

March 3, 2004

Mr. Christopher M. Crane, President
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SUBJECT: SUMMARY OF CONFERENCE CALL WITH THREE MILE ISLAND NUCLEAR
STATION, UNIT 1 (TMI-1), REGARDING THE FALL 2003 STEAM
GENERATOR INSPECTION RESULTS (TAC NO. MC1051)

Dear Mr. Crane:

On October 31, 2003, the staff of the Office of Nuclear Reactor Regulation participated in a conference call with TMI-1 representatives regarding the ongoing steam generator tube inspection activities. The call included a discussion of the inspection scope, exemptions the licensee took to industry guidance, and results of the inspections at the time of the call. A summary of the conference call is enclosed.

Sincerely,

/RA/

Donna M. Skay, Senior Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosure: Summary of Conference Call

cc w/encl: See next page

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*SE provided. No substantive changes.

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SUMMARY OF CONFERENCE CALL
WITH
THREE MILE ISLAND NUCLEAR STATION, UNIT 1
REGARDING THE FALL 2003 STEAM GENERATOR INSPECTION RESULTS

On October 31, 2003, the Nuclear Regulatory Commission (NRC) staff participated in a conference call with Three Mile Island Nuclear Station, Unit 1 (TMI-1), representatives regarding the fall 2003 steam generator (SG) tube inspection activities.

The issues discussed included those listed in the enclosure to the letter documenting the arrangement of this conference call, which was sent to TMI-1 on October 17, 2003 (ML032810039). The information provided to the NRC staff is summarized below.

Inspection Scope

The SG inspection scope consisted of the following:

- 100% inspection of inservice tubes (inservice tubing is the unexpanded tubing from the kinetic expansion transition in the upper tube sheet (UTS) to the roll expansion transition in the lower tube sheet (LTS)) using a bobbin coil
- 33% inspection of the kinetic expansions using a rotating coil (RC). Inspection included all of the 22" kinetic expansions
- 33% inspection of the installed sleeves using a bobbin coil in the unexpanded portion of the sleeve and inspection of the sleeve roll transitions using a RC probe
- Inspection of one tube border around installed sleeves (15th tube support plate (TSP) and UTS secondary face) using an RC. The inspection scope was chosen to address a concern with high-cycle fatigue.
- 33% inspection of tubes in the LTS kidney region from +5" to -4" using an RC probe. 609 tubes were inspected in the A SG and 884 tubes in the B SG.
- Inspection of the lower tube ends for tube-end-cracking (TEC) in response to the Crystal River 3 findings. Inspection results led to 100% inspection in SG B and ~50% inspection in SG A (difference due to sample expansion). Tube inspection was from the lower tube end to the transition at the top of the roll.
- Visual inspection of installed tube plugs
- 33% inspection of Westinghouse rolled plugs in A SG (8 plugs) and 33% of LTS explosive plugs with RC

Enclosure

- Special Interest Inspections using RC.
Inspection of all of the flaw-like indications reported by bobbin.
Inspection of all dents above the lower tubesheet.
Inspection of 33% of dents at the lower tubesheet secondary face or below.
Inspection of potential inside diameter intergranular attack (IDIGA) indications below the kinetic expansion.

Exceptions to Industry Guidelines

The licensee indicated that they take 10 exceptions to the “Electric Power Research Institute (EPRI) SG Examination Guidelines,” Revision 6 (EPRI Rev. 6). These guidelines do not constitute NRC requirements. The 10 exceptions include the following:

1. TMI-1 uses an operating leakage limit from both SGs of 144 gallons per day (gpd) vice the operating leakage limit of 150 gpd per SG (this exception is taken to Nuclear Energy Institute’s 97-06, Revision 1, “Steam Generator Program Guidelines,” operational leakage limit).
2. Full length tube inspection is from the kinetic expansion transition in the UTS to the roll expansion transition in the LTS.
3. Inspection expansions are not performed in areas where small IDIGA is identified using an RC probe due to the licensee’s operating experience that this degradation is the result of a previous sulfate excursion (bobbin probe is not effective at identifying this degradation).
4. Indications from sulfate degradation are not considered when determining the inspection result categories (EPRI, Rev.6, Section 3.5, categories C-1,C-2 or C-3).
5. A qualified technique is not used to inspect a uniquely sized LTS thimble plug.
6. A site-specific performance demonstration is employed for analyst qualification regarding sizing for IDIGA.
7. TMI-1 does 33% exam of kinetic expansion region.
8. TMI-1 uses only one analyst for sludge profiling.
9. TMI-1 is using up their inventory of older probes which do not have certificates of conformance in accordance with EPRI Rev. 6.
10. TMI-1 is inspecting 63 lower tubesheet thimble plugs in SG A using a +Point™ probe. This technique is not in accordance with EPRI, Rev. 6, Appendix H.

The licensee also indicated that they take 8 exceptions to EPRI’s water chemistry guidelines in their SG program. These water chemistry exceptions are related to the plant’s once-through SG design vice the U-tube SG design of many pressurized water reactors.

Inspection Results

At the time of the call, TMI-1 was in the process of performing inspections in both SGs. The tube full length bobbin inspection was nearing completion. Bobbin inspection of the sleeves had not yet started. Initial inspection of the sleeves using an RC probe was complete and sample expansion was in progress. Approximately 80% of the inspections within the kinetic expansion inspection scope were complete and inspection of the kidney region was nearing completion. The special interest inspection of dents and manufacturing burnish marks was just beginning.

During the kinetic expansion examination, 534 inside diameter (ID) volumetric indications and 33 ID circumferential indications were identified in SG A, while 46 ID volumetric indications and 53 ID circumferential indications were identified in SG B. The licensee stated that the majority of these indications had been previously identified and had exhibited no growth. Expansion of the inspection scope was not required by plant technical specifications because there was no growth associated with these indications. During inspection of the unexpanded portion of the tubes, the licensee identified 205 indications in SG A and 24 indications in SG B which are attributable to IDIGA. The licensee indicated these indications were not new indications.

The licensee stated that the dent inspection revealed no change in the number of dents or in the dent voltages. A single freespan indication in each SG had been identified using the bobbin probe which the licensee attributed to groove intergranular attack. The licensee was evaluating whether insitu pressure testing would be required for these indications. The number of TSP-wear indications (85 in SG A and 174 in SG B) was reported by the licensee to be typical of previous inspections and the indications exhibited little, if any growth.

During the sleeve inspection, the licensee identified an axial indication adjacent to the sleeve end in the parent tube. They believed this was groove IGA and expanded the inspection scope to 100% of all sleeves from 3" below the sleeve end through the roll transition of the sleeve. The indication was not identified by bobbin because the bobbin does not have the ability to access this area due to proximity with the sleeve end. The licensee indicated that they do not believe this indication has any relation to sleeve installation.

The licensee stated that all tubes with indications necessitating repairs would be plugged.

The licensee performed an inspection on the LTS tube ends to inspect for TECs in response to the issues identified at Crystal River 3. It was indicated by the licensee that they were observing similar results to what had been seen at Crystal River 3; however, in the TMI-1 SG B, the TEC indications were not limited to the peripheral tubes and the inspection had been expanded to include 100% of the LTS tube ends. In the TMI-1 SG A, the inspection scope was also expanded from the initial scope to include about 50% of the tubes. The inspection scope initially focused on the peripheral tubes and a boundary zone which was expanded based upon the inspection results. The licensee identified 2 axial, 27 circumferential and 2 ID volumetric indications during the SG A TEC inspection. These indications were small, were located in the LTS clad region and were generally adjacent to the tube seal weld. While in SG B, after completing approximately 70% of the inspection, the licensee identified 15 axial, 20 circumferential and 86 ID volumetric indications. The licensee stated that the axial and circumferential indications were similar in both SGs. The licensee also indicated that the volumetric indications in SG B had characteristics similar to sulfate degradation. Volumetric

indications were also found in the unexpanded region of the tubes in SG B. The licensee indicated that they expected to find approximately 200 tubes in SG B that would require plugging as a result of TEC.

Since the licensee identified flaws during the TEC examination in the unexpanded tube region, the staff made an observation regarding draft Generic Letter (GL), "Requirements for Steam Generator Tube Inspections," (ML031270171) and the proposed GL guidance which would indicate a need to inspect the entire tube using an NDE method capable of detecting the observed degradation. The licensee indicated that they were aware of the draft GL guidance and the potential need for expanded inspection scope for upcoming outages. The licensee indicated that only two small indications were identified that were outside the tube end region: one was 5 inches above the roll and was approximately 15% through-wall; and the other was approximately 4 inches above the roll and was about 20% through-wall. Again, the licensee indicated these were likely the result of the sulfate excursion which occurred in the 1980's and could not be identified with bobbin probe inspection.

The licensee indicated that they were planning on performing some complimentary inspections using an intelligent eddy current probe to obtain inspection data.

No decision had been made by the licensee at the time of the phone call regarding the number of insitu pressure tests that would be performed. However, the licensee stated that during the last outage about 20 insitu pressure tests were performed and that degraded tubes would be screened in accordance with the EPRI SG inspection guidelines for insitu pressure testing. No tube pulls were planned by the licensee.

The licensee informed the staff that no loose parts had been identified, but the SG inspection was not yet complete. In a follow-up communication with the staff, the licensee indicated that a potential loose part had been identified in SG A. Indications were identified as potential loose parts on two adjacent tubes around the 14th TSP. The initial detection was the result of an RC probe examination of an adjacent area in tube A114-113. Neither of the indications was detectable with the bobbin probe. The licensee plugged and stabilized the two affected tubes and five adjacent tubes. The licensee indicated that video inspection or retrieval of the suspected loose part was not possible.