



MAY 21 2015

LR-N15-0118

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

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

SUBJECT: Response to Salem Nuclear Generating Station, Unit 2, Request for Additional Information Re: Spring 2014 Steam Generator Tube Inspections (TAC No. MF5117)

REFERENCES:

1. Salem Nuclear Generating Station, Unit No. 2 – Request for Additional Information Re: Spring 2014 Steam Generator Tube Inspections, dated March 24, 2015 (TAC No. MF5117)
2. LR-N14-0232, Steam Generator Tube Inspection Report – Twentieth Refueling Outage (2R20), dated October 30, 2014, (ML14303A032)

On March 24, 2015, the Nuclear Regulatory Commission (NRC) provided to Mr. Thomas Joyce of PSEG Nuclear LLC (PSEG) a request for additional information (Reference 1). PSEG hereby formally documents its response to the request for additional information. Attachment 1 contains the NRC's questions followed by PSEG's response. There are no regulatory commitments contained in this letter.

Should you have any questions regarding this submittal, please contact Mr. D. Lafleur at (856) 339-1754.

Sincerely,

A handwritten signature in black ink that reads "John F. Perry". The signature is written in a cursive, flowing style.

John F. Perry
Site Vice President – Salem

Attachments (1)

MAY 21 2015

Page 2
LR-N15-0118

Cc: Mr. D. Dorman, Administrator – Region 1, NRC
Ms. C. Parker, Licensing Project Manager – Salem, NRC
Mr. P. Finney, USNRC Senior Resident Inspector, Salem (X24)
Mr. P. Mulligan, Manager IV, NJBNE
Mr. R. Braun, President and Chief Nuclear Officer – Nuclear
Mr. T. Cachaza, Salem Commitment Tracking Coordinator
Mr. L. Marabella, Corporate Commitment Tracking Coordinator
Mr. D. Lafleur, Salem Regulatory Assurance

LR-N15-0118

Attachment 1

Response to Salem Nuclear Generating Station, Unit 2, Request for Additional
Information Re: Spring 2014 Steam Generator Tube Inspections (TAC No. MF5117)

1. Please provide the cumulative effective full power months of operation that the steam generators (SGs) have operated as of RFO 20.

PSEG Response:

The approximate cumulative effective full power months (EFPM) of operation that the steam generators (SGs) have operated as of RFO 20 (2R20) is 66 EFPM.

2. Please discuss the scope and results of any secondary side inspections.

PSEG Response:

There were no secondary side inspections planned or required for outage 2R20, consistent with the pre-outage Degradation Assessment. However, PSEG planned contingent secondary side foreign object search and retrieval (FOSAR) dependent on the in-outage eddy current inspection results. During 2R20, a total of 3 possible loose part (PLP) indications were identified and confirmed by eddy current inspection. All three PLP indications were identified in SG 24 near the Top-of-Tubesheet (TTS) on the cold leg in three (3) adjacent tubes (Row 81 Column 49, Row 82 Column 48, and Row 83 Column 49). FOSAR was initiated in this steam generator to investigate the PLP signals. The PLPs were confirmed to be caused by a thin metallic foreign object. This object was subsequently removed from the SG, and post removal eddy current inspection of these tubes verified that the foreign object had been removed and that no foreign object tube wear was present.

3. Please summarize the number of indications and tubes with wear at the anti-vibration bars. Please summarize the number of indications and tubes with wear at the tube support plates (TSPs). Please discuss whether the number of new wear indications and wear growth rates have continued to decrease from RFO 19 to RFO 20, for both anti-vibration bar and TSP wear.

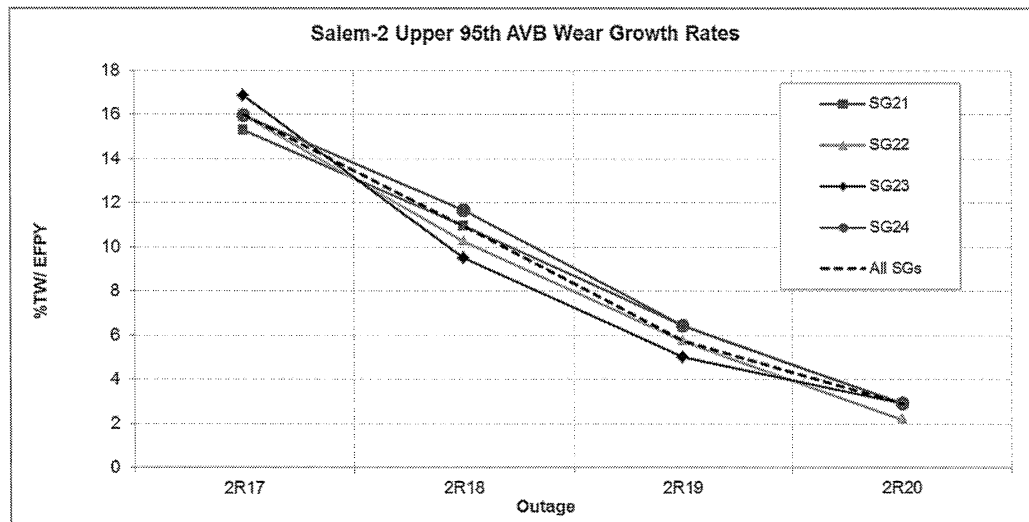
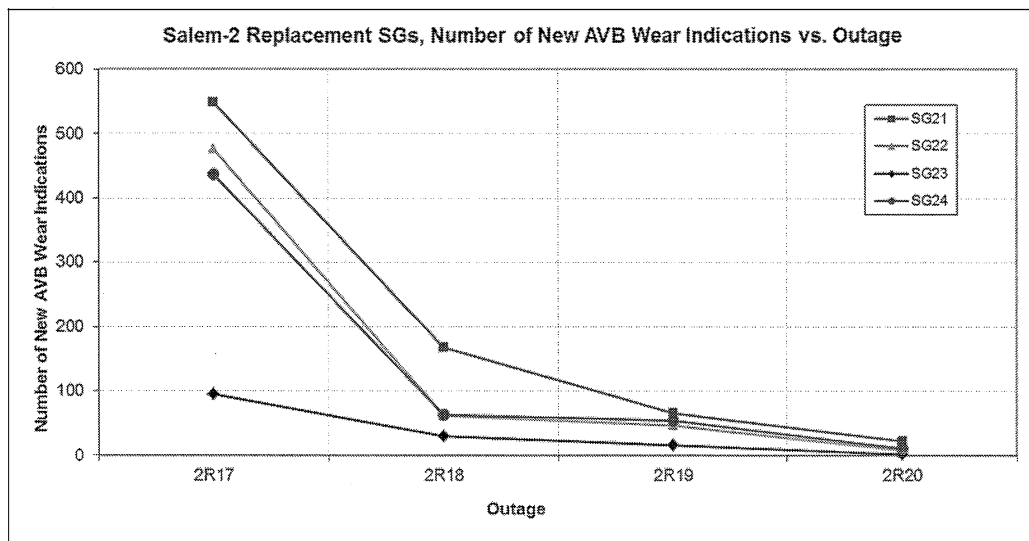
PSEG Response:

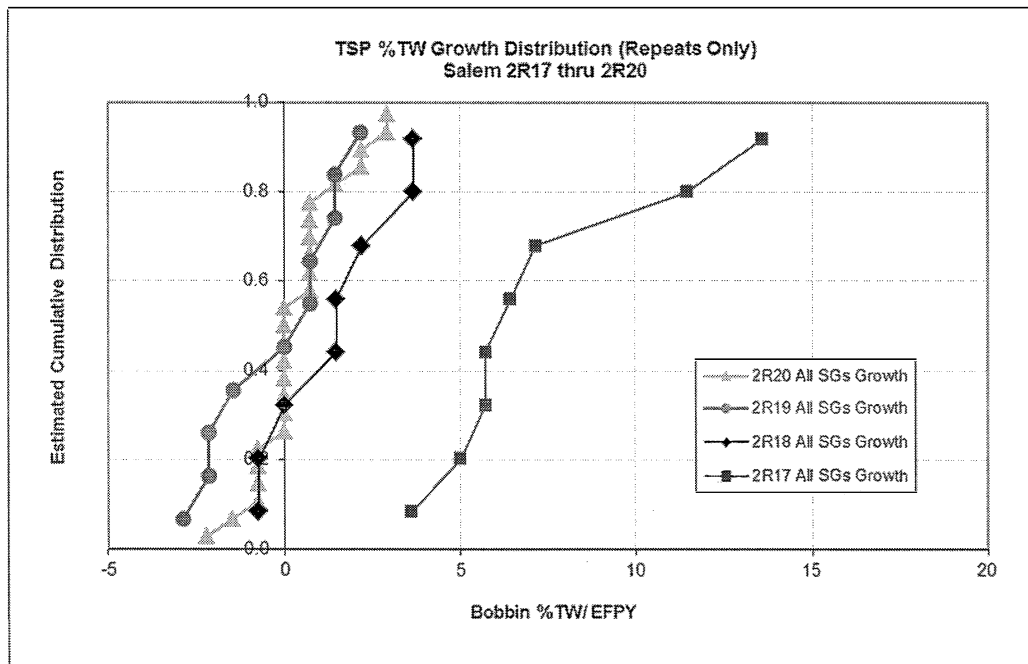
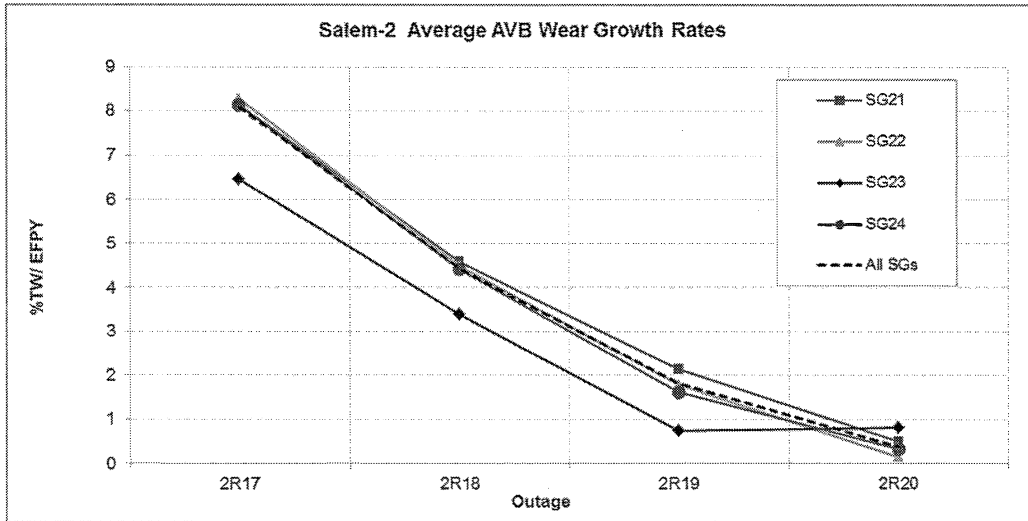
Below is a table summarizing the bobbin eddy current inspection results for the number of indications and tubes with wear at the anti-vibration bars (AVB) and tube support plates (TSP), and four graphs representing the trends for the number of new anti-vibration bar wear indications, AVB wear growth rates, and TSP wear growth rates. The growth rate graphs provide the trends with the upper 95th percentile growth rate and the average growth rate for AVB wear indications with history (with exception of 2R17, since all indications in 2R17 are new). As shown in these graphs, the trends for the number of new anti-vibration bar wear indications, AVB wear growth rates, and TSP wear growth rates at each inspection outage have continued to decline with each inspection outage; or have essentially no change (i.e. – stabilized). The number of TSP wear indications returned to service following outage 2R19 was 24 (Attachment 2 of LR-N14-0009, ML14010A428). During outage 2R20, 35 bobbin TSP wear indications were reported (one additional bobbin indication was reported as a Distorted Support Indication (DSI) bringing the bobbin indication total to 36). The overall population of TSP wear indications is limited and relatively small, with a change of 12 new TSP wear indications detected by eddy current bobbin inspection during outage 2R20. Subsequent to outage 2R20 tube plugging, 24 bobbin TSP wear indications were returned to service.

Indication Code	Summary of Number of Tubes and Indications from 2R20 Bobbin Inspections									
	SG21		SG22		SG23		SG24		Total	
	Tubes	Indic	Tubes	Indic	Tubes	Indic	Tubes	Indic	Tubes	Indic
TSP	5	8	3	4	6	6	12	18 Note 1	26	36
AVB	235	632	176	422	53	127	143	397	607	1578

Notes:

1. This includes a Distorted Support Indication (DSI) bobbin indication which was confirmed as wear with Rotating Probe Coil (RPC/+Point™).





4. Please clarify whether the tube in row 104, column 66 in SG 24 has two wear indications at 06C (one at 06C-0.58-inches and one at 06C+0.40-inches). Please discuss whether these indications are associated with TSP lands.

PSEG Response:

The tube in row 104, column 66, in SG 24 has two wear indications at 06C. One of the wear indications is at 06C-0.58 and the other is at 06C+0.40 inches. Both wear indications are associated with the TSP lands.

5. Please discuss the scope and results of any primary channel head inspections.

PSEG Response:

During outage 2R20, PSEG performed a visual examination of the steam generator channel head internal (primary side) cladding surfaces in all four steam generators, both on the hot leg and cold leg. With the exception of the as-found channel head foreign material identified in three of the four steam generators, the steam generator channel head bowl examinations resulted in satisfactory conditions and did not identify any signs of degradation, rust, deformation or abnormal conditions. The foreign material was identified in the cold legs of SG 21, 22, and 24. The foreign material consisted of a few small pieces of unidentifiable material including metal shavings, a piece of metal possibly from a lanyard, and two bolt heads that were determined to be from the reactor coolant pumps. The steam generator cold leg channel head cladding, tubesheet and tube plug surfaces were visually examined with no degradation identified. All foreign material was removed from the channel head of the steam generators. The corrective action process resulted in major repairs to the reactor coolant pumps as described in NRC Integrated Inspection Report 05000272/2014005 and 05000311/2014005, dated January 30, 2015 (ML 15030A400).

6. Please identify the tubes plugged during RFO 20.

PSEG Response:

The table below lists the tubes plugged during RFO 20 (2R20) for each SG.

SG	ROW	COLUMN
21	1	63
21	64	66
21	65	75
21	66	60
21	66	64
21	68	60
21	68	62
21	69	73
21	69	75
21	71	69
21	72	56
21	73	59
21	73	61
21	74	58
21	74	62
21	74	70
21	75	63
21	76	54

Attachment 1
LR-N15-0118

SG	ROW	COLUMN
21	76	58
21	76	64
21	77	59
21	77	61
21	78	52
21	78	54
21	79	61
21	79	69
21	80	62
21	81	59
21	81	61
21	81	63
21	81	65
21	81	67
21	82	60
21	82	62
21	83	59
21	83	63
21	85	57
21	85	67
21	86	66
21	88	60
21	88	62
21	89	61
21	92	74
21	93	63
21	94	68
21	95	59
21	96	58
21	96	62
21	97	57
21	97	59
21	97	61
21	97	67
21	98	58
21	98	60
21	100	58
21	101	67
22	1	63
22	57	55
22	62	114
22	67	63

Attachment 1
LR-N15-0118

SG	ROW	COLUMN
22	69	67
22	72	62
22	73	61
22	73	63
22	73	75
22	74	64
22	75	55
22	75	65
22	76	72
22	78	58
22	78	60
22	79	67
22	80	60
22	82	60
22	82	66
22	84	62
22	85	67
22	86	54
22	86	56
22	87	61
22	88	62
22	89	55
22	90	62
22	92	52
22	95	59
22	96	62
22	97	51
22	98	50
22	99	51
22	99	59
23	64	74
23	70	58
23	75	65
23	88	58
23	92	58
23	100	78
24	1	63
24	1	89
24	51	79
24	59	65
24	62	44
24	68	74

SG	ROW	COLUMN
24	69	69
24	69	71
24	70	66
24	71	71
24	72	68
24	73	65
24	73	67
24	73	69
24	77	67
24	78	66
24	79	63
24	79	67
24	80	68
24	81	61
24	81	71
24	82	66
24	83	61
24	83	63
24	85	55
24	85	61
24	85	65
24	85	71
24	91	65
24	91	69
24	92	62
24	93	69
24	94	58
24	94	70
24	95	65
24	98	54
24	100	56

- 7. Previously, the tube located in row 1, column 63 in three of the four SGs had wear at various TSP intersections. Please discuss any insights into the cause of wear given the limited number of indications of TSP wear and the general random nature of this form of degradation.**

PSEG Response:

It is observed that 3 of the 4 SGs have shown TSP wear in the tube at row 1 column 63. PSEG did not identify any unique cause related to these specific tubes. The TSP wear in these tubes was not significantly different as compared to the prior outage (2R19). The wear was nearly the same depth, or within a few percent through-wall of the 2R19

measured depths, and well below the Technical Specification (TS) tube plugging criteria (TS 6.8.4.i.c). However, PSEG administratively plugged and stabilized all three of these tubes during outage 2R20.

8. Please discuss whether the two inaccessible nuts on secondary components (hatches, camera ports), where other nuts were found to be loose in prior inspections, were able to be accessed to ensure tightness.

PSEG Response:

Secondary side inspections of the upper internals were not performed, or required, during outage 2R20. The nuts that were previously found loose and retightened, and the nuts that were inaccessible and left as-is, were not inspected during 2R20. The evaluations performed previously in 2R17 and 2R18, and in the pre-outage Degradation Assessment for 2R20, determined that the conditions within the upper internals do not require re-examination at this time; including the loose nuts (ML 102440037 item #2, ML 12088A010 item #1, and ML 14010A428 item #2). In summary of the loose nuts evaluations, the two (2) inaccessible nuts remain bounded by evaluation which allows use as-is. The nuts that were previously found loose in 2R17 on various hatches or camera ports, and tightened to higher torque, were re-examined in 2R18. These inspections confirmed the adequacy of the corrective actions conducted in 2R17, since none of the re-tightened nuts in 2R17 were found loose in 2R18.