



BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

May 12, 1992

CF 10154
PDEV0020600615



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

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

RE: *Injection Pressure Increase
Loving San Andres Unit
Waterflood Project
Lea County, New Mexico*

Dear Sir:

Reference is made to your request dated April 21, 1992, to increase the surface injection pressure on nine wells in the Lovington San Andres Unit Waterflood Project. This request is based on step rate tests conducted on these wells between March 12 and April 4, 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>
LSAU No. 9 "H" 1980' FNL & 660' FEL 36-16S-36E	1730 PSIG
LSAU No. 17 "I" 1980' FSL & 990' FEL 31-16S-37E	1990 PSIG
LSAU No. 24 "P" 660' FSL & 660' FEL 36-16S-36E	2039 PSIG
LSAU No. 26 "N" 660' FSL & 1980' FWL 36-16S-36E	1600 PSIG

WELL AND LOCATION

MAXIMUM INJECTION
SURFACE PRESSURE

LSAU No. 35
"C" 339' FNL & 1980' FWL
6-17S-37E

2141 PSIG

LSAU No. 37
"A" 330' FNL & 990' FEL
6-17S-37E

2166 PSIG

LSAU No. 41
"G" 1980' FNL & 1980' FEL
1-17S-36E

2072 PSIG

LSAU No. 43
"E" 1980' FNL & 660' FWL
1-17S-36E

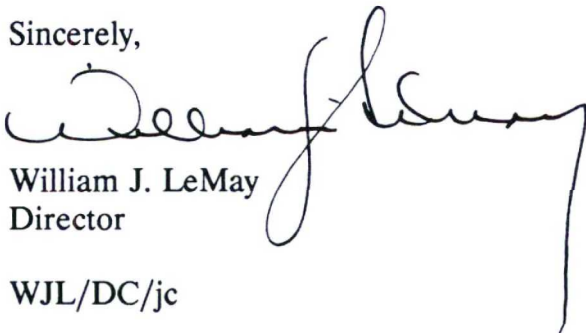
1450 PSIG

LSAU No. 57
"M" 660' FSL & 660' FWL
36-16S-36E

2276 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: R-9431
WFX-615



GREENHILL PETROLEUM CORPORATION

11490 WESTHEIMER ROAD, SUITE 200
HOUSTON, TEXAS 77077-6841
TELEPHONE (713) 589-8484
FAX. (713) 589-7892

Incorporated in Delaware, U.S.A.

May 12, 1992

State of New Mexico
Oil Conservation Division
Energy, Minerals, and
Natural Resources Department
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Attention: Mr. David Catanach

RE: Step Rate Test Graphs & Charts
Lovington San Andres Unit
Wells #9, #17, #24, #26, #35, #37, #41, #43, & #57
Lea County, New Mexico

Gentlemen:

Enclosed please find the step rate test graphs and charts covering Wells #9, #17, #24, #26, #35, #37, #41, #43, and #57. Greenhill Petroleum Corporation hereby requests permission to increase the surface injection pressure for the above listed 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/jem
92.284

Enc.

LOVINGTON SAN ANDRES
LEA COUNTY, NEW MEXICO

W E L L	#9	#17	#24	#26	#35	#37	#41	#43	#57
Surface Parting Pressure [PSIG]	1,780	2,040	2,089	1,650	2,191	2,216	2,122	1,500	2,326
Hydrostatic Pressure [PSIG]	2,060	1,278	1,862	1,970	1,833	1,683	1,942	1,880	1,788
Bottom Hole Pressure [PSIG]	3,840	3,318	3,951	3,620	4,024	3,899	4,064	3,380	4,114
Midperf Depth [FEET]	4,616	4,650	4,531	4,547	4,635	4,620	4,603	4,588	4,738
Fracture Gradient [PSI/FT]									
Requested Injection Pressure [PSIG]	1,780	2,040	2,089	1,650	2,191	2,200	2,122	1,500	2,200

MJN/jem
92.277

DATE: 05/12/92

NO WAITING PERIOD

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

Re: Injection Pressure Increase
LOVING SAN ANDRES UNIT
WATERFLOOD PROJECT
LEA County, New Mexico

Dear Sir:

Reference is made to your request dated APRIL 21, 1992, to increase the surface injection pressure on 9 WELLS IN THE LOVINGTON SAN ANDRES UNIT WATERFLOOD PROJECT. This request is based on step rate tests conducted on these wells BETWEEN MARCH 12 AND APRIL 4, 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>LSAU No. 9</u> <u>"H" 1980' FNL & 660' FEL</u> <u>36-16S-36E</u>	<u>1730 PSIG</u>
<u>LSAU No. 17</u> <u>NP 660' FSL & 660' FEL "I" 1980' FSL & 990' FEL</u> <u>31-16S-37E</u>	<u>1990 PSIG</u>
<u>LSAU No. 24</u> <u>"P" 660' FSL & 660' FEL</u> <u>36-16S-36E</u>	<u>2039 PSIG</u>
<u>LSAU No. 26</u> <u>"N" 660' FSL & 1980' FWL</u> <u>36-16S-36E</u>	<u>1600 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: T. GALLEGOS D. CATANACH FILE- WFX-615 R-9431 OCD- HOBBS

