

Monthly Highlights

for



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Application of RAMONA-3B to BWR ATWS\*  
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P. Saha, Group Leader  
LWR Code Assessment and Application Group  
Department of Nuclear Energy  
Brookhaven National Laboratory  
Upton, New York 11973

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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 January 1985 are noted below.

### 1. MSIV Closure ATWS Calculation (L. Neymotin)

The Transient #1 (Sequence 439) calculation is being rerun with the Pressure Suppression Pool (PSP) heat capacity temperature limit taken from Reference 1. In the previous calculations the temperature limit was supplied by INEL as an imposed "Reactor Vessel Pressure vs. Time" relationship. Since the latter curve has the reactor power history built in, use of the actual Browns Ferry PSP temperature limit curve - Reactor Vessel Pressure vs. PSP Temperature - is required. In the new calculation the reactor vessel will be depressurized by following the PSP temperature limit curve, i.e., by taking into account the RAMONA-3B predictions of the PSP temperature.

A new feature has been added to the RAMONA-3B code to more accurately calculate the condensation on the ECC water. The old model was expanded to include condensation on the downflowing film of water on the upper plenum shroud. The film is composed of the water exiting the riser and steam separators and the incoming ECC water.

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

The work required to produce the 1-D cross section coefficients for TRAC-BF1/1D has been completed. RAMONA-3B was updated and tested by writing the appropriate files for the FRAM code and restarting for each of the perturbed cases needed. FRAM has also been implemented and tested for accuracy.

After several conversations with W. Weaver, the information required for INEL to process the 1-D cross sections was determined along with the perturbations INEL would need for their cross section generation (i.e., 10% variation in void; -25°C difference in moderator temperature; -150°C difference in fuel temperature). With this information, the appropriate RAMONA-3B calculations were performed, a set of cross sections was generated, and a 1-D RAMONA-3B calculation was performed to verify the cross section set. The information was then electronically transmitted to INEL on January 31, 1985, one week ahead of schedule.

Finally, 3-D and 1-D decks have been created to run identical transients with RAMONA-3B.

#### REFERENCES

1. Harrington, R. M., and Hodge, S. A., "ATWS at Browns Ferry Unit One - Accident Sequence Analysis," NUREG/CR-3470, ORNL/TM-8902, Preliminary Draft.