



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

SL-0528

March 8, 2005

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

SUBJECT: SUMMARY REPORT - 519TH MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, FEBRUARY 10-11, 2005, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Diaz:

During its 519th meeting, February 10-11, 2005, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and memorandum:

REPORTS:

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

- Review of the Final Safety Evaluation Report for the Mixed Oxide Fuel Fabrication Facility Construction Authorization Request, dated February 24, 2005
- Waterford Steam Electric Station, Unit 3 - Extended Power Uprate, dated February 24, 2005

MEMORANDUM:

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

- Draft Regulatory Guide, DG-1137, "Guidelines for Lightning Protection for Nuclear Power Plants," dated February 11, 2005

HIGHLIGHTS OF KEY ISSUES

1. Power Uprate for Waterford Nuclear Plant

The Committee considered the license application by Entergy for an 8% core thermal power uprate for the Waterford Steam Electric Station, Unit 3.

The matter of boron concentration during long-term cooling was discussed during the meeting, and the Committee concluded that the licensee and the staff have demonstrated by conservative analyses that there exists, at Waterford, a significant margin to the boron solubility limit. However, there may be generic issues, not specific to power uprates, that are related to the precipitation of boric acid and its effects on long-term core cooling. The Committee became

aware that there does not appear to be a good technical basis for evaluating the properties of a boron-water mixture, together with chemicals added from the containment sump, when the concentration is close to the solubility limit.

Committee Action

The Committee issued a report to the NRC Chairman, dated February 24, 2005, recommending that the application be approved, subject to (1) the staff's approval of the pending alternate source term (AST) application and (2) documentation of the resolution of the boron precipitation issue during long-term cooling for Waterford 3 by the submittal of the analysis details and their acceptance in the staff's safety evaluation (SE). The Committee also agreed with the staff that the requirement for large-transient testing should be waived for this application.

The Committee also recommended that the staff should review the generic potential for boron concentration and precipitation to interfere with core cooling following a loss-of-coolant accident (LOCA). It further encouraged the staff to establish a basis for a quantitative assessment of the associated phenomena as it considers the potential for boron concentration and precipitation to interfere with core cooling following a LOCA.

2. Mixed Oxide (MOX) Fuel Fabrication Facility

The Committee heard presentations by and held discussions with representatives of the Office of Nuclear Material Safety and Safeguards (NMSS). The purpose of this meeting was to hear a staff presentation on the Final Safety Evaluation Report (FSER) for the Mixed Oxide (MOX) Fuel Fabrication Facility Construction Application Request.

Duke Cogema Stone and Webster (DCS) submitted to the NRC a Construction Authorization Request (CAR) to construct a MOX Fuel Fabrication Facility (FFF) on the Department of Energy (DOE)-owned Savannah River Site near Aiken, South Carolina on February 28, 2001. The MOX facility is being constructed because of an agreement between the United States and Russia, under which each country agreed to dispose of 34 metric tons of excess plutonium (Pu). The facility is designed to convert surplus weapons-grade plutonium to MOX fuel to be used to generate electricity at commercial nuclear power stations. DCS will be the operator of the MOX FFF and the MOX FFF will be regulated by NRC.

The NMSS staff presented information on the regulatory framework within which the construction authorization request was reviewed including the design bases requirements, the two step licensing process, the integrated safety analysis (ISA), and the application for a use and possession license. They also discussed the Savannah River Site where the MOX facility will be constructed, the mixed oxide fuel fabrication process that will finally result in fuel assemblies for use in commercial nuclear power plants, and the methodology used for the safety assessment of the construction authorization request.

The Committee and staff discussed the facility location and the emergency response in the event of an accident. While the emergency response details will be deferred to the second stage, they want to assure that in the event of an accident, emergency actions to protect all personnel will be undertaken quickly and effectively.

