

WORKSHEET FOR CALCULATION OF FATIC COLUMN WELLHEAD PRESSURE (P_w)

COMPANY Atlantic Richfield LEASE McDonald State WN WELL NO. 23 DATE 05/02/74

LOCATION: Unit C Section 15 Township 22-S Range 36-E

L 3254 H 3254 L/H 1 G 0.692 % CO₂ -0- % N₂ -0- % H₂S -0-

d 1.995 F_r .018231 GH 2252 P_{cr} 669 T_{cr} 388

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	.343	.343	.625	.625	.728	.728	.889	.889
2 T _w (W.H. °R)	538	538	536	536	534	534	530	530
3 T _s (B.H. °R)	548	548	548	548	548	548	548	548
4 T = ($\frac{L_w + T_s}{2}$)	543	543	542	542	541	541	539	539
5 Z (Est.)	.985	.973	.985	.973	.985	.973	.985	.973
6 T _Z	534.9	528.3	533.9	527.4	532.9	526.4	530.9	524.4
7 GH/T _Z	4.210	4.263	4.218	4.270	4.226	4.278	4.242	4.294
8 e ^s (Table XIV)	1.171	1.173	1.171	1.174	1.172	1.174	1.172	1.175
9 1-e ^s (Table XIV)	0.146	0.148	0.146	0.148	0.147	0.148	0.147	0.149
10 P _t	260.2	260.2	217.2	217.2	251.2	251.2	171.2	171.2
11 P _t 2/1000	67.7	67.7	47.2	47.2	40.1	40.1	29.3	29.3
12 F _r (Table XV)	.018231	.018231	.018231	.018231	.018231	.018231	.018231	.018231
13 F _c = F _r T _Z	9.752	9.631	9.734	9.615	9.715	9.597	9.679	9.560
14 F _c Q _m	3.34	3.30	6.08	6.01	7.07	6.99	8.60	8.50
15 L/H (F _c Q _m) ²	11.2	10.9	37.0	36.1	50.0	48.9	74.0	72.3
16 F _w = L/H (F _c Q _m) ² (1-e ^s)	1.64	1.61	5.40	5.34	7.35	7.24	10.88	10.77
17 P _w ² = P _t ² + F _w	69.3	69.3	52.6	52.5	47.5	47.3	40.2	40.1
18 P _s ² = e ^s P _w ²	81.2	81.3	61.6	61.6	55.7	55.5	47.1	47.1
19 P _s	9.0	9.0	7.8	7.8	7.5	7.4	6.9	6.9
20 P = ($\frac{P_t + P_s}{2}$)	134.6	134.6	112.5	112.5	129.4	129.3	89.1	89.1
21 P _r = (P/P _{cr})	0.20	0.20	0.17	0.17	0.19	0.19	0.13	0.13
22 T _r = (T/T _{cr})	1.40	1.40	1.40	1.40	1.39	1.39	1.39	1.39
23 Z (Table XI)	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973