

ATTACHMENT 2 TO AEP:NRC:1166K

EXISTING TECHNICAL SPECIFICATION  
PAGES MARKED TO REFLECT PROPOSED CHANGES

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## REACTOR COOLANT SYSTEM

### SURVEILLANCE REQUIREMENTS (Continued)

2. Tubes in those areas where experience has indicated potential problems.
3. A tube inspection (pursuant to Specification 4.4.5.4.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 recorded and an adjacent tube shall be selected and subjected to a tube inspection.

d. e.

The tubes selected as the second and third samples (if required by Table 4.4-2) during each inservice inspection may be subjected to a partial tube inspection provided:

1. The tubes selected for the samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found.
2. The inspections include those portions of the tubes where imperfections were previously found.

e. d.

Implementation of the steam generator tube/tube support plate interim plugging criteria for one fuel cycle (Cycle 13) requires a 100% bobbin coil inspection for hot leg tube support plate intersections and cold leg intersections down to the lowest cold leg tube support plate with known outer diameter stress corrosion cracking (ODSCC) indications.

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.

C. In addition to the sample required in 4.4.5.2.b.1 through 3, all tubes which have had the F\* criteria applied will be inspected in the roll expanded region. The roll expanded region of the tubes may be excluded from the requirements of 4.4.5.2.b.1.

## REACTOR COOLANT SYSTEM

### SURVEILLANCE REQUIREMENTS (Continued)

#### 4.4.5.4 Acceptance Criteria

a. As used in this Specification:

1. Imperfection means an exception to the dimensions, finish or contour of a tube or sleeve from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal wall thickness, if detectable, may be considered as imperfections.
2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube or sleeve.
3. Degraded Tube or Sleeve means an imperfection greater than or equal to 20% of the nominal wall thickness caused by degradation.
4. Percent Degradation means the amount of the wall thickness affected or removed by degradation.
5. Defect means an imperfection of such severity that it exceeds the repair limit.
6. Repair/Plugging Limit means the imperfection depth at or beyond which the tube or sleeved tube shall be repaired or removed from service. Any tube which, upon inspection, exhibits tube wall degradation of 40 percent or more of the nominal tube wall thickness shall be plugged or repaired prior to returning the steam generator to service. Any sleeve which, upon inspection, exhibits wall degradation of 29 percent or more of the nominal wall thickness shall be plugged prior to returning the steam generator to service. In addition, any sleeve exhibiting any measurable wall loss in sleeve expansion transition or weld zones shall be plugged. This definition does not apply for tubes experiencing outer diameter stress corrosion cracking confirmed by bobbin probe inspection to be within the thickness of the tube support plates. See 4.4.5.4.a.10 for the plugging limit for use within the thickness of the tube support plate.
7. Unserviceable describes the condition of a tube or sleeve 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 4.4.5.3.c, above.
8. Inspection determines the condition of the steam generator tube or sleeve from the point of entry (hot leg side) completely

this definition does not apply to the portion of the tube in the tubesheet below the F\* distance for F\* tubes.

## REACTOR COOLANT SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

around the U-bend to the top support of the cold leg. For a tube in which the tube support plate elevation interim plugging limit has been applied, the inspection will include all the hot leg intersections and all cold leg intersections down to, at least, the level of the last crack indication.

