SERDP
Strategic Environmental Research and Development Program
Improving Mission Readiness Through Environmental Research

Permeable Reactive Barriers for In-Situ Treatment of Chlorinated Solvents

Cleanup
CU-107

Background:

Chlorinated solvents account for a significant portion of environmental contamination requiring cleanup action. These contaminants have migrated through the subsurface and entered the groundwater at more than 1,000 Department of Defense (DoD) sites. The technology chosen for remediation is typically pump-and-treat. Although pump-and-treat can be effective in controlling plume migration, in-situ treatment approaches are required to better remediate and reduce risk at chlorinated solvent contamination sites. One of the most promising alternative treatment options utilizes in-situ permeable reactive walls.

Objective:

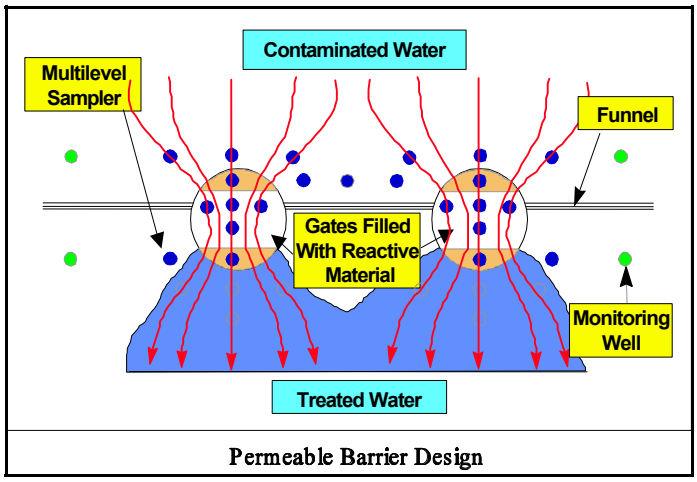
This project focuses on the testing of alternative reactive media to be used in an in-situ permeable barrier. Two different reactive media will be field-tested in a funnel and gate system to evaluate their effectiveness in destroying the chlorinated solvent contaminants in groundwater. Another objective is to concurrently develop a field-tested permeable barrier design protocol for in-situ remediation of chlorinated solvents in groundwater that would be acceptable to state and Federal environmental regulatory communities.

Summary of Process/Technology:

The "funnel and gate" technology consists of impermeable barriers installed in the ground to funnel the flow of contaminated groundwater toward a permeable section, or gate, in the wall which contains a reactive media that will destroy the contaminants as the water passes through the permeable section of the gate.

Benefit:

The main advantage of a reactive barrier is the passive nature of the treatment. For the most part, its operation does not depend on any external labor or input energy. Once installed, the barrier takes advantage of the in-situ groundwater flow to bring the contaminants in contact with the reactive material.



Permeable Barrier Design

Accomplishments:

Construction of the pilot-scale, permeable reactive barrier was completed during early January 1998 at Dover Air Force Base, Delaware. Water level and groundwater velocity measurements taken during February indicates that groundwater is flowing through and not around or above the gates. Extensive groundwater sampling and analysis conducted during 1998 indicates that the system is destroying the contaminants in the groundwater effectively as the water flows through the gate. Groundwater monitoring will continue during 1999 in an effort to understand better the longevity of the reactive material.

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