



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

SL-0473

PDR

September 3, 1999

The Honorable Greta Joy Dicus  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Dear Chairman Dicus:

SUBJECT: SUMMARY REPORT - FOUR HUNDRED SIXTY-FOURTH MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, JULY 14-16, 1999, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 464th meeting, July 14-16, 1999, 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, to transmit the memoranda noted below:

REPORTS

- SECY-99-148, "Credit for Existing Programs for License Renewal" (Report to Greta Joy Dicus, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated July 19, 1999)
- Proposed Revision 3 to Regulatory Guide 1.160 (DG-1082), "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants" (Report to Greta Joy Dicus, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated July 21, 1999)
- Proposed Final Regulatory Guide 1.181, "Content of the Updated Final Safety Analysis Report in Accordance with 10 CFR 50.71(e)" (Report to Greta Joy Dicus, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated July 21, 1999)
- Proposed Final Amendment to 10 CFR 50.55a, "Codes and Standards" (Report to Greta Joy Dicus, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated July 23, 1999)

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### LETTER

- Revision of Appendix K, "ECCS Evaluation Models," to 10 CFR Part 50 (Letter to William D. Travers, Executive Director for Operations, NRC, from Dana A. Powers, Chairman, ACRS, dated July 22, 1999)

### MEMORANDA

- Proposed Revision of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants -- LWR Edition," Chapter 13, "Conduct of Operations" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated July 21, 1999)
- Draft Regulatory Guide DG-1086, "Criterion for Triggering a Review Under 50.80 for Non-Owner Operator Service Companies" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated July 21, 1999)
- Latest Draft of the Differing Professional Opinion Consideration Document (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated July 22, 1999)

### OTHER

- Letter to John J. Holden, Vice President and Site Director, Florida Power Corporation, Crystal River Energy Complex, from John T. Larkins, Executive Director, ACRS, dated July 23, 1999.

### HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE

1. Electric Power Research Institute (EPRI) RETRAN-3D Thermal-Hydraulic Transient Analysis Code

The Committee heard presentations by and held discussions with ACRS Member Dr. G. Wallis, and representatives of EPRI and NRC staff regarding the EPRI RETRAN-3D thermal-hydraulic transient analysis code. Dr. Wallis summarized the results of his review of the documentation supporting RETRAN, focusing on the modeling of momentum and the associated equations. Dr. Wallis raised a number of significant concerns with the modeling approach, and noted that the use of the

global momentum equation to compute the rate of change of flowrate is inappropriate.

EPRI representatives discussed the modeling approach used in the code and noted that the RETRAN calculations are approximations. EPRI representatives stated that they are prepared to demonstrate that the momentum formulations are mathematically correct and that the code compares well against plant transient data. The Committee requested EPRI to provide a detailed response to Dr. Wallis' concerns. A representative of the NRC staff summarized the status of the staff review of the RETRAN-3D Code. The staff intends to require that EPRI formally respond to the issues raised by Dr. Wallis. In addition, the staff may expand the scope of its review of the RETRAN-3D given the concerns cited by Dr. Wallis.

### Conclusion

The Committee considered submitting formal comments on this matter. Following a discussion, Committee action was postponed pending receipt and review of EPRI's response to the concerns expressed by Dr. Wallis.

## 2. Proposed Revision to Appendix K of 10 CFR Part 50

The Committee heard presentations by and held discussions with representatives of the NRC staff and the Caldon Corporation regarding the proposed revision to Appendix K of 10 CFR Part 50. The proposed rule revision will permit a reduction in the conservatism of the reactor power level assumed for loss-of-coolant accident analysis. Specifically, the staff proposes to relax the requirement that the licensee use 1.02 times licensed power for the Appendix K emergency core cooling system analysis. This rulemaking is in response to efforts of licensees to seek credit in licensing analyses for reduction in uncertainties resulting from the use of more accurate flow measurement systems in measuring reactor power levels. This proposed rule change is intended to avoid a large number of licensee exemption requests thereby limiting the associated regulatory burden. Licensees granted this regulatory relief are likely to pursue small power uprates or cost-saving changes to plant operating parameters, which may have to be approved by the NRC.

