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1. Primary-to-secondary tube leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Specification 3.1.d and 3.4.a.4,
 2. A seismic occurrence greater than the Operating Basis Earthquake,
 3. A loss-of-coolant accident requiring actuation of the engineering safeguards, where the cooldown rate of the reactor coolant system exceeded 100°F/hr, or
 4. A main steam line or feedwater line break, where the cooldown rate of the reactor coolant system exceeded 100°F/hr.
- d. If the type of steam generator chemistry treatment is changed significantly, the steam generators shall be inspected at the next outage of sufficient duration following three (3) months of power operation since the change.
4. Plugging Limit Criteria - the following criteria apply independently to tube and sleeve wall degradation:
- a. Any tube which, upon inspection, exhibits tube wall degradation of 50% or more shall be plugged or repaired prior to returning the steam generator to service. If significant general tube thinning occurs, this criterion will be reduced to 40% wall degradation. Repair methods will be submitted under 10CFR50.90 to be incorporated, as an amendment, in the facility license. The commission will review the repair method, issue a significant hazards determination, and amend the facility license.
 - b. Any sleeve which, upon inspection, exhibits wall degradation of 31 percent or more shall be plugged prior to returning the steam generator to service. Figure 4.2-1 illustrates the application of tube, sleeve, and tube/sleeve joint plugging limit criteria.

Basis

Technical Specification 4.2.b.4

Steam generator tubes found with less than the minimum wall thickness criteria determined by analysis, as described in WCAP 7832(1) and (2), must either be repaired to be kept in service or removed from service by plugging.

Steam generator tube plugging is a common method of preventing primary to secondary steam generator tube leakage and has been utilized since the inception of PWR nuclear reactor plants. This method is relatively uncomplicated from a structural/mechanical standpoint as flow is cut-off from the affected tube by plugging it in the hot and cold leg faces of the tubesheet.

To determine the basis for the sleeve plugging limit, the minimum sleeve wall thickness was calculated in accordance with Draft Regulatory Guide 1.121 (August 1976). In addition, a combined allowance of 20 percent of wall thickness is assumed for eddy current testing inaccuracies and continued operational degradation per Draft Regulatory Guide 1.121 (August 1976).

Repair by sleeving, or other methods, has been recognized as a viable alternative for isolating unacceptable tube degradation and preventing tube leakage. Sleeving isolates unacceptable degradation and extends the service life of the tube, and the steam generator. Tube repair, by sleeving in accordance with Reference (3), has been evaluated and analyzed as acceptable. This reference establishes hydraulic equivalency ratios for the application of normal operating, upset, and accident condition bounding analyses. Design, installation, testing, and inspection of steam generator tube sleeves requires substantially more engineering than plugging, as the tube remains in service. Because of this, the NRC has defined steam generator tube repair to be an unreviewed safety question as described in 10CFR50.59(a)(2). As such, other tube repair methods will be submitted under 10CFR50.90; and in accordance with 10CFR50.91 and 92, the Commission will review the method, issue a significant hazards determination, and amend the facility license accordingly. A 90-day time frame for NRC review and approval is expected.