

NEW MEXICO OIL CONSERVATION COMMISSION  
MULTIPOINT AND ONE POINT BACK PRESSURE TEST, OR GAS WELL

Form C-122  
Revised 9-1-65

|                                                                                                                           |             |                                  |                          |                                      |                         |                                                     |
|---------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------|--------------------------|--------------------------------------|-------------------------|-----------------------------------------------------|
| Type Test<br><input checked="" type="checkbox"/> Initial <input type="checkbox"/> Annual <input type="checkbox"/> Special |             |                                  |                          |                                      | Test Date<br>8-26-88    |                                                     |
| Company<br>C.W. TRAINER                                                                                                   |             |                                  | Connection<br>LLANO      |                                      |                         |                                                     |
| Pool<br>UNDESIG N. VACCUM ATOKA- <i>Morrow</i> ATOKA                                                                      |             |                                  | Formation                |                                      | Unit                    |                                                     |
| Completion Date<br>8-19-88                                                                                                |             | Total Depth<br>12,200            |                          | Plug Back TD<br>12,177               |                         | Elevation<br>3978 KB                                |
| Farm or Lease Name<br>BETTY STATE                                                                                         |             |                                  |                          |                                      |                         |                                                     |
| Csg. Size<br>5½"                                                                                                          | Wt.<br>17#  | d<br>4.892"                      | Set At<br>12,200         | Perforations:<br>From 12096 To 12124 |                         | Well No.<br>2                                       |
| Tbg. Size<br>2 7/8"                                                                                                       | Wt.<br>6.5# | d<br>2.441                       | Set At<br>11993          | Perforations:<br>From To             |                         | Unit    Sec.    Twp.    Rge.<br>I    16    17    35 |
| Type Well - Single - Bradenhead - G.G. or G.O. Multiple<br>SINGLE                                                         |             |                                  |                          | Packer Set At<br>11999               |                         | County<br>LEA                                       |
| Producing Thru<br>TBG                                                                                                     |             | Reservoir Temp. °F<br>195@ 12096 |                          | Mean Annual Temp. °F<br>60           |                         | Baro. Press. - P <sub>a</sub><br>13.2               |
| State<br>NEW MEXICO                                                                                                       |             |                                  |                          |                                      |                         |                                                     |
| L<br>*12000                                                                                                               | H<br>12000  | G <sub>g</sub><br>.641           | % CO <sub>2</sub><br>.33 | % N <sub>2</sub><br>1.08             | % H <sub>2</sub> S<br>0 | Prover<br>4.026                                     |
| Meter Run<br>4.026                                                                                                        |             | Taps<br>FLG                      |                          |                                      |                         |                                                     |

| FLOW DATA |                  |   |              |                 | TUBING DATA          |          | CASING DATA     |          | Duration of Flow |          |                  |
|-----------|------------------|---|--------------|-----------------|----------------------|----------|-----------------|----------|------------------|----------|------------------|
| NO.       | Prover Line Size | X | Orifice Size | Press. p.s.i.g. | Diff. h <sub>w</sub> | Temp. °F | Press. p.s.i.g. | Temp. °F | Press. p.s.i.g.  | Temp. °F | Duration of Flow |
| SI        |                  |   |              |                 |                      |          | 1380            |          | PKR              |          | 24 HRS           |
| 1.        | 4 X 1.000        |   |              | 560             | 3.00                 | 92       | 1115            |          | PKR              | 6/64     | 1 HR             |
| 2.        | 4 X 1.000        |   |              | 550             | 4.00                 | 89       | 995             |          | PKR              | 12/64    | 1 HR             |
| 3.        | 4 X 1.000        |   |              | 560             | 14.00                | 83       | 677             |          | PKR              | 14/64    | 1 HR             |
| 4.        | 4 X 1.000        |   |              | 560             | 15.00                | 82       | 560             |          | PKR              | 48/64    | 1 HR             |
| 5.        |                  |   |              |                 |                      |          |                 |          |                  |          |                  |

