



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

SL-0550

May 1, 2007

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Chairman Klein:

SUBJECT: SUMMARY REPORT - 541st MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, APRIL 5-7, 2007, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 541st meeting, April 5-7, 2007, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports, letters, and memorandum:

REPORTS:

Reports to Dale E. Klein, Chairman, NRC, from William J. Shack, Chairman, ACRS:

- Human Reliability Analysis Models, dated April 23, 2007
- Technology-Neutral Framework for Future Plant Licensing, dated April 20, 2007

LETTERS:

Letters to Luis A. Reyes, Executive Director for Operations, NRC, from William J. Shack, Chairman, ACRS:

- Revision 3 to Standard Review Plan Section 4.2, "Fuel System Design," dated April 23, 2007
- Risk-Informed Technical Specifications Initiative 4b, Risk-managed Technical Specifications (RMTS) Guidelines, dated April 23, 2007

MEMORANDUM:

Memorandum to Luis A. Reyes, Executive Director for Operations, NRC, from Frank P. Gillespie, Executive Director, ACRS:

- Proposed Rule to Amend 10 CFR 50.61, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," dated April 10, 2007

HIGHLIGHTS OF KEY ISSUES

1. Human Reliability Analysis Models

In a November 8, 2006 Staff Requirements Memorandum, resulting from the October 20, 2006 meeting with the Advisory Committee on Reactor Safeguards (ACRS), the Commission requested the Committee to “work with the staff and external stakeholders to evaluate the different Human Reliability models in an effort to propose either a single model for the agency to use or guidance on which model(s) should be used in specific circumstances.” During the April 2007 meeting, the Committee discussed proposed plans by the NRC staff and the Electric Power Research Institute (EPRI) to evaluate several human reliability analysis (HRA) models used by staff and industry. The members commented that the objective should be to develop a common understanding of the relative importance of factors affecting human performance and ways in which they could be integrated into analysis. Achieving this objective will allow the staff to establish guidance on which model(s) should be used for specific regulatory applications. The staff presented its current plan for organizing an HRA Empirical Study using simulator data at the Halden Reactor Project in order to assess the strengths and weaknesses of HRA models. The Committee stated that it views this Empirical Study as part of the broader effort to collect evidence regarding the validity of HRA models. The Committee further stated that additional evidence should be collected from operating experience, especially the Augmented Inspection Team reports on past incidents.

Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated April 23, 2007, concluding that the staff and EPRI are making progress in developing a plan to evaluate several HRA models. The Committee plans to work with the staff in formulating the details of the plan and its implementation.

2. Revisions to Standard Review Plan Section 4.2, “Fuel System Design”

The Committee met with representatives of the NRC staff, EPRI, and the reactor fuel vendors to discuss Revision 3 to Standard Review Plan (SRP) Section 4.2, “Fuel System Design.” This revision addresses several new issues identified by the staff from operating experience, research, and reviews of advanced fuel designs and cladding materials. The staff presented new interim acceptance criteria for reactivity-initiated accidents (RIAs), which will be applicable to new reactors. As new RIA test data become available over the next 18 months, the interim criteria will be reevaluated, and the staff will establish the final criteria that will be applied to operating plants, as well as the schedule for their implementation. Representatives of the nuclear industry expressed concern about the use of experimental data from test reactors and the need to adjust that data to account for the different phenomena and fuel cladding behavior between test reactor and operating reactor conditions. The Committee noted that the revised SRP Section includes two new criteria that are not currently applied to fuel in operating plants, and methods to demonstrate compliance with these new criteria will need to be developed.

Committee Action

The Committee issued a letter to the Executive Director for Operations (EDO) on this matter, dated April 23, 2007, concurring with the issuance of Revision 3 to SRP Section 4.2, including the interim criteria in Appendix B, but with two recommendations for improvements to Appendix B before issuance of the final criteria. The Committee recommended that the methodology used to adjust the RIA experimental data to account for differences between test reactor conditions and power reactor conditions be justified and a clearer rationale be provided to justify the pellet cladding mechanical interaction limit line before the final criteria in Appendix B are developed.

3. Risk-Managed Technical Specification Initiative 4b - Flexible Completion Times

The Committee met with representatives of the NRC staff, EPRI, and the South Texas Project (STP) Nuclear Operating Company to discuss the industry guidance document NEI 06-09, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," the associated staff's draft safety evaluation, as well as the pilot plant implementation of RMTS at STP. The staff presented the major aspects of the program requirements of NEI 06-09 and stated that it is consistent with the Commission's policy statement on the use of probabilistic risk assessment (PRA) and the maintenance rule. The program manages risk specific to the associated plant configuration by determining technical specification completion times and requiring compensatory measures based on risk thresholds. The staff stated that the program requirement on cumulative risk limits and the requirement to enter into the plant corrective action program would address potential abuse of the program. The staff also discussed the benefits of the program, requirements for licensees' PRA programs, and the results of its audit at STP. Representatives from STP described the scope of their RMTS program, modeling of uncertainties, and training requirements. A database of about 20,000 maintenance states are available in the risk-informed completion time calculator to assist the plant operators and the maintenance planners in decisionmaking. An example of this computer based tool was presented.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter, dated April 23, 2007, concurring with the staff that the program requirements in NEI 06-09 are acceptable for referencing by licensees proposing to amend their technical specifications to implement RMTS.

