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July 21, 1988
RAC:041:88

Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, DC 20555
Attention: Docketing and Service Branch

Dear Sirs:

Subject: Solicitation of Public Comment on Leak Before Break Applications

Ref.: Federal Register, Vol. 53, No. 66, "10 CFR Part 50, Leak-Before-Break Technology: Solicitation of Public Comment on Additional Applications," pp. 11311-11312, April 6, 1988

In the referenced Federal Register notice, comments were invited to describe potential safety enhancements from the extension of Leak Before Break technology to environmental qualifications and emergency core cooling systems. The potential safety enhancements that could result from the extension of the technology are the same as the safety enhancements realizable from the proposed 10 CFR 50.46 rule change. These safety enhancements include the potential of mitigating the effect of the irradiation embrittlement of the pressure vessel, thus reducing the likelihood of pressurized thermal shock, and to increase component reliability by reducing the severity of the equipment duty requirements (e.g., diesel generator life).

The large break loss of coolant accident (LOCA) is a very unlikely design base event. For certain PWRs, the large break LOCA, when analyzed in accordance with the requirements of 10 CFR 50.46 and 10 CFR 50 Appendix K, determines the allowable peaking limits and sets related equipment performance requirements. Because of the model and assumptions requirements, the plant system and cycle designs necessary to comply with the criteria may exacerbate more probable events, or may dictate artificially stringent component performance requirements. If the Leak Before Break technology can support a reduced maximum allowable break size such that flow stagnation and reversal do not occur for the worst break, the currently approved models would predict a significant amount of energy removal early in the transient, and therefore would provide margin which could be used to address other safety issues. Increased peaking limits would provide the flexibility to develop very low radial leakage cycle designs which would reduce the fast fluence reaching the pressure vessel, and therefore mitigate the irradiation embrittlement of the vessel and vessel welds. Increased allowed peaking obtained from refinements of the current evaluation models has been used as part of vessel fluence reduction programs in some domestic PWRs. This fluence reduction could also benefit pressure vessel life extension.

Margin in the large break LOCA could also be used to reduce the severity of the equipment duty, thus increasing reliability. For example, because of Appendix K requirements used in a large break LOCA analysis, the diesel generators are required to cold start within a few seconds. The surveillance testing required to verify these short start times reduce the life of the generator. If the Leak Before Break technology provides margin for the worst break LOCA, the margin could be used to lengthen diesel generator start times. The increased start times would allow the surveillance tests to be conducted with less risk of damage to the diesel generator.

The large break LOCA is a very unlikely event, and the calculations with the current evaluation models are very conservative. This conservatism, and the resulting safety benefits of more realistic calculations, is being addressed in the proposed change to 10 CFR 50.46 which would allow the use of more realistic models and quantified uncertainties. However, the development of these more realistic models requires substantial resources. The use of the Leak Before Break technology to support a reduced maximum break size criterion may provide an alternative that allows the safety benefits from a more realistic LOCA analysis while using current evaluation models.

Sincerely yours,

R. A. Copeland
Manager, Reload Licensing

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cc: Mr. J. A. O'Brien (USNRC)