Ground Water, Surface Water, and Leachate

Air Sparging

Introduction:

Air is injected into a saturated matrix to remove contaminants through the process of volatilisation.

Description:

Air sparging is an *in situ* technology option where by air is injected through a contaminated aquifer. Injected air traverses horizontally and vertically in channels through the soil column, thus creating an underground stripper that removes contaminants through volatilization. The air helps to flush the contaminants into the unsaturated zone where a vapour extraction system is commonly implemented in conjunction with air sparging to remove the generated vapour phase contamination. This technology is designed to operate at high flow rates in order to maintain increased contact between the ground water and soil.

Oxygen added to contaminated ground water and vadose zone soils can also enhance biodegradation of contaminants below and above the water table.

Air sparging may last up to a few years.

Applicability:

The major target contaminant groups for air sparging are VOCs and fuels. Methane can be used as an amendment to the sparged air to enhance co-metabolism of chlorinated organic compounds.

Limitations:

- Airflow through the saturated zone may not be uniform, and as a consequence there can be uncontrolled movement of vapours.
- The depth of the contaminants and site-specific geology must be considered.
- Air injection wells should be designed for site-specific conditions.

Data Needs:

Important data sets include vadose zone gas permeability, depth to water, ground water flow rate, radial influence of the sparging well, aquifer permeability and heterogeneities, presence of low permeability layers, presence of DNAPLs, depth of contamination, and contaminant volatility and solubility.

Performance Data:

This technology has been demonstrated at numerous sites, though only a few sites are well documented.

Cost:

Surface area of contamination is the main cost driver, and affects the number of air sparge points.

Depth to contamination is the secondary cost driver. The costs increase with depth due to its impacts on the drilling costs.