



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

SL-0538

March 14, 2006

The Honorable Nils J. Diaz
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Chairman Diaz:

SUBJECT: SUMMARY REPORT - 529th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, February 9-10, 2006, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 529th meeting, February 9-10, 2006, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following letters and memoranda:

LETTERS:

Letters to Luis A. Reyes, Executive Director for Operations, NRC, from Graham B. Wallis, Chairman, ACRS:

- Draft NUREG Report, "Evaluation of Human Reliability Analysis Methods Against Good Practices," dated February 22, 2006.
- Standard Review Plan, Section 14.2.1, "Generic Guidelines for Extended Power Uprate Testing Programs," dated February 22, 2006.

MEMORANDA:

Memoranda to Luis A. Reyes, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS:

- Draft Final Revision 2 to Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis," dated February 14, 2006.
- Proposed Revisions to Regulatory Guides Regarding ASME Code Cases, dated February 14, 2006.
- Anonymous Letter Concerning the TRACE Computer Code Development and Review Practices, dated February 15, 2006.

OTHER:

- Letter to Mr. Paul B. Blanch from ACRS Chairman, Graham B. Wallis, dated February 10, 2006, Subject: Questions About The Role of the ACRS.

HIGHLIGHTS OF KEY ISSUES

1. Evaluation of Human Reliability Analysis (HRA) Methods Against Good Practices

The Committee met with representatives of the NRC staff to discuss the draft NUREG report on the evaluation of HRA methods against the good practices specified in NUREG-1792. The Committee reviewed the good practices in May 2004, while a joint meeting of the Human Factors and Reliability & Probabilistic Risk Assessment subcommittees reviewed the draft NUREG on the evaluation of methods in December 2005. The purpose of this report is to aid reviewers of HRAs in assessing the quality of analyses submitted to the NRC. It also provides the technical basis for developing review questions. Since this report highlights the strengths, limitations, and bases of various commonly applied HRA methods, it should also be useful to analysts preparing HRAs and other submittals requiring human performance considerations.

Committee Action:

The Committee issued a report to the NRC EDO, dated February 22, 2006, recommending that the draft report be issued for public comment.

2. Proposed Revisions to SRP Section 14.2.1, "Generic Guidelines for Extended Power Uprate Testing Programs"

The Committee met with representatives of the NRC staff to discuss the Standard Review Plan (SRP) 14.2.1, "Generic Guidelines for Extended Power Uprate [EPU] Testing Programs." The staff provided recent changes to the SRP, staff evaluations using the SRP, and a discussion of SRP Paragraph III.C, "Justification for Elimination of EPU Power Ascension Tests." Most of the SRP changes were editorial. The Committee focused on Paragraph III.C. The Committee said Paragraph III.C properly identifies the factors that would support a decision to eliminate EPU power ascension tests, but Paragraph III.C does not provide explicit guidance on how the decision should be made.

Committee Action:

The Committee issued a report to the NRC EDO, dated February 22, 2006, recommending that Paragraph III.C of SRP Section 14.2.1 be rewritten to provide more structured and explicit guidance defining those conditions under which large transient tests would be exempted or required.

3. FERRET Reactor Vessel Fluence Methodology

The Committee met with representatives of NRR to discuss the FERRET least squares adjustment methodology for reactor vessel dosimetry. The staff's presentation described the applicable General Design Criteria, the discrepancy between calculated and measured fluence values, and the history associated with the FERRET methodology. The general design criteria state that the reactor coolant pressure boundary should behave in a non-brittle manner and fluence is a major source of embrittlement in these materials. Fluence is also needed to calculate pressure-temperature limits for reactor pressure vessels. The FERRET methodology

combines measured dosimetry foil activations and calculated neutron spectrums to determine best estimate fluence. The staff requested that this methodology be submitted for review after reviewing vessel dosimetry reports that showed large discrepancies in the ratios of calculated to measured values. In 2004 Westinghouse submitted a topical report regarding the FERRET methodology for the staff's review. This report was later revised based on staff comments. The revised report includes a database of 104 surveillance capsules with uncertainties of about 10%. The staff approved the FERRET methodology under the condition that the uncertainties are within the bounds of the database.

Committee Action

This briefing was for information only. No committee action is necessary.

4. Draft 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 February meeting, the Committee discussed its draft 2006 report to the Commission on the NRC Safety Research Program.

Committee Action

The Committee plans to continue its discussion of the draft report on the NRC safety research program during its March 2006 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 February 8, 2006 meeting with the NRC staff and representatives of Progress Energy Carolinas, Inc. (PEC) to review the draft safety evaluation report (SER) related to the license renewal application for the Brunswick Steam Electric Plant, Units 1 and 2. The current operating licenses for Units 1 and 2 expire on September 8, 2016, and December 27, 2014, respectively. During the meeting, PEC described the plant, its operating history, the license renewal review methodology, and its commitment tracking system. The primary containments are of the BWR Mark I design but are constructed of reinforced concrete with a carbon steel liner. The staff's draft SER was issued on December 20, 2005 and contains no open or confirmatory items.

