



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



BRUCE KING  
 GOVERNOR

ANITA LOCKWOOD  
 CABINET SECRETARY

December 22, 1993

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

WFX-615

PDEV0020600615

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

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

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 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:

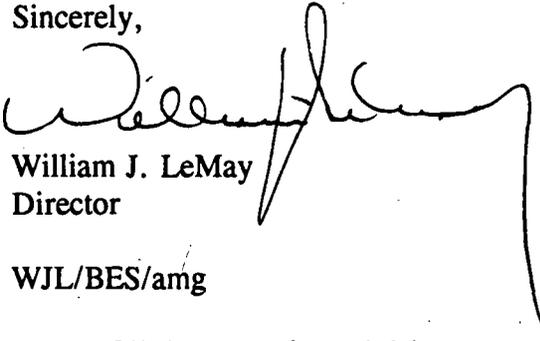
Well and Location	Maximum Injection Surface Pressure
LPU Well No. 31. 1650' FSL - 890' FWL Unit L, Section 36, Township 16 South, Range 36 East	1965 psig
LPU Well No. 71 660' FSL - 660' FEL Unit P, Section 1, Township 17 South, Range 36 East	1905 psig
Both wells located in Lea County, New Mexico.	

*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,



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 2nd

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

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

Incorporated in Delaware, U.S.A.

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

R-9431

Attn: Mr. David Catanach  
R-9771 WFX 605, 607, 631  
Re: Lovington Paddock Unit  
Well No.'s 31 and 71  
Lea County, New Mexico

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

615  
632

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 PADDOCK UNIT NO. 71  
 LEA COUNTY, NEW MEXICO

