D890314

The Honorable Lando W. Zech, Jr. Chairman U.S. Nuclear Regulatory Commission Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: ADDITIONAL APPLICATIONS OF LEAK-BEFORE-BREAK TECHNOLOGY

During the 347th meeting of the Advisory Committee on Reactor Safeguards, March 9-11, 1989, we discussed the NRC staff's proposal on this subject embodied in a November 22, 1988 draft of SECY-88-325, "Policy Statement on Additional Applications of Leak-Before-Break Technology." This matter was also discussed by our Subcommittee on Thermal Hydraulic Phenomena during a meeting on March 7, 1989. During these meetings, we had the benefit of discussions with representatives of the NRC staff, several industry groups, and Brookhaven National Laboratory. We also had the benefit of the documents referenced.

The central concept of leak-before-break (LBB) involves acceptance of the argument that, in a given piping system, small leaks through cracks in pipe walls can be detected before the cracks have grown to a size where they can cause a sudden gross failure of the pipe. Further, the argument says that when the leak is detected, the damaged pipe will be taken out of service before the crack has had a chance to grow to a size that is on the threshold of unstable propagation. In 1987, the NRC revised General Design Criterion 4 (GDC 4) to permit the use of the LBB concept for certain purposes and under certain circumstances in both existing and new nuclear power plants. This revision made it possible for licensees to exclude the dynamic effects of hypothetical sudden pipe ruptures from consideration in the design of certain pipe support structures, if the piping systems in question met certain conditions.

In granting its approval for the GDC 4 revision, the Commission recognized that there is nothing inherent in the LBB concept that limits the application to the use specified and stated that, "There are possibly other areas which could benefit from expanding the leak-before-break concept and simplification of requirements such as environmental qualification and ECCS." In response, the staff solicited public comments on this subject through a notice in the Federal Register dated April 6, 1988. A range of opinions was cited in 23 comment letters. After considering these comments, the staff recommended that no rulemaking be undertaken to apply the LBB concept to either ECCS or environmental qualification. They pointed out that any safety benefits associated with the application of the LBB concept to ECCS can be more readily obtained under the recently revised ECCS rule. In addition, the broad scope revision to GDC 4 permitted the use of exemptions for applying LBB to environmental qualification.

In our discussions with the NRC staff, it became apparent that they believe the potential safety enhancements that might result from extending the LBB concept would not be great enough to justify the large expenditure of resources needed to develop bases for rulemaking. They seemed to feel that the industry's failure to use the exemption option in the existing rule indicated a lack of industry interest. The staff indicated that requests for exemptions, suitably documented and supported, might eventually provide the basis for a rule extending the LBB approach to environmental qualification.

In presentations to the ACRS, some representatives of the industry expressed their belief that there was a real potential for substantial safety and/or economic benefits in applying the LBB concept to both ECCS and environmental qualification. However, they were reluctant to expend their own resources on activities that they felt would not lead to changes in the rules.

We agree with the staff's conclusions to the extent that rulemaking at this time would be premature. However, we believe an avenue for consideration of further extension of the LBB concept should exist. As a result of our most recent discussions of this issue with the staff and with industry representatives, we believe that the staff is open to a serious consideration of industry proposals to extend the concept to situations for which technical justification can be provided. We recommend that the policy statement contain language which makes it clear that this is the case.

Sincerely,

Forrest J. Remick Chairman

References:

- 1. U.S. Nuclear Regulatory Commission, SECY-88-325: "Policy Statement on Additional Applications of Leak-Before-Break Technology" (Predecisional), received by ACRS on November 25, 1988.
- 2. Letter dated March 3, 1989 from Malcolm H. Philips, Jr., and William A. Horin, representing the Nuclear Utility Group on Equipment Qualification, to David A. Ward, ACRS, Subject: Application of Leak-Before-Break Technology to Environmental Qualification of Electric Equipment.