Release Notes for RELAP5-3D Version 4.1.3

Code Improvements from Version 4.0.3

The following is a brief description of improvements and new features in version 4.1.3. The associated material in the User Manuals is shown as an underline.

Crossflow connections with the cladding deformation model

The capability to model crossflow connections with the cladding deformation model was unavailable previously due to coding limitation.

Added 2005 Groeneveld CHF correlation

This CHF correlation can be activated using Card 1 Option 53.

See Vol. 2, Appendix A, Section 2.

Round-off error reduction

Added real*16 variables to the BPLU solver and subroutines EQFINL and PRESEJ to eliminate some observed round-off error. This option can cause significant code slowdown, and can be accessed with Card 1 Option 63.

See Vol. 2 Appendix A, Section 2.

Moving problems can be modeled

A new capability has been added to RELAP5-3D to allow it to simulate movement, such as could be encountered in ships, airplanes, space crafts, or a terrestrial reactor during an earthquake. This new capability allows the user to simulate motion through input, including rotation about the origin implied by the position of the reference volume and translational displacement. The transient rotation can be input using either Euler or pitch-yaw-roll angles. The movement is simulated using a combination of sine functions and tables of rotational angles and translational displacement.

See more information at: http://www.inl.gov/relap5/newsletters.htm under Moving Problems.

Some of the affected cards include Card 119, 120-129, 190, 191-193, 194-196, and 2090NXXX. Other affected cards can be found by searching for the keyword “moving” in Vol. 2 Appendix A.

Verification capability added

The new verification capability locates differences, even in the last bit of 8-byte reals, between two code runs. It can be used to verify consistent results between two code versions, or for a single code version running an input deck and its restart. The verification capability is accessed with the 199 Card.

See Vol. 2 Appendix A, Section 2.

Enhanced stripping capability

User can now use keyword “all” for word 2 of the 1001-1999 strip request data to request all of a certain variable from the plot file. (e.g., 1001 mflowj all).

See Vol. 2, Appendix A, Section 16.

CSV option for strip files

The strip file can now be saved in comma separated values (CSV) format via the 104 card.

See Vol. 2 Appendix A, Section 2.

Machine dependent plot files conform to preBeta (3.0.0) standard

The machine dependent plot file format is the same as versions previous to the FORTRAN 95 conversion.

The plot file size limit of 4 GB is removed

There is no longer a size limit on the plot file.

Corrected left-to-right evaluation order issue

Some issues were observed on multi-core platforms with if-statement clauses connected by an and-conjunction operator. Updates allow the code to run correctly on multi-core platforms.

Improved allocation and deallocation of many variables

Some variables were found to be allocated/deallocated incorrectly. Many of these issues were corrected.

Restart errors were corrected

Issues with restart problems were found in which the restart did not work correctly. These restart errors were corrected.

Corrections for ‘powerx’, ‘propint’, and ‘delay’ control variables

The ‘powerx’, ‘propint’, and ‘delay’ control variables were not functioning correctly. They were corrected in version 4.1.3.