



STATE OF NEW MEXICO

CF 10103

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION



BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

April 14, 1992

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

Sage Energy Company
P.O. Drawer 3068
Midland, Texas 79702

Attention: Jay H. Hardy

RE: *Injection Pressure Increase
North Vacuum (Abo) North Unit
6 Wells
Lea County, New Mexico*

Dear Mr. Hardy:

Reference is made to your request dated May 5, 1992, to increase the surface injection pressure on six (6) wells in the North Vacuum (Abo) North Unit. This request is based on step rate tests conducted on these wells between April 29 & May 1, 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

MAXIMUM INJECTION
SURFACE PRESSURE

NVANU 3 No. 1
1780' FSL & 1980' FWL
Unit J, 1-17S-34E

3000 PSIG

NVANU 4A No. 1
1980' FSL & 860' FWL
Unit L, 1-17S-34E

3200 PSIG

WELL AND LOCATION

MAXIMUM INJECTION
SURFACE PRESSURE

NVANU 5B No. 1
660' FSL & 860' FEL
Unit P, 1-17S-34E

3100 PSIG

NVANU 2A No. 1
460' FSL & 1980' FWL
Unit N, 1-17S-34E

3200 PSIG

NVANU 14 No. 1
860' FNL & 660' FWL
Unit D, 12-17S-34E

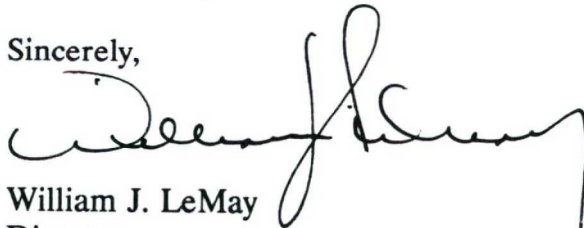
3000 PSIG

NVANU 14 No. 2
1980' FNL & 1780' FWL
Unit F, 12-17S-34E

2700 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-9359
D. Catanach
R. Brown

NO WAITING PERIOD

COMPANY: SAGE ENERGY COMPANY
ADDRESS: P.O. DRAWER 3068
CITY, STATE, ZIP: MIDLAND, TEXAS 79702
ATTENTION: JAY H. HARDY

Re: Injection Pressure Increase
NORTH VACUUM (ABO) NORTH UNIT
6 WELLS
LEA County, New Mexico

Dear Sir:

Reference is made to your request dated MAY 5, 1992, to increase the surface injection pressure on SIX (6) WELLS IN THE NORTH VACUUM (ABO) NORTH UNIT. This request is based on step rate tests conducted on these wells BETWEEN APRIL 29 & MAY 1, 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>NVANU 3 No. 1</u> <u>1780' FSL + 1980' FEL</u> <u>UNIT J 1-17S-34E</u>	<u>3000 PSIG</u>
<u>NVANU 4A No. 1</u> <u>1980' FSL + 860' FWL</u> <u>UNIT L 1-17S-34E</u>	<u>3200 PSIG</u>
<u>NVANU 5B No. 1</u> <u>660' FSL + 860' FEL</u> <u>UNIT P 1-17S-34E</u>	<u>3100 PSIG</u>
<u>NVANU 2A No. 1</u> <u>460' FSL + 1980' FWL</u> <u>UNIT N 1-17S-34E</u>	<u>3200 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. CALLEGOS~~

D. CATANACH

FILE- R-9359

OCD- HOBBS

R. BROWN

NVANU 14 No. 1

3000 PSIG

860' FNL & 660' FWL

UNIT D 12-17S-34E

NVANU 14 No. 2

2700 PSIG

1980' FNL & 1780' FWL

UNIT F 12-17S-34E

SAGE ENERGY COMPANY

P. O. DRAWER 3068

MIDLAND, TEXAS 79702

915/683-5271

OIL CONSERVATION DIVISION
RECEIVED

'92 MAY 7 AM 9 19

May 5, 1992

State of New Mexico
Oil Conservation Division
Post Office Box 2088
Santa Fe, NM 87504

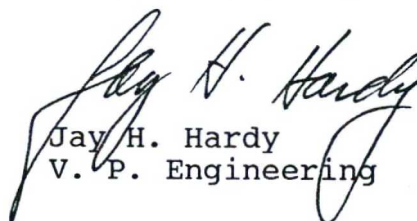
Attention: Mr. William J. LeMay, Director

Re: Injection Pressure Increase on Six Water Injection Wells
North Vacuum (Abo) North Unit (NVANU) (Order No. R-9359)
Lea County, New Mexico

Dear Mr. LeMay:

Sage Energy Company respectfully requests permission from the OCD to increase the allowable surface injection pressures on the subject wells (see attachment) from 1723 psig to the pressures as shown. This request is based on step rate tests which were run on the injection wells from April 29 through May 1, 1992, by John West Engineering Company (copies attached).

Very truly yours,


Jay H. Hardy
V. P. Engineering

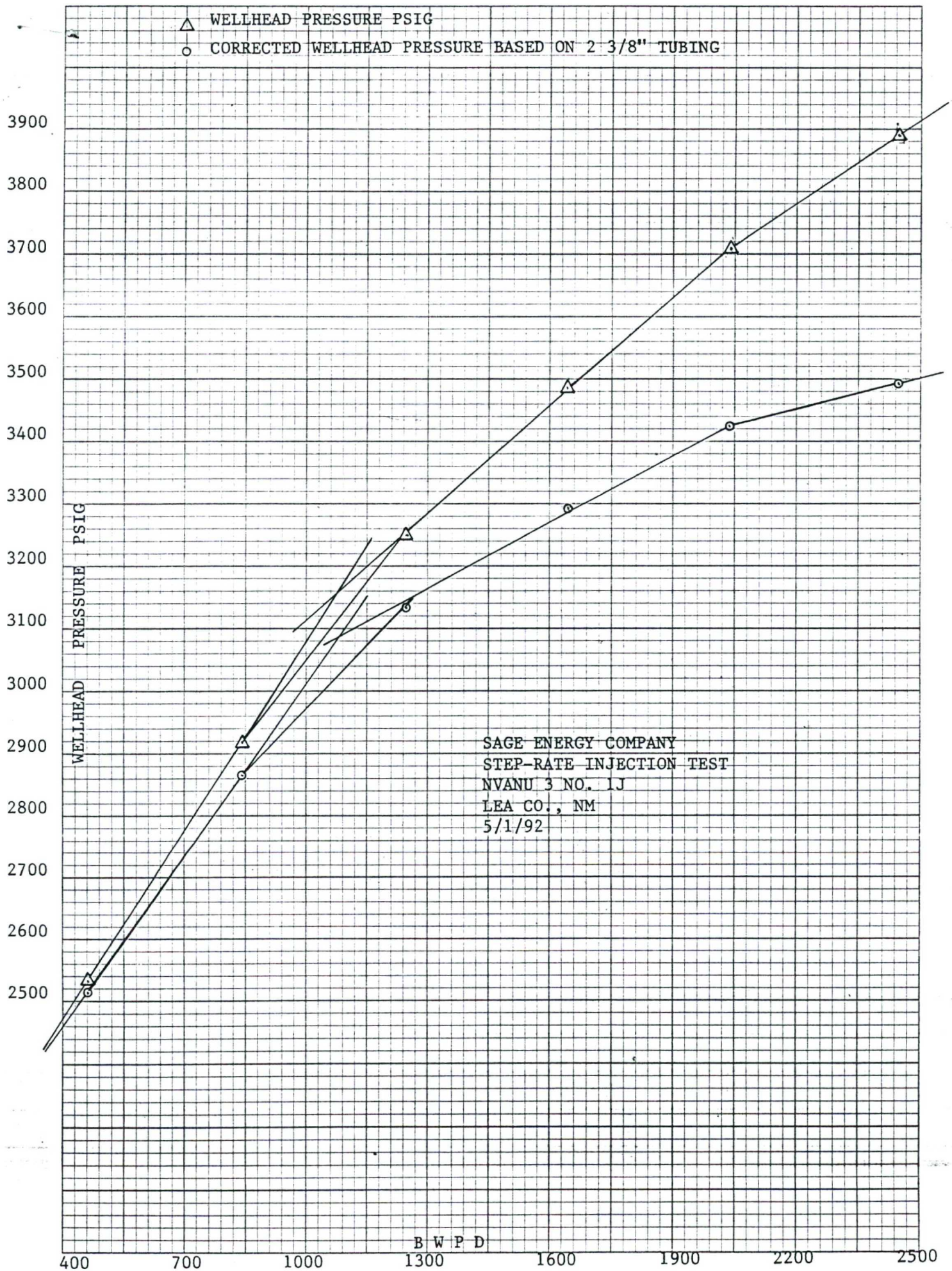
JHH/jbl

cc: OCD - Hobbs
OCD - Santa Fe, David Catanach

Sage Energy Company
North Vacuum (Abo) North Unit
Lea County, New Mexico

REQUESTED SURFACE INJECTION PRESSURES

<u>WELL AND LOCATION</u>	<u>MAXIMUM INJECTION SURFACE PRESSURE</u>
Section 1, Township 17 South <u>Range 34 East, NMPM</u>	
NVANU 3 No. 1, Unit J	3000 PSIG
NVANU 4A No. 1, Unit L	3200 PSIG
NVANU 5B No. 1, Unit P	3100 PSIG
NVANU 2A No. 1, Unit N	3200 PSIG
Section 12, Township 17 South <u>Range 34 East, NMPM</u>	
NVANU 14 No. 1, Unit D	3000 PSIG
NVANU 14 No. 2, Unit F	2700 PSIG



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 5/1/92

WELL NAME: North Vacuum (Abo) North Unit 3 No. 1J
Lea County, New Mexico

92140598

PERFS = 8689 - 8719

PACKER DEPTH =

BHP GAUGE DEPTH = 8805

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	2191.0				2191.0		
	11:50	2371.0	1.5	432.0	16.078	2354.9	12.60	
	11:55	2467.1	3.2	489.6	20.267	2446.8	14.28	
	12:00	2534.3	4.8	460.8	18.116	2516.2	13.44	
2				460.8				
	12:05	2472.8	7.7	835.2	54.436	2418.4	24.36	
	12:10	2849.7	10.7	864.0	57.960	2791.7	25.20	
	12:15	2918.3	13.6	835.2	54.436	2863.9	24.36	
3				845.0				
	12:20	3118.0	17.9	1238.4	112.815	3005.2	36.12	
	12:25	3201.9	22.2	1238.4	112.815	3089.1	36.12	
	12:30	3252.8	26.6	1267.2	117.717	3135.1	36.96	
4				1248.0				
	12:35	3406.7	32.3	1641.6	190.029	3216.7	47.88	
	12:40	3460.1	38.0	1641.6	190.029	3270.1	47.88	
	12:45	3485.5	43.7	1641.6	190.029	3295.5	47.88	
5				1641.6				
	12:50	3621.6	50.8	2044.8	285.285	3336.3	59.64	
	12:55	3673.7	57.9	2044.8	285.285	3388.4	59.64	
	1:00	3708.1	65.0	2044.8	285.285	3422.8	59.64	
6				2044.8				
	1:05	3846.7	73.6	2476.8	406.698	3440.0	72.24	
	1:10	3858.2	82.0	2419.2	389.374	3468.8	70.56	
	1:15	3891.2	90.5	2448.0	397.993	3493.2	71.40	
				2448.0				

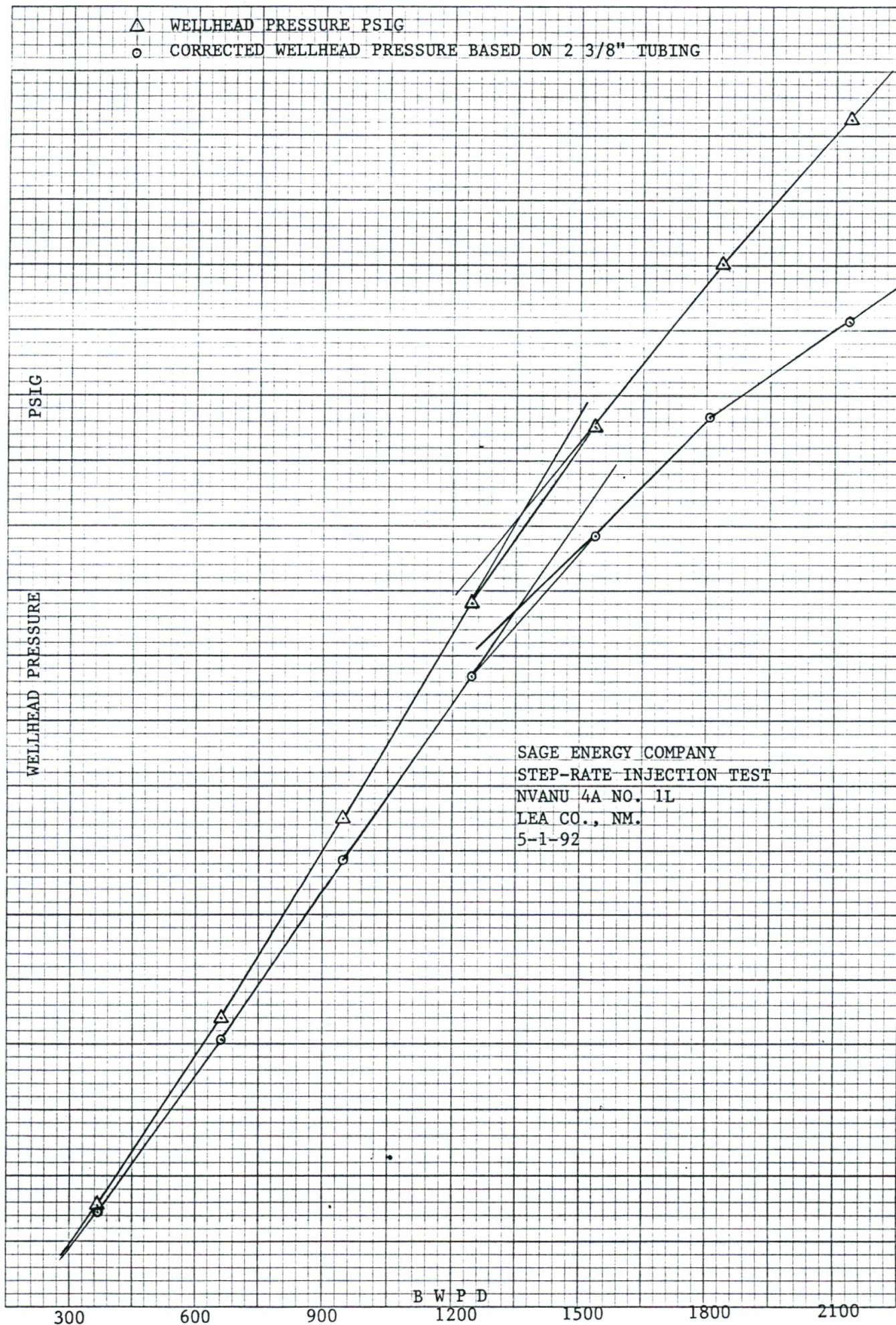
△ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING

PSIG
WELLHEAD PRESSURE

SAGE ENERGY COMPANY
STEP-RATE INJECTION TEST
NVANU 4A NO. 1L
LEA CO., NM.
5-1-92

B W P D

300 600 900 1200 1500 1800 2100



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 5/1/92

WELL NAME: North Vacuum (Abo) North Unit 4A No. 1L

WO#: 92140598

Lea County, New Mexico

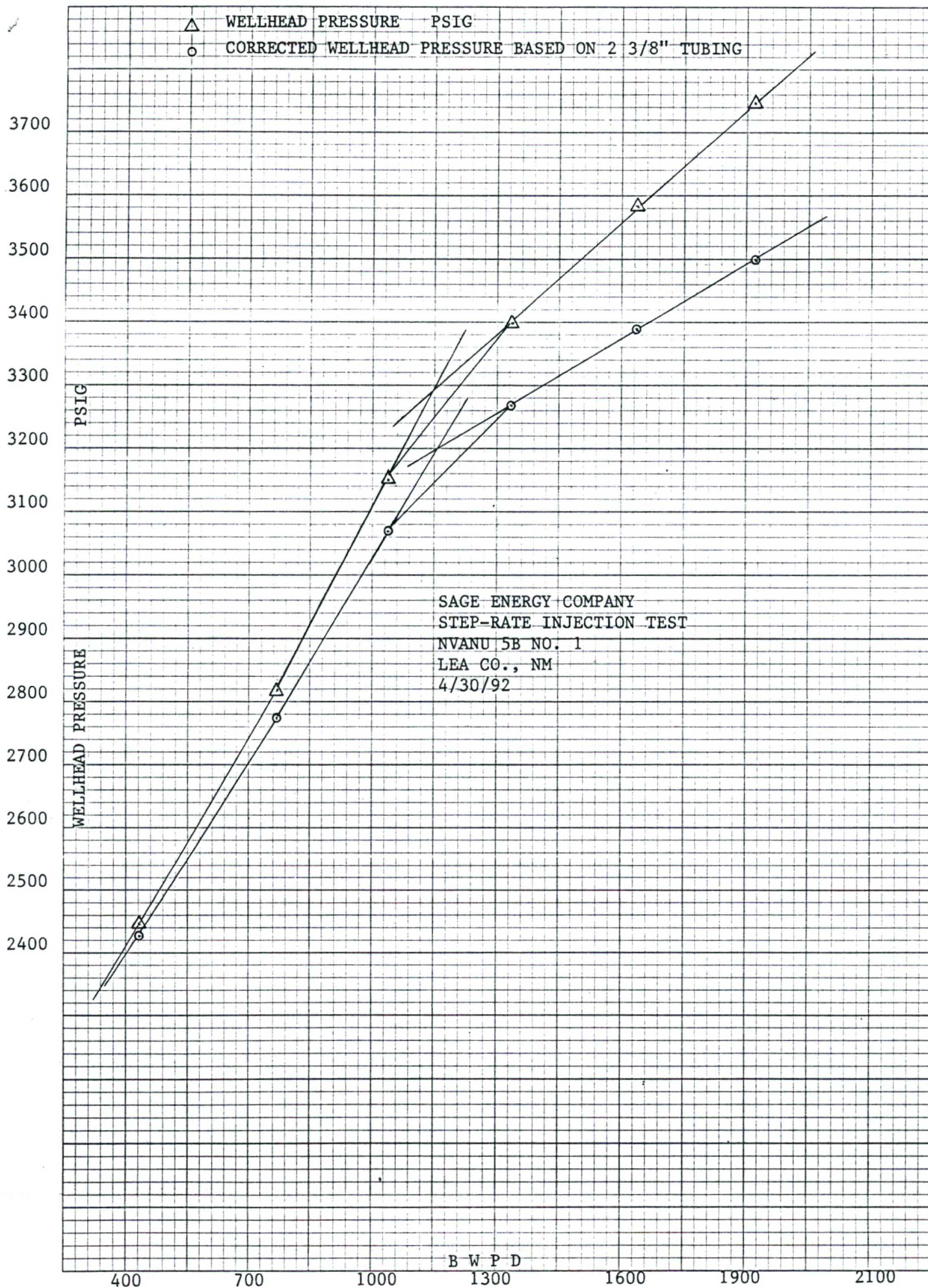
PERFS = 8682 - 8683

PACKER DEPTH =

BHP GAUGE DEPTH - 8760

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psf)
	8:50	2128.1				2128.1		
	8:55	2262.5	1.3	374.4	12.275	2250.2	10.92	
	9:00	2313.3	2.5	345.6	10.585	2302.7	10.08	
1	9:05	2356.5	3.8	374.4	12.275	2344.2	10.92	
				364.8				
	9:10	2504.7	6.1	662.4	35.271	2469.4	19.32	
	9:15	2581.0	8.4	662.4	35.271	2545.7	19.32	
2	9:20	2639.5	10.7	662.4	35.271	2604.2	19.32	
				662.4				
	9:25	2810.0	14.0	950.4	68.782	2741.2	27.72	
	9:30	2886.4	17.3	950.4	68.782	2817.6	27.72	
3	9:35	2952.6	20.6	950.4	68.782	2883.8	27.72	
				950.4				
	9:40	3119.3	24.9	1238.4	112.238	3007.1	36.12	
	9:45	3208.3	29.3	1267.2	117.115	3091.2	36.96	
4	9:50	3280.8	33.6	1238.4	112.238	3168.6	36.12	
				1247.9				
	9:55	3436.0	38.9	1526.4	165.248	3270.8	44.52	
	10:00	3500.9	44.2	1526.4	165.248	3335.7	44.52	
5	10:05	3554.3	49.6	1555.2	171.062	3383.2	45.36	
				1536.0				
	10:10	3698.1	56.0	1843.2	234.238	3463.9	53.76	
	10:15	3750.3	62.3	1814.4	227.512	3522.8	52.92	
6	10:20	3801.1	68.7	1843.2	234.238	3566.9	53.76	
				1833.6				
	10:25	3917.0	75.3	1900.8	247.960	3669.0	55.44	
	10:30	3966.5	82.7	2131.2	306.411	3660.1	62.16	
7	10:35	4022.5	90.1	2131.2	306.411	3716.1	62.16	
				2131.2				

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
STEP NO. & REMARKS	TIME	SURFACE TUBING PRESS. (psig)	CUMULATIVE VOL. INJECTED (bbls)	INJECTION RATE (bbls/day)	FRICTION HEAD LOSS (psi)	CORRECTED TUBING PRESS. (psi) (1)-(4)	INJECTION RATE (gpm) (8)/34.2067	MEASURED BHP (psi)
Fall - Off	10:36	3677.7				3677.7		
	10:37	3680.3				3680.3		
	10:38	3651.0				3651.0		
	10:39	3628.1				3628.1		
	10:40	3606.5				3606.5		
	10:41	3583.6				3583.6		
	10:42	3563.2				3563.2		
	10:43	3544.1				3544.1		
	10:44	3523.8				3523.8		
	10:45	3506.0				3506.0		



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 4/30/92

WELL NAME: North Vacuum (Abo) North Unit 5 "B" No. 1

WO#: 92140598

Lea County, New Mexico

PERFS = 8712 - 8735

PACKER DEPTH =

BHP GAUGE DEPTH = 8798

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (ps)	(5) CORRECTED TUBING PRESS. (ps) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (ps)
1	11:35	2087.1				2087.1		
	11:40	2298.5	1.5	432.0	16.065	2282.4	12.60	
	11:45	2384.6	3.0	432.0	16.065	2368.5	12.60	
	11:50	2445.4	4.5	432.0	16.065	2429.3	12.60	
				432.0				
2	11:55	2644.8	7.2	777.6	47.657	2597.1	22.68	
	12:00	2740.2	9.9	777.6	47.657	2692.5	22.68	
	12:05	2819.1	12.5	748.8	44.443	2774.7	21.84	
				768.0				
3	12:10	3000.0	16.1	1036.8	81.146	2918.9	30.24	
	12:15	3092.5	19.7	1036.8	81.146	3011.4	30.24	
	12:20	3151.1	23.3	1036.8	81.146	3070.0	30.24	
				1036.8				
4	12:25	3297.3	28.0	1353.6	132.888	3164.4	39.48	
	12:30	3361.0	32.6	1324.8	127.705	3233.3	38.64	
	12:35	3399.1	37.2	1324.8	127.705	3271.4	38.64	
				1334.4				
5	12:40	3530.1	42.9	1641.6	189.877	3340.2	47.88	
	12:45	3551.7	48.5	1612.8	183.761	3367.9	47.04	
	12:50	3582.3	54.2	1641.6	189.877	3392.4	47.88	
				1632.0				
6	12:55	3712.0	60.9	1929.6	256.061	3455.9	56.28	
	1:00	3731.1	67.6	1929.6	256.061	3475.0	56.28	
	1:05	3747.6	74.2	1900.8	249.035	3498.6	55.44	
				1920.0				

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) (8)/34.2857	(7) MEASURED BHP (psi)
Fall-Off	1:06	3409.3				3409.3		
	1:07	3413.1				3413.1		
	1:08	3401.6				3401.6		
	1:09	3392.7				3392.7		
	1:10	3386.4				3386.4		
	1:11	3380.0				3380.0		
	1:12	3372.4				3372.4		
	1:13	3367.3				3367.3		
	1:14	3361.0				3361.0		
	1:15	3354.6				3354.6		

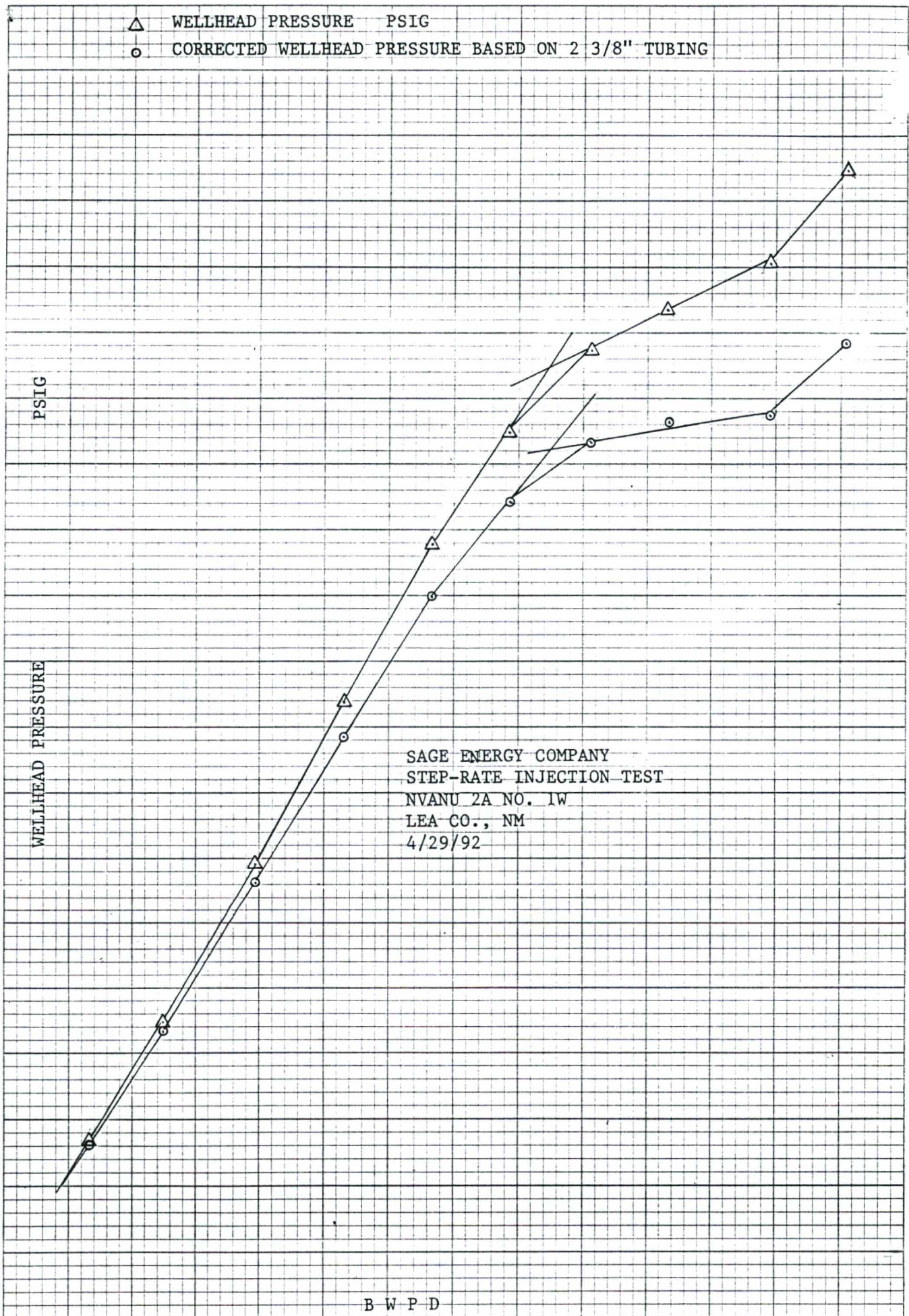
△ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING

PSIG
WELLHEAD PRESSURE

SAGE ENERGY COMPANY
STEP-RATE INJECTION TEST
NVANU 2A NO. 1W
LEA CO., NM
4/29/92

B W P D

700 500 800 1100



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 4/29/82

WELL NAME: North Vacuum (Abo) North Unit 2 "A" No. 1W
Lea County, New Mexico

WO#: 92140598

PERFS - 8690 - 8634

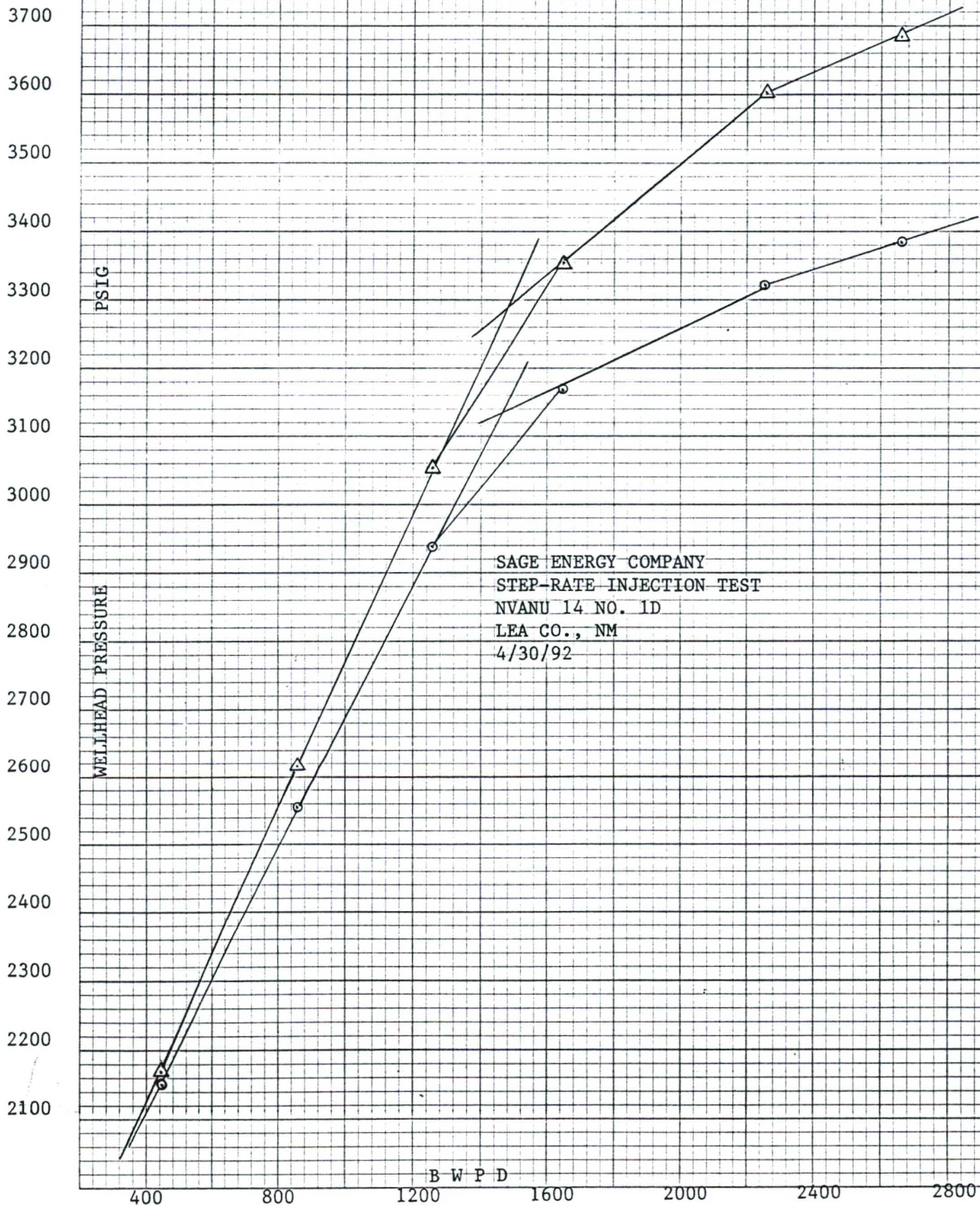
PACKER DEPTH -

BHP GAUGE DEPTH - 8650

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1) - (4)	(6) INJECTION RATE (gpm) (8)/34.2857	(7) MEASURED BHP (psf)
1	9:55	2132.4				2132.4		
	10:00	2202.1	0.8	230.4	4.937	2197.2	6.72	
	10:05	2243.9	1.7	259.2	6.139	2237.8	7.56	
	10:10	2266.8	2.6	259.2	6.139	2260.7	7.56	
2				249.6				
	10:15	2364.3	4.1	432.0	15.795	2348.5	12.60	
	10:20	2409.9	5.5	403.2	13.902	2396.0	11.76	
	10:25	2449.2	7.0	432.0	15.795	2433.4	12.60	
3				422.4				
	10:30	2577.3	9.3	662.4	34.828	2542.5	19.32	
	10:35	2644.8	11.5	633.6	32.079	2612.7	18.48	
	10:40	2693.1	13.7	633.6	32.079	2661.0	18.48	
4				643.2				
	10:45	2801.2	16.7	864.0	56.939	2744.3	25.20	
	10:50	2881.4	19.6	835.2	53.478	2827.9	24.36	
	10:55	2938.6	22.5	835.2	53.478	2885.1	24.36	
5				844.8				
	11:00	3051.8	26.2	1065.6	83.929	2967.9	31.08	
	11:05	3119.3	29.8	1036.8	79.780	3039.5	30.24	
	11:10	3179.0	33.4	1036.8	79.780	3099.2	30.24	
6				1046.4				
	11:15	3275.7	37.7	1238.4	110.829	3164.9	36.12	
	11:20	3316.4	42.0	1238.4	110.829	3205.6	36.12	
	11:25	3347.0	46.2	1209.6	106.108	3240.9	35.28	
7				1228.8				
	11:30	3409.3	51.2	1440.0	146.498	3262.8	42.00	
	11:35	3451.3	56.1	1411.2	141.124	3310.2	41.16	
	11:40	3474.2	61.0	1411.2	141.124	3333.1	41.16	
				1420.8				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psf)
8	11:45	3548.0	66.6	1612.8	180.670	3367.3	47.04	
	11:50	3555.6	72.2	1612.8	180.670	3374.9	47.04	
	11:55	3536.5	77.7	1584.0 1603.2	174.746	3361.8	46.20	
9	12:00	3573.4	84.1	1843.2	231.297	3342.1	53.76	
	12:05	3589.9	90.5	1843.2	231.297	3358.6	53.76	
	12:10	3605.2	96.9	1843.2 1843.2	231.297	3373.9	53.76	
10	12:15	3686.6	103.9	2016.0	273.004	3413.6	58.80	
	12:20	3708.2	111.0	2044.8	280.263	3427.9	59.64	
	12:25	3746.4	117.9	1987.2 2016.0	265.832	3480.6	57.96	
Fall-Off	12:26	3456.4				3456.4		
	12:27	3470.4				3470.4		
	12:28	3461.5				3461.5		
	12:29	3447.5				3447.5		
	12:30	3436.0				3436.0		
	12:31	3425.8				3425.8		
	12:32	3414.4				3414.4		
	12:33	3404.2				3404.2		
	12:34	3394.0				3394.0		
	12:35	3383.9				3383.9		

△ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 4/30/82

WELL NAME: North Vacuum (Abo) North Unit 14 No. 1D

WO#: 92140598

Lea County, New Mexico

PERFS = 8559 - 8603

PACKER DEPTH =

BHP GAUGE DEPTH = 8680

STEP NO. 1 REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psd)	(5) CORRECTED TUBING PRESS. (psd) (1)-(4)	(6) INJECTION RATE (gpm) (8)/34.2367	(7) MEASURED BHP (psd)
1	8:55	1850.9				1850.9		
	9:00	2029.7	1.5	432.0	15.849	2013.9	12.60	
	9:05	2107.2	3.1	460.8	17.859	2089.3	13.44	
	9:10	2168.1	4.6	432.0	15.849	2152.3	12.60	
				441.6				
2	9:15	2383.7	7.5	835.2	53.663	2330.0	24.36	
	9:20	2514.3	10.5	864.0	57.137	2457.2	25.20	
	9:25	2613.5	13.5	864.0	57.137	2556.4	25.20	
				854.4				
	9:30	2867.7	17.8	1238.4	111.213	2756.5	36.12	
3	9:35	2974.6	22.2	1267.2	116.045	2858.6	36.96	
	9:40	3054.9	26.6	1267.2	116.045	2938.9	36.96	
				1257.6				
	9:45	3242.0	32.3	1641.6	187.331	3054.7	47.88	
	9:50	3303.2	38.0	1641.6	187.331	3115.9	47.88	
4	9:55	3356.7	43.7	1641.6	187.331	3169.4	47.88	
				1641.6				
	10:00	3519.6	50.9	2073.6	288.606	3231.0	60.48	
	10:05	3568.0	58.0	2044.8	281.235	3286.8	59.64	
	10:10	3602.4	65.1	2044.8	281.235	3321.2	59.64	
5				2054.4				
	10:15	3690.3	73.6	2448.0	392.343	3298.0	71.40	
	10:20	3667.4	82.1	2448.0	392.343	3275.1	71.40	
	10:25	3685.3	90.7	2476.8	400.925	3284.4	72.24	
				2457.6				

1

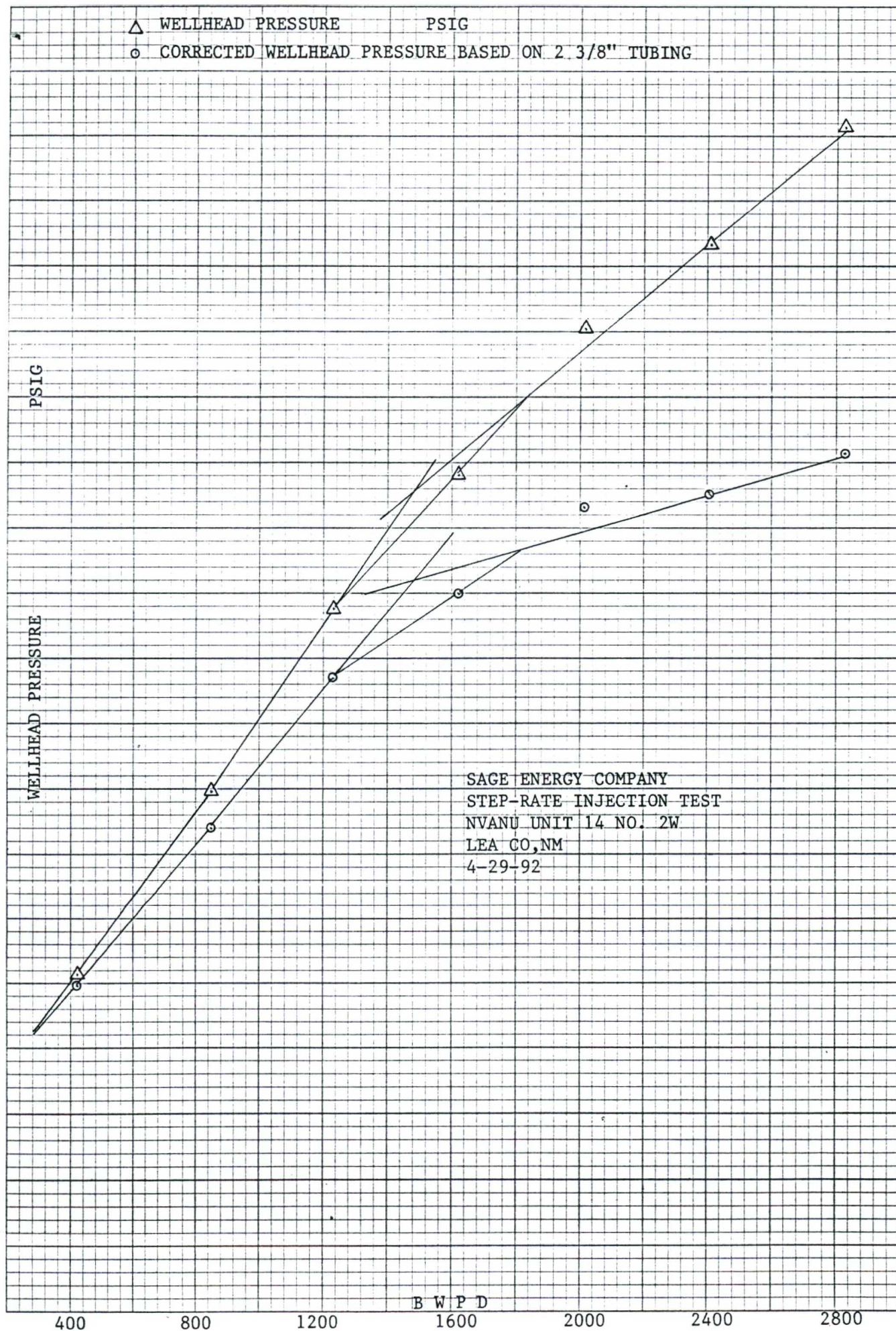
△ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING

PSIG
WELLHEAD PRESSURE

SAGE ENERGY COMPANY
STEP-RATE INJECTION TEST
NVANU UNIT 14 NO. 2W
LEA CO, NM
4-29-92

B W P D

400 800 1200 1600 2000 2400 2800



JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 4/28/92

WELL NAME: North Vacuum (Abo) North Unit 14 No. 2W
Lea County, New Mexico

WO#: 92140588

PERFS = 8545 - 8596

PACKER DEPTH =

BHP GAUGE DEPTH = 8630

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1) - (4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psf)
1	1:30	2044.2				2044.2		
	1:35	2136.7	1.4	403.2	13.870	2122.8	11.76	
	1:40	2182.2	2.9	432.0	15.758	2166.4	12.60	
	1:45	2213.9	4.4	432.0	15.758	2198.1	12.60	
2				422.4				
	1:50	2355.6	7.3	835.2	53.354	2302.2	24.36	
	1:55	2434.1	10.2	835.2	53.354	2380.7	24.36	
	2:00	2496.2	13.2	864.0	56.808	2439.4	25.20	
3				844.8				
	2:05	2657.6	17.5	1238.4	110.573	2547.0	36.12	
	2:10	2728.2	21.7	1209.6	105.863	2622.3	35.28	
	2:15	2778.4	26.0	1238.4	110.573	2667.8	36.12	
4				1228.8				
	2:20	2900.5	31.7	1641.6	186.252	2714.2	47.88	
	2:25	2929.7	37.3	1612.8	180.252	2749.4	47.04	
	2:30	2980.6	42.9	1612.8	180.252	2800.3	47.04	
5				1622.4				
	2:35	3118.0	49.9	2016.0	272.372	2845.6	58.80	
	2:40	3170.1	56.9	2016.0	272.372	2897.7	58.80	
	2:45	3204.5	63.9	2016.0	272.372	2932.1	58.80	
6				2016.0				
	2:50	3325.3	72.2	2390.4	373.273	2952.0	69.72	
	2:55	3321.5	80.6	2419.2	381.635	2939.9	70.56	
	3:00	3335.5	89.0	2419.2	381.635	2953.9	70.56	
7				2409.6				
	3:05	3462.7	98.8	2822.4	507.575	2955.1	82.32	
	3:10	3485.6	108.8	2880.0	526.904	2958.7	84.00	
	3:15	3515.0	118.5	2793.6	498.035	3017.0	81.48	
				2832.0				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2867	(7) MEASURED BHP (psf)
--------------------------	------	---	--	--	---------------------------------------	--	---	---------------------------------

Fall-Off

3:16
3:17
3:18
3:19
3:20
3:25

3062.0
3065.8
3048.0
3035.3
3024.0
2960.3

3062.0
3065.8
3048.0
3035.3
3024.0
2960.3

SAGE ENERGY COMPANY

P. O. DRAWER 3068

MIDLAND, TEXAS 79702

915/683-5271

OIL CONSERVATION DIVISION

RECEIVED

MAY 7 1992

May 5, 1992

State of New Mexico
Oil Conservation Division
Post Office Box 2088
Santa Fe, NM 87504

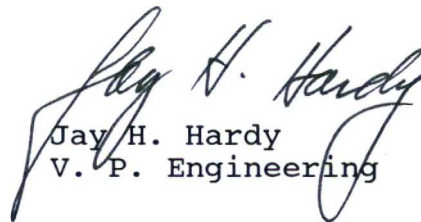
Attention: Mr. William J. LeMay, Director

Re: Injection Pressure Increase on Six Water Injection Wells
North Vacuum (Abo) North Unit (NVANU) (Order No. R-9359)
Lea County, New Mexico

Dear Mr. LeMay:

Sage Energy Company respectfully requests permission from the OCD to increase the allowable surface injection pressures on the subject wells (see attachment) from 1723 psig to the pressures as shown. This request is based on step rate tests which were run on the injection wells from April 29 through May 1, 1992, by John West Engineering Company (copies attached).

Very truly yours,


Jay H. Hardy
V. P. Engineering

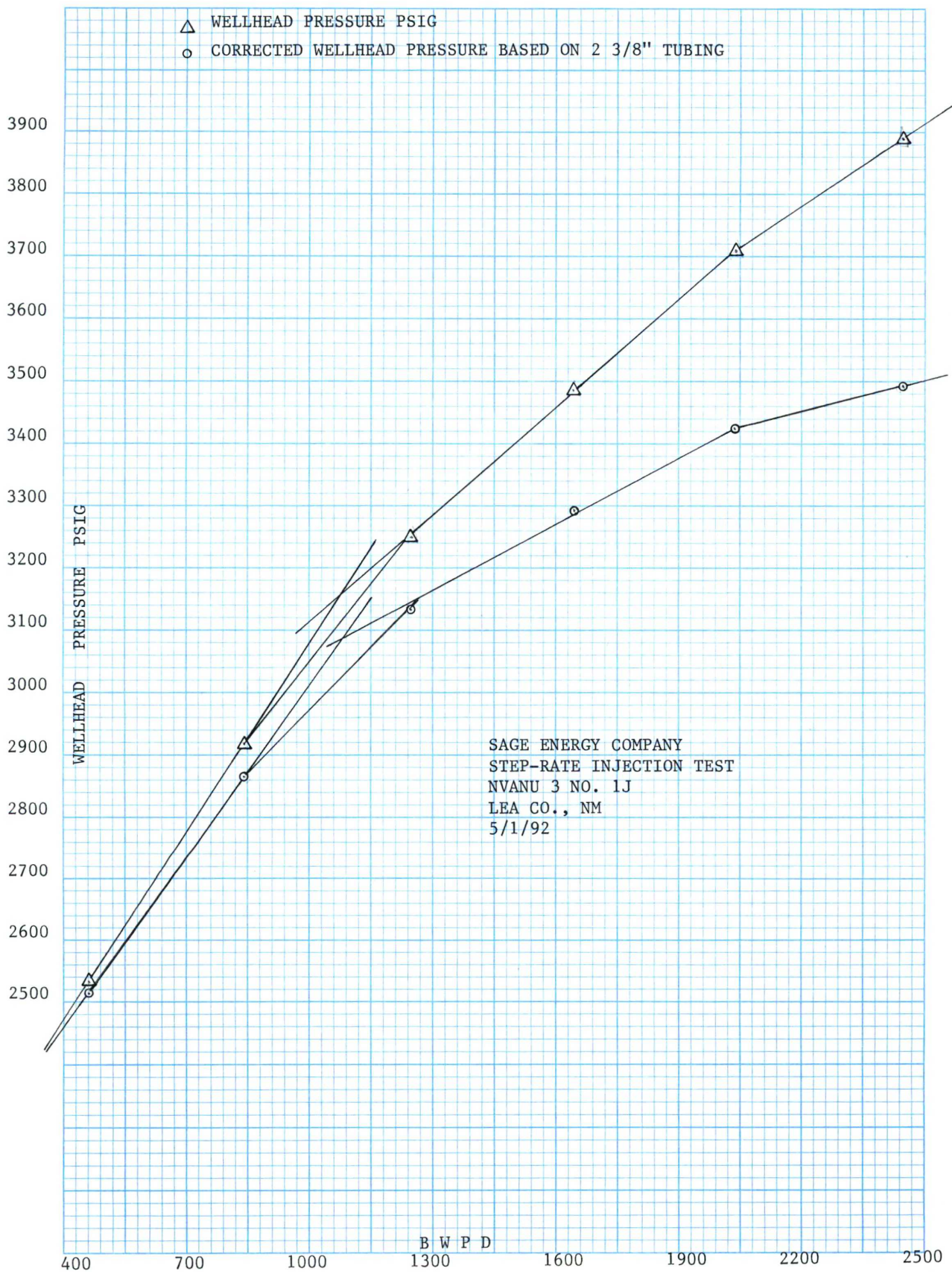
JHH/jbl

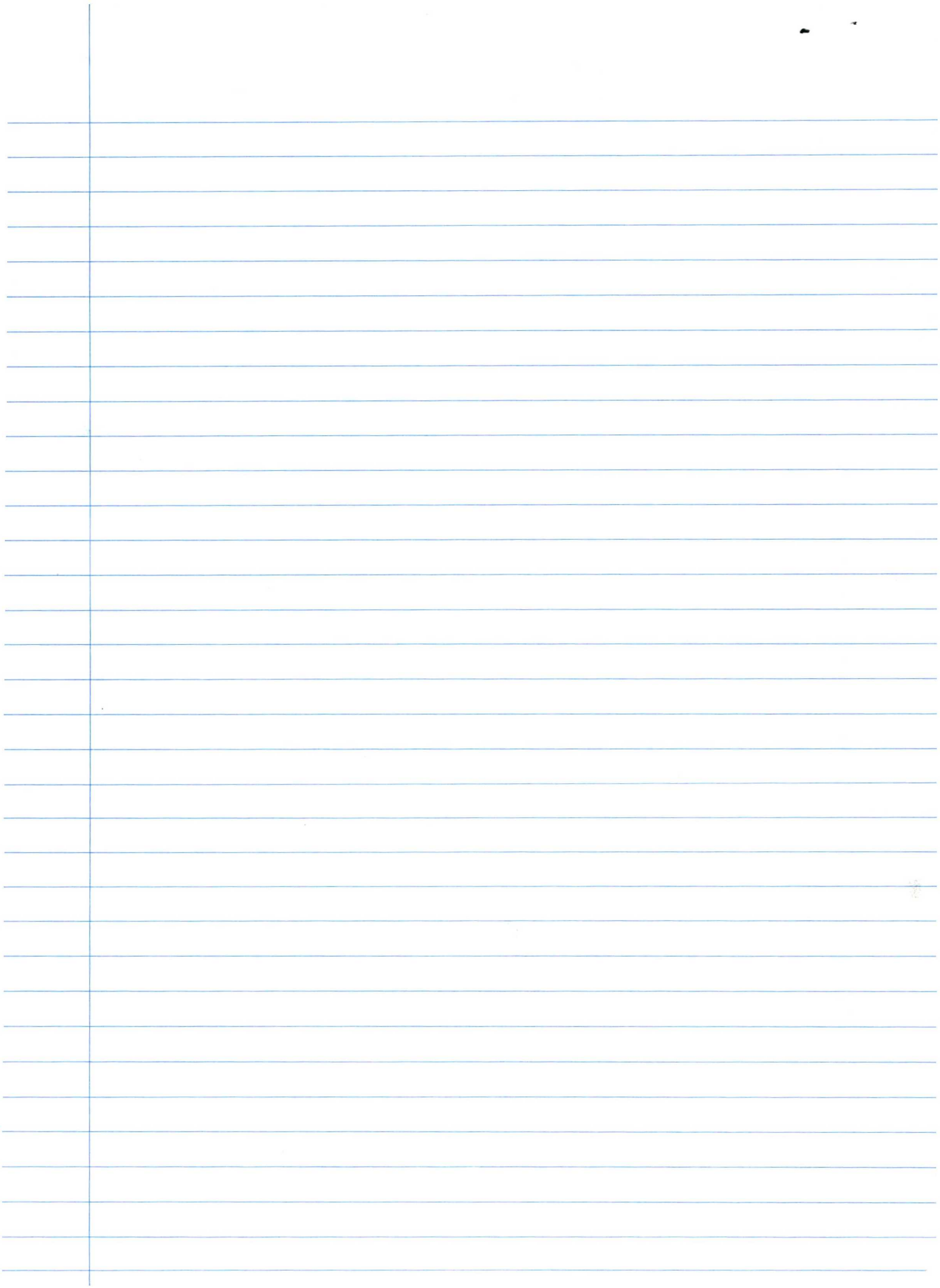
cc: OCD - Hobbs
OCD - Santa Fe, David Catanach

Sage Energy Company
North Vacuum (Abo) North Unit
Lea County, New Mexico

REQUESTED SURFACE INJECTION PRESSURES

<u>WELL AND LOCATION</u>	<u>MAXIMUM INJECTION SURFACE PRESSURE</u>
Section 1, Township 17 South <u>Range 34 East, NMPM</u>	
NVANU 3 No. 1, Unit J	3000 PSIG
NVANU 4A No. 1, Unit L	3200 PSIG
NVANU 5B No. 1, Unit P	3100 PSIG
NVANU 2A No. 1, Unit N	3200 PSIG
Section 12, Township 17 South <u>Range 34 East, NMPM</u>	
NVANU 14 No. 1, Unit D	3000 PSIG
NVANU 14 No. 2, Unit F	2700 PSIG





JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 5/1/92

WELL NAME: North Vacuum (Abo) North Unit 3 No. 1J
Lea County, New Mexico

92140598

PERFS = 8669 - 8719

PACKER DEPTH =

BHP GAUGE DEPTH = 8805

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)
1	11:45	2191.0				2191.0		
	11:50	2371.0	1.5	432.0	16.078	2354.9	12.60	
	11:55	2467.1	3.2	489.6	20.267	2446.8	14.28	
	12:00	2534.3	4.8	460.8	18.116	2516.2	13.44	
2				460.8				
	12:05	2472.8	7.7	835.2	54.436	2418.4	24.36	
	12:10	2849.7	10.7	864.0	57.960	2791.7	25.20	
	12:15	2918.3	13.6	835.2	54.436	2863.9	24.36	
3				845.0				
	12:20	3118.0	17.9	1238.4	112.815	3005.2	36.12	
	12:25	3201.9	22.2	1238.4	112.815	3089.1	36.12	
	12:30	3252.8	26.6	1267.2	117.717	3135.1	36.96	
4				1248.0				
	12:35	3406.7	32.3	1641.6	190.029	3216.7	47.88	
	12:40	3460.1	38.0	1641.6	190.029	3270.1	47.88	
	12:45	3485.5	43.7	1641.6	190.029	3295.5	47.88	
5				1641.6				
	12:50	3621.6	50.8	2044.8	285.285	3336.3	59.64	
	12:55	3673.7	57.9	2044.8	285.285	3388.4	59.64	
	1:00	3708.1	65.0	2044.8	285.285	3422.8	59.64	
6				2044.8				
	1:05	3846.7	73.6	2476.8	406.698	3440.0	72.24	
	1:10	3858.2	82.0	2419.2	389.374	3468.8	70.56	
	1:15	3891.2	90.5	2448.0	397.993	3493.2	71.40	
				2448.0				

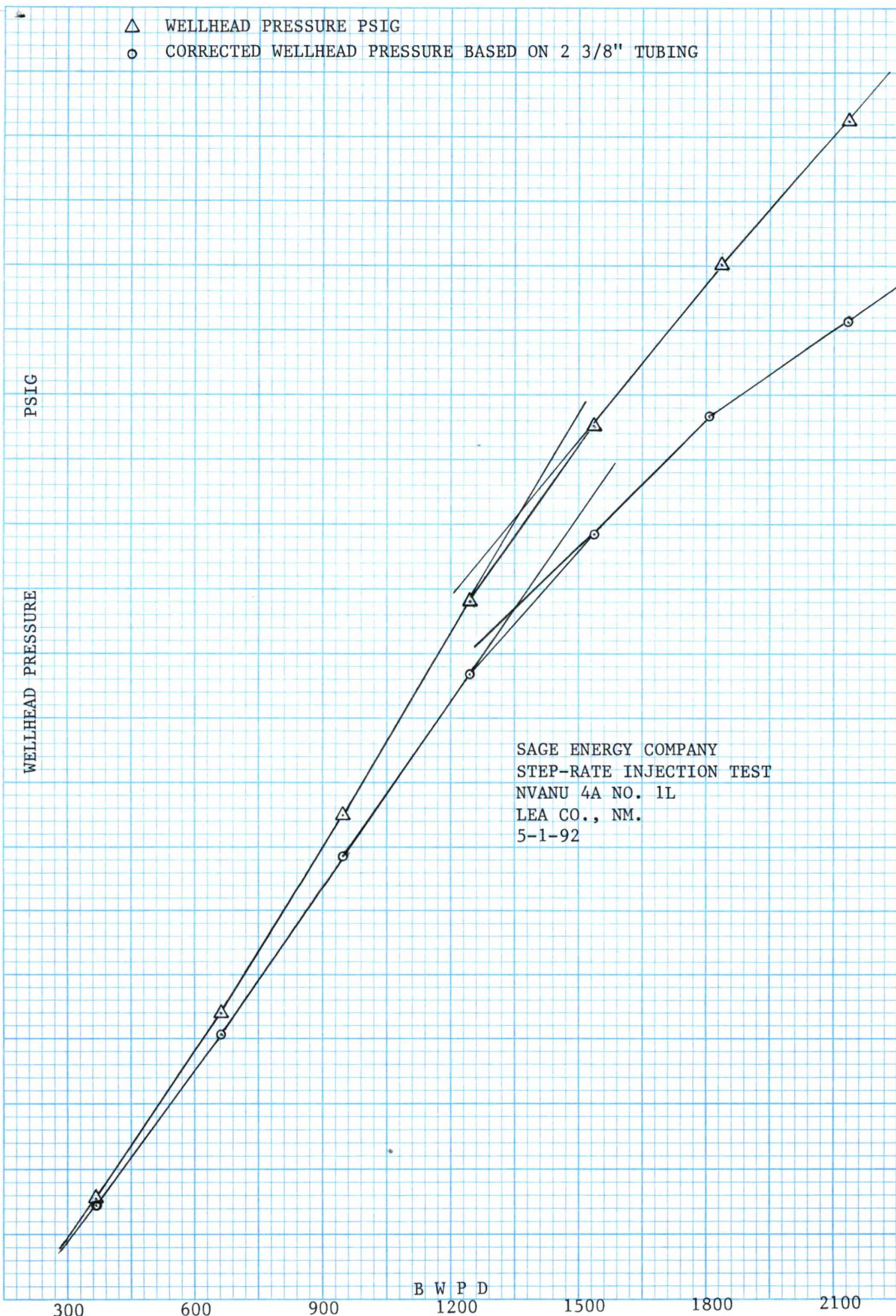
- △ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING

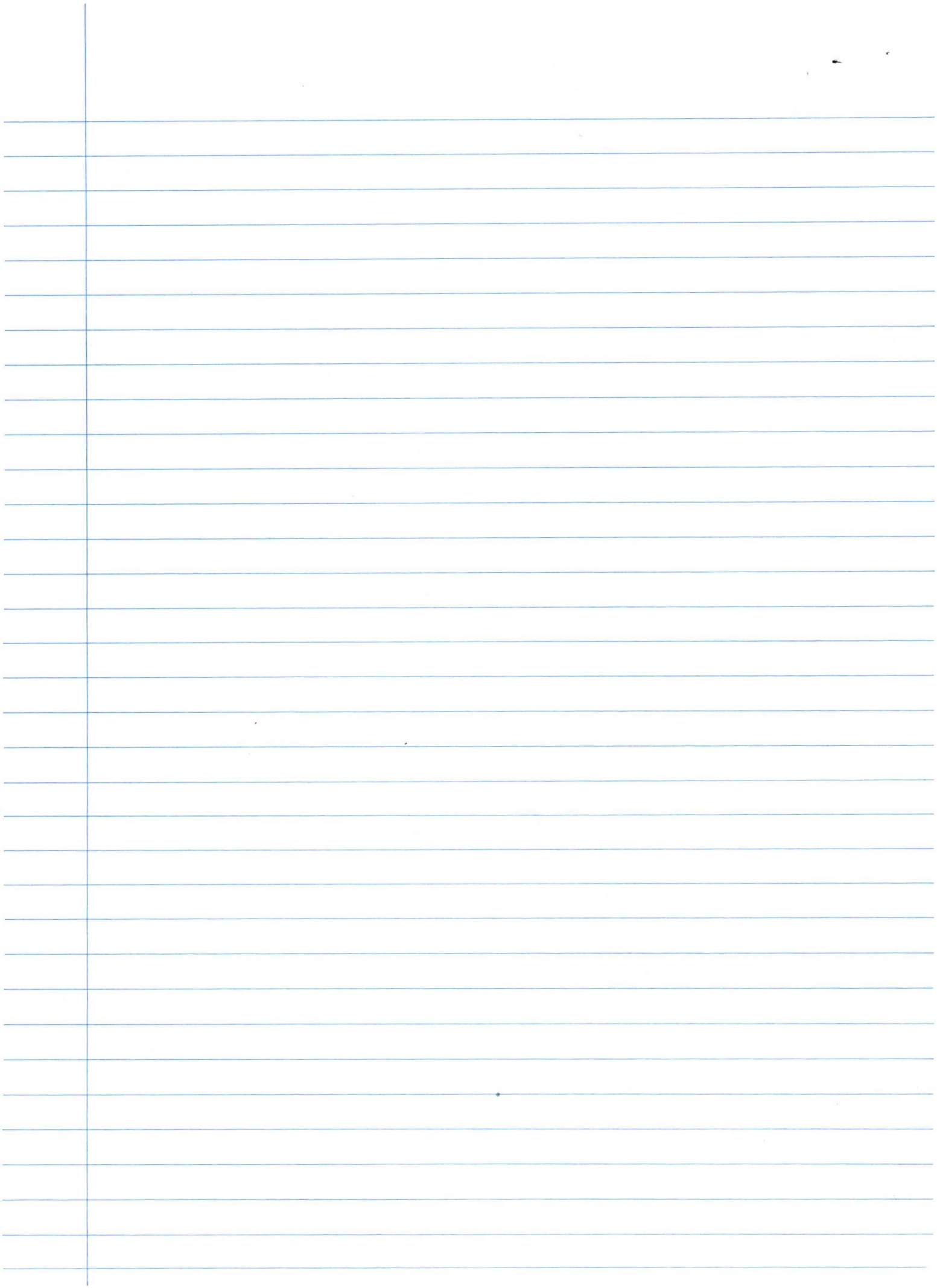
PSIG
WELLHEAD PRESSURE

SAGE ENERGY COMPANY
STEP-RATE INJECTION TEST
NVANU 4A NO. 1L
LEA CO., NM.
5-1-92

B W P D

300 600 900 1200 1500 1800 2100





JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 5/1/92

WELL NAME: North Vacuum (Abo) North Unit 4A No. 1L
Lea County, New Mexico

WO#: 92140598

PERFS = 8662 - 8683

PACKER DEPTH =

BHP GAUGE DEPTH = 8760

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)
1	8:50	2128.1				2128.1		
	8:55	2262.5	1.3	374.4	12.275	2250.2	10.92	
	9:00	2313.3	2.5	345.6	10.585	2302.7	10.08	
	9:05	2356.5	3.8	374.4	12.275	2344.2	10.92	
				364.8				
2	9:10	2504.7	6.1	662.4	35.271	2469.4	19.32	
	9:15	2581.0	8.4	662.4	35.271	2545.7	19.32	
	9:20	2639.5	10.7	662.4	35.271	2604.2	19.32	
3				662.4				
	9:25	2810.0	14.0	950.4	68.782	2741.2	27.72	
	9:30	2886.4	17.3	950.4	68.782	2817.6	27.72	
	9:35	2952.6	20.6	950.4	68.782	2883.8	27.72	
4				950.4				
	9:40	3119.3	24.9	1238.4	112.238	3007.1	36.12	
	9:45	3208.3	29.3	1267.2	117.115	3091.2	36.96	
	9:50	3280.8	33.6	1238.4	112.238	3168.6	36.12	
				1247.9				
5	9:55	3436.0	38.9	1526.4	165.248	3270.8	44.52	
	10:00	3500.9	44.2	1526.4	165.248	3335.7	44.52	
	10:05	3554.3	49.6	1555.2	171.062	3383.2	45.36	
				1536.0				
6	10:10	3698.1	56.0	1843.2	234.238	3463.9	53.76	
	10:15	3750.3	62.3	1814.4	227.512	3522.8	52.92	
	10:20	3801.1	68.7	1843.2	234.238	3566.9	53.76	
				1833.6				
7	10:25	3917.0	75.3	1900.8	247.960	3669.0	55.44	
	10:30	3966.5	82.7	2131.2	306.411	3660.1	62.16	
	10:35	4022.5	90.1	2131.2	306.411	3716.1	62.16	
				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)/34.2867	(7) MEASURED BHP (psi)
Fall-Off	10:36	3677.7				3677.7		
	10:37	3680.3				3680.3		
	10:38	3651.0				3651.0		
	10:39	3628.1				3628.1		
	10:40	3606.5				3606.5		
	10:41	3583.6				3583.6		
	10:42	3563.2				3563.2		
	10:43	3544.1				3544.1		
	10:44	3523.8				3523.8		
	10:45	3506.0				3506.0		

