



February 13, 2006

L-2006-043  
10 CFR 50.90

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

RE: St. Lucie Unit 2  
Docket No. 50-389  
Proposed License Amendment  
Request for Additional Information Response  
Define the Depth of the Required Tube Inspections and Clarify the  
Plugging Criteria Within the Tubesheet Region of the Original Steam Generators

By letter L-2004-245 dated November 8, 2004, Florida Power & Light Company (FPL) requested to amend Facility Operating License NPF-16 for St. Lucie Unit 2. As proposed, the amendment revises Technical Specification (TS) Section 4.4.5.4 to modify the definitions of steam generator tube "Plugging Limit" and "Tube Inspection," as contained in the St. Lucie Unit 2 Technical Specification (TS) Items 4.4.5.4.a.6 and 4.4.5.4.a.8, respectively. The purpose of these modifications is to define the depth of the required tube inspections and to clarify the plugging criteria within the tubesheet region. On December 16, 2004, the NRC issued a request for additional information (RAI) to allow the staff to complete their review of the FPL requested amendment. The RAI focused on the results of a joint industry program, WCAP-16208-P dated October 2004, Revision 0, *NDE Inspection Length for CE Steam Generator Tubesheet Region Explosive Expansions*, used as the technical basis for these changes. FPL responded to this RAI in letter L-2005-015 dated March 31, 2005. On November 23, 2005, the NRC issued an additional RAI and this letter provides FPL's response.

Interactions with the Staff led to the use of more conservative tube pull-out forces that necessitated a change to the proposed inspection depth from 10.1 inches to 10.3 inches. Attachment 1 provides new Technical Specification markup pages to support the change in inspection depth. Attachment 1 also incorporates the commitment made in the response to the first RAI as documented in FPL letter L-2005-015 dated March 31, 2005. Additionally, FPL's St. Lucie Unit 2 proposed license amendment on the steam generator repair method using Westinghouse Alloy 800 leak limiting sleeves (NRC TAC number MC5633) contained Technical Specification markups based on approval of the steam generator tube sheet inspection depth. Therefore, Attachment 2 provides the conforming Technical Specification markup pages required for the change in inspection depth.

Attachment 3 is a proprietary copy of the response document, Responses to NRC Requests for Additional Information on WCAP-16208-P, Revision 0, *NDE Inspection Length for CE Steam Generator Tubesheet Region Explosive Expansions*. Attachment 4 is a nonproprietary copy of the response document. Attachment 5 is Westinghouse authorization letter CAW-06-2090 with accompanying affidavit, Proprietary Information Notice, and Copyright Notice.

APD

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As Attachment 3 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the consideration listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

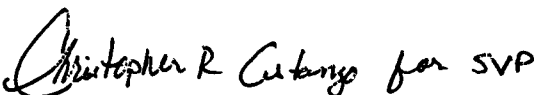
Correspondence with respect to the copyright or proprietary aspects of Attachment 3 above or the supporting Westinghouse affidavit should reference CAW-06-2090 and should be addressed to B. F. Maurer, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

The no significant hazard analysis submitted with FPL letter L-2004-245 remains bounding. In accordance with 10 CFR 50.91 (b)(1), a copy of the proposed amendment was forwarded to the State Designee for the State of Florida.

Based on discussions with the NRC project manager for St. Lucie, the requested approval of the proposed license amendment is requested to support the St. Lucie Unit 2 refueling outage scheduled for April 24, 2006. Please issue the amendment to be effective on the date of issuance and to be implemented within 60 days of receipt by FPL. The existing St. Lucie Unit 2 steam generators are scheduled for replacement in the fall 2007 refueling outage (SL2-17). Accordingly this Technical Specification change is requested for no more than two operating cycles (SL2-15 and SL2-16) (i.e., until the original steam generators are replaced).

Please contact Ken Frehafer at 772-467-7748 if there are any questions about this submittal.

Very truly yours,



Gordon L. Johnston  
Acting Vice President  
St. Lucie Plant

GLJ/KWF

Attachments

cc: Mr. William A. Passetti, Florida Department of Health

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Unit 2 Technical Specification Markups

3/4 4-14

3/4 4-15

**REACTOR COOLANT SYSTEM**

**SURVEILLANCE REQUIREMENTS (Continued)**

4.4.5.4 Acceptance Criteria

a. As used in this Specification

1. Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.
2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.
3. Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation.
4. % Degradation means the percentage of the tube wall thickness affected or removed by degradation.
5. Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.
6. Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service and is equal to 40% of the nominal tube wall thickness. ← **Insert A**
7. Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.5.3c., above.
8. Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg. ← **Insert B**
9. Preservice Inspection means an inspection of the full length of each tube in each steam generator performed by eddy current techniques prior to service to establish a baseline

**REACTOR COOLANT SYSTEM**

**SURVEILLANCE REQUIREMENTS (Continued)**

condition of the tubing. This inspection shall be performed after the field hydrostatic test and prior to Initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

- b. The steam generator shall be determined OPERABLE after completing the corresponding actions: (plug all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 4.4-2.

