PDR

POLICY ISSUE
(Information)

September 27, 1988 SECY-88-272

For: The Commissioners

From: Victor Stello, Jr.
Executive Director for Operations

Subject: TECHNICAL RESOLUTION OF UNRESOLVED SAFETY ISSUES A-3, A-4, and A-5 REGARDING STEAM GENERATOR TUBE INTEGRITY

Purpose: To inform the Commissioners that USIs A-3, A-4, and A-5 regarding steam generator tube integrity are technically resolved.

Background: Prior to 1978, operating experience with pressurized water reactor (PWR) steam generators was characterized by extensive corrosion and mechanically induced degradation of the steam generator tubes, frequent plant shutdowns to repair primary-to-secondary leaks, and two steam generator tube rupture (SGTR) events (Point Beach 1 in 1975 and Surry 2 in 1976). In 1978, steam generator tube integrity was designated as an Unresolved Safety Issue (USI), and Task Action Plans A-3, A-4, and A-5 were established to evaluate the safety significance of degradation in Westinghouse, Combustion Engineering, and Babcock and Wilcox steam generators, respectively. These studies were later combined into one effort because many problems with PWR steam generators supplied by these vendors were similar.

After SGTR events at Prairie Island 1 in 1979 and at R. E. Ginna in 1982, the staff initiated an integrated program to evaluate a number of recommendations stemming from the early USI effort and from lessons learned as a result of the SGTR events to date. The objective of the integrated program was to complete resolution of USIs A-3, A-4, and A-5, including identification of new requirements that should be imposed on operating license applicants and licensees and identification of further efforts that should be undertaken by NRC. The enclosed report, NUREG-0844, "NRC Integrated Program for the Resolution of Unresolved Safety Issues A-3, A-4, and A-5 Regarding Steam Generator Tube Integrity,"

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describes the results of this program.

Discussion: Risk From SGTR Events

The staff's risk analysis, as described in Section 3 of NUREG-0844, indicates that SGTR events beyond the design basis do not constitute a significant fraction of the early and latent cancer fatality risks associated with reactor events at a given site. Furthermore, the risk assessment indicates that the increment in risk associated with SGTR events is a small fraction of the accidental and latent cancer fatality risks to which the general public is routinely exposed. These findings reflect not just the effectiveness of NRC regulatory guidance and technical specification requirements, but very importantly also reflect industry efforts to improve steam generator reliability which is of significant economic importance to the industry in addition to providing added assurance of public health and safety.

The risk estimates documented in NUREG-0844 are based on consequence calculations employing population distributions, protective actions, and meteorological assumptions equivalent to those presented in the Byron Station final environmental statement (NUREG-0848). The staff has completed a comparative analysis that confirms that risk from SGTR-related causes does not exceed the Commission's safety goals on early or latent fatalities. Early fatality risks were estimated to be less than 10 percent of the safety goal, and the latent fatality risks were found to be a very small fraction of the safety goal.

Staff Recommendations Stemming From the USI Program and Subsequent Followup Actions

In view of the relatively low risk estimates associated with SGTR events, the staff has concluded that new generic requirements that had initially been proposed as part of the USI program are not warranted at this time. However, the staff found in its value-impact analysis that a number of these proposals, as a group, are effective measures for significantly reducing (1) the incidence of tube degradation, (2) the frequency of SGTRs and the corresponding potential for significant non-core melt releases, and (3) occupational exposures, and they are consistent with good operating and engineering practice. As a group, these actions are considered to be effective measures for mitigating the consequences of SGTRs. Adoption of these actions

by licensees would further reduce public risk (by as much as 70 percent) and provide added assurance that risk will continue to be small. These actions have been designated as staff-recommended actions.

As part of the steam generator USI program, the staff issued NRC Generic Letter 85-02 to all PWR licensees and applicants to inform them of the staff-recommended actions and to request a description of their overall programs for ensuring steam generator tube integrity and SGTR mitigation. The staff's assessment of the licensee and applicant responses to Generic Letter 85-02 was provided to the Commission in SECY 86-97, dated March 24, 1986. The staff concluded on the basis of this assessment that the large majority of the licensees and applicants are following programs, practices, and/or procedures that are partially to fully consistent with, or equivalent to, the staff-recommended actions.

The staff will continue to monitor steam generator operating experiences as an indicator of the effectiveness of licensee programs. As has been true in the past, the staff may impose additional requirements (pursuant to applicable regulations in 10 CFR 50.55a and 50.109) to continue to ensure that licensees are implementing adequately effective programs where such action is determined to be necessary on the basis of operating experience or as a result of ongoing staff actions and studies, discussed below.

The staff acknowledges that the industry has made significant progress in recent years in improving steam generator reliability. Industry-sponsored research by the Steam Generator Owners Group (SGOG) and the Electric Power Research Institute (EPRI) has resulted in a number of improvements in steam generator and secondary system design and in the availability to utilities of improved operating practices, non-destructive examination (NDE) methods, and preventive and corrective measures pertaining to specific problems. These improvements are gaining increasing acceptance and application throughout the industry, tending to further reduce risk at the affected plants and to provide added assurance that risk from steam generator-related causes will continue to be small.

