

DRAINAGE CALCULATIONS  
EAST LUSK (BONE SPRING) FIELD  
LEA COUNTY, NEW MEXICO

A. Recovery Above Bubble Point (2)

$$\begin{aligned} B/AF &= 257.7 \frac{(P_i - P_{bp}) \times (S_o C_o + S_w C_w + C_f)}{1 - S_w} \times \frac{(B_{oi})}{B_{ob}} \\ &= 257.7 \times \frac{(3927 - 2000) (.7 \times 8 + .3 \times 2.8 + 6) \times 10^{-6}}{1 - .3} \times \frac{1.3488}{1.37} \\ &= 257.7 \times \frac{(1927) (12.44 \times 10^{-6})}{.7} \times \frac{1.3488}{1.37} \\ &\approx \underline{\underline{8.7}} \quad (3.4\% \text{ OSTOIP}) \end{aligned}$$

B. Recovery Below Bubble Point (1)

$$\begin{aligned} B/AF &= e^{8.0845} \times \left\{ \frac{\phi (1 - S_w)}{B_{ob}} \right\}^{1.1611} \times \left( \frac{K}{u_{ob}} \right)^{0.0979} \times (S_w)^{0.3722} \times \left( \frac{P_b}{P_a} \right)^{0.1741} \\ &= e^{8.0845} \times \left\{ \frac{.065 \times (1 - .3)}{1.37} \right\}^{1.1611} \times \left( \frac{0.178}{0.55} \right)^{.0979} \times (.3)^{.3722} \times \left( \frac{2000}{200} \right)^{.1741} \\ &= 3243.8 \times (.0192) \times (.895) \times (.639) \times (1.493) \\ &= \underline{\underline{53.2}} \quad (20.6\% \text{ OSTOIP}) \end{aligned}$$

C. Total Recovery (#A + #B) = 53.2 + 8.7 = 61.9 B/A-F

= 20.6% + 3.4% = 24.0% of OSTOIP

D. Drainage Area =  $\frac{200,000 \text{ Bbls.}}{61.9 \text{ B/AF} \times 16'}$  = 202 Acres

Nomenclature

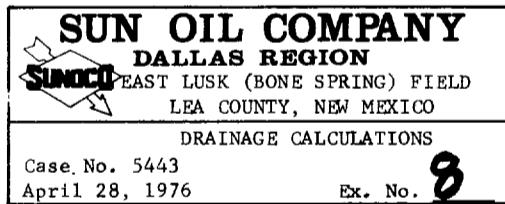
- $\phi$  - Fraction Porosity
- S - Fraction Fluid Saturation
- B - FVF Res. Bbls./S.T. Bbl.
- K - Permeability, ~~m/s~~ darcys
- u - Viscosity, Cp
- P - Pressure psia
- C - Compressibility, vol/vol/psi

Subscripts:

- o = oil
- bp or b = bubble point
- w = water
- f = formation
- a = abandonment
- i = initial

(1) J. J. Arps, et al, API Bulletin D14 (October, 1967): A Statistical Study of Recovery Efficiency

(2) Craft & Hawkins: Applied Petroleum Reservoir Engineering, (Prentice-Hall, Inc., 1959)



Sun 8  
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