

POLICY ISSUE INFORMATION

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FOR: The Commissioners

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SUBJECT: STEAM GENERATOR TUBE INTEGRITY (SGTI) - PLANS FOR REVISING THE
ASSOCIATED REGULATORY FRAMEWORK

PURPOSE:

This paper informs the Commission of the progress the staff has made in revising the steam generator (SG) regulatory framework and outlines the staff's future plans in this area. This paper also informs the Commission that current programs for addressing SG issues provide the staff with confidence that SG tube integrity (SGTI) will be maintained.

SUMMARY

Significant changes have been made to the NRC's SG review and oversight activities, and the pressurized water reactor (PWR) licensees have adopted the industry SG initiative discussed in the Nuclear Energy Institute (NEI) 97-06, "Steam Generator Program Guidelines." These actions provide additional assurance that individual licensees are maintaining SGTI. The staff is currently reviewing pilot plant and generic applications from the industry that will result in upgrading plant SG technical specifications (TSs).

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BACKGROUND:

The staff of the U.S. Nuclear Regulatory Commission (NRC) has informed the Commission of its actions related to ensuring SGTI in several previous communications. These include SECY-95-131, "Continuance of Proposed Rulemaking on Steam Generator Maintenance and Surveillance," dated May 22, 1995; COMSECY-97-013, "Steam Generator Rulemaking," dated May 23, 1997; SECY-98-248, "Proposed Generic Letter 98-XX, Steam Generator Tube Integrity," dated October 28, 1998; and SECY-00-0078, "Status and Plans for Revising the Steam Generator Tube Integrity Regulatory Framework," dated March 30, 2000. In addition, the staff briefed the Commission on SG issues in December 2001.

As previously reported to the Commission in COMSECY-97-013, a regulatory analysis conducted as part of the rulemaking study did not support development of a new rule, because the staff determined that the existing regulations provided an adequate regulatory basis for dealing with SG issues (i.e., the existing regulations contained in 10 CFR Part 50 provided an adequate basis to ensure public health and safety with respect to SG operation). However, the staff concluded that the NRC should take action that would result in licensees upgrading the SG tube surveillance requirements in TSs to assure that the condition of the tubes continues to remain adequate for the period of time between inspections. The need to upgrade the SG tube surveillance requirements in the TSs was exacerbated by the changing nature of the degradation being observed in the SGs. To this end, the staff prepared draft Generic Letter (GL) 98-XX and a draft regulatory guide (RG) (DG-1074, "Steam Generator Tube Integrity," dated December 1998). The draft GL would have requested that licensees address whether their current TSs ensure that SG tube integrity is monitored and maintained consistent with regulatory requirements and the licensing basis, and recommended that the TS be revised, as applicable, to ensure compliance. The draft RG was intended to define details of an acceptable approach for providing reasonable assurance of tube integrity.

While the staff worked on the draft GL and the draft RG, the industry, through NEI, developed the SG initiative, documented in NEI 97-06, "Steam Generator Program Guidelines," and voted to adopt it as a formal industry initiative. This industry initiative involves a performance-based programmatic strategy (including inservice inspection, tube integrity assessment, leakage monitoring and leakage limits, and secondary water chemistry) to provide reasonable assurance that tube integrity is maintained. For programmatic details, NEI 97-06 references a number of guideline documents published by the Electric Power Research Institute (EPRI). Those EPRI guidelines provide detailed guidance for managing SGTI in areas such as water chemistry, inspection, and flaw evaluation. The industry initiative resulted in improved program quality and a consistent program management approach. The SG program guidelines in NEI 97-06 (and the associated EPRI guidelines) have been voluntarily adopted and implemented in all SG tube inspection outages at all pressurized-water reactors since January 1999. Consistent with Direction Setting Issue (DSI) 13, "The Role of Industry," the staff subsequently discontinued its GL initiative to pursue SGTI enhancements through this industry initiative. On

February 4, 2000, NEI submitted a generic license change package (GLCP) for staff review and approval. This GLCP proposed replacing the existing SG tube surveillance requirements in the TS with new requirements intended to facilitate full implementation of the programmatic strategy of NEI 97-06. The proposed TS would require that the condition of the tubes be monitored at each SG tube inspection to verify that the performance criteria were met. Programmatic details for ensuring that the performance criteria would be met were to be in accordance with plant procedures, rather than specified in the TS itself. Guidance for developing these detailed procedures was to reside in NEI 97-06 and the referenced EPRI guidelines. Once approved by the NRC staff, the GLCP was intended to serve as a template for subsequent plant-specific amendment requests to revise the SG tube surveillance requirements in a plant's TS.