9. Sleeving a tube is permitted only in areas where the sleeve spans the tubesheet area and whose lower joint is at the primary fluid tubesheet face.
10. The Tube Support Plate Interim Plugging Criteria is used for disposition of a steam generator tube for continued service that is experiencing outer diameter initiated stress corrosion cracking confined within the thickness of the tube support plates. For application of the tube support plate interim plugging limit, the tube's disposition for continued service will be based upon standard bobbin probe signal amplitude. The plant-specific guidelines used for all inspections shall be amended as appropriate to accommodate the additional information needed to evaluate tube support plate signals with respect to the above voltage/depth parameters. Pending incorporation of the voltage verification requirement in ASME standard verifications, an ASME standard calibrated against the laboratory standard will be utilized in the Donald C. Cook Nuclear Plant Unit 1, steam generator inspections for consistent voltage normalization.
  1. A tube can remain in service if the signal amplitude of a crack indication is less than or equal to 1.0 volt, regardless of the depth of tube wall penetration, if, as a result, the projected end-of-cycle distribution of crack indications is verified to result in primary-to-secondary leakage less than 1 gpm in the faulted loop during a postulated steam line break event. The methodology for calculating expected leak rates from the projected crack distribution must be consistent with WCAP-13187, Rev. 0.
  2. A tube should be plugged or repaired if the signal amplitude of the crack indication is greater than 1.0 volt except as noted in 4.4.5.4.a.10.3 below.
  3. A tube can remain in service with a bobbin coil signal amplitude greater than 1.0 volt but less than or equal to 4.0 volts if a rotating pancake probe inspection does not detect degradation. Indications of degradation with a bobbin coil signal amplitude greater than 4.0 volts will be plugged or repaired.

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11. F\* Distance is the distance from the bottom of the hardroll transition toward the bottom of the tubesheet that has been conservatively determined to be 1.11 inches (not including eddy current uncertainty).
12. F\* Tube is a tube with degradation, below the F\* distance, equal to or greater than 40%, and not degraded (i.e., no indications of cracking) within the F\* distance.

## REACTOR COOLANT SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

- b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plugging or sleeving all tubes exceeding the repair limit and all tubes containing through-wall cracks) required by Table 4.4-2.
- c. Steam generator tube repairs may be made in accordance with the methods described in either WCAP-12623 or CEN-313-P.

#### 4.4.5.5 Reports

- a. Following each inservice inspection of steam generator tubes, if there are any tubes requiring plugging or sleeving, the number of tubes plugged or sleeved in each steam generator shall be reported to the Commission within 15 days.
- b. The complete results of the steam generator tube inservice inspection shall be included in the Annual Operating Report for the period in which this inspection was completed. This 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 or sleeved.
- c. Results of steam generator tube inspections which fall into Category C-3 and require prompt notification of the Commission shall be reported pursuant to Specification 6.9.1 prior to resumption of plant operation. The written followup of this report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.
- d. The results of inspections performed under 4.4.5.2 for all tubes in which the tube support plate interim plugging criteria have been applied shall be reported to the Commission within 15 days following the inspection. The report shall include:
  - 1. Listing of applicable tubes.
  - 2. Location (applicable intersections per tube) and extent of degradation (voltage).
- e. The results of steam line break leakage analysis performed under T/S 4.4.5.4.a.10 will be reported to the Commission prior to restart for Cycle 13.

or that have defects below the F\* distance and were not plugged

ATTACHMENT 3 TO AEP:NRC:1166K

PROPOSED REVISED  
TECHNICAL SPECIFICATION PAGES

## REACTOR COOLANT SYSTEM

### SURVEILLANCE REQUIREMENTS (Continued)

2. Tubes in those areas where experience has indicated potential problems.
  3. A tube inspection (pursuant to Specification 4.4.5.4.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 recorded and an adjacent tube shall be selected and subjected to a tube inspection.
- c. In addition to the sample required in 4.4.5.2.b.1 through 3, all tubes which have had the F\* criteria applied will be inspected in the roll expanded region. The roll expanded region of these tubes may be excluded from 4.4.5.2.b.1.
- d. The tubes selected as the second and third samples (if required by Table 4.4-2) during each inservice inspection may be subjected to a partial tube inspection provided:
1. The tubes selected for the samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found.
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- e. Implementation of the steam generator tube/tube support plate interim plugging criteria for one fuel cycle (Cycle 13) requires a 100% bobbin coil inspection for hot leg tube support plate intersections and cold leg intersections down to the lowest cold leg tube support plate with known outer diameter stress corrosion cracking (ODSCC) indications.

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## REACTOR COOLANT SYSTEM

### SURVEILLANCE REQUIREMENTS (Continued)

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6. Repair/Plugging Limit means the imperfection depth at or beyond which the tube or sleeved tube shall be repaired or removed from service. Any tube which, upon inspection, exhibits tube wall degradation of 40 percent or more of the nominal tube wall thickness shall be plugged or repaired prior to returning the steam generator to service. This definition does not apply to the portion of the tube in the tubesheet below the F\* distance for F\* tubes. Any sleeve which, upon inspection, exhibits wall degradation of 29 percent or more of the nominal wall thickness shall be plugged prior to returning the steam generator to service. In addition, any sleeve exhibiting any measurable wall loss in sleeve expansion transition or weld zones shall be plugged. This definition does not apply for tubes experiencing outer diameter stress corrosion cracking confirmed by bobbin probe inspection to be within the thickness of the tube support plates. See 4.4.5.4.a.10 for the plugging limit for use within the thickness of the tube support plate.
7. Unserviceable describes the condition of a tube or sleeve 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 4.4.5.3.c, above.
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## REACTOR COOLANT SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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9. Sleeving a tube is permitted only in areas where the sleeve spans the tubesheet area and whose lower joint is at the primary fluid tubesheet face.
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  1. A tube can remain in service if the signal amplitude of a crack indication is less than or equal to 1.0 volt, regardless of the depth of tube wall penetration, if, as a result, the projected end-of-cycle distribution of crack indications is verified to result in primary-to-secondary leakage less than 1 gpm in the faulted loop during a postulated steam line break event. The methodology for calculating expected leak rates from the projected crack distribution must be consistent with WCAP-13187, Rev. 0.
  2. A tube should be plugged or repaired if the signal amplitude of the crack indication is greater than 1.0 volt except as noted in 4.4.5.4.a.10.3 below.
  3. A tube can remain in service with a bobbin coil signal amplitude greater than 1.0 volt but less than or equal to 4.0 volts if a rotating pancake probe inspection does not detect degradation. Indications of degradation with a bobbin coil signal amplitude greater than 4.0 volts will be plugged or repaired.
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## REACTOR COOLANT SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

- b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plugging or sleeving all tubes exceeding the repair limit and all tubes containing through-wall cracks) required by Table 4.4-2.
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#### 4.4.5.5 Reports

- a. Following each inservice inspection of steam generator tubes, if there are any tubes requiring plugging or sleeving, the number of tubes plugged or sleeved in each steam generator shall be reported to the Commission within 15 days.
- b. The complete results of the steam generator tube inservice inspection shall be included in the Annual Operating Report for the period in which this inspection was completed. This report shall include:
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  - 2. Location and percent of wall-thickness penetration for each indication of an imperfection.
  - 3. Identification of tubes plugged or sleeved.
- c. Results of steam generator tube inspections which fall into Category C-3 and require prompt notification of the Commission shall be reported pursuant to Specification 6.9.1 prior to resumption of plant operation. The written followup of this report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.
- d. The results of inspections performed under 4.4.5.2 for all tubes in which the tube support plate interim plugging criteria has been applied or that have defects below the F\* distance and were not plugged shall be reported to the Commission within 15 days following the inspection. The report shall include:
  - 1. Listing of applicable tubes.
  - 2. Location (applicable intersections per tube) and extent of degradation (voltage).
- e. The results of steam line break leakage analysis performed under T/S 4.4.5.4.a.10 will be reported to the Commission prior to restart for Cycle 13.

ATTACHMENT 4 TO AEP:NRC:1166K

PROPRIETARY WCAP 13970  
"F\* TUBE PLUGGING CRITERION FOR TUBES  
WITH DEGRADATION IN THE TUBESHEET ROLL  
EXPANSION REGION OF THE DONALD C. COOK  
UNIT 1 STEAM GENERATORS"

AFFIDAVIT FOR WITHHOLDING WCAP 13970  
FROM PUBLIC DISCLOSURE