



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

May 14, 2020

The Honorable Kristine L. Svinicki
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

**SUBJECT: SUMMARY REPORT – 672nd MEETING OF THE ADVISORY COMMITTEE
ON REACTOR SAFEGUARDS, APRIL 8-9, 2020**

Dear Chairman Svinicki:

During its 672nd meeting, April 8-10, 2020, which was conducted virtually due to the COVID-19 pandemic and the mandatory telework order, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following correspondence:

LETTER REPORT

Letter Report to Kristine L. Svinicki, Chairman, U.S. NRC, from Matthew W. Sunseri, Chairman, ACRS:

- Report on the Safety Aspects of the Subsequent License Renewal Application Review of the Surry Power Station, Units 1 and 2, dated April 30, 2020, ADAMS Accession No. ML20120A610

LETTERS

Letters to Margaret M. Doane, Executive Director for Operations (EDO), NRC, from Matthew W. Sunseri, Chairman, ACRS:

- NuScale Combustible Gas Monitoring, dated April 28, 2020, ADAMS Accession No. ML20113F049
- NuScale Chapter 15: Open Item Closure and Area of Focus Reviews – Return to Criticality and Boron Distribution, dated April 29, 2020, ADAMS Accession No. ML20115E403

MEMORANDUM

Memorandum to Margaret M. Doane, 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 April 2020, dated April 23, 2020, ADAMS Accession No. ML20114E248

HIGHLIGHTS OF KEY ISSUES

1. Report on the Safety Aspects of the Subsequent License Renewal Application Review of the Surry Power Station, Units 1 and 2

The staff reviewed the Dominion application for SLR in accordance with the Generic Aging Lessons Learned (GALL-SLR) and the Standard Review Plan (SRP-SLR) guidance documents. Conformance with this guidance provides bases for a conclusion that an applicant for license renewal of 20 additional years beyond 60 years will assure adequate protection of the public through the subsequent period of extended operation (SPEO).

The most significant generic issues challenging operation beyond 60 years are: reactor pressure vessel embrittlement; irradiation-assisted stress corrosion cracking of reactor internals; concrete structures and containment degradation; and electrical cable environmental qualification, condition monitoring, and assessment. Each of these items has been addressed by Dominion and evaluated by the staff through the review process. We agree with the staff's safety evaluation report regarding these issues.

Based on audits, inspections, and staff reviews, the staff concluded that Dominion has demonstrated that the effects of aging at Surry will continue to be adequately managed. Safety functions will be maintained consistent with Surry's licensing basis for the SPEO, as required by 10 CFR 54.21(a)(3). The staff's review of the SLRA identified no open or confirmatory items. We agree with the staff's conclusion that there are no issues that preclude renewal of the operating license for Surry, as described in 10 CFR 54.29(a)(1) and (a)(2).

Committee Action

The Committee issued a letter report on April 30, 2020, with the following conclusions and recommendations:

- a) The established programs and the commitments made by Dominion to manage age-related degradation provide reasonable assurance that Surry can be operated in accordance with its licensing basis for the SPEO without undue risk to the health and safety of the public.
- b) The Dominion application for subsequent license renewal of the operating license for Surry should be approved.

2. NuScale Combustible Gas Monitoring

NuScale and the staff see a need for operators to monitor containment atmosphere for H₂ and O₂ concentrations sometime after 72 hours following a postulated severe core damage event. Continuous monitoring of combustible gases would allow operators to minimize the chance of a detonation that could challenge containment integrity. This core damage event is of very low probability because it requires failure of normal heat removal, failure of the passive decay heat removal system, and failure of the emergency core cooling system valves that provide another

passive means to remove decay heat. NuScale has proposed to use the process sampling system (PSS), which is used during normal operations, to monitor the containment atmosphere. The PSS is connected to the containment evacuation system (CES), which is a relatively large diameter pipe that is used to maintain containment vacuum during normal operation. The Committee issued a letter on December 20, 2019 (ADAMS Accession No. ML19354A031), where we raised our concerns. We stated that “[t]he risk tradeoff between un-isolating the NuScale containment to enable long-term hydrogen and oxygen monitoring should be weighed against alternatives that may not require such monitoring.”

The staff has proposed that the combustible gas monitoring system design not receive finality in the NuScale design certification because the design is not complete and, therefore, they are unable to estimate the dose implications of unisolating containment. This issue must be addressed by COL applicants.

