

December 6, 2000

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

SUBJECT: SUMMARY REPORT ON THE 477TH MEETING OF THE ADVISORY
COMMITTEE ON REACTOR SAFEGUARDS, NOVEMBER 2—4, 2000,
AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Meserve:

During its 477th meeting, November 2-4, 2000, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and letters. In addition, the Committee authorized Dr. Larkins, Executive Director, ACRS, to send you the memorandum noted below:

REPORTS

- Draft Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated November 8, 2000)
- License Renewal Guidance Documents (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated November 15, 2000)

LETTERS

- Proposed Framework for Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50 (Letter to William D. Travers, Executive Director for Operations, NRC, from Dana A. Powers, Chairman, ACRS, dated November 20, 2000)
- BWROG Proposal to Use Safety Relief Valves and Low Pressure Systems as a Redundant Safe Shutdown Path to Satisfy the Requirements of 10 CFR 50, Appendix R (Letter to William D. Travers, Executive Director for Operations, NRC, from Dana A. Powers, Chairman, ACRS, dated November 20, 2000)

MEMORANDUM

- Draft Safety Evaluation Report Related to “Justification for Not Including Postulated Breaks in Large-Bore Reactor Coolant System Piping in the Licensing Basis for Existing and Replacement Once-Through Steam Generators” (BAW-2374, Rev.0, July 2000) (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated November 13, 2000)

HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE

1. Revised Report of the Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants

The Committee heard presentations by and held discussions with representatives of the NRC staff and the Nuclear Energy Institute (NEI) and the Institute for Resource and Security Studies (IRSS) on the revised report of the final technical study of spent fuel pool accident risk at decommissioning nuclear power plants. The Committee discussed the staff's responses to the concerns identified in the April 13, 2000, ACRS report to the Commission. The concerns included the inappropriate use of the Regulatory Guide 1.174 risk acceptance criterion for large early release frequency (LERF), the use of an ignition temperature based on data from fresh cladding, the failure to consider uncertainties in plume dispersion parameters, the initial plume energy, and the assessment of the seismic risk.

The Committee discussed NEI's assertions that (1) the bounding estimate of seismic risk should not be used to justify retention of operating plant requirements, (2) opportunities to apply practical risk insights are lost if operating plant requirements are retained, and (3) hypothetical phenomena should not be used to determine consequences.

The Committee heard a presentation by Dr. Gordon Thompson, IRSS. He stated that the potential for pool fires could be almost completely eliminated by combining low-density pool storage and dry storage. Dr. Thompson recommended that the NRC declare a moratorium on any decisions or licensing actions that could increase the risk of a radioactive release from any spent fuel pool, pending the completion of new studies on spent fuel pool accident risk.

Conclusion

The Committee sent a report dated November 8, 2000, to Chairman Meserve on this matter.

2. Risk-Informed Regulation Implementation Plan (RIRIP)

The Committee heard a presentation by and held discussions with representatives of the NRC staff concerning the staff's proposed update to the Risk-Informed Regulation Implementation Plan (RIRIP). The Committee and staff discussed the purpose of the RIRIP — to serve as a roadmap for risk-informed regulation and for implementing the NRC Strategic Plan in each strategic arena (nuclear reactor safety, nuclear materials, nuclear waste safety, and international nuclear safety support). The Committee considered the staff's draft screening criteria for evaluating risk-informed initiatives and the role of the RIRIP in communicating planned activities, schedules, and milestones. The Committee and staff extensively discussed challenges to the risk-informed approach, including probabilistic risk assessment quality, the availability of licensee risk analysis for public scrutiny, the need for stakeholder confidence, and the development of safety goals for the nuclear materials and waste arenas.

Conclusion

This briefing was for information only. No Committee report was required.

3. Proposed Framework for Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50

The Committee heard a presentation by and held a discussions with representatives of the NRC staff and its contractors regarding Attachment 1 to SECY-00-0198. The title of the attachment is "Framework for Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50." The Committee discussed the purpose of the proposed Option 3 framework as staff guidance for evaluating candidate regulations and in developing risk-informed alternatives. The Committee considered the framework as a "work in progress" that will need to be updated as experience is gained in evaluating candidate regulations such as 10 CFR 50.44 (combustible gas control systems) and 10 CFR 50.46 (emergency core cooling systems). The Committee discussed the framework's consideration of selected issues including defense in depth (structural versus rational approaches), the quantification of safety margins in terms of probabilities, and the definition and implementation of the concept of accident-initiating events (anticipated, frequent, and rare initiators).

