

WFX-520
7DEV0020600520



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



September 10, 1992

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

Amoco Production Company
P.O. Box 3092
Houston, Texas 77253-3092

Mike D. Casteleberry

RE: *Injection Pressure Increase
Old Indian Draw Unit
10 Wells
Eddy County, New Mexico*

Dear Sir:

Reference is made to your request dated August 11, 1992, to increase the surface injection pressure on 10 wells in the Old Indian Draw Unit. This request is based on a step rate tests conducted on these wells between July 24 and 29, 1992. 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:

WELL AND LOCATION	MAXIMUM INJECTION <u>SURFACE PRESSURE</u>
Old Indian Draw Unit No. 2 660' FSL & 1980' FEL Section 18, 22 South, 28 East	800 PSIG
Old Indian Draw Unit No. 4 1980' FSL & 660' FEL Section 18, 22 South, 28 East	800 PSIG
Old Indian Draw Unit No. 5 1980' FNL & 1980' FEL Section 18, 22 South, 28 East	800 PSIG

WELL AND LOCATION

MAXIMUM INJECTION
SURFACE PRESSURE

Old Indian Draw Unit No. 6
2002' FSL & 1721' FWL
Section 18, 22 South, 28 East

800 PSIG

Old Indian Draw Unit No. 10
997' FNL & 1785' FWL
Section 18, 22 South, 28 East

800 PSIG

Old Indian Draw Unit No. 11
330' FNL & 668' FEL
Section 19, 22 South, 28 East

800 PSIG

Old Indian Draw Unit No. 12
1658' FNL & 794' FWL
Section 18, 22 South, 28 East

800 PSIG

Old Indian Draw Unit No. 16
330' FSL & 794' FWL
Section 7, 22 South, 28 East

800 PSIG

Old Indian Draw Unit No. 21
330' FSL & 2283' FEL
Section 7, 22 South, 28 East

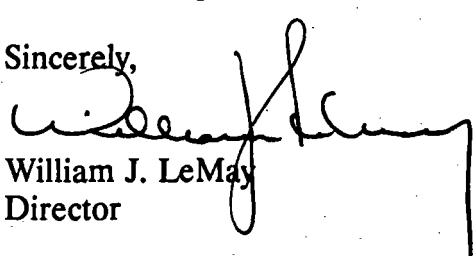
800 PSIG

Old Indian Draw Unit No. 35
1663' FSL & 963' FEL
Section 7, 22 South, 28 East

800 PSIG

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

WJL/DC/jc

cc: Oil Conservation Division - Artesia
File: WFX-520
U.S. BLM - Carlsbad

NO WAITING PERIOD

COMPANY: AMOCO PRODUCTION COMPANY
ADDRESS: P.O. BOX 3092
CITY, STATE, ZIP: HOUSTON, TEXAS 77253-3092
ATTENTION: MIKE D. CASTELEBERRY

Re: Injection Pressure Increase
OLD INDIAN DRAW UNIT - 10 WELLS
10 WELLS
EDDY County, New Mexico

Dear Sir:

Reference is made to your request dated AUGUST 11, 1992, to increase the surface injection pressure on 10 WELLS IN THE OLD INDIAN DRAW UNIT. This request is based on step rate tests conducted on these wells BETWEEN JULY 24 AND 29, 1992. 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:

<u>Well & Location</u>	<u>Maximum Injection Surface Pressure</u>
<u>OLD INDIAN DRAW UNIT No. 2</u> <u>660' FSL & 1980' FEL</u> <u>SECTION 18, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>
<u>OLD INDIAN DRAW UNIT No. 4</u> <u>1980' FSL & 660' FEL</u> <u>SECTION 18, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>
<u>OLD INDIAN DRAW UNIT No. 5</u> <u>1980' FNL & 1980' FEL</u> <u>SECTION 18, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>
<u>OLD INDIAN DRAW UNIT No. 6</u> <u>2002' FSL & 1721' FWL</u> <u>SECTION 18, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>

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.

xc: 2 - GALLEGOS D. CATANACH FILE-WFX 520 OCD-ARTESIA
BLM - CARLSBAD

~~INDIAN DRAW UNIT This request is based on step rate tests conducted on these wells between June 24 and 29, 1992. 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:~~

<u>Well & Location</u>	<u>Maximum Injection Surface Pressure</u>
<u>Old Indian Draw Unit No. 10</u> <u>997' FNL + 1785' FWL</u> <u>SECTION 18, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>
<u>Old Indian Draw Unit No. 11</u> <u>330' FNL + 668' FEL</u> <u>SECTION 19, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>
<u>Old Indian Draw Unit No. 12</u> <u>1658' FNL + 794' FWL</u> <u>SECTION 18, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>
<u>Old Indian Draw Unit No. 16</u> <u>330' FSL + 794' FWL</u> <u>SECTION 7, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>
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.	
Not Called D. CANNACK FILE WFA 520 OGD ARFESHA	
SLM CARUSO	
<u>Old Indian Draw Unit No. 21</u> <u>330' FSL + 2283' FEL</u> <u>SECTION 7, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>
<u>Old Indian Draw Unit No. 35</u> <u>1663' FSL + 963' FEL</u> <u>SECTION 7, 22 SOUTH, 28 EAST</u>	<u>800 PSIG</u>

~~Old Indian Draw Unit No.~~

~~800 PSIG~~

~~Old Indian Draw Unit No.~~

~~800 PSIG~~



OIL CONSERVATION DIVISION
RECEIVED

'92 AUG 24 PM 10 20

Amoco Production Company

501 WestLake Park Boulevard
Post Office Box 3092
Houston, Texas 77253

August 11, 1992

Re: Request for Injection Pressure
Limit Increase

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87504-2088

Gentlemen:

Attached are supporting step rate test results for the purpose of filing an application to inject water above the .2 PSI/FT injection pressure limit for the wells listed below. Based on the historical relationship of the performances of these wells, the maximum injection pressure of these wells can be determined by the attached step rate test results.

This application is for the following wells:

<u>LEASE</u>	<u>WELL NO.</u>	<u>SEC / TOWNSHIP / RANGE</u>	<u>DESIRED INJECTION PRESSURE</u>
Old Indian Draw Unit	2	18 22 - S 28 - E	800 PSI
Old Indian Draw Unit	4	18 22 - S 28 - E	800 PSI
Old Indian Draw Unit	5	18 22 - S 28 - E	800 PSI
Old Indian Draw Unit	6	18 22 - S 28 - E	800 PSI
Old Indian Draw Unit	10	18 22 - S 28 - E	800 PSI
Old Indian Draw Unit	11	19 22 - S 28 - E	800 PSI
Old Indian Draw Unit	12	18 22 - S 28 - E	800 PSI
Old Indian Draw Unit	16	7 22 - S 28 - E	800 PSI
Old Indian Draw Unit	21	7 22 - S 28 - E	800 PSI
Old Indian Draw Unit	35	7 22 - S 28 - E	800 PSI

If further information is required, please contact James Finley at 713 / 588 - 5096.

Yours very truly,

Attachments

cc: New Mexico Oil Conservation Division
P. O. Box 1980
Hobbs, New Mexico 88240

STEP RATE TESTERS, INC.

915/366-3409

P. O. Box 13094

ODESSA, TEXAS 79768

No. _____

COMPANY Amoco Production Co. DATE 7-24-92

ADDRESS _____ Fed. Lease No NM 0415688-A

WELL # 2 LEASE Old Indian Draw Unit

WELL FILE DATA:

T.D. 3342 PACKERS @ 3016-20 PERFS. 3215-3287

TBG. ID. 2 3/8 TBG. COATING PC DEPTH SN. _____ BHP @ 3250'

Surf - 284

STABILIZATION:

RATE 25 BHPD PRES. BHP 1807 PSIA CUMULATIVE _____ BBLs.

INCREMENTS:

RATE 50 BHPD PRES. _____ PSIA STEP LENGTH 60 MINS.
Surface 836 175

TEST RESULTS:

FORMATION PARTING POINT BHP 2352 PSIA @ 175 BHPD

	RATE BHPD	PRESSURE SURFACE PSIA	PRESSURE MINUS FRICTION PSIA	PRESSURE BOTTOM HOLE PSIA
1.	<u>25</u>	<u>284</u>	<u>284</u>	<u>1807</u>
2.	<u>25</u>	<u>499</u>	<u>496</u>	<u>2019</u>
3.	<u>125</u>	<u>653</u>	<u>653</u>	<u>2176</u>
4.	<u>175</u>	<u>836</u>	<u>829</u>	<u>2352</u>
5.	<u>225</u>	<u>861</u>	<u>847</u>	<u>2370</u>
6.	<u>275</u>	<u>882</u>	<u>865</u>	<u>2388</u>
7.	<u>325</u>	<u>905</u>	<u>883</u>	<u>2406</u>
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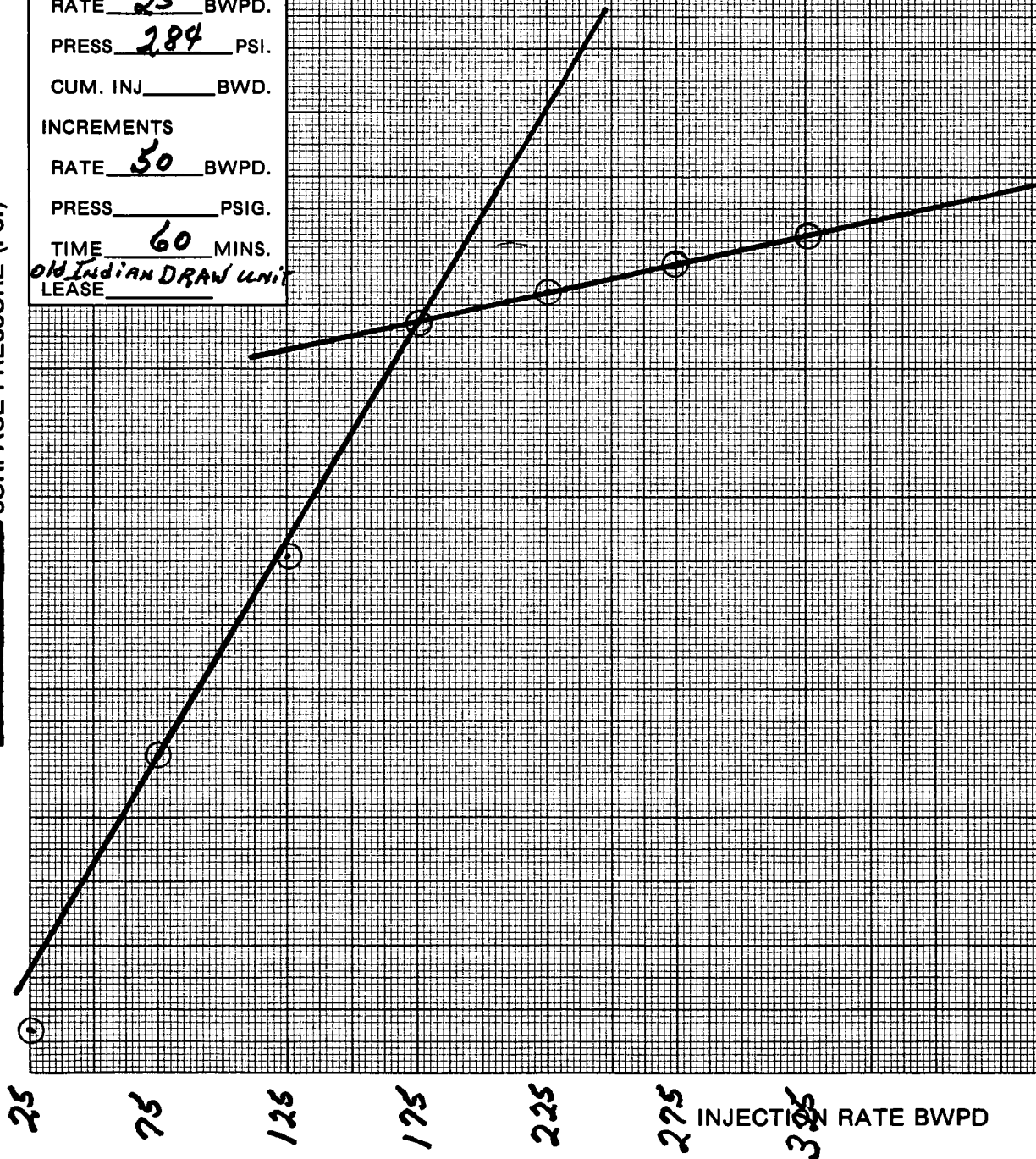
REMARKS _____

TESTER Wade Rice COMPANY REP. Jerry Huckaby

STEP RATE TESTERS INC.

WELL # 2
 DATE 7-24-92
 STABILIZATION
 RATE 25 BHPD.
 PRESS 284 PSI.
 CUM. INJ _____ BWD.
 INCREMENTS
 RATE 50 BHPD.
 PRESS _____ PSIG.
 TIME 60 MINS.
 LEASE OLD INDIAN DRAW UNIT

SURFACE PRESSURE (PSI)



INJECTION RATE BHPD

1000
 75
 50
 25
 900
 75
 50
 25
 800
 75
 50
 25
 700
 75
 50
 25
 600
 75
 50
 25
 500
 75
 50
 25
 400
 75
 50
 25
 300
 75
 250

STEP RATE TESTERS, INC.

915/366-3409

P. O. Box 13094

ODESSA, TEXAS 79768

No. _____

COMPANY Amoco Production Co. DATE 7-27-92

ADDRESS _____

WELL # 6 LEASE Old Indian Draw Unit

WELL FILE DATA:

T.D. 3322 PACKERS @ 3108-12 PERFS. 3192-3256
TBG. ID. 2 3/4 TBG. COATING PC DEPTH SN. _____ BHP @ 3225'

STABILIZATION:

RATE 200 BHPD PRES. 619 PSIG. CUMULATIVE _____ BBLs.

INCREMENTS:

RATE 150 BHPD PRES. _____ PSIG. STEP LENGTH 60 MINS.
Surface 800 370

TEST RESULTS:

FORMATION PARTING POINT BHP 2334 PSIG. @ 380 BHPD

	RATE BHPD	PRESSURE SURFACE PSIG.	PRESSURE MINUS FRICTION PSIG.	PRESSURE BOTTOM HOLE PSIG.
1.	<u>200</u>	<u>619</u>	<u>619</u>	<u>2133</u>
2.	<u>350</u>	<u>788</u>	<u>784</u>	<u>2298</u>
3.	<u>500</u>	<u>875</u>	<u>866</u>	<u>2380</u>
4.	<u>650</u>	<u>948</u>	<u>925</u>	<u>2439</u>
5.	<u>800</u>	<u>984</u>	<u>956</u>	<u>2470</u>
6.	<u>950</u>			
7.	<u>1100</u>			
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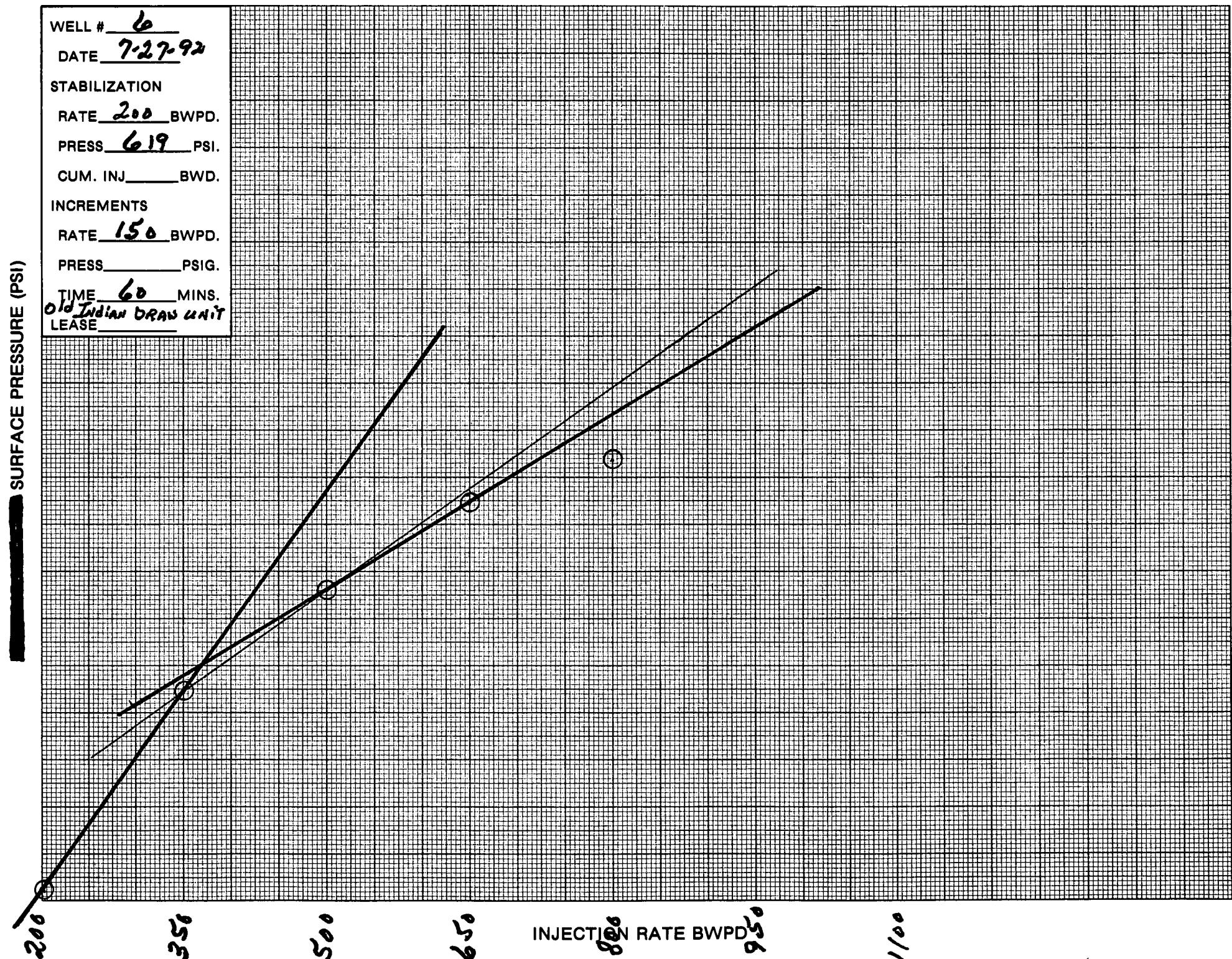
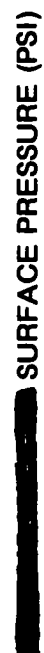
REMARKS _____

TESTER Wade Rice COMPANY REP. _____

STEP RATE TESTERS INC.

WELL # 6
 DATE 7-27-92
 STABILIZATION
 RATE 200 BWP.D.
 PRESS 619 PSI.
 CUM. INJ _____ BWD.
 INCREMENTS
 RATE 150 BWP.D.
 PRESS _____ PSIG.
 TIME 60 MINS.
 LEASE Old Indian Draw Unit

SURFACE PRESSURE (PSI)



1110
90
70
50
30
1010
90
70
50
30
910
90
70
50
30
810
90
70
50
30
710
90
70
50
30
610

INJECTION RATE BWP.D.

200 350 500 650 800 950 1100

STEP RATE TESTERS, INC.

915/366-3409

P. O. Box 13094

ODESSA, TEXAS 79768

No. _____

COMPANY Amoco Production Co. DATE 7-27-92

ADDRESS _____

WELL # 10 LEASE Old Indian Draw Unit

WELL FILE DATA:

T.D. 3397 PACKERS @ 3116 PERFS. 3209-3289

TBG. ID. 2318 TBG. COATING PC DEPTH SN. _____ BHP @ 3250

472

STABILIZATION:

RATE 75 BHPD PRES. 1991 PSIG. CUMULATIVE _____ BBLs.

INCREMENTS:

RATE 50 BHPD PRES. _____ PSIG. STEP LENGTH 60 MINS.

SURFACE 826 - 180

TEST RESULTS:

FORMATION PARTING POINT BHP- 2303 PSIG. @ 170 BHPD

	RATE BHPD	PRESSURE SURFACE PSIG.	PRESSURE MINUS FRICTION PSIG.	PRESSURE BOTTOM HOLE PSIG.
1.	<u>75</u>	<u>472</u>	<u>472</u>	<u>1991</u>
2.	<u>125</u>	<u>619</u>	<u>616</u>	<u>2135</u>
3.	<u>175</u>	<u>812</u>	<u>800</u>	<u>2319</u>
4.	<u>225</u>	<u>875</u>	<u>846</u>	<u>2365</u>
5.	<u>275</u>	<u>928</u>	<u>899</u>	<u>2418</u>
6.	<u>325</u>	<u>915</u>		<u>2395</u>
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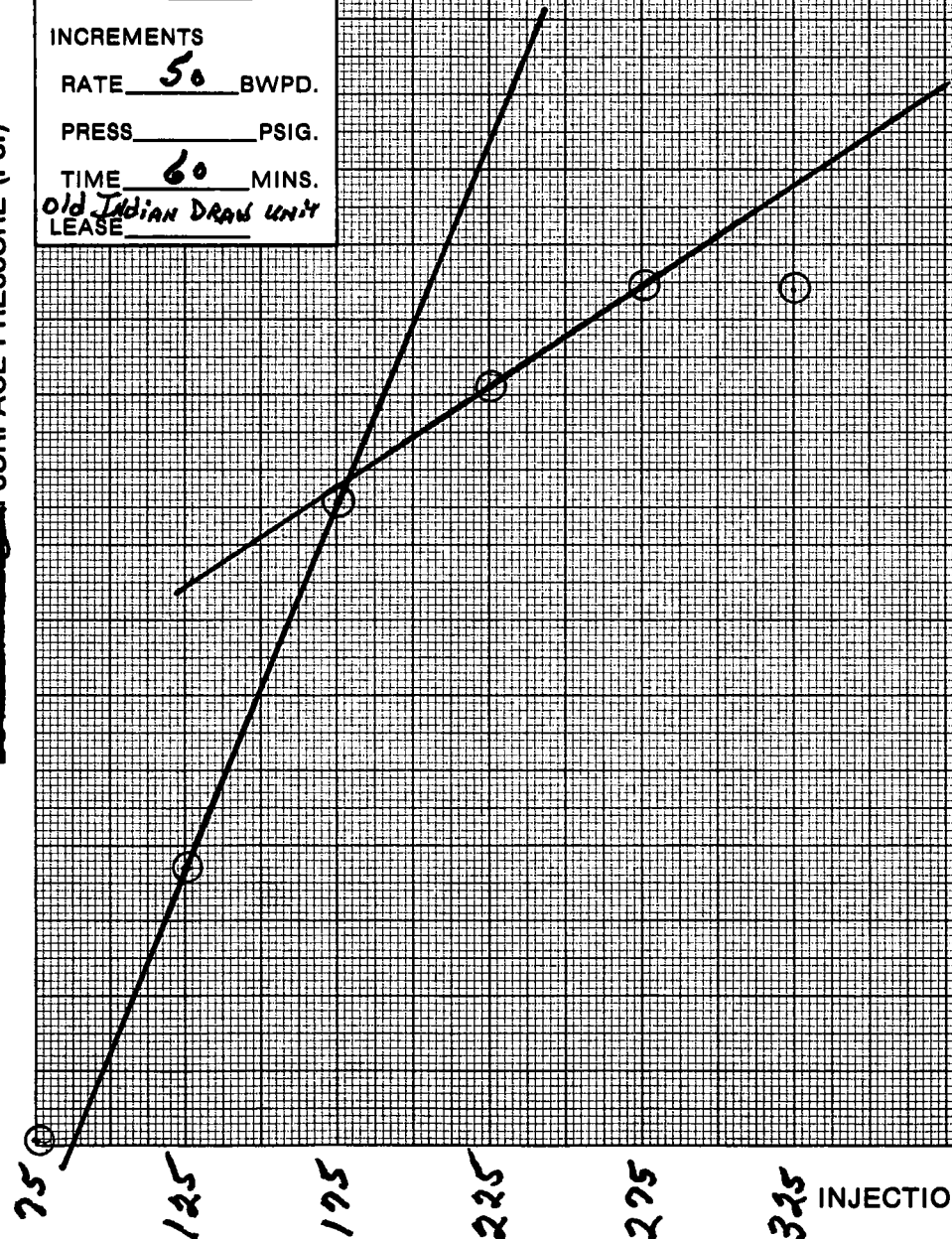
REMARKS _____

TESTER Wade Rice COMPANY REP. Terry Huckaby

STEP RATE TESTERS INC.

WELL # 10
 DATE 7-27-92
 STABILIZATION
 RATE 75 BHPD.
 PRESS 472 PSI.
 CUM. INJ _____ BWD.
 INCREMENTS
 RATE 50 BHPD.
 PRESS _____ PSIG.
 TIME 60 MINS.
 LEASE Old Indian Draw Unit

SURFACE PRESSURE (PSI)



1010
90
70
50
30
910
90
70
50
30
810
90
70
50
30
710
90
70
50
30
610
90
70
50
30
510
90
470

INJECTION RATE BHPD

STEP RATE TESTERS, INC.

915/366-3409

P. O. Box 13094

ODESSA, TEXAS 79768

No. _____

COMPANY Amoco Production Co. DATE 7-29-92

ADDRESS _____

WELL # 21 LEASE Old Indian Draw Unit

WELL FILE DATA:

T.D. 3409 PACKERS @ 3136 PERFS. 3238-3239 ?

TBG. ID. 2 3/4 TBG. COATING 1c DEPTH SN. 75 BHP @ 3260'

STABILIZATION:

RATE 0 BWPD PRES. 1601 PSIG. CUMULATIVE _____ BBLs.

INCREMENTS:

RATE 50 BWPD PRES. _____ PSIG. STEP LENGTH 60 MINS.

Surface 790 132

TEST RESULTS:

FORMATION PARTING POINT BHP- 2295 PSIG. @ 132 BWPD

	RATE BWPD	PRESSURE SURFACE PSIG.	PRESSURE MINUS FRICTION PSIG.	PRESSURE BOTTOM HOLE PSIG.
1.	<u>0</u>	<u>75</u>	<u>75</u>	<u>1601</u>
2.	<u>50</u>	<u>330</u>	<u>327</u>	<u>1853</u>
3.	<u>100</u>	<u>610</u>	<u>600</u>	<u>2126</u>
4.	<u>150</u>	<u>810</u>	<u>784</u>	<u>2310</u>
5.	<u>200</u>	<u>771</u>	<u>728</u>	<u>2254</u>
6.	<u>250</u>	<u>840</u>		<u>2318</u>
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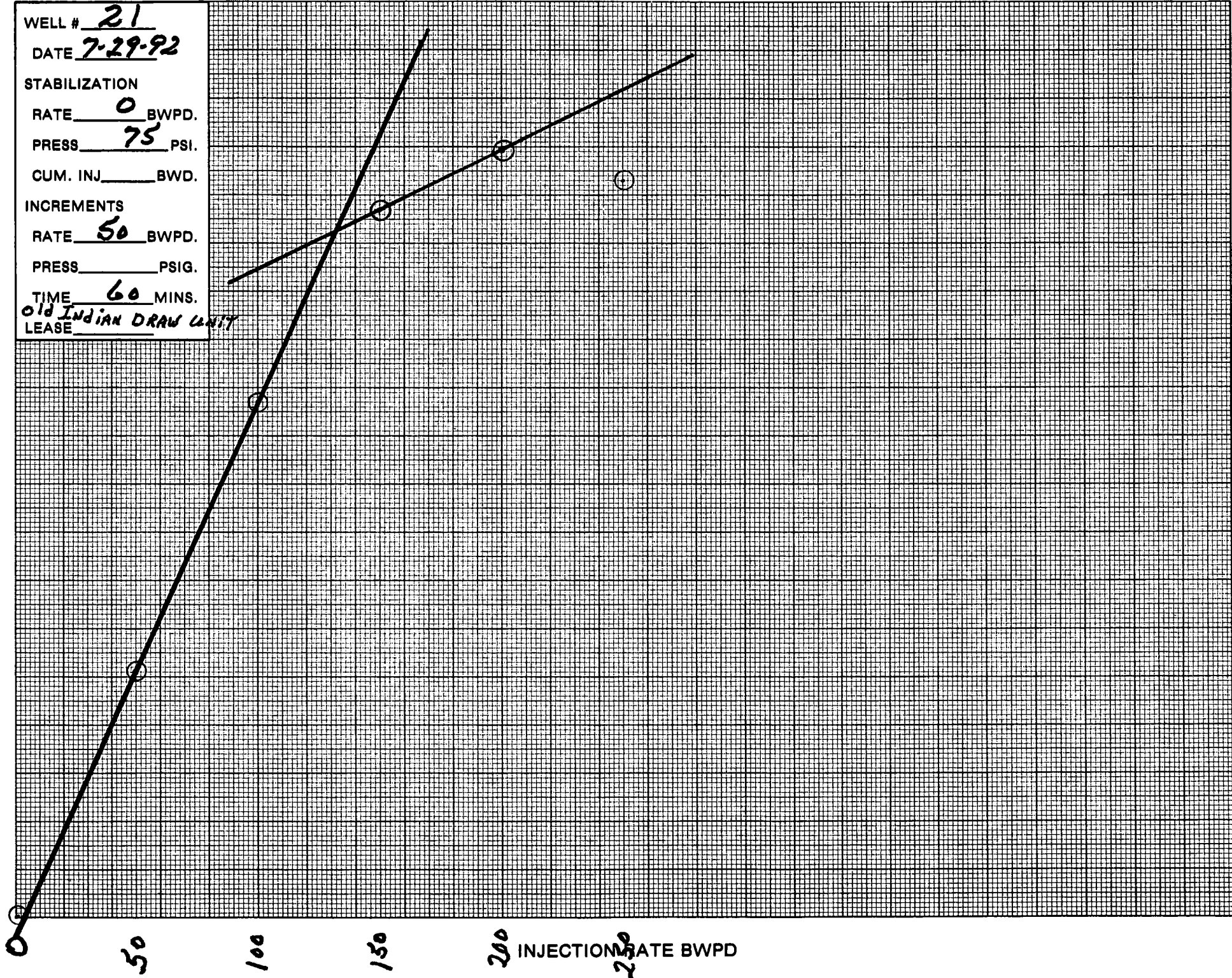
REMARKS _____

TESTER Mark Rice COMPANY REP. Terry Huckaby

STEP RATE TESTERS INC.