LSAU No. 35

2141 PSIG

"C" 339' FNL & 1890' FWL

6.17S.37E

LSAU No. 37

2166 PSIG

"A" 330' FNL & 990' FEL

6.17S.37E

LSAU No. 41

2072 PSIG

"G" 1980' FNL & 1980' FEL

1.17S.36E

LSAU No. 43

1450 PSIG

"E" 1980' FNL & 660' FWL

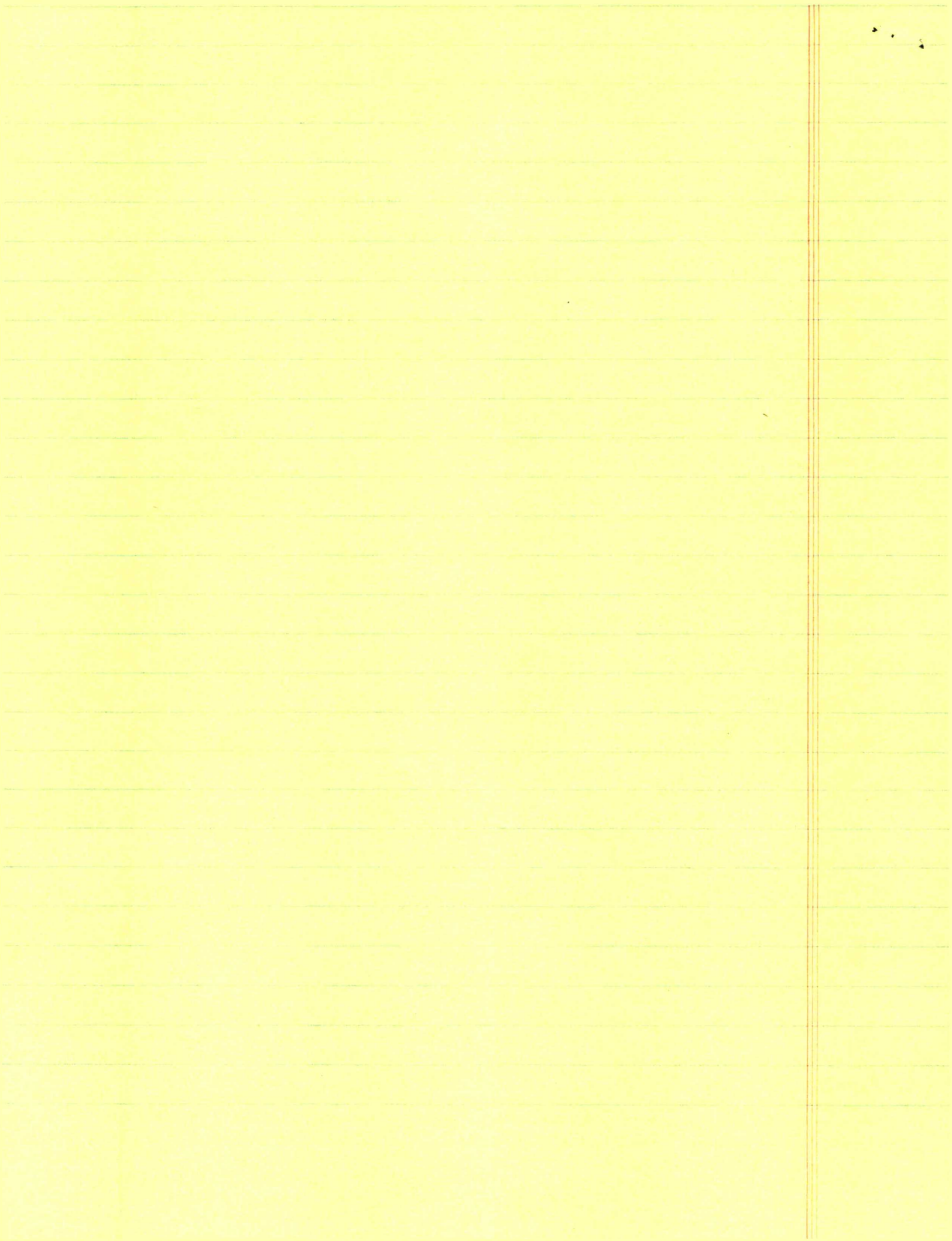
1.17S.36E

LSAU No. 57

2276 PSIG

"M" 660' FSL & 660' FWL

36.16S.36E





GREENHILL PETROLEUM CORPORATION

Incorporated in Delaware, U.S.A.

11490 WESTHEIMER ROAD, SUITE 200
HOUSTON, TEXAS 77077-6841
TELEPHONE (713) 589-8484
FAX (713) 589-7892

OIL CONSERVATION DIVISION
RECEIVED
APR 22 1992 9 47

April 21, 1992

State of New Mexico
Oil Conservation Division
Energy, Minerals, and
Natural Resources Department
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Attention: Mr. David Catanach

SHOULD BE COV. SAN ANDRES

RE: Step Rate Test Graphs & Charts
West Lovington Unit
Wells #9, #17, #24, #26, #35, #37, #41, #43, & #57
Lea County, New Mexico

Gentlemen:

Enclosed please find the step rate test graphs and charts covering Wells #9, #17, #24, #26, #35, #37, #41, #43, and #57. Greenhill Petroleum Corporation hereby requests permission to increase the surface injection pressure for the above listed 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
Michael J. Newport
Land Manager/Permian Basin

MJN/jem
92.284

Enc.

LOVINGTON UNIT

COUNTY, NEW MEXICO

	#26	#35	#37	#41	#43	#57
	1,650	2,191	2,216	2,122	1,500	2,326
	1,970	1,833	1,683	1,942	1,880	1,788
	3,620	4,024	3,899	4,064	3,380	4,114
	4,547	4,635	4,620	4,603	4,588	4,738
	1,650	2,191	2,200	2,122	1,500	2,200

