



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

January 11, 2011

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

SUBJECT: SUMMARY REPORT – 578th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, DECEMBER 2-4, 2010

Dear Chairman Jaczko:

During its 578th meeting, December 2-4, 2010, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and memoranda:

REPORTS

Reports to Gregory B. Jaczko, Chairman, NRC, from Said Abdel-Khalik, Chairman, ACRS:

- Final Safety Evaluation Report Associated with the License Renewal Application for the Kewaunee Power Station, dated January 7, 2011
- Report on the Final Safety Evaluation Report Associated with the Amendment to the AP1000 Design Control Document, dated December 13, 2010
- Long-Term Core Cooling for the Westinghouse AP1000 Pressurized Water Reactor, dated December 20, 2010
- Safety Culture Policy Statement, dated December 15, 2010

MEMORANDA

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

- Draft Final Regulatory Guides 3.12, 3.71, 4.16, and 5.80, dated December 8, 2010
- ACRS Review of Updates to 10 CFR 50.55a, "Codes and Standards," dated December 15, 2010

HIGHLIGHTS OF KEY ISSUES

1. Final Safety Evaluation Report Associated with the License Renewal Application for the Kewaunee Power Station

The Committee met with representatives of the NRC staff and Dominion Energy Kewaunee (DEK or the applicant) to discuss the staff's final Safety Evaluation Report (SER) related to the license renewal application for the Kewaunee Power Station (KPS). The presentations by the applicant and the NRC staff were primarily centered on efforts to resolve four open items identified in the draft SER issued July 2010 and emergent items that were not included in the revised SER issued November 2010. The open items were related to the use of FatiguePro™ software in metal fatigue calculations, the potential for primary water stress corrosion cracking (PWSCC) in nickel alloy steam generator divider plates, recent operating experience regarding leakage in buried and underground piping and tanks, and the adequacy of the Work Control Process Program. The emergent items were related to recent operating experience regarding failure of low voltage inaccessible cables exposed to moisture PWSCC in steam generator tube-to-tubesheet welds, the most limiting component for environmentally assisted fatigue evaluations, and ASME Class 1 small bore piping socket weld inspections. The staff concluded that the applicant's programs and commitments are adequate to close the open and emergent items and that the requirements of 10 CFR 54.29(a) have been met.

Committee Action

The Committee requested that the staff provide the final SER describing the resolution of the emergent items discussed during the meeting. Upon review of the final SER, the Committee issued a report to the NRC Chairman on this matter dated January 7, 2011, recommending that the application for renewal of the operating license of the Kewaunee Power Station be approved.

2. Final Safety Evaluation Report Associated with the Amendment to the AP1000 Design Control Document

The Committee met with representatives of the NRC staff and Westinghouse Electric Company (WEC) to discuss the AP1000 Design Certification Amendment (DCA) application. The staff discussed the application and the safety evaluation review process. The AP1000 design control document (DCD) Revision 17 was submitted in September 2008. During the period from 2008 to 2010, numerous AP1000 Subcommittee meetings were held reviewing the DCD amendment and related technical reports. The staff adopted a six-phase review process, with individual chapters of the staff's SER being provided for ACRS review. WEC representatives provided an overview of the AP1000 design, summarized the rulemaking history, and described the reasons for the amendment application. The objectives of the amendment were to increase plant standardization, broaden site applicability, and modify the shield building design to meet aircraft impact and seismic requirements. WEC also resolved combined license (COL) information items and closed some design acceptance criteria (DAC) items. Numerous instrumentation and control changes were made to reflect design evolution, such as addition of a reactor trip function, implementation of a rod withdrawal prohibit, and modification of the containment

isolation logic for the Component Cooling System. Other changes were associated with the integrated head package, reduction in head penetrations, reactor vessel flow skirt, reactor coolant pump, reactor vessel supports, containment vessel vacuum relief, and main control room passive filtration system. The new shield building uses a modular, steel concrete composite (SC) structure, replacing the existing reinforced concrete (RC) design. The redesign reduces passive heat removal air flow and affects seismic, aircraft impact, and other loading analyses. A member of the staff presented a non-concurrence on the use of brittle structural modules in the SC wall of the shield building.

Committee Action

The Committee issued a letter to the NRC Chairman on this matter dated December 13, 2010, concluding that there is reasonable assurance that the revised design can be built and operated without undue risk to the health and safety of the public. This conclusion is contingent on the results of reviews of the aircraft impact assessment and long-term core cooling which will be discussed in separate letters. This conclusion also relies in part on information and commitments provided by WEC during our meetings which have not yet been confirmed to be included in the DCA application. Two ACRS members provided additional comments regarding requiring operational testing of the AP1000 automatic depressurization system (ADS), ADS-4 squib valves.

3. Long-Term Core Cooling for the Westinghouse AP1000 Pressurized Water Reactor

The Committee met with representatives of the NRC staff and WEC to discuss the long-term core cooling (LTC) approach for the revised AP1000 design, WEC presented the resolution of issues associated with debris generation, which is a key safety issue for pressurized water reactors related to Generic Safety Issue (GSI)-191, "Assessment of Debris Accumulation on PWR Sump Performance." WEC summarized the AP1000 post-loss of coolant accident (LOCA) long-term cooling operation using passive systems. The AP1000 design greatly reduced post-LOCA debris sources. Since the AP1000 recirculation flow occurs by natural circulation with no active pumps, the gravity head available for driving the flow through the core is limited. Additionally, most of the possible LOCA locations will become flooded, allowing debris to enter the reactor coolant system without passing through screens. Hence, any potential problems with LTC would primarily be due to flow blockage in the core. WEC performed analyses using the WCOBRA/TRAC code to set acceptance criteria for core cooling. WEC presented fuel assembly test results that demonstrate that the AP1000 design meets the acceptance criteria derived from the WCOBRA/TRAC calculations. WEC also presented new LTC analysis requested by the ACRS during the November 4, 2010, ACRS Full Committee meeting. The new results showed that AP1000 can tolerate significantly higher fuel inlet pressure loss due to debris resistance.

Committee Actions

The Committee issued a letter to the NRC Chairman on this matter dated December 20, 2010, concluding that the regulatory requirements for long-term core cooling for design basis accidents have been met, and the issue is closed for the AP1000 design. This conclusion is based on the cleanliness requirements specified in the amendment. Any future proposed relaxation of these requirements will require substantial additional data and analysis.

4. Safety Culture Policy Statement

The Committee met with representatives of the NRC staff to discuss the Draft Final Safety Culture Policy Statement. The staff described the process, which involved workshops composed of various stakeholders, to develop the definition and traits of a positive safety culture that is included in the Policy Statement. The staff presented the results of the workshops and briefly discussed industry studies supporting the workshop results. The staff discussed the basis for leaving “security” out of the definition and traits of safety culture, while including it as a principle objective in the preamble to the statement of policy to be published in the Federal Register.

Committee Action

The Committee issued a letter to the NRC Chairman on this matter dated December 15, 2010, concluding that the proposed Safety Culture Policy Statement is responsive to the February 25, 2008, Staff Requirements Memorandum and that the proposed definition of safety culture and its associated traits describe a positive nuclear safety culture. The Committee recommended that implementation of the Policy Statement should allow the flexibility needed to address the safety significance and broad spectrum of technologies within its framework. Three ACRS members provided additional comments citing their views that efforts to implement the Safety Culture Policy Statement should be deferred until there is objective evidence that the traits that staff has identified can be measured and demonstrated to improve safety performance in cost effective ways.

OTHER COMMITTEE DECISIONS

Other Committee decisions were conveyed to the Executive Director for Operations via memoranda from Edwin M. Hackett.

1. The Committee has no objection to the staff’s proposal to issue these Regulatory Guides as final.
 - Draft Final Revision 1 to Regulatory Guide 3.12 (DG-3034), “General Design Guide for Ventilation Systems of Plutonium Processing and Fuel Fabrication Plants”
 - Draft Final Revision 2 to Regulatory Guide 3.71 (DG-3030), “Nuclear Criticality Safety Standards for Fuels and Material Facilities”
 - Draft Final Revision 2 to Regulatory Guide 4.16 (DG-4017), “Monitoring and Reporting Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Cycle Facilities”
 - Draft Final Regulatory Guide 5.80 (DG-5029), “Pressure-Sensitive and Tamper-Indicating Device Seals for Material Control and Accounting of Special Nuclear Material”
2. The Committee proposed a new process for its review of updates to 10 CFR 50.55a, “Codes and Standards,” that would improve the efficiency of routine, non-controversial, rulemakings.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of November 22, 2010, to conclusions and recommendations included in the October 20, 2010, ACRS report on the safety aspects of the General Electric-Hitachi (GEH) application for certification of the Economic Simplified Boiling Water Reactor (ESBWR) design. The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of October 27, 2010, to conclusions and recommendations included in the September 20, 2010, ACRS report regarding the South Texas Project Nuclear Operating Company application to amend the certified Advanced Boiling Water Reactor (ABWR) design to address the Aircraft Impact Assessment (AIA) Rule. The Committee decided that it was satisfied with the EDO response. The staff stated that they are documenting lessons-learned as a result of the initial AIA inspections and incorporating them into subsequent inspections. The staff plans to communicate their lessons-learned to the industry and to update the AIA guidance documents and inspection procedure in 2011.

SCHEDULED TOPICS FOR THE 579th ACRS MEETING

The following topics are scheduled for the 579th ACRS meeting, to be held on January 13-15, 2011:

- Aircraft Impact Assessment for the Revised AP1000 Design
- Final Safety Evaluation Report Associated with the Vogtle Units 3 and 4 Combined License Application
- Draft Final Revision 2 to Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and Draft Final Revision 1 to RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking Technical Specifications"
- Draft Final Rule and Regulatory Guidance Regarding Enhancements to Emergency Preparedness Regulations
- Staff Assessment of the RAMONA5-FA Code

Sincerely,

/RA/

Said Abdel-Khalik
Chairman

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Sincerely,

/RA/

Said Abdel-Khalik
Chairman

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Letter to the Honorable Gregory B Jaczko, Chairman, NRC, from Said Abdel-Khalik, Chairman, ACRS, dated January 11, 2011

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