



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

January 27, 2010

LICENSEE: Florida Power & Light

FACILITY: Turkey Point Unit 4

SUBJECT: SUMMARY OF NOVEMBER 10, 2009, CONFERENCE CALL WITH FLORIDA POWER & LIGHT, ON THE FALL 2009 STEAM GENERATOR INSPECTIONS (TAC NO. ME2536)

On November 10, 2009, a conference call was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Florida Power & Light (the licensee) at NRC Headquarters, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss the ongoing steam generator (SG) inspection activities at Turkey Point Unit 4.

Turkey Point Unit 4 has three Westinghouse Model 44F replacement SGs. Each SG has 3214 thermally treated Alloy 600 tubes. The tubes have a nominal outside diameter of 0.875 inch, and a nominal wall thickness of 0.050 inch. The tubes are supported by stainless steel tube support plates with quatrefoil-shaped holes and V-shaped antivibration bars. The tubes were hydraulically expanded through the full depth of the tubesheet.

Prior to the conference call, the licensee provided a written response to a set of discussion points from the NRC staff (Agencywide Documents Access and Management System Accession No. ML090550826). Names of the participants are shown in Enclosure 1. The licensee's response is included as replies to discussion points in Enclosure 2.

Abbreviations used by the licensee in Enclosure 2 include:

- AVB – Anti-vibration bars
- BET – Bottom of expansion transition
- DSI – Distorted support indication
- ECT – Eddy current testing
- EOC – End of cycle
- F.O. – Foreign Object
- FSOR – Foreign Object Search & Retrieval
- H* – H star
- HL or H/L – Hot leg
- ODS CC – Outside diameter stress corrosion cracking
- +Point – Plus Point™
- PWSCC – Primary water stress corrosion cracking
- RxCx – Row x Column x
- TBD – To be determined
- TP4-xx – Turkey Point Unit 4, Refueling outage number xx
- TSH – Top of tubesheet, hot-leg side
- TTS – Top of tubesheet
- V – Volts

Additional clarifying information and information not included in the enclosed document is summarized below.

The results of the BET examination showed that the lowest BET left in service was approximately 0.5 inch below the TTS.

The ding in the tube that is being preventively plugged for wear coincident with the ding has a bobbin coil voltage of approximately 3 V.

The FOSAR examination of SG A was ongoing at the time of the conference call.

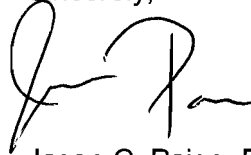
The object in SG C is a new object. This region of the tube bundle has a low-flow velocity.

Approximately 15 to 30 pounds of sludge per SG is removed during the sludge lancing operation.

Based on the information provided, the NRC staff did not identify any issues that warranted immediate followup action.

Please direct any inquiries to me at 301-415-5888 or Jason.Paige@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jason C. Paige', with a stylized flourish at the end.

Jason C. Paige, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-251

Enclosures:

1. Steam Generator Tube Inspection Discussion Points
2. List of Attendees

cc w/encls: Distribution via Listserv

LIST OF PARTICIPANTS

NOVEMBER 10, 2009, NUCLEAR REGULATORY COMMISSION (NRC)

CONFERENCE CALL WITH FLORIDA POWER & LIGHT (FPL)

TURKEY POINT UNIT 4

FALL 2009 STEAM GENERATOR INSPECTIONS

<u>Name</u>	<u>Organization</u>
Jason Paige	NRR
Ken Karwoski	NRR
Andrew Johnson	NRR
Bob Tomonto	FPL
Olga Hanek	FPL
Gary Boyers	FPL

STEAM GENERATOR TUBE INSPECTION DISCUSSION POINTS

Turkey Point Unit 4 - November 2009

The following discussion points have been prepared to facilitate the conference call arranged with the licensee to discuss the results of the steam generator tube inspections to be conducted during the upcoming fall 2009, [Turkey Point] Unit 4 refueling outage. This conference call is scheduled to occur towards the end of the planned SG tube inspections, but before the unit completes the inspections and repairs.

The NRC staff plans to document a summary of the conference call as well as any material that is provided in support of the call.

