

Case Study: Enhanced Reductive Dechlorination with an Organic Electron Donor

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Chlorinated solvents such as trichloroethene (TCE) and perchloroethene (PCE) have been widely used by industry. Remediation of these chemicals is a widespread and costly endeavor. Various techniques have been employed over the last 30 years to remediate groundwater impacted with PCE/TCE and with varying success. Effective remedial technologies used in recent years include biostimulation of impacted groundwater by supplying electron donors to enhance the natural process of reductive dechlorination by indigenous bacterial species such as *Dehalococcoides ethenogenes*. This study details remedial activities of a PCE/TCE-impacted groundwater unit underlying an auto dealership, located in the central north region of Houston, Texas.

Concentrations of PCE, TCE, and cis-1,2-dichloroethene (cis-1,2-DCE) in groundwater exceeded the drinking water standard. The initial strategy for closure was monitored natural attenuation (MNA). Due to time constraints and plume migration, the need for additional remedial action was required. Financial constraints limited the selection of electron donors. Cheese whey, a natural by-product associated with the cheese making process, was chosen as an alternative injection amendment.

Cheese whey is inexpensive, easily injected into the groundwater unit, provides an electron donor, and supplies the microbial community an additional substrate with a favorable carbon to nitrogen ratio. This combination gives cheese whey a significant competitive edge over many electron donors. Multiple direct injections of cheese whey have been performed at the Site. As a result, concentrations of PCE and TCE are now below the drinking water standard in all monitoring wells. Whey has proven to be an inexpensive and effective alternative for achieving reductive dechlorination of cVOCs in groundwater at this Site.