WELL # 21
 DATE 7-29-92
 STABILIZATION
 RATE 0 BWPD.
 PRESS 75 PSI.
 CUM. INJ BWD.
 INCREMENTS
 RATE 50 BWPD.
 PRESS PSIG.
 TIME 60 MINS.
 LEASE OLD INDIAN DRAW UNIT

SURFACE PRESSURE (PSI)



1000
75
50
25
900
75
50
25
800
75
50
25
700
75
50
25
600
75
50
25
500
75
50
25
400
75
50
25
300
75
50
25
200
75
50
25
100
25

INJECTION RATE BWPD

T-22-S





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



BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

September 11, 1992

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

Greenhill Petroleum Corporation
11490 Westheimer Road, Suite 200
Houston, Texas 77077-6841

Michael J. Newport

RE: *Injection Pressure Increase
Lovington San Andres Unit
8 Wells
Lea County, New Mexico*

Dear Sir:

Reference is made to your request dated August 25, 1992, to increase the surface injection pressure on 8 wells in the Lovington San Andres Unit. This request is based on a step rate tests conducted on these wells from July 28 to August 3, 1992. 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:

WELL AND LOCATION	<u>MAXIMUM INJECTION SURFACE PRESSURE</u>
Lovington San Andres Unit No. 11 1980' FNL & 1980' FWL "F" 31-16S-36E	1480 PSIG
Lovington San Andres Unit No. 13 1760' FSL & 440' FEL "I" 36-16S-36E	2200 PSIG
Lovington San Andres Unit No. 20 660' FSL & 660' FEL "P" 31-16S-37E	1980 PSIG

WELL AND LOCATION

MAXIMUM INJECTION
SURFACE PRESSURE

Lovington San Andres Unit No. 23
660' FSL & 990' FWL
"M" 31-16S-37E

2150 PSIG

Lovington San Andres Unit No. 26
660' FSL & 1980' FWL
"N" 36-16S-36E

1925 PSIG

Lovington San Andres Unit No. 35
339' FNL & 1980' FWL
"C" 6-17S-37E

2200 PSIG

Lovington San Andres Unit No. 37
330' FNL & 990' FEL
"A" 6-17S-37E

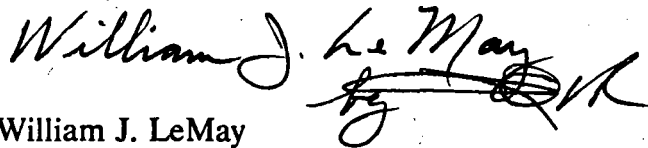
1911 PSIG

Lovington San Andres Unit No. 38
1650' FNL & 1980' FWL
"F" 6-17S-37E

2200 PSIG

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

WJL/DC/jc

cc: Oil Conservation Division - Hobbs
File: WFX-632
David Catanach

NO WAITING PERIOD

COMPANY: GREENHILL PETROLEUM CORPORATION
ADDRESS: 11490 WESTHEIMER ROAD, SUITE 200
CITY, STATE, ZIP: HOUSTON, TEXAS 77077-6841
ATTENTION: MICHAEL J. NEWPORT

Re: Injection Pressure Increase
LOVINGTON SAN ANDRES UNIT
8 WELLS
LEA County, New Mexico

Dear Sir:

Reference is made to your request dated AUGUST 25, 1992, to increase the surface injection pressure on 8 WELLS IN THE LOVINGTON SAN ANDRES UNIT. This request is based on step rate tests conducted on these wells from July 28 to August 3, 1992. 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:

<u>Well & Location</u>	<u>Maximum Injection Surface Pressure</u>
<u>LOVINGTON SAN ANDRES UNIT No. 11</u> <u>1980' FNL & 1980' FWL</u> <u>"F" 31-16S-36E</u>	<u>1480 PSIG</u>
<u>LOVINGTON SAN ANDRES UNIT No. 13</u> <u>1760' FSL & 440' FEL</u> <u>"I" 36-16S-36E</u>	<u>2200 PSIG</u>
<u>LOVINGTON SAN ANDRES UNIT No. 20</u> <u>660' FSL & 660' FEL</u> <u>"P" 31-16S-37E</u>	<u>1890 PSIG</u>
<u>LOVINGTON SAN ANDRES UNIT No. 23</u> <u>660' FSL & 900' FWL</u> <u>"M" 31-16S-37E</u>	<u>2150 PSIG</u>

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.

~~cc: T. GALLEGOS~~ D. CATANACH FILE- WFX-632 OCD- HOBBS

Maximum Injection Surface Pressure

1925 PSIG

2200 PSIG

1911 PSIG

2200 PS/G



GREENHILL PETROLEUM CORPORATION

Incorporated in Delaware, U.S.A.

OIL CONSERVATION DIVISION
HOUSTON, TEXAS 77077-6841
TELEPHONE (713) 589-8484
FAX (713) 589-7892

'92 AUG 31 PM 9 52

August 25, 1992

Oil Conservation Division
State of New Mexico
Energy, Minerals and Natural Resources Department
Attention: Mr. David Catanach
P. O. Box 2088
Santa Fe, New Mexico 87504-2088

Re: Step Rate Test Graphs and Charts
Lovington San Andres Unit
Well Numbers 11, 13, 20, 23, 26, 35, 37, and 38
Lea County, New Mexico

Dear Mr. Catanach:

Enclosed please find the Step Rate Test Graphs and Charts covering Lovington San Andres Unit Well Numbers 11, 13, 20, 23, 26, 35, 37 and 38. Greenhill Petroleum Corporation hereby requests permission to increase the surface injection pressure for the above referenced wells. This request is based upon Step Rate Tests conducted on these wells.

Please contact me in the event I can provide you with additional information.

Very truly yours,

Michael J. Newport
Land Manager-Permian Basin

MJN:sjs
92.620

Enclosure

ALL INFORMATION CONTAINED
HEREIN IS UNCLASSIFIED
DATE 01-11-2001 BY 1042
1042

GREENHILL PETROLEUM CORPORATION
LOVINGTON SAN ANDRES UNIT
STEP RATE TEST RESULTS

Well Identification	LSA 11	LSA 13	LSA 20	LSA 23	LSA 26	LSA 35	LSA 37	LSA 38
Surface Parting Pressure PSIG	1530	2283	1940	2200	1975	2260	1961	2252
Hydrostatic Pressure PSIG	2070	1998	1870	2130	2020	1874	1805	1667
Bottom Hole Pressure PSIG	3600	4281	3810	4330	3995	4134	3766	3919
Midperft Depth Feet	4852	4793	5018	4806	4825	4805	4805	4838
Fracture Gradient PSI/Ft	0.74	0.89	0.76	0.90	0.83	0.86	0.78	0.81
Requested Injection Pressure PSIG	1530	2200	1940	2200	1975	2200	1961	2200

1480 ✓ 1890 2150 1925 ✓ 1911 ✓

sjs
92.621

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
- BOTTOM HOLE PRESSURE @ 5018 FEET

2100

1900

1700

1500

1300

1100

900

700

500

300

100

WELLHEAD PRESSURE
PSIG

GREENHILL PETROLEUM CORPORATION
STEP-RATE INJECTION TEST
LOVINGTON SAN ANDRES UNIT WELL NO. 20
JULY 30, 1992

4000

3800

3600

3400

3200

3000

2800

2600

2400

BOTTOM HOLE PRESSURE
PSIG

B W P D

500

1000

1500

2000

2500

3000

3500

4000

JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 7/30/92

WELL NAME: Lovington San Andres Unit Well No. 20

WO#: 82141012

Lea County, New Mexico

MID-PERF8. = 4945 - 5090

PACKER DEPTH =

BHP GAUGE DEPTH = 5018

STEP NO. & REMAINS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psig) (1) - (4)	(6) INJECTION RATE (gpm) (3)/34.2337	(7) MEASURED BHP (psf)
1	1:15	89.5				89.5		2269
	1:20	236.3	2.0	576.0	15.601	220.7	16.80	2405
	1:25	255.2	3.9	547.2	14.189	241.0	15.96	2428
	1:30	264.1	5.8	547.2	14.189	249.9	15.96	2439
2				556.8				
	1:35	455.8	9.4	1036.8	46.282	409.5	30.24	2609
	1:40	496.3	13.0	1036.8	46.282	450.0	30.24	2653
	1:45	516.4	16.7	1065.6	48.688	467.7	31.08	2678
3				1046.4				
	1:50	738.3	22.0	1526.4	94.659	643.6	44.52	2857
	1:55	784.9	27.4	1555.2	97.990	686.9	45.36	2906
	2:00	816.4	32.8	1555.2	97.990	718.4	45.36	2935
4				1545.6				
	2:05	1023.2	39.9	2044.8	162.585	860.6	59.64	3100
	2:10	1071.2	46.9	2016.0	158.374	912.8	58.80	3149
	2:15	1104.1	53.9	2016.0	158.374	945.7	58.80	3182
5				2025.6				
	2:20	1331.9	62.7	2534.4	241.849	1090.1	73.92	3347
	2:25	1373.7	71.4	2505.6	236.789	1136.9	73.08	3395
	2:30	1409.1	80.3	2563.2	246.958	1162.1	74.76	3430
6				2534.4				
	2:35	1667.2	91.0	3081.6	347.225	1320.0	89.88	3596
	2:40	1722.9	101.8	3110.4	353.253	1369.6	90.72	3652
	2:45	1760.8	112.5	3081.6	347.225	1413.6	89.88	3688
7				3091.2				
	2:50	2000.0	125.3	3686.4	483.716	1516.3	107.52	3823
	2:55	2034.2	138.2	3715.2	490.730	1543.5	108.36	3865
	3:00	2053.2	151.0	3686.4	483.716	1569.5	107.52	3890
Out of water.				3695.9				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psig) (1)-(4)	(6) INJECTION RATE (gpm) (3)/24,000	(7) MEASURED BHP (psf)
Fall-Off	3:01	1421.7				1421.7		3615
	3:02	1200.2				1200.2		3406
	3:03	1049.5				1049.5		3255
	3:04	943.5				943.5		3148
	3:05	858.9				858.9		3061
	3:10	617.8				617.8		2817

