



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

September 27, 2011

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

**SUBJECT: SUMMARY REPORT – 586<sup>TH</sup> MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, SEPTEMBER 8-10, 2011**

Dear Chairman Jaczko:

During its 586<sup>th</sup> meeting, September 8-10, 2011, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports, letters, and memoranda:

**REPORTS**

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

- Revision 19 to the AP1000 Design Control Document and the AP1000 Final Safety Evaluation Report, dated September 19, 2011
- Proposed Rulemaking to Introduce a Site-Specific Performance Assessment and Human Intrusion Analysis Requirement to 10 CFR Part 61, dated September 22, 2011

**LETTERS**

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

- Draft Final Regulatory Guide 1.115, Revision 2, "Protection against Turbine Missiles," dated September 19, 2011
- Chapters 2, 5, 8, 10, 11, 12, 13, and 16 of the Safety Evaluation Report with Open Items for Certification of the US-APWR Design, dated September 22, 2011

Letter to 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 2011, dated September 19, 2011

#### MEMORANDA

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

- Draft Final Regulatory Guides 1.159, 1.221, and 1.218, dated September 20, 2011
- Supplement 1 to NUREG-1930, "Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Units 2 and 3," dated September 20, 2011
- Proposed Regulatory Guide DG-1278, dated September 21, 2011

#### HIGHLIGHTS OF KEY ISSUES

##### 1. Near-Term Task Force Report Regarding the Events at the Fukushima Dai-Ichi Site in Japan

The Committee met with representatives of the NRC's Near-Term Task Force to discuss their review of the events at the Fukushima Dai-ichi site in Japan. Their report, issued on July, 12, 2011, contained 12 overarching recommendations for consideration by the Commission. These recommendations were aimed at improving the safety of both operating and new nuclear reactors. The task force also suggested improvements in the NRC programs for the oversight of reactor safety. Implementation of these recommendations would require rulemakings, orders, staff actions, long-term evaluations, as well as a policy statement appropriately balancing defense-in-depth and risk considerations. As part of the public input, Mr. Adrian Heymer, from the Nuclear Energy Institute, provided the industry's comments on the Near-Term Task Force's proposed near-term NRC actions associated with the Fukushima Dai-ichi accident.

#### Committee Action

The Committee chose not to write a letter report during its September meeting. The Committee will consider a report during the October 6-8, 2011 meeting.

2. Technical Basis and Rulemaking Language Associated with Low-Level Waste Disposal and Site-Specific Analysis

The Committee met with representatives of the NRC staff to continue discussing the proposed rulemaking language and technical basis to include site-specific analyses into revisions to 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The staff described changes to the draft rule language based on the public comments received on the proposed rule and from a May 2011 public meeting held with stakeholders. The staff also presented information on the guidance being prepared to accompany the rule language changes. The Committee also discussed the proposed rulemaking language with the NRC staff during its 585<sup>th</sup> meeting held July 13-15, 2011.

Committee Action

The Committee issued a letter to the NRC Chairman on this matter, dated September 22, 2011, recommending that 10 CFR Part 61 not be revised in accordance with the staff's proposed rulemaking language. Specific recommendations were offered regarding the period of performance, depleted uranium, and analysis of inadvertent intruder scenarios.

3. SER associated with Revision 19 of the AP1000 DCD amendment

The Committee met with representatives of the NRC staff, Westinghouse Electric Company (WEC), and the public to discuss Revision 19 to the AP1000 Design Control Document (DCD) and the AP1000 Final Safety Evaluation Report (FSER). In addition to editorial corrections and the inclusion of conforming items previously identified in the Advanced FSER, the update provided resolution to a few outstanding issues. During the meeting representatives of the NRC staff and WEC described the resolution of these issues: (1) passive containment cooling system (PCS) tank analysis methodology, (2) enhanced shield building load combination, (3) containment accident pressure analysis. Details of the resolution for these issues are described in the letter to the NRC Chairman dated September 19, 2011.

In addition, a member of the public commented that WEC's analyses did not address solar radiation heating on the exterior surface of the concrete shield building. It was stated that WEC's analyses did not address solar radiation on the exterior surface of physical models of evaporative cooling on containment tests used to validate the computer code, WGOTHIC. The committee evaluated the effects of insolation on the shield building design and the predicted peak containment pressure during an accident.

Committee Action

The Committee issued a letter to the NRC Chairman on this matter dated September 19, 2011, 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.

4. Draft Final Revision 2 to Regulatory Guide (RG) 1.115, "Protection against Turbine Missiles."

The Committee met with representatives of the NRC staff to discuss the draft final Regulatory Guide (RG) 1.115, Revision 2, "Protection Against Turbine Missiles." The key elements of RG 1.115, Revision 2 include: (i) consolidation of NRC guidance on turbine missiles into one document; (ii) expansion of the guidance to include high-trajectory missiles; (iii) clarification of the analysis scope to include all structures, systems, and components (SSCs) that are important to safety, rather than only designated safety-related SSCs; (iv) clarification of the scope to include the effects from other units at multi-unit sites; and, (v) inclusion of the option for a risk-informed evaluation of turbine missile damage. The NRC staff presented their current position on protection against turbine missiles, the results of their review of turbine operating experience, and industry comments on the proposed RG.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter, dated September 19, 2011, recommending that Revision 2 of RG 1.115 be issued after adequate justification is provided for excluding an evaluation of high-trajectory missiles under Regulatory Position 2.b. The Committee also recommended that the staff supplement its review of domestic nuclear operating experience by including operating experience at large U.S. conventional power plants and international nuclear facilities for the last ~20 years to confirm that the nominal frequency of  $1 \times 10^{-4}$  turbine missile ejection event per year from all causes is justified.

5. Selected Chapters of the SER with Open Items Associated with the US-APWR Design Certification

The Committee met with representatives of Mitsubishi Heavy Industries, LTC. (MHI) and the NRC staff to discuss the following chapters of the safety evaluation report (SER) with open items associated with the United States – Pressurized Water Reactor (US-APWR) design certification (DC) application: Chapter 2, "Site Characteristics," Chapter 5, "Reactor Coolant and Connecting Systems," Chapter 8, "Electric Power," Chapter 10, "Steam and Power Conversion System," Chapter 11, "Radioactive Waste Management," Chapter 12, "Radiation Protection," Chapter 13, "Conduct of Operations," and Chapter 16, "Technical Specifications." Representatives of MHI and the NRC staff provided a summary of the major issues in these chapters. The main issues discussed include the survivability of the reactor coolant pump (RCP) seals with no seal cooling; the gas turbine generators (GTGs) and their reliability, compared to diesel generators; and the need to restore a source of AC power to support turbine-driven emergency feedwater (TDEFW) operation for longer than one hour. The staff also discussed their schedule for reviewing the DC application.

### Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter, dated September 22, 2011 recommending that issues associated with the RCP seals, GTG reliability, and operation of the TDEFW pumps be addressed. Except for these issues, the Committee did not identify any other issues with potentially significant safety implications. The Committee plans to review the staff's resolution of the open items and the identified issues during future meetings. The Committee will comment on potential safety implications of any system interactions in future interim letters and in their final report.

### 6. ACRS Assessment of the Quality of Selected NRC Research Projects

The Committee discussed the status of the ACRS Panels' review of the quality assessment of NRC research projects on NUREG/CR-6969, "Analysis of Experimental Data for High Burnup PWR Spent Fuel Isotopic Validation – ARIANE and REBUS Programs (UO<sub>2</sub> Fuel)," and NUREG/CR-7027, "Degradation of LWR Core Internal Materials Due to Neutron Irradiation."

### Committee Action

The Committee issued a letter to the Director of the Office of Nuclear Regulatory Research, on this matter dated September 19, 2011, transmitting their quality assessment report of NUREG/CR-6969 and NUREG/CR-702. The Committee anticipates receiving a list of candidate projects for the quality assessment in FY-2012 prior to their November 3-5, 2011 meeting.

### 7. Draft Final Regulatory Guides 1.159, 1.221, And 1.218

The Committee has no objection to the staff's proposal to issue the following Regulatory Guides (RGs) as final: Revision 2 to RG 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors," Final Revision to RG 1.221, "Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants," and Final Revision to RG 1.218, "Condition-Monitoring Techniques for Electric Cables Used in Nuclear Power Plants."

### 8. Supplement 1 to NUREG-1930, "Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Units 2 and 3"

The Committee considered Supplement 1 to NUREG-1930, "Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Units 2 and 3," and decided not to review it.

### 9. Proposed Regulatory Guide DG-1278

The Committee considered proposed Revision 3 to Regulatory Guide 1.160 (DG-1278), "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and decided not to review it. The Committee has no objection to the staff's proposal to issue this Guide for public comment. The Committee would like to have an opportunity to review the draft final version of this Guide after reconciliation of public comments.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO  
COMMITMENTS

The Committee considered the EDO's response of July 6, 2011, to comments and recommendations included in the May 19, 2011 ACRS letter on the final safety evaluation report associated with the amendment of AP 1000 design control document. The Committee decided that it was satisfied with the EDO's response.

The Committee considered the EDO's response of August 4, 2011, to comments and recommendations included in the July 20, 2011 ACRS letter on the request for an ACRS waiver of the final rule, US Advanced Boiling Water Reactor aircraft impact design certification amendment. The Committee decided that it was satisfied with the EDO's response.

The Committee considered the EDO's response of July 21, 2011, to comments and recommendations included in the June 22, 2011 ACRS letter on the draft regulatory guides DG-1261, DG-1262 and DG-1263. The Committee decided that it was satisfied with the EDO's response.

The Committee considered the EDO's response of July 14, 2011, to comments and recommendations included in the June 16, 2011 ACRS report on the safety aspects of the license renewal application for the Hope Creek Generating Station. The Committee decided that it was satisfied with the EDO's response.

The Committee considered the EDO's response of August 28, 2011, to comments and recommendations included in the May 24, 2011 ACRS letter on human factors considerations associated with emerging technologies in nuclear power plants. The Committee decided that it was satisfied with the EDO's response.

The Committee considered the EDO's response of July 25, 2011, to comments and recommendations included in the June 22, 2011 ACRS report on the Draft SECY Paper, "Options for Proceeding with Future Level 3 Probabilistic Assessment Activities." The Committee decided that it was satisfied with the EDO's response.

SCHEDULED TOPICS FOR THE 587<sup>th</sup> ACRS MEETING

The following topics are scheduled for the 587<sup>th</sup> ACRS meeting, to be held on October 6-8, 2011:

- Draft Final Revision 4 to Regulatory Guide (RG) 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident"
- Fuel Cycle Oversight Process (FCOP)
- NRC Staff Recommendations on the Near-Term Task Force Report Regarding the Events at the Fukushima Dai-ichi Site in Japan

Sincerely,

/RA/

Said Abdel-Khalik  
Chairman

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Sincerely,

/RA/

Said Abdel-Khalik  
Chairman

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**OFFICIAL RECORD COPY**

Letter to the Honorable Gregory B. Jaczko, NRC Chairman from Said Abdel-Khalik, ACRS Chairman, dated September 27, 2011

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