In SECY-00-0078, the staff outlined its plan for reviewing the industry initiative. The plan included preparing a safety evaluation (SE) documenting the staff's review of the industry initiative and presenting the evaluation as part of a Regulatory Issue Summary (RIS) to document NRC endorsement of the agreed-upon changes to NEI 97-06 and the GLCP. Before the RIS was issued, the staff would brief the Committee to Review Generic Requirements (CRGR) on the new regulatory framework and would publish the draft SE for public comment in the *Federal Register*. This approach was consistent with DSI-13. The Commission did not object to this approach, but indicated that the staff should brief the Commission before issuing the RIS. As set forth below, the staff has now determined that a different approach should be followed at this time.

DISCUSSION:

Current Regulatory Framework

The current framework comprises three main elements, including: (1) the regulatory requirements in the *Code of Federal Regulations*, the plant-specific licensing and design bases, and the TS; (2) industry guidelines and plant-specific programs; and (3) NRC oversight and review of licensees' SGTI activities. Although the staff continues to believe that the current framework for addressing SGTI provides assurance that the tube integrity is being maintained, the staff believes that the SG tube surveillance requirements in the TS need to be upgraded to assure the condition of the tubes remains adequate for the period of time between inspections.

The existing TS are essentially the same today as they were in the early 1990s, however, marked improvements in industry programs and the NRC oversight and review of licensees' programs since then provide additional assurance that tube integrity is being maintained. This is not to say that a SG tube failure cannot occur and new SG issues will not arise. Nonetheless, industry programs in conjunction with existing NRC regulations and the NRC oversight and review activities have given the staff a higher level of confidence in the adequacy of individual licensees' SGTI programs. For the most part, the improved NRC and industry

programs have been successful, and the three elements discussed above provide a balanced approach for addressing SG tube integrity that does not impose rigid, and in some cases, unnecessary requirements as may have been the case if the approach solely relied on detailed and prescriptive regulatory requirements. In addition to these initiatives, the staff is processing industry submittals to change the TS (as discussed later). The following discussion provides additional detail concerning improvements in the industry programs and the NRC's oversight and review of SG tube inspection activities.

With respect to industry programs, NEI 97-06 and the associated EPRI guidelines clearly define the goals of a SG management program. Although they are not regulatory requirements, the industry committed to implement these guidelines in 1999. The staff agrees with the stated goals and critical elements for providing reasonable assurance of tube integrity as specified in NEI 97-06. These goals include structural and leakage performance criteria that the tubes are required to meet during an operating cycle. Through this initiative, the industry has acknowledged and accepted the principle that continued SG tube integrity is not achieved simply by following the prescriptive inspection and repair requirements (such as those in the current TS), but that additional actions are frequently needed to provide continued assurance of SG tube integrity. Through the development and adaptation of the EPRI guidance documents (referenced in NEI 97-06), the industry programs now have significantly more structure and consistency than in the past.

The NRC has made significant changes with respect to the review and oversight of licensees' SG activities in recent years, mostly as a result of the lessons learned from the tube failure at Indian Point Unit 2. These changes include:

- revising the SG tube inspection activities inspection procedure to be more performance-based (e.g., increasing NRC technical staff oversight when licensees fail to meet performance criteria established for the SG tubes) and to provide a more appropriate level of resources for NRC inspection of licensee In-Service Inspection programs focused specifically on SGTI inspections;
- providing inspector training on the revised NRC inspection procedures;
- working with industry to improve the significance determination process to address SGTI issues;
- reviewing all SG inspection summary reports submitted by licensees in accordance with their TS requirements, including review of any operational assessments submitted;
- discussing SG tube inspection activities with a subset of plants (based on tube material and operating time) each outage season to better ensure appropriate implementation of industry and regulatory requirements; and
- developing internal guidance documents for NRC review of SG issues.

These regulatory activities provide additional assurance that actions taken by utilities are consistent with the intent of the industry's SG guidance. In the future, the staff may revise these regulatory activities as the industry enhances its SGTI guidelines and gains additional experience in implementing those guidelines. In addition, the staff may change various aspects of the NRC's oversight and review activities as a result of efforts by the Office of Nuclear Regulatory Research, captured in the agency's SG Action Plan, to further understand the risk associated with operating a plant with degraded SG tubes.

