

Complete Dechlorination in Extreme High-Flux Zone Achieved Using Solid-Phase, Co-Injectable Amendment



Summary

REGENESIS Remediation Services (RRS) conducted an initial phase remedial application of AquiFix®, a novel, solid-phase, co-injectable organic amendment designed to promote long-term anaerobic biodegradation of CVOCs (chlorinated volatile organic compounds). Two permeable reactive barriers (PRBs) were installed at a chlorinated solvent plume site in southern Michigan, —one with AquiFix alone and one with AquiFix plus PlumeStop®. Both applications rapidly reduced CVOCs by over 90%, with >99% reduction sustained for more than two years in the extreme mass flux zone.

Background

Past releases of trichloroethene (TCE) and tetrachloroethene (PCE) created a large CVOC plume migrating beneath a Michigan community. Baseline concentrations exceeded 64,000 µg/L, with extreme mass flux (>6,400 mg/m²/day) through a glacial esker aquifer. The objective was to evaluate AquiFix, alone and combined with PlumeStop, as a remedial alternative for full-scale application.

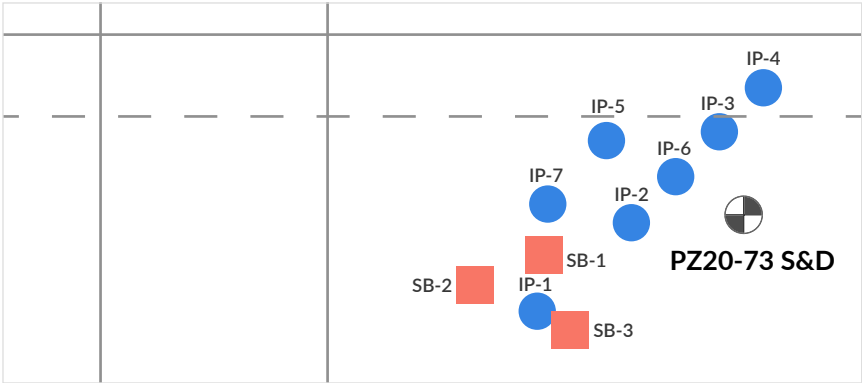
Application

REGENESIS® installed two 20-foot-long PRB treatment segments perpendicular to groundwater flow. Treatment Area 1 received Aquifix + PlumeStop; Treatment Area 2 received Aquifix alone. Both areas were bioaugmented with Bio-Dechlor INOCULUM® Plus (BDI). Injection depths targeted 17–29 feet below ground surface, matched to monitoring intervals.

Figure 1 Treatment Area

Initial phase application map of treatment area.

- Monitoring Well
- Injection Point
- Sample Boring



Results

Co-application of Aquifix and PlumeStop reduced CVOCs by >99% within two years, with ethene production averaging ~4,000 µg/L, indicating robust and complete dechlorination in the extreme mass flux zone. In the lower flux zone, Aquifix alone achieved 93% CVOC reduction with sustained ethene generation and microbial activity. Both treatments maintained total organic carbon levels, confirming long-term amendment persistence.

Figure 2 PZ20-73D - Aquifix, PlumeStop, BDI

Chlorinated ethene and ethene concentrations at PZ20-73D in Aquifix, PlumeStop, BDI pilot test barrier.

- TCE
- cDCE
- VC
- Ethene
- Total Cl-Ethenes
- TOC