| RATE OF FLOW CALCULATIONS |                       |                  |                         |                                  |                               |                                         |                      |
|---------------------------|-----------------------|------------------|-------------------------|----------------------------------|-------------------------------|-----------------------------------------|----------------------|
| NO.                       | Coefficient (24 Hour) | $\sqrt{h_w P_m}$ | Pressure P <sub>m</sub> | Flow Temp. Factor F <sub>t</sub> | Gravity Factor F <sub>g</sub> | Super Compress. Factor, F <sub>pv</sub> | Rate of Flow Q, Mcfd |
| 1                         | 4.753                 | 41.47            | 573.2                   | .9706                            | 1.249                         | 1.045                                   | 250                  |
| 2                         | 4.753                 | 47.46            | 563.2                   | .9732                            | 1.249                         | 1.044                                   | 286                  |
| 3                         | 4.753                 | 89.58            | 573.2                   | .9786                            | 1.249                         | 1.045                                   | 544                  |
| 4                         | 4.753                 | 92.73            | 573.2                   | .9795                            | 1.249                         | 1.045                                   | 563                  |
| 5                         |                       |                  |                         |                                  |                               |                                         |                      |

| NO. | P <sub>r</sub> | Temp. °R | T <sub>r</sub> | Z    | Gas Liquid Hydrocarbon Ratio          | NO FLUID PRODUCED | Mcf/bbl. |
|-----|----------------|----------|----------------|------|---------------------------------------|-------------------|----------|
| 1.  | .86            | 552      | 1.49           | .915 | A.P.I. Gravity of Liquid Hydrocarbons | N/A               | Deq.     |
| 2.  | .84            | 549      | 1.49           | .917 | Specific Gravity Separator Gas        | .641              | XXXXXXX  |
| 3.  | .86            | 543      | 1.47           | .915 | Specific Gravity Flowing Fluid        | XXXXX             |          |
| 4.  | .86            | 542      | 1.47           | .915 | Critical Pressure                     | *** 669           | P.S.I.A. |
| 5.  |                |          |                |      | Critical Temperature                  | *** 369           | R        |

\*\*\* 1238.5    P<sub>c</sub><sup>2</sup> 2069.3

| NO. | ** BHP | P <sub>w</sub> | P <sub>w</sub> <sup>2</sup> | P <sub>c</sub> <sup>2</sup> - P <sub>w</sub> <sup>2</sup> |
|-----|--------|----------------|-----------------------------|-----------------------------------------------------------|
| 1   | 1920.2 | 1157.1         | 1338.9                      | 730.4                                                     |
| 2   | 1533.2 | 1032.8         | 1066.7                      | 1002.4                                                    |
| 3   | 1364.2 | 719.5          | 517.7                       | 1551.6                                                    |
| 4   | 940.2  | 607.2          | 368.7                       | 1700.6                                                    |
| 5   | 790.2  |                |                             |                                                           |

(1)  $\frac{P_c^2}{P_c^2 - P_w^2} = 1.217$     (2)  $\left[ \frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 1.207$

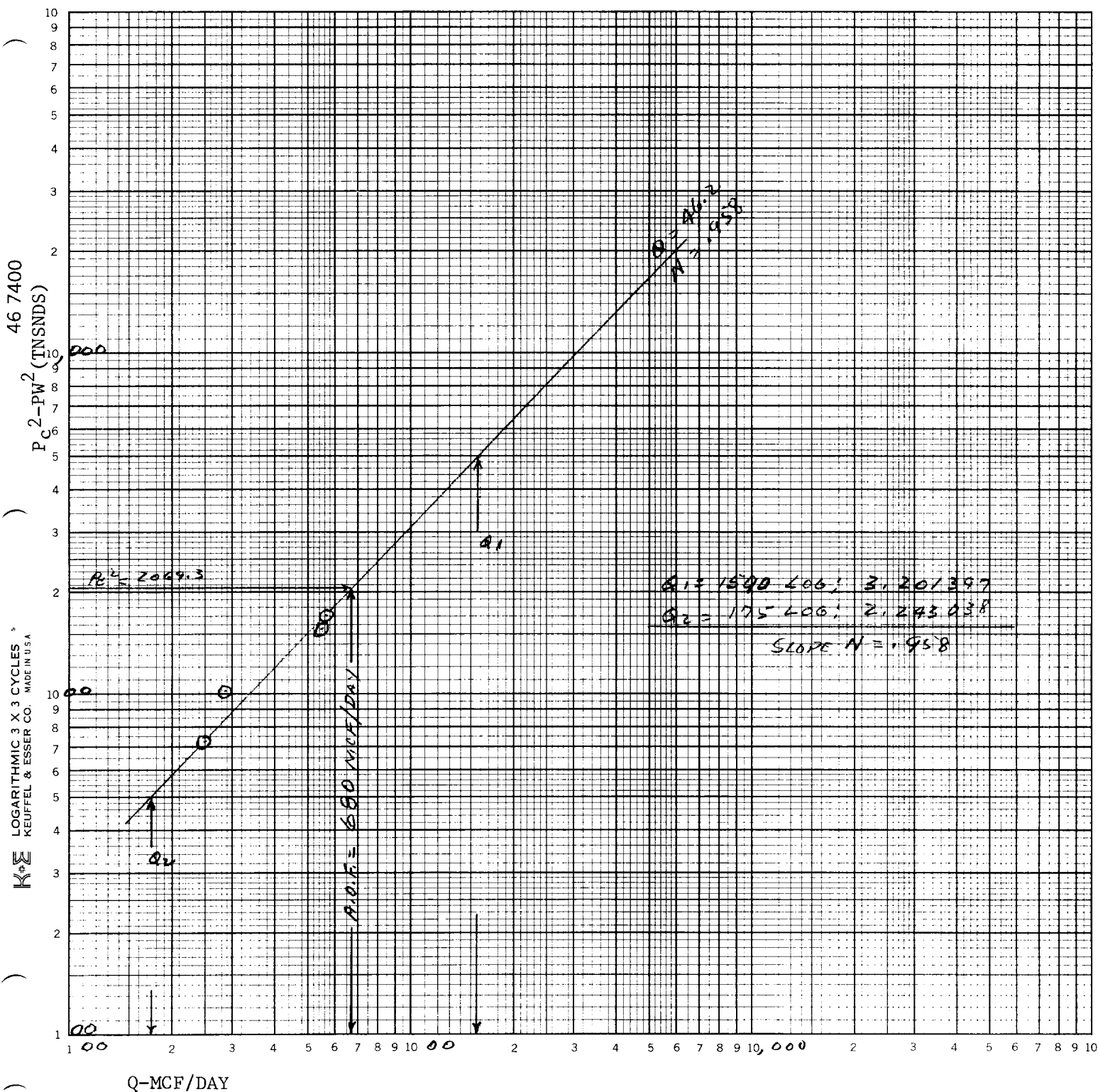
AOF = Q  $\left[ \frac{P_c^2}{P_c^2 - P_w^2} \right]^n = .680$

|                                                                       |                       |                |                        |      |                     |      |
|-----------------------------------------------------------------------|-----------------------|----------------|------------------------|------|---------------------|------|
| Absolute Open Flow                                                    | 680                   | Mcf/d @ 15.025 | Angle of Slope @       | 46.2 | Slope, n            | .958 |
| Remarks: *** Corrected to 1.08 % N <sub>2</sub>                       |                       |                |                        |      |                     |      |
| * BHP Instrument set at this point during test                        |                       |                |                        |      |                     |      |
| ** BHP'S    **** = Cal. SIP from BHP                                  |                       |                |                        |      |                     |      |
| Approved By<br>ORIGINAL SIGNED BY JERRY SEXTON<br>DISTRICT SUPERVISOR | Conducted By:<br>W.S. |                | Calculated By:<br>B.M. |      | Checked By:<br>B.M. |      |

NOV 07 1988

**K<sub>3</sub>E** LOGARITHMIC 3 X 3 CYCLES  
KEUFFEL & ESSER CO. MADE IN U.S.A.



# WORK SHEET FOR CALCULATION OF WELLHEAD PRESSURES ( $P_c$ or $P_w$ )

Form C-122F  
Adopted 9-1-65

FROM KNOWN BOTTOM HOLE PRESSURE ( $P_f$  or  $P_s$ )

COMPANY C. W. TRAINER LEASE BETTY STATE WELL NO. 2 DATE 8-26-88

LOCATION: Unit                      Section                      Township                      Range                     

L 12000 H 12000 L/H 1.000 G 1.641 %CO<sub>2</sub> .33 %N<sub>2</sub> 1.08 %H<sub>2</sub>S 0

\* BHP SET AT THIS POINT GH 7692 P<sub>CT</sub> 2669 T<sub>CT</sub> 369 \*\* CORRECTED TO 1.083 NL

\*\*\* FLOWING

①

②

③

④

| LINE |                                                              | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      |
|------|--------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1    | $T_w(W.H. \cdot R)$                                          | 534    | 534    | 534    | 534    | 534    | 534    | 534    | 534    |
| 2    | $T_s(B.H. \cdot R)$                                          | 655    | 655    | 655    | 655    | 655    | 655    | 655    | 655    |
| 3    | $T = \frac{T_w + T_s}{2}$                                    | 594.5  | 594.5  | 594.5  | 594.5  | 594.5  | 594.5  | 594.5  | 594.5  |
| 4    | Z (Est.)                                                     | .848   | .862   | .859   | .872   | .894   | .907   | .911   | .921   |
| 5    | TZ                                                           | 479.1  | 512.4  | 510.6  | 518.4  | 531.4  | 539.2  | 541.5  | 547.5  |
| 6    | GH/TZ                                                        | 16.052 | 15.009 | 15.062 | 14.837 | 14.472 | 14.265 | 14.202 | 14.048 |
| 7    | $e^s$ (Table XIV)                                            | 1.825  | 1.755  | 1.759  | 1.744  | 1.720  | 1.707  | 1.703  | 1.693  |
| 8    | $P_f$ or $P_s$                                               | 1533.2 | 1533.2 | 1364.2 | 1364.2 | 940.2  | 940.2  | 790.2  | 750.2  |
| 9    | $P_f^2$ or $P_s^2$                                           | 2350.7 | 2350.2 | 1861.0 | 1861.0 | 884.0  | 884.0  | 620.4  | 620.4  |
| 10   | $P_c^2 = P_f^2/e^s$ or $P_w^2 = P_s^2/e^s$                   | 1287.5 | 1328.8 | 1057.9 | 1066.8 | 513.7  | 517.7  | 366.5  | 368.7  |
| 11   | $P_c$ or $P_w$                                               | 1134.6 | 1157.1 | 1028.5 | 1032.8 | 716.7  | 719.5  | 605.4  | 607.2  |
| 12   | $P_c \cdot (\frac{P_w + P_s}{2})$ or $(\frac{P_c + P_f}{2})$ | 1333.9 | 1345.1 | 1196.3 | 1198.5 | 828.4  | 829.8  | 697.8  | 698.7  |
| 13   | $P_r = (P/P_{cr})$                                           | 1.99   | 2.01   | 1.79   | 1.79   | 1.24   | 1.24   | 1.04   | 1.04   |
| 14   | $T_r = (T/T_{cr})$                                           | 1.61   | 1.61   | 1.61   | 1.61   | 1.61   | 1.61   | 1.61   | 1.61   |
| 15   | Z (Table XI)                                                 | .862   | .861   | .872   | .872   | .907   | .907   | .921   | .921   |

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WORK SHEET FOR CALCULATION OF WELLHEAD PRESSURES ( $P_c$  or  $P_w$ )  
FROM KNOWN BOTTOM HOLE PRESSURE ( $P_f$  or  $P_g$ )

Form C-122F  
Adopted 9-1-65

COMPANY C. W. TRAINER LEASE BETTY STATE WELL NO. 2 DATE 8-26-88

LOCATION: Unit \_\_\_\_\_ Section \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_

L 12000 H 12000 L/H 1.000 G .641 % CO<sub>2</sub> .33 % N<sub>2</sub> 1.08 % H<sub>2</sub>S 0

