

# Case Study: Enhanced Reductive Dechlorination with an Organic Electron Donor

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Chlorinated solvents such as trichloroethylene (TCE) and perchloroethylene (PCE) have been widely used as industrial solvents. Remediation of cVOCs has become one of industry's most widespread and costly environmental impacts. Various techniques have been employed over the last 30 years to remediate groundwater resources with varying concentrations of cVOCs, 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* and *Dehalobacter*. This case study details remedial activities of a cVOCs impacted groundwater unit underlying an auto dealership, located in the central north region of Houston, Texas (Site).

Concentrations of PCE, TCE, and cis-1,2-dichloroethene (cis-1,2-DCE) in the sites groundwater exceeded the drinking water standard. The initial strategy for Site closure was monitored natural attenuation (MNA). Based on Client related time constraints and plume migration, 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 provides 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, once in excess of the applicable drinking water standard, are now below the 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.