The Committee had concerns regarding; 1. “red oil” and the applicant’s ability to control runaway reactions in closed systems under transient conditions, 2. the autocatalytic decomposition of hydroxylamine nitrate and the understanding of the associated basis for the limits and verification of the margins, 3. fires in moderation-controlled spaces where the use of water to suppress fires could initiate a criticality event and the applicant’s ability to demonstrate that in these spaces with limited amounts of combustible materials, post-fire cooling by conduction and thermal radiation is sufficient to prevent re-ignition, and 4. a consideration of a plan in the ISA to bring the facility to a safe configuration in the event of unplanned interruptions in waste receipt.

Committee Action

The Committee issued a report to the NRC Chairman, dated February 24, 2005, recommending that the Final Safety Evaluation Report for the Mixed Oxide Fuel Fabrication Facility be issued.

3. Subcommittee Report — Plant License Renewal

The Chairman of the Plant License Renewal Subcommittee provided a report to the Committee summarizing the results of the February 9, 2005, Subcommittee meeting with the NRC staff and representatives of the Indiana Michigan Power Company (I&M) to review the Safety Evaluation Report (SER) with Open Items related to the License Renewal Application for the Donald C. Cook Nuclear Plant (CNP) Units 1 and 2. The current operating licenses for Units 1 and 2 expire on October 25, 2014, and December 23, 2017, respectively. During the meeting, I&M described recent operating experience, major plant improvements, and plant-specific aging management programs. CNP is the third plant to be reviewed using on-site audits to verify consistency with the Generic Aging Lessons Learned (GALL) Report. The SER with Open Items that was issued on December 21, 2004, contained two open items and two confirmatory items. Since that time, these items have been resolved. The staff concluded that actions have been or will be taken such that there is reasonable assurance that activities will be conducted in the renewal term in accordance with the current licensing basis.

Committee Action

The Committee will review the final SER and hold discussions with the staff and applicant during the July 2005 ACRS meeting.

4. Assessment of the Quality of the Selected NRC Research Projects

The Committee discussed the plan, schedule, and assignments for assessing the quality of selected research projects. The Committee selected four specific projects from the list of nine candidate projects provided by the Office of Nuclear Regulatory Research (RES). A panel of three ACRS members was formed for each of the projects selected for review.

Committee Action:

The Committee plans to complete these reviews in FY 2005. Each panel will conduct a detailed review of assigned projects, prepare a report and present its assessment of the project before the full Committee. The panel report, amended as mandated by the full ACRS, will be provided to RES in October 2005.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the response from the EDO dated January 18, 2005, to the ACRS report dated November 17, 2004, concerning the Resolution of Certain Items Identified by the ACRS in NUREG-1740, "Voltage-Based Alternative Repair Criteria." The Committee decided that it was satisfied with the EDO response.

Consistent with the intent of the Committee's suggestions, the staff plans to initiate a sensitivity study in an attempt to determine the governing conditions and realistic bounds for the hot leg flows.

The staff will also assess the significance of the uncertainty in the hot leg flow rates in relation to the other uncertainties that impact the outcomes of the integrated probabilistic risk assessment analysis.

The staff committed to discussing these additional analyses with the ACRS in the future.

- The Committee considered the EDO's December 22, 2004 letter of response to the November 19, 2004 ACRS report summarizing the Committee's views on the subject of the proposed rule revision to incorporate post-fire operator manual actions into 10 CFR Part 50, Appendix R, Paragraph III.G.2, as a fourth compliance option. The Committee decided that it was satisfied with the EDO's response.

The staff committed to evaluate a more global approach to establishing regulatory requirements for safety-security interface. The staff also committed to ensure that all manual actions are feasible and reliable.

- The Committee considered the EDO's June 17, 2004 and its follow-up letter, dated December 20, 2004, responding to ACRS February 26, 2004 report (NUREG-1635, Vol. 6) on review and evaluation of the NRC safety research program.

RES had identified many projects for sunseting, consistent with ACRS recommendations, in its budget proposal for FY 2006. The Staff did not agree with some of the Committee's recommendations. The Committee decided to discuss staff responses during its preparation of the 2006 report on the NRC safety research program.

