



# NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

**BILL RICHARDSON**

Governor

**Joanna Prukop**

Cabinet Secretary

**Lori Wrotenbery**

Director

**Oil Conservation Division**

October 8, 2003

ChevronTexaco  
15 Smith Road  
Midland, Texas 79705

Attn: Mr. Garrett Luig

**Re:   Injection Pressure Increase  
      North Vacuum Abo West Unit Well No. 3H  
      API: 30-025-224495  
      Surface Location: Unit L, Section 15,  
      Township 17 South, Range 34 East, NMPM,  
      Lea County, New Mexico**

Dear Mr. Luig:

Reference is made to your request received in the Santa Fe office of the New Mexico Oil Conservation Division on September 9, 2003, to increase the surface injection pressure on the above-referenced horizontal water injection well. This request is based on a step rate test conducted on this well on March 7, 2002. The test results have been reviewed and we feel an increase in injection pressure is justified at this time.

Without modifying the tubing size or type (2-3/8 inch plastic coated), you are authorized to inject **at or below 3,800-psi surface injection pressure.**

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,

Lori Wrotenbery

Director

cc:   Oil Conservation Division – Hobbs  
      Files: Case No. 7400, PMX-213, IPI-209

9/9/03

IPI

LR

PLR0325335290

DRC

September 5, 2003

**ChevronTexaco**

New Mexico Oil Conservation Division  
1220 So. St. Francis Drive  
Santa Fe, New Mexico 87505

**RECEIVED**

SEP 09 2003

Attn: Mr. David Catanach

**OIL CONSERVATION  
DIVISION**

**RE: Injection Pressure Increase  
North Vacuum Abo West Unit Well #3H  
Unit Letter L, Section 15, Township 17-S, Range 34-E  
Lea County, New Mexico**

Dear Mr. Catanach,

ChevronTexaco is requesting permission to increase the surface injection pressure on North Vacuum Abo West Unit Well #3H (API No. 30-025-24495) from 3050 psig to 3800 psig. The surface location of this well is 1980' from the South line and 660' from the West line of Section 15, Unit Letter L, Township 17-S, Range 34-E, Lea County, New Mexico. The well location is shown on the surface map attached.

In April 2002, the New Mexico OCD granted approval to increase the surface injection pressure to 3050 psig based on a step rate test conducted March 7, 2002. The step rate test and the NMOCD approval are attached. After further analysis, ChevronTexaco concludes that the frac pressure on this well is greater than 3050 psig.

The step rate plot (surface pressure versus injection rate) submitted in 2002 uses a representative point for each "step." Steps 4, 5, 6, and 7 should have been omitted because the injection rate was not held constant. The next attachment, entitled "Corrected Step Rate Test," excludes these steps, and the parting pressure can clearly be seen at a surface tubing pressure of 3850 psig. In addition, there is an attachment entitled "Step Rate Test, Raw Data," which uses every point from the step rate test. This also shows the break to be around 3850 psig. As a result, ChevronTexaco is requesting permission to increase the surface injection pressure limit to 3800 psig.

It should also be noted that the majority of the wells in the field have surface pressure limits above 4000 psig. On June 6, 1997, the NMOCD granted approval to increase injection pressure on 13 wells. This approval letter is also attached. Please notice the injection pressure limit on Well #2 is 4075 psig. This well is directly at the toe of horizontal well #3H, and the two wells are completed in the same zone. The frac pressures should be very similar.

ChevronTexaco has difficulty obtaining good step rate data on the horizontal injection wells in this field. After being shut-in they will take large volumes of water for a short

time, and the pump trucks can not handle the high pressures at high rates. We hope the current data will suffice, but we are willing to try another test if you feel it is necessary.

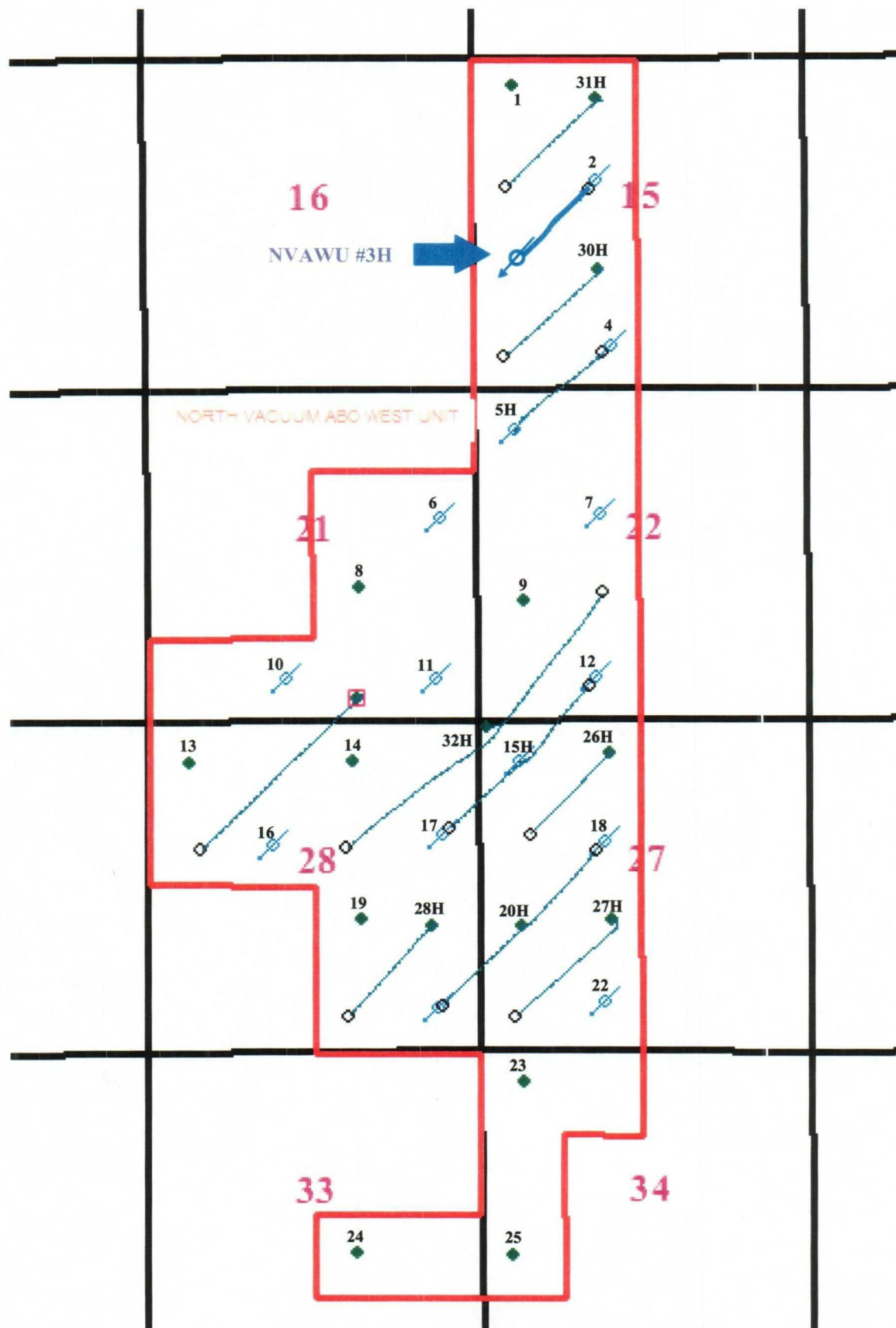
If you would like to discuss the step rate plots or I can provide you with any other information, please contact me.

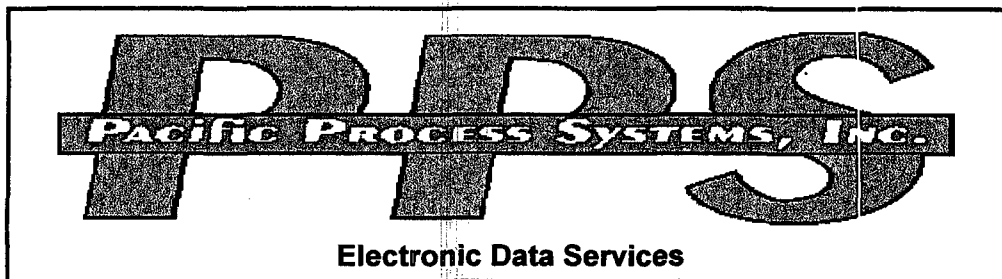
Sincerely,

Garrett Luig  
Petroleum Engineer  
ChevronTexaco

15 Smith Road  
Midland, TX 79705  
Tel. (432) 687-7298  
Fax. (432) 687-7871

# North Vacuum Abo West Unit





# *Step Rate Injection Test Report*

*for*

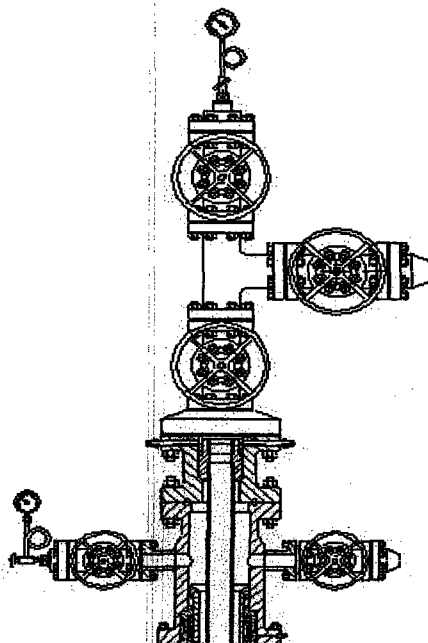
*Chevron / Texaco*

*NVAWU #3*

*0*

*Sec.15 - T17S - R34E*

*03-07-02*



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COMPANY : Chevron / Texaco  
WELL: NVAWU #3  
COMPANY REP: Britton McQuien  
PERFORATIONS: N/A

SERVICE DATES : 03-07-02  
TEST TYPE : Step Rate  
PPS TECHNICIANS : Joe Brown

DATE	TIME	REMARKS
3/7/02	9:20	Open up well with 24" at surface. Start pumping at 17.0 Bbl/day.
03/07/02	10:15	Start test.
03/07/02	10:20	
03/07/02	10:25	
03/07/02	10:30	Rate #1
03/07/02	10:35	
03/07/02	10:40	
03/07/02	10:45	Rate #2
03/07/02	10:50	
03/07/02	10:55	
03/07/02	11:00	Rate #3
03/07/02	11:05	
03/07/02	11:10	
03/07/02	11:15	Rate #4
03/07/02	11:20	
03/07/02	11:25	
03/07/02	11:30	Rate #5
03/07/02	11:35	
03/07/02	11:40	
03/07/02	11:45	Rate #6
03/07/02	11:50	
03/07/02	11:55	
03/07/02	12:00	Rate #6
03/07/02	12:05	
03/07/02	12:10	
03/07/02	12:15	Rate #7
03/07/02	12:20	
03/07/02	12:25	
03/07/02	12:30	Rate #8
03/07/02	12:35	
03/07/02	12:40	
03/07/02	12:45	Rate #9
03/07/02	12:50	
03/07/02	12:55	
03/07/02	13:00	Start Fall off. Reached Truck pump limit.
03/07/02	13:01	



COMPANY : Chevron / Texaco  
WELL: NVAWU #3  
COMPANY REP: Britton McQuien  
PERFORATIONS: N/A

SERVICE DATES : 03-07-02  
TEST TYPE : Step Rate  
PPS TECHNICIANS : Joe Brown

DATE	TIME	REMARKS
03/07/02	10:15	Start test.
03/07/02	13:02	
03/07/02	13:03	
03/07/02	13:04	
03/07/02	13:05	
03/07/02	13:06	
03/07/02	13:07	
03/07/02	13:08	
03/07/02	13:09	
03/07/02	13:10	
03/07/02	13:15	End Test.





COMPANY : Chevron / Texaco  
 WELL: NVAWU #3  
 COMPANY REP: Britton McQuien  
 PERFORATIONS: N/A

SERVICE DATES : 03-07-02  
 TEST TYPE : Step Rate  
 PPS TECHNICIANS : Joe Brown

STEP NO.	TIME	SURFACE TUBING PRESS.	CUMULATIVE VOL INJECTED	INJECTION RATE	INJECTION RATE (gpm)	MEASURED BHP
	10:15	47.6				
	10:20	101.9	4.4	1271.1	37.07	
	10:25	156.6	8.8	1268.5	37.00	
1	10:30	332.8	13.9	1470.6	42.89	
	10:35	439.7	19.5	1606.8	46.86	
	10:40	521.8	25.1	1607.3	46.88	
2	10:45	575.5	30.7	1607.2	46.88	
	10:50	875.0	37.8	2047.5	59.72	
	10:55	998.0	44.9	2048.8	59.76	
3	11:00	1048.2	52.1	2066.0	60.26	
	11:05	1364.3	60.5	2421.0	70.61	
	11:10	1469.6	69.0	2445.7	71.33	
4	11:15	1538.0	77.4	2439.4	71.15	
	11:20	1874.6	86.2	2517.5	73.43	
	11:25	1702.4	95.2	2610.4	76.14	
5	11:30	1876.7	104.6	2703.2	78.84	
	11:35	1844.4	114.3	2796.1	81.55	
	11:40	1934.5	124.2	2853.1	83.22	
6	11:45	2126.9	134.2	2877.0	83.91	
	11:50	2425.3	144.7	3003.2	87.59	
	11:55	2477.0	155.7	3168.5	92.41	
7	12:00	2563.7	166.6	3158.3	92.12	
	12:05	2916.5	178.9	3529.0	102.93	
	12:10	2972.3	191.3	3591.9	104.76	
8	12:15	3046.4	203.9	3622.2	105.65	
	12:20	3416.8	218.3	4128.3	120.41	
	12:25	3453.7	232.5	4112.7	119.95	
9	12:30	3539.1	246.8	4119.2	120.14	
	12:35	3888.4	262.3	4445.9	129.67	
	12:40	3871.7	277.8	4457.6	130.01	
10	12:45	3931.1	293.7	4585.3	133.74	
	12:50	4009.9	310.5	4846.9	141.37	
	12:55	4043.5	327.6	4922.9	143.59	



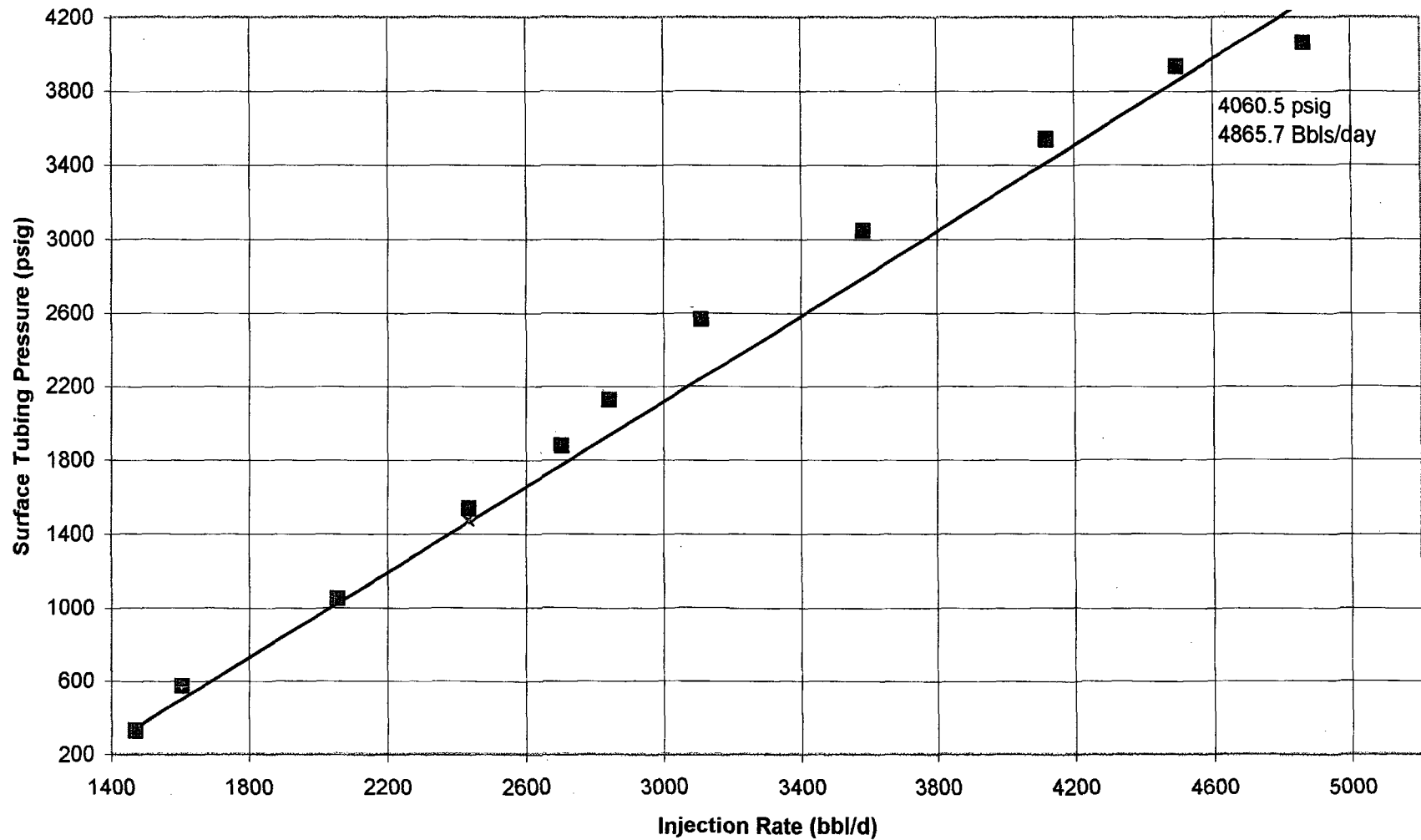
COMPANY : Chevron / Texaco  
 WELL: NVAWU #3  
 COMPANY REP: Britton McQuien  
 PERFORATIONS: N/A

SERVICE DATES : 03-07-02  
 TEST TYPE : Step Rate  
 PPS TECHNICIANS : Joe Brown

STEP NO.	TIME	SURFACE TUBING PRESS.	CUMULATIVE VOL INJECTED	INJECTION RATE	INJECTION RATE (gpm)	MEASURED BHP
<b>Falloff</b>	13:00	4060.5	344.4	4827.3	140.80	
	13:01	2552.0				
	13:02	2529.5				
	13:03	2470.3				
	13:04	2429.4				
	13:05	2392.1				
	13:06	2358.5				
	13:07	2327.6				
	13:08	2298.8				
	13:09	2271.3				
	13:10	2247.4				
	13:15	2141.6				

# *Pacific Process Systems, Inc.*

## Step Rate Injection Test





# NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON

Governor

Betty Rivera  
Cabinet Secretary

April 17, 2002

Lori Wrotenbery

Director

Oil Conservation Division

ChevronTexaco  
15 Smith Road  
Midland, Texas 79705

Attn: Mr. Britton McQuien

**Re: Injection Pressure Increase  
North Vacuum Abo West Unit No. 3  
North Vacuum Abo West Unit No. 5  
Lea County, New Mexico**

Dear Mr. McQuien:

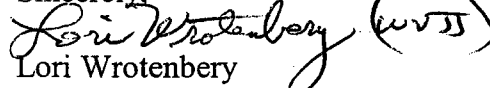
Reference is made to your request dated April 1, 2002, to increase the surface injection pressure on the above referenced North Vacuum Abo West (NVAW) wells. These horizontal injection wells are both located in Township 17 South, Range 34 East, NMPM, Lea County, New Mexico. This request is based on a step rate tests conducted on the wells on March 7, 2002. After reviewing test results, we feel an increase in injection pressure is justified at this time.

These wells are equipped with 2 3/8" coated tubing and injection packer. With size and type of tubing remaining the same, you are authorized to increase the surface injection pressure to the following:

Well and Location	Maximum Surface Injection Pressure
NVAW No. 3 (API: 30-025-24495 Surface in Unit L, Section 15)	3050 PSIG Water
NVAW No. 5 (API: 30-025-24112 Surface in Unit D, Section 22)	3400 PSIG Water

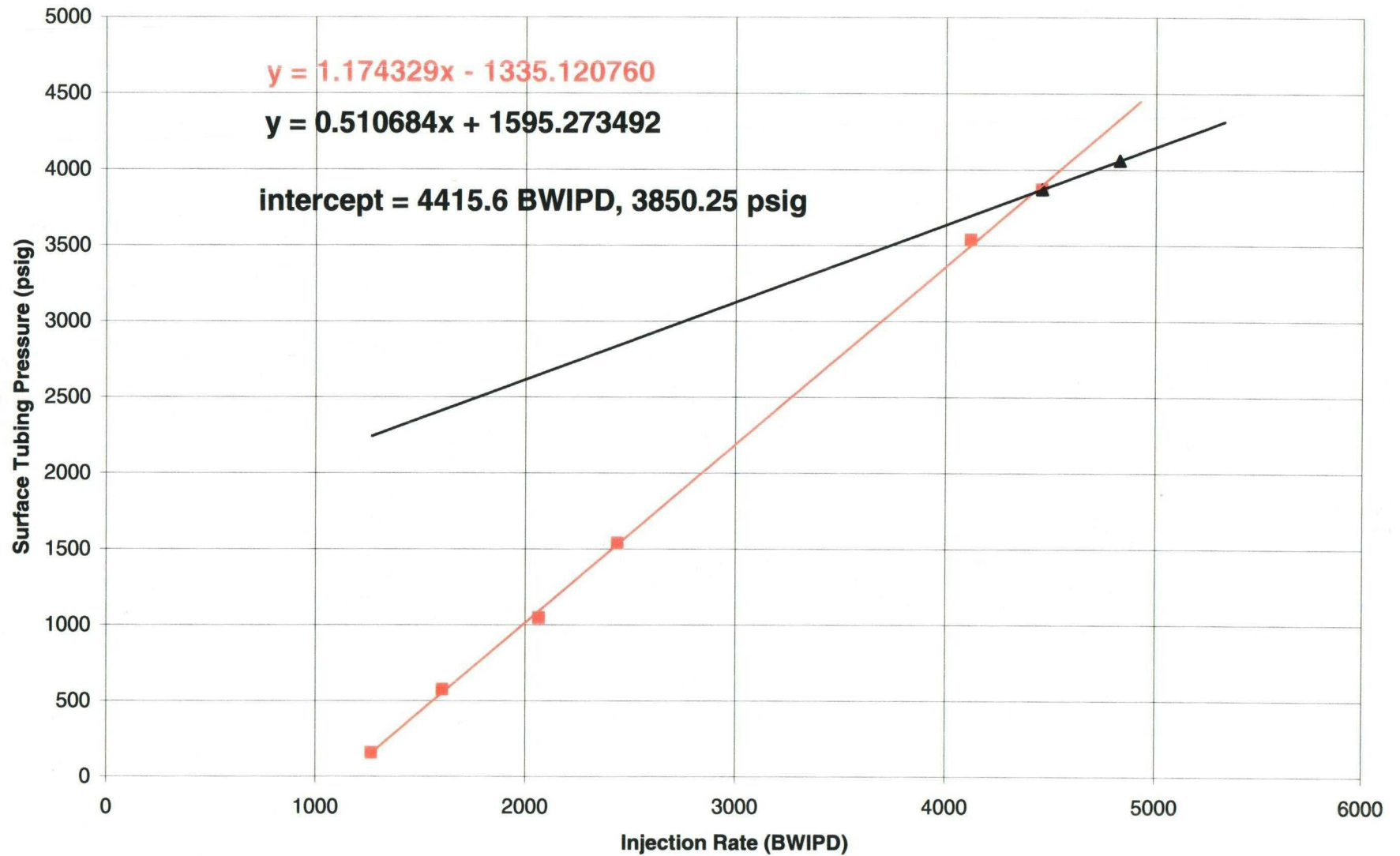
The Division Director may rescind this injection pressure increase if it becomes apparent that the injected water is not being confined to the injection zone or is endangering any fresh water aquifers.

