Reservoir Engineering Data

JOHNSTON ...found a better way

Recorder No. T-146 Field Report No. 22260 B

Estimated Damage Ratio	EDR	0.84		Effective Transmissibility OIL	$\frac{Kh}{\mu B}$	463.6	$\frac{Md\text{-}ft.}{Cp.}$
Maximum Reservoir Pressure INITIAL SHUT-IN	P_o	3931	P.S.I.G.	Effective Transmissability	$\frac{Kh}{\mu B}$		$\frac{Md\text{-}ft.}{Cp.}$
Slope of Shut-in Curve FINAL SHUT-IN	M	349	PSI/log cycle	Flow Rate OIL	Q	995	Bbl./day
Potentiometric Surface (Datum Plane, Sea Level)	PS	-	ft.	Pressure Gradient		.3360	PSI/ft.
Productivity Index	PI	.7179	Bbl./day/PSI	Gas Oil Ratio FROM "MFE" SAMPLER	GOR	1643	CF/Bbl.
Radius of Investigation		244	ft.	K (Effective to OIL)		14.73	Md.

SLOPE M = 3931 - 3582 = 349

Assumptions made for Calculations for Liquid Recoveries

1. Q is averaged at a constant rate.
2. P_f is formation flowing pressure at a constant rate.
3. Formation flow is taken as single phase flow.
   If gas is produced at surface, phase separation is assumed to have occurred in drill pipe.
4. Radial flow is assumed.
5. For the purpose of calculating EDR where specific reservoir parameters are not available it is assumed that:

Effective permeability, K, will fall between	1 to 200 md
Formation porosity, ϕ, will fall between	0.1 to 0.3
Fluid compressibility, c, will fall between	10^{-6} to 10^{-4}
Fluid viscosity, μ, will fall between	0.05 to 50 cp.
Well bore radius, r_w, will fall between	$3\frac{7}{8}$" to $4\frac{3}{8}$"
Which gives an average value for the function log $\frac{K}{\phi\mu c r_w^2}$ of	5.5

6. Other standard radial flow, equilibrium assumptions.

Empirical Equations:

1. $EDR = \frac{P_o - P_f}{M(\log T + 2.65)}$ where $M = \frac{P_1 - P_{10}}{\text{Log Cycle}}$
2. Transmissibility $\frac{Kh}{\mu\beta} = \frac{162.6\,Q}{M}$
3. DST $J = \frac{Q}{P_o - P_f}$ Theoretical $J = \frac{7.08 \times 10^{-3}\,Kh}{\mu\beta \ln (r_e/r_w)}$ Assumed $\ln (r_e/r_w) = 7.60$
4. P.S. = [$P_o \times 2.309$ ft./PSI] - [Recorder depth to sea level.]
5. Radius of investigation, $r_i \cong \sqrt{\frac{Kt}{40\phi\mu c}}$ where t = time in days