

October 2, 2001

The Honorable Richard A. Meserve  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Dear Chairman Meserve:

SUBJECT: SUMMARY REPORT - 485th MEETING OF THE ADVISORY  
COMMITTEE ON REACTOR SAFEGUARDS, SEPTEMBER 5-7, 2001  
AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 485th meeting, September 5-7, 2001, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following letters. In addition, the Committee authorized Dr. John T. Larkins, Executive Director, ACRS, to transmit the memoranda noted below:

LETTERS

- Proposed Final Revision to Regulatory Guide 1.78, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release" (Letter to William D. Travers, Executive Director for Operations, NRC, from George E. Apostolakis, Chairman, ACRS, dated September 13, 2001)
- Generic Safety Issue-191, "Assessment of Debris Accumulation on PWR Sump Pump Performance" (Letter to William D. Travers, Executive Director for Operations, NRC, from George E. Apostolakis, Chairman, ACRS, dated September 14, 2001)
- Application of GE Nuclear Energy TRACG Code to Anticipated Operational Occurrences (Letter to William D. Travers, Executive Director for Operations, NRC, from George E. Apostolakis, Chairman, ACRS, dated September 17, 2001)

## MEMORANDA

- Draft Regulatory Guides Concerning Control Room Habitability, Dose Assessment, Meteorological Assessment, and Testing (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated September 13, 2001)
- Proposed Final Revisions to Regulatory Guides 1.142, "Safety-Related Concrete Structures for Nuclear Power Plants," and 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated September 13, 2001)

## HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE

1. Proposed Recommendation for Resolving Generic Safety Issue (GSI)-191  
"Assessment of Debris Accumulation on PWR Sump Pump Performance"

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the proposed recommendation for the resolution of Generic Safety Issue (GSI) 191, "Assessment of Debris Accumulation on PWR Sump Pump Performance."

The staff presented a brief overview and the Office of Nuclear Regulatory Research's (RES) proposed recommendation for resolution of GSI-191. Since the July meeting with the ACRS on this issue, RES management reached a decision to transition the GSI-191 from the old process under a RES Office Letter 7, "Procedures for Identification, Prioritization, Resolution, and Tracking of Generic Issues," to a new process outlined in the Management Directive (MD) 6.4, "Generic Issue Process." In the old process, GSI-191 is near the end of the Resolution Stage, which now corresponds to the "Technical Assessment: Stage 3," in the new process. Upon the completion of this stage, RES will transmit the findings and its recommendation for resolution of GSI-191 to the Director, Office of Nuclear Reactor Regulation (NRR). In accordance with MD 6.4, NRR will have the lead responsibility for the remaining steps in the generic issue process which are Regulation and Guidance Development: Stage 4; Regulation and Guidance Issuance: Stage 5; Implementation: Stage 6; and Verification: Stage 7.

Based on the parametric evaluations of 69 plants performed at the Los Alamos National Laboratory, the proposed RES recommendation is that plant-specific analyses be

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conducted to determine the vulnerability of individual plants to loss of net positive suction head margin. If a vulnerability is identified, then appropriate corrective actions should be implemented.

#### Committee Action

The Committee issued a letter to the Executive Director for Operations, dated September 14, 2001.

#### 2. EPRI Report on Resolution of Generic Letter 96-06 Waterhammer Issues

The Committee heard presentations by and held discussions with representatives of the NRC staff and the Electric Power Research Institute (EPRI) regarding EPRI's report on the resolution of issues associated with waterhammer events occurring in low pressure pressurized water reactor (PWR) containment cooling systems. This issue is pursuant to the requirements specified in NRC Generic Letter (GL) 96-06. This matter was also reviewed by the ACRS Subcommittee on Thermal-Hydraulic Phenomena during meetings held on November 17, 1999, January 16-17, and August 22-23, 2001.

This issue involves the fan cooler units (FCUs) installed in PWR containments which are designed to condense steam and cool containment in the event of a design-basis loss-of-coolant or main steamline break events. If a simultaneous loss of offsite power event occurs, the cooling water will stop circulating through the FCU. This condition will result in draining some of the water from the FCU and create a steam/air filled void region. When the FCU pumps return to power, a slug of water will impact either water or solid surfaces creating a waterhammer event that could potentially break the system piping.

GL 96-06 addressed this concern and referenced NUREG/CR-5220, "Diagnosis of Condensation-Induced Waterhammer," for use in evaluating waterhammer conditions. EPRI and a number of utilities, however, elected to pursue another resolution to this issue, rather than the conservative approach specified in GL 96-06.

Previously, the ACRS Thermal-Hydraulic Subcommittee identified some concerns regarding EPRI's methodology, such as the limitations of air release fraction, test apparatus, determination of the heat transfer coefficient, and the sensitivity of "scaling-up" test data to plant design. The NRC staff believes that EPRI's methodology is sufficient for decisionmaking. Reviews are still required in areas such as determination of air release fraction, scaling of heat transfer area, and pressure limitations associated with condensation-induced waterhammer.

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### Committee Action

The Committee decided to continue its review of this matter in the near future.

#### 3. Thermal-Hydraulic Phenomena Subcommittee Report

The Committee heard a report regarding the July 17-18, 2001 Thermal-Hydraulic Phenomena Subcommittee meeting, held to discuss the status of the RES thermal-hydraulic research under way in support of the Pressurized Thermal Shock Reevaluation Project. The subcommittee also discussed the RES program investigating phase separation phenomena in support of proposed model upgrades for the TRAC-M and RELAP5 codes. Overall, the Subcommittee was favorably impressed with the PTS thermal-hydraulic research program. The research pertaining to phase separation in Tees was in need of additional effort to ensure a successful outcome.

### Committee Action

The Committee will factor this information into its ongoing review of the Pressurized Thermal Shock Reevaluation Project.

#### 4. Reactor Oversight Process

The Committee heard presentations by and held discussions with representatives of the NRC staff on the Reactor Oversight Process (ROP). Previous presentations focused on the initial implementation, performance indicators, the significance determination process, the action matrix, and cross-cutting issues.

The revised reactor oversight process (RROP) began in August 1998. A six-month pilot was completed in November 1999, and reported to the Commission (SECY-00-049), in February 2000. The initial implementation of the process began in April 2000. In July 2001, the results of the ROP initial implementation was sent to the Commission (SECY-01-0114).

The NRC revised its oversight process to make it more risk-informed, objective, and focused on areas of greatest safety significance. The six-month pilot program was conducted at 13 Units (9 sites) and was intended to test how effectively the revised ROP worked and to identify possible problems. Based on the results of the pilot, the initial implementation of the process began at all commercial nuclear power plants.

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#### Committee Action

The Committee is expected to complete its report to the Commission in response to SRM-M000302B at the October meeting.

#### 5. Peer Review of PRA Certification Process

The Committee heard a presentation by and held discussions with Mr. Michael T. Markley, ACRS Senior Staff Engineer, regarding the application of the PRA certification process described in NEI 00-02, "Probabilistic Risk Assessment (PRA) Peer Review Process Guidance," for the North Anna Power Station that was conducted by the Westinghouse Owners Group (WOG) and discussed with the licensee on July 16-20, 2001. The Committee discussed the grading process for PRA elements and level of significance for "fact and observation" findings. The Committee considered matters related to the qualifications and experience of the Peer Review Team; sampling nature of the certification process; deliberation of observations, recommendations, and insights during peer review consensus sessions; and licensee response to preliminary grading and insights. The Committee also discussed the possible need for follow-up procedures for NEI 00-02, lessons-learned in using certified PRAs, and activities to harmonize the initiatives related to PRA quality (e.g., proposed revision to Regulatory Guide 1.174 and industrial standards being developed by the American Society of Mechanical Engineers and American Nuclear Society).

#### Committee Action

This briefing was for information only. The Committee plans to continue its review of matters related to NEI 00-02 during future meetings.

#### 6. TRACG Best-Estimate Thermal-Hydraulic Code

The Committee heard presentations by and held discussions with representatives of GE Nuclear Energy and the NRC staff regarding the application of the GE TRACG realistic or "best-estimate" code to Anticipated Operational Occurrence transient events. GE applied the Code Scaling, Applicability and Uncertainty Evaluation methodology to Version 02A of the TRACG code. The NRC staff's review included the conduct of independent assessments, particularly of the neutronic features of the code, using a copy of TRACG which GE provided to the staff upon request.

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#### Committee Action

The Committee issued a report to the Executive Director of Operations on this matter, dated September 17, 2001.

