

## Ground Water, Surface Water, and Leachate

### Ion Exchange

#### Introduction:

Ion exchange eliminates ions from the aqueous phase by exchange with counter ions on the exchange medium.

#### Description:

Ion exchange materials may comprise of resins made from synthetic organic materials that contain ionic functional groups to which exchangeable ions are joined. They may be inorganic or natural polymeric materials. Once the resin capability has been exhausted, they can be regenerated for re-use. The time duration of ion exchange technology is short- to medium-term.

#### Applicability:

The technology is capable of removing dissolved metals and radionuclides from aqueous solutions. Compounds that have been treated are nitrate and ammonia nitrogen.

#### Limitations:

- Oil and grease in the ground water can clog the exchange resin.
- Suspended solids content greater than 10 mg/l may cause resin blinding.
- The pH of the influent water may impact upon the ion exchange resin selection.
- Oxidants in ground water may impair the ion exchange resin.
- Wastewater is generated through the regeneration step and will need supplementary treatment prior to disposal.

#### Data Needs:

Factors influencing the design of an ion exchange system are the occurrence of oil and grease, the concentration of the contaminant, exchange capacity of the resin, suspended solids, metals, inorganic ions in ground water and the pH of the ground water.

#### Cost:

The cost for a standard ion exchange system ranges from £ 0.04 to £ 0.15 per 1,000 litres treated.