

PROPOSED TECHNICAL SPECIFICATION CHANGES

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A tube inspection (pursuant to Specification 4.18.5.a.9) 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 recorded and an adjacent tube shall be selected and subjected to a tube inspection.

3. Tubes in the following groups may be excluded from the first random sample if all tubes in a group in both steam generators are inspected. The inspection may be concentrated on those portions of the tubes where imperfections were previously found. No credit will be taken for these tubes in meeting minimum sample size requirements. Where only a portion of the tube is inspected, the remainder of the tube will be subjected to the random inspection.
 - (1) Group A-1: Tubes within one, two or three rows of the open inspection lane.
 - (2) Group A-2: Unplugged tubes with sleeves installed.
 - (3) Group A-3: Tubes in the wedge-shaped group on either side of the lane region (Group A-1) as defined by Figure 4.18.1.
4. Tubes with axially-oriented tube end cracks (TEC) which have been left inservice for the previous cycle shall be inspected with a rotating coil eddy current technique in the area of the TEC and characterized in accordance with topical report BAW-2346P, Rev.0, during all subsequent SG inspection intervals pursuant to 4.18.4. The results of this examination may be excluded from the first random sample. Tubes with axial TEC which meet the criteria to remain in service will not be included when calculating the inspection category of the OTSG.
 - b. All tubes which have been repaired using the reroll process will have the new roll area inspected during the inservice inspection.
 - c. The second and third sample inspections during each inservice inspection as required by Table 4.18-2 may be less than a full tube inspection by concentrating the inspection on those areas of the tube sheet array and on those portions of the tubes where tubes with imperfections were previously found.

The results of each sample inspection shall be classified into one of the following three categories:

<u>Category</u>	<u>Inspection Results</u>
C-1	Less than 5% 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% of the total tubes inspected, are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.
C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.

the first sample inspection specified in Table 4.18-2. If the degradation mechanism which caused the leak is limited to a specific portion of the tube length, the inspection per this paragraph may be limited to the affected portion of the tube length. If the results of this inspection fall into the C-3 category, all of the tubes in the same group in the other steam generator will also be similarly inspected.

If the leaking tube has been repaired by the reroll process and is leaking in the new roll area, all of the tubes in the steam generator that have been repaired by the reroll process will have the new roll area inspected. If the results of this inspection fall into the C-3 category, all of the tubes with rerolled areas in the other steam generator will also be similarly inspected. This inspection will be in lieu of the first sample inspection specified in Table 4.18-2.

2. A seismic occurrence greater than the Operating Basis Earthquake,
3. A loss-of-coolant accident requiring actuation of the engineered safeguards, or
4. A main steam line or feedwater line break.

4.18.5 Acceptance Criteria

a. As used in this specification:

1. Tubing or Tube means that portion of the tube or sleeve which forms the primary system to secondary system pressure boundary.
2. Imperfection means 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% of the nominal tube wall thickness, if detectable, may be considered as imperfections.
3. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either the inside or outside of a tube.
4. Degraded Tube means a tube containing imperfections $\leq 20\%$ of the nominal wall thickness caused by degradation, except where all degradation has been spanned by the installation of a sleeve.
5. % Degradation means the percentage of the tube wall thickness affected or removed by degradation.
6. Defect means an imperfection of such severity that it exceeds the plugging limit except where the imperfection has been spanned by the installation of a sleeve. A tube containing a defect in its pressure boundary is defective.
7. Plugging Limit means the imperfection depth at or beyond which the tube shall be restored to serviceability by the installation of a sleeve, rerolled, or removed from service because it may become unserviceable prior to the next inspection; it is equal to 40% of the nominal tube wall thickness. Axially-oriented TEC indications in the tube that do not extend beyond the adjacent cladding portion of the tube sheet into the carbon steel portion are not included in this definition. These indications shall be assessed for continued plant operation in accordance with topical report BAW-2346P, Rev. 0.

The reroll repair process will only be used to repair tubes with defects in the upper tubesheet area. The reroll repair process will be performed only once per steam generator tube using a 1 inch roll length. The new roll area must be free of detectable degradation in order for the repair to be considered acceptable. The reroll repair process is described in the topical report, BAW-10232P, Revision 00.

8. 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 Specification 4.18.4.c.
 9. Tube Inspection means an inspection of the steam generator tube from the point of entry completely to the point of exit. For tubes that have been repaired by the reroll process within the upper tubesheet, that portion of the tube above the new roll can be excluded from future periodic inspection requirements because it is no longer part of the pressure boundary once the repair roll is installed.
- b. The steam generator shall be determined operable after completing the corresponding actions (plug, reroll, or sleeve all tubes exceeding the plugging limit and all tubes containing non-TEC through-wall cracks) required by Table 4.18-2 with the following exception:

Tubes with outer diameter intergranular attack indications within the upper tubesheet with potential of through-wall depths greater than the plugging limit, located by eddy current between 2.75 inches above the secondary face and below the roll transition, may remain in service for Cycle 15 contingent upon the following conditions:

1. One hundred percent of the unsleeved tubes are examined by bobbin coil eddy current in the upper tubesheet region during the fourteenth refueling outage,
2. Bobbin coil indications in the upper tubesheet region are examined by rotating pancake coil eddy current and confirmed to be volumetric,
3. A comparison shall be made between the bobbin coil voltage measured during the thirteenth refueling outage for the confirmed indications and the bobbin coil voltage for the same indications measured during the fourteenth refueling outage. The comparison shall confirm essentially no increase in voltage on average,
4. Tubes containing indications with bobbin coil voltage amplitudes > 0.7 volt and having growth > 0.3 volt since the last inspection shall be plugged or repaired, and
5. In-situ pressure testing in the "A" steam generator during the fourteenth refueling outage confirms, at a 95% confidence level, that the bounding accident leakage due to volumetric ODIGA flaws within the upper tubesheet region will be less than 0.5 gallon per minute due to a main steam line break.

4.18.6 Reports

Following each inservice inspection of steam generator tubes, the complete results of the inspection shall be reported to the NRC. This report, to be submitted within 90 days of inspection completion, shall include:

- a. Number and extent of tubes inspected;
- b. Location and percent of wall-thickness penetration for each indication of an imperfection;
- c. Identification of tubes plugged and tubes sleeved;
- d. Number of tubes repaired by rerolling and number of indications detected in the new roll area of the repaired tubes; and
- e. Summary of the condition monitoring and operational assessment results when applying TEC alternate repair criteria.

This report shall be in addition to a Special Report (per Specification 6.12.5.d) required for the results of steam generator tube inspections which fall into Category C-3 as denoted in Table 4.18-2. The Commission shall be notified of the results of steam generator tube inspections which fall into Category C-3 prior to resumption of plant operation. The written Special Report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.

Bases

The surveillance requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

In general, steam generator tubes that are degraded beyond the repair limit can either be plugged, sleeved, or rerolled. The steam generator tubes that are plugged are removed from service by the installation of plugs at both ends of the associated tube and thus completely removing the tube from service. When the tube end cracking (TEC) alternate repair criteria is applied, axially-oriented indications found not to extend from the tube sheet cladding region into the carbon steel region may be left in service under the guidelines of topical report BAW-2346P, Rev. 0. Following a SG inspection, an operational assessment is performed to ensure primary-to-secondary leaks rates will be maintained within the assumptions of the accident analysis.

Degraded steam generator tubes can also be repaired by the installation of sleeves which span the area of degradation and serve as a replacement pressure boundary for the degraded portion of the tube, thus permitting the tube to remain in service.

Degraded steam generator tubes can also be repaired by the rerolling of the tube in the upper tubesheet to create a new roll area and pressure boundary for the tube. The rerolling methodology establishes a new pressure boundary below the degradation, thus permitting the tube to remain in service. The degraded tube above the new roll area can be excluded from future periodic inspection requirements because it is no longer part of the pressure boundary once the repair roll is installed in the upper tubesheet. The rerolling repair process will only be used to repair defects in the upper tubesheet in accordance with BAW-10232P, Revision 00.

All tubes which have been repaired using the reroll process will have the new roll area inspected during future inservice inspections. Defective or degraded tube indications found in the new roll and any indications found in the original roll need not be included in determining the Inspection Results Category for the generator inspection.

The reroll repair process will only be used to repair tubes with defects in the upper tubesheet area. The reroll repair process will be performed only once per steam generator tube using a 1 inch roll length. Thus, multiple applications of the reroll process to any individual tube is not acceptable. The new roll area must be free of detectable degradation in order for the repair to be considered acceptable. After the new roll area is initially deemed acceptable, future degradation in the new roll area will be analyzed to determine if the tube is defective and needs to be removed from service. The reroll repair process is described in the topical report, BAW-10232P, Revision 00.

MARKUP OF CURRENT ANO-1 TECHNICAL SPECIFICATIONS

(FOR INFORMATION ONLY)

A tube inspection (pursuant to Specification 4.18.5.a.9) 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 recorded and an adjacent tube shall be selected and subjected to a tube inspection.

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- (1) Group A-1: Tubes within one, two or three rows of the open inspection lane.
- (2) Group A-2: Unplugged tubes with sleeves installed.
- (3) Group A-3: Tubes in the wedge-shaped group on either side of the lane region (Group A-1) as defined by Figure 4.18.1.

4. Tubes with axially-oriented tube end cracks (TEC) which have been left inservice for the previous cycle shall be inspected with a rotating coil eddy current technique in the area of the TEC and characterized in accordance with topical report BAW-2346P, Rev.0, during all subsequent SG inspection intervals pursuant to 4.18.4. The results of this examination may be excluded from the first random sample. Tubes with axial TEC which meet the criteria to remain in service will not be included when calculating the inspection category of the OTSG.

- b. All tubes which have been repaired using the reroll process will have the new roll area inspected during the inservice inspection.
- c. The second and third sample inspections during each inservice inspection as required by Table 4.18-2 may be less than a full tube inspection by concentrating the inspection on those areas of the tube sheet array and on those portions of the tubes where tubes with imperfections were previously found.

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If the leaking tube has been repaired by the reroll process and is leaking in the new roll area, all of the tubes in the steam generator that have been repaired by the reroll process will have the new roll area inspected. If the results of this inspection fall into the C-3 category, all of the tubes with rerolled areas in the other steam generator will also be similarly inspected. This inspection will be in lieu of the first sample inspection specified in Table 4.18-2.

2. A seismic occurrence greater than the Operating Basis Earthquake,
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4. Tubes containing indications with bobbin coil voltage amplitudes > 0.7 volt and having growth > 0.3 volt since the last inspection shall be plugged or repaired, and
5. In-situ pressure testing in the "A" steam generator during the fourteenth refueling outage confirms, at a 95% confidence level, that the bounding accident leakage due to volumetric ODIGA flaws within the upper tubesheet region will be less than 0.5 gallon per minute due to a main steam line break.

4.18.6 Reports

Following each inservice inspection of steam generator tubes, the complete results of the inspection shall be reported to the NRC. This report, to be submitted within 45-90 days of inspection completion, shall include:

- a. Number and extent of tubes inspected;
- b. Location and percent of wall-thickness penetration for each indication of an imperfection;
- c. Identification of tubes plugged and tubes sleeved; and

- d. Number of tubes repaired by rerolling and number of indications detected in the new roll area of the repaired tubes; and
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