

MULTIPHASE FLOW ONE POINT BACK PRESSURE TEST FOR GAS WELL

Type Test ☐ Initial ☐ Annual ☒ Special Test Date <u>02/19/74</u>					
Company <u>Atlantic Richfield</u>			Connection		
Pool <u>Drinkard</u>			Formation <u>Drinkard</u>		
Completion Date <u>10/12/73</u>		Total Depth <u>7835</u>		Plug Back TD <u>7240</u>	
Elevation <u>3450G</u>		Form or Lease Name <u>R. L. Brunson</u>			
Cas. Size <u>5 1/2</u>	Wt. <u>17.0</u>	d <u>4.892</u>	Set At <u>7825</u>	Perforations: From <u>6350</u> To <u>6492</u>	
Tub. Size <u>2-3/8</u>	Wt. <u>4.7</u>	d <u>1.995</u>	Set At <u>6315</u>	Perforations: From To	
Type Well - Single - Brdenhead - G.G. or G.O. Multiple <u>Single</u>				Packer Set At <u>6315</u>	
Producing Thru Tubing		Reservoir Temp. °F <u>110 @ 6300</u>		Mean Annual Temp. °F <u>600</u>	
Baro. Press. - P _g <u>13.2</u>		State <u>New Mexico</u>			
L <u>6315</u>	H <u>6315</u>	G _g <u>0.742</u>	% CO ₂ <u>---</u>	% N ₂ <u>---</u>	% H ₂ S <u>---</u>
Prover <u>XX</u>			Meter Run <u>Flange</u>		

FLOW DATA							TUBING DATA		CASING DATA		Duration of Flow
NO.	Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h _w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	
SI	4.00		2.75				1047	29	Pkr		93
1.	4.00		2.75	194	1.5	35	896	69			3.25
2.	4.00		2.75	202	3.3	37	853	70			1.50
3.	4.00		2.75	202	4.8	37	783	72			1.00
4.	4.00		2.75	206	7.0	39	702	71			1.00
5.											

RATE OF FLOW CALCULATIONS							
NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P _m	Flow Temp. Factor Ft.	Gravity Factor F _g	Super Compress. Factor, F _{pv}	Rate of Flow Q, Mcfd
1	56.63	17.62	206.9	1.0247	1.161	1.032	1224.6
2	56.63	26.48	215.7	1.0224	1.161	1.033	1837.6
3	56.63	32.01	215.7	1.0224	1.161	1.033	2221.5
4	56.63	39.19	219.4	1.0205	1.161	1.033	2715.6
5							

NO.	P _t	Temp. °R	T _r	Z	Gas Liquid Hydrocarbon Ratio <u>52</u> Mcf/bbl.
1	.31	495	1.22	.939	A.P.I. Gravity of Liquid Hydrocarbons <u>38.0</u> Deg.
2	.32	497	1.23	.938	Specific Gravity Separator Gas <u>0.742</u> XXXXXXXXX
3	.32	497	1.23	.938	Specific Gravity Flowing Fluid <u>XXXXX</u> .807
4	.33	499	1.23	.938	Critical Pressure <u>667</u> P.S.I.A. 665 P.S.I.A.
5					Critical Temperature <u>405</u> R 424 R

$P_c = 1060$ $P_c^2 = 1124$					$(1) \frac{P_c^2}{P_c^2 - P_w^2} = 2.5$	$(2) \left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 2.5$
NO	P _t ²	P _w	P _w ²	P _c ² - P _w ²		
1	826.6		857.8	266.2		
2	826.6		821.5	302.5		
3	750.3		741.3	382.7		
4	750.3		675.5	448.5		
5						

$AOF = Q \left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 6789$

Absolute Open Flow _____ Mcfd @ 15.025	Angle of Slope Θ <u>45°</u>	Slope, n <u>1.00</u>
Remarks: _____		

Approved By Commission: <u>[Signature]</u>	Conducted By: <u>J. Guy - G. Feist</u>	Calculated By: <u>J. Guy - G. Feist</u>	Checked By: <u>[Signature]</u>
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WORKSHEET FOR CALCULATION OF STATIC COLUMN WELLHEAD PRESSURE (P_w)

Form C-122D
Adopted 9-1-65

COMPANY Atlantic Richfield LEASE R. L. Brunson WELL NO. 5 DATE 02/01/74

LOCATION: Unit J Section 4 Township 22S Range 37E

L 6315 H 6315 L/H 1.000 G 0.807 % CO₂ -- % N₂ -- % H₂S --

d 1.995 F_r .018231 GH 5094 P_{cr} 665 T_{cr} 424
TABLE IX & X TABLE IX & X

LINE	1st Rate		2nd Rate		3rd Rate		4th Rate			
	Trial 1	Trial 2	Trial 1	Trial 2	Trial 1	Trial 2	Trial 1	Trial 2		
1 Q _m	1.225	1.225	1.838	1.838	2.222	2.222	2.716	2.716		
2 T _w (W.H. °R)	529	529	530	530	532	532	531	531		
3 T _s (B.H. °R)	570	570	570	570	570	570	570	570		
4 T = ($\frac{T_w + T_s}{2}$)	549.5	549.5	550.0	550.0	551.0	551.0	550.5	550.5		
5 Z (Est.)	.775	.745	.787	.754	.804	.772	.823	.787		
6 TZ	425.9	409.3	432.6	414.5	442.9	425.3	453.3	433.2		
7 GH/TZ	11.960	12.445	11.776	12.289	11.501	11.978	11.238	11.760		
8 e ^s (Table XIV)	1.566	1.595	1.555	1.585	1.539	1.567	1.524	1.554		
9 1 - e ^s (Table XIV)	.361	.373	.357	.369	.350	.362	.344	.357		
10 P _t	909.2	909.2	866.2	866.2	796.2	796.2	715.2	715.2		
11 P _t ² /1000	826.6	826.6	750.3	750.3	633.9	633.9	511.5	511.5		
12 F _r (Table XV)	.018231	.018231	.018231	.018231	.018231	.018231	.018231	.018231		
13 F _c = F _r TZ	7.765	7.463	7.887	7.557	8.075	7.753	8.264	7.897		
14 F _c Q _m	9.51	9.14	14.49	13.89	17.94	17.22	22.44	21.45		
15 L/H (F _c Q _m) ²	90.4	83.5	210.0	192.8	321.8	296.7	503.7	459.9		
16 F _w = L/H (F _c Q _m) ² (1 - e ^{-s})	32.68	31.14	74.98	71.21	112.74	107.35	173.20	164.01		
17 P _w ² = P _t ² + F _w	859.3	857.8	825.3	821.5	746.7	741.3	684.7	675.5		
18 P _s ² = e ^s P _w ²	1345.7	1367.9	1283.5	1302.4	1149.3	1161.6	1043.6	1049.9		
19 P _s	1160.0	1169.6	1132.9	1141.2	1072.1	1077.8	1021.6	1024.7		
20 P = ($\frac{P_t + P_s}{2}$)	1034.6	1039.4	999.5	1003.7	934.1	937.0	868.4	869.9		
21 P _r = (P/P _{cr})	1.56	1.56	1.50	1.51	1.40	1.41	1.31	1.31		
22 P _r = (T/T _{cr})	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30		
23 Z (Table XI)	.745	.744	.754	.753	.772	.771	.787	.787		