

TEXACO INC.
WEST STAR RT. BOX 423
LOVINGTON, NM 88260

June 20, 1988

State of New Mexico
Department of Energy and Minerals
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. William Lemay

In accordance with Paragraph (6) of NMOCD Order No. R-5530, Texaco Inc. respectfully requests that authorization be granted to increase surface injection pressure on seventeen wells in the Vacuum Grayburg San Andres Field, Lea County, New Mexico. This request is based on results of individual step rate tests conducted May 10-16 and June 6-10, 1988.

Five wells on the Central Vacuum Unit and twelve wells on the Vacuum Grayburg San Andres Unit were step rate tested, as summarized in Table 1. Bottom hole pressure information was obtained in four representative tests, with the remainder being surface tests. Both types of tests confirm surface parting pressures within the range of 1050 to 1470 psig. Three wells in exception to this, Vacuum Grayburg San Andres Unit Nos. 34, 48 and 50, were recently perforated in a low pore pressure Grayburg interval, which explains their lower parting pressure.

Your prompt consideration of this request is appreciated. Please advise if any further information is needed.

Yours very truly,

A. Gernandt
A. Gernandt
Area Superintendent

MAS

TABLE 1
SUMMARY OF STEP RATE TEST RESULTS

<u>Well</u>	<u>Location</u>	<u>Step Rate Surface Parting Pressure, PSIG</u>	<u>Current Injection Limit, PSIG</u>
CVU No. 73	H, 36-17S-34E	1050	876
CVU No. 84	I, 36-17S-34E	1194	870
CVU No. 93	M, 31-17S-35E	1251	871
CVU No. 99	E, 6-18S-35E	1145	878
CVU No. 159	D, 36-17S-34E	1265	883
VGSAU No. 18	K, 1-18S-34E	1310	862
VGSAU No. 30	K, 2-18S-34E	1310	975
VGSAU No. 32	L, 1-18S-34E	1270	1025
VGSAU No. 34	J, 1-18S-34E	970	867
VGSAU No. 44	F, 2-18S-34E	1383	889
VGSAU No. 46	H, 2-18S-34E	1470	864
VGSAU No. 48	F, 1-18S-34E	945	878
VGSAU No. 50	G, 1-18S-34E	975	878
VGSAU No. 59	E, 2-18S-34E	1160	901
VGSAU No. 62	C, 2-18S-34E	1290	903
VGSAU No. 63	B, 2-18S-34E	1380	897
VGSAU No. 67	L, 35-17S-34E	1430	897

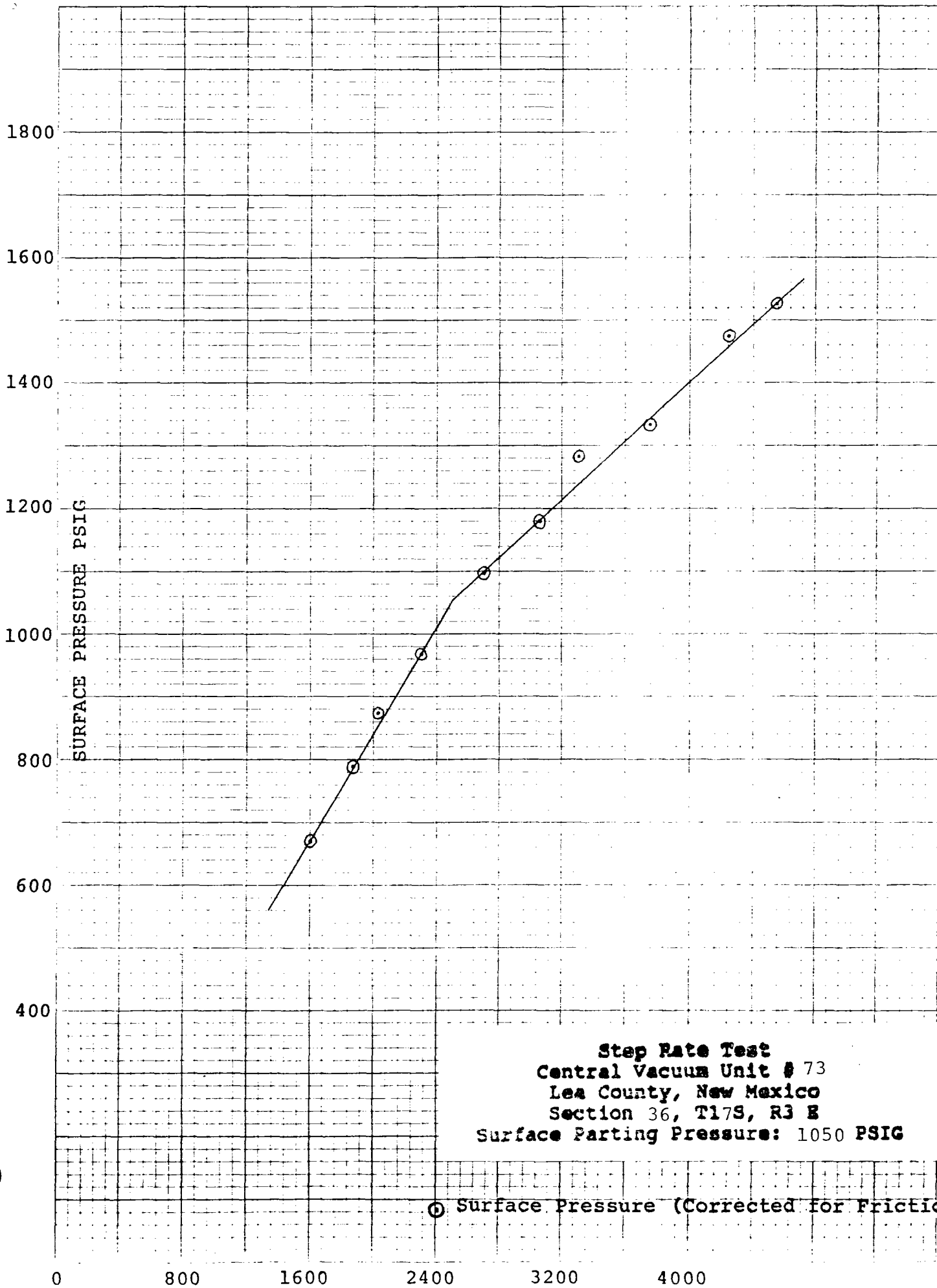
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

CENTRAL VACUUM UNIT NO. 73

5-13-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
1603	671
1872	790
2026	874
2294	968
2698	1098
3062	1181
3302	1283
3754	1333
4253	1475
4550	1527



Step Rate Test
Central Vacuum Unit # 73
Lea County, New Mexico
Section 36, T17S, R3 E
Surface Parting Pressure: 1050 PSIG

○ Surface Pressure (Corrected for Friction)

