



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 99 TO FACILITY OPERATING LICENSE NPF-35
AND AMENDMENT NO. 93 TO FACILITY OPERATING LICENSE NPF-52
DUKE POWER COMPANY, ET AL.
CATAWBA NUCLEAR STATION, UNITS 1 AND 2
DOCKET NOS. 50-413 AND 50-414

1.0 INTRODUCTION

By letter dated May 19, 1992, as supplemented June 15, 1992, Duke Power Company, et al. (the licensee) requested changes to the Technical Specifications (TSs) for the Catawba Nuclear Station, Units 1 and 2. The June 15, 1992, letter provided a submittal which contained answers to an NRC request for additional information. The proposed changes revise the surveillance requirements of TS 3/4.4.5., "Steam Generators," to permit the option of using the Babcock & Wilcox (B&W) explosive welded kinetic sleeving process for steam generator tube repair in the tube support region in accordance with B&W topical report BAW-2045P, Revision 1, "Recirculating Steam Generator Kinetic Sleeve Qualification for 3/4 Inch O.D. Tubes."

Previously, on March 4, 1991, the staff approved the use of the B&W kinetic sleeving process as alternative to plugging tubes degraded in the tubesheet region of the Catawba steam generators. The new amendment will allow the sleeves to be used in the tube support region as well. The details of the sleeving process are described in B&W topical report BAW-2045P, Revision 1, which the staff approved on June 18, 1992, as being suitable for referencing in licensing documents. The revised topical report also provides additional corrosion test data and information on the redesign of the 3/4 inch tube sheet sleeve using a kinetic weld at both the upper and lower joints, where in the previous design, the lower joint had been rolled. Although the design objective of the sleeve assembly is to be leak-tight, the sleeve is considered to be leak-limiting for design qualification calculations.

2.0 DISCUSSION

The purpose of a sleeve is to repair a degraded steam generator tube in order to maintain the function and integrity of the tube. The sleeve functions in essentially the same manner as the original tube. The sleeve, consisting of either of two lengths, 11 inches or 17 and one half inches is placed inside the existing degraded steam generator tube to span the tube support plate or tube sheet defect or indication.

The sleeving process requires cleaning the area to be sleeved, inserting and kinetically welding the sleeve and stress relieving the welds. Robotic manipulators perform the majority of the processes. Eddy current testing is used to verify positioning and expansions, as well as sleeve and tube integrity.

3.0 EVALUATION

BAW-2045P, Revision 1, contains the results of the sleeve design verification which included analysis and confirmatory testing to demonstrate the acceptability of the steam generator sleeving technique for defective tubes. The installed structural integrity of both the tube support plate and the tube sheet kinetically welded joints was qualified by subjecting sleeve/tube weld samples to a series of tests representing design service conditions. The samples were leak tested, fatigue tested, and leak tested again, to qualify the joint. BAW-2045P, Revision 1, describes in detail the analytical methods used for design and qualification of the B&W sleeve. The topical report addresses the ASME Boiler and Pressure Vessel code requirements used in design and qualification of the sleeve. It also summarizes the transients used to establish sleeve loading. Tube support sleeves were qualified to meet applicable portions of the 1986 ASME Code criteria for steam generator design and operation. The design and operating conditions specified for the sleeve bound the Catawba steam generator design conditions.

The sleeve material is thermally treated Alloy 690. This material has been demonstrated to be resistant to corrosion as detailed in BAW-2045P, Revision 1. In addition, the upper joint in the tube sheet sleeve assembly and both welds in the tube support sleeve assembly are stress relieved after welding to assure acceptable corrosion resistance of the parent tube.

The steam generator sleeve has been analyzed and tested to the operating and design conditions of the original tube as documented in the topical report. Based on Regulatory Guide 1.121 guidelines for tube degradation limits, a plugging limit of 40% of the original sleeve wall has been established, which is acceptable to the staff. It has been demonstrated that eddy current testing techniques are available to perform necessary sleeve/tube inspections for defect detection and to verify proper installation of the sleeve.

A proprietary method is described in the topical report with supporting validation data that demonstrates the inspectability of the sleeve and underlying tube. The licensee has provided a commitment to validate the adequacy of any system that is used for periodic inservice inspections as well as a commitment to implement upgraded testing methods as better methods are developed and validated for commercial use, as deemed appropriate by Duke Power Company.

The NRC's conclusions are based on previous reviews and approval of BAW-2045P, Revision 1, and the additional information contained in the letters dated May 19, 1992, from J. H. Taylor, B&W, to H. F. Conrad, NRC, and June 15, 1992, from M. S. Tuckman, Duke Power Company, to the NRC. The staff has concluded that there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner and the issuance of this amendment is acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the South Carolina State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a surveillance requirement. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (57 FR 30248 dated July 8, 1992). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 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 the amendments.

6.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: August 14, 1992