Sincerely,

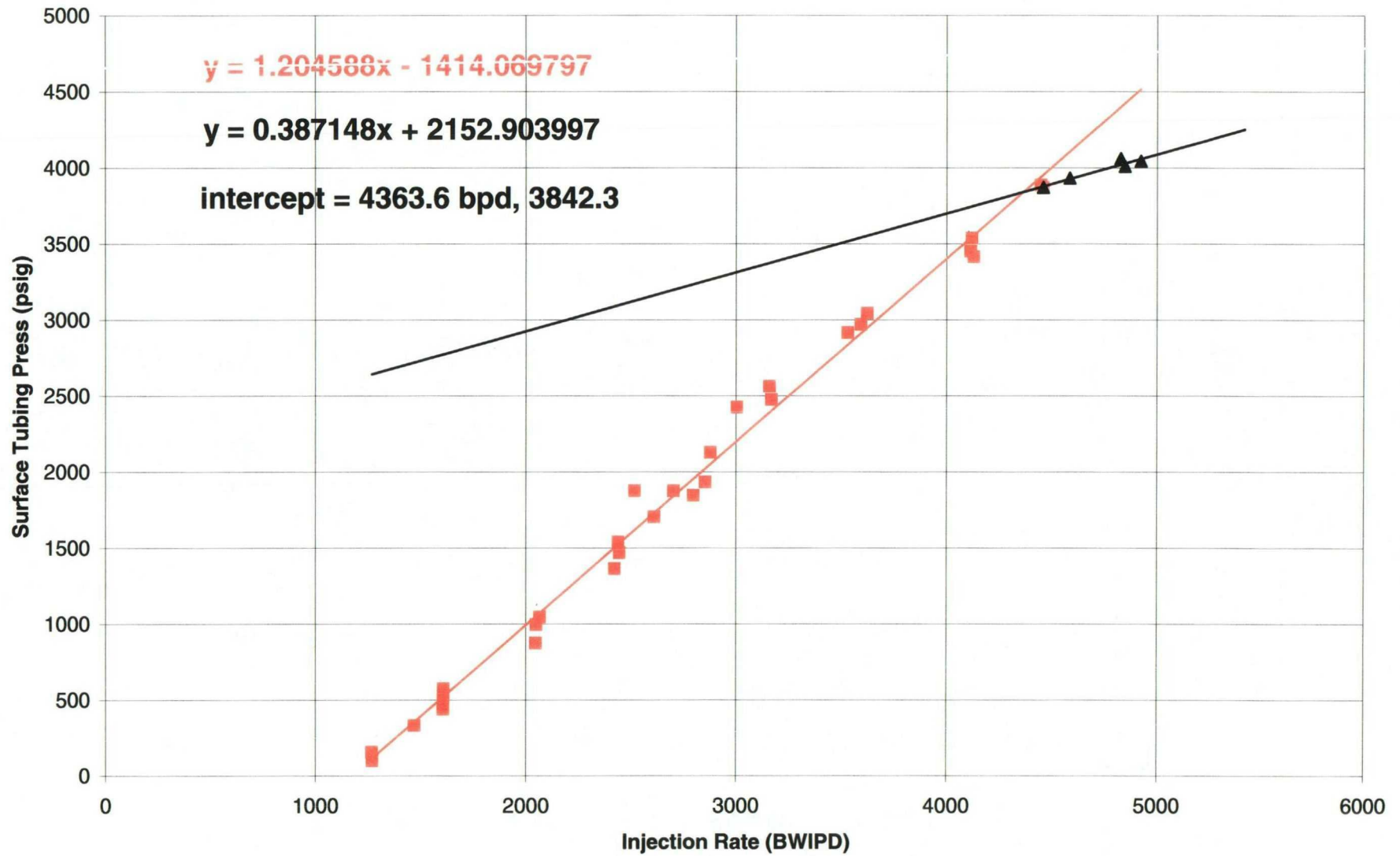
  
Lori Wrotenbery  
Director

cc: Oil Conservation Division - Hobbs  
Files: Case No. 7400; PMX 213; IPI 2002

### Corrected Step Rate Test (NVAWU #3H)



### Step Rate Test, Raw Data (NVAWU #3H)



COMPANY: Chevron / Texaco  
WELL: NVAWU #3  
COMPANY REP: Britton McQuien  
PERFORATIONS: N/A

SERVICES DATE: 03/07/02  
TEST TYPE: Step Rate  
PPS TECHNICIANS: Joe Brown

STEP NO.	TIME	SURFACE TUBING PRESS. (psig)	CUMULATIVE VOL INJECTED (bbls)	INJECTION RATE (bbls/day)	INJECTION RATE (gpm) (3)/34.2857	MEASURED BHP (psi)
1	10:15	47.6				
	10:20	101.9	4.4	1271.1	37.07	
	10:25	156.6	8.8	1268.5	37.00	
	10:30	332.8	13.9	1470.6	42.89	
	10:35	439.7	19.5	1606.8	46.87	
	10:40	521.8	25.1	1607.3	46.88	
	10:45	575.5	30.7	1607.2	46.88	
2	10:50	875.0	37.8	2047.5	59.72	
	10:55	998.0	44.9	2048.8	59.76	
	11:00	1048.2	52.1	2066.0	60.26	
3	11:05	1364.3	60.5	2421.0	70.61	
	11:10	1469.6	69.0	2445.7	71.33	
	11:15	1538.0	77.4	2439.4	71.15	
omit data	11:20	1874.6	86.2	2517.5	73.43	
	11:25	1702.4	95.2	2610.4	76.14	
	11:30	1876.7	104.6	2703.2	78.84	
	11:35	1844.4	114.3	2796.1	81.55	
	11:40	1934.5	124.2	2853.1	83.22	
	11:45	2126.9	134.2	2877.0	83.91	
	11:50	2425.3	144.7	3003.2	87.59	
	11:55	2477.0	155.7	3168.5	92.41	
	12:00	2563.7	166.6	3158.3	92.12	
	12:05	2916.5	178.9	3529.0	102.93	
	12:10	2972.3	191.3	3591.9	104.76	
	12:15	3046.4	203.9	3622.2	105.65	
8	12:20	3416.8	218.3	4128.3	120.41	
	12:25	3453.7	232.5	4112.7	119.95	
	12:30	3539.1	246.8	4119.2	120.14	
9	12:35	3888.4	262.3	4445.9	129.67	
	12:40	3871.7	277.8	4457.6	130.01	
10	12:45	3931.1	293.7	4585.3	133.74	
	12:50	4009.9	310.5	4846.9	141.37	
	12:55	4043.5	327.6	4922.9	143.58	
	13:00	4060.5	344.4	4827.3	140.80	



NEW MEXICO ENERGY, MINERALS  
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION  
2040 South Pacheco Street  
Santa Fe, New Mexico 87505  
(505) 827-7131

June 6, 1997

Texaco Exploration & Production, Inc.  
P.O. Box 730  
Hobbs, New Mexico 88241-0730

Attn: Mr. Robert McNaughton

**RE:    *Injection Pressure Increase,  
North Vacuum Abo West Waterflood Unit,  
Lea County, New Mexico***

Dear Mr. McNaughton:

Reference is made to your request dated March 31, 1997 to increase the surface injection pressure on 13 wells in the above referenced project. This request is based on step rate tests conducted on these wells between March 4 and 26, 1997. The results of the tests have been reviewed by my staff and we feel an increase in injection pressure all of the wells is justified at this time.

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

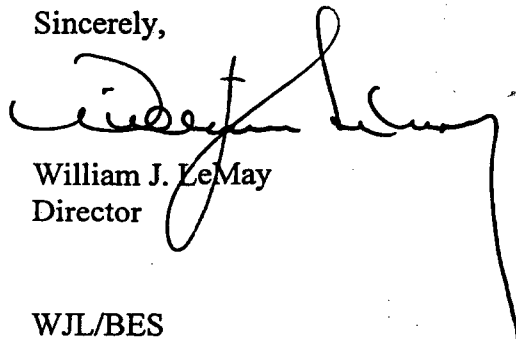
<i>Well and Location</i>	<i>Maximum Surface Injection Pressure</i>
North Vacuum Abo West Unit Well No.2 Unit Letter F, Section 15, Township 15 South, Range 34 East	4075 PSIG
North Vacuum Abo West Unit Well No.4 Unit Letter N, Section 15, Township 15 South, Range 34 East	4300 PSIG
North Vacuum Abo West Unit Well No.6 Unit Letter H, Section 21, Township 15 South, Range 34 East	4300 PSIG
North Vacuum Abo West Unit Well No.7 Unit Letter F, Section 22, Township 15 South, Range 34 East	4250 PSIG
North Vacuum Abo West Unit Well No.10 Unit Letter N, Section 21, Township 15 South, Range 34 East	4500 PSIG
North Vacuum Abo West Unit Well No.11 Unit Letter P, Section 21, Township 15 South, Range 34 East	4385 PSIG



<i>Well and Location</i>	<i>Maximum Surface Injection Pressure</i>
North Vacuum Abo West Unit Well No.12 Unit Letter N, Section 22, Township 15 South, Range 34 East	4275 PSIG
North Vacuum Abo West Unit Well No.16 Unit Letter F, Section 28, Township 15 South, Range 34 East	4165 PSIG
North Vacuum Abo West Unit Well No.17 Unit Letter H, Section 28, Township 15 South, Range 34 East	4135 PSIG
North Vacuum Abo West Unit Well No.18 Unit Letter F, Section 27, Township 15 South, Range 34 East	4285 PSIG
North Vacuum Abo West Unit Well No.21 Unit Letter P, Section 28, Township 15 South, Range 34 East	4100 PSIG
North Vacuum Abo West Unit Well No.22 Unit Letter N, Section 27, Township 15 South, Range 34 East	4110 PSIG
North Vacuum Abo West Unit Well No.25 Unit Letter L, Section 34, Township 18 South, Range 34 East	3870 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

cc: Oil Conservation Division - Hobbs  
Files: 3<sup>rd</sup> Q97 PSI-X; Case File No.7400