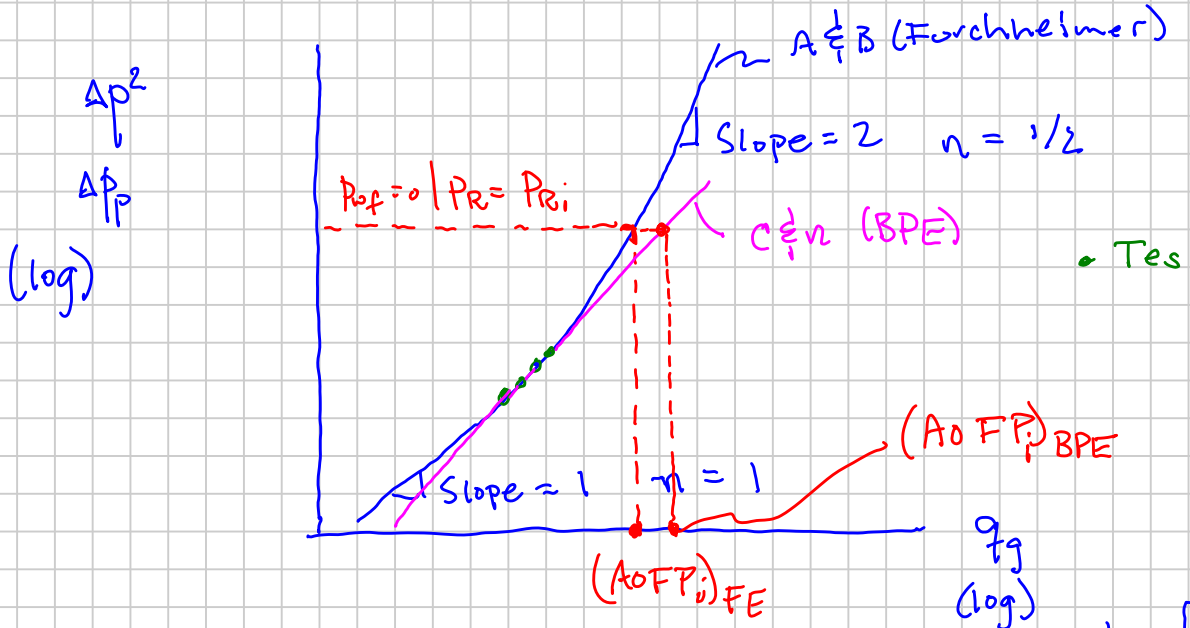
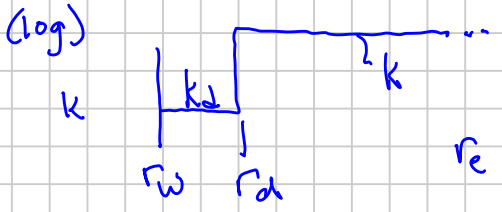
Note Title 4/14/2016





$(AOFP)_{BPE} \geq (AOFP)_{FE}$

? ?

Hawkins

$$2 = S_d = \left(\frac{k}{k_d} - 1\right) \ln \frac{r_d}{r_w}$$

$(S_t) = +22.8$

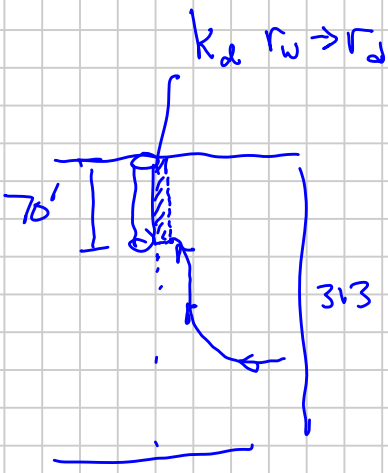
$S_b = +17$?

$= S_d \cdot \frac{1}{b} + S_b$

23 − 17 = +6

S_d

Pre-Cleanup: $S_t \sim +68 = S_d \cdot \frac{1}{b} + S_b$



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

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

Trendline Power eq.

