



TONEY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

March 25, 1986



1935 - 1985

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

Cabot Petroleum Corporation
P. O. Box 5001
Pampa, Texas 79065

Attention: George A. Forrest

Re: Injection Pressure Increase
J. L. Reed No. 3
Lea County, New Mexico

Dear Sir:

Reference is made to your request of February 25, 1986 to increase the surface injection pressure on you J. L. Reed No. 3 SWD Well. This request is based on a step rate test conducted on the well on February 19, 1986. The results of the test have been received by my staff and we feel an increase in injection pressure on this well is justified at this time.

You are therefore authorized to increase your surface injection pressure on the following well.

<u>Well & Location</u>	<u>Maximum Injection Surface Pressure</u>
J. L. Reed No. 3 Section 35, T-13S, R-37E, Lea County, New Mexico	1800 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 it is endangering any fresh water aquifers.

Sincerely,

R. L. Stamets
Director

cc: OCD - Hobbs
SWD - 286 File
Donna McDonald



CABOT PETROLEUM CORPORATION

OIL AND GAS
DRILLING AND PRODUCTION

806/669-2581

P. O. BOX 5001, PAMPA, TEXAS 79065

February 25, 1986

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Attn: Mr. Richard L. Stamets

Re: J. L. Reed #3 SWD
Step Rate Test

Gentlemen:

Reference is made to the attached "Step Rate Injection Test" by John West Engineering Company, dated 2-19-86. The injection tests indicate a possible fracture pressure of 1650 psi without friction; this surface tubing pressure is 1852 psi, with friction at 92 gallons per minute (i.e. 3154 BWPD Injection Rate). Reference is made to my attached calculations.

Also attached for your convenience is a plat showing the well located 1980 FNL and 1650 FEL, Unit G, Section 35-T13S-R37E, Lea County, New Mexico, and copy of Form C-103.

We respectfully request that our pressure limit on this well be administratively set at 1800 psi. Please advise.

Sincerely,

George A. Forrest
Senior Petroleum Engineer

GAF:nb
Attachemnt

cc: New Mexico Conservation Commission
P. O. Box 1980
Hobbs, New Mexico
Attn: Jerry Sexton, District Director

Rodney Boyd - Pampa
Dave Jodie - Houston

JOHN WEST ENGINEERING CO.
Step Rate Injection Test

CO. Name CABOT CORPORATION

Well Name J.L. REED NO. 3

DATE	TIME	Surface Pressure	BHP	Bbls./Day	Totalizer	REMARKS
2-19-86	2:00 P.M.	550				St. Test
	2:01	550				
	2:06	730			125	
	2:11	770			253	
	2:16	810		868.57	380	
	2:21	980			227	
	2:26	1040			448	
	2:31	1070		1556.5	681	
	2:36	1260			323	
	2:41	1290			646	
	2:46	1340		2054.85	899	
	2:51	1580			450	
	2:56	1640			900	
	3:01	1680		3085.	1350	
	3:06	1870			510	
	3:11	1920			1014	
2-19-86	3:16	1960		3508.57	1535	

Step Rate Injection Test

CO. Name CABOT CORPORATION

Well Name J. L. REED NO. 3

[illegible]

