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

January 06, 2021

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

SUBJECT: SUMMARY REPORT – 680th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, NOVEMBER 4-6, 2020

Dear Chairman Svinicki:

During its 680th meeting, November 4-6, 2020, which was conducted virtually due to the COVID-19 pandemic, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters. The ACRS completed the following correspondence:

LETTERS

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

- Final Draft Revision 8 of Standard Review Plan Branch Technical Position 7-19, "Guidance for Evaluation of Defense-in-Depth and Diversity to Address Common Cause Failure Due to Latent Defects in Digital Safety Systems," dated November 23, 2020, ADAMS Accession No. ML20328A157

- Revision 3 to Regulatory Guide 1.200, "Acceptability of Probabilistic Risk Assessment Results for Risk-informed Activities," dated November 23, 2020, ADAMS Accession No. ML20324A742

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 November 2020, dated November 19, 2020, ADAMS Accession No. ML20317A122

- Regulatory Guides, dated November 19, 2020, ADAMS Accession No. ML20317A116

HIGHLIGHTS OF KEY ISSUES

1. Final Draft Revision 8 of Standard Review Plan Branch Technical Position (BTP) 7-19, "Guidance for Evaluation of Defense-in-Depth and Diversity to Address Common Cause Failure (CCF) Due to Latent Defects in Digital Safety Systems"

The BTP provides guidance for evaluating any diversity and defense-in-depth means credited to address vulnerabilities to CCF caused by latent defects in system hardware, software or software-based logic, as well as, the effects of any unmitigated CCF outcomes on plant safety.

Specifically, the BTP provides guidance for reviewing (1) proposed design attributes, such as the use of diverse equipment, testing, or U.S. NRC-approved alternative methods, including defensive measures within the design of a system or component to eliminate the potential for CCF from further consideration, (2) diverse external equipment, including manual controls and displays to limit or mitigate a potential CCF, and (3) other measures to ensure conformance with the U.S. NRC's position on addressing potential CCFs in digital instrumentation and control (DI&C) systems.

The guidance of this BTP is intended for staff reviews of DI&C safety systems with (1) proposed modifications that require implementation of a license amendment, and (2) applications for construction permits, operating licenses, combined licenses, design certifications, standard design approvals, and manufacturing licenses. This BTP is not applicable to proposed modifications performed under the change process in 10 CFR 50.59, "Changes, tests and experiments." Review criteria for single random failures and cascading failures from shared resources (i.e., not due to latent design defects in DI&C Structures, Systems and Components (SSCs)) are not covered in this BTP.

To accomplish the D3 evaluation, the proposed revision:

1. maintains the guiding principles from SRM-SECY-93-087,

2. incorporates the use of safety significance determination assessments with three specific categories:

    a. High Safety-Significance: Safety-Related SSCs that perform Safety-Significant Functions,

    b. Lower Safety-Significance: Safety-Related SSCs that do not perform Safety-Significant Functions and Non-Safety-Related SSCs that do perform Safety-Significant Functions, and

    c. Lowest Safety-Significance: Non-Safety-Related SSCs that do not perform Safety-Significant Functions

3. incorporates qualitative assessment criteria from Supplement 1 to RIS 2002-22 for non-reactor protection systems/ESFAS and concepts of alternative measures,

4. provides guidance on spurious operation assessments,

5. identifies means to eliminate CCF from further consideration, to mitigate CCFs, and also defines the need to demonstrate that consequences of CCF vulnerabilities that have not been eliminated or mitigated are acceptable,

6. provides guidance for manual actions as diverse means for mitigation of CCFs, and

7. improves the structure of the BTP to enhance ease of use and readability.

Revision 8 incorporates expanded discussion on the philosophy of diversity and defense-in-depth. The reorganized structure and expanded content of the BTP makes it much easier to understand and use. It describes means to eliminate or mitigate the consequences of CCF from further consideration. It also defines the need to demonstrate that consequences of CCF vulnerabilities that have not been eliminated or mitigated are acceptable. However, there are several concerns as noted above and reflected in our recommendations that should be incorporated to ensure the critical defense-in-depth defensive measures of redundancy and independence to eliminate and mitigate CCFs are not compromised.

Committee Action

The Committee issued a letter on November 23, 2020, with the following recommendations:

- BTP 7-19, Revision 8 should be issued subsequent to incorporation of the two Recommendations below

- Sections A and B.2.1 discuss the combining or integrating of the Reactor Trip System (RTS) and Engineered Safety Features Actuation System (ESFAS) and associated communications architectures into a single protection system. This approach challenges two critical defense-in-depth and diversity (D3) elements, redundancy and independence. The BTP should ensure that reviewers verify these fundamental architecture principles are maintained.

- Section B.2.1 should ensure that interconnections between High Safety-Significance systems and those of Lower Safety-Significance are one-way, unidirectional digital communication devices rather than bi-directional communication devices (which reduce independence and defense-in-depth) to preclude compromise of High Safety-Significance Systems.

2. Revision 3 to Regulatory Guide 1.200, “Acceptability of Probabilistic Risk Assessment Results for Risk-informed Activities”

Regulatory Guide (RG) 1.200 describes an approach for determining the acceptability of a PRA to be used for regulatory decision-making. It endorses, with qualifications and clarifications, the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) consensus PRA standard and the Nuclear Energy Institute (NEI) peer review process. RG 1.200 is intended to reduce the need for the NRC staff to perform an in-depth review of the base PRA that is used to support an application.

Revision 3 to RG 1.200 is an important step in closing the gap associated with resolution of the acceptability of new methods or models. It should enable more efficiency in the review of risk-informed regulatory initiatives. As part of this resolution, this revision endorses the technical contents found in NEI 17-07, "Performance of PRA Peer Reviews Using the ASME/ANS PRA Standard," and PWROG-19027-NP, "Newly Developed Method Requirements and Peer Review," on the requirement and the use of peer review for newly developed methods. The RG also endorses a third document, ASME/ANS RA-S Case 1, for seismic PRA. In addition, this revision provides numerous enhancements and clarifications to guidance.

The Committee agrees that Revision 3 to RG 1.200 fully meets its intended goals and objectives and has no further comments. The document should be issued. The Committee also understands that the staff plans to further revise RG 1.200 to expand the scope to advanced light water reactors. The Committee looks forward to working with the staff as they continue to revise this guidance.

Committee Action

The Committee issued a letter on November 23, 2020, with the follow recommendation:

- Revision 3 to RG 1.200 should be issued.

SIGNIFICANT ACTIONS/DISCUSSIONS AT THE PLANNING AND PROCEDURES SESSION

Vice Chairman Rempe led a follow-on discussion on a proposal for the Office of Nuclear Regulatory Research to brief the Committee on relevant issues including plans post-Halden. The post-Halden topic has been added to the February 2021 Full Committee agenda.

The Committee approved the calendar year 2022 meeting dates (calendar year 2021 was approved in 2019).

SCHEDULED TOPICS FOR THE 681st ACRS MEETING

The following topics are on the agenda for the 681st ACRS meeting scheduled for December 1-4, 2020:

- BWRX-300 Topical Report NEDC-33912, "Reactivity Control"
- New Design Review Standard for Chapter 7 (Instrumentation and Control)
- Commission meeting preparations and conduct of Commission meeting

Sincerely,

Matthew W. Sunseri Digitally signed by Matthew W. Sunseri
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Matthew W. Sunseri
Chairman

January 06, 2021

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