

October 31, 2000

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

SUBJECT: SUMMARY REPORT - 476TH MEETING OF THE ADVISORY  
COMMITTEE ON REACTOR SAFEGUARDS, OCTOBER 5-7, 2000,  
AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Meserve:

During its 476th meeting, October 5-7, 2000, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following report and letter. In addition, the Committee authorized Dr. Larkins, Executive Director, ACRS, to transmit the memorandum noted below:

#### REPORT

- Union of Concerned Scientists Report, "Nuclear Plant Risk Studies: Failing the Grade" (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated October 11, 2000)

#### LETTER

- Pressurized Thermal Shock Technical Basis Reevaluation Project (Letter to William D. Travers, Executive Director for Operations, NRC, from Dana A. Powers, Chairman, ACRS, dated October 12, 2000)

#### MEMORANDUM

- Proposed Revision to 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated October 11, 2000)

## HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE

### 1. Discussion of Union of Concerned Scientists Report, "Nuclear Plant Risk Studies: Failing the Grade"

The Committee heard a presentation by and held a discussion with a representative of the Union of Concerned Scientists (UCS) concerning the August 2000 UCS report entitled, "Nuclear Plant Risk Studies: Failing the Grade," concerning the use of risk information in NRC decision making. The Committee discussed the issues raised in the report as well as feedback that UCS has received from interested parties. The UCS representative informed the Committee that its report has been criticized for using obsolete results from outdated Individual Plant Examinations (IPEs). UCS stated that they prefer to use the information provided in the updated licensee probabilistic risk assessments (PRAs) but noted that these PRAs are not available to the public. UCS also noted that the current IPE information was used in the development of the significance determination process of the revised reactor oversight process.

The Committee and UCS discussed several equipment studies (e.g., concerning high pressure core injection and reactor core isolation cooling systems, etc.) completed by the Office of Nuclear Regulatory Research (formerly the Office for Analysis and Evaluation of Operational Data). In particular, the Committee considered the UCS contention that these studies were flawed with system-level bias. The Committee also discussed the issues of assumptions and consequences in risk analysis and the UCS concern over differences in PRA results for "sister" plants.

#### Conclusion

The Committee provided a report to the Chairman on this matter dated October 11, 2000.

### 2. NEI 00-02, "Industry PRA Peer Review Process Guidelines"

The Committee heard presentations by and held discussions with representatives of the Nuclear Energy Institute (NEI) and ERIN Engineering concerning the proposed industry certification process described in the document NEI 00-02, "Industry PRA Peer Review Process Guidelines." NEI stated that NEI 00-02 was developed from the peer review process developed by the BWR Owners Group. NEI further stated that the certification process does not provide an overall grade

for PRAs, but can be used as a complement to or in lieu of industrial standards for PRA quality.

The Committee considered the industry's proposed approach to use NEI 00-02 as a means of addressing the issue of PRA quality for risk-informed decision making (i.e., as a template for NRC review). The Committee also considered the recent meetings between the NRC and industry representatives on this matter. The Committee noted that the staff had expressed concern that subjective standards may lead to inconsistent grading of subtier elements and that the results vary depending on the makeup of the peer review team. NEI acknowledged that most PRAs need to be improved. At the conclusion of the meeting, NEI invited the ACRS and NRC staff to observe and/or participate in the peer review process in order to gauge the rigor applied to licensee risk-informed decisions using the peer review panel.

#### Conclusion

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

### 3. Staff Views on ASME Standard for PRA for Nuclear Power Plant Applications

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning their views on Revision 12 of the ASME Standard for PRA for Nuclear Power Plant Applications. The staff used SECY 00-0162 as guidance in formulating their comments on the draft. The issue of PRA quality is central to risk-informed regulations and one that the Commission has continually raised with the staff. As a result of reviewing the draft standard, the staff concluded that the current version of the standard (1) does not address PRA quality, (2) is difficult to use in determining where there are strengths and weaknesses in the PRA results, (3) will provide limited assistance to staff in performing focused review of PRA submittals, and (4) will provide minimal assistance in making more efficient use of NRC resources.