SURFACE PRESSURE WITH FRICTION

CABOT CORPORATION

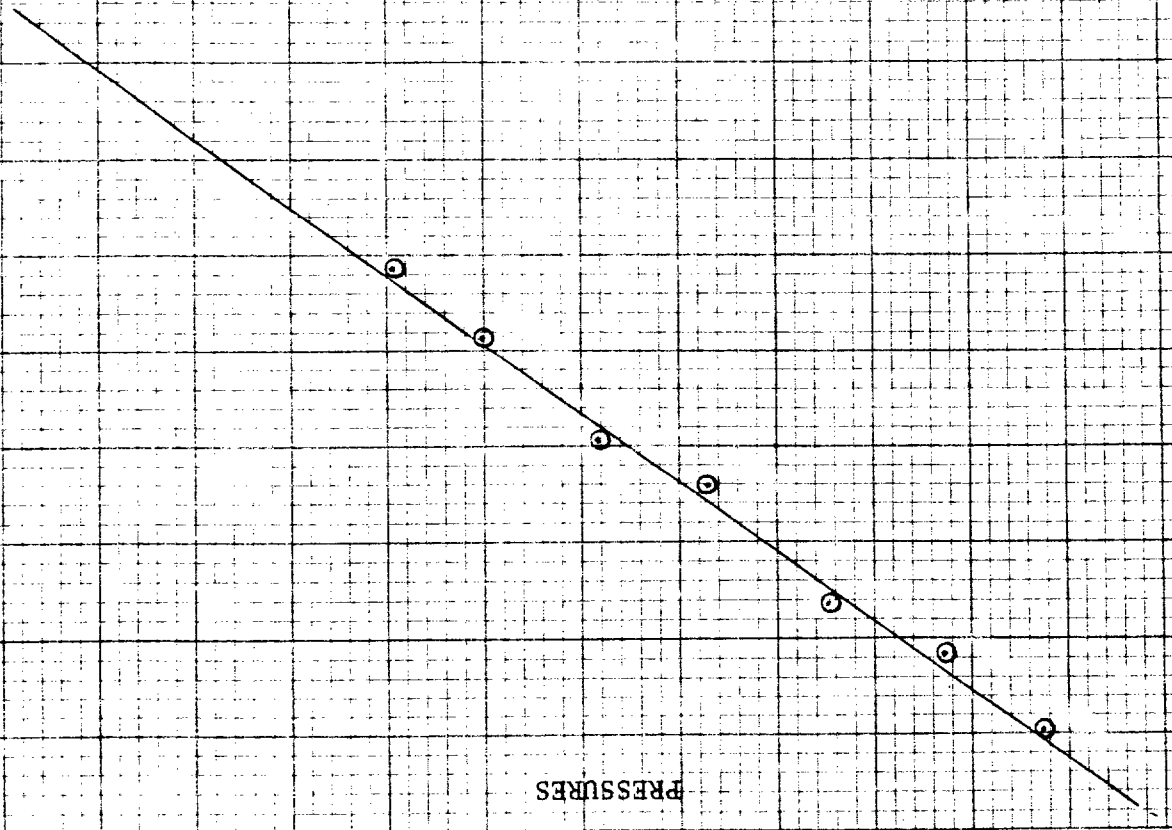
J.L. REED NO. 3

FEBRUARY 19, 1986

PRESSURES

2750
2500
2250
2000
1750
1500
1250
1000
750
500

25 50 75 100 125 150 175 200 225 250 275 300



JOHN WEST ENGINEERING CO.
STEP RATE INJECTION TEST

CABOT CORPORATION
J.L. REED NO. 3
FEBRUARY 19, 1986

	<u>FRICTION</u>	<u>SURFACE PRESSURE</u>	<u>W/O FRICTION</u>
1st Rate	18.48	810	791.52
2nd	54.92	1070	1015.18
3rd	91.6	1340	1248.4
4th	194.28	1680	1485.72
5th	246.37	1960	1713.63
6th	373.29	2250	1876.71
7th	474.6	2490	2015.4

POINTS TO PLOT

	<u>RATE GPM</u>	<u>SURFACE PRESSURE W/O FRICTION</u>
1st Rate	25.236	791.52
2nd	45.40	1015.18
3rd	59.93	1248.4
4th	90.00	1485.72
5th	102.33	1713.63
6th	128.10	1876.71
7th	145.80	2015.4

Friction was determined using Hazen Williams Formula

C = 1.50

Q = Volume

D = Diameter

SURFACE PRESSURE WITHOUT FRICTION

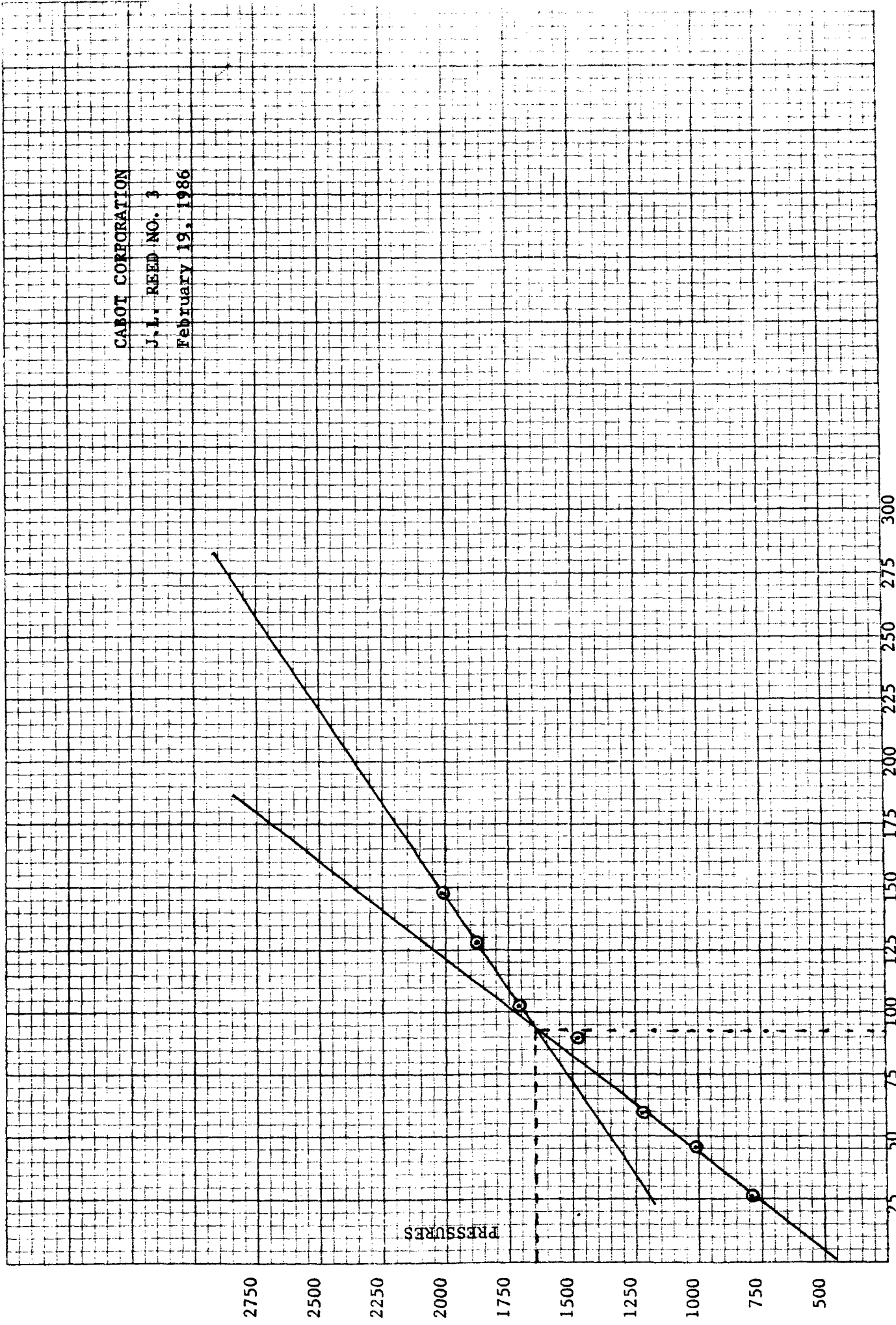
CAROT CORPORATION

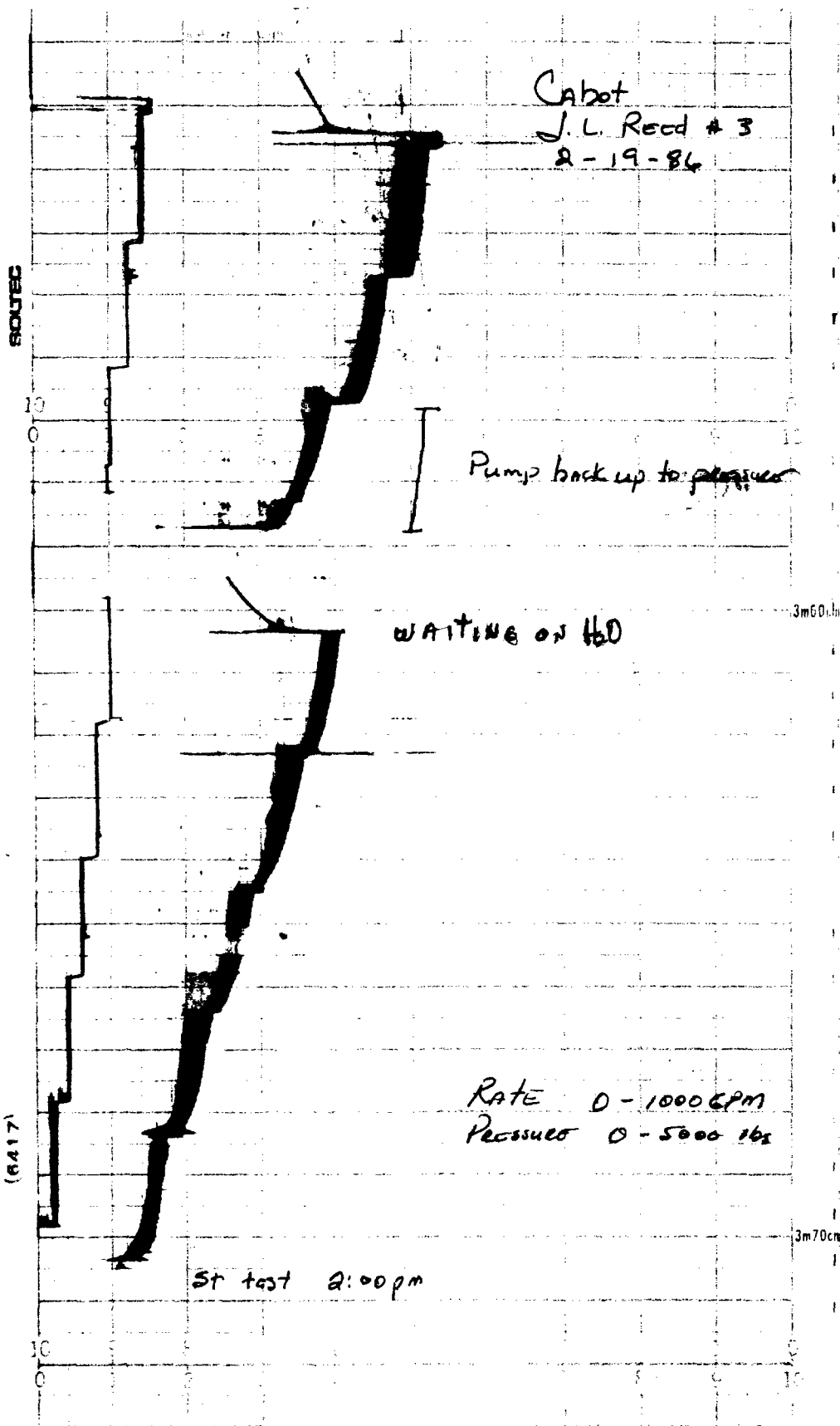
J.L. REED NO. 3

February 19, 1986

PRESSURES

GPM





Cabot
J.L. Reed #3
2-19-86

Pump back up to pressure

waiting on H₂O

RATE 0-1000 GPM
Pressure 0-5000 lbs

St test 2:00pm

Calculation of Apparent frac gradient:

$$\text{at } 92 \text{ GPM} \quad f = \left(\frac{460}{(2.15)^{4.87}} \right) \left(\frac{92}{150} \right)^{1.85} = 4.48$$

$$\Delta P_{\text{friction}} = 45.07 \times 4.48 = \underline{\underline{202 \text{ psi}}}$$

Therefore Apparent frac pressure is at 92 GPM (i.e. 3154 BWPD Injection rate) and 1852 psi surface tubing pressure.

Injection fluid (saltwater) specific gravity was 1.07

$$\text{Hydrostatic Head} = (1.07)(.433)(4507') = 2088 \text{ psi}$$

$$\text{BHP@ } 4507' = 2088 + 1650 = 3738 \text{ psi@ Frac}$$

$$\text{Therefore Frac Gradient} = 3738 \text{ psi} / 4507'$$

$$= \underline{\underline{0.83 \text{ psi/ft.}}}$$

by George Forrest
~~George Forrest~~
Senior Petroleum Engineer
Cabot Petroleum Corp.

CABOT PETROLEUM CORPORATION

J. L. REED SWD No. 3

1980 FNL & 1650 FEL, Unit G,

Sec. 35, T13S, R37E

Lea County, New Mexico

2-19-86 Step Rate Test

Reed #3 SWD injection string is 2 7/8 Tubing Lined internally with Sealtite PVC; I.D. of PVC = 2.15 inches.

