(GAS)(LIQUID) RESERVOIR ENGINEERING WORKSHEET HORNER METHOD (P)

C

1. Slope Determination (M) PSI/Log Cycle

M_2 = P(0 Log Cycle) ________ PSI
– P(1 Log Cycle) ________ PSI
= 1692 PSI/Log Cycle

M_1 = P(0 Log Cycle) ________ PSI
– P(1 Log Cycle) ________ PSI
= ________ PSI/Log Cycle

2. Pressure Gradient (PG_r)

$PG_r = P_i$ 7285 P_{sig} ÷ Recorder Depth 14028 Ft = PG_r 0.52 PSI/Ft

3. Transmissibility (Kh/μ) = [(162.6 X Q 1.1 RBPD) / (M 1692 PSI/Log Cycle)] = Kh/μ 0.11 Md · Ft / Cps

4. Productive Capacity (Kh) = (Kh/μ ________ Md · Ft / Cps X μ ________ Cps) = Kh .11 Md · Ft

5. Permeability (K) = (Kh ________ Md · Ft) ÷ (h ________ Ft) = K 3.7×10^{-2} Mds

6. Damage Ratio (DR)

DR = [(P_i 7285 PSI – P_{wf} 1425 PSI) / (M 1692 PSI/Log Cycle X (Log (K .11 Mds X T 195 Mins) / (Φ .05 dec X μ 1.0 Cps X C 3.3 X 10^{-6} X r_w^2 19.1 in)) – 2.85)] = DR 1.4 Dim

7. Estimated Damage Ratio (EDR) = [(P_i ________ PSI – P_{wf} ________ PSI) / (M ________ PSI/Log Cycle X (Log T ________ Min + 2.65))] = EDR ________ Dim

8. Pressure Drop Due To Damage (ΔP_{da})

ΔP_{da} = (P_i ________ PSI – P_{wf} ________ PSI) – ((P_i ________ PSI – P_{wf} ________ PSI) / DR ________) = ΔP_{da} ________ PSI

9. Damage No. (S') = (ΔP_{da} ________ PSI / 0.87M ________ PSI/Log Cycle) = S' ________ Dim

10. Effective Wellbore Radius

$r_w' = r_w$ ________ Ft X e^{-s} ________ = r_w ________ ft

11. Productivity Index Actual $(PI)_a$

$(P_i)_a$ = Q ________ (Bbls/day) / (P_i ________ PSI – P_{wf} ________ PSI) = $(P_i)_a$ ________ Bbls/d/PSI

12. Productivity Index Damaged Removed (Pi)

(PI) = Q ________ (Bbls/day) / (P_i ________ PSI – P_{wf} ________ PSI – ΔPD_a ________ PSI) = Pi ________ Bbls/d/PSI

13. Radius of Investigation (r_i)

r_i = √[(K .11 Mds X T* 195 Mins) / (57,600 Φ .05 dec X μ 1.0 Cps X C 3.3 X 10^{-6})] = r_i 32 Ft

*(Use flow time for R_i of flow) (Use shut-in time for R_i of shut-in)

14. Distance to an Anomaly (Intercept Method) $r_a(int)$

$r_a(int) = 1.57 \times 10^{-3}$ √[(K ________ Mds X Δt_i ________ Mins) / (Φ ________ dec X μ ________ Cps X C ________ X 10^{-})] = $r_a(int)$ ________ Ft

15. Distance to an Anomaly (Deviation Method) $r_a(dev)$

$r_a(dev.) = 3.94 \times 10^{-3}$ √[(K ________ Mds X T ________ Mins) / (Φ ________ X μ ________ Cps X C ________ X 10^{-} X ((T + Δt)/Δt)$_{dev}$ ________)] = $r_a(dev)$ ________ Ft

16. Potentiometric Surface (PS)