

AN APPLICATION OF THE RADTRAN 5 STOP MODEL

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The RADTRAN 5 Computer Code for Transportation Risk Analysis includes a model for calculating stop-related doses from incident-free transportation of radioactive material. The RADTRAN 5 stop model is more flexible than the stop model in previous releases of the code. The RADTRAN 5 stop model readily allows individual stop locations to be specifically described. It is the intent of this paper to (a) document the relationship of the RADTRAN 5 stop model to that in the previous release of the code, RADTRAN 4 and (b) to demonstrate the application of the stop-specific capability. First, a baseline is established to demonstrate the relationship between the results of the earlier release, RADTRAN 4, and the current model. This involves comparing the results obtained with identical input parameter values. A second step in this process involves demonstrating that segmentation of stop time into various intervals yields the same total stop dose, if all other variables are held constant.

To demonstrate the application of the stop-specific capability, a truck route in the United States that has been used for spent-fuel transportation is analyzed. Individual stops along the route and the numbers of persons and the duration of the stops are developed from published sources. These stop-specific data are used to generate a RADTRAN 5 result, which is compared to the result that one would obtain by using standard generic values for stop-related parameters on the same route. In addition, inspection of various types of radioactive-material shipments at state borders has been proposed as a safety measure. Since an inspection is merely a specialized type of stop, it can be modeled discretely with RADTRAN 5. Using time-and-motion data from a rehearsal for inspection of transuranic waste shipments on the border between the states of Colorado and New Mexico in the United States, the authors use RADTRAN 5 to generate an estimate of stop-related dose per inspection. The effect on total stop dose of adding such an inspection stop is illustrated.

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