Check of Friction Pressure Calculations using Hazen Williams formula:

$$f = \left(\frac{460}{d^{4.87}} \right) \left(\frac{q}{c} \right)^{1.85} = \text{friction loss in psi per 100 feet of pipe}$$

$c = 150 \text{ for PVC}$

1st Rate

$$f = \left(\frac{460}{(2.15)^{4.87}} \right) \left(\frac{25.236}{150} \right)^{1.85} = 0.409 \text{ psi/100'}$$

$$\Delta P_{\text{friction}} = 45.07 \text{ Hundred Feet} \times 0.409 = \underline{\underline{18.43 \text{ psi}}}$$

2nd Rate

$$f = (11.0607) \left(\frac{45.4}{150} \right)^{1.85} = 1.212$$

$$\Delta P_{\text{friction}} = 45.07 \times 1.212 = \underline{\underline{54.62 \text{ psi}}}$$

3rd Rate

$$f = (11.0607) \left(\frac{59.93}{150} \right)^{1.85} = 2.026$$

$$\Delta P_{\text{friction}} = 45.07 \times 2.026 = \underline{\underline{91.3 \text{ psi}}}$$

4th Rate

$$f = (11.0607) \left(\frac{90}{150} \right)^{1.85} = 4.299$$

$$\Delta P_{\text{friction}} = 45.07 \times 4.299 = \underline{\underline{193.75 \text{ psi}}}$$

5th Rate

$$f = (11.0607) \left(\frac{108.33}{150} \right)^{1.85} = 5.452$$

$$\Delta P_{\text{friction}} = 45.07 \times 5.452 = \underline{\underline{245.72 \text{ psi}}}$$

6th Rate

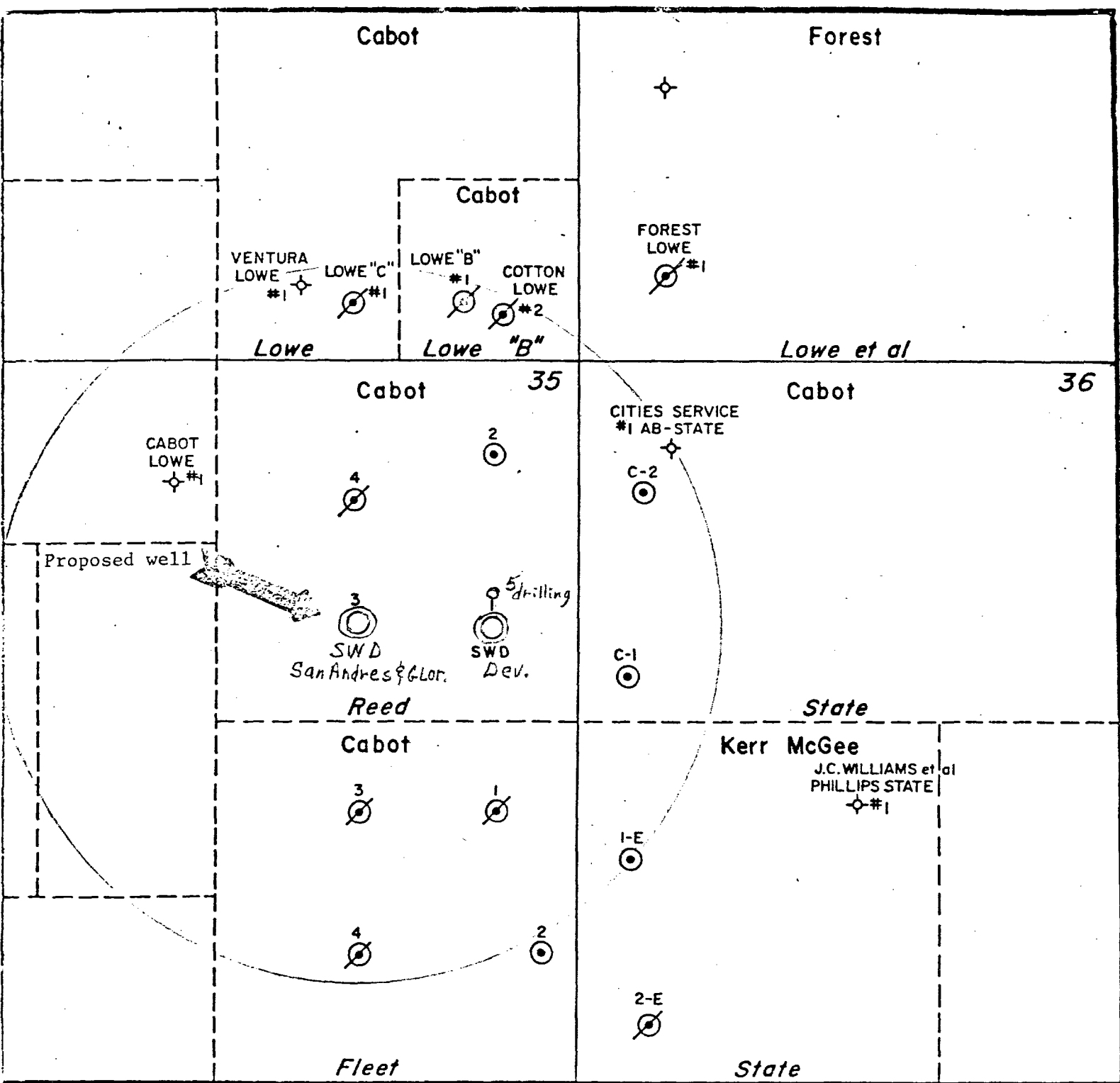
$$f = (11.0607) \left(\frac{128.1}{150} \right)^{1.85} = 8.26$$

