

done at room temperature), tube burst capability significantly exceeds the R.G. [Regulatory Guide] 1.121 criterion requiring the maintenance of a margin of 1.43 times the steam line break pressure differential on tube burst if through-wall cracks are present without regard to the presence of the tube support plate. Considering the existing data base, this criterion is satisfied with bobbin coil indications with signal amplitudes over twice the 2.0 volt voltage-based repair criteria, regardless of the indicated depth measurement. This structural limit is based on a lower 95% confidence level limit of the data. The 2.0 volt criterion provides an extremely conservative margin of safety to the structural limit considering expected growth rates of outside diameter stress corrosion cracking at Farley. Alternate crack morphologies can correspond to a voltage so that a unique crack length is not defined by a burst pressure to voltage correlation. However, relative to expected leakage during normal operating conditions, no field leakage has been reported from tubes with indications with a voltage level of under 7.7 volts for 3/4 inch tube which correlates to 10 volts for 7/8 inch tubing (as compared to the 2.0 volt proposed voltage-based tube repair limit). Thus, the proposed amendment does not involve a significant increase in the probability or consequences of an accident.

Relative to the expected leakage during accidents (sic) condition loadings, the accidents that are affected by primary-to-secondary leakage and steam release to the environment are Loss of External Electrical Load and/or Turbine Trip, Loss of All AC Power to Station Auxiliaries, Major Secondary System Pipe Failure, Steam Generator Tube Rupture, Reactor Coolant Pump Locked Rotor, and Rupture of a Control Rod Drive Mechanism Housing. Of these, the Major Secondary System Pipe Failure is the most limiting for Farley in considering the potential for off-site doses. The offsite doses analyses for the other events which model primary-to-secondary leakage and steam releases from the secondary side to the environment assume that the secondary side remains intact. The steam generator tubes are not subjected to a sustained increase in differential pressure, as is the case following a steam line break event. This increase in differential pressure is responsible for the postulated increase in leakage and associated offsite doses following a steam line break event. In addition, the steam line break event results in a bypass of containment for steam

generator leakage. Upon implementation of the voltage-based repair criteria, it must be verified that the expected distributions of cracking indications at the tube support plate intersections are such that primary-to-secondary leakage would result in site boundary dose within the current licensing basis. Data indicate that a threshold voltage of 2.8 volts could result in through-wall cracks long enough to leak at steam line break conditions. Applications of the proposed repair criteria requires that the current distribution of a number of indications versus voltage be obtained during the refueling outages. The current voltage is then combined with the rate of change in voltage measurement and a voltage measurement uncertainty to establish an end of cycle voltage distribution and, thus, leak rate during steam line break pressure differential. The leak rate during a steam line break is further increased by a factor related to the probability of detection of the flaws. If it is found that the potential steam line break leakage for degraded intersections planned to be left in service coupled with the reduced specific activity levels allowed result in radiological consequences outside the current licensing basis, then additional tubes will be plugged or repaired to reduce steam line break leakage potential to within the acceptance limit. Thus, the consequences of the most limiting design basis accident are constrained to present licensing basis limits.

(2) The proposed license amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Implementation of the proposed voltage-based tube support plate elevation steam generator tube repair criteria does not introduce any significant changes to the plant design basis. Use of the criteria does not provide a mechanism that could result in an accident outside of the region of the tube support plate elevations. Neither a single or multiple tube rupture event would be expected in steam generator in which the repair criteria have been applied during all plant conditions. The bobbin probe signal amplitude repair criteria are established such that operational leakage or excessive leakage during a postulate steam line break condition is not anticipated. Southern Nuclear has previously implemented a maximum leakage limit of 140/150 gpd (Unit 1/ Unit 2) per steam generator. The R.G. 1.121 criterion for establishing operational leakage limits that require plant shutdown are based upon leak-before-break considerations to detect a

free span crack before potential tube rupture. The 140/150 gpd limit provides for leakage detection and plant shutdown in the event of the occurrence of an unexpected single crack resulting in leakage that is associated with the longest permissible crack length. R.G. 1.121 acceptance criteria for establishing operating leakage limits are based on leak-before-break considerations such that plant shutdown is initiated if the leakage associated with the longest permissible crack is exceeded. The longest permissible crack is the length that provides a factor safety of 1.43 against bursting at steam line break pressure differential. A voltage amplitude of approximately 9 volts for typical outside diameter stress corrosion cracking corresponds to meeting this tube burst requirement at the 95% prediction interval on the burst correlation. Alternate crack morphologies can correspond to a voltage so that a unique crack length is not defined by the burst pressure versus voltage correlation. Consequently, typical burst pressure versus throughwall crack length correlations is used below to define the "longest permissible crack" for evaluating operating leakage limits.

The single through-wall crack lengths that results in tube burst at 1.43 times steam line break pressure differential and steam line break conditions are about 0.53 inch and 0.84 inch, respectively. Normal leakage for these crack lengths would range from about 0.4 gallons per minute to 4.5 gallons per minute, respectively, while lower 95% confidence level leak rates would range from about 0.06 gallons per minute to 0.6 gallons per minute, respectively.

An operating leak rate of 140/150 gpd per steam generator has been implemented. This leakage limit provides for detection of 0.4 inch long cracks at nominal leak rates and 0.6 inch long cracks at the lower 95% confidence level leak rates. Thus, the 140/150 gpd limit provides for plant shutdown prior to reaching critical crack lengths for steam line break conditions at leak rates less than 95% confidence level and for three times normal operating pressure differential at less than nominal leak rates.

Considering the above, the implementation of voltage-based plugging criteria will not create possibility of a new or different kind of accident from any previously evaluated.

(3) The proposed license amendment does not involve a significant reduction in margin of safety.

The use of the voltage-based tube support plate elevation repair criteria is demonstrated to maintain steam