

Monthly Highlights

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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 HRC 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.

The major activities performed during April 1985 are noted below.

1. Level and Pressure Control (L. Neymotin and G. C. Slovik)

The final Transient #1 (Sequence 439) calculations with level and pressure controls have been run to 1200 seconds using both 3-D and the recently developed 1-D neutronics core representations. Agreement between the two calculation results is very good. Therefore, from the cost effectiveness viewpoint, the 1-D model will be used more frequently in the future sensitivity studies of full-ATWS.

2. Manual Rod Insertion (G. C. Slovik)

Work has begun to study the effect of manual rod insertion following an MSIV closure ATWS. Specifically, this study will determine the number of control rods that must be inserted (and the elapsed time) for significant reduction of the reactor power. No such analysis has been carried out before, and RAMONA-3B with three-dimensional neutron kinetics is the perfect tool for this study.

To prepare the input deck to run the manual rod insertion transient, a control rod pattern and/or insertion methodology is needed. To accomplish this task, a BNL staff member (Gregory C. Slovik) went to ORNL to review the video tapes that were filmed at the TVA simulator while trained operators were trying to mitigate postulated ATWS events. The same control rod pattern and related timings for insertion, as used by the operators, will be modeled in RAMONA-3B to run the transient with manual rod insertion.

A RAMONA-3B input deck with 1/4-core symmetry has been completed. Once the deck is checked-out, the transient calculation will begin.