M. Cycock

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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JUN 20 1979

MEMORANDUM FOR: Charles Burger, Research Program Manager, Structural Engineering Research Branch, RSR

THRU: Walter R. Butler, Chief, Containment Systems Branch, DSS WB

FROM: John A. Zwolinski, Containment Systems Branch, DSS

SUBJECT: TASK ACTION PLAN A-1, REVIEW EG&G REPORT CAAP-TR-041, CODE ASSESSMENT AND APPLICATIONS PROGRAM, AN ANALYSIS TOOL FOR PREDICTING THE TRANSIENT HYDRODYNAMICS RESULTING FROM THE RAPID FILLING OF VOIDED PIPING SYSTEMS

Per your request, I have reviewed the subject report. The author reported that an analysis tool had been evaluated in terms of its applicability for predicting the transient hydrodynamics resulting from the rapid filling of voided piping systems. To evaluate the analysis tool, a test problem was constructed. The test problem consisted of a BWR core spray line containing numerous junctions, valves and a pipe reducer component. Results attained from the test problem were in the form of pressure versus time curves for the various components.

In general, the work reported appears technically accurate. However, numerous questions and observations remain. These are:

1) The boundary conditions and initial conditions used in the analysis were not demonstrated to be conservative. The statement in the text to the effect that since specific information was unavailable, regarding the flow control valve and check valve, arbitrary assumptions were made for pipe flow area reductions of 17% and 10%, respectively, requires justification.

2) The text is unclear regarding abrupt area changes and questions remain as to how this phenomenon was accurately modeled.

3) An interpretation of the results obtained from the test problem was not presented. For example, are the pressure transients found throughout the system within design limits for allowable stress?

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4) Instantaneous valve actuation initiated the test problem. It would have been interesting to review the results of a pump startup in order to compare both initiating conditions.

5) The author made few recommendations regarding the applicability of the work. The one major recommendation addressed the need for experimental verification of the analysis tool. This brings about questions regarding the actual merits and applicability of the tool until an experimental effort can be undertaken.

6) In general, criteria were not presented such that the reader could assess the importance of the pressure pulses found throughout the piping system.

Based upon the above, I recommend that additional sensitivity studies be conducted reflecting far more conservative initiating conditions, boundary conditions and general piping arrangements. As an alternative, we could explore the author's recommendations; i.e., provide experimental justification.

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