1. Discuss any trends in the amount of primary-to-secondary leakage observed during the recently completed cycle.

There were no indications of primary to secondary leakage for Turkey Point Unit 4 during the previous operating cycle as evidenced by air removal system, and steam generator blowdown radiation monitoring readings and sampling.

2. Discuss whether any secondary side pressure tests were performed during the outage and the associated results.

There are no planned secondary side pressure tests for Turkey Point Unit 4 during the current outage.

3. Discuss any exceptions taken to the industry guidelines.

No exceptions or deviations are taken.

4. For each steam generator, provide a description of the inspections performed including the areas examined and the probes used (e.g., dents/dings, sleeves, expansion-transition, U-bends with a rotating probe), the scope of the inspection (e.g., 100% of dents/dings greater than 5 volts and a 20% sample between 2 and 5 volts), and the expansion criteria.

Please see Table 1. Most inspection samples shown in Table 1 are planned for 100% of the population. Therefore, potential expansion of inspections would be limited to the following +Point™ inspections:

- *If cracking is detected in the hot leg tubesheet inspections, a minimum 20% sample would be conducted in the cold leg of the affected SG(s)*
- *If cracking is detected in the row 2 U-bend, a minimum 20% sample would be conducted in row 3 U-bends in the affected SG(s)*
- *If cracking is detected in the ding/dent inspections, a minimum 20% sample would be conducted for cold leg dings/dents in the affected SG(s)*

In addition to the ECT examinations, the following examinations will be performed during EOC 24.

*Visual examination of all tube plugs
Secondary Side Inspection*

- *Upper Bundle Flush*
- *Sludge Lance*
- *Foreign Object Search & Retrieval (FOSAR)*

5. For each area examined (e.g., tube supports, dent/dings, sleeves, etc), provide a summary of the number of indications identified to-date for each degradation mode (e.g., number of circumferential primary water stress corrosion cracking indications at the expansion transition). For the most significant indications in each area, provide an estimate of the severity of the indication (e.g., provide the voltage, depth, and length of the indication). In particular, address whether tube integrity (structural and accident induced leakage integrity) was maintained during the previous operating cycle. In addition, discuss whether any location exhibited a degradation mode that had not previously been observed at this location at this unit (e.g., observed circumferential primary water stress corrosion cracking at the expansion transition for the first time at this unit).

**Turkey Point Unit 4 Steam Generators
November 2009 Indication Summary**

Area Examined	Degradation Mode	Indication Count	Max. Depth	Max. Voltage	Max. Length	Tube Integrity Maintained
AVBs (u-bend)	wear	50	22%	0.77v	<0.6"	Yes
Row 1-2 U-bends	none	--	--	--	--	--
Broach Supports	wear	4 *	16%	0.27	0.59"	Yes
Flow Baffle	wear	4	12%	0.41v	TBD	Yes
Dings/Dents	none	--	--	--	--	--
Top of Tubesheet	none	--	--	--	--	--
Tubesheet H* Region (to 17.28")	none	--	--	--	--	--
Non-expanded Tubes	none	--	--	--	--	--
Region Below H* (for tube sever)	none	--	--	--	--	--

* 8 DSI pending +Point™ testing

6. Describe repair/plugging plans.

Tube plugging planned includes the following:

- *9 tubes that are not expanded through the depth of the tubesheet*
- *1 tube (preventative) - BET is 1.07" below the top of the tubesheet*
- *1 tube (preventative) - AVB wear coincident with ding (sizing not qualified)*

7. Describe in situ pressure test and tube pull plans and results (as applicable and if available).

None planned or required.

8. Discuss the following regarding loose parts:

- what inspections are performed to detect loose parts

Secondary side visual inspections of the tubesheet no tube lane and periphery region, and selected inner bundle visuals to investigate known foreign objects and possible loose part (PLP) indications based on ECT analysis.

Center flow slot regions of tube supports 3-6 in SG 4C.

- a description of any loose parts detected and their location within the SG (including the source or nature of the loose part, if known)

Please see Table 2

- if the loose parts were removed from the SG

Please see Table 2

- indications of tube damage associated with the loose parts

There is no tube damage is associated with any loose part

9. Discuss the scope and results of any secondary side inspection and maintenance activities (e.g., in-bundle visual inspections, feeding inspections, sludge lancing, assessing deposit loading, etc).

