ATTACHMENT 4

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

SURVEILLANCE INSTRUCTION

0-SI-SXI-068-114.2

STEAM GENERATOR TUBING INSERVICE INSPECTION AND AUGMENTED INSPECTIONS

Revision 1

QUALITY RELATED

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REVISION DESCRIPTION

Revised to incorporate Unit 1 Technical Specification change 95-15.

THIS PROCEDURE CANNOT BE DISTRIBUTED UNTIL AFTER REVISION 0 BECOMES EFFECTIVE ON DECEMBER 15.

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1.0 STATEMENT OF APPLICABILITY

A. This program defines the requirements for performing the second 10 year interval inservice inspection of steam generator tubing of both SQN Units 1 and 2. This program fulfills the augmented inservice inspection requirements of SQN Technical Specification 3/4.4.5. Also the applicable requirements of ASME Section XI Boiler and Pressure Vessel Code are fulfilled. Inspections are generally scheduled to coincide with outage periods.

B. The requirements of this program are applicable beginning at the start date of the second 10 year interval of both SQN Unit 1 or 2.

2.0 PURPOSE

The Steam Generator Tubing Inservice Inspection program shall be used for planning and executing the required examinations which prove the operability of the SQN Unit 1 and 2 steam generators.

3.0 INSPECTION INTERVALS

The second inservice inspection interval is defined by 0-SI-DXI-000-114.2.

4.0 CODES OF RECORD AND CODE CASES

A. Steam Generator Tubing examination requirements are in accordance with Technical Specification Surveillance Requirement 4.0.5, 4.4.5.0, 4.4.5.1, 4.4.5.2, 4.4.5.3, 4.4.5.4, and 4.4.5.5.

B. NDE techniques, and qualification of personnel will be in accordance with the 1989 Edition of ASME Section XI.

C. The following Code Cases shall be utilized and have been incorporated in NRC Regulatory Guide 1.147.

1. N-401-1, Eddy Current Examination
2. N-402-1, Eddy Current Calibration Standard Material

5.0 METHOD OF IMPLEMENTATION AND RESPONSIBILITIES

Responsibilities are defined in SSP-8.56.

5.1 Steam Generator Tubing Scan Plan

A. Steam generator tubing examinations are predominantly performed by contractors. The steam generator tubing scan plan is a listing of tubes to be examined in a specified outage and includes examination extent, examination technique (probe), and the eddy current calibration standard(s) and procedure(s) to be utilized. This listing is transmitted to:

1. Contractor
2. ANI/ANII
3. NSSS Tech Support
4. ISO Eddy Current Level III
5. RIMS
6. Corporate Steam Generator Programs
7. Materials and Inservice Inspection

B. The contractor performs the exams as specified and provides the documented examination results. When additional samples are required the Scan Plan shall be revised and distributed to the above organizations.

C. During implementation phases (usually outage periods), it may become necessary to change the Scan Plan expeditiously. Interim working copies may be hand written to allow examinations to be performed before a formal revision is issued. The interim working copies shall, prior to implementation, obtain the same approval as a Scan Plan revision.

5.2 Contractor NDE Personnel Certifications

Contractor personnel certifications shall be reviewed and acceptance documented by an ISO ET Level III.

5.3 Contractor NDE Procedures

Contractor procedures shall be reviewed and acceptance documented in accordance with SSP-2.3.