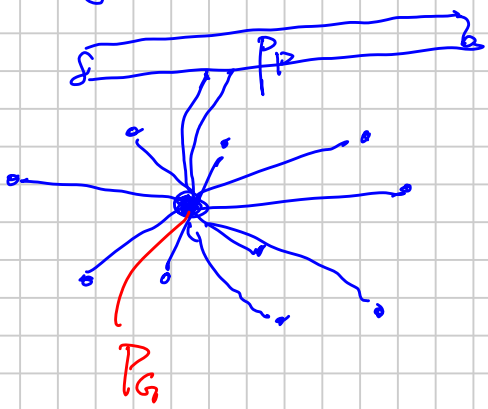
$x = q$

$y = \Delta p^2$

$y = \alpha \cdot x^{\beta}$

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

large (offshore)
Gas Field Development:



Longterm Gas Purchase Contract

DCQ = Daily Contract Rate (with ±10-20 swing)

$$q_{gF} = \sum_{w=1}^{N_w(t)} q_{gw}(t)$$

$$q_{gw} = \frac{-A_w + \left[A_w^2 + 4B_w \Delta p^2\right]^{0.5}}{2B_w}$$

A_w & B_w: Are Wellhead or Gathering-Point Constants

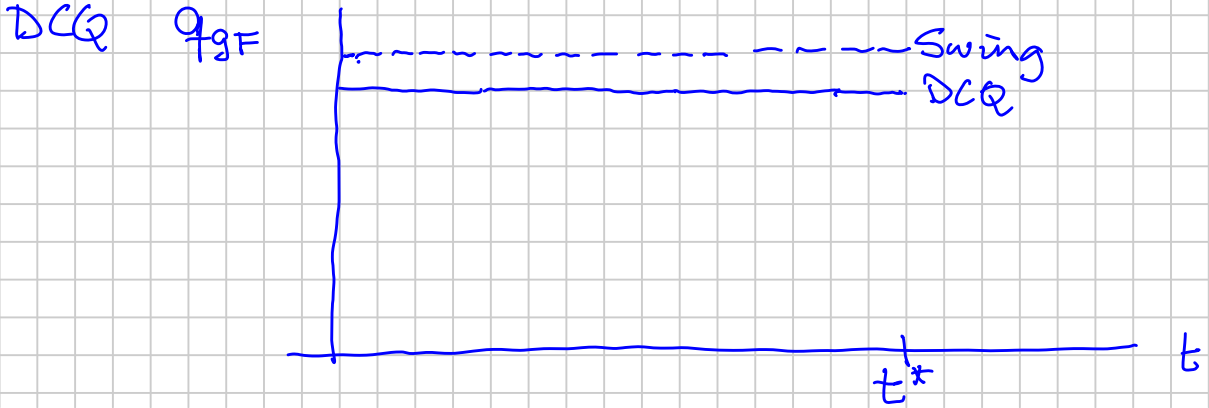
R T G

$\Delta p^2 = P_c^2(t) - P_G^2$

"P_R" = constant ≅ P_P

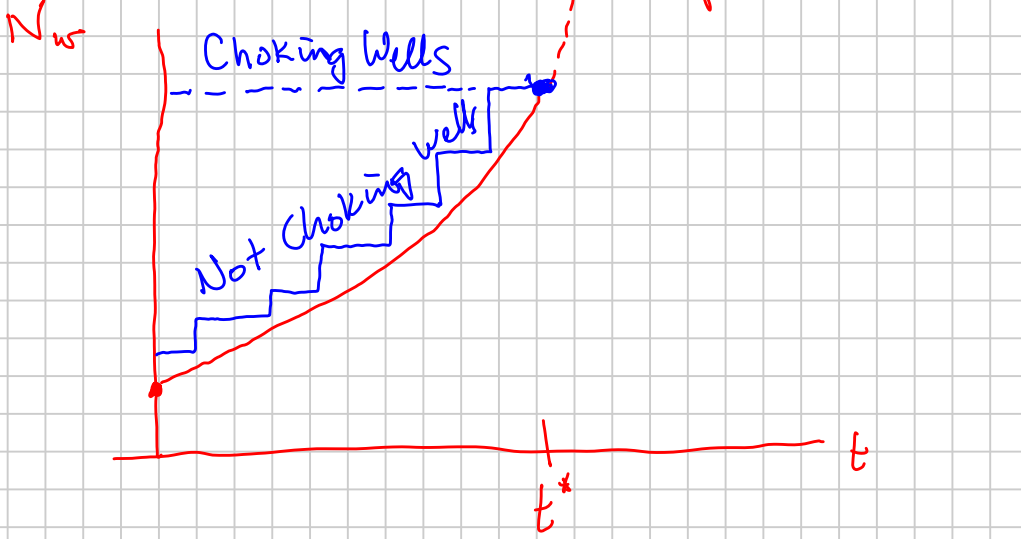
P_P: No Compress. Min. Wells Required (No Choke)

t^* Contract Delivery Period: 5-15 (20) years



$$\min. N_w(t) = \frac{DCQ}{\sum q_{gw}\left(p_{wf} = \text{constant}\right)}$$

No Choke Against Pipeline Pressure



FAF(N) ≠ FAF(R) ≠ Isochronal ⇒

$$A = (\quad)\left[\, p_D(t_D) + s \,\right]$$

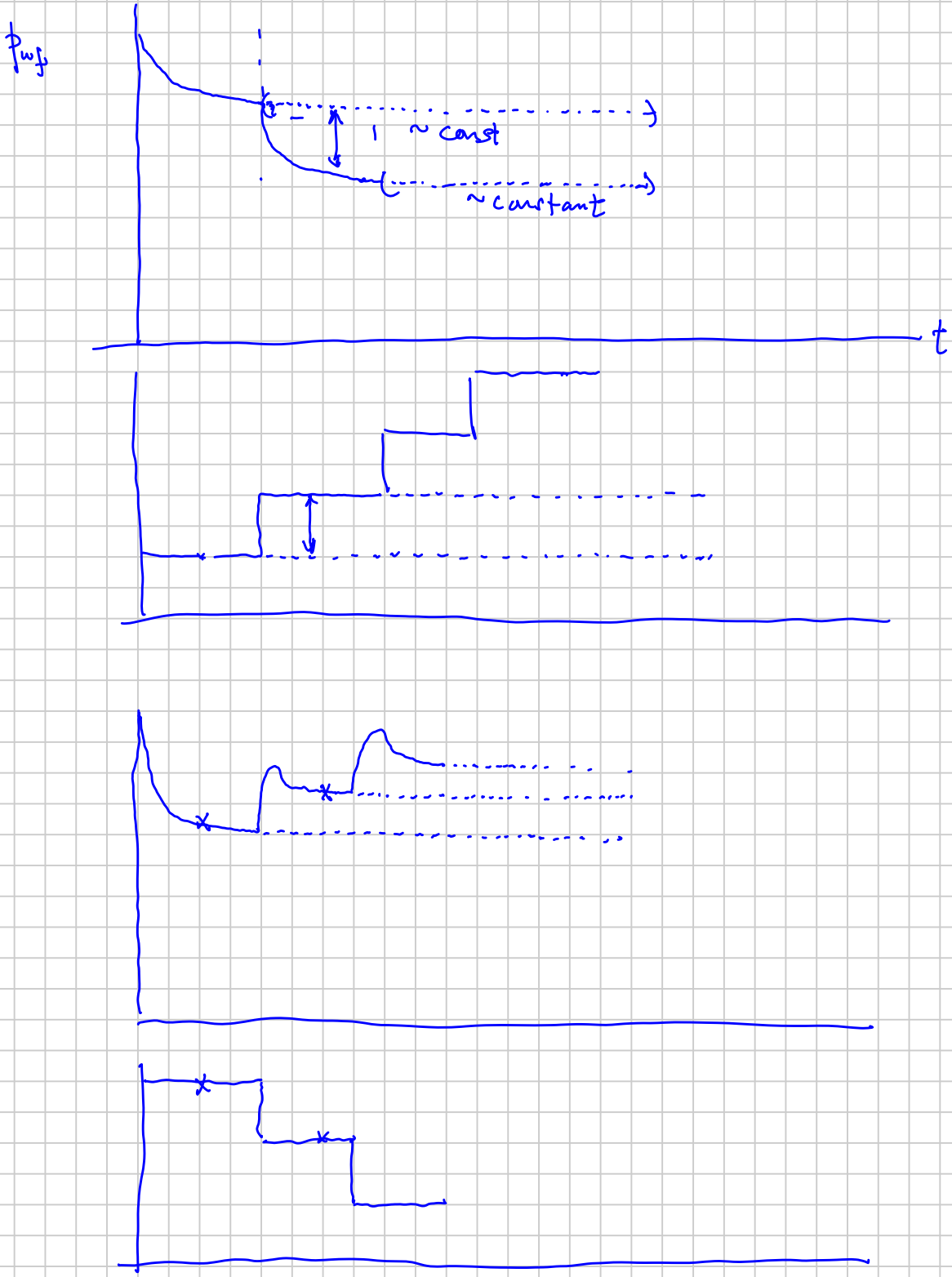
① Needs to be the same at "t_D" used (e.g. @ 4 hr)