The secondary side maintenance activities during the current Turkey Point Unit 4 refueling outage include:

- a. An inspection of the secondary side u-bend region and center flow slot regions of tube supports 3-6 in SG C. Findings include only a light coating of deposits. Deposit loading is considered light compared to similar vintage and design units.*
- b. Upper bundle flushing of SG A, B, and C.*
- c. Sludge lancing of flow distribution baffle and top of tubesheet in SG A, B, and C (17 Lbs).*
- d. Top of tubesheet inspections and foreign object retrieval.*

10. Discuss any unexpected or unusual results.

None

11. Provide the schedule for steam generator related activities during the remainder of the current outage.

Steam generator ECT and tube plugging should be complete on 11/11/09.

Secondary side maintenance and inspections should be completed by 11/13/09.

TABLE 1 - Basis for Tube Examination Samples

Technique	Examination Sample	Required or Supplemental	Basis	Potential Degradation
Bobbin	100% full length in rows 3 and higher. Row 1 & 2 examinations will be limited to the hot leg and cold leg straight sections.	Required	Degradation Assessment	Wear/ ODSCC
	Screening of 100% of dings ≤ 5 volts in straight sections (verticals).	Required	Degradation Assessment	ODSCC
+Point™	100% of the hot leg tubesheet to the extent of TTS +3.00 to -17.28".	Required	Degradation Assessment.	F.O. Wear PWSCC ODSCC
	Hot leg full depth tubesheet examination: Two unexpanded tubes in SG "A" and five unexpanded tubes in SG "B" identified with NTE indications (No Tube Expansion).	Required		
	Cold Leg Periphery Expansion Transitions - +3"/-2" from top of tubesheet. Two outermost peripheral tubes exposed to the annulus, and all open row 1 and 2 tubes in columns 1-92 to complete the periphery examination.	Required	Area of higher potential for wear	F.O. Wear
	Cold Leg full depth tubesheet examination: One unexpanded tube in SG "A" and one unexpanded tube in SG "B" identified with NTE indications (No Tube Expansion).	Required	Degradation Assessment	PWSCC ODSCC
	Tight radius u-bends – 100% of row 1 and 2	Required	Degradation Assessment	PWSCC ODSCC
	100% of hot leg freespan dings > 5 volts between TSH and 06H +1.00".	Required	Degradation Assessment	PWSCC ODSCC
	100% of u-bend dings	Required	Degradation Assessment	PWSCC ODSCC
	100% of hot leg dents/dings at structures.	Required	Degradation Assessment	PWSCC ODSCC

NOTE: Existing degradation mechanisms are wear at anti-vibration bars, tube supports and the flow baffle.

**TABLE 2 - Turkey Point Unit 4 SG Secondary Side Foreign Objects
(Actively Tracked) as of 11-9-09**

Item	S/G	Description	Initial Location And Basis	TP4-23 Location & Basis (11/2006)	TP4-24 Location & Basis (4/20/08)	TP4-25 Location & Basis 11/09
1	4A	1/16' x 2" Wire	H/L R22/23 C46	ECT PLP Object embedded In hard sludge retrieval unsuccessful	Seen by FOSAR 04/08 no retrieval attempted , fixed in location	TBD
2	4A	1/32" x 1" wire coil	H/L R 12/13 C 38	ECT PLP Object embedded In hard sludge on tube retrieval unsuccessful	Located in hard sludge pile region, no retrieval attempted	TBD
3	4A	1/16" x 2" Weld Rod	H/L R10/11 C76/77 (SSI Report shows C75/76)	Seen by FOSAR 11/06 Retrieval attempts unsuccessful	Seen by FOSAR 04/08, no retrieval attempted, fixed in location	TBD
4	4C	.1" x .15" x .5" oblong metallic object	H/L R 20/21 C 47	ECT verified presence (Based on look back)	ECT Skip Cycle	PLP (no wear) Visual confirmed 11/09 object wedged tightly. Retrieval unsuccessful.

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/RA/

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