

عنوان مقاله:

۲D Simulation of Dynamic Transportation of Volatile Hydrocarbons in Vadose Zone of Tehran Oil Refinery and Industrial area of Ray, Tehran, Iran

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خلاصه مقاله:

This work investigates the reactive transport of volatile hydrocarbons in the unconfined aquifer system of Tehran oil refinery and the industrial area of Ray, Tehran. A ۲D finite volume model is presented to predict the soil gas contamination caused by LNAPL traveling on the phreatic surface through the vadose zone of the aquifer incorporating physical, chemical, and biological processes. A multi-purpose commercial software called PHOENICS is modified by incorporating extra codes to solve the model equations numerically. The model predictions closely agree with the field measurements, showing that the LNAPL migration is typically affected by the volatilization process. LNAPLs represent a potential long-term source of soil and groundwater contamination in the studied site. A comparison of the simulation results in a time step of ۳۶ years with the results of field studies shows that the presented numerical model can simulate the reaction transfer of evaporated hydrocarbons in the unsaturated region. The concentrations have decreased in the time step of ۳۶ years compared to the values shown in the time step of ۵۰ years. This decrease in the hydrocarbon gas-phase concentrations in the unsaturated zone is due to excavations at the site for field studies. Through these excavations, a significant volume of the gaseous phase trapped below the earth's surface is released into the atmosphere, which reduces the accumulation of volatile gases beneath the earth's surface.

کلمات کلیدی:

transportation of volatile hydrocarbons, two-dimensional simulation, biological mechanisms, Oil Refinery

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