



BRUCE KING  
GOVERNOR

ANITA LOCKWOOD  
CABINET SECRETARY

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



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

December 22, 1993

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

WFX-615

PDEV0020600615

Attention: Michael J. Newport

**RE: Injection Pressure Increase, Lovington San Andres Unit Well No. 29,  
Section 2, Township 17 South, Range 36 East, Lea County, New Mexico**

Dear Mr. Newport:

Reference is made to your request dated December 8, 1993 to increase the surface injection pressure on the above-referenced well. This request is based on a step rate test conducted on these wells on November 15, 1993. The results of the test have been reviewed by my staff and we feel an increase in injection pressure on this well is justified at this time.

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

Well and Location	Maximum Injection Surface Pressure
Lovington San Andres Unit Well No. 29 660' FNL - 660' FEL Unit A, Section 2, Township 17 South, Range 36 East	2200 psig
This well located in Lea County, New Mexico.	

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,

*Injection Pressure Increase*  
*Greenhill Petroleum Corporation*  
*December 22, 1993*  
*Page 2*

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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/BES/amg

cc: Oil Conservation Division - Hobbs  
File: WFX-615  
PSI-X, 4th Quarter



STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
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December 22, 1993

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, TX 77077-6841

Attention: Michael J. Newport

**RE: Injection Pressure Increase, Two Wells, Lovington Paddock Unit,  
Lea County, New Mexico**

Dear Mr. Newport:

Reference is made to your request dated December 8, 1993 to increase the surface injection pressure on two wells in your Lovington Paddock Unit. This request is based on step rate tests conducted on these wells between November 16 and 17, 1993. The results of the tests have been reviewed by my staff and we feel an increase in injection pressure on these wells are justified at this time.

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

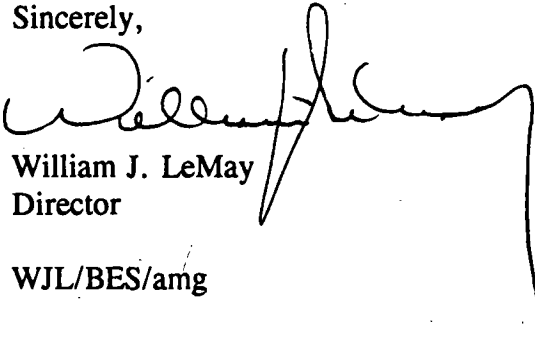
Well and Location	Maximum Injection Surface Pressure
LPU Well No. 31 1650' FSL - 890' FWL Unit L, Section 36, Township 16 South, Range 36 East	1965 psig
LPU Well No. 71 660' FSL - 660' FEL Unit P, Section 1, Township 17 South, Range 36 East	1905 psig
Both wells located in Lea County, New Mexico.	

*Injection Pressure Increase  
Greenhill Petroleum Corporation  
December 22, 1993  
Page 2*

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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 black ink, appearing to read 'William J. LeMay', with a long, sweeping horizontal stroke extending to the right.

William J. LeMay  
Director

WJL/BES/amg

cc: Oil Conservation Division - Hobbs  
File: WFX-605  
WFX-607  
PSI-X, 4th Quarter

NO WAITING PERIOD

COMPANY: GREENHILL PETROLEUM CORP.  
ADDRESS: 11490 Westheimer Road, Suite 200  
CITY, STATE, ZIP: Houston, Texas 77077-6841  
ATTENTION: Mr. Michael J. Newport

Re: Injection Pressure Increase  
2 Wells - Lovington Paddock Unit  
Lea County, New Mexico

Dear Sir:

Reference is made to your request dated December 8, 1993, to increase the surface injection pressure on 2 wells in your Lovington Paddock Unit. This request is based on step rate tests conducted on these wells between November 16 and 17, 1993. 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 &amp; Location</u>	<u>Maximum Injection Surface Pressure</u>
LPU Well No.31 1650' FSL & 890' FWL Unit L, Section 36, T16S, R36E	1965 psig
LPU Well No.71 660' FSL & 660' FEL Unit P, Section 1, T17S, R36E	1905 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.

William J. LeMay  
Director

WJL/BES

xc: OCD - Hobbs  
FILE - WFX- 605 & 607; 4th QTR PSI-X and

NO WAITING PERIOD

COMPANY: **GREENHILL PETROLEUM CORP.**  
ADDRESS: **11490 Westheimer Road, Suite 200**  
CITY, STATE, ZIP: **Houston, Texas 77077-6841**  
ATTENTION: **Mr. Michael J. Newport**

RE: *Injection Pressure Increase  
Lovington San Andres Unit Well No.29  
Sec. -T20S-R30E  
Lea County, New Mexico*

Dear Sir:

Reference is made to your request dated December 8, 1993, to increase the surface injection pressure on the above referenced well. This request is based on a step rate test conducted on this well November 15, 1993. The results of the tests have been reviewed by my staff and we feel an increase in injection pressure on this well is justified at this time.

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

<u>Well &amp; Location</u>	<u>Maximum Injection Surface Pressure</u>
Lovington San Andres Unit Well No.29 660' FNL & 660' FEL Unit Letter "A", Section 2-T17S-R36E Lea County, New Mexico	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/BES/

xc: FILE - WFX-615; 4th QTR psi-x OCD - Hobbs



# GREENHILL PETROLEUM CORPORATION

Incorporated in Delaware, U.S.A.

PSI-X

N/R

11490 WESTHEIMER ROAD, SUITE 200  
HOUSTON, TEXAS 77077-6841  
TELEPHONE (713) 589-8484  
FAX. (713) 589-9399

December 8, 1993

State of New Mexico  
Oil Conservation Division  
Energy, Mineral & Natural  
Resources Department  
310 Old Sante Fe Trail  
Sante Fe, New Mexico 87501

Attn: Mr. David Catanach  
R-9111 WFX 605, 607, 631  
Re: Lovington Paddock Unit  
Well No.'s 31 and 71  
Lea County, New Mexico

R-9431

615  
632

Lovington San Andres Unit  
Well Number 29  
Lea County, New Mexico

Gentlemen:

Enclosed please find the step rate injection tests covering Lovington San Andres No. 29, Lovington Paddock No.'s 31 and 71. Greenhill Petroleum Corporation requests that the tubing pressure be increased to the following:

LPU No. 31 - 2010 PSI 1905  
LPU No. 71 - 1950 PSI 1905  
LSA No. 29 - 2200 PSI OK

Thank you for your cooperation and please let me know if you have any further questions.

Very truly yours,

Michael J. Newport  
Land Manager - Permian Basin

MJN:ls-93.403

Enclosures

**WEST-TEST, INC.**  
A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY  
Hobbs, New Mexico

**STEP RATE INJECTION TEST**

CLIENT: GREENHILL PETROLEUM CO.