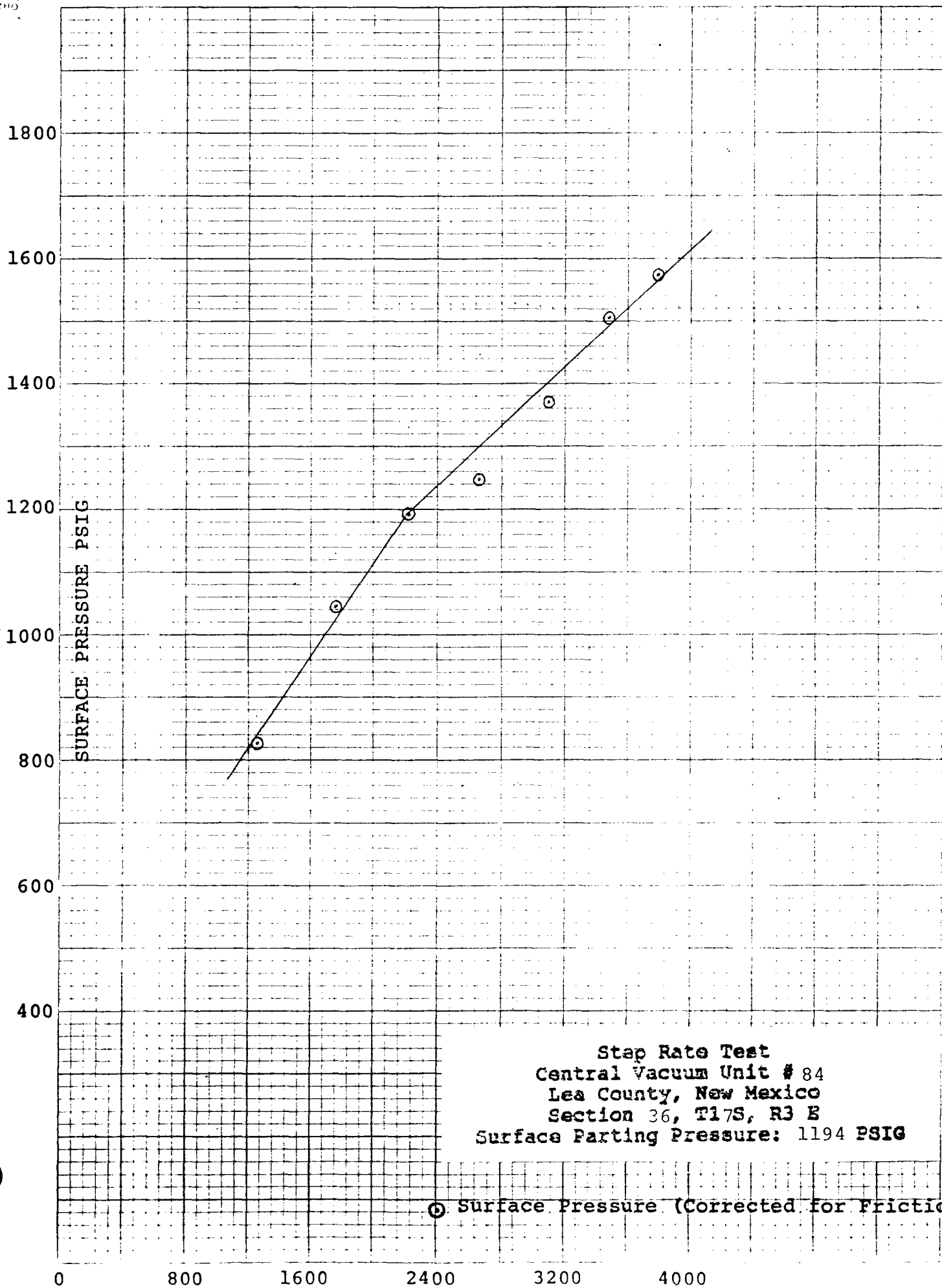
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

CENTRAL VACUUM UNIT NO. 84

5-13-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
1258	824
1757	1043
2227	1194
2659	1245
3101	1371
3485	1503
3787	1574



STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

CENTRAL VACUUM UNIT NO. 93

5-12-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
1354	734
1910	967
2467	1251
2909	1348
3437	1454
3773	1547



1800

1600

1400

1200

1000

800

600

400

SURFACE PRESSURE PSIG

Step Rate Test
Central Vacuum Unit #93
Lea County, New Mexico
Section 31, T17S, R3 E
Surface Parting Pressure: 1251 PSIG

⊙ Surface Pressure (Corrected for Friction)

0

800

1600

2400

3200

4000

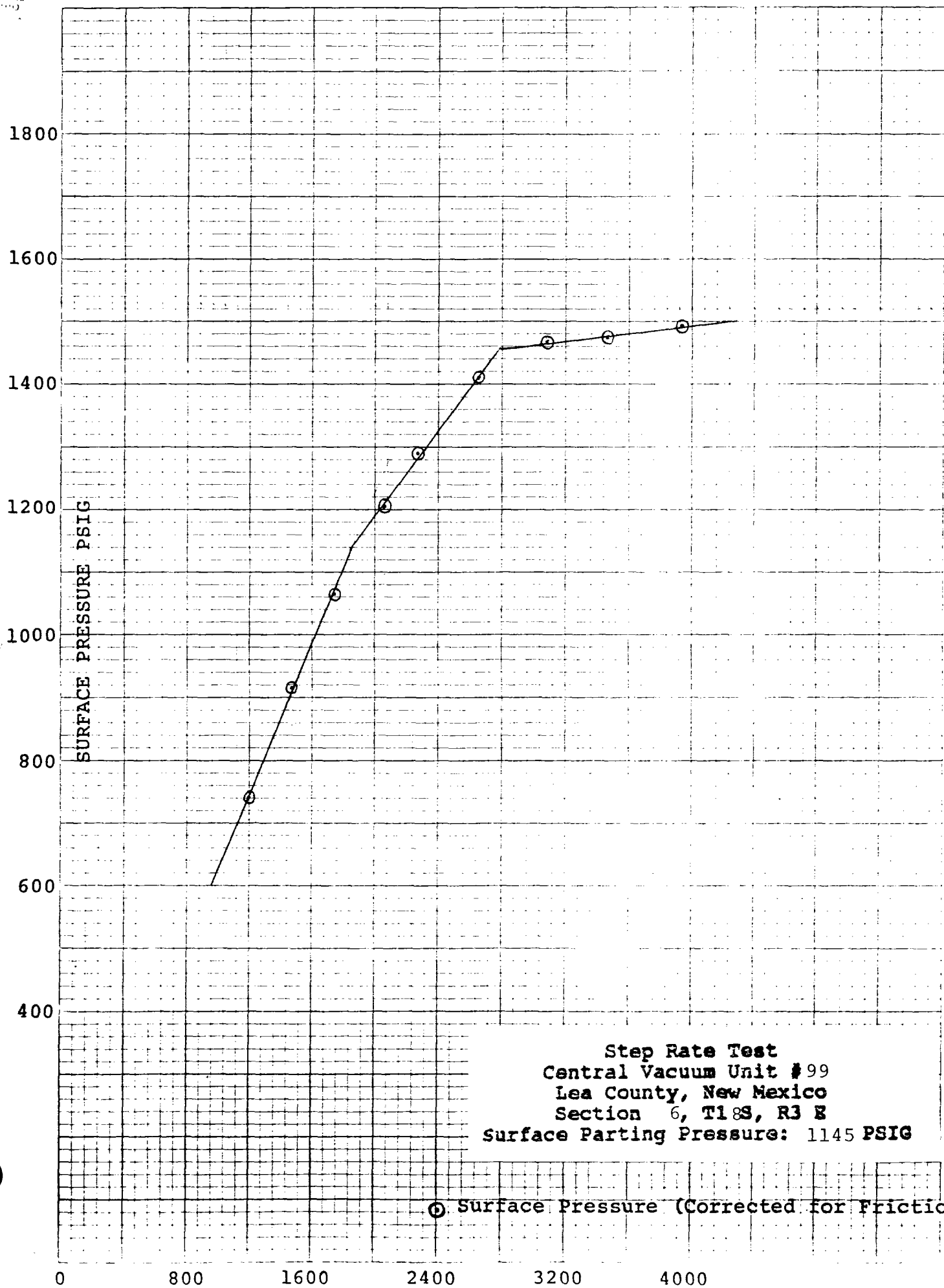
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

CENTRAL VACUUM UNIT NO. 99

5-12-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
1200	741
1469	917
1747	1063
2064	1205
2275	1291
2650	1411
3093	1468
3456	1476
3926	1495