4. ACRS Report on the NRC Safety Research Program

The ACRS provides the Commission a biennial report, presenting the Committee's observations and recommendations concerning the overall NRC Safety Research Program. During the April 2007 meeting, the Committee discussed proposed format, content, and assignments for its 2008 report to the Commission on the NRC Safety Research Program.

Committee Action

The Committee plans to discuss a draft report on the NRC Safety Research Program during its September 2007 meeting.

5. Subcommittee Report on Plant License Renewal

The Chairman of the Plant License Renewal Subcommittee provided a report to the Committee summarizing the results of the April 4, 2007 meeting with the NRC staff and representatives of Entergy Nuclear Operations, Inc. (Entergy) to review the Safety Evaluation Report (SER) with open items related to the license renewal application for the Pilgrim Nuclear Power Station. The current operating license for Pilgrim expires on June 8, 2012. During the meeting, Entergy described the plant, its operating history, and the license renewal application. The major discussion topics were the potential corrosion of the primary containment carbon steel liner, water intrusion into the floor of the torus building, and the lack of benchmarking for neutron fluence calculations. The applicant described multiple and diverse measures available for detection of water leakage that could result in corrosion of the containment liner, inservice inspection of the liner, hydrological and structural analyses regarding water intrusion into the torus room, and plans to resolve the open item regarding fluence. The staff's draft SER was issued in March 2007 and contains four open items, three proposed license conditions, and 45 commitments from the applicant.

Committee Action

The Committee plans to review the final SER associated with this license renewal application during its September 2007 meeting.

6. Meeting with Commissioner Jaczko

The Committee met with Commissioner Jaczko to discuss items of mutual interest. Commissioner Jaczko described his views regarding some of the issues associated with risk-informed and performance-based regulations for fire protection, emergency planning, and emergency core cooling (10 CFR 50.46a). He also discussed the agency's preparation for new reactor licensing and the importance of validating and verifying models that contribute to regulatory decisions. Commissioner Jaczko concluded by stating that given the complex phenomena associated with nuclear power plant operations there are still a number of important technical issues to be addressed. The discussion with the ACRS members covered the consequences of accidents in terms of health effects and land contamination, the quantitative health objectives, the challenges with communicating risk analyses to the public, and the ACRS report on the safety research program.

Committee Action

This was an information briefing. No Committee action was necessary.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of March 8, 2007, to comments and recommendations included in the February 8, 2007 ACRS report on the safety aspects of the license renewal application for the Oyster Creek Generating Station. The Committee decided that it was satisfied with the EDO's response.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from March 10, 2007 through April 4, 2007, the following Subcommittee meetings were held:

- Reliability and Probabilistic Risk Assessment — March 22, 2007

The Subcommittee reviewed the staff's plans for evaluating the agency's human reliability analysis models.

- Reliability and Probabilistic Risk Assessment — March 23, 2007

The Subcommittee reviewed Risk-informed Technical Specifications Initiative 4b, Risk-managed Technical Specifications Guidelines.

- Materials, Metallurgy, and Reactor Fuels — April 3, 2007

The Subcommittee reviewed Revision 3 to Standard Review Plan Section 4.2, "Fuel System Design."

- Plant License Renewal — April 4, 2007

The Subcommittee reviewed the license renewal application for the Pilgrim Nuclear Power Station and the associated SER with Open items prepared by the NRC staff.

- Planning and Procedures — April 4, 2007

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

- The Committee plans to review the draft final version of 10 CFR 50.61, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," after reconciliation of public comments.
- The Committee plans to continue to work with the staff to resolve certain issues associated with the technology-neutral framework for future plant licensing.
- The Committee plans to work with the staff in formulating the details of its plan to evaluate different human reliability analysis models.
- The Committee plans to discuss a draft report on the NRC safety research program during its September 2007 meeting.
- The Committee plans to review the final SER associated with the license renewal application for the Pilgrim Nuclear Power Station during its September 2007 meeting.

PROPOSED SCHEDULE FOR THE 542nd ACRS MEETING

The Committee agreed to consider the following topics during the 542nd ACRS meeting, to be held on May 3-5, 2007:

- Digital Instrumentation and Control Systems Matters
- Commission Paper on Staff's Recommendation to Make a Risk-informed and Performance-based Revision to 10 CFR Part 50
- Status of the Development of an Integrated Long-Term Regulatory Research Plan
- ACRS Members' Issues Associated with the Technology-Neutral Framework for Future Plant Licensing
- Discussion of Topics for Meeting with the NRC Commissioners
- Proposed Report on Revision to 10 CFR 50.46 LOCA Criteria for Fuel Cladding Materials

Sincerely,

/RA/

William J. Shack
Chairman

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/RA/

William J. Shack
Chairman

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