

State of New Mexico
ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT
Santa Fe, New Mexico 87505



OIL CONSERVATION DIVISION



February 2, 1995

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

Attn: David M. Tilley

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

CF 10154
R-9431

WFX-615
PDEV0020600615
WFX-632
PDEV0020600632

Dear Mr. Tilley:

Reference is made to your request dated December 27, 1994, to increase the surface injection pressure on seven wells within the Lovington San Andres Unit Waterflood Project. This request is based on step rate tests conducted on these wells December 12 - 15, 1994. The results of the tests have been reviewed by my staff and we feel an increase in injection pressure on six of 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 Surface Pressure
LSAU No. 8 Unit F, Section 31, Township 16 South, Range 37 East	1970 PSIG
LSAU No. 9 Unit H, Section 36, Township 16 South, Range 36 East	1930 PSIG
LSAU No. 10 Unit G, Section 36, Township 16 South, Range 36 East	2000 PSIG
LSAU No. 11 Unit F, Section 36, Township 16 South, Range 36 East	1740 PSIG

VILLAGRA BUILDING - 408 Galisteo

Forestry and Resources Conservation Division
P.O. Box 1948 87504-1948
827-5830

Park and Recreation Division
P.O. Box 1147 87504-1147
827-7465

2040 South Pacheco

Office of the Secretary
827-5950

Administrative Services
827-5925

Energy Conservation & Management
827-5900

Mining and Minerals
827-5970

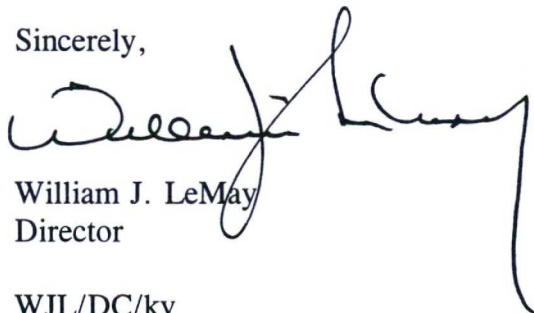
Oil Conservation
827-7131

Well and Location	Maximum Injection Surface Pressure
LSAU No. 15 Unit K, Section 31, Township 16 South, Range 37 East	1740 PSIG
LSAU No. 58 Unit E, Section 31, Township 16 South, Range 37 East	1940 PSIG
wells located in Lea County, New Mexico.	

It was noted that the step rate test conducted on the LSAU No. 21 was initiated at a surface pressure of 1641 psi. This pressure is considerably higher than the current maximum injection pressure authorized for this well (914 psi). The Division generally requires that the starting pressure for these tests be lower than the currently authorized pressure. Please re-run this test according to this procedure and re-submit for approval.

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/kv

cc: Oil Conservation Division - Hobbs
R. Brown
D. Catanach
File: WFX-615
WFX-632
Case File 10154

NO WAITING PERIOD

COMPANY: Greenhill Petroleum Corporation
ADDRESS: 11490 Westheimer Road, Suite 200
CITY, STATE, ZIP: Houston, Texas 77077-6841
ATTENTION: David M. Tilley

Re: Injection Pressure Increase
Livingston San Andres Unit
Water Flood Project
Lea County, New Mexico

Dear Sir:

Reference is made to your request dated December 27, 1994, to increase the surface injection pressure on Seven wells within the Livingston San Andres Unit Water Flood Project. This request is based on step rate tests conducted on these wells December 12-15, 1994. 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. Six of

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. 8</u> <u>Unit F, Section 31, T-16S, R-37E</u>	<u>1970 PSIG</u>
<u>LSAU No. 9</u> <u>Unit H, Section 36, T-16S, R-36E</u>	<u>1930 PSIG</u>
<u>LSAU No. 10</u> <u>Unit G, Section 36, T-16S, R-36E</u>	<u>2000 PSIG</u>
<u>LSAU No. 11</u> <u>Unit F, Section 36, T-16S, R-36E</u>	<u>1740 PSIG</u>
<u>LSAU No. 15</u> <u>Unit R, Section 31, T-16S, R-37E</u>	<u>1740 PSIG</u>
<u>LSAU No. 58</u> <u>Unit E, Section 31, T-16S, R-37E</u>	<u>1940 PSIG</u>

It was noted that the step rate test conducted on the LSAU No. 21 was initiated at a surface pressure of 1641 psi. This pressure is considerably higher than the current maximum injection pressure authorized for this well (914 psi.). The Division generally requires that the starting pressure for these tests be lower than the currently authorized pressure. Please re-run this test according to this procedure and re-submit for approval.

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. GALLEGO
R. Brown

D. CATANACH

FILE- WFX-615
WFX-632
Case File-1054

OCD- H66



GREENHILL PETROLEUM CORPORATION

Incorporated in Delaware, U.S.A.

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

Tuesday, December 27, 1994

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

Attention: David Catanach

Re: Lovington San Andres Unit
Lea County, New Mexico
Request for injection pressure increases

In compliance with the current administrative order (# WFX-632) Greenhill Petroleum Corporation has run additional step rate tests on selected water injection wells in order to show justification for injection pressure increases. Attached Table 1 shows the current maximum allowed injection pressure and the requested maximum allowable injection pressure for each well tested. Included are the step-rate test results which were conducted December 13 -15, 1994. This data is submitted for your review to substantiate our request.

We respectfully request approval to increase the wellhead injection pressures as indicated for each well submitted. Until notification is received the wells will continued to be operated at the current maximum allowed pressures. Thank you for your time and consideration of this request.

Sincerely,

David M. Tilley
Production Engineer

cc: files

enclosures

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

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 15, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 8
LEA COUNTY, NEW MEXICO

