SL-0480

May 3, 2000

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

SUBJECT: SUMMARY REPORT - 471ST MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS ON APRIL 5-7, 2000, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Meserve:

During its 471st meeting on April 5-7, 2000, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and letter. In addition, the Committee authorized Dr. Larkins, Executive Director of the ACRS, to transmit the memoranda 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 April 13, 2000)

- NRC Program for Risk-Based Analysis for Reactor Operating Experience (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated April 13, 2000)

- Reactor Safety Goal Policy Statement (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated April 17, 2000)

LETTER

- Proposed NRC Research Plan for Digital Instrumentation and Control (Letter to William D. Travers, Executive Director for Operations, NRC, from Dana A. Powers, Chairman, ACRS, dated April 18, 2000)

MEMORANDA

- Final Rule: "Elimination of the Requirement for Noncombustible Fire Barrier Penetration Seal Materials and Other Minor Changes" (10 CFR Part 50) (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated April 6, 2000)

- Draft Regulatory Guide DG-1094, "Fire Protection for Operating Nuclear Power Plants" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated April 7, 2000)

- SECY-00-0061, Proposed Revision to the Enforcement Policy to Address the Revised Reactor Oversight Process (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated April 10, 2000)

- SECY-00-0071, Draft Regulatory Guide (DG-1095), "Guidance for Implementation of 10 CFR 50.59 (Changes, Tests, and Experiments)" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated April 10, 2000)

HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE

1. Spent Fuel Pool Accident Risk for Decommissioning Nuclear Power Plants

   The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the draft final technical study of spent fuel pool accident risk at decommissioning nuclear power plants.

   The staff stated that decommissioning nuclear power plants poses a different risk to public health and safety than operating nuclear power plants. However, under current regulations, the decommissioning plants are subject to many of the same requirements as operating plants. Exemptions from the regulations are frequently requested by the licensees after a nuclear power plant is permanently shut down. To reduce the need to routinely process exemptions, the staff has undertaken a study to provide the technical basis for rulemaking concerning several exemption issues.

   In a Staff Requirements Memorandum dated December 21, 1999, the Commission requested the ACRS to perform a technical review of the validity of the draft study and its risk objectives.

In the draft final study the staff concluded that, provided certain industry decommissioning commitments are implemented at the plants, after one year of decay time the risk associated with spent fuel pool fires is sufficiently low that emergency planning requirements can be significantly reduced. The staff also concluded that after five years, the risk of zirconium fires is negligible even if the fuel is uncovered and thus requirements intended to ensure spent fuel cooling can be reduced.

Conclusion

The Committee issued a report on this matter to Chairman Meserve, dated April 13, 2000.

2. Proposed Research Plan for Digital Instrumentation and Control

The Committee heard presentations by and held discussions with the representatives of the NRC staff regarding the proposed research plan for digital instrumentation and control (I&C). This plan is in response to issues raised by the ACRS and the National Research Council in the area of digital I&C.

The National Research Council, under a contract with the NRC, performed a study on the use of digital I&C systems and issued a report documenting several recommendations. The National Research Council recommended that the NRC develop a research plan that would balance short-term regulatory needs and long-term anticipatory research needs.

The proposed research plan has been developed to address both the short term goal of supporting the effective and efficient regulation of the digital I&C systems, balanced with the long term anticipatory research needs.

The digital I&C research activities are grouped into four areas. The first two areas, Systems Aspects of Digital Technology and Software Quality Assurance, have been developed to meet the short-term goal of improving the review of digital systems by providing tools and methods that can improve the current review process. The third area, Risk Assessment of Digital I&C Systems, has been developed to meet the long-term goal of including digital systems in risked-based regulatory programs. The fourth area, Emerging I&C Technology and Applications, has been developed to meet the long-term goal of reducing the time it takes for the NRC to become ready to review the application of new technology to nuclear power plants.

Conclusion

The Committee issued a letter on this matter to Dr. William D. Travers, Executive Director for Operations, on April 18, 2000.

3. Proposed White Paper on Risk-Based Performance Indicators

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the proposed White Paper entitled "Development of Risk-Based Performance Indicators: Program Overview." The Committee and the staff discussed the staff's plan for developing risk-based performance indicators (RBPIs) for use in the revised reactor oversight process (RROP). In particular, the Committee and the staff discussed the key attributes of the RROP cornerstones of safety, performance data that are available relative to the cornerstones, modes of plant operation, potential benefits of RBPIs , and the process and planned actions for integrating RBPIs into the RROP. The Committee also discussed the sources for gathering performance data, such as the Equipment Performance Information Exchange System Program and the Sequence Coding and Search System.

Conclusion

The Committee's comments on this matter are included in a report to Chairman Meserve, dated April 13, 2000, on the NRC program for risk-based analysis of reactor operating experience.

