

CRITICAL RADIONUCLIDE/CRITICAL PATHWAY ANALYSIS FOR THE SAVANNAH RIVER SITE

G. Timothy Jannik

Westinghouse Savannah River Company
Savannah River Technology Center
Aiken, SC 29808

ABSTRACT

Many different radionuclides were released to the environment from the Savannah River Site (SRS) during its operational history (1954 - present). However, only a small number of the released radionuclides were relatively significant contributors to doses/risks to offsite people.

This paper documents the radiological critical-contaminant/critical-pathway analysis performed for SRS. The analysis covers radiological releases to the atmosphere and to surface water, which are the principal media that carry contaminants off site.

For the next 30-years, if site missions and operations remain constant, only tritium is projected to exceed a maximally-exposed-individual (MEI) risk of $1E-06$ for either the airborne or liquid pathways. However, if combined, projected 30-year liquid pathway MEI risks from cesium-137, strontium-89/90, and plutonium-239 would exceed a risk of $1E-06$. All other liquid pathway radionuclides have negligible ($<1E-07$) projected 30-year risks. Except for tritium, all airborne pathway radionuclides also have negligible ($<1E-07$) projected 30-year risks.

The critical exposure pathways associated with the airborne pathway MEI projected risks are inhalation and vegetation consumption. The critical exposure pathways associated with the liquid pathway MEI projected risks are drinking water ingestion and fish consumption.

For the SRS-specific, non-typical exposure pathways (i.e. recreational fishing and deer and hog hunting), cesium-137 is the critical radionuclide.

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