

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

MAR 9 1970

Form C-122
 Revised 9-1-65

| | | | |
|---|--|--|-----------------------------|
| Type Test <input checked="" type="checkbox"/> Initial <input type="checkbox"/> Annual <input type="checkbox"/> Special | | Test Date 3/3/70 | |
| Company Aztec Oil & Gas Company | | Connection Southern Union Gas Company | |
| Pool South Corbin Morrow | | Formation Morrow | |
| Completion Date 12/12/69 - Recomp. | | Total Depth 13,406 | Elevation 3805 KB |
| Csg. Size 5 1/2 | | Wt. 20.0 | Set At 13,315 |
| Tbg. Size 2 1/16 | | Wt. 3.4 | Set At 13,160 |
| Type Well - Single - Bradenhead - G.G. or G.O. Multiple Single | | Packer Set At 13,010 | County Lea |
| Producing Thru Tbg L 13,160 | | Reservoir Temp. °F 172 @ 13,500 | Mean Annual Temp. °F 60° |
| Baro. Press. - P _a 13.2 | | State New Mexico | |
| Gg .660 | | % CO ₂ - | % N ₂ - |
| Prover - | | Meter Run X | |
| Pages Flg | | | |

| NO. | Prover Line Size | X | Orifice Size | Press. p.s.i.g. | Diff. hw | Temp. °F | TUBING DATA | | CASING DATA | | Duration of Flow |
|-----|------------------|---|--------------|-----------------|----------|----------|-----------------|----------|-----------------|----------|------------------|
| | | | | | | | Press. p.s.i.g. | Temp. °F | Press. p.s.i.g. | Temp. °F | |
| SI | | | | * | * | | | | | | |
| 1. | 3 | X | 2.00 | 6.05 | 2.40 | 60 | 3665 | 70 | Choke | | 24.0 |
| 2. | 3 | X | 2.00 | 6.10 | 3.60 | 55 | 3508 | 70 | 8/64 | | 2.25 |
| 3. | 3 | X | 2.00 | 6.18 | 4.95 | 53 | 3365 | 70 | 10/64 | | 1.25 |
| 4. | 3 | X | 2.00 | 6.25 | 6.80 | 50 | 3228 | 70 | 13/64 | | 1.25 |
| 5. | 3 | X | 2.00 | 6.20 | 2.70 | 60 | 2980 | 70 | 16/64 | | 1.00 |
| | | | | | | | 3460 | 70 | 10/64 | | 20.0 |

| NO. | Coefficient (24 Hour) | * $\sqrt{h_w P_m}$ | Pressure * P _m | Flow Temp. Factor Ft. | Gravity Factor F _g | Super Compress Factor, F _p | Rate of Flow Q, Mcfd |
|-----|-----------------------|--------------------|---------------------------|-----------------------|-------------------------------|---------------------------------------|----------------------|
| | | | | | | | |
| 2 | 21.32 | 69.44 | 372.1 | 1.005 | 1.231 | 1.043 | 1910 |
| 3 | 21.32 | 96.73 | 381.9 | 1.007 | 1.231 | 1.044 | 2669 |
| 4 | 21.32 | 134.4 | 390.6 | 1.010 | 1.231 | 1.045 | 3723 |
| 5 | 21.32 | 52.93 | 384.4 | 1.000 | 1.231 | 1.041 | 1446 |

| NO. | P _r | Temp. °R | T _r | Z | Gas Liquid Hydrocarbon Ratio | | Mcf/bbl. |
|-----|----------------|----------|----------------|------|---------------------------------------|------|----------|
| | | | | | A.P.L. Gravity of Liquid Hydrocarbons | 56.0 | |
| 1 | 0.55 | 520 | 1.38 | .926 | | | |
| 2 | 0.56 | 515 | 1.36 | .920 | | | |
| 3 | 0.57 | 513 | 1.36 | .918 | | | |
| 4 | 0.58 | 510 | 1.35 | .915 | | | |
| 5 | 0.57 | 520 | 1.38 | .923 | | | |

