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Groundwater Remediation For UST Sites

In Situ Air Sparging With Soil Vapor Extraction

***In situ air sparging with soil vapor extraction (SVE) is** a technique for removing dissolved volatile contaminants from groundwater. The technique injects air into the saturated zone. The air forms bubbles that rise into the unsaturated zone, carrying trapped and dissolved contaminants. Extraction wells in the unsaturated zone capture sparged air. If necessary, the air can then be treated using a variety of vapor treatment options.*

This technique is most effective in homogenous, permeable aquifers. Performance data for this technique are limited.

In situ air sparging with soil vapor extraction is a rapid remediation technique that can reduce contamination levels in six months. It is also able to quickly remove volatile organic compounds (VOCs) from below the groundwater table.

Petroleum Types And Constituents

- Gasoline and diesel
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX)

In Situ Air Sparging With Soil Vapor Extraction	
Advantages	• Rapidly reduces volatile organic compounds (VOCs) from below groundwater table • Can enhance and accelerate effectiveness of soil vapor extraction (SVE) and downgradient pumping
Limitations	• Removes primarily volatile constituents • Effectiveness is limited in low permeability or heterogeneous media • Difficult to control air distribution in groundwater • Can promote vapor and plume migration • Limited performance data are available; contaminant levels may rebound over time
System Components	• Vertical or horizontal extraction and injection wells • Trenches • Vacuum pump, compressor, or blower • Aboveground vapor treatment equipment (optional)

Wastestream Treatment	• Vapor treatment options (if needed):
	  • *Vapor phase biofilter*
	  • *Granulated activated carbon*
	  • *Internal combustion engine*
	  • *Catalytic oxidation unit*
	  • *Thermal incinerator*

Parameters to Monitor[1]	• Vacuum/pressure monitoring at the wellhead, pump, compressor, blower, and observation points • Airflow rate • Vapor concentrations • Dissolved oxygen • Water levels • Constituent concentrations in groundwater and soil
Cleanup Levels and Timing[2]	• Generally achieves maximum contaminant levels (MCLs) for volatile constituents • For an ideal site[3], ~90% reduction in 6 months to 1 year • For an average site[4], ~90% reduction in 6 months to 2 years
Costs[5]	• For an ideal site[3], $60,000 to $180,000 • For an average site[4], $120,000 to $200,000

[1]"Parameters to monitor" are for performance purposes only; compliance monitoring parameters vary by state.
[2]Cleanup standards are determined by the state.
[3]An "ideal site" assumes no delays in corrective action and a relatively homogenous, permeable subsurface.
[4]An "average site" assumes minimal delays in corrective action and a moderately heterogeneous and permeable subsurface.
[5]Costs include equipment, and operation and maintenance.