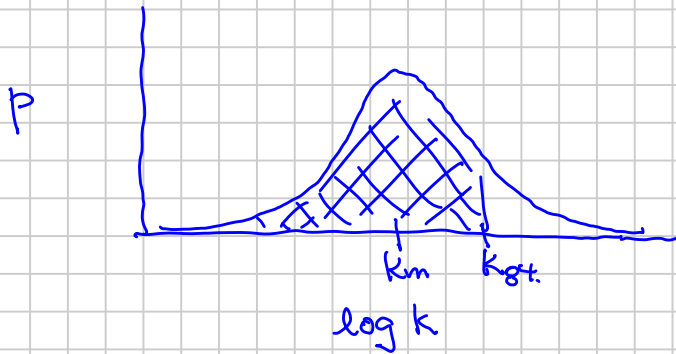


CONFORMANCE : Macroscopic } Vertical Sweep  
 k(x,y,z) Volumetric } Area Efficiency

Vertical (z):

- log-normal



50% ≤ k<sub>m</sub>  
 94% ≤ k<sub>94</sub>

Dykstra & Parsons (V)

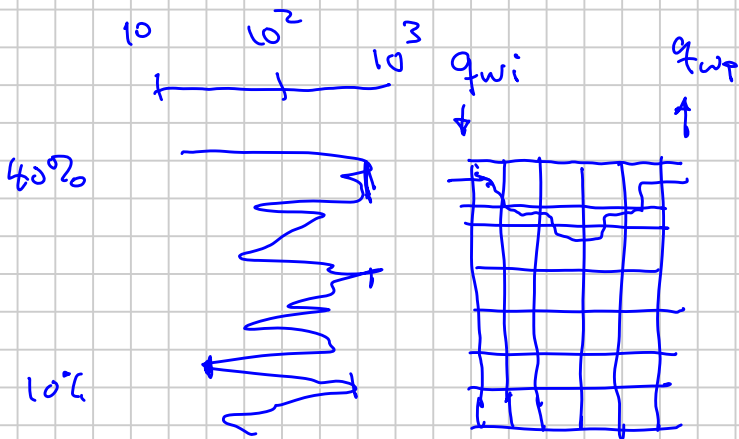
$$V_k \equiv \left| \frac{k_{94\%} - k_m}{k_m} \right|$$

$$\sigma_k \sim V_k$$

k<sub>m</sub> = Geometric Avg

$$\log k_m = \frac{1}{N} \sum_{i=1}^N \log k_i$$

k<sub>v</sub> ~ 0 vary low  
 (limited or no vertical flow)  
 "layered cake" model



Random (V) distribution

$$\Rightarrow \bar{k}_G$$

Flow

$$\bar{k}_A = \frac{1}{N} \sum_{i=1}^N k_i$$

Flow

1949: Muskat (Layered WF)

- Exponential
- Linear
- ?
- (Mentioned DP V<sub>k</sub>)

⇒ Disturbance Assumption

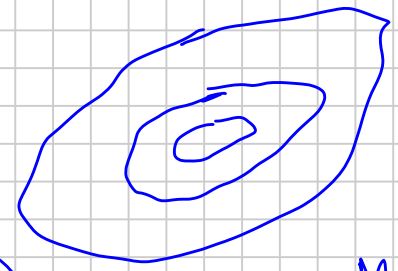
2-paragraph "BL theory"

no math found below

• Areal  $k(x,y)$

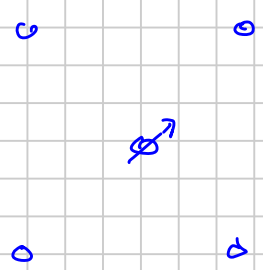
- Log normal, randomly distributed  $\Rightarrow$  "homogeneous"  $T_G$
- Mapped
  - Contours

$\Rightarrow$  Well Placement }  
 &#amp;#x2191; # wells

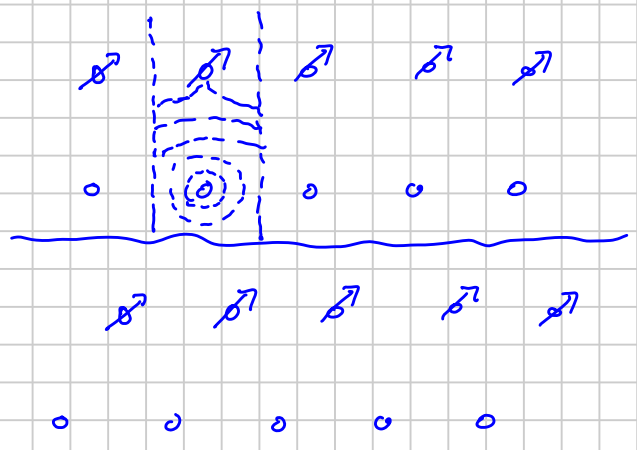


Muskat  
 Patterns (inj : Prod)

- 5-spot (Inverted 5-spot)



- Line Drive (Inverted Line Drive)



7-spot

9-spot

# UEOR CONFORMANCE

\* Start Simple:

HF + Matrix ("Planar Fracture" model)

