

July 20, 2000

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

Dear Chairman Meserve:

SUBJECT: NUCLEAR ENERGY INSTITUTE LETTER DATED JANUARY 19, 2000,
ADDRESSING NRC PLANS FOR RISK-INFORMING THE TECHNICAL
REQUIREMENTS IN 10 CFR PART 50

During the 474th meeting of the Advisory Committee on Reactor Safeguards, July 12-14, 2000, we discussed the subject letter to NRC Chairman Meserve. In addition, we discussed with representatives of the staff and the Nuclear Energy Institute (NEI) the NRC plans for risk-informing the technical requirements in 10 CFR Part 50. During our discussions, we had the benefit of the documents referenced.

This report responds to the Commission's request in the April 5, 2000 Staff Requirements Memorandum (SRM) that the ACRS review the subject letter.

Recommendations

1. The staff should proceed with finalizing the framework for risk-informing the technical requirements of 10 CFR 50, including the prioritization criteria, and use the information in the NEI letter, as appropriate.
2. The staff will want to interact further with the Industry to determine the benefits and burden reduction that could result from changes in rules in light of risk information.

Background

The Commission directed the staff to develop a plan for risk-informing technical requirements in 10 CFR Part 50. In response to staff activities in this area, NEI conducted an industry survey to identify regulations that are prime candidates for assessment and change or possible candidates for improvement. This was the subject of an NEI letter dated January 19, 2000, to Chairman Meserve. In an SRM dated April 5, 2000, the Commission requested that:

The ACRS review the January 19, 2000, letter from the Nuclear Energy Institute (NEI) to Chairman Meserve, that addresses NRC plans for risk-informing the technical requirements in 10 CFR Part 50. In particular, the ACRS, in coordination with the NRC staff, should evaluate the priority listing of regulatory requirements that might be modified based on consideration of risk. This includes review of interim staff reports on the activities described in SECY-99-256 and SECY-99-264.

In SECY-98-300, "Options for Risk-Informed Revisions to 10 CFR Part 50 - Domestic Licensing of Production and Utilization Facilities," the staff proposed three options for modifying regulations in 10 CFR Part 50 to make them risk informed. These options were:

1. Continue with ongoing rulemaking, but make no additional changes to Part 50.
2. Make changes to the overall scope of systems, structures, and components (SSCs) covered by those sections of Part 50 requiring special treatment (such as quality assurance, technical specifications, environmental qualification, and 10 CFR 50.59 by formulating new definitions of safety-related and important-to-safety SSCs).
3. Make changes to specific requirements in the body of regulations, including general design criteria.

In the SRM of June 8, 1999, the Commission approved proceeding with the current rulemaking in Option 1, implementing Option 2, and proceeding with a study of Option 3. For Option 3, the Commission requested that the staff determine how best to proceed and provide a detailed plan outlining its recommendations regarding specific regulatory changes that should be pursued. SECY-99-256 provides the staff's plans for implementing Option 2. SECY-99-264 provides the staff's plans with respect to the Commission request to proceed with a study of Option 3.

The letter of January 19, 2000, which is the primary subject of this report, provided the industry's initial response to SECY-99-264. In this letter, NEI stated that there is general industry support for the overall approach. NEI also reported the results of a survey to which 61 units responded. This survey identified what the industry considers as prime candidate regulations for assessment and change and provided estimates of the financial benefits expected from risk-informing each identified regulation.

Discussion

It is appropriate that the staff consider the industry's priorities and seek information from the industry on the expected benefits. The industry priority list appears to be primarily driven by burden reduction and the associated cost savings. This is an important input in the prioritization process. The industry presumably is the best judge of the burden associated with a regulation, and this input will be valuable to the staff in developing its own priority listing. Many of the NEI priority items seem to relate to the scope of SSCs important to safety, quality assurance, and in-service inspection. These items are already incorporated under Option 1 and Option 2 and, thus, are already being given priority. The staff has also accelerated its preparation of a risk-informed revision to 10 CFR 50.44, "Standards for combustible gas control system in light-water-cooled power reactors."

In SECY-00-0086, "Status Report on Risk-Informing the Technical Requirements of 10 CFR Part 50 (Option 3)," the staff proposed a framework for prioritization, consideration of defense in depth, safety margins, and uncertainties. Because this framework is still under development, it is premature for us to comment. We believe, however, that this framework is appropriate and its development should continue.

