



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

August 9, 1983

Honorable Nunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Dr. Palladino:

SUBJECT: ACRS REPORT ON FLAW EVALUATION PROCEDURES FOR BWR PIPE CRACKS

We have followed with some concern the continuing discovery of the extent of stress corrosion cracking (SCC) in the large pipes that make up a significant part of the BWR primary system pressure boundary. While the stainless steel in these pipes is tough, and thus prone to leak-before-break, the residual stress pattern in the pipes tends to make the cracks grow around the pipe before they pass through. Thus the cracks may have worked their way both completely around and through much of the wall before a leak develops.

In their evaluation of the reliability of the cracked BWR piping for continued service, the licensees, the vendor, and the NRC Staff rely heavily on the "measurements" of crack depth obtained by conventional ultrasonic probe motion techniques. We believe that this is a delusion, since we can find no consistent experimental evidence or body of expert opinion indicating that the measured crack depths bear any direct relationship to the actual crack depths. We are concerned with the use of a procedure that takes the ultrasonic testing (UT) depth measurement as fact, combines it with the flaw evaluation procedure of Paragraph IWB 3640*, Section XI of the ASME Boiler and Pressure Vessel Code, and asserts that adequate margins exist in the piping for safe operation under normal and faulted conditions. While this assertion may be correct, in our opinion it can be taken only on the basis of faith, since we know of no way to demonstrate its validity with the UT techniques being used in the inspections.

We believe that a position consistent with traditional Commission conservatism in matters of primary pressure boundary integrity would be to assume that any UT detectable crack extends through the entire wall thickness. With this assumption, justification for continued operation would have to be based on calculations of strength of the remaining cross-section, the toughness of stainless steel, and the probability of leak-before-break. The present approach, in effect, may accept a much higher probability of a LOCA than has been considered acceptable.

* Although not in the current version of the ASME Boiler and Pressure Vessel Code, this paragraph has been approved by the ASME Main Committee and will be published in the Winter 1983 Addenda.

August 9, 1983

Of course, if the industry could find a technique with a demonstrated ability to measure the depth of SCC in stainless steel pipes, they should then, and only then, be allowed to take credit for the strength of the remaining wall thickness.

We believe that the Commission should not allow Paragraph IWB 3640 to be used for evaluation of cracked BWR piping until the concerns expressed in this letter are resolved.

Sincerely,



J. J. Ray
Chairman