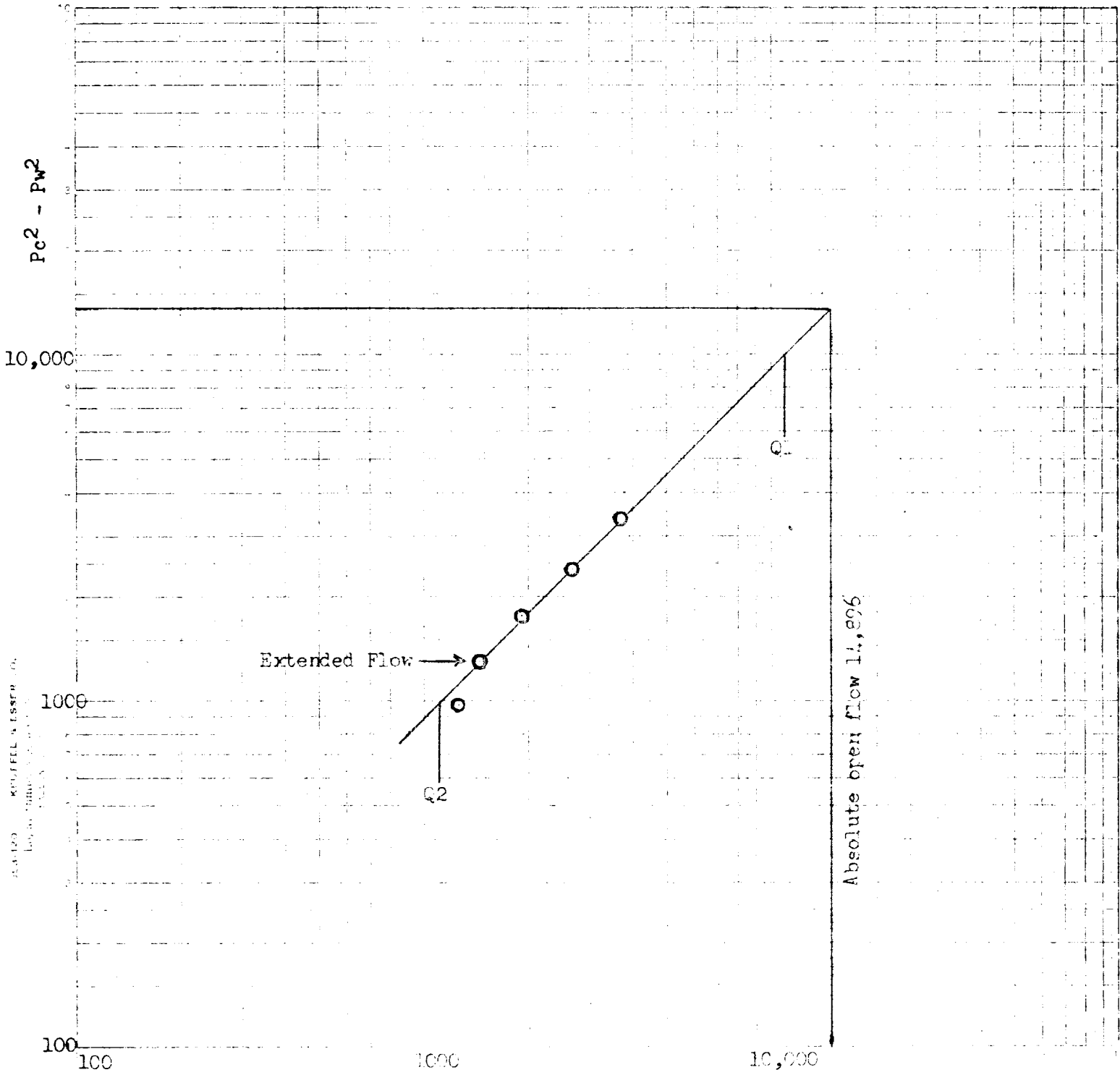
| NO. | P _r ² | P _w | P _w ² | P _c ² - P _w ² | P _c ² | P _c ² - P _w ² | n |
|-----|-----------------------------|----------------|-----------------------------|---|-----------------------------|---|---|
| | | | | | | | |
| 2 | 3429.1 | 11759 | 1770 | | | | |
| 3 | 3337.3 | 11138 | 2391 | | | | |
| 4 | 3185.6 | 10148 | 3381 | | | | |
| 5 | 3498.0 | 12236 | 1293 | | | | |

Absolute Open Flow: 14,896 Mcfd @ 15.025 Angle of Slope θ : 1.000
 Remarks: * L - 10 chart, 100" X 1000#

Approved By Commission: *[Signature]* Conducted By: *[Signature]* Calculated By: *[Signature]* Checked By: *[Signature]*
 OIL REPORTS & GAS SERVICES

ztec Oil & Gas Company
 Federal M No. 1
 Unit L, Sec. 27, T18S, R33E
 Lea County, New Mexico
 March 3, 1970

MAR 9 1970



24-1120 KUSSELL MESSER CO.
 LOG-LOG PAPER
 1000 X 1000

Q MCFD

$\log Q_1 = 4.041393$
 $\log Q_2 = 3.041393$
 $n = 1.000$

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70
 LOCATION: Unit L Section 27 Township 18 S Range 33 E
 I. 13160 H 13160 I/H 1.000 G .782 % CO₂ - % N₂ - % H₂S -
 d 1.75 P_f 0.025671 Q_m 1.252 M²ctd (L/H) (F_fQ_m)² .001033 P_{ct} 666 T_{ct} 418
TABLE IX & X