6.0 ABBREVIATIONS AND DEFINITIONS

A. **ANI** - Authorized Nuclear Inspector.

B. **ANII** - Authorized Nuclear Inservice Inspector.

C. **SCAN PLAN** - A schedule of examinations required to be performed during a particular period of time.

D. **NDE** - Nondestructive Examination

E. **EXAMINATION** - Denotes the performance of NDE by personnel qualified/certified in accordance with SNT-TC-1A.

F. **ET** - Eddy Current

G. **SG** - Steam Generator

H. **ISI** - Inservice Inspection

I. **TSP** - Tube Support Plate

J. **ODSCC** - Outside Diameter Stress Corrosion Cracking

K. **PWSCC** - Primary Water Stress Corrosion Cracking

L. **RPC** - Rotating Pancake Coil

M. **WEXTEX** - Westinghouse Explosive Tube Expansion

N. **AVB** - Anti-Vibration Bar

O. **PSI** - Preservice Inspection

P. **NIS-1** - Section XI Code required report to NRC for ISI

Q. **ISO** - TVA's Inservice Inspection Organization

R. **ASME** - American Society of Mechanical Engineers

S. **EPRI** - Electric Power Research Institute.

7.0 STEAM GENERATOR TUBING INSERVICE INSPECTION

7.1 General

A. Refer to Technical Specifications Surveillance Requirements 4.0.5 and 4.4.5.0 through 4.4.5.5.

B. Each steam generator tube bundle consists of 3,388 NiCrFe alloy (inconel SB-163) U-tubes of 0.875 O.D. by 0.050 average wall thickness.

C. During the inspection interval, steam generator tubing shall undergo eddy current examinations. Other NDE methods may be utilized to improve the characterization of an indication but eddy current shall be utilized to determine compliance with acceptance criteria 7.5.A.6. These examinations shall be performed in accordance with the SQN Technical Specifications and satisfy Surveillance Requirement 4.4.5.0 through 4.4.5.5. The Scan Plan for SG tubing examination shall be approved by the ISO ET Level III and the NSSS Technical Support Steam generator program engineer.

7.2 Steam Generator Sample Selection and Inspection

During scheduled inspections, each steam generator shall be determined operable during the shutdown by selecting and inspecting a sample of tubes (as defined below) from each steam generator **[C.1]**. During unscheduled inspections, as a minimum the number of steam generators inspected shall fulfill the requirements 7.4 C.

7.3 Steam Generator Tube Sample Selection and Inspection

The steam generator tube minimum sample size, inspection result classification, and the corresponding Action Required shall, as a minimum, fulfill the requirements in Table 2 of Appendix A. The ISI of steam generator tubes shall be performed at the frequencies specified in Section 7.4, and the inspected tubes shall be verified acceptable per the acceptance criteria of Section 7.5.

The full length inspection [TVA commitment of NRC L44 850617 801] **[C.2]** of a minimum of S (as defined by Table 2 of Appendix A) tubes selected for inspection will be examined. Note the hot leg inspection sample and the cold leg inspection sample do not necessarily involve the same tube (i.e., it does not preclude making separate entries from the hot and cold leg sides and selecting different tubes on the hot leg and cold leg sides to meet the minimum sample) **[C.2]**. The tubes selected for these inspections shall be selected such that over a five cycle period all tubes are examined **[C.1]**. These inspections shall be selected on a random basis except:

7.3 Steam Generator Tube Sample Selection and Inspection (Continued)

A. Where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 1/2 S (as defined by Table 2 of Appendix A) tube inspected shall be from these critical areas.

B. The first sample of tubes selected for each inspection (subsequent to the preservice inspection) of each steam generator shall include:

1. All nonplugged tubes that previously had detectable wall penetrations greater than 20 percent.
2. Tubes in those areas where experience has indicated potential problems.
3. A tube inspection (pursuant to Section 7.5.A.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be evaluated and recorded and an adjacent tube shall be selected and subjected to a tube inspection.
4. All non-plugged and non-heat treated Row 1 and 2 U-bend regions shall be examined by rotating pancake coil (or equivalent) eddy current examinations. The probe type utilized shall have been qualified for the detection of U-bend primary water stress corrosion cracking **[C.3]**.
5. All non-plugged and non-peened (in the hot leg tube sheet expansion transition region) tubes shall be examined by rotating pancake coil eddy current examinations. The probe type utilized shall have been qualified for the detection of tube sheet expansion transition primary water stress corrosion cracking.
6. Examine, with bobbin coil, the protruding hot leg tube ends of the following nonplugged Unit 2 steam generator #1 tubes (Row-R, Column-C):

   R1C11, R1C12, R1C13, R1C19, R1C20, R1C21, R1C24, R1C28, R1C37, R1C44, R1C48, R1C49, R1C51, R1C53, R1C54, R1C56, R1C59, R1C65, R1C66, R1C67, R1C69, R1C75, R1C76, R1C77, R1C78, R1C79, R1C80, R1C82, R1C83, R1C86, R1C94.

   If indications are detected by bobbin coil examinations, the plugging criteria and expansion sample may be determined by a tube sheet region alternate plugging criteria approved by NRC. Otherwise, bobbin coil examine in all steam generators, all non-plugged hot leg protruding tube ends in which a Combustion Engineering roll plug has been installed.

   These requirements may be eliminated for the above listed tubes where the protruding tube ends are machined off. **[C.7]**

7.3 Steam Generator Tube Sample Selection and Inspection (Continued)

7. Examine 100 percent of the hot leg dented TSP intersections (greater than or equal to 5 volts) in Unit 1 SG 1 and 2 and Unit 2 SG 1, 2, 3, 4. In Unit 1 SG 3 and 4, examine 100 percent of dented first and second hot leg TSP intersections and 20 percent of the dented third hot leg TSP intersections (greater than or equal to 5 volts). These examinations are to be performed with Rotating Pancake coil (RPC) (or equivalent) qualified to EPRI PWR Examination Guideline Appendix H for detection of PWSCC and ODSCC.

8. Examine 100 percent of the WEXTEX expansion transition Zone 4 with RPC (or equivalent) qualified to EPRI PWR Examination Guideline Appendix H for detection of PWSCC and/or ODSCC.

9. Examine 20 percent of rows 1 and 2 U-bend regions with an RPC (or equivalent) qualified to EPRI PWR Examination Guideline, Appendix H.

10. Examine an additional 20 percent of the tubes in the region where AVB wear has occurred with bobbin coil (or equivalent).

11. Examine an additional 20 percent of the tubes in the outer periphery five rows deep with bobbin coil (or equivalent) for the detection of loose part wear and cold leg thinning.

12. For Unit 1, indications left in service as a result of application of the tube support plate voltage-based repair criteria shall be inspected by bobbin coil probe during all future refueling outages. **[C.8]**

C. The tubes selected as the second and third sample (if required by Table 2 of Appendix A) during each ISI may be subjected to partial tube inspection provided:

1. The tubes selected for these samples included the tubes from those areas of the tubes sheet array where tubes with imperfections were previously found.

2. The inspections include those portions of the tubes where imperfections were previously found.

D. For Unit 1, implementation of the steam generator tube/tube support plate (TSP) repair criteria requires: **[C.6]**

1. A 100 percent bobbin coil examination for hot-leg and cold-leg TSP intersections down to the lowest cold-leg TSP with known ODSCC indications. The determination of the lowest cold-leg TSP intersections having ODSCC indications shall be based on the performance of at least a 20 percent random sampling of tubes examined over their full length.

7.3 Steam Generator Tube Sample Selection and Inspection (Continued)

2. All intersections where copper signals interfere with the detection of flaws will be examined with a rotating pancake coil probe.

3. All intersections with large mixed residuals will be examined with a rotating pancake coil probe.

4. All bobbin flaw indications with voltages greater than 2.0 volts will be examined with a rotating pancake coil probe (RPC).

5. All dented (greater than or equal to 5 volts bobbin coil) TSP intersections in the lower two hot-leg (HL) TSPs and 20 percent of the dented (greater than or equal to 5 volts bobbin coil) TSP intersections at the third HL TSP of SG 3 and 4 will be examined with RPC or equivalent. All dented (greater than or equal to 5 volts bobbin coil) HL TSPs in SGs 1 and 2 will be examined with RPC.

6. If circumferential cracks are identified at dented TSP intersections with RPC or equivalent (7.3.D.5 above) in the 5 to 6 volt range (by bobbin coil), expand dent sampling to include a 20 percent sample of dented intersections less than 5 volts at the affected TSP elevation and a 20 percent sample of dented intersections less than 5 volts at each lower elevation (if applicable) in the affected steam generator.

   If indications are identified in the less than 5 volts dented TSP range, the expansion shall be consistent with Table 3 of Appendix A. The sample result classification as defined in 7.3.E below shall be utilized. If the result classification is C-3, then the inspection will also be expanded to include a 20 percent sample of the next highest TSP elevation.

NOTE Tube degradation identified in the portion of the tube that is not a reactor coolant pressure boundary (tube end up to the start of the tube-to-tube sheet weld) is excluded from the Result and Action Required in Table 2 of Appendix A.

E. The results of each sample inspection (i.e., sample data set) shall be classified into one of the three categories identified in Table 1 of Appendix A.

7.4 Inspection Frequencies

The above required ISIs of steam generators shall be performed at frequencies indicated in the following paragraphs and in such a manner that the maximum allowable time between eddy current inspections on individual steam generators is 72 months. **[C.2]**.

7.4 Inspection Frequencies (Continued)

A. ISIs shall be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. If two consecutive inspections following service under All Volatile Treatment conditions, not including the PSI, result in all inspection results falling into the C-1 category or if two consecutive inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the inspection interval may be extended to a maximum of one per 40 months.

B. If the results of the ISI of a steam generator conducted in accordance with Table 2 of Appendix A at 40-month intervals fall in Category C-3, the inspection frequency shall be increased to at least once per 20 months. The increase in inspection frequency shall apply until the subsequent inspections satisfy the criteria of section 7.4 A.; the interval may then be extended to a maximum of once per 40 months.

C. Additional, unscheduled ISIs shall be performed on each steam generator in accordance with the first sample inspection specified in Table 2 of Appendix A during the shutdown subsequent to any of the following conditions.

1. Primary-to-secondary tube leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Technical Specification 3.4.6.2.
2. A seismic occurrence greater than the Operating Basis Earthquake.
3. A loss-of-coolant accident requiring actuation of the engineered safeguards.
4. A main steam line or feedwater line break.
5. If an unscheduled ISI is performed for other than above reasons, an engineering evaluation shall determine which SGs will be examined.

7.5 Acceptance Criteria

A. As used in Section 7.0:

1. Imperfection - an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy current testing indications below 20 percent of the nominal tube wall thickness, if detectable, may be considered as imperfections.

2. Degradation - a service induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.

3. Degraded Tube - a tube containing imperfections greater than or equal to 20 percent of the nominal wall thickness caused by degradation.

4. Percent Degradation - the percentage of the tube wall thickness affected or removed by degradation.

5. Defect - an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.

6. Plugging Limit - the imperfection depth at or beyond which the tube shall be removed from service because it may become unserviceable prior to the next inspection and is equal to 40 percent or the nominal tube wall thickness. Plugging limit does not apply to the portion of the tube that is not within the pressure boundary of the reactor coolant system (tube end up to the start of the tube-to-tube sheet weld). For Unit 1, this definition does not apply to tube support plate intersections if the voltage-based repair criteria are being applied. Refer to 7.5.A.10 for the repair limit applicable to these intersections. **[C.8]**

7. Unserviceable - describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in Section 7.4 C.

8. Tube Inspection - means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the point of exit (cold leg side) (i.e., tube end to tube end). Entries may be made from either the hot or cold leg sides and separate entries on the hot leg and cold leg sides on different tubes are allowed. **[C.2]**

9. Preservice Inspection (PSI) - a tube inspection of each steam generator tube performed by eddy current techniques prior to service to establish a baseline condition of the tubing. This inspection shall be performed prior to initial power operation using the equipment and techniques expected to be used during subsequent ISIs.

7.5 Acceptance Criteria (Continued)

10. Tube Support Plate Plugging Limit, for Unit 1 only, is used for the disposition of an alloy 600 steam generator tube for continued service that is experiencing predominantly axially oriented outside diameter stress corrosion cracking confined within the thickness of the tube support plates. At tube support plate intersections, the plugging (repair) limit is based on maintaining steam generator tube serviceability as described below: **[C.8]**

    a. Steam generator tubes, whose degradation is attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with bobbin voltages less than or equal to the lower voltage repair limit (Note 1), will be allowed to remain in service.

    b. Steam generator tubes, whose degradation is attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with a bobbin voltage greater than the lower voltage repair limit (Note 1), will be repaired or plugged, except as noted in 7.5.A.10.c below.

    c. Steam generator tubes, with indications of potential degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with a bobbin voltage greater than the lower voltage repair limit (Note 1), but less than or equal to upper voltage repair limit (Note 2), may remain in service if a rotating pancake coil inspection does not detect degradation. Steam generator tubes, with indications of outside diameter stress corrosion cracking (ODSCC) degradation with a bobbin coil voltage greater than the upper voltage repair limit (Note 2) will be plugged or repaired.

    d. Not applicable to SQN.

7.5 Acceptance Criteria (Continued)

e. If an unscheduled mid-cycle inspection is performed, the following mid-cycle repair limits apply instead of the limits identified in 7.5.A.10.a, 7.5.A.10.b, and 7.5.A.10.c.

The mid-cycle repair limits are determined from the following equations:

$$V_{MURL} = \frac{V_{SL}}{1.0 + NDE + Gr\,\frac{(CL - \Delta t)}{CL}}$$

$$V_{MLRL} = V_{MURL} - (V_{URL} - V_{LRL})\,\frac{(CL - \Delta t)}{CL}$$

Where:
- V_{URL} = upper voltage repair limit
- V_{LRL} = lower voltage repair limit
- V_{MURL} = mid-cycle upper voltage repair limit based on time into cycle
- V_{MLRL} = mid-cycle lower voltage repair limit based on V_{MURL} and time into cycle
- Δt = length of time since last scheduled inspection during which V_{URL} and V_{LRL} were implemented
- CL = cycle length (the time between two scheduled steam generator inspections)
- V_{SL} = structural limit voltage
- Gr = average growth rate per cycle length
- NDE = 95-percent cumulative probability allowance for nondestructive examination uncertainty (i.e., a value of 20-percent has been approved by NRC)

Implementation of these mid-cycle repair limits should follow the same approach as in 7.5.A.10.a, 7.5.A.10.b, and 7.5.A.10.c.

7.5 Acceptance Criteria (Continued)

NOTE 1 The lower voltage repair limit is 1.0 volt for 3/4-inch diameter tubing or 2.0 volts for 7/8-inch diameter tubing.

NOTE 2 The upper voltage repair limit is calculated according to the methodology in GL 95-05 as supplemented. V_{URL} may differ at the TSPs and flow distribution baffle.

B. The steam generator shall be determined operable after completing the corresponding action (plug all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 2 of Appendix A.

7.6 Reporting

Plant management shall report the following information to the NRC within the time period specified. See SSP-4.5 for the reporting instructions.

A. Tube Plugging Report

Following each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the NRC within 15 days of steam generator manway closure.

B. Inservice Inspection Results Report

The complete results of the steam generator tube ISI shall be submitted to the NRC in a special report pursuant to Technical Specification 6.9.2 within 12 months following completion of the inspection (steam generator manway closure). This special report shall include:

1. Number and extent of tubes inspected.
2. Location and percent of wall-thickness penetration for each indication of an imperfection.
3. Identification of tubes plugged.

7.6 Reporting (Continued)

C. Category C-3 Report

1. Results of steam generator tube inspections which fall into Technical Specification Category C-3 require prompt notification of the NRC pursuant to Technical Specification 6.6.1 prior to resumption of plant operation.
2. The written follow-up of this report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures to prevent recurrence.

D. Unit 1 Alternate Plugging Notification Requirements

For implementation of the voltage-based repair criteria to tube support plate intersections, notify the staff prior to returning the steam generators to service (i.e., mode 4) should any of the following conditions arise: **[C.8]**

1. If estimated leakage based on the projected end-of-cycle (or if not practical using the actual measured end-of-cycle) voltage distribution exceeds the leak limit (determined from the licensing basis dose calculation for the postulated main steam line break) for the next operating cycle.
2. If circumferential crack-like indications are detected at the tube support plate intersections.
3. If indications are identified that extend beyond the confines of the tube support plate.
4. If indications are identified at the tube support plate elevations that are attributable to primary water stress corrosion cracking.
5. If the calculated conditional burst probability based on the projected end-of-cycle (or if not practical, using the actual measured end-of-cycle) voltage distribution exceeds 1×10^{-2}, notify the NRC and provide an assessment of the safety significance of the occurrence. This calculation will follow the methodology described in WCAP 14277.

E. Unit 1 Alternate Plugging Criteria Report

If alternate plugging criteria (APC) is implemented, the following results, distributions, and evaluations will be submitted to the NRC staff within 90 days of unit restart (i.e., mode 2): **[C.8]**

1. The results of metallurgical examinations of tube intersections removed from the unit.
2. End-of-cycle (EOC) voltage distribution - all indications found during the inspection regardless of a rotating pancake coil (RPC) confirmation.

7.6 Reporting (Continued)

3. Cycle voltage growth rate distribution (i.e., from beginning of cycles to EOC).
4. Voltage distribution for EOC repaired indications - distribution of indications presented in item 2 that were repaired (i.e., plugged or sleeved).
5. Voltage distribution for indications left in service at the beginning of the next operating cycle regardless of RPC confirmation -- obtained from Items 2 and 4 above.
6. Voltage distribution for indications left in service at the beginning of the next operating cycle that were confirmed by RPC to be crack-like or not RPC inspected.
7. Nondestructive examination uncertainty distribution used in predicting of the EOC (for the next cycle of operation) voltage distribution.
8. Conditional probability of burst during main steam line break (MSLB) evaluation.
9. Total leak rate during MSLB evaluation.

F. Examination Report

1. For eddy current examination of heat exchanger tubing, the report shall include a record indicating the tube(s) examined (this may be marked on a tube sheet sketch or drawing), the extent to which each tube was examined, any scanning limitations, the axial location and depth of penetration of each reported degraded tube, and the identification and certification levels of the operator(s) and data evaluator(s) who conducted each examination or part thereof.
2. A summary of the SG tubing examination shall be submitted to Materials and Inservice Inspection group in accordance with plant schedules for inclusion in the NIS-1, Owners Report for ISI.

8.0 ADDITIONAL AUGMENTED INSPECTIONS

8.1 Steam Generator Feed Ring and J-Tubes

The carbon steel J-tube nozzles have been replaced with Inconel 600 J-tube nozzles. This material is resistant to erosion corrosion damage. Inspection of the J-tube nozzles is not necessary. A thickness check of each SG's feed ring header and tee shall be performed on a frequency of every 10 years. This augmented examination is self-imposed by TVA (S01 860515 828) and does not require a special report. Results of the examination shall be included in the ISI Site Final Report.

8.2 SG Primary Bowl Divider Plate Weld Inspection

A remote visual inspection shall be performed by the SG Engineer (or his designee) on each SG of both Unit 1 and Unit 2 once during the 10 year interval. The results shall be documented within the WR for SG Primary side maintenance.

8.3 SG Shell Upper Cone Girth Weld Inspection

A visual inspection shall be performed by the SG Engineer (or his designee) on each SG of both Unit 1 and Unit 2 once during the 10 year interval. The results shall be documented within the WR for SG Secondary side maintenance.

9.0 CHARACTERIZATION AND RESOLUTION OF INDICATIONS

A. Appendix B shall be used to document the characterization and resolution of all indications of defective tubes and all service induced wall loss indications. Indications which exceed the plugging limit (Section 7.5.A.6.) required the tube to be plugged. Indications greater than or equal to 20% wall loss and less than 40% wall loss are required to be examined in future outages.

B. Appendix B shall group indications from a sample together (i.e. initial sample, first expansion, second expansion) and shall document the classification of each sample in accordance with Section 7.3.E. Appendix B shall also document the quantity of exams in each sample.

C. The ISO Eddy Current Level III shall review Appendix B and concur with the characterization and resolution of indications. The SG Program Engineer shall evaluate the characterization and resolution of indications to determine if changes or additional ameliorative actions are required in the SG Preservation Program or in this instruction.

10.0 INTERFACE DOCUMENTS

A. SSP-8.56, Steam Generator Preservation Program

B. 0-MI-MXX-068-005.0, Steam Generator Primary Side Maintenance

C. 0-SI-DXI-000-114.2, ASME Section XI Inservice Inspection Program, Unit 1 and Unit 2

D. 0-MI-MXX-003-002.0, Steam Generator Secondary Side Maintenance Inspection.

11.0 DEVELOPMENTAL REFERENCES

A. EPRI PWR Steam Generator Examination Guidelines, Rev. 3

B. ASME Section XI, 1989 Edition

C. Tech Specs 4.4.5.0 through 4.4.5.5

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CLASSIFICATION OF INSPECTION RESULTS

TABLE 1

NOTE In all inspections, previously degraded tubes must exhibit significant (greater than 10 percent) further wall penetrations to be included in the below percentage calculations.

INSPECTION CATEGORY	INSPECTION RESULTS
C-1	Less than 5 percent of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1 percent of the total tubes inspected are defective, or between 5 and 10 percent of the total tubes inspected are degraded tubes.
C-3	More than 10 percent of the total tubes inspected are degraded tubes or more than 1 percent of the inspected tubes are defective.

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STEAM GENERATOR TUBE INSPECTION TABLE 2

	FIRST SAMPLE INSPECTION		SECOND SAMPLE INSPECTION		THIRD SAMPLE INSPECTION	
Sample Size	**Results**	**Action Required**	**Results**	**Action Required**	**Results**	**Action Required**
A minimum of S tubes per SG	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug defective tubes and inspect additional 2S tubes in this SG.	C-1	None	N/A	N/A
			C-2	Plug defective tubes and inspect additional 4S tubes in this SG.	C-1	None
					C-2	Plug defective tubes
					C-3	Perform action for C-3 result of first sample
			C-3	Inspect all tubes this SG, plug defective tubes and inspect 2S tubes in each other SG. prompt notification to NRC pursuant to technical specification 6.6.1.	N/A	N/A
	C-3	Inspect all tubes this SG, plug defective tubes and inspect 2S tubes in each other SG. Prompt notification to NRC pursuant to technical specification 6.6.1.	All other SGs are C-1.	None	N/A	N/A
			Some SGs C-2 but no addnl. SG are C-3.	Perform action for C-2 result of second sample.	N/A	N/A
			Addnl. SG is C-3.	Inspect all tubes in each SG and plug defective tubes. Prompt notification to NRC pursuant to Technical Specification 6.6.1.	N/A	N/A

$S = 3\frac{N}{n}\%$ Where N is the number of steam generators in the unit and n is the number of steam generators inspected during an inspection.

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UNIT 1 SGS 3 AND 4 EXPANSION OF THE HL DENTED TSP SAMPLE
TABLE 3

INITIAL SAMPLE		FIRST EXPANSION		SECOND EXPANSION	
Result	**Action Required**	**Result**	**Action Required**	**Result**	**Action Required**
C-1	None	N/A	N/A	N/A	N/A
C-2	Inspect an additional 20% sample of TSP in this SG.	C-1	None	N/A	N/A
		C-2	Inspect an additional 20% sample of TSP intersections in this SG.	C-1	None
				C-2	Inspect all remaining TSP intersections in this SG
				C-3	Inspect all remaining TSP intersections in this SG and a 20% sample in other SGs.
		C-3	Inspect all remaining TSP intersections in this SG and a 20% sample in other SGs	N/A	N/A
C-3	Inspect all remaining TSP intersections in this SG and a 20% sample in other SGs	C-1 in other SG	None	N/A	N/A
		C-2 but not C-3 in other SG	Inspect an additional 20% sample of TSP intersections in other SG	N/A	N/A
		C-3 in other SG	Inspect all remaining TSP intersections in other SGs	N/A	N/A

TSP = dented hot-leg tube support plate.

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MINIMUM NUMBER OF STEAM GENERATORS TO BE INSPECTED DURING INSERVICE INSPECTION

TABLE 4

Preservice Inspection	No	Yes
Number of SG per Unit	Four	Four
First ISI	All	Two
Second and Subsequent ISI	One[1]	One[2]

1. The inservice inspection may be limited to one steam generator on a rotating schedule encompassing $3^{N}/n\%$ of the tubes (where N is the number of steam generators in the plant and n is the number of steam generators inspected) if the results of the first or previous inspections indicate that all steam generators are performing in a like manner. Note that under some circumstances, the operating condition in one or more steam generators may be found to be more severe than those in other steam generators. Under such circumstances the sample sequence shall be modified to inspect the most severe conditions.
2. Each of the other two steam generators not inspected during the first inservice inspections shall be inspected during the second and third inspections. The fourth and subsequent inspection shall follow the instructions described in 1 above.

APPENDIX B
Page 1 of 1

RESOLUTION OF DEFECTIVE TUBES AND ALL SERVICE INDUCED WALL LOSS INDICATIONS

Unit _____

Outage _____ Date _____

S/G	ROW	COL	LOCATION	PERCENT DEGRADATION	FLAW CHARACTERIZATION	RESOLUTION

Quantity of examinations _____.
Steam Generator _____ Inspection results have been classified as Category _____.

Reviewed By: _____ / _____
TVA Level III Date

Evaluated By: _____ / _____
SG Program Engineer Date

SOURCE NOTES

Page 1 of 2

IMPLEMENTING STATEMENT	REQUIREMENTS DOCUMENT	REQUIREMENTS STATEMENT
C.1	EPRI PWR Steam Generator Examination Guidelines	Conduct a production examination of all steam generators during scheduled outages. Examine a 20 percent random sample of and steam generator such that all tubes are examined over a five cycle period.
C.2	Response to NRC dated 6/17/85 J.A. Domer to NRC	Revise the ISI program to reflect full-length Steam Generator Tube inspections (NCO-850284-004).
	(Continued)	TVA's ISI program shall reflect a maximum 72 month steam generator inspection interval for a specific steam generator.
	(Continued)	Separate entries from the hot and cold leg sides selecting different tubes on the hot and cold leg sides may be used to meet the minimum sampling requirements for inspection.
C.3	CAQR SQP880312	All nonplugged and nonheat treated Row 1 and 2 U-bend regions shall be examined by rotating pancake coil eddy current examinations during each scheduled inservice inspection for SG tubing. The probe type utilized shall have been qualified for the detection of U-bend primary water stress corrosion cracking.
C.4	CAQR CHS 89-0044	Adequate examinations during scheduled ISIs shall be performed to detect AVB wear indications.
C.5	CAQR SQP 90-0262	RPC examinations during scheduled ISIs are required to detect top of tubesheet cracking at the WEXTEX expansion transition.
C.6	NER 91-1193 NER 90-1016 IE Notice 90-049 IE Notice 91-067 TVA Response W03-911219-00	RPC examinations during scheduled ISIs are required to detect TSP intersection cracking.

SOURCE NOTES

Page 2 of 2

IMPLEMENTING STATEMENT	REQUIREMENTS DOCUMENT	REQUIREMENTS STATEMENT
C.7	NCO 940250001	TVA will change the appropriate inspection procedures to include a bobbin coil inspection of the protruding tube ends in the 33 tubes in Unit 2 SG1 in subsequent refueling outages, or until the indications are removed or the tubes are plugged. These procedure changes will include contingencies for indications which are detected with the bobbin coil inspection in this region. In this case, TVA will expand the inspection based on the number and nature of the indications in the non-plugged hot leg row 1 tubes in Unit 2
C.8	Tech Spec Change 95-15	SG tubing alternate plugging criteria at tube support plates.

NOTE: C.8 Unit 1 Alternate Plugging Criteria is for Unit 1 Operating Cycle 8.

ENCLOSURE 2

SEQUOYAH NUCLEAR PLANT (SQN)

UNITS 1 AND 2

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

INSERVICE TEST PROGRAM UPDATED FOR

SECOND 10-YEAR INTERVAL

ATTACHMENT 1: ASME INSERVICE PUMP TESTING PROGRAM BASIS DOCUMENT

ATTACHMENT 2: ASME INSERVICE VALVE TESTING PROGRAM BASIS DOCUMENT