NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 9-1-65

# MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

JOHN KLEE

RECEIVED

APR 30 1981

O. C. D.
ARTESIA, OFFICE

Type Test: [X] Initial [ ] Annual [ ] Special — FOUR POINT

Test Date: 4-2-81

| | | | | |
|---|---|---|---|---|
| Company: FRED POOL Drlg Co | Connection: AIR | | | Unit: B |
| Pool: WILDCAT Abo | Formation: ABO | | | |
| Completion Date: 3-20-81 | Total Depth: 4,235 | Plug Back TD: 4,235 | Elevation: KB 4,065 | Farm or Lease Name: J.C. NAIL |
| Csg. Size: 4.50 / Wt.: 10.50 / d: 4.052 / Set At: 4,235 | Perforations: From 3,668 To 3,824 | | | Well No.: #2 |
| Tbg. Size: 2.375 / Wt.: 4.60 / d: 1.995 / Set At: 3,506 | Perforations: From OPEN ENDED | | | Unit: B / Sec.: 33 / Twp.: 5S / Rge.: 24E |
| Type Well – Single – Bradenhead – G.G. or G.O. Multiple: SINLGE | | Packer Set At: NONE | | County: EDDY |
| Producing Thru: TUBING | Reservoir Temp. °F: 98 @ 3,746 | Mean Annual Temp. °F: 60 | Baro. Press. – $P_a$: 13.2 | State: NEW MEXICO |

| L | H | Gg | % $CO_2$ | % $N_2$ | % $H_2S$ | Prover | Meter Run | Taps |
|---|---|---|---|---|---|---|---|---|
| 3746 | 3746 | .802 | .38 | 51.05 | 0 | | 4" | FLG |

| NO. | FLOW DATA: Prover Line Size X Orifice Size | Press. p.s.i.g. | Diff. $h_w$ | Temp. °F | TUBING DATA: Press. p.s.i.g. | Temp. °F | CASING DATA: Press. p.s.i.g. | Temp. °F | Duration of Flow |
|---|---|---|---|---|---|---|---|---|---|
| SI | | | | | 1004.0 | 60 | 1114 | 60 | 72.00 |
| 1. | 4" X 1" | 395.0 | 3.00 | 86 | 957.0 | 78 | 1072 | 86 | 1.00 |
| 2. | 4" X 1" | 400.0 | 6.00 | 86 | 920.0 | 74 | 1030 | 86 | 1.00 |
| 3. | 4" X 1" | 405.0 | 11.0 | 86 | 867.0 | 70 | 971 | 86 | 1.00 |
| 4. | 4" X 1" | 405.0 | 22.00 | 88 | 775.0 | 66 | 873 | 88 | 1.00 |
| 5. | | | | | | | | | |

## RATE OF FLOW CALCULATIONS

| NO. | Coefficient (24 Hour) | $\sqrt{h_w P_m}$ | Pressure $P_m$ | Flow Temp. Factor Ft. | Gravity Factor Fg | Super Compress. Factor, Fpv | Rate of Flow Q, Mcfd |
|---|---|---|---|---|---|---|---|
| 1 | 4.8740 | 34.99 | 408.2 | .9759 | 1.1166 | 1.0122 | 188. |
| 2 | 4.8740 | 49.79 | 413.2 | .9759 | 1.1166 | 1.0122 | 268. |
| 3 | 4.8740 | 67.82 | 418.2 | .9759 | 1.1166 | 1.0127 | 365. |
| 4 | 4.8740 | 95.92 | 418.2 | .9741 | 1.1166 | 1.0127 | 515. |
| 5 | | | | | | | |

| NO. | $P_t$ | Temp. °R | $T_r$ | Z |
|---|---|---|---|---|
| 1 | .70 | 546. | 1.96 | .976 |
| 2 | .71 | 546. | 1.96 | .976 |
| 3 | .72 | 546. | 1.96 | .975 |
| 4 | .72 | 548. | 1.96 | .975 |
| 5 | | | | |

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas .8020 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 581 P.S.I.A. _____ P.S.I.A.
Critical Temperature 279 R _____ R

$P_c$ 1127.2 $P_c^2$ 1270.6

| NO | $P_t^2$ | $P_w$ | $P_w^2$ | $P_c^2 - P_w^2$ |
|---|---|---|---|---|
| 1 | | 1085.2 | 1177.7 | 93.0 |
| 2 | | 1043.2 | 1088.3 | 182.0 |
| 3 | | 984.2 | 968.6 | 302.0 |
| 4 | | 886.2 | 785.4 | 485.0 |
| 5 | | | | |