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|--|-------------|---------|---------|---------|---------|----------|---------|---------|---|---|----|
| 1 | H | | 0 | 6580 | | | 13160 | | | | | |
| 2 | GH | | 0 | 5145.6 | | | 10,291.2 | | | | | |
| 3 | 37.5GH | | 0 | 192,960 | | | 335,920 | | | | | |
| 4 | P ₀ or P _n | | 3521.2 | 4401.5 | 4336.5 | 4386.0 | 5250.8 | 5224.3 | 5223.9 | | | |
| 5 | P _i | | 5.29 | 6.61 | 6.59 | 6.59 | 7.88 | 7.85 | 7.84 | | | |
| 6 | T | | 530 | 581 | 581 | 581 | 632 | 632 | 632 | | | |
| 7 | T _n | | 1.27 | 1.39 | 1.39 | 1.39 | 1.51 | 1.51 | 1.51 | | | |
| 8 | Z | | .737 | .871 | .869 | .869 | .982 | .980 | .979 | | | |
| 9 | P/Z, P/Z | 4:8 | 4777.7 | 5053.4 | 5047.8 | 5047.2 | 5347.0 | 5331.4 | 5336.0 | | | |
| 10 | P/TTZ | 9:6 | 9.01 | 8.70 | 8.69 | 8.69 | 8.46 | 8.44 | 8.44 | | | |
| 11 | (P/TTZ) ² /1000 | (10) 2/1000 | .081180 | .075690 | .075516 | .075516 | .071572 | .071234 | .071234 | | | |
| 12 | L _n (F _f Q _m) ² | | .001033 | .001033 | .001033 | .001033 | .001033 | .001033 | .001033 | | | |
| 13 | | 11 + 12 | .082213 | .076723 | .076549 | .076549 | .072505 | .072267 | .072267 | | | |
| 14 | L _n | 10-13 | 109.593 | 113.395 | 113.522 | 113.522 | 116.521 | 116.789 | 116.789 | | | |
| 15 | M=P _n -P _{n-1} | | | 880.3 | 865.3 | 864.8 | 864.8 | 838.8 | 837.9 | | | |
| 16 | N=1 _n +1 _{n-1} | | | 222.989 | 223.115 | 223.115 | 230.043 | 230.311 | 230.311 | | | |
| 17 | M x N | 15 x 16 | | | | | | | | | | |
| 18 | Σ (M x N) | Σ 17 | | | | | 192,950 | | 385,928 | | | |

One copy to be filed in District Office (Work copy acceptable)

WORK SHEET FOR STEPWISE CALCULATION
PRESSURE (P_c & P_w)

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E

$d = 1.75$ $P_1 = 0.25671$ $Q_m = 1.252$ $M^2 c_{fd} (L/H) (F_{1, Q_m})^2 = .001033$ $P_{cr} = 666$ $T_{cr} = 418$
 $P = 1,157,760$ $P_w = 1680.4$ $P_w = 5223.9 - 1680.4 = 3543.2$

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|--|--|----------|---------|---------|---------|---------|---------|---|---|---|----|
| 1 | H | | 13160 | 6580 | | 0 | | | | | | |
| 2 | GH | | 10,291.2 | 5145.6 | | 0 | | | | | | |
| 3 | 30.5GH | | 385,920 | 192,960 | | 0 | | | | | | |
| 4 | P ₁ or P _n | | 5223.9 | 4409.6 | 4397.3 | 3570.6 | 3540.4 | 3542.2 | | | | |
| 5 | F ₁ | | 7.84 | 6.62 | 6.60 | 5.36 | 5.32 | 5.32 | | | | |
| 6 | F | | 632 | 581 | 581 | 530 | 530 | 530 | | | | |
| 7 | T _r | | 1.51 | 1.39 | 1.39 | 1.27 | 1.27 | 1.27 | | | | |
| 8 | Z | | .979 | .872 | .870 | .743 | .740 | .740 | | | | |
| 9 | P ₁ or P ₂ | $\frac{P_1}{Z}$ | 5336.0 | 5056.9 | 5054.4 | 4805.7 | 4784.3 | 4786.8 | | | | |
| 10 | P/TZ | $\frac{P}{T \cdot Z}$ | 8.44 | 8.90 | 8.70 | 9.07 | 9.03 | 9.03 | | | | |
| 11 | (P/TZ) $\frac{2}{1000}$ | $(\frac{P}{T \cdot Z}) \frac{2}{1000}$ | | | | | | | | | | |
| 12 | L ₁ (F ₁ Q _m) ² | | | | | | | | | | | |
| 13 | | $\frac{L_1}{1 + L_2}$ | | | | | | | | | | |
| 14 | H ₁ | $\frac{H_1}{10-13}$ | 118.483 | 114.942 | 114.942 | 110.254 | 110.741 | 110.741 | | | | |
| 15 | M = P _n - P _{n-1} | | | 814.3 | 826.6 | 826.7 | 856.9 | 855.1 | | | | |
| 16 | N = H _n - H _{n-1} | | | 233.425 | 233.425 | 225.196 | 225.683 | 225.683 | | | | |
| 17 | M x N | $\frac{M \times N}{15 \times 16}$ | | | 192,949 | | | 192,982 | | | | |
| 18 | $\Sigma (M \times N)$ | $\Sigma 17$ | 385,920 | | 192,971 | | | | | | | |

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E
L 13160 H 13160 L/H 1.000 G .815 % CO₂ - % N₂ - % H₂S -
 d 1.75 F₀ .025671 Q_m 1.910 M² cfd (L/H) (F₀ Q_m)² .002404 P_{cr} 665 T_{cr} 428
TABLE IX A X TABLE IX B X

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|---|-------------------------|---------|---------|---------|---------|---------|---------|---------|---|---|----|
| 1 | H | | 0 | 6580 | | | 13160 | | | | | |
| 2 | GH | | 0 | 5362.7 | | | 10725.4 | | | | | |
| 3 | 37.5GH | | 0 | 201,101 | | | 402,202 | | | | | |
| 4 | P ₀ or P _n | | 3378.2 | 4303.2 | 4289.3 | 4288.8 | 5199.5 | 5175.8 | 5175.3 | | | |
| 5 | T ₁ | | 5.08 | 6.47 | 6.45 | 6.45 | 7.82 | 7.78 | 7.78 | | | |
| 6 | T | | 530 | 581 | 581 | 581 | 632 | 632 | 632 | | | |
| 7 | T ₁ | | 1.24 | 1.36 | 1.36 | 1.36 | 1.48 | 1.48 | 1.48 | | | |
| 8 | T | | .714 | .856 | .854 | .854 | .975 | .971 | .971 | | | |
| 9 | P/2 or P/2 | | 4731.4 | 5027.1 | 5022.6 | 5022.0 | 5332.8 | 5330.4 | 5329.9 | | | |
| 10 | P/TZ | | 8.93 | 8.65 | 8.64 | 8.64 | 8.44 | 8.43 | 8.43 | | | |
| 11 | (P/TZ) ² /1000 | (10) ² /1000 | .079745 | .074823 | .074650 | .074650 | .071234 | .071065 | .071065 | | | |
| 12 | L ₁ H(F ₀ Q _m) ² | | .002404 | .002404 | .002404 | .002404 | .002404 | .002404 | .002404 | | | |
| 13 | | | .082149 | .077227 | .077054 | .077054 | .073638 | .073469 | .073469 | | | |
| 14 | L ₁ | 11 + 13 | 108.705 | 112.007 | 112.129 | 112.129 | 114.615 | 114.742 | 114.742 | | | |
| 15 | M = P _n - P _{n-1} | | | 925.0 | 911.1 | 910.6 | 910.7 | 887.0 | 886.5 | | | |
| 16 | N = L ₁ + L _{n-1} | | | 220.712 | 220.834 | 220.834 | 226.744 | 226.871 | 226.871 | | | |
| 17 | M * N | 15 x 16 | | | | | | | 201,121 | | | |
| 18 | Σ (M * N) | Σ 17 | | | | | | | 402,212 | | | |

One copy to be filed in District Office (Work copy acceptable)

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE)

PRESSURE

(P_c & P_w)

MAR 9 1970

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E

L 13160 II 13160 L/H 1.000 G .815 % CO₂ - % N₂ - % H₂S -

$$P = \frac{1,206,606}{690,972} = 1746.2$$

$$P_w = 5175.3 - 1734.6 = 3429.1$$

$$d = \frac{1.75 \cdot F \cdot 0.025671 Q_m}{1.910 \cdot M^2 \cdot d \cdot (L/H) \cdot (F \cdot Q_m)^2} = \frac{.002404}{665} = T_{CF} = 428$$