Conclusion

The Committee sent a letter dated November 20, 2000, to the Executive Director for Operations, on this matter.

4. Differing Professional Opinion (DPO) on Steam Generator Tube Integrity

Dr. Powers, the Chairman of the Ad Hoc Subcommittee on the DPO, reported to the Committee on the status of the Subcommittee's review of the technical merits of the DPO issues. This review was undertaken at the request of the NRC Executive Director for Operations (EDO). The Ad Hoc Subcommittee, established during the September 2000 ACRS meeting, consists of Dr. Powers (Chairman), Dr. Bonaca, Dr. Kress, Mr. Sieber, and Dr. Ballinger (Massachusetts Institute of Technology). Drs. Catton and Higgins, from the EDO's office, are the DPO consultants to the Subcommittee. The Subcommittee held a meeting October 10—14, 2000, to discuss the DPO issues with the DPO author and the NRC staff. The Subcommittee Chairman is compiling a report based on the information presented during the Subcommittee meeting and the comments made by the Subcommittee members and consultants.

The DPO author and the NRC staff briefed the full Committee during the November ACRS meeting. The DPO author recommended that —

- Generic Letter 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes," be rescinded
- All plants that do not meet the 40% plugging criterion be shut down until all their tubes have been plugged

Representatives of the NRC staff discussed past, present, and future efforts to resolve the DPO and the steam generator issues, including the issuance of the DPO Consideration document, several NUREG reports, and research efforts to address the jet cutting tubes.

Conclusion

The Ad Hoc Subcommittee plans to submit a report to the full Committee. The report during the December 2000 ACRS meeting will reflect incorporation of the internal peer review comments. The Committee has approved the report, and will send it to the EDO for use in resolving the DPO issues.

5. Performance-Based, Risk-Informed Fire Protection Standard for LWRs and Related Issues

The Committee heard presentations by and held discussions with representatives of the Boiling Water Reactor Owners Group (BWROG), NRC staff, the National Fire Protection Association (NFPA), and NEI about the BWROG proposal to use the safety relief valves (SRVs) and the low-pressure system (LPS) as redundant safe shutdown path and about the NFPA 805 standard. The Committee discussed the BWROG proposal. The BWROG's position is that use of SRVs and LPS to support the 10 CFR Part 50, Appendix R safe shutdown requirement is consistent with the original design basis for BWRs. The proposal specifies a technically acceptable and safe method of achieving and maintaining either hot or cold shutdown. The representatives of BWROG also stated that same method is specified in emergency operating procedures as a means to achieve cold shutdown after small-break loss-of-coolant accidents in BWRs. The NRC staff supports the BWROG's position on the use of SRVs and the LPS as a redundant path to achieve safe shutdown. The NRC staff plans to publish the safety evaluation report on this issue in the near future.

Mr. Fred Emerson, NEI, presented the industry's views on implementation of the NFPA 805 standard. The NFPA 805 standard has six chapters on: (1) goals, performance objectives, and performance criteria, (2) a general approach for establishing a fire protection program and fire protection requirements, (3) determination of fire protection systems and features, (4) fire protection during decommissioning and permanent plant shutdown, and (5) a summary of referenced NFPA publications. There are six appendices on: (1) explanations of matters in the body of the standard, (2) nuclear safety assessment, (3) the application of fire modeling to nuclear power plants, (4) the use of PSA methods, (5) a deterministic approach for plant fire damage and business interruption, and (6) referenced publications. The NFPA membership vote is scheduled for November 15, 2000. The membership can accept the standard as it is, accept it as amended, return part of the standard to the NFPA 805 Committee, or return the entire standard to the Committee. If the Committee approved, the Standards Council will issue the standard on January 13, 2001. In concluding, Mr. Emerson said that the NFPA standard offers potential benefits to plants and that the industry has extensively supported its development.

Mr. Denis Shumaker presented the preliminary results of the pilot use of the NFPA 805 standard at Salem Generating Plant. He concluded that the NFPA 805 standard adequately explains fire risk and manage it. It provides a basis for assessing fire risk actual plant configurations and modifications and will allow licensees to focus of resources on the most important fire risks.

