Abstract

The software and data package DCFPAK (Dose Coefficient File Package) allows electronic access to nuclear decay data and dose and risk coefficients for exposure to radionuclides. DCFPAK has been built in a series of versions designed to allow access to expanded capabilities as they are completed. Eight versions of DCFPAK were built from 1996 through 2008. The most recently released version is DCFPAK 2.2 (2008). The present version, called DCFPAK 3.0, improves DCFPAK 2.2 mainly by expanding the set of radionuclides addressed in the inhalation and ingestion scenarios.

DCFPAK 3.0 provides electronic access to the following information:

 updated nuclear decay data for each of the1252 radionuclides addressed in ICRP Publication 107 (2008);

 age-specific ingestion dose coefficients for 888 radionuclides (all radionuclides in ICRP Publication 107 with half-life ≥ 10 min, excluding noble gases), based on biokinetic and dosimetric models applied in Federal Guidance Report No. 13 (FGR13) and the updated nuclear decay data;

 age-specific inhalation dose coefficients for each of these 888 radionuclides inhaled as particulate aerosols with any user-specified distribution of particles with sizes (within the bounds 0.0001-200 μm aerodynamic diameter), based on models of FGR13 and the updated nuclear decay data;

 age-specific inhalation dose coefficients for gas or vapor forms of selected radionuclides;

 for various external exposure scenarios, external dose rate coefficients for each of the full set of 1252 radionuclides based on models of Federal Guidance Report No. 12 (FGR12) for adults and the updated nuclear decay data;

 age- and gender-averaged cancer mortality and morbidity risk coefficients based on the models and methods of FGR13 for 888 radionuclides with half-life ≥ 10 min and selected exposure scenarios;

 age-independent skin dose coefficients for each of the full set of 1252 radionuclides based on the updated nuclear decay data.

Two types of age-specific dose coefficients are included in the package: committed equivalent dose coefficients and short-term integrated absorbed dose coefficients. The integration period for the committed equivalent dose coefficients is 50 y for intake by an adult and to age 70 y for intake at a pre-adult age. The integration period for the short-term absorbed dose coefficients is 0-30 d after intake regardless of age at intake