

September 13, 2000

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

Dear Chairman Meserve:

SUBJECT: PROPOSED RISK-INFORMED REVISIONS TO 10 CFR 50.44, "STANDARDS FOR COMBUSTIBLE GAS CONTROL SYSTEM IN LIGHT-WATER-COOLED POWER REACTORS"

During the 474th and 475th meetings of the Advisory Committee on Reactor Safeguards, July 12-14 and August 29-September 1, 2000, we met with representatives of the NRC staff, the Nuclear Energy Institute, and Performance Technology, Inc., to discuss proposed risk-informed revisions to 10 CFR 50.44 and related matters. Our Subcommittee on Reliability and Probabilistic Risk Assessment met on June 29 and July 11, 2000, to discuss these matters. We also had the benefit of the documents referenced.

Background

We last met with the Commission on March 2, 2000, to discuss staff plans for developing risk-informed revisions to 10 CFR Part 50 and to discuss our report dated October 12, 1999, concerning the staff's proposed Option 2 (SECY-99-256) and Option 3 (SECY-99-264) approaches. On July 20, 2000, we provided a report to the Commission on the NEI letter dated January 19, 2000, concerning the issues and priorities for NRC plans for risk-informing the technical requirements in 10 CFR Part 50.

This report responds to the Commission request in the April 5, 2000 Staff Requirements Memorandum (SRM) on these matters. It focuses on the staff's examination of 10 CFR 50.44 as a trial case for risk-informing the regulations under Option 3.

Conclusions and Recommendations

1. We agree with the staff's conclusion that there is little or no safety benefit associated with some of the requirements of the current 10 CFR 50.44 and that these requirements constitute unnecessary regulatory burdens.

2. The work, to date, provides sufficient basis for the development of a risk-informed 10 CFR 50.44 that can provide both a safety benefit and a reduction in unnecessary burden. We recommend that the staff be directed to proceed with rulemaking.
3. Because the study of 10 CFR 50.44 is intended to be illustrative of a general approach, the discussion of how risk information was used to develop the results on the conditional large release probabilities should be expanded.

Discussion

In the SRM dated February 3, 2000, the Commission approved the staff's plan to risk-inform the technical requirements of 10 CFR Part 50 (Option 3). In accordance with that plan, the staff has developed a draft framework document for risk-informed changes to 10 CFR 50. The staff used the processes described in the framework document to develop recommendations for risk-informed changes to 10 CFR 50.44 for the control of hydrogen and carbon monoxide that could burn or detonate, thereby challenging the integrity of the containment.

We were briefed on the development of the proposed framework document during our July 12-14, 2000 meeting. Subsequently, we received an updated draft revision 2 of the framework document. This document continues to evolve, and we have not yet had sufficient opportunity to review it. Although we wish to discuss the details of the framework with the staff, we agree that it is appropriate for the staff to begin trial application of the framework for the development of risk-informed changes to specific regulations.

The initial application of the processes described in the framework was to develop recommendations for changes to 10 CFR 50.44. The draft version of the staff study of a risk-informed approach to 10 CFR 50.44 provides an excellent discussion of the development and implementation of the current 10 CFR 50.44 and its relationship to other regulations and implementing documents. It also provides a useful summary of the risk significance of combustible gases and effectively characterizes the important issues. Because it is intended to be illustrative of how risk information can be used to develop alternatives to current regulations, the discussion of how the risk information in NUREG-1150 and NUREG-1560 was used to develop the conditional large release probabilities should be expanded. It would be helpful, for example, to identify the dominant sequences leading to containment failure due to combustible gases for a representative set of plants, to compare the findings from studies of severe accident risks (NUREG-1150) and from the individual plant examinations (NUREG-1560) and to better explain the reasoning that was used in the development of the conditional large release probabilities for the various classes of containments (Tables 4-2, 3, and 4 of the 10 CFR 50.44 study). More specific references to NUREG-1150 are also needed to make the study a proper technical basis document for the development of a risk-informed 10 CFR 50.44.

The staff presented specific recommendations for the elimination, modification, or enhancement of some of the current requirements in 10 CFR 50.44. In addition, the staff proposes to specify in the regulation a combustible gas source term based on realistic calculations for risk-significant severe accident sequences. A performance-based alternative would be provided to allow the licensee to use plant-specific analyses to demonstrate that the plant would meet specified performance criteria (e.g., maintenance of containment integrity for at least 24 hours for all risk-significant events). The staff also recommends that long-term (greater than 24

hours) combustible gas control be included as part of the Severe Accident Management Guidelines to mitigate the possibility of a large, late radionuclide release.

We agree with the staff's assessment on the risk-significance of combustible gas control for the various types of containments and believe that the work, to date, provides the basis for the development of a risk-informed 10 CFR 50.44 that can provide both a safety benefit and a reduction in unnecessary burden for licensees. The staff should be directed to proceed with rulemaking. The results of this study should assist the disposition of the petition for rulemaking that came from the submission by Performance Technology, Inc.

We look forward to reviewing revisions to the framework document. We also look forward to reviewing the staff's proposed rulemaking (Option 2) associated with the special treatment requirements for structures, systems, and components.

Sincerely,

/RA/

Dana A. Powers
Chairman

References:

1. Draft memorandum received August 18, 2000, from William D. Travers, Executive Director for Operations, NRC, to The Commissioners, Subject: Status Report on Risk-Informing the Technical Requirements of 10 CFR Part 50 (Option 3) and Recommendations on Risk-Informing 10 CFR 50.44 (Combustible Gas Control).
2. Memorandum dated February 3, 2000, from Annette Vietti-Cook, Secretary, NRC, to William D. Travers, Executive Director for Operations, NRC, Subject: Staff Requirements - SECY-99-264 - Proposed Staff Plan for Risk-Informing Technical Requirements of 10 CFR Part 50.
3. Letter dated April 18, 2000 from Steven D. Floyd, Nuclear Energy Institute, to Thomas L. King, Office of Nuclear Regulatory Research, NRC, Subject: Industry Comments on Draft NRC Framework for Risk-Informing NRC Technical Requirements, and Draft NRC Report on Risk-Informing 10 CFR 50.44, "Standards for Combustible Gas Control Systems in Light-Water-Cooled Power Reactors."
4. Report dated October 12, 1999, from Dana A. Powers, Chairman, ACRS, to Greta Joy Dicus, Chairman, NRC, Subject: Proposed Plans for Developing Risk-Informed Revisions to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."
5. Report dated July 20, 2000, from Dana A. Powers, Chairman, ACRS, to Richard A. Meserve, Chairman, NRC, Subject: Nuclear Energy Institute Letter dated January 19, 2000, Addressing NRC Plans for Risk-Informing the Technical Requirements in 10 CFR Part 50.
6. U. S. Nuclear Regulatory Commission NUREG-1150, Vols. 1-3, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants," Final Report, December 1990.
7. U. S. Nuclear Regulatory Commission NUREG-1560, Vols. 1-5, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," Final Report, December 1997.