User Problem Status

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Problem 11018

- ***Symptom: The fluid donoring at the surge line outlet appears to be briefly in error from 75.25 to 75.65 s. The flow is out of the pressurizer through a time-dependent junction, the bottom volume is liquid-filled, but the junction density is taken from the surge line rather than from the bottom pressurizer volume; this causes the junction flow to not match the specified value. This coincides with a brief appearance of a thermal front in the bottom cell.***
- ***Root Cause: Pressurizer is directly connected to a time-dependent volume.***
- ***Resolution: Resolved. Found differences between the thermal front equations described in the manual, and what is used in the code. Corrected the equations to match what is in the manual (which was in the original completion report as well), the results improved somewhat. The model is working as coded. The odd behavior was eliminated by adding a small volume between the pressurizer and the time-dependent volume. The manuals were also updated to indicate that a pressurizer should not be directly connected to a time-dependent volume when using the thermal front model.***

Problem 11022

- ***Symptom: RELAP5-3D sets the wall heat transfer coefficient to the maximum of the values from forced, laminar, and free convection correlations in single-phase heat transfer. When the flow is upwards, the heat transfer coefficient is increased by free convection effects due to buoyancy. However, when the flow is downwards, the heat transfer coefficient can become less than the laminar value. Choosing the maximum value causes the code to predict results similar to those from the literature for upflow, but results in wrong trends for downflow.***
- ***Root Cause: Incorrect heat transfer coefficient may be used.***
- ***Status: Resolved. The capability for improved predictions of mixed convection effects was provided by allowing the user to input multipliers for the heat transfer coefficients from the forced, laminar, and free convection correlations. This allows the user to turn off or augment the heat transfer coefficient from any of the three correlations, which provides a more generalized capability.***

Problem 11030

- ***Symptom: A MHI engineer reported a problem related to the critical flow calculation with Henry-Fauske in a steam generator tube rupture calculation. The problem was traced to the volume orientation. The calculated break flow rate decreased by about 30% when the break junction was connected to face 1 compared to the case when the break junction was connected to face 2. This suggests that the momentum flux is not handled correctly in the Henry-Fauske model when the volume is oriented opposite to the flow direction. The code gave identical answers regardless of the volume orientation when the Ransom-Trapp critical flow model was used. This error appeared in the original implementation of the Henry-Fauske model in version 3.2.1.2.***
- ***Root Cause: Incorrect handling of the volume orientation.***
- ***Status: Resolved. Found that various variables in subroutine JCHOKE are calculated inconsistently when different volume/junction orientations are used. The various calculations were modified to be consistent irrespective of the orientation. The same results are now obtained for the different orientations.***

Problem 12002

- ***Symptom: The plot file capability does not work correctly when multiple cases are run within a single input deck. The referenced input deck runs four cases and generates four restart files using a separate 104 card for each case. However, the code generates only a single plot file based on the restart name in the execution script. Therefore, plots can be made for only a single case. Prior to the separation of the restart and plot files, plots could be made from each of the four restart files.***
- ***Root Cause: No error checking for heat structure temperatures exceeding the material composition data.***
- ***Status: Resolved. The coding was changed so that separate plot and restart files are now created for each 104 card case. After this change was made it was found that the 'none' option on the 104 card still created a plot file which was named 'plotfl'. Modified the coding to prevent the creation of a plot file when the 'none' option is input.***

Problem 12015

- ***Symptom: A second restart problem which begins after a steady-state problem and a first transient restart decreases to the minimum time-step and does not increase the time-step size.***
- ***Root Cause: 1st restart problem terminated 'successfully' due to a trip even the code reported a failed timestep.***
- ***Status: Resolved. Looked at the problem more closely and discovered that the 1st restart terminates due to a trip when variable 'succes' is equal to 5. This caused problems when the 2nd restart thought it needed to perform a backup before it took a step. A problem should not be able to terminate when variable 'succes' is equal to 5. Added an 'if test' to the section of subroutine DTSTEP that allows the problem to terminate by a trip to first check if 'succes' is not equal to 5. The update then tested successfully and the second restart problem runs with a reasonable time-step size.***

Next Code Version Release

- *Last Released IRUG Version was 2.4.3*
- *FORTRAN 95 Version 4.0.3 ready for release to IRUG Members*
- *Large Number of New Features and Capability Have Been Added in Addition to the FORTRAN 95 Programming Language Change*