



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

SL-0540

May 12, 2006

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

Dear Chairman Diaz:

SUBJECT: SUMMARY REPORT - 531st MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, APRIL 5-7, 2006, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 531st meeting, April 5-7, 2006, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and letters:

REPORTS:

Reports to Nils J. Diaz, Chairman, NRC, from Graham B. Wallis, Chairman, ACRS:

- NRC Staff's Proposed Approach to Enhance the Reactor Oversight Process to Address Safety Culture Issues, dated April 21, 2006
- Review of Ongoing Security-Related Activities (Official Use Only – Security-Related Information), dated April 24, 2006

LETTERS:

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

- Review of the 1994 Addenda to the ASME Code for Class 1, 2, and 3 Piping Systems and the Resolution of the Differences Between the NRC Staff and ASME, dated April 14, 2006
- Grand Gulf Early Site Permit Application: Evaluation of Transportation Accidents on the Mississippi River, dated April 14, 2006
- Response to Your March 29, 2006 Letter Regarding Standard Review Plan, Section 14.2.1, "Generic Guidelines for Extended Power Uprate Testing Programs," dated April 19, 2006
- Draft Final Regulatory Guide 1.205, "Risk-Informed Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," dated April 20, 2006
- Application of the TRACG Computer Code to Evaluate the Stability of the Economic Simplified Boiling Water Reactor, dated April 21, 2006

HIGHLIGHTS OF KEY ISSUES

1. Safeguards and Security Matters

The Committee met with representatives of the NRC staff to discuss recent structural calculations, confirmatory fire analysis research, results of three plant-type analyses, spent fuel pool heatup calculations, the spent fuel experimental program, and the plant-specific mitigation strategy assessments. The primary purpose of the discussions was to review the staff's activities in these areas in light of the Committee's previous conclusions and recommendations.

Committee Action:

The Committee issued a report to the NRC Chairman, dated April 24, 2006, concluding that the staff's activities appropriately address the Committee's past recommendations. The Committee also stated several other conclusions and recommendations regarding specific issues.

2. Application of TRACG Code to ESBWR Stability

The Committee reviewed the staff's draft Safety Evaluation report related to the application of the TRACG computer code to evaluate the stability of the Economic Simplified Boiling Water Reactor (ESBWR). The Committee focused on whether TRACG can adequately model those ESBWR features that affect stability, in light of the reliance of the ESBWR on natural circulation, rather than forced circulation, to provide flow to the core during full-power operation.

The evaluation was limited to the capabilities of TRACG to represent the major physical phenomena occurring in the ESBWR. Both the NRC staff and General Electric presented detailed calculations and comparisons of computer code predictions against data from test facilities and operating BWRs. These comparisons included scenarios during which the plants were operating at or close to natural conditions, and they indicated that TRACG has the ability to model the phenomena that are relevant to the ESBWR, and that TRACG represents the oscillations with reasonable accuracy.

Committee Action

The Committee issued a letter to the EDO, dated April 21, 2006, recommending that the staff approve the application of the TRACG code to analyze the stability of the ESBWR during normal operation, anticipated operational occurrences, and the low-power phase of reactor startup.

3. Hazards Analysis Associated with the Grand Gulf Early Site Permit Application and the Associated NRC Staff's Evaluation

The Committee met with representatives of the NRC staff and System Energy Resources, Inc. (SERI), the applicant, regarding the hazards analysis associated with the Grand Gulf Early Site Permit (ESP) application. The staff summarized the applicant's probabilistic analysis used to assess the hazards posed to the ESP site by barge traffic on the Mississippi River. The applicant estimated the probability associated with each volatile commodity that could cause an over-pressure of greater than 1 psi at the ESP site to ensure that it was less than 1E-6/yr. The applicant considered over-pressure conditions that could result from an explosion contained within a barge; explosions near a barge that had spilled volatile, combustible cargo so that a vapor cloud developed; and explosions of vapor clouds that drifted toward the proposed site. The applicant estimated that the total probability (from all sources) of exceeding 1 psi at the ESP site to be approximately 3E-8/yr. The NRC staff independently evaluated the probabilities of these three classes of explosions. The staff was careful to use shipment frequencies, accident frequencies, spill frequencies and the like that could be justified based on data applicable to barge traffic on the Mississippi River. The staff adopted conservative probabilities in those instances where sufficient data were not available to justify lower probabilities used in some cases by the applicant. The Staff

concluded that the probability of an explosion producing a pressure pulse in excess of 1psi at the proposed power plant site was on the order of the 1E-6/yr. The staff concluded that explosions of such low probability posed negligible risk to power plant facilities that might be located on the proposed site. The Committee found the staff's analyses of river transportation accidents acceptable and supported the changes to the Safety Evaluation Report the staff proposes to make to describe these analyses.

