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UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D C. 20555-0001

October 26, 2001

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

Dear Chairman Meserve:

SUBJECT. SUMMARY REPORT - 486th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, OCTOBER 4-6, 2001 AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 486th meeting, October 4-6, 2001, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and a letter. In addition, the Committee authorized Dr. John T. Larkins, Executive Director, ACRS, to transmit the memoranda noted below:

REPORTS

- The Revised Reactor Oversight Process (Report to Chairman Meserve, NRC, from George E. Apostolakis, Chairman, ACRS, dated October 12, 2001)

- Proposed Resolution of Generic Safety Issue (GSI)-173A, "Spent Fuel Storage Pool for Operating Facilities" (Report to Chairman Meserve, NRC, from George E. Apostolakis, Chairman, ACRS, dated October 15, 2001)

- Duane Arnold Energy Center Extended Power Uprate (Report to Chairman Meserve, NRC, from George E. Apostolakis, Chairman, ACRS, dated October 17, 2001)

- NRC Action Plan to Address the Differing Professional Opinion Issues on Steam Generator Tube Integrity (Report to Chairman Meserve, NRC, from George E. Apostolakis, Chairman, ACRS, dated October 18, 2001)

LETTER

- EPRI Report on Resolution of NRC Generic Letter 96-06 Waterhammer Issues (Letter to Dr. William D. Travers, Executive Director for Operations, NRC from George E. Apostolakis, Chairman, ACRS, dated October 23, 2001).

8/12

MEMORANDA

- Draft Regulatory Guides Associated with a Proposed Revision to 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated October 12, 2001)

- Draft Regulatory Guide (DG)-1085, "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," and Draft NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated October 15, 2001)

- Response to Your August 8, 2001, Letter on the Risk-Based Performance Indicators: Phase I Report (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated October 18, 2001)

- Letter from Dr. Kenneth D. Bergeron Regarding Tennessee Valley Authority License Amendment Request to Allow Tritium Production at the Watts Bar Nuclear Power Plant (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated October 18, 2001)

- Draft Regulatory Guides Associated With Proposed Revision to 10 CFR 50.55a, "Codes and Standards" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated October 23, 2001)

HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE

1. Duane Arnold Core Power Uprate

The Committee heard presentations by and held discussions with representatives of the NRC staff and the Nuclear Management Company regarding the license amendment request for an increase in core thermal power for the Duane Arnold Energy Center (DAEC), pursuant to the General Electric Nuclear Energy Extended Power Uprate

Program. DAEC has requested a 15.3% power increase under the Extended Power Uprate Program. Combined with a power increase previously approved by the staff, the total power increase is 20% above the originally licensed power level. This is the largest power uprate ever considered for a boiling water reactor in the United States.

The Committee's review focused on the issues of: susceptibility of the plant to ATWS (anticipated transients without scram), ATWS recovery, reduction in some of the times available for operator actions because of higher decay heat, material degradation due to irradiation-assisted stress corrosion cracking of reactor internals and flow-assisted corrosion and fatigue of feedwater piping, and containment response to accident events involving higher decay heat levels.

Committee Action

The Committee issued a report to Chairman Meserve on this matter, dated October 17, 2001.

2. Readiness Assessment for Future Plant Designs and the Staff Proposal Regarding Exelon's Regulatory Licensing Approach for the Pebble Bed Modular Reactor

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the staff's readiness assessment for future plant designs. In the Staff Requirements Memorandum (SRM) of February 13, 2000, the Commission directed the NRC staff to assess technical, licensing, and inspection capabilities and identify enhancements, if any, that would be necessary to ensure that the agency can effectively carry out its responsibilities associated with an early site permit application and the construction of new nuclear power plants.

The staff has identified technical, licensing, and inspection capability skill gaps within the three major review Offices, NRR, RES, and NMSS and in the NRC Regional Offices. The staff believes that , in the short term, the NRC can fill many of these skill gaps through contracted technical assistance. The staff's assessment identified many activities that may need to be performed in support of the new reactor licensing. However, due to the uncertainty of the plans of potential applicants, the priorities of these activities depend on the number and timing of industry decisions to pursue new licensing activities.

The Committee also heard presentations by and held discussions with representatives of the Exelon Generation Company regarding Exelon's proposed licensing approach for

evaluating the PBMR. Exelon is proposing to utilize the current regulations (10 CFR Part 52) and is not seeking new rulemaking as part of its Combined License (COL) application. Exelon is proposing to build upon the design and review of the South African demonstration plant and on previous Modular High Temperature Gas-Cooled Reactor (MHTGR) work to develop licensing basis acceptance criteria. Some objectives for developing the PBMR licensing approach as proposed by Exelon include the establishment of agreed upon quantitative top-level regulatory criteria, and a process to determine which regulatory requirements and guidance are applicable and to what extent they should be supplemented. Contemporary probabilistic risk assessment tools will be used to help establish the PBMR design basis.