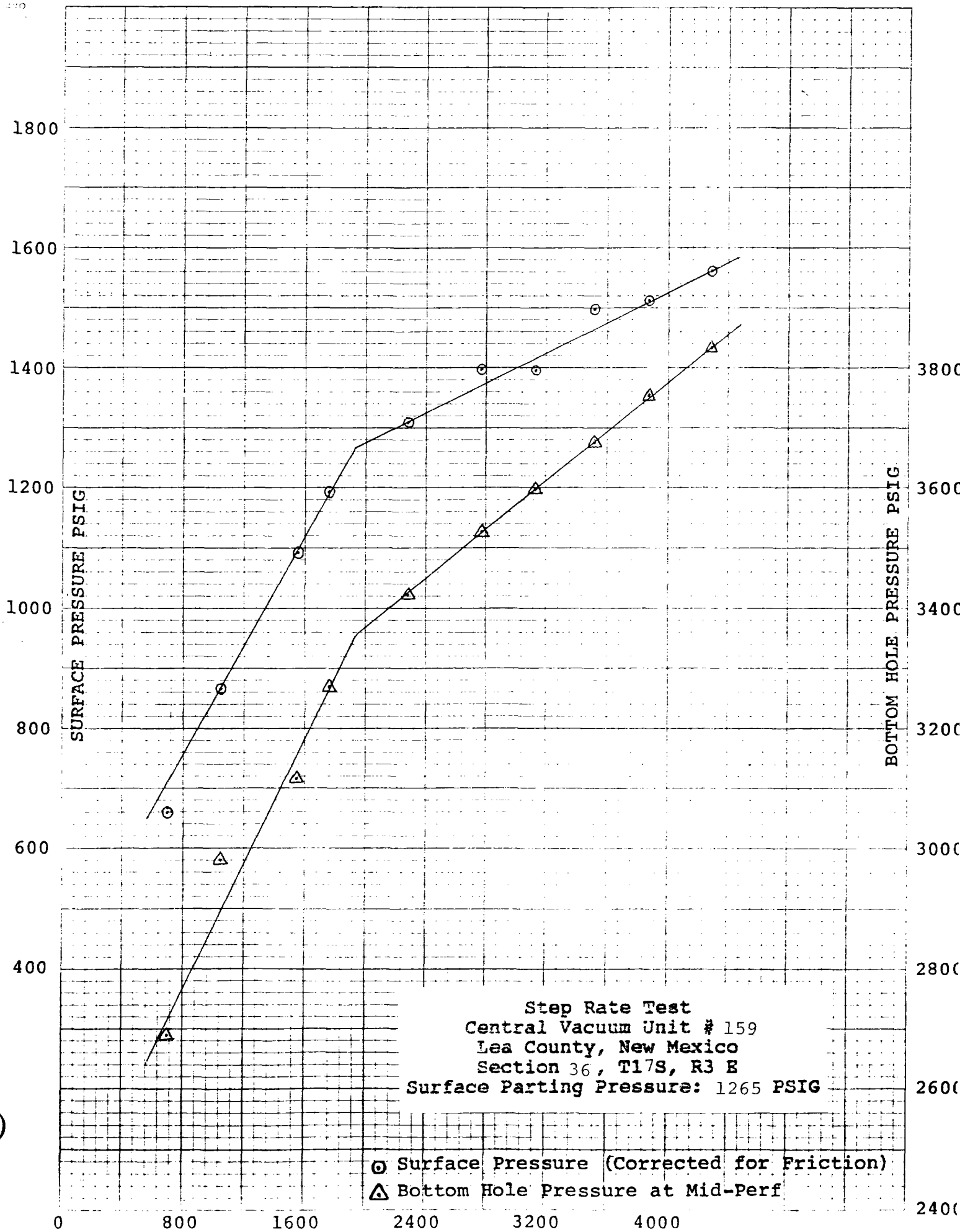
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

CENTRAL VACUUM UNIT NO. 159

6-8-88

<u>INJECTION RATE (BWPd)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>	<u>BOTTOM HOLE PRESSURE (PSI)</u>
701	658	2690
1046	865	2881
1546	1094	3117
1757	1195	3270
2285	1308	3422
2774	1399	3526
3129	1395	3598
3514	1498	3676
3869	1513	3757
4291	1561	3835



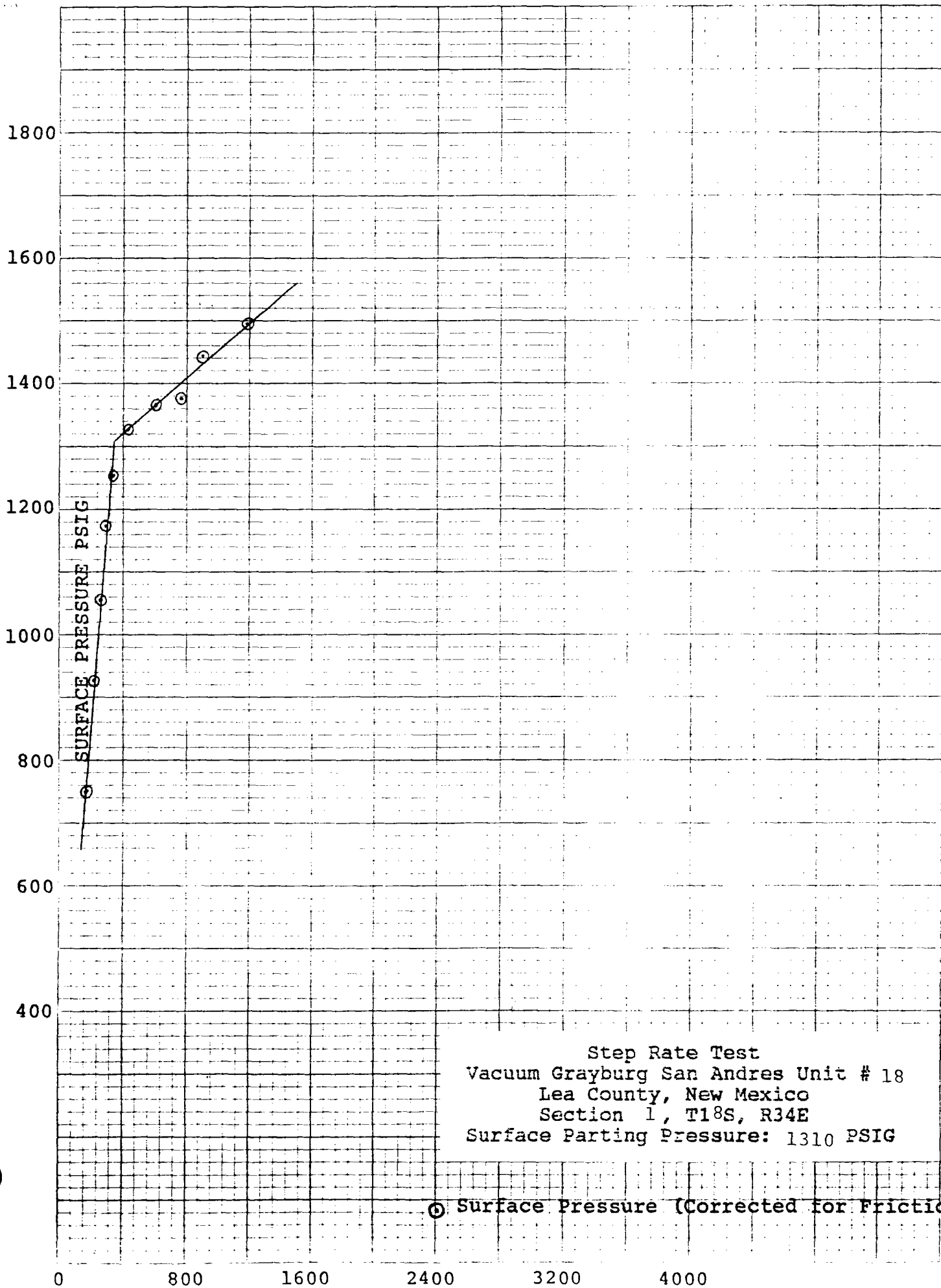
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 18

5-9-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
171	769
224	928
251	1057
287	1176
341	1255
426	1332
604	1364
764	1376
902	1443
1179	1496



