



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

PMX-176

PDEV00207 00176

March 10, 1995

Phillips Petroleum Company
4001 Penbrook
Odessa, Texas 79762

Attn: Mr. Keith H. Maberry

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

Dear Mr. Mayberry:

Reference is made to your request dated February 21, 1995 to increase the surface injection pressure on 4 wells in the above referenced waterflood project. This request is based on step rate tests conducted between February 13 and February 15, 1995. 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.

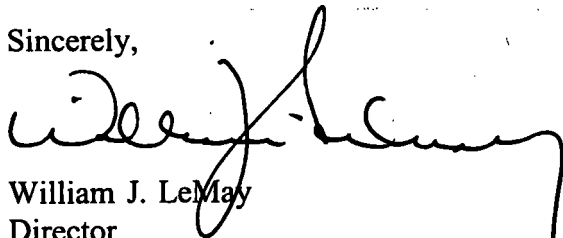
You are therefore authorized to increase the surface injection pressure on the following wells:

Well and Location	Maximum Surface Injection Pressure
East Vacuum Grayburg San Andres Unit Well No.383, Unit Letter M, Section 33	2070 PSIG
East Vacuum Grayburg San Andres Unit Well No.384, Unit Letter O, Section 32	2090 PSIG
East Vacuum Grayburg San Andres Unit Well No.385, Unit Letter P, Section 32	1660 PSIG
East Vacuum Grayburg San Andres Unit Well No.386, Unit Letter M, Section 32	1920 PSIG
All wells located Township 17 South, Range 35 East, Lea County, New Mexico.	

7
Injection Pressure Increase
Phillips Petroleum Company
March 10, 1995
Page 2

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

cc: Oil Conservation Division - Hobbs
Files: PMX-176; PSI-X 1st QTR 95

3rd



PHILLIPS PETROLEUM COMPANY

ODESSA, TEXAS 79762
4001 PENBROOK

EXPLORATION AND PRODUCTION GROUP
Permian Basin Region

February 21, 1995

N/R
OIL CONSERVATION DIVISION
RECEIVED

'95 FEB 24 AM 8 52

Request for Increased Injection Pressure
East Vacuum Grayburg San Andres Unit
Waterflood Project - Lea County, N M
NMOCD Administrative Order No. PMX-176

Mr. David R. Catanach
State of New Mexico
Energy, Minerals & Natural Resources Dept.
Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87504

Mr. Catanach,

Phillips Petroleum Company requests administrative approval to increase the maximum surface injection pressure to 1500 psig on East Vacuum Grayburg San Andres Unit Well Nos. 383, 384, 385, and 386, Lea County, New Mexico. Attached are recent injection step-rate tests submitted as proof that the requested injection pressure is below the formation parting pressure. The measured parting pressures are 2120 psig for well 383, 2140 psig for well 384, 1710 psig for well 385, and 1970 psig for well 386.

The subject wells were approved under NMOCD Administration Order No. PMX-176, on September 20, 1994. A copy of the Exhibit "A" of this Order is attached for your reference.

If you have any questions or require further information, please call me at (915) 368-1232

Sincerely,

Keith H. Maberry
Senior EOR Operations Engineer

383	2070
384	2090
385	1660
386	1920

CC: Mr. Jerry Sexton
NMOCD District 1
P. O. Box 1980
Hobbs, New Mexico 88240
Central Files

EXHIBIT "A"
DIVISION ORDER NO. PMX-176
EAST VACUUM GRAYBURG SAN ANDRES UNIT PRESSURE MAINTENANCE PROJECT
APPROVED ALTERNATE WATER/CO₂ INJECTION WELLS

<i>Well Name</i>	<i>Well No.</i>	<i>Location</i>	<i>Unit</i>	<i>S-T-R</i>
East Vacuum Grayburg San Andres Unit	383	1219'FSL & 1769'FWL	M	33-17S-35E
"	384	825'FSL & 2524'FEL	O	32-17S-35E
"	385	875'FSL & 1160'FEL	P	32-17S-35E
"	386	1310'FSL & 531'FWL	M	32-17S-35E
"	387	1440'FSL & 508'FWL	L	33-17S-35E

