Release Notes for RELAP5-3D Version 2.4
Code Improvements from version 2.3

The following is a brief description of improvements and new features in version 2.4. Links to associated material in the User Manuals show as an underline.

Compressor Model

This new model was added to the code to enable modeling helium-cooled gas reactors. The model is described in Volume I, pg. 3-382, and the input is described on pg. A7-101 of Volume II, Appendix A.

Choking Models

The optional Henry-Fauske critical flow model has been modified so that results are time step size insensitive. In addition, users can now select either the Ransom-Trapp or Henry-Fauske critical flow models on a junction-by-junction basis by setting junction control flag "c". See, for example, Volume II, Appendix A. page A7-19.

Material Properties

The built-in heat structure material properties available in the code were made consistent with those in the MATPRO reference. The temperature ranges for the data were also extended to prevent code execution failures with out-of-range thermal property data. See Volume I, pg. 4-9.

Added and Improved Coolant Properties

New coolants added to the code are:

- Xenon (XE)
- Helium-Xenon (HENXEN)
- Molten salts LiF-BeF2 (MS1, 66% and 34%, also known as flibe), NaBF4-NaF (MS2, 92% and 8%), LiF-NaF-KF (MS3, 46.5%, 11.5%, and 42%, also known as flinak), and NaF-ZrF4 (MS4, 50% and 50%)

Properties were improved for helium (HEN), CO_2 (CO2), and water (H2O) near the critical point. See Volume II, Appendix A, pg. A2-20.

Heat Transfer Model Multipliers

Users can now apply multipliers to the heat transfer coefficients for transition boiling and film boiling as well as to the value of critical heat flux. See Volume II, Appendix A, pg. A8-18.

RELAP5-3D Code Corrections in Version 2.4

The following table describes significant corrections in version 2.4.

Model/Feature	Problem Description	Correction
Pump	The code did not check to ensure that the pump single-phase homologous curve independent variables were entered increasingly.	Added proper input checking to require the variables are entered increasingly. In the manuals, modified the words to more correctly indicate the variables must be entered increasingly.
Plot-Restart file	A restart-plot file was not being written to later in time on a long-running calculation.	Corrected an error in subroutine DTSTEP
Heat Structures	Code would fail without an error message if pitch to diameter ratio of 0.0 was input for the the 12-word format for the 1CCCG801 and 1CCCG901 cards.	Corrected a coding error so that the minimum value is set to 1.1, as stated in Appendix A.
Thermal Radiation	An error in the radiation model occurred when the heat structure temperature was below the minimum temperature for a radiation calculation. The code was using the last radiation heat flux computed in the conduction solution.	The radiation heat fluxes were set to zero for this case.