

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 6-29-60
 Company Humble Oil & Refining Co. Lease South Four Lakes Well No. 3
 Unit D Sec. 1 Twp. 13-S Rge. 34-E Purchaser El Paso Natural Gas Company
 Casing 7" OD Wt. 26 I.D. _____ Set at 12,874 Perf. 12,797 To 12,867
 Tubing 2" Wt. 4.70 I.D. _____ Set at 12,775 Perf. _____ To _____
 Gas Pay: From 12,797 To 12,867 L 12,775 xG 1.463 -GL 18690 Bar.Press. 13.2
 Producing Thru: Casing _____ Tubing x Type Well Single
 Date of Completion: 11-22-56 Packer 12,772 Single-Bradenhead-G. G. or G.O. Dual Reservoir Temp. _____

OBSERVED DATA

Tested Through (~~Pressure~~) (~~Control~~) (Meter) Type Taps Flange

No.	Flow Data			Tubing Data		Casing Data		Duration of Flow Hr.
	(Line) Size	(Orifice) Size	Press. psig	Diff. h _w	Temp. °F.	Press. psig	Temp. °F.	
SI	4"					1694		50.05 Hrs.
1.	4"	.750	675.7	57.8	85	1611	88	22140
2.	4"	.750	675.7	46.2	86	1611	88	1100
3.	4"	.750	675.7	38.4	88	1619	85	3100
4.	4"	.750	692.4	22.1	88	1556	82	19100
5.								

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.	3.435	199.80	688.9	.9768	.8276	1.1187	628.6
2.	3.435	178.40	688.9	.9759	.8276	1.1180	533.3
3.	3.435	162.65	688.9	.9753	.8276	1.1159	502.8
4.	3.435	124.89	705.6	.9762	.8276	1.1180	385.6
5.							

PRESSURE CALCULATIONS *See attached sheet

Gas Liquid Hydrocarbon Ratio 2954.3 cf/bbl.
 Gravity of Liquid Hydrocarbons 40.3 deg.
 P_c 9.936 (1-e^{-s}) .72343
 Specific Gravity Separator Gas .876
 Specific Gravity Flowing Fluid .7389
 P_c 1707 P_c 2913.8

No.	P _w P _t (psia)	P _t ²	F _c Q	(F _c Q) ²	(F _c Q) ² (1-e ^{-s})	P _w ²	P _c ² -P _w ²	Cal. P _w	P _w P _c
1.	1657	2745.6	6.166	38.019	27.511	2773.1	110.7	1665.3	.976
2.	1657	2745.6	5.498	30.228	21.873	2767.5	148.3	1603.6	.975
3.	1662	2762.2	4.988	24.880	18.665	2780.2	133.6	1687.4	.977
4.	1609	2588.9	3.841	14.753	10.675	2599.6	314.2	1612.3	.943
5.									

Absolute Potential: 2650 MCFPD; n = 2.08872

COMPANY Humble Oil & Refining Company
 ADDRESS Box 2347, Hobbs, New Mexico
 AGENT and TITLE ORIGINAL R. R. ALWORTH R. R. Alworth, District Superintendent
 WITNESSED J. E. Homack; Calculated by L. N. Perry, Jr.
 COMPANY Humble Oil & Refining Company

LNP/mcb REMARKS
 Used bottom hole pressure data for curve; see attached tables. Fourth point disregarded due to build-up of fluid in well bore, indicated by drop in surface pressure with reduced flow.

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} = Supercompressibility 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 #3 (Dev.)

	BHP	(BHP) ²	(SIHBP) ² (Fl. BHP) ²	Q
Shut In	3857	14,876.5	-	-
1	3700	13,690.0	1186.5	427.6
2	3706	13,734.4	1142.1	381.2
3	3715	13,801.2	1075.3	346.2
4	3743	14,010.0	866.5	272.8

Method of Calculation of Supercompressibility Factor (Fpv)

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

Separator gas gravity = 0.876

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

p. 103 NGSMA:

pseudo critical pressure = $P_c = 658$

pseudo critical temperature = $T_c = 437$

for Point 1, $P = 688.9$ psia, $T = 85^\circ F$

$$\text{pseudo reduced pressure} = P_R = \frac{P}{P_c} = \frac{688.9}{658} = 1.0470$$

$$\text{pseudo reduced temperature} = T_R = \frac{T}{T_c} = \frac{460 + 85}{437} = 1.2471$$

from Fig 3, p. 102 $Z = .799$

$$F_{pv} = \frac{1}{\sqrt{.799}} = 1.1180$$

South from Line 101 (100)

Station	Station	Station	Station
100	101	102	103
104	105	106	107
108	109	110	111
112	113	114	115
116	117	118	119
120	121	122	123

Station 100 is the starting point of the line.

The line is a straight line with a constant slope.

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$$y = mx + b$$

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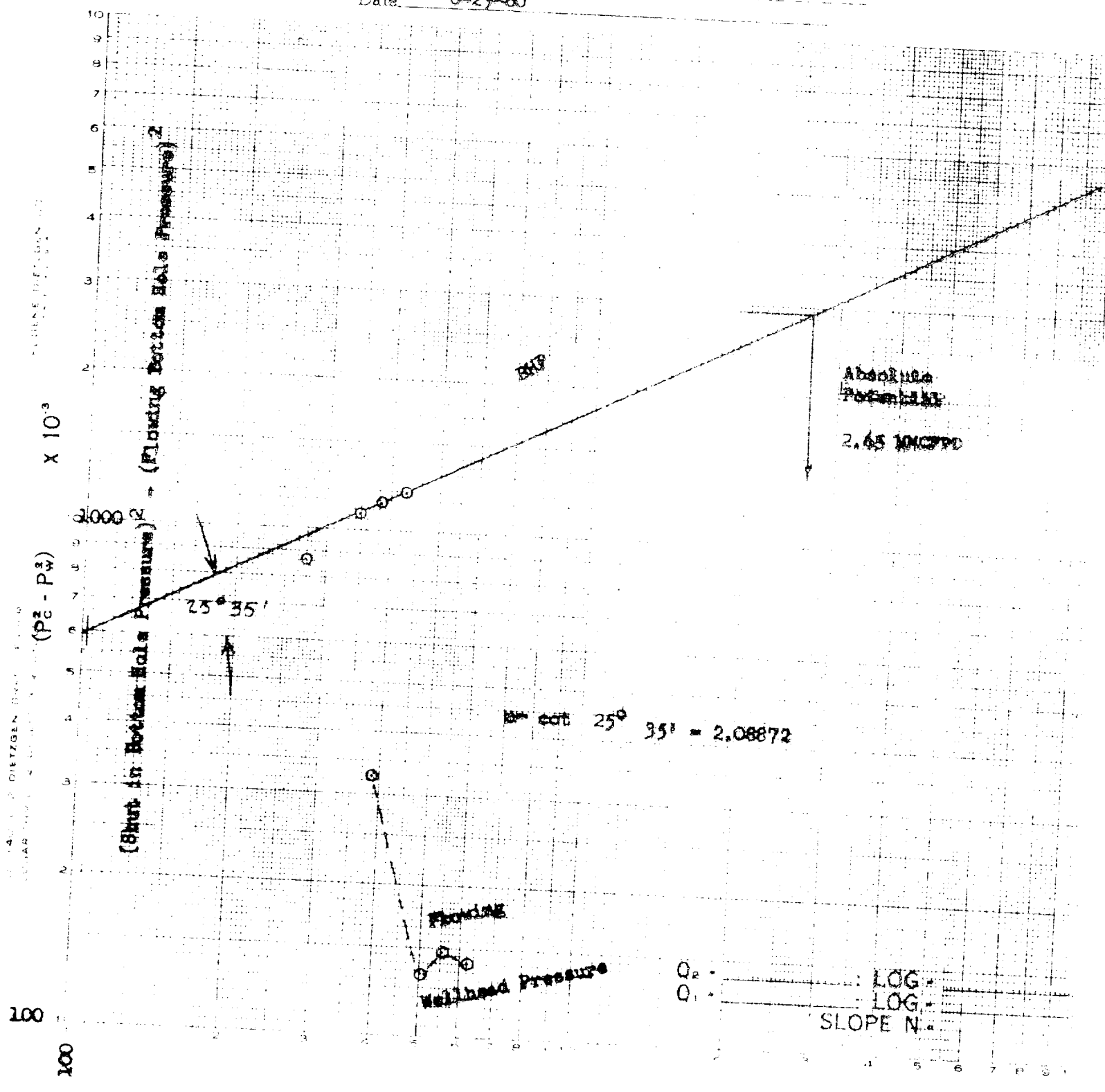
The line is a straight line with a constant slope.

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$$y = mx + b$$

HUMBLE OIL AND REFINING COMPANY
 MULTIPLE POINT BACK PRESSURE TEST FOR GAS WELLS

Well South Four Lakes Unit No. 3 (Dev.)
 Location NM/MNH, Sec. 1, T-12-S, R-24-E
 County Lea County, New Mexico
 Date 6-29-60



0 - MCFD - 15.025 PSIA