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Appendix I

Nemeth and Kennedy's Correlation

$$ln(DPP) = A_1\left[XCO_2 + XH_2S + 0.2XN_2 + 0.4XC_1 + XC_2 + 2\left(XC_3 + XC_4\right) + XC_5 + XC_6\right]$$
$$+A_2\gamma_{C_{7^+}} + \frac{A_3XC_1}{XC_1 + 0.002} + A_4T_f + A_5\left(XC_{7^+}MWC_{7^+}\right) + A_6\left(XC_{7^+}MWC_{7^+}\right)^2 +$$
$$A_7\left(XC_{7^+}MWC_{7^+}\right)^3 + A_8\left[\frac{MWC_{7^+}}{\gamma_{C_{7^+}} + 0.001}\right] + A_9\left[\frac{MWC_{7^+}}{\gamma_{C_{7^+}} + 0.001}\right]^2 + A_{10}\left[\frac{MWC_{7^+}}{\gamma_{C_{7^+}} + 0.001}\right]^3 + A_{11} \quad (1)$$

Where,

A_1 to A_{11} are correlation constants with values as shown below:

A_1=-2.0623054, A_2=6.6259728, A_3=-4.4670559 x 10^{-3}, A_4=1.0448346 x10^{-4}, A_5=3.2673714 x10^{-2}, A_6=-3.6453277 x10^{-3}, A_7=7.4299951 x 10^{-5}, A_8=-1.1381195 x 10^{-1}, A_9=6.2476497 x 10^{-4}, A_{10}=-1.0716866 x10^{-6}, A_{11}=1.0746622 x 10.

T_f is reservoir fluid temperature in

X is mole fraction of gasconstituents

$\gamma_{C_{7^+}}$ is specific gravity of heptane plus fraction and

MWC_{7^+} is molecular weight of heptane plus fraction

Elsharkawy's Correlation

$$PP = A_0 + A_1T_f + A_2XH_2S + A_3XCO_2 + A_4XN_2 + A_5XC_1 + A_6XC_2 + A_7XC_3 +$$
$$A_8XC_4 + A_9XC_5 + A_{10}XC_6 + A_{11}XC_7 + A_{12}MW_{C_{7^+}} + A_{13}\gamma_{C_{7^+}} + A_{14}\left(X_{C_{7^+}}MW_{C_{7^+}}\right)A_{13}\gamma_{C_{7^+}} + A_{14}\left(X_{C_{7^+}}MW_{C_{7^+}}\right) +$$
$$A_{15}\left(\frac{MW_{C_{7^+}}}{\gamma_{C_{7^+}}}\right) + A_{16}\left(\frac{X_{C_{7^+}}MW_{C_{7^+}}}{\gamma_{C_{7^+}}}\right) + A_{17}\left(\frac{X_{C_{7^+}}}{\left(XC_1 + XC_2\right)}\right) + A_{18}\left(\frac{X_{C_{7^+}}}{XC_3 + XC_4 + XC_5 + XC_6}\right) \quad (2)$$

Where,

DPP is in psia, T_f is the reservoir temperature in °F, X is mole fraction of gas constituents, MWC_{7^+} is molecular weight of heptane plus fraction (C_7+) and $\gamma_{C_{7^+}}$ is specific gravity of (C_7+) The constants A_0 through are A_0=4268.85 , A_1=0.094056, A_2=-7157.87, A_3=-4540.58, A_4=-4663.55, A_5=-1357.56, A_6=-7776.10, A_7=-9967.99, A_8=-4257.10, A_9=-1417.10, A_{10}=691.5298, A_{11}=40660.36, A_{12}=205.26, A_{13}=-7260.32, A_{14}=-352.413, A_{15}=-114.519, A_{16}=8.133, A_{17}=94.916 and A_{18}=238.252.

Humoud and Al-Marhoun (2001):

$$ln(DPP) = \beta_0 + \beta_1 ln(T_R) + \beta_2 ln(R_m) + \beta_3 ln(P_{SP}.T_{SP}) + \frac{\beta_4}{T_{Pr}} + \frac{\beta_5}{P_{Pr}} + \frac{\beta_6}{\gamma_{(C_{(7^+)})}} \quad (4)$$

Where,

$\beta_0 = 43.777183$, $\beta_1 = -3.594131$, $\beta_3 = -0.053527$, $\beta_4 = -4.291404$, $\beta_5 = -3.698703$, $\beta_6 = -4.590091$ and R_m is the mass gas-oil ratio defined as:

$$R_m = \frac{R_{SP}.\gamma_{g_{SP}}}{\gamma_{C_{7^+}}} \quad (5)$$

Marruffo (2002) Correlation:

$$DPP = K_1 * \left[\frac{GCR^{K_2}}{C_{7^+}^{K_3}} * K_8 * API^{\left(K_4 * T_f^{K_5} - K_6 C_{7^+}^{K_7}\right)} \right] \quad (6)$$

Where,

K_1= 346.7764689, K_2= 0.0974139, K_3=-0.294782419, K_4=-0.047833243, K_5=0.281255219, K_6=0.00068358, K_7=1.906328237, K_8=8.417626216.

C_7+ is heptane plus percentage composition. *GCR* is gas condensate ratio and T_f is reservoir temperature in degree Fahrenheit.