GH 2692  $P_{CT}$  \* 669  $T_{CT}$  \* 369  $P_{CT}$  TABLE IX & X  $T_{CT}$  TABLE IX & X

SNOUT-IN

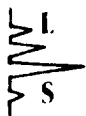
\* CORRECTED TO 1.08% H<sub>2</sub>S

| LINE | 1                                                        | 2      | 3      | 4 | 5         | 6       | 7 | 8 |
|------|----------------------------------------------------------|--------|--------|---|-----------|---------|---|---|
| 1    | $T_w$ (W.H. °R)                                          | 534    | 534    |   |           |         |   |   |
| 2    | $T_s$ (B.H. °R)                                          | 655    | 655    |   |           |         |   |   |
| 3    | $T = (\frac{T_w + T_s}{2})$                              | 594.5  | 594.5  |   |           |         |   |   |
| 4    | Z (Est.)                                                 | .828   | .840   |   |           |         |   |   |
| 5    | TZ                                                       | 492.8  | 499.3  |   |           |         |   |   |
| 6    | GH/TZ                                                    | 15.607 | 15.403 |   |           |         |   |   |
| 7    | $e^S$ (Table XIV)                                        | 1.795  | 1.781  |   |           |         |   |   |
| 8    | $P_f$ or $P_g$                                           | 1920.2 | 1920.2 |   |           |         |   |   |
| 9    | $P_f^2$ or $P_g^2$                                       | 3687.1 | 3687.1 |   |           |         |   |   |
| 10   | $P_c^2 = P_f^2/e^S$ or $P_w^2 = P_g^2/e^S$               | 2053.5 | 2069.3 |   |           |         |   |   |
| 11   | $P_c$ or $P_w$                                           | 1433.0 | 1438.5 | * | Shut-in   | Cal.    |   |   |
| 12   | $P_c = (\frac{P_w + P_s}{2})$ or $(\frac{P_c + P_f}{2})$ | 1676.6 | 1679.3 |   | Fract. to | surface |   |   |
| 13   | $P_r = (P/P_{cr})$                                       | 2.51   | 2.51   |   |           |         |   |   |
| 14   | $T_r = (T/T_{cr})$                                       | 1.61   | 1.61   |   |           |         |   |   |
| 15   | Z (Table XI)                                             | .840   | .840   |   |           |         |   |   |

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# LABORATORY SERVICES

1331 Tasker Drive  
Hobbs, New Mexico 88240

Telephone: 505-397-3713

FOR: John West Engineering  
Hobbs, N. M.

SAMPLE IDENTIFICATION: Betty State # 2  
COMPANY: C. W. Trainer  
LEASE:  
PLANT:

SAMPLE DATA: DATE SAMPLED: 8/26/88  
ANALYSIS DATE: 8/27/88  
PRESSURE — PSIG: 550  
TEMPERATURE — °F:

GAS (x) LIQUID ( )  
SAMPLED BY: Buz Thomason  
ANALYSIS BY: Rolland Perry

REMARKS:

## COMPONENT ANALYSIS

| COMPONENT        |       | MOL<br>PERCENT | GPM   | LIQ. VOL.<br>PERCENT |
|------------------|-------|----------------|-------|----------------------|
| Hydrogen Sulfide | (H2S) | -              |       |                      |
| Nitrogen         | (N2)  | 1.08           |       |                      |
| Carbon Dioxide   | (CO2) | 0.33           |       |                      |
| Methane          | (C1)  | 88.84          |       |                      |
| Ethane           | (C2)  | 6.21           | 1.584 |                      |
| Propane          | (C3)  | 1.95           | 0.537 |                      |
| I-Butane         | (IC4) | 0.26           | 0.085 |                      |
| N-Butane         | (NC4) | 0.44           | 0.139 |                      |
| I-Pentane        | (IC5) | 0.17           | 0.062 |                      |
| N-Pentane        | (NC5) | 0.17           | 0.062 |                      |
| Hexane           | (C6)  | 0.14           | 0.065 |                      |
| Heptanes Plus    | (C7+) | 0.41           | 0.230 |                      |
|                  |       | 100.00         | 2.764 |                      |

BTU/CU. FT. — DRY 1125  
At 14.650 WET 1106

SPECIFIC GRAVITY — CALCULATED 0.641  
MEASURED

VAPOR PRESSURE (ABSOLUTE) — CALCULATED

26# GASOLINE — 0.468

CU. FT./GAL.

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