



June 18, 2015

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10 CFR 50.4
10 CFR 50.55a

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Re: St. Lucie Unit 2
Docket No. 50-389
Response to Request for Additional Information Regarding the Spring 2014 Steam Generator Tube Inspections

References:

1. FPL letter L-2014-291 dated September 18, 2014: Steam Generator Tube Inspection Report (ML14279A237)
2. FPL letter L-2015-089 dated March 23, 2015: Response to Request for Additional Information Regarding the Spring 2014 Steam Generator Tube Inspections (ML15091A306).
3. NRC Letter dated May 11, 2015: St. Lucie Plant, Unit 2 – Request for Additional Information (RAI) Regarding the Spring 2014 Steam Generator Tube Inspections. (ML15114A383)

Per Reference 1 above, Florida Power and Light Company (FPL) submitted information summarizing the results of the spring 2014 steam generator tube inspections performed at St. Lucie, Unit 2. FPL responded to the NRC staff first round of requests for additional information (RAIs) by letter dated March 23, 2015 (Reference 2).

By letter dated May 11, 2015 (Reference 3), the NRC Staff requested additional information regarding the spring 2014 steam generator tube inspections. The attachment to this letter provides the detailed response to the requests for additional information.

Please contact Richard Sciscente at (772) 467-7156 if there are any questions about this submittal.

Sincerely,

Eric Katzman
Licensing Manager
St. Lucie Plant

ESK/rcs

Attachment

cc: USNRC Regional Administrator, Region II
USNRC Senior Resident Inspector, St. Lucie Units 1 and 2

A001
NRK

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING THE SPRING 2014 STEAM GENERATOR TUBE
INSPECTIONS

By letter dated September 18, 2014 (ML14279A237), FPL submitted information summarizing the results of the spring 2014 steam generator tube inspections performed at St. Lucie, Unit 2. FPL responded to the NRC staff first round of requests for additional information (RAIs) by letter dated March 23, 2015 (ML15091A306).

The NRC staff reviewed the information FPL provided and determined that the following additional information (RAIs 8 – 12) is needed in order to complete their review.

RAI-8

The Florida Power and Light Company (FPL), in its response to RAI-3, by letter dated March 23, 2015, indicates that no degradation related to Nuclear Safety Advisory Letter 12-01 was detected, which could imply that some corrosion degradation was detected. Confirm that no corrosion related degradation was found in the channel head.

Response

The channel head was inspected for degradation during condition monitoring. This included inspections related to NSAL 12-01. No corrosion-related degradation was found in the channel head.

RAI-9

FPL, in its response to RAI-4, by letter dated March 23, 2015, indicates that the analysis performed for the loose parts has been evaluated within the corrective action program, but no results were provided. Confirm that the analysis supported a full cycle of operation.

Response

A wear evaluation was performed for the loose parts. The evaluation focused on the threaded metal bezel component of the loose parts since the tube wear results for other lens/cover components (rubber gasket, glass lens, retaining ring) are bounded by that of the metal bezel component. The wear evaluation performed showed that a 40% through-wall wear life is estimated at 73 years of full power operation at the uprated power level. Thus, the analysis performed for the loose parts supported a full cycle of operation.

RAI-10

Clarify the difference between U-bend apex (AV4/5) wear, AVB [anti-vibration bar]-transition tube wear, V-shaped support pad wear, and V-shaped support bar wear. For example, does U-bend apex (AV4/5) wear mean wear at the apex on the extrados of the tube as a result of the tube interacting with the bottom edge of the AVB? Does AVB-transition tube wear mean wear at the apex on the flank of the tube as a result of the tube interacting with side of an AVB? Does V-shaped support pad wear mean wear as a result of the tube interacting with the support pad "sitting" on that tube, whereas V-shaped support bar wear is wear on a tube from the tube interacting with a neighboring tube's V-shaped support bar?

Response

Background: Each St. Lucie Unit-2 SG is equipped with 4 sets of V-shaped anti-vibration bars (AVBs) for U-bend bundle support. Each AVB set is required by design to be inserted into the bundle to a prescribed depth known as the "minimum required depth". To provide additional stability to the bundle, the upper 3 sets of AVB supports have been inserted two rows deeper into the bundle, than required. This is referred to as the "as-fabricated depth". AVB insertion depths are summarized in Table 1 below.