1600

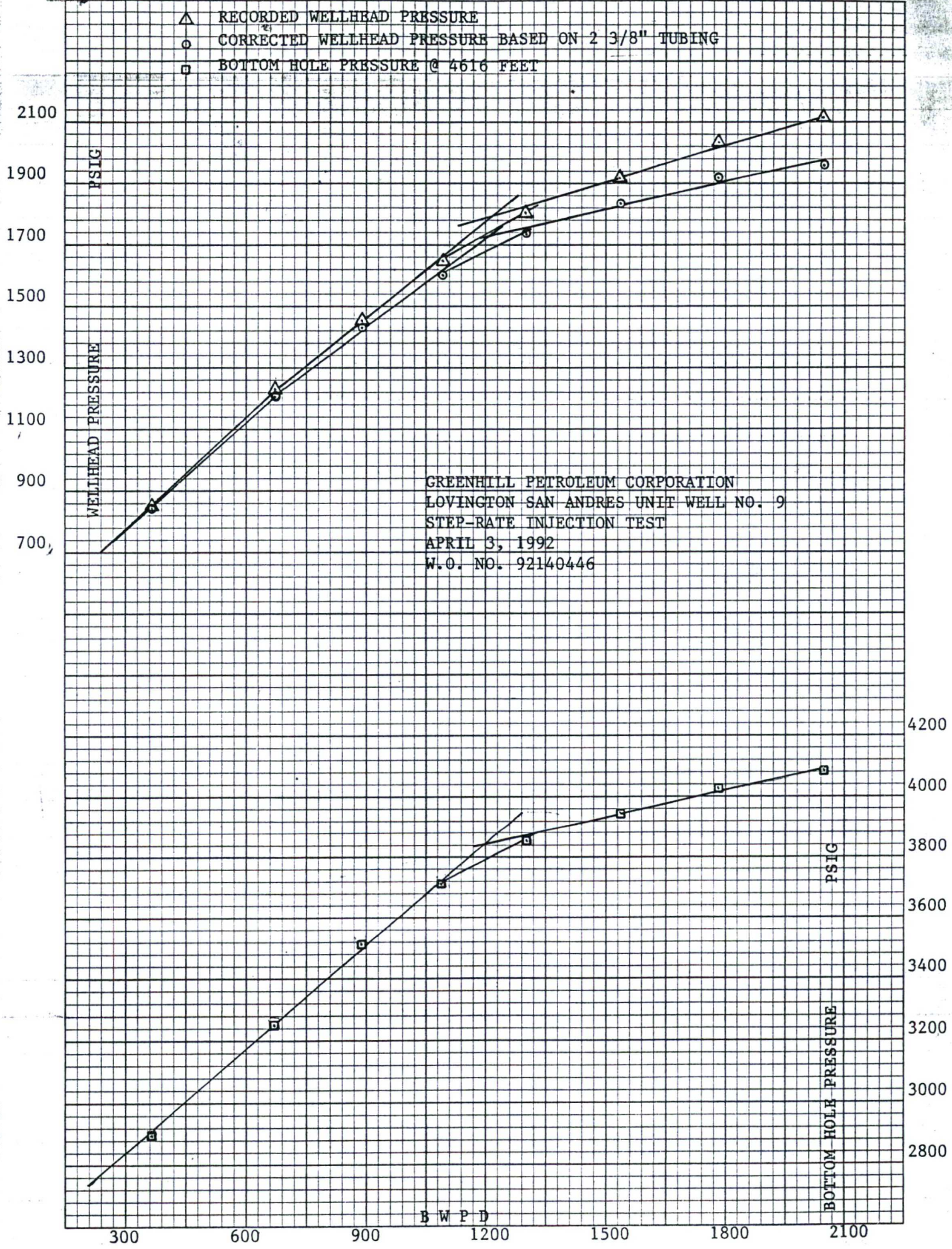
2141

2166

2072

1450

2276



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: April 2, 1992

WELL NAME: Lovington San Andres Unit Well No. 9

WO#: 92140446

Lea County, New Mexico

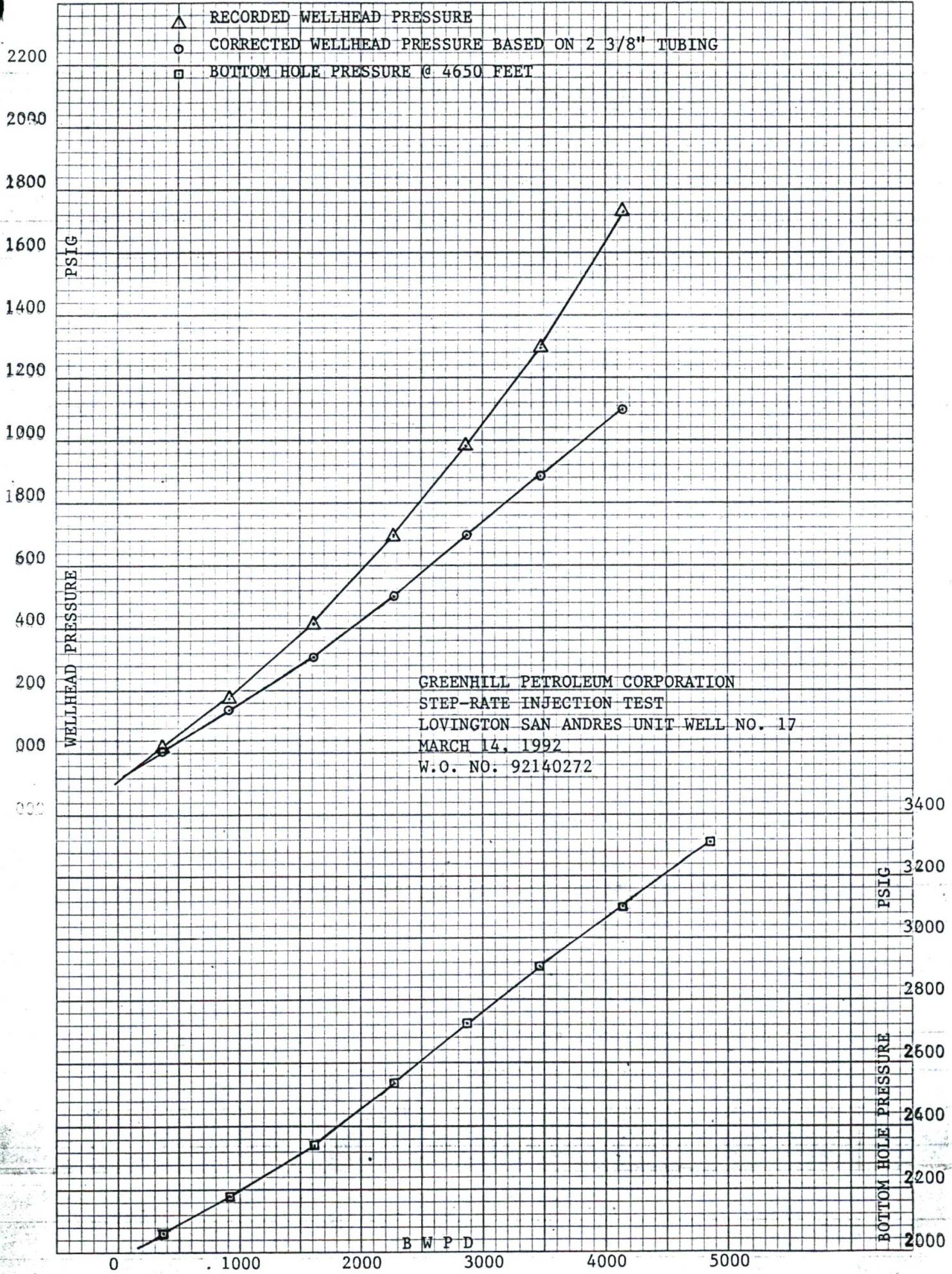
MID-PERFS. =

PACKER DEPTH =

BHP GAUGE DEPTH = 4616'

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2957	(7) MEASURED BHP (psi)
1	7:45	578.5				578.5		2579.2
	7:50	718.7	1.3	374.4	6.468	712.2	10.92	2749.8
	7:55	785.7	2.6	374.4	6.468	779.2	10.92	2830
	8:00	853.9	3.8	345.6	5.578	848.3	10.08	2896.1
2				364.8				
	8:05	1054.9	6.1	662.4	18.586	1036.3	19.32	3065.7
	8:10	1146.1	8.5	691.2	20.108	1126.0	20.16	3171.2
	8:15	1223.4	10.8	662.4	18.586	1204.8	19.32	3245.4
3				671.9				
	8:20	1369.0	13.9	892.8	32.285	1336.7	26.04	3374.4
	8:25	1433.6	17.0	892.8	32.285	1401.3	26.04	3451.2
	8:30	1457.7	20.1	892.8	32.285	1425.4	26.04	3517.1
4				892.8				
	8:35	1556.5	23.9	1094.4	47.053	1509.4	31.92	3608.4
	8:40	1611.0	27.7	1094.4	47.053	1563.9	31.92	3669.6
	8:45	1647.7	31.5	1094.4	47.053	1600.6	31.92	3716.1
5				1094.4				
	8:50	1741.3	36.1	1324.8	67.002	1674.3	38.64	3782
	8:55	1776.7	40.6	1296.0	64.332	1712.4	37.80	3825
	9:00	1802.1	45.1	1296.0	64.332	1737.8	37.80	3858.2
6				1305.6				
	9:05	1866.6	50.4	1526.4	87.076	1779.5	44.52	3902.3
	9:10	1903.4	55.8	1555.2	90.140	1813.3	45.36	3928.3
	9:15	1916.1	61.1	1526.4	87.076	1829.0	44.52	3951.9
7				1536.0				
	9:20	1993.4	67.3	1785.6	116.389	1877.0	52.08	3987.6
	9:25	2014.9	73.5	1785.6	116.389	1898.5	52.08	4008.9
	9:30	2033.9	79.7	1785.6	116.389	1917.5	52.08	4028.9
				1785.6				

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
STEP NO.		SURFACE	CUMMULATIVE	INJECTION	FRICTION	CORRECTED	INJECTION	MEASURED
Σ		TUBING PRESS	VOL. INJECTED	RATE	HEAD LOSS	TUBING PRESS.	RATE (gpm)	BHP
REMARKS	TIME	(psig)	(bbls)	(bbls/day)	(psi)	(psi) (1)-(4)	(3)/34.2857	(psi)
8 Fall - Off	9:35	2080.8	86.7	2016.0	145.686	1935.1	58.80	4057.4
	9:40	2092.9	93.8	2044.8	149.560	1943.3	59.64	4069
	9:45	2112.5	101.0	2073.6	153.480	1959.0	60.48	4080.6
				2044.8				
	9:45	1945.4				1945.4		4059.9
	9:46	1936.5				1936.5		4047.8
	9:47	1925.1				1925.1		4036.9
	9:48	1916.3				1916.3		4028.4
	9:49	1908.7				1908.7		4019.9
	9:50	1902.3				1902.3		4012.6
	9:51	1896.0				1896.0		4005.3
	9:52	1889.7				1889.7		3998
	9:53	1883.3				1883.3		3991.9
	9:54	1877.0				1877.0		3985.8
	9:55	1870.7				1870.7		3978.5
	9:56	1865.6				1865.6		3972.3
	9:57	1859.3				1859.3		3966.2
	9:58	1854.2				1854.2		3960.1
	9:59	1847.9				1847.9		3952.7
	10:00	1842.8				1842.8		3946.6



GREENHILL PETROLEUM CORPORATION
STEP-RATE INJECTION TEST
LOVINGTON SAN ANDRES UNIT WELL NO. 17
MARCH 14, 1992
W.O. NO. 92140272

JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: March 14, 1992

WELL NAME: Lovington San Andres Unit Well No. 17
Lea County, New Mexico

WO#: 92140272

MID-PERFS. =

PACKER DEPTH = 4550

BHP GAUGE DEPTH = 4650

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	8:25	15.0				15.0		2045
	8:30	17.7	1.3	374.4	6.516	11.2	10.92	2052
	8:35	17.8	2.7	403.2	7.473	10.3	11.76	2055
	8:40	17.9	4.0	374.4	6.516	11.4	10.92	2057
				384.0				
2	8:45	132.7	7.2	921.6	34.491	98.2	26.88	2141
	8:50	157.9	10.4	921.6	34.491	123.4	26.88	2166
	8:55	173.1	13.5	892.8	32.523	140.6	26.04	2181
3				912.0				
	9:00	343.8	19.1	1612.8	97.123	246.7	47.04	2285
	9:05	380.3	24.7	1612.8	97.123	283.2	47.04	2324
	9:10	405.6	30.2	1584.0	93.939	311.7	46.20	2349
				1603.2				
4	9:15	616.7	38.1	2275.2	183.563	433.1	66.36	2462
	9:20	656.0	46.0	2275.2	183.563	472.4	66.36	2505
	9:25	687.6	53.9	2275.2	183.563	504.0	66.36	2536
				2275.2				
5	9:30	902.5	63.8	2851.2	278.676	623.8	83.16	2643
	9:35	946.8	73.9	2908.8	289.180	657.6	84.84	2689
	9:40	980.9	83.9	2880.0	283.906	697.0	84.00	2721
				2880.0				
6	9:45	1212.6	95.9	3456.0	397.795	814.8	100.80	2825
	9:50	1255.6	108.0	3484.8	403.949	851.7	101.64	2872
	9:55	1286.1	120.1	3484.8	403.949	882.2	101.64	2905
				3475.2				
7	10:00	1571.0	134.5	4147.2	557.371	1013.6	120.96	3021
	10:05	1616.7	149.0	4176.0	564.553	1052.1	121.80	3070
	10:10	1649.8	163.3	4118.4	550.232	1099.6	120.12	3107
				4147.2				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2557	(7) MEASURED BHP (psi)
8	10:15	1974.2	180.1	4838.4	741.304	1232.9	141.12	3225
	10:20	2017.5	197.0	4867.2	749.487	1268.0	141.96	3279
	10:25	2048.2	213.9	4867.2 4857.6	749.487	1298.7	141.96	3318
Fall-Off	10:26	978.7				978.7		3045
	10:27	877.7				877.7		2933
	10:28	798.2				798.2		2850
	10:29	735.1				735.1		2787
	10:30	687.2				687.2		2737
	10:35	515.8				515.8		2565
	10:40	411.3				411.3		2463

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
- BOTTOM HOLE PRESSURE @ 4531 FEET

2100

1900

1700

1500

1300

1100

900

700

500

PSIG

WELLHEAD PRESSURE

GREENHILL PETROLEUM CORPORATION
 LOVINGTON SAN ANDRES UNIT WELL NO. 24
 STEP-RATE INJECTION TEST
 APRIL 1, 1992
 W.O. NO. 92140446

4000

3800

3600

3400

3200

3000

2800

2600

PSIG

BOTTOM HOLE PRESSURE

B W P D

400

700

1000

1300

1600

1900

2200

JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: April 1, 1992

WELL NAME: Lovington San Andres Unit # 24
Lea County, New Mexico

W.O No. 92140446

MID-PERFS. =

PACKER DEPTH = 4431'

BHP GAUGE DEPTH = 4531'

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	8:10	372.5				372.5		2346
	8:15	570.8	1.6	460.8	9.323	561.5	13.44	2540
	8:20	639.1	3.3	489.6	10.429	628.7	14.28	2613
	8:25	693.4	4.9	460.8	9.323	684.1	13.44	2658
				470.4				
2	8:30	883.0	7.9	864.0	29.826	853.2	25.20	2834
	8:35	957.6	10.8	835.2	28.012	929.6	24.36	2907
	8:40	1006.9	13.7	835.2	28.012	978.9	24.36	2958
3				844.8				
	8:45	1219.6	18.1	1267.2	60.576	1159.0	36.96	3147
	8:50	1303.3	22.5	1267.2	60.576	1242.7	36.96	3231
	8:55	1367.9	26.7	1209.6	55.581	1312.3	35.28	3298
4				1248.0				
	9:00		32.5	1670.4	100.985	-101.0	48.72	3489
	9:05	1675.6	38.3	1670.4	100.985	1574.6	48.72	3573
	9:10	1738.9	43.9	1612.8	94.637	1644.3	47.04	3637
				1651.2				
5	9:15	1946.6	51.1	2073.6	150.654	1795.9	60.48	3805
	9:20	2034.0	58.1	2016.0	143.003	1891.0	58.80	3890
	9:25	2088.5	65.2	2044.8	146.806	1941.7	59.64	3951
				2044.8				
Fall-Off	9:26	1754.3				1754.3		3751
	9:27	1642.9				1642.9		3627
	9:28	1551.7				1551.7		3536
	9:29	1478.3				1478.3		3463
	9:30	1420.1				1420.1		3405
	9:35	1218.9				1218.9		3201
	9:40	1097.4				1097.4		3079

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
- BOTTOM HOLE PRESSURE @ 4547'

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. 26
 APRIL 3, 1992
 W.O. NO. 92140446

4100

3900

PSIG

3700

3500

3300

3100

2900

2700

BOTTOM HOLE PRESSURE

B W P D

300

600

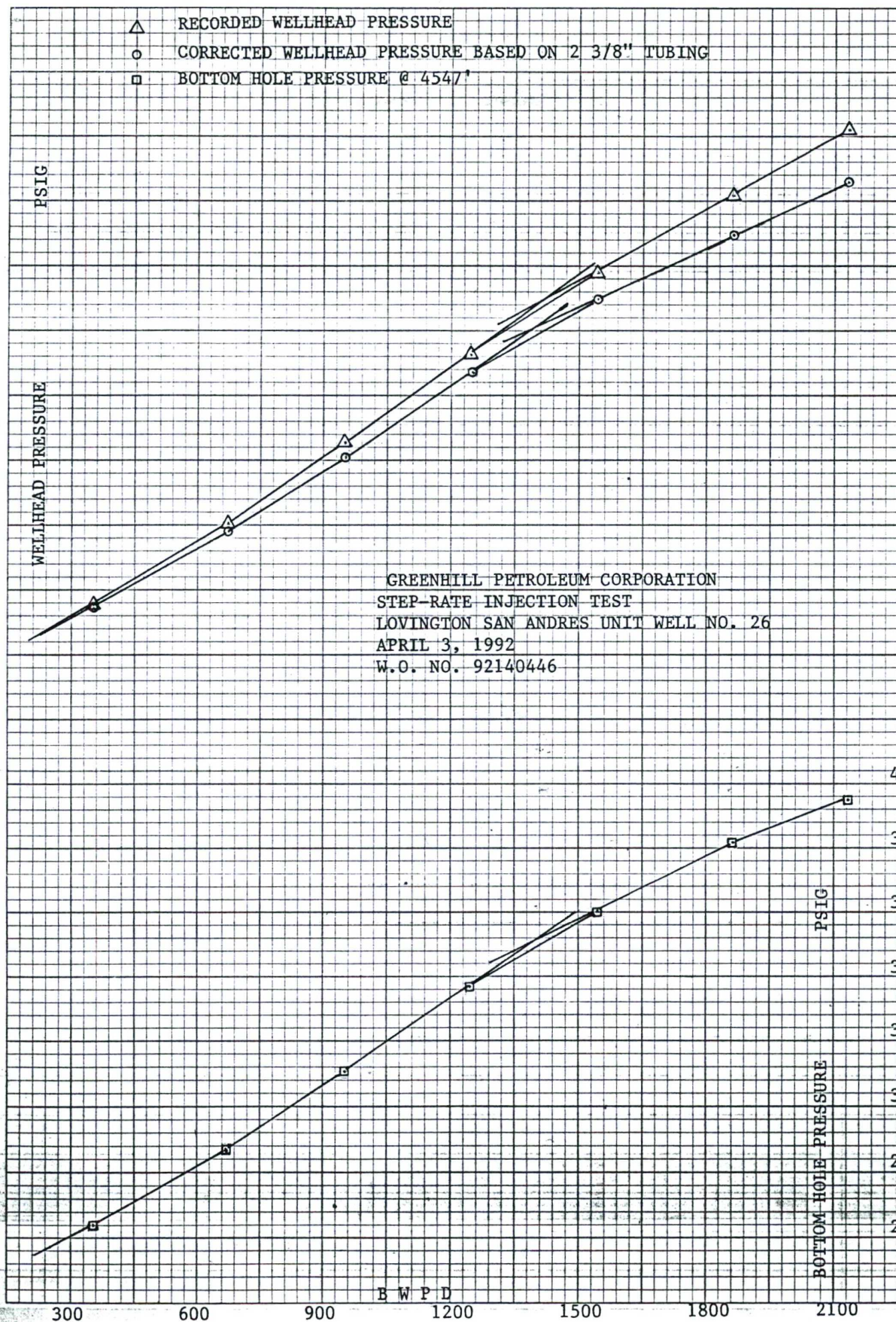
900

1200

1500

1800

2100



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico.