A representative of the Caldon Corporation discussed the criteria Caldon has established to ensure safe application of more accurate feedwater flow measurement systems.

Conclusion

The Committee issued a letter to the Executive Director for Operations, dated July 22, 1999, on this matter.

3. Options for Crediting Existing Programs for License Renewal

The Committee heard presentations by and held discussions with representatives of the NRC staff and the Nuclear Energy Institute (NEI) regarding the proposed options, included in SECY-99-148, for crediting existing NRC-approved programs for license renewal. The staff recommended that existing programs be reviewed and that the results of the Generic Aging Lessons Learned (GALL) process be used to focus the Standard Review Plan for license renewal applications. NEI representatives stated that the staff review should be focused on modified and new aging management programs and not on verifying the licensing basis. The Committee discussed what constitutes an adequate aging management program, the need for analyses of the long-term effects of significant abnormal events, the types of inspections performed, and the options proposed by the staff.

Conclusion

The Committee issued a report to Chairman Dicus, dated July 19, 1999, on this matter.

4. Proposed Revision 3 to Regulatory Guide 1.160 (DG-1082), "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants"

The Committee heard presentations by and held discussions with representatives of the NRC staff and NEI regarding the proposed Revision 3 to Regulatory Guide 1.160 (DG-1082) and the draft revision to Section 11, "Assessment of Risk Resulting from Performance of Maintenance Activities," of NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."

The NRC staff stated that the proposed Revision 3 to Regulatory Guide 1.160 provides an acceptable method for complying with the requirements in 10 CFR 50.65 (a)(4). Paragraph (a)(4) of the rule requires licensees to assess and manage the increase in risk before maintenance activities are performed on structures, systems, and components (SSCs). Emphasis should be placed on the assessment of those SSCs modeled in the licensee's probabilistic risk assessment (PRA), in addition to all SSCs considered to be risk significant by the licensee's Maintenance Rule Expert Panel. Licensees also should consider low-safety significant SSCs

which may have an impact on support systems with intersystem dependencies.

NEI representatives stated that a draft copy of the NUMARC 93-01 document is being revised and it will be available for staff review by the end of August 1999. NEI representatives stated that they are working with the staff and the industry to resolve comments on the draft revision to Section 11 of NUMARC 93-01 and the issues associated with the definitions of "reliability" and "unavailability."

### Conclusion

The Committee issued a report to Chairman Dicus, dated July 21, 1999, on this matter.

#### 5. Proposed Approach for Revising 10 CFR 50.61, Pressurized Thermal Shock (PTS) Rule

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning current NRC and industry efforts to develop a technical basis for promulgating a risk-informed revision to 10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," (PTS rule). The staff stated that it plans to use a combination of new research data and an expert elicitation process to formulate a technically sound basis for making 10 CFR 50.61 risk informed. Based on recent research findings, the staff expects that further analyses will result in an order of magnitude reduction in the probability of reactor pressure vessel (RPV) failure due to PTS events.

The Committee members discussed the need for the staff to concentrate its efforts first on the reevaluation of the technical basis for the through-wall crack penetration mean frequency of  $5 \times 10^{-6}$  per reactor-year acceptance criterion in Regulatory Guide 1.154, "Format and Content of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors," and noted that the success of the expert elicitation process for flow distribution assumptions will depend entirely on the integrity of the empirical data that have been or will be gathered during this effort. The staff plans to issue the proposed revision to the PTS screening criterion by September 2001.

### Conclusion

This briefing was for information only. As requested by the staff, the Committee plans to hold discussions with the staff at crucial milestones during the development of a revised PTS screening criterion.

6. Proposed Final Regulatory Guide for Updating Final Safety Analysis Reports

The Committee heard presentations by and held discussions with representatives of the NRC staff and NEI regarding the proposed final Regulatory Guide 1.181, "Content of the Updated Final Safety Analysis Report in Accordance with 10 CFR 50.71(e)." NEI representatives discussed NEI 98-03, Revision 1, "Guidelines for Updating Final Safety Analysis Reports," which the staff endorses in Regulatory Guide 1.181. The Committee discussed the industry experience and initiatives that led to the need for this guidance, the staff's use of enforcement discretion during the interim update period, and major provisions of the proposed guidance including allowance for removal of excessive detail, unnecessary, obsolete, and redundant information from Final Safety Analysis Reports. The Committee discussed the possible evolution in the regulations (e.g., risk informed, performance based, etc.) that will lead to changes in the assessment of safety system performance and the types of accidents that are considered in safety analysis reports.

