



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

SL-0556

December 4, 2007

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

Dear Chairman Klein:

SUBJECT: SUMMARY REPORT – 547TH MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, NOVEMBER 1-3, 2007, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 547th meeting, November 1-3, 2007, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following report and letters.

REPORT

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

- Staff's Implementation of Lessons Learned from Reviews of Early Site Permit Applications, dated November 19, 2007.

LETTERS

Letters to Luis A. Reyes, Executive Director for Operations, NRC, from William J. Shack, Chairman, ACRS:

- Interim Letter: Southern Nuclear Operating Company Application for the Vogtle Early Site Permit and the Associated NRC Safety Evaluation Report with Open Items, dated November 20, 2007.
- Interim Letter: Chapters 2, 5, 8, 11, 12, and 17 of the NRC Staff's Safety Evaluation Report with Open Items Related to the Certification of the ESBWR Design, dated November 20, 2007.

HIGHLIGHTS OF KEY ISSUES

1. Extended Power Uprate Application for the Susquehanna Power Plant

The Committee met with representatives of the NRC staff and Pennsylvania Power and Light Company (PPL, the licensee), to discuss the extended power uprate (EPU) application for the Susquehanna Steam Electric Station (SSES) and the associated NRC staff's safety evaluation (SE). The PPL application requested that operation of SSES Units 1 and 2 be increased from 3489 MWt to 3952 MWt, which corresponds to approximately 14% above the current licensed thermal power. Previously, SSES received NRC approval for a 6 % power uprate (4.5% stretch power uprate in 1993, and 1.4% measurement uncertainty recapture uprate in 2001).

The power uprate on both units is expected to be completed by 2010 and will make SSES Unit 1 and 2 the highest powered BWRs in the US. PPL plans to implement the full uprate in phases, with Unit 1 implementing the EPU in 2010 and Unit 2 in 2009. The meeting focused on the SSES plant response, safety systems and components capabilities, and performance at the extended power uprate. The applicant and staff described the analyses supporting the steam dryer integrity and performance and the adequacy of the planned steam dryer power ascension testing and monitoring at EPU conditions.

The review of the SSES EPU application also required a review of the fuel vendor's (AREVA) analytical methods and codes in order to ensure their applicability within the ranges for which they are qualified and benchmarked, as well as to ensure that the uncertainties accounting for their accuracy remain valid for the SSES EPU core thermal-hydraulic conditions. Based on the content of the staff's SE and the October 9 -10, 2007 Subcommittee meeting presentations and discussions, the Power Uprate Subcommittee determined that the AREVA methods review had unresolved technical issues that needed to be addressed in an updated SE. Another Power Uprate Subcommittee meeting was held on November 14, 2007 to address technical issues such as:

- Qualification data supporting the neutronic methods
- Propagation of the void quality correlation uncertainties to the safety analyses
- Reliability of the neutron monitoring instrumentation in the presence of bypass voiding
- Anticipated transient without scram (ATWS) instability analyses conclusions supporting the AREVA cores
- Potential for pellet-clad interaction (PCI) failures of the AERVA ATRIUM-10 non-barrier fuel used in SSES cores

Committee Action

The Committee plans to continue its discussion of this matter during its December 6-8, 2007, meeting.

2. Vogtle Early Site Permit (ESP) Application

The Committee met with representatives of the NRC staff and Southern Nuclear Operating Company (SNC) to discuss the application submitted by SNC for the Vogtle ESP, and the associated NRC staff Safety Evaluation Report (SER) with Open Items. The Vogtle ESP application is different from previously reviewed ESP applications in two significant ways. The Vogtle ESP application references a specific reactor design, i.e., AP1000, rather than relying on a plant parameter envelope based on several reactor designs. The Vogtle ESP application also proposed complete and integrated emergency plans, including an emergency planning ITAAC [inspection, testing, and analyses acceptance criteria], rather than providing only major features of an emergency plan. These differences have probably resulted in fewer ESP conditions arising in the SER for the application. In the SER with Open Items the staff asked the applicant to further assess the post-construction hydrology of the site, the seismic hazard at the site, and weather extremes at the site.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter dated November 20, 2007, concluding that the staff has undertaken a thorough review and, where

appropriate, independent analysis of the Vogtle ESP application. The Committee plans to review the final SER on the Vogtle ESP application during a future meeting.

3. Staff's Implementation of the Lessons Learned from the Review of ESP Applications

In response to a November 8, 2006, Staff Requirements Memorandum, the Committee met with representatives of the NRC staff to discuss the efficiency and effectiveness of staff's implementation of lessons learned from its review of ESPs. The staff explained the extent to which it had implemented each recommendation in the Committee's September 22, 2006, letter to the Executive Director for Operations on ESP lessons learned.

Committee Action

The Committee issued a report to the NRC Chairman on this matter dated November 19, 2007, concluding that the staff has moved effectively to address many of the lessons learned from the review of ESPs within the regulatory process. However, the Committee noted that the staff still needs to provide guidance to applicants on adequate means to ensure the quality, integrity, and the ability to retrieve data obtained from the Internet.

4. Research Reports on Aircraft Impact Study – New Reactor Designs

The Committee met with representatives of the NRC staff to discuss the results of the study performed to determine the vulnerabilities of an aircraft impact on new reactors of four designs, namely, the AP1000, ABWR, ESBWR, and the EPR. Because National Security Information and Safeguards Information were involved in this briefing, it was closed to the public. The staff stated that, as specified by the Commission, pertinent information from the study has been provided to the properly cleared individuals in the industry involved in new reactor designs. The staff has initiated a similar study for the US-APWR design, the results of which will be available in 2008.

Committee Action

The Committee determined that the staff's actions are consistent with the ACRS recommendations in its April 24, 2006, report. The Committee determined that no ACRS letter is necessary at this point.

5. ESBWR Design Certification Review

The Committee met with representatives of the NRC staff and General Electric – Hitachi Nuclear Energy Americas, LLC, (GEH) to discuss six Chapters from the staff's SER with Open Items related to the ESBWR design certification application. At the request of the staff, we agreed to review the staff's SER on a chapter-by-chapter basis to help timely completion of the review, as well as effective resolution of our concerns prior to issuing the final SER. The staff and GEH described SER Chapters 2, 5, 8, 11, 12, and 17 with open items and combined license (COL) action items. During this meeting, the Committee identified issues in addition to those that the staff identified in these SER Chapters. One of these issues relates to the need for the staff to investigate the adequacy of controls on post-weld grinding to prevent degradation of the resistance of austenitic stainless steels and nickel-based alloys to various stress corrosion cracking mechanisms. Another issue relates to the need for more controls on reactor coolant water chemistry in order to prevent irradiation assisted stress corrosion cracking of materials.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter dated November 20, 2007, recommending that controls on welding practices should be revised to eliminate, to the extent possible, post-weld grinding of materials susceptible to stress corrosion cracking. The Committee plans to review the staff's resolution of the Open Items in these SER Chapters during future meetings. Since many of the ESBWR systems in these chapters may interact with systems discussed in other SER chapters that have not been reviewed, the Committee will consider and comment on safety implications of any system interactions in future interim letters and in our final report. Additionally, the Committee would like to review the data and the analysis procedure used to develop the source term for radioactive materials released from the fuel into the reactor coolant.

6. 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 November 2007 meeting, the Committee discussed the draft ACRS 2008 report on the NRC Safety Research Program. The Committee also discussed the scope of long-term research the Agency needs to consider.

Committee Action

The Committee plans to continue its discussion of the draft ACRS report on the NRC Safety Research Program during its December 2007 meeting.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of October 24, 2007, to comments and recommendations included in the September 26, 2007, ACRS letter on the RES staff's proposed resolution of Generic Issue 156.6.1, "Pipe Break Effects on Systems and Components Inside Containment." The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of October 26, 2007, to comments and recommendations included in the September 26, 2007, ACRS report on the review of the license renewal application for the Pilgrim Nuclear Power Station. The Committee decided that it was satisfied with the EDO's response.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

The following Subcommittee meetings were held during the period from October 6, 2007, through October 31, 2007:

- Power Uprates — October 9-10, 2007

The Subcommittee reviewed the application by PPL for an extended power uprate for Susquehanna Steam Electric Station Units 1 and 2 and the associated staff's safety evaluation.

- Early Site Permits — October 24, 2007

The Subcommittee reviewed the application submitted by SNC for the Vogtle ESP and the associated NRC staff's Draft Safety Evaluation Report (DSEER) with Open Items. The Subcommittee also discussed the efficiency and effectiveness of staff's implementation of lessons learned from its review of ESP applications.

- ESBWR — October 25, 2007

The Subcommittee discussed several SER Chapters with Open Items associated with the ESBWR design certification application.

- AP1000 — October 31, 2007

The Subcommittee discussed the AP1000 design and related issues resulting from the proposed revisions to 10 CFR Part 52, Appendix D.

- Planning and Procedures — October 31, 2007

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 continue its discussion on the Extended Power Uprate application for the Susquehanna Steam Electric Station during its December 6-8, 2007, meeting.
- The Committee plans to review the final SER on the Vogtle ESP application during a future meeting.
- The Committee plans to review the staff's resolution of the open items in SER Chapters 2, 5, 8, 11, 12, and 17 associated with the ESBWR design certification application during future meetings. Since many of the systems described in these chapters may interact with systems discussed in other SER chapters, the committee plans to review the safety implications of any system interactions during future meetings.
- The Committee would like the opportunity to review ESBWR reactor coolant system (RCS) chemistry controls in future meetings.
- The Committee plans to continue its discussion of the draft ACRS report on the NRC Safety Research Program during its December 6-8, 2007, meeting.

PROPOSED SCHEDULE FOR THE 548th ACRS MEETING

The Committee agreed to consider the following topics during the 548th ACRS meeting, to be held on December 6-8, 2007:

- Draft Final NUREG-1829, "Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process," and Draft NUREG-XXXX, "Seismic Considerations for the Transition Break Size"
- AREVA Enhanced Option III Long Term Stability Solution (Topical Report ANP-10262)
- State-of-the-Art Reactor Consequence Analysis (SOARCA)
- Draft ACRS Report on the NRC Safety Research Program
- Extended Power Uprate Application for the Susquehanna Nuclear Power Plant

Sincerely,

/RA/

William J. Shack

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Sincerely,

/RA/

William J. Shack

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