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## ASSESSMENT OF POTENTIAL RADIATION DOSE TO MAN FROM AN ACUTE TRITIUM RELEASE INTO A FOREST ECOSYSTEM

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**Abstract** -- On 2 May 1974, 479,000 Ci of tritium gas escaped from a Savannah River Plant exhaust stack. The tritium first reached the ground in a pine forested area and was partially assimilated into the ecosystem. Samples of vegetation collected and measured for a period of 70 days showed an increase in the levels of tritiated water. Cycling of the tritium retained in the forest ecosystem resulted in a higher concentration of tritiated water vapor in the air at breathing height near the forest floor than that calculated by the usual models used for predicting air concentration. In addition, the model for tritium cycling in the forest predicts a diurnal cycle of tritiated water vapor concentration with higher concentrations at night when air movement under the canopy is slower.

The potential dose to the maximum individual because of inhalation and skin absorption of tritium as HTO after the release was calculated in three ways: (1) by using the body water model from the *ICRP Publication 2* and assimilation during the passage of the puff, (2) by using the body water model from the *ICRP Publication 2* and assimilation during an extended exposure period to tritium determined by the experimental measurements and (3) by using a three-compartment dosimetry model with retention half-times of 9, 30 and 450 days with the extended exposure period used in (2). The potential doses were 0.14, 0.80 and 0.89 mrem, respectively. These potential doses show the necessity of considering the interaction of radioactive material with the ecosystem for dose calculation.