DATE: NOVEMBER 17, 1983

WELL NAME LOVINGTON PADDOK UNIT NO. 71  
LEA COUNTY, NEW MEXICO

WOSP: 93-14-2277

MID-PERFS. - TD-6000

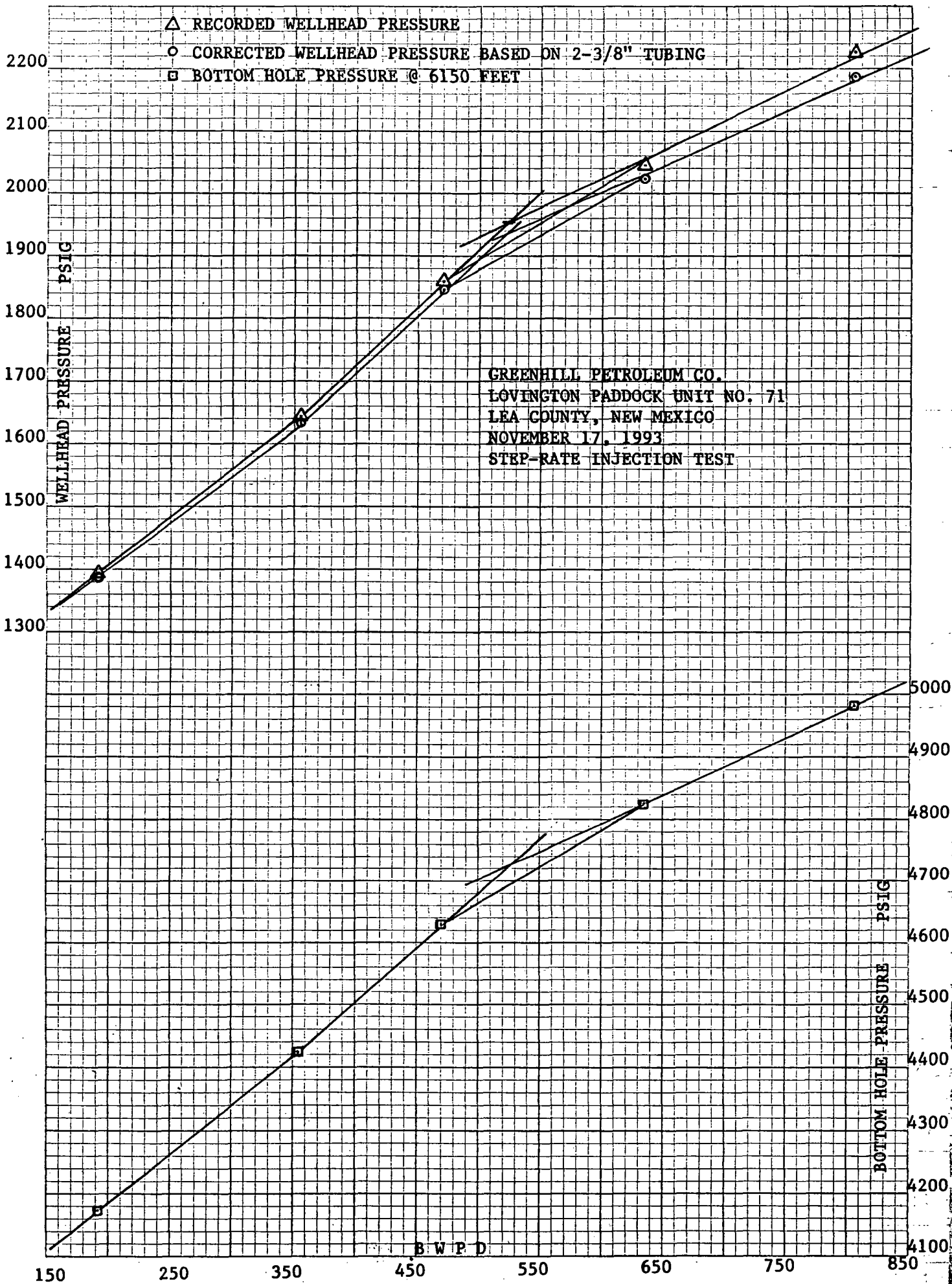
PACKER DEPTH - 6000

BHP GAUGE DEPTH - 6150

*660 5 + 660 E  
P 1-175.36 E*

STEP NO. #		(1) SURFACE TUBING PRESS. (PSIG)	(2) CUMULATIVE VOL. INJECTED (GAL)	(3) INJECTION RATE (GPM)	(4) FRICTION HEAD LOSS (PSI)	(5) CORRECTED TUBING PRESS. (PSI) (1)-(4)	(6) INJECTION RATE (GPM) FROM TEST	(7) MEASURED BHP (PSI)
1	9:30	1045.8				1045.8		3833
	9:35	1267.0	0.6	172.8	2.061	1264.9	5.04	4052
	9:40	1339.6	1.3	201.6	2.742	1336.9	5.88	4130
	9:45	1397.0	2.0	201.6	2.742	1394.3	5.88	4178
2				192.0				
	9:50	1555.5	3.3	374.4	8.618	1546.9	10.92	4329
	9:55	1588.5	4.5	345.6	7.432	1581.1	10.08	4381
	10:00	1640.8	5.7	345.6	7.432	1633.4	10.08	4422
3				355.2				
	10:05	1753.2	7.4	489.6	14.156	1739.0	14.28	4539
	10:10	1813.1	9.0	460.8	12.654	1800.4	13.44	4590
	10:15	1860.4	10.6	460.8	12.654	1847.7	13.44	4631
4				470.4				
	10:20	1955.1	12.8	633.6	22.808	1932.3	18.48	4727
	10:25	2034.5	15.0	633.6	22.808	2011.7	18.48	4785
	10:30	2044.7	17.2	633.6	22.808	2021.9	18.48	4822
5				633.6				
	10:35	2174.0	20.0	806.4	35.632	2138.4	23.52	4911
	10:40	2212.3	22.8	806.4	35.632	2176.7	23.52	4951
	10:45	2226.3	25.6	806.4	35.632	2190.7	23.52	4983
FALLOFF				806.4				
	10:46	2032.7				2032.7		4845
	10:47	1980.2				1980.2		4790
	10:48	1937.9				1937.9		4749
	10:49	1903.3				1903.3		4714
	10:50	1853.4				1853.4		4680
	10:55	1757.4				1757.4		4564
	11:00	1677.9				1677.9		4482





