

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

September 16, 1992

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

Dear Mr. Taylor:

# SUBJECT: DRAFT COMMISSION PAPER, "DESIGN CERTIFICATION AND LICENSING POLICY ISSUES PERTAINING TO PASSIVE AND EVOLUTIONARY ADVANCED LIGHT WATER REACTOR DESIGNS"

During the 389th meeting of the Advisory Committee on Reactor Safeguards, September 10-12, 1992, we reviewed the NRC staff's positions and recommendations concerning the certification issues for evolutionary and passive light water reactor designs contained in the draft Commission paper, which was forwarded to the Commission on June 25, 1992. Our Subcommittee on Improved Light Water Reactors met on September 9, 1992, to review this subject. During these meetings we had the benefit of discussions with representatives of the NRC staff and EPRI. We also had the benefit of the document referenced. We previously provided comments to you on other policy issues related to design certification in our letters of May 13, 1992 and August 17, 1992.

Our comments and recommendations on the proposed policy issues contained in the drai. Commission paper are given below. Issues A, B, C, D, E, and C apply to evolutionary and passive plant designs and Issues F and H apply only to passive plant designs. The issue titles and letter designations correspond to those of the draft Commission paper.

#### A. Defense Against Common-Mode Failures in Digital Instrumentation and Control (I&C) Systems

It is our view that the thrust of the staff recommendations concerning defense against common-mode failures in digital I&C systems as underlined in Issue A of the draft Commission paper is appropriate. We agree with the staff that the applicant should be required to assess the defense in depth and diversity of the proposed designs for the events postulated in the Safety Aralysis Report, and demonstrate an acceptable plant response for each. The staff proposes that the instruments, controls, and equipment required to demonstrate an acceptable response be independent of any common-mode failure mechanisms associated with the event. We view this requirement to be essential, but remain open as to the

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best approach. The staff proposes an independent set of safetygrade displays and controls in the main control room. We believe that other arrangements might be shown to be acceptable.

In a separate letter to Chairman Selin dated September 16, 1992, we have provided additional comments and advice regarding the general approach being taken by the staff in its review of digital instrumentation. Tontrol systems.

#### B. Analyses of E. jal Everts Beyond the Design Basis

To assist in the closure of severe accident issues, the staff recommends that (1) analyses submitted in accordance with the requirements of 10 CFR 52.47 (concerning the contents of applications for standard design certification) include an assessment of internal and external events and (2) during the design certification review, the staff should evaluate those external events that are not site dependent (e.g., fires, internal floods) and certain bounding analyces. We agree with this staff recommendation

# C. Elimination of the Operating Basis Earthquake from Seismic Design

The staff is still reviewing this issue and has expressed only an interim position. We believe the staff is taking an appropriate approach in its interim position.

# D. Multiple Steam Generator Tube Ruptures (MSGTRs)

The staff is recommending that the applicant for design certification perform additional analyses to datermine the AP600 response to multiple breaks of up to 5 steam generator tubes. We agree with the staff's recommendation, but believe the staff should have a better technical basis for estimating the frequency of occurrence of such multi-tube breaks.

The staff is also recommending that the applicant for design certification of a passive or evolutionary PWR assess design features necessary to mitigate the amount of containment bypass leakage that could result from MSGTRs. We agree with the staff's recommendation.

# E. <u>Probabilistic Rick Assessment (PRA) Beyond Design Certifica-</u> tion

The staff is recommending that, throughout the duration of the combined or operating license, the PRA be revised to address significant plant modifications, operating experience, and other developments that may affect previous PRA insights.

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We ore convinced that it is worthwhile for a plant operator to have an up-to-date PRA and are, therefore, reluctant to recommend against this position. However, if this is to be required, the staff should more clearly \_pecify how it intends to use the updated PRA and what is meant by keeping it current. We think such quidance is part of the overall issue of appropriate use of PKAs in regulation and would be helpful to licensees and to the staff.

#### Role of the Operator in a Passive Plant Control Poom F . .

We agree with the first part of the staff's position "that sufficient man-in-the-loop testing and evaluation be performed ... to demonstrate that functions and tasks are integrated properly into the man/machine interface design" of passive ALWR control rooms.

The second part of the staff's underlined position states "that a fully functional integrated control room prototype is necessary for passive plant control room designs to demonstrate that functions and tasks are integrated properly into the man/machine interface design." We pointed out to the staff that the non-underlined last sentence of this paragraph is inconsistent with this language in that it would permit an applicant to "demonstrate that a control room prototype of reduced scope is sufficient." We also pointed out that the non-underlined paragraph preceding the underlined paragraph states that such a prototype "would likely" be required (not would be required) to demonstrate that functions and tasks are integrated properly into the man/machine interface design. We believe that the staff should clarify its intent by reconciling these various statements.

The staff believes that operators of passive plants will be confronted with a new operating philosophy. The staff argues that "the operators of passive plants must understand the operation of 'investment protection' systems and their interfaces with the safety-related passive systems" and that they will be confronted with "new functions and tasks unlike those required for evolutionary plants" (or current plants) "due to the new approach in operational philosophy" and "the increase in automation, and the greater use of advanced technology in the passive plant designs." As a result of our discussions with the staff and EPRI, we believe that the staff may be overreacting to the "newness" of these issues. It appears to us that additional discussion of this issue among the staff and EPRI and the vendors is needed.

#### G. Control Room Annunciator (Alarm) Reliability

We agree with the staff's position that the alarm system for ALWRs should meet the requirements of the EPRI Utility Requirements Document.

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#### H. Regulatory Treatment of Nonsafety Systems

We were told that the staff is still engaged in significant ongoing discussions and review of this issue and that the associated position and recommendations are subject to modification. We believe the issue is substantial and has broad implications with respect to such items as use of PAAs in regulation, safety goal implementation, and reduction of regulatory burdens, and we expect to have additional future interactions with the staff and the industry. Consequently, we are not prepared to express a position on this issue at this time.

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Sincerely,

David A. Ward Chairman

Reference:

. Draft Commission Paper dated June 25, 1992, from James M. Taylor, Executive Director for Operations, NRC, for the Commissioners, Subject: Review of the Draft Commission Paper, "Design Certification and Licensing Policy Issues Pertaining to Passive and Evolutionary Advanced Light Water Reactor Designs"