

also  
File

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

|                                                                                                                           |             |                                           |                        |                                       |                         |
|---------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------|------------------------|---------------------------------------|-------------------------|
| Type Test<br><input checked="" type="checkbox"/> Initial <input type="checkbox"/> Annual <input type="checkbox"/> Special |             |                                           |                        | Test Date<br>2-10-89                  |                         |
| Company<br>TERRA RESOURCES                                                                                                |             |                                           |                        | Connection<br>AIR                     |                         |
| Pool<br>Forn Ranch W.H. Co.                                                                                               |             |                                           |                        | Formation<br>WOLF CAMP                |                         |
| Completion Date<br>2-2-89                                                                                                 |             | Total Depth<br>6331                       |                        | Plug Back TD<br>5725                  |                         |
| Elevation                                                                                                                 |             | Form or Lease Name<br>Terra STATE 35-9-26 |                        |                                       |                         |
| Csg. Size<br>5.5                                                                                                          | Wt.<br>15.5 | d<br>4.950                                | Set At<br>5725         | Perforations:<br>From 5320 To 5330    |                         |
| Thg. Size<br>2.375                                                                                                        | Wt.<br>4.7  | d<br>1.995                                | Set At<br>5218         | Perforations:<br>From To              |                         |
| Type Well - Single - Brdenhead - G.G. or G.O. Multiple<br>SINGLE-GAS                                                      |             |                                           |                        | Packer Set At<br>5218                 |                         |
| Producing Thru<br>TUBING                                                                                                  |             | Reservoir Temp. °F<br>135 @ 5325          |                        | Mean Annual Temp. °F<br>60            |                         |
|                                                                                                                           |             |                                           |                        | Buro. Press. - P <sub>c</sub><br>13.2 |                         |
| L<br>5325                                                                                                                 | H<br>5325   | G <sub>g</sub><br>.671                    | % CO <sub>2</sub><br>0 | % N <sub>2</sub><br>2.32              | % H <sub>2</sub> S<br>0 |
| Prover<br>0                                                                                                               |             | Meter Run<br>2.067                        |                        | Taps<br>FLANGE                        |                         |

| FLOW DATA |                        |   |                 |                    |                         | TUBING DATA |                    | CASING DATA |                    | Duration<br>of<br>Flow |             |
|-----------|------------------------|---|-----------------|--------------------|-------------------------|-------------|--------------------|-------------|--------------------|------------------------|-------------|
| NO.       | Prover<br>Line<br>Size | X | Orifice<br>Size | Press.<br>p.s.i.g. | Diff.<br>h <sub>w</sub> | Temp.<br>°F | Press.<br>p.s.i.g. | Temp.<br>°F | Press.<br>p.s.i.g. |                        | Temp.<br>°F |
| SI        |                        |   |                 |                    |                         |             | 1115               | 60          |                    |                        | 98          |
| 1.        | 2.067                  | X | 1.375           | 80                 | 3.5                     | 60          | 1075               | 60          |                    |                        | 1           |
| 2.        | 2.067                  | X | 1.375           | 80                 | 7                       | 60          | 1053               | 60          |                    |                        | 1           |
| 3.        | 2.067                  | X | 1.375           | 80                 | 15.8                    | 60          | 998                | 60          |                    |                        | 1           |
| 4.        | 2.067                  | X | 1.375           | 80                 | 28.3                    | 60          | 910                | 60          |                    |                        | 1           |
| 5.        |                        |   |                 |                    |                         |             |                    |             |                    |                        |             |

| RATE OF FLOW CALCULATIONS |                          |                  |                            |                                        |                                     |                                               |                        |
|---------------------------|--------------------------|------------------|----------------------------|----------------------------------------|-------------------------------------|-----------------------------------------------|------------------------|
| NO.                       | Coefficient<br>(24 Hour) | $\sqrt{h_w P_m}$ | Pressure<br>P <sub>m</sub> | Flow Temp.<br>Factor<br>F <sub>t</sub> | Gravity<br>Factor<br>F <sub>g</sub> | Super<br>Compress.<br>Factor, F <sub>pv</sub> | Rate of Flow<br>Q, M-d |
| 1                         | 10.20                    | 18.06            | 93.2                       | 1.0000                                 | 1.2208                              | 1.0094                                        | 227                    |
| 2.                        | 10.20                    | 25.34            | 93.2                       | 1.0000                                 | 1.2208                              | 1.0094                                        | 321                    |
| 3                         | 10.20                    | 38.31            | 93.2                       | 1.0000                                 | 1.2208                              | 1.0094                                        | 482                    |
| 4.                        | 10.20                    | 51.31            | 93.2                       | 1.0000                                 | 1.2208                              | 1.0094                                        | 645                    |
| 5.                        |                          |                  |                            |                                        |                                     |                                               |                        |

