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State of New Mexico  
Energy, Minerals and Natural Resources Department

Form C-122  
Revised 4-1-91

OIL CONSERVATION DIVISION

P.O. Box 2088  
Santa Fe, New Mexico 87504-2088

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

|                                                                                                                           |  |                                    |                   |                                        |                                                      |                                  |                                                     |
|---------------------------------------------------------------------------------------------------------------------------|--|------------------------------------|-------------------|----------------------------------------|------------------------------------------------------|----------------------------------|-----------------------------------------------------|
| Operator<br><b>SANTA FE SNYDER</b>                                                                                        |  |                                    |                   | Lease or Unit Name<br><b>BELL LAKE</b> |                                                      |                                  |                                                     |
| Type Test<br><input checked="" type="checkbox"/> Initial <input type="checkbox"/> Annual <input type="checkbox"/> Special |  |                                    |                   | Test Date<br><b>12/9/99</b>            |                                                      | Well No.<br><b>20</b>            |                                                     |
| Completion Date<br><b>11/29/99</b>                                                                                        |  | Total Depth<br><b>13,370</b>       |                   | Plug Back TD<br><b>13345</b>           |                                                      | Elevation<br><b>3429</b>         |                                                     |
| Unq. Size<br><b>4.5</b>                                                                                                   |  | WL<br><b>13.5</b>                  | d<br><b>3.900</b> | Sec At<br><b>13367</b>                 | Perforations:<br>From: <b>12918</b> To: <b>12928</b> |                                  | Unq. Lin. - Sec. - TWP - Rge.<br><b>32-22S-534E</b> |
| Log. Size<br><b>2-3/8</b>                                                                                                 |  | WL<br><b>4.7</b>                   | d<br><b>1.995</b> | Sec At<br><b>12831</b>                 | Perforations:<br>From: To:                           |                                  | County<br><b>LEA</b>                                |
| Type Well - Single - Bradenhead - G.G. or G.C. Multiple<br><b>single</b>                                                  |  |                                    |                   | Packer Sec At<br><b>12831</b>          |                                                      | Formation                        |                                                     |
| Producing Thru<br><b>TBG</b>                                                                                              |  | Reservoir Temp. °F<br><b>185.2</b> |                   | Mean Annual Temp. °F<br><b>60°</b>     |                                                      | Baro. Press. - P<br><b>13.2</b>  |                                                     |
| L<br><b>12831</b>                                                                                                         |  | II<br><b>12831</b>                 | Gg<br><b>582</b>  | % CO <sub>2</sub><br><b>367</b>        | % N <sub>2</sub><br><b>430</b>                       | % H <sub>2</sub> S<br><b>-0-</b> | Prover<br><b>-0-</b>                                |
|                                                                                                                           |  |                                    |                   |                                        |                                                      |                                  | Measure<br><b>3.068</b>                             |
|                                                                                                                           |  |                                    |                   |                                        |                                                      |                                  | Tags<br><b>FLG</b>                                  |

FLOW DATA

TUBING DATA

CASING DATA

| NO. | Prover Line Size | Orifice Size | Press. psig. | Diff. h <sub>u</sub> | Temp. °F | Press. psig. | Temp. °F | Press. psig. | Temp. °F | Duration of Flow |
|-----|------------------|--------------|--------------|----------------------|----------|--------------|----------|--------------|----------|------------------|
| 51  |                  |              |              |                      |          | 6235         | N/A      | PKR          | N/A      | 24 hrs.          |
| 1.  | 3.068 X 1.750    | 516          | 2.7"         | 76°                  | 6210     |              |          |              |          | 60 min           |
| 2.  | 3.068 X 1.750    | 519          | 9.8"         | 74°                  | 6066     |              |          |              |          | 60 min           |
| 3.  | 3.068 X 1.750    | 522          | 36.4"        | 66°                  | 5619     |              |          |              |          | 60 min           |
| 4.  | 3.068 X 1.750    | 548          | 124"         | 55°                  | 4472     |              |          |              |          | 60 min           |
| 5.  |                  |              |              |                      |          |              |          |              |          |                  |

RATE OF FLOW CALCULATIONS

| NO. | COEFFICIENT (24 HOUR)                    | Pressure P <sub>m</sub> | Flow Temp. Factor F <sub>t</sub> | Gravity Factor F <sub>g</sub> | Super. Compress. Factor F <sub>sp</sub> | Rate of Flow Q, Mcf/d |
|-----|------------------------------------------|-------------------------|----------------------------------|-------------------------------|-----------------------------------------|-----------------------|
| 1.  |                                          |                         |                                  |                               |                                         | 808                   |
| 2.  |                                          |                         |                                  |                               |                                         | 1555                  |
| 3.  | GAS VOLUMES MEASURED BY TOTAL FLOW METER |                         |                                  |                               |                                         | 2952                  |
| 4.  |                                          |                         |                                  |                               |                                         | 5821                  |
| 5.  |                                          |                         |                                  |                               |                                         |                       |

| NO. | P <sub>i</sub> | Temp. °R | T <sub>i</sub> | Z | Gas Liquid Hydrocarbon Ratio          | N/A | Mcf/d      |
|-----|----------------|----------|----------------|---|---------------------------------------|-----|------------|
| 1.  |                |          |                |   | A.P. L Gravity of Liquid Hydrocarbons | N/A | Day        |
| 2.  |                |          |                |   | Specific Gravity Separator Gas        | 582 | XXXXXXXXXX |
| 3.  | TOTAL FLOW     |          |                |   | Specific Gravity Flowing Fluid        | N/A | XXXXXX     |
| 4.  |                |          |                |   | Critical Pressure                     | 675 | P.S.I.A    |
| 5.  |                |          |                |   | Critical Temperature                  | 346 | R          |

P<sub>i</sub> 6361.5 P<sub>e</sub> 40,468.7

| NO. | P <sub>i</sub> <sup>2</sup> | P <sub>e</sub> <sup>2</sup> | P <sub>i</sub> <sup>2</sup> - P <sub>e</sub> <sup>2</sup> |
|-----|-----------------------------|-----------------------------|-----------------------------------------------------------|
| 1.  | 6247.7                      | 39033.8                     | 1434.9                                                    |
| 2.  | 6075.1                      | 36906.8                     | 3561.9                                                    |
| 3.  | 5669.5                      | 32143.2                     | 8325.5                                                    |
| 4.  | 4690.6                      | 22001.7                     | 18467.0                                                   |
| 5.  |                             |                             |                                                           |

$$1) \frac{P_e^2}{P_i^2 - P_e^2} = 2.19 \quad (2) \left[ \frac{P_e^2}{P_i^2 - P_e^2} \right]^n = 1.83$$

$$AOF = Q \left[ \frac{P_i^2}{P_e^2 - P_i^2} \right]^n = 10,652$$

Absolute Open Flow **10,652** Mcf/d @ 15.025 Angle of Slope  $\theta$  **52.13** Slope, n **.777**

