



Manufacturing Facility, Alpharetta, GA

Project Summary

The subject site is in Alpharetta, Georgia. The site has historically had soil and groundwater impacted by tetrachloroethene (PCE) and trichloroethene (TCE). The in-situ injection program targeted these compounds and their anaerobic daughter products. The pilot scale injection program included 8 injection points down-gradient of the source area. The injections were completed at 14.5 feet below ground surface (bgs). This injection depth was chosen based on the more permeable sandy layers that were identified during characterization of the site. These more permeable layers are those believed to have historically provided the preferential pathways taken by the dissolved-phase chlorinated volatile organic compounds (CVOCs).

Remediation Plan

The down-gradient area was selected for the pilot rather than a more impacted area so as to minimize any expansion of the plume that could occur from a source area injection. The pilot scale injection program utilized direct-push technology to apply; vitamins (B₁₂, B₂), essential nutrients (o-PO₄⁺ and NH₄⁺), sodium sulfite, calcium propionate, yeast extract, zero-valent iron (ZVI), and hydrogen release compounds (HRC[®]-X and HRC[®]). The objectives of the program were to establish and maintain a stable dissolved hydrogen level, provide micro-nutrients, maintain pH, provide for optimal competitive conditions for the desired microbial consortia while minimizing the impact to the day-to-day operations of the facility (U.S. Patent 7,129,388). The stimulus of these indigenous bacteria in the subsurface, in conjunction with the ZVI component, is utilized to effect the rapid and measurable removal of the targeted compounds in the groundwater and saturated soils.

Results

The groundwater results from the six monitoring wells within the injection area show large reductions in CVOCs. The initial disappearance of the targeted compounds in the sampling event thirty days following the injection may be interpreted as a direct result of the ZVI's reduction of dissolved phase CVOCs. The temporary rebound in the following sampling event is typical, as the biological consortia is established and biofilms form on the soils. The continued trend is even more significant when tracked against the groundwater elevation in the area. The February 2008 CVOc concentrations have continued to decrease even as groundwater elevation has risen two and a half feet. This would indicate that the vadose zone was also addressed with the treatment program. Eight months following the injections, concentrations of all CVOcs, except vinyl chloride in a down gradient well, are below the state and EPA standards for both residential and non-residential standards. The concentration of vinyl chloride 2.2 ppb is slightly above the standard of 2 ppb and expected to fall as reducing conditions are maintained.

Tageted Compounds - Down Gradient Monitoring Well (07 Pilot)