Conclusion

The Committee issued a report to Chairman Dicus, dated July 21, 1999, on this matter.

7. Control Room Habitability

The Committee heard presentations by and held discussions with representatives of the NRC staff and NEI regarding the issue of nuclear power plant control room habitability/integrity. As part of this discussion, the Committee also heard a presentation by Dr. Louis Kovach, an Invited Expert, on the control room leak testing.

Dr. Kovach briefly discussed problems related to airflow and air purification. He stated that in the past, air-in leakage values were measured for several control rooms by performing tracer gas tests. The results of these tests showed that for several control rooms, the original design values assumed in the radiological consequences analysis for the control room air-in leakage were exceeded by approximately 2 to 55 fold. While the tracer gas tests have a reasonable accuracy, the conditions under which these tests are performed are not well defined and introduce a far greater error than indicated by the cited in-leakage values alone. Dr. Kovach stated that the conditions under which the control room envelopes and the ventilation systems are tested should be carefully established to yield realistic data.

Mr. Jack Hayes, NRC staff, presented the background and the results of the tracer gas tests conducted in the control rooms of the nuclear power plants. He stated

that tracer testing represented a sampling of 13 control rooms at 21 plants. None of the control rooms tested met the licensing basis and some did not meet the requirements of 10 CFR Part 50, Appendix A, General Design Criterion 19. He concluded by stating that the staff is working with NEI to address the concerns on control room habitability.

Mr. Kurt Cozens, NEI, stated that NEI created a Control Room Habitability Task Force in 1998 to resolve this issue. He stated that the Task Force is developing a NEI guidance document for the licensees. The staff was provided with a draft copy of the NEI 99-03 guidance document for review. NEI is addressing NRC comments on the draft document and plans to issue a revised document in August 1999.

#### Conclusion

This briefing was for information only. A meeting of the Severe Accident Management Subcommittee is scheduled for September 17, 1999 to review this matter in detail. The ACRS plans to continue its review of this matter during its October 1999 meeting.

#### 8. Proposed Amendment to 10 CFR 50.55a

The Committee heard presentations by and held discussions with representatives of the NRC staff regarding the proposed amendment to 10 CFR 50.55a, "Codes and Standards." The staff concluded that the amendment does not change the character of the ASME Codes and does not represent a government-unique standard as defined by Public Law 104-113. The Committee and staff discussed the use of ASME Code Cases, the staff's justification for the proposed limitations, the reason for the number of ASME Code revisions, the meaning of "engineering judgment," and the frequency of ASME Code updates.

#### Conclusion

The Committee issued a report to Chairman Dicus, dated July 23, 1999, on this matter. The Committee plans to review the proposed final amendment to 10 CFR 50.55a related to the elimination of the 120-month inservice inspection and inservice testing update requirement during the October 1999 ACRS meeting. The NRC staff subsequently stated that they would brief the ACRS on the status of the high pressure safety injection Class 1 weld examination issue and the staff's recommendations regarding the inservice inspection and inservice testing update requirement during the September 30-October 2, 1999, ACRS meeting.

9. Subcommittee Report

Dr. Kress, Chairman of the ACRS Subcommittee on Regulatory Policies and Practices, provided a report of the July 13, 1999, joint meeting of the Subcommittees on Reliability and Probabilistic Risk Assessment and on Regulatory Policies and Practices concerning the development of risk-informed revisions to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." Dr. Kress stated that all but one ACRS member attended this meeting. He noted that another meeting of the joint Subcommittees was scheduled for September 23-24, 1999, to review the staff's proposed rulemaking plan and the staff's plans to conduct a study to evaluate other areas of 10 CFR Part 50 which might be made risk informed.

Conclusion

The ACRS plans to discuss this matter during its September 30-October, 2, 1999 meeting.

10. Proposed Plan for Preparation of the Annual ACRS Report to the Commission

The Committee discussed its proposed plan and schedule for completing the year 2000 ACRS report to the Commission regarding the NRC Safety Research Program. This discussion included the format and content, and the identification of the research areas that should be addressed in the ACRS report.

Conclusion

As requested by RES, the Committee plans to expedite its review of the NRC Safety Research Program and completion of the annual report to the Commission.

11. Highlights from Incident Reporting System

Representatives of the NRC staff and a private consultant briefed the Committee on the highlights of events that occurred at foreign nuclear plants during the 1997-1998 period. The International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) of the Organization for Economic Co-operation and Development (OECD) jointly operate an Incident Response System (IRS) by collecting data on nuclear power plants. The IRS was established as a tool for the exchange of information among regulators that do not have access to an information system with the nuclear industry. The IAEA staff retrieved 128 IRS reports. Due to a low relevance, 74 reports were eliminated from the review. The remaining 54 reports were subdivided into three groups; events with important

lessons, equipment and system issues, and management of safety.

### Conclusion

This briefing was for information only.

## RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- The Committee discussed the response from the NRC Executive Director for Operations (EDO) dated June 14, 1999, to ACRS comments and recommendations included in the ACRS report dated May 17, 1999, concerning the proposed final revisions to 10 CFR 50.59 and related requirements in 10 CFR Parts 50 and 72 concerning changes, tests, and experiments.

The Committee plans to review the proposed regulatory guide, inspection procedures, and associated industry guidance in NEI 96-07 during future meetings.

- The Committee discussed the EDO's response dated June 22, 1999, to the ACRS comments and recommendations included in the ACRS letter dated May 19, 1999 concerning modifications proposed by the Westinghouse Owners Group to the Core Damage Assessment Guidance and the Post Accident Sampling System Requirements.

The Committee was not satisfied with the EDO's response to this matter and decided to continue its discussion of this issue during its September 1-3, 1999 meeting.

- The Committee discussed the EDO's response dated June 28, 1999, to the ACRS comments and recommendations included in the ACRS letter dated May 19, 1999, concerning an interim letter on the safety aspects of the Baltimore Gas and Electric Company's license renewal application for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.

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

- The Committee discussed the EDO's response dated July 15, 1999, to the ACRS comments and recommendations included in the ACRS letter dated June 11, 1999, regarding the proposed options for using averted onsite costs and voluntary initiatives in regulatory analyses.

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

- The Committee discussed the EDO's response, dated June 2, 1999, to ACRS comments and recommendations included in the ACRS reports dated April 14 and May 11, 1999, regarding proposed final revision to 10 CFR 50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants.

The Committee plans to continue its discussion of this matter during future meetings.

- The Committee discussed the EDO's response dated July 2, 1999, to ACRS comments and recommendations included in the ACRS report dated May 14, 1999, concerning proposed resolution of Generic Safety Issue-158, Performance of safety-related power-operated valves under design basis conditions.

The Committee plans to follow-up on the progress made by the staff and industry in addressing the ACRS concern whether power-operated relief valves are able to perform their intended functions under design basis dynamic conditions.

- The Committee discussed the EDO's response dated July 13, 1999, to ACRS comments and recommendations included in the ACRS report dated May 17, 1999, regarding the use of mixed oxide fuel in commercial nuclear power plants.

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

#### OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from June 2, 1999 through July 13, 1999, the following Subcommittee meetings were held:

- Joint Plant Operations and Fire Protection - June 23, 1999

The Subcommittees met with the NRC Region I personnel to discuss plant performance review, implementation challenges associated with the revised inspection and assessment programs, and fire protection issues, including the results of the pilot fire protection functional inspections.

- Plant License Renewal - June 30 and July 1, 1999

The Subcommittee reviewed the safety evaluation reports related to Babcock and Wilcox generic license renewal program topical reports and the Oconee license renewal application, and issues associated with the license renewal process.

- Joint Reliability and Probabilistic Risk Assessment and Regulatory Policies and Practices - July 13, 1999

The Subcommittees discussed the staff's plans for the development of risk-informed revisions to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"

- Planning and Procedures - July 13, 1999

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.

