

Resolving the Feasibility of Treating Contaminants Stored in Plumes

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Abstract. In 2002, an iron Permeable Reactive Barrier (PRB) was installed in F. E. Warren Air Force Base, Wyoming which reduced TCE concentration at the barrier to MCL. After five years, TCE concentration forty and sixty feet downgradient of the barrier dropped only by roughly one order of magnitude. These persistent concentrations are related to desorption and back diffusion of TCE from low permeability zones.

To investigate the mechanisms of back diffusion, visualization studies have been done at Colorado State University. The studies also suggest the likelihood of large amounts of contaminant mass to be stored in plumes. Therefore, the next step is to resolve if treatment of contaminants stored in low flow zones is technically feasible. This research will involve development of white papers (addressing key issues including cost and removal efficiency) and demonstrative laboratory and modeling studies for the following options:

- Multiple permeable reactive barriers
- Drifting chemical oxidants, chemical reductants, and degradable carbon sources into plumes
- Matrix modification

Benefits of this task include identification of research needs for plumes treatment approaches.

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