Selected User Problem Resolutions

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Highlights from the resolution of old user problem reports

UP 07025

This insufficiency was reported when a test problem failed on a material temperature out of range. The surface temperature changed over 600 K in one time step. The problem was caused by the user inputting a volumetric heat capacity and thermal conductivity of 0.0. This code issue was corrected by adding a test to verify that ρC_p and $k > 0$ and generate a failure if they are 0.0. Vol. 2 Appendix A was also updated to indicate that the user must enter a value greater than 0.0 for ρC_p and k.

UP 08016

This error was encountered on a re-node restart. 4x99 identical heat structures were added on restart (these were the lowest numbered heat structures in the renodalized deck). During the restart transient, HS 1014-045 – 1014-92 gave different results from the other identical heat structures. [The results were identical at 0.0 s, but not at 3.0 s during the transient]. Numbered sequentially, HS 1014-045-92 occupied the same positions as HS 8201-001-016 in the steady state run. The 8201 HS were the only ones using the radiation enclosure model in the deck. A work around was found by changing the added HS geometry numbers to values that were greater than any in the steady-state deck.

The issue was traced to variable 'jlr' which is set to 0 or 1 in r-level, then reset to the index locations in i-level. Added a new variable 'ordlr' to be set to the index location in i-level and used in the transient. This allowed for the reuse of the values set in variable 'jlr' to correctly set the indexes for HS-8201. With the index error corrected, the test decks were run and the 4 identical heat structures get identical results 3.0 s into the transient.

UP 08035

The code failed on input if an uncoupled heat structure (i.e. one that does not affect the hydraulics tries to reference another heat structure for its geometry information, presumably because the input geometry (-2) does not equal the geometry of the referenced heat structure (+2). The error is due to variable 'htopt' which uses bit packing. The 24th bit of variable 'htopt' stores the value of the input geometry (i.e. 1, 2, or 3). The 27th bit of variable 'htopt' is then set if a heat structure is decoupled from hydrodynamics. The code later tests if the value of variable 'htopt' is the same for both heat structures, but they were not because they were set differently. Logical variable 'ht_decpl' was added to be set to true if the heat structure is decoupled. The use of the 27th bit of 'htopt' was then replaced with a test on variable

'ht_decpl'. This caused the value of 'htopt' to be the same when they are tested, so the code views them as compatible geometry types and resolved the issue.

UP 10011

The capability restoration request was filed as a result of a change put in version 2.5.8 to subroutine RRESTF to require the title on the restart input deck to be the same as it is on the initial input deck; if the titles are not the same, an input error occurs. This was put in the code for PVM. This restriction causes trouble with code users, who often run a steady state initial input deck and then run many transient restart input decks from the end of the steady state. The users use the title card to indicate what a particular restart input deck does. This restriction does not allow the users to use the title card for this purpose. This was found in RELAP5-3D version 2.9.3; this affects some earlier and all later RELAP5-3D versions. The code was unmodified for PVM cases, but was changed for non-PVM cases to allow the title cards to be different (a warning message is printed however.