

INTERIM REPORT

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SUBTASK B: IRT and RETRAN Code Modification and Evaluation
SUBTASK C: Simulator Model Evaluation

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INTERIM REPORT

NRC Research and Technical
Assistance Report

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THERMAL REACTOR SAFETY CODE DEVELOPMENT

HIGHLIGHTS

FOR

May 30, 1980*

SUBTASK A: RAMONA Code Modification and Evaluation

SUBTASK B: IRT and RETRAN Code Modification and Evaluation

SUBTASK C: Simulator Model Evaluation

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* Work carried out under the auspices of the United States Nuclear Regulatory Commission.

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A. RAMONA-III Code Modification and Evaluation

A.1 Code Assessment

The introduction of compressibility terms proportional to the time rate of change of system pressure has been seen previously to have a large influence on the relative power spike in the turbine trip transients. A series of runs have been made which confirm that the major contribution is from the liquid terms in the downcomer.

A.2 Small Break Capability

Available references on small break loss of coolant accidents in BWRs were reviewed. A list of code requirements for calculating such transients was compiled. The existing capabilities of RAMONA-III are evaluated against this list and a list of required tests modifications and additions was developed.

A.3 Reactivity Edits

The problems involved in implementing reactivity edits into RAMONA-III have been studied. Reactivity edits have been previously implemented in the BNL codes BNL-TWIGL and MEKIN-B. These implementations have been looked at to learn the similarities and focus the differences encountered in RAMONA-III. The mathematical expressions for the adjoint fluxes, which are necessary for the reactivity calculations, have been formulated in terms of the RAMONA-III neutronic equations.

B. IRT and RETRAN Code Modification and Evaluation

B.1 IRT Code Modification

A preliminary version of the Mark II steam generator model coupled with the main IRT code is currently being tested. The initial results are in reasonable good agreement with the results produced by the Mark I version for a similar transient.

A model to simulate steam generator tube rupture is currently being added to the Mark II steam generator.

B.2 RETRAN Code

The MOD 2 version of the RETRAN code has been used to analyze the first of the natural circulations tests being planned for the Sequoyah plant. This test consists of a trip of the main coolant pumps from full flow conditions while maintaining the reactor power level as close as possible to 3% rated. The results of the analyses were transmitted to NRC staff at a presentation in Silver Spring.

C. Simulator Model Evaluation

During the month of May, work began on the software review of the Surry/EAI simulator. This effort is expected to continue through the next reporting period in preparation for the now scheduled Surry simulator runs in July. Efforts are moving forward with the VEPCO organization to secure an input RETRAN deck for the Surry reactor. At this time, we are awaiting a final resolution by their legal department.

The TVA/Singer review still remains open. TVA requires all information requests to come through the appropriate NRC project managers, and Singer is in the process of drafting a contract for BNL signature prior to releasing the Browns Ferry simulator models. At a meeting with the NRC staff, May 29 & 30, BNL requested NRC intervention in this area to expedite the Browns Ferry review.

BNL completed its review of the Applied Dynamics International AD-10 computer and has presented its recommendations to the staff. To this end, Dr. Wulff and Mr. Durston attended an ADI user's meeting during the month.

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