

## BACK PRESSURE TEST SHEET

Field \_\_\_\_\_ Lease SCHARTZ Well No. 1 Date of Test 31 Aug 77  
 Formation \_\_\_\_\_ County PAWNEE State KANSAS Location 31-23-17 16 W  
 Casing: Size 5 1/2 Wt. \_\_\_\_\_ Set at 4235 Perf 4196 To 4200 L \_\_\_\_\_ Packer \_\_\_\_\_ 0 \_\_\_\_\_  
 Tubing: Size 2 7/8 Wt. \_\_\_\_\_ Set at 4210 Perf 4210 To \_\_\_\_\_ Reservoir Temp \_\_\_\_\_  
 Test Run on  tubing, Casing, Annulus.  (Cross out those not applicable) Meter Run \_\_\_\_\_ Conn \_\_\_\_\_

## OBSERVED FIELD DATA

| Run No. | Flow Data         |                      |                          |             | Tubing Data |           |             | Casing Data |             |
|---------|-------------------|----------------------|--------------------------|-------------|-------------|-----------|-------------|-------------|-------------|
|         | Time of Run, Min. | (Prover) (Line) size | (Orifice) (Orifice) Size | Press. psia | Diff. in    | Temp. °F. | Press. psia | Temp. °F.   | Press. psia |
| Shut in |                   |                      |                          |             |             |           |             |             | 856.4       |
| 1       | 60                | 2"                   | 1/4                      | 69.4        |             | 76        | PUMP        |             | 834.4       |
| 2       | 60                | 2"                   | "                        | 146.4       |             | 74        |             |             | 795.4       |
| 3       | 60                | 2"                   | "                        | 255.4       |             | 76        |             |             | 720.4       |
| 4       | 60                | 2"                   | "                        | 310.4       |             | 81        |             |             | 637.4       |
| 5       |                   |                      |                          |             |             |           |             |             |             |

## FLOW CALCULATIONS

| Run No. | Coefficient (24-Hour) | $\sqrt{h_v P_f}$ | Pressure psia | Flow Temp. Factor $P_t$ | Gravity Factor $F_g$ | Compress. Factor $F_{pw}$ | Rate of Flow Q-MCFD |
|---------|-----------------------|------------------|---------------|-------------------------|----------------------|---------------------------|---------------------|
| 1       | 1.115                 |                  | 69.4          | .9850                   | 1.264                | —                         | 96                  |
| 2       | 1.115                 |                  | 146.4         | .9869                   | 1.264                | 1.012                     | 206                 |
| 3       | 1.115                 |                  | 255.4         | .9850                   | 1.264                | 1.023                     | 363                 |
| 4       | 1.115                 |                  | 310.4         | .9804                   | 1.264                | 1.027                     | 440                 |
| 5       |                       |                  |               |                         |                      |                           |                     |

## PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio \_\_\_\_\_ cf/bbl. Specific Gravity Separator Gas 1.626  
 Gravity of Liquid Hydrocarbons \_\_\_\_\_ deg. Specific Gravity Flowing Fluid \_\_\_\_\_  
 $P_c$  \_\_\_\_\_ (1-s<sup>-2</sup>)  $P_c$  856.4  $P_c^2$  733.4

| Run No. | $P_v$ $P_t$ (psia) | $P_t^2$ | $P_{cQ}$ | $(P_{cQ})^2$ | $(P_{cQ})^2 (1-s^2)$ | $P_v^2$ | $P_c^2 - P_v^2$ | Cal. $P_v$ | $\frac{P_v}{P_c}$ |
|---------|--------------------|---------|----------|--------------|----------------------|---------|-----------------|------------|-------------------|
| 1       | 834.4              |         |          |              |                      | 696.2   | 37.2            | 96         |                   |
| 2       | 795.4              |         |          |              |                      | 632.6   | 100.8           | 206        |                   |
| 3       | 720.4              |         |          |              |                      | 519.0   | 214.4           | 363        |                   |
| 4       | 637.4              |         |          |              |                      | 406.3   | 327.1           | 440        |                   |
| 5       |                    |         |          |              |                      |         |                 |            |                   |

