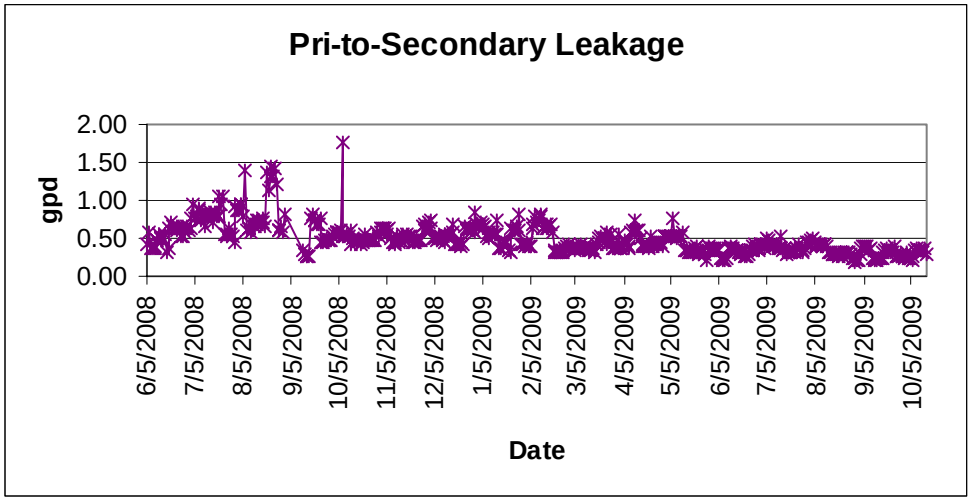
Update: 11/12/2009 3:12:00 PM

Waterford 3 RF16 Steam Generator Tube Inspection Discussion Points

The following discussion points have been prepared by the NRR Staff to facilitate the conference call to discuss the results of the Waterford 3 Refueling Outage 16 (Fall 2009) steam generator tube inspection. This conference call has been scheduled for Friday, November 13, 2009 at 1:00 PM CST/2:00 PM EST prior to completions of the inspections and repairs.

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



Primary to secondary Leakage has remained below 2 gpd for the entire cycle.
Primary to secondary leakage has remained less than 1 gpd for the last 12 months.

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

No Secondary Side Pressure Tests were conducted.

3. Discuss any exceptions taken to the industry guidelines.

No exceptions or deviations have been taken to the industry guidelines.

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, Ubends 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.

Area	Probe	Scope	Expansion
Full Length	Bobbin	100%	None
HL TTS	Plus Point	100% - C*	CL if > 1%
CL TTS - periphery	Plus Point	~ 10%	Dependent of finding
Row 1 & 2 U-bend	Plus Point	100%	Additional rows depending on finding
Wear	Plus Point	100%	None
Dents ≥ 2 volt at eggcrates	Plus Point	100%	None
Dents ≥ 2 volt at batwings	Plus Point	20%	100% depending on finding
Freespan Dings ≥ 5 volt	Plus Point	20%	100% depending on finding

C* inspection depth requirement is 10.6 inches – the nominal depth of inspection is -12 inches ensuring it is fully inspected. This is the third HL TTS examination utilizing the C* depth.

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).

As of 11/13/2009, 1000 data files

SG31:

Area Examined	Degradation Mode	Indications identified to-date	Most Significant Indication		
			Volts	Depth	Length
Transition Expansion or within Tubesheet	Axial PWSCC	0			
	Circ PWSCC	1 TSH – 11.58”	0.82	51 / 49	31 deg
	Axial ODSCC	2 TSH – 0.06”	0.15	39 / 29	0.14
	Circ ODSCC	0			
Eggcrates/BW	Axial ODSCC	48 ind / 44 tubes	0.42	61 / 42	0.91
Eggcrates/BW/Straps	Repairable Structural Wear	0			

SG 31 0800hrs on 11/12/2009

SG32:

Area Examined	Degradation Mode	Indications identified to-date	Most Significant Indication		
			Volts	Depth	Length
Transition Expansion or within Tubesheet	Axial PWSCC	0			
	Circ PWSCC	1	0.49	74 / 39	32 deg
	Axial ODSCC	0			
	Circ ODSCC	0			
Eggcrates/BW	Axial ODSCC	37 ind / 32 tubes	.38 /.42	59 / 44	0.64”
Eggcrates/BW/Straps	Repairable Structural Wear	1 BW5 +0.96”	1.69	40	N/A

SG 32 0800hrs on 11/12/2009

All locations satisfy structural and leakage integrity performance criterion.

No new degradation modes reported.

6. Describe repair/plugging plans.

   All cracks identified are plugged on detection, regardless of location. Any wear indications greater than or equal to 40% through wall are plugged on detection. Circumferential cracking within 3 inches of the top of the tubesheet are stabilized. All other circumferential cracks would also be stabilized.

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

   There are currently no in-situ pressure tests required.

   There are no plans for tube pull.

8. Discuss the following regarding loose parts:

   a) What inspections are performed to detect loose parts

      Primary – 100% hot leg top of tubesheet with MRPC / Periphery on CL TTS +/- 3 inches and 3 tubes in; 100% Bobbin tube end hot (TEH) – tube end cold (TEC)

      Secondary – foreign object search and retrieval (FOSAR) cart exam of annulus; Blowdown Lane Exam with camera system; “Bottom Up” composite with Analysis by Engineering Resolution Team. Wrap around bar to batwing visual inspection and the 45 degree inner bundle inspection. Additionally, the steam drums internals were visually inspected in both generators (i.e. chevron dryers and cyclone separators)

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

Loose part identified in CR-WF3-2009-06504 Steam Generator #1 feed ring distribution box elbow tee assembly is completely broken off. The elbow tee assembly was visible and found resting between the outer shell of the steam generator and the shroud around the tubes.

c) If the loose parts were removed from the SG

Loose part identified in CR-WF3-2009-06504 Steam Generator #1 feed ring distribution box elbow tee assembly was removed from the steam generator outer shell and the shroud around the tubes.

d) Indications of tube damage associated with the loose parts

No tube damage associated with loose parts in eddy current testing in both steam generators. Foreign object search and retrieval (FOSAR) at the hot and cold leg for both steam generator tubesheets periphery and blowdown lane have not been completed at this time.

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

Waterford 3 completed the SG#1 and 2 wrapper bar to batwing inspections with no changes noted. All of the batwings were attached to the wrapper bar and no twisting or distortion of the wrapper bar or upper batwings was evident.

Waterford 3 also completed the SG#1 and 2 45-degree through bundle inspections. Evidence of wear on the stabilizer was found in the inner tubes to the stay cylinder area. See below for details

A visual inspection will be performed on both steam generators at the top of tubesheet.

Eddy current possible loose part (PLP) locations will be provided to the Secondary Inspection Crew for their use.

A steam drum / feedring inspection was completed.

No Sludge Lancing was performed.

10. Discuss any unexpected or unusual results.

CR-WF3-2009-06504 during the feed ring inspections of Steam Generator No.1 per NOECP 257 and W/O 116193 it was discovered that weld between the Elbow Tee Assembly and the feed ring distribution box is broken. The elbow tee assembly is completely broken off. The elbow tee assembly was visible and found resting

between the outer shell of the steam generator and the shroud around the tubes. The part was located and a retrieval attempt was successful. Currently evaluating repair options.

CR-WF3-2009-06467 while performing the steam drum inspections of Steam Generator No. 1 it was noted that one of the drain pipe unions was loose. The union was still engage and had not separated. There is no loose part concern with the condition. This drain line drains water from the chevron deck back to the area below can deck. There was no damage to the union and it was successfully retighten.

CR-WF3-2009-06486 the SG Batwing 45 Diagonal Examination is a visual examination of the inner row of tubes where the Batwing to Tube Bundle Interface is located in the Stay Cavity Region. This area is where the batwing, originating at its support structure in the central stay cavity region, first enters the tube bundle and passes near to or contacts the first tube and is susceptible to erosion due to flow induced vibration. The results of the RF16 SG 32 secondary side inspections are being tracked under CR-WF3-2006-03966 CA#64. Waterford 3 steam generator tubes have a 0.75 inch outer diameter (OD) with a 0.048-inch average wall thickness. All inner-most tubes around the stay cylinder also have a stabilizer installed. The stabilizers are fabricated from 0.5 inch diameter 6 x 19 or 6 x 25 wire rope with an Independent Wire Rope Core (IWRC). During the initial visual inspection of video obtained during the RF16 secondary side SG Batwing 45 diagonal examination collected under WO 153098-01, the Engineering Resolution Team observed intrados tube wear which appeared to be through wall and through portions of the stabilizer on SG32 Hot Leg, Zone B, North as documented in the attached photograph. From the initial review it appears that as much as two of the outer strands as well as part of the IWRC of wire rope have been worn from contact with a broken batwing. Based upon the observed condition a more detailed analysis is needed.

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

Completion of eddy current testing program in both steam generators includes cold leg bobbin, u-bends using plus point RPC and special interest using plus point RPC. Completion by November 16, 2009

Completion of tube plugging from eddy current testing results in both steam generators. Completion by November 19, 2009

Completion of foreign object search and retrieval (FOSAR) in both steam generators. Completion by November 15, 2009.

Completion of evaluation of steam generator feedring inspection findings and repair to be determined.