$$\Delta P_{\text{friction}} = 45.07 \times 8.26 = \underline{\underline{372.28 \text{ psi}}}$$

7th Rate

$$f = (11.0607) \left(\frac{145.8}{150} \right)^{1.85} = 10.495$$

$$\Delta P_{\text{friction}} = 45.07 \times 10.495 = \underline{\underline{473.00 \text{ psi}}}$$



**CABOT CORPORATION**
MIDLAND, TEXAS

KING FIELD
Lea County, New Mexico
2-25-86
George Forrest
Scale: 1" = 1000'

I-3
TEXAS PACIFIC
STATE S#1
SWD (San Andres
& Glorieta)

JOHNNY
#1
SWD (San Andres & Glorieta)

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OPERATOR	

CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease	
State ☐	Fee ☐
5. State Oil & Gas Lease No.	

SUNDRY NOTICES AND REPORTS ON WELLS

DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR.
USE "APPLICATION FOR PERMIT -" (FORM C-101) FOR SUCH PROPOSALS.

OIL WELL ☐ GAS WELL ☐ OTHER- Salt Water Disposal

Name of Operator
Cabot Petroleum Corporation
Address of Operator
P. O. Box 5001, Pampa, TX 79065
Location of Well

UNIT LETTER G 1980 FEET FROM THE North LINE AND 1650 FEET FROM
East LINE, SECTION 35 TOWNSHIP 13S RANGE 37E N.M.P.M.

7. Unit Agreement Name
8. Farm or Lease Name J. L. Reed
9. Well No. 3
10. Field and Pool, or Wildcat King
12. County Lea

15. Elevation (Show whether DF, RT, GR, etc.)
3847.9' GR

Check Appropriate Box To Indicate Nature of Notice, Report or Other Data
NOTICE OF INTENTION TO: SUBSEQUENT REPORT OF:

PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPERATIONS ☐	PLUG AND ABANDONMENT ☐
PULL OR ALTER CASING ☐	OTHER ☐	CASING TEST AND CEMENT JOBS ☐	OTHER <u>SWD Conversion</u> ☒

7. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

Re-entered previously plugged and abandoned J.L. Reed, et al #3 and converted to SWD in San Andres and Glorieta formations, New Mexico Oil Conservation Division Order #R-7941: SWD-286

On 8/5/85 Cleaned cement from 8 5/8" casing. Drilled thru cement @ 28'. Drilled and reversed out mud and cement with production water. Drilled cement plug from 4553'-4650', cleaned out to 6630', tagged at 6630', wash down to 6685', drilled 5' of cement and clean hole. Ran 8 5/8" casing scraper to 4550'. Ran Baker 2 7/8" X 8 5/8" Model A-3 Lokset w/1.995 ID, nickel coated packer and 142 jts. 2 7/8" J-55 tubing lined internally with Sealtite PVC. Circulated annulus with corrosion inhibited fresh water and set packer @ 4507.30' K.B. Tested 8 5/8" casing w/1000#, held ok. Commence with injection.

18. I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNED <u>Rodney C Boyd</u>	TITLE <u>Agent</u>	DATE <u>8/28/85</u>
ORIGINAL SIGNED BY JERRY SEXTON	DISTRICT SUPERVISOR	DATE <u>SEP - 3 1985</u>
APPROVED BY <u></u>	TITLE <u></u>	DATE <u></u>

CONDITIONS OF APPROVAL, IF ANY: