

April 14, 2009

Dr. Mario V. Bonaca, Chairman  
Advisory Committee on Reactor Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

SUBJECT: DRAFT FINAL NUREG-1855, "GUIDANCE ON THE TREATMENT OF UNCERTAINTIES ASSOCIATED WITH PRAs IN RISK-INFORMED DECISION MAKING," AND DRAFT APPENDIX A, "EXAMPLE IMPLEMENTATION OF THE PROCESS FOR THE TREATMENT OF PRA UNCERTAINTY IN A RISK-INFORMED REGULATORY APPLICATION"

Dear Dr. Bonaca:

Thank you for your letter dated February 23, 2009, that provides the views of the Advisory Committee on Reactor Safeguards (ACRS) on NUREG-1855, "Guidance on the Treatment of Uncertainties Associated with Probabilistic Risk Assessments in Risk-Informed Decisionmaking," which included Appendix A, "Example Implementation of the Process for the Treatment of PRA Uncertainty in a Risk-Informed Regulatory Application." In addition, we met with the subcommittee on probabilistic risk assessment (PRA) on March 27, 2009, and discussed the issues on Appendix A raised in your February 23, 2009, letter. The staff's responses to the Committee's recommendations are provided below.

1. ACRS Recommendation: NUREG-1855 is a valuable contribution to the management of uncertainty in risk-informed regulatory applications. It should be published.

Staff Response: The staff has published NUREG-1855.

2. ACRS Recommendation: Draft Appendix A should not be published until it is revised. The Committee further notes that the appendix needs improvement in the following areas:
  - Results are presented in ways that may be misinterpreted as general conclusions when they are applicable only to the specific situation modeled.
  - Important dependencies are not described in ways that make it clear that the user will need to identify and model them properly.
  - The use of arbitrary sensitivity analyses to evaluate model uncertainties is not justified. The sensitivity analyses are intended to guide the analysts in identifying compensatory measures that would increase the level of confidence that the acceptance guidelines are met. More discussion of the sufficiency of the analyses to identify key uncertainties is needed. In addition, guidance would be needed on the quantitative evaluation of the impact of these compensatory measures.

- It is assumed in the appendix that the current PRAs typically contain significant conservatisms. Not enough attention is paid to the possibility that significant nonconservative assumptions may exist.

Staff Response: The staff met with the subcommittee on PRA on March 27, 2009, to discuss Appendix A to NUREG-1855 and, specifically, to discuss the proposed staff changes in addressing the ACRS comments. The members supported the proposed staff changes with some additional suggestions that the staff has incorporated into the appendix. Moreover, a public workshop is scheduled for May 5 and 6, 2009. The staff plans to use insights from the workshop to determine what further revisions to the appendix are needed before publication.

3. ACRS Recommendation: The staff should develop methods for the quantification and integration of model uncertainties in risk-informed decisions. The Committee further notes that although NUREG-1855 provides good guidance for the identification of sources of model uncertainty, it stops short of providing meaningful guidance on quantification of these uncertainties and integrating them into the overall PRA results or risk-informed decisions. The Committee notes that it will be a challenge to develop guidelines that will help the analysts incorporate model uncertainties into PRAs efficiently and to perform meaningful sensitivity studies, but that the staff should undertake such an effort.

Staff Response: The staff plans to pursue the feasibility and benefit of developing such guidance. Part of this assessment will evaluate whether this guidance is better suited to be developed as a staff effort, as part of an industry collaborative effort, as a separate industry effort, or as a separate national consensus standard effort. Insights from the May workshop will be factored into the evaluation.

4. ACRS Recommendation: Additional examples illustrating applications of the diverse aspects of the guidance should be developed and published separately. The Committee further notes that it would be useful at a later time to publish additional examples illustrating more diverse evaluations of the kinds of uncertainty described in the report. These examples should be less influenced by the assumptions and numerical analyses from a single plant-specific PRA. Moreover, the Committee also notes that although many regulatory decisions focus primarily on Level 1+ PRA results, consequence analyses and the Safety Goals require risk information and assessments of the uncertainties in Level 2 and Level 3 PRAs. Significant model uncertainties may arise in modeling physical and chemical phenomena that are addressed in these PRAs. The Committee recommends that guidance on handling these uncertainties should be part of the follow-on work.

Staff Response: The staff agrees that additional examples would be beneficial. The staff plans, based on user needs and insights from the workshop, to identify examples that would be most beneficial to develop and to identify and prioritize what additional guidance needs to be developed as part of any follow-on work. In addition, the staff intends to extend the scope of the NUREG. The status and content of the standards under development for Level 2 and Level 3 will be factored into the schedule of the follow-on work in this area.

M. Bonaca

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The staff plans to continue to interact with the Committee as the NUREG is revised and updated.

Sincerely,

***/RA Martin Virgilio for/***

R. W. Borchardt  
Executive Director  
for Operations

cc: Chairman Klein  
Commissioner Jaczko  
Commissioner Lyons  
Commissioner Svinicki  
SECY

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