WOSP: 93-14-2277

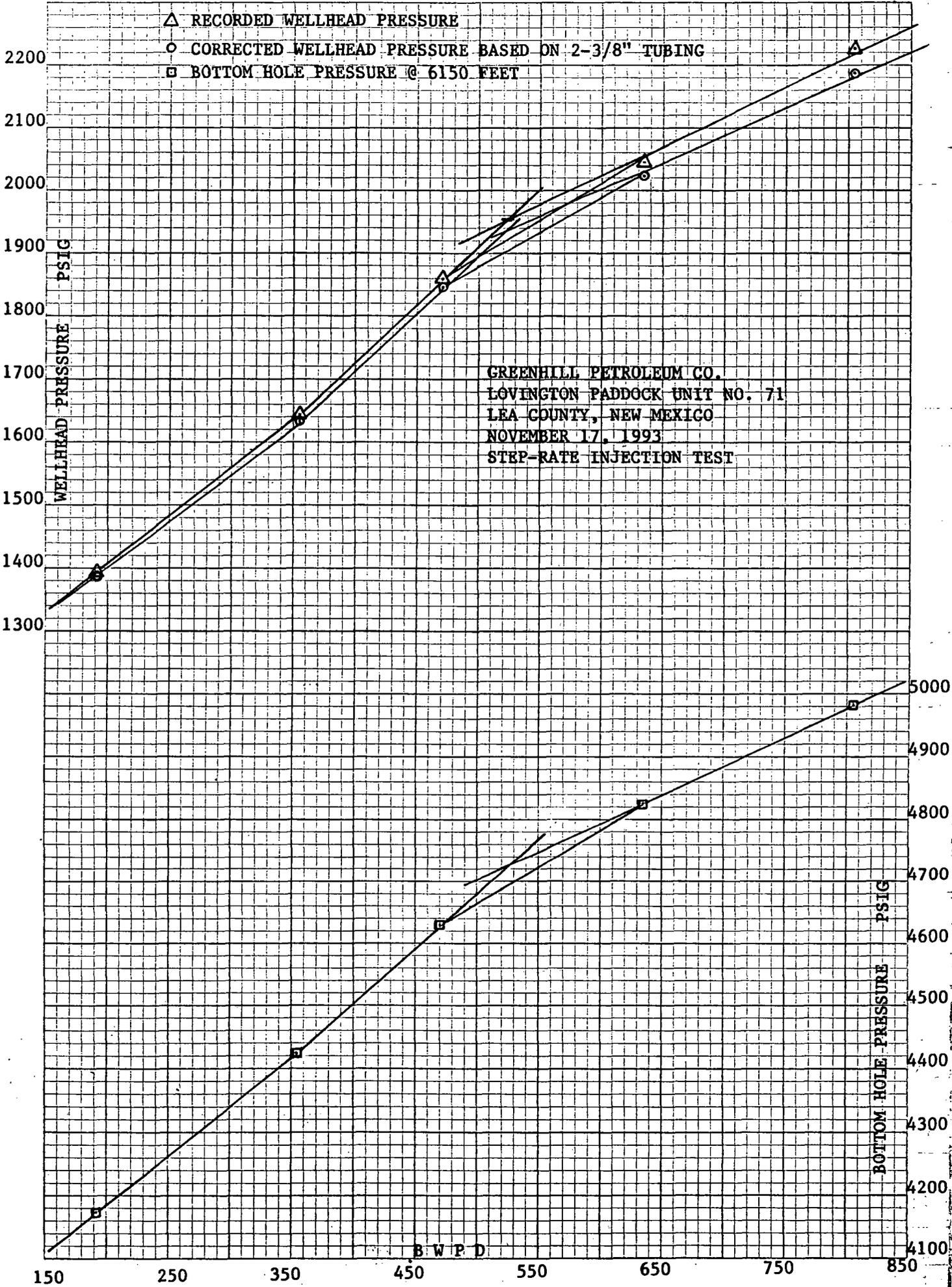
*660 5 + 660 E  
 P 1-175.36 E*

MID-PERFS. = TD-8900

PACKER DEPTH = 6000

BHP GAUGE DEPTH = 6150

STEP NO. #	TIME	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		SURFACE TUBING PRESS. (PSIG)	CUMULATIVE VOL. INJECTED (GAL)	INJECTION RATE (GPM)	INJECTION HEAD LOSS (PSI)	CONNECTED TUBING PRESS. (PSI) (1) - (2)	INJECTION RATE (GPM) KORVA TEST	MEASURED BHP (PSI)
	9:30	1045.8				1045.8		3833
1	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
					192.0			
2	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
				355.2				
3	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
				470.4				
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
				633.6				
5	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
				806.4				
FALLOFF	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

