PEOPLES 32-1

DERIVATION OF MATERIAL BALANCE EQUATION
(above the bubble point - no water influx)

Original oil vol. = current oil vol. + formation compression & water expansion

$$N\,Boi = (N-Np)\,Bo + \frac{N\,Boi}{(1-Sw)}(Cf + Sw\,Cw)(pi-p)$$

let $\bar{c} = \frac{cf + Cw\,Sw}{(1-Sw)}$, then

$$N\,Boi = N\,Bo - Np\,Bo + N\,Boi\,\bar{c}\,(pi-p)$$

$$N = \frac{Np\,Bo}{(Bo - Boi\,(1-\bar{c})\,(pi-p))}$$

Np - cumulative oil production (stock tank barrels)

N - original oil in place (stock tank barrels)

Bo - oil formation volume factor (reservoir bbls./stock tank bbls.)

Boi - initial formation volume factor (reservoir bbls./stock tank bbls.)

p - reservoir pressure (psia)

pi - initial reservoir pressure (psia)

Cf - formation compressibility (psi $^{-1}$)

Cw - water compressibility (psi $^{-1}$)

Sw - water saturation (fraction)

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EXHIBIT 3A