November 19, 2015

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

SUBJECT: INTERIM STAFF GUIDANCE DC/COL-ISG-028, "ASSESSING THE TECHNICAL ADEQUACY OF THE ADVANCED LIGHT-WATER REACTOR PROBABILISTIC RISK ASSESSMENT FOR THE DESIGN CERTIFICATION APPLICATION AND COMBINED LICENSE APPLICATION"

Dear Mr. Stetkar:

I am responding to the three recommendations noted in the Advisory Committee on Reactor Safeguards (ACRS) letter dated September 23, 2015, regarding Interim Staff Guidance (ISG) DC/COL-ISG-028, "Assessing the Technical Adequacy of the Advanced Light-Water Reactor Probabilistic Risk Assessment for the Design Certification Application and Combined License Application." The U.S. Nuclear Regulatory Commission (NRC) staff appreciates the time and effort that the ACRS has devoted to this important subject as reflected in meetings held with the ACRS Subcommittee for Reliability and Probabilistic Risk Assessment (PRA) on August 21, 2015, and the ACRS full committee on September 15, 2015. As discussed below, the staff has fully considered the ACRS recommendations and is proceeding with plans to issue the ISGs.

ACRS RECOMMENDATIONS AND NRC STAFF RESPONSES

Recommendation 1: The staff should issue the ISG after considering our Recommendations 2 and 3.

> *Response*: The staff agrees with the ACRS recommendation to issue the ISG after considering Recommendations 2 and 3. A summary of the staff's considerations of ACRS Recommendations 2 and 3 is provided below.

Recommendation 2: The staff should develop revised guidance that endorses PRA conformance with American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) Capability Category II requirements to the greatest extent achievable at the design certification (DC) and combined license (COL) stages of the licensing reviews.

> *Response:* The staff believes that the decision on what requirements a PRA needs to meet should be based on what is reasonable and appropriate for the circumstances in which the PRA is being relied upon. In determining the acceptability of the PRA for Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," DC

and COL applications, Standard Review Plan (SRP) Section 19.0, “Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors,” states that the staff will consider a number of factors based on the information supplied by the applicant, including the scope, level of detail, and technical adequacy needed to support the PRA’s specific uses and risk-informed applications. Regulatory Guide (RG) 1.200, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,” which endorses, with qualifications and clarifications, the ASME/ANS RA-Sa-2009, “Addenda to ASME/ANS RA-S-2008 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications,” (the PRA standard) offers an acceptable approach for addressing PRA technical adequacy. The purpose of the ISG is to offer supplementary guidance specifically for using the PRA standard in determining the technical adequacy of the PRA relied upon for DC and COL applications.

RG 1.200 states that the PRA needed to support regulatory decisions can vary depending on the specific application. That is, the scope, level of detail, and technical adequacy of the PRA needs to be commensurate with the application for which it is intended to be used and the role the PRA results play in decisionmaking. RG 1.200 further recognizes that a PRA may not satisfy each technical requirement to the same degree; that is, the capability category achieved for the different technical requirements may vary, especially at the individual supporting requirement level. Although the regulatory guide states that, in general, meeting Capability Category II of the PRA standard is adequate for most applications, it also states that for some applications, Capability Category I may be sufficient for certain requirements, whereas for other applications it might be necessary to achieve Capability Category III for specific requirements.

Section 1-3.2 of the endorsed PRA standard describes a process for defining the application and then determining the appropriate capability category for each of the supporting requirements needed to support the application. The staff developed the ISG generally consistent with this section of the PRA standard, while considering the staff’s previous experience with DC and COL applications. As stated in SRP Section 19.0, there are two general objectives of the PRA for an application for a DC or COL. The first objective is to demonstrate that the design properly balances preventive and mitigative features and represents a reduction in risk when compared to the prior generation of plant designs (i.e., current operating plants designed prior to 1985). The second objective of the PRA is to identify and establish specifications and performance objectives for design, construction, inspection, and operational programs, such as the regulatory treatment of non-safety systems; regulatory oversight process mitigating systems performance index; reliability assurance program; technical specifications; maintenance rule; and inspections, tests, analyses, and acceptance criteria. In developing the ISG, the staff reiterated the position in SRP Section 19.0 that a PRA standard which meets the high-level requirements and the applicable supporting requirements for Capability Category I should generally be acceptable for the DC and COL applications and sufficient for meeting the objectives for use of PRA. However, the ISG does identify some

supporting requirements for which Capability Category II must be addressed. These are typically associated with supporting requirements that contain no action at the Capability Category I level and that could create non-conservative results.

Furthermore, because the capability category determination depends on the specific use of the PRA, the ISG is narrowly focused only on applications for DCs and COLs. Other applications (e.g., risk-managed technical specifications, risk-informed inservice inspection, etc.) are specifically excluded from using the ISG and are directed to address the application-specific regulations and guidance, including the evaluation of the technical adequacy of the PRA needed for those specific applications.

In conclusion, the staff believes that the proposed ISG identifies the reasonable and appropriate supporting requirements that need to address Capability Category I or II commensurate with, and sufficient for, meeting the objectives for using the PRA in an application for a DC or COL.

Recommendation 3: The staff should expand the revised guidance to include seismic PRA in the endorsement of Capability Category II. For the COL, any seismic analysis should be site-specific.

Response: In the Commission Staff Requirements Memorandum (SRM) on SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor Designs," the Commission approved the staff recommendation that a PRA-based seismic margins analysis can be used in lieu of a seismic PRA. In addition, the Commission SRM on SECY-93-087 allows a COL applicant to compare its site characteristics against the site characteristics used in the referenced DC, and if its site is enveloped by the referenced DC characteristics, then the COL applicant does not need to evaluate PRA further. However, if the site characteristics are not enveloped, then the COL applicant needs to evaluate site-specific seismic PRAs. In addition, in accordance with 10 CFR 52.79(a)(46) and 10 CFR 52.79(d)(1), COL applicants that reference a DC must update the design-specific plant system and accident sequence analysis to incorporate any site-specific effects (e.g., soil liquefaction and slope failure) and plant-specific features, as applicable. These positions are also reflected, with additional details specific to seismic evaluations, in a number of staff guidance documents, including SRP Section 19.0 and DC/COL-ISG-020, "Interim Staff Guidance on Implementation of a Probabilistic Risk Assessment-Based Seismic Margin Analysis for New Reactors." DC/COL-ISG-020 offers specific guidance for PRA-based seismic analyses in support of DC applications and post-DC activities, including COL updates to incorporate site-specific and plant-specific features.

Therefore, for a COL application that references a DC, the staff review of the COL PRA focuses on the plant-specific aspects of the PRA, the site-specific design features that deviate from the referenced DC, and the associated differences in risk results and insights. In this review, the staff determines if the assumptions made in the DC applicant's PRA during design development and

certification, in which a specific site might not have been identified or all aspects of the design (e.g., balance of plant) might not have been fully developed, either remain valid or are adequately addressed within the COL application. In this regard, the staff review already considers site-specific characteristics in the COL reviews.

To require a DC or COL applicant to perform a seismic PRA, or to require a COL applicant to perform a site-specific seismic evaluation even though its site is enveloped by the DC site characteristics, would be a change in position of the NRC and necessitate a change to a number of staff guidance documents. In determining the scope of future DC and COL reviews, the staff will consider if it is appropriate to propose a change in position and require seismic PRAs at the COL application stage, recognizing that a seismic PRA is already required to be developed before fuel load to meet 10 CFR 50.71(h). The advantages and disadvantages of requiring a seismic PRA at the COL application stage instead of before fuel load will need to be fully considered.

The ACRS letter also includes a discussion about the assignment of each of the supporting requirements to one of six categories, noting that the staff includes additional clarifications and comments for many supporting requirements. The ACRS letter states that this approach might create confusion, and that applicants might overlook the clarifications and comments based on the designations. The staff agrees with the ACRS comment, and the ISG will be revised before issuance by replacing the current categorization approach with the less ambiguous approach of establishing qualifications and clarifications for each supporting requirement, as appropriate. This revision will be similar to the approach in RG 1.200, Appendix A, “NRC Regulatory Position on ASME/ANS PRA Standard,” and has the added advantage of enabling a smoother transition of this ISG into RG 1.200 at the next revision of the regulatory guide.

The staff appreciates the insights and advice the ACRS provides. We look forward to future interactions with the committee.

Sincerely,

/RA/

Victor M. McCree
Executive Director
for Operations

cc: Chairman Burns
Commissioner Svinicki
Commissioner Ostendorff
Commissioner Baran
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