

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Four Lakes Devonian Formation Devonian County Lea
Initial (Recomplete) Annual - Special - Date of Test 10-7-61
Company Humble Oil & Refining Co. Lease South Four Lakes Unit Well No. 6
Unit I Sec. 2 Twp. 12-S Rge. 34E Purchaser El Paso Natural Gas Co.
Casing 7" Wt. 32# I.D. 26# Set at 12,845 Perf. 12,654 To 12,662
12,710 12,730
Tubing 2" Wt. 4.7 I.D. - Set at 12,710 Perf. - To -
Gas Pay: From 12,654 To 12,752 L - xG - -GL - Bar. Press. 13.2
Producing Thru: Casing - Tubing I Type Well Gas-Oil Dual
Single-Bradenhead-G. G. or G.O. Dual
Date of Completion: 9-20-61 Packer 12,555 Reservoir Temp. -

OBSERVED DATA

Hi-Pressure Separator

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

No.	Flow Data					Tubing Data		Casing Data		Duration of Flow Hr.
	(Prover) (Line) Size	(Choke) (Orifice) Size	Press. psig	Diff. h _w	Temp. °F.	Press. psig	Temp. °F.	Press. psig	Temp. °F.	
SI								Packer		72
1.	4"	1.00"	659	17.64	72	850	-	-	-	23
2.	4"	1.00"	676	10.89	73	860	-	-	-	2
3.	4"	1.00"	676	6.25	76	950	-	-	-	3
4.	4"	1.00"	659	4.00	76	1355	-	-	-	20
5.	4"	1.00"	668	1.56	80	1500	-	-	-	7

Hi-Pressure Separator FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_{wP_f}}$	Pressure psia	Flow Temp. Factor F _t	Gravity Factor F _g	Compress. Factor F _{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	6.135 108.89	108.90	672.4 672.2	0.9887	0.8974	1.096 1.092	646.1 647.8
2.	6.135 86.63	86.61	688.9 689.7	0.9877	0.8974	1.094 1.093	515.2 514.9
3.	6.135 65.63	65.61	688.9 689.2	0.9850	0.8974	1.088 1.090	387.1 387.9
4.	6.135 51.85	51.86	672.4 672.2	0.9850	0.8974	1.083 1.090	304.6 306.5
5.	6.135 32.60	32.61	680.6 681.2	0.9813	0.8974	1.085 1.086	191.1 191.3

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio 3370 cf/bbl.
Gravity of Liquid Hydrocarbons 58.6 deg.
T_c - (1-e^{-S}) -

Specific Gravity Separator Gas 0.745
Specific Gravity Flowing Fluid -
P_c - P_c² -

(Data obtained with a BHP bomb)

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.									
2.									
3.									
4.									
5.									

Absolute Potential: 950 MCFPD; n 1.000COMPANY Humble Oil & Refining CompanyADDRESS Box 2347, Hobbs, New MexicoAGENT and TITLE R. R. Alwerth, District SuperintendentWITNESSED J. C. Womack and Horace Robertson; calculated by John W. SauerCOMPANY Humble Oil & Refining Company

REMARKS

Because of depth and gravity of gas, a bottom hole pressure gauge was used to obtain pressure data. See data on attached sheet which gives low-pressure separator gas volume and bottom hole pressure data. On the attached plot of the back pressure data note that flow rates 2 and 3 were for short intervals and the BHP had not stabilized, causing these points to fall off of the dashed line curve. Since a slope of 1.0 was not obtained, a line with a slope of 1.0 was drawn through the point corresponding to the highest rate of 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.

E_g = Gravity correction factor.

E_t = Flowing temperature correction factor.

E_{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 .

MULTI-POINT BACK PRESSURE TEST DATA
South Four Lakes Unit 6
(Continued)

Four Lakes Devonian Pool, Devonian Formation, Lea County, Humble Oil & Refining Co.

OBSERVED DATA

Low Pressure Separator
Tested Through Meter

No.	Flow Data		Press. psig	Diff. h _w	Temp. °F.	Tubing Data		Press. psig	Temp. °F.	Casing Data		Duration of Flow Hr.
	(Prover) (Line) Size	(Choke) (Orifice) Size				Press. psig	Temp. °F.			Press. psig	Temp. °F.	
SI												72
1.	4"	1.250		9.00	42	-	-	-	-	-	-	23
2.	4"	1.250		4.41	42	-	-	-	-	-	-	2
3.	4"	1.250		4.00	42	-	-	-	-	-	-	3
4.	4"	1.250		2.25	47	-	-	-	-	-	-	20
5.	4"	1.250		1.21	50	-	-	-	-	-	-	7

Low Pressure Separator

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_{wpf}}$	Pressure psia	Flow Temp. Factor F _t	Gravity Factor F _g	Compress. Factor F _{pv}	Rate of Flow (-MCFPD @ 15.025 psia)
1.	9.683	15.6	27.0	1.0178	0.7226	1.00	111.1
2.	9.683	10.9	27.0	1.0178	0.7226	1.00	77.6
3.	9.683	10.6	28.1	1.0178	0.7226	1.00	75.5
4.	9.683	8.7	33.6	1.0127	0.7226	1.00	61.6
5.	9.683	5.9	29.2	1.0098	0.7226	1.00	41.7

