


Monthly Highlights

for


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Application of RAMONA-3B to BWR ATWS*
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Application of RAMONA-3B to BWR ATWS

This project provides detailed, best-estimate, BWR ATWS analyses for the NRC Severe Accident Sequence Analysis (SASA) Program. In particular, several Browns Ferry Unit 1 MSIV closure ATWS analyses are being performed using the RAMONA-3B code with three-dimensional neutron kinetics. These calculations will not only improve understanding of the BWR behavior during an ATWS, but they can also be used for benchmarking similar calculations performed elsewhere by using the point kinetics codes such as RELAP5 and BWR-LACP.

The major activities performed during December 1984 are noted below.

1. MSIV Closure ATWS Calculation (L. Neymotin)

At the request of NRC, a modified Transient 1 (Sequence #439) calculation was performed with RAMONA-3B. The modification called for no manual depressurization of the reactor vessel; only the HPCI and RCIC flow was adjusted so that the water level remained at the top of active fuel (TAF). This calculation has been performed up to 500 seconds when a quasi-stable situation has been reached. The average pressure at this point was 75 bar (1066 psia) and the average reactor power was 25% of the rated power. This power is only 3% above the power calculated in the original Transient 1 calculation with a vessel pressure of 56 bar (796 psia) at 500 seconds. Therefore, the effect of vessel depressurization on reactor power is rather small at these high pressures (between 75 and 56 bar).

2. 1-D Collapsed Cross Sections (G. C. Slovik)

Progress has been made in generating an equivalent set of 1-D neutronic data from the Browns Ferry Cycle 5 3-D cross sections. Specifically, the updates necessary for the RAMONA-3B code have been incorporated, and the testing of the procedure is expected to begin soon.

3. Other Related Activities (G. C. Slovik)

At the request of INEL, the axial power distributions and the corresponding void profiles at several different times from a RAMONA-3B calculation of Transient 1 have been supplied. The point kinetics feedback coefficients for moderator, Doppler and void were also sent. These were calculated from the RAMONA-3B reactivity edits and sent to INEL for comparison with their previously used values.