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: April 3, 1992

WELL NAME: Lovington San Andres Unit Well No. 26
Lea County, New Mexico

WO#: 92140446

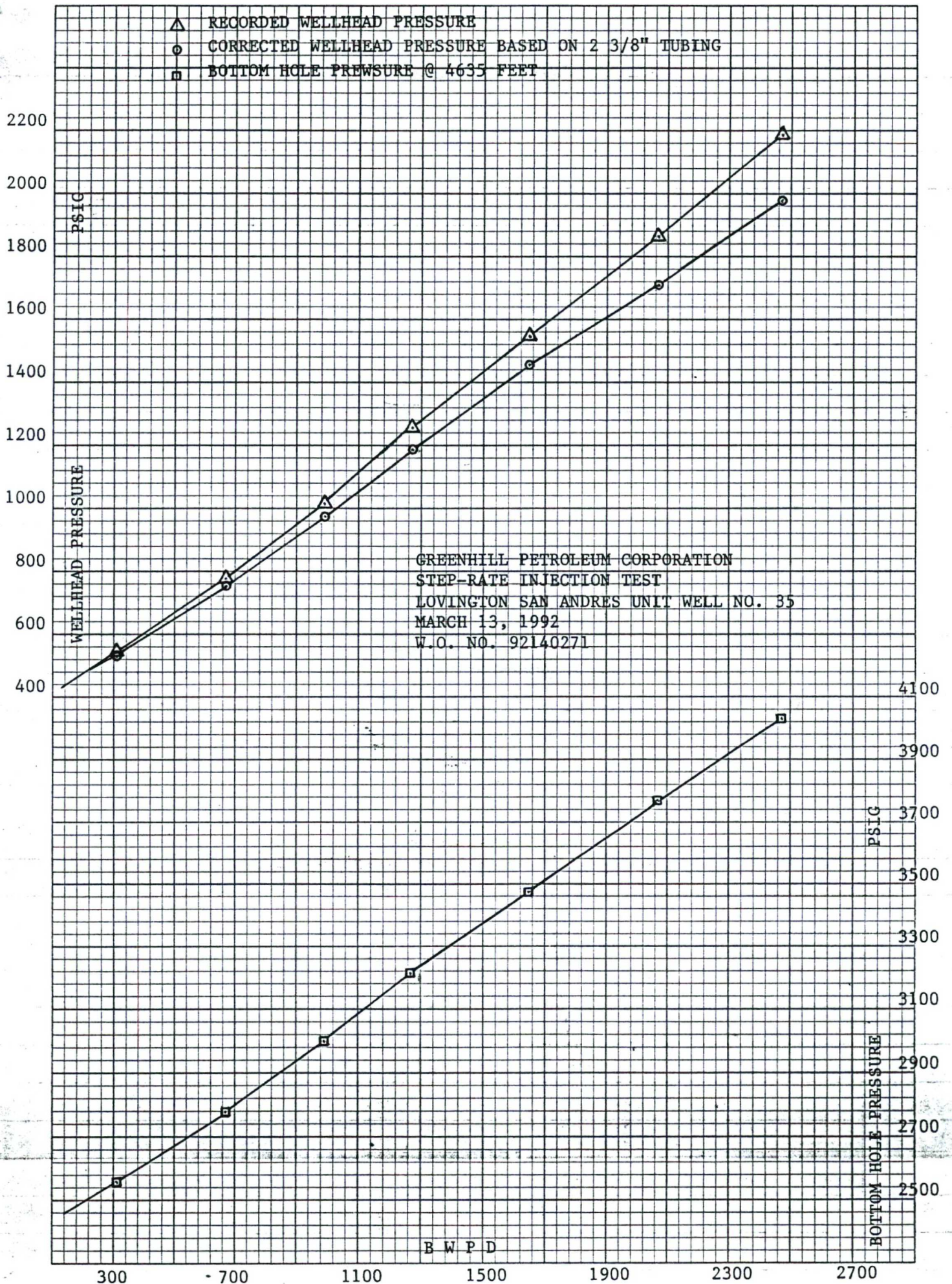
MID-PERFS. =

PACKER DEPTH = 4447

BHP GAUGE DEPTH = 4547

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	11:20	559.1				559.1		2537
	11:25	667.9	1.2	345.6	5.495	662.4	10.08	2648
	11:30	732.4	2.5	374.4	6.371	726.0	10.92	2708
	11:35	755.1	3.7	345.6	5.495	749.6	10.08	2741
2				355.2				
	11:40	888.9	6.1	691.2	19.808	869.1	20.16	2863
	11:45	952.0	8.4	662.4	18.308	933.7	19.32	2925
	11:50	1001.1	10.7	662.4	18.308	982.8	19.32	2974
3				672.0				
	11:55	1137.9	14.1	979.2	37.730	1100.2	28.56	3096
	12:00	1193.5	17.4	950.4	35.702	1157.8	27.72	3161
	12:05	1249.3	20.6	921.6	33.727	1215.6	26.88	3210
4				950.4				
	12:10	1389.8	25.0	1267.2	60.790	1329.0	36.96	3331
	12:15	1453.1	29.3	1238.4	58.259	1394.8	36.12	3402
	12:20	1521.5	33.6	1238.4	58.259	1463.2	36.12	3463
5				1248.0				
	12:25	1660.7	39.0	1555.2	88.792	1571.9	45.36	3577
	12:30	1719.0	44.4	1555.2	88.792	1630.2	45.36	3646
	12:35	1784.8	49.7	1526.4	85.774	1699.0	44.52	3701
6				1545.6				
	12:40	1922.8	56.2	1872.0	125.123	1797.7	54.60	3808
	12:45	1972.3	62.7	1872.0	125.123	1847.2	54.60	3868
	12:50	2020.4	69.1	1843.2	121.585	1898.8	53.76	3918
7				1862.4				
	12:55	2125.6	76.5	2131.2	159.047	1966.6	62.16	3994
	1:00	2177.5	83.9	2131.2	159.047	2018.5	62.16	4043
	1:05	2218.0	91.3	2131.2	159.047	2059.0	62.16	4078
				2131.2				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
Fall-Off	1:06	1993.7				1993.7		4014
	1:07	1955.7				1955.7		3964
	1:08	1914.0				1914.0		3918
	1:09	1876.0				1876.0		3880
	1:10	1827.0				1827.0		3844
	1:15	1689.9				1689.9		3692
	1:20	1571.0				1571.0		3571



