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

August 15, 2023

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

SUBJECT: SUMMARY REPORT – 707th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, JULY 12 - 14, 2023

Dear Chair Hanson:

During its 707th meeting, July 12-14, 2023, which was conducted in person and virtually, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters. The ACRS completed the following correspondence:

LETTERS

Letters to Daniel H. Dorman, Executive Director for Operations (EDO), U.S. Nuclear Regulatory Commission (NRC) from Joy L. Rempe, Chairman, ACRS:

- Vogtle Electric Generating Plant, Units 1 and 2, Use of Accident Tolerant Fuel Lead Test Assemblies, dated July 27, 2023, Agencywide Documents Access and Management System (ADAMS) Accession No. ML23200A306.

- EPRI Topical Report 3002018337, "Use of Data Validation and Reconciliation Methods for Measurement Uncertainty Recapture," dated July 31, 2023, ADAMS Accession No. ML23206A128.

- Framatome Topical Report ANP-10339P, "ARITA™-ARTEMIS™/RELAP™ Integrated Transient Analysis Methodology," dated July 31, 2023, ADAMS Accession No. ML23206A130.

MEMORANDUM

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

- Documentation of Receipt of Applicable Official NRC Notices to the Advisory Committee on Reactor Safeguards for July 2023, dated July 24, 2023, ADAMS Accession No. ML23201A133.

OTHER CORRESPONDENCE

Letter to Christopher T. Hanson, Chair, U.S. NRC from Joy L. Rempe, Chairman, ACRS:

- Transmittal of Report, "International Meeting of Nuclear Regulatory Advisory Committees – March 2023," dated July 20, 2023, ADAMS Accession No. ML23202A217.

HIGHLIGHTS OF KEY ISSUES

a. Vogtle Electric Generating Plant, Units 1 and 2, Use of Accident Tolerant Fuel (ATF) Lead Test Assemblies (LTAs)

The Committee heard from the NRC staff and Southern Nuclear Operating Company (SNC) representatives and issued its letter dated July 27, 2023, with the following conclusions and recommendation:

1. Allowing SNC the use of four ATF LTAs (each with four higher enriched fuel rods) in Vogtle, Unit 2, will not adversely affect public safety.

2. Data obtained from these LTAs with inform future ATF and higher enrichment applications.

3. The staff safety evaluation (SE) report should be issued.

b. Electric Power Research Institute (EPRI) Topical Report 3002018337, "Use of Data Validation and Reconciliation (DVR) Methods for Measurement Uncertainty Recapture (MUR)"

The Committee heard from the NRC staff and EPRI representatives and issued its letter dated July 31, 2023, with the following conclusions and recommendation:

1. The methodology documented in the EPRI-3002018337 topical report presents a viable roadmap for future use of DVR methods for MUR.

2. The limitations and conditions (L&Cs) in the draft staff SE report provide a well-documented set of expectations for future submittals applying this methodology.

3. The SE report should be issued.

c. Framatome Topical Report ANP-10339P, "ARITA™-ARTEMIS™/RELAP™ Integrated Transient Analysis Methodology"

The Committee heard from the NRC staff and Framatome representatives and issued its letter dated July 31, 2023, with the following conclusions and recommendation:

1. The evaluation model (EM) documented in topical report ANP-10339P conservatively accounts for uncertainties in transient analyses for conventional Westinghouse and Combustion Engineering pressurized water reactors (PWRs).

2. The L&Cs in the draft staff SE report provide comprehensive guidance for applicants and future reviewers to ensure that the ARITA™ methodology is used within its validation range.

3. The SE report should be issued.

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

1. The Committee discussed the Full Committee and Subcommittee schedules through November 2023 as well as the planned agenda items for Full Committee meetings.

   During the discussion, it was agreed that if the Committee did not identify any safety or risk significant items in their review of the Saint Lucie Subsequent License Renewal application, an effort would be made to complete the ACRS letter report during the September Full Committee meeting.