4. Human Performance Program

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning SECY 00-0053, "NRC Program on Human Performance in Nuclear Power Plant Safety." The staff summarized the results of research studies related to the quantitative and qualitative contribution of human errors to significant events and outlined human performance activities related to the reactor oversight process, plant licensing and monitoring, the risk-informed regulation implementation plan, and emerging technology and related issues.

The Committee and staff discussed whether there is a human contribution to all errors, how to identify or prevent latent errors, whether there is a need for additional control station design guidance, and the use of human reliability assessment models. They also discussed the use of the supplemental inspection procedure, the premises associated with the significance

determination process, and the use of a risk-informed approach for evaluating manual versus automatic actions.

Conclusion

The Committee plans to discuss the preparation of a report to Chairman Meserve on this matter at the May 11-13, 2000, ACRS meeting.

5. Special Studies for Risk-Based Analysis of Reactor Operating Experience

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the NRC program for risk-based analysis of reactor operating experience. The Committee discussed the staff's individual programs for RBPIs, accident sequence precursor analyses, common-cause failure analyses, system and component reliability and availability studies, and special studies (e.g., study of initiating event frequencies, D. C. Cook draft risk assessment, etc.). The Committee also discussed the development of Standardized Plant Analysis Risk models. These programs were developed by the former Office for Analysis and Evaluation of Operational Data and are now administered by RES.

Conclusion

The Committee issued a report to Chairman Meserve, dated April 13, 2000, on the NRC programs for risk-based analysis of reactor operating experience and on the staff's proposed White Paper on RBPIs.

6. Reports of the Thermal-Hydraulic Phenomena and Materials and Metallurgy and Subcommittees

Thermal-Hydraulic Phenomena Subcommittee — Dr. Wallis, Chairman of the Thermal-Hydraulic Phenomena Subcommittee, provided a report to the ACRS on the results of the Subcommittee meeting on March 15, 2000. The meeting was held to discuss the status of the NRC staff's reviews of the Electric Power Research Institute (EPRI) RETRAN-3D, the Siemens Power Corporation S-RELAP5, and the General Electric (GE) Nuclear Energy TRACG codes and to begin review of thermal-hydraulic issues associated with the NRC staff's reevaluation of the pressurized thermal shock (PTS) screening criterion. The Subcommittee does not anticipate any further review of the RETRAN code, subject to additional action by the staff. The Subcommittee was provided introductory information relative to the S-RELAP5 and TRACG codes as the staff's review has just begun.

RES provided an overview of its program to obtain the necessary thermal-hydraulic inputs (system pressure, downcomer temperature, and fluid-to-wall convective heat transfer) to support revision of the PTS rule. This program consists of ensuring whether these inputs, developed to support the original PTS rule, are still valid or require updating or correction. Experiments will be performed at the Oregon State University test facility to obtain data on loop flow stagnation and downcomer mixing phenomena. Dr. Wallis stated that the Committee should review this program during the July meeting.

Conclusion

The Committee plans to continue its review of the RES PTS thermal-hydraulic program in conjunction with its ongoing review of the PTS Technical Bases Reevaluation Project. The ACRS's review of the above-noted thermal-hydraulic codes will be performed in coordination with the staff's review schedule.

Materials and Metallurgy Subcommittee — The Chairman of the Materials and Metallurgy Subcommittee summarized the presentation made by the staff at the Subcommittee meeting on March 16, 2000, concerning the status of the NRC PTS Technical Basis Reevaluation Project. He provided background on the development of the current PTS screening criterion and described the activities of and interactions among the three groups working in the areas of probabilistic fracture mechanics, probabilistic risk assessments, and thermal-hydraulics. Each group is composed of NRC staff and industry experts.

The Subcommittee Chairman highlighted the expert elicitation process that the staff is using to develop a flaw distribution, the staff's plans for incorporating uncertainties, and the potential approach for revising the PTS acceptance criterion. The Committee discussed the amount of conservatism in the current PTS screening criterion, statistical treatment of the data, location and positioning of assumed flaws, and the possible need for modifying other regulatory guidance based on the results of this project.

Conclusion

The Committee decided to review and comment on the proposed draft Commission paper concerning the potential revisions to the PTS acceptance criterion during the May 11-13, 2000, ACRS meeting. In addition, the results of the expert elicitation process associated with flaw distribution will be reviewed and commented on when available.

7. Proposed Revision of the Commission's Safety Goal Policy Statement for Reactors

The Committee continued its discussions on the proposed revision of the Commission's Safety Goal Policy Statement (SGPS) for reactors. During this meeting, the Committee developed formal comments on the specifics of the proposed revisions to the SGPS.

