



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

August 4, 2020

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

**SUBJECT: SUMMARY REPORT – 674th MEETING OF THE ADVISORY COMMITTEE
ON REACTOR SAFEGUARDS, JUNE 3-5, 2020**

Dear Chairman Svinicki:

During its 674th meeting, June 3-5, 2020, which was conducted virtually due to the COVID-19 pandemic, 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. Nuclear Regulatory Commission (NRC), from Matthew W. Sunseri, Chairman, ACRS:

- Review of NEI 96-07, Appendix D, Revisions 1, and NRC Draft Regulatory Guide 1.187, Revision 2, Addressing Application of 10 CFR 50.59 to Digital I&C (Instrumentation and Control) Modifications, dated June 23, 2020, Agencywide Documents Access and Management System (ADAMS) Accession No. ML20174A536

LETTER

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

- Regulatory Guide (RG) 1.236, Pressurized-Water Reactor Control Rod Ejection and Boiling Water Reactor Control Rod Drop Accidents, dated July 22, 2020, ADAMS Accession No. ML20204A985

MEMORANDA

Memoranda 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 June 2020, dated June 10, 2020, ADAMS Accession No. ML20161A381

- Regulatory Guides, dated June 10, 2020, ADAMS Accession No. ML20161A383

HIGHLIGHTS OF KEY ISSUES

1. Review of NEI 96-07, Appendix D, Revisions 1 and NRC Draft Regulatory Guide 1.187, Revision 2, Addressing Application of 10 CFR 50.59 to Digital I&C Modifications

The Committee last documented its review of this issue in a letter dated June 20, 2019 (ADAMS Accession No. ML19171A323). Since issuance of this report, the Nuclear Energy Institute (NEI) developed a new draft document, NEI 96-07, Appendix D, Revision 1, dated May 2020, to resolve the one exception the staff identified in its last version of the regulatory guide. The revised NEI document includes a substantively revised Section 4.3.6 dealing with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 Criterion 6. The document delineates an approach that focuses on the significance of a different result caused by a malfunction to determine the need for obtaining a license amendment prior to performing a DI&C modification or replacement. The staff proposed draft RG 1.187, Revision 2, dated June 2020, to endorse NEI 96-07, Appendix D, Revision 1, with clarifications only, since the need for the exception was resolved.

The Committee agrees with the proposed resolution and RG 1.187, Revision 2, should be issued.

Committee Action

The Committee issued a letter on June 23, 2020, with the following conclusion and recommendation:

- a) Guidance for applying 10 CFR 50.59 to DI&C systems has been needed. This stems from the inherently different failure characteristics of systems that include DI&C equipment and from the unique and far-reaching potential impacts of DI&C system common-cause events.
 - b) Draft Revision 2 to RG 1.187, dated June 2020, that endorses NEI 96-07, Appendix D, Revision 1, provides an acceptable approach for applying 10 CFR 50.59 guidance when conducting DI&C modifications and should be issued.
2. Regulatory Guide (RG) 1.236, Pressurized-Water Reactor Control Rod Ejection and Boiling-Water Reactor Control Rod Drop Accidents

The staff proposes a new regulatory guide, RG 1.236, which defines fuel cladding failure thresholds for ductile failure, brittle failure, pellet-clad mechanical interaction, and fuel melting, along with their impact on core geometry and coolability. The RG also describes methods and procedures that the NRC staff consider acceptable for analyzing a postulated pressurized water reactor control rod ejection accident and a postulated boiling water reactor (BWR) control rod drop accident. Finally, the RG establishes analytical limits and guidance for demonstrating compliance with applicable regulations. To facilitate implementation, this guide also provides acceptable analytical models for cladding hydrogen uptake and estimating transient fission gas release. The latter is used as an input in assessing radiological consequences, and refers to

further guidance contained in RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." This is a necessary companion regulatory guide that is a critical component of the overall evaluation of RIAs.

This RG provides thorough, comprehensive guidance for analyzing reactivity-insertion accidents, such as a postulated PWR control rod ejection or a postulated BWR control rod drop, to meet regulatory requirements on reactivity limits and associated radiation dose consequences. RG 1.236 should be issued, and we encourage timely completion of RG 1.183 as a necessary complement for evaluating reactivity insertion (or initiated) accidents.

The Committee commends the staff's performance in the development of RG 1.236. The resultant product required a deliberate, long-term focus on relevant issue identification and resolution; it involved two public comment periods and significant stakeholder interaction; it derived in part from substantial international collaboration and cooperation; and it tapped into current, applicable NRC engineering and research resources.

The Committee recommends that the background materials and rationale that went into developing this new guide should be captured and published as part of the Commission's Knowledge Management Program. This will aid the staff in their reviews of advanced reactor core designs incorporating new fuel forms with increased accident tolerance, higher enrichments, and increased burnups. We look forward to reviewing staff actions related to these and similar submittals, and completion of RG. 1.183.

Committee Action

The Committee issued a letter dated July 22, 2020, with the following conclusions:

- a) RG 1.236 provides thorough, comprehensive guidance for analyzing reactivity-insertion accidents, and it should be issued.
- b) Timely completion of RG 1.183 on source terms is a necessary complement to fully implementing the guidance in RG 1.236.
- c) Significant effort was made by the staff in reviewing experimental data to define limits in RG 1.236. Key background materials, methods, and rationale used to develop this guide should be captured and published as part of the Commission's Knowledge Management Program.
- d) It is anticipated that this guide will be applied on a case-by-case basis as evolutionary changes are made to light water reactor fuels. These include changes to fuel pellet and cladding structure, higher enrichments, non-UO₂ fuel forms, and higher burnups. We look forward to reviewing staff actions related to these and similar submittals.

DRAFT SCHEDULING NOTE FOR POTENTIAL COMMISSION MEETING WITH THE ACRS

The Committee approved a draft scheduling note for the Commission meeting with the ACRS currently scheduled for October 8, 2020 and subsequently rescheduled by the Commission to December 3, 2020. Topics on the proposed scheduling note include (1) introduction, transformation and license renewals (Chairman Sunseri), (2) NuScale review (Member-at-Large Kirchner), (3) NRC Research (Vice Chairman Rempe), and (4) Digital I&C issues (Member Brown). The staff forwarded the proposed scheduling note to SECY after the meeting.

SCHEDULED TOPICS FOR THE 675th ACRS MEETING AND 676th SPECIAL ACRS MEETING

The following topics are on the agenda for the 675th ACRS meeting which is scheduled for July 8-11, 2020:

- Letter writing regarding review of the latest update of branch technical position (BTP) 7-19, "Guidance for Evaluation of Diversity and Defense-in-Depth in Digital Computer-based I&C Systems"
- Letter writing on the EPRI topical report on uranium oxy-carbide tri-structural isotropic coated particle fuel performance
- Continued discussion and letter writing regarding various NuScale design certification issues including boron distribution, final letter, and lessons learned

The following topics are on the agenda for the 676th special ACRS meeting scheduled for July 21-25, 2020:

- Continued discussion and letter writing regarding various NuScale design certification issues including boron distribution, final letter, and lessons learned

Sincerely,

Matthew W. Sunseri
Chairman

August 4, 2020

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