

Effect of surfactant-enhanced soil flushing (SESF) for PCE and TCE-contaminated groundwater remediation

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The objectives of this study were to select potentially suitable surfactants that solubilize tetrachloroethylene (PCE) and trichloroethylene (TCE) present as contaminants and to evaluate the optimal range of process parameters that can increase the removal efficiency in surfactant-enhanced soil flushing (SESF) pilot tests. Used experimental method for surfactant selection was batch experiments. The surfactant solution parameters for SESF pilot tests were surfactant solution concentration, surfactant solution pH, and the flow rate of surfactant solution in the SESF system. Based on the batch experiments, DOSL (an anionic surfactant) was selected as a suitable surfactant that solubilizes PCE and TCE present as contaminants. The highest recovery (95 %) of the contaminants was obtained using a DOSL surfactant in the batch experiments. The pilot test results revealed that the optimum conditions were achieved with a surfactant solution concentration of 4 % (v/v), a surfactant solution pH of 7.5, and a flow rate of 30 L/min of surfactant solution. The maximum removal of contaminants (89 %) was obtained when optimum conditions were simultaneously met in pilot-scale SESF operations. These results confirm the viability of SESF for treating PCE and TCE-contaminated groundwater.