Committee Action

The Committee issued a report to the EDO on this topic via letter dated April 28, 2020, with the following conclusions:

- a) The Committee concurs with the staff position that the combustible gas monitoring system design not receive finality in the NuScale design certification because the staff is unable to evaluate dose implications.
- b) The Committee is concerned that to obtain a sample representative of the containment atmosphere, the proposed combustible gas monitoring system design will require establishing a sizeable flow through non-safety-grade piping outside containment. This may have implications on worker and off-site doses.
- c) The Committee expects to have the opportunity to review the final design updates submitted by COL applicants to ensure that the Committee’s concerns have been addressed and are supported by analyses.

3. NuScale Chapter 15: Open Item Closure and Area of Focus Reviews – Return to Criticality and Boron Distribution

The Committee reviewed the Phase 2 safety evaluation (SE) with open items in July 2019; it included many open items. The path to resolution of 11 of these was unresolved at the time. No specific serious problems had been identified at Phase 2, but these open items were tracked for several reasons: (a) calculations had been performed using topical report methodologies that had not yet been reviewed; (b) requests for additional information had been issued, but responses had not been received; or (c) changes in module protection system (mostly setpoints) had been proposed by the Applicant but not yet fully evaluated.

The Committee has reviewed the staff’s resolution of the 34 Phase 2 SE Report open items, including the 11 unresolved open items. The Committee agrees with the staff evaluation of these open items and their final resolution as documented in the Advanced SE Report without open items.

The possibility of the NuScale Power Module (NPM) becoming critical after shutdown under some extreme conditions has required NuScale to request an exemption to general design criterion (GDC) 27. The staff has reviewed in detail this event, and the Committee concurs with

their evaluation that the exemption to GDC 27 is acceptable. The risk associated with this event is extremely low.

As part of the long-term-cooling evaluation, the applicant and the staff have evaluated the impact of boron redistribution between hot and cold regions in the NPM. As the coolant boils, boron tends to concentrate in the hot regions and is diluted in the cold regions where essentially-boron-free steam condenses. We are concerned specifically about boron dilution in the downcomer by steam condensation from the steam generators or from the vessel wall because it would provide a mechanism to insert unborated coolant in the core if natural circulation is re-established or when sudden ECCS flow starts by opening the recirculation valves. This could lead to a rapid return to power event with the possibility of core damage.

The Committee concurs with the staff's conclusions in Chapter 15 of their Advanced SE Report: all open items, including those unresolved from the earlier SE, have been resolved. However, a new issue related to boron redistribution remains open.

Committee Action

The Committee issued a report to the EDO on this topic via letter dated April 29, 2020, with the following conclusions and recommendations:

- a) The Committee concurs with the staff's conclusions in Chapter 15 of their Advanced SE Report: all open items, including those unresolved from the earlier SE, have been resolved. However, a new issue related to boron redistribution remains open.
- b) Major conclusions from our focus areas are the following:
 1. Return to Criticality – The low risk of event sequences associated with return to criticality makes the General Design Criterion (GDC) 27 exemption acceptable.
 2. Boron Redistribution – The issue remains open. The Applicant and the staff are working on its resolution. The Committee will review the final staff evaluation.

AMENDMENT TO BYLAWS TO CLARIFY USE OF VIRTUAL MEETINGS

In the March Full Committee meeting, the Committee discussed the potential need to conduct meetings virtually because of the COVID-19 pandemic and voted to authorize the ACRS Committee leadership to work on a proposed amendment to the bylaws, if needed, for virtual meetings. In the April Full Committee meeting, the Committee voted to amend its bylaws to clarify conducting meetings virtually. In accordance with Section 14, "Amendments," of the ACRS bylaws (April 2018), the following amendment was approved as an addition to Section 3, "Conduct of Meetings":

3.4 Committee Meetings by Telecommunication: Full Committee and Subcommittee meetings may be held, at the direction of the Chairman, by conference telephone or other two-way, multi-party communications systems. Participation through such communication systems shall constitute presence for the purpose of establishing a quorum.

Note that there were no Regulatory Guide or Reconciliation discussions during the April Full Committee meeting.

SCHEDULED TOPICS FOR THE 673rd ACRS MEETING

The following topics were placed on the agenda for the 673rd ACRS meeting which is scheduled for May 6-9, 2020:

- Letter Writing for Various NuScale Design Certification Application Review Topics
- Letter Writing for Kairos Advanced Reactor Design Topical Report Subjects

Sincerely,

Matthew W. Sunseri,
Chairman

May 14, 2020

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