OPTIMIZATION REMEDIATION PROCESS OF GROUNDWATER THROUGH CONTROLED RELEASE OF PERMANGANATE USING GENETIC ALGORITHM-FINITE DIFFERENCE METHOD

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Abstract:

The contamination of groundwater is a wide spread and persistent problem which admits no easy analysis or solution and has become a growing concern. Relative to this matter, chemical contaminants remain as an important issue because the procedure of water purification from these material is expensive and time consuming; hence, the ever increasing emphasis on protection and preservation of natural resources though regional planning is evident today [1]. In Situ Chemical Oxidation (ISCO) is a popular technology used to treat contaminated groundwater. ISCO is the delivery of chemical oxidants, typically through injection, to groundwater to degrade contaminants. One of the challenging issues regarding to standard ISCO is the quick reaction and dissolution in environment. A method to address this challenge is the use of a encapsulated passive, slow-release oxidant, which is inserted and allowed to dissolve and intercept the contaminant over numerous years. Encapsulation prevents instant dissolution of the entire oxidant mass into the environment [2, 3]. Slow release of permanganate is an emerging approach in order to remediate groundwater, in which the cylinders with only few centimeters in diameter are placed in wells or pushed directly into the subsurface.

This study has been focused on simulation and optimization of groundwater remediation via controlled release of permanganate using genetic algorithm-finite difference method. The discretization of the groundwater flow and reactive transport equations is done by finite difference method. Genetic algorithm approach is used to find the best location of oxidant sources entire the geometry.

Reference:

