ANO-1 STEAM GENERATOR TUBE
INSPECTION DISCUSSION POINTS

March 29, 2010

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 spring 2010, Unit 1 refueling outage (1R22). 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.**

   No indication of primary-to-secondary leakage present prior to the current refueling outage (1R22). (Argon – 41 less than minimum detectable, Tritium ~ 1 gallon per day) (Ar-41 < MDA, H3 ~1.0 gpd)

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

   No secondary side pressure tests have been performed or scheduled for 1R22.

3. **Discuss any exceptions taken to the industry guidelines.**

   No exceptions were taken to NEI 97-06 and EPRI Steam Generator 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, 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.**

   The 1R22 Steam Generator Examination is being performed to validate the extent of tie-rod bowing. ANO-1 has previously evaluated a two cycle operating interval in the most recent Operational Assessment. Tie-rod bowing was previously identified and entered into Entergy's Corrective Action Program as CR-ANO-1-2007-00959.

   BOBBIN EXAMINATION:

   All in-service tubes surrounding each tie rod in both steam generators are to be examined full length (UTE-LTE) with the standard bobbin coil technique, using single guide tubes. Additional tubes to be inspected full length include those tubes that are affected by bowed

tie rods. The primary probe utilized for this examination will be the 0.510 multi-frequency (M/ULC) bobbin probe (510UL).

SG A – 472 Tubes
SG B – 312 Tubes

SPECIAL INTEREST +POINT EXAMINATION:

The following indication code categories identified during the bobbin coil examination will require subsequent diagnostic testing with plus point.

1. I-Code indications identified with Bobbin.
2. New Wear Indications identified with Bobbin.
3. Any further indications as identified by lead analysis personnel or customer representatives.

Area Inspected	Exam Type	Probe Used	OTSG	# of Inspections	Expansion
Full Length Tubing	100% Full Length	0.510 Bobbin	'A'	472	None
Full Length Tubing	100% Full Length	0.510 Bobbin	'B'	312	None
Special Interest	Retest	X-Probe	'A'		None
Special Interest	Retest	X-Probe	'B'		None

PLUG VISUAL EXAMINATION:

All plugs in the Inlet and Outlet channel heads will be visually examined to verify tube plug location and potential leaking plugs.

Current Plugged Tubes

SG- A 10 plugged tubes
SG- B 6 plugged tubes

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).**

   There were no I-code indications reported.

   Wear growth rates were consistent with the 1R21 Operational Assessment.

   The total number of tie-rod to tube contact in the 1st of SG A

   Two tie-rods have proximity indications in the first span that previously had none.

   The maximum extent of bowing of the first span tie rod increased from approximately 1.2" lateral bow (1R21) to approximately 1.4" (1R22). An increase of approximately 0.2".

   [SG A] Wear indications were less than 40%. The max growth for repeat wear was 7%. The max growth for new wear was 13%. No free span wear was found.

   Tube Integrity was maintained for previous cycle for all degradation mechanisms.

6. **Describe repair/plugging plans.**

   No tubes required repairs.

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

   None - No indications exceeded screening criteria have been identified to date.

8. **Discuss the following regarding loose parts:**

   what inspections are performed to detect loose parts

   None / Bowl visual on primary

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

   None

if the loose parts were removed from the SG

None

indications of tube damage associated with the loose parts

None

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).

During 1R22 there were no secondary side inspection activities planned or conducted.

10. Discuss any unexpected or unusual results.

There were no unexpected results associated tie-rod bowing examination results or tube support wear.

1R22 – Criteria Chart from DA

Category	1R21 Inspection Value	Acceptance Criteria	Potential Additional Analysis, Repairs or Inspections
Maximum Lateral Extent of Tie Rod Bowing in **First Span, Outermost Ring**	1.19 inch	≤1.5 inch	> 2.0 inch
Maximum Lateral Extent of Tie Rod Bowing in **First Span, Second Outermost Ring**	0.47 inch	≤ 0.63 inch	>0.78 inch
Maximum Lateral Extent of Tie Rod Bowing in **14th and 15th Spans, Outermost Ring**	0.19 inch	≤ 0.25 inch	>0.32 inch
Maximum Lateral Extent of Tie Rod Bowing in **14th and 15th Spans, Second Outermost Ring**	No bowing detected	≤ 0.06 inch	> 0.06 inch
Bowed Rods in Contact with Tubes outside of First Span	0	0	>2

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

3/29 – Complete SG B bobbin Examination.

3/30 – Bowl Close Out SG A / SG B