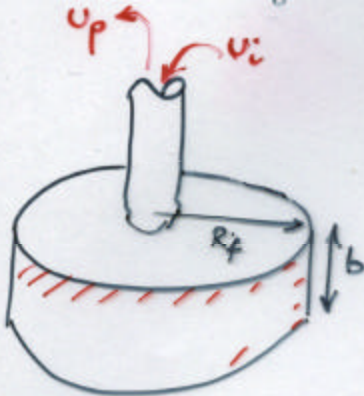## 5.7.2 Single Well Tracer Test

- Higher than natural gradient
- Incorporates scale effects
- Needs only single wellbore   — Injection then recovery of fluid

- Neglects diffusion — incorporates dispersion

U_p = cumulative volume recovered at initial concentration, C_o.

U_i = total volume injected

R_f = average frontal position of injected water at end of injection

n = porosity
b = aquifer thickness or wellbore zone.

Volume in = Qt

Volume occupied = $\pi R_f^2 b n$

$$Qt = \pi R_f^2 b n$$

$$R_f^2 = \frac{Qt}{\pi b n}$$

$$\frac{c}{c_o} = \frac{1}{2} \, erfc \left\{ \frac{(U_p - U_i) - 1}{\left\{ \frac{16}{3} (d_L / R_f) \left[2 - (1 - U_p/U_i) \right]^{1/2} \left[1 - (U_p/U_i) \right] \right\}^{1/2}} \right\}$$