4.4.5.5 **Reports**

- a. Within 15 days following the completion of each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission in a Special Report pursuant to Specification 6.9.2.
- b. The complete results of the steam generator tube inservice inspection shall be submitted to the Commission in a Special Report pursuant to Specification 6.9.2 within 12 months following completion of the inspection. This Special Report shall include:
  - 1. Number and extent of tubes inspected.
  - 2. Location and percent of wall-thickness penetration for each indication of an imperfection.
  - 3. Identification of tubes plugged.

Insert C →

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**Insert A for PSL Unit 2 TS Page 3/4 4-14**

This Plugging Limit is not applicable in the portion of the tube that is greater than 10.3 inches below the bottom of the hot leg expansion transition or top of the tubesheet, whichever is lower, to the tube end. Degradation detected between 10.3 inches below the bottom of the hot leg expansion transition or top of the tubesheet, whichever is lower, and the bottom of the hot leg expansion transition or top of the tubesheet, whichever is higher, shall be plugged on detection.

**Insert B for PSL Unit 2 TS Page 3/4 4-14**

10.3 inches below the bottom of the hot-leg expansion transition or top of the tubesheet, whichever is lower, completely around the U-bend to the top support of the cold leg.

**Insert C for PSL Unit 2 TS Page 3/4 4-15**

- c. Following each inspection and within 120 days after the reactor coolant system reenters MODE 4, the following information concerning indications found in the tubesheet region (including the expansion transition) shall be reported to the Commission in a Special report pursuant to Specification 6.9.2. This Special Report shall include:
1. Number of total indications, location of each indication, orientation of each indication, severity of each indication, and whether the indications initiated from the inside or outside diameter.
  2. The cumulative number of indications detected in the tubesheet region as a function of elevation within the tubesheet.
  3. Projected end-of-cycle accident induced leakage from tubesheet indications. This leakage shall be combined with the postulated end-of-cycle accident induced leakage from all other sources. If the preliminary estimated total projected end-of-cycle accident induced leakage from all sources exceeds the leakage limit, the NRC staff shall be notified prior to Unit restart.

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### Unit 2 Technical Specification Markups

3/4 4-12  
3/4 4-14  
3/4 4-15  
3/4 4-17

**REACTOR COOLANT SYSTEM**

**SURVEILLANCE REQUIREMENTS (Continued)**

Insert A

1. All nonplugged tubes that previously had detectable wall penetrations (greater than 20%).
  2. Tubes in those areas where experience has indicated potential problems.
  3. A tube inspection (pursuant to Specification 4.4.5.4.a.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.
- c. The tubes selected as the second and third samples (if required by Table 4.4-2) during each inservice inspection may be subjected to partial tube inspection provided:
1. The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found.
  2. The inspections include those portions of the tubes where imperfections were previously found.

The results of each sample inspection shall be classified into one of the following three categories:

<u>Category</u>	<u>Inspection Results</u>
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.



**REACTOR COOLANT SYSTEM**

**SURVEILLANCE REQUIREMENTS (Continued)**

**4.4.5.4 Acceptance Criteria**

a. As used in this Specification

1. **Imperfection** means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.
2. **Degradation** means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.
3. **Degraded Tube** means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation.
4. **% Degradation** means the percentage of the tube wall thickness affected or removed by degradation.
5. **Defect** means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.

Insert B

6. **Plugging Limit** means the imperfection depth at or beyond which the tube shall be removed from service and is equal to 40% of the nominal tube wall thickness. This Plugging Limit is not applicable in the portion of the tube that is greater than 10.1 inches below the bottom of the hot leg expansion transition or top of the tubesheet, whichever is lower, to the tube end. Degradation detected between 10.1 inches below the bottom of the hot leg expansion transition or top of the tubesheet, whichever is lower, and the bottom of the hot leg expansion transition or top of the tubesheet, whichever is higher, shall be plugged on detection.

7. **Unserviceable** describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.5.3c., above.

Insert C

8. **Tube inspection** means an inspection of the steam generator tube from 10.1 inches below the bottom of the hot leg expansion transition or top of the tubesheet, whichever is lower, completely around the U-bend to the top support of the cold leg.

