



Technical Specification 6.9.1.10

LR-N14-0107

APR 24 2014

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington DC 20555-001

Salem Nuclear Generating Station Unit 1
Facility Operating License No. DPR-70
NRC Docket No. 50-272

Subject: **RAI Response to the Steam Generator Tube Inspection Report – Twenty-second Refueling Outage (1R22)**

By letter dated November 04, 2013 (Agencywide Documents Access System (ADAMS) Accession No. ML13310A885), PSEG Nuclear, L.L.C., submitted information summarizing the results of the 2013 steam generator (SG) inspections performed at Salem Nuclear Generating Station, Unit 1 during the refueling outage 1R22. The NRC staff has reviewed the information provided and determined that additional information is needed in order to complete our review as follows.

1. The description of the scope of array probe inspections indicates that you inspected 50 percent of the hot-leg population of internal tubesheet over expansions, which were greater than 0.25 inches. Please confirm the number and the units.
2. Please discuss the scope and results of any secondary side inspections, other than foreign object search and retrieval, performed during the outage (e.g., results of inspections in the steam drum and upper bundle).
3. Please discuss the scope and results of any tube plug inspections (e.g., was there any degradation and were all plugs in their proper locations).
4. Please discuss the scope and results of any inspections performed in the SG primary channel heads.

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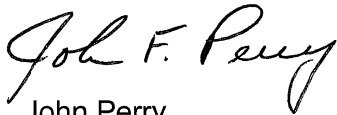
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The NRC staff requests a response to the above questions by April 25, 2014.

There are no commitments contained in this letter.

Should you have any questions regarding this submittal, please contact Mr. C. Dahms at (856) 339-5456.

Sincerely,

A handwritten signature in black ink that reads "John F. Perry". The signature is written in a cursive style with a large, stylized "J" and "P".

John Perry
Site Vice President – Salem

Attachments (1)

cc: Mr. W. Dean, Administrator, Region I, NRC
Mr. John Lamb, Project Manager, NRC
NRC Senior Resident Inspector, Salem
Mr. P. Mulligan, Manager IV, NJBNE
Mr. L. Marabella, Corporate Commitment Tracking Coordinator
Mr. T. Cachaza, Salem Commitment Tracking Coordinator
Mr. Milton Washington, Chief Inspector – Occupational Safety and Health Bureau of
Boiler and Pressure Vessel Compliance

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Attachment 1
LR-N14-0107

RAI Response to the Steam Generator Tube Inspection Report
TS 6.9.1.10

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PSEG Nuclear LLC

RAI Response to the Steam Generator Tube Inspection Report – Twenty-second Refueling Outage (1R22)

1. The description of the scope of array probe inspections indicates that you inspected 50 percent of the hot-leg population of internal tubesheet over expansions, which were greater than 0.25 inches. Please confirm the number and the units.

PSEG Response:

An internal tubesheet overexpansion (OEX) is defined as a profile deviation equal to 1.5 mils (0.0015 inches) or greater from the average of the expanded tubesheet region profile and has an axial extent greater than 0.25 inch. The definition of internal tubesheet overexpansion is consistent with industry guidance provided in the 2005 timeframe, in response to operating experience including NRC Information Notice 2005-09. 50% of the Hot Leg (HL) population of OEX that exist within the tubesheet, down to a depth of 15.21 inches below the top of the tubesheet (TTS) were inspected with array probe.

2. Please discuss the scope and results of any secondary side inspections, other than foreign object search and retrieval, performed during the outage (e.g., results of inspections in the steam drum and upper bundle).

PSEG Response:

Secondary side upper internal inspections were performed in all four (4) steam generators. These inspections consisted of both visual inspections and ultrasonic testing (UT). This was accomplished by inspection personnel entering the SG via the upper secondary manways. The visual inspections were performed to identify the general condition of the components; including the feedwater ring components and supports, drain pipes, primary and secondary separators. The feedwater ring visual inspections include all external surfaces, and some internal surface inspections. The internal feedwater ring visual inspection is completed using a small video probe delivered through the J-nozzle itself, and articulated back to view the area near the entrance way of the J-nozzle (internal to the feedring). The primary purpose of this inspection is to check for erosion of the carbon steel in the area near the J-nozzle connection to the feedwater ring (carbon steel). Note that all the J-nozzles were replaced with an improved design prior to the replacement Model F SGs operating at Salem Unit 1. The new design is made with inconel alloy 600 J-nozzles, with carbon steel sleeve buttered with 82/182 cladding and weld. This improved design eliminated flow accelerated corrosion (FAC) concerns with the J-nozzles. The visual inspections performed for the J-nozzles are defense in-depth inspections to validate resistance to FAC.

UT was performed on all four (4) steam generator feedwater rings (including tee, elbows, reducers) to evaluate for FAC. UT was also performed on several of the primary moisture separator (PMS) riser barrels for impingement erosion from J-nozzle overspray, on those locations identified from the visual inspections.

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The results of the visual inspections identified several primary moisture separator riser barrels with signs of impingement erosion from J-nozzle overspray. The UT inspections of the feedwater rings identified minor (or no) signs of FAC. No FAC was identified with the J-nozzles, confirming the improved design resistance to FAC. In summary, all the visual and UT inspections identified some minor conditions that were evaluated and did not require any further corrective actions at this time.

Other secondary side inspections performed in all four (4) steam generators included visual inspections of the upper tube support plates (TSP). These visual inspections were accomplished by removing small inspection ports located at the uppermost tube support plate and inserting a camera probe. The visual inspections were performed to identify the general conditions of the TSPs and tubing areas (as-possible), including the deposit loading on and within the TSP broach flow hole areas. The visual inspections did not identify conditions adverse to quality, and the TSP broached holes had relatively minor deposits.

3. Please discuss the scope and results of any tube plug inspections (e.g., was there any degradation and were all plugs in their proper locations).

PSEG Response:

Visual inspections during outage 1R22 of all previously installed tube plugs did not detect degradation or conditions adverse to quality. All tube plugs were in their proper locations.

4. Please discuss the scope and results of any inspections performed in the SG primary channel heads.

PSEG Response:

PSEG performed visual inspection of the steam generator channel head internal (primary side) cladding surfaces in all four steam generators, both on the hot leg and cold leg. The entire channel head internal surfaces were inspected, including the channel head cladding, tubesheet cladding, divider plate and associated welds. No degradation was identified.