ALL IN LEA COUNTY, NEW MEXICO

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

STEP RATE INJECTION TEST

CLIENT: PHILLIPS PETROLEUM COMPANY

DATE: FEBRUARY 15, 1995

WELL NAME: EAST VACUUM GRAYBURG SAN ANDRES UNIT NO. 3345-383
LEA COUNTY, NEW MEXICO

WO#: 95-14-0204

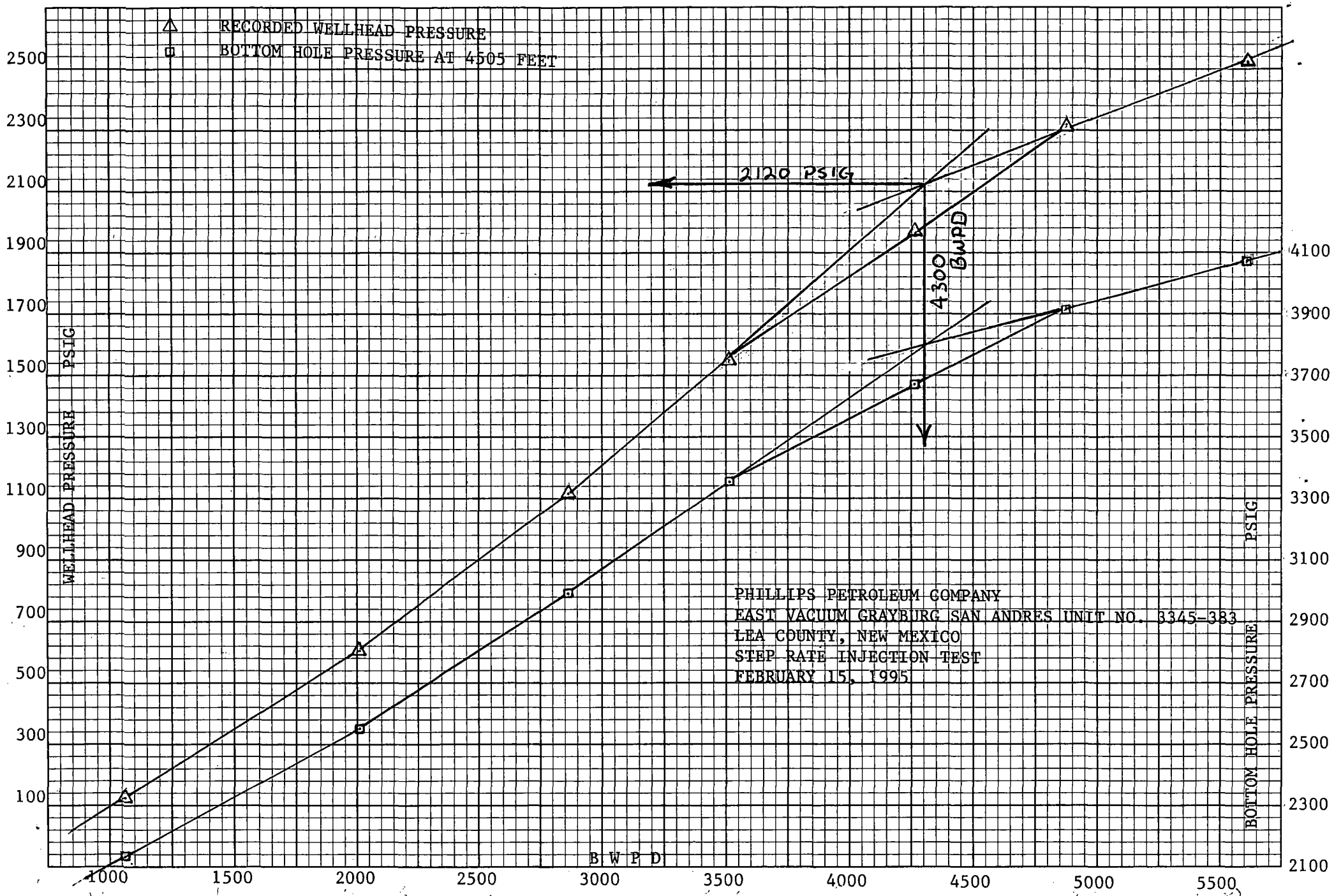
PERFS = 4478-4535

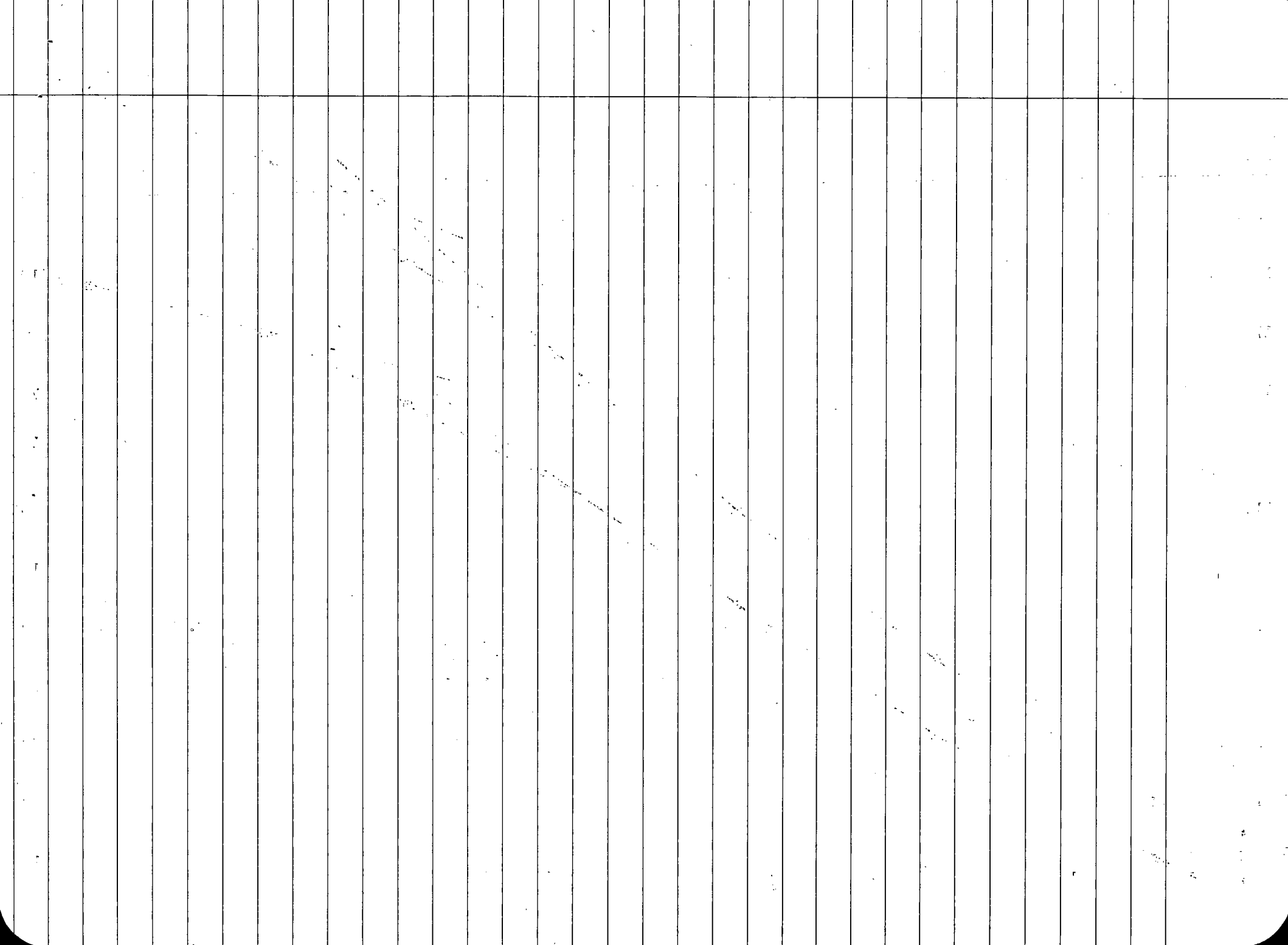
PACKER DEPTH = 4421

BHP GAUGE DEPTH = 4505

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	19.8				19.8		2044.0
	9:30	58.0	3.6	1036.8	15.568	42.4	30.24	2077.0
	9:35	102.5	7.3	1065.6	16.378	86.1	31.08	2115.0
	9:40	126.8	11.1	1094.4	17.206	109.6	31.92	2138.0
2				1065.6				
	9:45	474.1	18.1	2016.0	53.273	420.8	58.80	2416.0
	9:50	549.5	25.1	2016.0	53.273	496.2	58.80	2501.0
	9:55	605.8	32.0	1987.2	51.874	553.9	57.96	2552.0
3				2006.4				
	10:00	971.3	42.0	2880.0	103.057	868.2	84.00	2839.0
	10:05	1054.4	51.8	2822.4	99.276	955.1	82.32	2928.0
	10:10	1112.0	61.8	2880.0	103.057	1008.9	84.00	2988.0
4				2860.8				
	10:15	1389.8	74.1	3542.4	151.148	1238.7	103.32	3201.0
	10:20	1463.9	86.1	3456.0	144.398	1319.5	100.80	3277.0
	10:25	1541.7	98.3	3513.6	148.882	1392.8	102.48	3348.0
5				3504.0				
	10:30	1838.5	113.1	4262.4	212.844	1625.7	124.32	3547.0
	10:35	1911.3	128.0	4291.2	215.512	1695.8	125.16	3618.0
	10:40	1961.2	142.7	4233.6	210.191	1751.0	123.48	3669.0
6				4262.4				
	10:45	2233.0	159.8	4924.8	278.048	1955.0	143.64	3829.0
	10:50	2293.3	176.5	4809.6	266.135	2027.2	140.28	3886.0
	10:55	2317.7	193.5	4896.0	275.047	2042.7	142.80	3922.0
7				4876.8				
	11:00	2537.1	213.0	5616.0	354.520	2182.6	163.80	4023.0
	11:05	2544.9	232.3	5558.4	347.823	2197.1	162.12	4049.0
	11:10	2530.9	252.0	5673.6	361.276	2169.6	165.48	4075.0
				5616.0				

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)
TEST STOPPED DUE FALLOFF	11:11	1470.0		ON WELLHEAD**		1470.0		3630.0
	11:12	1245.9				1245.9		3405.0
	11:13	1098.7				1098.7		3255.0
	11:14	988.6				988.6		3143.0
	11:15	897.9				897.9		3051.0
	11:20	616.8				616.8		2766.0
	11:25	449.4				449.4		2596.0





WEST-TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY
Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: PHILLIPS PETROLEUM COMPANY