2. The ACRS Executive Director led a discussion of significant notices issued by the Agency since the last Full Committee meeting in June 2023 (this activity is documented in the memorandum dated July 24, 2023). Note that there were no regulatory guide reviews by the Committee this month.

3. Member Halnon led a discussion about the visit to Region IV later in July 2023. Member Halnon and ACRS staff are continuing to work with the Committee members and Region IV staff to arrange logistics for the visit. A Plant Operations Subcommittee meeting will be held on Wednesday, July 26, 2023, as noticed on the ACRS public website.

4. Members Ballinger and Halnon led a discussion about the Seabrook Alkali-silica Reaction issue. A Plant Operations Subcommittee meeting is scheduled for Wednesday, October 18, 2023.

5. Member March-Leuba led a discussion of a readout of the Accident Analysis – Thermal Hydraulics Subcommittee meetings held on June 6 and 21, 2023. The Subcommittee met with representatives of Global Nuclear Fuel and the staff to review the draft SE (ML23163A249) for topical report NEDC-33935P, Revision 0, by Global Nuclear Fuel – Americas, entitled “LANCR02/PANAC11 Application Methodology,” and two associated methodology qualification reports (NEDC-33776P, Revision 4, and NEDC-33777P, Revision 4). These reports support the combined use of the LANCR02 and PANAC11 codes for modeling coupled neutronics and thermal-hydraulic boiling water reactor core physics. The reports document in a concise manner the methodology, which permits the definition of the well-structured update process defined in Appendix D of NEDC-33935P. The staff has found the use of the methodology, associated uncertainties, and the update process to be justified based on their review of the basic principles as well as the use of extensive benchmark data and a well-defined test matrix.

   Member March-Leuba reviewed the draft SE report and concurred with the staff findings. In consultation with members present at these Subcommittee meetings, Member March-Leuba recommended that a full committee meeting and a letter are not required; the ACRS would concur with the staff conclusions, but generating a letter would delay issuance of the final SE report.

   The Committee agreed with the Subcommittee’s recommendation.

6. Member Ballinger led a discussion on a topical report concerning chromia-doped fuel. The Fuels, Materials, and Structures Subcommittee met on June 20, 2023, to review the Framatome Topical Report, ANP-10340P-A, Revision 0, Supplement 1, Revision 0, "Incorporation of Chromia-Doped Fuel Properties in Framatome PWR Methods." The Subcommittee heard from the NRC staff and Framatome representatives.

   The topical report is a supplement to Framatome's base topical report, ANP-10340P-A, Revision 0, "Incorporation of Chromia-Doped Fuel Properties in AREVA Approved Methods," May 2018. Chromia-doped fuel pellets have a larger grain size. This helps reduce fission gas release. Framatome is adding chromia-doped fuel pellets (as well as chromia-coated cladding) to the existing GAIA fuel design for PWRs.

   Staff reviewed ANP-10340P-A, Revision 0, Supplement 1, Revision 0 to: (1) ensure that the material properties and in-core behavioral characteristics of chromia-doped fuel, as analyzed using the GALILEO and other Framatome PWR methodologies, are capable of accurately (or conservatively) ensuring fuel system safety criteria are met; (2) identify any limitations on the behavioral characteristics of the additive fuel; and (3) ensure compliance of fuel design criteria with licensing requirements for fuel designs.

   Consistent with the final SE report of the approved base Topical Report, the usage of chromia-doped fuel in PWR methods is subject to the same L&Cs found in the base topical report (i.e., there are limitations on grain size, burnup, and chromia concentration). In addition, staff added a limitation on maximum burnup.

   Material property changes have been implemented, as necessary, in both the GALILEO thermal-mechanical fuel performance code and other Framatome PWR analysis methodologies. The impact of the chromia dopant on in-reactor fuel performance (such as reactivity-initiated accident behavior, loss of coolant accident behavior, and fission gas release) were analyzed and judged to be minimal.