The staff stated in SECY 86-97 that it would inform licensees of its findings concerning their plants as part of Multi-Plant Action (MPA) C-11. Staff plans in this regard have been dropped in view of the low safety significance of this task.

Ongoing Staff Actions and Studies

The integrated program has identified a number of steam generator-related issues warranting further staff action or study. These issues are discussed in Section 4 of NUREG-0844 and have been designated as Generic Issue 67, "Steam Generator Staff Actions." Some of these issues have been completed. Other issues extend beyond strictly steam generator-related issues and are being addressed as part of currently approved staff implementation plans for ongoing generic issue reviews (e.g., TMI TAP I.C.1, "Improved Emergency Operating Procedures," Generic Letter 82-33). Completion of these broad generic tasks is considered to be outside the scope of the staff's integrated program to resolve USIs A-3, A-4, and A-5.

The remaining staff actions identified in Section 4 of NUREG-0844 involve other issues relating to steam generators which are being addressed commensurate with their priority status and the availability of staff resources. Resolution of USIs A-3, A-4, and A-5 is not contingent upon completion of these tasks in view of the low risk estimates associated with SGTR events. However, these actions will help ensure that risk continues to be low and may lead to proposals concerning needed improvements to the reliability of steam generator inspection programs, revisions to the Standard Review Plan concerning the design-basis SGTR, and resolution of the steam generator overfill issue. The potential regulatory and safety benefits and cost of implementation will be assessed for any proposals stemming from these activities. If justified by this cost/benefit analysis, additional or revised regulatory guidance or requirements may be issued by NRC.

Of special note is the comprehensive assessment of steam generator inspection programs, including inspection sampling strategies and eddy current test practices, being performed as part of the Steam Generator Group Project/Steam Generator Tube Integrity Program (SGGP/SGTIP) sponsored by the Office of Nuclear Regulatory Research. There is increasing evidence from this program and from operating experience of deficiencies in the reliability of current field inspection practices although the staff does not believe that significant risk to public health or safety is involved. The SGGP/SGTIP program is expected to lead to updated regulatory guidance that addresses these deficiencies. This program may also lead to new, augmented inservice inspection requirements (pursuant to 10 CFR 50.55a), if NRC determines from this program that added assurance of steam generator tube integrity is needed.

Public Comments

NRC issued a draft version of NUREG-0844 for public comment in April 1985. Letters received from the public are listed in Appendix A of NUREG-0844 and were limited to nuclear steam supply system (NSSS) vendors and nuclear utilities. None of the comments received took issue with the major findings of the report, namely, that risk from SGTR-related causes is small and that USIs A-3, A-4, and A-5 can be considered resolved.

July 15, 1987, SGTR Event at North Anna 1

The enclosed NUREG-0844 was largely prepared before the July 15, 1987, SGTR event at North Anna Unit 1. This report was updated before final publication to acknowledge the North Anna event and to reference the staff's generic followup to this event, namely, issuance of Bulletin 88-02, dated February 5, 1988. This bulletin requests that licensees and operating license applicants perform specified inspections and analyses to determine whether their plants are susceptible to the failure mechanism that led to the North Anna event and that they implement corrective actions if necessary.

Conclusion: The Commission's current regulations (i.e., 10 CFR Part 50, Appendices A and B; 10 CFR 50.55a; 10 CFR 50.109; and 10 CFR Part 100) provide the staff with sufficient authority to ensure that licensees are implementing programs relating to steam generator tube integrity that provide adequate protection to public health and safety. The staff will continue to monitor steam generator experience as an indicator of the effectiveness of licensee programs for ensuring steam generator tube integrity. As exemplified by Bulletin 88-02, the staff may impose additional requirements (pursuant to applicable regulations) to continue to ensure that licensees are implementing adequately effective programs where such action is determined to be necessary on the basis of operating experience or as a result of ongoing staff studies.

The staff concludes that with final publication of NUREG-0844, Unresolved Safety Issues A-3, A-4, and A-5 regarding steam generator tube integrity are technically resolved.

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Enclosure:
NUREG-0844 - Commissioners, SECY and OGC only.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICE OF THE
SECRETARY

November 17, 1989

MEMORANDUM FOR: Teresa Neville, Acting Chief
Public Document Room

THRU: Sandy Shotman, Chief
Correspondence and Records Branch

FROM: Andrew Bates, Chief
Operations Branch

SUBJECT: RELEASE OF DOCUMENTS TO PDR

Attached for placement in the PDR are copies of:

- SECY-89-122 - Resolution of Unresolved Safety Issue (USI) A-48, "Hydrogen Control Measures and Effects of Hydrogen Burns on Safety Equipment"

- SECY-88-272 - Technical Resolution of Unresolved Safety Issues A-3, A-4, and A-5 Regarding Steam Generator Tube Integrity

- SECY-84-119 - Resolution of Unresolved Safety Issue A-1, "Water Hammer"

These documents are being placed in the PDR at the EDO's request with concurrence by Commissioners' offices.

Attachments:
As stated

cc: EDO
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