Mobil Oil Corporation

P.O. BOX 633
MIDLAND, TEXAS 79701

January 17, 1967

RECEIVED
JAN 19 1967
O. C. C.
ARTESIA, OFFICE

Mr. Elvis A. Utz, Gas Engineer
New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico

GAS WELL DELIVERABILITY TEST
BROWN-HUMBLE FEDERAL NO. 1
SECTION 17, T20S, R25E,
CEMETERY MORROW POOL
EDDY COUNTY, NEW MEXICO

Dear Sir:

Mobil Oil Corporation respectfully requests that the New Mexico Oil Conservation Commission amend the letter order of November 22, 1966, to approve the flaring of 8.08 MMCF of gas from the subject well.

A forty-eight hour deliverability test was completed on the subject well January 5, 1965. This test was conducted as described in Mobil's letter of November 17, 1966, in which authority to flare 6 MMCF of gas was requested.

During the deliverability test, the well produced at considerably higher pressures than anticipated with a corresponding increase in gas volume produced. The volume of gas calculated to have been flared from this well is 8.08 MMCF, exceeding the authorized volume of 6.0 MMCF by 2.08 MMCF.

Attached are the results of the test including a plat of flowing well-head pressure versus time and the gas volume calculation sheet.

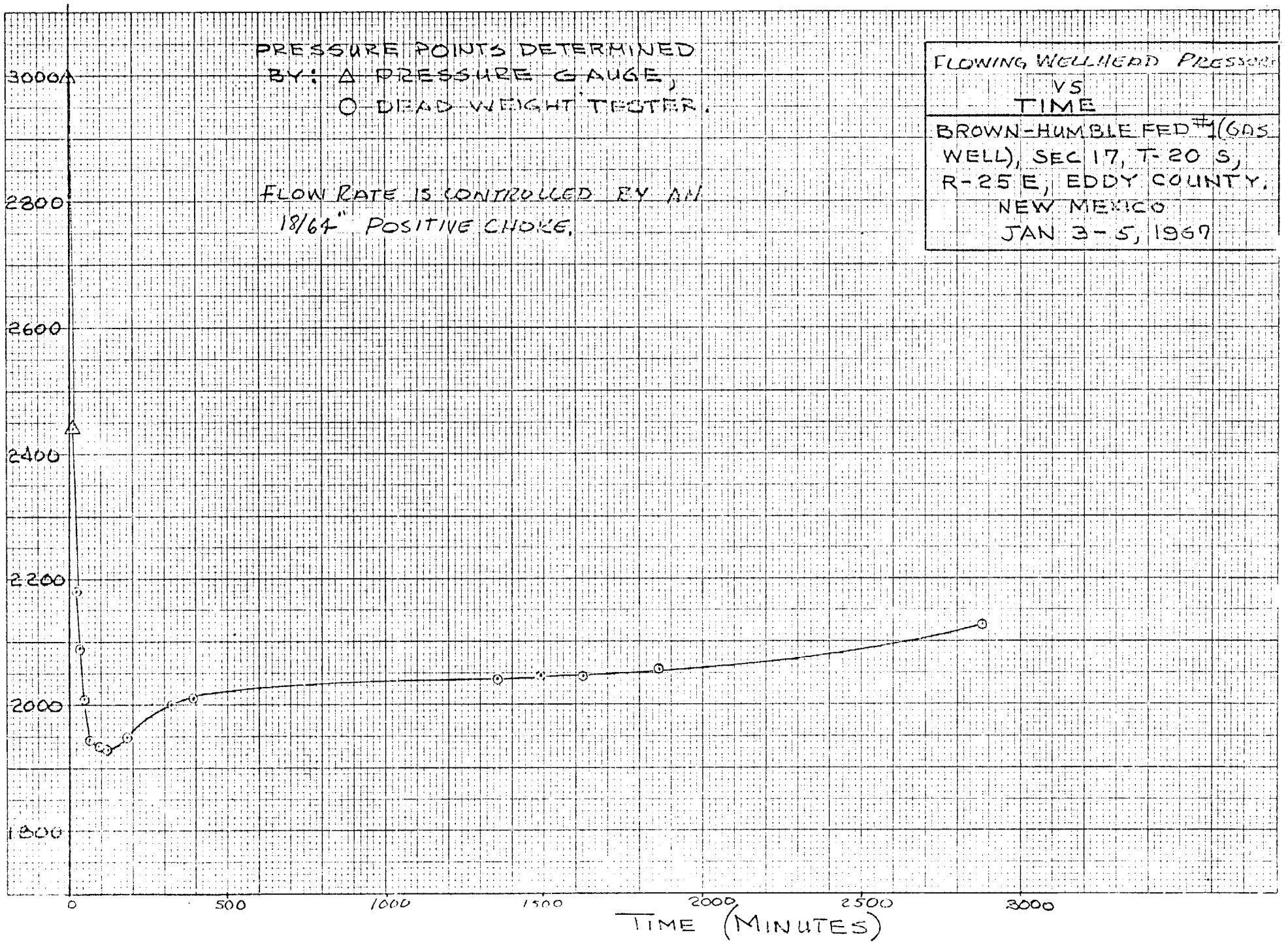
Yours very truly,

N. E. Bourland for
Ira B. Stitt, Jr.
Division Operations Engineer

RED/nab
Attachment
cc: United States Geological Survey
Attn: Mr. James A. Knauf

New Mexico Oil Conservation Comm. ✓
Artesia, New Mexico

20 Squares to the Inch
12-282



VOLUME CALCULATIONS FOR FLOW THROUGH POSITIVE CHOKES.

REFERENCES:

(1) "MANUAL FOR BACK PRESSURE TEST FOR NATURAL GAS WELLS - STATE OF NEW MEXICO," COMPILED BY ELVIS A UTE, GAS ENGINEER, NMOCC, FEBRUARY 1, 1956

(2) "SIMPLIFIED SUPERCOMPRESSIBILITY TABLES" COMPILED FROM C.N.G.A. BULLETINS TS-402 AND TS-461. APPROVED BY NMOCC.

FORMULA:

$$Q = C \times P_t \times F_t \times F_G \times F_{PV}$$

WHERE:

Q = FLOW RATE IN MCFD @ 15.025 PSIA & 60°F,
C = POSITIVE CHOKE COEFFICIENT,
P_t = PRESSURE ACTING ON CHOKE,
F_t = FLOWING GAS TEMPERATURE FACTOR,
F_G = FLOWING GAS GRAVITY FACTOR,
F_{PV} = FLOWING GAS SUPERCOMPRESSIBILITY FACTOR.

DATA:

POSITIVE CHOKE SIZE = 18/64 INCH,
FLOWING GAS TEMPERATURE = 60°F (ASSUMED),
GAS GRAVITY = 0.5873 ≅ 0.59,
$P_{t\,AVG_1}$ = 1985 PSIG + 15.025 PSIA ≅ 2000 PSIA FROM t = 0 MIN TO t = 390 MIN (SEE DRAWDOWN GRAPH),
$P_{t\,AVG_2}$ = 2055 PSIG + 15.025 PSIA ≅ 2070 PSIA FROM t = 390 MIN TO t = 2880 MIN (SEE DRAWDOWN GRAPH).

FACTORS FOR FORMULA:

$C = 1.6907$ (COL #1, TABLE IV, REF #1)
$P_{t\,AVG_1} = 2000$ PSIA (SEE DATA)
$P_{t\,AVG_2} = 2070$ PSIA (SEE DATA)
$F_t = 1.000$ (TABLE V, REF #1)
$F_G = 1.0084$ (TABLE VI, REF #1)
$F_{PV_1} = 1.147$ (PAGE 5, REF #2)
$F_{PV_2} = 1.150$ (PAGE 7, REF #2)

FLOW RATES:

TIME - $t = 0$ MIN TO $t = 390$ MIN

$$Q_1 = C \times P_{t\,AVG_1} \times F_t \times F_G \times F_{PV}$$

$$Q_1 = (1.6907)(2000)(1.000)(1.0084)(1.147)$$
$$Q_1 = 3.91 \text{ MMCFD}$$

TIME - $t = 390$ MIN TO $t = 2880$ MIN

$$Q_2 = C \times P_{t\,AVG_2} \times F_t \times F_G \times F_{PV}$$

$$Q_2 = (1.6907)(2070)(1.000)(1.0084)(1.150)$$
$$Q_2 = 4.06 \text{ MMCFD}$$

VOLUME GAS PRODUCED:

$$G_p = Q_1 t_1 + Q_2 t_2$$

$$G_p = (3.91 \text{ MMCFD})(390 \text{ MIN})\left(\frac{\text{DA}}{1440 \text{ MIN}}\right) + (4.06 \text{ MMCFD})(2490 \text{ MIN})\left(\frac{\text{DA}}{1440 \text{ MIN}}\right)$$
$$G_p = (3.91 \text{ MMCFD})(0.271 \text{ DA}) + (4.06 \text{ MMCFD})(1.729 \text{ DA})$$
$$G_p = 1.06 \text{ MMCF} + 7.02 \text{ MMCF}$$
$$G_p = \underline{8.08 \text{ MMCF}} \text{ OF GAS PRODUCED DURING 48 HOUR DRAWDOWN TEST.}$$