DATE: FEBRUARY 13, 1995

WELL NAME: EAST VACUUM GRAYBURG SAN ANDRES UNIT NO. 3202-384
LEA COUNTY, NEW MEXICO

WO#: 95-14-0201

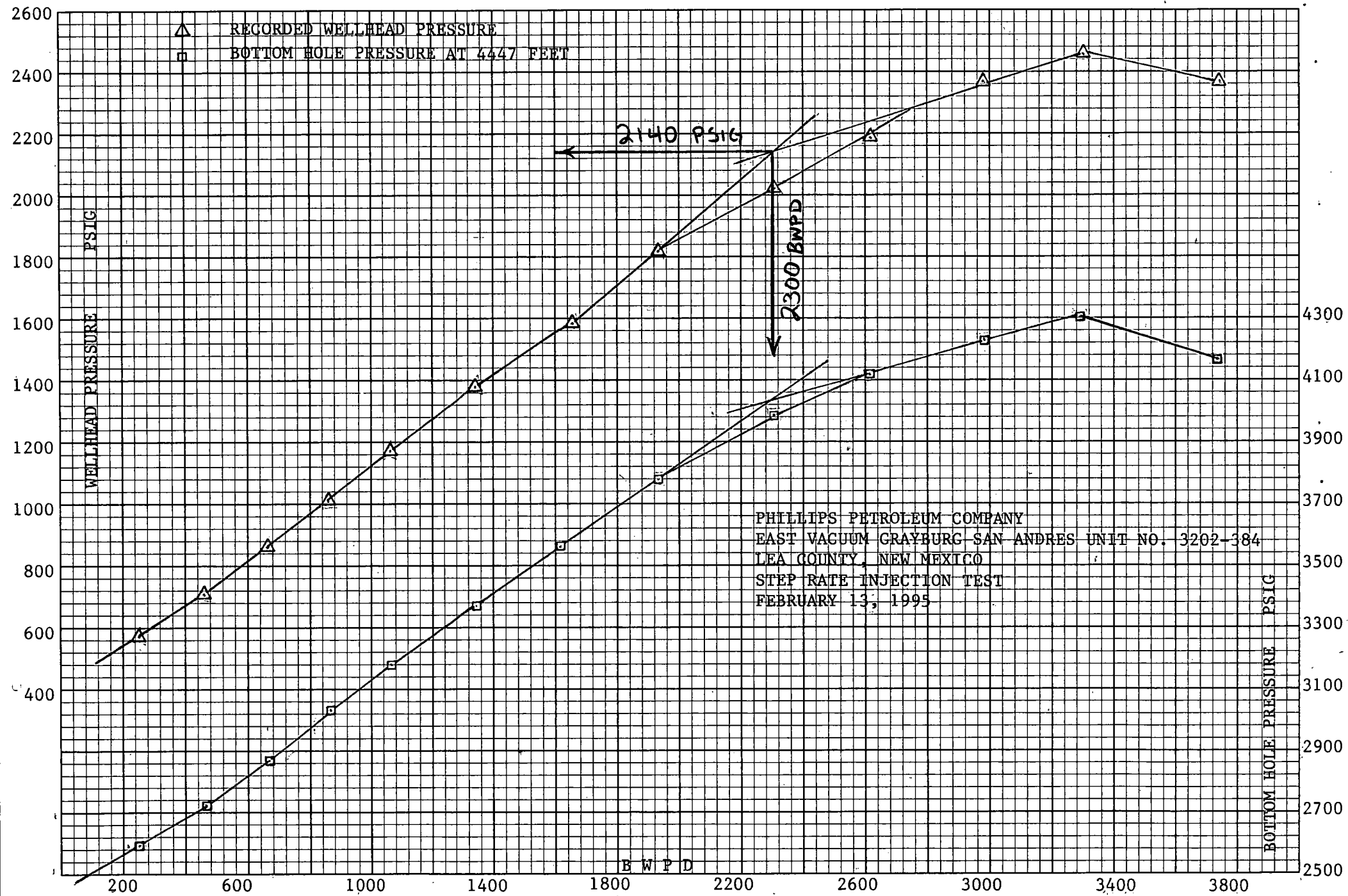
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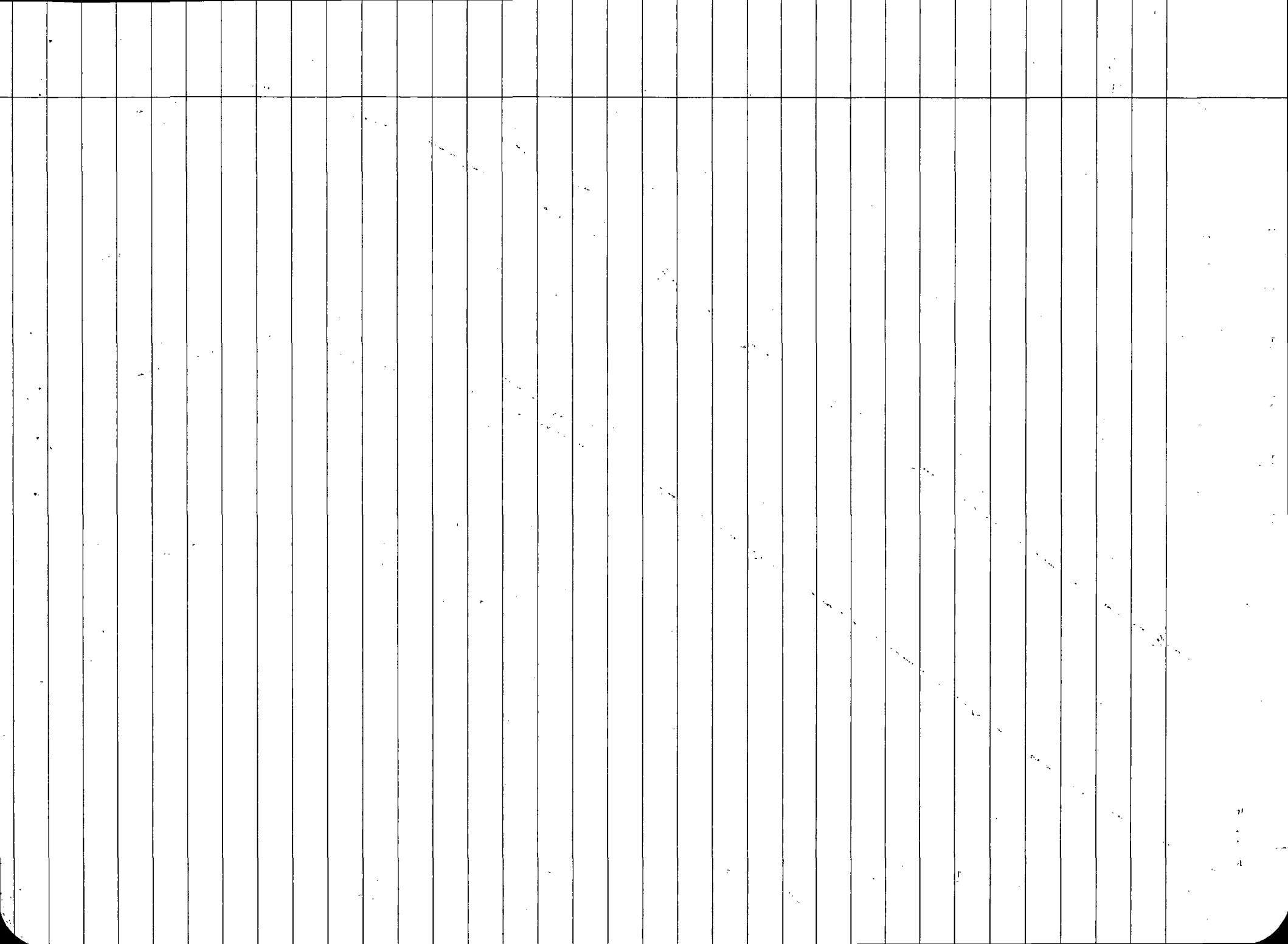
PACKER DEPTH = 4321

