

Soil Remediation

Fracture Enhanced Dual Phase SVE

Fracture Enhanced Dual Phase Soil Vapor Extraction

Location: South-Central, Iowa

Year completed: 1999

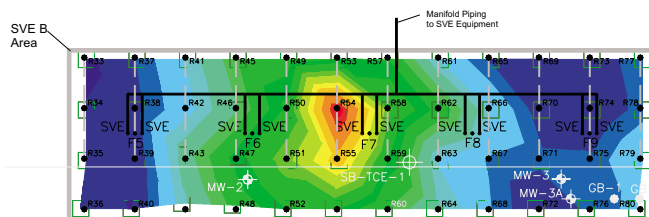
A former manufacturing facility in South-Central, Iowa was contaminated with trichloroethene (TCE) in the soil and groundwater. The soil, a tight highly consolidated clay, had significant amounts of TCE present requiring source removal down to a depth of 30 feet. Due to the soil's low permeability and perched water table, a horizontal sand filled fracture enhanced dual phase SVE system in the vadose zone was selected for source removal.

The horizontal sand filled fractures installed in the tight clay significantly increases its permeability and greatly enhances the radius of influence of the SVE extraction wells. The horizontal sand filled fractures were installed beneath the existing building and utilities. The fracture geometry was recorded in real time during injection by the active resistivity method. The horizontal fractures were installed at depths of 6', 11', 15', 19' and 23' below the existing floor slab.

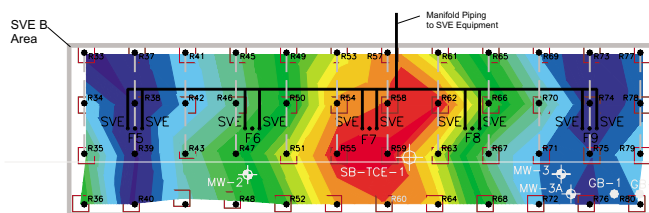


Large Manufacturing Facility

The fracture enhanced dual phase SVE system consists of a high vacuum high flow system to maximize the contaminant removal from the soil formation. A high vacuum stress is applied to the highly permeable sand filled fractures resulting in the rapid migration of contaminants in the soil towards the fractures.



Excitation of Frac Casing & Initial Injection



Excitation of Completed Horizontal Fracture

Real Time Mapping of Fracture Injection

The operating SVE system is monitored continuously for vacuum, well head and total flow rates, condensate level in extraction wells, condensate volumes and system up time. The instrumentation software automatically up loads these data daily to an internet site for review and analysis.



Dual Phase SVE Well Heads & Piping System