RADIOLOGICAL ASSESSMENT SYSTEM FOR CONSEQUENCE ANALYSIS (RASCAL) VERSION 3.0

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SUMMARY
The Radiological Assessment System for Consequence AnaLysis, Version 3.0 (RASCAL 3.0) is the U.S. Nuclear Regulatory Commission's (NRC) main computational tool for use during radiological emergencies. RASCAL estimates doses from radiological accidents for comparison with Protective Action Guides and acute health effects thresholds. It includes six computational tools: ST-Dose, FM-Dose, Decay, BackCalc, UF6Plume, and MetProc. ST-Dose computes time-dependent nuclide release rates, atmospheric transport, radiological decay, and doses. FM-Dose computes doses from environmental concentrations of nuclides. Decay computes radiological decay and daughter in-growth. BackCalc estimates a distribution of possible release rates from field measurements. UF6Plume computes uranium exposures and HF concentrations from a UF_6 release. MetProc prepares meteorological data for use by ST-Dose and UF6Plume.

Three databases are included in RASCAL 3.0. They contain U.S. radiological facilities data, nuclide dose and decay data, and field measurements made during an incident.

I. BACKGROUND

The current version of RASCAL, RASCAL 2.2[1], is a DOS-based set of tools that is primarily intended for power reactor emergencies. However, NRC has regulatory authority over radiological facilities other than power reactors (e.g., fuel cycle facilities). These facilities have accident scenarios that are different from those at power reactors. RASCAL 3.0 is an enhanced, Windows-based set of tools applicable to reactors, fuel cycle facilities, and transportation accidents.

II. ST-DOSE

ST-Dose (Source Term to Dose) estimates a radioactive source term, calculates atmospheric transport and radiation doses. Both the source and the reduction mechanisms (sprays, filters, etc) that are used during an emergency may be varied with time. Results are displayed as graphics or as summary or detailed tables. Cumulative dose, dose rate, and deposition may be displayed. Any result may be interpolated from the computational grid to user-defined receptor points.

ST-Dose can use either real-time or pre-calculated meteorological data files created by MetProc.

III. METPROC