



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

SL-0529

March 31, 2005

The Honorable Nils J. Diaz  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Dear Chairman Diaz:

SUBJECT: SUMMARY REPORT - 520<sup>th</sup> MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, March 3-5, 2005 AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 520<sup>th</sup> meeting, March 3-5, 2005, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports, letters, and memorandum:

REPORTS:

Reports to Nils J. Diaz, Chairman, NRC, from Graham B. Wallis, Chairman, ACRS:

- Revised Draft NUREG Report "Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process," dated March 11, 2005
- Proposed Rulemaking to Modify 10 CFR 50.46, "Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements," dated March 14, 2005

LETTERS:

Letters to Luis A. Reyes, Executive Director for Operations, NRC, from Graham B. Wallis, Chairman, ACRS:

- Interim Letter: Draft Safety Evaluation Report on North Anna Early Site Permit Application, dated March 11, 2005
- Pressurized Thermal Shock (PTS) Reevaluation Project: Technical Basis for Revision of the PTS Screening Criterion in the PTS Rule, dated March 11, 2005

MEMORANDUM:

Memorandum to Luis A. Reyes, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS:

- Proposed Generic Letter 2005-XX, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," dated March 8, 2005

## HIGHLIGHTS OF KEY ISSUES

### 1. Revised Draft NUREG on Expert Elicitation on Large-Break LOCA Frequencies

The Committee met with representatives of the NRC staff to review the revised draft NUREG Report, "Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process." The expert elicitation produced several distributions to assist in the determination of an appropriate alternative break size. This alternative break size is part of a draft proposed rulemaking to modify the requirements addressing large-break LOCAs.

#### Committee Action

The Committee issued a report to the NRC Chairman on March 11, 2005, recommending that the revised draft NUREG Report be issued for public comment. The Committee commented on the appropriate choice of a composite distribution.

### 2. Proposed Rulemaking Package for Risk-Informing 10 CFR 50.46

The Committee met with the NRC staff, the Nuclear Energy Institute, and the Westinghouse Owners Group to review the proposed rulemaking, "Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements," to modify 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors." The Committee previously reviewed a draft version of a proposed rule during the 518<sup>th</sup> meeting on December 2-4, 2004 and issued a letter on December 17, 2004. The current proposed rule uses the initiating event frequencies from the expert elicitation process and other relevant information to guide the determination of an appropriate alternative break size. The transition break size in the current version of the rule is equivalent to a single-ended rupture of the largest pipe attached to the reactor coolant system rather than the double-ended rupture in the earlier version. A representative of the Westinghouse Owners Group discussed efforts under way to quantify possible safety benefits from a smaller transition break size. He said the Westinghouse Owners Group hoped the results of the quantification would be available during the proposed rule's public comment period. NEI said that the proposed rule should increase focus on safety-significant matters. NEI stated that the proposed rule should be issued so that stakeholders may engage in the process.

#### Committee Action

The Committee issued a report to the NRC Chairman on March 14, 2005, recommending that the proposed rule for risk-informing 10 CFR 50.46 be released for public comment. The Committee commented on consideration of late containment failure, whether certain acceptance criteria in Regulatory Guide (RG) 1.174 need to be codified in the rule, and the importance of associated regulatory guidance.

### 3. Draft Safety Evaluation Report Related to North Anna Early Site Permit Application

The Committee heard presentations by and held discussions with representatives of the NRC staff and Dominion Nuclear North Anna, LLC (Dominion) regarding the staff's Draft Safety Evaluation Report (DSER) and Dominion's application related to North Anna early site permit

(ESP). The Committee is conducting such effort to fulfill the requirement of 10 CFR 52.23, which states that the ACRS shall report on those portions of an ESP application that concern safety.

Dominion has submitted a first-of-a-kind application for ESP, and seeks to locate up to two nuclear power units, each with a thermal power of up to 4300 Megawatts, wholly within the existing North Anna Power Station (NAPS) site. This site was previously approved for four units, but only two units (3-loop Westinghouse pressurized water reactors) were constructed and operated.

Dominion's application included a description and a safety assessment of the site, as required by 10 CFR 52.17. The DSER summarizes the results of the staff's technical evaluation of the suitability of the proposed site for a nuclear power plant(s) falling within a plant parameter envelope (PPE) that Dominion specified in its application.

The proposed North Anna site will have reactors founded on hard rock with seismically induced accelerations that extend to frequencies in excess of 10 Hz. Some generic issues arose during the staff's review of the application, including Dominion's concept for emergency planning, the approach for determining safe shutdown earthquake, and the design/site interface. Currently, most of the open items in the DSER are considered resolved. However, the staff has identified 18 permit conditions and 19 site-related combined license action items that it will recommend that the Commission impose should an ESP be issued to the applicant.

#### Committee Action

The Committee issued an interim letter to the NRC Executive Director for Operations on March 11, 2005, stating that the staff is preparing a quality safety evaluation of a first-of-a-kind application for an ESP. The Committee sees a promising start to the first application of the ESP process both on the part of Dominion and the staff. The Committee looks forward to examining the final version of the staff's Safety Evaluation Report, and will work with the staff in the development of lessons learned from the review of this and subsequent ESP applications.

#### 4. Technical Basis for Potential Revision of the Pressurized Thermal Shock (PTS) Screening Criterion in the PTS Rule

The Committee met with representatives of the NRC to discuss the staff's development of a technical basis for revision of the PTS screening criterion in the PTS Rule (10 CFR 50.61). This matter was also discussed during a joint meeting of the ACRS Subcommittees on Thermal-Hydraulic Phenomena, Materials and Metallurgy, and Reliability and Probabilistic Risk Assessment (PRA) on November 30-December 1, 2004, and at the ACRS meeting of December 2, 2004. The focus of the current meeting was on NUREG-1809, "Thermal Hydraulic Evaluation of Pressurized Thermal Shock," which documents the applicability of RELAP5 for PTS applications.

### Committee Action

The Committee issued a letter to Executive Director for Operations, concluding that the PTS Reevaluation Project has developed a comprehensive technical basis for analyzing the susceptibility of reactor pressure vessels to PTS and to support rulemaking to revise the current PTS Rule. The Committee also concluded that the external peer review of the technical work was valuable, and that the staff response to the criticisms and questions raised by the peer review panel has strengthened the technical basis. The Committee recommended that NUREG-1809 be substantially revised. The Committee would like to review the final version of this NUREG.

#### 5. Proposed Revisions to Generic License Renewal Guidance Documents/Scoping Review Process for BOP Systems

The Committee met with representatives of the NRC staff to discuss proposed updates to generic license renewal guidance documents and the scoping review process for balance of plant (BOP) systems. The staff is revising NUREG-1800 (Standard Review Plan for License Renewal Applications for Nuclear Power Plants), NUREG-1801 (Generic Aging Lessons Learned Report), and RG 1.188 (Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses). These documents were issued for public comment on January 31, 2005. The revised versions will be published on September 30, 2005. NUREG-1801 was updated to incorporate approved past precedents, interim staff guidance, and lessons learned from previous reviews. A definitions chapter was also added for materials, environments, and aging mechanisms. Changes to NUREG-1800 reflect the changes to NUREG-1801 and incorporate the new audit process for reviewing aging management programs. The proposed revision to RG 1.188 endorses NEI 95-10 Revision 5 (Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule) with exceptions. These exceptions are related to alternative scoping of non-safety-related piping and supports and the use of short term exposure to leakage in determining the need for aging management. The staff also described a two-tier process for the scoping review of BOP systems. The Tier-1 review applies screening criteria to identify systems for a more detailed Tier-2 review. The screening criteria consider risk significance, operating experience, and previous review experience. This new process was applied to Brunswick and 15 of 39 BOP systems were selected for the Tier-1 review. This new process will focus the review on more important systems and conserve limited staff resources.

### Committee Action

This briefing was for information only. No committee action was necessary. The Committee plans to review the draft final versions of these documents after reconciliation of public comments.

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

- The Committee considered the EDO's February 1, 2005, response to the ACRS letter of December 10, 2004 concerning the Committee's review of the proposed staff Safety Evaluation (SE) related to the Nuclear Energy Institute (NEI) guidance report

“Pressurized Water Reactor Sump Performance Evaluation Methodology.” Following its initial review of this matter in October, 2004, the Committee had responded with a second letter to the EDO on December 10, 2004, which acknowledged the desire of the staff to move forward with the resolution of this issue. The Committee also noted that the staff will alert the responsible national standards organizations about technical shortcomings in one of their guidance documents. Overall, however, the Committee continued to believe that both the SE and the guidance document contain technical faults and limitations that will have to be corrected at some stage in order for the methods to be sufficiently robust and durable to support sound regulatory decisions. The Committee did not consider the EDO’s response to be acceptable.

**The EDO’s February 1, 2005 response acknowledged the Committee’s concerns, and expressed the view that the staff continues to take steps to address them. The staff is conducting ongoing confirmatory work on the NUREG/CR-6224 head loss correlation, and downstream and chemical effects are also being evaluated. The staff will provide the results of these studies to the Committee as they become available.**

The Committee determined that it will continue to discuss this issue with the staff, as individual licensee responses are received in the fall of 2005, and as new information arises from the ongoing research efforts. The Committee looks forward to reviewing future refinements to the guidance documentation by both the staff and the industry.

#### OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from February 10, 2005 through March 2, 2005, the following Subcommittee meetings were held:

- Early Site Permits Subcommittee - March 2, 2005

The Subcommittee reviewed Draft Safety Evaluation Report for the North Anna early site permit application, the application itself, and the applicant’s proposed plant parameter envelope information.

- Planning and Procedures - March 2, 2005

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 plans to review the draft final version of the NUREG Report, “Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process,” after resolution of public comments.

- The Committee plans to review the draft final rulemaking, "Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process," to modify 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," after resolution of public comments. The Committee plans to review the associated regulatory guide prior to its being issued for public comment.
- The Committee plans to review the draft final version of Generic Letter 2005-XX, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," after reconciliation of public comments.
- The Committee plans to review the final version of the staff's Final Safety Evaluation Report related to Dominion application for an early site permit.
- The Committee plans to work with the staff in the development of "lessons learned" from the review of Dominion application and the next few applications for early site permits.
- The Committee would like to review the final version of NUREG-1809, "Thermal-Hydraulic Evaluation of Pressurized Thermal Shock."
- The Committee plans to review the draft final revisions to the Generic License Renewal Guidance documents after reconciliation of public comments.
- The Committee plans to review future refinements to the NEI guidance document and results of the ongoing research efforts related to the resolution of GSI-191.

#### PROPOSED SCHEDULE FOR THE 521<sup>th</sup> ACRS MEETING

The Committee agreed to consider the following topics during the 521<sup>th</sup> ACRS meeting, to be held on April 7-9, 2005:

- Final Review of the License Renewal Application for Joseph M. Farley Nuclear Plant, Units 1 and 2
- NUREG-1792, "Good Practices for Implementing Human Reliability Analysis"
- Meeting with the NRC Commissioners to discuss items of mutual interest.
- Accident Sequence Precursor Program and Development of SPAR Models

Sincerely,

**/RA/**

Graham B. Wallis  
Chairman

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NAME	NGreen, Jr.		MSnodderly		MScott		JTLarkins		JTLarkins for GBW	
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