

YPC - Federal AB Com No. 5, L-21-185-25E, Unders. Petmo Penn & Atoka, Edley Co.

Estimate of Gas Reserves and Projected Future Commingled Production.

U. Cisco Perfs: 6528-6568; after stimulation, flowed 420 mcfpd $P_s = 2700$ psia

$$KH = Q B_o \mu_g T_s Z (0.5) \ln \frac{r_e}{r_w} / 703 (P_s^2 - P_w^2)^n \quad \mu_g = 0.0200 \text{ cp}, n = 0.66, T_s = 584^\circ R$$

$$K = \frac{420000}{5.615} \frac{0.0200 (584) (0.760) (0.5) (3.08) 10^3}{703 (2700^2 - 135^2)^{0.66}} = 1.53 \text{ md.} \quad H = 27 \text{ ft}, \phi = 6.0\%, S_w = 32.3\%$$

Recovery factor, after Craig & Buckley statistics:

$$R.F. = 0.11403 + 0.2719 \log K + 0.25569 S_w - 0.1355 \log \mu - 1.538 \phi - 0.00035 H$$

$$R.F. = 0.11403 + 0.05476 + 0.08259 + 0.23021 - 0.09228 - 0.00945 = 0.37986$$

$$\text{Gas Reserves} = 43560 \frac{\text{scf}}{\text{act ft}} (320 \text{ ac}) \left(\frac{27 \text{ ft}}{2} \right) (0.06 \phi) (0.677 S_g) \left[\frac{2700 \text{ psia } 520^\circ R}{15.025 \text{ psia } 584^\circ R} \frac{0.37986}{0.760} \right] = 747.2 \text{ mme}$$

L. Cisco Perfs: 7029-7038; after stimulation, flowed 21 mcfpd.

$$P_s = 2900 \text{ psia}$$

$$K = \frac{21000}{5.615} \frac{0.0205 (588) (0.796) (0.5) (3.08) 10^3}{703 (2900^2 - 300^2)^{0.69}} = 0.15 \text{ md.} \quad \mu_g = 0.0205 \text{ cp}, n = 0.69, T_s = 588^\circ R$$

$$H = 9 \text{ ft}, \phi = 7.4\%, S_w = 28.0\%$$

$$R.F. = 0.11403 - 0.22402 + 0.07159 + 0.22876 - 0.16918 - 0.00315 = 0.02803$$

$$\text{Gas Reserves} = 43560 \frac{\text{scf}}{\text{act ft}} (320 \text{ ac}) \left(\frac{9 \text{ ft}}{2} \right) (0.074 \phi) (0.72 S_g) \left[\frac{2900 \text{ psia } 520^\circ R}{15.025 \text{ psia } 588^\circ R} \frac{0.02803}{0.796} \right] = 20.1 \text{ mme}$$

U. Canyon Perfs: 7464-7474; after stimulation, flowed 15 mcfpd.

$$P_s = 3000 \text{ psia}$$

$$K = \frac{15000}{5.615} \frac{0.0210 (592^\circ R) (0.802) (0.5) (3.08) 10^3}{703 (10 \text{ ft}) (3000^2 - 500^2)^{0.695}} = 0.10 \text{ md.} \quad \mu_g = 0.0210 \text{ cp}, n = 0.695, T_s = 592^\circ R$$

$$H = 10 \text{ ft}, \phi = 7.7\%, S_w = 27.2\%$$

$$R.F. = 0.11403 - 0.27190 + 0.06955 + 0.22734 - 0.11843 - 0.00350 = 0.01709$$

$$\text{Gas Reserves} = 43560 \frac{\text{scf}}{\text{act ft}} (320 \text{ ac}) \left(\frac{10 \text{ ft}}{2} \right) (0.077 \phi) (0.728 S_g) \left[\frac{3000 \text{ psia } 520^\circ R}{15.025 \text{ psia } 592^\circ R} \frac{0.01709}{0.802} \right] = 21.9 \text{ mme}$$

$$\text{Total Petmo Penn Reserves} = \text{---} = 789.2 \text{ MMCF}$$

Atoka Perfs: 8430-8436; after stimulation, flowed 60 mcfpd.

$$P_s = 3100 \text{ psia}$$

$$K = \frac{60000}{5.615} \frac{0.0210 (601^\circ R) (0.845) (0.5) (3.08) 10^3}{703 (6 \text{ ft}) (3100^2 - 200^2)^{0.75}} = 0.94 \text{ md.} \quad \mu_g = 0.0210 \text{ cp}, n = 0.75, T_s = 601^\circ R$$

$$H = 6 \text{ ft}, \phi = 8.2\%, S_w = 18.3\%$$

$$R.F. = 0.11403 - 0.00731 + 0.04679 + 0.22734 - 0.13381 - 0.00210 = 0.24494$$

$$\text{Gas Reserves} = 43560 \frac{\text{scf}}{\text{act ft}} (320 \text{ ac}) \left(\frac{6 \text{ ft}}{2} \right) (0.082 \phi) (0.817 S_g) \left[\frac{3100 \text{ psia } 520^\circ R}{15.025 \text{ psia } 601^\circ R} \frac{0.24494}{0.845} \right] = 179.4 \text{ mme}$$

It is suggested that future commingled production be apportioned as follows:

$$\text{Petmo Penn Gas} = 789.2 \text{ mme} = 81\% \quad 153 \text{ mcf/bbl} = 5158 \text{ b.} = 94\%$$

$$\text{Atoka Gas} = \frac{179.4}{1968.6} \text{ mme} = 19\% \quad \frac{514 \text{ mcf/bbl}}{5507} = 349 \text{ b.} = 6\%$$

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