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

- The Committee plans to review the proposed regulatory guide, which would provide guidance for implementing the revised 10 CFR 50.59 process, inspection procedures, and associated industry guidance in NEI 96-07 during the December 2-4, 1999, ACRS meeting.
- The Committee plans to continue its discussion of the June 22, 1999 EDO response to the ACRS comments and recommendations included in the May 19, 1999, letter on the Westinghouse Owners Group proposed modifications to the Post Accident Sampling System requirements.
- The Committee would like to hear a briefing by the staff at a future meeting regarding the progress made by the staff and industry in ensuring that power-operated relief valves perform their intended functions under design basis dynamic conditions.
- The Committee plans to continue its discussion of issues associated with maintenance activities during its review of the proposed final revision 3 to Regulatory Guide 1.160, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants."
- The Committee plans to review the revised Section 11, "Assessment of Risk Resulting from Performance of Maintenance Activities," of NUMARC 93-01 document when available.
- As requested by the staff, the Committee plans to hold discussions with the staff at crucial milestones during the development of a revised PTS screening criterion.

- The Committee plans to discuss the control room habitability issues as well as the NEI 93-03 guidance document during the October 1999 ACRS meeting.
- The Committee plans to review the proposed final amendment to 10 CFR 50.55a regarding elimination of the 120-month ISI and IST update requirement at the October 1999 ACRS meeting.

#### PROPOSED SCHEDULE FOR THE 465TH ACRS MEETING

The Committee agreed to consider the following during the 465th ACRS Meeting, September 1-3, 1999:

Safety Evaluation Report Related to the Oconee Nuclear Power Plant License Renewal Application for Oconee Nuclear Power Plant Units 1, 2, and 3, and related matters  
Briefing by and discussions with representatives of the NRC staff and Duke Energy Corporation regarding the staff's Safety Evaluation Report associated with the license renewal application for the Oconee Nuclear Power Plant Units 1, 2, and 3, and other license renewal issues.

Proposed Resolution of Generic Safety Issue-145, "Actions to Reduce Common Cause Failures" Briefing by and discussions with representatives of the NRC staff regarding proposed resolution of Generic Safety Issue-145.

Proposed Final Source Term Rule and Associated Draft Regulatory Guide and Standard Review Plan Section, and related matters  
Briefing by and discussions with representatives of the NRC staff regarding the proposed final rule on the application of alternative source term at operating plants and associated draft regulatory guide and Standard Review Plan Section, and related matters.

Proposed Revision to Regulatory Guide 1.78 (DG-1087), "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release" (Open) Briefing by and discussions with representatives of the NRC staff regarding the proposed revision to Regulatory Guide 1.78.

ACRS Plans for Reviewing the RETRAN-3D Thermal-Hydraulic Transient Analysis Code  
Discussion by the Committee members regarding the ACRS plans for reviewing the Electric Power Research Institute RETRAN-3D thermal-hydraulic transient analysis code.

Application of the Electric Power Research Institute (EPRI) Risk-Informed Methods to Inservice Inspection of Piping  
Briefing by and discussions with representatives of the NRC staff and EPRI regarding the staff's proposed final Safety Evaluation Report on the application of the EPRI risk-informed

methods to inservice inspection of piping at nuclear power plants.

Proposed Guidance for Using Risk Information in the Review of Licensing Actions and related matters

Briefing by and discussions with representatives of the NRC staff regarding the proposed guidance for using risk information in the review of licensing actions, and related matters.

Proposed Final Revision 3 to Regulatory Guide 1.105, "Instrument Setpoints for Safety Systems"

Briefing by and discussions with representatives of the NRC staff regarding proposed final revision 3 to Regulatory Guide 1.105.

Office of Nuclear Regulatory Research (RES) Self-Assessment Program

Briefing by and discussions with representatives of RES regarding the status of activities associated with the RES self- assessment program, including the proposed process for prioritizing RES activities.

Sincerely,

A handwritten signature in black ink that reads "Dana A. Powers". The signature is written in a cursive style with a large, prominent "D" at the beginning.

Dana A. Powers  
Chairman