Committee Action

The Committee issued a letter to the EDO, dated April 14, 2006, on this matter that supported issuance of the ESP.

4. Safety Conscious Work Environment/Safety Culture

The Committee reviewed NRC's initiative to enhance the Reactor Oversight Process (ROP) to more fully address safety culture issues. The Committee examined the staff's approach to treating safety culture in a regulatory framework including the associated inspection manual chapter and procedures, safety culture components and their link to the cross-cutting areas, and stakeholder interactions. However, revision to Inspection Procedure 95003 "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input," that governs how an independent assessment of licensees' safety culture is to be performed, was not reviewed by the Committee because it was not available at the time of the meeting. Committee members noted that Inspection Procedure 95003 will need to include clear thresholds and expectations for the resolution of the staff's concerns with the licensee's safety culture. Several issues were considered by the Committee and discussed including the adequacy of the time available for Resident Inspector review of entries to the corrective action program, and relevancy of safety culture components to more than one cross-cutting issue. The staff concluded by stating that implementation of the revised ROP to address safety culture is on track for July 1, 2006, and inspector training will begin in early April 2006.

Committee Action

The Committee issued a report to the NRC chairman, dated April 21, 2006, that concluded the proposed staff's approach to address safety culture in the ROP will significantly enhance the ability of the agency to identify and address safety culture issues at reactor sites. The Committee also recommended that the staff reassess the adequacy of time available for Resident Inspector review of entries to the corrective action program, and that Inspection Procedure 95003 include criteria for safety culture assessments, contain clear thresholds for evaluating cross-cutting aspects of findings, and clear expectations for resolving staff's concerns with the licensee's safety culture. The Committee plans to hold further discussions with the staff on Inspection Procedure 95003.

5. Draft Final Regulatory Guide, "Risk-Informed, Performance-Based Fire Protection for Existing Light Water Nuclear Power Plants"

The Committee heard presentations by and held discussions with representatives of the staff regarding the draft final Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants." The staff provided the Committee a summary of the changes to the draft final Regulatory Guide 1.205 based on the previous ACRS recommendations.

Committee Action

The Committee issued a letter to the EDO, dated April 20, 2006, recommending that the staff issue the final Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," after the peer review requirements are clarified.

6. Review of 1994 Addenda for Class 1, 2, and 3 Piping Systems to the ASME Code Section III and the Resolution of the Differences Between the Staff and ASME

The Committee met with representatives of the NRC staff and ASME to discuss the resolution of the differences between the staff and ASME regarding the 1994 Addenda to Section III of the ASME Code related to Class 1, 2, and 3 piping systems. The seismic design criteria specified in this addenda allowed significantly higher allowable stresses than the previous version of the Code. The staff described its concerns with the technical basis for these revisions. ASME has initiated Code changes to address all but one of the staff's concerns. The remaining unresolved issue deals with the stress indices for carbon steel elbows and tees at elevated temperatures. The staff is concerned that for seismic events dynamic strain aging could result in a significant reduction in the ultimate tensile strength of carbon steels at temperatures above 300 °F. The staff proposes to address this issue by placing a restriction in the 10 CFR 50.55a endorsement of the ASME Code that would reduce the appropriate stress indices to 75% of the value specified in the Code. The ASME representatives stated that the impact of dynamic strain aging for seismic events is insignificant and requested an opportunity to make a more detailed presentation to the Committee at a later date.

Committee Action

The Committee issued a letter to the EDO, dated April 14, 2006, stating that most of the differences between the staff and ASME are resolved and the staff proposes to address the one remaining issue related to dynamic strain aging of carbon steels at elevated temperatures by placing a restriction on the endorsement of the ASME Code in 10 CFR 50.55a. The Committee noted that this approach is practical, but encouraged the staff to work with ASME to resolve the one remaining issue.

7. Subcommittee Reports

Subcommittee on Plant License Renewal

The Chairman of the Plant License Renewal Subcommittee provided a report to the Committee, summarizing the results of the April 5, 2006 meeting with the NRC staff and representatives of Constellation Energy Group (CEG) to review the Safety Evaluation Report (SER) with open items related to the license renewal application for the Nine Mile Point Nuclear Station, Units 1 and 2. The current operating licenses for Units 1 and 2 expire on August 22, 2009, and October 31, 2026, respectively. During the meeting, CEG described the plant, its operating history, the license renewal review methodology, and its commitment tracking system. The staff's draft SER issued on March 3, 2006 contains 2 open items and no confirmatory items. The Committee decided that an interim letter was not needed. The Committee plans to review the final SER related to the license renewal application for the Nine Mile Point Nuclear Station during its July 2006 meeting.