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 4.2072$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 2.2404$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 817.7$

Absolute Open Flow 817.7 Mcfd @ 15.025 Angle of Slope θ 60°7'17" Slope, n .5614

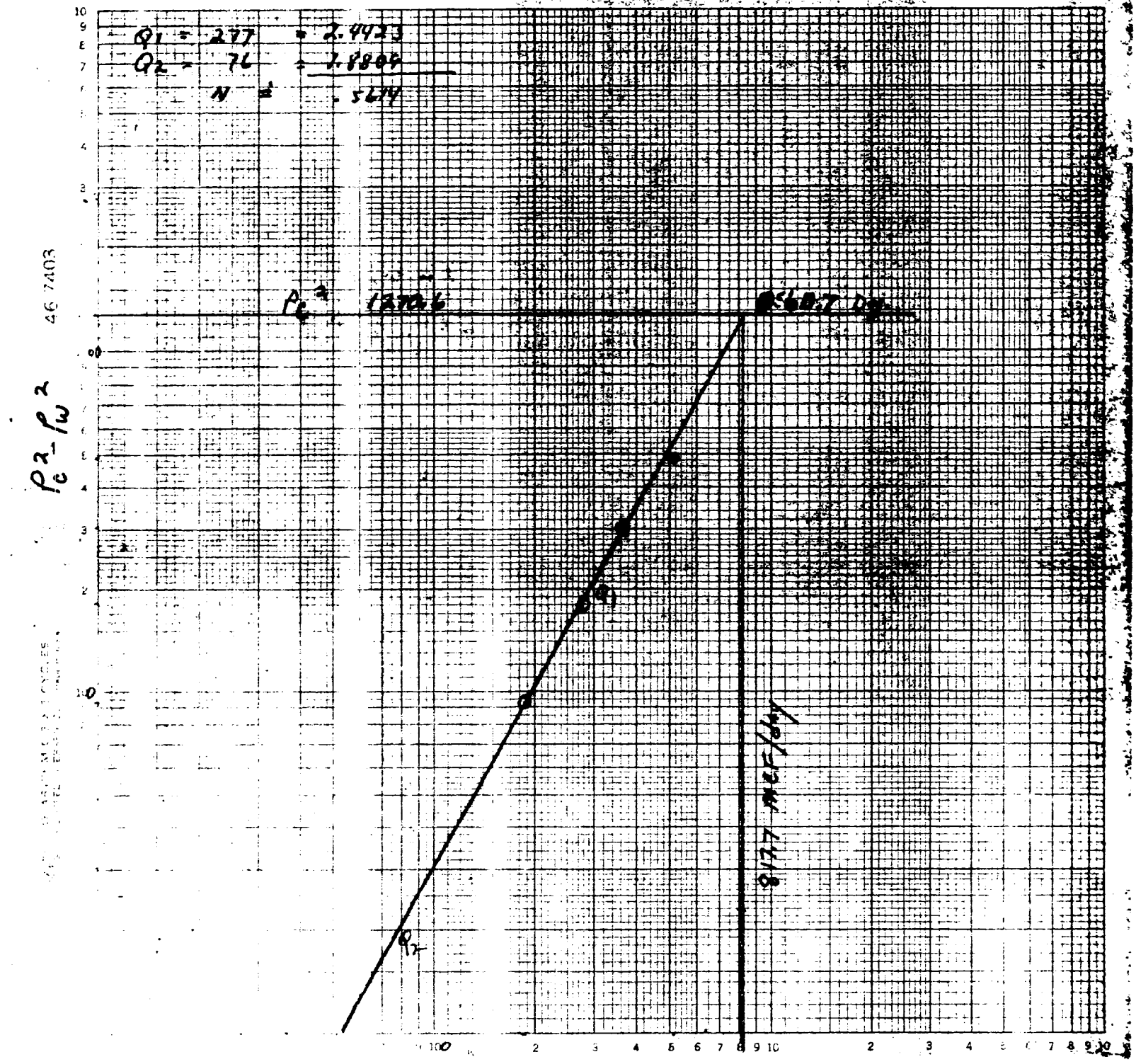
Remarks: _____

Approved By Commission: | Conducted By: | Calculated By: | Checked By:

Fred Pool Drilling

J. C. Nail #2

Unit B Sec. 32, T. 5S, R. 24E



NEW-TEX LAB
P. O. BOX 1161
HOBBS, N.M. 88240

No. 4719
Run No.
Date of Run 4-05-81
Date Secured 4-03-81

# CERTIFICATE OF ANALYSIS

A Sample of Fred Pool J. C. Nail #2
Secured from Bennett Wireline
At Box 787 Secured by
Artesia, New Mexico 88210 Time Date
Sampling conditions Press
Temp.

## FRACTIONAL ANALYSIS

### Percentage Composition

| | MOL % | LIQ. % | G.P.M. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| Carbon Dioxide | .378 | | |
| Air | | | |
| Nitrogen | 51.052 | | |
| Oxygen | | | |
| Hydrogen sulfide | | | |
| Hydrogen | | | |
| Methane | 44.657 | | |
| Ethane | 2.267 | | .605 |
| Propane | .722 | | .198 |
| Butanes | | | |
| Iso-Butane | .190 | | .062 |
| N-Butane | .383 | | .120 |
| Pentanes | | | |
| Iso-Pentane | .098 | | .036 |
| N-Pentane | .109 | | .039 |
| Hexanes | .065 | | .027 |
| Heptanes Plus | .079 | | .036 |
| Octanes | | | |
| TOTAL | 100.000 | | 1.123 |

Calc. Sp. Gr. — 0.8023
Calc. A.P.I. —
Calc. Vapor Press. — PSIA
Sp. Gr.
Mol. Wt. 23.25

LIQUID CONTENT (GAL./MCF)

| | |
|---|---|
| Propane Calc. G.P.M. | .198 |
| Butanes Calc. G.P.M. | .182 |
| Pentanes Plus. G.P.M. | .138 |
| Ethane Calc. G.P.M. | .605 |
| ___ RVP Gasoline G.P.M. | |

B.T.U./Cu. Ft. @ 14.696 P.S.I.A.

| | |
|---|---|
| Dry Basis | 544 |
| Wet Basis | 534 |

Sulfur Analysis by Titration Gr./100 Cu. Ft.

| | |
|---|---|
| Hydrogen Sulfide | |
| Mercaptans | |
| Sulfides | |
| Residual Sulfur | |
| Total Sulfur | |

Run by Deane Simpson Checked by Approved by Deane Simpson

**Additional Data and Remarks**

...N - OIL & GAS CONSERVATION DIVISION
...ng Oklahoma City Oklahoma 73105

# BACK - PRESSURE TEST FOR NATURAL GAS WELLS

Lease Name: J. C. NAIL NO. 2 OTC No.:
Well No.: 2 SEC: 33 TWP: 5S RGE: 24E County: CHAVES
State: NEW MEXICO Type test: FOUR POINT-INITIAL Test date: 4-2-81
Company: FRED POOL Connection: AIR
Field: WILDCAT Pool No.: Reservoir: ABO
Location: B Compl date: 3-20-81 Tot depth: 4235 Plug back: 4235
Elev.: 4065 KB Type compl: SINGLE Packer set at: 0
Prod. thru: TUBING BHT: 98.0 F Atm temp: 60 F Baro press.: 13.2 PSI
Size: METER RUN 4 in Taps: FLANGE L: 3746 H: 3746 Gg: .802
%CO2: .38 %N2: 51.05 %H2S: 0 API WELL NO.: 31

| | Size(in) | Wt(#/Ft) | Set at | ***** Perforation ***** |
|---|---|---|---|---|
| Casing | 4.500 | 10.50 | 4235 | from 3668 to 3824 |
| Tubing | 2.375 | 4.60 | 3506 | from 0 to 0 |

********** FLOW DATA **********

| No. SI | Orifice Size | Press PSIG | Diff in/RTS | Temp F |
|---|---|---|---|---|
| 1 | 1.0000 | 395.0 | 3.00 | 86 |
| 2 | 1.0000 | 400.0 | 6.00 | 86 |
| 3 | 1.0000 | 405.0 | 11.00 | 86 |
| 4 | 1.0000 | 405.0 | 22.00 | 88 |

| ** TUBING ** Press PSIG | Temp F | ** CASING ** Press PSIG | Temp F | * DURATION * Dur. of Flow(hrs) |
|---|---|---|---|---|
| 1004.0 | 60.0 | 1114.0 | 60.0 | 72.00 |
| 957.0 | 78.0 | 1072.0 | 86.0 | 1.00 |
| 920.0 | 74.0 | 1030.0 | 86.0 | 1.00 |
| 867.0 | 70.0 | 971.0 | 86.0 | 1.00 |
| 775.0 | 66.0 | 873.0 | 88.0 | 1.00 |

********** RATE OF FLOW CALCULATION **********

| No. | Coeff. (24hrs) | SQRT (Hw*Pw) | Press Pm | Flow Temp (Ft) | Gravity (Fg) | Compress (Fpv) | Rate of Flow(Q) |
|---|---|---|---|---|---|---|---|
| 1 | 4.8740 | 34.99 | 408.2 | .9759 | 1.1166 | 1.0122 | 188. |
| 2 | 4.8740 | 49.79 | 413.2 | .9759 | 1.1166 | 1.0122 | 268. |
| 3 | 4.8740 | 67.82 | 418.2 | .9759 | 1.1166 | 1.0127 | 365. |
| 4 | 4.8740 | 95.92 | 418.2 | .9741 | 1.1166 | 1.0127 | 515. |

**********

| No. | Pr | Temp. R | Tr | Z |
|---|---|---|---|---|
| 1 | .70 | 546. | 1.96 | .976 |
| 2 | .71 | 546. | 1.96 | .976 |
| 3 | .72 | 546. | 1.96 | .975 |
| 4 | .72 | 548. | 1.96 | .975 |

Pc 1127.2 (Pc)2 1270.6

**********

| No. | Pw | (Pw)2 | (Pc)2-(Pw)2 |
|---|---|---|---|
| 1 | 1085.2 | 1177.7 | 93.0 |
| 2 | 1043.2 | 1088.3 | 182.0 |
| 3 | 984.2 | 968.6 | 302.0 |
| 4 | 886.2 | 785.4 | 485.0 |

**GAS LIQUID HYDROCARBON CALCULATION**
Ratio .000 MCF/BBL
API Gravity .0 DEG.
Specific Gravity:
Separator Gas .8020
Flowing Fluid .8020
Critical Press 581 PSIA 581 PSIA
Critical Temp 279 R 279 R

(Pc)2 / ((Pc)2 - (Pn)2) = 4.2072 4.2072
((Pc)2 / ((Pc)2 - (Pw)2))n = 2.2404 3.3915
WHAOF = Q * ((Pc)2 / ((Pc)2 - (Pw)2))n
= 817.7 \ 1237.9

Calculated Well Head Open Flow: 817.7 MCFPD Slope: .5614 Angle: 60.7 Deg.
1237.9 MCFPD .8500 49.6 Deg.

REMARKS

APPROVED BY COMMISSION CONDUCTED BY CALCULATED BY CHECKED BY
Wohlford & Jenkins

JOHN KLEE

BENNETT WIRE LINE SERVICE
Artesia, New Mexico 88210

# SUBSURFACE PRESSURE MEASUREMENTS

COMPANY FRED POOL WELL NAME J.C. NAIL #2

DATE OF TEST 4-2-81 TO 4-3-81 LOCATION ABO 

## CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

ELEMENT NUMBER RPG3# 16150N, 0-2,000 LB. RANGE *
TIME WELL SHUT IN 1955 HOURS 4-2-81 END OF FOUR POINT BACK PRESSURE TEST
TIME CLOCK STARTED 1203
DEAD WEIGHT ELEMENT ON SURFACE 1017 LBS.
TIME ELEMENT REACHED BOTTOM 1307
DEAD WEIGHT ELEMENT ON BOTTOM 1017 LBS.
ELEMENT SET AT FEET
* TANDUM BOMBS RUN RPG3# 9891N, 0-3,650 LB. RANGE

| DATE | HOUR | TIME | DEFLECTION in/inches | CALCULATED PRESSURE psig | CORRECTION P ± PC psig | CORRECTED PRESSURE psig | PRESSURE AT MID-POINT OF PERFORATIONS P.S.I.A. |
|---|---|---|---|---|---|---|---|
| 4-2-81 | 0 | 1307 | | 1,113 | 13.2 | | 1,126 |
| START HEAT | 2 | 1507 | | 1,114 | 13.2 | | 1,127 |
| START TEST | 2HR 43MIN | 1550 | | 1,109 | 13.2 | | 1,122 |
| | 2HR 58MIN | 1605 | | 1,098 | 13.2 | | 1,111 |
| | 3HR 13MIN | 1620 | | 1,087 | 13.2 | | 1,100 |
| | 3HR 28MIN | 1635 | | 1,074 | 13.2 | | 1,087 |
| END RATE1 | 3HR 43MIN | 1650 | | 1,072 | 13.2 | | 1,085 |
| | 3HR 58MIN | 1705 | | 1,057 | 13.2 | | 1,070 |
| | 4HR 13MIN | 1720 | | 1,048 | 13.2 | | 1,061 |
| | 4HR 28MIN | 1735 | | 1,040 | 13.2 | | 1,053 |
| END RATE2 | 4HR 43MIN | 1750 | | 1,030 | 13.2 | | 1,043 |
| | 4HR 58MIN | 1805 | | 1,014 | 13.2 | | 1,027 |
| | 5HR 13MIN | 1820 | | 999 | 13.2 | | 1,012 |
| | 5HR 28MIN | 1835 | | 984 | 13.2 | | 997 |
| END RATE3 | 5HR 43MIN | 1850 | | 971 | 13.2 | | 984 |
| TAKE GAS SAMPLE | 5HR 58MIN | 1905 | | 934 | 13.2 | | 947 |
| | 6HR 13MIN | 1920 | | 910 | 13.2 | | 923 |
| | 6HR 28MIN | 1935 | | 887 | 13.2 | | 900 |
| END RATE4 | 6HR 43MIN | 1950 | | 873 | 13.2 | | 886 |
| SHUT WELL | 6 3/4HR | 1952 | | 872 | 13.2 | | 885 |
| IN | 7 | 2007 | | 933 | 13.2 | | 946 |
| | 7⅙ | 2022 | | 975 | 13.2 | | 988 |
| | 7⅓ | 2037 | | 1,001 | 13.2 | | 1,014 |
| | 7 3/4 | 2052 | | 1,023 | 13.2 | | 1,036 |
| | 8 | 2107 | | 1,035 | 13.2 | | 1,048 |
| | 8⅙ | 2122 | | 1,044 | 13.2 | | 1,057 |
| | 8⅓ | 2137 | | 1,052 | 13.2 | | 1,065 |
| | 8 3/4 | 2152 | | 1,059 | 13.2 | | 1,072 |
| | 9 | 2207 | | 1,063 | 13.2 | | 1,076 |
| | 9⅓ | 2337 | | 1,071 | 13.2 | | 1,084 |
| | 10 | 2307 | | 1,078 | 13.2 | | 1,091 |
| 4-3-81 | 11 | 2407 | | 1,085 | 13.2 | | 1,098 |
| | 12 | 0107 | | 1,091 | 13.2 | | 1,104 |
| | 13 | 0207 | | 1,093 | 13.2 | | 1,106 |
| | 14 | 0307 | | 1,096 | 13.2 | | 1,109 |
| | 15 | 0407 | | 1,098 | 13.2 | | 1,111 |
| | 16 | 0507 | | 1,099 | 13.2 | | 1,112 |
| | 17 | 0607 | | 1,100 | 13.2 | | 1,113 |
| | 18 | 0707 | | 1,101 | 13.2 | | 1,114 |
| | 19 | 0807 | | 1,103 | 13.2 | | 1,116 |

BENNETT WIRE LINE SERVICE
Artesia, New Mexico 88210

# SUBSURFACE PRESSURE MEASUREMENTS

COMPANY FRED POOL WELL NAME J.C. NIAL #2

DATE OF TEST 4-2-81 TO 4-3-81 LOCATION ABO PAGE 2 OF 2

## CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

| DATE | HOUR | TIME | DEFLECTION in/inches | CALCULATED PRESSURE psig | CORRECTION P ± PC psig | CORRECTED PRESSURE psig | PRESSURE AT MID-POINT OF PERFORATIONS P.S.I.A |
|---|---|---|---|---|---|---|---|
| 4-3-81 | 20 | 0907 | | 1,108 | 13.2 | | 1,117 |
| | 21 | 1007 | | 1,104 | 13.2 | | 1,117 |
| | 22 | 1,107 | | 1,105 | 13.2 | | 1,118 |
| | 23 | 1207 | | 1,105 | 13.2 | | 1,118 |
| | 24 | 1307 | | 1,105 | 13.2 | | 1,118 |
| | 25 | 1407 | | 1,106 | 13.2 | | 1,119 |
| | 26 | 1507 | | 1,106 | 13.2 | | 1,119 |
| | 27 | 1607 | | 1,106 | 13.2 | | 1,119 |
| | | | | | | | |
| | | | | | | | |

DEAD WEIGHT AT THE END OF 20 HOURS 12 MINUTES FROM SHUT IN 1,006 PSIA SURFAC