

Direct Injection of Hydrogen to Remediate Dissolved Chlorinated Solvents

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The project site includes an approximately one acre area containing dissolved chlorinated solvents in a sandy glacial outwash underlain by clay. An air sparging system was installed approximately 2 years ago at the upgradient side of the project site, in the former source area. Significant reductions were observed during the early phase of the air sparging system operation, likely due primarily to mass transfer. Recent monitoring suggests that a plateau has been achieved and that further reductions in concentrations of chlorinated solvents will require a modified approach, particularly downgradient of the air sparge system. Consequently, testing has occurred involving the direct injection of hydrogen. The concept was to evaluate the possibility of creating a reductive environment more favorable to degradation of chlorinated solvents and also to achieve direct dechlorination through the increased availability of hydrogen. The process involved injection of hydrogen into a well screened at the base of the glacial sand and monitoring a nearby well. Redox, pH, dissolved oxygen and other field parameters were measured and ground water samples were collected before, during and after the injection period. Initial results suggest that the result of hydrogen injection was a reduction in redox and pH. In addition, concentrations of PCE trended downward while TCE trended upwards. The total concentration of chlorinated solvents also trended downward.