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: March 13, 1992

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

WO#: 92140271

MID-PERFS. =

PACKER DEPTH = 4535

BHP GAUGE DEPTH = 4635

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	8:20	368.4				368.4		2386
	8:25	492.3	1.1	316.8	4.768	487.5	9.24	2505
	8:30	517.7	2.2	316.8	4.768	512.9	9.24	2536
	8:35	543.0	3.2	288.0	3.997	539.0	8.40	2558
2				307.2				
	8:40	702.3	5.6	691.2	20.191	682.1	20.16	2698
	8:45	737.7	7.9	662.4	18.662	719.0	19.32	2745
	8:50	773.1	10.2	662.4	18.662	754.4	19.32	2779
3				672.0				
	8:55	993.6	13.7	1008.0	40.579	953.0	29.40	2909
	9:00	982.9	17.1	979.2	38.460	944.4	28.56	2961
	9:05	1008.2	20.5	979.2	38.460	969.7	28.56	3000
4				988.8				
	9:10	1162.7	24.9	1267.5	61.994	1100.7	36.97	3120
	9:15	1210.9	29.4	1296.0	64.597	1146.3	37.80	3172
	9:20	1255.2	33.8	1267.5	61.994	1193.2	36.97	3213
5				1267.5				
	9:25	1477.7	39.5	1641.6	100.032	1377.7	47.88	3362
	9:30	1506.0	45.3	1670.4	103.303	1402.7	48.72	3425
	9:35	1551.6	51.0	1641.6	100.032	1451.6	47.88	3475
6				1651.2				
	9:40	1751.6	58.2	2073.6	154.112	1597.5	60.48	3628
	9:45	1821.3	65.3	2044.8	150.175	1671.1	59.64	3698
	9:50	1869.4	72.5	2073.6	154.112	1715.3	60.48	3754
7				2064.0				
	9:55	2080.9	81.0	2448.0	209.506	1871.4	71.40	3904
	10:00	2148.1	89.6	2476.8	214.088	1934.0	72.24	3974
	10:05	2191.2	98.2	2476.8	214.088	1977.1	72.24	4024
				2467.2				

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. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
Fall-Off	10:06	1665.7				1665.7		3709
	10:07	1550.5				1550.5		3587
	10:08	1470.7				1470.7		3507
	10:09	1411.3				1411.3		3446
	10:10	1361.9				1361.9		3395
	10:15	1197.3				1197.3		3230

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING
- BOTTOM HOLE PRESSURE @ 4620 FEET

2300

2100

1900

1700

1500

1300

1100

900

700

500

PSIG

WELLHEAD PRESSURE

GREENHILL PETROLEUM CORPORATION
STEP-RATE INJECTION TEST
LOVINGTON SAN ANDRES UNIT WELL NO. 37
MARCH 13, 1992
W.O. NO. 92140271

3900

3700

3500

3300

3100

2900

2700

2500

PSIG

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: March 13, 1992

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

WO#: 92140271

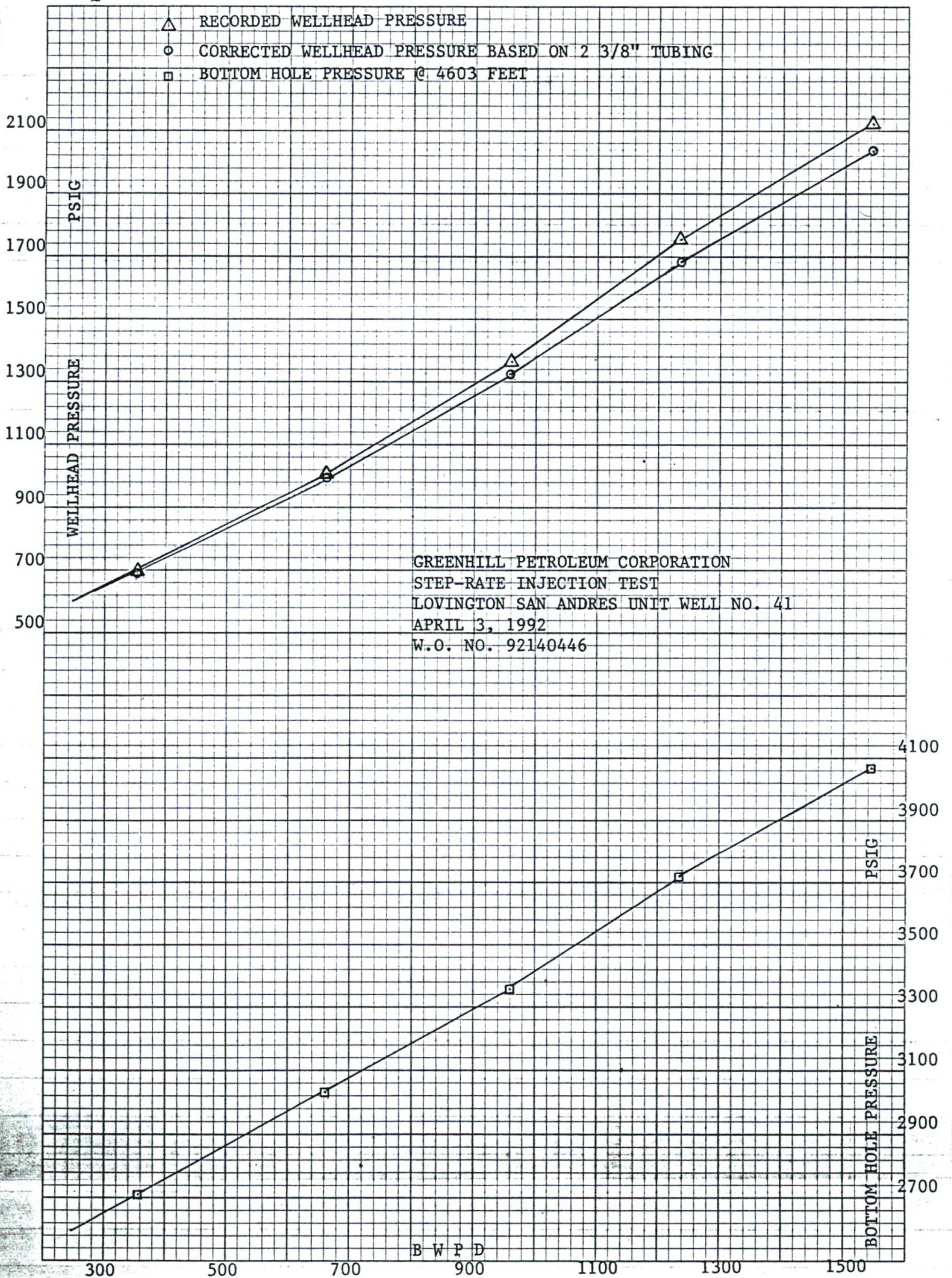
MID-PERFS. =

PACKER DEPTH = 4520

BHP GAUGE DEPTH = 4620

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (9)/34.2857	(7) MEASURED BHP (psi)
1	12:05	305.9				305.9		2322
	12:10	480.2	1.5	432.0	8.436	471.8	12.60	2478
	12:15	508.0	3.1	460.8	9.506	498.5	13.44	2526
	12:20	516.0	4.7	460.8	9.506	506.5	13.44	2545
				451.2				
2	12:25	694.9	7.7	864.0	30.411	664.5	25.20	2694
	12:30	730.2	10.7	864.0	30.411	699.8	25.20	2729
	12:35	770.7	13.7	864.0	30.411	740.3	25.20	2763
				864.0				
3	12:40	933.6	18.2	1296.0	64.388	869.2	37.80	2902
	12:45	979.1	22.7	1296.0	64.388	914.7	37.80	2946
	12:50	1003.2	27.2	1296.0	64.388	938.8	37.80	2972
				1296.0				
4	12:55	1242.4	33.6	1843.2	123.537	1118.9	53.76	3146
	1:00	1279.1	40.0	1843.2	123.537	1155.6	53.76	3191
	1:05	1313.3	46.5	1872.0	127.131	1186.2	54.60	3222
				1852.8				
5	1:10	1529.7	54.6	2332.8	191.012	1338.7	68.04	3375
	1:15	1585.4	62.7	2332.8	191.012	1394.4	68.04	3425
	1:20	1610.7	70.9	2361.6	195.397	1415.3	68.88	3455
				2342.4				
6	1:25	1855.0	80.7	2822.4	271.726	1583.3	82.32	3607
	1:30	1889.2	90.6	2851.2	276.878	1612.3	83.16	3649
	1:35	1908.2	100.4	2282.4	183.447	1724.8	66.57	3680
				2832.0				
7	1:40	2139.9	112.0	3340.8	371.202	1768.7	97.44	3819
	1:45	2185.5	123.5	3312.0	365.304	1820.2	96.60	3863
	1:50	2215.9	135.0	3312.0	365.304	1850.6	96.60	3899
				3321.6				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
Fall-Off	1:51	1431.0				1431.0		3490
	1:52	1281.6				1281.6		3321
	1:53	1177.8				1177.8		3214
	1:54	1104.4				1104.4		3141
	1:55	1046.1				1046.1		3083
	2:00	870.4				870.4		2905