WO#: 94-14-2178

OPEN HOLE 4610-5105

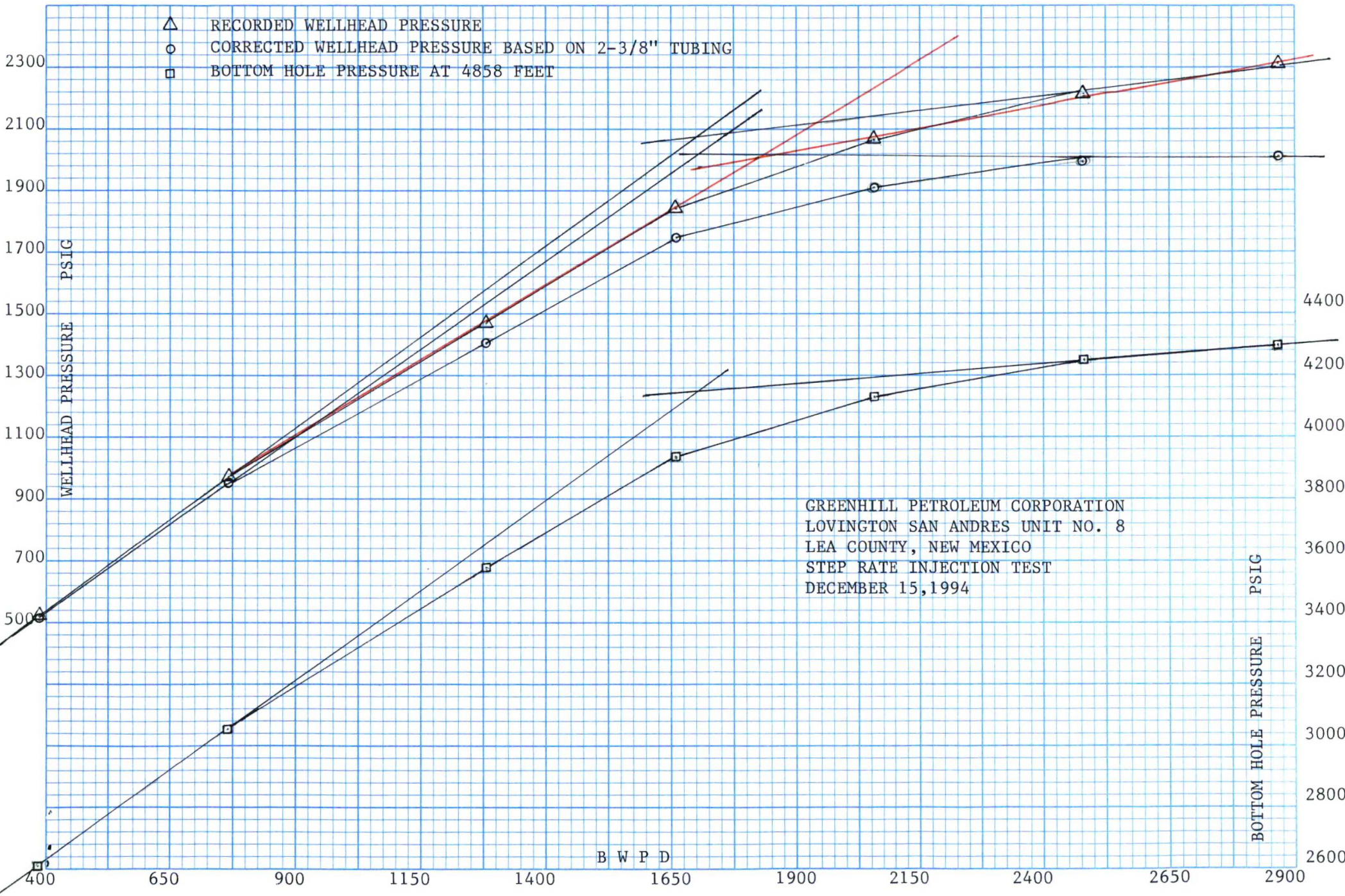
PACKER DEPTH = 4552

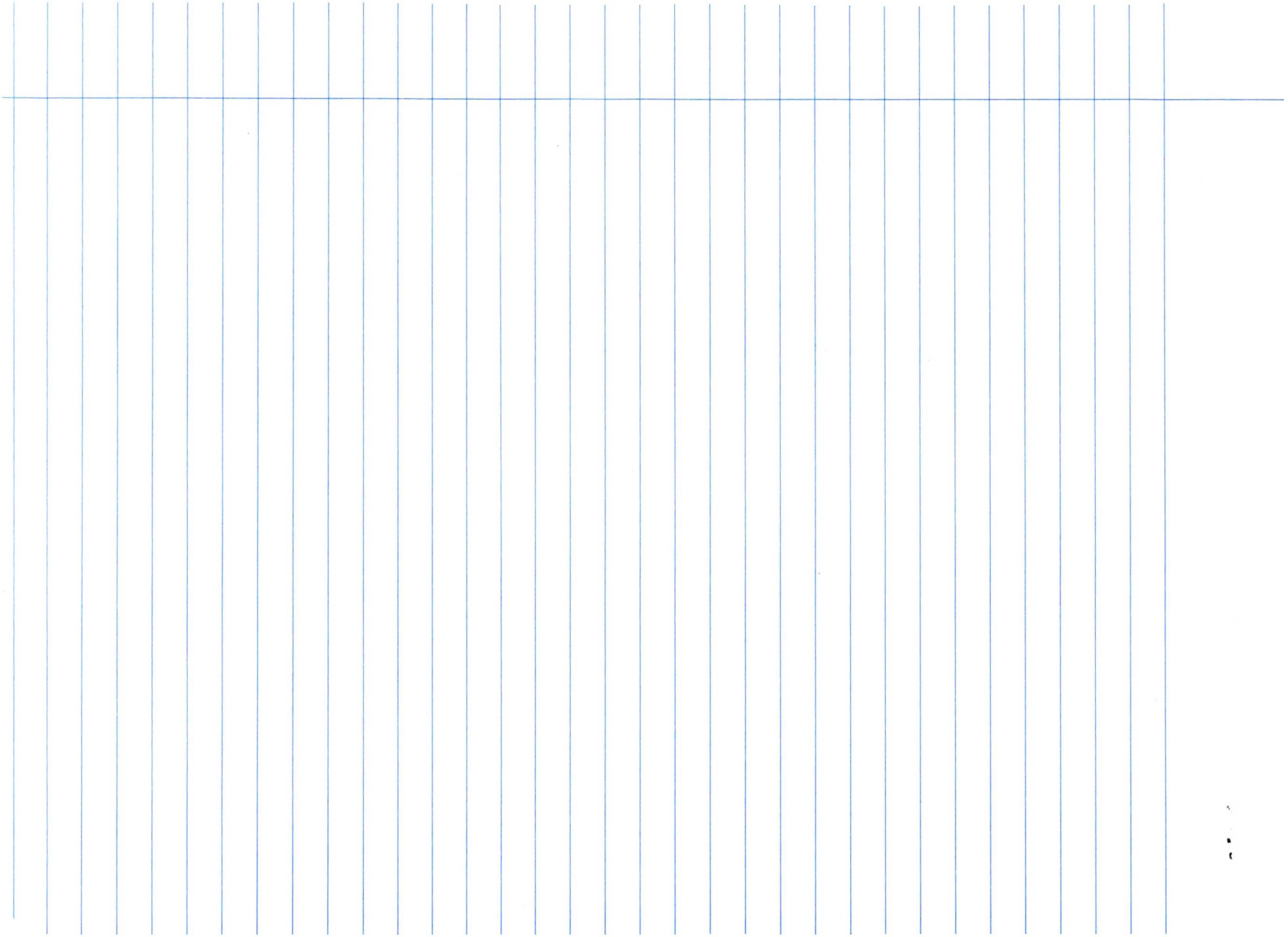
BHP GAUGE DEPTH = 4858

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	8:40	168.5				168.5		2262.9
	8:45	362.3	1.3	374.4	6.807	355.5	10.92	2457.6
	8:50	464.3	2.6	374.4	6.807	457.5	10.92	2546.7
	8:55	524.1	3.9	374.4	6.807	517.3	10.92	2608.4
				374.4				
2	9:00	764.2	6.6	777.6	26.315	737.9	22.68	2840.5
	9:05	881.6	9.2	748.8	24.540	857.1	21.84	2960.8
	9:10	974.7	11.9	777.6	26.315	948.4	22.68	3053.3
3				768.0				
	9:15	1274.1	16.4	1296.0	67.705	1206.4	37.80	3331.1
	9:20	1380.3	20.8	1267.2	64.948	1315.4	36.96	3466.6
	9:25	1473.6	25.2	1267.2	64.948	1408.7	36.96	3573.6
4				1276.8				
	9:30	1721.7	31.0	1670.4	108.273	1613.4	48.72	3783.7
	9:35	1794.6	36.7	1641.6	104.845	1689.8	47.88	3873.4
	9:40	1850.7	42.5	1670.4	108.273	1742.4	48.72	3933.5
				1660.8				
5	9:45	1990.1	49.6	2044.8	157.401	1832.7	59.64	4037.5
	9:50	2036.0	56.8	2073.6	161.526	1874.5	60.48	4094.3
	9:55	2062.7	63.9	2044.8	157.401	1905.3	59.64	4129.5
				2054.4				
6	10:00	2181.7	72.5	2476.8	224.389	1957.3	72.24	4193.8
	10:05	2212.2	81.1	2476.8	224.389	1987.8	72.24	4233.8
	10:10	2215.8	89.7	2476.8	224.389	1991.4	72.24	4245.6
				2476.8				
7	10:15	2310.4	99.7	2880.0	296.605	2013.8	84.00	4276.7
	10:20	2316.5	109.6	2851.2	291.141	2025.4	83.16	4290.9
	10:25	2313.6	119.6	2880.0	296.605	2017.0	84.00	4296.0
				2870.4				

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	10:26	1984.1				1984.1		4243.2
	10:27	1964.8				1964.8		4224.1
	10:28	1950.6				1950.6		4208.1
	10:29	1937.3				1937.3		4192.8
	10:30	1924.5				1924.5		4178.5
	10:35	1863.2				1863.2		4111.2
	10:40	1804.1				1804.1		4042.8

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
- BOTTOM HOLE PRESSURE AT 4858 FEET





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

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 13, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 9
LEA COUNTY, NEW MEXICO

WO#: 94-14-2137

OPEN HOLE 4645-5100

PACKER DEPTH = 4510

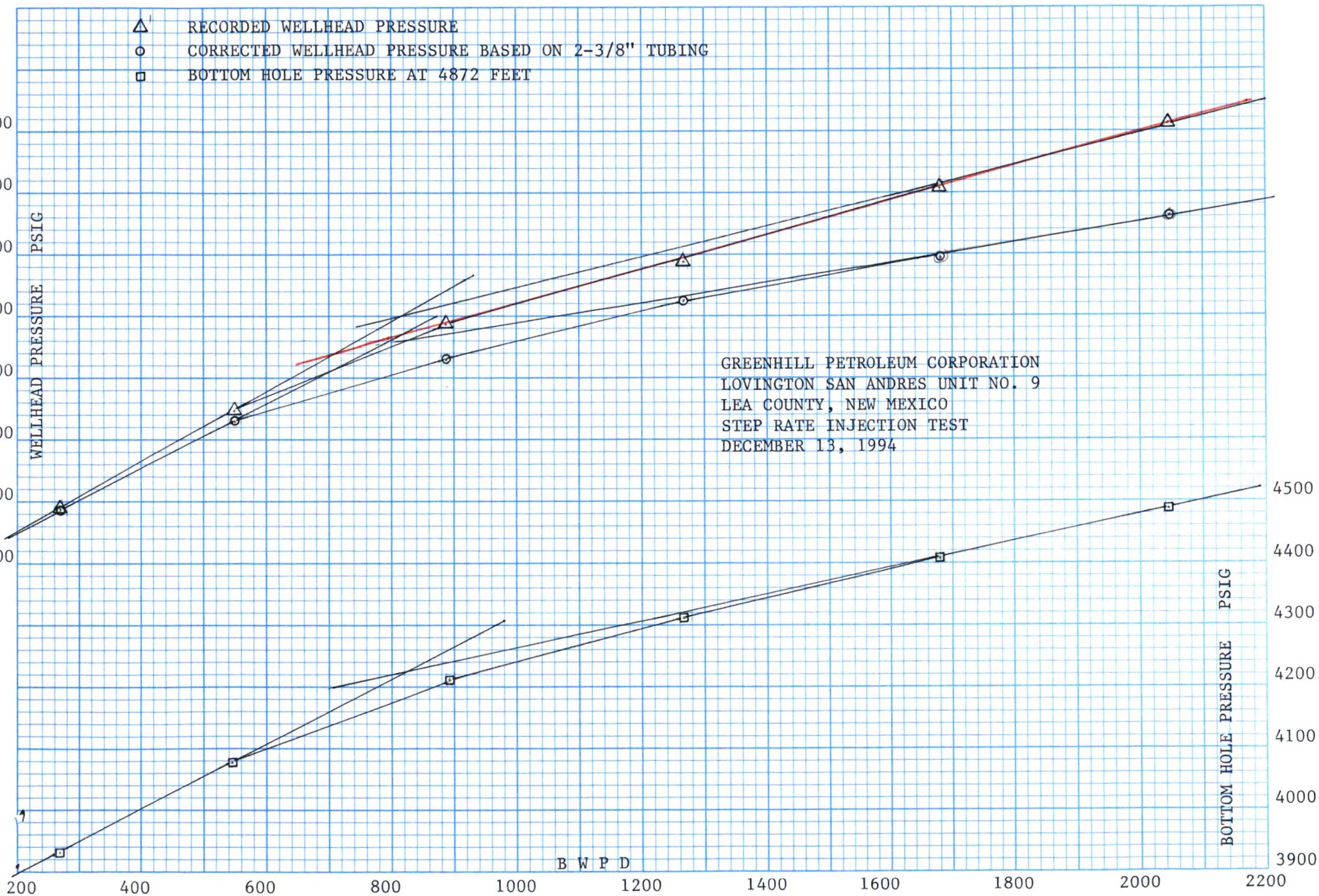
BHP GAUGE DEPTH = 4872

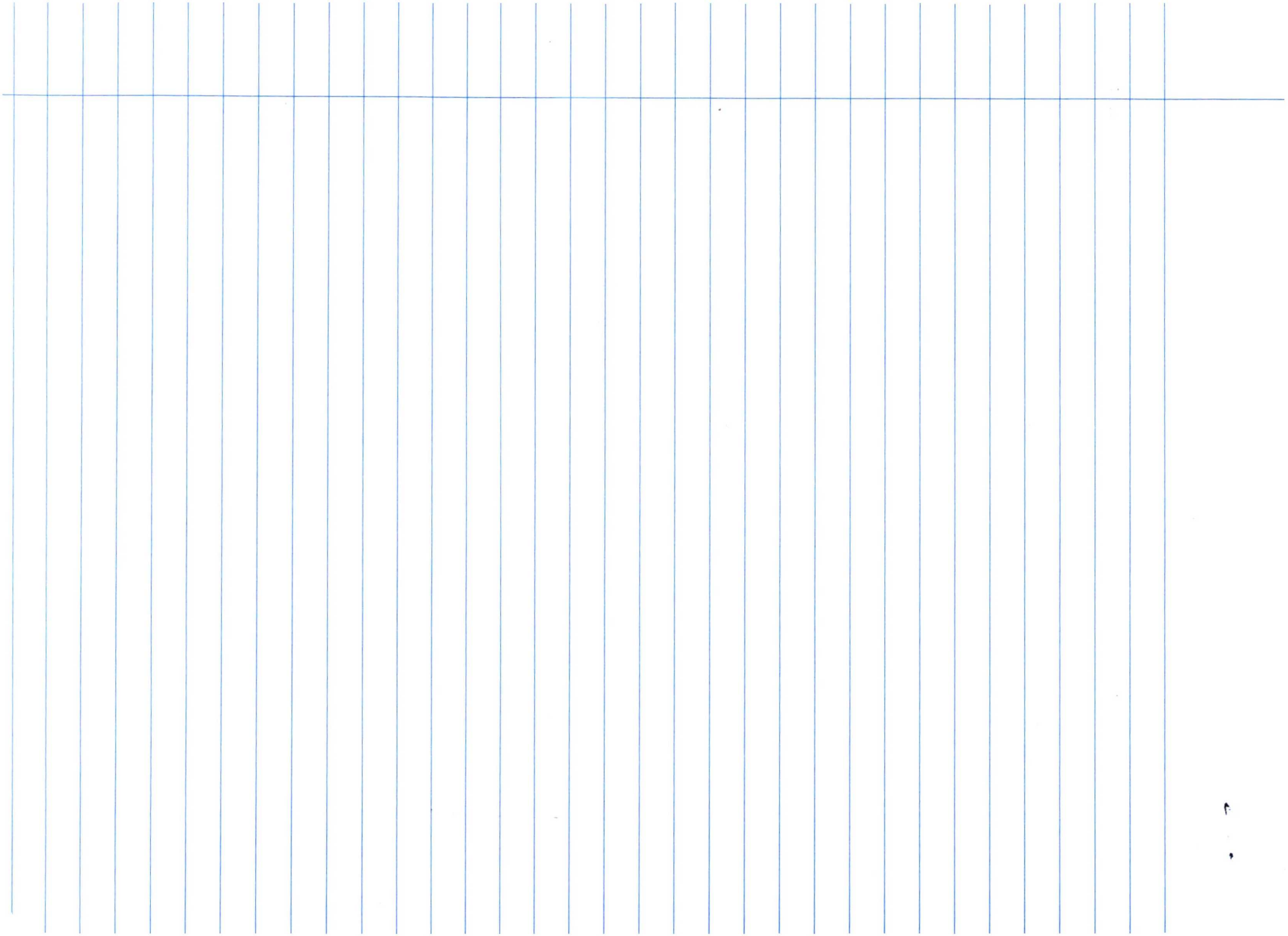
STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	1:45	1544.8				1544.8		3811.6
	1:50	1629.1	0.9	259.2	3.458	1625.6	7.56	3878.7
	1:55	1662.2	1.8	259.2	3.458	1658.7	7.56	3909.8
	2:00	1687.7	2.8	288.0	4.202	1683.5	8.40	3931.6
				268.8				
2	2:05	1774.7	4.7	547.2	13.776	1760.9	15.96	4007.9
	2:10	1816.9	6.6	547.2	13.776	1803.1	15.96	4048.6
	2:15	1842.5	8.5	547.2	13.776	1828.7	15.96	4078.6
3				547.2				
	2:20	1924.4	11.6	892.8	34.076	1890.3	26.04	4143.2
	2:25	1957.6	14.7	892.8	34.076	1923.5	26.04	4180.3
	2:30	1984.5	17.8	892.8	34.076	1950.4	26.04	4208.7
4				892.8				
	2:35	2052.4	22.2	1267.2	65.135	1987.3	36.96	4257.4
	2:40	2071.6	26.6	1267.2	65.135	2006.5	36.96	4288.6
	2:45	2087.1	31.0	1267.2	65.135	2022.0	36.96	4313.5
5				1267.2				
	2:50	2171.7	36.8	1670.4	108.585	2063.1	48.72	4352.3
	2:55	2189.6	42.7	1699.2	112.074	2077.5	49.56	4380.1
	3:00	2206.3	48.5	1670.4	108.585	2097.7	48.72	4403.9
6				1680.0				
	3:05	2275.6	55.6	2044.8	157.854	2117.7	59.64	4437.9
	3:10	2297.5	62.8	2073.6	161.992	2135.5	60.48	4463.5
	3:15	2314.4	69.8	2016.0	153.766	2160.6	58.80	4487.4
				2044.8				

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	3:16	2161.8				2161.8		4476.7
	3:17	2147.7				2147.7		4472.0
	3:18	2145.2				2145.2		4468.9
	3:19	2141.4				2141.4		4465.1
	3:20	2138.9				2138.9		4462.7
	3:25	2125.0				2125.0		4447.9
	3:30	2115.0				2115.0		4433.6

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
- BOTTOM HOLE PRESSURE AT 4872 FEET

GREENHILL PETROLEUM CORPORATION
 LOVINGTON SAN ANDRES UNIT NO. 9
 LEA COUNTY, NEW MEXICO
 STEP RATE INJECTION TEST
 DECEMBER 13, 1994





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WEST-TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 13, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 10
LEA COUNTY, NEW MEXICO