Absolute Potential 915 MCFD at 14.4 psia; n 1.742

Company MESSMER-REINHARDT Address \_\_\_\_\_

Tested By: William E Turner Jr

Calculated By: Same

Witnessed By: Charlie Albrecht

Company MESSMER-REINHARDT

Remarks \_\_\_\_\_

**STATE OF KANSAS - CORPORATION COMMISSION**  
**ONE POINT STABILIZED OPEN FLOW OR DELIVERABILITY TEST**

FORM G-2  
8-7-58

TYPE TEST: ☐ Deliverability ☒ Open Flow TEST DATE: 31 AUGUST 1977

COMPANY MESSMER-REINHARDT LEASE SCHARTZ WELL NO. 1  
 COUNTY PAWNEE, KANSAS LOCATION C 6 1/2 NW SECTION 31 TWP 23 RNG # 16 W ACRES  
 FIELD \_\_\_\_\_ RESERVOIR \_\_\_\_\_ PIPELINE CONNECTION \_\_\_\_\_

COMPLETION DATE \_\_\_\_\_ PLUG BACK TOTAL DEPTH \_\_\_\_\_ PACKER SET AT \_\_\_\_\_

CASING SIZE 5 1/2 WT. \_\_\_\_\_ I.D. \_\_\_\_\_ SET AT 4235 PERF. 4110 TO 4200  
 TUBING SIZE 2 1/8 WT. \_\_\_\_\_ I.D. \_\_\_\_\_ SET AT 4210 PERF. 4210 TO \_\_\_\_\_  
 TYPE COMPLETION (Describe) SINGLE (V43) TYPE FLUID PRODUCTION \_\_\_\_\_

PRODUCING THRU CASING RESERVOIR TEMPERATURE F BAR. PRESS - P<sub>s</sub>  
14.4 Psia

GAS GRAVITY - G 0.626 % CARBON DIOXIDE \_\_\_\_\_ % NITROGEN \_\_\_\_\_ API GRAVITY OF LIQUID \_\_\_\_\_

VERTICAL DEPTH (H) \_\_\_\_\_ TYPE METER CONN. NOVE (METER RUN) (PROVER) SIZE 2

SHUT-IN PRESSURE: SHUT IN 30 AUG 127 AT 9:05 (AM)(PM) TAKEN 31 AUG 127 AT 9:15 (AM)(PM)  
 FLOW TEST: STARTED 31 Aug 127 AT 9:15 (AM)(PM) TAKEN 1 SEP 127 AT 9:15 (AM)(PM)

**OBSERVED DATA**

DURATION OF SHUT-IN 24 HR.

| SHUT-IN OR FLOW | ORIFICE SIZE in. | (METER) (PROVER) PRESSURE psig | DIFF. in. (h <sub>w</sub> )(h <sub>d</sub> ) | FLOWING TEMP. t | WELL-HEAD TEMP. t | CASINO WELL-HEAD PRESS |                                                          | TUBING WELL-HEAD PRESS |                                                          | DURATION HOURS | LIQUID PROD. Bbls. |
|-----------------|------------------|--------------------------------|----------------------------------------------|-----------------|-------------------|------------------------|----------------------------------------------------------|------------------------|----------------------------------------------------------|----------------|--------------------|
|                 |                  |                                |                                              |                 |                   | psig                   | (P <sub>w</sub> )(P <sub>d</sub> )(P <sub>c</sub> ) psia | psig                   | (P <sub>w</sub> )(P <sub>d</sub> )(P <sub>c</sub> ) psia |                |                    |
| SHUT-IN         |                  |                                |                                              |                 |                   | 842                    | 856.4                                                    |                        |                                                          |                |                    |
| FLOW            | <u>1/4</u>       | <u>84</u>                      |                                              | <u>67</u>       |                   | <u>645</u>             | <u>659.4</u>                                             | <u>PUA</u>             |                                                          | <u>24 1/2</u>  |                    |

**RATE OF FLOW CALCULATIONS**

| COEFFICIENT (F <sub>d</sub> ) (S <sub>d</sub> ) Mcfd | (METER) (PROVER) PRESSURE psia | EXTENSION $\sqrt{P_m \times h_w}$ | GRAVITY FACTOR F <sub>g</sub> | FLOWING TEMP. FACTOR F <sub>t</sub> | DEVIATION FACTOR F <sub>pv</sub> | RATE OF FLOW R Mcfd | GOR | G <sub>m</sub> |
|------------------------------------------------------|--------------------------------|-----------------------------------|-------------------------------|-------------------------------------|----------------------------------|---------------------|-----|----------------|
| <u>1.115</u>                                         | <u>99.4</u>                    |                                   | <u>1.264</u>                  | <u>.9933</u>                        | <u>—</u>                         | <u>139</u>          |     |                |

**(OPEN FLOW) (DELIVERABILITY) CALCULATIONS**

|                                                  |                     |                                       |             |                 |                                 |                   |                                                              |
|--------------------------------------------------|---------------------|---------------------------------------|-------------|-----------------|---------------------------------|-------------------|--------------------------------------------------------------|
| $(P_c)^2 = 733.4$ ;                              |                     | $(P_w)^2 = 434.8$ ;                   |             | $P_d =$ _____ % | $(P_c - 14.4) + 14.4 =$ _____ ; | $(P_d)^2 = 0.207$ | $(P_d)^2 =$ _____                                            |
| $(P_c)^2 - (P_d)^2$<br>or<br>$(P_c)^2 - (P_w)^2$ | $(P_c)^2 - (P_w)^2$ | $\frac{P_c^2 - P_d^2}{P_c^2 - P_w^2}$ | LOG [     ] | "n"             | $n \times \text{LOG [     ]}$   | ANTILOG           | OPEN FLOW<br>DELIVERABILITY<br>EQUALS<br>R x ANTILOG<br>Mcfd |
| 733.2                                            | 298.6               | 2.455                                 | .3901       | .742            | .2895                           | 1.948             | 271                                                          |

OPEN FLOW 271 Mcfd @ 14.65 psia DELIVERABILITY Mcfd @ 14.65 psia

The undersigned authority, on behalf of the Company, states that he is duly authorized to make the above report and that he has knowledge of the facts stated therein, and that said report is true and correct.

Executed this the 1 day of Sept, 1977.

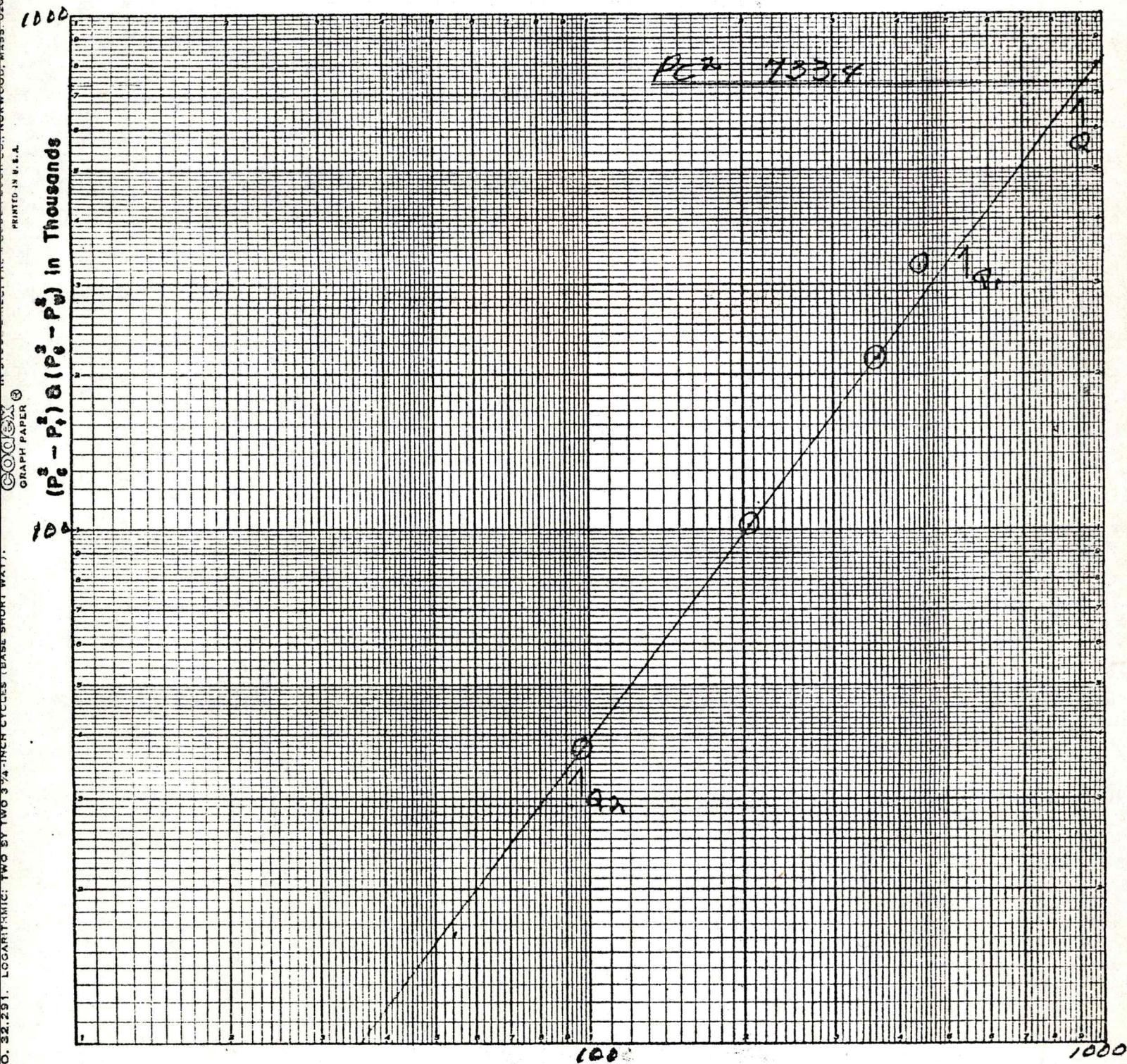
William E. Lunn  
For Company

Witness (if any)

Checked by

# BACK PRESSURE CURVE

Operator MESSMER-REINHARDT Lease SCHAPIZ Well No. 1  
 County PAWNEE Field \_\_\_\_\_ Location 31-23-1916W  
 Date of Test 31 Aug 77 Slope "n" .742 W.H. \_\_\_\_\_ Abs. \_\_\_\_\_  
 Calc. W.H. Potential \_\_\_\_\_ MCF/D Calc. Abs. Potential 915 MCF/D



William E. Zuercher

Q in MCF/Day  
 Q = 915

Q<sub>1</sub> 530 [LOG] 2.724  
 Q<sub>2</sub> 96 [LOG] 1.982  
 N = .742

KANSAS-NEBRASKA NATURAL GAS COMPANY, INC.  
Back Pressure Field Data Sheet

Date of Test 31 AUGUST 1977

Lease SCHARTZ Well No. 1 Company MESSMER-REINHARDT  
Field \_\_\_\_\_ County RAVINE State KANSAS Location NE-SW-NW 31-23-17  
Production Casing 5 1/2 Wt. \_\_\_\_\_ Set at 4235 Perf. 4196 to 4200  
Tubing Size 2 3/8 Set at 4210 Perf. 4210 to \_\_\_\_\_  
Meter run \_\_\_\_\_ Conn. \_\_\_\_\_ Shut-in Pressure 842 psig. Well shut in \_\_\_\_\_ hrs.  
(Before or After)

