Note Title 4/12/2016

Fig. 10 $\Delta p^2/q_g$ vs q_g ⇒ Linear trend

Slope → B

Int → A

A. Replot Fig. 10. Compare the A and B given by Fetkovich with the A and B determined by "Trend Line" using Excel (with only the three highest rates). Use the Fetkovich-reported values in any calculations or work below.

- use paper values $\Delta p^2/q_g$ Δp^2 by MJF

* - use p_{wf} from the table
q_g
post-cleanup

F. How much does the AOFP change (at initial pressure, $p_R=p_{Ri}$) if the partial penetration skin is completely removed by perforating the entire thickness of the reservoir?

All pressures used in Δp^2 p_p should be psia ≡ p_a

Δp

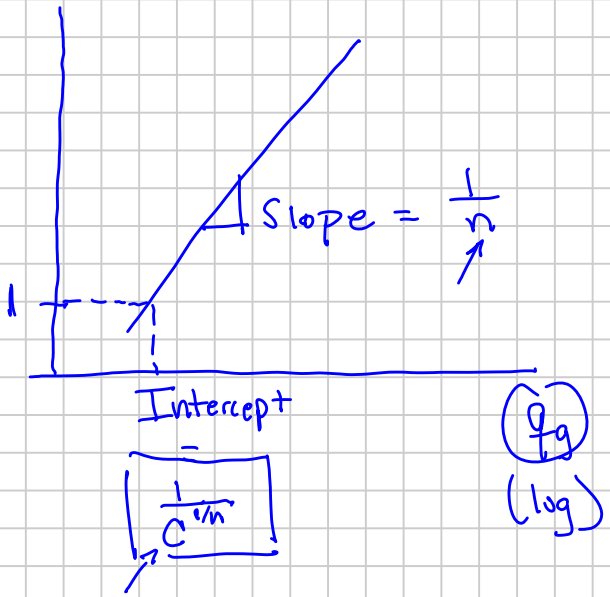
Eq. Constant Eq. Expnt (log) (Δp^2)

$\sim \frac{1}{C^{1/n}}$ (1/n)

$\Delta p^2 = \frac{1}{C^{1/n}} \cdot q_g$

$q_g = C(\Delta p^2)^n$

Power Ex



Power Eq. Fit $n = \frac{1}{\beta}$

$\Delta p^2 = \alpha q_g^{\beta}$

$\alpha = \frac{1}{C^{1/n}}$

$\alpha = \frac{1}{C^{\beta}}$

$C = \left(\frac{1}{\alpha}\right)^{1/\beta}$

$= \left(\frac{1}{\alpha}\right)^{n}$

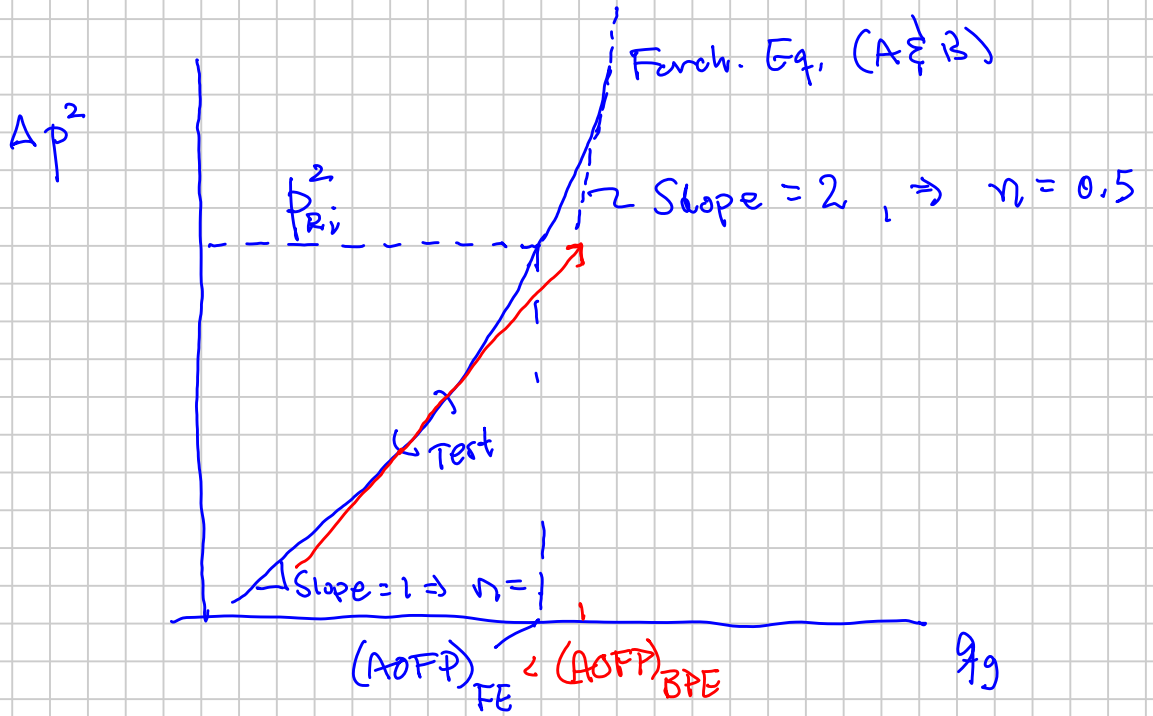
Post-Cleanup:

Power Eq. Fit: $y = \Delta p^2 = 0.0154 \cdot q_g^{1.4678}$ ($y \propto x^{\beta}$)

$$n = \frac{1}{\beta} = \frac{1}{1.4678} = 0.681$$

$$C = \left(\frac{1}{0.0154}\right)^{0.681} = 17.17$$

Q: Why is $(AOFP)_{Func.\ A\xi B} \neq (AOFP)_{BPE\ C,n}$?

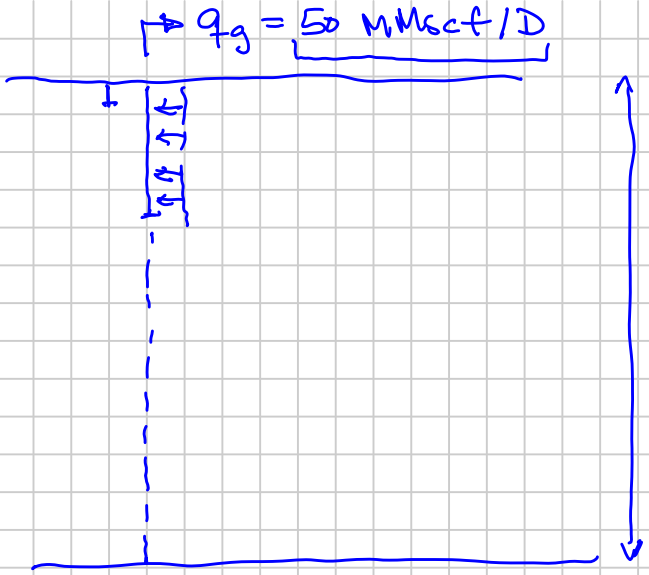


$A = 1$ $\quad S_b = +20$ $\quad A = (\ )\left[\frac{8}{8+S_b}\right]$

$A' =$ $\quad S_b = 0$ $\quad A' = (\ )\left[\frac{8}{8}\right]$

$$A' = A * \frac{8}{8+20} \sim \frac{8}{28} = 0.3$$

1



βv^2

$v \propto \frac{1}{r}$

$r_w \rightarrow 2'$

$q_g = 50$ MMscf/D

v_{313} @ $r = 1'$ Fully Penetrating Well =

$\left(\frac{20}{313}\right) v_{20}$ @ $r = 1'$ 20' Partial Penetration

$B'(h = 313\text{ ft}) \neq B(h = 20')$