Exelon claims that certain regulatory objectives are not amenable to probabilistic treatment such as occupational exposure minimization, environmental impacts other than radiological, and security and safeguards. These objectives will be met in the conventional manner. For the remaining objectives such as limiting public exposure during normal operation and preventing and mitigating accidents, Exelon is proposing a risk-informed licensing approach.

The NRC staff is in the process of reviewing Exelon's proposed licensing approach and plans to issue a Commission paper upon completion of its review. The staff will continue to interact with the ACRS throughout the pre-application reviews and the analysis of technical issues.

Committee Action

The Committee will continue its review and follow-up of this matter during future meetings.

3. Action Plan to Address ACRS Comments and Recommendations Associated with the Differing Professional Opinion (DPO) on Steam Generator Tube Integrity

The Committee heard presentations by and held discussions with representatives of the NRC staff regarding the Action Plan that was jointly developed by the Office of Nuclear Reactor Regulation and the Office of Nuclear Regulatory Research to address the ACRS recommendations included in NUREG-1740, "Voltage-Based Alternative Repair Criteria." The Committee reviewed the elements of the action plan to determine whether the staff adequately and appropriately respond to the ACRS recommendations. The staff presented the scope of various elements of the Action Plan and the associated milestones. The Committee provided comments on certain elements of the Action Plan to help improve and refine these elements.

Committee Action

The Committee issued a report to Chairman Meserve on this matter, dated October 18, 2001. The Committee plans to have continued interaction with the staff as results are obtained from the planned work to refine and improve the technical bases for the alternative repair criteria.

4. Proposed Resolution of Generic Safety Issue-173A "Spent Fuel Storage Pool for Operating Facilities"

The Committee heard presentations by and held discussions with representatives of the NRC staff regarding the proposed resolution of GSI-173A.

Previously, the staff proposed a resolution of GSI-173A and used supporting analyses that utilized screening criteria. In accordance with these criteria, issues having an estimated fuel uncovery frequency greater than $1x\ 10^{5}$ /yr received additional regulatory analysis, and issues with a frequency of less than $1x\ 10^{-6}$ /yr received no additional action.

In a report to the Commission dated June 20, 2000, the Committee raised the concern that the screening criteria, which were derived on the basis of steam-oxidation severe accident source terms and the Commission's Safety Goals, could be inappropriate for spent fuel pool (SFP) accidents. In that report the Committee indicated that the source terms for SFP accidents could be dominated by air-oxidation of clad, which could substantially increase the release of fuel fines and ruthenium compared to steam-oxidation releases. The Committee recommended that the staff defer closing out GSI-173A until the completion and consideration of the findings of the "technical study of spent fuel pool accident risk at decommissioning nuclear power plants."

The staff completed the study and the results of the study, documented in NUREG-1738, indicate that even if the large, early release frequency were $1x\ 10^{5}$ /yr, the Commission's quantitative health objectives would still be met with air-oxidation source term. The Committee concluded that the screening criteria used in the staff's proposed resolution of GSI-173A are appropriate to resolve the issue.

Committee Action

The Committee issued a report to Chairman Meserve on this matter, dated October 15, 2001.

5. Interim Review of the License Renewal Application for the Turkey Point Nuclear Power Plant and Westinghouse Topical Reports Related to License Renewal

The Committee heard presentations by and held discussions with representatives of the NRC staff regarding the safety evaluation report (SER) related to the license renewal of Turkey Point Nuclear Plant, Units 3 and 4, and associated Westinghouse topical reports. The Committee members and the staff discussed the relationship between the thoroughness of the staff review and the length of time to approve an application. They also discussed the four open issues related to reactor pressure vessel head penetration inspection, seismic II over I pipe analyses, one-time inspections of storage tanks, and evaluation of underclad cracks in reactor pressure vessels.

Committee Action

The Committee decided to comment on the SER after resolution of the open items.

6. Materials and Metallurgy Subcommittee Report

The Committee heard a report by the Chairman of the ACRS Materials and Metallurgy Subcommittee on the items discussed at the September 25, 2001 Materials and Metallurgy Subcommittee meeting. At the Subcommittee meeting, the staff presented information concerning the status of the Steam Generator Action Plan, including the Office of Nuclear Regulatory Research programs addressing issues associated with a differing professional opinion on steam generator tube integrity. The staff also presented information concerning the steam generator tube leakage at South Texas Unit 2.

Committee Action

The Committee decided to schedule a Subcommittee meeting on November 29, 2001, to gather information concerning the staff's review of the Nuclear Energy Institute (NEI) Generic Change Package and NEI 97-06, "Steam Generator Program Guidelines."

7. EPRI Report on Resolution of NRC Generic Letter 96-06 Waterhammer Issues

The Committee completed its review of the Electric Power Research Institute (EPRI) proposed approach to resolution of issues associated with waterhammer events occurring in low-pressure pressurized water reactor containment cooling systems, pursuant to the requirements specified in NRC Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident

Conditions." This matter was also discussed with representatives of the NRC staff and EPRI during the September ACRS meeting.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter, dated October 23, 2001.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- The Committee considered the response from the Executive Director of Operations (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. As authorized by the Committee, the ACRS Executive Director issued a memorandum on October 18, 2001, informing the EDO that the ACRS plans to continue its review of the development of risk-based performance indicators as progress is made in establishing and testing methods to support the reactor oversight process. The Committee is interested in reviewing the SAPHIRE code and SPAR model development in more detail during future meetings.

- The Committee considered the response from the EDO, dated October 1, 2001, to comments and recommendations included in the ACRS report dated July 25, 2001, concerning the staff's feasibility study on risk-informing the technical requirements of 10 CFR 50.46 for emergency core cooling systems. The Committee decided that it was satisfied with the EDO's response. The Committee plans to continue its review of this matter during future meetings.

- The Committee considered the response from the EDO, dated September 17, 2001, to comments and recommendations included in the ACRS report dated July 24, 2001, concerning SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools." The EDO response did not answer all of the Committee's questions and the ACRS will follow-up on this matter particularly in light of the recent events of September 11, 2001.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from September 5, 2001, through October 3, 2001, the following Subcommittee meetings were held:

- Plant License Renewal - September 25, 2001

  The Subcommittee discussed the draft Safety Evaluation Report, with open items, concerning the license renewal application for Turkey Point Nuclear Plant, Units 3 and 4, and the associated Westinghouse Topical Reports.

- Materials and Metallurgy - September 26, 2001

  The Subcommittee discussed the status of the Steam Generator Action Plan and the South Texas Project, Unit 2, steam generator tube integrity issues.

- Thermal-Hydraulic Phenomena - September 26-27, 2001

  The Subcommittee reviewed the license amendment request of the Nuclear Management Company, for a core power uprate for the Duane Arnold Energy Center.

- Planning and Procedures - October 3, 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 plans to have continued interaction with the staff as results are obtained from the planned work specified in the Steam Generator Action Plan to refine and improve the technical bases for the alternative repair criteria.

- The Committee plans to continue its review of the development of risk-based performance indicators as progress is made in establishing and testing methods to support the reactor oversight process. The Committee is interested in reviewing the SAPHIRE code and SPAR model development in more detail during future meetings.

- The Committee plans to continue its review of matters related to risk-informing 10 CFR 50.46 during future meetings.

- The Committee decided to schedule a Subcommittee meeting to gather information concerning the staff's review of the Nuclear Energy Institute (NEI) Generic Change Package and NEI 97-06, "Steam Generator Program Guidelines."

- The Committee decided to review the proposed final version of the regulatory guides associated with a proposed revision to 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage," after the resolution of public comments.

- The Committee decided to review the proposed final version of the regulatory guides associated with a proposed revision to 10 CFR 50.55a, "Codes and Standards," after the resolution of public comments.

- The Committee decided to comment on the SER related to the license renewal application for Turkey Point, Units 3 and 4, after resolution of the open items.

- The Committee considered the response from the EDO, dated September 17, 2001, to ACRS comments and recommendations included in the ACRS report to Chairman Meserve, dated July 24, 2001, related to SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, And Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools." The Committee decided to follow-up on this matter in light of the recent events of September 11, 2001.

- The Committee plans to continue its review of the staff activities associated with the pre-application review of the future plant designs.

- The Committee would like to be kept informed of the staff's disposition of the issues raised by Dr. Kenneth D. Bergeron in a letter dated September 13, 2001 to Dr. Powers, ACRS, regarding Tennessee Valley Authority License Amendment Request to allow tritium production at the Watts Bar nuclear power plant.

The Honorable Richard A Meserve

PROPOSED SCHEDULE FOR THE 487th ACRS MEETING

The Committee agreed to consider the following topics during the November 8-10, 2001 ACRS meeting:

- Final Review of the Hatch License Renewal Application
- Dresden and Quad Cities Core Power Uprate
- NRC Safety Research Program
- Proposed Update to 10 CFR Part 52
- Circumferential Cracking of PWR Vessel Head Penetrations
- Licensing Approach for the Pebble Bed Modular Reactor Design
- Meeting with Commissioner McGaffigan
- Discussion of Topics for Meeting with the NRC Commissioners

Sincerely,

George E. Apostolakis
Chairman