

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 October 1984 are noted below.

1. MSIV Closure ATWS Calculation (E. Cazzoli, L. Neymotin and G. Slovik)

Two different transient calculations have been completed using the newly generated cross sections set for the Browns Ferry, Unit 3 EOC-5 core fuel condition. Transient 1 (Sequence #439) was run to 1000 seconds. The prediction showed that after 350 seconds the reactor power dropped to about 17.5% of rated power and stayed at this level thereafter. By 1000 seconds, the PSP water temperature increased from 70°F to approximately 182°F. This calculation will be continued until the PSP temperature reaches the potential HPCI failure temperature of 190°F (87.8°C).

The second calculation (MSIV closure ATWS with the failure of recirculation pumps to trip) was rerun with the BF cross sections. The results showed that the capacity of the Safety and Relief Valves is sufficient to prevent the reactor vessel over-pressurization, and that core damage is imminent because the water level is dropping extremely fast due to the large amount of steam being produced in the core.

Work on the two remaining calculations, i.e., MSIV closure Anticipated Transient with Half Scram (ATWHS) and MSIV closure ATWS with failure of HPCI system (Transients 3 and 4) has begun. Some additional information is being gathered on the most probable control rods pattern for the ATWHS calculation as well as on the details of the Transient 4 scenario.

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