# WEST-TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

## STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CO.

DATE: NOVEMBER 15, 1993

WELL NAME: LOVINGTON SAN ANDRES NO. 29

WO#: 93-14-2278

Lea County, New Mexico

MID-PERFS. = OPEN HOLE 4590-4940

PACKER DEPTH = 4507

BHP GAUGE DEPTH = 4765

1 1/2

660 N & E  
A 2 17336E

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)/54.2857	(7) MEASURED BHP (psi)
1	12:15	1508.1				1508.1		3586
	12:20	1568.0	0.7	201.6	2.124	1565.9	5.88	3648
	12:25	1599.3	1.3	172.8	1.597	1597.7	5.04	3675
	12:30	1624.3	2.1	230.4	2.720	1621.6	6.72	3708
2				201.6				
	12:35	1751.7	3.4	374.4	6.677	1745.0	10.92	3839
	12:40	1859.1	4.7	374.4	6.677	1852.4	10.92	3933
	12:45	1902.9	5.9	345.6	5.758	1897.1	10.08	4004
3				364.8				
	12:50	2060.3	7.8	547.2	13.473	2046.8	15.96	4144
	12:55	2172.9	9.8	576.0	14.815	2158.1	16.80	4263
	1:00	2266.7	11.7	547.2	13.473	2253.2	15.96	4346
4				556.8				
	1:05	2396.8	14.2	720.0	22.386	2374.4	21.00	4473
	1:10	2464.3	16.7	720.0	22.386	2441.9	21.00	4544
	1:15	2510.6	19.1	691.2	20.757	2489.8	20.16	4592
FALLOFF				710.4				
	1:16	2444.4				2444.4		4537
	1:17	2396.8				2396.8		4499
	1:18	2365.6				2365.6		4468
	1:19	2339.3				2339.3		4441
	1:20	2315.6				2315.6		4416
	1:25	2214.3				2214.3		4312
	1:30	2146.9				2146.9		4244

- △ RECORDED WELLHEAD PRESSURE  
○ CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING  
□ BOTTOM HOLE PRESSURE @ 4765 FEET

2500

2400

2300

2200

2100

2000

1900

1800

1700

1600

WELLHEAD PRESSURE PSIG

GREENHILL PETROLEUM CO.  
LOVINGTON-SAN-ANDRES NO. 29  
LEA COUNTY, NEW MEXICO  
NOVEMBER 15, 1993  
STEP-RATE INJECTION TEST

