NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool **Four Lakes Devonian** Formation **Devonian** County **Lea**

Initial **x** Annual _____ Special _____ Date of Test **7-1-60**

Company **Humble Oil & Refining Company** Lease **South Four Lakes Unit** Well No. **2**

Unit **G** Sec. **2** Twp. **12-S** Rge. **34-E** Purchaser **El Paso Natural Gas Company**

Casing **5½"OD** Wt. **17** I.D. _____ Set at **12,924** Perf. **12,809** To **12,859**

Tubing **2** Wt. **4.70** I.D. _____ Set at **12,794** Perf. **-** To **-**

Gas Pay: From **12809** To **12859** L **12794** xG **mix 1.631** -GL **20867** Bar.Press. _____

Producing Thru: Casing _____ Tubing _____ Type Well _____

Date of Completion: **10-8-56** Packer **12,791** Single-Bradenhead-G. G. or G.O. Dual Reservoir Temp. _____

OBSERVED DATA

Tested Through ~~(Prover)~~ ~~(Choke)~~ (Meter) Type Taps **Flange**

No.	Flow Data (Prover) (Line) Size	Flow Data (Choke) (Orifice) Size	Flow Data Press. psig	Flow Data Diff. h_w	Flow Data Temp. °F.	Tubing Data Press. psig	Tubing Data Temp. °F.	Casing Data Press. psig	Casing Data Temp. °F.	Duration of Flow Hr.
SI						2380	91			50:45
1.	4"	1.5"	692.4	47.6	72	1978	90	-	-	20:00
2.	4"	1.5"	692.4	42.2	74	2032	91			2:00
3.	4"	1.5"	692.4	34.8	74	2112	100			1:30
4.	4"	1.5"	692.4	28.1	74	2167	101			1:45
5.	4"	1.5"	675.7	19.4	72	2290	91			18.00

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv} *	Rate of Flow Q-MCFPD @ 15.025 psia
1.	13.99	183.27	705.6	.9887	.8276	1.134	2378.9
2.	13.99	172.56	705.6	.9868	.8276	1.132	2232.3
3.	13.99	156.70	705.6	.9868	.8276	1.132	2026.7
4.	13.99	140.81	705.6	.9868	.8276	1.132	1821.1
5.	13.99	115.61	688.9	.9887	.8276	1.131	1496.7

*See attached sheet.

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio **2068.4** cf/bbl. G_l = Specific Gravity Separator Gas **.676**

Gravity of Liquid Hydrocarbons **60.3** deg. G_2 = Specific Gravity Flowing Fluid **.7389**

F_c **9.936** $(1-e^{-s})$ **.76208** P_c **2393** P_c^2 **5726.4**

No.	P_w P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$(F_cQ)^2$ $(1-e^{-s})$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	1991	3964.1	23.637	558.71	425.78	4389.9	1336.5	2095.2	.876
2.	2045	4182.0	22.180	491.93	374.91	4556.9	1169.5	2134.7	.892
3.	2125	4515.6	20.137	405.50	309.02	4824.6	901.8	2196.5	.918
4.	2180	4752.4	18.094	327.39	249.50	5001.9	724.5	2236.5	.935
5.	2283	5121.2	14.871	221.15	168.53	5289.7	436.7	2299.9	.961

Absolute Potential: **7,270** MCFPD; n = **0.5076872**

COMPANY **Humble Oil & Refining Company**

ADDRESS **Box 2347, Hobbs, New Mexico**

AGENT and TITLE ORIGINAL SIGNED R. R. ALWORTH **R. R. Alworth, District Superintendent**

WITNESSED **J. C. Womack, Calculated by L. N. Perry, Jr.**

COMPANY **Humble Oil & Refining Company**

REMARKS

Used bottom hole pressure curve (data on attached sheet) because ofdepth and weight of gas.
LNP/mcb

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

BOTTOM HOLE PRESSURE DATA

South Four Lakes Unit Well #2

	BHP	$(BHP)^2$	$\frac{(SI\ BHP)^2}{(Fl.\ BHP)^2}$	C
Shut in	4977	24,770.5	-	-
1	4697	22,061.8	2708.7	2378.9
2	4731	22,382.3	2388.2	2232.3
3	4775	22,800.6	1969.9	2026.7
4	4817	23,203.5	1567.0	1821.1
5	4867	23,687.7	1082.8	1496.7

Method of Calculation of Supercompressibility Factor (F_{pv})

Example using Engineering Data Book, 1957, National Gasoline Supply Men's Association:

Separator gas gravity = .876

$F_{pv} = \frac{1}{\sqrt{Z}}$

p. 103, NGSMA:

psuedo critical pressure = P_c = 658

psuedo critical temperature = T_c = 437

Point 1, P = 705.6 psia, T = 74° F

psuedo reduced pressure = $P_R = \frac{P}{P_c} = \frac{705.6}{658} = 1.072$

psuedo reduced temperature = $T_R = \frac{T}{T_c} = \frac{460 + 74}{437} = 1.222$

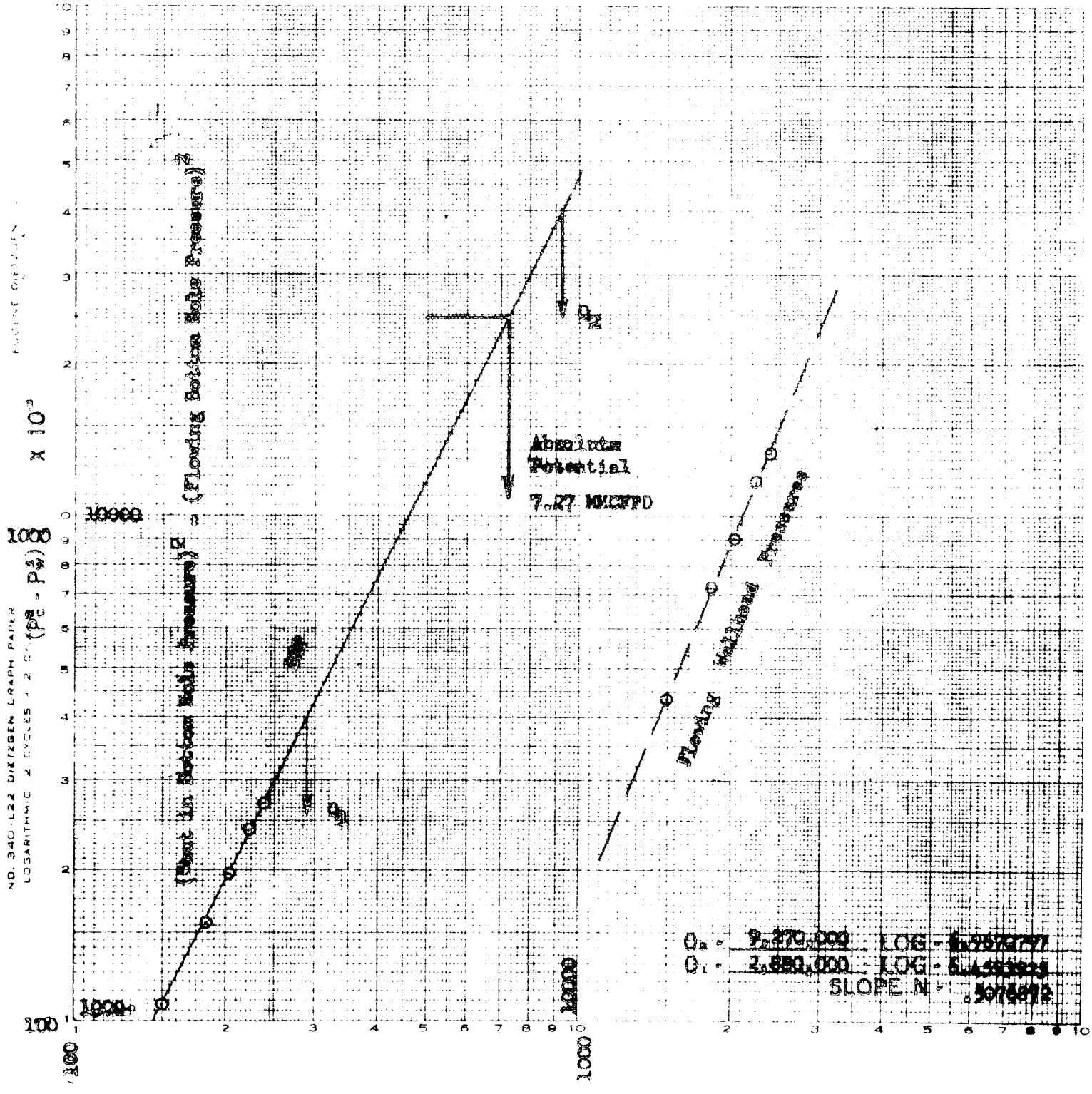
Fig. 3, p. 102: Z = 0.780

$F_{pv} = \frac{1}{\sqrt{.780}} = 1.1324$

HUMBLE OIL AND REFINING COMPANY

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Well South Four Lakes Unit, Well #2 (Dev.)
Location SW/NE¼ Sec. 2, T-12-S, R-34-E
County Lea County, New Mexico
Date 7-1-60



Q - MCFD 15.025 PSIA