Incorporating Background Attenuation Rates into an Active Remedy Design

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Background/Objectives. The former NASA facility in Downey, California produced aircraft beginning in 1929 and transitioned to support NASA's space programs from the 1960s through 1999. In 2003, NASA transferred ownership of the land to the City of Downey, which subsequently sold portions of the site totaling 155 acres for redevelopment. Beginning in 2004, the entire industrial facility was demolished and re-developed into retail space, a regional hospital complex, and a city park.

Manufacturing activities throughout the operating life of the facility generated soil and groundwater contamination, including the chlorinated solvents PCE and TCE, which formed a 5,000-foot-long groundwater contamination plume in the upper Gaspur Aquifer, in the San Gabriel River Valley alluvium. PCE and TCE concentrations exceeded 10,000 ug/L in source zones and limited dechlorination was observed along the groundwater flow path.

In November, 2003, Arcadis entered a guaranteed, fixed-cost contract to achieve no-further-action for soil and groundwater contamination by the end of October, 2014. The final contract value was $16.4 MM.

Approach/Activities. Three major factors: the large scale of the groundwater plume (more than 155 acres in area, 5,000 feet long), the depth to groundwater (greater than 55 feet), and the on-going redevelopment, all prevented direct application of any remedy across the entire contaminated volume. To meet the 10-year completion requirement, it was necessary to combine both direct and indirect actions in the remedy.

Carbohydrate-driven enhanced reductive dechlorinated was selected as the primary remedial technology for groundwater contamination at the site. The biostimulant was injected along ten permanent well lines, arranged perpendicular to groundwater flow and spaced at regular intervals along the flow path. Total organic carbon was sustained in each injection zone to create a strong reductive dechlorination zone, extending approximately 150 feet (100 days of travel time) downgradient from each well line. Aquifer restoration between the active treatment zones was accomplished by flushing with the solvent-free groundwater generated by the treatment processes.

The remedy was designed to achieve drinking water standards across the entire plume (note that the cis-DCE for California is 6 ug/L), with a no-further-action determination to be issued when all compliance wells reached target levels that incorporated background attenuation rates observed across the site. Off-site wells and wells at the downgradient boundary would have to reach drinking water standards, while wells in upgradient zones could be cleared at higher concentrations, based on attenuation occurring along the flow path.

Results/Lessons Learned. The active ERD remedy was completed in 2012 and groundwater remedial goals, including post-treatment monitoring, were achieved in 2014. Early in 2017, the Los Angeles Regional Water Quality Control Board issued its determination that no further action is required for the site.