- The Committee considered the response from the EDO, dated December 16, 2004, to the 2003 report of the Advisory Committee on Reactor Safeguards on the NRC's Safety Research Program, NUREG-1635, Volume 5. The Committee expressed concern as to the level of detail and the timeliness of the EDO's response. The Committee plans to discuss the actions taken by the NRC staff in response to the Committee's recommendations at an appropriate future time.
- The Committee considered the December 22, 2004 RES response to the November 18, 2004 ACRS letter providing findings from an assessment performed by the Committee to evaluate the quality of selected NRC research projects. The Committee decided that it was satisfied with the RES response.
- The Committee considered the response from the EDO, dated January 18, 2005, to the December 17, 2004 ACRS letter on risk-informing 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors." The Committee decided it was satisfied with the EDO's response.

The staff committed to meeting with the ACRS to discuss the draft proposed rule for a voluntary alternative to 10 CFR 50.46 prior to issuance for public comment.

- The Committee considered the response from the EDO, dated February 4, 2005, to the December 10, 2004 ACRS report on estimating loss-of-coolant accident frequencies through the elicitation process.

The Committee decided it was not satisfied with the EDO's response and plans to follow up on its concerns during its review of the revised draft NUREG Report, "Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process," in March 2005.

- The Committee considered the EDO's response of December 23, 2004, to lessons learned included in the ACRS letter dated November 18, 2004, regarding lessons learned from the ACRS review of the AP1000 design. The Committee decided that it was satisfied with the EDO's response.

The staff committed to meet with the ACRS to discuss the status of the progress made in addressing some of the ACRS comments.

The staff committed to meet with the ACRS to discuss the Draft NUREG-1791, "Guidance for Assessing Exemption Requests from the Nuclear Power Plant Licensed Operators Staffing Requirements Specified in 10 CFR 50.54(m)."

With regard to Committee's comment on aerosol removal in containment, the staff committed to consider this issue in conjunction with future plant design certification reviews and discuss this issue with the ACRS during a future meeting.

- The Committee considered the EDO's response of January 13, 2005, to the ACRS letter dated December 9, 2004, regarding "Interim Letter- Regulatory Structure For New Plant Licensing: Technology-Neutral Framework". The Committee decided that it was satisfied with the EDO's response.

The staff committed to have continued discussion and interaction with the ACRS on this effort as progress is made.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from December 1, 2004, through February 9, 2005, the following Subcommittee meetings were held:

- Thermal-Hydraulic Phenomena - January 26, 2005

The Subcommittee reviewed the power uprate application and the associated Safety Evaluation prepared by the NRC staff for the Waterford Nuclear Power Plant.

- Plant License Renewal - Donald C. Cook Units 1 and 2 - February 9, 2005

The Subcommittee reviewed the License Renewal Application and associated SER with Open Items for the Donald C Cook Nuclear Plant Units 1 and 2.

- Planning and Procedures - February 9, 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 revised draft NUREG Report, "Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process," in March 2005.
- The Committee plans to review the proposed rulemaking package for risk-informing 10 CFR 50.46 in March 2005.
- The Committee plans to continue its discussion and interactions with the staff on the lessons learned from the AP1000 design review.
- The Committee plans to continue its discussion and interactions with the staff regarding regulatory structure for new plant licensing: Technology-Neutral Framework.
- The Committee plans to review the draft final Regulatory Guide, DG-1137, "Guidelines for Lightning Protection for Nuclear Power Plant," after Reconciliation of Public comments.

PROPOSED SCHEDULE FOR THE 520th ACRS MEETING

The Committee considered the following topics during the 520th ACRS meeting, held on March 3-5, 2005:

- Revised Draft NUREG on Expert Elicitation on Large-Break LOCA Frequencies
- Proposed Rulemaking Package for Risk-Informing 10 CFR 50.46
- Draft Safety Evaluation Report Related to North Anna Early Site Permit Application
- Technical Basis for Potential Revision of the Pressurized Thermal Shock (PTS) Screening Criteria in the PTS Rule
- Proposed Revisions to Generic License Renewal Guidance Documents/Scoping Review Process for BOP Systems

Sincerely,

/RA/

Graham B. Wallis
Chairman

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