



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

December 1, 2010

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

**SUBJECT: SUMMARY REPORT – 577<sup>th</sup> MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, NOVEMBER 4-6, 2010**

Dear Chairman Jaczko:

During its 577<sup>th</sup> meeting, November 4-6, 2010, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following letters and memorandum:

**LETTERS**

Letters to R. W. Borchardt, Executive Director for Operations, NRC, from Said Abdel-Khalik, Chairman, ACRS:

- Response to the October 7, 2010, EDO Letter Regarding Closure of Design Acceptance Criteria for New Reactors, dated November 9, 2010
- Standard Review Plan for Renewal of Spent Fuel Dry Cask Storage System Licenses and Certificates of Compliance (NUREG-1927), dated November 16, 2010
- Draft Final Revisions to Generic License Renewal Guidance Documents, dated November 17, 2010

Letter to Dr. Brian Sheron, Director, Office of Nuclear Regulatory Research, NRC, from Said Abdel-Khalik, Chairman, ACRS:

- ACRS Assessment of the Quality of Selected NRC Research Projects – FY 2010, dated November 15, 2010

**MEMORANDUM**

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

- Withdrawal of Regulatory Guides 1.39, 1.81, and 1.154, dated November 9, 2010

**HIGHLIGHTS OF KEY ISSUES**

1. Closure of Design Acceptance Criteria for New Reactors

During its 574<sup>th</sup> meeting, July 14-16, 2010, the Committee held extensive discussions on the closure of Design Acceptance Criteria (DAC) and Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), with a particular focus on DAC for digital instrumentation and control. These discussions focused on the fundamental concept of DAC, the history of DAC, and the intent of 10 CFR Part 52 to advance standardization of nuclear reactor designs. The Committee issued a report on this matter dated August 9, 2010, concluding that DAC closure requires expertise, judgment, and interpretation and that it should be performed by NRC staff experts with an independent assessment by the ACRS. The Committee also concluded that it is preferable that all DAC be resolved no later than COL stage. However, whether resolved as part of the COL process or post-COL, proper closure of DAC requires a consistent scope and depth of evaluation. Closure of DAC was discussed during the November 5, 2010, meeting between ACRS and the Commission. On October 7, 2010, the Executive Director for Operations responded to the August 9, 2010, ACRS report.

#### Committee Action

The Committee issued a response letter to the Executive Director for Operations on this matter, dated November 9, 2010. The Committee was pleased with the level of agreement between the staff and ACRS on several aspects of the Committee's recommendations: DAC closure requires expert judgment; subject matter experts with experience in the area covered by the DAC should perform the inspection of activities for verification of DAC closure; it is preferable to close DAC as early as possible; and proper closure of DAC requires a consistent scope and depth of evaluation. The Committee plans to review the DAC inspection procedure and pilot program. The Committee still believes that an independent ACRS assessment should be continued through at least the first few applications.

#### 2. Standard Review Plan for Renewal of Independent Spent Fuel Storage Installation Licenses and Dry Cask Storage System Certificates of Compliance

The Committee met with representatives of the NRC staff to discuss the standard review plan (SRP) for renewal of spent fuel dry cask storage systems (NUREG-1927). NUREG-1927 provides guidance to the staff to ensure that the applicant assesses the structures, systems, and components (SSCs) determined to be within the scope of renewal. The SRP also identifies aging effects requiring management and provides appropriate analyses of all SSCs with a time-dependent operating life. The Commission instructed the staff to develop this SRP after the final rule amending 10 CFR § 72.42 by extending the term allowed for specific Independent Spent Fuel Storage Installation (ISFSI) licenses from not to exceed 20 years to not to exceed 40 years.

#### Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter, dated November 16, 2010, recommending that NUREG-1927 be issued.

#### 3. Draft Final Revision 2 of NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," and NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants"

The Committee met with representatives of the NRC staff to discuss draft final Revision 2 of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), and draft final Revision 2 of NUREG-1801, "Generic Aging Lessons

Learned (GALL) Report.” The staff presented background information; an overview of general changes to license renewal guidance documents; as well as major changes to aging management programs in the mechanical, structural, and electrical areas. The staff also discussed the changes made to these documents after receiving feedback from the Plant License Renewal Subcommittee on October 22, 2010. The Committee noted that the revised license renewal guidance documents have appropriately incorporated many lessons learned from the review of recent license renewal applications, associated safety evaluation reports, and domestic and foreign operating experience. The Committee viewed the proposed revisions as significant enhancements to the guidance available to the staff and the licensees for the management of aging during the period of extended operation.

#### Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter, dated November 17, 2010, recommending that the draft final revisions to the generic license renewal guidance documents be issued. The Committee also recommended that the staff continue to evaluate the need for revisions to the guidance documents in order to maintain them current.

#### 4. Long-Term Core Cooling Approach for the Revised AP1000 Design

The Committee met with representatives of the NRC staff and Westinghouse Electric Company (WEC) to discuss the long-term core cooling 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 (PWRs) and is related to Generic Safety Issue (GSI)-191, “Assessment of Debris Accumulation on PWR Sump Performance.” WEC described the differences between the AP1000 design and generic PWR designs. The AP1000 design has greatly reduced post loss of coolant accident (LOCA) debris sources. Since the AP1000 recirculation flow occurs by natural circulation with no active pumps, the recirculation has slow flow characteristics. Most of the possible LOCA locations will become flooded, allowing debris to enter the reactor coolant system without passing through screens. WEC performed analyses using the WCOBRA/TRAC code to set safety limits for the core cooling. Members questioned the oscillatory flow behavior observed in these calculations. WEC then presented fuel assembly test results that demonstrate that the AP1000 design meets safety limits derived from the WCOBRA/TRAC calculations. Members questioned the validity of these tests and the rationale for selecting the total amount of fiber and the portion of the fiber trapped at the core inlet. The prototypicality of the test rig and the pressure drop distribution along the flow path were also discussed. The staff’s presentation summarized their evaluation approach for the AP1000 GSI-191 long-term core cooling. The staff concluded that the fuel assembly head loss tests performed with design basis debris loading met the acceptance criteria with considerable margin and that there is reasonable assurance that, even in the presence of debris, adequate core cooling is maintained after the LOCA.

#### Committee Action

This was an information briefing. No Committee action was necessary. The Committee plans to continue its review of the revised AP1000 design during its December 2-4, 2010, meeting.

#### 5. Assessment of the Quality of Selected NRC Research Projects

The Committee completed its report on the quality assessment of the research projects on NUREG/CR-6947, “Human Factors Considerations with Respect to Emerging Technology in

Nuclear Power Plants," and NUREG/CR-6997, "Modeling a Digital Feedwater Control System Using Traditional Probabilistic Risk Assessment Methods."

#### Committee Action

The Committee issued a letter to the Director of the Office of Nuclear Regulatory Research dated November 15, 2010, transmitting this report. NUREG/CR-6997 was found to be of superior professional quality with some elements of innovation. NUREG/CR-6947, by itself, was judged to not be a technical research report suitable for quality review by ACRS. Even as a summary/management report, it could be substantially improved by clarifying priorities, interdependencies, and intended continued activities.

#### 6. Meeting with the Commission

On November 5, 2010, the Committee met with the NRC Commissioners to discuss the following topics of mutual interest:

- ABWR Aircraft Impact Assessment
- 10 CFR 50.46(a), "Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements"
- Mixed Oxide Fuel Fabrication Facility
- ESBWR – Long-Term Core Cooling
- Design Acceptance Criteria

#### Committee Action

The November 16, 2010, Staff Requirements Memorandum associated with this meeting identified no requirements for ACRS or staff action.

#### OTHER COMMITTEE DECISIONS

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

The Committee had no objection to the staff's proposal to withdraw the following Regulatory Guides:

- Regulatory Guide 1.39, "Housekeeping Requirements for Water-Cooled Nuclear Power Plants"
- Regulatory Guide 1.81, "Shared Emergency and Shutdown Electric Systems for Multi-Unit Nuclear Power Plants"
- Regulatory Guide 1.154, "Format and Content of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors"

Since Regulatory Guide 1.81 is being withdrawn because it conflicts with requirements in 10 CFR 50.55a(h), the Committee recommended that the staff develop guidance in this area that is consistent with the regulations.

## RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- The Committee considered the EDO's response of October 7, 2010, to comments and recommendations included in the August 9, 2010, ACRS report on the closure of DAC for new reactors. The Committee issued a response letter to the Executive Director for Operations on this matter, dated November 9, 2010.
- The Committee considered the EDO's response of October 25, 2010, to comments and recommendations included in the September 17, 2010, ACRS report on SECY-10-0113, "Closure Options for Generic Safety Issue – 191, Assessment of Debris Accumulation in Pressurized Water Reactor Sump Performance." The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of October 18, 2010, to comments and recommendations included in the September 22, 2010, ACRS report on the long-term core cooling for the Economic Simplified Boiling Water Reactor (ESBWR). The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of October 26, 2010, to comments and recommendations included in the September 27, 2010, ACRS report on the license application for the Mixed Oxide Fuel Fabrication Facility and the associated Safety Evaluation Report. The Committee decided that it was satisfied with the EDO's response.

## SCHEDULED TOPICS FOR THE 578<sup>th</sup> ACRS MEETING

The following topics are scheduled for the 578<sup>th</sup> ACRS meeting, to be held on December 2-4, 2010:

- Final Safety Evaluation Report Associated with the License Renewal Application for the Kewaunee Power Station
- Final Safety Evaluation Report Associated with the Amendment to the AP1000 Design Control Document
- Safety Culture Policy Statement

Sincerely,

*/RA/*

Said Abdel-Khalik  
Chairman

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 Said Abdel-Khalik  
 Chairman

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Letter to the Honorable Gregory B Jaczko, Chairman, NRC, from Said Abdel-Khalik, Chairman, ACRS, dated December 1, 2010

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