7. Proposed Final Revision to Regulatory Guide 1.78 (DG-1089), "Main Control Room Habitability During a Postulated Hazardous Chemical Release"

The Committee heard presentations by and held discussions with the NRC staff regarding the proposed final revision to Regulatory Guide 1.78. The Committee verified that its previous recommendations had been incorporated into the proposed final revision to the Regulatory Guide. The Committee and the staff discussed the amount of time available to put on a respirator, the assumed meteorological conditions used in the analyses, and the characteristics of a performance based guideline.

#### Committee Action

The Committee issued a letter to the NRC Executive Director for Operations (EDO) on this matter, dated September 13, 2001.

#### RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- The Committee considered the response from the EDO, dated August 8, 2001, to ACRS comments and recommendations included in the ACRS letter dated June 19, 2001, concerning the results of the staff's Phase 1 effort to develop risk-based performance indicators. The Committee decided to continue its evaluation of the EDO's response during the October 4-6, 2001 ACRS meeting.
- The Committee discussed the response from the NRC EDO dated August 15, 2001 to the ACRS comments and recommendations included in the ACRS report dated June 19, 2001, concerning issues raised by the ACRS pertaining to Industry Use of Thermal-Hydraulic Codes. The Committee decided that it was satisfied with the EDO's response.
- The Committee discussed the response from the EDO, dated August 21, 2001, to ACRS comments and recommendations included in the ACRS letter to Chairman Meserve, dated July 23, 2001, related to the issuance of a Bulletin regarding Circumferential Cracking of PWR Vessel Head Penetrations. The Committee was satisfied with the response from the EDO and will continue its involvement.

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### OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from July 11, 2001 through September 4, 2001, the following Subcommittee meetings were held:

- Thermal-Hydraulic Phenomena - July 17-18, 2001

The Subcommittee discussed (1) the NRC Office of Nuclear Regulatory Research (RES) experimental program at the APEX-CE facility pertaining to thermal-hydraulic phenomena associated with Pressurized Thermal Shock (PTS) in support of the NRC PTS Rule Reevaluation Program; and, (2) the RES program investigating phase separation phenomena in support of model upgrades for the RES TRAC-M and RELAP5 codes.

- Thermal-Hydraulic Phenomena (Revisions) - August 22-23, 2001

The Subcommittee discussed (1) the GE Nuclear Energy TRACG realistic thermal-hydraulic code version and its application to evaluation of anticipated operational occurrences; and, (2) resolution of issues associated with the Electric Power Research Institute (EPRI) Report, TR-113594, "Resolution of Generic Letter 96-06 Waterhammer Issues."

- Planning and Procedures - September 4, 2001

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 EXECUTIVE DIRECTOR FOR OPERATIONS

- The Committee will continue its review of the NRC/Electric Power Research Institute program pertaining to resolution of waterhammer issues pursuant to the requirement of Generic Letter 96-06 during its October meeting.
- The Committee decided not to review four draft regulatory guides related to control room habitability and plans to review these guides after the resolution of public comments. The Committee has no objection to the issuance of the guides for public comment.

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- The Committee plans to continue its review of the development of risk-based performance indicators during future meetings.
- The Committee decided that given the urgency of the Circumferential Cracking of PWR Vessel Head Penetrations issue, an interim briefing on the status of the related topics that are not dependent upon the fall outages should be provided to the Committee. The staff has agreed to a presentation in November 2001.

#### PROPOSED SCHEDULE FOR THE 486th ACRS MEETING

The Committee agreed to consider the following topics during the 486th ACRS meeting, October 4-6, 2001:

- Duane Arnold Core Power Uprate
- Readiness Assessment for Future Plant Designs and the Staff Proposal Regarding Exelon's Regulatory Licensing Approach for the Pebble Bed Modular Reactor
- Action Plan to Address ACRS Comments and Recommendations Associated with the Differing Professional Opinion (DPO) on Steam Generator Tube Integrity
- Proposed Resolution of Generic Safety Issue-173A, "Spent Fuel Storage Pool for Operating Facilities"
- Interim Review of the License Renewal Application for the Turkey Point Nuclear Power Plant and Westinghouse Topical Reports Related to License Renewal
- Subcommittee Report
- Safety Culture and Risk-Informing General Design Criteria

Sincerely,

**/RA/**

George E. Apostolakis  
Chairman