Superposition is not required

② All infinite-acting transients from earlier rates & shut-ins need to have "died out"

"Lower"-k wells often violate ②

When does ~~FAT~~ satisfy ② higher k > x00 md - D's



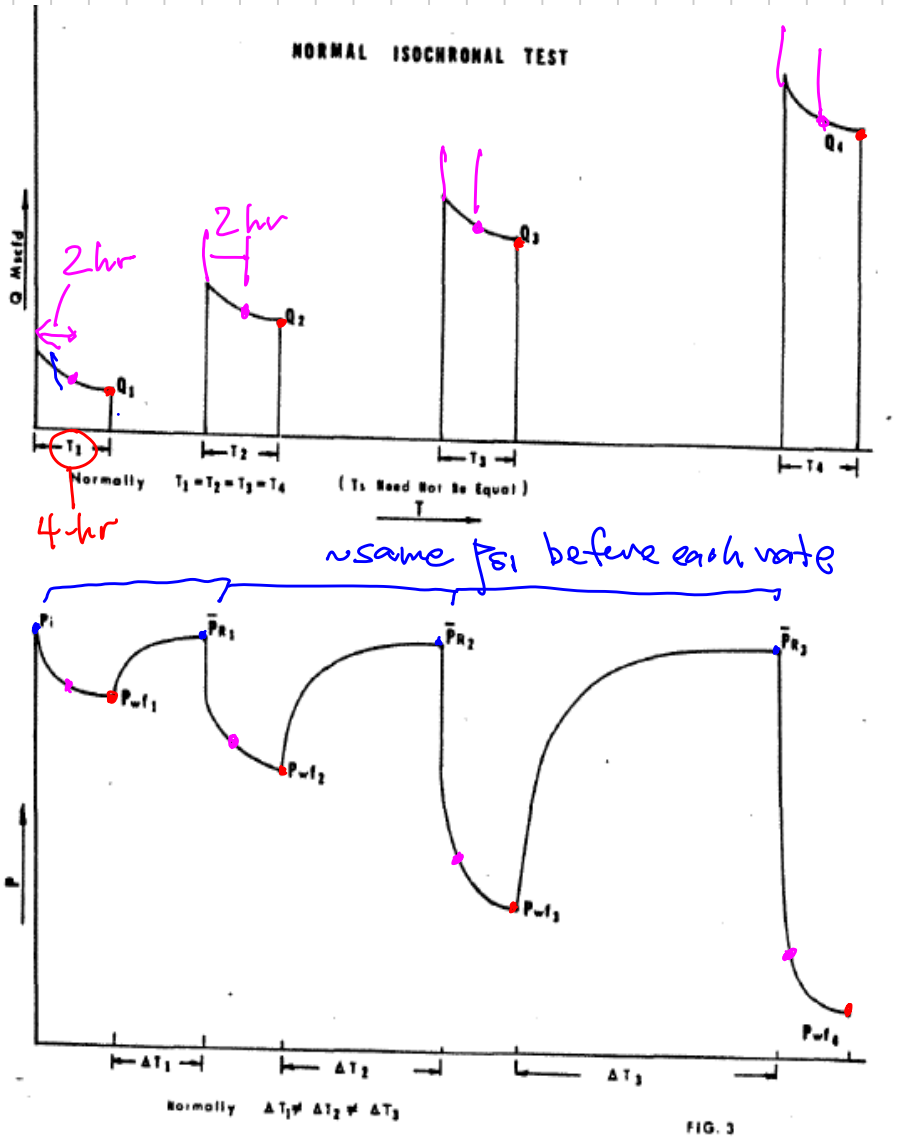


FIG. 3

Winestock & Colpitts

Const

$$p_i - p_{wf}^{(t)} = \cdot \; C \cdot q_f \; p_D(t_D)$$

PTA

$$p_i - p_{wf}(t) \simeq C \cdot q(t) \cdot p_D(t_D)$$

If $p_{wf}(t)$ & $q(t)$ are smoothly varying functions of time

$$\frac{p_i - p_{wf}(t)}{q(t)}$$

$q(t)$