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: 4/3/92

WELL NAME: Lovington San Andres Unit Well No. 41
Lea County, New Mexico

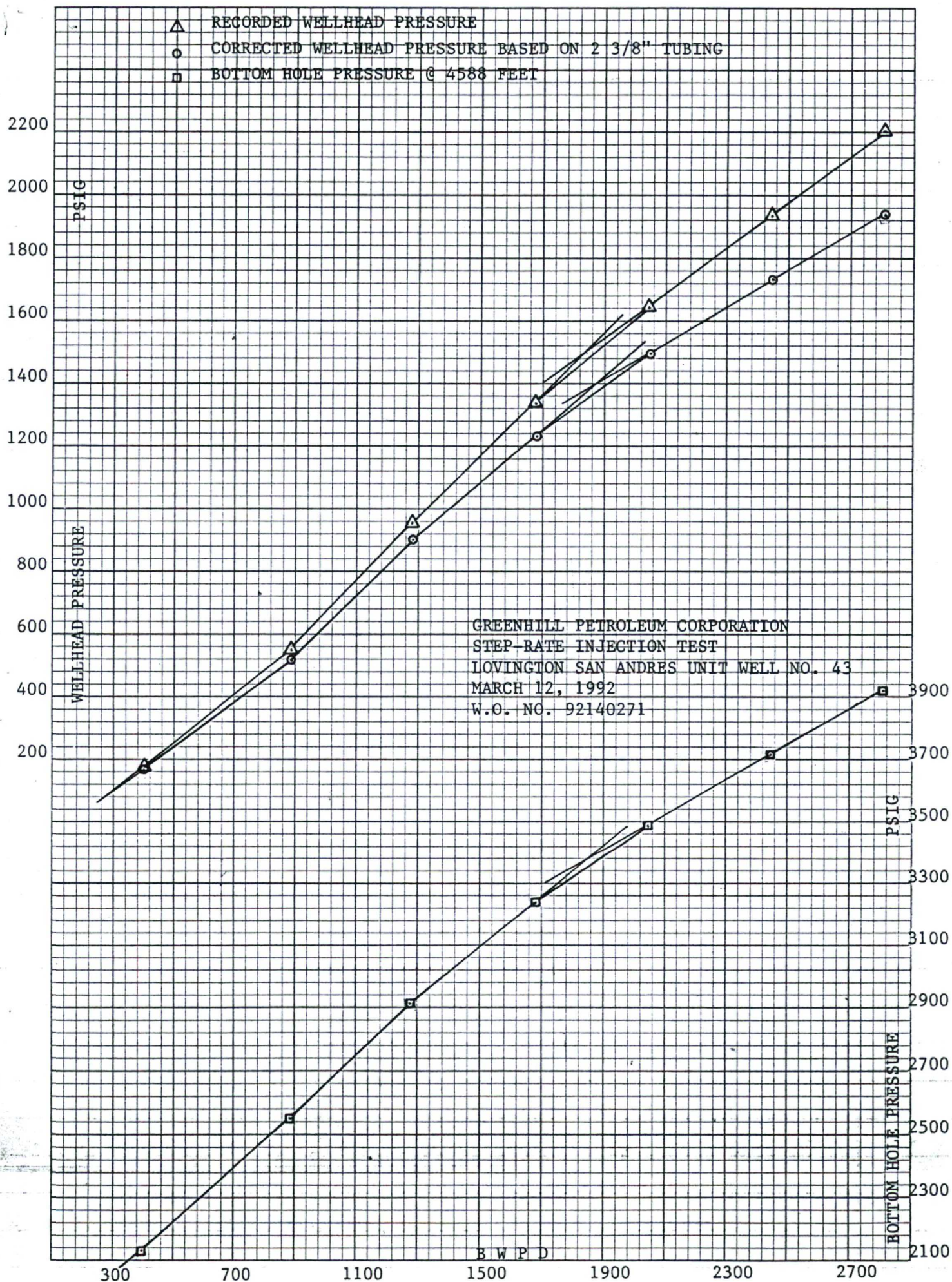
WO#: 92140446

MID-PERFS. =

PACKER DEPTH =

BHP GAUGE DEPTH = 4603

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	8:30	441.3				441.3		2446
	8:35	605.6	1.3	374.4	6.450	599.2	10.92	2601
	8:40	663.8	2.5	345.6	5.562	658.2	10.08	2668
	8:45	699.3	3.7	345.6	5.562	693.7	10.08	2711
				355.2				
2	8:50	868.7	6.0	662.4	18.534	850.2	19.32	2877
	8:55	944.6	8.3	662.4	18.534	926.1	19.32	2959
	9:00	1009.1	10.6	662.4	18.534	990.6	19.32	3029
3				662.4				
	9:05	1207.0	14.0	979.2	38.194	1168.8	28.56	3199
	9:10	1282.6	17.3	950.4	36.142	1246.5	27.72	3292
	9:15	1364.9	20.6	950.4	36.142	1328.8	27.72	3360
				959.9				
4	9:20	1564.9	24.9	1238.4	58.976	1505.9	36.12	3540
	9:25	1649.8	29.2	1238.4	58.976	1590.8	36.12	3638
	9:30	1752.4	33.5	1238.4	58.976	1693.4	36.12	3720
				1238.4				
5	9:35	1944.8	38.9	1555.2	89.886	1854.9	45.36	3893
	9:40	2039.9	44.3	1555.2	89.886	1950.0	45.36	3989
	9:45	2122.4	49.6	1526.4	86.830	2035.6	44.52	4064
				1545.6				
Fall-Off	9:46	1842.5				1842.5		3874
	9:47	1745.0				1745.0		3771
	9:48	1671.6				1671.6		3697
	9:49	1608.3				1608.3		3632
	9:50	1556.4				1556.4		3581
	9:55	1366.6				1366.6		3388
	10:00	1236.2				1236.2		3258