Conclusion

The Committee issued a report to Chairman Meserve, dated April 17, 2000, on this matter.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- The Committee discussed the response from the EDO, dated March 6, 2000, to ACRS comments and recommendations included in its letter dated February 11, 2000, concerning the revision of Appendix K, "ECCS Evaluation Models," to 10 CFR Part 50.

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

- The Committee discussed the response from the EDO, dated March 20, 2000, to the ACRS comments and recommendations included in the ACRS report dated February 8, 2000, concerning SECY-00-001, "Evaluation of the Requirement for Licensees to Update Their Inservice Inspection and Inservice Testing Programs Every 120 Months."

  The Committee decided that this issue is moot since the Commission will decide on the issue.

- The Committee discussed the response from the EDO, dated April 4, 2000, to the ACRS comments and recommendations included in the ACRS report dated February 14, 2000, concerning "Impediments to the Increased Use of Risk-Informed Regulation."

  The Committee decided to continue its discussion on this matter during future meetings.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from March 1 through April 4, 2000, the following Subcommittee meetings were held:

- Thermal-Hydraulic Phenomena - March 15, 2000

  The Subcommittee discussed (1) the review of the thermal-hydraulic issues associated with the PTS Screening Criterion Reevaluation Project being conducted by RES; (2) the NRC staff acceptance review of the Siemens S-RELAP5 and the GE Nuclear Energy TRACG codes; and (3) the status of the NRC staff's review of the EPRI RETRAN-3D code.

- Human Factors - March 15, 2000

  The Subcommittee reviewed the proposed Commission paper concerning the NRC program on human performance in nuclear power plant safety, including staff activities associated with quantifying the risk of human performance, the effects of economic deregulation, and latent human errors.

- Materials and Metallurgy - March 16, 2000

  The Subcommittee reviewed the status of the Technical Basis Reevaluation Project, including the probabilistic fracture mechanics analysis, the expert elicitation process for flaw distribution, and the associated probabilistic risk assessments.

- Planning and Procedures - April 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 the ACRS and its staff.

LIST OF FOLLOW-UP MATTERS FOR THE EXECUTIVE DIRECTOR FOR OPERATIONS

- The Committee plans to review and comment on the proposed draft Commission paper concerning the potential revisions to the PTS acceptance criterion at the ACRS meeting on May 11-13, 2000.

- The Committee plans to review and comment on the expert elicitation flaw distribution when it becomes available.

- The Committee will consider reviewing the proposed final version of Regulatory Guide DG-1095, “Guidance for Implementation of 10 CFR 50.59 (Changes, Tests, and Experiments)” after reconciliation of public comments.

- The Committee plans to review the proposed final version of Regulatory Guide DG-1094, “Fire Protection for Operating Nuclear Power Plants,” after reconciliation of public comments.

- The Committee plans to review the results of the PTS Technical Basis Reevaluation Project when available.

PROPOSED SCHEDULE FOR THE 472nd ACRS MEETING

The Committee agreed to consider the following topics during the 472nd ACRS Meeting, May 11-13, 2000:

Initiatives Related to Risk-Informed Technical Specifications
Briefing by and discussions with representatives of the NRC staff and industry groups regarding initiatives related to risk-informed technical specifications, initial industry submittals on risk-informed technical specifications, and related matters.

Potential Revisions to the Pressurized Thermal Shock (PTS) Acceptance Criterion
Briefing by and discussions with representatives of the NRC staff regarding a draft Commission Paper that describes potential revisions to the PTS acceptance criterion.

Proposed Revision to Regulatory Guide 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis”
Briefing by and discussions with representatives of the NRC staff regarding a proposed revision to Regulatory Guide 1.174 and an associated guidance on the use of risk information in license amendment reviews.

Proposed Regulatory Guide and Standard Review Plan (SRP) Section Associated with NRC Code Reviews
Briefing by and discussions with representatives of the NRC staff regarding the proposed Regulatory Guide and SRP Section associated with the NRC staff’s review of the analytical codes.

SECY-00-0062, Risk-Informed Regulation Implementation Plan
Briefing by and discussions with representatives of the NRC staff regarding the risk-informed regulation implementation plan described in SECY-00-0062.

Operating Event at E.I. Hatch Nuclear Power Plant, Unit 1
Briefing by and discussions with representatives of the NRC staff regarding the findings and recommendations of the Augmented Inspection Team, which investigated the January 26, 2000 reactor trip event at the E. I. Hatch Nuclear Power Plant, Unit 1.

Physical Security Requirements for Power Reactors (Open/Closed)
Briefing by and discussions with representatives of the NRC staff regarding the status of revising the physical security requirements for power reactors. The focus will be on the incorporation of insights gained from threat assessment activities conducted by the staff in coordination with other Federal agencies.

Sincerely,

/**RA**/

Dana A. Powers
Chairman

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