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

September 9, 1980

Mr. William J. Dircks, Acting
Executive Director for Operations
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Dircks:

SUBJECT: CLADDING SWELLING AND RUPTURE MODELS FOR LOCA ANALYSIS - NUREG-0630

During its 245th meeting the Advisory Committee on Reactor Safeguards discussed the final version of the NRC Staff report: "Cladding Swelling and Rupture Models for LOCA Analysis" - NUREG-0630. The Committee initially discussed this item with the NRC Staff at its 235th meeting during November 1979. A draft version of NUREG-0630 was discussed at a combined meeting of the ECCS and Reactor Fuel Subcommittees on February 14, 1980. A final version was discussed at a Subcommittee meeting on Reactor Fuel on September 3, 1980.

Based on research done in the U.S. and overseas, the Staff believes that some of the current vendor evaluation techniques fail to assure that for the fuel cladding in a LOCA "the degree of swelling and incidence of rupture are not underestimated" as required in Appendix K of 10 CFR 50.46. The procedures proposed in NUREG-0630 introduce additional conservatisms by prescribing new curves for clad strain and flow blockage. It is not at all clear that the approach presently used leads to a lack of conservatism in estimating cladding strain that would occur during a LOCA.

At low reflood rates, Appendix K prohibits consideration of the cooling due to water droplets in the steam, when indeed they contribute significantly to the cooling provided. Also, the Staff believes Appendix K requires that clad ballooning must be prescribed so as to provide a negative effect on cooling, when in fact there is clear evidence that it increases cooling in most of the situations of concern. This approach both constrains the application of research results by the Staff and thrusts a strong component of artificiality into the entire proceedings.

In light of the above considerations, the ACRS recommends that implementation of the NUREG-0630 models and other significant changes in the evaluation models be held in abeyance until a thorough revision of the Appendix K requirements can be undertaken by the NRC Staff. This revision should take into account research results so that both the nonconservative and overly conservative aspects of the evaluation model can be properly evaluated.

Sincerely,

Milton S. Plesset

Milton S. Plesset
Chairman

References

1. U.S. Nuclear Regulatory Commission, "Cladding Swelling and Rupture Models for LOCA Analysis," USNRC Report NUREG-0630, April 1980

2. U.S. Nuclear Regulatory Commission, "Cladding Swelling and Rupture Models for LOCA Analysis," USNRC Draft Report NUREG-0630, November 1979

3. Memorandum for NRC Public Document Room from D.A. Powers, NRC, Subject: Formal Comments on Draft NUREG-0630, dated March 14, 1980

4. Memorandum from R.J. Budnitz, Director, Office of Nuclear Regulatory Research, NRC, to H.R. Denton, Director, Office of Nuclear Reactor Regulation, NRC, dated June 6, 1980, Subject: Comments on Draft NUREG-0630, "Cladding Swelling and Rupture Models for LOCA Analysis," D.A. Powers and R.O. Meyer, March 24, 1980