

# WORKSHEET FOR CALCULATION OF S11C COLUMN WELLHEAD PRESSURE (P<sub>w</sub>)

C-122D  
Adopted 9-1-65

COMPANY Yates Petroleum Corp LEASE Willowbrook DE Federal WELL NO. 4 DATE 3-2-78

LOCATION: Unit K Section 7 Township 20-S Range 29-E

L 11257 H 11257 L/H 1.99883 G 0.643 % CO<sub>2</sub> 0.68 % N<sub>2</sub> 0.57 % H<sub>2</sub>S N/A  
 23/8 - 1122173983 41653.6  
 14-23- 30(472) 241.4 d 1.99883 F<sub>r</sub> 0.01421 GH 2235.25  
 1/3 338- 5(317) 23.8  
 P<sub>CT</sub> 072 T<sub>CT</sub> 371  
 TABLE IX & X TABLE IX & X

| LINE                                                                                      | 1      | 2      | 3       | 4       | 1       | 2       | 3       | 4       |
|-------------------------------------------------------------------------------------------|--------|--------|---------|---------|---------|---------|---------|---------|
| 1 Q <sub>m</sub>                                                                          |        | 2.0227 | 2.941   | 3.786   | 4.726   | 2.0227  | 2.941   | 3.786   |
| 2 T <sub>w</sub> (W.H. °R)                                                                | 516    | 529    | 538     | 546     | 553     |         |         |         |
| 3 T <sub>s</sub> (B.H. °R)                                                                | 632    | 631    | 630     | 627     | 628     |         |         |         |
| 4 T = (T <sub>w</sub> + T <sub>s</sub> )                                                  | 574    | 580    | 584     | 587.5   | 590.5   | 580     | 580     | 587.5   |
| 5 Z (Est.)                                                                                | 1.5785 | 1.847  | 1.835   | 1.827   | 1.818   | 1.847   | 1.847   | 1.826   |
| 6 T <sub>Z</sub>                                                                          | 304.76 | 487.60 | 487.64  | 485.86  | 483.02  | 487.64  | 487.64  | 485.86  |
| 7 GH/T <sub>Z</sub>                                                                       | 14.354 | 14.857 | 14.843  | 14.898  | 14.985  | 14.986  | 14.986  | 15.003  |
| 8 e <sup>s</sup> (Table XIV)                                                              | 1.7130 | 1.7457 | 1.7447  | 1.7483  | 1.7541  | 1.7447  | 1.7447  | 1.7553  |
| 9 1-e <sup>s</sup> (Table XIV)                                                            |        | 0.4272 | 0.4269  | 0.4280  | 0.4299  | 0.42856 | 0.4284  | 0.4302  |
| 10 P <sub>t</sub>                                                                         | 3570   | 3043.2 | 2901.2  | 2625.2  | 2302.2  | 3043.2  | 2625.2  | 2302.2  |
| 11 P <sub>t</sub> 2/1000                                                                  | 12744  | 926.1  | 847.0   | 6891.7  | 5300.4  | 926.1   | 6891.7  | 5300.1  |
| 12 F <sub>r</sub> (Table XV)                                                              | 58827  | 155714 | 155662  | 155866  | 156194  | 155449  | 155934  | 156263  |
| 13 F <sub>c</sub> = F <sub>r</sub> T <sub>Z</sub>                                         |        | 8.3803 | 8.3879  | 8.3573  | 8.3086  | 8.4202  | 8.13472 | 8.2978  |
| 14 F <sub>c</sub> Q <sub>m</sub>                                                          |        | 16.987 | 22.991  | 31.64   | 39.266  | 17.068  | 31.603  | 39.215  |
| 15 L/H (F <sub>c</sub> Q <sub>m</sub> ) <sup>2</sup>                                      |        | 288.5  | 528.6   | 1001.1  | 1541.9  | 291.3   | 998.7   | 1537.8  |
| 16 F <sub>w</sub> = L/H (F <sub>c</sub> Q <sub>m</sub> ) <sup>2</sup> (1-e <sup>s</sup> ) |        | 123.3  | 225.7   | 428.5   | 662.8   | 124.0   | 427.9   | 661.7   |
| 17 P <sub>w</sub> <sup>2</sup> = P <sub>t</sub> <sup>2</sup> + F <sub>w</sub>             |        | 9384.4 | 8642.7  | 7320.2  | 5962.9  | 9385.1  | 7319.6  | 5961.8  |
| 18 P <sub>s</sub> <sup>2</sup> = e <sup>s</sup> P <sub>w</sub> <sup>2</sup>               | 21830  | 16382  | 15078.9 | 12797.9 | 10459.5 | 16340.4 | 12805.6 | 10464.7 |
| 19 P <sub>s</sub>                                                                         | 4672.3 | 4047.5 | 3883.2  | 3577.4  | 3234.1  | 4042.3  | 3578.5  | 3234.9  |
| 20 P = (P <sub>t</sub> + P <sub>s</sub> )                                                 | 4121   | 3545.3 | 3392.2  | 3101.3  | 2768.2  | 3542.8  | 3101.8  | 2768.5  |
| 21 P <sub>r</sub> = (P/P <sub>cr</sub> )                                                  | 6.132  | 5.226  | 5.048   | 4.615   | 4.119   | 5.272   | 4.616   | 4.120   |
| 22 T <sub>r</sub> = (T/T <sub>cr</sub> )                                                  | 1.547  | 1.5633 | 1.5741  | 1.5835  | 1.5916  | 1.5633  | 1.5835  | 1.5916  |
| 23 Z (Table XI)                                                                           | 1.8285 | 1.844  | 1.835   | 1.826   | 1.817   | 1.844   | 1.826   | 1.817   |

WILLIAMS

$$0.615 + \frac{116790}{100000} = 1.615$$

$$\begin{array}{r} 671 \quad 364.4 \\ 27.1 \quad 1.7- \\ \hline 671 \quad 364.4 \end{array}$$

$$\begin{array}{r} 670.12 \quad 37.1 \\ 2 \quad 1.8- \\ \hline 670.12 \quad 37.1 \end{array}$$

$$15.1007 + 0.0001 = 15.1008$$