March 9, 2009

MEMORANDUM TO: Edwin M. Hackett, Executive Director
Advisory Committee for Reactor Safeguards

FROM: Michele G. Evans, Director ***/RA/***
Division of Component Integrity
Office of Nuclear Reactor Regulation

SUBJECT: PROPOSED CLOSEOUT PACKAGE - GENERIC SAFETY ISSUE 163, "MULTIPLE STEAM GENERATOR TUBE LEAKAGE"

The Office of Nuclear Reactor Regulation (NRR) has completed its technical assessment of Generic Safety Issue (GSI) 163, "Multiple Steam Generator Tube Leakage." The Nuclear Regulatory Commission (NRC) opened GSI 163 to address a concern of an NRC staff member in a Differing Professional Opinion (DPO) dated December 23, 1991 and March 27, 1992 (References 1 and 2) relating to the potential for a main steam line break accident to cause significant primary-to-secondary leakage leading to core damage. The DPO was prompted by widespread outer diameter stress corrosion cracking (ODSCC) at the steam generator (SG) tube support plates at the Trojan plant, which the DPO's author claimed could not be reliably detected, and by the staff's approval of alternate repair criteria (ARC) which would allow many tubes known to contain such cracks to remain in service.

In accordance with Management Directive 6.4, "Generic Issues Program," the staff screened the issue and classified it as GSI 163 on June 16, 1992 (Reference 3). The principal assertion addressed by GSI 163 was the potential for multiple SG tube leaks during a non-isolatable main steam line break (MSLB) outside containment leading to core damage that could result from the loss of all primary system coolant and safety injection fluid in the refueling water storage tank (RWST). The technical work conducted to address this issue supports its closure with no changes to existing regulations or guidance.

A draft closeout package for GSI 163 documenting the staff's conclusions and the technical basis for these conclusions is enclosed. This closeout package consists of a draft GSI closure memorandum to the NRC Executive Director for Operations and an accompanying technical report, "Resolution of Generic Safety Issue 163 - Multiple Steam Generator Tube Leakage." In accordance with Management Directive 6.4, the closeout package should normally include an endorsement letter from the Advisory Committee for Reactor Safeguards (ACRS). Accordingly, ACRS endorsement of the enclosed draft closeout package is requested. In the event that the ACRS would like to be briefed on this matter, we have added this topic to the May 2009 ACRS meeting agenda.

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Although GSI 163 was opened in response to the DPO concerns in References 1 and 2, resolution of GSI 163 is separate from resolution of the DPO. The DPO concerns were reviewed by an Advisory Committee for Reactor Safeguards (ACRS) Ad Hoc Subcommittee that served as the DPO review panel. The Subcommittee's conclusions and recommendations were endorsed by the ACRS and transmitted to the NRC Executive Director for Operations (EDO) on February 1, 2001 (References 4 and 5). In a memorandum to the DPO author dated March 5, 2001 (Reference 6), the NRC EDO stated that the concerns raised in the DPO were dispositioned and the DPO was closed. The ACRS conclusions and recommendations were addressed as part of the SG Action Plan (SGAP). The SGAP is documented in Reference 7, and the status of this program is periodically updated in Reference 8.

The staff has completed all SGAP tasks that were opened to address the ACRS Ad Hoc Subcommittee conclusions and recommendations relating to voltage based ARCs, damage progression mechanisms, and iodine spiking. Based on the results of these tasks, the staff concludes that the DPO concerns relating to these issues are not substantiated and that no changes to existing requirements are needed to closeout GSI 163. The ACRS has concurred with the closure of these tasks. Regarding ACRS Ad Hoc Subcommittee conclusions and recommendations relating to risk, the NRC Office of Nuclear Regulatory Research (RES) is continuing to evaluate these risk issues in SGAP Tasks 3.4 and 3.5. These studies are nearing completion and are not expected to identify needed changes to existing requirements for managing SG tube integrity and are, therefore, outside the scope of GSI 163.

With respect to GSI 163, the staff concludes that the technical specification requirements relating to SG tube integrity provide reasonable assurance that all tubes will exhibit acceptable structural margins against burst or rupture under normal operating conditions and design basis accidents, including MSLB, and that leakage from one or multiple tubes under design basis accidents will be limited to very small amounts, consistent with the applicable regulations for offsite and control room dose. Thus, the staff concludes that the GSI principal assertion and related concerns in the DPO are not substantiated, that no changes to existing regulations or guidance are needed, and that the GSI is closed.

References

1. Memorandum from T. Speis to J. Hopenfeld, "Your Differing Professional Opinion Dated 12/23/91" (ADAMS Accession No. 9212290195), US NRC, February 19, 1992. This memorandum encloses (Enclosure 1) J. Hopenfeld's Differing Professional Opinion dated December 23, 1991.

2. Memorandum from J. Hopenfeld to E. Beckjord, "A New Generic Issue: Multiple Steam Generator Leakage" (ADAMS Accession No. ML003709116), US NRC, March 27, 1992.

3. Memorandum from E. Beckjord to T. Murley, "A New Generic Issue: Multiple Steam Generator Tube Leakage" (ADAMS Accession No. 9212040356), US NRC, June 16, 1992.

4. Letter from D. Powers (ACRS) to W. Travers (NRC), "Differing Professional Opinion on Steam Generator Tube Integrity" (ADAMS Accession No. ML010780125), February 1, 2001.

5. NUREG-1740, “Voltage Based Alternative Repair Criteria, A Report to the Advisory Committee on Reactor Safeguards by Ad Hoc Subcommittee on a Differing Professional Opinion” (ADAMS Accession No. ML010750315), February 2001.

6. Memorandum from W. Travers to J. Hopenfeld, “Differing Professional Opinion On Steam Generator Tube Integrity Issues” (ADAMS Accession No. ML010660353), USNRC, March 5, 2001.

7. Memorandum from S. J. Collins and A. C. Thadani to W. Travers, “Steam Generator Action Plan Revisions to Address Differing Professional Opinion on Steam Generator Tube Integrity” (ADAMS Accession No. ML011300073, US NRC, May 11, 2001.

8. http://www.nrc.gov/reactors/action-plans/nrr-task-action-plans.html

Enclosures:
1. Draft closeout memorandum from the Director, NRR, to the EDO
2. Draft technical report prepared by NRR, “Resolution of Generic Safety Issue 163 – Multiple Steam Generator Tube Leakage”

5. NUREG-1740, "Voltage Based Alternative Repair Criteria, A Report to the Advisory Committee on Reactor Safeguards by Ad Hoc Subcommittee on a Differing Professional Opinion" (ADAMS Accession No. ML010750315), February 2001.

6. Memorandum from W. Travers to J. Hopenfeld, "Differing Professional Opinion On Steam Generator Tube Integrity Issues" (ADAMS Accession No. ML010660353), USNRC, March 5, 2001.

7. Memorandum from S. J. Collins and A. C. Thadani to W. Travers, "Steam Generator Action Plan Revisions to Address Differing Professional Opinion on Steam Generator Tube Integrity" (ADAMS Accession No. ML011300073, US NRC, May 11, 2001.

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1. Draft closeout memorandum from the Director, NRR, to the EDO
2. Draft technical report prepared by NRR, "Resolution of Generic Safety Issue 163 – Multiple Steam Generator Tube Leakage"

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