

## **TRITIUM MOVEMENT THROUGH VADOSE ZONE IN AN IRRIGATED WATERSHED**

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The irrigation of an upland forest using tritium-containing groundwater has been proposed as a means of reducing subsurface tritium migration to streams, and eventually the Savannah River, at the U.S. Department of Energy's Savannah River Site (SRS) located near Aiken, SC. Estimates of public exposure indicate that evapotranspiration of tritiated irrigation water by the tree canopy is considerably less hazardous to the public than its ingestion as drinking water. The objective of the current study was to evaluate the processes controlling water movement within the irrigation site in order to maximize evapotranspiration of irrigation water and minimize tritium movement below the rooting zone. Numerous soil cores and plant tissue samples were collected to determine the soil moisture distribution and the background tritium concentration in the soil and foliage within the test site prior to irrigation. The moisture retention properties (matric potential) and unsaturated hydraulic conductivities were determined for the horizons comprising the predominant soil series within the study site using both standard methods and an Unsaturated Flow Apparatus (UFA; UFA Ventures Inc., Kennewick, WA). Soil moisture distribution after tritium application was also measured periodically using time domain reflectometry (TDR), with instrumental response calibrated using soil core samples. Pore water samples were also collected using suction lysimeters installed at select depths. Such a data set provides an excellent means of calibrating models designed to predict solute transport in the vadose zone.