WO#: 94-14-2136

OPEN HOLE 4600-5112

PACKER DEPTH = 4560

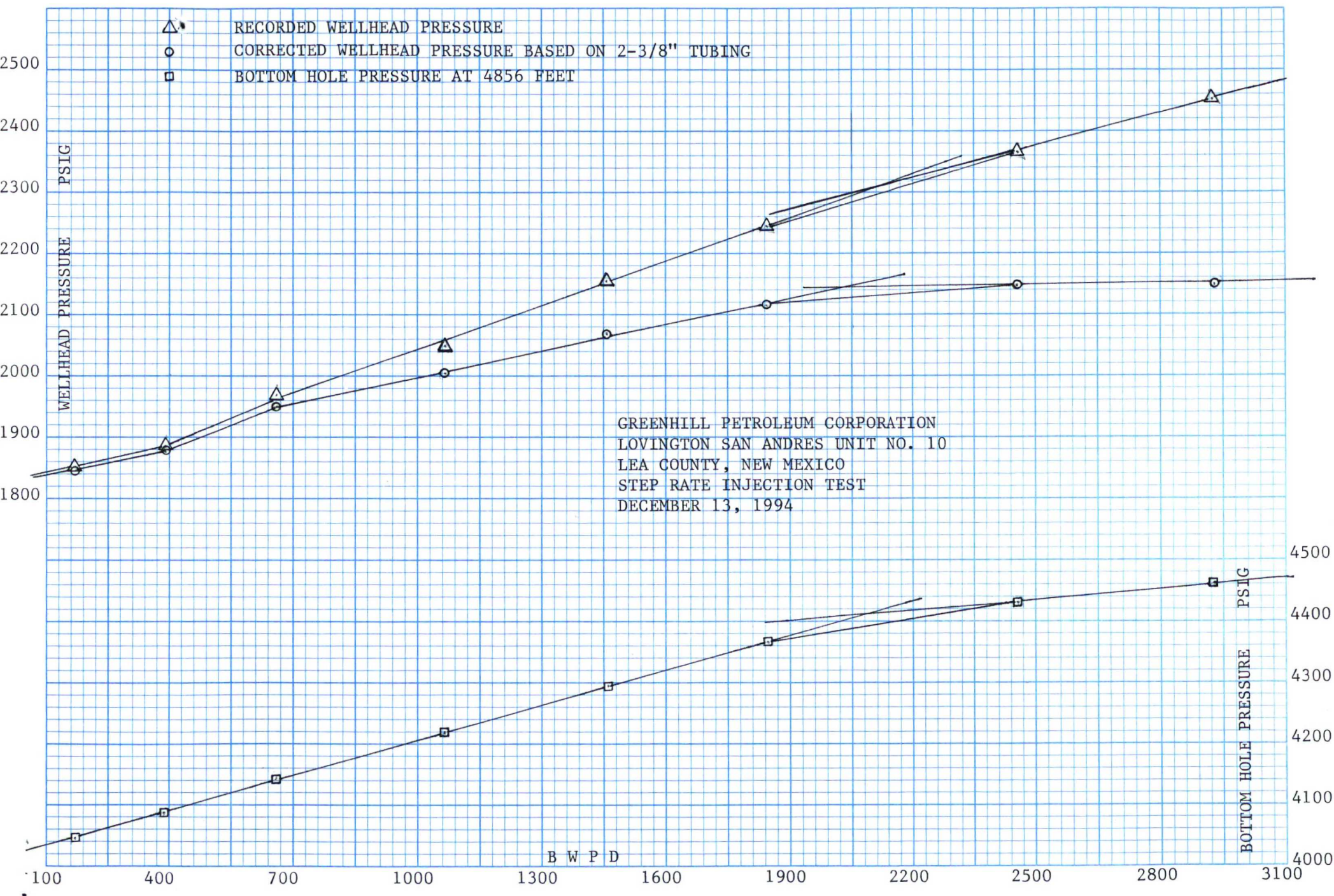
BHP GAUGE DEPTH = 4856

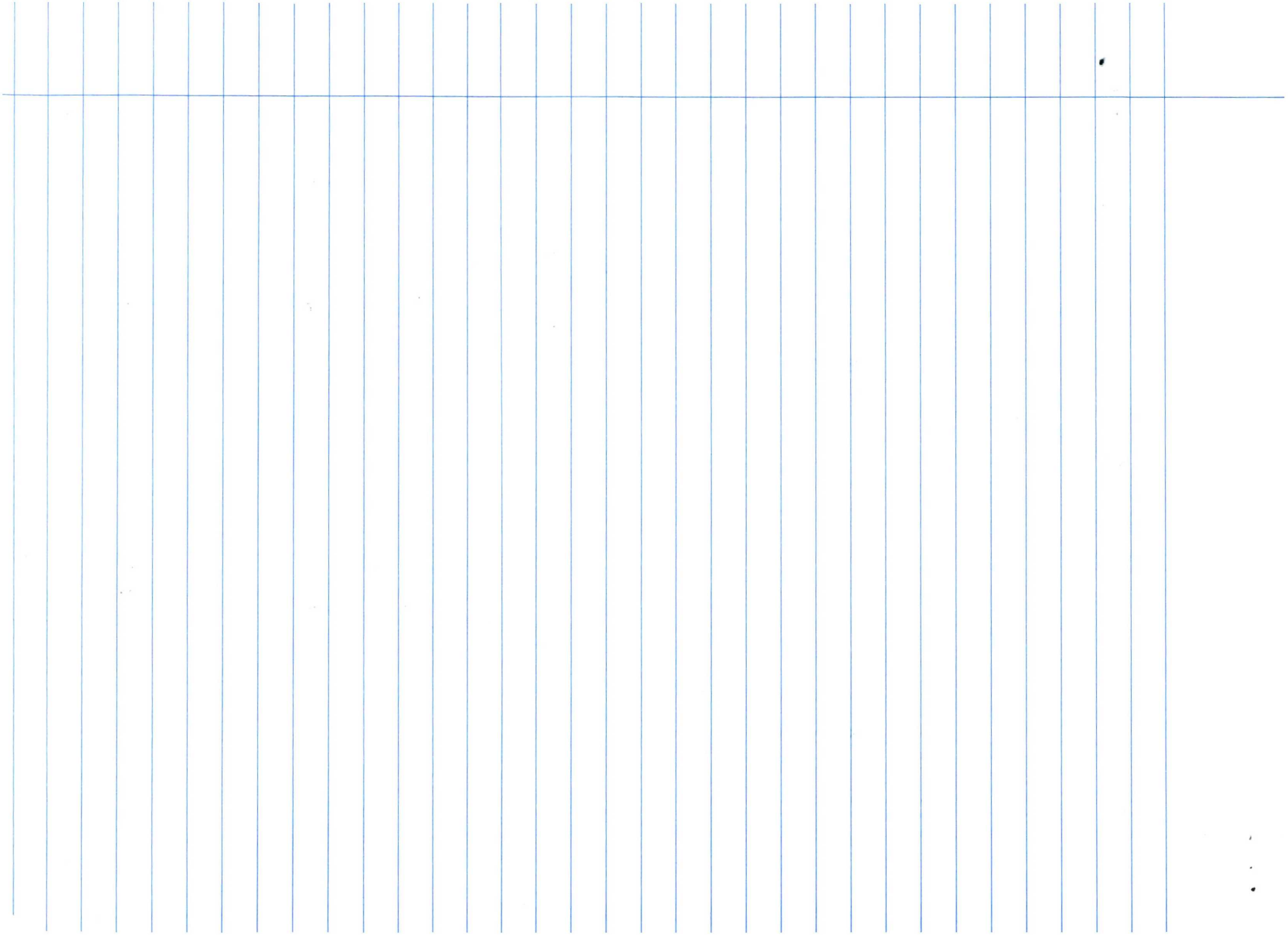
STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	9:25	1821.6				1821.6		4010.0
	9:30	1847.1	0.5	144.0	1.162	1845.9	4.20	4027.1
	9:35	1849.5	1.1	172.8	1.628	1847.9	5.04	4035.1
	9:40	1850.6	1.8	201.6	2.165	1848.4	5.88	4042.1
				172.8				
2	9:45	1867.0	3.1	374.4	6.804	1860.2	10.92	4062.1
	9:50	1879.6	4.5	403.2	7.804	1871.8	11.76	4075.6
	9:55	1883.2	5.9	403.2	7.804	1875.4	11.76	4086.1
3				393.6				
	10:00	1934.1	8.2	662.4	19.552	1914.5	19.32	4112.7
	10:05	1945.4	10.5	662.4	19.552	1925.8	19.32	4129.4
	10:10	1968.1	12.8	662.4	19.552	1948.5	19.32	4144.3
4				662.4				
	10:15	2025.4	16.5	1065.6	47.116	1978.3	31.08	4179.1
	10:20	2037.9	20.2	1065.6	47.116	1990.8	31.08	4201.4
	10:25	2049.2	23.9	1065.6	47.116	2002.1	31.08	4218.7
5				1065.6				
	10:30	2128.4	29.0	1468.8	85.311	2043.1	42.84	4255.2
	10:35	2146.2	34.0	1440.0	82.242	2064.0	42.00	4278.1
	10:40	2156.3	39.1	1468.8	85.311	2071.0	42.84	4296.1
6				1459.2				
	10:45	2212.6	45.5	1843.2	129.847	2082.8	53.76	4326.2
	10:50	2226.7	51.9	1843.2	129.847	2096.9	53.76	4347.1
	10:55	2243.3	58.3	1843.2	129.847	2113.5	53.76	4362.8
7				1843.2				
	11:00	2347.0	66.8	2448.0	219.495	2127.5	71.40	4397.0
	11:05	2364.9	75.4	2476.8	224.296	2140.6	72.24	4418.0
	11:10	2367.3	83.9	2448.0	219.495	2147.8	71.40	4432.0
				2457.6				

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)
8 FALLOFF	11:15	2457.0	94.0	2908.8	301.991	2155.0	84.84	4450.2
	11:20	2453.1	104.2	2937.6	307.546	2145.6	85.68	4455.2
	11:25	2453.1	114.4	2937.6 2928.0	307.546	2145.6	85.68	4460.1
	11:26	2132.6				2132.6		4429.9
	11:27	2135.1				2135.1		4417.5
	11:28	2126.2				2126.2		4406.6
	11:29	2118.5				2118.5		4399.6
	11:30	2112.1				2112.1		4392.2
	11:35	2090.2				2090.2		4366.2

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
- BOTTOM HOLE PRESSURE AT 4856 FEET

GREENHILL PETROLEUM CORPORATION
 LOVINGTON SAN ANDRES UNIT NO. 10
 LEA COUNTY, NEW MEXICO
 STEP RATE INJECTION TEST
 DECEMBER 13, 1994





WEST - TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY
Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 12, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 11
LEA COUNTY, NEW MEXICO

WO#: 94-14-2131

PERFS = 4575-5130

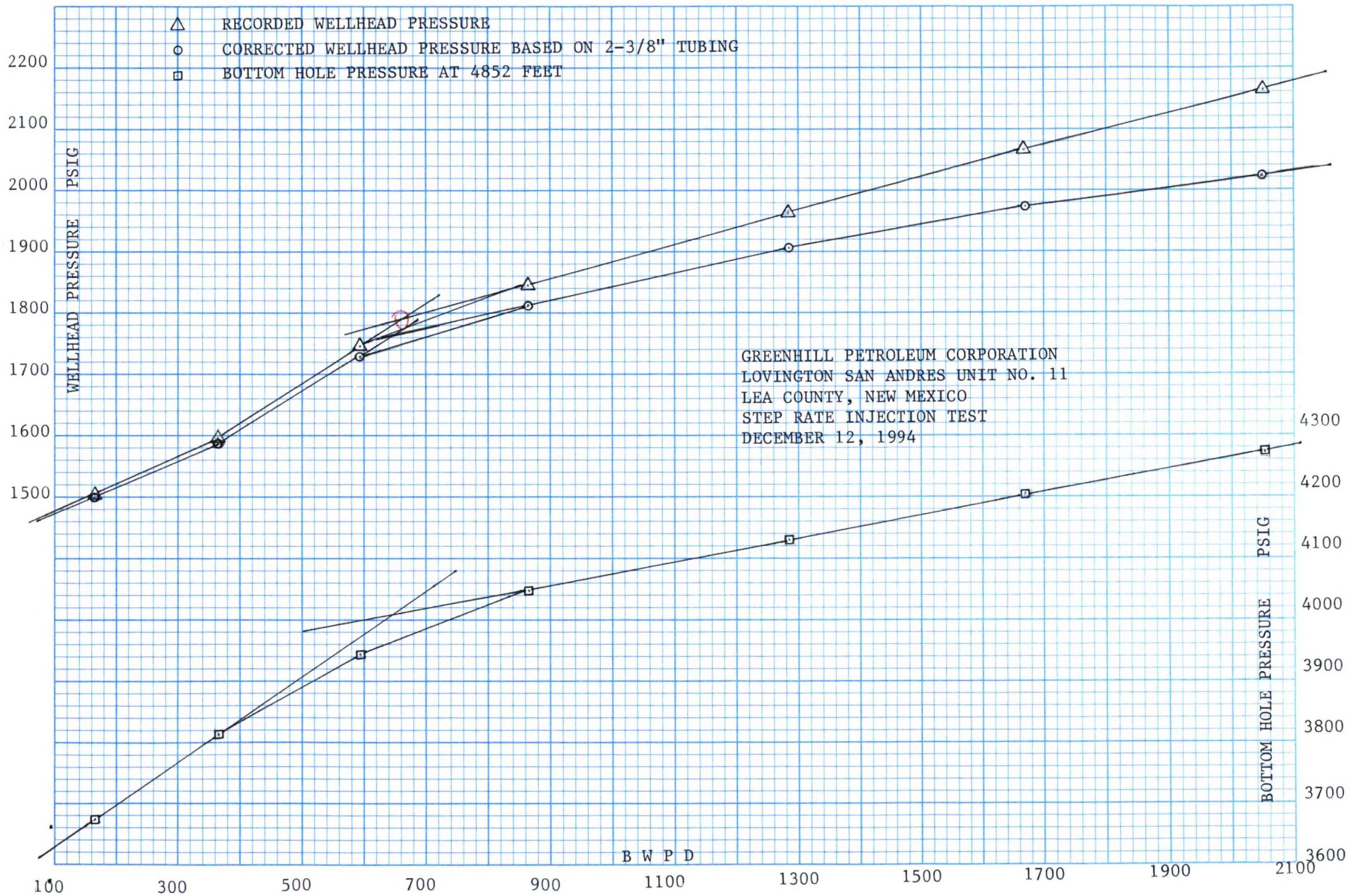
PACKER DEPTH = 4524

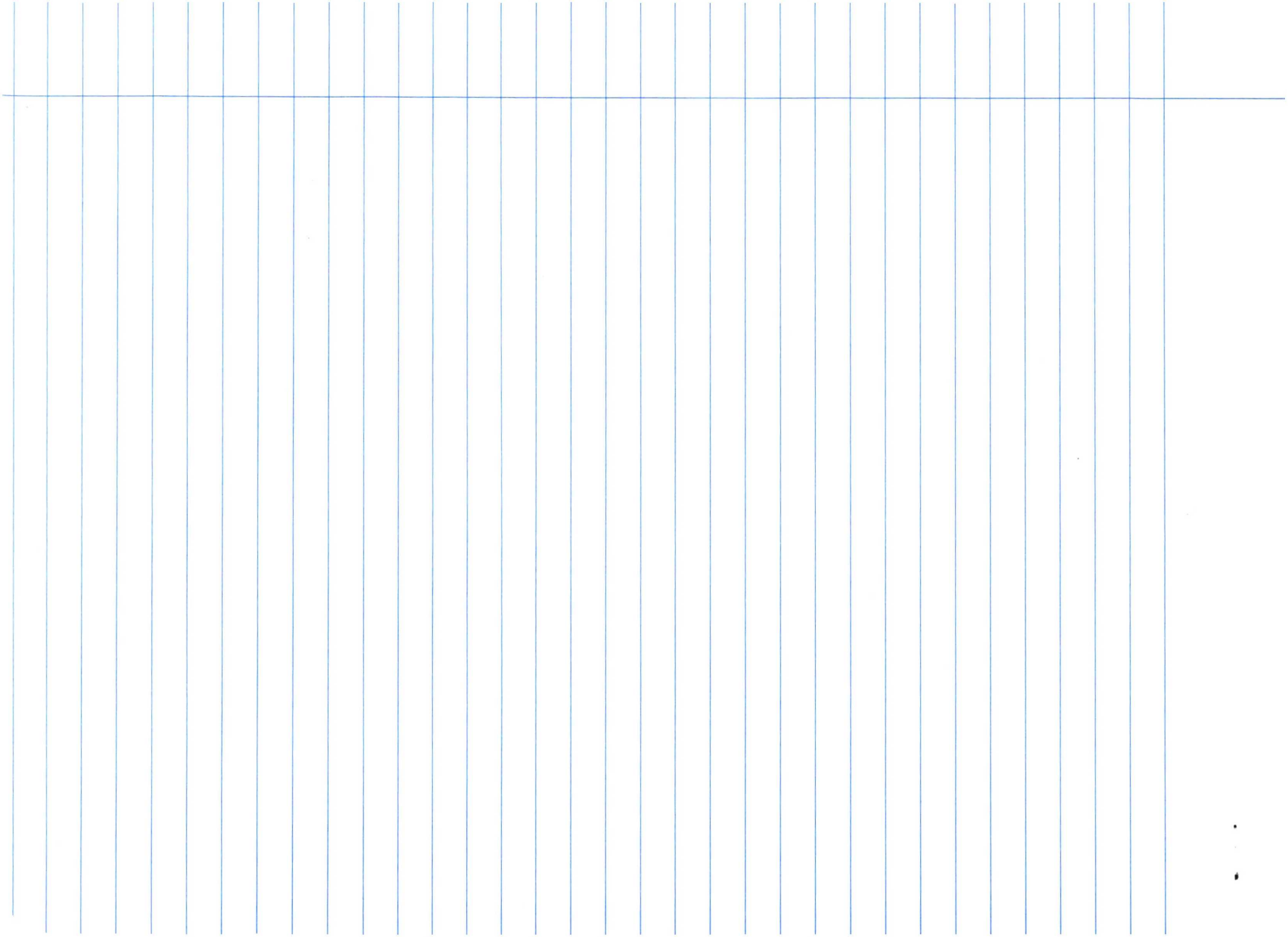
BHP GAUGE DEPTH = 4852

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	10:10	1352.0				1352.0		3547.2
	10:15	1453.1	0.6	172.8	1.431	1451.7	5.04	3635.6
	10:20	1456.9	1.1	144.0	1.022	1455.9	4.20	3661.5
	10:25	1501.6	1.7	172.8	1.431	1500.2	5.04	3676.7
				163.2				
2	10:30	1564.3	3.0	374.4	5.984	1558.3	10.92	3761.9
	10:35	1595.0	4.2	345.6	5.161	1589.8	10.08	3793.6
	10:40	1596.1	5.5	374.4	5.984	1590.1	10.92	3817.2
3				364.8				
	10:45	1703.6	7.6	604.8	14.532	1689.1	17.64	3891.3
	10:50	1726.7	9.6	576.0	13.277	1713.4	16.80	3921.3
	10:55	1745.9	11.7	604.8	14.532	1731.4	17.64	3941.9
4				595.2				
	11:00	1811.2	14.7	864.0	28.112	1783.1	25.20	4004.3
	11:05	1827.8	17.7	864.0	28.112	1799.7	25.20	4026.8
	11:10	1841.8	20.7	864.0	28.112	1813.7	25.20	4044.2
5				864.0				
	11:15	1923.7	25.2	1296.0	59.519	1864.2	37.80	4096.4
	11:20	1944.1	29.6	1267.2	57.095	1887.0	36.96	4114.6
	11:25	1963.2	34.1	1296.0	59.519	1903.7	37.80	4132.6
				1286.4				
6	11:30	2034.9	39.8	1641.6	92.168	1942.7	47.88	4169.2
	11:35	2047.6	45.7	1699.2	98.239	1949.4	49.56	4187.7
	11:40	2069.4	51.5	1670.4	95.181	1974.2	48.72	4204.5
				1670.4				
7	11:45	2138.6	58.6	2044.8	138.369	2000.2	59.64	4235.4
	11:50	2148.7	65.7	2044.8	138.369	2010.3	59.64	4255.5
	11:55	2162.8	72.9	2073.6	141.996	2020.8	60.48	4273.5
				2054.4				

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	11:56	1984.6				1984.6		4248.0
	11:57	1974.3				1974.3		4242.0
	11:58	1967.9				1967.9		4236.9
	11:59	1962.8				1962.8		4231.1
	12:00	1958.9				1958.9		4226.5
	12:05	1940.9				1940.9		4203.0
	12:10	1924.2				1924.2		4181.1

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





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

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 14, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 15
LEA COUNTY, NEW MEXICO

WO#: 94-14-2169

PERFS = 4531-5110

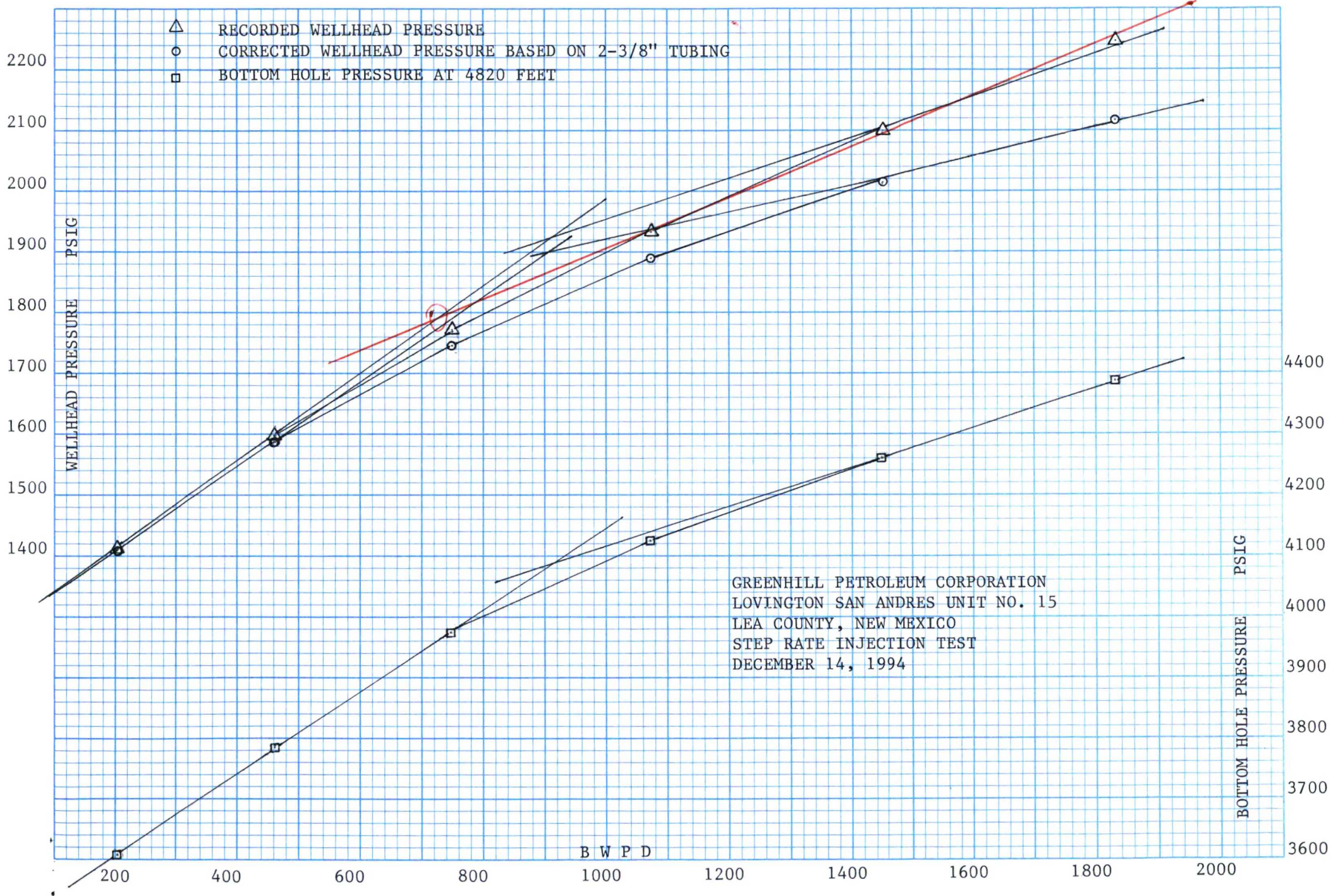
PACKER DEPTH = 4407

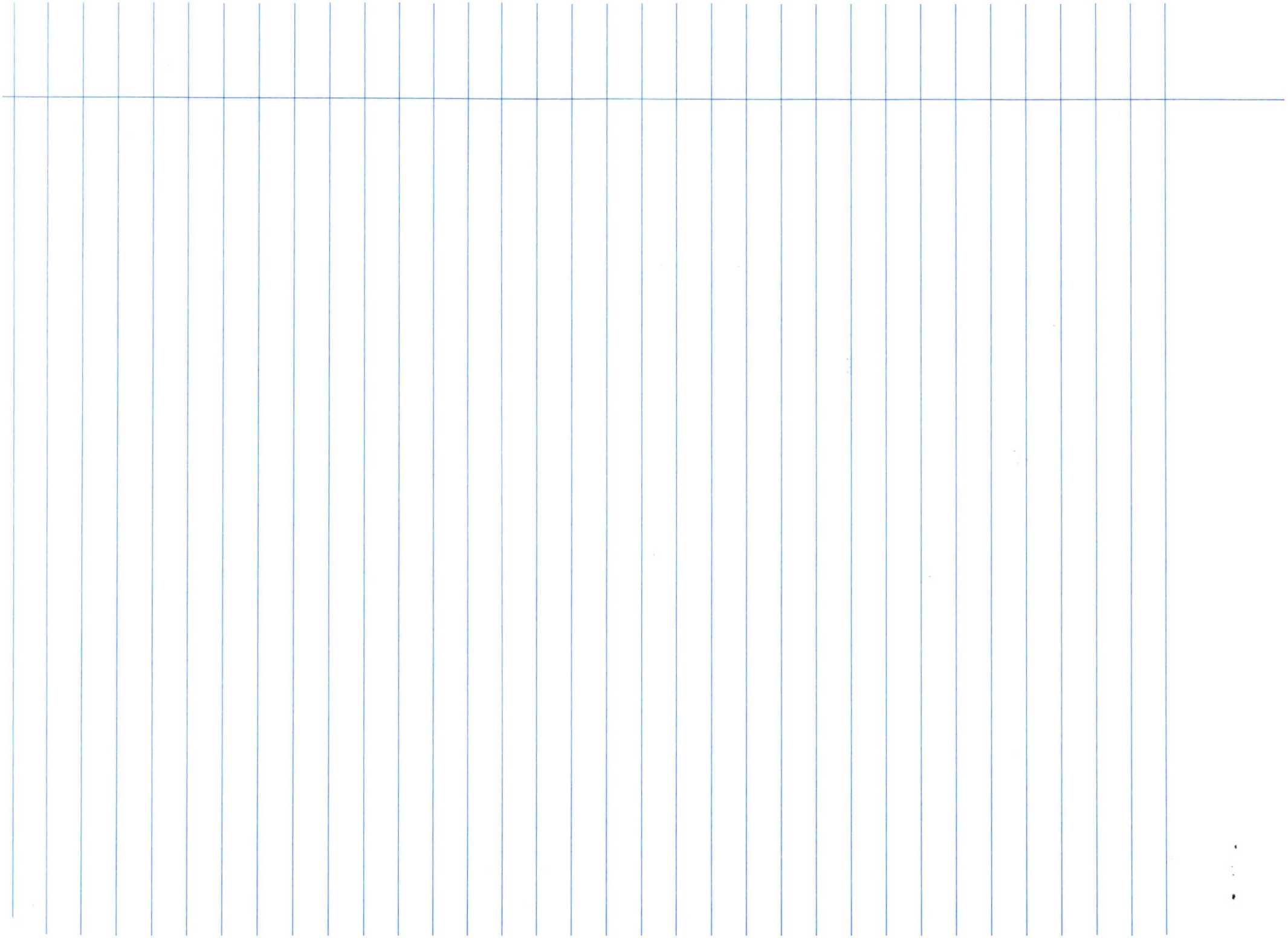
BHP GAUGE DEPTH = 4820

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	8:40	1263.2				1263.2		3462.0
	8:45	1376.9	0.7	201.6	2.149	1374.8	5.88	3559.3
	8:50	1411.2	1.4	201.6	2.149	1409.1	5.88	3587.0
	8:55	1414.8	2.1	201.6	2.149	1412.7	5.88	3606.4
				201.6				
2	9:00	1533.7	3.7	460.8	9.917	1523.8	13.44	3713.9
	9:05	1562.9	5.3	460.8	9.917	1553.0	13.44	3759.8
	9:10	1598.6	6.9	460.8	9.917	1588.7	13.44	3791.0
3				460.8				
	9:15	1697.0	9.5	748.8	24.348	1672.7	21.84	3897.1
	9:20	1737.8	12.1	748.8	24.348	1713.5	21.84	3942.6
	9:25	1768.4	14.7	748.8	24.348	1744.1	21.84	3974.9
				748.8				
4	9:30	1866.8	18.4	1065.6	46.767	1820.0	31.08	4051.6
	9:35	1912.8	22.2	1094.4	49.132	1863.7	31.92	4091.7
	9:40	1937.0	25.9	1065.6	46.767	1890.2	31.08	4123.5
				1075.2				
5	9:45	2032.9	31.0	1468.8	84.678	1948.2	42.84	4187.8
	9:50	2068.6	36.0	1440.0	81.632	1987.0	42.00	4227.7
	9:55	2098.0	41.0	1440.0	81.632	2016.4	42.00	4259.8
				1449.6				
6	10:00	2191.5	47.4	1843.2	128.885	2062.6	53.76	4316.7
	10:05	2223.5	53.8	1843.2	128.885	2094.6	53.76	4355.9
	10:10	2244.0	60.1	1814.4	125.184	2118.8	52.92	4387.6
				1833.6				

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)
FALLOFF	10:11	2088.8				2088.8		4355.4
	10:12	2082.4				2082.4		4336.9
	10:13	2067.0				2067.0		4321.1
	10:14	2054.1				2054.1		4308.0
	10:15	2042.6				2042.6		4296.4
	10:20	1992.5				1992.5		4240.6
	10:25	1948.9				1948.9		4193.5

- △ RECORDED WELLHEAD PRESSURE
○ CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
□ BOTTOM HOLE PRESSURE AT 4820 FEET





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

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 14, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 21
LEA COUNTY, NEW MEXICO

WO#: 94-14-2170

PERFS = 4570-5032

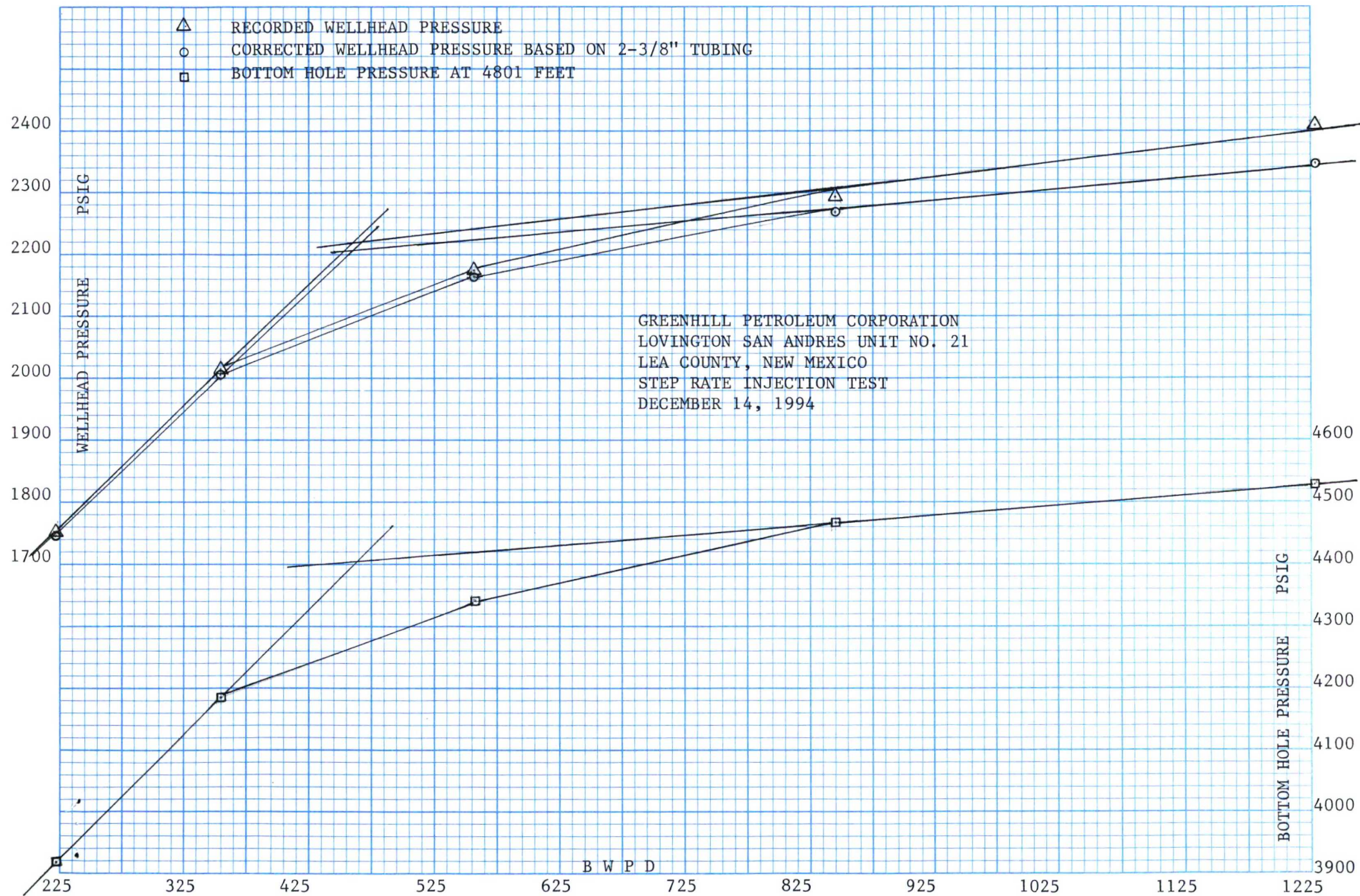
PACKER DEPTH = 4521

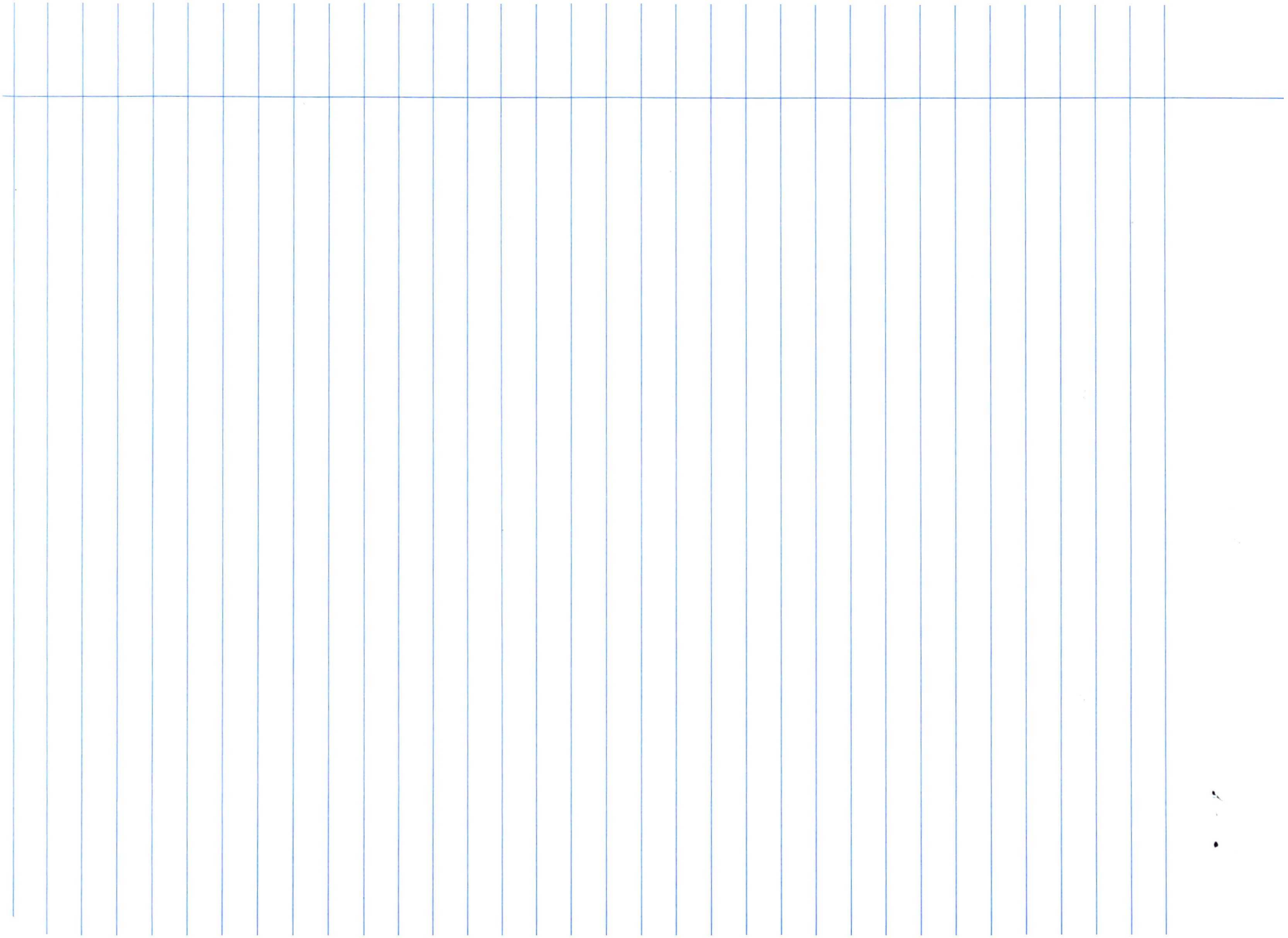
BHP GAUGE DEPTH = 4801

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	11:45	1310.0				1310.0		3496.4
	11:50	1641.4	0.9	259.2	3.407	1638.0	7.56	3828.7
	11:55	1693.7	1.6	201.6	2.140	1691.6	5.88	3886.8
	12:00	1751.2	2.3	201.6	2.140	1749.1	5.88	3919.7
2				220.8				
	12:05	1884.3	3.5	345.6	5.801	1878.5	10.08	4069.4
	12:10	1976.4	4.8	374.4	6.727	1969.7	10.92	4143.6
	12:15	2016.0	6.0	345.6	5.801	2010.2	10.08	4183.2
3				355.2				
	12:20	2113.4	7.9	547.2	13.575	2099.8	15.96	4278.1
	12:25	2149.2	9.9	576.0	14.927	2134.3	16.80	4315.3
	12:30	2176.2	11.8	547.2	13.575	2162.6	15.96	4340.8
4				556.8				
	12:35	2246.6	14.7	835.2	29.682	2216.9	24.36	4404.3
	12:40	2274.8	17.7	864.0	31.603	2243.2	25.20	4429.1
	12:45	2295.3	20.6	835.2	29.682	2265.6	24.36	4453.8
5				844.8				
	12:50	2369.6	24.9	1238.4	61.513	2308.1	36.12	4505.7
	12:55	2394.0	29.1	1209.6	58.893	2335.1	35.28	4529.7
	1:00	2408.0	33.4	1238.4	61.513	2346.5	36.12	4544.7
FALLOFF				1228.8				
	1:01	2314.4				2314.4		4513.5
	1:02	2310.6				2310.6		4499.9
	1:03	2299.0				2299.0		4489.8
	1:04	2291.3				2291.3		4480.7
	1:05	2283.6				2283.6		4473.6
	1:10	2251.4				2251.4		4440.8
	1:15	2225.6				2225.6		4414.1

- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
- BOTTOM HOLE PRESSURE AT 4801 FEET

GREENHILL PETROLEUM CORPORATION
 LOVINGTON SAN ANDRES UNIT NO. 21
 LEA COUNTY, NEW MEXICO
 STEP RATE INJECTION TEST
 DECEMBER 14, 1994





WEST-TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY
Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 15, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 58
LEA COUNTY, NEW MEXICO

WO#: 94-14-2179

OPEN HOLE 4570-5070

PACKER DEPTH = 4523

BHP GAUGE DEPTH = 4820

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	12:05	1752.1				1752.1		3956.2
	12:10	1788.0	0.8	230.4	2.751	1785.2	6.72	3971.5
	12:15	1803.5	1.6	230.4	2.751	1800.7	6.72	3975.2
	12:20	1814.6	2.4	230.4	2.751	1811.8	6.72	3980.8
2				230.4				
	12:25	1857.4	3.9	432.0	8.801	1848.6	12.60	4015.0
	12:30	1861.3	5.4	432.0	8.801	1852.5	12.60	4031.6
	12:35	1883.1	6.9	432.0	8.801	1874.3	12.60	4044.1
3				432.0				
	12:40	1930.6	9.3	691.2	20.997	1909.6	20.16	4083.2
	12:45	1948.5	11.7	691.2	20.997	1927.5	20.16	4101.4
	12:50	1969.1	14.1	691.2	20.997	1948.1	20.16	4131.6
4				691.2				
	12:55	2022.9	17.9	1094.4	49.132	1973.8	31.92	4160.6
	1:00	2035.7	21.5	1036.8	44.456	1991.2	30.24	4185.6
	1:05	2051.2	25.2	1065.6	46.767	2004.4	31.08	4207.4
5				1065.6				
	1:10	2121.7	30.3	1468.8	84.678	2037.0	42.84	4249.4
	1:15	2142.2	35.4	1468.8	84.678	2057.5	42.84	4273.7
	1:20	2151.2	40.3	1411.2	78.638	2072.6	41.16	4291.5
6				1449.6				
	1:25	2219.2	46.8	1872.0	132.635	2086.6	54.60	4323.3
	1:30	2235.9	53.2	1843.2	128.885	2107.0	53.76	4343.0
	1:35	2243.6	59.7	1872.0	132.635	2111.0	54.60	4358.8
				1862.4				

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	1:36	2083.4				2083.4		4321.2
	1:37	2074.4				2074.4		4315.3
	1:38	2069.3				2069.3		4309.1
	1:39	2064.1				2064.1		4303.6
	1:40	2059.0				2059.0		4298.2
	1:45	2037.2				2037.2		4275.0
	1:50	2021.8				2021.8		4255.4

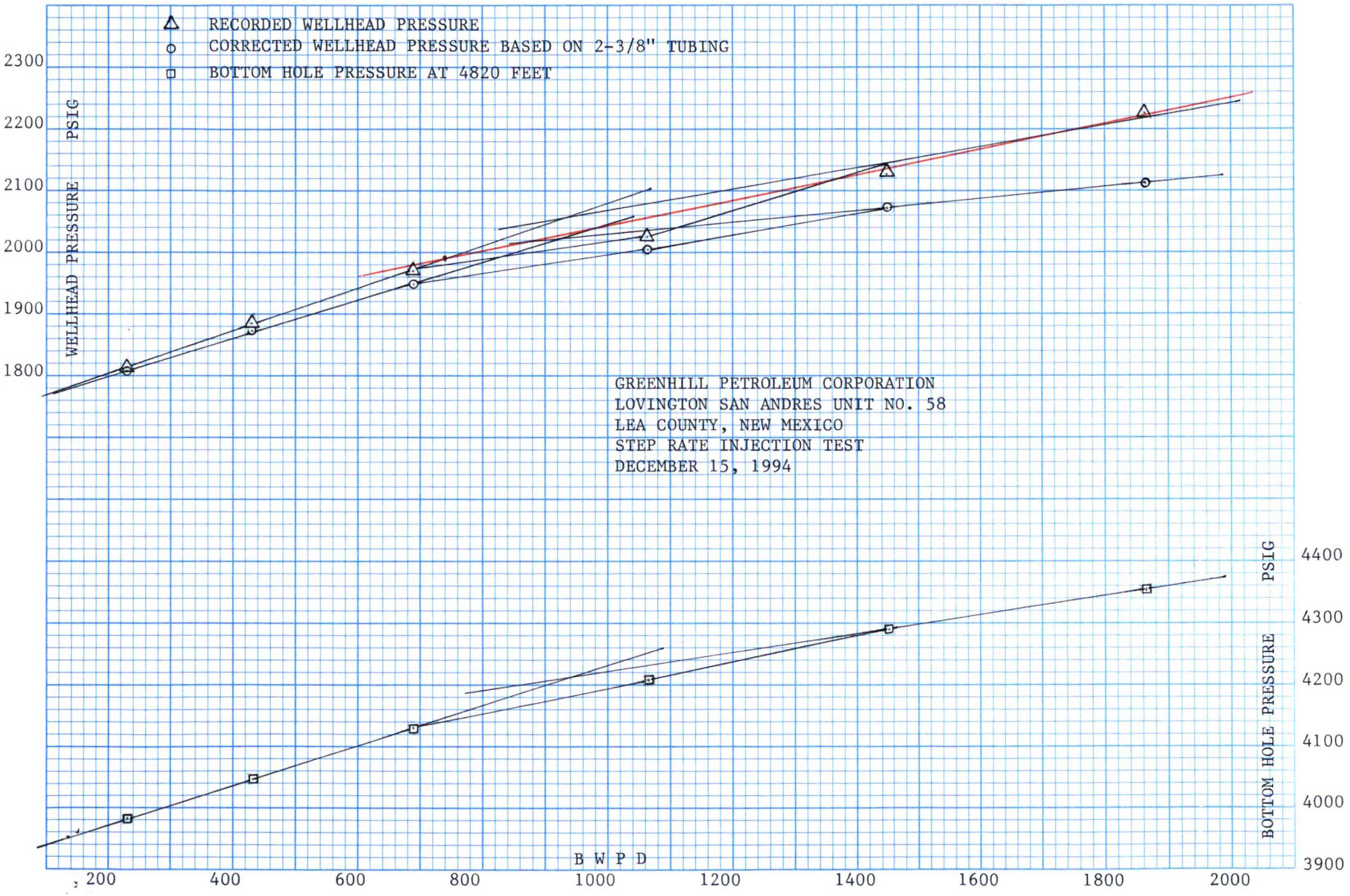
- △ RECORDED WELLHEAD PRESSURE
- CORRECTED WELLHEAD PRESSURE BASED ON 2-3/8" TUBING
- BOTTOM HOLE PRESSURE AT 4820 FEET

WELLHEAD PRESSURE
PSIG

GREENHILL PETROLEUM CORPORATION
LOVINGTON SAN ANDRES UNIT NO. 58
LEA COUNTY, NEW MEXICO
STEP RATE INJECTION TEST
DECEMBER 15, 1994

BOTTOM HOLE PRESSURE
PSIG

B W P D



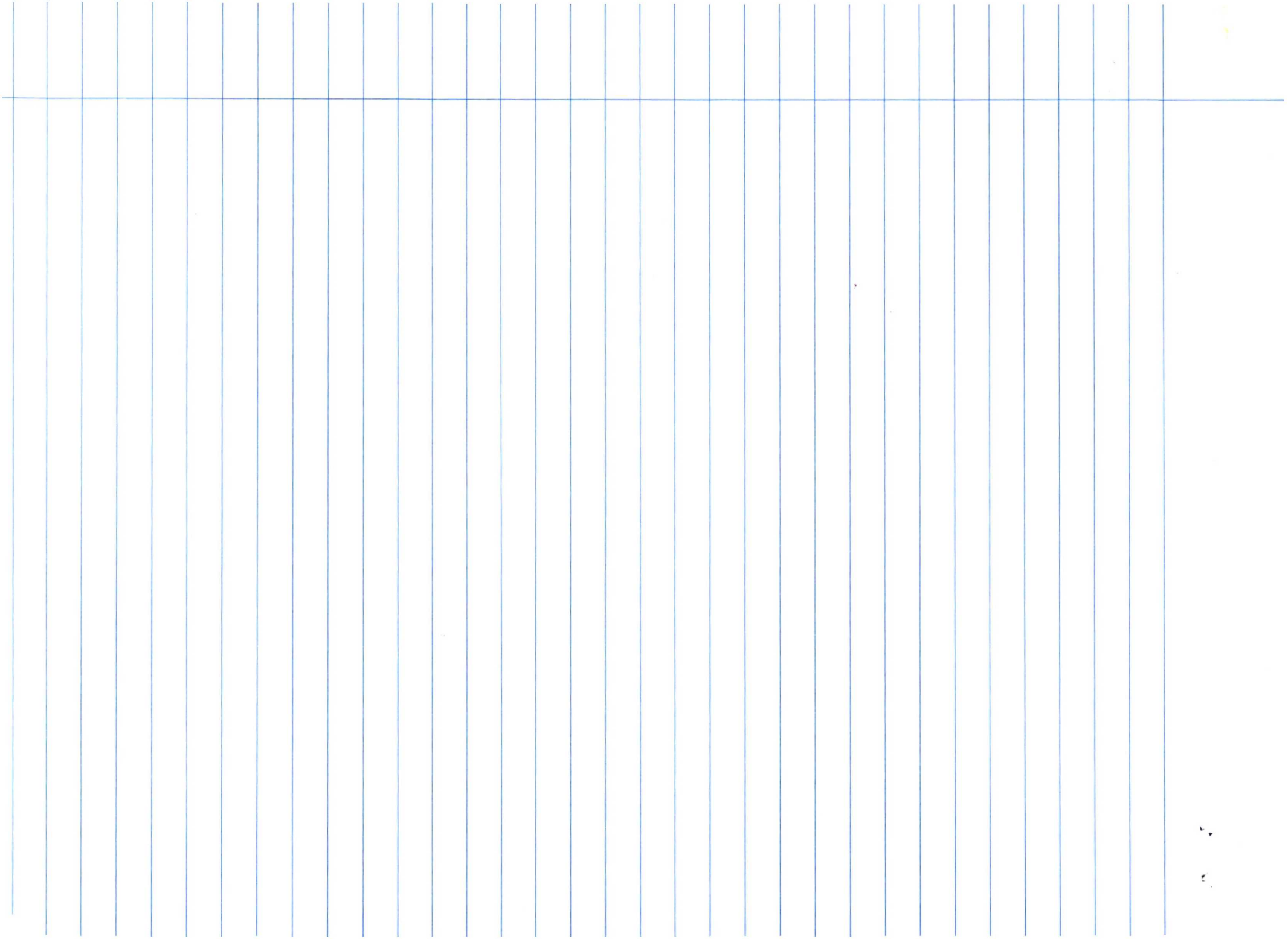


TABLE 1

Lovington San Andres Unit

WELL	#	Current Maximum Injection Pressure	Requested Maximum Injection Pressure
LSAU	8	1750	2000 — 1970
LSAU	9	1730	1980 - 1930
LSAU	10	1800	2000 - 2000
LSAU	11	1480	1780 - 1740
LSAU	15	1505	1900 - 1740
LSAU	21	914	2000
LSAU	58	1750	2000 - 1940

WFX-632- 8, 11
 6/15, 9, 21,
 R-9431 10, 15, 58
 Core 10/15