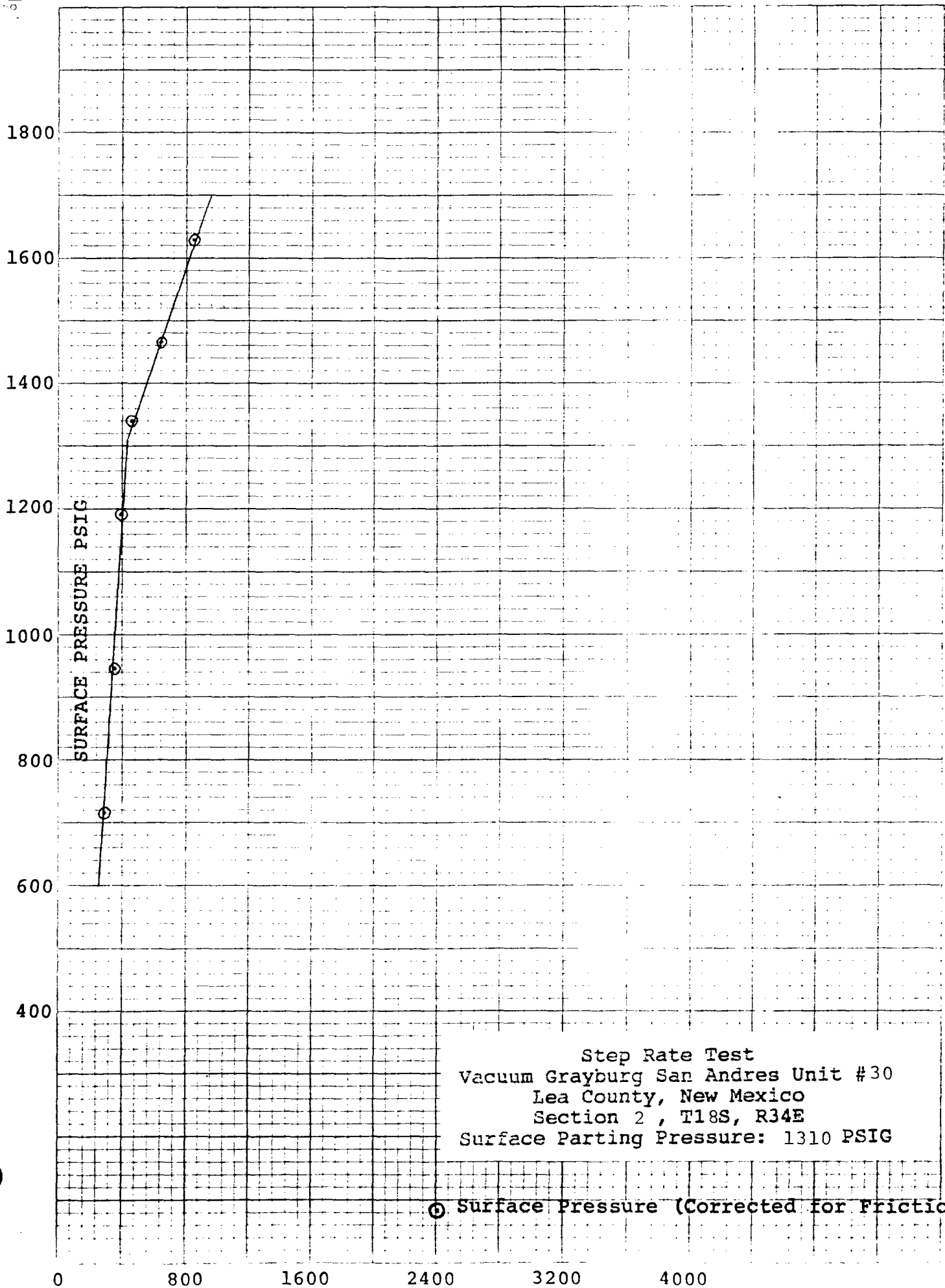
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 30

5-9-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
288	717
346	944
394	1193
461	1341
643	1463
845	1628



STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 32

6-7-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
365	1076
586	1152
749	1218
1046	1277
1334	1303
1661	1305

1800

1600

1400

1200

1000

800

600

400

SURFACE PRESSURE PSIG

Step Rate Test
Vacuum Grayburg San Andres Unit # 32
Lea County, New Mexico
Section 1, T18S, R34E
Surface Parting Pressure: 1270 PSIG

○ Surface Pressure (Corrected for Friction)

0

800

1600

2400

3200

4000

0

STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 34

6-7-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
1171	848
1565	908
1901	957
2285	975
2640	981
3043	986



1800

1600

1400

1200

1000

800

600

400

SURFACE PRESSURE PSIG

Step Rate Test
Vacuum Grayburg San Andres Unit # 34
Lea County, New Mexico
Section 1, T18S, R34E
Surface Parting Pressure: 970 PSIG

○ Surface Pressure (Corrected for Friction)

0 800 1600 2400 3200 4000

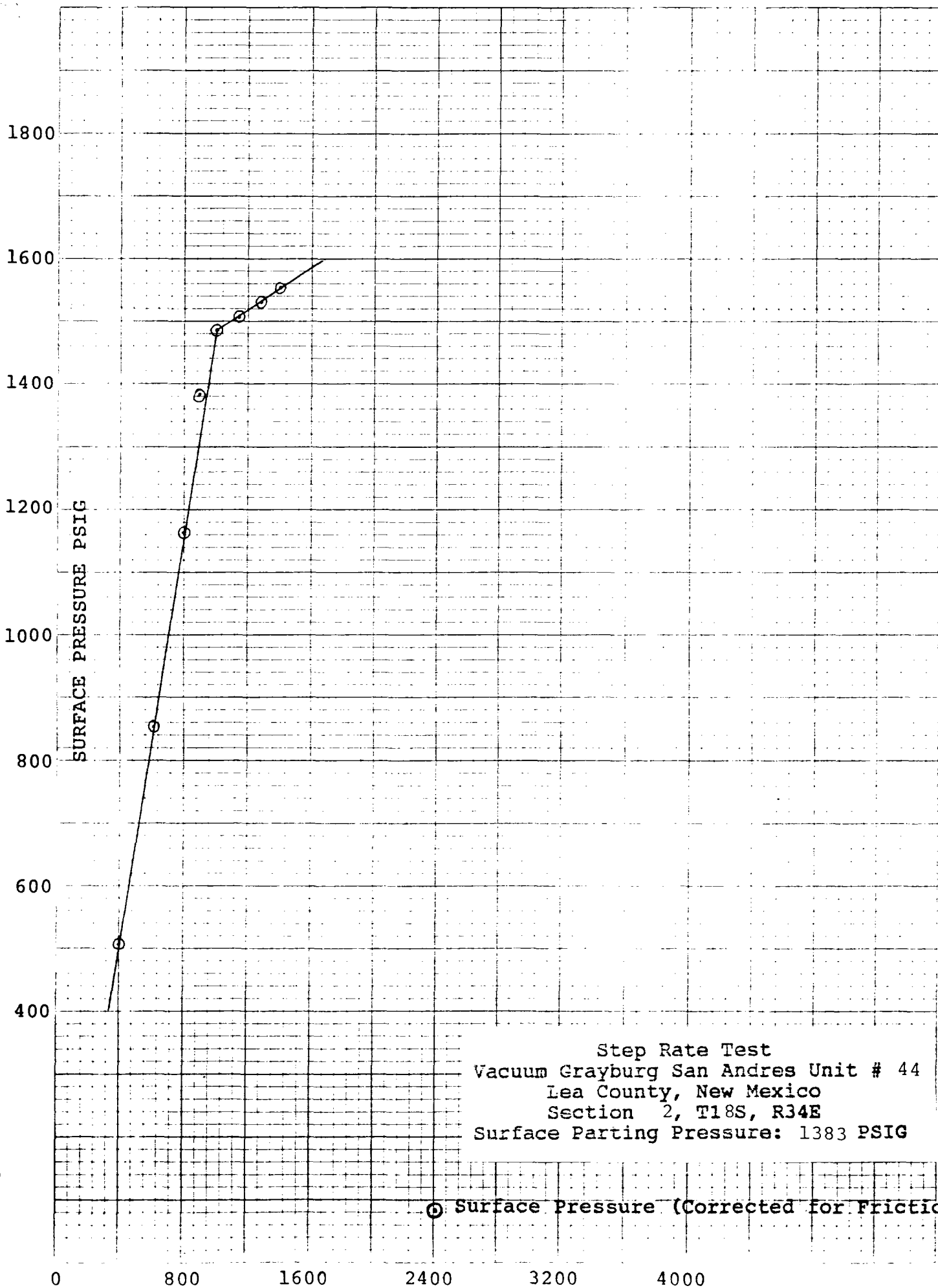
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 44

5-6-88

<u>INJECTION RATE (BWPd)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
480	504
614	854
806	1163
893	1383
1008	1485
1142	1504
1277	1534
1402	1555



Step Rate Test
Vacuum Grayburg San Andres Unit # 44
Lea County, New Mexico
Section 2, T18S, R34E
Surface Parting Pressure: 1383 PSIG

○ Surface Pressure (Corrected for Friction)

