

3.7.3. Rise and Fall of Water-Table

Fall of water table - "Free" product drops

Rise of water table - Residual LNAPL is trapped below water table and available \rightarrow dissolution

Rate of movement controlled by:

- Darcy's law, $k/k/\mu$
- Density (driving flow)
- Capillarity

Residual volumes controlled by soil retention capacity

Gravel 5 L/m^3
Silty sand 40 L/m^3 } due to capillarity

Say $n = 30\%$

$1 \text{ m}^3 = 1000 \text{ L}$

porosity @ $30\% \rightarrow 300 \text{ L}$

\therefore saturation $S_{nw} = \frac{5}{300}$ to $\frac{40}{300}$

$S_{nw} = 1.6\%$ to 13%

- Free product may be drained by open wells and trenches
- Bound product must be removed by \rightarrow volatilization/venting
 \rightarrow dissolution

Note: cannot apply high fluid suction pressures due to short circuiting.

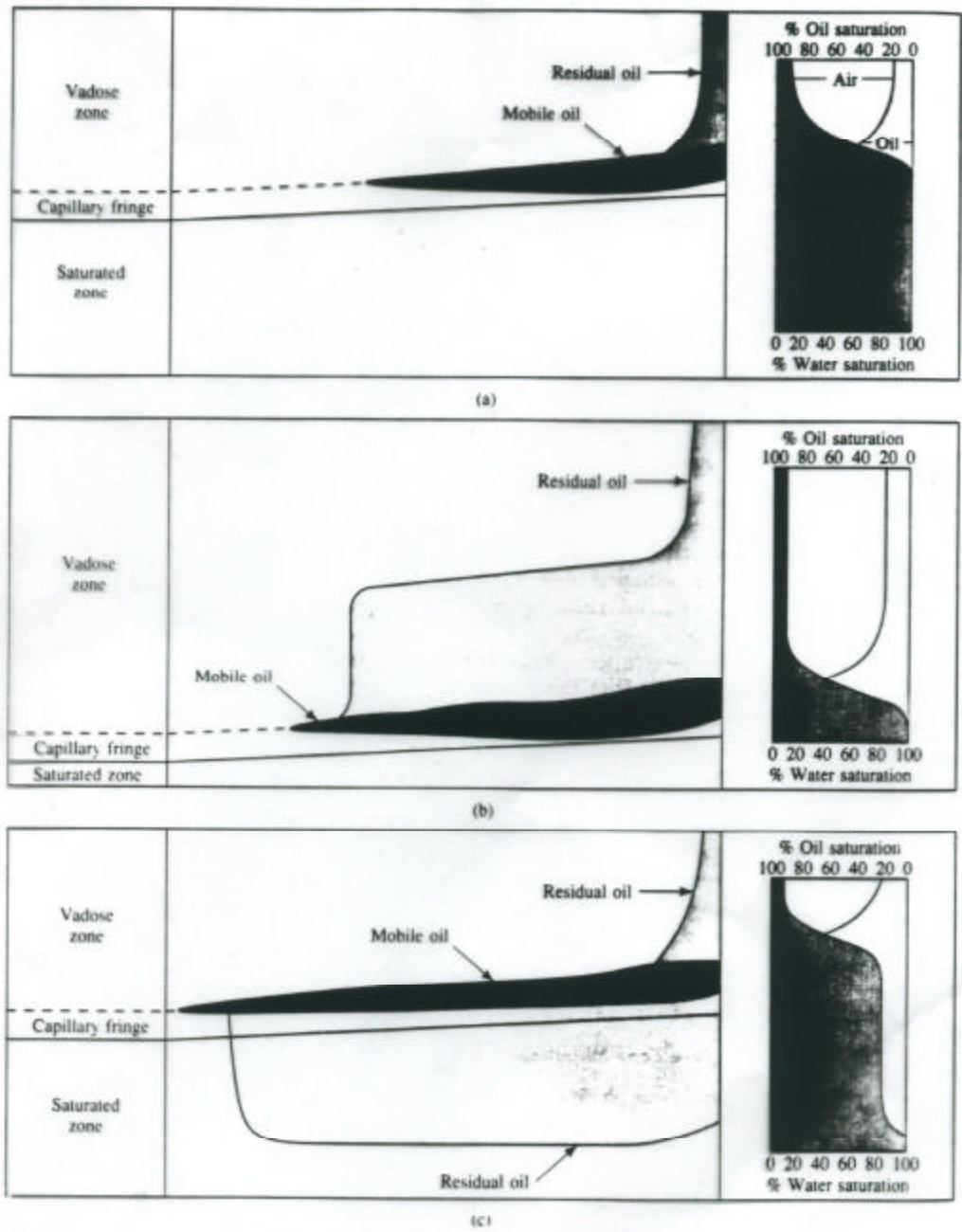


FIGURE 5.22 Effect of a falling and then rising water table on the distribution of mobile and residual phases of an LNAPL.