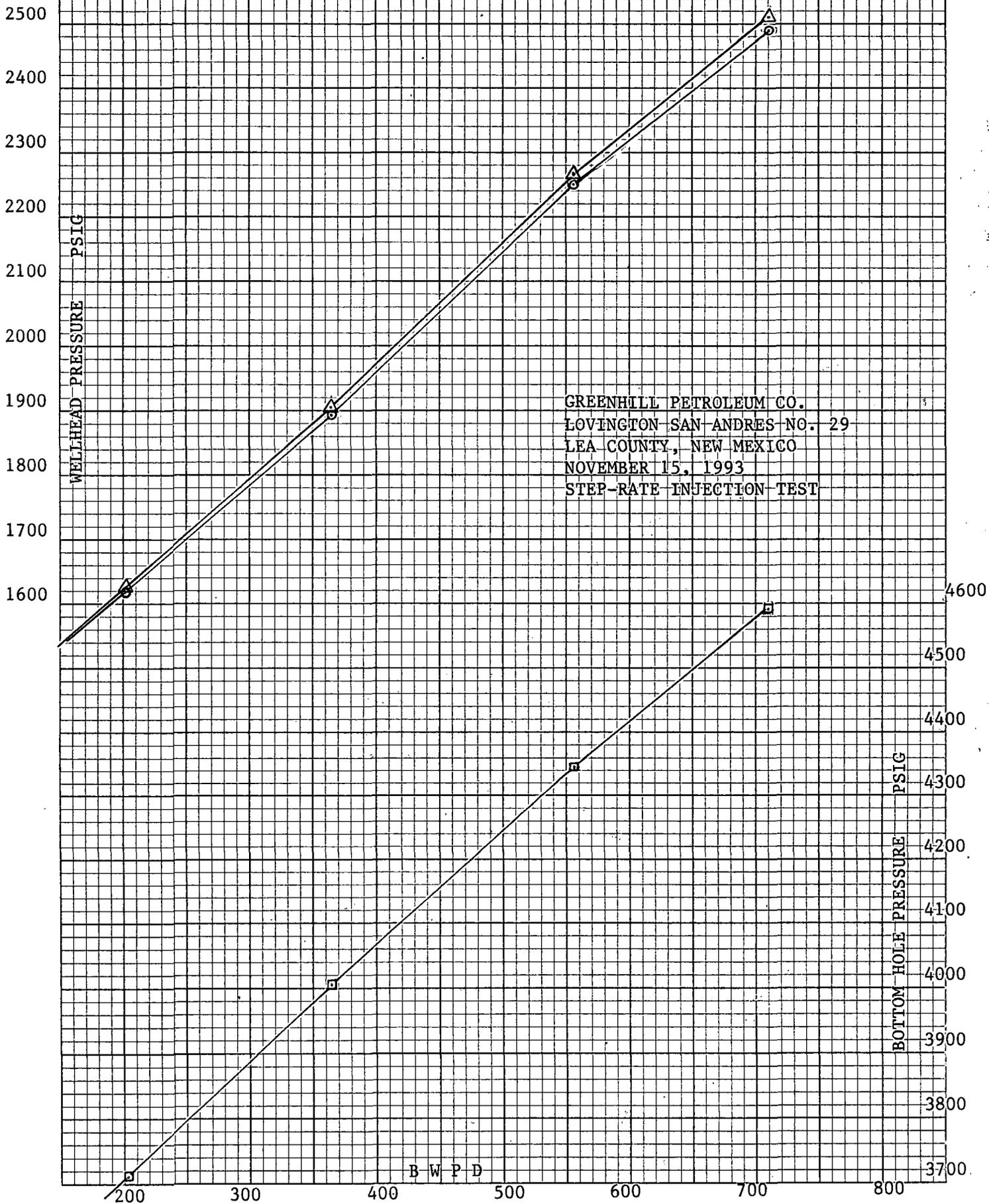
PACKER DEPTH = 4507

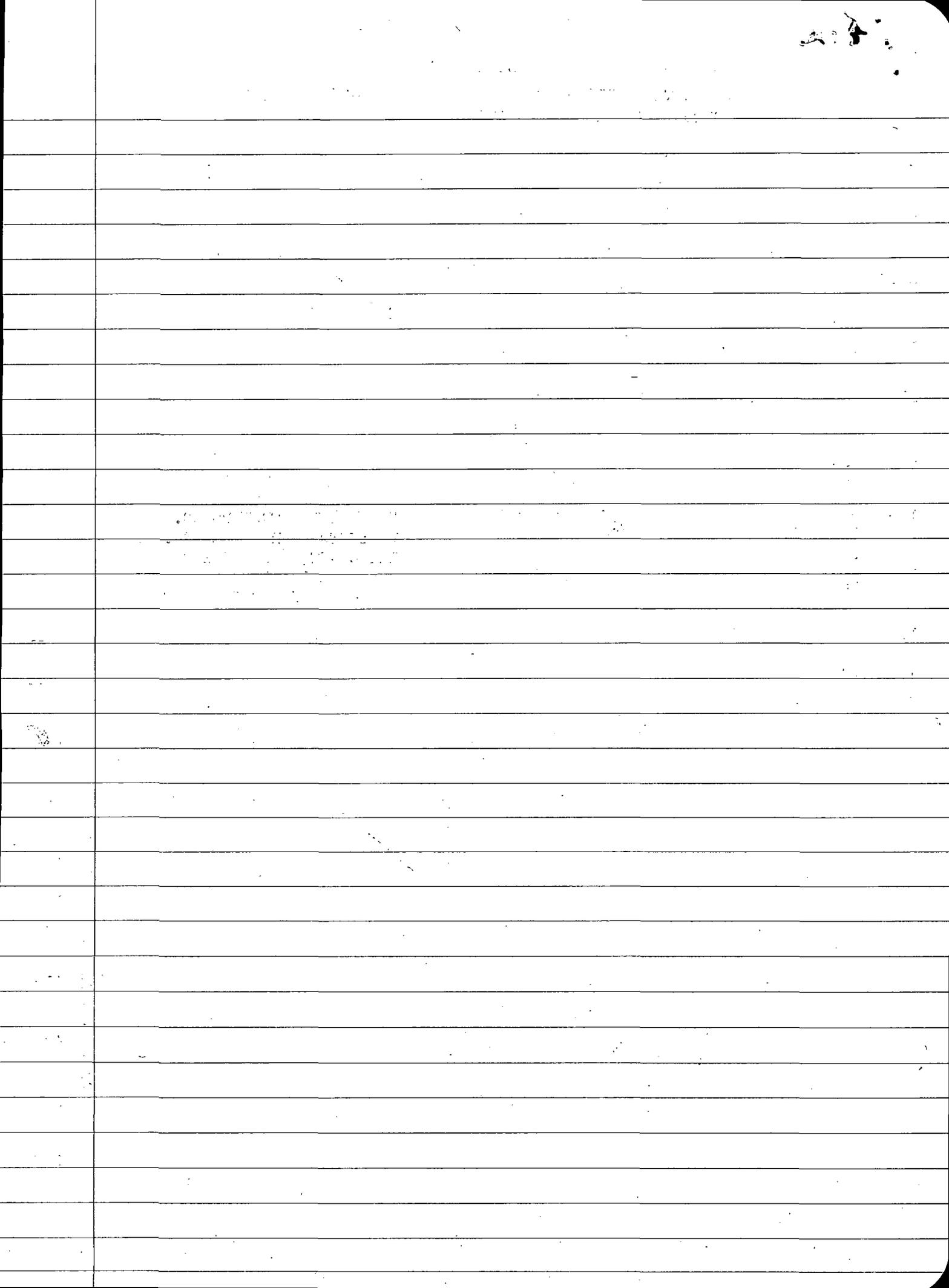
BHP GAUGE DEPTH = 4765

*1 1/2*  
*660 N & E*  
*A 2 17336E*

STEP NO. & REMARKS	TIME	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		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)/94.2857	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





# 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

*1800psi 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	10:05	1656.5	3.7	201.6				
	10:10	1688.4	5.3	460.8	12.732	1643.8	13.44	4436
	10:15	1722.9	6.9	460.8	12.732	1675.7	13.44	4470
3	10:20	1806.0	9.1	460.8	12.732	1710.2	13.44	4496
	10:25	1850.7	11.4	633.6	22.948	1783.1	18.48	4567
	10:30	1885.2	13.6	662.4	24.915	1825.8	19.32	4603
	10:35	1982.5	16.6	633.6	22.948	1862.3	18.48	4629
4	10:40	2014.4	19.6	643.2				
	10:45	2037.4	22.6	864.0	40.733	1941.8	25.20	4699
	10:50	2123.3	26.2	864.0	40.733	1973.7	25.20	4732
