

REACTOR COOLANT SYSTEMSURVEILLANCE 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 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.
2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.
3. Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation.
4. % Degradation means the percentage of the tube wall thickness affected or removed by degradation.
5. Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.
6. Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service and is equal to 40% of the nominal tube wall thickness. (NOTE 1)
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 4.4.5.3.c, above.
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 top support of the cold leg.

NOTE 1: This definition does not apply to the area of tubes in the tubesheet region more than 1.25 inches below the top of the tubesheet except when the tube does not have an intact tube directly above it (one row higher in number, same column).

REACTOR COOLANT SYSTEM

BASES

3/4.4.5 STEAM GENERATORS

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.

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 500 gallons per day per steam generator can readily be detected by radiation monitors of steam generator blowdown. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged.

Wastage-type defects are unlikely with proper chemistry treatment of the secondary coolant. However, even if a defect should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging will be required for ~~all~~ tubes with imperfections exceeding ~~the plugging limit of 40%~~ of the tube nominal wall thickness. ^(A) Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results will be promptly reported to the Commission pursuant to 10 CFR 50.72(b)2(i) prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

(A) However, for those tubes with imperfections found greater than 1.25 inches below the top of the tubesheet, no plugging will be required.

ATTACHMENT B

No Significant Hazards Determination

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

No.

The supporting P* evaluation demonstrates that the presence of the tubesheet will complement tube integrity in that region by precluding tube deformation beyond its initial outside diameter. The resistance to both tube rupture and tube collapse behavior is strengthened by the presence of the tubesheet in that region. Furthermore, the existing Technical Specification leakage rate requirements remain in place in the unlikely event leakage from this region does occur.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

No.

The supporting evaluation demonstrates that implementation of the P* criterion minimizes the potential for any possible tube indications that may exist from creating any type of accident.

In order to obtain a meaningful quantitative value for the P* criterion, the hypothetical case of the circumferential separation of both ends of a steam generator U-tube, subsequent vertical displacement and contact with the tube directly above it (one row higher, same column) was assumed as described in the supporting evaluation. Generally, cracking that has been observed in operating units has been located in the non-expanded to expanded transition of the tube hardroll and/or skip roll locations in the tubesheet, and has been typified as short and axially oriented. For axial indications in the tubesheet region, the tube end remains structurally intact, minimizing any potential for tube pullout due to mechanisms defined in the development of the P* criterion.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

No.

As demonstrated in the supporting evaluation, integrity of the tube bundle under both normal and postulated accident conditions will continue to be maintained. Current Technical Specification leakage rate limitations will continue to be met; therefore, any leakages will be limited to ensure safety margins are preserved.