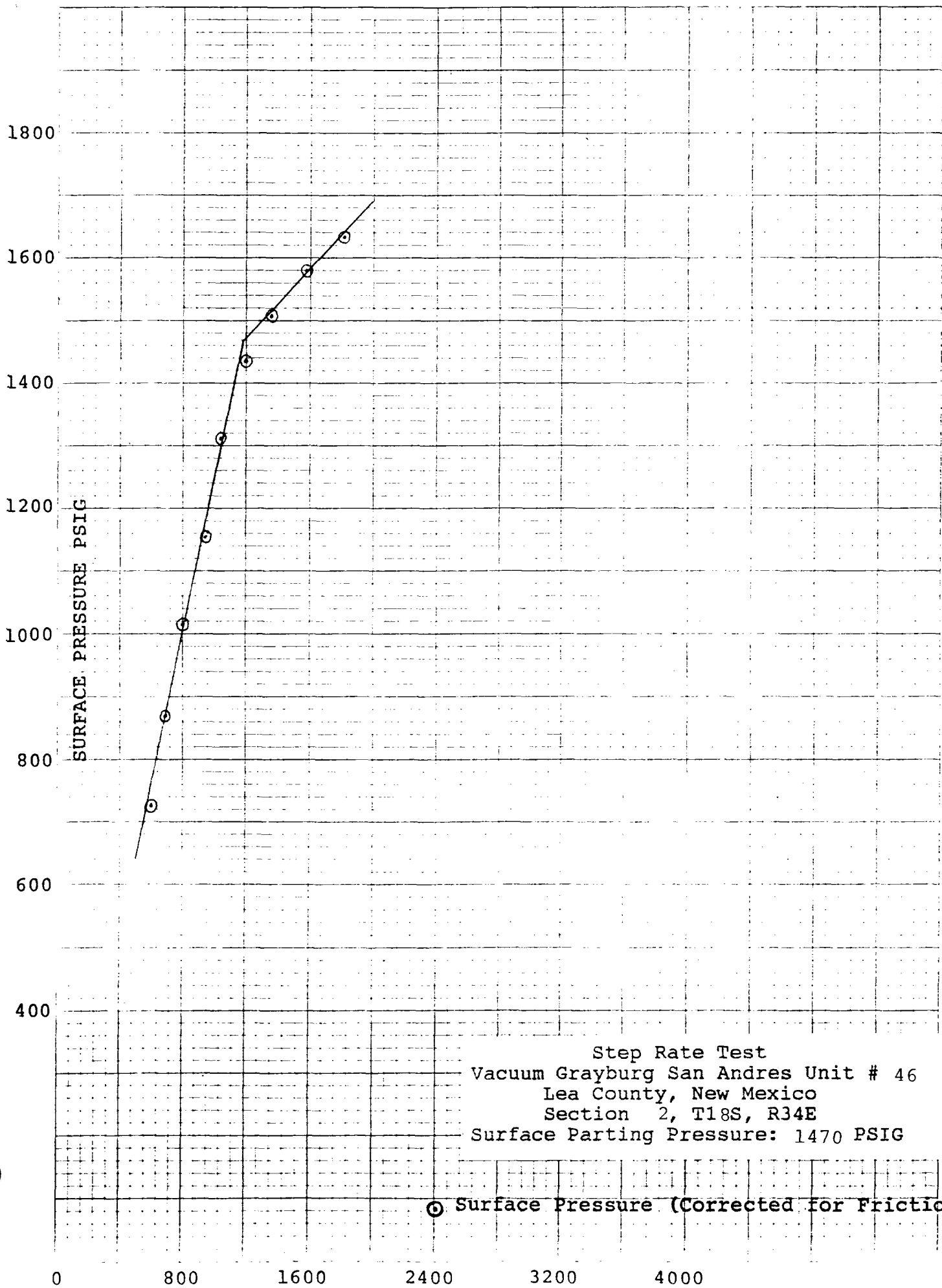
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 46

5-6-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
605	725
691	872
797	1016
950	1155
1046	1311
1200	1435
1363	1505
1574	1579
1814	1633



STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 48

6-10-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>	<u>BOTTOM HOLE PRESSURE (PSI)</u>
374	610	2557
691	683	2645
1162	778	2761
1555	913	2878
2131	954	2953
2630	964	2991
3206	963	3033
3533	978	3062

1800

1600

1400

1200

1000

800

600

400

3800

3600

3400

3200

3000

2800

2600

2400

SURFACE PRESSURE PSIG

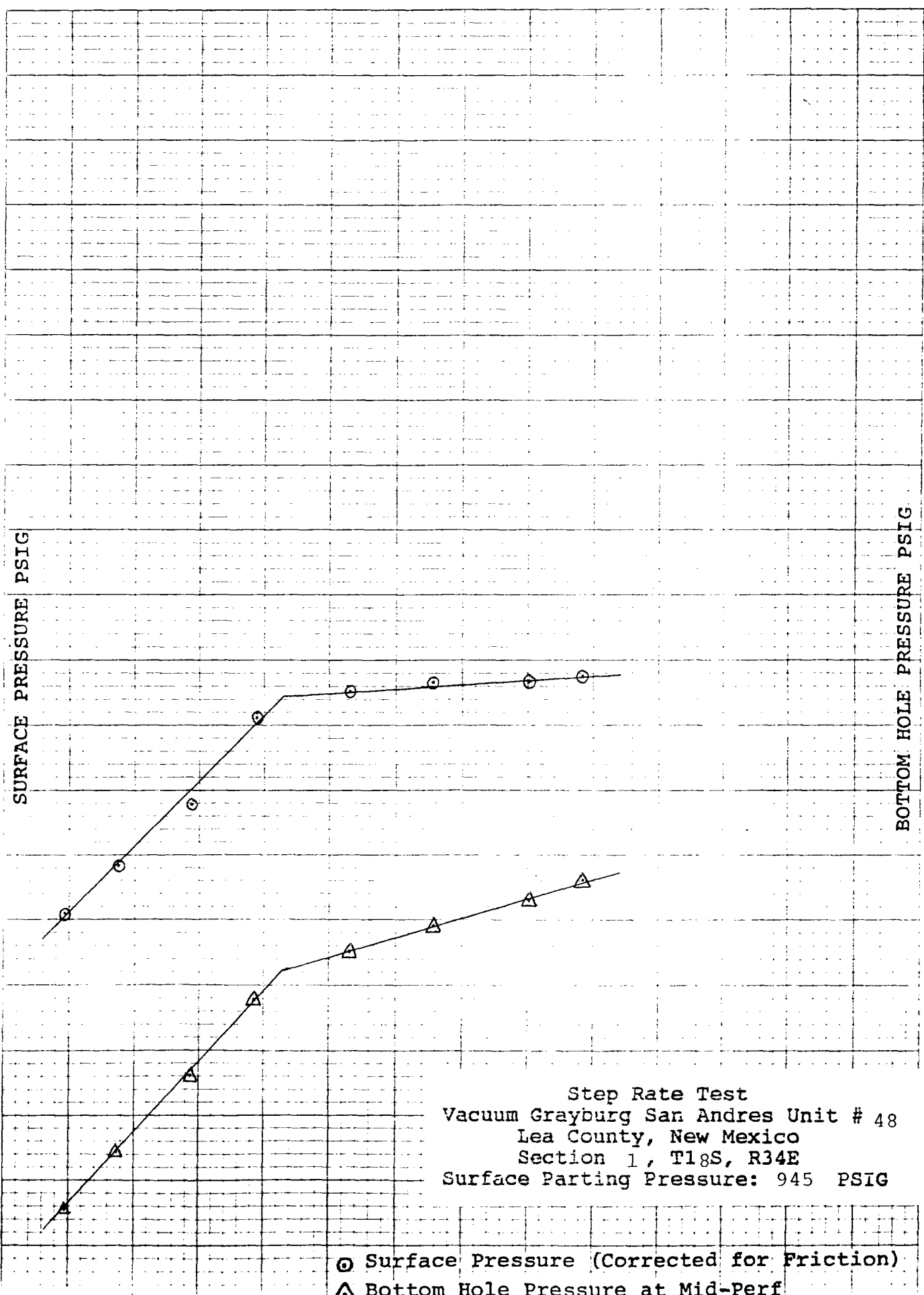
BOTTOM HOLE PRESSURE PSIG

Step Rate Test
Vacuum Grayburg San Andres Unit # 48
Lea County, New Mexico
Section 1, T18S, R34E
Surface Parting Pressure: 945 PSIG

⊙ Surface Pressure (Corrected for Friction)
△ Bottom Hole Pressure at Mid-Perf

0 800 1600 2400 3200 4000

DATE REVD



STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 50

6-6-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
298	538
614	737
902	905
1334	982
1766	993
2160	983
2534	1001