The staff discussed major concerns that led to the conclusions chapter by chapter. Among the concerns discussed were the definition of the categories within which the PRA applications would fit, the requirements for the risk assessment application process, the completeness and accuracy of the technical content of the document, and the changes necessary for the standard to be acceptable.

### Conclusion

This briefing was for information only. No committee action was required.

#### 4. Pressurized Thermal Shock Technical Basis Reevaluation Project

The Committee heard presentations by and held discussions with the NRC staff regarding the status of activities associated with the Pressurized Thermal Shock (PTS) Technical Basis Project. The staff described the FAVOR probabilistic fracture mechanics computer code and provided a more detailed description of the development of a fracture toughness distribution. The ACRS Members and the staff discussed reevaluating the reactor vessel failure acceptance value based on a source term that assumes air oxidation of fuel instead of steam-oxidation. They discussed the appropriateness of using a Weibull distribution for the fracture toughness data and a one dimensional finite analysis for crack distributions. They also discussed the effects of neutron fluence, the characterization of flaws, damage accumulation, and the calculation of thermal-hydraulic uncertainties.

### Conclusion

The Committee provided a letter to the Executive Director for Operations (EDO) on this matter dated October 12, 2000.

#### 5. Discussion of Industry Issues

The Committee met with Ralph Beedle, NEI Senior Vice President and Chief Nuclear Officer, Nuclear Generation Division and members of his staff to discuss NEI's current regulatory initiatives, emerging industry issues, NEI's recent reorganization, and other issues of mutual interest. These issues included: risk-informing 10 CFR Part 50; license renewal; decommissioning; and the revised reactor oversight process.

NEI representatives frequently meet with the ACRS to discuss particular regulatory issues. In contrast, these discussions focused on strategic planning, regulatory philosophy, and ACRS and NEI views on emerging issues.

### Conclusion

The discussions were informative and productive. The ACRS Chairman plans to schedule this type of stakeholder exchange on a regular basis.

## 6. GSI-168, Equipment Qualification

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the proposed resolution and the status of Generic Safety Issue (GSI) 168, “Environmental Qualification (EQ) of Low-Voltage Instrumentation and Control (I&C Cables).”

The staff presented a brief technical and regulatory background, and the research results for resolution of GSI 168. The Office of Nuclear Regulatory Research (RES) sponsored the research program to resolve issues related to the qualification of certain electric components used in commercial nuclear power plants. Brookhaven National Laboratory (BNL) was selected as the lead laboratory to provide the technical assistance to RES. The objective of this research program was to provide information to assist the staff to resolve specific issues related to the EQ process for low-voltage I&C electric cables. Initially, a comprehensive list of 43 issues were identified. Based on a thorough review and analysis of the literature, 24 issues were resolved by considering past research results, and 19 issues were unresolved. Of the latter, six issues were identified that required additional testing of the cables to resolve. These issues are summarized below:

- How do the properties of cables subjected to accelerated aging techniques used in the original qualification compare with the properties of naturally aged cables of equivalent age?
- What are the limitations in using an estimated value of the activation energy to predict the chemical degradation during thermal aging?
- Do multiconductor cables have different failure mechanisms than single conductor cables, and, if so, are these unique failure mechanisms properly accounted for in the qualification process?
- Do bonded jacket cables have different failure mechanisms than unbonded jacket cables, and, if so, are these unique failure mechanism properly accounted for in the qualification process?
- Are there any effective condition monitoring techniques for determining cable condition in situ?
- Can condition monitoring techniques be used to predict LOCA survivability?

