

No. 93-56  
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FOR IMMEDIATE RELEASE  
(Friday, April 30, 1993)

NOTE TO EDITORS:

The Nuclear Regulatory Commission has received from its independent Advisory Committee on Reactor Safeguards (ACRS) the attached letter-type report that provides comments on a NRC staff position on policy, technical and licensing issues pertaining to evolutionary and advanced light-water reactor designs.

In addition, the ACRS has sent to the NRC's Executive Director for Operations two letter reports that concern proposed implementation guidance for the NRC's maintenance rule and proposed final versions of Regulatory Guides for implementing the NRC's revised Part 20, "Standards for Protection Against Radiation."

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Attachments:  
As stated

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April 26, 1993

The Honorable Ivan Selin, Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Selin:

SUBJECT: SECY-93-087, "POLICY, TECHNICAL, AND LICENSING ISSUES  
PERTAINING TO EVOLUTIONARY AND ADVANCED LIGHT-WATER  
REACTOR (ALWR) DESIGNS"

During the 396th meeting of the Advisory Committee on Reactor Safeguards, April 15-17, 1993, we discussed the NRC staff positions, delineated in SECY-93-087, on policy, technical, and licensing issues pertaining to evolutionary and advanced light-water reactor designs. During this meeting, we had the benefit of discussions with representatives of the NRC staff and of the documents referenced. We have discussed these issues during

several of our previous meetings and provided comments and recommendations in the reports referenced.

We are in general agreement with the staff's positions in SECY-93-087; however, we have concerns regarding some issues and offer our comments and recommendations as follows. (The section titles and letter designations correspond to those in SECY-93-087.)

I. SECY-90-016 ISSUES

E. Fire Protection

In our April 26, 1990 report, we pointed out that redundant train separation is likely to be the most significant feature leading to reduced fire risk. We recommended that the proposed fire protection enhancements include separation of environmental control systems (i.e., separate heating, ventilating, and air conditioning (HVAC) systems for each train). The staff responded by conceding that separate HVAC arrangements may be needed, although other options may be available to the designer. The Commission endorsed the staff's response.

We remain concerned that a common normal ventilation system (such as that proposed for the ABWR) will be difficult to design to prevent the effluent from a postulated accident in one train of engineered safety features from reaching essential mitigating equipment in the other trains and creating conditions that exceed their environmental qualifications. Of particular concern is the capability of ventilation dampers to isolate the effects of high energy pipe ruptures in confined compartments served by the common HVAC system.

G. Hydrogen Control

The staff claims that it has sufficient basis for understanding hydrogen behavior to go forward with licensing criteria. It has not been demonstrated to us that this basis is as extensive, or applicable, as the staff believes. Further, the AP600 and ABB-CE System 80+ designs have containments that are more susceptible to significant damage from hydrogen detonation than most existing and evolutionary plants. This requires that the licensing criteria for this issue be reconsidered.

H. Core Debris Coolability

The staff has weakened the position taken in SECY-90-016 by not requiring that the core debris be adequately quenched. We believe that the present criterion for coolability, namely a cavity floor area greater than

0.02m<sup>2</sup>/MWt, is not soundly based. We recommend that the staff validate containment response to core-on-the-floor accident sequences by independent analyses using, for example, MELCOR, or CORCON and CONTAIN.

J. Containment Performance

We agree with the requirement that containment stresses not exceed ASME Code Service Level C for metal containments, but it is not clear how electrical penetrations through the containment should be considered. Such penetrations utilize nonmetallic electrical insulation as a portion of the containment boundary and need further consideration.

L. Equipment Survivability

We agree that passive plant design features provided only for severe accident mitigation need not be subject to the environmental qualification requirements of 10 CFR 50.45. We believe, however, that such mitigation features must be designed to provide reasonable assurance that they will operate in the severe accident environment for which they are intended and over the timespan for which they are needed.

## II. OTHER EVOLUTIONARY AND PASSIVE DESIGN ISSUES

### Q. Defense Against Common-Mode Failure in Digital Instrumentation and Control Systems

The staff's second recommendation is that the vendor or applicant analyze each postulated common-mode failure for each event that is evaluated in the accident analysis section of the safety analysis report (SAR). We recommend that the scope of this assessment include consideration of common-mode failures during all events postulated in the SAR (e.g., fire, flood, pipe rupture, and extensive loss of essential power sources) and not be restricted to those events discussed in Chapter 15, "Accident Analysis."

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

The staff's basic recommendation is that the Commission approve the position that the alarm system for ALWRs meet the applicable EPRI requirements for redundancy, independence, and separation. These requirements do not include the use of Class 1E equipment and circuits. The staff also seeks approval of an additional position that goes beyond the EPRI requirements. This position is that "alarms that are provided for manually controlled actions for which no automatic control is provided and that are required for the safety systems to accomplish their safety functions, shall meet the applicable requirements for Class 1E equipment and circuits." We believe that the staff needs to provide clarification and additional justification for this position.

Collectively, our identified issues represent a significant array of incompletely addressed concerns. We urge that they be addressed on a timely basis to ensure their early consideration by the design teams.