△ RECORDED WELLHEAD PRESSURE
 ○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
 □ BOTTOM HOLE PRESSURE @ 4806 FEET

2400

2200

2000

1800

1600

1400

1200

1000

800

600

PSIG

WELLHEAD PRESSURE

GREENHILL PETROLEUM CORPORATION
 STEP-RATE INJECTION TEST
 LOVINGTON SAN ANDRES UNIT WELL NO 23
 JULY 30, 1992

4400

4200

4000

3800

3600

3400

3200

3000

2800

BOTTOM HOLE PRESSURE PSIG

B W P D

500

900

1300

1700

2100

2500

2900

3100

JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 7/30/92

WELL NAME: Lovington San Andres Unit Well No. 23
Lea County, New Mexico

WO#: 92141012

MID-PERF8. = 4530 - 5081

PACKER DEPTH = 4470

BHP GAUGE DEPTH = 4806

STEP NO. X REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (6)/34.2857	(7) MEASURED BHP (psf)
	9:55	528.8				528.8		2625
	10:00	667.8	1.9	547.2	13.590	654.2	15.96	2758
	10:05	718.3	3.8	547.2	13.589	704.7	15.96	2813
1	10:10	755.0	5.7	547.2	13.589	741.4	15.96	2852
				547.2				
	10:15	909.0	9.3	1036.8	44.327	864.7	30.24	2993
	10:20	982.2	12.9	1036.8	44.327	937.9	30.24	3060
2	10:25	1032.8	16.5	1036.8	44.327	988.5	30.24	3112
				1036.8				
	10:30	1206.2	21.7	1497.6	87.521	1118.7	43.68	3254
	10:35	1286.0	27.0	1526.4	90.660	1185.3	44.52	3333
3	10:40	1346.7	32.4	1555.2	93.850	1252.9	45.36	3392
				1526.4				
	10:45	1539.2	39.4	2016.0	151.683	1387.5	58.80	3547
	10:50	1641.7	46.4	2016.0	151.683	1490.0	58.80	3633
4	10:55	1688.5	53.5	2044.8	155.716	1532.8	59.64	3694
				2025.6				
	11:00	1886.0	62.2	2505.6	226.786	1659.2	73.08	3834
	11:05	1965.7	71.0	2534.4	231.632	1734.1	73.92	3915
5	11:10	2036.6	79.8	2534.4	231.632	1805.0	73.92	3979
				2524.8				
	11:15	2212.6	90.2	2995.2	315.512	1897.1	87.36	4098
	11:20	2288.5	100.7	3024.0	321.148	1967.4	88.20	4167
6	11:25	2336.6	111.2	3024.0	321.148	2015.5	88.20	4221
				3014.4				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/hr)	(4) FRICTION HEAD LOSS (ps)	(5) CORRECTED TUBING PRESS. (ps) (5)-(4)	(6) INJECTION RATE (gpm) (3)/24.687	(7) MEASURED BHP (ps)
Fall-Off	11:26	1998.7				1998.7		4105
	11:27	1907.5				1907.5		4021
	11:28	1837.9				1837.9		3954
	11:29	1778.5				1778.5		3895
	11:30	1726.6				1726.6		3842
	11:35	1545.6				1545.6		3659
	11:40	1436.8				1436.8		3549

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
- BOTTOM HOLE PRESSURE @ 4852 FEET

2100

1900

1700

1500

1300

1100

900

700

PSIG

WELLHEAD PRESSURE

GREENHILL PETROLEUM CORPORATION
 STEP-RATE INJECTION TEST
 LOVINGTON SAN ANDRES UNIT WELL NO. 11
 JULY 28, 1992

4000

PSIG

3800

3600

3400

3200

3000

2800

BOTTOM HOLE PRESSURE

B-W-P-D

400

900

1400

1900

2400

2900

3400

JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 7/28/92

WELL NAME: Lovington San Andrea Unit Well No. 11
Lea County, New Mexico

WO#: 92141019

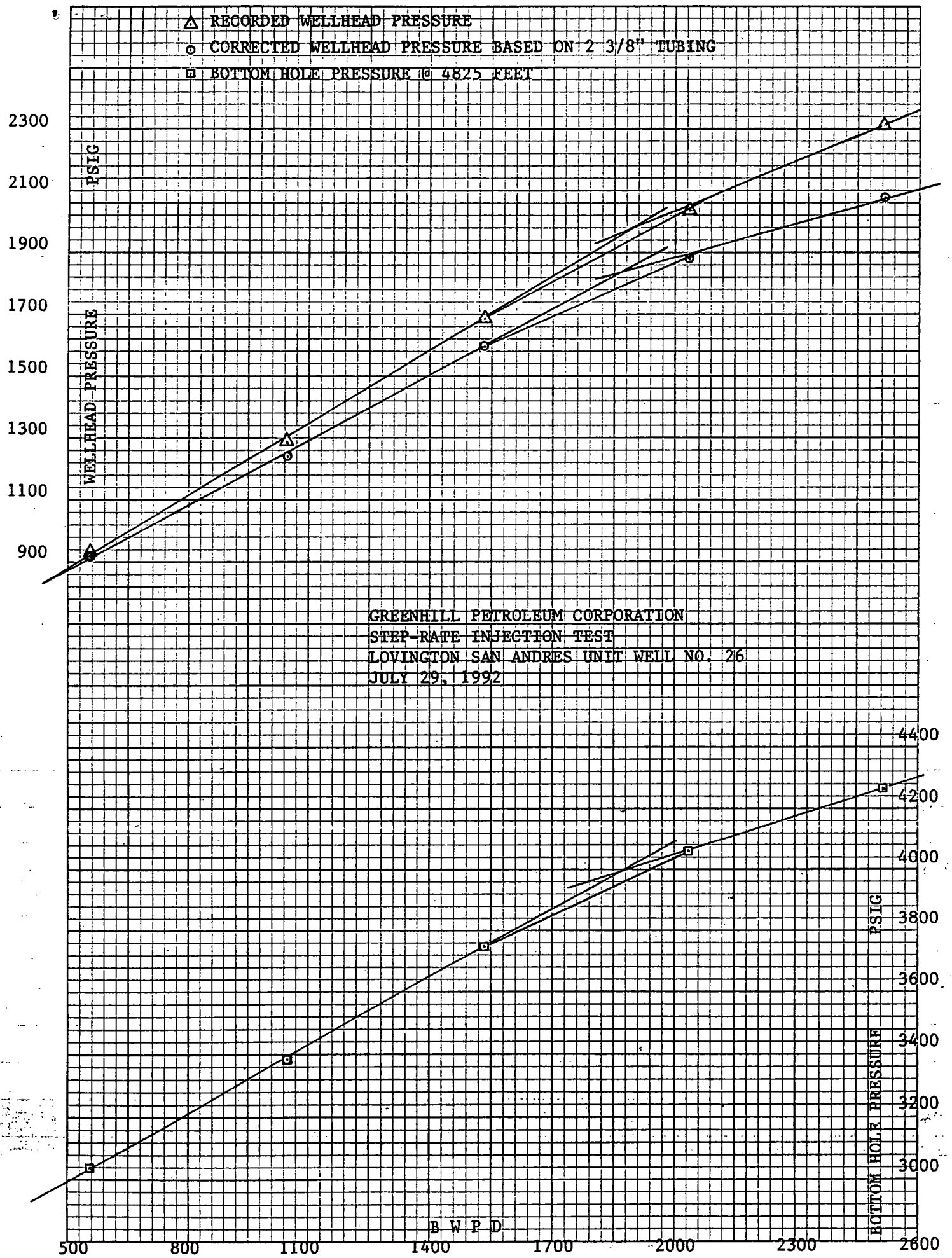
MID-PERF8. = 4575 - 5190

PACKER DEPTH =

BHP GAUGE DEPTH = 4852

STEP NO. 1		(1) BLHFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psig) (1)-(4)	(6) INJECTION RATE (gpm) (5)/34.2537	(7) MEASURED BHP (psf)
1	9:35	486.5				486.5		2610
	9:40	641.7	1.6	460.8	9.983	631.7	13.44	2762
	9:45	699.8	3.2	460.8	9.983	689.8	13.44	2832
	9:50	755.4	4.6	403.2	7.798	747.6	11.76	2878
				441.6				
2	9:55	889.2	7.4	806.4	28.112	861.1	23.52	3012
	10:00	968.7	10.1	777.6	26.282	942.4	22.68	3084
	10:05	1040.7	12.8	777.6	26.282	1014.4	22.68	3145
3				787.2				
	10:10	1159.7	16.7	1123.2	51.893	1107.8	32.76	3271
	10:15	1241.9	20.5	1094.4	49.459	1192.4	31.92	3347
	10:20	1310.3	24.4	1123.2	51.893	1258.4	32.76	3406
4				1113.6				
	10:25	1445.7	29.7	1526.4	91.528	1354.2	44.52	3518
	10:30	1495.1	35.0	1526.4	91.528	1403.6	44.52	3573
	10:35	1534.3	40.2	1497.6	88.358	1445.9	43.68	3611
5				1516.8				
	10:40	1634.3	46.9	1929.6	141.215	1493.1	56.28	3674
	10:45	1668.5	53.6	1929.6	141.215	1527.3	56.28	3706
	10:50	1683.5	60.3	1929.6	141.215	1542.3	56.28	3728
6				1929.6				
	10:55	1784.7	68.7	2419.2	214.565	1570.1	70.56	3772
	11:00	1807.5	76.9	2361.6	205.209	1602.3	68.88	3794
	11:05	1826.4	85.4	2448.0	219.314	1607.1	71.40	3814
7				2409.6				
	11:10	1906.2	95.2	2822.4	285.371	1620.8	82.32	3842
	11:15	1920.1	105.0	2822.4	285.371	1634.7	82.32	3856
	11:20	1941.7	114.7	2793.6	280.007	1661.7	81.48	3868
				2812.8				

