



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

September 29, 2008

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: SUMMARY REPORT – 555th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, SEPTEMBER 4-5, 2008, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Klein:

During its 555th meeting, September 4-5, 2008, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and memoranda:

REPORTS

Reports to Dale E. Klein, Chairman, NRC, from William J. Shack, Chairman, ACRS:

- Development of the TRACE Thermal-Hydraulic System Analysis Code, dated September 24, 2008
- Report on the Safety Aspects of the License Renewal Application for the Wolf Creek Generating Station, Unit 1, dated September 17, 2008

MEMORANDA

Memoranda to R. W. Borchardt, Executive Director for Operations, NRC, from Edwin M. Hackett, Executive Director, ACRS:

- Draft Final Revision to Regulatory Guides 10.7, 10.8, and 10.9, dated September 9, 2008
- Draft Regulatory Guides DG-1205, DG-1187, DG-1197, DG-1196, DG-3031, DG-0020, DG-5026, DG-1141, DG-3035, DG-5027, and DG-1203, dated September 9, 2008
- Proposed Interim Staff Guidance (ISG) DC/COL-ISG-06, dated September 9, 2008
- Withdrawal of Regulatory Guide (RG) 8.1, "Radiation Symbol," dated September 9, 2008

HIGHLIGHTS OF KEY ISSUES

1. License Renewal Application and Final SER for the Wolf Creek Generating Station, Unit 1

The Committee met with representatives of the Wolf Creek Nuclear Operating Corporation (WCNOC) (the applicant) and the NRC staff to discuss the license renewal application (LRA) for the Wolf Creek Generating Station (WCGS) and the associated NRC staff's final Safety Evaluation Report (SER). The operating license for WCGS expires on March 11, 2025. The applicant has requested approval for continued operation for a period of 20 years beyond the current license expiration date.

The applicant discussed the resolution of the five open items, of which, two items were related to the scoping boundary of station blackout (SBO) recovery paths and the remaining three were related to metal fatigue. For closure of the SBO recovery paths related open items, the applicant submitted an amendment to the LRA by including: (a) a breaker at transmission system voltage on both the East and West switchyard bus and (b) an underground medium voltage switchyard cable. The staff reviewed this amendment and found it to be acceptable. For the metal fatigue issues, the applicant has committed to update the fatigue monitoring program baseline fatigue analyses as follows: (a) for the surge line hot leg nozzle, the applicant will account for the additional insurge and outsurge cycles accumulated in the early years of plant operation, during which thermal cycle counts were not collected in a systematic and rigorous manner, and (b) for the charging nozzles, the applicant will account for differential contribution of fatigue for each category of charging event. Based on the commitments made by the applicant, the staff concludes that the applicant has provided an acceptable basis for managing aging effect of environmentally assisted metal fatigue of the surge line hot leg nozzle and charging nozzles in accordance with 10 CFR 54.21(c)(1)(iii).

The staff described its review and inspection of the applicant's scoping, screening, and aging management programs; the program implementation at WCGS; and resolution of the open items. The staff concluded that the requirement of 10 CFR 54.29(a) has been met.

Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated September 17, 2008. The Committee concluded that the programs established by the applicant to manage age-related degradation provide reasonable assurance that the WCGS can be operated in accordance with the current licensing basis for the period of extended operation without undue risk to the health and safety of the public. The Committee recommended that the WCNOC application for renewal of the operating license for WCGS be approved.

2. Draft Final Revision 1 to Regulatory Guide 1.131, "Qualification of Safety-Related Cables and Field Splices for Nuclear Power Plants"

The Committee met with representatives of the NRC staff and a member of the public to discuss Revision 1 of Draft Final Regulatory Guide 1.131, "Qualification of Safety-Related Cables and Field Splices for Nuclear Power Plants." The staff noted that the final Regulatory Guide will be issued as a new regulatory guide bearing the number 1.211.

This Guide endorses IEEE Standard 383-2003, "Standard for Qualifying Class 1E Electric Cables and Field Splices for Nuclear Power Generating Stations," with some minor clarifications and/or exceptions. This Guide describes a method that the NRC staff considers acceptable for complying with the Commission's regulations for the qualification of safety-related cables and field splices for nuclear power plants.

Some Committee members suggested that clarifications be added in the Guide regarding the definition of risk-significant safety-related equipment (e.g. cable). Also, it should be made clear: that (a) the scope of the Guide is limited to the safety-related cables; (b) the cables under Appendix R, "Fire Protection Program for Nuclear Power Facilities," are not within the scope of this Guide; and (c) there is a need for testing specialty cables with connectors. In addition, some members noted that the last Regulatory Position in this Guide states that condition monitoring should be implemented, but the Guide does not endorse any specific condition monitoring techniques to assess physical and operating conditions of the cable. This establishes a testing program with no defined methodology or acceptance criteria.

A representative from the industry focus group on equipment qualification stated that the nuclear industry generally supports the proposed draft final Regulatory Guide except for the regulatory position on condition monitoring of safety-related power, control, instrumentation, and control cables.

Committee Action

The Committee plans to review a revised version of this Regulatory Guide during a future ACRS meeting.

3. TRACE Computer Code Peer Review

The Committee met with representatives of the NRC staff to discuss the development of the TRACE thermal-hydraulic system analysis code and the outcome of the recently completed peer review. The peer reviewers identified no major deficiencies that preclude the use of TRACE for confirmatory analyses of postulated loss-of-coolant accidents (LOCAs) in current light water reactors (LWRs). Several improvements have been recommended by the peer reviewers and the staff has proposed a plan to address them. The Committee agreed with the recommended improvements and endorsed the staff's plan.

The staff noted that TRACE is now being used for performing small-break and large-break LOCA confirmatory analyses for the Browns Ferry Nuclear Plant extended power uprate (EPU). Plant decks are also being prepared to assist EPU reviews of other BWR designs, as well as Westinghouse, Combustion Engineering, and Babcock & Wilcox PWRs. Analyses of anticipated operational occurrences (AOOs) and chimney instabilities for the Economic Simplified Boiling Water Reactor (ESBWR), and assessments of applicability of TRACE to other new reactor designs are in progress.

Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated September 24, 2008. The Committee concluded that significant progress has been made toward the incorporation of TRACE into the regulatory process. The Committee recommended that further peer review be conducted to evaluate the applicability of TRACE to new LWR designs, as well as for analysis of coupled reactor physics-thermal hydraulics issues related to EPUs and expanded operating domains. The Committee also recommended that the capability to evaluate uncertainties in the TRACE code predictions be incorporated into TRACE. The Committee noted that the continued development of TRACE is necessary to keep pace with the evolving industry capabilities.

4. Anticipated Advanced Reactor Research Needs

The Committee members discussed anticipated research needs in the area of advanced reactors and identified items to be discussed during the January 2009 Future Plant Designs Subcommittee and the February 2009 full Committee meetings. The Future Plant Designs Subcommittee Chairman presented a chronology of recent developments in the area of advanced reactors and an outline of what should be addressed at these two meetings. The following subjects received considerable discussion: use of PRA to establish the licensing basis events; radiological consequence and source term research; and safety system performance and qualification. Some specific issues, unique to HTGR, will also be discussed at the above meetings. Following Commission guidance, HTGR is the current focus of the NRC advanced reactor research plan.

Committee Action

The Committee plans to review the NRC advanced reactor research plan during its February 2009, meeting.

5. Quality Assessment of Selected Research Projects

The Committee discussed the status of the quality assessment of the research projects on: "Assessment of Predictive Bias and the Influence of Manufacturing, Model, and Power Uncertainties in NRC Fuel Performance Code Predictions," and NUREG/CR - 6943, "A Study of Remote Visual Methods to Detect Cracking in Reactor Components." The Committee discussed the results of panel reviews and the numerical rating scores for these projects.

Committee Action

The Committee plans to complete its report on the quality assessment of the research projects noted above during its October 2-4, 2008, meeting.

6. Materials, Metallurgy, and Reactor Fuels Subcommittee Report

The Chairman of the Materials, Metallurgy, and Reactor Fuels Subcommittee provided a report to the Committee summarizing the results of the September 3, 2008 meeting with representatives of the NRC staff, AREVA, Global Nuclear Fuel, Westinghouse, and the Electric Power Research Institute to discuss current fuel designs, new fuel designs, new cladding materials, lead test assembly programs, post-irradiation examinations, extended burnup experience, recent fuel performance experience, and design and analytical methods that are under development.

7. ESBWR Subcommittee Report

The Chairman of the ESBWR Subcommittee provided a report to the Committee summarizing the results of the August 21-22, 2008 meeting with representatives of the NRC staff and General Electric Hitachi Nuclear Energy to discuss the PRA supporting the Safety Evaluation Report with Open Items associated with the ESBWR Design Certification Application. The Subcommittee also continued a review of Section 19.2, on severe accident mitigation.

Chapter 19 of the ESBWR Design Control Document is not a complete description of the PRA. Instead, Chapter 19 presents the results of the PRA. A full description of the PRA was submitted in the form of a topical report, NEDO-33201. Although the Office of New Reactors (NRO) staff has reviewed this document, the review has been done in the context of the overall review of the ESBWR Design Control Document. There is no separate staff-generated safety evaluation for NEDO-33201. Consequently, the Subcommittee opted to interactively discuss four selected accident sequences with the applicant's staff and the NRO staff, with the objective of exploring the quality and completeness of the PRA.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of July 8, 2008, to comments and recommendations included in the May 19, 2008, ACRS report concerning the draft NUREG/CR-6962, "Approaches for Using Traditional Probabilistic Risk Assessment Methods for Digital Systems." The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of August 21, 2008, to comments and recommendations included in the June 3, 2008, ACRS report on Susquehanna extended power uprate application. The Committee decided that it was satisfied with the EDO's response.

- The Committee considered the EDO's response of August 27, 2008, to comments and recommendations included in the July 23, 2008, ACRS report on the Millstone Unit 3 stretch power uprate. The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of July 8, 2008, to comments and recommendations included in the May 23, 2008, ACRS interim letter on Chapters 4, 6, 15, 18, and 21 of the NRC Staff's SER with Open Items related to the ESBWR design. The Committee decided that it was satisfied with the EDO's response.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from July 14, 2008, through September 3, 2008, the following Subcommittee meetings were held:

- Plant Operations and Fire Protection - July 24, 2008

The Subcommittee held a meeting at the NRC Region III office in Lisle, Illinois to discuss regional inspections, operational activities, initiatives undertaken by the Region, and other challenges facing the Region.

- ESBWR – August 21-22, 2008

The Subcommittee discussed the PRA supporting the SER with Open Items associated with the ESBWR Design Certification Application. The Subcommittee also reviewed selected PRA sequences and severe accident management strategies to better understand the technical quality and degree of completeness of the PRA and how the staff's review has addressed these topics. The Subcommittee also continued a review of Section 19.2, on severe accident mitigation.

- Materials, Metallurgy, and Reactor Fuels – September 3, 2008

The Subcommittee discussed current fuel designs, new fuel designs, new cladding materials, lead test assembly program post-irradiation exams, extended burnup experience, recent fuel performance experience, and design and analytical methods that are under development.

- Planning and Procedures – September 3, 2008

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 review a revised version of draft final Regulatory Guide 1.211, "Qualification of Safety-Related Cables and Field Splices for Nuclear Power Plants" during a future meeting.

- The Committee plans to undertake more detailed reviews of (1) new zirconium-based alloys for fuel cladding, guide tubes, spacers and channels; (2) new UO₂ formulations containing solid solution or grain boundary additives; and (3) selected topical reports associated with fuels containing significant changes in analytical methods.
- The Committee would like an opportunity to review the draft final versions of the regulatory guides listed in the memorandum, "Draft Regulatory Guides DG-1205, DG-1187, DG-1197, DG-1196, DG-3031, DG-0020, DG-5026, DG-1141, DG-3035, DG-5027, and DG-1203," dated September 9, 2008.
- The Committee would like an opportunity to review the draft final version of DC/COL-ISG-06, "Interim Staff Guidance on Evaluation and Acceptance Criteria for 10 CFR 20.1406 to Support Design Certification and Combined License Applications."
- The Committee plans to review the NRC advanced reactor research plan during its February 2009 meeting.
- The Committee plans to complete the draft ACRS report on quality assessment of the selected research projects during its October 2-4, 2008, meeting.

PROPOSED SCHEDULE FOR THE 556th ACRS MEETING

The Committee agreed to consider the following topics during the 556th ACRS meeting, to be held on October 2-4, 2008:

- License Renewal Application and Final SER for the Shearon Harris Nuclear Power Plant, Unit 1
- Status of Resolution of Generic Safety Issue (GSI)-191, "Assessment of Debris Accumulation on Pressurized-Water Reactor (PWR) Sump Performance"
- Selected Chapters of the SER Associated with the ESBWR Design Certification Application
- Quality Assessment of Selected Research Projects
- Historical Perspectives and Insights on Reactor Consequence Analyses
- Preparation for Meeting with the Commission on November 7, 2008

Sincerely,

/RA/

William J. Shack
Chairman

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Sincerely,
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William J. Shack
Chairman

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Letter to the Honorable Dale E. Klein, Chairman, NRC, from William J. Shack, Chairman, ACRS, dated September 29, 2008

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