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Technical Specification 6.9.1.10

LR-N12-0074

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Salem Nuclear Generating Station Unit 2
Facility Operating License No. DPR-75
NRC Docket No. 50-311

Subject: Response to Request for Additional Information Regarding Steam Generator Tube Inspection Conducted During the Spring 2011 Refueling Outage Salem Nuclear Generating Station, Unit No. 2
Docket No. 50-311

References: (1) PSEG Letter LR-N11-0318, "Steam Generator Tube Inspection Report Eighteenth Refueling Outage (2R18)," dated October 24, 2011.

PSEG Nuclear LLC (PSEG) hereby transmits its response to the Nuclear Regulatory commission (NRC) request for additional information regarding Reference 1.

Attachment 1 contains the NRC's questions in bolded text followed by PSEG response. These responses were provided to the NRC during a teleconference held on January, 31, 2012.

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There are no commitments contained in this letter. If there are any questions regarding this letter, please contact Kreasy A. King at (856) 339-2922.

Sincerely,

Carl J. Fricker
Site Vice President Salem Station

Attachments (1)

cc: Mr. W. Dean, USNRC - Administrator - Region I
Mr. R. Ennis, USNRC - Licensing Project Manager - Salem
USNRC Senior Resident Inspector - Salem (X24)
Mr. P. Mulligan, NJBNE Manager IV
Mr. T. Cachaza, Salem Commitment Tracking Coordinator
Mr. L. Marabella, Corporate Commitment Tracking Coordinator

1. Please discuss the scope and results of any secondary side inspections. For example, were any visual inspections performed at the hatches, camera ports and feedring inspection port covers where loose nuts/bolts/washers were identified during the previous refueling outage to confirm the adequacy of the corrective actions? If loose parts were identified and not removed, or locations with possible loose part indications were not visually inspected, discuss the results of any evaluations performed to ensure these parts would not result in a loss of tube integrity for the period between inspections.

During Outage 2R18, secondary side upper internal inspections were performed in all four (4) steam generators. The scope was similar to those inspections performed in the previous outage, 2R17. This was accomplished by inspection personnel entering the SG via the upper secondary manways. These inspections were performed to identify the general condition of the components; including the feedring components and supports, drain pipes, instrument taps, primary and secondary separators, and downcomer loose parts trapping screens. In addition, focused inspections were preformed on all "internal" camera ports (inspection ports), hatches (manways), and feedring inspection port including all nuts/bolts/washers. Inspections confirmed the adequacy of the corrective actions conducted in 2R17. None of the nuts/bolts/washers were found loose, with the exception of the five (5) inaccessible nuts that were evaluated in 2R17 and left as-is. PSEG did obtain new/modified tooling prior to 2R18 to attempt access to the inaccessible nuts in 2R18, and was partially successful. Three (3) of the five (5) nuts that were inaccessible in 2R17 were successfully tightened to specification in 2R18 with the new tooling. The remaining two (2) nuts remain bounded by the evaluation performed in 2R17 which allows use as-is. PSEG is investigating additional new/modified tooling.

The inspections for the loose parts trapping screens provided validation of screen integrity and removal of any foreign material that accumulated during the previous cycle. The inspections did identify several small pieces of foreign material; consisting of small pieces of metal foil, soft graphite material, and small nuts, washers, a bolt, and other small metal pieces. In summary, all of the foreign material was removed from the screens, and all the screens were structurally intact with no degradation identified. The foreign material removed from the loose part trapping screens was entered into the corrective action program for further review. The foreign material (nuts, bolt, washers, other small metal pieces) were determined to be from feedwater heater tube plugs, and the graphite and foil material was likely from ineffective foreign material exclusion (FME) during maintenance efforts in the balance of the plant (Feedwater system, etc). Expanded inspection scope was performed during outage 2R18 in the feedwater heaters, resulting in replacement of all the deficient tube plugs (Powerfect design) with plugs of a more robust design.

Sludge lancing was not performed in outage 2R18; therefore top of tubesheet (TTS) visual inspections was a contingency pending if eddy current inspections detected possible loose parts or loose part wear. No loose parts or loose parts wear indications were identified in outage 2R18 based on eddy current inspections, therefore visual inspections of the TTS was not required. Also, as explained previously, these steam

generators are equipped with loose parts trapping screens which have proven to be effective at mitigating foreign material from entering the tube bundle.

2. During the last inspection, a 30 percent through-wall repair limit was implemented. It appears that a similar repair limit was not implemented during this outage. Please clarify. Please indicate which tubes were plugged during the spring 2011 outage.

The Operational Assessment (OA) for cycle 19 provided that tube plugging was only required at the Technical Specification repair criteria (40% TW or greater). Tubes with AVB wear exceeding 38% TW, or wear indications that exceeded 19% TW change in wear depth as compared to 2R17 were administratively plugged. Several other tubes not meeting this criterion were also plugged based on engineering discretion, which was mostly based on those indications that were close to one of the size or rate of wear criteria (or both). It should also be noted that when compared to 2R17, the average AVB growth rate (wear rate) in each SG decreased by almost one-half at 2R18; and the upper 95th growth rate in each SG decreased by approximately one-third.

The Operational Assessment (OA) for cycle 19 used a probabilistic full bundle analysis approach consistent with guidance from the EPRI SG Integrity Assessment Guidelines, Rev 3. The probabilistic full bundle approach (which considers each wear indication returned to service in each SG) is more responsive to extreme value growth rates because it explicitly captures the fact that, if more deep wear scars are returned to service, there is an increasing probability that large growth rates will be matched with large beginning of cycle (BOC) depths; making deep end of cycle (EOC) flaws more likely. Hence, this approach will yield a lower repair limit for a SG which has a large population of flaws. The resulting per-bundle probabilities of meeting $3\Delta P$ are greater than 0.96 for the plugging limit implemented (AVB wear of 39% TW or greater), and exceed the required 0.95 per-bundle probability as defined in the EPRI SG Integrity Assessment Guidelines, Rev 3. This demonstrates with high probability that performance criteria will be met, for each steam generator, during the next operating cycle (up to outage 2R19).

The following tubes were plugged and stabilized during outage 2R18:

SG21: Row 83 Column 65
SG21: Row 89 Column 65
SG22: Row 78 Column 74
SG22: Row 83 Column 63
SG22: Row 82 Column 64
SG22: Row 86 Column 58
SG22: Row 91 Column 63
SG23: Row 82 Column 64
SG24: Row 85 Column 59
SG24: Row 85 Column 63
SG24: Row 90 Column 62
SG24: Row 97 Column 57
SG24: Row 87 Column 59
SG24: Row 78 Column 68

Attachment 1
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SG24: Row 78 Column 70
SG24: Row 79 Column 71