Table 1: AVB Support Depths

AVB Support	Minimum Required Depth (tube row)	As-Fabricated Depth (tube row)
AV4-AV5	72	70
AV3-AV6	43	41
AV2-AV7	20	18
AV1-AV8	1	1

A transition row is the lowest tube row (in a series of vertically stacked tube rows) that is supported by the AVB support. Thus, for St. Lucie Unit 2 the transition rows are identical to the ones listed in the "as-fabricated" depths column in Table 1. The region where the apex of the transition row intersects the bottom portion of the AVB support is referred to as the "crossover region". In this region, the centerline of the transition row's U-bend (concave down) coincides with centerline of the AVB bottom (concave up), as shown in the sketch in the Response to RAI-7 (ML15091A306).

AVB Transition Tube wear: Wear occurring in the "as-fabricated" transition rows (rows 70, 41, 18 and 1) at the crossover region. Wear is located at the flank of the tube. To date, AVB Transition Tube Wear has only been identified in Row 41 in the St. Lucie Unit 2 SGs.

U-Bend Apex wear (AV4/5): Wear occurring in a lower tube row (deeper in bundle) that is below the "as-fabricated" transition rows in the St. Lucie Unit 2 SGs. To date, U-Bend Apex wear has only been identified in Row 69 tubes. The wear mechanism is acting similar to the AVB Transition Tube wear at the crossover region where the tube and the AVB support overlap, and is located on the flank of the tube as supported by ECT data. The designation "U-Bend Apex wear" is used to identify the difference in location within the tube bundle as compared to the AVB Transition Tube wear.

V-Shaped Support Pad wear: Wear occurring on a V-Shaped Support Pad tube (also referred to as a "parent tube"), on the extrados/flank of the tube. The wear is a result of the tube interacting with the support pad "sitting" on that tube.

V-Shaped Support Bar wear: Wear occurring on a tube adjacent to a V-Shaped Support Pad, where the side of the V-Shaped Support Pad comes into contact with the flank of the adjacent (neighboring) tube. The wear on the tube is from the tube interacting with a neighboring tube's V-shaped support bar.

RAI-11

FPL, in its response to RAI-6 by letter dated March 23, 2015, indicates that the tube is supported by the V-shaped support pad. Clarify whether the tube is supported by the V-shaped support pad or whether the V-shaped support pad supports the U-bend supports (by "sitting/resting" on the tube).

Response

The V-shaped support pads provide support to the "AVB system" by resting on select peripheral tubes (also referred to as "parent" tubes or "support" tubes). The "AVB system" consists of U-bend support components including AVBs, AVB end-clamping devices (also called comb/clamp systems) and hoops (which link the AVBs, comb and bundle wrapper together).

RAI-12

The U.S. Nuclear Regulatory Commission staff noticed that the number of indications reported in FPL's response to RAI-5, by letter dated March 23, 2015, is slightly different than what was provided during a conference call on March 20, 2014 (refer to summary of conference call dated August 8, 2014, (ADAMS Accession No. ML14189A090)). Confirm that the values in response to RAI-5 are correct. Is the difference in the number of indications/tubes due to various factors such as completing the inspection (including confirming the nature/presence of the indication with a rotating or array probe), performing quality assurance checks, and possibly reclassifying some of the March 2014 indications as other types of wear (V-shaped support pad/bar wear, etc.)? Also, confirm whether there were 16 indications in 16 tubes attributed to U-bend apex wear in Steam Generator (SG) A (or whether the 16 indications were in 15 tubes since your September 18, 2014, report implies that the 16 indications were in 15 tubes rather than 16 tubes in SG A).

Response

The information provided during the March 20, 2014 conference call was preliminary, as documented in the August 8, 2014 Conference Call Summary (ML14189A090). Bobbin probe exams and the "special interest" (+Point™) exams were not yet completed as of the March 20, 2014 conference call.

In summary, the values in response to RAI-5 are correct with the following exception: with respect to the "Number of affected tubes" at the "U-bend Apex (AV4/5)" location of SG-2A, the value reported in RAI-5 should have been 15 rather than 16 tubes.