

WORKSHEET FOR CALCULATION OF STATIC COLUMN WELLHEAD PRESSURE (P_w)

C-122D
Adopted 9-1-65

COMPANY Yates Petroleum LEASE Brainerd "IO" Fed WELL NO. 1 DATE 3-7-78

LOCATION: Unit B Section 1 Township 22-S Range 21-E

6212 H 6212 L/H 1.000 G 0.785 % CO₂ 1.34 % N₂ 1.47 % H₂S NH
 $\frac{2\frac{3}{8}}{4\frac{1}{2}} - \frac{6131(3.98)}{81(6.4)} = 2440.14$
 $\frac{13292d}{6212(4.4)} = 2.0352$ F_t 0.016952 GH 4876.14 P_{cr} 620 T_{cr} 414

TABLE IX B

TABLE IX B

LINE	SI	1	2	3	4	5	1	2	3	4
1 Q _m		1087	1129	1196	1295		1087	1129	1196	1295
2 T _w (W.H. °R)	505	518	523	528	532					
3 T _s (B.H. °R)	579	578	577	576	576					
4 T = ($\frac{1}{w} + \frac{1}{s}$)	542	548	550	552	554		548	550	552	554
5 Z (Est.)		1685	1700	1730	1760		1684	1701	1728	17625
6 TZ	348.51	375.38	385.00	402.96	421.04		374.83	385.55	401.86	422.425
7 GH/TZ	13.992	12.991	12.666	12.101	11.582		13.010	12.648	12.135	11.544
8 e ^s (Table XIV)	1.6900	1.6277	1.6080	1.5743	1.5429		1.6288	1.6069	1.5763	1.5417
9 1-e ^s (Table XIV)		0.3856	0.3781	0.3648	0.3523		0.3861	0.3777	0.3656	0.3514
10 P _t	1497.2	1308.2	1238.2	1138.2	993.2		1308.2	1238.2	1138.2	993.2
11 P _t 2/1000	2241.6	1711.4	1533.13	1295.5	986.45		1711.4	1533.13	1295.5	986.45
12 F _t (Table XIV) $s = 0.0375$	52470	48715	47497	45380	43432		48786	47430	45505	43789
13 F _c = F _t TZ		63634	6527	6831	71375		63541	6536	6812	71609
14 F _c Q _m		0.554	0.842	1.339	2.105		0.553	0.843	1.335	2.117
15 L/H (F _c Q _m) ²		0.306	0.709	1.793	4.433		0.306	0.711	1.783	4.463
16 F _w = L/H (F _c Q _m) ² (1-e ^{-s})		0.12	0.27	0.65	1.56		0.118	0.27	0.65	1.57
17 P _w ² = P _t ² + F _w		1711.5	1533.40	1296.15	988.07		1711.5	1533.40	1296.15	988.07
18 P _s ² = e ^s P _w ²	3788.3	2785.8	2465.7	2040.5	1525.7		2785.8	2464.0	2043.1	1522.9
19 P _s	1946.4	1669.1	1570.3	1428.5	1235.0		1669.1	1569.7	1429.4	1234.9
20 P = ($\frac{P_t + P_s}{2}$)	1721.5	1488.7	1404.2	1283.3	1114.1		1488.7	1403.9	1283.8	1113.2
21 P _r = (P/P _{cr})	2.581	2.223	2.096	1.915	1.663		2.222	2.095	1.916	1.662
22 T _r = (T/T _{cr})	1.309	1.324	1.3285	1.333	1.338		1.324	1.3285	1.333	1.338
23 Z (Table XI)	0.643	0.684	0.701	0.728	0.7625		0.684	0.701	0.728	0.7625

$$F_R = \frac{1.63294}{(15.1603 + 4 \log d) d^{5/2}} = .016959$$

16.3947

$$G_{min} = \frac{.953 + \frac{4595(.1711)}{93210}}{1 + \frac{737}{93210}} = \frac{.796013}{1.007907} = .785$$

$$\begin{array}{r} 666.1 \quad 419.5 \\ 5.4+ \quad 1.3- \\ 1.4- \quad 4.2- \\ \hline 670.0 \quad 414 \end{array}$$

$$\begin{array}{r} 667 \quad 409 \\ 4+ \quad 5.5- \\ \hline 671 \quad 404 \end{array}$$