1800

1600

1400

1200

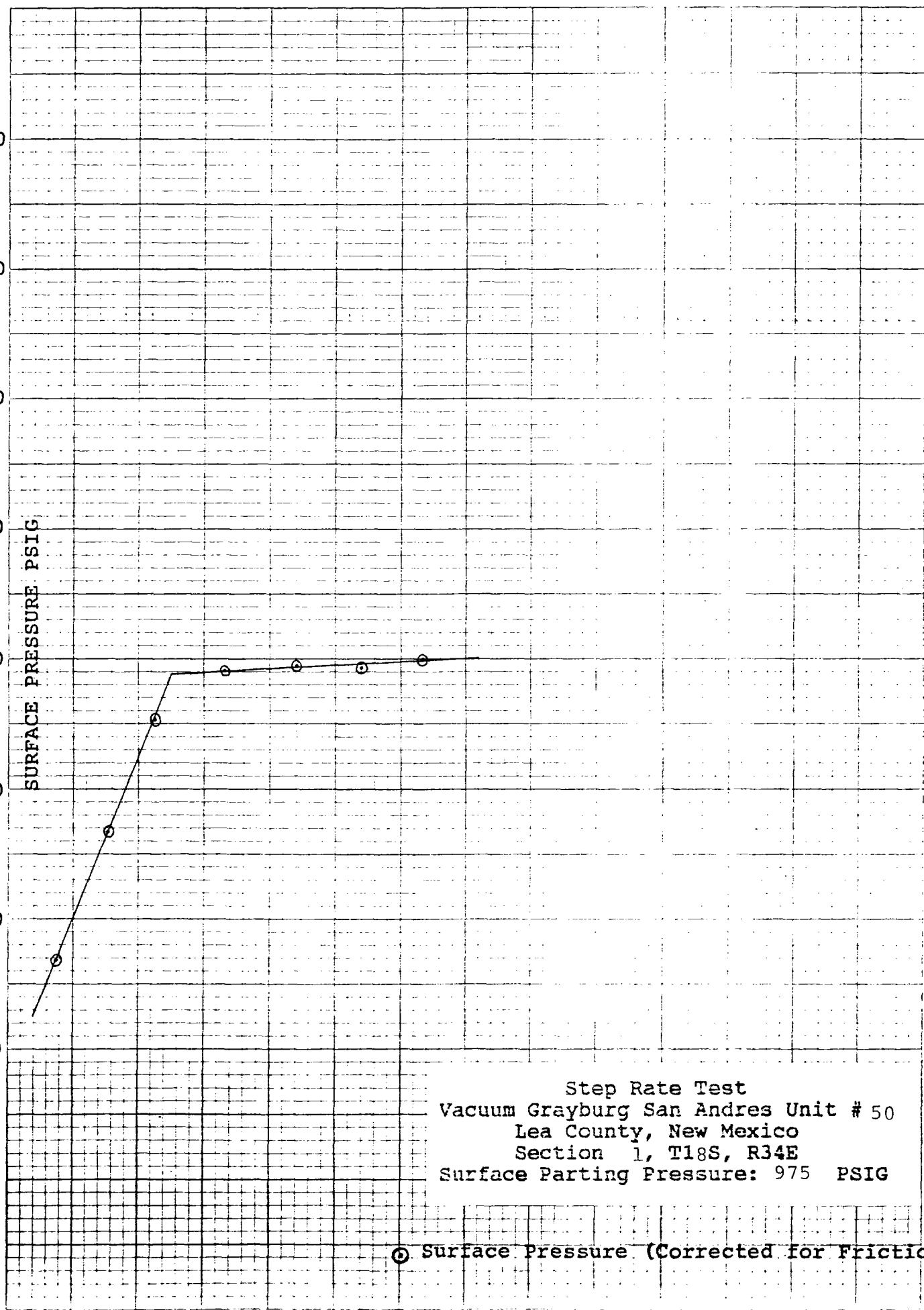
1000

800

600

400

SURFACE PRESSURE PSIG



Step Rate Test
 Vacuum Grayburg San Andres Unit # 50
 Lea County, New Mexico
 Section 1, T18S, R34E
 Surface Parting Pressure: 975 PSIG

Surface Pressure (Corrected for Friction)

0 800 1600 2400 3200 4000

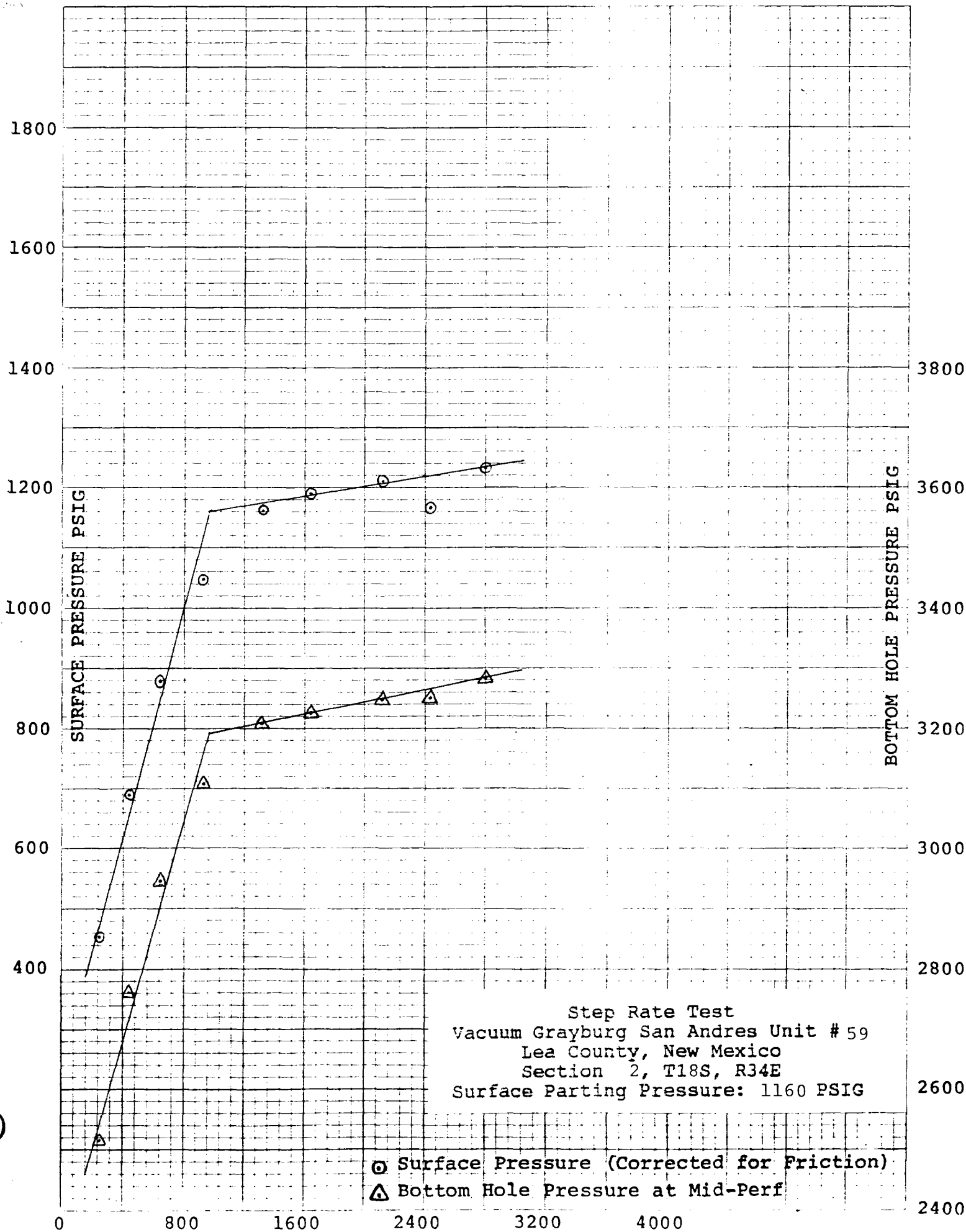
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 59

6-10-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>	<u>BOTTOM HOLE PRESSURE (PSI)</u>
250	454	2518
442	691	2761
643	879	2946
931	1047	3107
1325	1161	3208
1632	1191	3224
2122	1210	3247
2429	1164	3250
2794	1234	3283



STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 62

6-9-88

<u>INJECTION RATE (BWPD)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
278	654
480	984
586	1201
758	1326
979	1415
1171	1469

1800
1600
1400
1200
1000
800
600
400

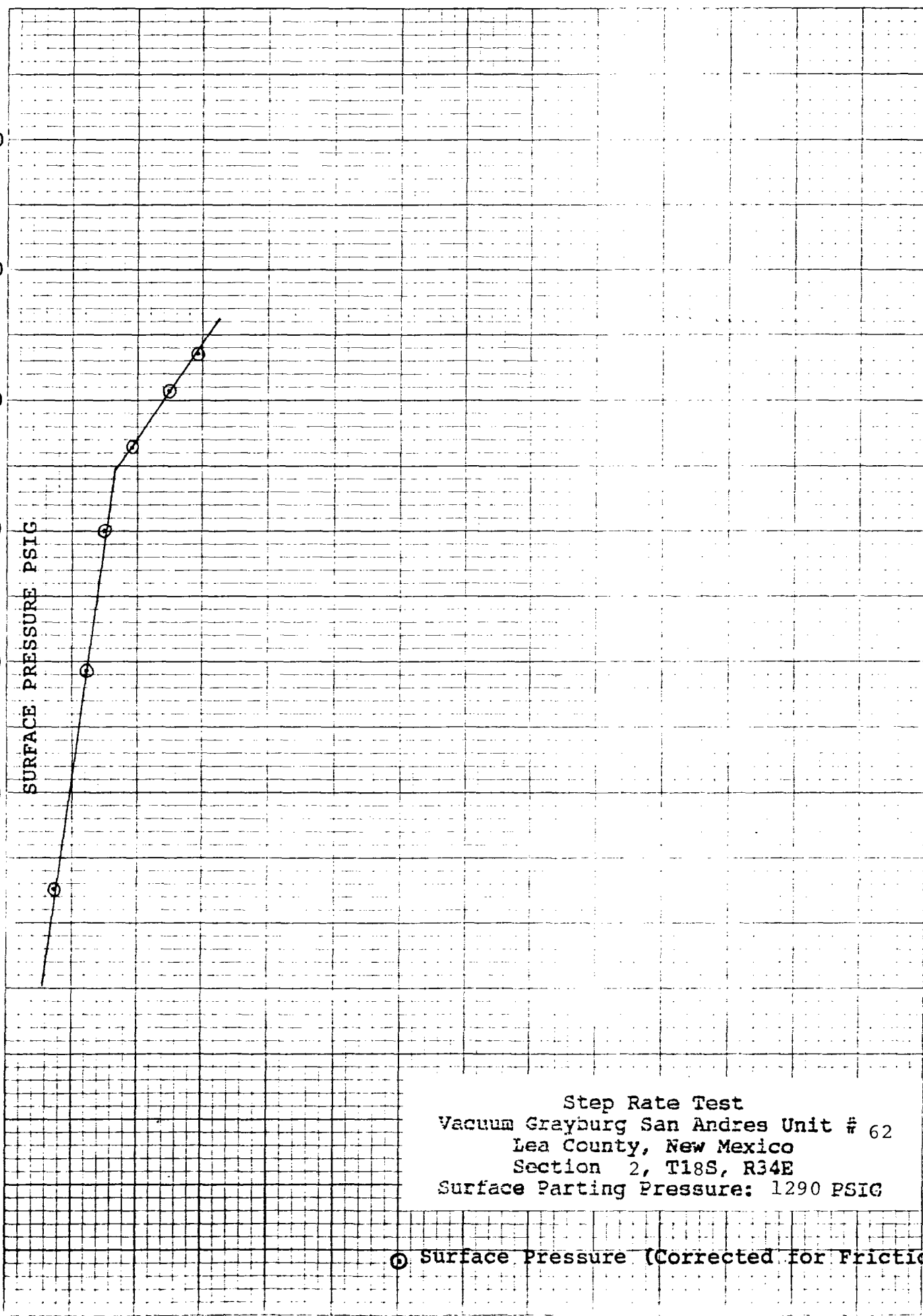
SURFACE PRESSURE PSIG

Step Rate Test
Vacuum Grayburg San Andres Unit # 62
Lea County, New Mexico
Section 2, T18S, R34E
Surface Parting Pressure: 1290 PSIG

⊙ Surface Pressure (Corrected for Friction)

0 800 1600 2400 3200 4000

0



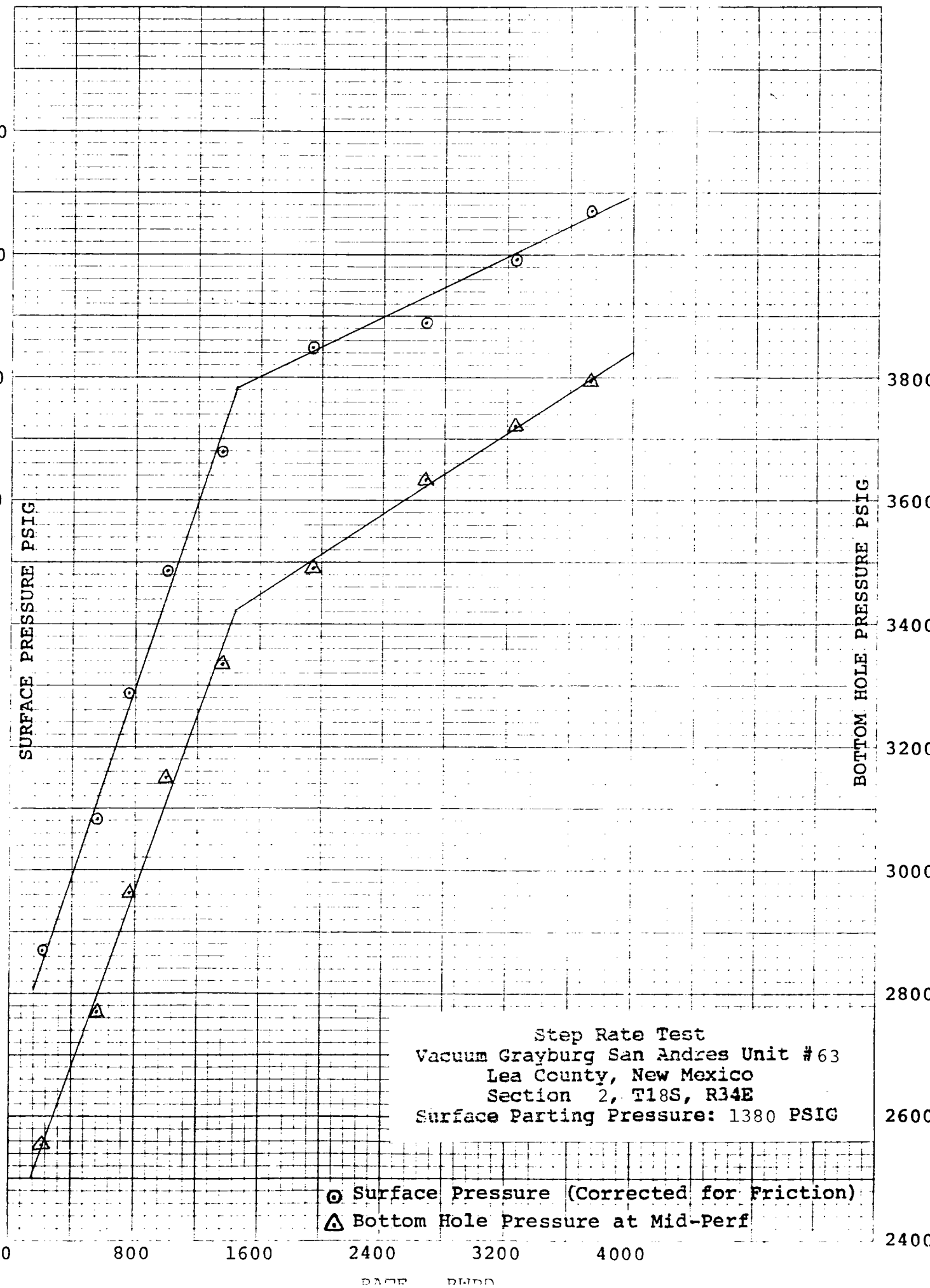
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 63

6-8-88

<u>INJECTION RATE (BWPd)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>	<u>BOTTOM HOLE PRESSURE (PSI)</u>
221	470	2554
566	682	2771
758	887	2962
998	1084	3153
1354	1279	3335
1939	1447	3491
2669	1488	3634
3254	1592	3721
3734	1670	3796



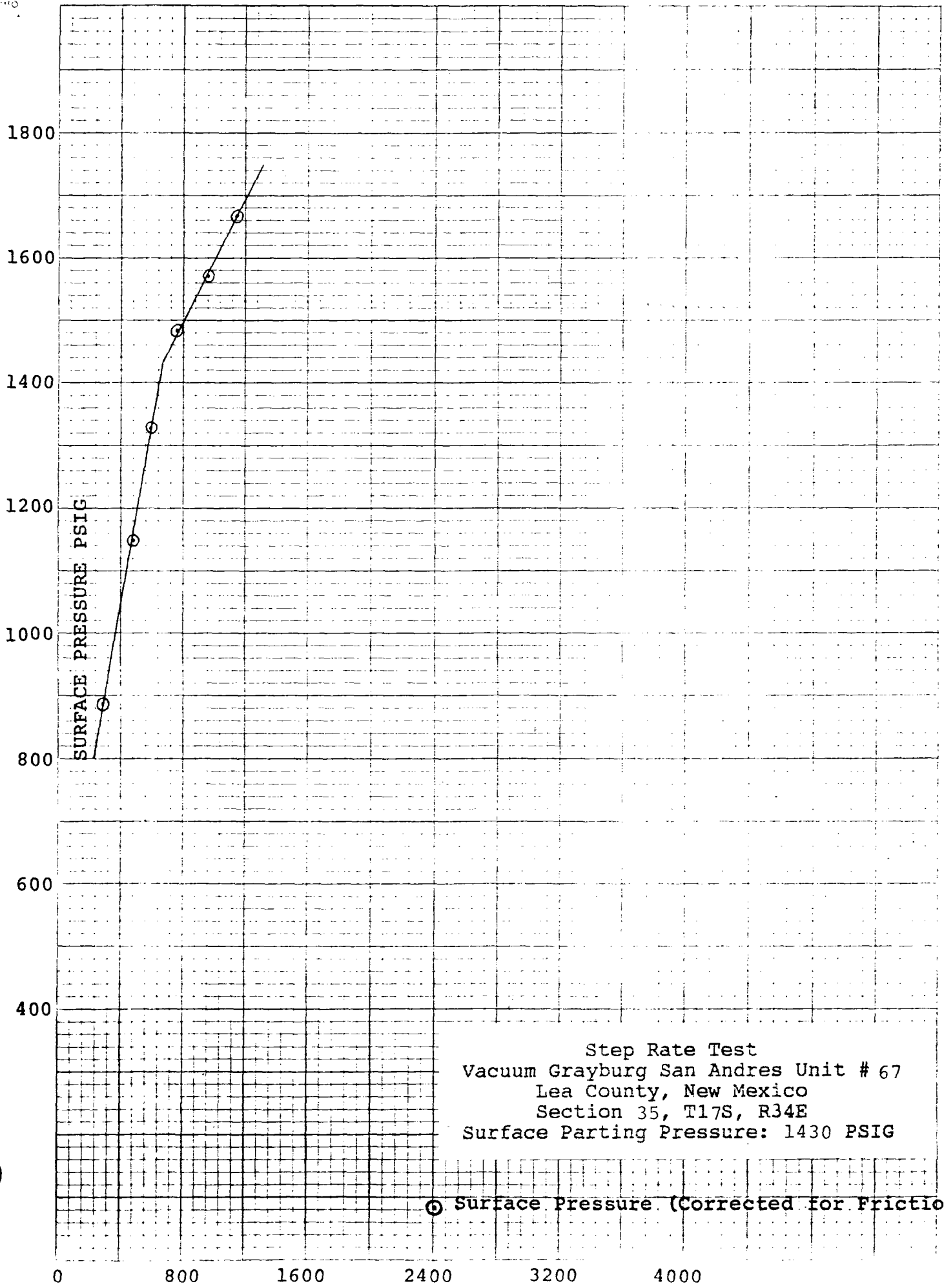
STEP RATE INJECTION TEST DATA

TEXACO PRODUCING INC.

VACUUM GRAYBURG SAN ANDRES UNIT NO. 67

6-9-88

<u>INJECTION RATE (BWPd)</u>	<u>SURFACE PRESSURE (PSI) (Corrected for Friction)</u>
288	888
480	1148
586	1327
768	1482
960	1571
1142	1664





STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2083
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

October 11, 1988

Texaco, Inc.
West Star Route Box 423
Lovington, NM 88260

Attention: A. Gernandt

RE: Amended Injection Pressure
Increase Central Vacuum Unit,
Vacuum Grayburg San Andres
Unit, Lea County, New Mexico

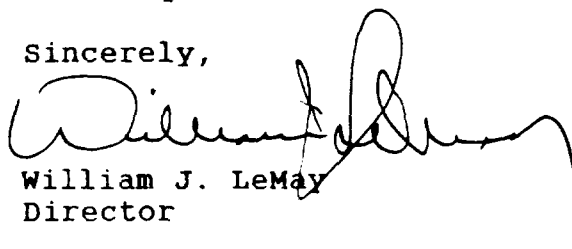
Dear Mr. Gernandt:

Reference is made to your request dated June 23, 1988, to increase the surface injection pressure on seventeen wells within the Central Vacuum Unit and Vacuum Grayburg San Andres Unit. This request is based on step rate tests conducted on these wells during May & June, 1988. 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 wells show on Exhibit "A" attached to this order.

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,



William J. LeMay
Director

cc: OCD - Hobbs	File: PMX-120
D. McDonald	PMX-121
D. Catanach	PMX-43
Case File: 6008,	PMX-74
& 4852	PMX-111

Injection Pressure Increase
October 12, 1988
Page No. 2

EXHIBIT "A"

<u>WELL & LOCATION</u>	<u>MAXIMUM SURFACE INJECTION PRESSURE</u>
Central Vacuum Unit No. 73 2630 FNL & 142 FEL (Unit H) Section 36, T-17S, R-34E	1000 PSIG
Central Vacuum Unit No. 84 1333 FSL & 151 FEL (Unit I) Section 36, T-17S, R-34E	1144 PSIG
Central Vacuum Unit No. 93 10 FSL & 1136 FWL (Unit M) Section 31, T-17S, R-35E	1200 PSIG
Central Vacuum Unit No. 99 1408 FNL & 11211 FWL (Unit E) Section 6, T-18S, R-35E	1095 PSIG
Central Vacuum Unit No. 159 1310 FNL & 100 FWL (Unit D) Section 36, T-17S, R-34E	1215 PSIG
VGSAU Well No. 18 1330 FSL & 1330 FWL (Unit K) Section 1, T-18S, R-34E	1260 PSIG
VGSAU Well No. 30 2630 FSL & 2630 FWL (Unit K) Section 2, T-18S, R-34E	1260 PSIG
VGSAU Well No. 32 2630 FSL & 30 FWL (Unit L) Section 1, T-18S, R-34E	1220 PSIG
VGSAU Well No. 34 2630 FSL & 2630 FEL (Unit J) Section 1, T-18S, R-34E	920 PSIG
VGSAU Well No. 44 1330 FNL & 1330 FWL (Unit F) Section 2, T-18S, R-34E	1435 PSIG
VGSAU Well No. 46 1405 FNL & 1230 FEL (Unit H) Section 2, T-18S, R-34E	1415 PSIG

Injection Pressure Increase
October 12, 1988
Page No. 3

VGSAU Well No. 48 1330 FNL & 1330 FWL (Unit F) Section 1, T-18S, R-34E	895 PSIG
VGSAU Well No. 50 1330 FNL & 1330 FEL (Unit G) Section 1, T-18S, R-34E	925 PSIG
VGSAU Well No. 59 2500 FNL & 40 FWL (Unit E) Section 2, T-13S, R-34E	1110 PSIG
VGSAU Well No. 62 65 FNL & 1330 FWL (Unit C) Section 2, T-18S, R-34E	1240 PSIG
VGSAU Well No. 63 50 FNL & 2630 FEL (Unit B) Section 2, T-18S, R-34E	1330 PSIG
VGSAU Well No. 67 2630 FEL & 120 FWL (Unit L) Section 35, T-17S, R-34E	1380 PSIG