D920514

Mr. James M. Taylor
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Taylor:

SUBJECT: ADVANCE NOTICE OF PROPOSED RULEMAKING ON SEVERE ACCIDENT PLANT PERFORMANCE CRITERIA FOR FUTURE LWRS

During the 385th meeting of the Advisory Committee on Reactor Safeguards, May 6-9, 1992, we reviewed an Advance Notice of Proposed Rulemaking (ANPR) on Severe Accident Plant Performance Criteria for Future LWRs. The ANPR was prepared by the staff to solicit early feedback on its proposals to incorporate additional plant and containment performance criteria into 10 CFR Part 50. This is part of the second phase of a program to separate regulatory requirements for plant design from those for siting. The ACRS commented on earlier parts of this program in reports to Chairman Selin of January 15, 1992, "Proposed 10 CFR Part 50 and Part 100 (Nonseismic) Rule Changes and Proposed Update of Source Term," and February 14, 1992, "Proposed Revisions to 10 CFR Parts 50 and 100 and Proposed Regulatory Guides Relating to Seismic Siting and Earthquake Engineering Criteria." The ACRS report of May 17, 1991, "Proposed Criteria To Accommodate Severe Accidents in Containment Design," also provided Committee views on this subject. During this meeting, we had the benefit of discussions with representatives of the NRC staff and of the documents referenced.

Containments in existing plants were designed without explicit consideration of the effects of severe accidents. Surrogate design criteria were used instead. Over the past decade, experience, analysis, and research into the nature of severe accidents have provided information which can be used to develop a better design basis. An approach to doing this was recommended in the ACRS report of May 17, 1991.

The staff is now proposing that rulemaking be undertaken to specify severe accident criteria for containment design through revisions to 10 CFR Part 50. This would apply to the "passive" generation of LWR plants and future LWRs. The rule change is probably too late to apply directly to evolutionary designs. We were told that efforts will be made to achieve consistency. Because of the complexity and significance of the issues, the staff proposes an ANPR to provide the public and industry with an early indication of the scope of issues and the alternatives being considered, and to solicit feedback. Both technical and administrative issues are of concern. The proposed rule would call for direct consideration of several phenomena associated with severe accidents:

Hydrogen generation, combustion, and detonation
Fuel-coolant interaction
Core-concrete and structural interaction

High pressure melt ejection
Overpressure and overtemperature caused by decay heat
and chemical energy
Containment bypass

This ANPR will offer three alternatives for comment. Alternative 1 is a "prescriptive - hardware oriented" approach. Alternative 2 is "nonprescriptive - phenomena oriented." Alternative 3 is the "General Design Criteria (GDC)" approach recommended by the ACRS in its May 17, 1991 report. Each of the three alternatives addresses the issues we believe to be important if properly implemented.

The Committee position on this overall issue remains essentially as described in earlier ACRS reports. We favor Alternative 3. We emphasize that our proposal, if adopted, would require a major development effort by the staff, as would either of the other alternatives.

This ANPR is an appropriate means for initiating this needed program, and its scope appears to be adequate. It is important to obtain input from the industry, the public, and the reactor safety community. Ultimately, however, the Commission will have to make important and difficult judgments in deciding what it is going to require for future containments.

We were told that NRC procedures require that the regulatory analysis of the rule change ultimately to be proposed will include a cost-benefit evaluation. We suggest that such an analysis should have little influence on any decision about the rule. First, the severe accident and containment issues involved are very complex and difficult to analyze so that any benefit attributed to lowered risk will be very highly conjectural. Second, the essential purpose of containment is to provide physical defense-in-depth as a hedge against important uncertainties. This is an arbitrary, judgment-based requirement, and cannot be fully quantified.

In our discussions, we were told that one of the concerns held by the staff about Alternative 3 is that it proposes that new containment design criteria should be made a part of the GDC in Appendix A of 10 CFR Part 50. The concern is that existing GDC include stringent requirements related to traditional "safety grade" service. These include requirements for redundancy, quality assurance, seismic resistance, and equipment qualification. All of such requirements would not necessarily be appropriate for severe accident mitigation features in containment systems. We agree, but suggest that more than one class of reliability requirements could be specified for containment systems, as a part of new GDC. The important point is that containments should be explicitly designed for the mitigation of severe accidents.

We look forward to further interaction with the staff as this program progresses.

Sincerely,

David A. Ward
Chairman

References:

1. Memorandum dated April 3, 1992 from Warren Minners, NRC Office of Nuclear Regulatory Research, for Raymond F. Fraley, ACRS, Subject: ACRS Review of Advance Notice of Proposed Rulemaking (ANPR) on Severe Accident Performance Criteria for Future LWRs enclosing draft SECY paper dated April 3, 1992 (Predecisional)
2. SECY-92-070 dated February 28, 1992 for the Commissioners from James M. Taylor, NRC Executive Director for Operations, Subject: Staff Comparison of ACRS-Proposed Criteria to Accommodate Severe Accidents in Advanced Light Water Reactor Containment Designs with Related Criteria Proposed by Industry (M910607A)
3. ACRS report dated May 17, 1991, to NRC Chairman Carr, Subject: Proposed Criteria to Accommodate Severe Accidents In Containment Design.