



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

May 17, 2022

The Honorable Christopher T. Hanson
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: SUMMARY REPORT – 694th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, APRIL 6 - 8, 2022

Dear Chairman Hanson:

During its 694th meeting, April 6 - 8, 2022, which was conducted in person and virtually, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters. The ACRS completed the following correspondence:

LETTER REPORT

Letter Report to Christopher T. Hanson, Chairman, U.S. Nuclear Regulatory Commission (NRC) from Joy L. Rempe, Chairman, ACRS

- Rulemaking Plan for the Review of Embrittlement and Surveillance Requirements for High-fluence Nuclear Power Plants in Long-term Operation, dated April 28, 2022, ADAMS Accession No. ML22105A325.

LETTERS

Letters to Daniel H. Dorman, Executive Director for Operations (EDO), NRC, from Joy L. Rempe, Chairman, ACRS

- Safety Evaluation for Topical Report NEDC-33922P, "BWRX-300 Containment Evaluation Method," Revision 2, dated April 21, 2022, ADAMS Accession No. ML22101A298, and
- Safety Evaluation for Topical Report NEDO-33914, Revision 1, "BWRX-300 Advanced Civil Construction and Design Approach, dated April 21, 2022, ADAMS Accession No. ML22105A106.

MEMORANDA

Memoranda to Daniel H. Dorman, EDO, NRC, from Scott W. Moore, Executive Director, ACRS:

- Regulatory Guides, dated April 21, 2022, ADAMS Accession No. ML22111A087, and
- Documentation of Receipt of Applicable Official NRC Notices to the Advisory Committee on Reactor Safeguards for April 2022, dated April 21, 2022, ADAMS Accession No. ML22111A070.

HIGHLIGHTS OF KEY ISSUES1. Point Beach Subsequent License Renewal Application

The Committee heard from the licensee and NRC staff on this topic and plans to deliberate and finalize a letter report on this application during the May 4 – 5, 2022, meeting.

2. Rulemaking Plan for the Review of Embrittlement and Surveillance Requirements for High-fluence Nuclear Power Plants in Long-term Operation

The Committee heard from the NRC staff and the Electric Power Research Institute and issued its letter dated April 28, 2022, with the following findings and conclusion:

- a. The staff evaluation of the current state and future evolution of reactor pressure vessel (RPV) embrittlement provides a detailed discussion on the effect of neutron fluence above 6×10^{19} n/cm² (E>1 MeV) and identifies three alternatives as options for a path forward.
- b. In SECY-22-0019, staff recommends Alternative 2 as a compromise between the status quo option (Alternative 1) and implementation of an enhanced reactor pressure vessel (RPV) embrittlement correlation for all plants (Alternative 3).
- c. Alternative 2 allows for continued use of the existing Regulatory Guide (RG) 1.99, Revision 2, correlation as required by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," if a plant's end of life fluence to the RPV does not exceed a threshold of 6×10^{19} n/cm² (E>1 MeV). For plants that will exceed this threshold, a new correlation, likely American Society for Testing and Materials (ASTM) E900-15, "Standard Guide for Predicting Radiation-Induced Transition Temperature Shift in Reactor Vessel Materials," would become the new regulatory basis for estimating RPV embrittlement. In addition, higher fluence data would need to be obtained on a plant specific basis when in its extended period of operation.
- d. The Committee concurs with the staff's recommendation. This approach, if implemented, will increase assurance of adequate protection against RPV failure at higher fluences.

3. Safety Evaluation (SE) for Topical report NEDC-33922P, "BWRX-300 Containment Evaluation Method," Revision 2

The Committee heard from the NRC staff and applicant on this topic and issued its letter dated April 21, 2002, with the following conclusions and recommendation:

- a. The proposed analysis methodology documented in NEDC-33922P, Revision 2, subject to the staff-imposed limitations and conditions, is appropriate to evaluate BWRX-300 containment performance.
- b. A key BWRX-300 performance issue is the potential accumulation of non-condensable gases that may limit heat transfer capability or increase the potential for deflagration during accidents. When the design is finalized, the methodology report limitations and conditions require that these performance issues are addressed.
- c. The SE report should be issued.

4. Safety Evaluation for Topical Report NEDO-33914, Revision 1, "BWRX-300 Advanced Civil Construction and Design Approach"

The Committee heard from the NRC staff and the applicant on this topic and issued its letter dated April 21, 2022, with the following conclusion and recommendation:

- a. The proposed civil construction and design guidelines documented in NEDO-33914, Revision 1, subject to the staff-imposed limitations and conditions, are appropriate to support the safe design of the BWRX-300, including its below-grade reactor building.
- b. The SE report should be issued.

5. Discussions at the Planning and Procedures (P&P) Session

- a. The Committee discussed the Full Committee and Subcommittee schedules through August 2022 as well as the planned agenda items for Full Committee meetings.
- b. The ACRS Executive Director also led a discussion of significant notices issued by the Agency since the last Full Committee meeting in March 2022 (this activity is documented in the memorandum dated April 21, 2022).
- c. The Committee discussed recommendations on reviews of regulatory guides (RGs), as documented in the memorandum mentioned above, dated April 21, 2022.
- d. Member Halnon led a discussion of the planned visit to NRC's Region 3 office the week of August 15, 2022. This visit will include site visits to the SHINE construction site, an operating plant (likely Byron), and a plant operations subcommittee meeting at the regional office.
- e. Member Ballinger led a discussion about the status of the SHINE operating license application review and when ACRS interactions could take place (the ACRS "rainbow chart" schedule was already populated with proposed subcommittee and full committee meeting dates for this topic).

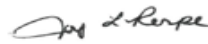
- f. Member Petti led a discussion about the various Committee activities involving the 10 CFR Part 53 rulemaking language and noted that subcommittee and full committee meeting agenda items have already been identified on the rainbow chart and anticipated work schedule.
- g. Member Brown led a discussion of upcoming activities regarding the topic of common cause failure and the staff's drafting of a SECY paper on the subject. A subcommittee meeting has been scheduled for May 20, 2022, and an item has been placed on the June full committee meeting agenda.
- h. Chairman Rempe led a discussion of the status of international outreach efforts and requested volunteers from the Members to work on developing the outreach plan.
- i. Executive Director Moore led a discussion of reconciliations for the following topic: Safety Evaluation of the Kairos Topical Report, KP-TR-012-P, Revision 1, "KP-FHR Mechanistic Source Term Methodology" [Petti]. The Committee discussed the staff's response and decided not to take further action on this topic.
- j. The Committee held a closed portion of the P&P session to discuss administrative and personnel issues, as advertised in the agenda published in the *Federal Register*.

6. Scheduled Topics for the 695th ACRS Meeting

The following topics are on the agenda for the 695th ACRS meeting scheduled for May 4 – 5, 2022:

- Finalization of the Point Beach Subsequent License Renewal Application Letter Report
- Information briefing on the University Leadership Program
- Information briefing on the Digital Twins topic

Sincerely,



Signed by Rempe, Joy
on 05/17/22

Joy L. Rempe
Chairman

May 17, 2022

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