If the staff is to have reliable estimates of the benefits of risk-informing selected parts of 10 CFR Part 50, there must be some sort of determination of the possible plant changes that will result. This determination appears to require first developing the risk-informed version of the rule and then identifying the possible changes on a plant-by-plant basis. After the staff has decided on the risk-informed version of a particular rule, it may want to further interact with the industry to determine the ranges of benefits – including uncertainties. For risk/benefit decisions, uncertainties in benefits are just as important as uncertainties in risk.

The highest priority candidate in the NEI letter is 10 CFR 50.46 and Appendix K related to emergency core cooling system (ECCS). The NEI letter provided information on the potential benefit (of up to \$3 million per unit per year) as one of the bases for this selection. In our view, 10 CFR 50.46 and Appendix K can be considered as a deterministic specification on how good the ECCS cooling capability must be after it is activated. Its risk implications relate primarily to success criteria – will the ECCS be good enough to provide assurance that the accident will be terminated and long-term shutdown cooling provided. Probabilistic risk assessment insights, however, also suggest that the proposed challenge to the ECCS, an instantaneous double ended guillotine break (DEGB), is an extremely unlikely event.

It is not clear that substantial changes can be made in terms of the success criteria. Successful continued cooling involves evaluation of the effects of potential local hot spots, possible geometry changes as a result of rod bowing and clad swelling, local dry out, steam-zirconium chemical reactions, and possible propagation of loss of coolant from local to substantial involvement of the core. Such phenomena are highly uncertain and, therefore, must have proper criteria to provide the required confidence to be attached to the success criteria that the accident will be terminated and the core damage frequency acceptance value will be achieved. In our view, then, this is an area with a strong defense-in-depth component related to the proper balance between prevention and mitigation in a highly uncertain phenomenological area.

There appear to be greater benefits from reconsidering changes in the definition of the challenges to the ECCS, i.e., replacement of the DEGB, with an alternative large-break loss-of-coolant accident. It has long been recognized that the DEGB has led to undesirable consequences in the structural design of piping systems. It may also have negative consequences when used as the design basis for ECCS. It could, for example, result in a greater likelihood of pressurized thermal shock and lead to unrealistic startup times for emergency equipment that can reduce reliability.

On the other hand, the use of the DEGB can be considered as a sort of margin on the acceptable performance of ECCS. A systematic assessment, therefore, of the consequences of this change must be considered. Although the staff's framework is still under development, it does include a

proposed process to appropriately consider the impacts of changes to the regulations. We look forward to interacting with the staff in its development of the final framework.

Sincerely,

/RA/

Dana A. Powers
Chairman

References:

1. Letter dated January 19, 2000, from Joe F. Colvin, President and Chief Executive Officer, NEI, to Richard A. Meserve, Chairman, NRC, regarding Proposed Staff Plan for Risk-Informing Technical Requirements in 10 CFR Part 50.
2. Memorandum dated April 5, 2000, from Annette L. Vietti-Cook, Secretary, NRC, to John T. Larkins, ACRS/ACNW, Subject: Staff Requirements - Meeting with ACRS on Risk Informing 10 CFR Part 50, March 2, 2000.
3. Memorandum dated June 8, 1999, from Annette L. Vietti-Cook, Secretary, NRC, to William D. Travers, Executive Director for Operations, NRC, Subject: Staff Requirements - SECY-98-300 - Options for Risk-Informed Revisions to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."
4. Memorandum dated April 12, 2000, from William D. Travers, Executive Director for Operations, NRC, for the Commissioners, SECY-00-0086, Subject: Status Report on Risk-Informing the Technical Requirements of 10 CFR Part 50 (Option 3).
5. Memorandum dated October 29, 1999, from William D. Travers, Executive Director for Operations, NRC, for the Commissioners, SECY-99-256, Subject: Rulemaking Plan for Risk-Informing Special Treatment Requirements.
6. Memorandum dated November 8, 1999, from William D. Travers, Executive Director for Operations, NRC, for the Commissioners, SECY-99-264, Subject: Proposed Staff Plan for Risk-Informing Technical Requirements in 10 CFR Part 50.
7. Memorandum dated December 23, 1998, from William D. Travers, Executive Director for Operations, NRC, for the Commissioners, SECY-98-300, Subject: Options for Risk-Informed Revisions to 10 CFR Part 50 - "Domestic Licensing of Production and Utilization Facilities."