Subcommittee Report on NRC Safety Culture Initiative

The Chairman of the joint Subcommittees on Human Factors and Reliability and Probability Risk Assessment provided a report to the Committee summarizing the results of the January 25, 2006 Subcommittee meeting with the NRC staff regarding the status of NRC's safety management/culture initiatives and associated approaches to address safety culture in the regulatory oversight process (ROP). The Subcommittee gathered information in three areas (1) description of safety culture components and how they would be used in a regulatory process, (2) status of NRC safety culture initiative and proposed approach, and (3) international experience related to safety culture. The Subcommittee Chairman proposed that a letter to Commission be written on NRC's safety culture initiative.

Subcommittee Report on Thermal Hydraulic Phenomena

The Chairman of the Thermal Hydraulics Subcommittee provided a report to the Committee summarizing the results of the January 19, 2006 meeting with the NRC staff regarding a revision to Regulatory Guide 1.82 to reflect lessons learned from the Vermont Yankee Power Uprate review. The revised Regulatory Guide should be available for ACRS consideration in mid-2006. The Subcommittee Chairman also reported that the staff safety evaluation related to the ESBWR stability analysis methodology was considered and an additional meeting with GE and the staff will be needed in March to resolve outstanding issues.

Subcommittee Report on Regulatory Policies and Practices and Thermal Hydraulic Phenomena

The Chairman of the joint Subcommittees on Regulatory Policies and Practices and Thermal Hydraulic Phenomena provided a report to the Committee summarizing the results of the January 25, 2006 meeting to discuss a preliminary version of the draft proposed regulatory guide in support of a voluntary alternative rule that would allow licensees to implement a redefined large break LOCA and associated risk-informed ECCS requirements.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of December 21, 2005, to comments and recommendations included in the ACRS' November 18, 2005 report on the safety aspects of the license renewal application for the Point Beach Nuclear Plant (PBNP) Units 1 and 2. The Committee decided that it was satisfied with the EDO's response.

The EDO response stated that Region III staff will perform at least two biennial Problem Identification and Resolution (PI&R) inspections at PBNP before Unit 1 enters the period of extended operation and additional PI&R inspections before Unit 2 enters the period of extended operation. Region III staff will also spend at least 100 hours of inspection on special reviews of the licensee's Corrective Action Program after the original red findings have been closed out.

- The Committee considered the EDO's response of December 23, 2005, to comments and recommendations included in the ACRS' November 18, 2005 report on the staff recommendation to withdraw the proposed rule on post-fire operator manual actions. The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of December 23, 2005, to comments and recommendations included in the ACRS' November 18, 2005 report on the draft final Generic Letter 2005-xx, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power." The Committee decided that it was satisfied with the EDO's response.

The EDO's response stated the staff will consider exploring the grid reliability issues stated in the generic letter with the licensees after the electric reliability standards are approved and in effect, the staff will continue to work with FERC

and NERC on grid reliability matters as suggested in your letter to ensure a reliable offsite power system for the nuclear power plants, and we will brief the ACRS after the staff has evaluated the information submitted by the licensees in response to the subject generic letter.

- The Committee considered the EDO's response of December 23, 2005, to comments and recommendations included in the ACRS' November 21, 2005 report on the Committee's review of the Draft NRC Digital System Research Plan for FY 2005 - FY 2009. The Committee decided that it was satisfied with the EDO's response.

In the EDO's response letter, the staff agrees with all of the Committee's recommendations. The staff plans to expand the research project in Section 3.3.1 of the plan to include development of an inventory and classification system as recommended. The staff plans to better identify regulatory needs and anticipated benefits across all research areas. The staff believes the research gives equal weight to the two aspects of software safety, and plans to ensure that the system-centric approach is more apparent in the plan. Finally, the staff plans to conduct research related to advanced nuclear power plant digital systems with a high priority once the design information becomes available.

- The Committee considered the EDO's response of January 19, 2006, to comments and recommendations included in the ACRS' December 21, 2005 report on the safety aspects of the draft final Generic Letter 2005-xx, "Impact of Potentially Degraded Hemyc/MT Fire Barrier Materials on Compliance with Approved Fire Protection Programs." The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of February 1, 2006 to the ACRS' December 23, 2005 letter on the final Safety Evaluation Report of the System Energy Resources, Inc., application for the Grand Gulf early site permit. The Committee decided that it was satisfied with the EDO's response.

The EDO response noted the Committee's concern with transportation accidents on the Mississippi River and has asked the applicant to provide additional information to demonstrate how it meets Regulatory Guide 1.91, "Evaluations of Explosions Postulated to Occur on Transportation Routes Near Nuclear Power Plants." The NRC staff's evaluation of this information will be documented in an upcoming NUREG. Prior to issuance of the NUREG, the staff plans to inform the ACRS of the proposed changes. The Committee plans to review the staff's evaluation of this information.

- The Committee considered RES' response of December 7, 2005, to the findings included in the ACRS' November 4, 2005 letter on the ACRS' assessment of the quality of selected research projects. The Committee decided that it was satisfied with RES' response.

The RES response stated that staff intends to re-examine the data and the data reduction from the Rod Bundle Heat Transfer tests at the Pennsylvania State University (PSU) before they are used for model and correlation development.

The RES response stated that questionable assumptions involving the treatment of fluid properties, flow patterns, and magnitude of the bundle pressure drop will be revised if those assumptions made by PSU are found to be inadequate. The RES response also stated that the grid effect on low void and low flow rates will receive additional consideration in future evaluations of these data. RES will soon propose a list of candidate projects for ACRS review in FY 2006.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from December 8, 2005 through February 8, 2006, the following Subcommittee meetings were held:

- Reliability and Probabilistic Risk Assessment and Human Factors — December 15-16, 2005

The joint Subcommittees examined the status of human reliability analysis including ATHEANA, SPAR-H, and industry approaches.

- Thermal-Hydraulic Phenomena — January 19, 2006

The Subcommittee reviewed the analytical methods to be used to evaluate stability scenarios for the ESBWR and discussed the staff's plans to revise Regulatory Guide 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident."

- Human Factors and Reliability and Probability Risk Assessment — January 25, 2006

The Subcommittees examined the status of NRC's safety management/culture initiatives, and associated approaches to address safety culture in the regulatory oversight process.

- Regulatory Policies and Practices and Thermal-Hydraulic Phenomena — January 25, 2006

The Subcommittees reviewed the staff's draft proposed Regulatory Guide in support of risk-informed changes to loss-of-coolant accident technical requirements.

- Planning and Procedures — January 26-27, 2006

The Subcommittee discussed ACRS business processes, anticipated workload, future technical expertise needed on the Committee, strategy for handling anticipated heavy workload, proactive initiatives, knowledge management, ACRS subcommittee structure, stakeholders' comments received during the ACRS self-assessment survey, technical challenges in the areas of advanced reactor designs, early site permits, extended power uprates, and risk-informing 10 CFR Part 50.

- Planning and Procedures — February 8, 2006

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

- Plant License Renewal — February 8, 2006

The Subcommittee reviewed the License Renewal Application for the Brunswick Steam Electric Plant, Units 1 and 2 and the associated Safety Evaluation Report with Open Items.

LIST OF MATTERS FOR THE ATTENTION OF THE EDO

- The Committee plans to review the draft final NUREG report, "Evaluation of Human Reliability Analysis Methods Against Good Practices," during a future meeting.
- The Committee would like to be kept informed of changes to Standard Review Plan Section III.c.
- The Committee would like to be kept informed of the disposition of issues related to the development, validation, and verification of the TRACE Code.
- The Committee plans to review the final changes to the ROP manual chapters and inspection procedures to address safety culture and the staff's safety culture initiative during its April 2006 meeting.
- The Committee plans to review the application of the TRACG Code for analyzing the Economic Simplified Boiling Water Reactor stability during its April 2006 meeting.
- The Committee plans to review proposed Revision 4 to Regulatory Guide 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident," during a future meeting.
- The Committee plans to review the draft final rule and associated Regulatory Guide in support of a risk-informed alternative to ECCS requirements during a future meeting.
- The Committee plans to review the final Safety Evaluation Report related to the license renewal of the Brunswick Steam Electric Plant, Units 1 and 2 during its May 2006 meeting.

PROPOSED SCHEDULE FOR THE 530th ACRS MEETING

The Committee agreed to consider the following topics during the 530th ACRS meeting, to be held on March 9-11, 2006:

- Final Review of the Clinton Early Site Permit Application
- Staff's Evaluation of the Licensees' Responses to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors"
- Results of the Chemical Effects Tests Associated with PWR Sump Performance
- Final Review of the License Renewal Application for Browns Ferry Units 1, 2, and 3
- Draft Final Revision 4 (DG-1128) to Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants"
- Evaluation of Precursor Data to Identify Significant Operating Events
- Draft final ACRS Report on the NRC Safety Research Program

Sincerely,

/RA/

Graham B. Wallis
Chairman