9. **Preservice inspection** means an inspection of the full length of each tube in each steam generator performed by eddy current techniques prior to service to establish a baseline

**REACTOR COOLANT SYSTEM**

**SURVEILLANCE REQUIREMENTS (Continued)**

condition of the tubing. This inspection shall be performed after the field hydrostatic test and prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

Insert D

Plugging or Repair Limit

- b. The steam generator shall be determined OPERABLE after completing the corresponding actions: (plug all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 4.4-2.

or repair

or repaired

4.4.5.5 Reports

- a. Within 15 days following the completion of each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission in a Special Report pursuant to Specification 6.9.2.
- b. The complete results of the steam generator tube inservice inspection shall be submitted to the Commission in a Special Report pursuant to Specification 6.9.2 within 12 months following completion of the inspection. This Special Report shall include:

and sleeves

1. Number and extent of tubes inspected.
2. Location and percent of wall-thickness penetration for each indication of an imperfection.
3. Identification of tubes plugged,

or repaired

TABLE 4.4-2  
STEAM GENERATOR TUBE INSPECTION

1st SAMPLE INSPECTION			2nd SAMPLE INSPECTION		3rd SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S Tubes per S.G.	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug defective tubes and inspect additional 2S tubes in this S.G.  or repair	C-1	None	N/A	N/A
			C-2	Plug defective tubes and inspect additional 4S tubes in this S.G.	C-1	None
					C-2	Plug defective tubes
C-3	Perform action for C-3 result of first sample	N/A	N/A			
C-3	Inspect all tubes in this S.G., plug de- fective tubes and inspect 2S tubes in each other S.G.	All other S.G.s are C-1	None	N/A	N/A	
		Some S.G.s C-2 but no additional S.G. are C-3	Perform action for C-2 result of second sample.	N/A	N/A	
		Additional S.G. is C-3	Inspect all tubes in each S.G. and plug defective tubes.	N/A	N/A	

$S = 3 \frac{N}{n} \%$  Where N is the number of steam generators in the unit, and n is the number of steam generators inspected during an inspection.

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**Insert A for TS Page 3/4 4-12:**

4. All Inservice Leak Limiting Alloy 800 sleeves shall be inspected over their full length during each refueling outage. These inspections will include both the tube and the sleeve.

**Insert B for TS Page 3/4 4-14:**

6. Plugging or Repair Limit means the condition at or beyond which the tube shall be removed from service by plugging or repaired by sleeving using the method in Specification 4.4.5.4.a.10 in the affected area. The plugging or repair limits are as follows:
  - i. In the non-sleeved portion of a tube, the plugging or repair limit imperfection depth is 40% of the nominal wall thickness. This Limit is not applicable in the portion of the tube that is greater than 10.3 inches below the bottom of the hot leg expansion transition or top of the tubesheet (whichever is lower) to the tube end. Degradation detected between 10.3 inches below the bottom of the hot leg expansion transition or top of the tubesheet (whichever is lower) and the bottom of the hot leg expansion transition or top of the tubesheet (whichever is higher) shall be plugged or repaired on detection.
  - ii. In the region of a tube sleeved using a Westinghouse Leak Limiting Alloy 800 sleeve, the tube shall be plugged upon detection of any service induced imperfection, degradation or defect in the (a) sleeve or (b) pressure boundary portion of the original tube wall in the sleeve/tube assembly (i.e., the sleeve-to-tube joint).
  - iii. All Leak Limiting Alloy 800 Sleeves that have a nickel band shall be plugged or removed from service after one cycle in operation.

**Insert C for TS Page 3/4 4-15:**

8. Tube Inspection for a tube with no portion of a sleeve extending below 10.3 inches from the bottom of the hot leg expansion transition or the top of the tubesheet (whichever is lower) means an inspection of the steam generator tube from 10.3 inches below the bottom of the hot leg expansion transition or top of the tubesheet (whichever is lower) completely around the U-bend to the top support of the cold leg. Tube Inspection for a tube with a portion of a sleeve extending below 10.3 inches from the bottom of the hot leg expansion transition or the top of the tubesheet (whichever is lower) means an inspection from the bottom of the sleeve completely around the U-bend to the top support of the cold leg.

**Insert D for TS Page 3/4 4-15:**

10. Tube Repair refers to sleeving with Westinghouse Leak Limiting Alloy 800 sleeves as described in WCAP-15918-P Revision 2, which are used to maintain a tube in service. Leak Limiting Alloy 800 Sleeves are applicable only to the original steam generators. The pressure boundary portion of the original tube wall in the sleeve/tube assembly (i.e., the sleeve-to-tube joint) shall be inspected prior to installation of each sleeve.