UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

June 20, 1997

The Honorable Shirley Ann Jackson
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Chairman Jackson:

SUBJECT: PROPOSED REGULATORY APPROACH ASSOCIATED WITH STEAM GENERATOR INTEGRITY

During the 442nd meeting of the Advisory Committee on Reactor Safeguards, June 11-14, 1997, we met with representatives of the NRC staff and the Nuclear Energy Institute (NEI) to discuss the staff's proposed regulatory approach for ensuring steam generator tube integrity. We reviewed the staff's original rulemaking approach during our November 7-9, 1996 meeting, and provided a letter to the Executive Director for Operations on November 20, 1996. Our Subcommittees on Materials and Metallurgy and on Severe Accidents also reviewed the rulemaking approach on June 3-4 and November 5-6, 1996, and on January 9 and April 15-16, 1997. We also had the benefit of the documents referenced.

The staff had intended to develop a risk-informed, performance-based rule to provide a new regulatory basis for managing steam generator tube degradation. But in the course of the development of the new rule, the staff discovered that the introduction of new tube performance criteria to replace the current 40-percent through-wall crack-depth criterion could create a potential for increased susceptibility to thermally induced tube failure during certain severe accident sequences.

We previously reviewed the staff's analyses of tube performance in severe accident situations. Although there were many uncertainties in the analyses, we concurred with the staff position that thermally induced tube failures must be addressed when alternate tube repair criteria are considered.

The introduction of a requirement to evaluate tube behavior during severe accidents would constitute a backfit. The regulatory analysis performed by the staff demonstrated that this backfit could not be justified on a generic basis.

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The need still exists for regulatory guidelines for addressing new diverse steam generator tube degradation mechanisms. The staff has determined that enforceable guidance, which also provides flexibility to licensees, can be promulgated with a generic letter and two regulatory guides. One regulatory guide, which would be required for licensees electing to adopt alternate tube repair criteria, would provide guidance for risk assessments that address thermally induced tube failures.

The generic letter and the other regulatory guide would specify new guidelines for inspecting and assessing the condition of degraded tubes. The intent of these new guidelines is to ensure that nondestructive examination techniques are adequate for assessing tube conditions. The staff believes that these new guidelines constitute a compliance backfit and are not subject to the backfit rule.

The NEI Steam Generator Working Group contends that the existing regulatory requirements and guidance are adequate, and that the proposed generic letter, which would request changes to licensee technical specifications, is unnecessary. NEI has presented a framework of guidelines, which address a wide variety of steam generator related issues, that could serve as the basis for industry guidance and obviate the need for the proposed regulatory guides. NEI agrees that a risk assessment is appropriate when alternate repair criteria are adopted.

Recommendation

The proposed staff approach for developing a new regulatory basis to ensure steam generator tube integrity is reasonable, and we recommend that the staff continue with this approach.

Discussion

The industry and the staff are in crisis with respect to the present regulatory requirements for steam generator tube integrity. The mechanisms by which steam generator tubes degrade are now different than those envisaged at the time applicable regulations were formulated. The industry is forced to repair steam generator tubes with defects that cannot be characterized accurately or confidently. Both the industry and staff agree that this results in plugging or repairing tubes that otherwise should function satisfactorily well into the future. Such a practice saps the economic viability of the plant and curtails the resource base available to support plant operations. At the same time, the staff is responding on a case-by-case basis to licensee requests for staff action concerning identified steam generator tube degradation. Actions are needed to define criteria for steam generator maintenance programs that will ensure steam generator

tube integrity, and to develop inspection guidelines for the NRC staff.

The three options available to provide stability to the steam generator program are rulemaking, technical specification changes initiated through the generic letter process, or reliance on industry programs. Rulemaking would provide fixed enforceable criteria but is untenable due to backfit considerations. Reliance on formal industry programs would provide flexibility to licensees but would be unenforceable through the regulatory process. The proposed changes that would be made in the technical specifications would result in enforceable criteria and inspectable solutions, and would, according to the staff, constitute a compliance backfit.

There is agreement between the staff and NEI that improvements in condition monitoring, operational assessment, and nondestructive examination qualification programs are beneficial and have been implemented by most utilities. We believe that the staff and NEI should reach agreement on the performance criteria for ensuring steam generator tube integrity, as well as on the guidelines for proper implementation of these criteria.

The staff proposal would allow licensees to continue to use older criteria with augmented condition monitoring and operational assessment. On the other hand, a licensee could institute alternate repair criteria specific to the particular degradation mechanisms peculiar to the plant's steam generators. The regulatory guidance would define how to qualify this degradation specific management program. Licensees choosing this option would have to evaluate the risk of induced steam generator tube failure during severe accidents.

We agree with the staff decision to address probabilistic risk assessment issues in a separate regulatory guide consistent with the draft Regulatory Guide DG-1061, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Current Licensing Basis."

We plan to continue our review of this issue when the implementing documents are available.

Dr. W. J. Shack did not participate in the Committee's deliberations regarding this matter.

Sincerely,

R. L. Seale

R. L. Seale
Chairman

References:

1. Memorandum dated May 23, 1997, from L. Joseph Callan, Executive Director for Operations, to NRC Commissioners, Subject: Steam Generator Rulemaking.
2. Letter dated November 20, 1996, from T. S. Kress, Chairman, ACRS, to James M. Taylor, Executive Director for Operations, NRC, Subject: Proposed Rule on Steam Generator Integrity.
3. U.S. Nuclear Regulatory Commission, Draft Regulatory Guide DG-1061, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Current Licensing Basis," dated February 28, 1997.