Specific Gravity Separator Gas 1.149

TOTAL VOLUME

No.	Hi-Press. Volume	Lo-Press. Volume	Total
1.	646.1	111.1	757.2
2.	515.2	77.6	592.8
3.	387.1	75.5	462.6
4.	304.6	61.6	366.2
5.	191.1	41.7	232.8

BOTTOM HOLE PRESSURE DATA

No.	BHP	(BHP) ² x 10 ⁻³	(SI BHP) ²	(FL BHP) ²
SI	4289	18,396	-	-
1.	1985	3,940	14,456	
2.	2019	4,076	14,320	
3.	2243	5,031	13,365	
4.	3119	9,728	8,668	
5.	3479	12,103	6,293	

Humble Oil & Refining Co.
Box 2347
Hobbs, New Mexico

HUMBLE OIL AND REFINING COMPANY
MULTI-POINT BACK PRESSURE TEST FOR C-1 WELLS

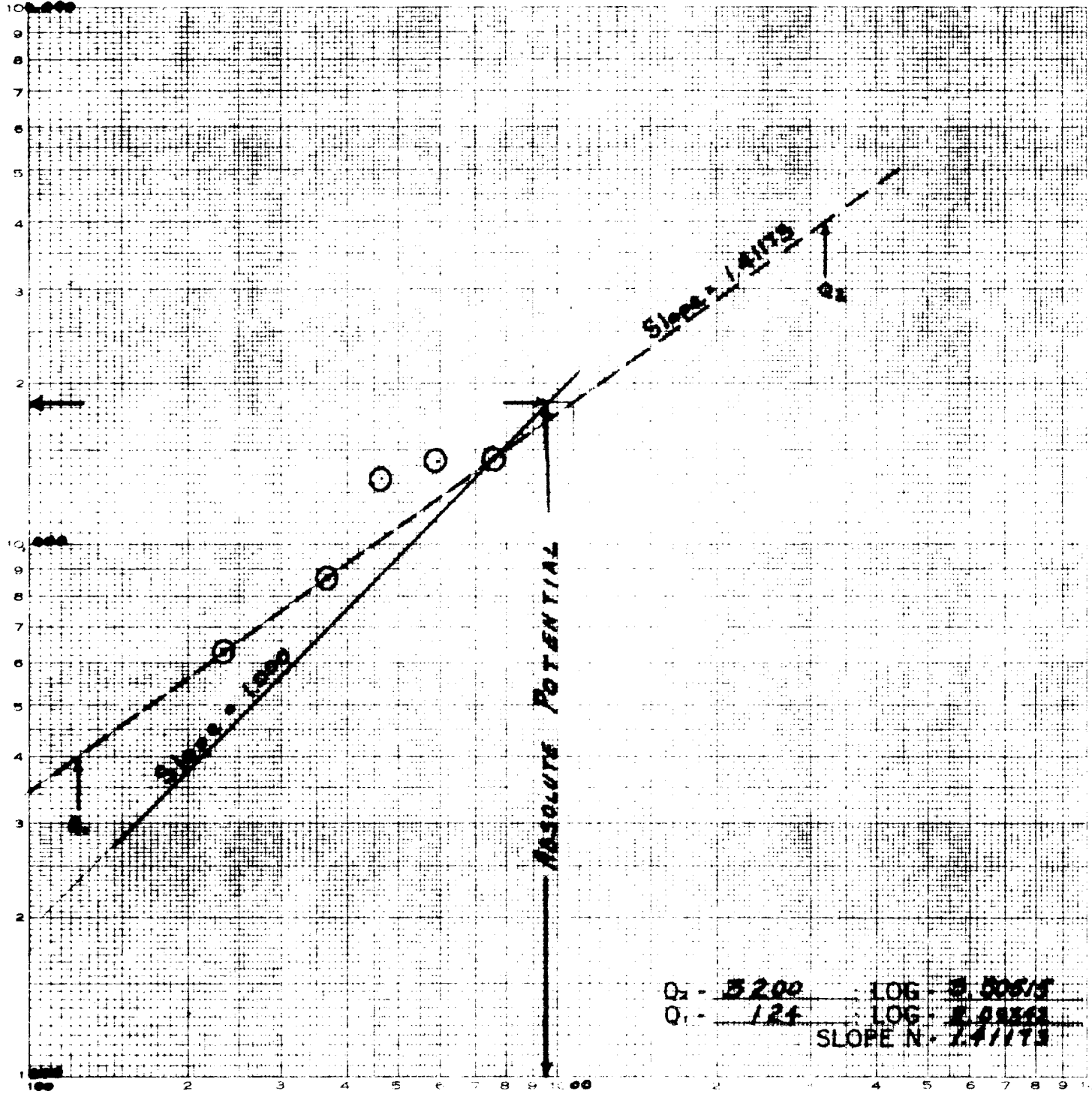
Well SOUTH FOUR LAKES UNIT No. 6
Location I-2-123-34E
County LEA
Date 10-7-61

EUGENE DIEZGEN CO.

NO. 330 1.22 DIETZEN GRAPH PAPER
LOGARITHMIC - 2 CYCLES X 2 CYCLES

$\times 10^{-3}$

$(P_2 - P_1)$



Q - MCFD - 15.025 PSID