November 25, 2014

Mr. John W. Stetkar, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: RESPONSE TO ADVISORY COMMITTEE ON REACTOR SAFEGUARDS RECOMMENDATIONS ON DRAFT DESIGN-SPECIFIC REVIEW STANDARD FOR THE B&W MPOWER™ SMALL MODULAR REACTOR CHAPTER 7, "INSTRUMENTATION AND CONTROLS"

Dear Mr. Stetkar:

By letter dated August 6, 2014, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14196A141), the Advisory Committee on Reactor Safeguards (ACRS or Committee) provided recommendations related to Chapter 7, "Instrumentation and Controls" (I&C), of the Design-Specific Review Standard (DSRS) for the Babcock and Wilcox (B&W) mPower™ small modular reactor (SMR) design (ADAMS Accession No. ML14111A331). The staff presented its proposed guidance for reviewing the I&C design of the B&W mPower SMR during meetings with the ACRS Digital I&C Systems subcommittee on May 21, 2014, and the ACRS Full Committee during the 616th meeting held on July 9-11, 2014. This letter describes the staff's responses to the ACRS recommendations.

Recommendation 1: The review process described in mPower DSRS Chapter 7, Instrumentation and Control Systems, should be piloted, subject to incorporation of our recommendations.

Staff Response: The staff originally intended to pilot the mPower DSRS Chapter 7 guidance with the review of an anticipated application for design certification of the B&W mPower SMR. The staff is also developing comparable guidance for NuScale DSRS Chapter 7. If another applicant requests the staff to develop similar DSRS Chapter 7 guidance related to a specific reactor design, the staff will evaluate the feasibility of revising the guidance to ensure its applicability to another proposed reactor design. In light of the results of these pilot projects, the staff will consider preparation of generic review guidance that incorporates the DSRS approach.

Recommendation 2: The DSRS should specify that safety importance Categories A1 (Safety-related risk-significant) and B1 (Non-safety-related risk-significant) should receive the most stringent review. The depth of review should be less stringent for Category A2 (Safety-related non-risk-significant) and least stringent for Category B2 (Non-safety-related non-risk-significant). This risk-significant/safety-related ordering should be applied in a consistent manner throughout all chapters of the DSRS.

Staff Response: In accordance with the Standard Review Plan (SRP) Introduction - Part 2, safety and risk categories A1 (safety-related, risk-significant) and B1 (nonsafety-related, risk-significant) are reviewed similarly with respect to design-based acceptance criteria. In both

cases, the review consists of traditional rigorous approaches, including independent analyses and evaluations, confirmatory calculations, computer modeling, and other similar techniques. Examples of design-based acceptance criteria include those acceptance criteria related to the basic design, materials and suitability for service conditions of systems, structures, and components (SSCs).

In this regard, the review for categories A1 and B1 is more stringent than for category A2 (safety-related, non-risk-significant), which allows reviewer flexibility to demonstrate satisfaction of both design-based and performance-based acceptance criteria using alternative approaches such as the use of programmatic or other selected requirements. Examples of performance-based acceptance criteria include those acceptance criteria related to SSC capabilities, reliability, and availability.

It is the staff's intent that the safety and risk category review treatment shown in the SRP Introduction, Part 2, when fully implemented, will be uniformly applied across SSCs under review. Furthermore, the approach for each SSC should be specifically documented in the DSRSs for those designs where a DSRS is used for licensing reviews. This treatment is consistent with the graded safety and risk approach described by the ACRS.

In its letter, the ACRS has highlighted the difference between the safety and risk categorization terminology used in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors," and in the SRP Introduction - Part 2, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: Small Modular Reactor Edition." The staff acknowledges that in the SRP, the staff applied different labels to the safety and risk categories established in 10 CFR 50.69, even though they apply to the same SSCs. The staff responds that it intentionally selected the different terminology in the SRP because the DSRS presents optional review approaches for the different categories of SSCs, but these review approaches are not related to the requirements of 10 CFR 50.69. Furthermore, the DSRS does not call for applicants or staff reviewers to apply the risk-informed treatment allowed by § 50.69, although an applicant may do so at its option.

Recommendation 3: Section 7.0, Instrumentation and Controls - Introduction and Overview of Review Process, Section 7.2.9 Control of Access, Identification, and Repair, and Section 7.2.13 Displays and Monitoring should be revised as indicated in the discussion.

Staff Response: Regarding DSRS Section 7.0, the staff agrees with the recommendation and will revise DSRS Section 7.0 to identify the review guidance for categories A1 and A2 that is consistent with the SRP Introduction, Part 2.

Regarding DSRS Section 7.2.9, the ACRS letter communicated its position on the staff's review of "control of access." By letter dated April 3, 2014 (ADAMS Accession No. ML14071A121), the staff provided a supplemental response to a letter from the ACRS dated March 19, 2013 (ADAMS Accession No. ML13067A273). The ACRS's interpretation of IEEE Std. 603-1991, Section 5.9 differs from the staff's as documented in previous interactions with the ACRS on this topic. Therefore, as stated in the April 3, 2014, letter, the staff will develop a SECY paper addressing the control of access issue and update the ACRS on the subject in the future.

Regarding the ACRS recommendation on DSRS Section 7.2.13 which describes the review of displays and monitoring, the Committee noted that the review of instrumentation and parameters that should be available for monitoring severe accidents is best accomplished by an interdisciplinary team that includes licensed operators. The staff agrees with the recommendation regarding the interdisciplinary approach. The staff has substantially enhanced the staff guidance on interfaces among different disciplines and chapters during the development of Chapter 7 mPower DSRS based on lessons learned from the past new reactor licensing reviews. DSRS Section 7.2.13 includes more enhanced interface guidance to the staff and provides for thorough review interfaces with multiple chapters and disciplines, which include human factors in addition to severe accident, reactor systems, probabilistic risk analysis, and so forth. The staff will draw on the expertise of all requisite disciplines and chapters to ensure that fully qualified technical staff and sufficient resources are involved in a thorough review of the applications.

The U.S. Nuclear Regulatory Commission staff appreciates the comments and recommendations provided by the ACRS, and it looks forward to working with the Committee in the future.

Sincerely,

/RA Michael R. Johnson Acting for/

Mark A. Satorius
Executive Director
for Operations

cc: Chairman Macfarlane
Commissioner Svinicki
Commissioner Ostendorff
Commissioner Baran
Commissioner Burns
SECY

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The U.S. Nuclear Regulatory Commission staff appreciates the comments and recommendations provided by the ACRS, and it looks forward to working with the Committee in the future.

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