Subcommittee on Power Uprates

The Chairman of the Power Uprates Subcommittee provided a report to the Committee summarizing the discussion regarding interim review of the Ginna core power uprate application and the associated NRC staff's Safety Evaluation. The application under consideration would raise the power 16.8 percent above current level to 1775 Mwth. The Power Uprate Subcommittee met on March 15-16, 2006 to discuss all aspects of the application except the SBLOCA issues, which it plans to review during another subcommittee meeting on April 27, 2006. The full Committee plans to review the complete SER at the 532nd meeting in May 2006.

8. Quality Assessment of Selected NRC Research Projects

The Committee discussed the selection of projects and assignments for assessing the quality of the selected research projects. The Committee selected the following two projects for the Committee's assessment of the quality of NRC research projects for the remaining FY 2006: (1) Containment Capacity Studies and (2) Molten Core Concrete Interaction Test Program at Argonne National Laboratory. The Committee raised some concerns about the candidate projects proposed by RES since many of them were either among projects that the Committee has recently reviewed or the project was more about a process rather than a specific research.

Committee Action

The Committee plans to discuss the status report on the review of the selected projects during May 31-June 2, 2006 ACRS meeting.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of March 23, 2006, to comments and recommendations included in the February 22, 2006 ACRS letter on Draft NUREG-1824, "Evaluation of Human Reliability Analysis Methods Against Good Practices."

The Committee decided that it was satisfied with the EDO's response. The staff plans to follow the Committee's recommendation and plans to continue to interact with the Committee as work progresses on this and other aspects of the NRC's HRA Research Program.

- The Committee considered the EDO's response of March 29, 2006, to comments and recommendations included in the February 22, 2006 ACRS letter on Standard Review Plan Section 14.2.1, "Generic Guidelines for Extended Power Uprate Testing Programs." While the EDO agrees that further improving the SRP decision logic is desirable, the EDO does not believe that it is practical, or possibly even feasible to do so.

The Committee decided that the EDO response was unsatisfactory. The Committee responded to the EDO in a letter dated April 19, 2006 to more fully describe our recommendations.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from March 8, 2006, through April 5, 2006, the following Subcommittee meetings were held:

- Early Site Permits — March 8, 2006

The Subcommittee reviewed the application for an early site permit for the Clinton site, and the associated NRC staff's Final Safety Evaluation Report. The Subcommittee focused on the applicant's performance-based seismic hazard analysis methodology.

- Thermal-Hydraulic Phenomena — March 14, 2006

The Subcommittee reviewed the staff's Safety Evaluation Report related to the application of the TRACG code to evaluate the stability of the ESBWR.

- Power Uprate — March 15-16, 2006

The Subcommittee reviewed the application for a 17% power uprate for the R. E. Ginna Nuclear Power Plant.

- Plant License Renewal — April 5, 2006

The Subcommittee reviewed the License Renewal Application for the Nine Mile Point Nuclear Plant and the related Safety Evaluation Report with open items prepared by the NRC staff.

- Planning and Procedures — April 5, 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.

LIST OF MATTERS FOR THE ATTENTION OF THE EDO

- The Committee plans to hold further discussions with the staff on the revised Inspection Procedure 95003.
- The Committee raised some concerns about the candidate projects proposed by RES for the quality assessment since many of them were either among projects that the Committee has recently reviewed or the project was more about a process rather than specific research.
- The Committee plans to review the final SERs related to the Ginna and Beaver Valley power uprate applications during its May 2006 meeting.
- The Committee plans to review the final SER related to the license renewal application for the Nine Mile Point nuclear station during its July 2006 meeting.
- The Committee responded to the EDO in a letter dated April 19, 2006 to more fully describe our recommendations regarding Standard Review Plan Section 14.2.1, "Generic Guidelines for Extended Power Uprate Testing Programs," and requests the opportunity to meet with the staff to discuss approaches to improving SRP Section 14.2.1.

PROPOSED SCHEDULE FOR THE 532nd ACRS MEETING

The Committee agreed to consider the following topics during the 532nd ACRS meeting, to be held on May 4 and 5, 2006:

- Final Review of the License Renewal Application for the Brunswick Steam Electric Plant
- Final Review of the Extended Power Uprate Application for R. E. Ginna Nuclear Plant
- Final Review of the Extended Power Uprate Application for the Beaver Valley Nuclear Plant
- Proposed Revisions to 10 CFR Part 52, "License, Certifications, and Approvals for Nuclear Power Plants"
- NRC Staff's Response to ACRS Comments on the Draft Final Revision 4 to Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants"

Sincerely,

/RA/

Graham B. Wallis
ACRS Chairman