Release Notes for RELAP5-3D Version 4.3.4
Advances since Version 4.2.1

The following is a brief description of improvements and new features in version 4.3.4. The associated material in the User Manuals is shown as an underline.

New RELAP5-3D Capabilities

Molecular diffusion model
A molecular diffusion model was previously implemented in the code, but it was not fully converted to Fortran 95. The associated coding was converted to Fortran 95 and the model is now available. This option is controlled with Card 117.

See Vol. 2, Appendix A, Section 2 and Vol. 1 Section 3.4.14.

Specification of heat structure lengths on input for reflood/2D conduction
The length of heats structures can now be specified via input as opposed to using the volume length. This capability was added using the new 1CCCG500 and 1CCCG600 cards. These cards allow the user to use a 7 word format for the 1CCCG501-599 and 1CCCG601-699 cards, where the heat structure length can be specified with Word 6.

See Vol. 2, Appendix A, Section 8.

Use of temperature-dependent conductance for conduction enclosures
The user can now specify a temperature-dependent conductance table for conduction enclosures. The table must be of type htc-temp for this capability.

See Vol. 2, Appendix A, Sections 9 and 11.

Nodal kinetics updates
- Energy-dependent albedos can be specified for external radial and axial boundaries.

See Vol. 2, Appendix A, Section 15.21.1.

- Composition-dependent neutron velocities can be specified to account for variations across compositions.

See Vol. 2, Appendix A, Section 15.22.1.

- Kinetics time step advancement can be controlled independent of the thermal-hydraulics.

See Vol. 2, Appendix A, Sections 3.3 and 3.4.

New Auxiliary Program Capabilities

Property file generator for use with other codes
Property files can be shared by different codes to reduce differences in running coupled calculations.

Ph-Interpolator auxiliary program
This program calculates state properties from pressure and specific enthalpy. It can run as a subroutine that can be called from RELAP5-3D. It is found in the polate directory at same level as the relap and run directories.

R5EXEC coupling program
This program was previously named PVMEXEC.

Improvements to RELAP5-3D

Verification testing results improved
Verification tests of the code coupling through R5EXEC were added for both base runs and restart. New tests were created to test additional code features. Error corrections were made to RELAP5-3D so that all code features tested by the new and old test suite cases now pass verification testing.

Restart file simplified
Previously restart files placed two consecutive dumps at the same cumulative time on the restart file during a restart. The first dump was the restart information and the second dump contained the same information modified by restart processing (such as adding or deleting components or tables). This has been eliminated.

Multi-deck input
The ability to run two separate input decks from a single input file was augmented to allow subsequent decks to restart previous decks in the same input file.

See Vol. 2, Appendix A, Section 1.7.

Code Corrections

MBINARY plots and strips
The format for both plot and strip files in MBINARY format have been synchronized.

Minor edit variables 'fricxk', 'fricxl', and 'hlossx'
Minor edit variables 'fricxk', 'fricxl', and 'hlossx' were found to give incorrect values when they were requested. These variables are corrected in this version and now give correct values.

Alternate Sodium properties made default
The alternate Sodium (Na) properties are made default in this version. The original property file is maintained as tpfna2.

Corrected issue with CHF for 2D conduction and some reflood problems
The CHF was found to be calculated incorrectly for 2D conduction problems and the non-reflood side of a heat structure when connected to a volume on both sides of the heat structure. The variable 'chf' was found to not reset correctly between time-steps. The variable was reset and this problem is now corrected.

Issue with Chen correlation at low velocities corrected
The Chen correlation was not transitioning correctly to pool boiling for low velocity flows. The suppression factor and heat transfer coefficient were modified to smoothly transition between fluid velocities of 0.06 and 0.01 m/s.

Other user problem corrections
Various additional user problems have been found and fixed in this version.