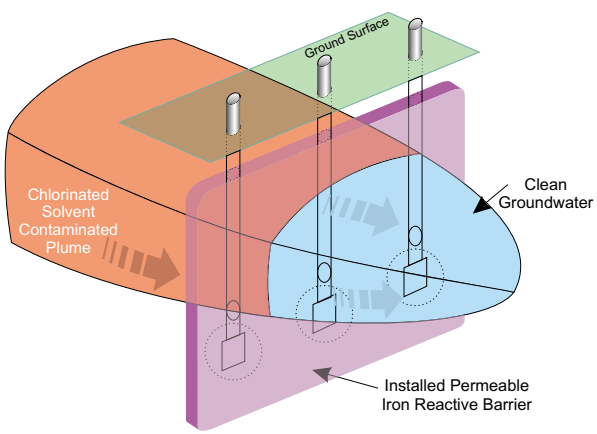
Groundwater Remediation

Iron Reactive Barriers

Iron Reactive Barrier

Location: *Montross, Virginia*
Year completed: *2002*

An active manufacturing facility in Montross, Virginia was contaminated with chlorinated solvents in the soil and groundwater. Groundwater contamination consists of a variety of volatile chlorinated solvents; namely, PCE, TCE, TCA and DCE in the thousands of ppb range. The overall remediation system for the site includes a soil vapor extraction system (SVE) in the unsaturated zone, and an *in situ* iron reactive barrier for remediation of the groundwater VOC contamination. GeoSierra was retained to design and build the iron reactive barrier. The iron reactive barrier was selected over the original ROD groundwater Pump and Treat remedy due to better performance, minimal operation and maintenance and lower cost.



Azimuth Controlled Vertical Iron Reactive Barrier Construction by Hydraulic Fracturing

The iron reactive barrier system was installed by GeoSierra azimuth controlled vertical hydraulic fracturing technology. The site consists of silts and fine sands overlying an aquitard consisting primarily of clays and silts. The iron reactive barrier was constructed in upper sands and silts and keyed into the underlying aquitard. The fine sands are characterized as loose flowing sands with a permeability of approximately 1 Darcy.

Aerial View of Iron Permeable Reactive Barrier

The iron reactive barrier was constructed from 82 frac injection wells and is over 1160 feet in length, ranging in depth from 5 feet down to a total depth of 44 feet below ground surface. The *in situ* iron reactive permeable barrier has the capacity to degrade extremely high concentrations of VOCs to below their MCL levels, as the groundwater flows naturally through the barrier. The VOC's in the presence of iron below the water table are progressively degraded to non-toxic end products such as ethene.

Mixing and Pumping Equipment

Frac Wells ready for Injection of Iron Slurry Mixture for Reactive Barrier

Injected Iron Slurry Mixture for Reactive Barrier

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