

15.3.4 STEAM AND POWER CONVERSION SYSTEM

Applicability

Applies to the operating status of steam and power conversion system.

Objective

To define conditions of the steam and power conversion system steam-relieving capacity. Auxiliary Feedwater System and Service Water System operation is necessary to ensure the capability to remove decay heat from the core.

Specification

- A. When the reactor coolant is heated above 350°F the reactor shall not be taken critical unless the following conditions are met:
1. A minimum steam-relieving capability of eight (8) main steam safety valves available, except for low power physics testing.
 2. Auxiliary Feedwater System
 - a. Two Unit Operation - All four auxiliary feedwater pumps together with their associated flow paths and essential instrumentation shall be operable.
 - b. Single Unit Operation - Both motor driven auxiliary feedwater pumps and the turbine driven auxiliary feedwater pump associated with that unit together with their associated flow paths and essential instrumentation shall be operable.

15.4.2 INSERVICE INSPECTION OF SAFETY CLASS COMPONENTS

Applicability

Applies to inservice inspection of Safety Class Components.

Objectives

To provide assurance of the continuing integrity of the safety class systems.

Specifications

A. STEAM GENERATOR TUBE INSPECTION REQUIREMENTS

1. Tube Inspection

Entry from the hot leg side with examination from the point of entry completely around the U-bend to the top support of the cold leg is considered a tube inspection.

2. Sample Selection and Testing

Selection and testing of steam generator tubes shall be made on the following basis:

- (a) One steam generator of each unit may be selected for inspection during inservice inspection in accordance with the following requirements:
 1. The inservice inspection may be limited to one steam generator on an alternating sequence basis. This examination shall include at least 6% of the tubes if the results of the first or a prior inspection indicate that both generators are performing in a comparable manner.
 2. When both steam generators are required to be examined by Table 15.4.2-1 and if the condition of the tubes in one generator is found to be more severe than in the other steam generator of a unit, the steam generator sampling sequence at the subsequent inservice inspection shall be modified to examine the steam generator with the more severe condition.
- (b) The minimum sample size, inspection result classification and the associated required action shall be in conformance with the requirements specified in Table 15.4.2-1. The results of each sampling examination of a steam generator shall be classified into the following three categories:

Category C-1: Less than 5% of the total number of tubes examined are degraded but none are defective.

Category C-2: Between 5% and 10% of the total number of tubes examined are degraded, but none are defective or one tube to not more than 1% of the sample is defective.

Category C-3: More than 10% of the total number of tubes examined are degraded, but none are defective or more than 1% of the sample is defective.

In the first sample of a given steam generator during any inservice inspection, degraded tubes not beyond the plugging limit detected by the prior examinations in that steam generator shall be included in the above percentage calculations, only if these tubes are demonstrated to have a further wall penetration of greater than 10% of the nominal tube wall thickness.

- (c) Tubes shall be selected for examination primarily from those areas of the tube bundle where service experience has shown the most severe tube degradation.
- (d) In addition to the sample size specified in Table 15.4.2-1, the tubes examined in a given steam generator during the first examination of any inservice inspection shall include all non-plugged tubes in that steam generator that from prior examination were degraded.
- (e) During the second and third sample examinations of any inservice inspection, the tubes inspection may be limited to those sections of the tube lengths where imperfections were detected during the prior examination.

3. Examination Method and Requirements

The examination method shall meet the intent of the requirements in ASME Section XI Appendix IV. This includes equipment, personnel and procedure requirements, certification and calibration along with records and reports. The actual technique may be the latest industry accepted technique, provided the flaw detection capability is as good or better than the technique endorsed by the code in effect per Technical Specification 15.4.2.B.1. This allows the use of improvements in inspection techniques that were not included in the code in effect. However, it means that word-for-word compliance with Appendix IV of ASME Section XI may not be possible.

4. Inspection Intervals

- (a) Inservice inspections shall not be more than 24 calendar months apart.
- (b) The inservice inspections may be scheduled to be coincident with refueling outages or any plant shutdown, provided the inspection intervals of 15.4.2.A.4(a) are not exceeded.
- (c) If two consecutive inservice inspections covering a time span of at least 12 months yield results that fall in C-1 category, the inspection frequency may be extended to 40-month intervals.
- (d) If the results of the inservice inspection of steam generator tubing conducted in accordance with Table 15.4.2-1 requires that a third sample examination must be performed, and the results of this fall in category C-3, the inspection frequency shall be reduced to not more than 20-month intervals. The reduction shall apply until a subsequent inspection demonstrates that a third sample examination is not required.
- (e) Unscheduled inspections shall be conducted in accordance with Specifications 15.4.2.A.2 on any steam generator with primary-to-secondary tube leakage exceeding Specification 15.3.1.D.4. All steam generators shall be inspected in the event of a seismic occurrence greater than an operating basis earthquake, a LOCA requiring actuation of engineered safeguards, or a main steam line or feedwater line break.

5. Acceptance Limits

- (a) Definitions:

Imperfection is an exception to the dimension, 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.

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

Degraded Tube is a tube that contains imperfections caused by degradation greater than 20% of the nominal tube wall thickness.

Defect is an imperfection of such severity that it exceeds the minimum acceptable tube wall thickness of 50%. A tube containing a defect is defective.

Plugging Limit is the imperfection depth beyond which the tube must be removed from service or repaired, because the tube may become defective prior to the next scheduled inspection. The plugging limit is 40% of the nominal tube wall thickness.

6. Corrective Measures

All tubes that leak or have degradation exceeding the plugging limit shall be plugged or repaired by a process such as sleeving* prior to return to power from a refueling or inservice inspection conditions. Sleeved tubes having sleeve degradation exceeding 40% of the nominal sleeve wall thickness shall be plugged.

7. Reports

- (a) After each inservice examination, the number of tubes plugged or repaired in each steam generator shall be reported to the Commission as soon as practical.
- (b) The complete results of the steam generator tube inservice inspection shall be included in the Annual Results and Data Report for the period in which the inspection was completed.

Reports shall include:

- 1. Number and extent of tubes inspected.
 - 2. Location and percent of all thickness penetration for each indication.
 - 3. Identification of tubes plugged or repaired.
- (c) Reports required by Table 15.4.2-1 - Steam Generator Tube Inspection shall provide the information required by Specification 15.4.2.A.7(a) and a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence. The report shall be submitted to the Commission prior to resumption of plant operation.

* Brazed joints shall not be employed. Tubes previously subject to explosive plugging shall not be sleeved.

B. INSERVICE INSPECTION OF SAFETY CLASS COMPONENTS OTHER THAN STEAM GENERATOR TUBES

1. Inservice inspection of ASME Code Class 1, Class 2 and Class 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50, Section 50.55a(g) modified by Section 50.55a(b), except where specific written relief is granted by the NRC, pursuant to 10 CFR 50, Section 50.55a(g)(6)(i).
2. Containment isolation valves will be tested in accordance with Technical Specification 15.4.4 instead of Section IWV-3420, Valve Leak Rate Test.

BASIS

The steam generator tube inspection requirements are based on the guidance given in NRC Regulatory Guide 1.83, "Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes." ASME Section XI Appendix IV is being used for defining the basic requirements or the inspection method. However, at the present time, changes and improvements in steam generator eddy current inspection are occurring faster than the code can be revised. Thus, in order to ensure that the best possible exam of the tubing and/or sleeves is being done, the technique utilized will, in general, be the latest industry-accepted technique. This means that complete word-for-word compliance with Appendix IV may not be possible. However, the basic requirements and intent will be met, to the extent practical.

As stated in 15.4.2.B.1, safety class components, other than the steam generator tubing, will be inspected in accordance with ASME Section XI. The code edition/addenda utilized for the inspection interval will be as defined in 10 CFR 50. The same code is utilized for both Unit 1 and Unit 2. Safety-related components are classified as safety Class 1, 2, or 3. The code boundaries are defined based upon the following documents:

- (a) Regulatory Guide 1.26, "Quality Group Classifications and Standards for Water, Steam, and Radioactive Waste Containing Components of Nuclear Power Plants."
- (b) American National Standard N18.2, "Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants."
- (c) Point Beach Nuclear Plant Units 1 & 2 Final Safety Analysis Report.

Code classified components are tabulated showing each specific examination area and the examination requirements in an inspection interval long-term plan. This plan is completely revised for each ten-year inspection interval.

TABLE 15.4.2-1

STEAM GENERATOR TUBE INSPECTION PER UNIT
POINT BEACH UNITS 1 & 2

1ST SAMPLE EXAMINATION			2ND SAMPLE EXAMINATION		3RD SAMPLE EXAMINATION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S tubes per Steam Generator (SG)	C-1	Acceptable for Continued Service	N/A	N/A	N/A	N/A
	C-2	Plug or repair tubes exceeding the plugging limit and proceed with 2nd sample examination of 2S tubes in same steam generator	C-1	Acceptable for Continued Service	N/A	N/A
			C-2	Plug or repair tubes exceeding the plugging limit and proceed with 3rd sample examination of 4S tubes in same steam generator	C-1	Acceptable for Continued Service
S=3(N/n)%					C-2	Plug or repair tubes exceeding plug limit. Acceptable for Continued Service
Where:					C-3	Perform action re- quired under C-3 of 1st sample verification
N is the number of steam generators in the plant = 2			C-3	Perform action re- quired under C-3 of 1st sample examination	N/A	N/A
n is the number of steam generators inspected during an examination	C-3	Inspect essentially all tubes in this SG, plug or repair tubes exceed- ing the plugging limit and proceed with 2nd sample examination of 2S tubes in the other steam generator. Reportable in accord- ance with 10 CFR 50.73ii	C-1 in other SG	Acceptable for Continued Service	N/A	N/A
			C-2 in other SG	Perform action required under C-2 of 2nd sample examination above	N/A	N/A
			C-3 in other SG	Inspect essentially all tubes in SG & plug or repair tubes exceeding the plugging limit. Reportable in accordance with 10 CFR 50.73ii	N/A	N/A

15.6.10 PLANT OPERATING RECORDS

Specification

Records and logs relative to the following items shall be retained for six (6) years unless a longer period is required by applicable regulations.

- A. Records of normal plant operation, including power levels and periods of operation at each power level.
- B. Records of principal maintenance activities, including inspection, repair, substitution or replacement of principal items of equipment pertaining to nuclear safety.
- C. Records of reportable events.
- D. Records of periodic checks, inspections and calibrations performed to verify that surveillance requirements are being met.
- E.* Records of new and spent fuel inventory and assembly histories.
- F.* Records of changes made to the plant and to plant drawings as described in the FFDSAR.
- G.* Records of plant radiation and contamination surveys.
- H.* Records of off-site environmental monitoring surveys.
- I.* Records of radiation exposure of all plant personnel, including all contractor personnel and visitors who enter radiation control areas in the plant.
- J.* Records of radioactivity levels in liquid and gaseous wastes released to the environment and dilution of these wastes.
- K. Records of any special reactor tests or experiments.
- L. Records of changes made in the Operating Procedures.