



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 23, 2019

Dr. Peter C. Riccardella, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: RESPONSE TO THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS' LETTER REGARDING THE STAFF'S ASSESSMENT OF THE CONTINUED ADEQUACY OF REVISION 2 OF REGULATORY GUIDE 1.99

Dear Dr. Riccardella:

I am responding to your letter dated November 27, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19331A231), in which the Advisory Committee on Reactor Safeguards (ACRS) provided its findings and recommendations concerning its review of TLR-RES/DE/CIB-2019-2, "Assessment of the Continued Adequacy of Revision 2 of Regulatory Guide (RG) 1.99" (ADAMS Accession No.: ML19203A089). The Metallurgy & Reactor Fuels Subcommittee of the ACRS reviewed this technical letter report on August 22, 2019, and the ACRS Full Committee completed its review of the technical letter report during the 668th meeting of the ACRS on November 6-8, 2019.

In its letter, the Committee provided several conclusions and a recommendation. The ACRS concluded:

1. The embrittlement trend correlation (ETC) in RG 1.99, Revision 2 (the RG) has a number of deficiencies, the most significant of which is increasing error beyond a fluence of 6×10^{19} neutrons per square centimeter (n/cm^2) ($E > 1$ MeV).
2. The American Society for Testing and Materials (ASTM) Subcommittee E10.02, Behavior and Use of Nuclear Structural Material, has performed an extensive review of several ETCs. It concluded that the correlation in ASTM E900-15, which is based on a much more extensive database, overcomes the deficiencies in the RG and provides the best fit at higher fluences.
3. A staff working group has been established and has identified a path forward for addressing this issue.
4. A staff oversight group has also been established to guide the implementation of a revision to the RG to correct its deficiencies.

The ACRS also recommended that the oversight group should consider each plant's situation to eliminate unnecessary burden on plants for which reactor pressure vessel (RPV) limits are not challenged. As noted in the staff's presentation to the ACRS on November 6, 2019, the oversight group is conducting analyses to determine the safety significance of operating with pressure-temperature limits based on nonconservative reference temperature, nil ductility transition (RT_{NDT}) values, and is also conducting a plant impact

study on a sample of operating reactors. The results of these analyses will guide the oversight group in determining how a revised RG 1.99 would be implemented with the goals established in the agency's Principles of Good Regulation.

The working group is currently in the process of performing the following tasks that were defined in our November 6, 2019, presentation:

- Determine limitations of ETC implementation.
- Determine how to apply individual plant surveillance data.
- Determine margins on ETC.
- Determine default values for inputs that are not available.
- Write a draft revised RG 1.99 for internal review.

The oversight group and the working group are working expeditiously to complete the activities related to the development of a revised regulatory guide as described in the November 6, 2019, presentation to the ACRS.

The staff will notify the ACRS when we are ready to present the draft revision of RG 1.99 to the Committee.

The staff appreciates the Committee's review and feedback as well as the thoughtful discourse during the August 22, 2019, subcommittee meeting and the November 6-8, 2019, ACRS Full Committee meeting.

Sincerely,

/RA/

Raymond V. Furstenu
Director of Nuclear Regulatory Research

cc: Chairman Svinicki
Commissioner Baran
Commissioner Caputo
Commissioner Wright
SECY

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