



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

ACRSR-2075

April 27, 2004

The Honorable Nils J. Diaz  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SUBJECT: DRAFT PLAN FOR IMPLEMENTATION OF THE COMMISSION'S PHASED  
APPROACH TO PRA QUALITY

Dear Chairman Diaz:

During the 511<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards on April 15-17, 2004, we reviewed the NRC staff's draft plan for implementing the Commission's phased approach to Probabilistic Risk Assessment (PRA) Quality. Our Subcommittee on Reliability and PRA reviewed this matter during a meeting held on March 25, 2004. During these reviews, we had the benefit of discussions with the NRC staff and the Nuclear Energy Institute. We also had the benefit of the documents referenced.

#### CONCLUSIONS AND RECOMMENDATIONS

1. The NRC staff has developed a practical strategy that would encourage the development of guidance documents necessary to implement the Commission's phased approach to PRA quality.
2. The staff review of an application using a PRA with a scope greater than that for which guidance documents exist should not be given low priority.
3. Proactive licensees should not be discouraged from pushing the boundaries of the state of the practice by the prospect of low priority staff review. Licensees should be encouraged to address in their application the relevant technical issues cited in the December 18, 2003 Staff Requirements Memorandum (SRM) (Reference 1). The staff should give high priority to these reviews.
4. Development of guidance on how to perform sensitivity and uncertainty analyses should receive a higher priority in the draft plan.
5. The staff should be prepared to develop its own guidance documents if industry consensus standards are not developed in a timely manner to meet the Commission's schedule for achieving Phase 3.

#### DISCUSSION

In the December 18, 2003 SRM, the Commission approved the implementation of a phased approach to achieving an appropriate quality for PRAs used in support of NRC's risk-informed regulatory decisionmaking. Also, the Commission directed the staff to develop an action plan that would define a practical strategy for implementing this phased approach to PRA quality. In response to the Commission's direction, the NRC staff has developed a draft action plan (Reference 2).

The SRM recognizes that PRA quality cannot be separated from the regulatory decision the PRA is intended to support. As Regulatory Guide (RG) 1.174 (Reference 3) states and the SRM confirms, PRA quality requirements must be commensurate with the specific application. We have also emphasized the importance of focusing on the decision itself in our letters (References 4 and 5). The quality of the decision will be higher if the PRA provides all the risk insights that are relevant to that decision. We believe it is more appropriate to refer to the technical adequacy of the PRA for a specific regulatory decision rather than its quality.

The adequacy of a PRA is determined by three elements: scope (internal and external initiating events, full power and low-power and shutdown modes), level of detail, and technical adequacy. The SRM distinguishes between a “baseline PRA” and “risk-informed decisionmaking elements.” The baseline PRA is independent of the application while the risk-informed decisionmaking elements are unique to the application. The term “PRA quality” (or, better, “adequacy”) refers to the baseline PRA.

In the SRM, the phases are differentiated by the availability of guidance (industry consensus standards, industry guidance documents, and regulatory guides). Conformance with this guidance accompanied by peer and NRC staff reviews are expected to ensure technical adequacy. The staff is directed to give low priority or even return non-conforming applications. The goal is to reach Phase 3 by December 31, 2008. In this phase, it is envisioned that the licensees will have baseline PRAs that will conform to existing guidance documents and will be of sufficient depth to support all anticipated applications. Phase 4, in which the PRAs will be using state-of-the-art methods, will be considered after Phase 3 has been completed and is not part of the proposed plan.

Many guidance documents, especially consensus standards, prescribe what should be done rather than how. The technical adequacy of a PRA, however, depends very much on how various assessments are done. The argument against describing acceptable methods is that doing so will stifle the development of innovative methods. In some cases, such as the assessment of common-cause failures, the acceptable methods emerge slowly as practitioners begin to converge to their use. Although we acknowledge that guidance documents cannot, and should not, be overly prescriptive, and that the evaluation of technical adequacy will have to rely on the judgment of peer reviewers, we believe that sufficient guidance should be given so that these reviewers will be aware of what the agency expects in the area of technical adequacy.

It is recognized that we are currently somewhere between Phase 1 and Phase 2. A question that is raised is whether the staff should give low priority to its reviews of applications that use PRAs with a scope greater than that for which guidance exists. The staff recommends that review of these applications should be given low priority. Although we acknowledge the staff’s concern that such reviews will be resource intensive, we believe that proactive licensees should not be discouraged from pushing the boundaries of the state of the practice. In fact, the development of guidance documents at a later time will rely heavily on the work of these licensees.

The Commission has directed the staff to include in its plan “the resolution of technical issues, such as model uncertainty, treatment of seismic and other external events, and human performance issues for each application and phase.” During our review of Regulatory Guide 1.200, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,” in September 2003, the staff told us that guidance regarding model uncertainties and the conduct of uncertainty and sensitivity studies

might be available for our review in early 2004. The draft plan lists a projected completion date of December 30, 2004, for this guidance (a NUREG report).

Development of guidance on how to perform sensitivity and uncertainty analyses should receive a higher priority in the draft plan. Additionally, there are regulatory decisions that must be made before the projected completion date of December 30, 2004. These decisions may be sensitive to the technical issues cited in the SRM. We understand that the industry has its own projects on these matters (Reference 6). We believe that the staff review of the products of these projects, when submitted to the NRC, should receive high priority.

In a letter to the EDO (Reference 7), representatives of the American Nuclear Society (ANS) and American Society of Mechanical Engineers (ASME) express concern that "the schedule defined in the SRM seems rather ambitious." The plan should provide the staff sufficient time to develop its own guidance, if consensus standards are not produced in a timely manner to achieve Phase 3 by December 31, 2008, as the SRM directs.

Sincerely,

**/RA/**

Mario V. Bonaca  
Chairman

References:

1. Staff Requirements Memorandum from Annette Vietti-Cook, Secretary, to Chairman Diaz, Subject: COMNJD-03-0002 - Stabilizing the PRA Quality Expectations and Requirements, dated December 18, 2003.
2. Letter from Gareth Parry, NRR, to Michael R. Johnson and Suzanne Black, Division of Systems Safety and Analysis, NRR, Subject: Draft Plan for Implementation of the Commission's Phased Approach to PRA quality, March 15, 2004.
3. Regulatory Guide 1.174, Revision 1, "An Approach for using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," November 2002.
4. Letter from Mario V. Bonaca, Chairman, ACRS, to Nils J. Diaz, Chairman, NRC, Subject: Improvement of the Quality of Risk Information for Regulatory Decisionmaking, May 16, 2003.
5. Letter from Mario V. Bonaca, Chairman, ACRS, to Nils J. Diaz, Chairman, NRC, Subject: Draft Final Regulatory Guide x.xxx, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," (Formerly DG-1122), September 22, 2003.
6. Letter from Anthony R. Pietrangelo, Nuclear Energy Institute, to Mike Tschiltze, NRR, Subject: Provides an Industry Perspective on the Commission Paper and NRC Staff Draft Implementation Plan Regarding PRA Quality and Scope, April 8, 2004.
7. Memorandum from James F. Mallay, Chair, ANS Standards Board, and C. Wesley Rowley, ASME Vice President, Nuclear Codes and Standards, to William D. Travers, EDO, NRC, Subject: Comments on the Commission-Approved Implementation of a Phased Approach to Develop PRAs to Adequately Support Risk-Informed Applications and Regulatory Decision-Making, March 15, 2004.