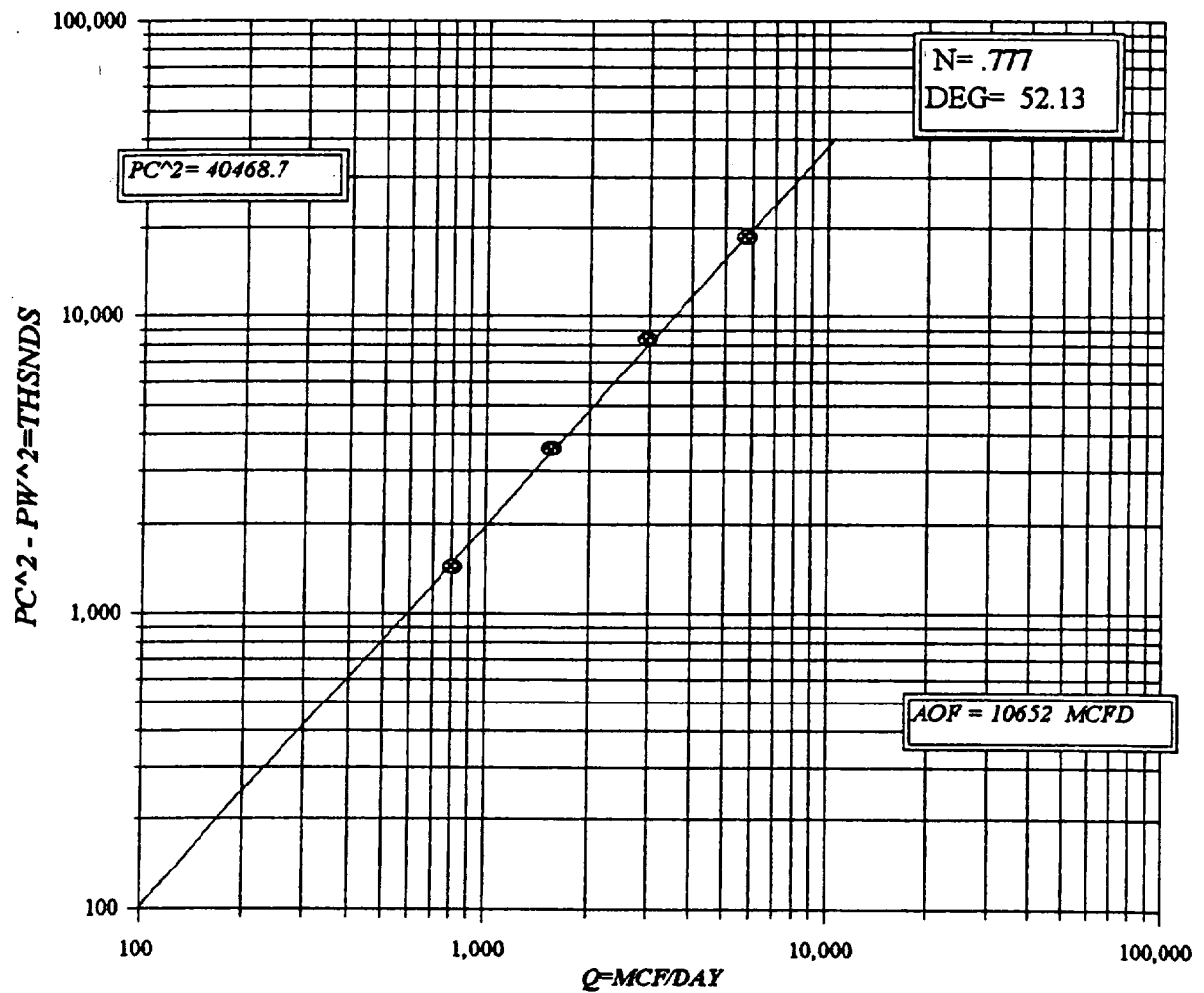
Remarks: > CALCULATED FROM KNOWN BOTTOM HOLE PRESSURES

\* NO LIQUID MADE DURING TEST

|                      |                                          |                             |                          |
|----------------------|------------------------------------------|-----------------------------|--------------------------|
| Approved By Division | Conducted By:<br><b>PRO WELL TESTING</b> | Calculated By:<br><b>MB</b> | Checked By:<br><b>BM</b> |
|----------------------|------------------------------------------|-----------------------------|--------------------------|

K

**SANTA FE SYNDER**  
**BELL LAKE # 20**



WORK SHEET FOR CALCULATION OF WELLHEAD PRESSURE (Pc or Pw)  
FROM KNOWN BOTTOM HOLE PRESSURE (Pf or Ps)