Gravity 626  
Test Run on: Casing, Tubing, Annulus (Cross out those not applicable.)  
Other remarks about test set-up: TEST RAN DOWNSTREAM OF A SEPARATOR  
WITH A 2" PROVER. PUMPING UNIT ON TUBING

BTU 1019

OBSERVATIONS

NEG H<sub>2</sub>S

| Date              | Time  | Orif. Size | Flow. Temp.               | Prover Pressure psig | Diff. h <sub>w</sub> Inches of Water | Wellhead Working Pressure psig | Remarks           |
|-------------------|-------|------------|---------------------------|----------------------|--------------------------------------|--------------------------------|-------------------|
| 31 AUG 77         | 9:15  | 1/4        |                           |                      |                                      | 842                            |                   |
|                   | 9:20  |            |                           |                      |                                      | 832                            | PUMPING UNIT ON   |
|                   | 9:25  |            |                           |                      |                                      | 830                            |                   |
|                   | 9:30  |            | 76                        | 43                   |                                      | 829                            |                   |
|                   | 9:45  |            | 75                        | 52                   |                                      | 824                            | PUMPING UNIT OFF: |
|                   | 10:00 |            | 75                        | 54                   |                                      | 821                            | PRESS TO HIGH.    |
|                   | 10:15 |            | 76                        | 55                   |                                      | 820                            |                   |
|                   |       |            | CHANGED RATES             |                      |                                      |                                |                   |
|                   | 10:30 |            | 70                        | 136                  |                                      | 802                            |                   |
|                   | 10:45 |            | 71                        | 128                  |                                      | 794                            |                   |
|                   | 11:00 |            | 73                        | 133                  |                                      | 787                            |                   |
|                   | 11:15 |            | 74                        | 132                  |                                      | 781                            |                   |
|                   |       |            | CHANGED RATES             |                      |                                      |                                |                   |
|                   | 11:30 |            | 73                        | 358                  |                                      | 752                            |                   |
|                   | 11:45 |            | 74                        | 252                  |                                      | 736                            |                   |
|                   | 12:00 |            | 75                        | 246                  |                                      | 721                            |                   |
|                   | 12:15 |            | 76                        | 241                  |                                      | 706                            |                   |
|                   |       |            | CHANGED RATES             |                      |                                      |                                |                   |
|                   | 12:30 |            | 77                        | 324                  |                                      | 679                            |                   |
|                   | 12:45 |            | 79                        | 312                  |                                      | 656                            |                   |
|                   | 1:00  |            | 80                        | 304                  |                                      | 638                            |                   |
|                   | 1:15  |            | 81                        | 296                  |                                      | 623                            |                   |
|                   |       |            | CHANGED RATES FOR 1 POINT |                      |                                      |                                |                   |
| 15 SEP 77         | 8:45  | 1/4        | 67                        | 84                   |                                      | 645                            |                   |
|                   | 9:00  |            | 67                        | 84                   |                                      | 645                            |                   |
|                   | 9:15  |            | 67                        | 84                   |                                      | 645                            |                   |
|                   | 9:30  |            | 67                        | 84                   |                                      | 645                            |                   |
| cc: Tom Swanson   |       |            |                           |                      |                                      |                                |                   |
| Ron Tinton        |       |            |                           |                      |                                      |                                |                   |
| Harva Truskett    |       |            |                           |                      |                                      |                                |                   |
| State Corp. Comm. |       |            |                           |                      |                                      |                                |                   |
| Messmer-Reinhardt |       |            |                           |                      |                                      |                                |                   |
| File              |       |            |                           |                      |                                      |                                |                   |

Tested By William E. Turner Jr.  
Witness Charles Drake