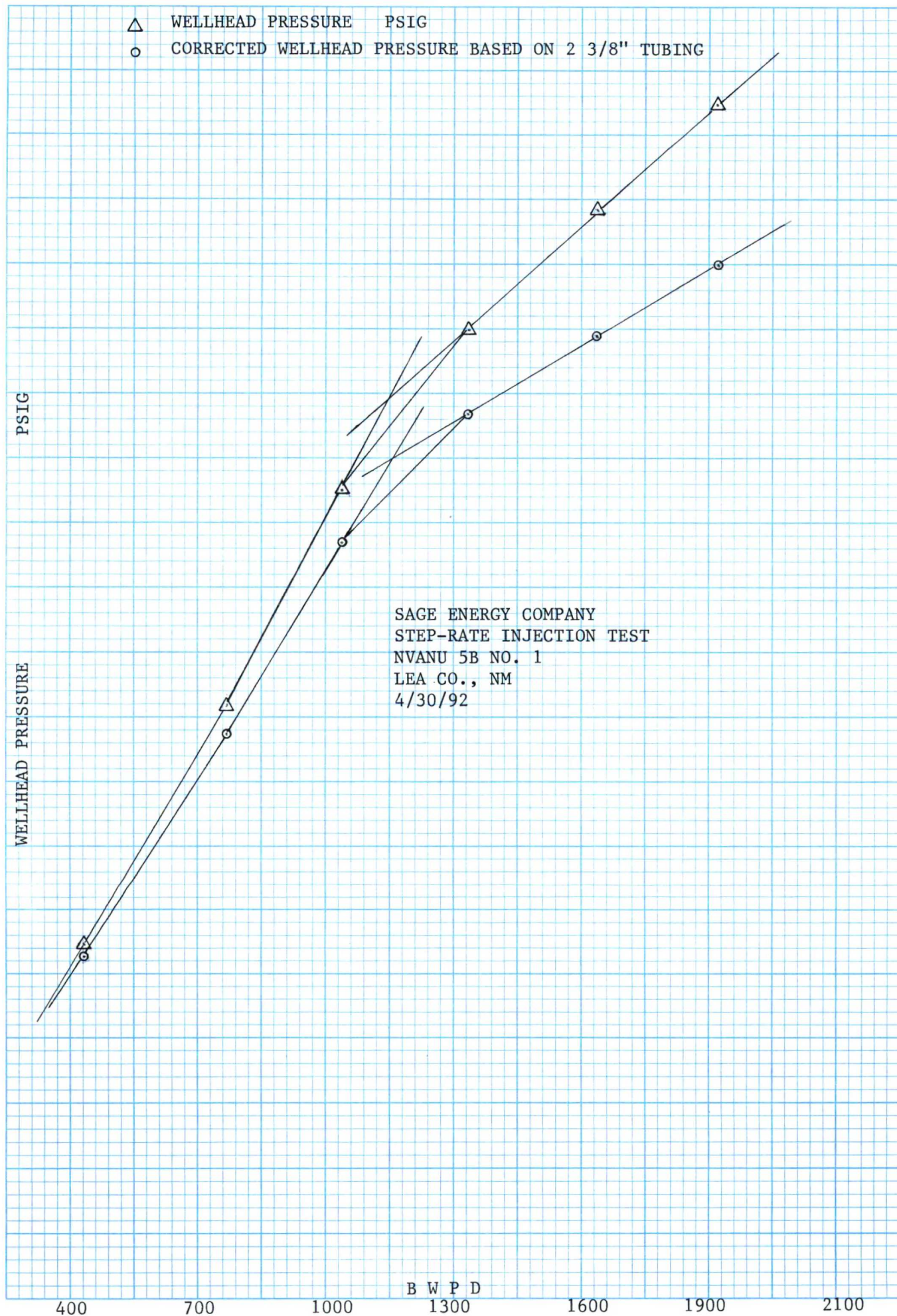
△ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING

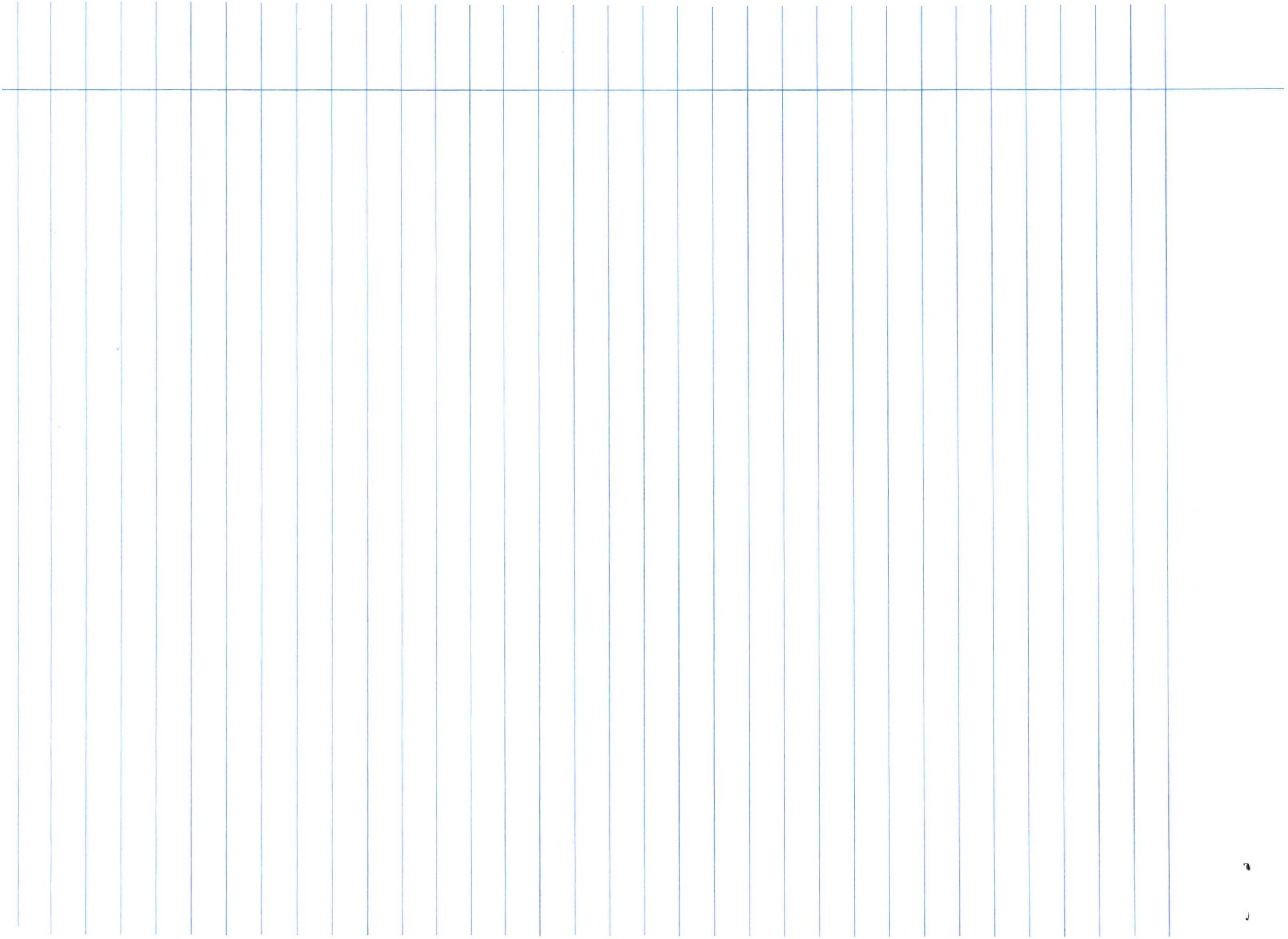
PSIG
WELLHEAD PRESSURE

SAGE ENERGY COMPANY
STEP-RATE INJECTION TEST
NVANU 5B NO. 1
LEA CO., NM
4/30/92

B W P D

400 700 1000 1300 1600 1900 2100





JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 4/30/92

WELL NAME: North Vacuum (Abo) North Unit 5 "B" No. 1
Lea County, New Mexico

WO#: 82140598

PERFS = 8712 - 8735

PACKER DEPTH =

BHP GAUGE DEPTH = 8798

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (5)/34.2857	(7) MEASURED BHP (psf)
1	11:35	2087.1				2087.1		
	11:40	2298.5	1.5	432.0	16.065	2282.4	12.60	
	11:45	2384.6	3.0	432.0	16.065	2368.5	12.60	
	11:50	2445.4	4.5	432.0	16.065	2429.3	12.60	
				432.0				
2	11:55	2644.8	7.2	777.6	47.657	2597.1	22.68	
	12:00	2740.2	9.9	777.6	47.657	2692.5	22.68	
	12:05	2819.1	12.5	748.8	44.443	2774.7	21.84	
3				768.0				
	12:10	3000.0	16.1	1036.8	81.146	2918.9	30.24	
	12:15	3092.5	19.7	1036.8	81.146	3011.4	30.24	
	12:20	3151.1	23.3	1036.8	81.146	3070.0	30.24	
4				1036.8				
	12:25	3297.3	28.0	1353.6	132.888	3164.4	39.48	
	12:30	3361.0	32.6	1324.8	127.705	3233.3	38.64	
	12:35	3399.1	37.2	1324.8	127.705	3271.4	38.64	
				1334.4				
5	12:40	3530.1	42.9	1641.6	189.877	3340.2	47.88	
	12:45	3551.7	48.5	1612.8	183.761	3367.9	47.04	
	12:50	3582.3	54.2	1641.6	189.877	3392.4	47.88	
				1632.0				
6	12:55	3712.0	60.9	1929.6	256.061	3455.9	56.28	
	1:00	3731.1	67.6	1929.6	256.061	3475.0	56.28	
	1:05	3747.6	74.2	1900.8	249.035	3498.6	55.44	
				1920.0				

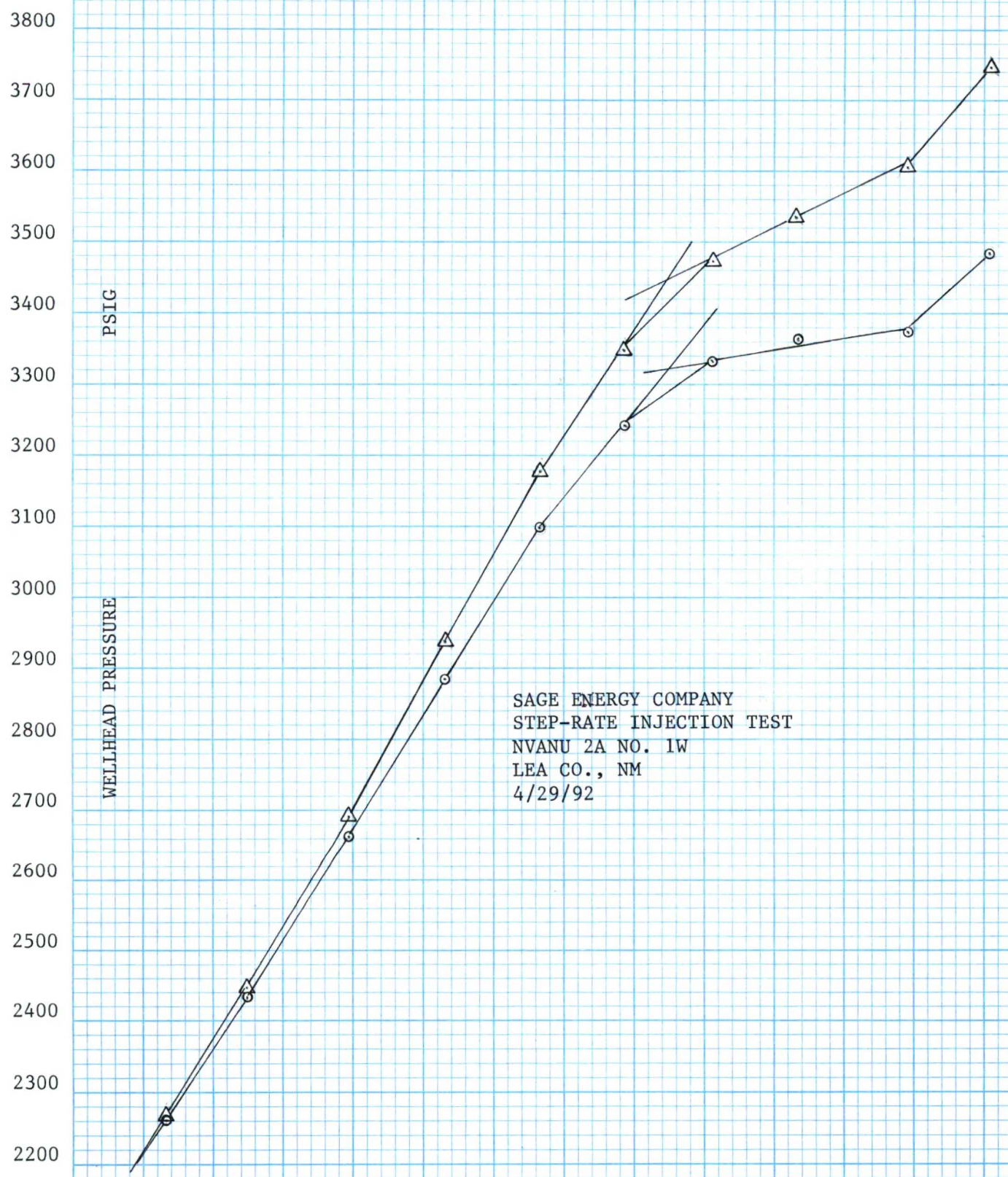
STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (ps)	(5) CORRECTED TUBING PRESS. (ps) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (ps)
Fall-Off	1:06	3409.3				3409.3		
	1:07	3413.1				3413.1		
	1:08	3401.6				3401.6		
	1:09	3392.7				3392.7		
	1:10	3386.4				3386.4		
	1:11	3380.0				3380.0		
	1:12	3372.4				3372.4		
	1:13	3367.3				3367.3		
	1:14	3361.0				3361.0		
	1:15	3354.6				3354.6		

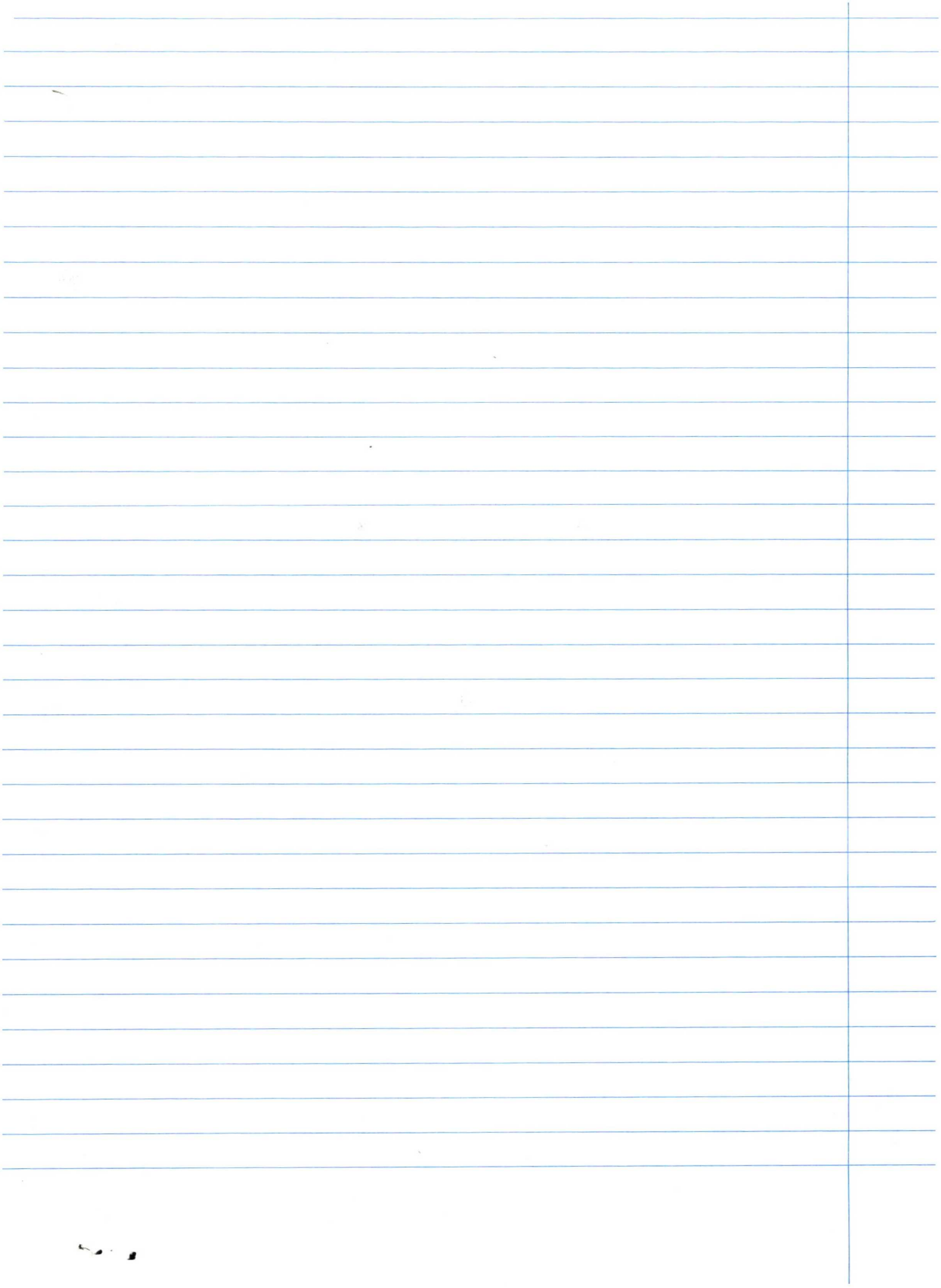
△ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING

WELLHEAD PRESSURE
PSIG

SAGE ENERGY COMPANY
STEP-RATE INJECTION TEST
NVANU 2A NO. 1W
LEA CO., NM
4/29/92

B W P D





JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 4/29/92

WELL NAME: North Vacuum (Abo) North Unit 2 "A" No. 1W
Lea County, New Mexico

WO#: 92140598

PERFS = 8590 - 8634

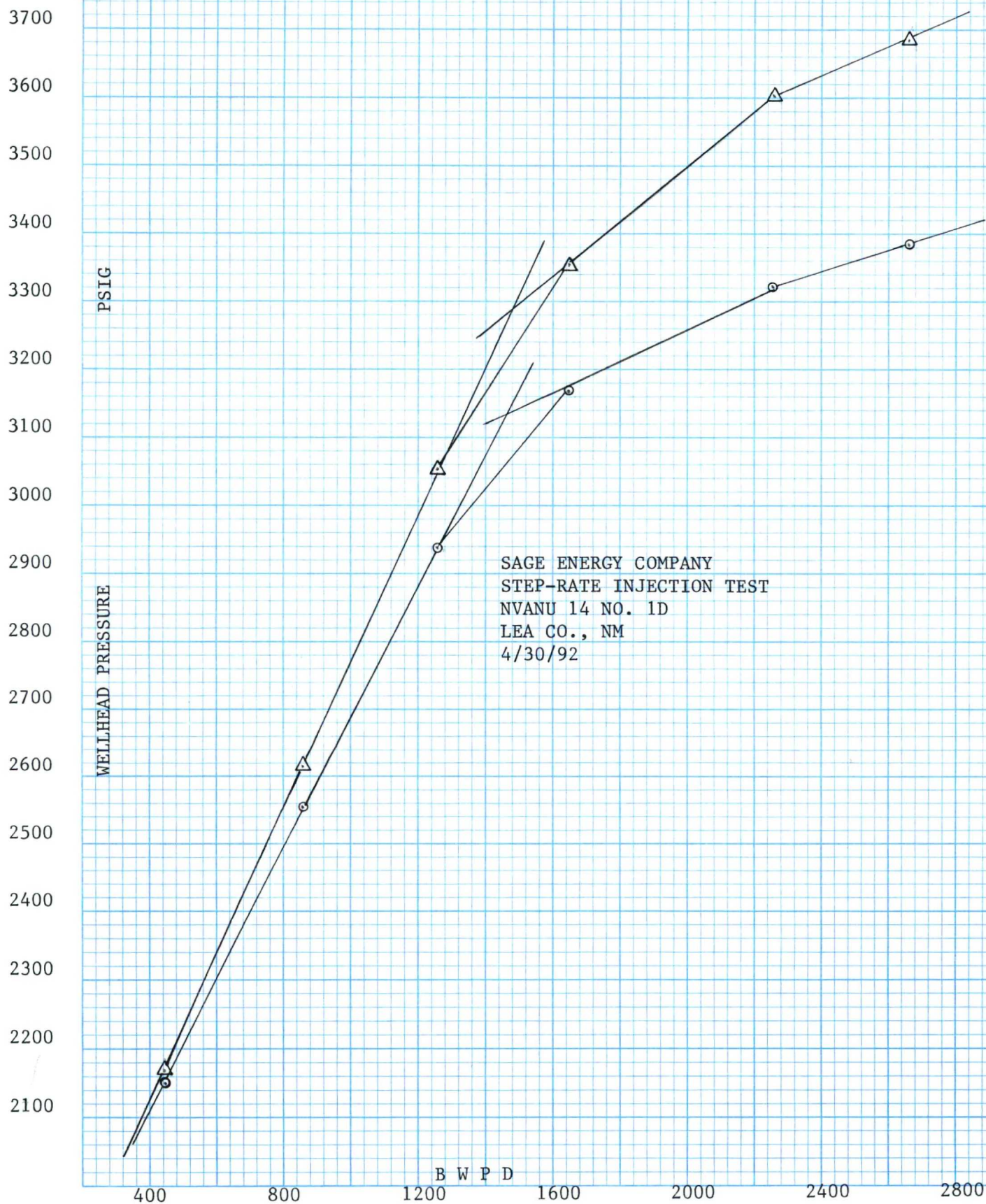
PACKER DEPTH =

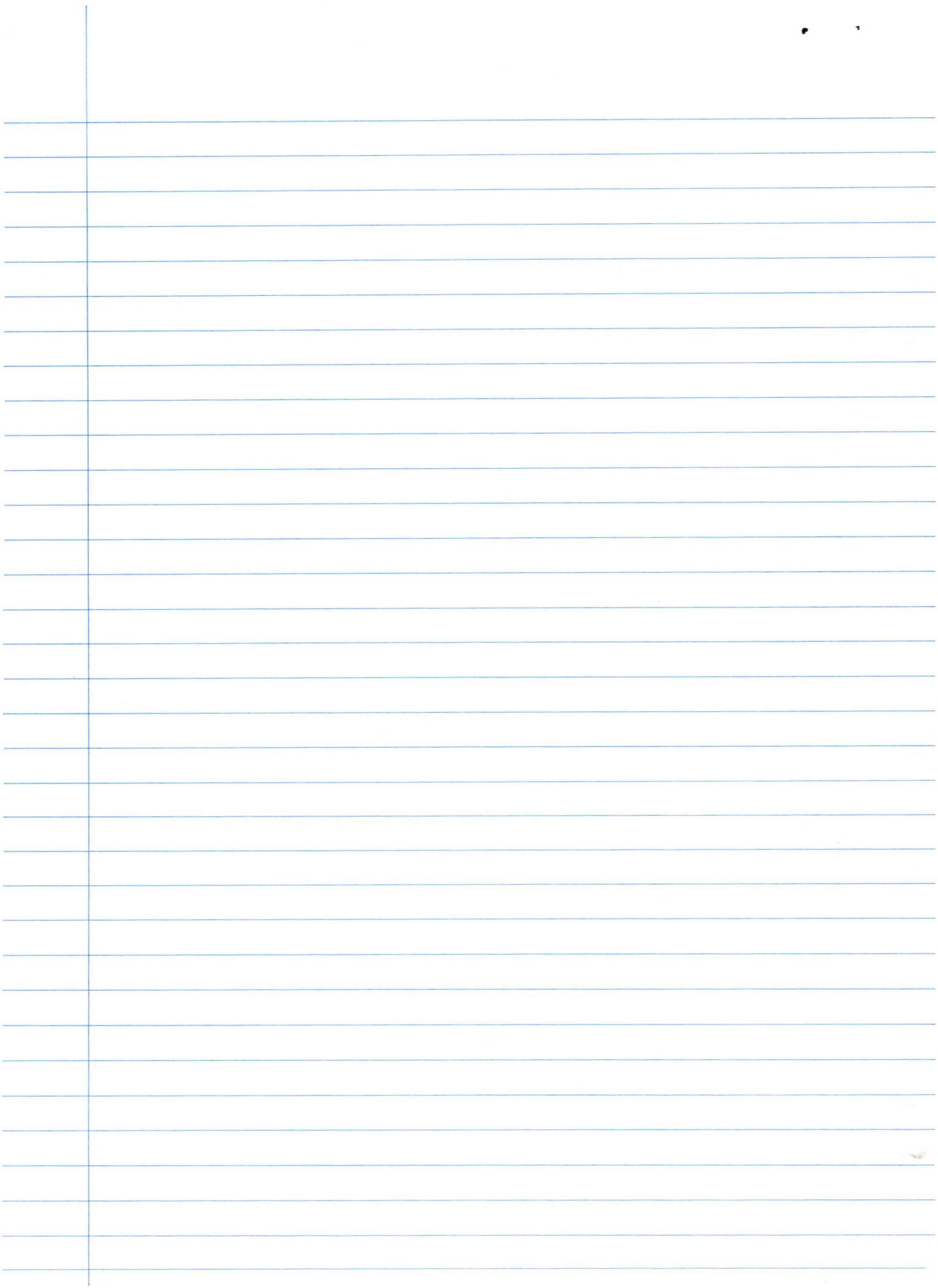
BHP GAUGE DEPTH = 8650

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)/34.2367	(7) MEASURED BHP (psi)
1	9:55	2132.4				2132.4		
	10:00	2202.1	0.8	230.4	4.937	2197.2	6.72	
	10:05	2243.9	1.7	259.2	6.139	2237.8	7.56	
	10:10	2266.8	2.6	259.2	6.139	2260.7	7.56	
2				249.6				
	10:15	2364.3	4.1	432.0	15.795	2348.5	12.60	
	10:20	2409.9	5.5	403.2	13.902	2396.0	11.76	
	10:25	2449.2	7.0	432.0	15.795	2433.4	12.60	
3				422.4				
	10:30	2577.3	9.3	662.4	34.828	2542.5	19.32	
	10:35	2644.8	11.5	633.6	32.079	2612.7	18.48	
	10:40	2693.1	13.7	633.6	32.079	2661.0	18.48	
4				643.2				
	10:45	2801.2	16.7	864.0	56.939	2744.3	25.20	
	10:50	2881.4	19.6	835.2	53.478	2827.9	24.36	
	10:55	2938.6	22.5	835.2	53.478	2885.1	24.36	
5				844.8				
	11:00	3051.8	26.2	1065.6	83.929	2967.9	31.08	
	11:05	3119.3	29.8	1036.8	79.780	3039.5	30.24	
	11:10	3179.0	33.4	1036.8	79.780	3099.2	30.24	
6				1046.4				
	11:15	3275.7	37.7	1238.4	110.829	3164.9	36.12	
	11:20	3316.4	42.0	1238.4	110.829	3205.6	36.12	
	11:25	3347.0	46.2	1209.6	106.108	3240.9	35.28	
7				1228.8				
	11:30	3409.3	51.2	1440.0	146.498	3262.8	42.00	
	11:35	3451.3	56.1	1411.2	141.124	3310.2	41.16	
	11:40	3474.2	61.0	1411.2	141.124	3333.1	41.16	
				1420.8				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psf)
8	11:45	3548.0	66.6	1612.8	180.670	3367.3	47.04	
	11:50	3555.6	72.2	1612.8	180.670	3374.9	47.04	
	11:55	3536.5	77.7	1584.0	174.746	3361.8	46.20	
9				1603.2				
	12:00	3573.4	84.1	1843.2	231.297	3342.1	53.76	
	12:05	3589.9	90.5	1843.2	231.297	3358.6	53.76	
	12:10	3605.2	96.9	1843.2	231.297	3373.9	53.76	
10				1843.2				
	12:15	3686.6	103.9	2016.0	273.004	3413.6	58.80	
	12:20	3708.2	111.0	2044.8	280.263	3427.9	59.64	
	12:25	3746.4	117.9	1987.2	265.832	3480.6	57.96	
Fall-Off				2016.0				
	12:26	3456.4				3456.4		
	12:27	3470.4				3470.4		
	12:28	3461.5				3461.5		
	12:29	3447.5				3447.5		
	12:30	3436.0				3436.0		
	12:31	3425.8				3425.8		
	12:32	3414.4				3414.4		
	12:33	3404.2				3404.2		
	12:34	3394.0				3394.0		
	12:35	3383.9				3383.9		

- △ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING





JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 4/30/92

WELL NAME: North Vacuum (Abo) North Unit 14 No. 1D
Lea County, New Mexico

WO#: 92140598

PERFS = 8559 - 8603

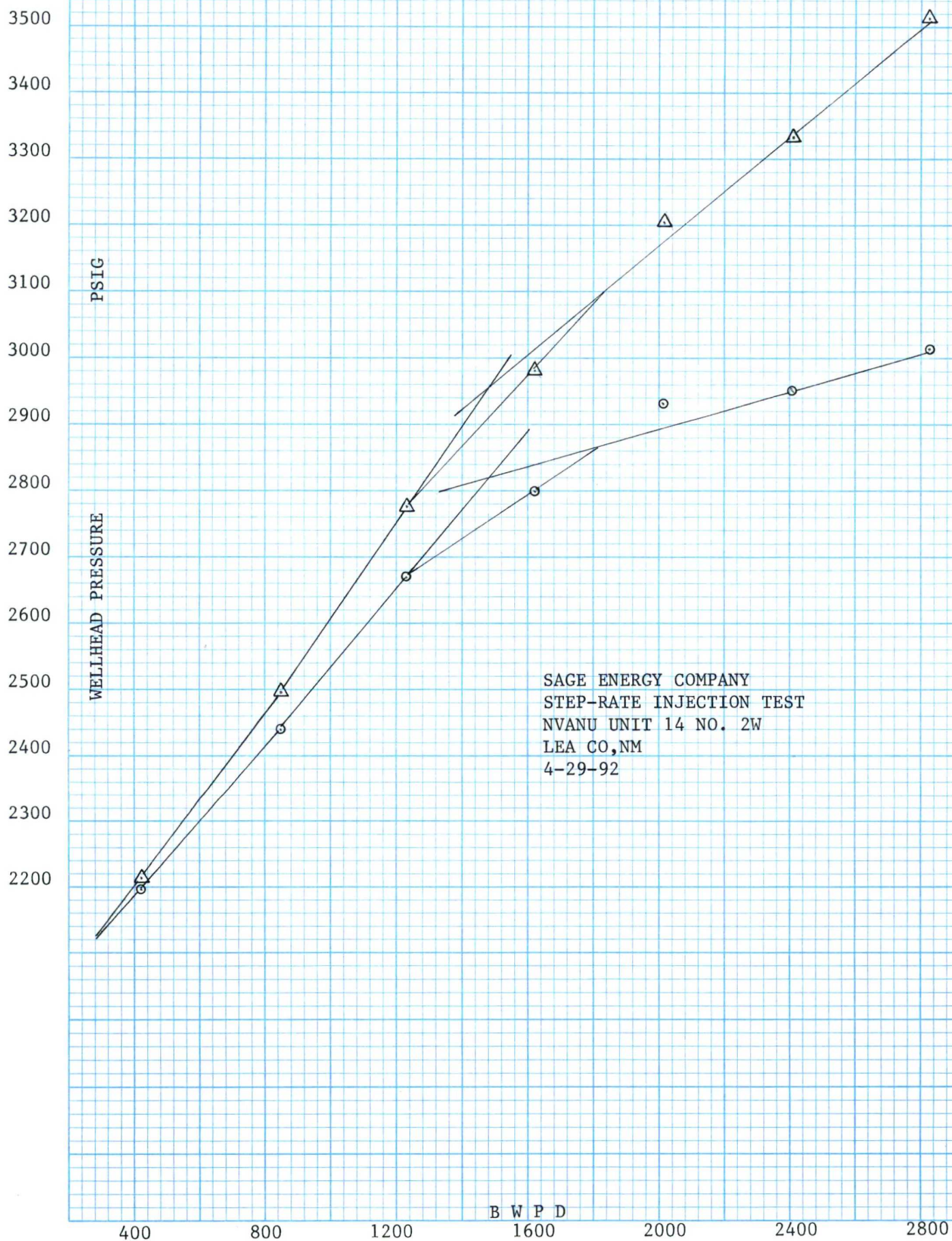
PACKER DEPTH =

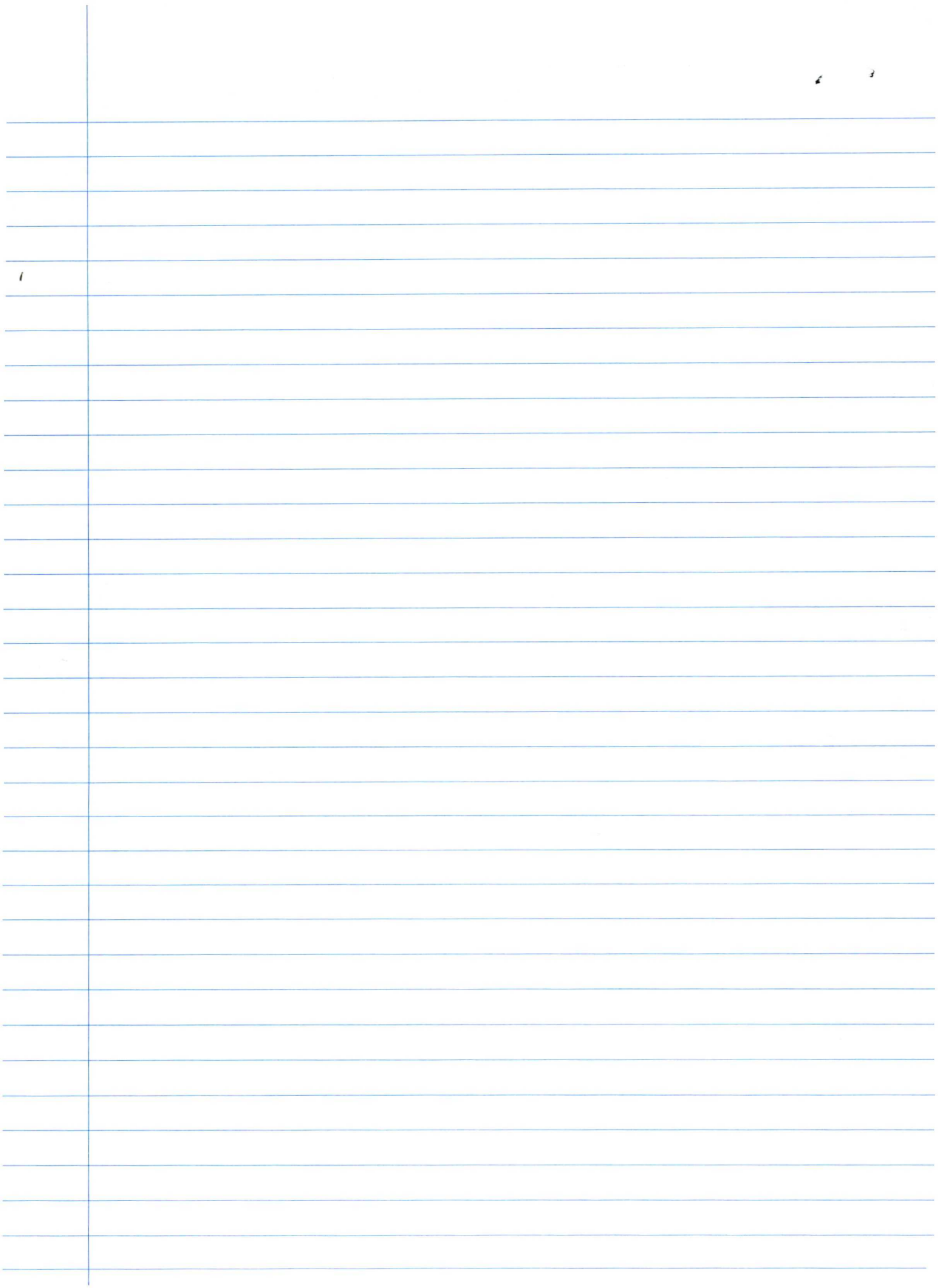
BHP GAUGE DEPTH = 8680

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (8)/34.2857	(7) MEASURED BHP (psf)
1	8:55	1850.9				1850.9		
	9:00	2029.7	1.5	432.0	15.849	2013.9	12.60	
	9:05	2107.2	3.1	460.8	17.859	2089.3	13.44	
	9:10	2168.1	4.6	432.0	15.849	2152.3	12.60	
2				441.6				
	9:15	2383.7	7.5	835.2	53.663	2330.0	24.36	
	9:20	2514.3	10.5	864.0	57.137	2457.2	25.20	
	9:25	2613.5	13.5	864.0	57.137	2556.4	25.20	
3				854.4				
	9:30	2867.7	17.8	1238.4	111.213	2756.5	36.12	
	9:35	2974.6	22.2	1267.2	116.045	2858.6	36.96	
	9:40	3054.9	26.6	1267.2	116.045	2938.9	36.96	
4				1257.6				
	9:45	3242.0	32.3	1641.6	187.331	3054.7	47.88	
	9:50	3303.2	38.0	1641.6	187.331	3115.9	47.88	
	9:55	3356.7	43.7	1641.6	187.331	3169.4	47.88	
5				1641.6				
	10:00	3519.6	50.9	2073.6	288.606	3231.0	60.48	
	10:05	3568.0	58.0	2044.8	281.235	3286.8	59.64	
	10:10	3602.4	65.1	2044.8	281.235	3321.2	59.64	
6				2054.4				
	10:15	3690.3	73.6	2448.0	392.343	3298.0	71.40	
	10:20	3667.4	82.1	2448.0	392.343	3275.1	71.40	
	10:25	3685.3	90.7	2476.8	400.925	3284.4	72.24	
				2457.6				

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) (8)/34.2857	(7) MEASURED BHP (psi)
Fall-Off	10:26	3292.1				3292.1		
	10:27	3298.5				3298.5		
	10:28	3278.1				3278.1		
	10:29	3264.1				3264.1		
	10:30	3251.4				3251.4		
	10:31	3238.7				3238.7		
	10:32	3226.0				3226.0		
	10:33	3214.6				3214.6		
	10:34	3201.9				3201.9		
	10:35	3189.2				3189.2		

△ WELLHEAD PRESSURE PSIG
○ CORRECTED WELLHEAD PRESSURE BASED ON 2 3/8" TUBING





JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: Sage Energy Company

DATE: 4/28/82

WELL NAME: North Vacuum (Abo) North Unit 14 No. 2W
Lea County, New Mexico

WO#: 92140598

PERFS = 8545 - 8596

PACKER DEPTH =

BHP GAUGE DEPTH = 8630

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	1:30	2044.2				2044.2		
	1:35	2136.7	1.4	403.2	13.870	2122.8	11.76	
	1:40	2182.2	2.9	432.0	15.758	2166.4	12.60	
	1:45	2213.9	4.4	432.0	15.758	2198.1	12.60	
2				422.4				
	1:50	2355.6	7.3	835.2	53.354	2302.2	24.36	
	1:55	2434.1	10.2	835.2	53.354	2380.7	24.36	
	2:00	2496.2	13.2	864.0	56.808	2439.4	25.20	
3				844.8				
	2:05	2657.6	17.5	1238.4	110.573	2547.0	36.12	
	2:10	2728.2	21.7	1209.6	105.863	2622.3	35.28	
	2:15	2778.4	26.0	1238.4	110.573	2667.8	36.12	
4				1228.8				
	2:20	2900.5	31.7	1641.6	186.252	2714.2	47.88	
	2:25	2929.7	37.3	1612.8	180.252	2749.4	47.04	
	2:30	2980.6	42.9	1612.8	180.252	2800.3	47.04	
5				1622.4				
	2:35	3118.0	49.9	2016.0	272.372	2845.6	58.80	
	2:40	3170.1	56.9	2016.0	272.372	2897.7	58.80	
	2:45	3204.5	63.9	2016.0	272.372	2932.1	58.80	
6				2016.0				
	2:50	3325.3	72.2	2390.4	373.273	2952.0	69.72	
	2:55	3321.5	80.6	2419.2	381.635	2939.9	70.56	
	3:00	3335.5	89.0	2419.2	381.635	2953.9	70.56	
7				2409.6				
	3:05	3462.7	98.8	2822.4	507.575	2955.1	82.32	
	3:10	3485.6	108.8	2880.0	526.904	2958.7	84.00	
	3:15	3515.0	118.5	2793.6	498.035	3017.0	81.48	
				2832.0				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psf)	(5) CORRECTED TUBING PRESS. (psf) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psf)
Fall - Off	3:16	3062.0				3062.0		
	3:17	3065.8				3065.8		
	3:18	3048.0				3048.0		
	3:19	3035.3				3035.3		
	3:20	3024.0				3024.0		
	3:25	2960.3				2960.3		