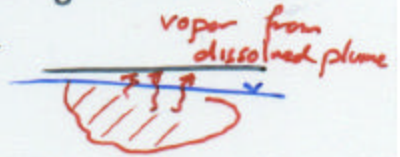


5.2 Vacuum Vaporizer Wells

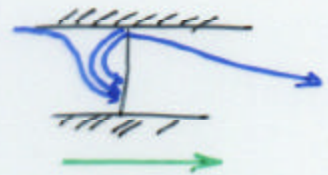
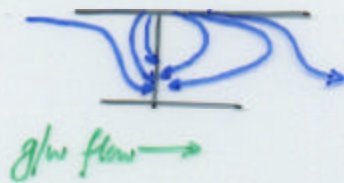
(UVB: Unterdruck Verdampfer Brunnen)

1. Direct in-well stripping off of volatile NAPLs from groundwater, and
2. Passively by soil vapor extraction in vadose zone



Effectiveness related to:

1. Solubility
2. Volatility
3. Recirculation of treated water in aquifer



- o For horiz. flow velocities the form of the capture zone changes
- o Overlap capture zones

Field Implementation

3. configurations

a) Two distinct regions "g/w extraction" and "stripping".

Clean air drawn into well

stripped water re-injected

Subatmospheric pressures in stripping region

b) No separation plate. Short-circuiting stopped by density differences

May counteract - also heat produced in process.

a) & b) subject to clogging Fe, Mn, Ca.

UVBs to 40m flow rates to 500m³/hr. - Fresh air & soil gas 180-320m³/hr.
May stimulate biodegradation

Level of Demonstration

60+ sites in Europe
Sands and silty soils

PCE, TCE, TCA 10-1000 ppb

Rhone - Ruhr steel plants. 10^{-1} cm/s Sandy soil 40 m deep

Concentration to 5 ppm

Recovery 120-300 mg/m³ vapor production

Daily removal 2.0 kg/d.

4000 hours operation 50 kg VOCs.

Applicability/Limitations

$H > 10^5$ atm/m²/mole

Aqueous phase contaminants

Not known if free phase NAPL will be immobilized.

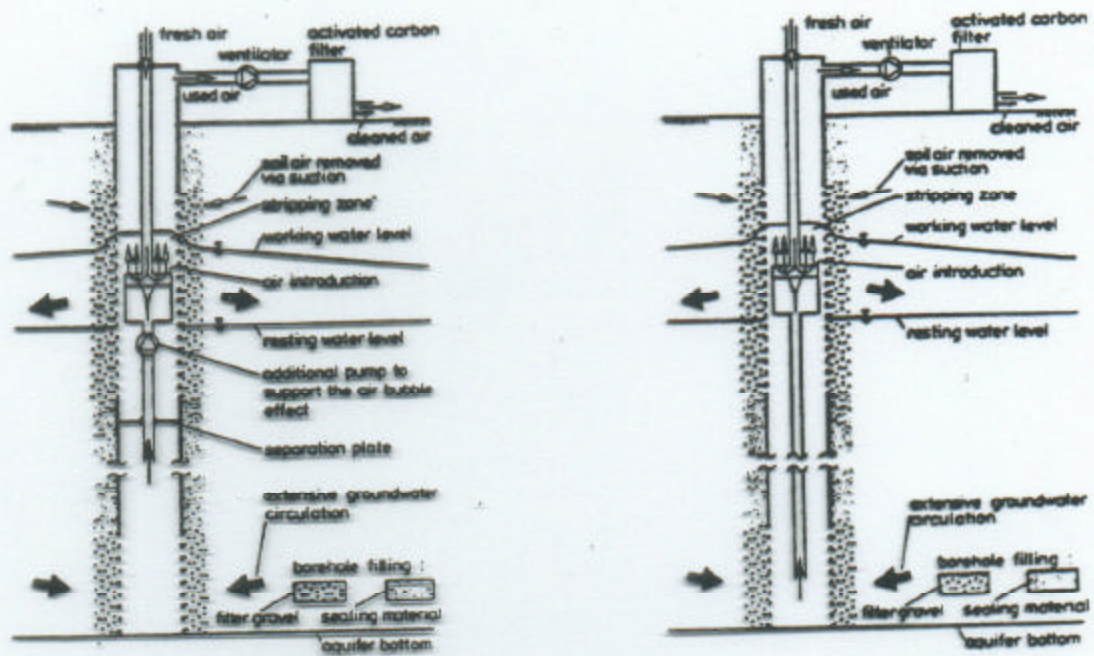
Good site characterization to avoid cross contamination

K range so far. 10^{-1} - 10^{-4} cm/s.

Ambient groundwater velocities to 1 m/d.

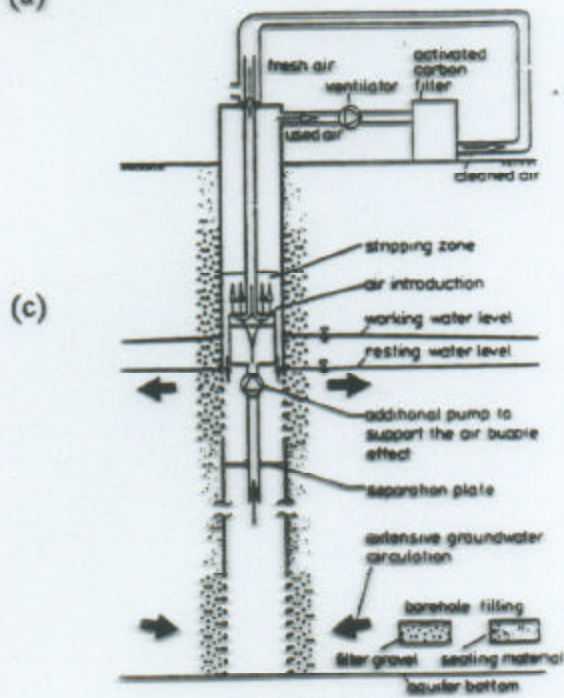
Cost and Availability

\$50-100/yd².



(a)

(b)



(c)

Figure 3.6.2.3 Schematic of vacuum vaporizer well (UVB) configured with (a) separation plate and vacuum extraction; (b) no separating plate and vacuum extraction; and, (c) separation plate and closed air recirculation. [Herring et al, 1992a].