

## FATE OF ETHANOL FUELS IN THE VADOSE ZONE

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The use of ethanol fuels is increasing, with ethanol being blended to gasoline in fractions ranging from 5% to 95%. When dealing with subsurface contamination by such mixtures, one issue that has not received much attention, particularly in field scale tests and numerical modeling, is the impact of the vadose zone. To address this issue, a controlled field test was performed at CFB-Borden. In this field test, E10 (gasoline with 10% ethanol) and E95 (95% ethanol) were released in the unsaturated zone, and ethanol and hydrocarbons distribution in the source zone was evaluated based on soil cores. Most of the ethanol from the E10 spill was retained in the unsaturated zone pore water, while after the E95 spill most of the ethanol accumulated on top of the capillary fringe. Laboratory tests are underway to investigate ethanol retention in the unsaturated zone under different settings. The potential for ethanol flushing from above the capillary fringe to the saturated zone by water table oscillation was evaluated in the field. The unsaturated zone was found to play a major role on ethanol fate, and therefore should not be neglected when evaluating ethanol fuels contamination.

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