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

A. Recovery Above Bubble Point (2)

$$B/AF = 257.7 \frac{(P_i - P_{bp}) \times (S_oC_o + S_wC_w + C_f)}{1-S_w} \times \frac{(B_{oi})}{B_{ob}}$$

$$= 257.7 \times \frac{(3927 - 2000)\ (.7x8 + .3 \times 2.8 + 6) \times 10^{-6}}{1-.3} \times \frac{1.3488}{1.37}$$

$$= 257.7 \times \frac{(1927)\ (12.44 \times 10^{-6})}{.7} \times \frac{1.3488}{1.37}$$

$$\simeq \underline{8.7} \text{ (3.4\% OSTOIP)}$$

B. Recovery Below Bubble Point (1)

$$B/AF = e^{8.0845} \times \left\{\frac{\phi\ (1-S_w)}{B_{ob}}\right\}^{1.1611} \times \left(\frac{K}{u_{ob}}\right)^{0.0979} \times (S_w)^{0.3732} \times \left(\frac{P_b}{P_a}\right)^{0.1741}$$

$$= e^{8.0845} \times \left\{\frac{.065 \times (1-.3)}{1.37}\right\}^{1.1611} \times \left(\frac{0.178}{0.55}\right)^{.0979} \times (.3)^{.3732} \times \left(\frac{2000}{200}\right)^{.1741}$$

$$= 3243.8 \times (.0192) \times (.895) \times (.639) \times (1.493)$$

$$= \underline{53.2} \text{ (20.6\% OSTOIP)}$$

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

ϕ - Fraction Porosity
S - Fraction Fluid Saturation
B - FVF Res. Bbls./S.T. Bbl.
K - Permeability, ~~mds.~~ 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 OIL COMPANY
DALLAS REGION
SUNOCO
EAST LUSK (BONE SPRING) FIELD
LEA COUNTY, NEW MEXICO
DRAINAGE CALCULATIONS
Case No. 5443
April 28, 1976
Ex. No. 8

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