



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 87 TO FACILITY OPERATING LICENSE NO. NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-395

1.0 INTRODUCTION:

By letter dated July 24, 1989, South Carolina Electric & Gas Company (SCE&G) requested a revision to their Technical Specifications for the Virgil C. Summer Nuclear Station (VCSNS). The proposed change revises the surveillance requirements of Technical Specification 3/4.4.5, "Steam Generators," to extend the application of the F* tube plugging criterion for the life of the steam generators. Current authorization to apply the F* criterion expires at the end of the fifth fuel cycle which is scheduled to occur in the spring of 1990. The initial submittal was supplemented in submittals dated October 27 and December 11, 1989 and January 5, 1990. These submittals contained amplifying information and reformatted the analysis supporting the submittal. The supplements did not change the proposed action or affect the initial determination published in the Federal Register on October 16, 1989.

2.0 BACKGROUND

The F* criterion allows steam generator tubes to remain in service when degradation has been detected in the full depth hard roll expanded portion of the tube in the tube sheet below the "F*" distance (1.6"). If the F* criterion were not in use for VCSNS, defects below the F* distance would require the affected tubes to be plugged. Plugging is not necessary because the presence of the tube sheet constrains the tube and maintains its integrity in the hard rolled region by preventing tube deformation beyond its expanded outside diameter. The resistance to both tube rupture and tube collapse is significantly strengthened by the tube sheet. In addition, the contact between the tube and the tube sheet limits the leak rate of any potential throughwall tube cracks in this region.

The technical basis for establishing the F* criterion was described previously in Westinghouse Reports WCAP 11228 (proprietary) and WCAP 11229 (non-proprietary). The F* criterion identifies a distance below the face of the tube sheet or the top of the last hardroll, whichever is further in the tubesheet, and designates that distance F*. Below F*, tube degradation of any extent does not necessitate plugging. To date, the F* criterion has been utilized during both the third and fourth refueling outages at VCSNS.

3.0 EVALUATION

The technical justification for the use of the F* criterion was previously reviewed and approved for use in VCSNS for a period ending with the fifth fuel cycle by letter dated November 5, 1986 (J. B. Hopkins to D. A. Nauman), which included the NRC SER to support Amendment 54 to the VCSNS Technical Specifications. No new test data or information has been presented by the developer of the F* criterion which influences the original technical justification for the F* criterion. In addition, no adverse effects of the application of the F* criterion at VCSNS, or any other plant, have been identified to date. Accordingly, the originally submitted justification is still applicable.

Eddy current inspection results, tube plugging data, and tube leak rate data were reviewed by the licensee to determine the effect, if any, of the F* criterion on tube plugging requirements and leakage rates. Inspection results were also utilized to determine actual trends in tube degradation since implementation of the F* criterion, as well as predicted trends in degradation had the F* criterion not been utilized.

The SCE&G submittals dated May 15, 1987, and December 6, 1988, document inspection results on F* tubes. Some crack growth did occur, but growth appears to be arrested at the end of the "skip roll" region where the residual stresses are relieved.

A review by the licensee of primary coolant leak rates for VCSNS over the period the F* criterion has been in use, indicates that leak rates have remained below the limits specified by the plant technical specifications. In addition, the leak rate data indicates that no significant increases, transients, or abnormalities in the leak rates have been associated with the tubes which have remained in service due to the F* criterion.

In order to verify that the use of the F* criterion has been applied in an acceptable manner, the staff requested additional information from the licensee with respect to the interpretation of eddy current data. By letters dated October 27, 1989 and January 5, 1990, the licensee provided the staff with detailed information on the exact interpretation of eddy current data. Included were lissajous figure print-outs from the October 1988 inspection. These data were reviewed by the staff and its consultant from Oak Ridge National Laboratory and were found to be acceptable.

4.0 SUMMARY

Use of the F* criterion at VCSNS has had no adverse impact on any aspect of steam generator operability. No significant change in primary to secondary coolant leakrates have been observed as a result of the F* criterion.

Other plants similar in design and operation to VCSNS have successfully implemented an alternate plugging criterion such as F* with no adverse effects on steam generator operability.

5.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration, and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

6.0 CONCLUSION

The Commission has issued a "Notice of Consideration of Issuance of Amendment to Facility Operating License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing" which was published in the FEDERAL REGISTER on October 18, 1989 (54 FR 42866) and consulted with the State of South Carolina. No public comments or requests for hearing were received, and the State of South Carolina did not have comments.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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