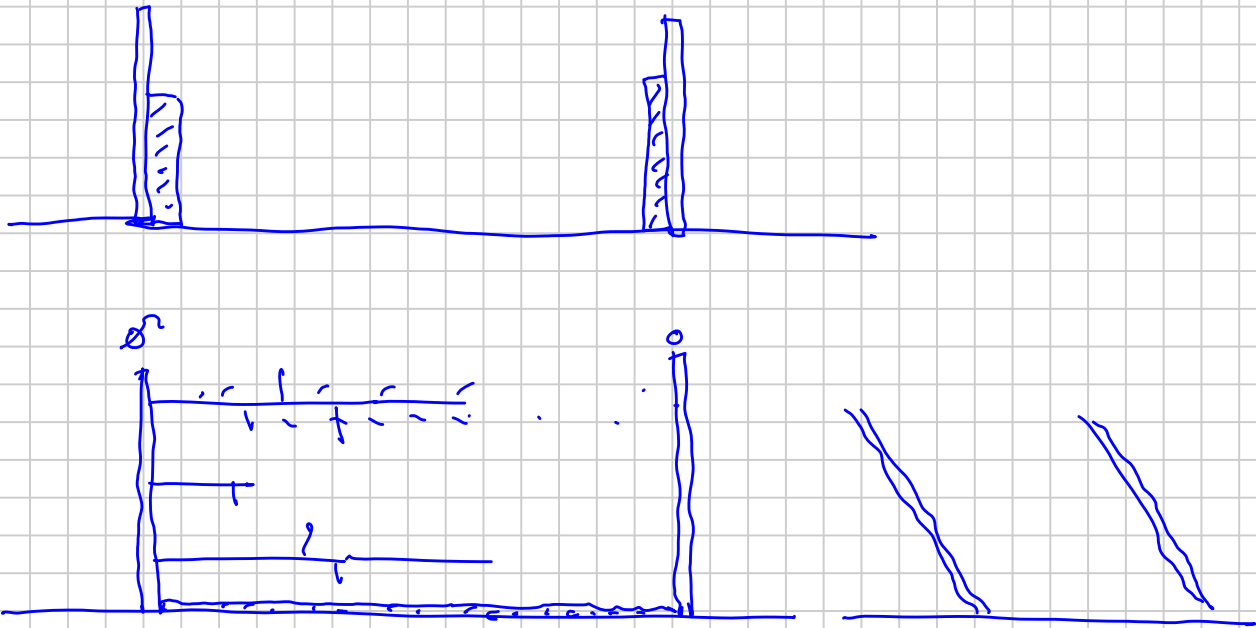
V Conformance:  $h_f k_{xy}(z)$

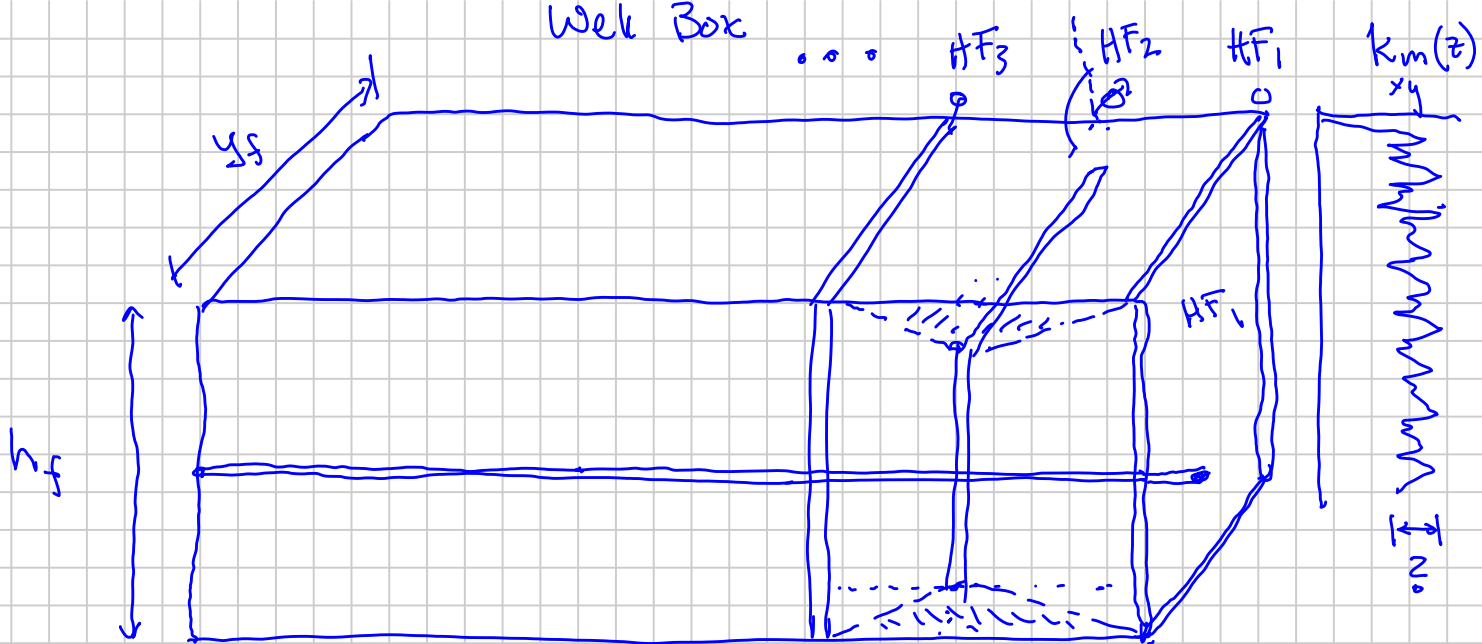
A Conformance

\* More Complex Model  $\Rightarrow$  "Fractures Dominate"  
 $\Rightarrow$  Fear: Short Circuiting

- For high # HFs, short HF-to-HF distances,  
could get SRVs overlapping

$\Rightarrow$  Opportunity:





✓ \* Areal Conductance: should be  $H/bH$

? \* Vertical Conductance:  $k_{xy}(z)$  "V"  $\begin{matrix} \nearrow \text{large} \\ \searrow \text{small} \end{matrix}$

? \* Well-to-Well Interference  
(2) (HF-to-HF) (Connectivity)

Access (1)?

- 3-HF Pilot test w/ "Loner" Well

Access (2)

- Observe neighbor well GOR perf.  
during F-to-F Well Process.

- A fix exists.

