

December 14, 2001

Dr. William D. Travers  
Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Dr. Travers:

**SUBJECT: PROPOSED STEAM GENERATOR PROGRAM GUIDELINES AND  
ASSOCIATED GENERIC LICENSE CHANGE PACKAGE**

During the 488<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, December 5-7, 2001, we reviewed the latest revision to Nuclear Energy Institute document, "Steam Generator Program Guidelines" (NEI 97-06), and the associated Steam Generator Program Generic License Change Package. Our Materials and Metallurgy Subcommittee reviewed these documents on November 29, 2001. During our reviews, we had the benefit of discussions with representatives of the staff and NEI. We also had the benefit of the documents referenced.

### **CONCLUSIONS**

1. NEI 97-06 and the related Generic License Change Package describe a steam generator tube management program that is flexible enough to accommodate evolving technical knowledge and could provide an enforceable regulatory framework.
2. We concur with the staff's conclusion that there is a need for additional technical justification to support the industry's proposal to extend the inspection intervals for Alloy 600TT and 690TT tubing beyond that currently permitted by regulations.

### **BACKGROUND**

In the early 1990s, the regulations required licensees to repair steam generator tubes having flaws deeper than 40 percent through-wall. Since the nondestructive examination (NDE) methods were unable to characterize the dimensions of a crack with sufficient accuracy and reproducibility, licensees repaired tubes with identified cracks. In 1995, the staff issued Generic Letter 95-05, which, in certain specific situations, allowed steam generator tubes with cracks to remain in service, in part, on the basis of data from voltage-based NDE methodologies.

Since that time, the staff and NEI have worked to develop a regulatory framework to ensure steam generator tube integrity. The staff considered developing a rule, but it failed to pass the regulatory analysis test.

In 1997, affected licensees committed to follow NEI 97-06 that defined performance criteria for structural integrity and leakage under accident and normal operating conditions. These criteria were implemented by tube integrity assessment guidelines defined in a series of evolving Electric Power Research Institute (EPRI) reports. In addition, NEI proposed an industry Steam Generator Program Generic License Change Package, which provided templates for licensees to amend plant-specific technical specifications.

The staff and NEI are now in general agreement concerning the content of NEI 97-06 and the degree of regulatory control offered by the Generic License Change Package. Of particular note is the fact that the program is adaptable and that the supporting technology is evolving. Investigations sponsored by the industry and the NRC staff are ongoing.

## **DISCUSSION**

Our discussions with the staff and NEI addressed wide-ranging technical issues, including the following:

- Effectiveness of performance criteria for structural integrity and leakage rates in light of NDE uncertainties
- Qualification of NDE processes
- Adequacy of burst and leakage models
- Adequacy of the data to justify proposed inspection and condition monitoring intervals

An unresolved technical issue is the appropriate length of inspection intervals. The NEI position on inspection intervals is contained in draft revision 6 of the EPRI document, "PWR Steam Generator Examination Guidelines," in which NEI proposes that the intervals for Alloy 600TT and 690TT tubing be extended beyond the interval permitted by current regulations. Although the domestic operating experience justifies increasing the inspection intervals for these alloys, there have been reported incidents of cracking of Alloy 600TT tubes in foreign plants. These identified cracks have been discounted by industry due to different construction and operating conditions. However, there were no controlled data presented to explain the validity of this position and whether the differences in stress, environment, or material conditions, which govern cracking susceptibility, are sufficient to ensure an adequate resistance in domestic plants. There is a need to review the relevant global operating and laboratory databases.

The steam generator management program was originally intended to be primarily performance based. If the Generic License Change Package is approved, a greater degree of performance-based capability will have been achieved. Full implementation of a performance-based approach for determining plant-specific inspection intervals will depend on evolving developments in inspection techniques, and quantification of the stochastic aspects of stress corrosion cracking.

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

Sincerely,

**/RA/**

George E. Apostolakis  
Chairman

References:

1. Letter dated February 7, 2001, from David Modeen, Nuclear Energy Institute (NEI), to Samuel J. Collins, Office of Nuclear Reactor Regulation (NRR), NRC, Subject: NEI 97-06, "Steam Generator Program Guidelines," Revision 1.
2. Letter dated December 11, 2000, from David Modeen, NEI, to Samuel J. Collins, NRR, Subject: Revised Industry Steam Generator Program Generic License Change Package.
3. Memorandum dated September 18, 2001, from Edmund J. Sullivan, Division of Engineering, NRR, to William Bateman, Division of Engineering, NRR, Subject: NRC Staff Comments on Steam Generator Inspection Intervals.
4. Memorandum dated September 21, 2001, from Maitri Banerjee, Division of Licensing Project Management, NRR, to Edmund J. Sullivan, Division of Engineering, NRR, Subject: "Summary of August 29, 2001, Public Meeting With the Nuclear Energy Institute Regarding NEI 97-06."
5. U. S. Nuclear Regulatory Commission Generic Letter 95-05 -- Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking, August 3, 1995.
6. Letter dated May 15, 1995, from T. S. Kress, Chairman, ACRS, to James M. Taylor, Executive Director for Operations, NRC, Subject: Proposed Final Generic Letter 95-XX, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes."