

ENCLOSURE

SEQUOYAH NUCLEAR PLANT (SQN)

NRC QUESTIONS AND TVA RESPONSES

UNIT 1 CYCLE 12 INSERVICE INSPECTION (ISI) SUMMARY REPORT

The following NRC questions were developed following NRC review of TVA's September 11, 2003 letter that provided the SQN ISI Summary Report within 90 days from completion of the inspections performed during SQN's Unit 1 Cycle 12 refueling outage. The NRC staff requests additional information to continue its review of the ISI report. TVA has developed responses to the NRC questions as presented below.

NRC Question No. 1

Page 66. TVA used the +point probe to inspect 13 hot leg tube support plate intersections (H01 through H07) in each of the four steam generators. The NRC staff is not clear whether it was a sample inspection or an inspection to confirm indications/signals detected by the bobbin probe at the support plate intersections. (A) Discuss the reason(s) for inspecting these intersections. (B) If it was a sample inspection, a sample of 13 tubes is small comparing to the total numbers of 34,881 support plate intersections in each steam generator to determine degradation at the intersections. Discuss the basis (e.g., industry guidance) for the number of the inspected intersections in the sample.

TVA Response

- A) TVA performed +Point inspection on 50 support plate locations for information only. These tests provided eddy current data at various locations near various internal bundle features to give analysts a baseline signal to evaluate for this new type of support structure.
- B) This was not considered a sample inspection. These +Point examinations were not performed due to anomalous signals.
- C) As stated above, these tests were performed for information purposes. These tests are not required by industry guidelines.

NRC Question No. 2

Page 66. TVA performed Diagnostic/PID (positive identification) inspection on a total of 190 tubes in four steam generators using the +point probe. On page 67, it is shown that TVA preventively plugged 20 tubes. This implies that there are 170 tubes containing diagnostic/PID signals that were not plugged, assuming one signal per tube. (A) Discuss the types (e.g., dents, dings) and locations of the signals that were detected in the 170 tubes. (B) Discuss the types and locations of the signals that were detected in the 20 plugged tubes. (C) Discuss future inspection plans for the 170 tubes having diagnostic/PID signals. (D) Explain why steam generator 3 has much more diagnostic/PID signals than the other three steam generators.

TVA Response:

A) The majority of the 190 diagnostic/PID examinations were +Point examinations of bobbin signals that either could not be characterized or were dings or manufacturing burnish marks that TVA wanted baseline +Point data on. The PIDs were also counted in this number. Since the specific question on dings was raised, below is a table of dings identified during the inspection. They are in various locations in the steam generator and caused by the manufacturing process. TVA +Point examined all indications greater than or equal to 2 volts.

	0.2-1 VOLTS	1-1.5 VOLTS	1.5-2 VOLTS	2-5 VOLTS	5-10 VOLTS	>10 VOLTS	TOTAL DENTS		LARGEST DENT
SG1	7	3	7	10	1		28		6.9
SG2	14	11	5	9	2	1	42		42.9
SG3	28	30	26	44	35	3	166		23.7
SG4	56	18	8	21	4		107		5.69

B) One tube was preventively plugged due to its location and signal characteristics in the U-Bend. The signal was characterized by analysts as geometry. Nineteen tubes were preventively plugged due to a pre-existing condition discovered during fabrication. The upper bundle support structures, called lock bars, on certain peripheral tubes had cracked during the manufacturing process. Some of these bars had to have portions of the bars cut out. A flow analysis of the final support structure determined that specific tubes would need to be plugged and stabilized prior to operation in accordance with TVA

specified conservative replacement steam generator fabrication specification requirements as it related to flow-induced vibration. One of the nineteen tubes plugged and stabilized had a 22% through wall indication as a direct result of the lock bar cutting operation. It was characterized during the inspection as an "SVI," single volumetric indication.

- C) Dings will be examined in future outages as required by the EPRI Examination Guidelines. Bobbin signals that can not be characterized in future outages will also be examined by rotating coil probes.
- D) Steam generator 3 had more "dings" from the fabrication process than the other steam generators.

NRC Question No. 3

Page 66. TVA detected a volumetric indication in steam generators 1 and 4. (A) Discuss the location of the volumetric indications, (B) Discuss the root cause of the volumetric indications, and (C) Confirm that the two degraded tubes were plugged.

TVA Response

- A) Steam generator 1 row 59 column 33 had a volumetric indication measuring 0.08 volts between the second and third vertical support. This indication is a manufacturing defect. Steam generator 4 row 42 column 118 had a volumetric indication at the third vertical support. Because of the location, it was determined that this indication was caused by the modification to the lock bars.
- B) See response to 2A.
- C) The tube characterized as "SVI" and the tube characterized as "GEO" (i.e., geometry) discussed above were both plugged. The SVI was also stabilized.

NRC Question No. 4

The NRC staff is not clear whether the pre-service eddy current inspection was performed before or after the pre-service hydrostatic test of the steam generators, whether the tube fabricator performed an eddy current inspection of the virgin tubes before the tubes were inserted into the steam generator, and whether an inspection was performed after the tubes were inserted into the steam generators but before the steam generators were shipped to the plant site. (A) Discuss

in which stage of the replacement steam generator effort that the pre-service inspection results shown on pages 66 and 67 were obtained. (B) Discuss whether the steam generator inspection results obtained during cycle 12 outage will be considered as the baseline data.

TVA Response

- A) The eddy current inspection was performed after completion of manufacturing and after all required ASME tests, including the hydrostatic tests. This inspection was performed onsite prior to the U1C12 outage. This report was included in the 90-day report for completeness.

- B) Yes, the inspection results are considered the baseline data.