

WORKSHEET FOR CALCULATION OF STATIC COLUMN WELLHEAD PRESSURE (P_w)

COMPANY Phillips Pet. Co. LEASE Lusk Deep Unit "A" WELL NO. 5 DATE 10/21/83

LOCATION: Unit J Section 19 Township 19S Range 32E

L 12300 H 12300 L/H 1.000 G/H .767 % CO₂ .68 % N₂ .45 % H₂S

d 2.479 F_r 0.0079 GH 9434 P_{cr} 666 T_{cr} 415
1st Rate 2nd Rate 3rd Rate 4th Rate

LINE	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd
1 Q _m												
2 T _w (W.H. °R)	.441	.441	.468	.468	.470	.470	.470	.470	.639	.639	.639	.639
3 T _s (B.H. °R)	534	534	534	534	534	534	534	534	534	534	534	534
4 T = ($\frac{T_w + T_s}{2}$)	657	657	657	657	657	657	657	657	657	657	657	657
5 Z (Est.)	595.5	595.5	595.5	595.5	595.5	595.5	595.5	595.5	595.5	595.5	595.5	595.5
6 T _Z	1521	1550	1610	1525	1827	1787	1787	1787	1901	1879	1879	1879
7 GH/T _Z	310.3	327.5	363.3	312.6	492.5	468.7	468.7	468.7	536.5	523.4	523.4	523.4
8 e ^S (Table XIV)	30.407	28.804	25.971	30.176	19.156	20.130	20.130	20.130	17.583	18.023	18.023	18.023
9 1-e ^S (Table XIV)	3.128	2.945	2.648	3.100	2.051	2.127	2.127	2.127	1.934	1.966	1.966	1.966
10 P _t	.680	.660	.622	.677	.512	.530	.530	.530	.483	.491	.491	.491
11 P _t ² /1000	1578.2	1578.2	1138.2	1138.2	531.2	531.2	531.2	531.2	313.2	313.2	313.2	313.2
12 F _t (Table XV)	2490.7	2490.2	1295.5	1295.5	282.2	282.2	282.2	282.2	98.1	98.1	98.1	98.1
13 F _c = F _t T _Z	.00079	.00079	.00079	.00079	.00079	.00079	.00079	.00079	.00079	.00079	.00079	.00079
14 F _c Q _m	3.127	3.301	3.661	3.151	4.964	4.724	4.724	4.724	5.408	5.276	5.276	5.276
15 L/H (F _c Q _m) ²	1.379	1.456	1.713	1.475	2.333	2.220	2.220	2.220	3.456	3.371	3.371	3.371
16 F _w = L/H (F _c Q _m) ² (1-e ^{-S})	1.902	2.119	2.936	2.175	5.443	4.929	4.929	4.929	11.941	11.365	11.365	11.365
17 P _w ² = P _t ² + F _w	1.294	1.400	1.827	1.473	2.789	2.612	2.612	2.612	5.765	5.584	5.584	5.584
18 P _s ² = e ^S P _w ²	2492.0	2492.1	1297.3	1297.0	285.0	284.8	284.8	284.8	103.9	103.7	103.7	103.7
19 P _s	7794.0	7339.6	3435.7	4021.3	584.5	605.8	605.8	605.8	200.8	203.8	203.8	203.8
20 P = ($\frac{P_t + P_s}{2}$)	2791.8	2709.2	1853.6	2005.3	764.5	778.4	778.4	778.4	448.1	451.4	451.4	451.4
21 P _r = (P/P _{cr})	2185.0	2143.7	1495.9	1571.8	647.9	654.8	654.8	654.8	380.7	382.3	382.3	382.3
22 T _r = (T/T _{cr})	3.28	3.22	2.25	2.36	.97	.98	.98	.98	.57	.57	.57	.57
23 Z (Table XI)	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
	1.550	1.547	1.525	1.521	1.787	1.784	1.784	1.784	1.879	1.879	1.879	1.879