| NO. | P <sub>1</sub> | Temp. °R | T <sub>1</sub> | Z    | Gas Liquid Hydrocarbon Ratio          | NA    | Mcf/bbl. |
|-----|----------------|----------|----------------|------|---------------------------------------|-------|----------|
| 1   | .14            | 520      | 1.39           | .982 | A.P.I. Gravity of Liquid Hydrocarbons | NA    | Deg.     |
| 2.  | .14            | 520      | 1.39           | .982 | Specific Gravity Separator Gas        | .671  | XXXXXXX  |
| 3.  | .14            | 520      | 1.39           | .982 | Specific Gravity Flowing Fluid        | XXXXX | .671     |
| 4.  | .14            | 520      | 1.39           | .982 | Critical Pressure                     | 665   | P.S.I.A. |
| 5   |                |          |                |      | Critical Temperature                  | 374   | °R       |

| NO. | P <sub>1</sub> <sup>2</sup> | P <sub>w</sub> | P <sub>2</sub> <sup>2</sup> | P <sub>c</sub> <sup>2</sup> - P <sub>w</sub> <sup>2</sup> |
|-----|-----------------------------|----------------|-----------------------------|-----------------------------------------------------------|
| 1   | 1184                        | 1089           | 1186                        | 87                                                        |
| 2   | 1137                        | 1067           | 1139                        | 133                                                       |
| 3   | 1023                        | 1014           | 1027                        | 245                                                       |
| 4   | 852                         | 927            | 860                         | 413                                                       |
| 5   |                             |                |                             |                                                           |

(1)  $\frac{P_c^2}{P_2^2 - P_w^2} = 3.0823$

AOI = 0  $\left[ \frac{P_2^2}{P_c^2 - P_w^2} \right]^n = 1292$

(2)  $\left[ \frac{P_2^2}{P_c^2 - P_w^2} \right]^n = 2.0028$

|                    |      |              |                  |      |          |      |
|--------------------|------|--------------|------------------|------|----------|------|
| Absolute Open Flow | 1292 | Mcf @ 15.025 | Angle of Slope ° | 58.3 | Slope, n | .617 |
|--------------------|------|--------------|------------------|------|----------|------|

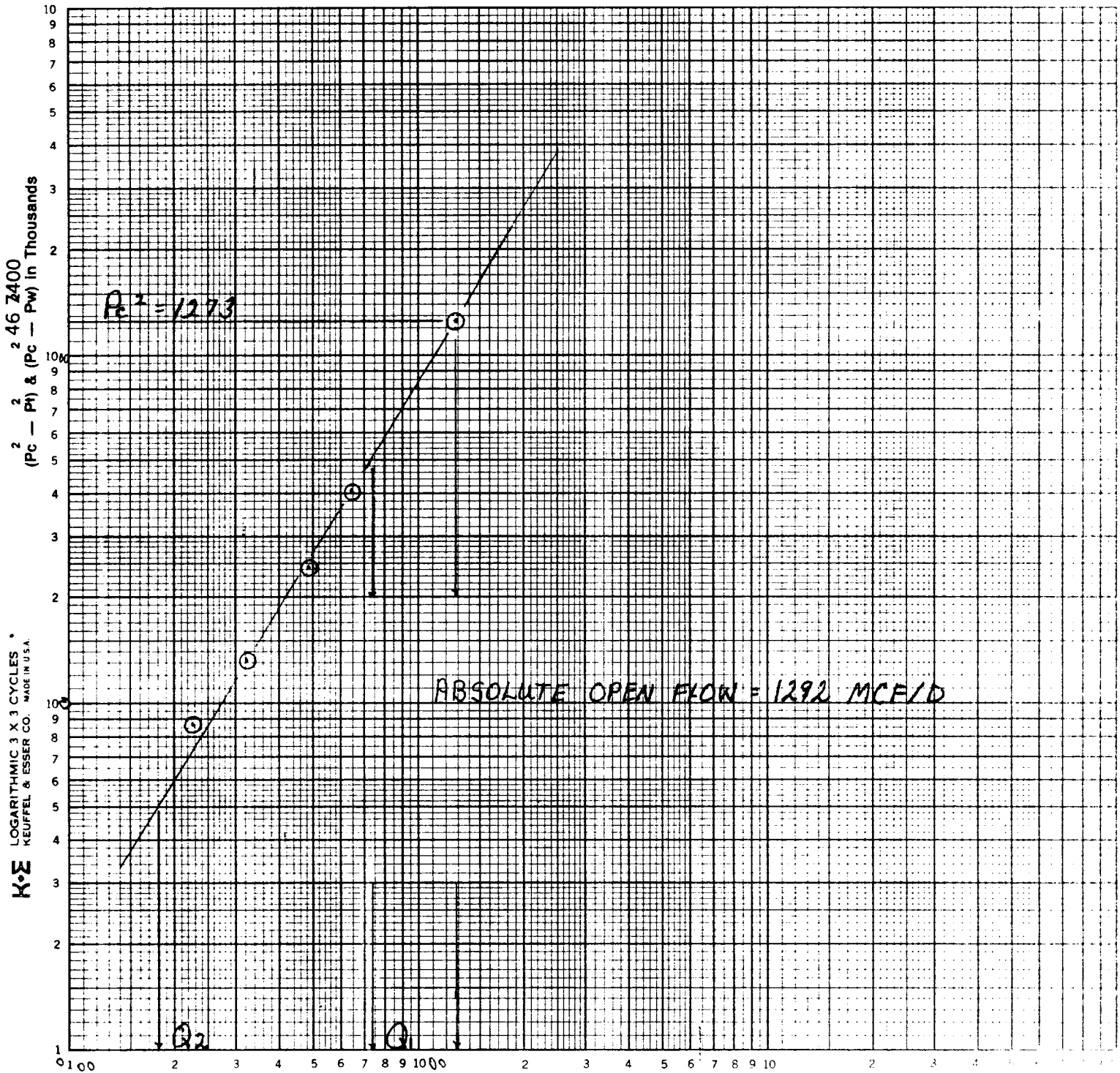
Remarks: CHOKE SIZES 1ST RATE 5/64 2ND RATE 6.5/64 3RD RATE 8.5/64 4TH RATE 10.5/64

|                      |                                 |                            |             |
|----------------------|---------------------------------|----------------------------|-------------|
| Approved By Division | Conducted By:<br>RICKY HATCHETT | Calculated By:<br>MATT LEE | Checked By: |
|----------------------|---------------------------------|----------------------------|-------------|

# BENNETT & CATHEY PRODUCTION TESTING BACK PRESSURE CURVE

Operator TERRA RESOURCES Lease STATE 35 Well No. 1  
 County CHAVES Field \_\_\_\_\_ Location \_\_\_\_\_  
 Date of Test 2-10-89 Slope "n" .617 Angle of Slope 58.3  
 Calc. Abs. Potential 1292 MCF/D



$$\overline{\Delta P}_1^2 \quad P_c^2 - P_w^2 = 500$$

$$\overline{\Delta P}_2^2 \quad P_c^2 - P_w^2 = 50$$

$$Q_1 = 745$$

$$Q_2 = 180$$

$$\text{LOG } Q_1 = 2.872$$

$$\text{LOG } Q_2 = 2.255$$

$$n = 0.617$$

"Let your Interest in Measurement be our Concern"



**PRECISION SERVICE INC.**

Flow Measurement Engineers

Analysis Results Summary

Casper, WY 82601

Run No. 206-1  
Date Run 02/06/89  
Date Sampled 02/04/89

Analysis For: BENNETT & CATHEY WRLN.

Lease: TERRA STATE #35-1 Producer: TERRA RESOURCES  
Location: BITTER LAKES County: CHAVES State: NEW MEXICO  
Purpose: WELL TEST Sampled By: B & C WRLN.  
Sampling Temp. 60 °F Atmos Temp.          °F  
Volume/day: 400 MCF Formation:           
Pressure on Bomb: 80 PSIG; Line Pressure: 93.2 PSIA PSIG

Gas Component

Analysis

Press. Base: 14.73

|                                   | Mol. %  | Liq. % | GPM<br>Per MCF |
|-----------------------------------|---------|--------|----------------|
| Carbon Dioxide CO <sub>2</sub>    |         |        |                |
| Oxygen O <sub>2</sub>             |         |        |                |
| Nitrogen N <sub>2</sub>           | 2.322   |        |                |
| Hydrogen Sulfide H <sub>2</sub> S |         |        |                |
|                                   |         |        |                |
| Methane C <sub>1</sub>            | 86.660  |        |                |
| Ethane C <sub>2</sub>             | 6.024   |        | 1.611          |
| Propane C <sub>3</sub>            | 2.413   |        | .665           |
| Iso-Butane IC <sub>4</sub>        | .371    |        | .121           |
| Nor-Butane NC <sub>4</sub>        | .744    |        | .235           |
|                                   |         |        |                |
| Iso-Pentane IC <sub>5</sub>       | .250    |        | .091           |
| Nor-Pentane NC <sub>5</sub>       | .270    |        | .098           |
| Hexanes plus                      | .945    |        | .436           |
| Hexanes C <sub>6</sub>            |         |        |                |
| Heptanes                          |         |        |                |
| Heptanes Plus C <sub>7</sub> +    |         |        |                |
|                                   |         |        |                |
| Total                             | 100.000 |        | 3.257          |
|                                   |         |        |                |
| Pentane + G.P.M.                  |         |        | .625           |
| Propane + GPM                     |         |        | 1.646          |
| 26-lb Gasoline                    |         |        | 1.009          |

BTU Dry 1158  
BTU Wet 1138  
Calc. Specific Gravity .671

@ Std. Press. 14.696

BTU Dry 1155  
BTU Wet 1135

Calc. Vap. Press. #/Sq. In.         

Reid Vap. Press. #/Sq. In.         

Z Factor .9972  
N Value 1.2923  
Ave Mol Wt 19.3996  
Ave Cu Ft/Gal         

Run by JEFFREY A. PROPP

Calculated By JEFFREY A. PROPP

Remarks:

Distribution:

