PSEG Nuclear LLC
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PSEG
Nuclear LLC

AUG 07 2017

Technical Specification 6.9.1.10

LR-N17-0115

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

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

Subject: Response to Request for Additional Information (RAI), Re: Steam Generator Tube Inspection Report (CAC No. MF9094)

Reference: NRC email to PSEG, "Request for Additional Information – Salem Unit 1 – Steam Generator Tube Inspection Report (CAC No. MF9094)," dated July 11, 2017 (ADAMS Accession No. ML17192A167)

In the referenced email, the Nuclear Regulatory Commission (NRC) requested PSEG Nuclear LLC (PSEG) to provide additional information in order to complete the review of the Steam Generator Tube Inspection Report – Twenty-fourth Refueling Outage (1R24). Attachment 1 provides a response to the request for additional information.

There are no regulatory commitments contained in this letter.

Should you have any questions regarding this submittal, please contact Ms. Tanya Timberman at 856-339-1426.

Sincerely,

Patrick A. Martino
Plant Manager
Salem Generating Station

Attachment:
1. Response to Request for Additional Information

cc: Mr. D. Dorman, Administrator, Region I, NRC
Mr. R. Ennis, Project Manager, NRC
NRC Senior Resident Inspector, Salem
Mr. P. Mulligan, Chief, NJBNE
Hope Creek Commitment Tracking Coordinator
Corporate Commitment Tracking Coordinator

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Attachment 1

Response to Request for Additional Information

LR-N17-0115
Attachment 1

Response to Final Request for Additional Information (RAI)
Regarding Steam Generator Tube Inspection Report
Salem Nuclear Generating Station, Unit 1
Docket No. 50-272

By letter dated January 20, 2017 (Agencywide Documents Access and Management System Accession No. ML17020A111), PSEG Nuclear LLC (the licensee) submitted a report to the U.S. Nuclear Regulatory Commission (NRC) summarizing the results of the 2016 steam generator (SG) inspections at Salem Nuclear Generating Station, Unit No. 1. These inspections were performed during refueling outage (RFO) 24. The SG tube inspection report is required to discuss the topics listed under Technical Specification 6.9.1.10, which includes information such as the scope of inspections performed, degradation mechanisms found, and the results of condition monitoring.

The NRC staff is reviewing your submittal and has determined that additional information is needed to complete its review. The specific information requested is addressed below.

Chemical, Corrosion, and Steam Generator Branch (RCCB)
Reviewer: Alan Huynh

RAI-RCCB-1

Please provide the number, location, and material (if known) of all foreign objects that remain in the SGs. Please also include all foreign object wear indications that were not included in the report, if any.

PSEG Response to RAI-RCCB-1

Below is a summary of the known foreign objects that remain in the steam generators (SG).

SG 11, Row 57 Column 48, on the cold leg side of the flow baffle plate has a foreign object detected by eddy current. This location was not accessible to secondary side inspection; therefore the material of this foreign object is unknown. This tube was plugged and stabilized, as documented in Attachment 9 of the Steam Generator Tube Inspection Report (Reference 1).

In SG 12, a foreign object that appears to be metallic (approximately 1.25 inch long, 0.5 inch wide, and 0.15 inch thick), is located on the top of tubesheet (TTS), hot leg side, adjacent to tubes Row 20 Column 42, Row 21 Column 41, and Row 21 Column 42. This object was detected in outage 1R20, and also re-inspected in 1R24. Retrieval efforts were unsuccessful. Tubes at Row 20 Column 42, Row 20 Column 43, Row 21 Column 41, and Row 21 Column 42 were preventatively plugged and stabilized in outage 1R20.

In SG 14, a foreign object that appears to be a stainless steel machine curl (approximately 1.5 inch long, 0.25 inch overall diameter, and 0.13 inch wide) was found to be located on the top of tubesheet, hot leg side, adjacent to Row 56 Column 57. Retrieval efforts were unsuccessful.

In SG 14, a foreign object that appears to be a wire bristle (approximately 1.75 inch long and 0.01 inch in diameter) was found to be located on the top of tubesheet, hot leg side, adjacent to Row 55 Column 60 and Row 55 column 59. Retrieval efforts were unsuccessful.

Attachment 9 of the Steam Generator Tube Inspection Report (Reference 1) includes all foreign object wear indications identified during outage 1R24.

RAI-RCCB-2

On page 4 of 6 of Attachment 1 to the letter dated January 20, 2017, the scope of the Array Probe inspections lists special interest inspections that resulted from secondary side inspections. However, further discussion of these inspections is not included in the report. Please discuss the results of any secondary side inspections performed during RFO 24.

PSEG Response to RAI-RCCB-2

In each steam generator, following top of tubesheet water lancing (sludge lancing), visual inspections and Foreign Object Search and Retrieval (FOSAR) were performed at the top of tubesheet. These inspections included the full length of the no tube lane (area between row 1 tubes), some inner bundle inspections (hot leg and cold leg), completely around the annulus tube areas (shell-to-tube bundle region, including periphery tubes), and locations with foreign material. The annulus / periphery tubes inspection included articulating the camera angle to view into the bundle (from the annulus region) allowing inspection between the periphery tubes into the bundle. The purpose of these inspections was to identify and remove foreign material and to assess the effectiveness of the water lancing. Visual inspections and FOSAR are also performed, as possible, at other locations on the top of the tubesheet or the flow baffle plates. This can occur when eddy current inspections (e.g. – Array Probe inspection) identify possible loose parts (PLP). RAI response RAI-RCCB-1 provides information regarding foreign objects (also commonly referred to as loose parts).

Other secondary side inspections performed in each steam generator included visual inspections of the upper tube support plates (TSP) and accessible areas. 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 in the area of support structures (e.g. – TSPs), wrapper plug assemblies, anti-rotation keys, and tubing areas (as-possible). Visual inspections did not identify conditions adverse to quality.

RAI-RCCB-3

For each operating cycle since and including RFO 18 in 2007, please provide the effective full power months of operation for the Unit 1 SGs.

PSEG Response to RAI-RCCB-3

The first cycle of operation following SG replacement was Cycle 13. The approximate cumulative effective full power months (EFPM) for each cycle since SG replacement, including RFO 18 to RFO 24 (end of cycle 24), is provided in the table below:

Cycle	Cycle Length (EFPD)	Cumulative Cycle Length (EFPM)
13	492	16.2
14	499	32.6
15	465	47.9
16	480	63.6
17	461	78.8
18	500	95.2
19	526	112.5
20	500	129.0
21	500	145.4
22	492	161.6
23	494	177.8
24	490	193.9

References

1. PSEG letter to NRC, "Steam Generator Tube Inspection Report – Twenty-fourth Refueling Outage (1R24)," dated January 20, 2017 (ADAMS Accession No. ML17020A111)