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: March 12, 1992

WELL NAME: Lovington San Andres Unit Well No. 43
Lea County, New Mexico

WO#: 92140271

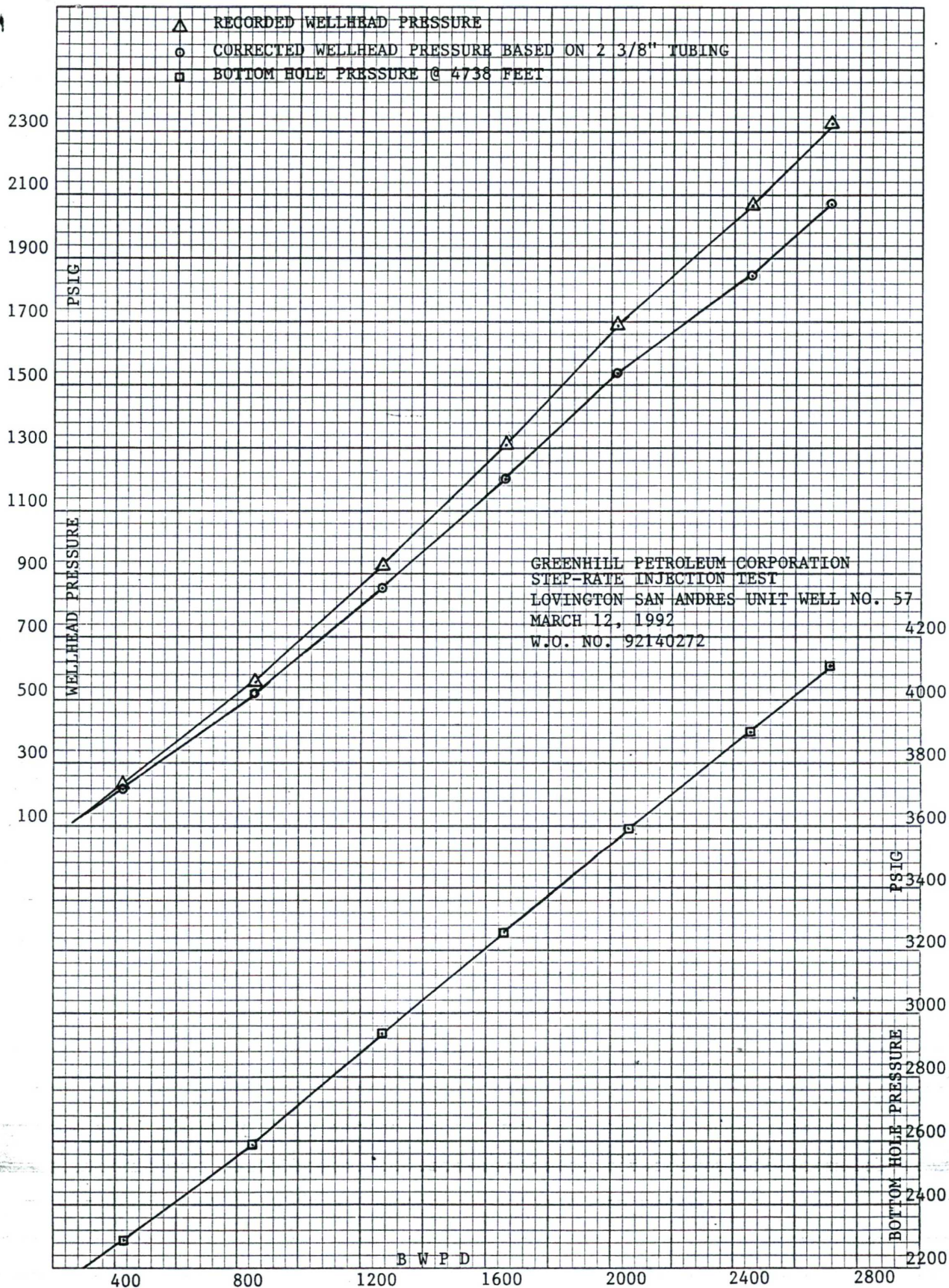
MID-PERFS. =

PACKER DEPTH = 4488

BHP GAUGE DEPTH = 4588

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
	8:00							2021
	8:05	148.9	1.3	374.4	6.429	142.5	10.92	2099
	8:10	167.9	2.7	403.2	7.374	160.5	11.76	2124
1	8:15	178.1	4.1	403.2	7.374	170.7	11.76	2135
				393.6				
	8:20	515.6	7.1	864.0	30.201	485.4	25.20	2458
	8:25	538.4	10.3	921.6	34.031	504.4	26.88	2519
2	8:30	551.1	13.4	892.8	32.090	519.0	26.04	2547
				892.8				
	8:35	833.0	17.9	1296.0	63.942	769.1	37.80	2783
	8:40	900.1	22.4	1296.0	63.942	836.2	37.80	2861
3	8:45	958.2	26.7	1238.4	58.784	899.4	36.12	2912
				1276.8				
	8:50	1274.4	32.5	1670.4	102.255	1172.1	48.72	3169
	8:55	1317.4	38.4	1699.2	105.541	1211.9	49.56	3214
4	9:00	1337.7	44.2	1670.4	102.255	1235.4	48.72	3236
				1680.0				
	9:05	1597.3	51.3	2044.8	148.653	1448.6	59.64	3439
	9:10	1626.6	58.4	2044.8	148.653	1477.9	59.64	3474
5	9:15	1640.6	65.5	2044.8	148.653	1491.9	59.64	3488
				2044.8				
	9:20	1891.3	74.0	2448.0	207.381	1683.9	71.40	3674
	9:25	1919.3	82.5	2448.0	207.381	1711.9	71.40	3701
6	9:30	1931.9	91.0	2448.0	207.381	1724.5	71.40	3718
				2448.0				
	9:35	2174.1	100.8	2822.4	269.844	1904.3	82.32	3887
	9:40	2192.0	110.6	2822.4	269.844	1922.2	82.32	3909
7	9:45	2202.2	120.3	2793.6	264.772	1937.4	81.48	3923
				2812.8				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
Fall-Off	9:46	1017.1				1017.1		3044
	9:47	754.3				754.3		2779
	9:48	592.7				592.7		2616
	9:49	490.4				490.4		2512
	9:50	409.5				409.5		2432
	9:55	202.6				202.6		2223



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Greenhill Petroleum Corporation

DATE: March 12, 1992

WELL NAME: Lovington San Andres Unit Well No. 57
Lea County, New Mexico

WO#: 92140272

MID-PERFS. =

PACKER DEPTH = 4340

BHP GAUGE DEPTH = 4738

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	11:15	20.6				20.6		2090
	11:20	148.0	1.1	316.8	4.874	143.1	9.24	2207
	11:25	193.9	2.8	489.6	10.906	183.0	14.28	2257
	11:30	227.9	4.5	489.6	10.906	217.0	14.28	2291
2				432.0				
	11:35	393.2	7.4	835.2	29.292	363.9	24.36	2441
	11:40	476.6	10.4	864.0	31.188	445.4	25.20	2525
	11:45	551.3	13.4	864.0	31.188	520.1	25.20	2587
3				854.4				
	11:50	754.6	17.8	1267.2	63.344	691.3	36.96	2760
	11:55	853.0	22.3	1296.0	66.033	787.0	37.80	2857
	12:00	922.5	26.7	1267.2	63.344	859.2	36.96	2928
4				1276.8				
	12:05	1132.4	32.4	1641.6	102.255	1030.1	47.88	3092
	12:10	1231.1	38.2	1670.4	105.599	1125.5	48.72	3191
	12:15	1308.3	44.0	1670.4	105.599	1202.7	48.72	3268
5				1660.8				
	12:20	1531.2	51.1	2044.8	153.513	1377.7	59.64	3429
	12:25	1626.2	58.3	2073.6	157.536	1468.7	60.48	3526
	12:30	1692.1	65.4	2044.8	153.513	1538.6	59.64	3597
6				2054.4				
	12:35	1912.3	74.0	2476.8	218.846	1693.5	72.24	3741
	12:40	1994.5	82.5	2448.0	214.161	1780.3	71.40	3829
	12:45	2061.6	91.0	2448.0	214.161	1847.4	71.40	3896
7				2457.6				
	12:50	2209.8	100.4	2707.2	257.990	1951.8	78.96	3993
	12:55	2269.3	109.8	2707.2	257.990	2011.3	78.96	4060
	1:00	2326.3	119.3	2736.0	263.090	2063.2	79.80	4114
				2716.8				

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
STEP NO. & REMARKS	TIME	SURFACE TUBING PRESS. (psig)	CUMMULATIVE VOL. INJECTED (bbls)	INJECTION RATE (bbls/day)	FRICTION HEAD LOSS (psi)	CORRECTED TUBING PRESS. (psi) (1)-(4)	INJECTION RATE (gpm) (3)/34.2857	MEASURED BHP (psi)
Fall-Off	1:01	1884.5				1884.5		3993
	1:02	1809.8				1809.8		3897
	1:03	1727.5				1727.5		
	1:04	1659.2				1659.2		3774
	1:05	1590.8				1590.8		3676
	1:10	1328.8				1328.8		3411
	1:15	1144.0				1144.0		3223