FORM C-122F

COMPANY SANTAFE

LEASE : BELL LAKE WELL NO. : 20

DATE 12/9/99

UNIT

SECTION :

TWNSHP :

RANGE :

L

12831

H : 12831

L/H : 1

G/GMIX : 0.5820

CO2 : 0.367

N2 : 0.43

H2S :

GH : 7467.6

PCR : 675

TCR : 346

| LINE |                         | 1       | 2       | 3     | 4     | 5     | 6     | 7     | 8     |
|------|-------------------------|---------|---------|-------|-------|-------|-------|-------|-------|
| 1    | TM(W.H. R)              | 534     | 534     | 534   | 534   | 534   | 534   | 534   | 534   |
| 2    | Ts(B.H. R)              | 662.3   | 662.3   | 662.3 | 662.3 | 662.3 | 662.3 | 662.3 | 662.3 |
| 3    | T=(Tw+Ts/2)             | 598.2   | 598.2   | 598.2 | 598.2 | 598.2 | 598.2 | 598.2 | 598.2 |
| 4    | Z (EST.)                | 1.281   | 1.139   | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |
| 5    | TZ                      | 766     | 681     | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |
| 6    | GH/TZ                   | 9.745   | 10.965  | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |
| 7    | eS(TABLE XIV)           | 1.441   | 1.509   | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |
| 8    | Pf or Ps                | 7813.5  | 7813.5  | 0     | 0     | 0     | 0     | 0     | 0     |
| 9    | Pf2 or Ps2              | 61050.8 | 61050.8 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 10   | Pc2=Pf/eS or Pw2=Ps2/eS | 42363.2 | 40468.9 | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |
| 11   | Pc or Pw                | 6509    | 6362    | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |
| 12   | P=(Pw+Ps/2)or(Pc+Pf/2)  | 7161    | 7088    | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |
| 13   | Pr=(P/Pcr)              | 10.61   | 10.50   | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |
| 14   | Tr(T/Tcr)               | 1.73    | 1.73    | 1.73  | 1.73  | 1.73  | 1.73  | 1.73  | 1.73  |
| 15   | Z (TABLE XI)            | 1.139   | 1.132   | ERR   | ERR   | ERR   | ERR   | ERR   | ERR   |

PC PW 1 : 6361.5 PW 2 : ERR PW 3 : ERR PW 4 : ERR

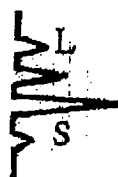
WORK SHEET FOR CALCULATION OF WELLHEAD PRESSURE (Pc or Pw)  
FROM KNOWN BOTTOM HOLE PRESSURE (Pf or Ps)

FORM C-122F

COMPANY SANTAFE LEASE : BELL LAKE WELL NO. : 20 DATE 12/9/99  
UNIT SECTION : TOWNSHIP : RANGE :  
L 12831 H : 12831 L/H : 1 G/GMIX : 0.5820  
CO2 : 0.367 N2 : 0.43 H2S :  
GH : 7467.6 PCR : 675 TCR : 346

