

July 23, 2002

The Honorable Richard A. Meserve  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Chairman Meserve:

SUBJECT: DRAFT FINAL REVISION 1 TO REGULATORY GUIDE 1.174 AND TO  
CHAPTER 19 OF THE STANDARD REVIEW PLAN

During the 494<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, July 10-12, 2002, we reviewed the draft final Revision 1 to Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and to the Standard Review Plan (SRP), Chapter 19, "Use of Probabilistic Risk Assessment in Plant-Specific, Risk-Informed Decisionmaking: General Guidance." During this review, we had the benefit of discussions with representatives of the NRC staff. We also had the benefit of the documents referenced.

### **RECOMMENDATIONS**

1. Revision 1 to RG 1.174 and the associated SRP Chapter 19 should not be issued until more substantive changes are made.
2. Both RG 1.174 and SRP Chapter 19 should emphasize that all sources of risk from internal and external initiators during low-power and shutdown (LPSD), as well as full-power, operations must be included in the risk assessment. If bounding estimates of the risk contribution from plant modes not rigorously analyzed are used, justification of the estimates should be provided.
3. RG 1.174 and SRP Chapter 19 should state that changes to the licensing basis will, in general, require probabilistic risk assessments (PRAs) that conform at least to Category 2 of the American Society of Mechanical Engineers (ASME) standard [and the comparable category of the future American Nuclear Society (ANS) standards for external events and LPSD operations] and a Grade 3 of the industry peer review process.

### **DISCUSSION**

The publication of RG 1.174 and associated SRP Chapter 19 in 1998 was a major milestone in the NRC initiative to risk inform the regulations. RG 1.174 introduced the concept of an integrated decisionmaking process that had as inputs risk information, considerations of

defense in depth, and sufficient safety margins. The Guide also defined acceptable ranges of values for the possible increases in core damage frequency (CDF) and large early release frequency (LERF) that could result from proposed changes in the licensing basis.

The approach to the use of risk information established in RG 1.174 was consistent with the philosophy of a risk-informed, rather than risk-based, regulatory system. As such, the Guide did not determine acceptance in terms of strict numerical values for  $\Delta$ CDF and  $\Delta$ LERF and did not specify how to integrate various inputs to the decisionmaking process. Also, the Guide stated that the scope, level of detail, and technical acceptability of the PRA should be commensurate with the application.

Because the explicit use of risk information from PRAs for regulatory purposes was relatively new in the late 1990s, the staff recognized in SRP Chapter 19 that licensees probably would not have a PRA that analyzed all significant plant modes and accident initiators. It was also recognized that the quality of available PRAs varied widely. Because risk information was to be utilized in an integrated decisionmaking process, it was accepted that such incomplete PRAs could still provide useful insights into the risk impact of proposed licensing changes, thus leading to more effective regulatory decisions.

Although this approach has been successful in the development of some risk-informed licensing changes, such as risk-informed inspection programs, it had the unfortunate consequence that it did not encourage the development of full-scope PRAs for all operational modes nor the use of rigorous methods in developing risk information.

Incomplete and less-than-rigorous PRAs undermine the credibility of the entire risk-informed regulatory process. We believe that the slow progress of risk-informed initiatives can be attributed, in part, to this lack of credibility.

The proposed revisions make no substantive changes to the existing RG 1.174, and publication of these revisions may send the wrong message that incomplete PRAs are acceptable for a broad range of risk-informed changes to the licensing basis. Therefore, these revisions should not be issued.

Revision to RG 1.174 and the associated SRP Chapter 19 should reflect the progress of the last five years, as exemplified by PRA standards that provide new consensus guidance for a high-quality PRA and the industry peer review process. In view of these developments, the revised guidance should specify that a licensee who wishes to take advantage of risk information produce such information using methods consistent with rigorous consensus standards and include all significant sources of risk from all plant modes. Such a provision would bolster the credibility of risk-informed decisions and reduce the staff and licensee effort required to assess risk implications of licensing changes.

The PRAs should include rigorous uncertainty analyses, at least for parameter uncertainties. This would allow more focused attention on those sources of uncertainty that are much more difficult to address, such as model uncertainty and incompleteness. When approximations (e.g., bounding estimates of the risk due to plant modes not rigorously analyzed) or approximate methods are used, they should be justified. Sensitivity analyses should be used

judiciously and only after an uncertainty analysis has been performed. We look forward to working with the staff on these important issues.

Additional comments by ACRS Members Dana A. Powers and John D. Sieber are provided below.

Sincerely,

*/RA/*

George E. Apostolakis  
Chairman

Additional Comments by ACRS Members Dana A. Powers and John D. Sieber

Our colleagues have the laudable desire to encourage improvements in the scope and depth of probabilistic risk assessments being utilized by licensees especially when they seek risk-informed changes to licensing bases. Our colleagues are, however, seeking improvements with such demands for rigor and stringency, regardless of need, that they may alienate some applicants. Such demands will increase the burdens associated with RG 1.174 and SRP Chapter 19 for both applicants and the NRC staff.

References:

1. SECY-02-0070, memorandum dated April 24, 2002, for the Commissioners, from William D. Travers, Executive Director for Operations, NRC, Subject: Publication of Revisions 1 to Regulatory Guide 1.174 and SRP Chapter 19 and Notice of a Staff Plan for Endorsing Consensus Probabilistic Risk Assessment Standards and Industry Peer Review Programs, with attachments:
  - 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," April 2002.
  - Standard Review Plan, NUREG-0800, Chapter 19, Revision 1, "Use of Probabilistic Risk Assessment in Plant-Specific, Risk-Informed Decisionmaking: General Guidance," April 2002.
2. Letter dated June 14, 2000, from G. M. Eisenberg, ASME International, to M. Markley, ACRS staff, transmitting Draft 12 of Proposed ASME Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications, dated May 30, 2000.
3. Letter dated January 24, 2001, from Shawn M. Coyne-Nalbach, American Nuclear Society, to M. T. Markley, ACRS staff, transmitting Draft BSR/ANS-58.21, "External Events PRA Methodology Standard," dated December 25, 2000.