RADTRAD Change Log: Version 4.5.0

Released May 2015

- **Updates:**

  - Added the option for user to select an adaptive time step algorithm which dynamically adjusts time step size in order to keep the estimated solution error within a user specified limit. Estimated solution error is included as a plot variable.

  - Added the option for user to select the default time step option with error calculation. This option does not use adaptive time stepping, but does calculate error, and includes the estimated error plot variable to determine whether an adaptive time step solution is advisable.

  - Added a reactor coolant system (RCS) activity calculator to the SNAP model editor to permit the calculation of radionuclide concentration in the reactor coolant based on the ANS 18.1 Standard and the GALE-BWR and GALE-PWR computer codes. Pre-incident and co-incident iodine spiking is included in the model. The ability to consider dose equivalent I-131 and Xe-133 is also included.

  - Added the ability for the user to model alternative source term (AST) non-LOCA DBAs described in Regulatory Guide 1.183 (RG 1.183). Accident scenarios include the fuel handling accident and a rod ejection (PWR) or control rod drop (BWR) accident. The design basis accident models based on the TID-14844 and the alternate source term in RG 1.183 is retained. The ability to consider a gap release from either RG 1.25 or RG 1.183 is also available.

- **Code Fixes:**

  - Update the dose conversion factors (DCFs) to those provided in the Radiological Toolbox which are based on the DCFs compiled in FGR-11 and FGR-12. A total of 748 dose conversion factors is available.

  - Updated and added larger radionuclide database from ICRP-38 (838 available nuclides). Note that FGR11 and 12 DCFs are not available for all nuclides. A warning is provided in the SNAP model editor if the user selects a nuclide for which no DCF is available. Users can input DCF data as needed.

  - Plot variables were previously named based on the dose location number (e.g., dose1.body). They are now named based on the dose location name with spaces removed (e.g. ExclusionAreaBoundary.body).

  - Changes to the output files:

    - Previously the model description was printed to the output and NRC output file in the header to sections or at page divisions. Now the description is only printed at the start of the output file and the model 'title' is printed in the header to sections or at page divisions.

- Worst two hour dose is printed as a time range rather than a single time value.
- Worst two hour dose was removed from final doses since this information is already provided in the section just above final doses.