Successful Bioremediation at a Former Air Force Base Fire Training Area

Carbon Tetrachloride Concentrations Reduced Below Treatment Goal within 8 Months

Project Highlights

- Air Force Base contaminated with high levels of carbon tetrachloride due to on-site firefighting training
- 97% reduction in contaminant within three months
- Carbon tetrachloride reduced to below detection limits

Project Summary

Training exercises at Texas Air Force Base resulted in an impact to soil and groundwater by trichloroethylene (TCE) and carbon tetrachloride. A monitored natural attenuation study conducted indicated that chlorinated solvents at the plume would naturally decline to acceptable levels after 30 years of monitoring.

After over 14 years of monitoring, contaminant reductions were not proceeding as quickly as predicted and additional remediation was advised. It was determined that limited anaerobic activity was present and biostimulation was a viable option. A pilot test was conducted on-site.

The objective of the test was to determine the feasibility of injection into the shallow, discontinuous groundwater unit. The pilot test was also designed to determine if the residual TCE and carbon tetrachloride could be biodegraded through enhanced bioremediation and reduced to below 5 ppb (the Texas Risk Reduction Program limit). Follow-up injections were applied downgradient of the source area and also in a barrier configuration several hundred feet dowgradient of the source were implemented about 6 months after the pilot test.

Site Details

Site Type: DoD - Air Force Base

Contaminant of Concern: Chlorinated Solvents, CarbonTetrachloride

Concentration: Carbon Tetrachloride - 313 ug/L

Remediation Approach: Enhanced Anaerobic Bioremediation

Soil Type: Clay and Gravel

Technology Used:

3-D MICROEMULSION

Technology Description

3-D Microemulsion® is an engineered electron donor material that offers a novel 3-stage electron donor release profile, pH neutral chemistry, and is delivered on-site as a factory-emulsified product.

Results

The combination of the pilot test and full-scale application resulted in a 97.8% reduction in carbon tetrachloride 8 months post-injection, with chloroform, methylene chloride, and chloromethane remediation daughter products on a downward trend. High TCE concentrations were effectively treated as well with TCE peaking after injections to 126 ppb within a 3-month period to 0.2 ppb.

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