5	10:55	2152.9	29.9	864.0	40.733	1996.7	25.20	4758
	11:00	2175.9	33.7	864.0	57.073	2066.2	30.24	4815
	11:05	2250.3	37.9	1036.8	60.041	2092.9	31.08	4846
6	11:10	2274.6	42.3	1065.6	63.077	2112.8	31.92	4872
	11:15	2280.0	46.5	1065.6	75.907	2174.4	35.28	4917
				1209.6	82.729	2191.9	36.96	4946
				1228.8	75.907	2204.1	35.28	4953

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
STEP NO. & REMARKS	TIME	SURFACE TUBING PRESS. (psig)	CUMMULATIVE VOL. INJECTED (bbis)	INJECTION RATE (bbis/day)	FRICTION HEAD LOSS (psi)	CORRECTED TUBING PRESS. (psi) (1)-(4)	INJECTION RATE (gpm) (3)/34.2857	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

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
- RECORDED BOTTOM HOLE PRESSURE @ 6188 FEET

WELLHEAD PRESSURE PSIG

BOTTOM HOLE PRESSURE PSIG

GREENHILL PETROLEUM COM  
 LOVINGTON PADDOCK NO. 31  
 LEA COUNTY, NEW MEXICO  
 NOVEMBER 16, 1993  
 STEP-RATE INJECTION TEST

B W P D

