

SPILL OF DENATURATED ETHANOL INTO GASOLINE RESIDUALS

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Denaturated ethanol (95% ethanol, 5% hydrocarbons) is transported to be blended with gasoline at distribution terminals. In the event of an accidental spill into a site that was previously contaminated by gasoline, ethanol would be expected to quickly dissolve and travel with the groundwater. Since ethanol acts as a cosolvent, it could dissolve some of the gasoline residuals and carry high hydrocarbon concentrations downgradient. A controlled field test was conducted to evaluate the consequences of a denaturated ethanol spill into gasoline residuals. Initially, a gasoline contamination was created releasing 200L of gasoline in the unsaturated zone. Approximately one year later, 200L of denaturated ethanol was released on top of the previous contamination. Groundwater concentrations were monitored above and below the water table. Ethanol was found to accumulate on top of capillary fringe in a small area close to the source zone, causing significant depression of the capillary fringe. Ethanol downgradient transport was extremely delayed, likely due to reduced hydraulic conductivity caused by the lower aqueous saturation, and changes in density and viscosity. Despite ethanol high solubility, high ethanol concentrations have not been detected after 180 days, 2.5 m downgradient the source. Cosolvent effects were also not evident during this period.

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