

RADTRAD Change Log: Version 5.1.0

Released April 2025

- A new model parameter was added to the input files to specify if the inputs should follow the regulatory guide revision 0 or revision 1 guidelines. The `-REV` command line option was also added to specify the model parameter. The default option when none is specified is REV1. To select a particular revision, include `-REV #` (note the space between REV and the #) where # is 0 or 1.
- The chemical groups specified in Regulatory Guide 1.183 Revision 1 were changed slightly when compared to revision 0. These changes include a new chemical group, Molybdenum, which includes the elements Mo, Tc, and Nb. These elements were removed from their previous groups. The element Zr was also moved to the Cerium group. These changes are only applied when the REV1 model parameter is set.
- When REV1 is turned on, the REA-CRDA accident types now include an option to turn on the calculation of additional fission gas release due to pellet fragmentation. This option requires input for the change in enthalpy in the fuel rod in units of cal/g and the burnup of the fuel in terms of MWd/MTU.
- The regulatory guide introduced a new implementation of the X/Q tables. The tables were no longer based on a problem time and the worst two-hour dose time should have the worst or highest X/Q value associated with that time. The revision one implementation of the X/Q tables now includes a duration that the X/Q value will be used and RADTRAD determines when the worst two-hour dose occurs to apply the values. This implementation can be turned on or off by setting the X/Q revision flag to REV0 or REV1 (this is different than the model parameter REV0 or REV1 flag). The X/Q revision flag is set to REV1 by default when the model parameter REV1 flag is specified.
- A new pathway was included in RADTRAD 5.1.0. This new pathway calculates the releases in a BWR MSL as described in Appendix A of Regulatory Guide 1.183 Revision 1. This pathway is only available when REV1 is specified in the model parameters.
- A new model for the FHA accident type was added to calculate the re-evolution of iodine from the spent fuel pool. This model is based off of Regulatory Guide 1.183 Revision 1 Appendix B. The accident type is only available when the model parameter REV1 is defined.
- Some unintended changes happened while fixing the worst two-hour dose specified in the change log below for 5.0.4. These changes caused some bugs when calculating the worst two-hour doses at certain simulation times. These bugs were fixed by basing the worst two-hour doses on the plot points rather than time steps and interpolation between two points was added when a specific time is set. The plot points are generated more frequently and therefore provide a more accurate calculation of the worst two-hour dose.