Sincerely,

Paul Shewmon, Chairman  
Advisory Committee on Reactor  
Safeguards

### References:

1. SECY-93-087, dated April 2, 1993, for the Commissioners, from James M. Taylor, Executive Director for Operations, NRC, Subject: Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactors (ALWR) Designs

2. Report from Paul Shewmon, ACRS Chairman, to Ivan Selin, NRC Chairman, Subject: Computers in Nuclear Power Plant Operations, March 18, 1993
3. Report from David A. Ward, ACRS Chairman, to James M. Taylor, Executive Director for Operations, NRC, Subject: Draft Commission Paper, "Design Certification and Licensing Policy Issues Pertaining to Passive and Evolutionary Advanced Light Water Reactor Designs," September 16, 1992
4. Report from David A. Ward, ACRS Chairman, to Ivan Selin, NRC Chairman, Subject: Digital Instrumentation and Control System Reliability, September 16, 1992
5. Report from David A. Ward, ACRS Chairman, to James M. Taylor, Executive Director for Operations, NRC, Subject: Issues Pertaining to Evolutionary and Passive Light Water Reactors and Their Relationship to Current Regulatory Requirements, August 17, 1992
6. Report from David A. Ward, ACRS Chairman, to James M. Taylor, Executive Director for Operations, NRC, Subject: Issues Pertaining to Evolutionary and Passive Light Water Reactors and Their Relationship to Current Regulatory Requirements, May 13, 1992
7. Report from Carlyle Michelson, ACRS Chairman, to Kenneth M. Carr, NRC Chairman, Subject: Evolutionary Light Water Reactors Certification Issues and Their Relationship to Current Regulatory Requirements, April 26, 1990

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April 26, 1993

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

Dear Mr. Taylor:

SUBJECT: IMPLEMENTATION GUIDANCE FOR THE MAINTENANCE RULE

During the 396th meeting of the Advisory Committee on Reactor Safeguards, April 15-17, 1993, we discussed with the NRC staff the status of its proposed implementation guidance for the Maintenance Rule, 10 CFR 50.65. We also heard from representatives of NUMARC on this matter and had the benefit of the documents referenced.

The staff's present plan is that this implementation guidance will be in the form of the Regulatory Guide entitled "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" that endorses the NUMARC 93-01 document as an acceptable means of complying with the provisions of the Maintenance Rule. Both of these documents have been issued for public comment and the comments received have been analyzed by the staff. In addition,

NUMARC conducted a validation and verification effort to test the guidance in the NUMARC 93-01 document by having a number of licensees apply it to their plants. The staff participated in this effort. We commend both the staff and NUMARC for their efforts in producing what appears to be a well-considered approach to implementation of the performance-based Maintenance Rule.

The process is now at a point where the staff and NUMARC are finalizing their respective documents with the expectation that they will be issued in final form by June 30, 1993. Contrary to what is stated in the draft of the regulatory guide, we do expect to review these documents when they are completed.

At this time, we have the following comments to offer:

- On many occasions, we have provided comments on the trigger-value approach proposed by the staff to resolve Generic Issue B-56, "Diesel Generator Reliability." The proposed regulatory guide for implementing the Maintenance Rule explicitly endorses the trigger value procedure for "monitoring emergency diesel generator (EDG) performance against EDG target reliability levels." It is categorically impossible to demonstrate the reliability of EDGs using this method. We remain strongly opposed to its use for this purpose and continue to recommend that the Station Blackout Rule, 10 CFR 50.63, be revised to deal with this issue. When this is done, the regulatory guide should be appropriately revised.
- We agree with the staff's approach in resolving our concerns regarding maintenance in power plant switchyards. We recommend, however, that appropriate plant management exercise control of all such switchyard activities to prevent the kind of unanticipated events that have occurred in the past.

Sincerely,

Paul Shewmon, Chairman  
Advisory Committee on Reactor  
Safeguards

References:

1. Draft Regulatory Guide DG-1020, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," November 1992
2. Draft of Final Regulatory Guide (formerly DG-1020), Regulatory Analysis and Backfit Analysis for 10 CFR 50.65, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (hand dated April 13, 1993)
3. Draft NUMARC 93-01, Revision 3, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," March 24, 1993

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April 23, 1993

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

Dear Mr. Taylor:

SUBJECT: PROPOSED FINAL VERSIONS OF REGULATORY GUIDES FOR  
IMPLEMENTING REVISED 10 CFR PART 20, "STANDARDS FOR  
PROTECTION AGAINST RADIATION"

During the 396th meeting of the Advisory Committee on Reactor Safeguards, April 15-17, 1993, we discussed the proposed final versions of the three referenced regulatory guides that provide guidance for implementing some of the requirements of the revised 10 CFR Part 20. Our Subcommittee on Occupational and Environmental Protection Systems and a Working Group of the Advisory Committee on Nuclear Waste also discussed these guides with representatives of the Office of Nuclear Regulatory Research (RES) during a joint meeting on March 26, 1993. ACRS and ACNW had provided comments on the earlier versions of these guides in letters dated October 17, and October 23, 1991.

We believe that these guides provide an effective implementation strategy and should prove very useful to the licensees and regulatory authorities. These guides reflect careful consideration by the RES staff of both our earlier comments and the public comments. We concur in the regulatory positions of these guides and recommend that they be issued expeditiously.

Sincerely,

Paul Shewmon, Chairman  
Advisory Committee on Reactor  
Safeguards

References:

1. Regulatory Guide 8.N.10, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants," August 1992
2. Regulatory Guide 8.9, Revision 1, "Acceptable Concepts, Models, Equations and Assumptions for a Bioassay Program," March 1993
3. Regulatory Guide 8.37, "ALARA Radiation Programs for Effluents From Materials Facilities," March 1993
4. 10 CFR 20, "Standards for Protection Against Radiation," revised on May 21, 1991