4600

4500

4400

4300

4200

4100

4000

3900

3800

3700

BOTTOM HOLE PRESSURE PSIG

B W P D

200

300

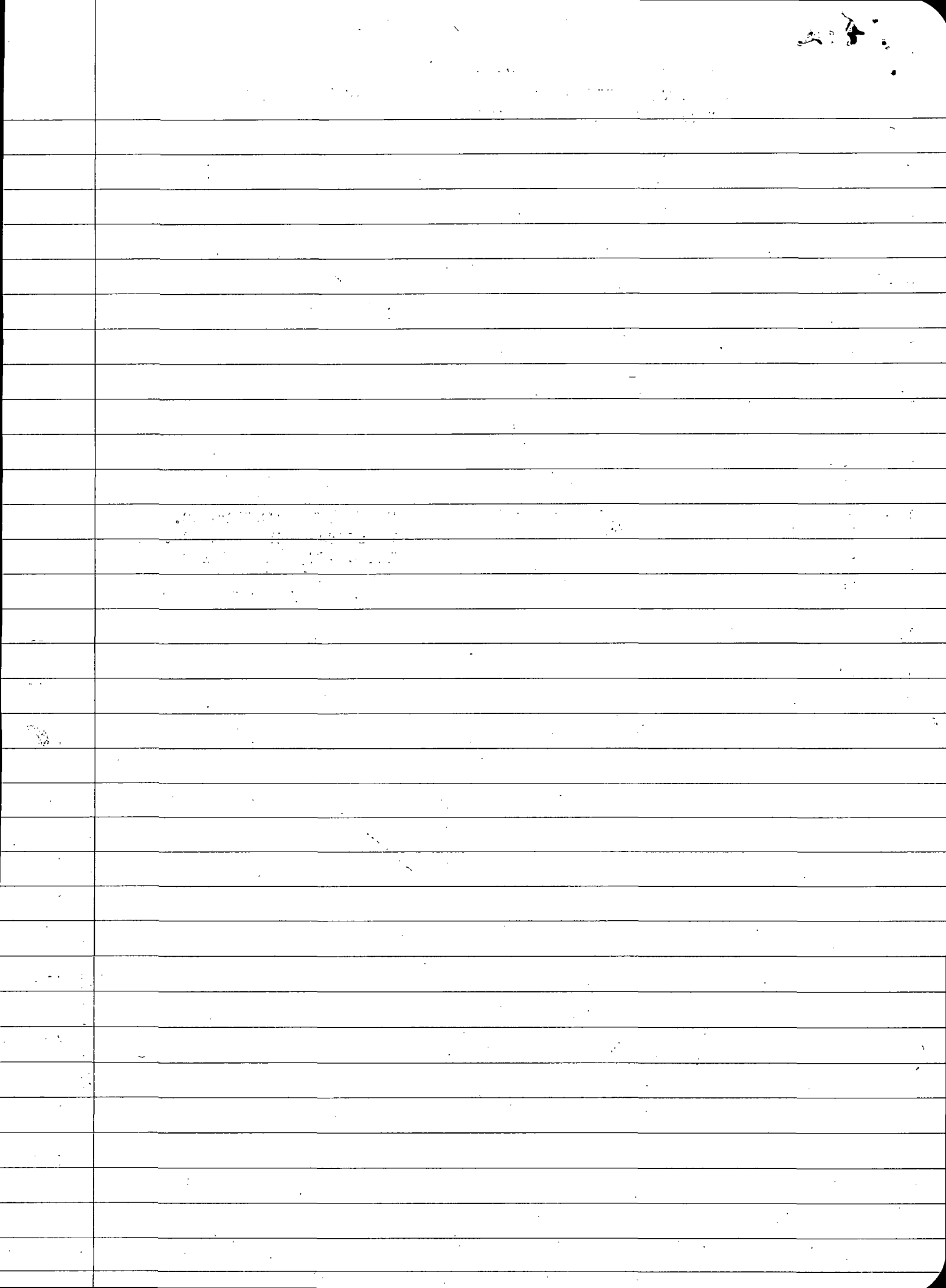
400

500

600

700

800



# WEST-TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

## STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CO.

DATE: NOVEMBER 16, 1993

WELL NAME: LOVINGTON PADDOCK NO. 31  
LEA COUNTY, NEW MEXICO

WO#: 93-14-2276

MID-PERFS. = OPEN HOLE 6080-6295

PACKER DEPTH = 6009

BHP GAUGE DEPTH = 6188

1800 psi 4/92

16503 890W  
L 36.165.365

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	9:45	1445.7				1445.7		4251
	9:50	1514.7	0.7	201.6	2.759	1511.9	5.88	4314
	9:55	1554.3	1.4	201.6	2.759	1551.5	5.88	4334
	10:00	1554.2	2.1	201.6	2.759	1551.4	5.88	4352
2				201.6				
	10:05	1656.5	3.7	460.8	12.732	1643.8	13.44	4436
	10:10	1688.4	5.3	460.8	12.732	1675.7	13.44	4470
	10:15	1722.9	6.9	460.8	12.732	1710.2	13.44	4496
3				460.8				
	10:20	1806.0	9.1	633.6	22.948	1783.1	18.48	4567
	10:25	1850.7	11.4	662.4	24.915	1825.8	19.32	4603
	10:30	1885.2	13.6	633.6	22.948	1862.3	18.48	4629
4				643.2				
	10:35	1982.5	16.6	864.0	40.733	1941.8	25.20	4699
	10:40	2014.4	19.6	864.0	40.733	1973.7	25.20	4732
	10:45	2037.4	22.6	864.0	40.733	1996.7	25.20	4758
5				864.0				
	10:50	2123.3	26.2	1036.8	57.073	2066.2	30.24	4815
	10:55	2152.9	29.9	1065.6	60.041	2092.9	31.08	4846
	11:00	2175.9	33.7	1094.4	63.077	2112.8	31.92	4872
6				1065.6				
	11:05	2250.3	37.9	1209.6	75.907	2174.4	35.28	4917
	11:10	2274.6	42.3	1267.2	82.729	2191.9	36.96	4946
	11:15	2280.0	46.5	1209.6	75.907	2204.1	35.28	4953
				1228.8				

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)
FALLOFF	11:16	2064.3				2064.3		4874
	11:17	2032.2				2032.2		4842
	11:18	2009.2				2009.2		4818
	11:19	1990.0				1990.0		4799
	11:20	1970.8				1970.8		4780
	11:25	1917.1				1917.1		4724
	11:30	1876.1				1876.1		4681