| LINE |                         | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       |
|------|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1    | TW(W.H. R)              | 534     | 534     | 534     | 534     | 534     | 534     | 534     | 534     |
| 2    | Ts(B.H. R)              | 662.3   | 662.3   | 662.3   | 662.3   | 662.3   | 662.3   | 662.3   | 662.3   |
| 3    | T=(Tw+Ts/2)             | 598.2   | 598.2   | 598.2   | 598.2   | 598.2   | 598.2   | 598.2   | 598.2   |
| 4    | Z (EST.)                | 1.270   | 1.129   | 1.167   | 1.110   | 1.129   | 1.075   | 1.039   | 0.993   |
| 5    | TZ                      | 759     | 675     | 698     | 664     | 675     | 643     | 622     | 594     |
| 6    | GH/TZ                   | 9.833   | 11.062  | 10.696  | 11.245  | 11.056  | 11.613  | 12.015  | 12.568  |
| 7    | eS(TABLE XIV)           | 1.446   | 1.514   | 1.493   | 1.525   | 1.514   | 1.546   | 1.569   | 1.602   |
| 8    | Pf or Ps                | 7687.78 | 7687.78 | 7501    | 7501    | 7048.65 | 7048.65 | 5937.01 | 5937.01 |
| 9    | Pf2 or Ps2              | 59102.0 | 59102.0 | 56265.0 | 56265.0 | 49683.5 | 49683.5 | 35248.1 | 35248.1 |
| 10   | Pc2=Pf/eS or Pw2=Ps2/eS | 40875.9 | 39033.9 | 37673.7 | 36906.7 | 32821.6 | 32143.0 | 22462.6 | 22001.4 |
| 11   | Pc or Pw                | 6393    | 6248    | 6138    | 6075    | 5729    | 5669    | 4739    | 4691    |
| 12   | P=(Pw+Ps/2)or(Pc+Pf/2)  | 7041    | 6968    | 6819    | 6788    | 6389    | 6359    | 5338    | 5314    |
| 13   | Pr=(P/Pcr)              | 10.43   | 10.32   | 10.10   | 10.06   | 9.46    | 9.42    | 7.91    | 7.87    |
| 14   | Tr(T/Tcr)               | 1.73    | 1.73    | 1.73    | 1.73    | 1.73    | 1.73    | 1.73    | 1.73    |
| 15   | Z (TABLE XI)            | 1.129   | 1.123   | 1.110   | 1.108   | 1.075   | 1.073   | 0.993   | 0.992   |

PM 1 : 6247.7 PM 2 : 6075.1 PM 3 : 5669.5 PM 4 : 4690.6

**Laboratory Services, Inc.**

4016 Fiesta Drive  
Hobbs, New Mexico 88240

Telephone: (505) 397-3713

FOR: Santa Fe Snyder  
P. O. Box 2327  
Carlsbad, New Mexico 88220

SAMPLE:  
IDENTIFICATION: Bell Lake #20  
COMPANY: Santa Fe Snyder  
LEASE:  
PLANT:

SAMPLE DATA: DATE SAMPLED: 12/9/99 3:00 pm  
ANALYSIS DATE: 12/10/99  
PRESSURE - PSIG 520  
SAMPLE TEMP. °F 68  
ATMOS. TEMP. °F

GAS (XX) LIQUID ( )  
SAMPLED BY: Pro Well  
ANALYSIS BY: Vickie Walker

REMARKS: Sample taken @ the meter run.  
Crude Oil API Gravity @ 60° F = 48.1

**COMPONENT ANALYSIS**

| COMPONENT              | MOL<br>PERCENT | GPM   |
|------------------------|----------------|-------|
| Hydrogen Sulfide (H2S) |                |       |
| Nitrogen (N2)          | 0.430          |       |
| Carbon Dioxide (CO2)   | 0.387          |       |
| Methane (C1)           | 96.138         |       |
| Ethane (C2)            | 2.179          | 0.581 |
| Propane (C3)           | 0.486          | 0.134 |
| I-Butane (IC4)         | 0.080          | 0.026 |
| N-Butane (NC4)         | 0.106          | 0.033 |
| I-Pentane (IC5)        | 0.037          | 0.014 |
| N-Pentane (NC5)        | 0.020          | 0.007 |
| Hexane Plus (C6+)      | 0.157          | 0.064 |
|                        | 100.000        | 0.859 |

BTU/CU.FT. - DRY 1038  
AT 14.650 DRY 1034  
AT 14.650 WET 1018  
AT 14.73 DRY 1040  
AT 14.73 WET 1022

MOLECULAR WT. 16.8587

SPECIFIC GRAVITY -  
CALCULATED 0.582  
MEASURED