

September 18, 2002

LICENSEE: Tennessee Valley Authority

FACILITY: Sequoyah Nuclear Plant, Unit 1

SUBJECT: SUMMARY OF CONFERENCE CALL WITH TENNESSEE VALLEY
AUTHORITY (TVA) REGARDING THE 2001 STEAM GENERATOR
INSPECTION RESULTS AT SEQUOYAH UNIT 1 (TAC NO. MA5427)

On November 8, 2001, the NRC staff participated in several conference calls with the Tennessee Valley Authority (TVA) to discuss the ongoing steam generator (SG) inspection activities at Sequoyah Nuclear (SQN) Plant, Unit 1. The issues discussed included those listed in the enclosure to the letter documenting the arrangement of this conference call, which was sent to TVA on October 25, 2001 (ML012990363). All information documented in this outage summary was provided verbally by the licensee during the conference call. At the time of this call, the acquisition of eddy current data was almost complete, but the analysis of the eddy current data was still ongoing.

The licensee stated that primary-to-secondary SG leakage was less than 0.1 gallons per day during the previous cycle and, therefore, no secondary side hydrostatic tests were conducted. The licensee's initial SG inspection scope was as follows:

- Full length examination of 100 percent of the inservice tubes with a bobbin probe in all four SGs
- Examination of 100 percent of the inservice tubes in the hot leg (HL) top-of-tubesheet (TTS) region of all four SGs with a rotating pancake coil (RPC) equipped with a Plus point (+Pt) coil
- Examination of the U-bend region of 100 percent of the inservice tubes in Rows 1 and 2 and 20 percent of the inservice tubes in Row 3 in all four SGs with an RPC probe equipped with a +Pt coil
- Examination of 100 percent of tube support plate (TSP) dents greater than or equal to 1 volt (as measured by the bobbin coil probe) in all four SGs with an RPC probe equipped with a +Pt coil

The licensee stated that the following indications had been identified at the time the conference call occurred.

LOCATION	TYPE	QUANTITY FOUND	COMMENTS
TTS	Axial PWSCC	12	
TTS	Circ PWSCC	14	
TTS	Axial ODSCC	12	
TTS	Circ ODSCC	2	
TSP	Axial PWSCC (ARC)	236 (37 require plugging)	
TSP	Circ PWSCC (> 5 volt dents)	25	Approx. 3499 dents inspected with +Pt
TSP	Circ PWSCC (2 - 5 volt dents)	21	Approx. 5174 dents inspected with +Pt
TSP	Circ PWSCC (1 - 2 volt dents)	17	Approx. 7449 dents inspected with +Pt
TSP	Circ PWSCC < 1 volt dents)	4	
TSP	Axial ODSCC (ARC)	794 (none require plugging)	
TSP	Circ ODSCC	24	
AVB	Wear	1 requires plugging	
CL	Wastage	8 require plugging	
U-BEND	Axial ODSCC	1 (Row 3)	
U-BEND	Geometry	4 - 5 preventive plugging	

TTS - top-of-tubesheet ARC - alternate repair criteria AVB - anti vibration bar
 TSP - tube support plate Circ - circumferential OD - outside diameter
 PWSCC - primary water stress corrosion cracking CL - cold leg
 ODSCC - outside diameter stress corrosion cracking

Additional information provided by the licensee on several of these degradation modes is provided below.

TSP Axial PWSCC (ARC)

Two hundred and thirty six (236) indications were identified at the time the conference call took place. The ARC requires a tube to be plugged if the flaw extends outside the TSP and if that portion of the flaw is greater than 40 percent throughwall. Approximately, 37 of the 236 indications required plugging due to flaw depths greater than 40 percent throughwall outside the TSP. None of the 37 indications challenged the structural or leakage integrity performance

criteria, and therefore, did not require in situ pressure testing. In addition, none of the remaining tubes with indications required plugging since the flaw sizes within the TSP were within acceptable limits.

TSP Circ PWSCC

The licensee stated that none of the circumferential indications challenged the leakage or structural integrity performance criteria or required in situ pressure testing. Therefore, TVA did not expand the scope of inspections of dented intersections below the 1-volt threshold. Some of the circumferential indications were located at the same TSP intersection as an axial indication (i.e., mixed mode). However, none of the mixed mode flaws were determined to be interacting (i.e., separated less than 0.25 inches), therefore, further evaluation was not necessary. (Mixed mode flaws that interact may cause the tube's burst pressure to be lower than if only one of the flaws was present.) The SG inspections were not complete at the time of the call, so the staff requested that TVA contact the NRC if any mixed mode flaws were found to be interacting following completion of the conference call.

U-Bend Axial ODSCC and U-Bend Geometry

The licensee identified one axial ODSCC flaw in the U-bend of a Row 3 SG tube. As a result, they expanded the scope of U-bend inspections to include 100 percent of Row 3 tubes and 20 percent of Row 4 tubes. No additional flaws were identified. This was the first outage that Row 3 tubes were inspected with an RPC probe, however they had been previously inspected with a bobbin probe. Based on a review of historical bobbin probe data, the licensee stated that they believe the indication was present for several cycles. The indication was estimated to have a 58 percent average depth, 70 percent maximum depth, 0.25 inches long and 0.51 volts. The flaw was calculated to have a burst pressure of approximately 5000 psi, which is above the structural integrity performance burst criteria of 4173 psi. However, the licensee planned to in situ pressure test the flaw due to potential uncertainties with the eddy current sizing technique.

TVA stated that they assessed the noise levels in the U-bends at Sequoyah Unit 1 and found them to be lower than those in the Electric Power Research Institute (EPRI) qualification data. In addition, they do not believe hourglassing has occurred, because they do not have large dents, and the dents they do have are localized and mainly present in the lower TSPs. Also, they do not have any significant TSP ligament cracking.

During this outage, TVA dedicated two eddy current analysts to measuring noise levels in the data from the sludge pile region, U-bends and TTS. The licensee stated that a large portion of data was reanalyzed, a large number of tubes were retested to obtain better data quality, and 4 or 5 tubes were being preventively plugged due to "geometry" signals in the U-bends. The licensee stated that these signals were most likely due to permeability and had not changed over time. These tubes were being preventively plugged because of the possibility that the signals may be capable of masking actual flaw signals.

In Situ Pressure Tests

The licensee stated that they follow EPRI guidelines for in situ pressure testing. The criteria for determining whether in situ testing is required due to leakage integrity concerns are based on flaw voltages. To determine whether a tube requires testing due to structural integrity

concerns, the licensee calculates an estimated burst pressure based on flaw sizing estimates. Uncertainties are factored in to the flaw sizing estimates. Any tube whose calculated burst pressure is below three times normal operating pressure differentials (the $3\Delta P$ structural integrity performance criteria) is in situ pressure tested.

At the time of this call, no tube required in situ pressure testing due to leakage or structural integrity concerns. However, as previously discussed, the licensee planned to test the Row 3 tube with a U-bend indication.

Repair Plans

The licensee planned to plug-on-detection all tubes with flaws except for wear (which would be depth-sized and plugged based on technical specification criteria) and tubes that were permitted to be left in-service based on NRC approved alternate repair criteria.

Sleeving and Tube Pulls

No sleeving or tube pulls were planned.

Fall 2001 Three Mile Island Unit 1 Issue

The licensee discussed their assessment of the impact of the Fall 2001 Three Mile Island Unit 1 (TMI-1) issued, discussed in NRC Information Notice 2002-02 (ML013480327), on Sequoyah Unit 1's inspection plans. TVA indicated that they did not plan to deplug any tubes. The licensee instructed eddy current analysts to carefully monitor the data for wear scars in the vicinity of plugged tubes. NRC staff indicated that based on the information available at that time, they had no further questions.

/RA/

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Office of Nuclear Reactor Regulation

Docket No. 50-327

Enclosures: As stated

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