



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

November 3, 2009

The Honorable Gregory B. Jaczko
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: SUMMARY REPORT - 566th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, OCTOBER 8-10, 2009, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Jaczko:

During its 566th meeting, October 8-10, 2009, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports, letter, and memorandum:

REPORTS

Reports to Gregory B. Jaczko, Chairman, NRC, from Mario V. Bonaca, Chairman, ACRS:

- Report on the 3-Dimensional Finite Element Analysis of the Oyster Creek Nuclear Generating Station Drywell Shell, dated October 16, 2009
- Report on the Draft Final Revision 2 to Regulatory Guide 1.189 (DG 1214), "Fire Protection for Nuclear Power Plants," dated October 20, 2009
- Closure of Steam Generator Action Plan Items 3.1k, 3.4, 3.5, 3.10, 3.11, and 3.12, dated October 22, 2009
- Report on the Safety Aspects of the License Renewal Application for the Susquehanna Steam Electric Station, Units 1 and 2, dated October 23, 2009

LETTER

Letter to R. W. Borchardt, Executive Director for Operations, NRC, from Mario V. Bonaca, Chairman, ACRS:

- NRC Staff's Safety Evaluation Report with Open Items Regarding the North Anna, Unit 3 Combined License Application, dated October 23, 2009

MEMORANDUM

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

- Withdrawal of Regulatory Guide 1.56, dated October 14, 2009

HIGHLIGHTS OF KEY ISSUES

1. Combined License (COL) Application for North Anna, Unit 3, Economic Simplified Boiling Water Reactor (ESBWR), and the Draft Safety Evaluation Report (SER) with Open Items

The Committee met with representatives of the NRC staff and the applicant, Dominion Virginia Power (Dominion), to discuss the COL application for North Anna, Unit 3, and the associated NRC staff's draft Safety Evaluation Report (SER) with Open Items. Some of the topics discussed were: hydrologic engineering; geology; qualification and In-Service Testing (IST) Programs; plant water system, and Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC).

Dominion representatives provided an overview of the North Anna, Unit 3, COL activities. Dominion discussed the responses to selected requests for additional information (RAIs) issued by the staff. In particular, Dominion discussed RAIs related to the function of the makeup water system; during shutdown/refueling mode, the plant service water system, and the circulating water system.

The staff provided the status of the resolution of the open items in the draft SER, especially the open issues related to the buried fiberglass piping used in the plant service water system and the proposed resolution to this issue. The staff also discussed the remaining open items on stability of subsurface materials and foundations, and safety-related mechanical equipment qualification. In closing, the staff stated that there were a few open items related to ITAAC and the Design Acceptance Criteria (DAC) that will be treated in a generic manner in the future.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter, dated October 23, 2009, recommending that the staff proceed with the development of the final SER after resolving all open items. The Committee stated that at this time it has not identified any significant issues regarding the North Anna COL application.

2. License Renewal Application and Final SER for the Susquehanna Steam Electric Station, Units 1 and 2

The Committee met with representatives of the NRC staff and PPL Susquehanna, LLC (PPL or the applicant) to discuss the final SER related to the license renewal application for the Susquehanna Steam Electric Station, Units 1 and 2.

PPL discussed its general site information, operating experience, corrective actions, and commitment tracking process. PPL made 60 regulatory commitments for its license renewal

program. The applicant also discussed four follow-up items resulting from the ACRS interim review: condition of underground medium voltage cables, station blackout recovery scoping, condition of containment, and aging of main steam line flow restrictors. PPL stated that it has established adequate aging management programs for the period of extended operation.

The NRC staff provided an overview of its review results, documented in the SER, and regional inspection results. The staff provided additional information regarding the applicant's plant-specific Boral operating experience, the Boral Coupon Testing Program, and the associated aging management program. The staff concluded that the applicant's Water Chemistry Program and Boral Coupon Testing Program are adequate to manage the aging effects of Boral used in the spent fuel pool racks. The staff also provided a brief discussion on the applicant's Metal Fatigue Monitoring Program and the effects of reactor coolant environment on the fatigue life of components and piping.

The Susquehanna final SER contained no open items. Based on its review, the staff concluded that the requirements of 10 CFR 54.29(a) have been met.

Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated October 23, 2009, recommending that the PPL application for renewal of the operating licenses of Susquehanna Steam Electric Station, Units 1 and 2, be approved.

3. Resolution of Several Steam Generator Action Plan (SGAP) Items

The Committee met with representatives of the NRC staff to discuss the resolution of the remaining task items in the SGAP. In particular, the staff discussed the closure of task items 3.1k, 3.4, 3.5, 3.10, and 3.12. The SGAP task items were intended to develop a better understanding of reactor coolant system conditions and corresponding component behavior under severe accidents. In addition, the items were expected to define the risk associated with severe accident induced steam generator tube ruptures leading to containment bypass. The presentation topics were from the following technical areas of research: thermal-hydraulics (computational fluid dynamics methods), steam generator tube material failures, reactor coolant system material failures, component behavior studies, and probabilistic risk assessment (PRA). The thermal-hydraulics analysis takes the PRA sequence being evaluated and determines the fluid temperatures and pressures as a function of time. These conditions are then used as inputs to the reactor coolant system material failure and component behavior models. The thermal-hydraulic results and material failure information are combined into a PRA model to determine the risk associated with the consequential steam generator tube rupture. The methods and models for evaluating reactor components under severe accident conditions were discussed. The staff stated that the remaining SGAP items can be closed and that the remaining issues associated with consequential steam generator tube failure risk no longer require the level of coordination and agency focus required to implement the action plan process.

Committee Action

The Committee issued a letter to the Chairman on this matter, dated October 22, 2009, recommending that the staff proceed with closure of the remaining SGAP items.

4. 3-Dimensional Finite Element Analysis of the Oyster Creek Drywell Shell

The Committee met with representatives of the NRC staff and Exelon Nuclear Generation Company (Exelon) to discuss the 3-dimensional (3-D) finite element analysis (FEA) of the Oyster Creek Nuclear Generating Station (Oyster Creek) drywell shell. During the Oyster Creek license renewal process, Exelon committed to perform a 3-D FEA of its drywell shell prior to entering the period of extended operation. By letter dated January 22, 2009, Exelon submitted the results of the Oyster Creek drywell shell analysis.

During the meeting, Exelon provided background information, described the drywell, discussed drywell thickness measurements, and summarized the analyses. Exelon explained why the ultrasonic thickness internal grid locations are representative of the general area average thickness. Exelon discussed specifically the modeling of the vent header boundary conditions, and explained the reasons why the vent pipes/header will not buckle before the shell. Exelon also discussed its finite element model, sensitivity studies, and overall results.

The staff presented its overview of the 3-D FEA and regional inspection results. The staff concluded that the Oyster Creek 3-D FEA was performed utilizing widely accepted engineering practices consistent with ASME Code, good engineering judgment, and applied conservatively biased realistic assumptions. The staff also concluded that the evaluations in all cases (baseline and sensitivity cases) confirm the Oyster Creek drywell shell complies with the ASME Code limits, and provide reasonable and realistic quantification of the available safety margin of the drywell shell for the postulated loading conditions.

Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated October 16, 2009, stating that the analysis presented by Exelon fulfills its commitment to provide a modern, realistic, 3-D FEA that better quantifies the available safety margin for the current Oyster Creek drywell shell configuration. The Committee agreed with the staff's conclusion that this analysis was performed using good engineering practices and judgment and used conservatively biased realistic assumptions.

5. Draft Final Revision 2 to Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants"

The Committee met with representatives of the NRC staff to review draft final Regulatory Guide (RG) 1.189, Revision 2, "Fire Protection for Nuclear Power Plants." The staff described the changes in RG 1.189 including discussions of safe shutdown success path components and components important to safety, the use of operator manual actions and fire modeling for assessing components important to safe shutdown, and examples of safe shutdown success path components and components important to safe shutdown.

The staff also discussed the previously unresolved issues in relation to the Nuclear Energy Institute document (NEI), NEI 00-01, Revision 2, "Guidance for Post Fire Safe Shutdown Circuit Analysis," and subsequent staff resolution of these issues. In addition, the staff discussed the industry comment that NEI 00-01 should be referenced in the Guide.

Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated October 20, 2009, recommending that Regulatory Guide 1.189, Revision 2 be issued as final.

6. 10 CFR Part 52 Regulatory Process

Representatives of the NRC staff provided an overview of the new reactor licensing process under 10 CFR Part 52, "Early Site Permits, Standard Design Certifications, and Combined Licenses for Nuclear Power Plants." The staff discussed requirements for licensing such as applicant qualifications, design acceptability, environmental impacts, operational programs, site safety, and verification of the closure of ITAAC and DAC. The staff also discussed the regulatory process related to Early Site Permit (ESP), Design Certification, COL, Standard Design Approval, Manufacturing License, and Limited Work Authorization (LWA).

Committee Action

This was an information briefing. No Committee action was necessary.

7. Draft ACRS Report on the NRC Safety Research Program

The Committee discussed the draft 2010 ACRS biennial report to the Commission on its review and evaluation of the NRC Safety Research Program.

Committee Action

The Committee plans to continue the discussions on its draft report on review and evaluation of the NRC Safety Research Program during its November 5-7, 2009 meeting.

8. AP1000 Subcommittee Report

The Chairman of the AP1000 Subcommittee provided a report regarding the matters discussed at the October 6-7, 2009, Subcommittee meeting. In that meeting, the Subcommittee was briefed by representatives of the NRC staff and the Westinghouse Electrical Company on three Chapters of the amended AP1000 Design Control Document (DCD) as well as the corresponding Chapters of the draft SER with open items. The specific Chapters were Chapter 3 (Design of Structures, Components, Equipment, and Systems), Chapter 8 (Electric Power), and Chapter 18 (Human Factors Engineering). The Standard Review Plan Sections 3.7 and 3.8 pertaining to the treatment of seismic issues and the design of containment structures were not discussed, and have been deferred to a later Subcommittee meeting. It was noted that these Chapters contain about 30 open items pertaining to the staff's AP1000 design review.

Committee Action

The Subcommittee plans to continue its review of the AP1000 DCD amendments during future meetings.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of September 22, 2009, to comments and recommendations included in the July 24, 2009 ACRS letter concerning draft final Regulatory Guide 1.215, "Guidance for ITAAC Closure under 10 CFR Part 52." The Committee was partially satisfied with the EDO's response.

The staff has argued that using the design certification process, and post-licensing inspections and reviews, will be adequate to support DAC closure. Since detailed design information may not be available during the design certification process, the ACRS remains concerned that the DAC closure process is not satisfactorily defined to ensure adequacy of the design. ACRS and NRO have initiated a dialogue focused on this subject. The ACRS is looking forward to ongoing engagement on this subject with NRO as the staff continues to work out the details for ITAAC/DAC closure.

- The Committee considered the EDO's response of August 25, 2009, to comments and recommendations included in the July 27, 2009 ACRS letter concerning draft Final Revision 3 to Regulatory Guide (RG) 1.100, "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants." The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of August 27, 2009, to comments and recommendations included in the July 22, 2009 ACRS letter concerning draft Template NEI-08-08, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination," and Draft DC/COL-Interim Staff Guidance -06. The Committee decided that it was satisfied with the EDO's response.

SCHEDULE FOR THE 567th ACRS MEETING

The following topics are scheduled for the 567th ACRS meeting, to be held on November 5-7, 2009:

- Amendments to the AP1000 Design Control Document (DCD)
- Draft Final Regulatory Guide 5.71, "Cyber Security Programs for Nuclear Facilities"
- Overview of the Advanced Boiling Water Reactor (ABWR) Design as Applied to the South Texas Project (STP) Combined License Application (COLA)

- NRC Staff's Plan for the STP COLA Review
- Discussion of topics for Meeting with the Commission on December 4, 2009
- Draft ACRS Report on the NRC Safety Research Program
- Significant Operating Experience

Sincerely,

/RA/

Mario V. Bonaca
Chairman

- Draft ACRS Report on the NRC Safety Research Program
- Significant Operating Experience

Sincerely,
/RA/
Mario V. Bonaca
Chairman

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Letter to the Honorable Gregory B Jaczko, Chairman, NRC, from Mario V. Bonaca, Chairman, ACRS, dated November 3, 2009

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