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|--|-------------------------|---------|---------|---------|---------|---------|---------|---------|---|---|----|
| 1 | II | | 13160 | 6580 | | 0 | | | | | | |
| 2 | GH | | 10725.4 | 5362.7 | | 0 | | | | | | |
| 3 | 37.5GH | | 402,202 | 201,101 | | 0 | | | | | | |
| 4 | P _s or P _h | | 5175.3 | 4327.7 | 4315.8 | 3456.2 | 3426.7 | 3427.7 | 3427.2 | | | |
| 5 | P ₁ | | 7.78 | 6.51 | 6.49 | 5.20 | 5.15 | 5.15 | 5.15 | | | |
| 6 | T | | 632 | 581 | 581 | 530 | 530 | 530 | 530 | | | |
| 7 | T _r | | 1.48 | 1.36 | 1.36 | 1.24 | 1.24 | 1.24 | 1.24 | | | |
| 8 | Z | | .971 | .859 | .857 | .723 | .718 | .718 | .718 | | | |
| 9 | P _w /P _z | 4.8 | 5329.9 | 5038.1 | 5035.9 | 4780.4 | 4772.6 | 4774.0 | 4773.3 | | | |
| 10 | P _w /P _z | 9.6 | 8.43 | 8.67 | 8.67 | 9.02 | 9.00 | 9.01 | 9.01 | | | |
| 11 | (P _w /P _z) ² /1000 | (10) ² /1000 | | | | | | | | | | |
| 12 | L/H(F·Q _m) ² | | | | | | | | | | | |
| 13 | | II + 12 | | | | | | | | | | |
| 14 | I _n | IO-13 | 118.624 | 115.340 | 115.340 | 110.865 | 111.111 | 110.988 | 110.988 | | | |
| 15 | M·P _n -P _{n-1} | | | 847.6 | 859.5 | 859.6 | 839.1 | 888.1 | 888.6 | | | |
| 16 | N·I _n +I _{n-1} | | | 233.964 | 233.964 | 226.205 | 226.451 | 226.328 | 226.328 | | | |
| 17 | M×N | 15×16 | | | 201,902 | | | | 201,115 | | | |
| 18 | Σ(M×N) | Σ17 | 402,202 | | 201,110 | | | | 402,225 | | | |

One copy to be filed in District Office (Work copy acceptable)

WORK SHEET FOR STEPWISE CALCULATION

(SUBSURFACE) PRESSURE (P₁ & P₂)
~~REPERFOR~~ ~~REPERFOR~~

MAR 9 1970

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E

$\frac{1}{1}$ 1.75 F_1 .025671 Q_m 2.669 M^2 ctd (L/H) (F₁Q_m)² .0044694 P_{ct} 668 T_{ct} 401

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|---|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---|---|----|
| 1 | H | | 0 | 6580 | | | 13,160 | | | | | |
| 2 | GH | | 0 | 4803.4 | | | 9605.8 | | | | | |
| 3 | 3M-SGH | | 0 | 180,128 | | | 360,255 | | | | | |
| 4 | P ₂ or P _n | | 3241.2 | 4058.2 | 4045.4 | 4044.5 | 4848.7 | 4828.2 | 4827.4 | | | |
| 5 | P ₁ | | 4.85 | 6.03 | 6.06 | 6.05 | 7.26 | 7.23 | 7.23 | | | |
| 6 | T ₁ | | 530 | 581 | 581 | 591 | 632 | 632 | 632 | | | |
| 7 | T ₂ | | 1.32 | 1.45 | 1.45 | 1.45 | 1.58 | 1.58 | 1.58 | | | |
| 8 | Z | | .718 | .850 | .849 | .848 | .956 | .954 | .954 | | | |
| 9 | P ₂ or P ₁ | 4-8 | 4514.2 | 4774.4 | 4764.9 | 4769.5 | 5071.9 | 5061.0 | 5060.2 | | | |
| 10 | P ₂ or P ₁ | 9-6 | 8.52 | 8.22 | 8.20 | 8.21 | 8.03 | 8.01 | 8.01 | | | |
| 11 | (F ₁ T ₁) ² /1000 | (10) 2/1000 | .072590 | .067568 | .067240 | .067404 | .064481 | .064160 | .064160 | | | |
| 12 | L/H(F ₁ Q _m) ² | | .004694 | .004694 | .004694 | .004694 | .004694 | .004694 | .004694 | | | |
| 13 | | I ₁ + I ₂ | .077284 | .072262 | .071934 | .072098 | .069175 | .068854 | .068854 | | | |
| 14 | I _n | I ₀ - I ₃ | 110.243 | 113.753 | 113.993 | 113.873 | 116.082 | 116.333 | 116.333 | | | |
| 15 | M-P _n -P _{n-1} | | | 817.0 | 804.2 | 803.3 | 804.2 | 783.7 | 782.9 | | | |
| 16 | M-I _n +I _{n-1} | | | 223.996 | 224.236 | 224.116 | 229.955 | 230.206 | 230.206 | | | |
| 17 | M x N | I ₅ x I ₆ | | | | 180,032 | | | 180,228 | | | |
| 18 | Σ(M x N) | Σ I ₇ | | | | 180,032 | | | 360,260 | | | |

One copy to be filed in District Office (Work copy acceptable)

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE)

PRESSURE (P_c & P_w)

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E

L 13160 H 13160 L/H 1.000 G .730 % CO₂ - % N₂ - % H₂S -

$P = \frac{1,080,765}{725,299} = 1490.1$ $P_w = 4827.4 - 1490.1 = 3337.3$
 $d = 1.75$ $F_p = 0.25671$ $Q_m = 2.669$ $M^2 \text{ cfd} = (L/H) (F_p Q_m)^2 = .004694$ $P_{cr} = 558$ $T_{cr} = 401$

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|--|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---|---|----|
| 1 | H | | 13,160 | 6580 | | | 0 | | | | | |
| 2 | GH | | 9606.8 | 4803.4 | | | 0 | | | | | |
| 3 | 37.5GH | | 360,255 | 180,128 | | | 0 | | | | | |
| 4 | P _c or P _n | | 4827.4 | 4106.0 | 4094.5 | 4095.3 | 3363.3 | 3333.0 | 3334.7 | | | |
| 5 | P _r | | 7.23 | 6.15 | 6.13 | 6.13 | 5.03 | 4.99 | 4.99 | | | |
| 6 | T | | 632 | 581 | 581 | 581 | 530 | 530 | 530 | | | |
| 7 | T _r | | 1.58 | 1.45 | 1.45 | 1.45 | 1.32 | 1.32 | 1.32 | | | |
| 8 | Z | | .954 | .855 | .854 | .854 | .730 | .727 | .727 | | | |
| 9 | P _r - P _r /Z | | 5060.2 | 4802.3 | 4794.5 | 4795.4 | 4607.3 | 4584.6 | 4586.9 | | | |
| 10 | P/TZ | | 8.01 | 8.27 | 8.25 | 8.25 | 8.69 | 8.65 | 8.65 | | | |
| 11 | (P/TZ) ² /1000 | (10) ² /1000 | | | | | | | | | | |
| 12 | L/H(F _p Q _m) ² | | | | | | | | | | | |
| 13 | | I ₁ + I ₂ | | | | | | | | | | |
| 14 | I _n | I ₀ - I ₃ | 124,844 | 120,919 | 121,212 | 121,212 | 115,075 | 115,607 | 115,607 | | | |
| 15 | M = P _n - P _{n-1} | | | 721.4 | 732.9 | 732.1 | 732.0 | 762.3 | 760.6 | | | |
| 16 | N = I _n + I _{n-1} | | | 245,763 | 246,056 | 246,056 | 236,287 | 236,819 | 236,819 | | | |
| 17 | M x N | I ₅ x I ₆ | | | | | | | | | | |
| 18 | Σ(M x N) | Σ I ₇ | 360,255 | | | 180,117 | | | | | | |

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E

L 13160 H 13160 L/H 1.000 G .783 % CO₂ - % N₂ - % H₂S -

d 1.75 F_p .025671 Q_m 3.723 M²ctd (L/H) (F_p Q_m)² .009134 P_{cr} 666 T_{cr} 418

TABLE IX B X
TABLE IX B X

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|---|-------------------------|---------|---------|---------|---------|---------|---------|---|---|---|----|
| 1 | H | | 0 | 6580 | | 13160 | | | | | | |
| 2 | Q _m | | 0 | 5152.1 | | 10304.3 | | | | | | |
| 3 | 37,500F | | 0 | 193,205 | | 386,410 | | | | | | |
| 4 | P _e or F _n | | 2993.2 | 3908.0 | 3902.1 | 4811.0 | 4800.2 | 4799.3 | | | | |
| 5 | F ₁ | | 4.49 | 5.87 | 5.86 | 7.22 | 7.21 | 7.21 | | | | |
| 6 | F | | 530 | 581 | 581 | 632 | 632 | 632 | | | | |
| 7 | F _p | | 1.27 | 1.39 | 1.39 | 1.51 | 1.51 | 1.51 | | | | |
| 8 | Z | | .674 | .816 | .815 | .938 | .938 | .938 | | | | |
| 9 | P _e or F _n Z | | 4440.9 | 4789.2 | 4787.9 | 5129.0 | 5117.5 | 5116.5 | | | | |
| 10 | P _e F _e | | 8.38 | 8.24 | 8.24 | 8.12 | 8.10 | 8.10 | | | | |
| 11 | (P _e /P _{cr}) ² /1000 | (10) ² /1000 | .070224 | .067898 | .067898 | .065934 | .065610 | .065610 | | | | |
| 12 | L/H(F _p Q _m) ² | | .009134 | .009134 | .009134 | .009134 | .009134 | .009134 | | | | |
| 13 | | | .079358 | .077032 | .077032 | .075068 | .074744 | .074744 | | | | |
| 14 | I _n | | 105.597 | 106.969 | 106.969 | 108.169 | 108.370 | 108.370 | | | | |
| 15 | M=P _n -P _{n-1} | | | 914.8 | 908.9 | 908.9 | 898.1 | 897.2 | | | | |
| 16 | N I _n + I _{n-1} | | | 212.566 | 212.566 | 215.138 | 215.339 | 215.339 | | | | |
| 17 | M x N | | | | 193,201 | | | 193,202 | | | | |
| 18 | Σ (M x N) | Σ I ₇ | | | 193,201 | | | 386,403 | | | | |