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
STEP NO.		SHOULDER	CUMULATIVE	INJECTION	FRICTION	CORRECTED	INJECTION	MEASURED
REMARKS	TIME	TUBING PRESS.	VOL. INJECTED	RATE	HEAD LOSS	TUBING PRESS.	RATE (gpm)	RIP
		(psig)	(bbls)	(bbls/day)	(psig)	(psig) (5)-(4)	(6)/(34.7087)	(psig)
8	11:25	2017.6	126.1	3283.2	377.499	1640.1	95.76	3893
	11:30	2039.1	137.4	3254.4	371.396	1667.7	94.92	3913
	11:35	2066.9	148.6	3225.6	365.338	1701.6	94.08	3927
Fall-Off				3254.4				
	11:36	1789.7				1789.7		3907
	11:37	1759.3				1759.3		3898
	11:38	1750.5				1750.5		3892
	11:39	1744.1				1744.1		3885
	11:40	1737.8				1737.8		3879
	11:45	1712.4				1712.4		3851
	11:50	1689.6				1689.6		3827



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 7/29/82

WELL NAME: Lovington San Andres Unit Well No. 28

WO#: 92141019

Lea County, New Mexico

MID-PERF8. = 4520 - 5129

PACKER DEPTH = 4447

BHP GAUGE DEPTH = 4826

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psig) (1) - (4)	(6) INJECTION RATE (gpm) (3) / 24.0007	(7) MEASURED BHP (psi)
1	11:30	587.7				587.7		2701
	11:35	789.6	1.9	547.2	13.643	776.0	15.96	2898
	11:40	875.5	3.9	576.0	15.001	860.5	16.80	2983
	11:45	936.0	5.8	547.2	13.643	922.4	15.96	3039
				556.8				
2	11:50	1140.8	9.5	1065.8	46.816	1094.0	31.08	3230
	11:55	1219.3	13.1	1036.8	44.502	1174.8	30.24	3319
	12:00	1287.6	16.7	1036.8	44.502	1243.1	30.24	3386
3				1046.4				
	12:05	1517.9	22.0	1526.4	91.018	1426.9	44.52	3577
	12:10	1606.5	27.3	1526.4	91.018	1515.5	44.52	3675
	12:15	1687.5	32.7	1555.2	94.221	1593.3	45.36	3750
				1535.9				
4	12:20	1892.5	39.7	2016.0	152.282	1740.2	58.80	3903
	12:25	1976.0	46.8	2044.8	156.331	1819.7	59.64	3989
	12:30	2035.4	53.9	2044.8	156.331	1879.1	59.64	4053
				2035.2				
5	12:35	2217.6	62.6	2505.6	227.682	1989.9	73.08	4167
	12:40	2273.3	71.4	2534.4	232.547	2040.8	73.92	4231
	12:45	2307.5	80.1	2505.6	227.682	2079.8	73.08	4271
				2515.2				
Fall-Off	12:46	2075.8				2075.8		4206
	12:47	2023.9				2023.9		4156
	12:48	1983.4				1983.4		4120
	12:49	1951.8				1951.8		4084
	12:50	1913.8				1913.8		4046
	12:55	1759.4				1759.4		3890
	1:00	1626.5				1626.5		3755

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
- BOTTOM HOLE PRESSURE @ 4793 FEET

2300
2100
1900
1700
1500
1300
1100
900

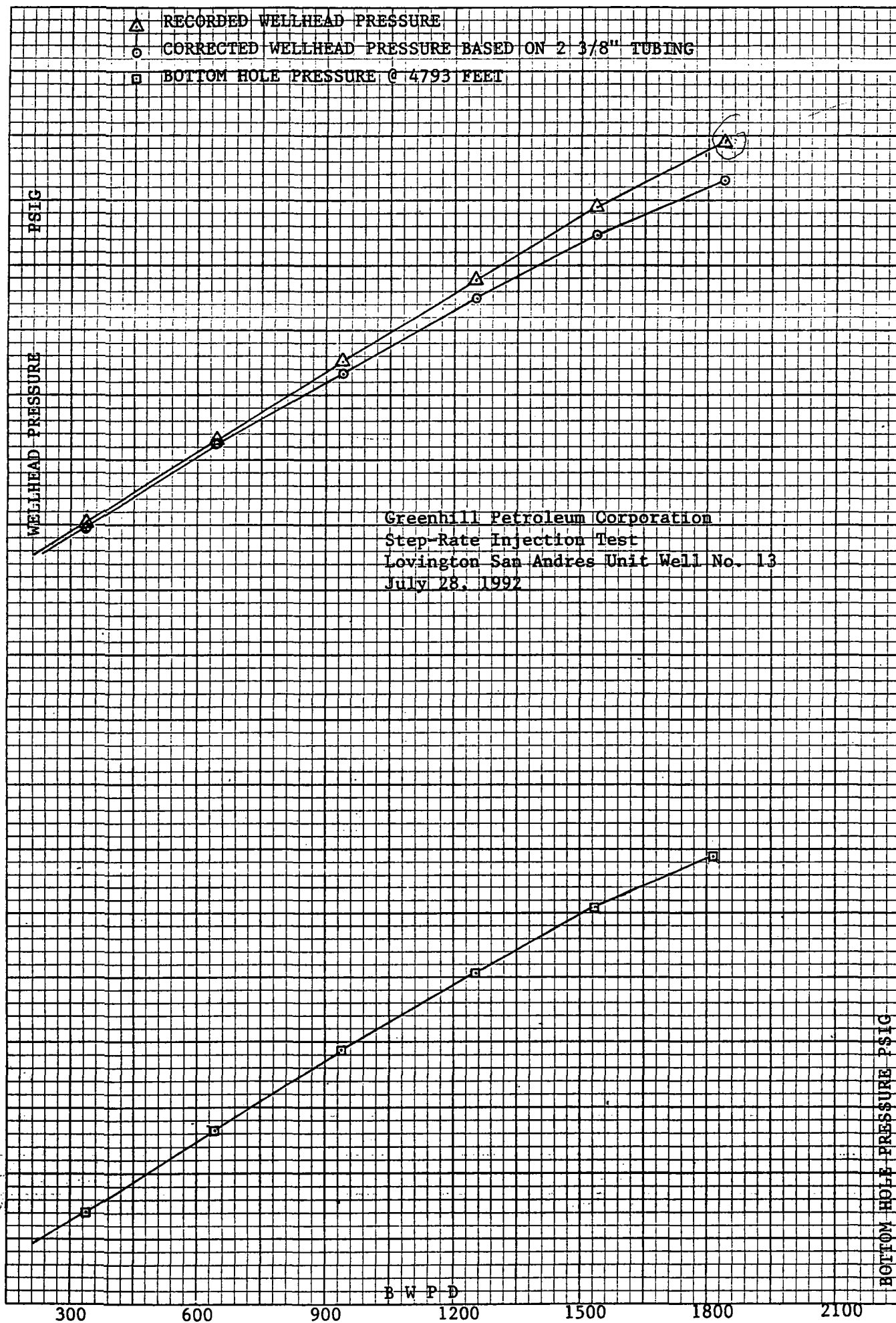
WELLHEAD PRESSURE
PSIG

Greenhill Petroleum Corporation
Step-Rate Injection Test
Lovington San Andres Unit Well No. 13
July 28, 1992

BOTTOM HOLE PRESSURE PSIG

B W P D

300 600 900 1200 1500 1800 2100



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 7/28/92

WELL NAME: Lovington San Andres Unit Well No. 13
Lea County, New Mexico

WO#: 92141012

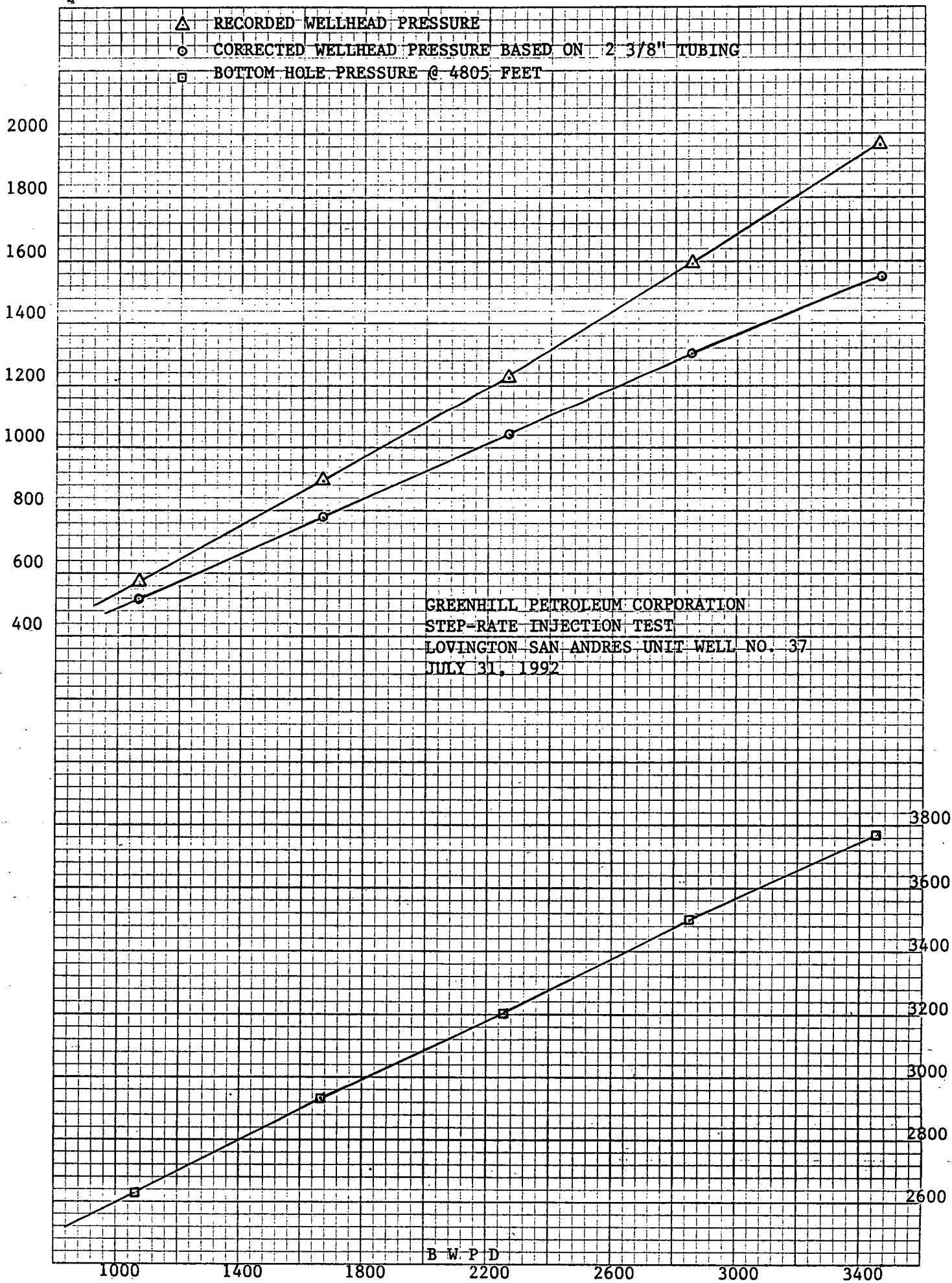
MID-PERF8. = 4518 - 5068

PACKER DEPTH =

BHP GAUGE DEPTH = 4783

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psig)	(5) CORRECTED TUBING PRESS. (psig) (1)-(4)	(6) INJECTION RATE (gpm) (bbl/34.567)	(7) MEASURED BHP (psig)
	1:25	877.7				877.7		2958
	1:30	1001.2	1.2	345.6	5.792	995.4	10.08	3069
	1:35	1056.8	2.3	316.8	4.931	1051.9	9.24	3133
1	1:40	1101.1	3.5	345.6	5.792	1095.3	10.08	3181
				335.9				
	1:45	1227.7	5.7	633.6	17.775	1209.9	18.48	3291
	1:50	1289.9	8.0	662.4	19.299	1270.6	19.32	3368
2	1:55	1367.2	10.2	633.6	17.775	1349.4	18.48	3430
				643.2				
	2:00	1490.0	13.5	950.4	37.634	1452.4	27.72	3539
	2:05	1529.3	16.8	950.4	37.634	1491.7	27.72	3613
3	2:10	1605.3	20.0	921.6	35.551	1569.7	26.88	3673
				940.8				
	2:15	1730.6	24.4	1267.2	64.079	1666.5	36.96	3778
	2:20	1798.9	28.8	1267.2	64.079	1734.8	36.96	3851
4	2:25	1858.8	33.1	1238.4	61.411	1797.4	36.12	3910
				1257.6				
	2:30	1963.5	38.4	1526.4	90.415	1873.1	44.52	3999
	2:35	2048.3	43.8	1555.2	93.596	1954.7	45.36	4066
5	2:40	2082.5	49.1	1526.4	90.415	1992.1	44.52	4119
				1535.9				
	2:45	2206.6	55.5	1843.2	128.163	2078.4	53.76	4191
	2:50	2245.8	61.8	1814.4	124.483	2121.3	52.92	4241
6	2:55	2282.5	68.0	1785.6	120.852	2161.6	52.08	4281
				1814.4				

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
STEP NO. & REMARKS	TIME	SHUT-IN TUBING PRESS. (psig)	CUMULATIVE VOL. INJECTED (bbls)	INJECTION RATE (bbls/day)	FRICTION HEAD LOSS (psi)	CORRECTED TUBING PRESS. (psi) (1)-(5)	INJECTION RATE (gpm) (bbls/day) (6)/1.34 (bbls)	MEASURED BHP (psi) (7)-(5)
Fall-Off	2:56	2143.3				2143.3		4251
	2:57	2114.2				2114.2		4234
	2:58	2100.2				2100.2		4221
	2:59	2087.6				2087.6		4207
	3:00	2074.9				2074.9		4196
	3:05	2026.8				2026.8		4144
	3:10	1990.0				1990.0		4106



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 7/31/92

WELL NAME: Lovington San Andres Unit Well No. 37
Lea County, New Mexico

WO#: 92141013

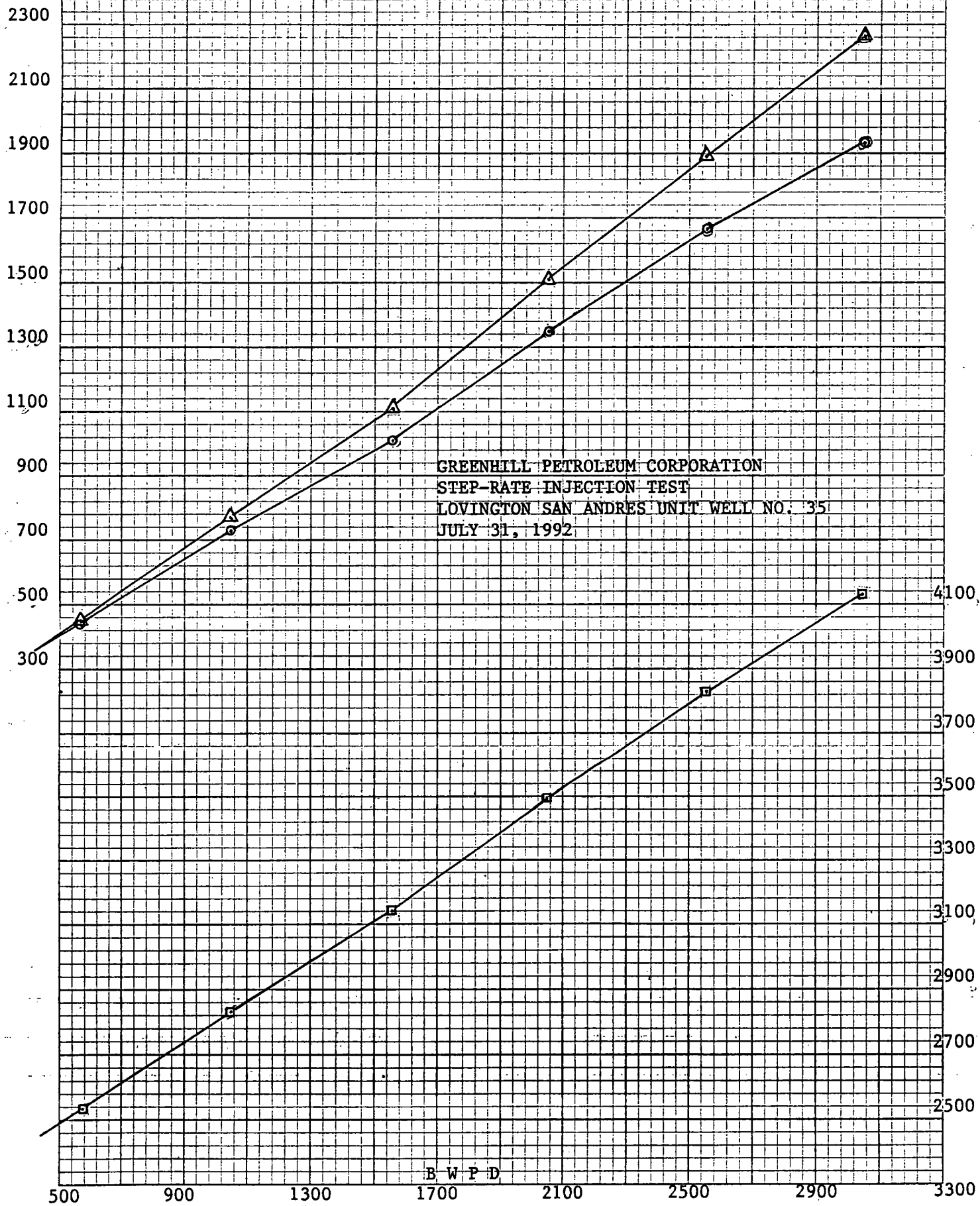
MID-PERF8. = 4560 - 5050

PACKER DEPTH = 4520

BHP GAUGE DEPTH = 4805

STEP NO. #	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psig) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psf)
1	8:35	78.5				78.5		2171
	8:40	486.0	3.7	1065.7	46.630	419.4	31.08	2530
	8:45	525.4	7.5	1094.4	48.979	476.4	31.92	2595
	8:50	563.4	11.2	1065.6	46.622	516.8	31.08	2629
				1075.2				
2	8:55	802.3	17.0	1670.4	107.092	695.2	48.72	2832
	9:00	869.3	22.8	1670.4	107.092	762.2	48.72	2891
	9:05	885.9	28.6	1670.4	107.092	778.8	48.72	2925
3				1670.4				
	9:10	1151.6	36.4	2246.4	185.263	966.3	65.52	3123
	9:15	1194.6	44.3	2275.2	189.681	1004.9	66.36	3171
	9:20	1225.0	52.1	2246.4	185.263	1039.7	65.52	3201
4				2256.0				
	9:25	1490.8	62.0	2851.2	287.965	1202.8	83.16	3395
	9:30	1546.7	71.8	2822.4	282.607	1264.1	82.32	3447
	9:35	1595.0	81.8	2880.0	293.369	1301.6	84.00	3493
5				2851.2				
	9:40	1852.2	93.7	3427.2	404.740	1447.5	99.96	3671
	9:45	1915.6	105.8	3484.8	417.414	1498.2	101.64	3723
	9:50	1961.3	117.8	3456.0	411.055	1550.2	100.80	3766
Shut down out of Water				3456.0				
Fall-Off	9:57	1277.9				1277.9		3394
	9:58	1091.9				1091.9		3205
	9:59	969.2				969.2		3080
	10:00	884.7				884.7		2995
	10:05	652.5				652.5		2761

▲ RECORDED WELLHEAD PRESSURE
 ○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
 □ BOTTOM HOLE PRESSURE @ 4805 FEET



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 7/31/92

WELL NAME: Lovington San Andres Unit Well No. 35
Lea County, New Mexico

WO#: 92141019

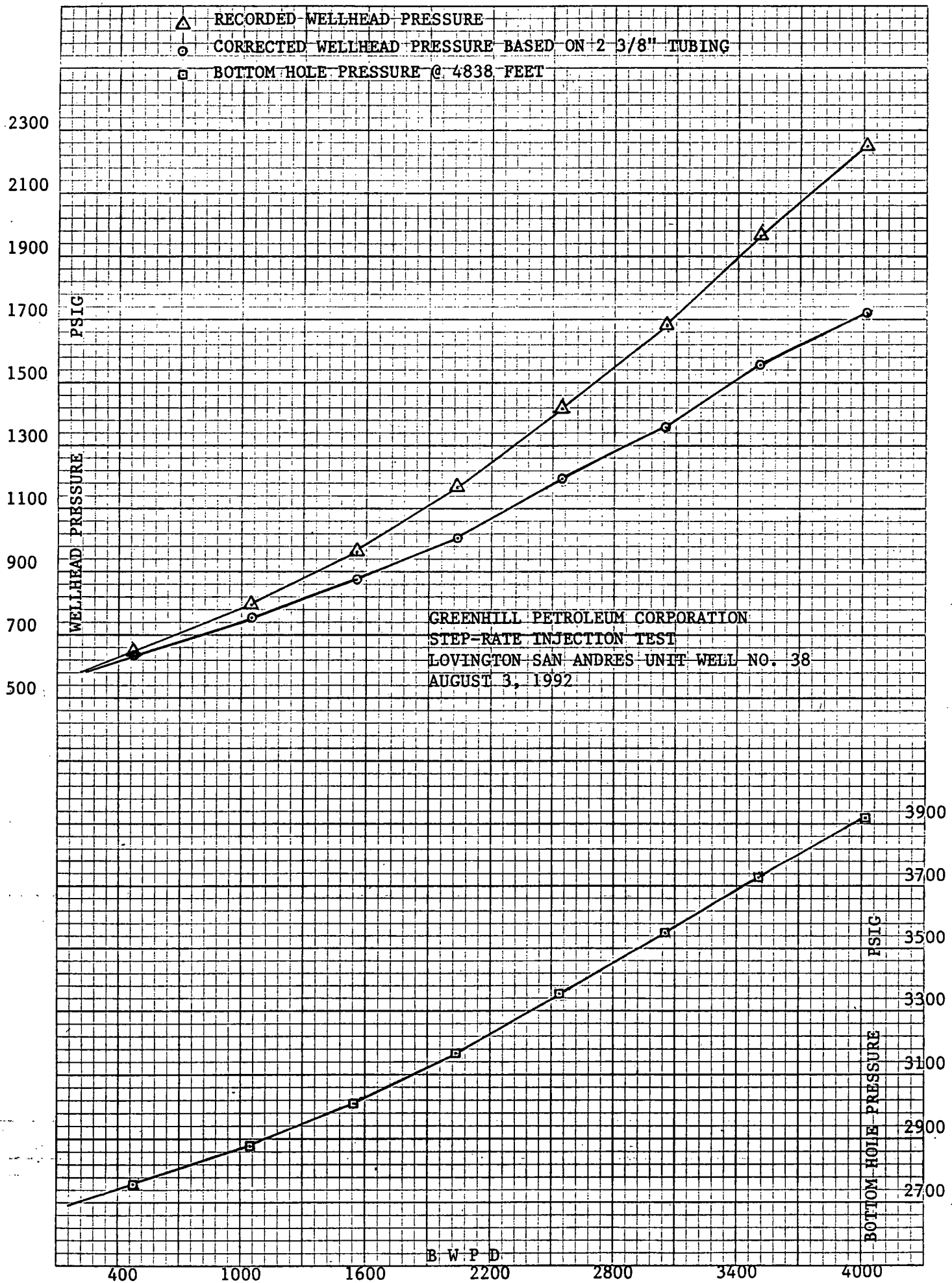
MID-PERF8. = 4570 - 5040

PACKER DEPTH = 4635

BHP GAUGE DEPTH = 4806

STEP NO. REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psig) (3)-(4)	(6) INJECTION RATE (gpm) (bbls/day) x 1.602	(7) MEASURED BHP (psi)
1	11:35	140.4				140.4		2206
	11:40	361.5	2.0	576.0	14.939	346.6	16.80	2438
	11:45	415.0	4.0	576.0	14.939	400.1	16.80	2495
	11:50	456.2	6.0	576.0	14.939	441.3	16.80	2538
				576.0				
2	11:55	642.9	9.7	1065.6	46.622	596.3	31.08	2716
	12:00	722.4	13.4	1065.6	46.622	675.8	31.08	2780
	12:05	770.3	17.0	1036.8	44.317	726.0	30.24	2825
3				1055.9				
	12:10	982.3	22.4	1555.2	93.830	888.5	45.36	3015
	12:15	1051.8	27.8	1555.2	93.830	958.0	45.36	3087
	12:20	1102.5	33.2	1555.2	93.830	1008.7	45.36	3140
				1555.2				
4	12:25	1346.8	40.3	2044.8	155.683	1191.1	59.64	3336
	12:30	1435.4	47.4	2044.8	155.683	1279.7	59.64	3424
	12:35	1502.4	54.6	2073.6	159.764	1342.6	60.48	3495
				2054.4				
5	12:40	1748.0	63.5	2563.2	236.475	1511.5	74.76	3681
	12:45	1822.7	72.4	2563.2	236.475	1586.2	74.76	3754
	12:50	1893.6	81.2	2534.4	231.583	1662.0	73.92	3823
				2553.6				
6	12:55	2131.6	91.9	3081.6	332.487	1799.1	89.88	3997
	1:00	2203.7	102.5	3052.8	326.761	1876.9	89.04	4075
	1:05	2259.5	113.0	3024.0	321.081	1938.4	88.20	4134
				3052.8				

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
STEP NO. 2		SURFACE TURNING PRESS.	CUMULATIVE VOL. INJECTED	INJECTION RATE	FRICTION HEAD LOSS	CORRECTED TURNING PRESS.	INJECTION RATE (gpm)	MEASURED BHP
REMARKS	TIME	(psig)	(bbls)	(bbls/day)	(psf)	(psig) (1)-(4)	(gpm) (5)-(6)	(hp) (7)-(8)
Fall-Off	1:06	1634.2				1634.2		3754
	1:07	1488.7				1488.7		3600
	1:08	1391.2				1391.2		3500
	1:09	1317.8				1317.8		3426
	1:10	1258.3				1258.3		3367
	1:15	1063.5				1063.5		3169



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 8/9/92

WELL NAME: Lovington San Andres Unit No. 38
Lea County, New Mexico

WO#: 92141012

MID-PERF8. = 4590 - 5085

PACKER DEPTH =

BHP GAUGE DEPTH = 4898

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psig) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2887	(7) MEASURED BHP (psf)
1	8:55	608.0				608.0		2714
	9:00	644.7	1.7	489.6	11.136	633.6	14.28	2742
	9:05	651.1	3.3	460.8	9.954	641.1	13.44	2750
	9:10	647.4	5.0	489.6	11.136	636.3	14.28	2758
2				480.0				
	9:15	747.2	8.7	1065.6	46.942	700.3	31.08	2819
	9:20	762.5	12.4	1065.6	46.942	715.6	31.08	2849
	9:25	796.7	16.0	1036.8	44.622	752.1	30.24	2873
3				1056.0				
	9:30	893.9	21.4	1555.2	94.475	799.4	45.36	2937
	9:35	930.5	26.7	1526.4	91.264	839.2	44.52	2978
	9:40	963.4	32.1	1555.2	94.475	868.9	45.36	3010
4				1545.6				
	9:45	1088.5	39.2	2044.8	156.753	931.7	59.64	3084
	9:50	1134.1	46.3	2044.8	156.753	977.3	59.64	3132
	9:55	1168.4	53.4	2044.8	156.753	1011.6	59.64	3170
5				2044.8				
	10:00	1326.6	62.3	2563.2	238.099	1088.5	74.76	3253
	10:05	1376.0	71.1	2534.4	233.174	1142.8	73.92	3307
	10:10	1419.0	79.9	2534.4	233.174	1185.8	73.92	3350
6				2544.0				
	10:15	1578.5	90.4	3024.0	323.286	1255.2	88.20	3433
	10:20	1648.1	100.9	3024.0	323.286	1324.8	88.20	3494
	10:25	1686.1	111.6	3081.6	334.770	1351.3	89.88	3542
7				3043.2				
	10:30	1853.2	123.7	3484.8	420.281	1432.9	101.64	3625
	10:35	1908.9	136.1	3571.2	439.761	1469.1	104.16	3682
	10:40	1968.4	148.2	3484.8	420.281	1548.1	101.64	3731
				3513.6				

STEP NO. 8		(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psf)
8	10:45	2150.6	162.2	4032.0	550.457	1600.1	117.60	3815
	10:50	2212.7	176.1	4003.2	543.206	1669.5	116.76	3874
	10:55	2251.9	190.0	4003.2 4012.8	543.206	1708.7	116.76	3919
Fall-Off	10:56	1686.2				1686.2		3816
	10:57	1638.1				1638.1		3757
	10:58	1587.5				1587.5		3711
	10:59	1547.0				1547.0		3674
	11:00	1512.9				1512.9		3638
	11:05	1387.6				1387.6		3511
	11:10	1299.0				1299.0		3422