Modeling of Surfactant Enhanced Remediation of DNAPL Contaminated Soils. (S01-zhang060814-Oral)

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Abstract:

Stochastical analysis was carried out to assess the effect of soil spatial variability and heterogeneity on recovery of denser-than-water nonaqueous phase liquids (DNAPL) during the process of surfactant enhanced remediation. A three-dimensional, multicomponent, multiphase, compositional model was utilized to simulate water flow and chemical transport processes in heterogeneous soils. Soil spatial variability and heterogeneity was accounted for by considering the soil permeability as a spatial random variable and a geostatistical method was used to generate random distributions of the permeability. The randomly generated permeability fields were incorporated into the numerical model to simulate DNAPL transport in heterogeneous fields and stachastical analysis was conducted using the simulated results. Based on the analysis, a relationship between DNAPL recovery and soil heterogeneity was established. Temporal and spatial distributions of relative saturations in the phases of water, DNAPL, and microemulsion in heterogeneous soils were related to soil heterogeneity.

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Presentation Information:

Presentation Date: Thursday, November 14, 2002
Presentation Time: 11:00 am

Keywords:

surfactant, DNAPL, soil heterogeneity, remediation