From: Jason Schaperow RES
To: Tin Mo
Date: Mon, Feb 14, 2000 2:17 PM
Subject: Importance of Ru to offsite consequences

I spoke with your acting Branch Chief, Vincent Holahan, and he said you might be able to help me with a question I have.

I am working on analyses of source terms and consequences of accidents involving prolonged loss of water from a spent fuel pool (melt-down type accidents). As a result of radioactive decay from storage in the spent fuel pool, noble gases and iodine have decayed and the only element that is released from the fuel in significant amounts is cesium. However, the Canadians have small-scale experimental results showing that, in an air environment, ruthenium can be released following nearly complete oxidation of the fuel cladding. When I perform a MACCS calculation that includes a ruthenium release, I get a larger number of early fatatities than with a cesium release alone. Because the spent fuel pool I am modeling has about the same number of curies of ruthenium and cesium, the larger number of early fatalities is caused by ruthenium-106's larger inhalation dose conversion factor for the lungs. Why is ruthenium's inhalation dose conversion factor for the lungs so much higher than cesium's?

Also, I noticed that the clearance class (clearance from the lung to the blood) that the ruthenium inhalation dose conversion factor for the lungs in MACCS is based on is "Y," indicating that it takes on the order of years to be cleared from the lungs. Is it appropriate to use this dose conversion factor for calculating early fatalities? (The ruthenium dose conversion factors for the day and week clearance classes are smaller than for the year clearance class.)

Thank you.
Jason Schaperow

CC: Charles Tinkler, Vincent Holahan

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