BHP GAUGE DEPTH = 4447

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	9:55	462.9				462.9		2476.0
	10:00	535.7	0.9	259.2	1.182	534.5	7.56	2548.0
	10:05	561.2	1.8	259.2	1.182	560.0	7.56	2575.0
	10:10	571.4	2.6	230.4	0.951	570.4	6.72	2591.0
2				249.6				
	10:15	649.3	4.2	460.8	3.428	645.9	13.44	2663.0
	10:20	667.1	5.8	460.8	3.428	663.7	13.44	2698.0
	10:25	713.1	7.4	460.8	3.428	709.7	13.44	2723.0
3				460.8				
	10:30	784.6	9.8	691.2	7.258	777.3	20.16	2797.0
	10:35	810.0	12.1	662.4	6.709	803.3	19.32	2838.0
	10:40	868.8	14.4	662.4	6.709	862.1	19.32	2868.0
4				672.0				
	10:45	940.2	17.5	892.8	11.654	928.5	26.04	2946.0
	10:50	988.7	20.5	864.0	10.968	977.7	25.20	2989.0
	10:55	1006.5	23.5	864.0	10.968	995.5	25.20	3023.0
5				873.6				
	11:00	1098.6	27.3	1094.4	16.984	1081.6	31.92	3100.0
	11:05	1142.0	30.9	1036.8	15.368	1126.6	30.24	3145.0
	11:10	1177.7	34.6	1065.6	16.167	1161.5	31.08	3181.0
6				1065.6				
	11:15	1289.0	39.3	1353.6	25.167	1263.8	39.48	3275.0
	11:20	1334.8	44.0	1353.6	25.167	1309.6	39.48	3327.0
	11:25	1378.0	48.7	1353.6	25.167	1352.8	39.48	3370.0
7				1353.6				
	11:30	1496.7	54.5	1670.4	37.136	1459.6	48.72	3472.0
	11:35	1550.1	60.2	1641.6	35.960	1514.1	47.88	3528.0
	11:40	1597.1	65.9	1641.6	35.960	1561.1	47.88	3574.0
				1651.2				

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)/24.2657	(7) MEASURED BHP (psi)
8	11:45	1713.3	72.6	1929.6	48.494	1664.8	56.28	3670.0
	11:50	1771.9	79.3	1929.6	48.494	1723.4	56.28	3728.0
	11:55	1812.7	86.0	1929.6	48.494	1764.2	56.28	3775.0
				1929.6				
9	12:00	1943.1	93.8	2246.4	64.243	1878.9	65.52	3877.0
	12:05	1990.3	102.0	2361.6	70.470	1919.8	68.88	3936.0
	12:10	2037.6	110.1	2332.8	68.888	1968.7	68.04	3985.0
				2313.6				
10	12:15	2137.4	119.2	2620.8	85.443	2052.0	76.44	4063.0
	12:20	2195.0	128.2	2592.0	83.714	2111.3	75.60	4099.0
	12:25	2194.8	137.3	2620.8	85.443	2109.4	76.44	4121.0
				2611.2				
11	12:30	2296.0	147.6	2966.4	107.448	2188.6	86.52	4183.0
	12:35	2329.2	158.0	2995.2	109.386	2219.8	87.36	4212.0
	12:40	2372.6	168.3	2966.4	107.448	2265.2	86.52	4233.0
				2976.0				
12	12:45	2431.5	179.8	3312.0	131.747	2299.8	96.60	4281.0
	12:50	2450.6	191.3	3312.0	131.747	2318.9	96.60	4300.0
	12:55	2462.0	202.7	3283.2	129.635	2332.4	95.76	4308.0
				3302.4				
13	1:00	2518.4	215.6	3715.2	162.945	2355.5	108.36	4326.0
	1:05	2460.6	228.6	3744.0	165.289	2295.3	109.20	4272.0
	1:10	2375.9	241.7	3772.8	167.649	2208.3	110.04	4175.0
				3744.0				
FALLOFF	1:11	1920.9				1920.9		4012.0
	1:12	1859.4				1859.4		3961.0
	1:13	1827.4				1827.4		3926.0
	1:14	1799.2				1799.2		3896.0
	1:15	1771.0				1771.0		3868.0
	1:20	1653.1				1653.1		3744.0
	1:25	1563.4				1563.4		3654.0





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

STEP RATE INJECTION TEST

CLIENT: PHILLIPS PETROLEUM COMPANY

DATE: FEBRUARY 14, 1995

WELL NAME: EAST VACUUM GRAYBURG SAN ANDRES UNIT NO. 3202-385
LEA COUNTY, NEW MEXICO

WO#: 95-14-0202

PERFS. = 4370-4534

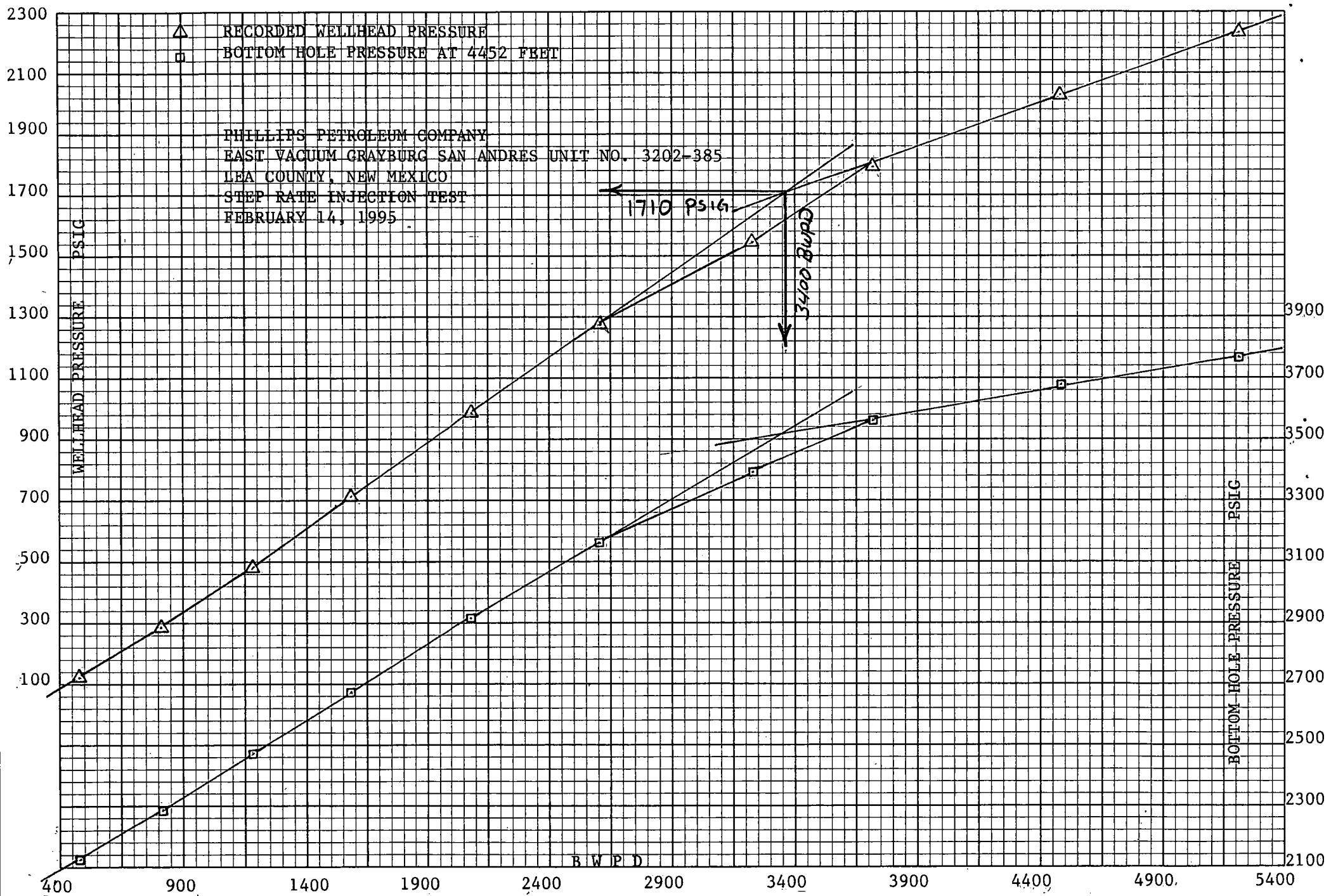
PACKER DEPTH = 4323

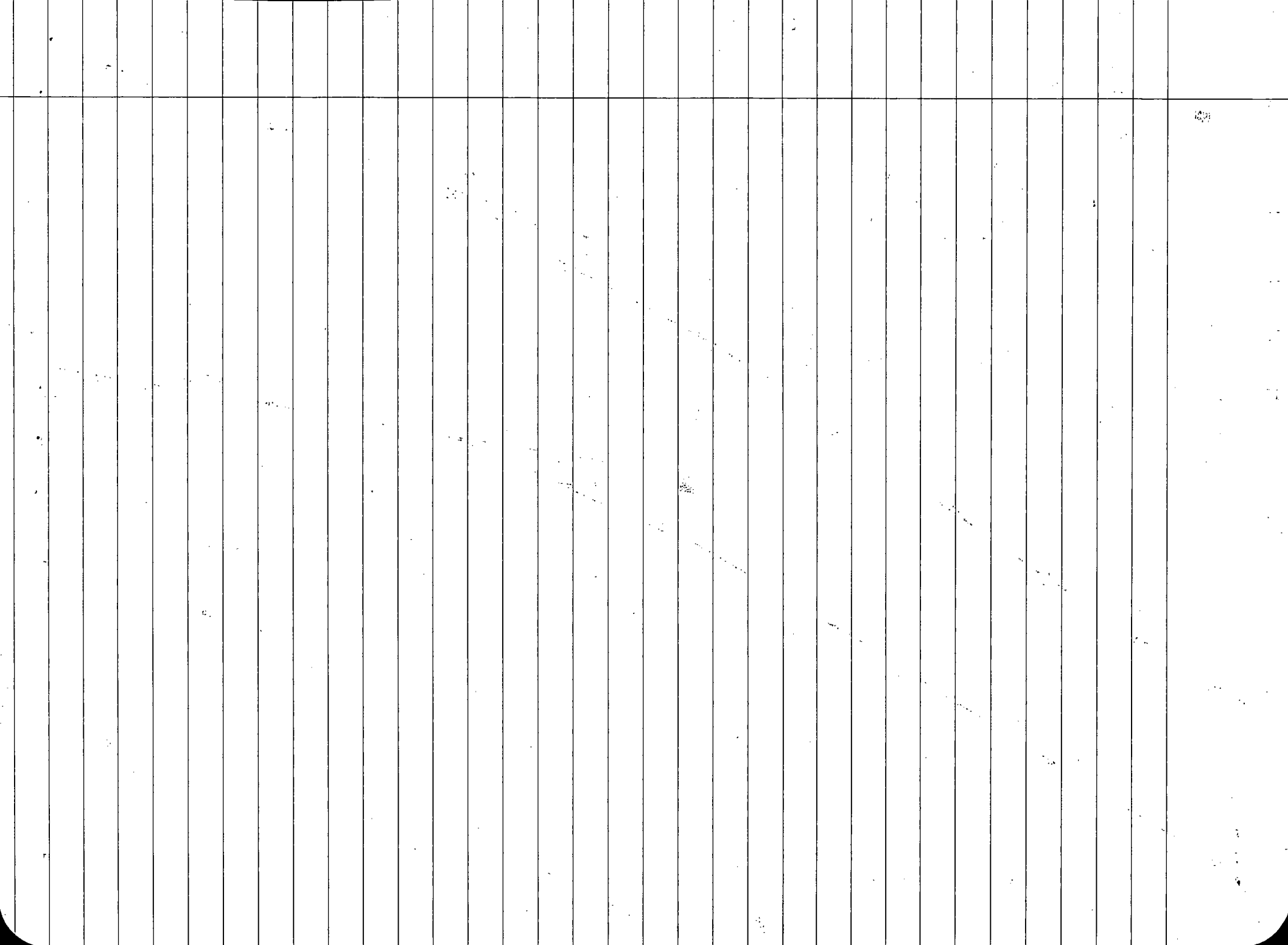
BHP GAUGE DEPTH = 4452

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)/24.2857	(7) MEASURED BHP (psi)
1	10:00	15.9				15.9		2010.0
	10:05	69.1	1.8	518.4	4.268	64.8	15.12	2077.0
	10:10	100.7	3.5	489.6	3.839	96.9	14.28	2111.0
	10:15	120.8	5.1	460.8	3.432	117.4	13.44	2133.0
				489.6				
2	10:20	214.9	7.9	806.4	9.665	205.2	23.52	2212.0
	10:25	255.7	10.8	835.2	10.313	245.4	24.36	2257.0
	10:30	286.4	13.7	806.4	9.665	276.7	23.52	2292.0
3				816.0				
	10:35	393.8	17.8	1180.8	19.570	374.2	34.44	2379.0
	10:40	443.6	22.0	1209.6	20.462	423.1	35.28	2430.0
	10:45	485.7	26.1	1180.8	19.570	466.1	34.44	2474.0
				1190.4				
4	10:50	604.6	31.6	1584.0	33.698	570.9	46.20	2569.0
	10:55	660.7	37.1	1584.0	33.698	627.0	46.20	2629.0
	11:00	706.6	42.6	1584.0	33.698	672.9	46.20	2677.0
				1584.0				
5	11:05	862.4	49.8	2073.6	55.463	806.9	60.48	2794.0
	11:10	928.7	57.1	2102.4	56.896	871.8	61.32	2861.0
	11:15	982.3	64.4	2102.4	56.896	925.4	61.32	2918.0
				2092.8				
	11:20	1141.0	73.6	2649.6	87.286	1053.7	77.28	3032.0
6	11:25	1207.7	82.4	2534.4	80.395	1127.3	73.92	3100.0
	11:30	1271.9	91.5	2620.8	85.539	1186.4	76.44	3160.0
				2601.6				
7	11:35	1429.5	102.3	3110.4	117.428	1312.1	90.72	3267.0
	11:40	1491.1	113.2	3139.2	119.447	1371.7	91.56	3333.0
	11:45	1542.3	124.1	3139.2	119.447	1422.9	91.56	3387.0

3129.6

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	11:50	1704.9	137.0	3715.2	163.128	1541.8	108.36	3384.0
	11:55	1766.3	149.9	3715.2	163.128	1603.2	108.36	3540.0
	12:00	1789.4	162.9	3744.0	165.475	1623.9	109.20	3567.0
9				3724.8				
	12:05	1948.6	178.2	4406.4	223.674	1724.9	128.52	3620.0
	12:10	2011.0	193.9	4521.6	234.613	1776.4	131.88	3658.0
10	12:15	2027.0	209.7	4550.4	237.385	1789.6	132.72	3682.0
				4492.8				
	12:20	2188.7	227.7	5184.0	302.128	1886.6	151.20	3725.0
FALLOFF	12:25	2196.3	245.8	5212.8	305.241	1891.1	152.04	3752.0
	12:30	2233.4	264.0	5241.6	308.368	1925.0	152.88	3774.0
				5212.8				
	12:31	1681.2				1681.2		3712.0
	12:32	1623.6				1623.6		3663.0
	12:33	1583.9				1583.9		3633.0
	12:34	1559.5				1559.5		3598.0
	12:35	1527.5				1527.5		3568.0
	12:40	1415.4				1415.4		3450.0
	12:45	1304.5				1304.5		3335.0





WEST-TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY
Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: PHILLIPS PETROLEUM COMPANY

DATE: FEBRUARY 14, 1995

WELL NAME: EAST VACUUM GRAYBURG SAN ANDRES UNIT NO. 3229-386
LEA COUNTY, NEW MEXICO

WO#: 95-14-0203

PERFS = 4336-4500

PACKER DEPTH = 4295

BHP GAUGE DEPTH = 4418

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)/24.2857	(7) MEASURED BHP (psi)
1	2:45	23.5				23.5		2001.0
	2:50	23.6	3.4	979.2	13.735	9.9	28.56	2005.0
	2:55	25.0	6.6	921.6	12.278	12.7	26.88	2005.0
	3:00	23.8	9.7	892.8	11.578	12.2	26.04	2006.0
				931.2				
2	3:05	162.8	14.0	1238.4	21.209	141.6	36.12	2128.0
	3:10	198.6	18.5	1296.0	23.070	175.5	37.80	2164.0
	3:15	223.0	22.9	1267.2	22.131	200.9	36.96	2189.0
3				1267.2				
	3:20	399.4	28.9	1728.0	39.281	360.1	50.40	2333.0
	3:25	439.2	34.9	1728.0	39.281	399.9	50.40	2378.0
	3:30	471.3	40.8	1699.2	38.079	433.2	49.56	2411.0
4				1718.4				
	3:35	707.8	48.8	2304.0	66.884	640.9	67.20	2597.0
	3:40	757.7	56.7	2275.2	65.346	692.4	66.36	2656.0
	3:45	803.8	64.6	2275.2	65.346	738.5	66.36	2699.0
				2284.8				
5	3:50	1036.5	74.5	2851.2	99.205	937.3	83.16	2881.0
	3:55	1090.4	84.3	2822.4	97.359	993.0	82.32	2936.0
	4:00	1128.9	94.0	2793.6	95.529	1033.4	81.48	2979.0
				2822.4				
6	4:05	1528.4	107.3	3830.4	171.291	1357.1	111.72	3243.0
	4:10	1607.9	119.2	3427.2	139.434	1468.5	99.96	3336.0
	4:15	1674.6	132.4	3801.6	168.916	1505.7	110.88	3410.0
				3686.4				
7	4:20	1962.7	147.9	4464.0	227.364	1735.3	130.20	3610.0
	4:25	2015.2	163.5	4492.8	230.085	1785.1	131.04	3668.0
	4:30	2053.7	178.9	4435.2	224.658	1829.0	129.36	3705.0
				4464.0				

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)/24-2857	(7) MEASURED BHP (psi)
8	4:35	2271.6	197.0	5212.8	302.910	1968.7	152.04	3798.0
	4:40	2283.2	215.6	5356.8	318.571	1964.6	156.24	3813.0
	4:45	2297.4	233.8	5241.6	306.013	1991.4	152.88	3840.0
				5270.4				
	4:50	919.6				919.6		2956.0
FALLOFF	GAUGE	BLEW OUT BEFORE	ON LAST RATE	INJECTION WAS RUN	LINE	PUMP	WAS SHUT	DOWN