   Staff concluded that thermal-mechanical performance of the proposed chromia-doped PWR fuel, such as fuel melt temperature, thermal conductivity, and fuel swelling, was adequately addressed in the Framatome submittal with the application of the GALILEO fuel performance code. Fission gas release was found to be adequately predicted using the updated correlation in GALILEO.

   The Subcommittee concluded that the Framatome submittal and the staff's safety evaluation were thorough and complete. The Subcommittee did not identify any open issues or unresolved questions and therefore recommends that additional review by the Full Committee of the ACRS is not necessary.

   The Committee agreed with the Subcommittee's recommendation.

7. Member Bier led a discussion about future efforts regarding micro-reactor licensing policies. NRC staff have contacted ACRS staff with preliminary and planning information for the development of a SECY Paper entitled, "*Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operation for Testing at a Manufacturing Facility*." ACRS staff have tentatively scheduled a Regulatory Policies and Practices Subcommittee meeting on October 3, 2023, followed by a Full Committee session in the November meeting to review and comment on this SECY Paper.

8. Chairman Rempe led a discussion about the workload balance and Subcommittee structure document. Member Halnon has drafted guidance on performing design and licensing reviews, and this information will be added to the Subcommittee structure document. The Chairman requested that ACRS staff make this document publicly available on the ACRS public website.

9. Chairman Rempe led a discussion of follow-up items from the international activity effort. A final report has been prepared and distributed for comment to ACRS members and international counterparts. Final comments were received and incorporated. Hence, the document is ready to be forwarded to the Commission and made publicly available. A draft of the transmittal letter was reviewed and approved by the Committee; the letter is dated July 20, 2023 (listed under other correspondence above).

10. Member Brown led a discussion about the digital instrumentation and control (DI&C) issue regarding common cause failure.

    At the Commission's direction (regarding SRM-SECY-22-0076, "Expansion of Current Policy on Potential Common-Cause Failures in Digital Instrumentation and Control Systems") in late May 2023, the staff spent June 2023 deciding the scope of changes and schedule to meet the Commission's 12-month deadline. The Commission's 12-month deadline requires an accelerated schedule. The staff reached out to the Committee as soon as they finished their detailed milestone schedule.

    Within one year, the staff plans to respond to SRM-SECY-22-0076 by developing implementing guidance, mainly an update to Branch Technical Position (BTP) 7-19 and perhaps a draft Regulatory Guide. The NRR staff is asking if the ACRS can support briefings on the draft updated guidance (i.e., BTP 7-19, Rev. 9) in September 2023 (Subcommittee) and October 2023 (Full Committee) and on the final updated guidance in April 2024 (Subcommittee) and in May 2024 (Full Committee). The staff current target date for issuance of the draft updated guidance for public comment is October 19, 2023. So, the staff has very little to no flexibility with the timing of certain required activities (e.g., seeking public comment, obtaining OMB clearance on final guidance).

    Several members are traveling to the Westinghouse fuel facility during September Subcommittee week. However, it was agreed that the Committee would allow some time for the DI&C Subcommittee to address this issue in September 2023 – most likely during the September Full Committee meeting week.

11. There was one reconciliation this month regarding the Kairos Non-power Reactor Hermes Construction Permit Application. NRR's response letter was reviewed, and it was decided no further action on this topic was necessary.

12. There was a closed session of the P&P to discuss proprietary Committee Engagement Plans as well as sensitive administrative and personnel issues.

e. Scheduled Topics for the 708th ACRS Meeting

The following topics are on the agenda for the 708th ACRS meeting scheduled for September 6-8, 2023:

- Information session on Volcanic Hazards evaluations for new reactor licensing,
- Saint Lucie Subsequent License Renewal Application review,
- PWR Owners Group (PWROG) Topical Report on hydrogen-based transient cladding strain limit,
- BTP 7-19 regarding common cause failures and DI&C systems, and
- Revision to Regulatory Guide 1.183 regarding use of alternate source term.

Sincerely,

Signed by Rempe, Joy on 08/15/23

Joy L. Rempe
Chairman

August 15, 2023

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If Sensitive, which category?
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