

November 6, 2002

The Honorable Richard A. Meserve
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Chairman Meserve:

SUBJECT: SUMMARY REPORT - 496th MEETING OF THE ADVISORY
COMMITTEE ON REACTOR SAFEGUARDS, OCTOBER 10-12,
2002, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 496th meeting, October 10-12, 2002, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports:

REPORTS

The following reports were issued to Richard A. Meserve, Chairman, NRC, from George E. Apostolakis, Chairman, ACRS:

- Confirmatory Research Program on High-Burnup Fuel, dated October 17, 2002
- Draft Report "Guidance for Performance-Based Regulation," dated October 17, 2002

HIGHLIGHTS OF KEY ISSUES

1. Confirmatory Research Program on High-Burnup Fuel

The Committee heard presentations by and held discussions with representatives of the NRC staff regarding the NRC's confirmatory research program on high-burnup fuel, including research on creep of high-burnup fuel cladding. The Committee also heard a presentation by representatives of the Electric Power Research Institute (EPRI) regarding their topical report on reactivity insertion accidents.

The NRC Office of Nuclear Regulatory Research (RES) has undertaken a research program to confirm that the current limit on fuel burnup (62 Gwd/t) is adequate. A research program of experimental and analytic research involving the collaboration of NRC, EPRI, and numerous foreign partners has been organized. That program

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addresses high-burnup fuel behavior under conditions of design-basis loss-of-coolant accidents (LOCAs) and boiling water reactor (BWR) anticipated transients without scram (ATWS), as well as reactivity insertion events in pressurized water reactors (PWRs). RES has also completed phenomena identification and ranking table studies for high-burnup fuel under a variety of conditions. RES currently supports a single criterion for fuel failure, whereas EPRI has proposed the continued use of two separate criteria.

Committee Action

The Committee issued a report to NRC Chairman Meserve on this matter dated October 17, 2002, concluding that RES has a well-organized and leveraged program of confirmatory research on the behavior of high-burnup fuel. However, the Committee remains concerned that the time-temperature conditions used in the study of high-burnup fuel during design-basis LOCAs may not reveal phenomena unique to high-burnup fuel.

2. Overview of European Simplified Boiling Water Reactor (ESBWR), SWR 1000 (Boiling Water Reactor), Advanced CANDU Reactor (ACR 700) Pre-Application Review

The Committee heard presentations by and held discussions with representatives of the NRC staff and industry concerning the NRC staff's schedule for the review of new reactors and the design features of the ESBWR (GE Nuclear Energy), SWR 1000 (Framatome ANP), and ACR 700 (AECL Technologies). These designs are evolutionary water reactor designs with near-term deployment expectations. The ESBWR and SWR 1000 are large boiling water reactor designs. The ACR 700 is a light-water cooled evolution of the CANDU 6 reactor design, utilizing slightly enriched uranium fuel.

Committee Action

This briefing was for the Committee's information. No Committee action was taken at this time.

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3. Catawba and McGuire License Renewal Application

The Committee received a briefing by the Chairman of the ACRS Subcommittee on License Renewal on the staff's Safety Evaluation Report (SER), with open items, regarding the Duke Energy Company (Duke) license renewal application (LRA) for the Catawba and McGuire Nuclear Stations. The Committee found the staff's SER to be well written, thorough, and complete. However, the Committee was concerned that (i) open items existed that were very similar to items that had been resolved for previous LRAs (e.g., scoping of fire protection); and (ii) the staff did not have a program to verify implementation of licensee commitments prior to entering the license renewal period.

Committee Action

The Committee decided not to write an interim letter at this time. The Committee plans to review the final SER in February 2003 and provide a report to the Commission.

4. Policy Issues Related to Advanced Reactor Licensing

The Committee heard presentations by and held discussions with representatives of RES regarding issues with potential policy implications resulting from technical considerations related to licensing of future non-light water reactor designs. The staff discussed the schedule and proposed options for resolution of seven policy issues. These policy issues were identified as: expectation for safety; defense-in-depth; use of international codes and standards; event selection; source term; containment vs. confinement; and emergency preparedness.

Currently, no decision has been made regarding the need for a generic licensing approach for future plants as the number and type of future non-LWR plant applications is uncertain. This is supported by Exelon's recent decision to phase out the Pebble Bed Modular Reactor (PBMR) pre-application review. Nevertheless, the NRC staff believes that the establishment of guidance in key areas will benefit all stakeholders by improving the effectiveness, efficiency, and predictability of the review process.

Committee Action

This briefing was for the Committee's information. The Committee plans to discuss this matter during future meetings. The ACRS Subcommittee on Future Plant Designs has scheduled a meeting on November 21, 2002 to continue the discussion on this matter.

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5. Program Plan for Low-Power Shutdown (LPSD) Standardized Plant Analysis Risk (SPAR) Model Development and Cancellation of Revision 4i of SPAR Models

The Committee heard presentations by and held discussions with representatives of RES regarding: program plan for LPSD SPAR model development; reasons for cancellation of Revision 4i of SPAR models; insights from onsite review of LPSD SPAR model for Surry Nuclear Power Plant Units 1 and 2; and LPSD SPAR model template for PWRs. There are two LPSD models available for use by the staff based on shutdown PRAs performed at Surry and Grand Gulf. Recently, the staff has begun work on two tasks: (a) use the LPSD model templates to develop LPSD models for the lead plants in the various plant cases; and (b) update and enhance the SPAR model human reliability analysis methodology. The Committee discussed with the staff its reasons for canceling Revision 4i of the SPAR models specifically to develop a response to Commissioner McGaffigan's question with regard to ACRS views on this matter. The staff indicated that since RES had intended to begin Revision 4i of the SPAR models in FY2005, it has not yet defined in detail the scope of this revision. RES has decided to cancel Revision 4i of the SPAR models and focus its resources on the development of models for external events.

Committee Action

The Committee did not issue a letter or report on this matter. With regard to the appropriateness of canceling Revision 4i of the SPAR models, even though details of the planned Revision 4i were not made available, the Committee considered the staff's decision to be appropriate.

6. Guidance for Performance-Based Regulation

The Committee heard presentations by and held discussions with representatives of RES regarding the draft NUREG/BR "Guidance for Performance-Based Regulation." The staff informed the Committee that the research and development effort on performance-based approaches is over. The implementation and execution of the guidance document is meant to be applied to all three arenas of agency activity: reactors, materials, and waste. It was concluded that the performance-based initiative will become part of the overall risk-informed and performance-based activity.

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Committee Action

The Committee issued a report to NRC Chairman Meserve on this matter dated October 17, 2002, stating that the Committee agreed with the staff's proposal to publish the guidance document as a NUREG/BR report. Prior to its publication, the staff should provide more discussion of safety margins and performance parameters. The Committee will continue to meet with the staff to discuss further progress on implementation of performance-based regulatory activities.

7. Discussion of Steam Dryer Failure Event at the Quad Cities Nuclear Power Station Unit 2

The Committee discussed issues associated with the steam dryer damage observed at Unit 2 of the Quad Cities Nuclear Power Station in July 2002. Specifically, the unit was forced to shut down subsequent to initiating an Extended Power Uprate (EPU) pursuant to the GE Nuclear Energy EPU Program. Damage to the dryer was believed to be caused by high-cycle fatigue resulting from the increased steam flow at EPU conditions.

Committee Action

The Committee intends to discuss issues resulting from this event with BWR licensees during its future reviews of extended power uprates.

8. Recent Operating Events

The Committee, in its efforts to continue awareness of recent operating events, discussed a pump motor fire at Farley, a hydrogen dryer fire at McGuire, emergency preparedness issues at Cooper, and a potential auxiliary feedwater system problem at Point Beach.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- The Committee considered the EDO's response of September 3, 2002, to comments and recommendations included in the ACRS report dated July 18, 2002, concerning "Risk Metrics and Criteria for Reevaluating the Technical Basis of the Pressurized Thermal Shock Rule."

The Committee decided that it was satisfied with the EDO's response.

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OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from September 12, 2002 through October 9, 2002, the following Subcommittee meetings were held:

- License Renewal - October 8, 2002

The staff briefed the Subcommittee on the safety evaluation report, with open items, for the Duke Energy Company license renewal application for the Catawba and McGuire Nuclear Stations. The applicant also participated in the discussions.

- Reactor Fuels - October 9, 2002

The Subcommittee reviewed RES confirmatory research program on high-burnup fuels and the EPRI topical report on reactivity insertion accidents.

- Planning and Procedures - October 9, 2002

The Subcommittee discussed proposed ACRS activities, practices, and procedures for conducting Committee business and organizational and personnel matters relating to ACRS and its staff.

LIST OF MATTERS FOR THE ATTENTION OF THE EDO

- ACRS review of the proposed resolution of GSI-185, "Control of Reactivity Following Small-Break Loss-of-Coolant Accidents in Pressurized Water Reactors" has been postponed, pending receipt of the RES draft final report on its resolution approach and the outcome of subsequent review by the ACRS Subcommittee on Thermal Hydraulic Phenomena.
- The Committee plans to review the final SER related to the Duke Energy Company license renewal application for the Catawba and McGuire Nuclear Stations in February 2003.
- The Committee plans to discuss during a future meeting RES plans to explore the risk consequences of taking fuel to higher levels of burnup.
- The Committee plans to continue to meet with the staff to discuss further progress on the performance-based regulatory activities.

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- The Committee plans to discuss policy issues related to advanced reactor licensing during future meetings. The ACRS Subcommittee on Future Plant Designs is scheduled to discuss this matter during a meeting on November 21, 2002.

PROPOSED SCHEDULE FOR THE 497th ACRS MEETING

The Committee agreed to consider the following topics during the 497th ACRS meeting, November 7-9, 2002:

- Proposed Resolution of Generic Safety Issue (GSI)-189, "Susceptibility of Ice Condenser and Mark III Containments to Early Failure from Hydrogen Combustion During a Severe Accident"
- Early Site Permit Process
- Peach Bottom License Renewal Application—Subcommittee Report
- Westinghouse AP1000 Design
- Risk-Informed Improvements to Standard Technical Specifications
- Organizational and Personnel Matters (Closed)
- Safeguards and Security Activities (Closed)

ACRS Meeting Dates for CY2003

The Committee has approved the following dates for the ACRS meetings in CY2003:

—	January 2003 - No meeting
499	February 6-8, 2003
500	March 6-8, 2003
501	April 10-12, 2003
502	May 8-10, 2003
503	June 11-13, 2003
504	July 9-11, 2003
—	August 2003 - No meeting
505	September 11-13, 2003
506	October 2-4, 2003
507	November 6-8, 2003
508	December 4-6, 2003

Sincerely,

/RA/

George E. Apostolakis
Chairman