WORK SHEET FOR STEPWISE CALCULATION

RESERVOIR PRESSURE (SURFACE)

(P_c & P_w)

MAR 9 1970

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E

1 13160 11 13160 L/11 1.000 G .783 % CO₂ - % N₂ - % H₂S -

$P = 1,159,230$ $\frac{1}{1.75}$ $F_1 \cdot 025671 Q_m$ 3.723 $M^2 \cdot d$ $(L/H) (F_{10m})^2$ P_{ct} 666 T_{OT} 418
 $718,372 = 1613.7$ $P_M = 4799.3 - 1613.7 = 3185.6$

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|--|---------|---------|---------|---------|---------|---------|---------|---------|---|---|----|
| 1 | H | | 13160 | 6580 | | | 0 | | | | | |
| 2 | OR | | 10304.3 | 5152.1 | | | 0 | | | | | |
| 3 | 3145GH | | 386,410 | 193,205 | | | 0 | | | | | |
| 4 | Base P _h | | 4799.3 | 4016.8 | 4004.5 | 4005.4 | 3210.6 | 3183.1 | 3185.0 | | | |
| 5 | P ₁ | | 7.21 | 6.03 | 6.01 | 6.01 | 4.82 | 4.78 | 4.78 | | | |
| 6 | P ₂ | | 632 | 591 | 581 | 591 | 530 | 530 | 530 | | | |
| 7 | P ₃ | | 1.51 | 1.39 | 1.39 | 1.39 | 1.27 | 1.27 | 1.27 | | | |
| 8 | P ₄ | | .938 | .827 | .826 | .826 | .699 | .696 | .696 | | | |
| 9 | Base P _{1/2} | 4.8 | 5116.5 | 4857.1 | 4848.1 | 4849.2 | 4593.1 | 4573.4 | 4576.1 | | | |
| 10 | P _{1/2} | 9.5 | 8.10 | 8.36 | 8.34 | 8.35 | 8.67 | 8.63 | 8.63 | | | |
| 11 | (E ₁ - E ₂) / (1000) (10) / (1000) | | | | | | | | | | | |
| 12 | L ₁ (10) / (1000) | | | | | | | | | | | |
| 13 | | 11 + 12 | | | | | | | | | | |
| 14 | L _h | 10 + 13 | 123,457 | 119,617 | 119,904 | 119,760 | 115,340 | 115,875 | 115,875 | | | |
| 15 | M ₁ (E ₁ - E ₂) / (1000) | | | 782.5 | 794.8 | 793.9 | 794.8 | 822.3 | 820.4 | | | |
| 16 | N ₁ (L _h + L _{h-1}) | | | 243,074 | 243,361 | 243,217 | 235,100 | 235,635 | 235,635 | | | |
| 17 | M ₁ × N | 15 × 16 | | | | | | | 193,090 | | | |
| 18 | Σ (M ₁ × N) | Σ 17 | 386,410 | | | | | | 193,320 | | | |

One copy to be filed in District Office (Work copy acceptable)

WORK SHEET FOR STEPWISE CALCULATION

(SUBSURFACE) PRESSURE (P_f & P_g)
~~XXXXXXXXXX~~

MAR 9 1970

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE 3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E
13160 H 13160 I/H 1.000 G .791 % CO₂ _____ % N₂ _____ % H₂S _____

d 1.75 F_p .025671 Q_m 1.446 M₂crit (L/H) (F_p Q_m)² .001378 P_{cr} 666 T_{cr} 421
TABLE IX & X TABLE IX & X

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|--|--------|---------|---------|---------|---------|---------|---------|---|---|---|----|
| 1 | H | | 0 | 6580 | | 13160 | | | | | | |
| 2 | GH | | 0 | 5204.8 | | 10409.6 | | | | | | |
| 3 | 37.5GH | | 0 | 195,180 | | 390,360 | | | | | | |
| 4 | P _u or P _n | | 3473.2 | 4354.6 | 4344.6 | 5216.0 | 5195.1 | 5194.1 | | | | |
| 5 | P _u | | 5.22 | 6.54 | 6.52 | 7.83 | 7.80 | 7.80 | | | | |
| 6 | T | | 530 | 581 | 581 | 632 | 632 | 632 | | | | |
| 7 | T _r | | 1.26 | 1.38 | 1.38 | 1.50 | 1.50 | 1.50 | | | | |
| 8 | Z | | .729 | .864 | .862 | .978 | .976 | .976 | | | | |
| 9 | P _u / P _u / Z | | 4764.3 | 5040.0 | 5040.1 | 5333.3 | 5322.8 | 5321.8 | | | | |
| 10 | P _u / T _r | | 8.99 | 8.67 | 8.67 | 8.44 | 8.42 | 8.42 | | | | |
| 11 | (P _u / T _r) ² / 1000 | | .080820 | .075169 | .075169 | .071234 | .070896 | .070896 | | | | |
| 12 | (L/H)(F _p Q _m) ² | | .001378 | .001378 | .001378 | .001378 | .001378 | .001378 | | | | |
| 13 | | | .082198 | .076547 | .076547 | .072612 | .072274 | .072274 | | | | |
| 14 | H _u | | 110.717 | 113.264 | 113.264 | 116.234 | 116.501 | 116.501 | | | | |
| 15 | M = P _n + P _u - 1 | | | 881.4 | 871.4 | 871.4 | 850.5 | 849.5 | | | | |
| 16 | N = L _n + L _{n-1} | | | 223.981 | 223.981 | 229.498 | 229.765 | 229.765 | | | | |
| 17 | M x N | | | | 195,177 | | | 195,185 | | | | |
| 18 | Σ (M x N) | | | | 195,177 | | | 390,362 | | | | |

One copy to be filed in District Office (Work copy acceptable)

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE) PRESSURE (P_c & P_w)

COMPANY Aztec Oil & Gas Co. LEASE Federal M WELL NO. 1 DATE MAR 9 1970
3/3/70

LOCATION: Unit L Section 27 Township 18 S Range 33 E
L 13160 II 13160 I/H 1.000 G .791 % CO₂ - % N₂ - % H₂S -

$P = \frac{1,171,080}{690.458} = 1696.1$ $Q_m = \frac{1.75 \cdot 1.446}{1.75 \cdot 1.446} = 1.446$ $M^2 \text{ cfd} = 3498.0$ $(L/H) (F_{rQ_m})^2 = .001378$ $P_{ct} = 666$ $T_{ct} = 421$

| LINE | ITEM | SOURCE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|--|-------------|---------|---------|---------|---------|---------|---------|---|---|---|----|
| 1 | H | | 13160 | 6580 | | 0 | | | | | | |
| 2 | OH | | 10409.6 | 5204.8 | | 0 | | | | | | |
| 3 | 37.5GH | | 390,360 | 195,180 | | 0 | | | | | | |
| 4 | P _g or P _h | | 5194.1 | 4372.4 | 4359.9 | 3525.7 | 3495.1 | 3496.5 | | | | |
| 5 | P _i | | 7.80 | 6.57 | 6.55 | 5.29 | 5.25 | 5.25 | | | | |
| 6 | I | | 632 | 581 | 581 | 530 | 530 | 530 | | | | |
| 7 | T _r | | 1.50 | 1.33 | 1.38 | 1.26 | 1.26 | 1.26 | | | | |
| 8 | Z | | .976 | .867 | .865 | .735 | .731 | .731 | | | | |
| 9 | P _g or F/Z | | 5321.8 | 5043.1 | 5040.3 | 4796.9 | 4781.3 | 4783.2 | | | | |
| 10 | P _r /T _r | | 8.42 | 8.68 | 8.68 | 9.05 | 9.02 | 9.02 | | | | |
| 11 | (P _r /T _r) ² /1000 | (10) 2/1000 | | | | | | | | | | |
| 12 | L _h (F _r Q _m) ² | | | | | | | | | | | |
| 13 | | | | | | | | | | | | |
| 14 | I _h | 10-13 | 118.765 | 115.207 | 115.207 | 110.497 | 110.865 | 110.865 | | | | |
| 15 | M=F _h ·P _h ⁿ⁻¹ | | | 821.7 | 834.2 | 834.2 | 864.8 | 863.4 | | | | |
| 16 | N=I _h +I _{h-1} | | | 233.972 | 233.972 | 225.704 | 226.072 | 226.072 | | | | |
| 17 | M×N | 15×16 | | | 195,179 | | | 195,191 | | | | |
| 18 | Σ(M×N) | Σ17 | 390,360 | | 195,181 | | | | | | | |

One copy to be filed in District Office (Work copy acceptable)