

ENVIRONMENTAL FRACTURING APPLICATIONS



EMPLACEMENT OF TREATMENT AMENDMENTS FOR TCE REMEDIATION

... evaluation of various commercial treatment amendments emplaced by pressurized injection and fracturing demonstrated order of magnitude cost savings for the full scale remediation of TCE underlying the site.

PROBLEM

The failure of a TCE containment structure resulted in the release of chlorinated solvents into fine grained sediments and groundwater to a depth of 18 metres over an extensive area at a former manufacturing facility.

OBJECTIVES

- to emplace various treatment amendments into aquifer sediments and evaluate their performance for full scale remediation.

FIELD PROGRAM

A total of 5 boreholes were advanced and treatment amendments emplaced at depths between 6.1 and 17.0m depth within the TCE plume. Liquid and solid phase treatment amendments emplaced into soils included a polylactate emulsion, a cellulose micro-iron slurry, and a 17% solution of Modified Fentons Reagent. A total of 4,800 kg of solid amendment and 18,200 L of modified H₂O₂ solution were distributed and mapped in subsoils.

EVALUATION

The *in situ* pilot treatment program resulted in:

- change of groundwater geochemistry to strongly reducing conditions (-175 mV) for anaerobic reductive TCE dehalogenation
- Fentons solution resulted in a 300% increase in dissolved oxygen (to 30.3 mg/L) and oxidation potential of +180 mV for chemical oxidation of TCE
- feasibility of full scale treatment

Fracture – emplacement of solid and liquid phase treatment amendments for remediating TCE at a former manufacturing facility.



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