As technical and administrative SG issues arise (e.g., through the oversight process and operating experience), they are addressed by the staff and the industry. For example, the staff is currently addressing a generic issue related to the interpretation of TS requirements related to SG tube inspections and is issuing a draft generic communication for public comment to address this issue. Typical staff actions to address such issues include evaluating the need for additional plant-specific actions and evaluating the generic implications of the event or issue. In addition to evaluating events and issues, the staff continues to perform independent research to confirm current understanding of the relationship between SG tube degradation and risk, the adequacy of the technical basis supporting the industry programs (e.g., structural and leakage integrity models), and the appropriateness of industry corrective actions. In response to this additional experience and research, the staff will interact with the industry to ensure that these issues are addressed.

Revised Regulatory Framework

The staff continues to work with the industry and other stakeholders to improve the SG regulatory framework. Currently, the staff's efforts are primarily focused on resolving issues associated with industry's proposed TS changes. One of the most significant issues the staff and industry are addressing is establishing the maximum amount of time that would be permitted by the TS between inspections. Maximum inspection intervals are typically specified in the TS since inspections are critical for obtaining information for evaluating whether the SGTI performance criteria are being met and for ensuring prompt detection of conditions that are adverse to quality (i.e., failure to maintain tube integrity). The staff has raised concerns with respect to the industry's proposed changes to the maximum inspection intervals currently specified in the TS.

Based on feedback from the staff in 2001 and 2002, regarding legal, technical, and administrative issues, NEI revised its GLCP approach for addressing SGTI surveillance requirements. The industry decided to submit proposed revisions to the TS through both a plant-specific (i.e., lead plant) and generic process. The two submittals are intended to be consistent. The staff received the lead-plant submittal on February 25, 2003, and the generic submittal on March 14, 2003. The generic submittal followed a process established by the TS Task Force (TSTF) for proposing changes to the standard TS. This process is described in RIS 2000-06, "Consolidated Line Item Improvement Process for Adopting Standard Technical Specification Changes for Power Reactors."

The staff is reviewing both the plant-specific amendment request and the TSTF changes. The plant-specific submittal serves as the vehicle the staff is using to address any remaining technical issues that had previously been identified during its earlier review of the GLCP (such as the maximum inspection interval). Regarding the staff's review of the generic submittal, the staff no longer intends to issue a RIS with a generic SE since the plant-specific review will be documented in an evaluation in accordance with the 10 CFR 50.90 process. The TSTF changes will be reviewed in accordance with the process discussed in RIS 2000-06. Although the staff and industry are working together to reach agreement on the remaining technical issues, if timely agreement can not be reached, the staff will consider other regulatory options for having licensees address any weaknesses in their TS.

In summary, industry programs in conjunction with existing NRC regulations and NRC oversight and review activities have given the staff a higher level of confidence in the adequacy of individual licensees' SGTI programs. In addition, the staff continues to work with the industry on revising the SG tube surveillance requirements in the TS. While the staff believes that SG tube surveillance requirements in the TS need to be upgraded to assure the condition of the tubes remain adequate for the period of time between inspections, as explained above, the current framework for addressing tube integrity provides assurance that SGTI is being maintained.

RESOURCES:

The staff estimates that reviewing NEI 97-06, the TSTF generic changes, and the lead plant submittal will require 1.2 full-time equivalents. The Office of Nuclear Reactor Regulation has included these resources in its current budget for Fiscal Year 2003. This project will include reviewing the industry's proposal, as well as conducting meetings with stakeholders, and can be accomplished with in-house resources. The staff has also budgeted the necessary resources for the other activities outlined in this paper.

COORDINATION:

The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections to its content. The Office of the General Counsel has also reviewed this paper and has no legal objection.

CONCLUSION:

Based on its ongoing efforts in the area of steam generator tube integrity, the staff has modified its plans as previously described in SECY-00-0078. The staff concluded that it is no longer necessary to issue a separate Regulatory Issue Summary with a generic safety evaluation because existing processes are available to evaluate the lead plant and generic submittals. The staff will evaluate the lead plant submittal using the license amendment process and the

generic submittal using the Technical Specification Task Force process, as described in RIS2000-006. Both of these processes provide opportunities for public involvement. The staff believes that the proposed approach is acceptable to address continued SG tube integrity.

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