The NRC staff presented a brief overview of the NFPA 805 standard. The standard changes the existing Appendix R requirements. The performance criterion for NS allow the use of ADS and LPS for shutting down BWRs and specifies feed-and-bleed as the only shutdown method for PWRs. Performance-based, risk-informed allow the recovery of SSCs vs free of fire damage. The 72-hour cold shutdown requirement, alternative or dedicated shutdown, and 8-hour emergency lighting requirement has been eliminated from the NFPA 805 standard. Technical and implementing issues need to be resolved before the standard can be adopted by the NRC staff.

Conclusion

The Committee sent a letter dated November 17, 2000, to the EDO on BWROG proposal to use SRVs or LPS as redundant shutdown paths.

6. ABB/CE and Siemens Digital Instrumentation and Control (I&C) Applications

The Committee received a report on the results of October 31, 2000, meeting of the Plant Subcommittee on ABB/CE and Siemens Digital I&C Applications. During the Subcommittee meeting with the representatives of the NRC staff, Westinghouse Nuclear Automation (formerly known as ABB/CE), and Siemens Corporation the safety evaluations of the Westinghouse and Siemens topical reports on digital I&C applications was discussed.

The NRC staff stated that, based on information from Westinghouse on the topical report and the staff's review the design of the Common Qualified (Common Q) platform meets the relevant NRC regulatory requirements and is acceptable for safety-related I&C applications in nuclear power plants, subject to the satisfactory resolution of the generic open items. The staff had also reviewed the safety system design descriptions in the Siemens topical report for conformance to the guidelines in the regulatory guides and industry codes and standards applicable to these systems. The staff concluded that the applicant adequately identified the guidelines applicable to these systems.

Conclusion

The Committee will continue its discussion of the topical reports during future ACRS meetings.

7. License Renewal Guidance Documents

The Committee heard presentations by and held discussions with the NRC staff and NEI regarding draft guidance documents for preparing and reviewing license renewal applications. The staff discussed the changes incorporated into the latest drafts of the guidance documents, how it disposed of stakeholders' comments, and the status of unresolved issues. NEI said the industry is concerned that the license renewal process may be used to impose additional unnecessary programs on licensees. The Committee and the staff discussed the aging of electrical cables and the use of emergency operating procedures in the scoping process. They also discussed updating the guidance document to incorporate lessons learned and to recognize new editions of codes and standards.

Conclusion

The Committee sent a report dated November 15, 2000, to Chairman Meserve.

8. Research Report to the Commission

The Committee discussed the 2001 ACRS report to the Commission on NRC safety research program. The Committee will continue to take an active role in reviewing ongoing and proposed research activities and provide comments and make recommendations to the Commission.

The Committee members discussed the format and content of the report and stated that the report should focus on longer-term research to ensure the Commission's carry out its safety mission efficiently and effectively in the future.

Conclusion

The Committee will continue discussing and preparing the 2001 ACRS report to the Commission on the NRC safety research program at the December 6-9, 2000 ACRS meeting.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- The Committee discussed the response from the NRC Executive Director for Operations (EDO) dated October 23, 2000, to the ACRS comments and recommendations included in the ACRS report dated September 8, 2000, concerning the proposed high-level guidelines for performance-based activities.

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

- The Committee discussed the response from the EDO, dated October 25, 2000, to ACRS comments and recommendations included in the ACRS report dated September 13, 2000, concerning proposed risk-informed revisions to 10 CFR 50.44, Standards for Combustible Gas Control System in Light-Water-Cooled Power Reactors.”

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

- The Committee discussed the response from the EDO, dated October 25, 2000, to ACRS comments and recommendations included in the ACRS report dated September 7, 2000, concerning assessment of the quality of probabilistic risk assessments.

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

- The Committee discussed the response from the EDO dated October 30, 2000, to ACRS comments and recommendations included in the ACRS report dated September 14, 2000, concerning the pre-application review of the AP1000 standard plant design-phase 1.

The Committee decided to continue its discussion of the issues included in its report and the adequacy of the EDO’s response during future meetings.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from October 5 through October 31, 2000, the following Subcommittee meetings were held:

- Ad Hoc Subcommittee - October 10-14, 2000

The Subcommittee met to discuss the technical merits of the Differing Professional Opinion Issues associated with steam generator tube integrity.

- Fire Protection Subcommittee - October 16-17, 2000

The Subcommittee met to review the revised draft NFPA 805 Performance Standard for Fire Protection for Light Water Reactor Electric Generating Plants, Draft Regulatory Guide on Fire Protection for Operating Nuclear Power Plants, post-fire safe shutdown circuit analysis, and other fire protection related issues.

- Reactor Fuels Subcommittee - October 18, 2000

The Subcommittee met to discuss the status of the staff's effort regarding the revised report of a technical study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants, and related matters.

- Plant License Renewal Subcommittee - October 19-20, 2000

The Subcommittee met to review drafts of the Standard Review Plan for license renewal, the Generic Aging Lessons Learned (GALL) Report Sections 2, 3, 4, 5 through 8, the associated regulatory guide, and NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54, The License Renewal Rule."

- Plant Systems Subcommittee - October 31, 2000

The Subcommittee met to discuss the safety evaluation reports on the topical reports for ABB/CE and Siemens Digital I&C Applications.

- Planning and Procedures Subcommittee - October 31, 2000

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

- Safety Research Program - November 1, 2000

The Subcommittee met to discuss the NRC safety research programs and hear the views of the NRC staff in preparation of the 2001 ACRS report to the Commission.

FOLLOWUP ITEMS

- The Committee plans to review the staff's safety evaluation report on the BWR Owners Group proposal to use safety relief valves and low-pressure systems as a redundant method to achieve safe shutdown as required by 10 CFR Part 50, Appendix R.
- The Committee plans to review additional refinements to the framework document associated with risk-informed changes to the technical requirements of 10 CFR Part 50.

- The Committee plans to review the staff's validation that the artificially aged cables used in the accelerated aging studies conducted to address the issues of GSI-168 are representative of 30-40 year old cables along with its review of the proposed resolution of GSI-168.
- The Committee plans to continue its discussion of issues included in its September 14, 2000 report on the pre-application review of the AP1000 design and the adequacy of the EDO's response dated October 30, 2000, during future meetings.

PROPOSED SCHEDULE FOR THE 478TH ACRS MEETING

The Committee agreed to consider the following topics during the 478th ACRS meeting, December 7-9, 2000:

Issues Associated with Core Power Uprates

Briefing by and discussions with representatives of the NRC staff regarding issues associated with core power uprates, including: staff plans for developing a Standard Review Plan Section for power uprate reviews; staff position regarding the need for applying risk-informed decisionmaking in the review of significant power uprate applications; and other related matters.

Differing Professional Opinion (DPO) on Steam Generator Tube Integrity

Report by the Chairman of the Ad Hoc Subcommittee on DPO regarding conclusions and recommendations of the Ad Hoc Subcommittee on the technical merits of the DPO issues. Discussion with representatives of the NRC staff and the DPO author, as needed, regarding additional information on DPO issues.

Subcommittee Report

Report by the Chairman of the Thermal-Hydraulic Phenomena Subcommittee regarding the status of review of the GE Nuclear Energy TRACG best-estimate thermal-hydraulic code.

Subcommittee Report

Report by the Chairman of the Plant Systems Subcommittee regarding ABB/CE and Siemens digital I&C applications and insights gained from meeting with the RSK on digital I&C in Germany during November 2000.

Meeting with NRC Commissioner Diaz

Discussion with Commissioner Diaz regarding the NRC Safety Research Program and other items of mutual interest.

South Texas Project Exemption Request

Briefing by and discussions with representatives of the NRC staff and South Texas Project Nuclear Operating Company (STPNOC) regarding the STPNOC's exemption request to exclude certain components from the scope of special treatment requirements in 10 CFR Part 50 and the associated NRC staff's Draft Safety Evaluation Report.

Control Room Habitability

Briefing by and discussions with representatives of the NRC staff and the nuclear industry regarding issues associated with control room habitability and the staff and industry efforts in resolving those issues.

Proposed Final Regulatory Guide DG-1053, "Calibration and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence"

Briefing by and discussions with representatives of the NRC staff regarding the proposed final Regulatory Guide DG-1053, including the staff's resolution of public comments.

Proposed Modifications to the Commission's Safety Goal Policy Statement for Reactors

Briefing by and discussions with representatives of the NRC staff regarding the proposed modifications to the Commission's Safety Goal Policy Statement for reactors.

NRC Safety Research Program

Discussion of the 2001 ACRS report to the Commission on the NRC Safety Research Program.

Response to Commission Request

Discussion of the response to the Commission request that the ACRS provide a detailed discussion of how the perceived weaknesses with industry-developed thermal-hydraulic codes may adversely affect the NRC's regulatory role and provide more specific recommendations on how those weaknesses should be addressed.

Sincerely,

/RA/

Dana A. Powers
Chairman