The staff concluded that the research test results suggested that some of the cable types would not function during a LOCA after 40 years of service. Most of them would not survive after 60 years of service, if they are operated at rated temperatures. It should be noted that most cables operate at temperatures significantly less than the rated temperature. Further, the staff concluded that risk studies give relatively high core damage frequency values, conditioned on all of the cables failing during LOCA. Additionally, research data would not support a sufficiently low failure rate to reduce the core damage frequency values to an acceptably low level.

#### Conclusion

This briefing was for information only and no Committee action was required on this matter.

#### 7. ACRS Review of Generic Guidance Documents Associated with License Renewal

Dr. Bonaca, Chairman of the Plant License Renewal Subcommittee, noted that the staff and industry were developing a set of guidance documents for preparing and reviewing license renewal applications. He explained that his Subcommittee plans to review these documents during a meeting on October 19-20, 2000. The Members identified and discussed questions resulting from their initial review of the documents.

#### Conclusion

This discussion was for information only.

#### 8. Annual Report to the Commission on the NRC Safety Research Program

The Committee continued its discussion of the NRC Safety Research Program and the format and content of the ACRS 2001 report. The Committee indicated that the focus of its report will be on the long-term research needed to facilitate the execution of the NRC's mission in the future. The Committee also discussed certain acceptance criteria that could be useful in evaluating the research programs.

#### Conclusion

The Committee will continue its discussion and preparation of the ACRS 2001 report to the Commission on the NRC safety research program during future

ACRS meetings. A Subcommittee meeting with the NRC staff has been scheduled for November 1, 2000, to discuss this matter.

#### RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- ! The Committee discussed the response from the EDO, dated August 31, 2000, to ACRS comments and recommendations included in the ACRS letter dated July 20, 2000, concerning the proposed final ASME Standard for PRA for Nuclear Power Plant Applications.

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

#### OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from August 29 through October 4, 2000, the following Subcommittee meetings were held:

- Materials and Metallurgy Subcommittee - September 21, 2000

The Subcommittee on Materials and Metallurgy discussed the status of activities associated with the Pressurized Thermal Shock (PTS) Technical Basis Reevaluation Project. These activities included determining a flaw distribution, embrittlement correlation, and fracture toughness.

- Planning and Procedures - October 4, 2000

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

#### PROPOSED SCHEDULE FOR THE 477TH ACRS MEETING

The Committee agreed to consider the following topics during the 477th ACRS Meeting, November 2-4, 2000:

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

Briefing by and discussions with representatives of the NRC staff regarding the revised version of the report and the staff's response to previous ACRS concerns.

##### Risk-Informed Regulation Implementation Plan (RIRIP)

Briefing by and discussions with representatives of the NRC staff regarding the update to the RIRIP.

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

Briefing by and discussions with representatives of the NRC staff regarding the proposed NRC framework for risk-informed changes to the technical requirements of 10 CFR Part 50 described in Attachment 1 to SECY-00-0198.

Differing Professional Opinion (DPO) on Steam Generator Tube Integrity

Report by the Chairman of the Ad Hoc Subcommittee on DPO issues regarding the outcome of the October 10-14 subcommittee meeting, proposed subcommittee recommendations, schedule for completing the review, and related matters.

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

Briefing by and discussions with representatives of the NRC staff, the Nuclear Energy Institute, and the National Fire Protection Association (NFPA) on the revised NFPA 805 standard, post-fire safe shutdown circuit analysis, and other related fire protection issues.

ABB/CE and Siemens Digital I&C Applications

Report by the Subcommittee Chairman on a subcommittee meeting on this matter and his recommendation regarding further review by the full Committee.

License Renewal Guidance Documents

Briefing by and discussions with representatives of the NRC staff regarding the proposed Standard Review Plan for License Renewal, the Generic Aging Lessons Learned Report, a Regulatory Guide, and NEI 95-10, "Industry Guidelines for Implementing the Requirements of the License Renewal Rule."

Research Report to the Commission

Discussion of the status of the draft ACRS report on the NRC Safety Research Program.

Sincerely,

**/RA/**

Dana A. Powers  
Chairman