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SUBJECT: Summary report -542nd meeting of the ACRS, May 3-5, 2007, and other related activities of the committee

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

May 23, 2007

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

Dear Chairman Klein:

SUBJECT: SUMMARY REPORT - 542<sup>nd</sup> MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, MAY 3-5, 2007, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 542<sup>nd</sup> meeting, May 3-5, 2007, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and memoranda:

REPORTS

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

- Development of an Integrated Long-Term Regulatory Research Plan, dated May 16, 2007
- Draft Commission Paper on Staff Plan Regarding a Risk-Informed and Performance-Based Revision to 10 CFR Part 50, dated May 16, 2007
- Activities Related to Digital Instrumentation and Control Systems, dated May 18, 2007
- Proposed Technical Basis for the Revision to 10 CFR 50.46 LOCA Embrittlement Criteria for Fuel Cladding Materials, dated May 22, 2007

MEMORANDA

Memoranda to Luis A. Reyes, Executive Director for Operations, NRC, from Frank P. Gillespie, Executive Director, ACRS:

- Draft Regulatory Guide DG-1132, "Qualification of Safety-Related Cables and Field Splices for Nuclear Power Plants," dated May 8, 2007
- Draft Regulatory Guide DG-1173, "Guidance on Monitoring and Responding to Reactor Coolant System Leakage," dated May 8, 2007

## HIGHLIGHTS OF KEY ISSUES

### 1. Digital Instrumentation and Control (I&C) System Matters

The Committee met with representatives of the NRC staff and the Nuclear Energy Institute (NEI) to discuss the industry and NRC staff activities for addressing digital I&C issues. NEI representatives discussed ongoing short-term and long-term industry activities on digital I&C and described frequent meetings with the digital I&C Steering Committee of the NRC to prioritize needs and resources. In general, NEI agrees with the NRC approach to addressing digital I&C issues, but considers implementation of analog backups to digital I&C to be unnecessary and overly complicated for providing necessary levels of diversity and defense in depth (D3). NEI is working with the Electric Power Research Institute (EPRI) to develop technical papers on methods for ensuring D3.

The staff described digital I&C Steering Committee activities, D3 research, and risk-informing reviews of digital I&C systems. The staff's draft project plan identifies issues and describes specific Task Working Group activities associated with cyber security, highly integrated control room communications and human factors, D3, risk-informed reviews of digital I&C systems, and licensing process issues. The development of guidance for adequate levels of D3 is the most urgent need to support new reactor licensing in the near term. The staff plans to address several issues associated with D3 including defining adequate diversity, criteria for manual actions, and guidance on common-cause effects. Since the current guidance uses a deterministic approach for licensing a digital system, the staff is identifying challenges with implementing risk-informed methods such as modeling issues and development of a review process consistent with current regulations.

### Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated May 18, 2007, concurring with the staff's approach to developing a project plan that defines a process to improve deployment of digital I&C technology for new and operating reactors. The Committee recommended that (1) the staff develop an inventory and classification of the various types of digital and software systems that are being used or are likely to be used in nuclear power plants and (2) the staff evaluate operating experience with digital systems in nuclear and other industries to obtain insights regarding potential failure modes. The Committee also recommended that the information obtained through performing the activities in these recommendations be used in the development of regulatory guidance on diversity and defense in depth for digital I&C systems.

### 2. Commission Paper on Staff's Recommendation Regarding a Risk-Informed and Performance-Based Revision to 10 CFR Part 50

The Committee met with representatives of the NRC staff to discuss the staff's proposed recommendation to the Commission regarding the development of a risk-informed and performance-based revision to 10 CFR Part 50 for future plant licensing (i.e., a new 10 CFR Part 53). The staff proposes to defer this rulemaking until the licensing strategy for the Next Generation Nuclear Plant (NGNP) is completed. This recommendation is based on: stakeholder comments to "test" the draft requirements before codifying them; the near term impact on design certifications and combined license applications; the potential impact on NGNP licensing strategy development; and the potential impact on longer-term projects such as the Global Nuclear Energy Partnership. The staff noted that the current regulatory structure

contains requirements that may not be applicable to advanced reactor designs. Advanced reactors also have design and operational issues different from light-water reactors (LWRs). The discussion covered certain advanced reactor policy issues raised in the advance notice of proposed rulemaking (ANPR) issued in May of 2006, a summary of the public comments received on the ANPR and policy issues, as well as a high-level discussion of the technology-neutral regulatory framework.

The staff stated that stakeholders generally supported the development of risk-informed requirements for future reactor designs but did not want it to disrupt near-term plans for LWR design certifications and combined license applications or ongoing risk-informed initiatives. Stakeholders suggested that the draft requirements derived from the framework be compared to requirements derived from 10 CFR Parts 50 and 52. The framework could then be adjusted based on this comparison before initiating rulemaking. The Committee members discussed the best way to test the framework (i.e., on a LWR or a non-LWR).

Policy issues discussed during the meeting included: level-of-safety and integrated risk; defense in depth; single failure criterion; containment performance standards; and the integration of safety, security, and emergency preparedness. The staff summarized stakeholders' comments associated with each issue. The staff indicated that it planned to publish NUREG-1860, "Framework for Development of a Risk-Informed, Performance-Based Alternative to 10 CFR Part 50," in the summer of 2007.

#### Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated May 16, 2007, concurring with the staff's recommendation to defer development of a new 10 CFR Part 53 until the licensing strategy for the NGNP is completed and recommending that work on the technology-neutral regulatory framework continue so that it can help guide the development of the NGNP licensing strategy. The Committee also noted that there are important issues, critical to the development of the framework, that are still being debated within the ACRS and recommended that NUREG-1860 not be finalized until the Committee reaches a position on these issues and discusses them with the staff.

### 3. Status of the Development of an Integrated Long-Term Regulatory Research Plan

The Committee met with representatives of the NRC staff regarding the staff's activities associated with the development of an integrated long-term regulatory research plan. The staff described the objectives of the agency-wide, long-term regulatory research plan as well as a summary of proposed activities for Fiscal Year 2009. The staff noted that the focus of the long-term research plan is on anticipated future needs which are not currently identified in other NRC planning documents. The staff identified four broad areas of long-term research activities: research to support licensing of nuclear facilities developed for the Department of Energy's Global Nuclear Energy Partnership; research to support reactor license renewal beyond 60 years; research activities associated with possible development of experimental facilities; and cross-cutting and emergent technologies. The staff also noted that the long-term regulatory research is a living document and will be updated periodically. The Committee members commented that the focus of the work proposed by the staff is different from that emphasized for long-term research in recent ACRS biennial reports on Review and Evaluation of the NRC Safety Research Program. The Committee members also commented on several of the specific long-term research projects.

#### Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated May 16, 2007. The Committee also noted that it will comment in a separate forum on the broader scope of long-term research the agency needs to consider.

#### 4. ACRS Members' Issues Associated with the Technology-Neutral Framework for Future Plant Licensing

The Committee had a discussion of individual ACRS member's issues associated with the technology-neutral regulatory framework for future plant licensing. The members' issues were divided into the following categories: Design Requirements vs. Site Requirements; Technical Issues; Policy Issues; and Philosophical Issues. The Committee has not yet reached a consensus on issues such as: preserving the concept of design-basis or licensing-basis events; separating design acceptance from site suitability; using the quantitative health objectives as the high-level risk acceptance criteria; and the need for a complimentary cumulative distribution function acceptance curve. There was general agreement among Committee members that draft NUREG-1860 was not as clear and concise as an effective framework document should be.

#### Committee Action

The Committee plans to continue its discussions on members' issues associated with the technology-neutral regulatory framework during the June 2007 meeting.

#### RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of April 24, 2007, to comments and recommendations included in the March 22, 2007 ACRS report regarding the development of the TRACE thermal-hydraulic system analysis code. The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of April 23, 2007, to comments and recommendations included in the March 22, 2007 ACRS letter regarding the proposed NRC staff and industry activities for addressing dissimilar metal weld issues resulting from the Wolf Creek pressurizer weld inspection. The Committee decided that it was satisfied with the EDO's response.

**The staff committed to keep the Committee informed of this issue as the advanced finite element analyses being performed by industry and the staff proceed.**

#### OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from April 8, 2007 through May 2, 2007, the following Subcommittee meetings were held:

- Digital Instrumentation and Control Systems - April 18, 2007

The Subcommittee reviewed the NRC staff and industry activities associated with digital instrumentation and control systems.

- Safety Research Program - May 2, 2007

The Subcommittee discussed the status of staff's efforts associated with the development of an integrated, long-term regulatory research plan.

- Planning and Procedures - May 2, 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 would like an opportunity to review the draft final version of DG-1132, "Qualification of Safety-Related Cables and Field Splices for Nuclear Power Plants," after reconciliation of public comments.
- The Committee plans to review the draft final version of DG-1173, "Guidance on Monitoring and Responding to Reactor Coolant System Leakage," after reconciliation of public comments.
- The Committee plans to have continued discussions with the staff on long-term integrated research projects.
- The Committee plans to continue its discussions on the technology-neutral regulatory framework during the June 2007 meeting.
- The Committee plans to continue working with the staff as the development and implementation of the digital I&C project plan proceed.

#### PROPOSED SCHEDULE FOR THE 543<sup>rd</sup> ACRS MEETING

The Committee agreed to consider the following topics during the 543<sup>rd</sup> ACRS meeting to be held on June 6-8, 2007:

- Draft NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire"
- Maximum Extended Load Line Limit Analysis Plus (MELLLA+) and Supporting Topical Reports
- Overview of the PHEBUS-FP Experimental Program and Results of Recent Tests
- ACRS Member's Issues Associated with the Technology-Neutral Framework for Future Plant Licensing

- Meeting with the Commission to Discuss Items of Mutual Interest
- 
- Status of the ACRS Assessment of the Quality of Selected NRC Research Projects

Sincerely,

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William J. Shack