	<u>1239</u>	<u>3257</u>
10.				
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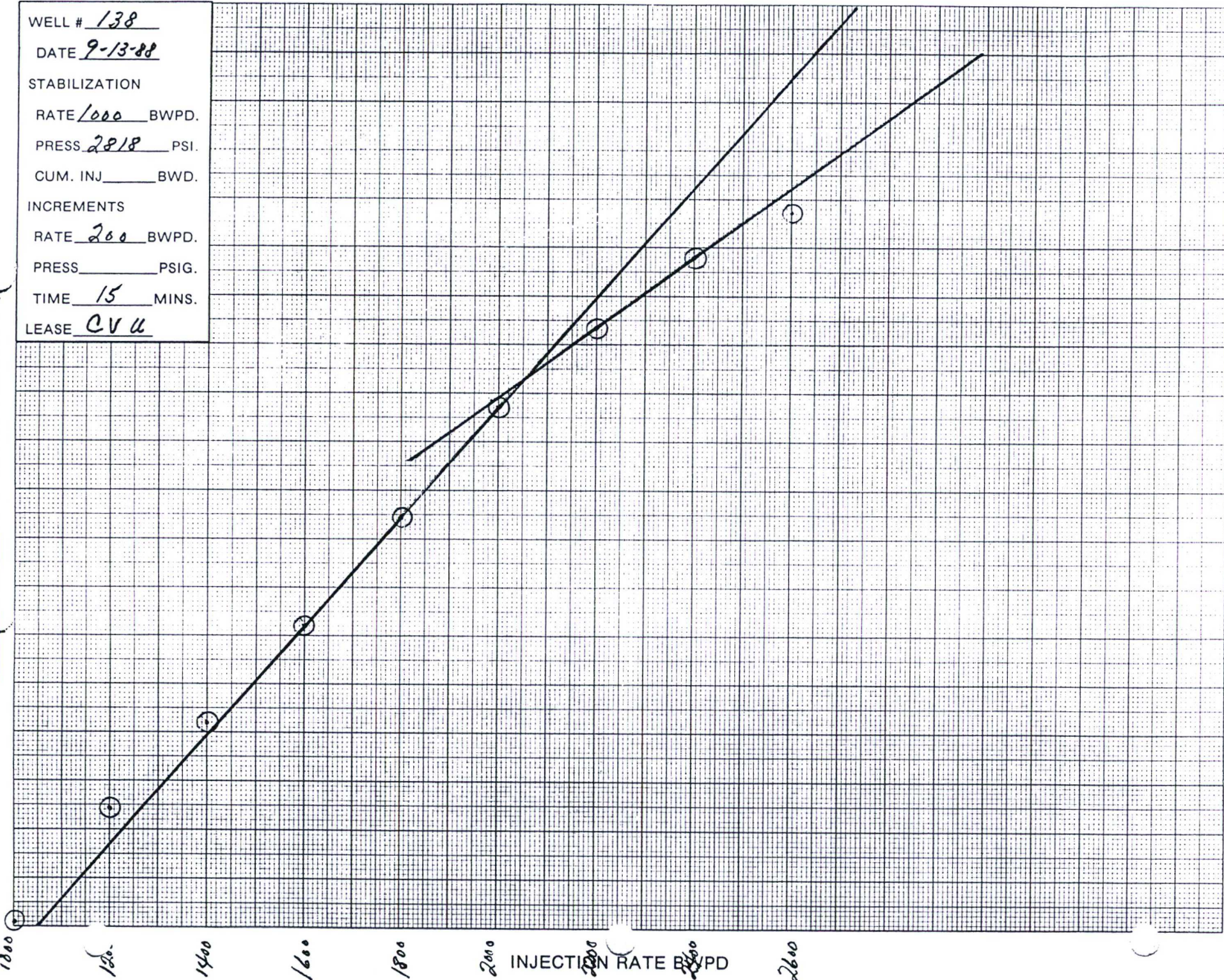
REMARKS 1-minute test - 1112 PSIG

TESTER Mark Rini COMPANY REP. _____

STEP RATE TESTERS INC.

WELL # 138
 DATE 9-13-88
 STABILIZATION
 RATE 1000 BWPD.
 PRESS 2818 PSI.
 CUM. INJ BWD.
 INCREMENTS
 RATE 200 BWPD.
 PRESS PSIG.
 TIME 15 MINS.
 LEASE CVU

BOTTOM HOLE OR SURFACE PRESSURE (PSI)



3310
 95
 80
 65
 50
 35
 20
 3205
 90
 75
 60
 45
 30
 15
 3100
 85
 70
 55
 40
 25
 3010
 95
 80
 65
 50
 35
 20
 2905
 90
 75
 60
 45
 30
 2815

INJECTION RATE BWPD